BRU Series Industrial Charger / DC UPS

- Float Battery Chargers
- Typical Voltages: 12V 24V
- Power Level: 275W-330W
- Isolated input – output
- Over voltage protection
- Overload and short circuit protection
- Independent Battery Charging Output
- DC OK & Battery OK Alarms with Relays
- Battery Connected Test
- Battery Low Volts Disconnect

Model Selection Table

Model Number	Description
BRU-12-20-CM	AC/DC DC UPS Input: 230VAC 50Hz Output: 13.8 VDC 20A AC fail alarm Battery low alarm
BRU-24-12-CM	AC/DC DC UPS Input: 230VAC 50Hz Output: 27.6 VDC 12A AC fail alarm Battery low alarm
BRU-12-20-CM-T	AC/DC DC UPS Input: 230VAC 50Hz Output: 13.8 VDC 20A AC fail alarm Battery low alarm temperature probe
BRU-24-12-CM-T	AC/DC DC UPS Input: 230VAC 50Hz Output: 27.6 VDC 12A AC fail alarm Battery low alarm temperature probe

Description

The BRU series is a family of 13.8Vdc and 27.6Vdc 275W - 330W off- line battery chargers / DC UPS power supplies which operate from 220/240Vac mains power. When connected to a lead- acid battery, these units provide uninterrupted power to a DC load in the event of a mains failure. The BRU contains a two step current limited float charger, battery charge current limiting, a battery low voltage disconnect, mains/charger and battery alarms, battery present detection and optional float voltage temperature compensation (option –T). It employs high efficiency switching technology, combined with very low output noise which makes it suitable for powering sensitive loads such as radio equipment.

Specifications

INPUT

Input Voltage:	190 to 264Vac, or 225 to 400Vdc
Frequency:	45 to 65 Hz
Input Current:	1.4A maximum
Inrush current:	10A maximum
Line regulation:	0.2%typical

OUTPUT

Output Voltage	13.8Vdc, 27.6Vdc
Output Current	13.8Vdc: 20A27.6Vdc: 12A
Load regulation	0.5% typical
Ripple & noise	28mVp-p (13.8Vdc output)
100 MHz bandwidth	55mVp-p (27.6Vdc output)
Efficiency	> 80%

PROTECTION

Current limit	Load circuit - Constant current Battery circuit - Constant current
Short circuit protection	Indefinite, auto-resetting
Over-voltage protection	17.5 to 20V latching (13.8Vdc output) 31.5 to 39V latching (27.6Vdc output)
Isolation	Input to Output: 4.2Kvdc 1 min Output to Ground: 2.1Kvdc 1 min Output to Ground: 700Vdc 1 min

ENVIRONMENTAL	
Operating temperature	0 to 70°C ambient See derating curves for details
Humidity	5 to 90% relative humidity (non-condensing)
Over-temperature protection	Automatic & auto-resetting
Cooling requirement	Natural convection

STANDARDS AND APPROVALS

C-Tick	AS/NZS CISPR11 Group 1 Class A.
Safety	Complies with AS/NZS 60950, class 1, NSW Office of Fair Trading Approval N20602
EMC	Emissions comply with AS/NZS CISPR11,

	Group 1, Class B. Complies with ACA EMC Scheme, Safety & EMC Regulatory Compliance Marked

ALARMS AND BATTERY FUNCTIONS

DC OK alarm	Green LED : ON=OK voltage free change over relay contacts (32V,1A) Alarms on loss of AC mains power or failure of off-line AC/DC converter / battery charger
Battery OK alarm	Green LED : ON=OK voltage free change over relay contacts(32V,1A) Alarms on battery low voltage 11V, failure of battery fuse or battery disconnected. Alarm cancelled when fuse or battery replaced, or AC input restored
Battery low voltage disconnect (LVD)	10.2 to 12.6V for 12V battery, adjustable 20.4 to 25.2V for 24V battery,adjustable Indicated by voltage-free changeover relay contacts & green LED: ON=BATT OK

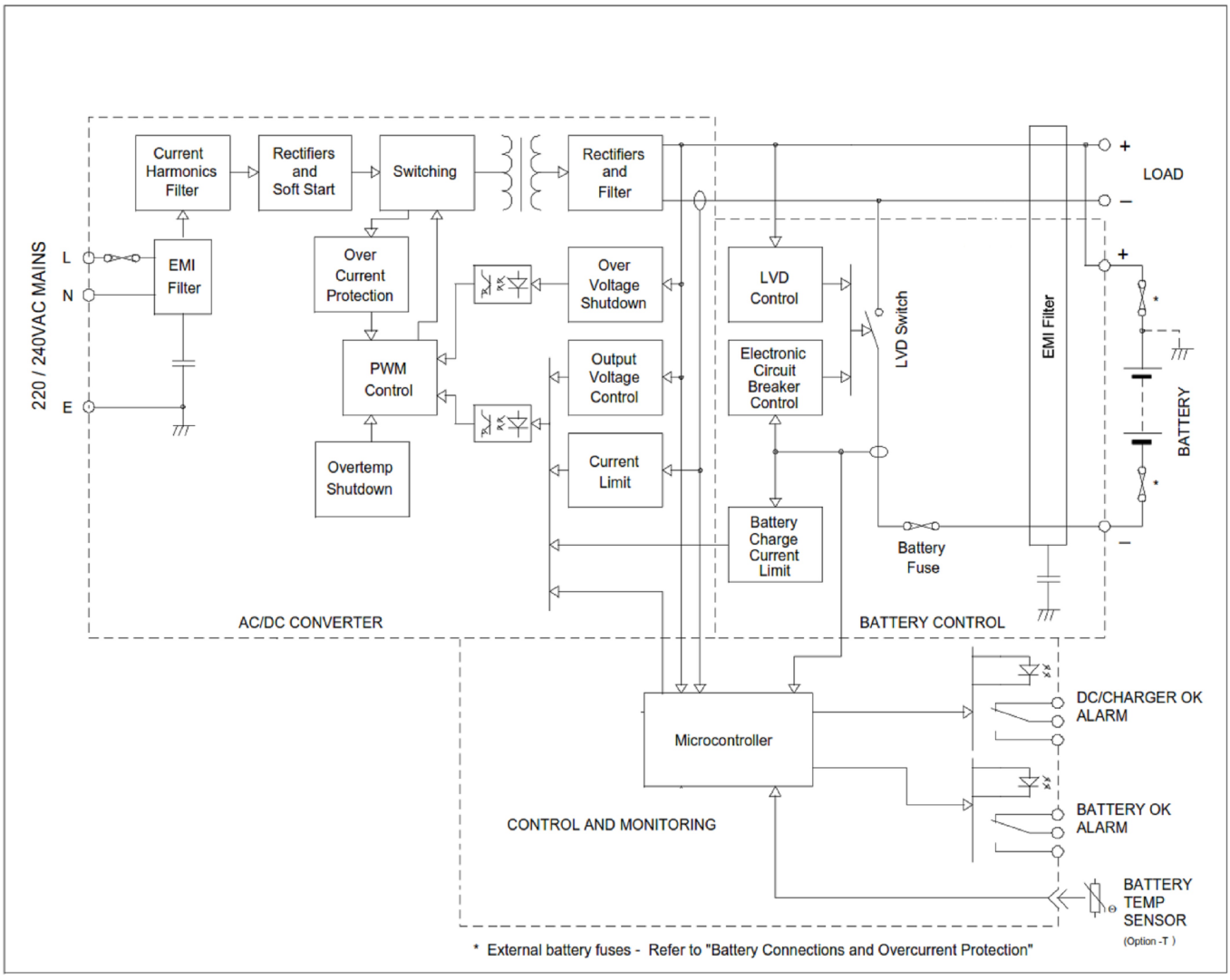
OPTIONAL FEATURES

Temperature probe	Optional pluggable proble 2m longs Float voltage set to 2.3V/cell at 25°C with compensation of 3.3mv/°C cell
Conformal Coating	Option CC: Tropic protection for moist areas
Charge current limit	Default is 100% can be factory set from 20% to 100%

MECHANICAL

Input connector	IEC60320 inlet,10A Class 1
Output/Battery connector	4 way pluggable screw terminal block Suitable for up to 4mm² wire
Alarm terminal	6 way pluggable screw terminal block Suitable for up to 1.5mm² wire
Case size	264 L x 186 W x 67 H mm
Weight	2.1kg

BRU block diagram

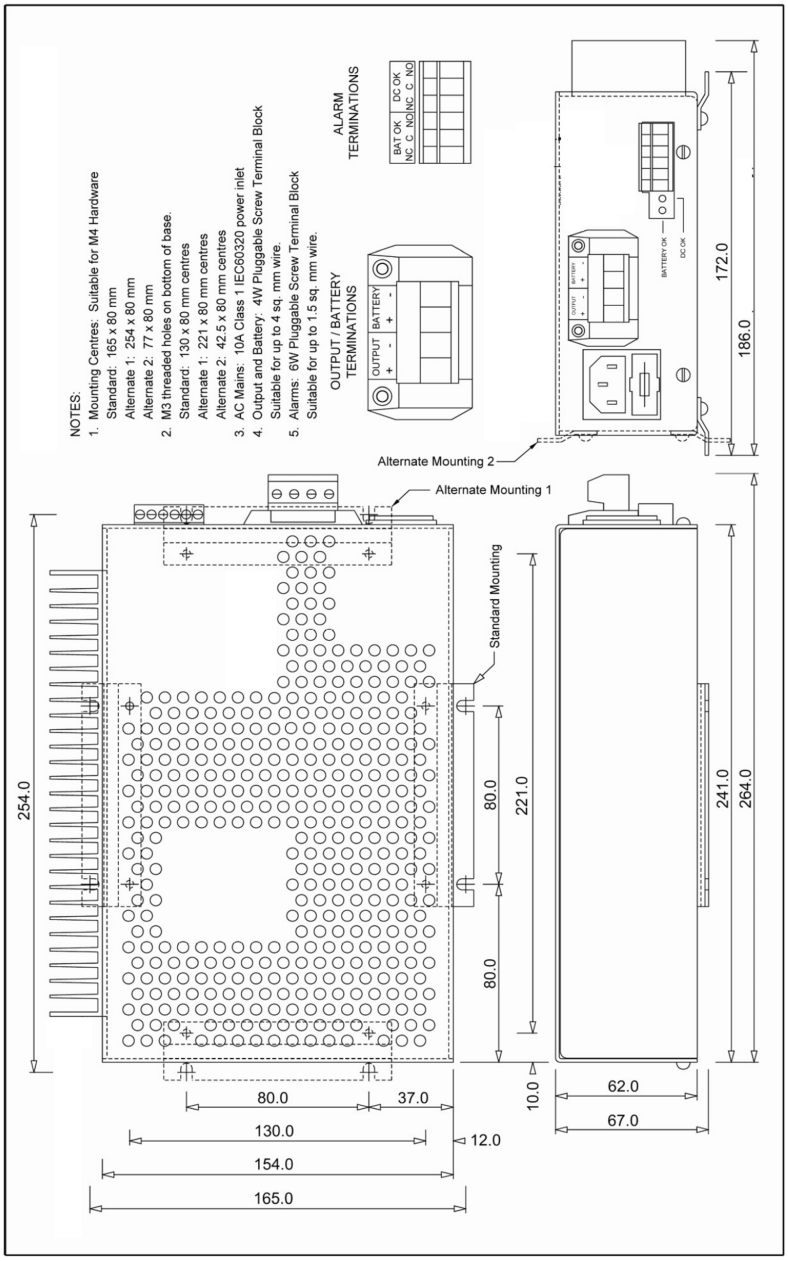


Operating principle of tbe BRU DC UPS

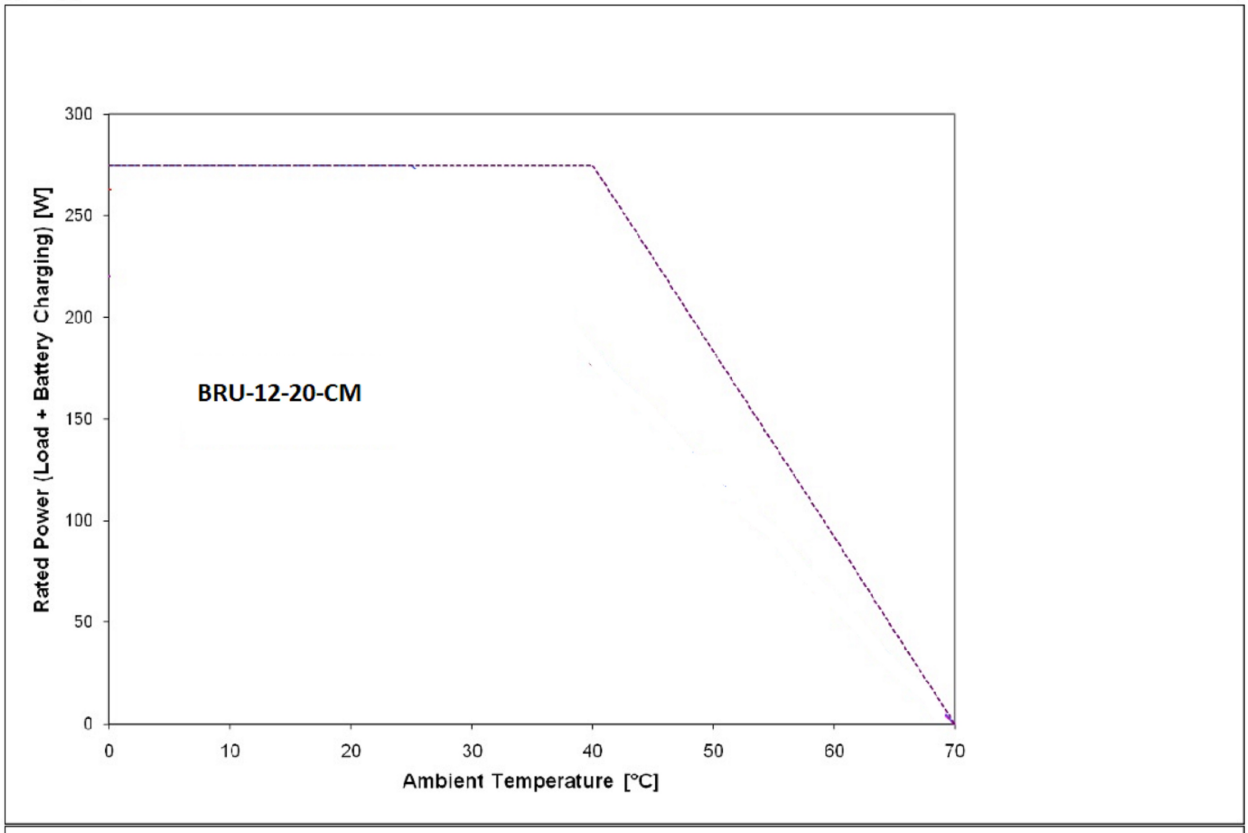
From the block diagram the BRU DC UPS operates as follows:

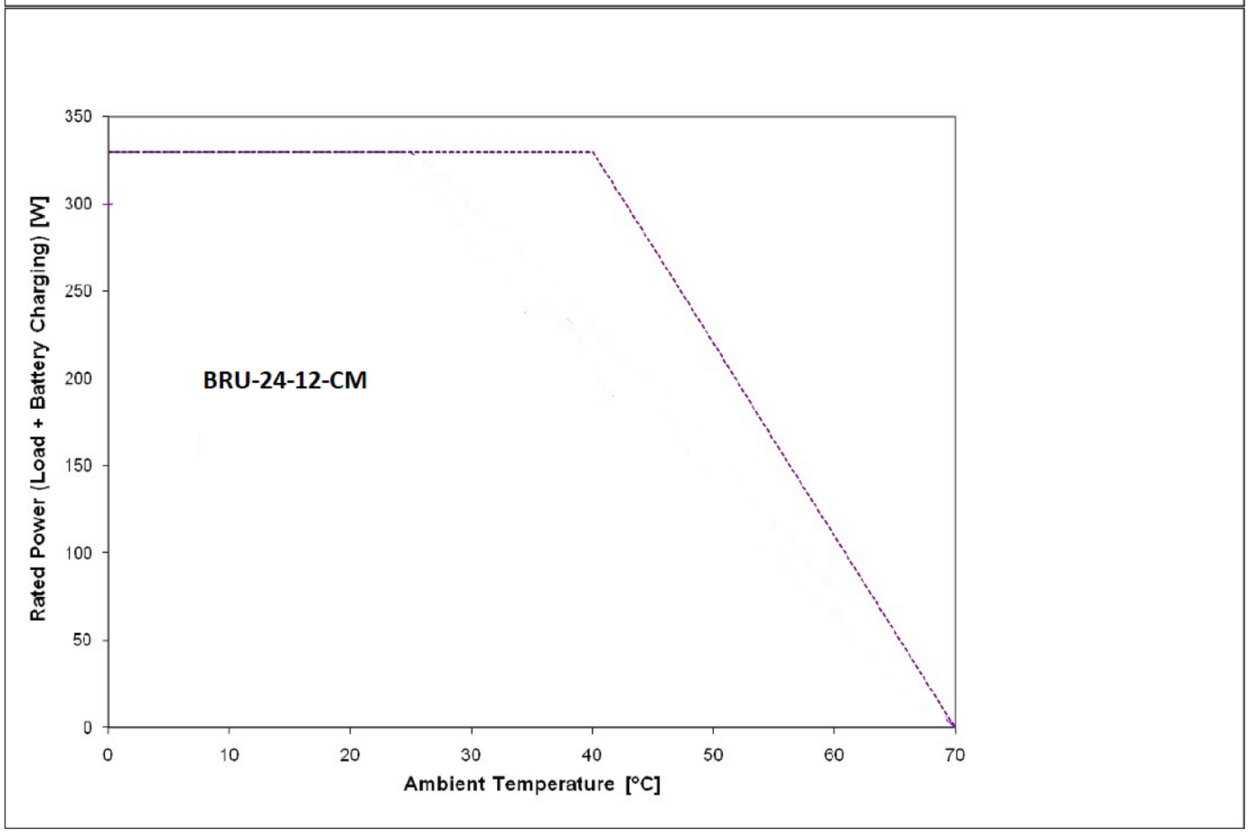
- A high efficiency switching AC/DC converter provides 13.8Vdc 20A or 27.6Vdc 12A directly to the load and to charge the battery. This converter provides a constant output float voltage and a constant current limit. Latching output overvoltage shutdown and autoresetting overtemperature shutdown are also included.
- The battery is connected across the output of the AC/DC converter via an electronic low voltage disconnect switch (LVD switch) in the negative lead. As a result, the output and battery voltage are essentially equal and the battery is available to supply the load the instant when mains power fails.
- The BRU operates as a two step charger. If the battery is discharged and mains voltage is applied, the BRU provides constant current to the battery. Once the battery voltage has risen to the float voltage, the AC/DC converter operates as a constant voltage charger.
- Battery charging current is controlled by its own constant current limiter. This circuit reduces the AC/DC converter output to control the charging current into the battery. It is factory adjustable between 10% and 100% of the rated output of the AC/DC converter. Consequently, the maximum battery charging current can be set to suit the installed battery capacity (typically 0.1C), and battery damage due to excessive charging current is prevented. This current limiter has no effect on output current to the load. The unit is protected against battery reverse polarity by an internal fuse.
- To protect the battery against overdischarge, the electronic LVD switch disconnects the negative load terminal from the negative battery terminal when the battery is fully discharged. This switch is automatically reset on reapplication of mains power. For this switch to operate correctly, the battery negative and load negative must not be connected together outside of the BRU.
- To reset the LVD switch without mains voltage, momentarily connect battery negative and load negative together externally to the BRU. This will raise the output voltage above the LVD threshold causing the LVD switch to close. After this connection is removed, the load will operate from the battery until the battery becomes fully discharged and the LVD switch reopens.
- The LVD switch also operates as a self-resetting electronic circuit breaker for the battery. This protects the load wiring against overcurrents or accidental short circuits. The circuit breaker trips in less than 2mS for short duration current surges of greater than typically 350% of the AC/DC converter output current rating and in less than 300ms for overcurrents greater than typically 170% of the AC/DC converter output current rating.
- Advanced monitoring and control functions are provided by an embedded microcontroller.
- The microcontroller provides two alarms with separate voltage free changeover contacts. The alarm terminal markings show the contact state in the normal (no alarm) condition. An LED is provided for each of these alarms on the chassis mount models. These green LEDs are ON in the normal (no alarm) condition.
- DC/CHARGER OK indicates an alarm (LED off) in the following conditions:
  Loss of mains power, or Failure of the off-line AC/DC converter and battery charger.
- BATTERY OK indicates an alarm (LED off) in the following conditions. The battery voltage is less than 1.8V/cell, or No battery is connected to the BRU, or The battery wiring is faulty, or A battery fuse has failed.
- Once per hour, the embedded microcontroller performs a battery present test. It momentarily reduces the float voltage setpoint causing the load to be supplied from the battery. If no battery is present, the microcontroller asserts a battery disconnected alarm. This causes the BATTERY OK alarm to change to the alarm state. This alarm will also be raised in the event one or more of the battery fuses has failed, or the battery wiring is faulty. This alarm is reset when the battery connection is restored. On initial application of ac mains to the system, a battery present test is not performed until the battery voltage rises to 2.3V/cell.
- Temperature compensation of the battery float voltage is available with the optional battery temperature sensor. The battery float voltage is set to 2.30V/cell at 25°C with compensation of -3.3mV/&degC/cell at other temperatures.

BRU Mechanical Drawing



BRU derating curves





Installation Instructions

- BRU DC UPS are designed to be mounted on a flat horizontal or vertical surface. Two mounting brackets with screws are provided to allow the unit to be mounted by either the bottom or one side. The unit can be mounted horizontally or vertically without additional protection, a non-combustible plate must be mounted below the BRU unit and the unit must be installed inside a separate enclosure complying with AS/NZS60950, Cl. 4.6.2. Ensure that airflow around the unit is not impeded.

- Terminals : Refer to mechanical outline drawings for terminal sizes and locations. Battery Connections and Overcurrent Protection
- The BRU DC UPS is intended be used with valve regulated lead acid batteries It is recommended that batteries be installed according to AS2676.2:1992. In particular, one or both of the battery leads must be protected against overcurrent by a fuse or circuit breaker located close to the battery.
- If the positive terminal of the battery is earthed, then a fuse or circuit breaker is only required in the negative terminal.
- If neither terminal of the battery is earthed, then a fuse or circuit breaker is required in both terminals. It is recommended that the negative terminal of the battery not be earthed. These protective devices must be sized to interrupt the short circuit current of the battery.
- Ensure that the external battery fuse in the negative battery lead is not installed and that all loads are either disconnected or turned off.
- Apply 220/240Vac mains voltage to the input.
- Wait for approximately one minute. This allows the BRU to complete its first battery present test after which it will raise a BATTERY DISCONNECTED alarm. Measure the voltage at the output terminals of the unit. This voltage should be either 13.8Vdc or 27.6Vdc.
- Measure the voltage drop across the fuse holder in the negative battery lead. This voltage should be less than ±2.5Vdc for 13.8V models and less than ±5Vdc for 27.6V models. If the voltage is above this limit, the battery polarity is reversed and should be corrected before proceeding.
- Install the fuse in the battery negative lead. The BATTERY DISCONNECTED alarm should clear within approximately 10 seconds.
- Measure the voltage across the battery. This should equal 2.30V/cell (13.8V or 27.6V) or it should gradually rise indicating that the battery is charging.
- Confirm that both LEDs on the unit are ON indicating no alarms.
- Turn on loads or connect loads to the unit.