

## 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 (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 - External Temp. Sensor	27.1 - 27.3 VDC (25°C) (Temperature dependant) 0 - 60°C <a href="http://www.tracopower.com/products/tsp-ts.pdf">www.tracopower.com/products/tsp-ts.pdf</a> (recommended, if ambient temperature differs from 25°C)
Battery Charge Current	- Buffer Mode - High Mode - Low Mode	2.4 A typ. 1.2 A typ.
Battery Test Interval	- Buffer Mode - High Mode - Low Mode - Push Button	10 minutes 1 minute 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 - Deep Discharge - Overcharge - Short Circuit - Reverse Connection
External Battery Fuse		15 A F Blade Type (Fast Fuse) (Littlefuse 0287015 ATOF)

### Input Specifications

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

### Output Specifications

Output Voltage	- Battery Mode - Buffer Mode	24.0 VDC Vin - (0.1 to 0.5 V)
Efficiency	- Battery Mode - Buffer Mode	96 % typ. 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 - Battery Mode to Buffer Mode	20 ms typ. 20 ms typ.
Output Current Limitation	- Battery Mode - Buffer Mode	10.1 - 12 A dependant on power supply unit characteristic
Overvoltage Protection	- Battery Mode	<33 VDC

All specifications valid at nominal voltage, resistive full load and +25°C after warm-up time, unless otherwise stated.

### Status Signals Specifications

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

### Safety Specifications

Safety Standards	- IT / Multimedia Equipment	EN 62368-1 IEC 62368-1
	- Measurement, Control & Lab.	EN 61010-1 EN 61010-2-201 IEC 61010-1 IEC 61010-2-201 UL 61010-1 UL 61010-2-201
	- Uninterruptible Power Systems	EN 62040-1 (ready) IEC 62040-1 (ready)
	- Certification Documents	<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	- Conducted Emissions	EN 55011 class B (internal filter)
	- Radiated Emissions	EN 55011 class B (internal filter)
Electromagnetic compatibility	in correspondence to connected unit	

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## General Specifications

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

## Supporting Documents

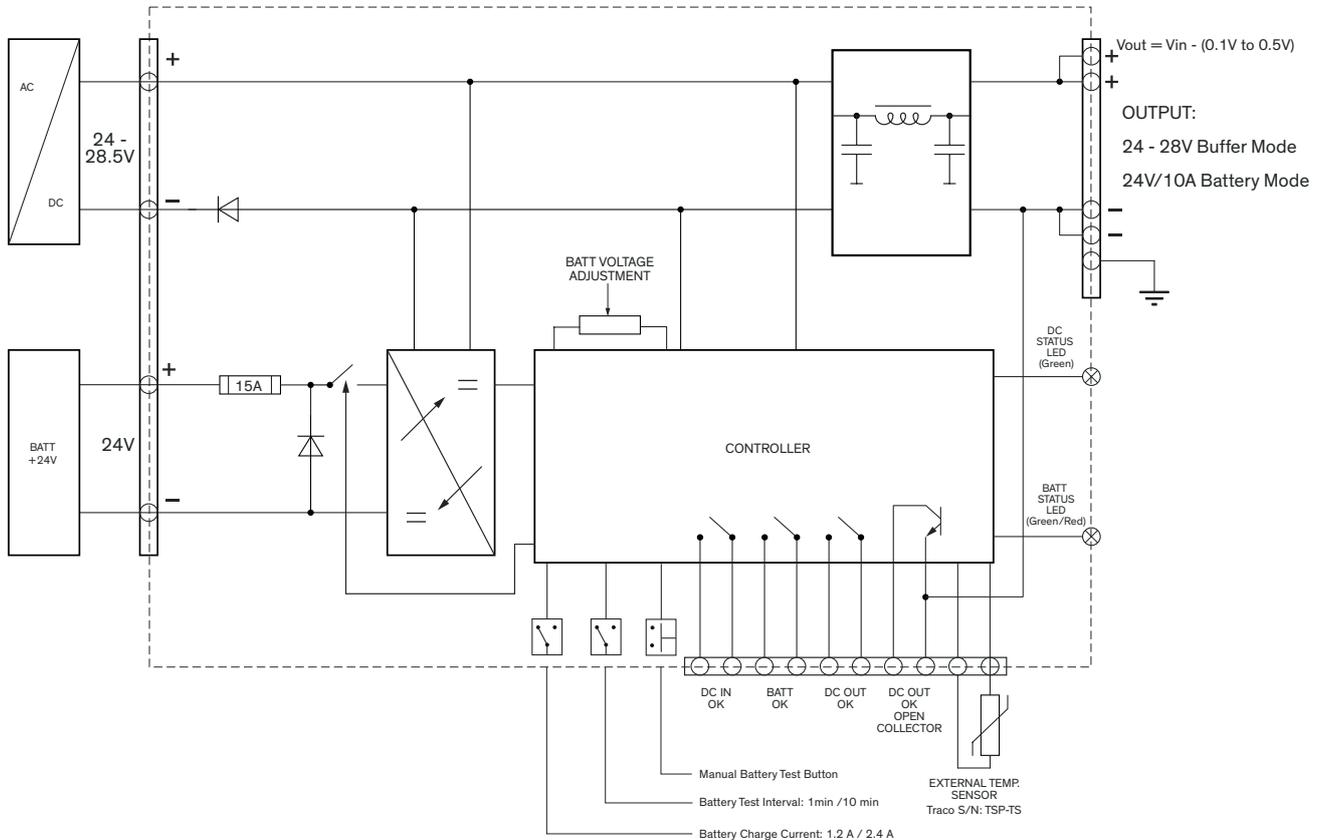
Overview Link (for additional Documents)

[www.tracopower.com/overview/tib-bcmu](http://www.tracopower.com/overview/tib-bcmu)

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## Function Specification

### Block Diagram:



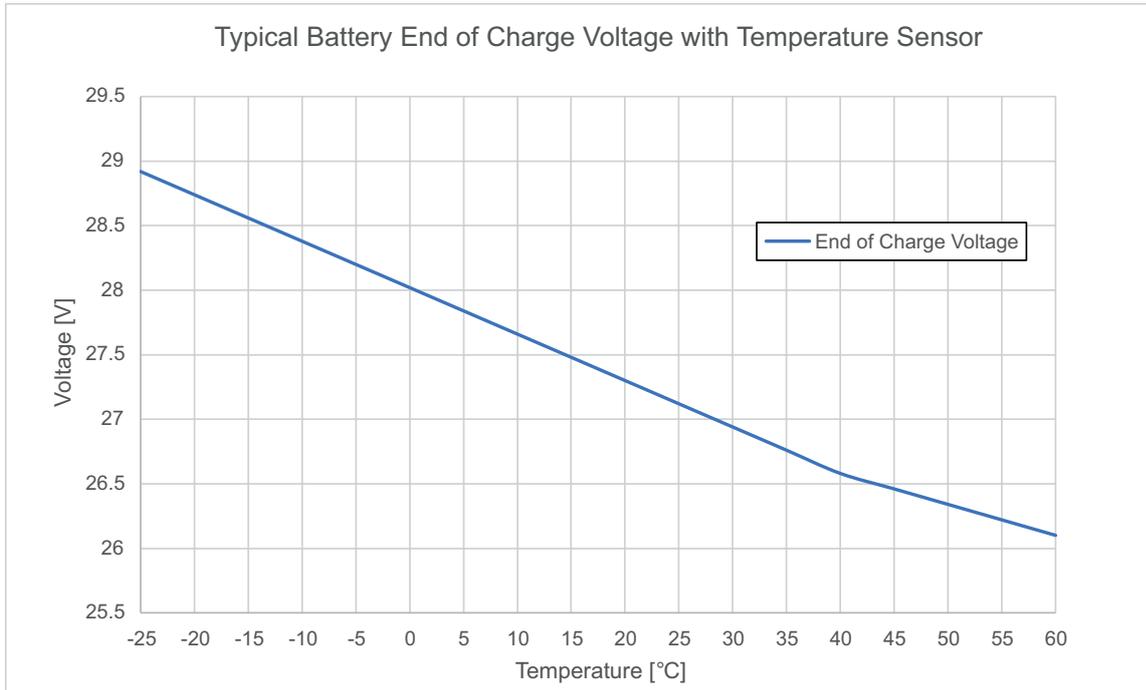
DC-Out OK Relay and Open Collector	
Closed	$V_{OUT} \geq 23.0V$
Open	$V_{OUT} \leq 22.6V$
DC-IN OK Relay	
Closed	$23.6V \leq V_{IN} \leq 28.5V$
Open	$V_{IN} \leq 23.2V$ or $V_{IN} \geq 28.9V$
Battery OK Relay	
Closed	$VBATT \geq 22V$ (Buffer Mode)
	$VBATT \geq 22.4V$ (Battery Mode)
Open	No Battery Connected ( $VBATT \leq 16V$ )
	Polarity Wrong
	Failed Battery Test
	$VBATT \leq 22V$ (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 ( $V_{OUT} \geq 23.0V$ ) using DC In ( $23.6V \leq V_{IN} \leq 28.5V$ )
Off	constant	DC Out is not OK ( $V_{OUT} \leq 22.6V$ )
Green Blink On/Off	100/100	DC In Overvoltage ( $V_{IN} \geq 28.9V$ )
	500/500	DC In Undervoltage on Start-Up ( $V_{IN} \leq 23.2V$ )
	1500/500	DC Out OK during Discharge ( $V_{OUT} \geq 23.0V$ )
BATT Status LED (Green/Red)		
Color / Behaviour	Blink Speed [ms]	Meaning
Green	constant	Battery Fully Charged ( $VBATT = V_{EOC}$ and $I_{CHARGE}$ is low)
		Discharging ( $VBATT \geq 22.4V$ )
		Battery Charging ( $22V \leq VBATT \leq V_{EOC}$ )
Green Blink On/Off	500/500	Battery charging due to overload (internal setting)
	100/100	Battery not charging due to overload (internal setting)
	1500/500	Discharging ( $VBATT \leq 22V$ )
Red	constant	No Battery connected ( $VBATT \leq 16V$ ) or Polarity wrong
Red Blink On/Off	500/500	Failed Battery Test but still charging battery ( $16V \leq VBATT \leq 22V$ )
Off	constant	Battery Voltage not OK ( $VBATT \leq 19.7V$ )

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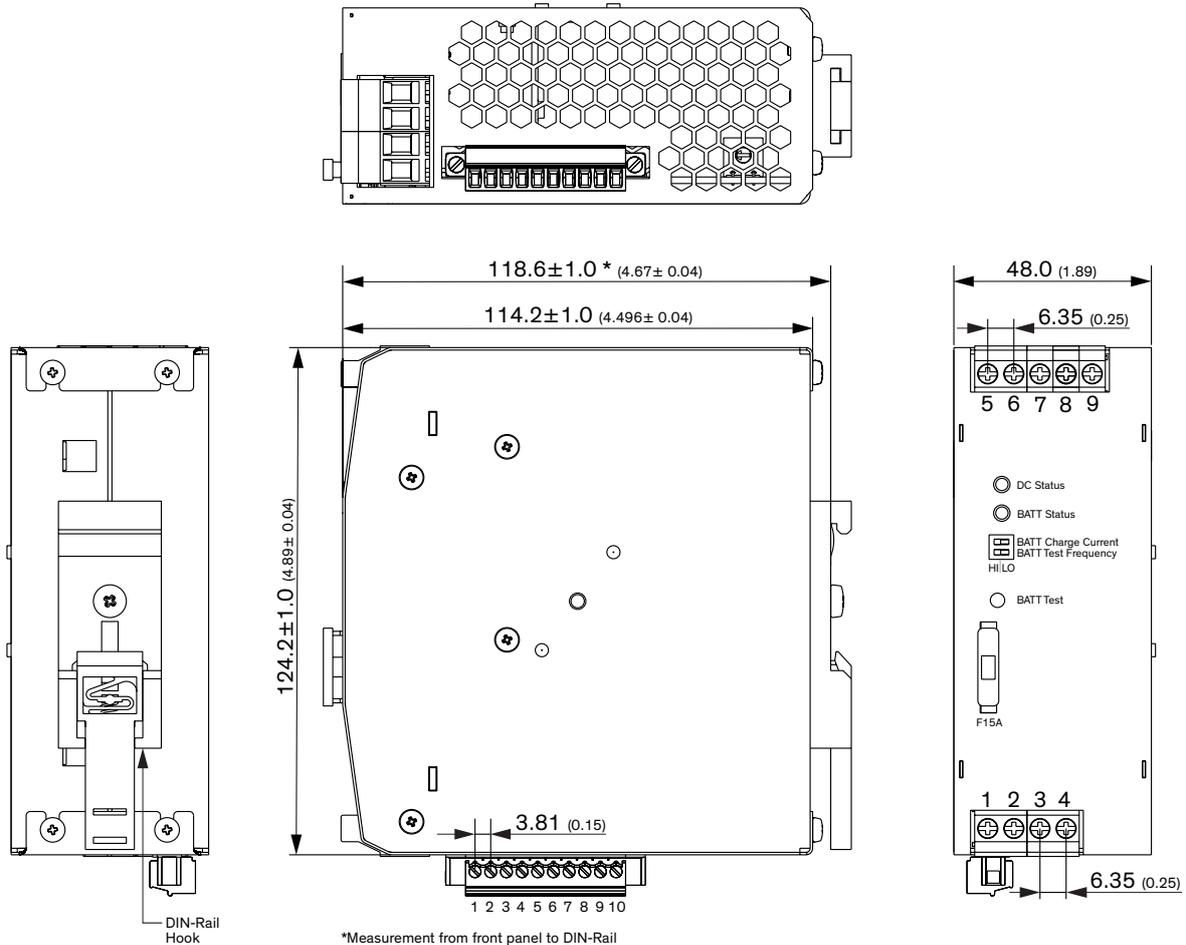
**Function Specification (continued)**

**Battery:**

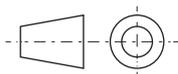


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### Outline Dimensions



Dimensions in mm (inch)



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

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

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

**Input:** 4-port Screw Terminal  
Stranded & Solid  
Torque: 0.8 Nm  
Wire dimension range: 16 - 10 AWG  
1.5 - 4.0 mm<sup>2</sup>

**Output:** 5-port Screw Terminal  
Stranded & Solid  
Torque: 0.8 Nm  
Wire dimension range: 16 - 10 AWG  
1.5 - 4.0 mm<sup>2</sup>

**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>