

## Battery Controller Module

## TIB-BCMU Series

- Compact metal enclosure with DIN-rail mount
- Uninterruptible power supply (UPS) function
- For use with 24V lead-acid batteries
- Constant output voltage
- >96% efficiency during battery operation
- >98% efficiency during pass-through operation
- Integrated EN 55011 class B EMI filter
- Battery OK, input OK, output OK signals
- Protection against: short circuit, reverse polarity, overload, deep-discharge protection
- 3-year product warranty



UL 61010-1 IEC 62368-1

The TIB-BCMU turns an existing AC/DC power converter into a fully-fledged uninterruptible power supply (UPS) solution. The integrated microprocessor-powered battery management system ensures that the connected lead-acid battery is always fully charged. Periodic impedance measurements are performed to alert the user in case of a rare battery failure or an accidental disconnection. During battery backup operation, the internal DC/DC power conversion stage keeps the output voltage constant. An internal EN 55011 class B EMI filter ensures highest output voltage quality. The battery terminals are protected with a user-serviceable 15A blade type fuse. The TIB-BCMU comes with industry standard EN/IEC/UL 61010-1 certifications for measurement, laboratory, and control equipment as well as EN 62040-1 certifications for uninterruptible power supplies, making it a first choice for demanding applications.

### Models

| Order code      | Input voltage range              | Output current max. | Output Power max. | Back up battery            |
|-----------------|----------------------------------|---------------------|-------------------|----------------------------|
| TIB 240-124BCMU | 24.0 - 28.5 VDC<br>(24 VDC nom.) | 10 A                | 240 W             | 24V lead-acid battery pack |

### Options

|        |   |
|--------|---|
| TSP-TS | - Optional External Temperature Sensor (0 - 60°C): <a href="http://www.tracopower.com/products/tsp-ts.pdf">www.tracopower.com/products/tsp-ts.pdf</a> |
|--------|---|

## Battery Specifications

|                                   |   |  |
|-----------------------------------|---|--|
| Battery End of Charge Set Voltage | - Factory Default<br>- External Temp. Sensor                | 27.1 - 27.3 VDC (25°C)<br>(Temperature dependant)<br>0 - 60°C<br><a href="http://www.tracopower.com/products/tsp-ts.pdf">www.tracopower.com/products/tsp-ts.pdf</a><br>(recommended, if ambient temperature differs from 25°C) |
| Battery Charge Current            | - Buffer Mode<br>- High Mode<br>- Low Mode                  | 2.4 A typ.<br>1.2 A typ.   |
| Battery Test Interval             | - Buffer Mode<br>- High Mode<br>- Low Mode<br>- Push Button | 10 minutes<br>1 minute<br>on demand  |
| Battery Test Current              | - Buffer Mode   | 2 A / 100 ms typ. (25°C)   |
| Battery Resistance Test           | - Buffer Mode   | 100 mΩ max. (25°C)   |
| Battery Disconnection             | - Battery Mode  | 19.8 - 20.2 VDC  |
| Battery Warning                   | - Battery Mode  | 21.8 - 22.2 VDC  |
| Battery Protection Modes          |   | - Overvoltage<br>- Deep Discharge<br>- Overcharge<br>- Short Circuit<br>- Reverse Connection   |
| External Battery Fuse             |   | 15 A F Blade Type (Fast Fuse)<br>(Littlefuse 0287015 ATOF)   |

## Input Specifications

|               |               |  |
|---------------|---------------|--|
| Input Voltage | - Buffer Mode | 24 - 28.5 VDC                          |
| Input Current | - Buffer Mode | 12 A max. continuous<br>20 A max. peak |

## Output Specifications

|                           |  |  |
|---------------------------|--|--|
| Output Voltage            | - Battery Mode<br>- Buffer Mode                                | 24.0 VDC<br>Vin - (0.1 to 0.5 V)                             |
| Efficiency                | - Battery Mode<br>- Buffer Mode                                | 96 % typ.<br>98 % typ.                                       |
| Capacitive Load           |  | Infinite   |
| Minimum Output Voltage    | - Transition from Buffer Mode to Battery Mode                  | 22 VDC min.  |
| Transition Time           | - Buffer Mode to Battery Mode<br>- Battery Mode to Buffer Mode | 20 ms typ.<br>20 ms typ.                                     |
| Output Current Limitation | - Battery Mode<br>- Buffer Mode                                | 10.1 - 12 A<br>dependant on power supply unit characteristic |
| Overvoltage Protection    | - Battery Mode   | <33 VDC  |

## Status Signals Specifications

|   |   |
|---|---|
| Relay (DC-IN OK, Battery OK, DC-OUT OK) | 30 VDC / 1 A, 60 VDC / 0.5 A<br>Active short                |
| DC-OUT OK<br>Open Collector NPN         | 60 VDC / 400 mA max.<br>(internal limitation)<br>Active low |

## Safety Specifications

|                  |  |  |
|------------------|--|--|
| Safety Standards | <ul style="list-style-type: none"> <li>- IT / Multimedia Equipment</li> <li>- Measurement, Control &amp; Lab.</li> <li>- Uninterruptible Power Systems</li> <li>- Certification Documents</li> </ul> | EN 62368-1<br>IEC 62368-1<br>EN 61010-1<br>EN 61010-2-201<br>IEC 61010-1<br>IEC 61010-2-201<br>UL 61010-1<br>UL 61010-2-201<br>EN 62040-1 (ready)<br>IEC 62040-1 (ready)<br><a href="http://www.tracopower.com/overview/tib-bcmu">www.tracopower.com/overview/tib-bcmu</a> |
| Protection Class | Class I: Connection to PE  |  |
| Pollution Degree | PD 2   |  |

## EMC Specifications

|                               |   |  |
|-------------------------------|---|--|
| EMI Emissions                 | <ul style="list-style-type: none"> <li>- Conducted Emissions</li> <li>- Radiated Emissions</li> </ul> | EN 55011 class B (internal filter)<br>EN 55011 class B (internal filter) |
| Electromagnetic compatibility | in correspondence to connected unit   |  |

## General Specifications

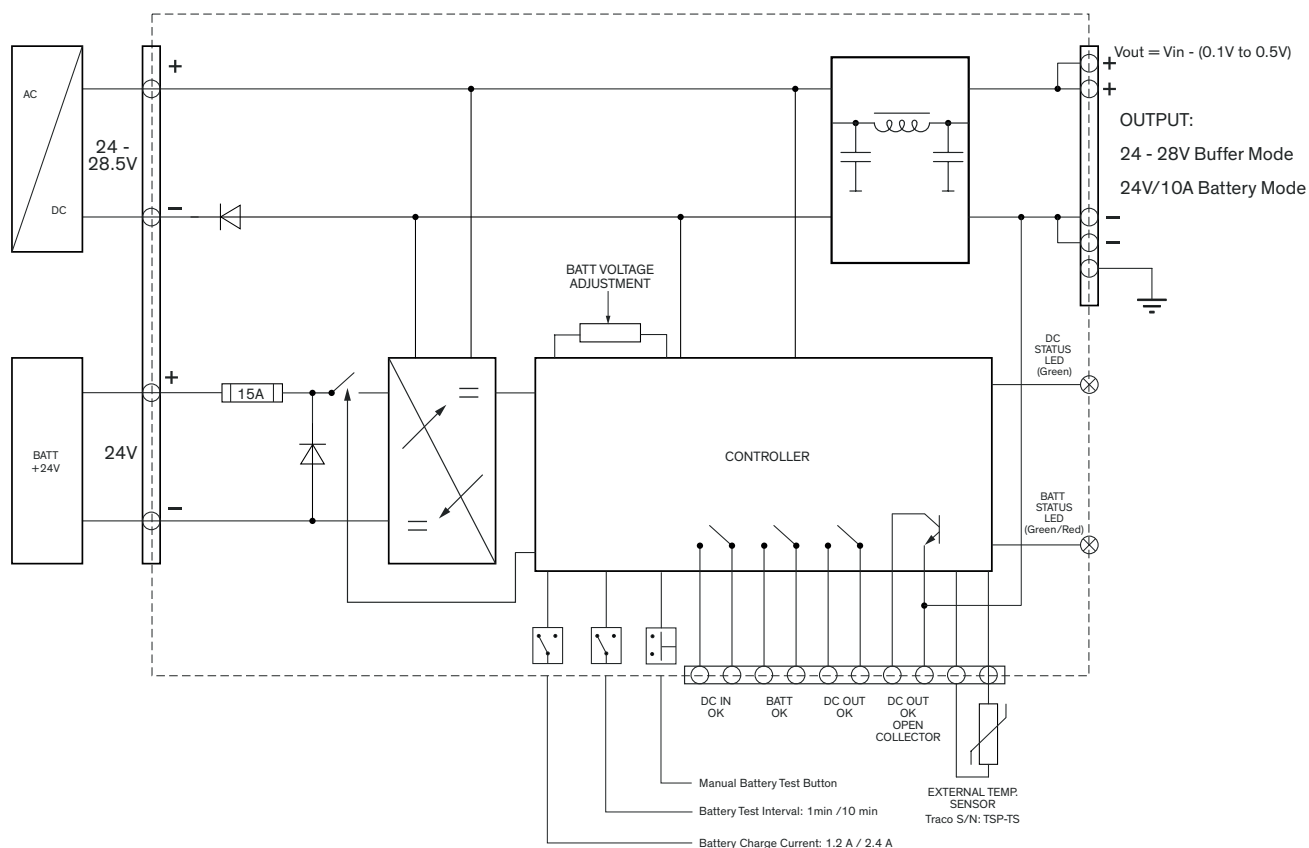
|                           |   |  |
|---------------------------|---|--|
| Relative Humidity         |   | 95% max. (non condensing)  |
| Temperature Ranges        | - Operating Temperature<br>- Storage Temperature            | 0°C to +60°C (no derating)<br>-25°C to +70°C   |
| Cooling System            |   | Natural convection (20 LFM)  |
| Altitude During Operation |   | 2'000 m max.   |
| Acoustic Noise            |   | < 20 dBa   |
| Insulation System         | - Input to Output   | Non-isolated   |
| Isolation Test Voltage    | - Input to Case or PE, 60 s<br>- Output to Case or PE, 60 s | 500 VDC<br>500 VDC   |
| Standby Power             |   | <3.5 W typ.  |
| Leakage Current           | - Earth Leakage Current<br>- Touch Current                  | ≤ 0.5 mA<br>≤ 0.1 mA   |
| Reliability               | - Calculated MTBF   | 1'000'000 h (IEC 61709)  |
| Environment               | - Vibration<br><br>- Mechanical Shock                       | IEC 60068-2-6<br>2 g, 3 axis, sine sweep, 10-55Hz, 11 oct/min<br>IEC 60068-2-27<br>25 g, 3 axis, half sine, 11 ms  |
| Housing Material          |   | Aluminium (Chassis)<br>Stainless Steel (Cover)   |
| Housing Type              |   | Metal Case   |
| Mounting Type             |   | DIN-Rail Mount<br>(EN 60715 - 35×7.5mm/35×15mm)  |
| Connection Type           |   | Screw Terminal   |
| Weight                    |   | 530 g  |
| Environmental Compliance  | - REACH Declaration<br><br>- RoHS Declaration               | <a href="http://www.tracopower.com/info/reach-declaration.pdf">www.tracopower.com/info/reach-declaration.pdf</a><br>REACH SVHC list compliant<br>REACH Annex XVII compliant<br><a href="http://www.tracopower.com/info/rohs-declaration.pdf">www.tracopower.com/info/rohs-declaration.pdf</a><br>Exemptions: 7a, 7c-I<br>(RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule).<br>The SCIP number is provided on request.) |

## Supporting Documents

|  |  |
|--|--|
| Overview Link (for additional Documents) | <a href="http://www.tracopower.com/overview/tib-bcmu">www.tracopower.com/overview/tib-bcmu</a> |
|--|--|

### Function Specification

#### Block Diagram:

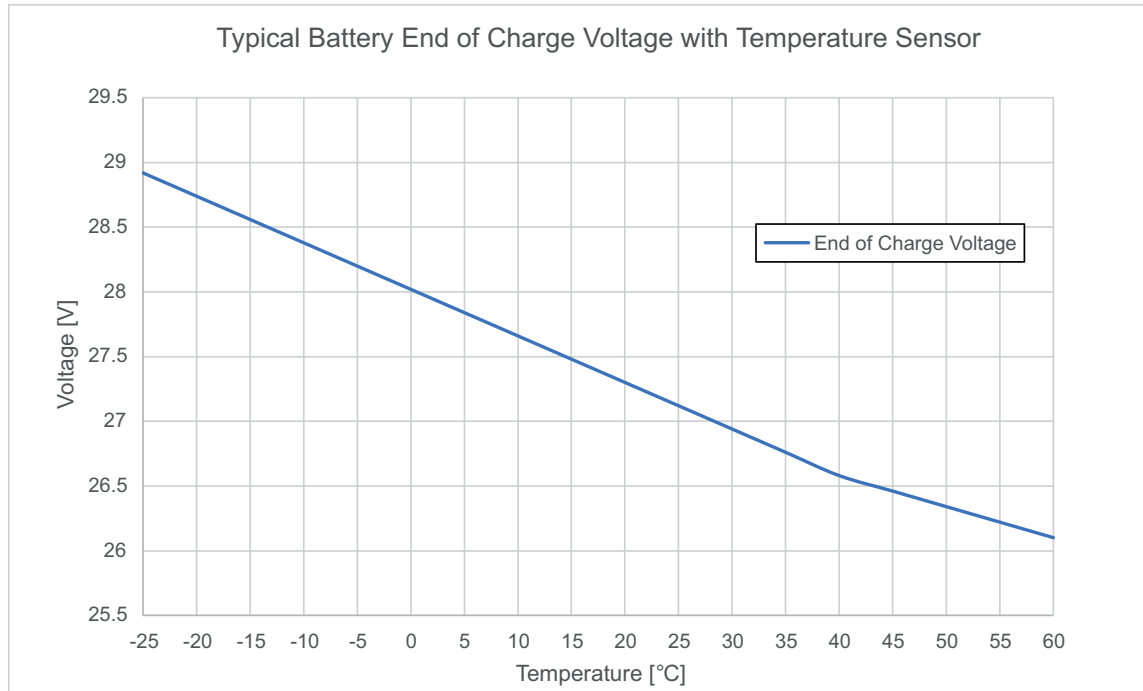


| DC-Out OK Relay and Open Collector |                                     |
|------------------------------------|-------------------------------------|
| Closed                             | VOUT ≥ 23.0V                        |
| Open                               | VOUT ≤ 22.6V                        |
| DC-IN OK Relay                     |                                     |
| Closed                             | 23.6 V ≤ VIN ≤ 28.5 V               |
| Open                               | VIN ≤ 23.2V or VIN ≥ 28.9V          |
| Battery OK Relay                   |                                     |
| Closed                             | VBATT ≥ 22 V (Buffer Mode)          |
|                                    | VBATT ≥ 22.4 V (Battery Mode)       |
| Open                               | No Battery Connected (VBATT ≤ 16 V) |
|                                    | Polarity Wrong                      |
|                                    | Failed Battery Test                 |
|                                    | VBATT ≤ 22 V (Battery Mode)         |
| Ext. Temperature Sensor            |                                     |
| Traco Power P/N: TSP-TS (optional) |                                     |

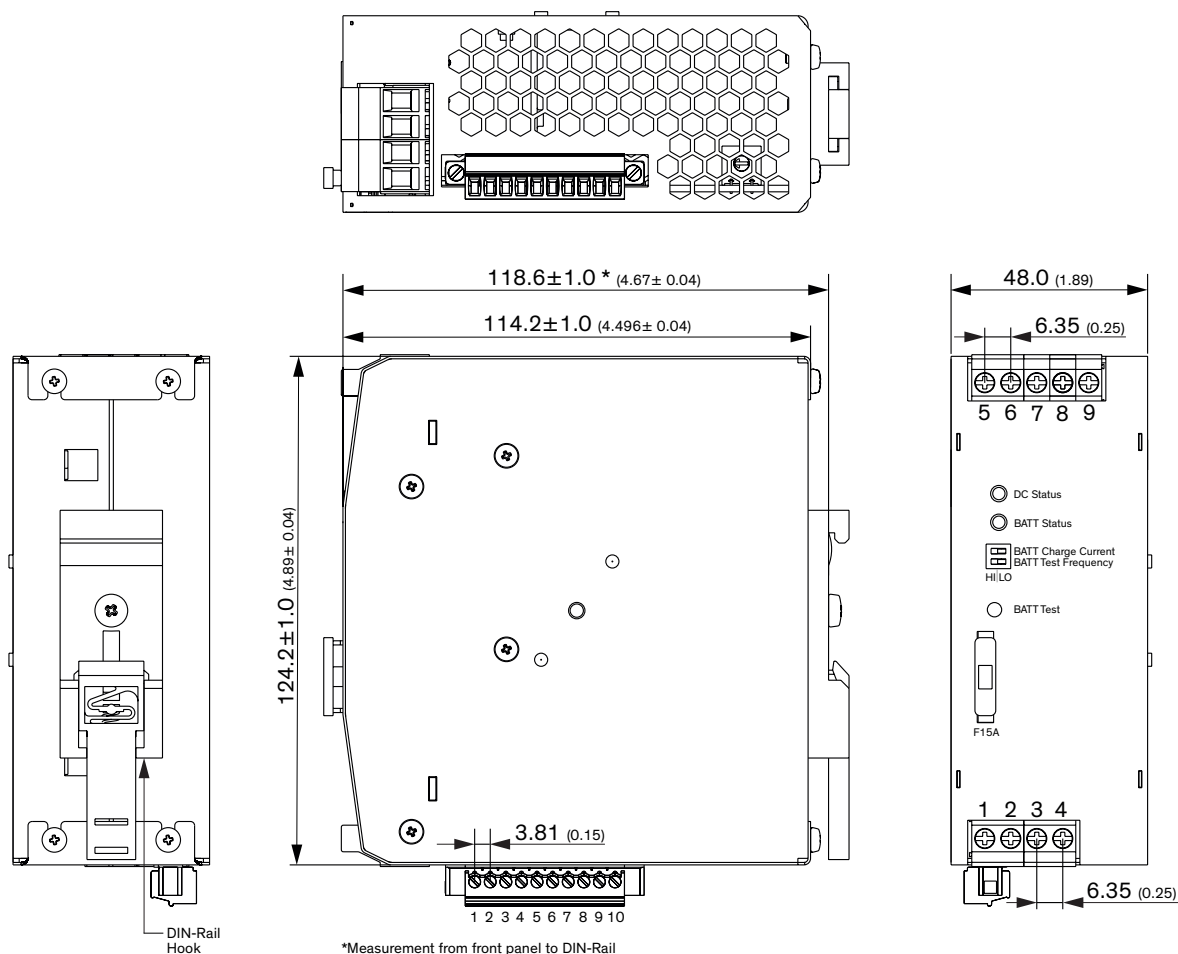
| DC Status LED (Green)       |                  |  |
|-----------------------------|------------------|--|
| Color / Behaviour           | Blink Speed [ms] | Meaning  |
| Green                       | constant         | DC Out OK (VOUT ≥ 23.0 V) using DC In (23.6 V ≤ VIN ≤ 28.5 V)        |
| Off                         | constant         | DC Out is not OK (VOUT ≤ 22.6 V)                                     |
| Green Blink On/Off          | 100/100          | DC In Overvoltage (VIN ≥ 28.9 V)                                     |
|                             | 500/500          | DC In Undervoltage on Start-Up (VIN ≤ 23.2 V)                        |
|                             | 1500/500         | DC Out OK during Discharge (VOUT ≥ 23.0 V)                           |
| BATT Status LED (Green/Red) |                  |  |
| Color / Behaviour           | Blink Speed [ms] | Meaning  |
| Green                       | constant         | Battery Fully Charged (VBATT = VEOC and ICHARGE is low)              |
|                             |                  | Discharging (VBATT ≥ 22.4 V)   |
|                             |                  | Battery Charging (22 V ≤ VBATT ≤ VEOC)                               |
| Green Blink On/Off          | 500/500          | Battery not charging due to overload (internal setting)              |
|                             | 100/100          | Discharging (VBATT ≤ 22 V)   |
|                             | 1500/500         |  |
| Red                         | constant         | No Battery connected (VBATT ≤ 16 V) or Polarity wrong                |
| Red Blink On/Off            | 500/500          | Failed Battery Test but still charging battery (16 V ≤ VBATT ≤ 22 V) |
| Off                         | constant         | Battery Voltage not OK (VBATT ≤ 19.7 V)                              |

**Function Specification (continued)**

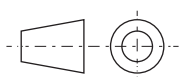
**Battery:**



### Outline Dimensions



Dimensions in mm (inch)



| Input |             |
|-------|-------------|
| Pin   | Function    |
| 1     | DC-IN (-)   |
| 2     | DC-IN (+)   |
| 3     | BATT-IN (-) |
| 4     | BATT-IN (+) |

**Input:** 4-port Screw Terminal  
Stranded & Solid  
Torque: 0.7 Nm  
Wire dimension range: 16 - 10 AWG  
1.5 - 4.0 mm<sup>2</sup>

| Output |          |
|--------|----------|
| Pin    | Function |
| 5      | 0V       |
| 6      | 0V       |
| 7      | +24V     |
| 8      | +24V     |
| 9      | PE       |

**Output:** 5-port Screw Terminal  
Stranded & Solid  
Torque: 0.7 Nm  
Wire dimension range: 16 - 10 AWG  
1.5 - 4.0 mm<sup>2</sup>

| Signals |                          |
|---------|--------------------------|
| Pin     | Function                 |
| 1       | DC In OK Relay Contact   |
| 2       | Normally Open            |
| 3       | Battery OK Relay Contact |
| 4       | Normally Open            |
| 5       | DC Out OK Relay Contact  |
| 6       | Normally Open            |
| 7       | DC Out OK Open Collector |
| 8       | 0 V                      |
| 9       | External Temperature     |
| 10      | Sensor                   |

**Signals:** 10-port Screw Terminal  
Stranded & Solid  
Torque: 0.2 Nm  
Wire dimension range: 28 - 14 AWG  
0.1 - 2.0 mm<sup>2</sup>