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 55032 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): www.tracopower.com/products/tsp-ts.pdf

Battery Specifications

Battery End of Charge Set Voltage	- Factory Default		27.1 - 27.3 VDC (25°C) (Temperature dependant)
	- External Temp. Sensor		0 - 60°C www.tracopower.com/products/tsp-ts.pdf (recommended, if ambient temperature differs from 25°C)
Battery Charge Current	- Buffer Mode	- High Mode	2.4 A typ.
		- Low Mode	1.2 A typ.
Battery Test Interval	- Buffer Mode	- High Mode	10 minutes
		- Low Mode	1 minute
		- Push Button	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	24.0 VDC
	- Buffer Mode	Vin - (0.1 to 0.5 V)
Efficiency	- Battery Mode	96 % typ.
	- Buffer Mode	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	20 ms typ.
	- Battery Mode to Buffer Mode	20 ms typ.
Output Current Limitation	- Battery Mode	10.1 - 12 A
	- Buffer Mode	dependant on power supply unit characteristic
Overvoltage Protection	- Battery Mode	<33 VDC

I 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	www.tracopower.com/overview/tib-bcmu
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	www.tracopower.com/info/reach-declaration.pdf REACH SVHC list compliant REACH Annex XVII compliant www.tracopower.com/info/rohs-declaration.pdf 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

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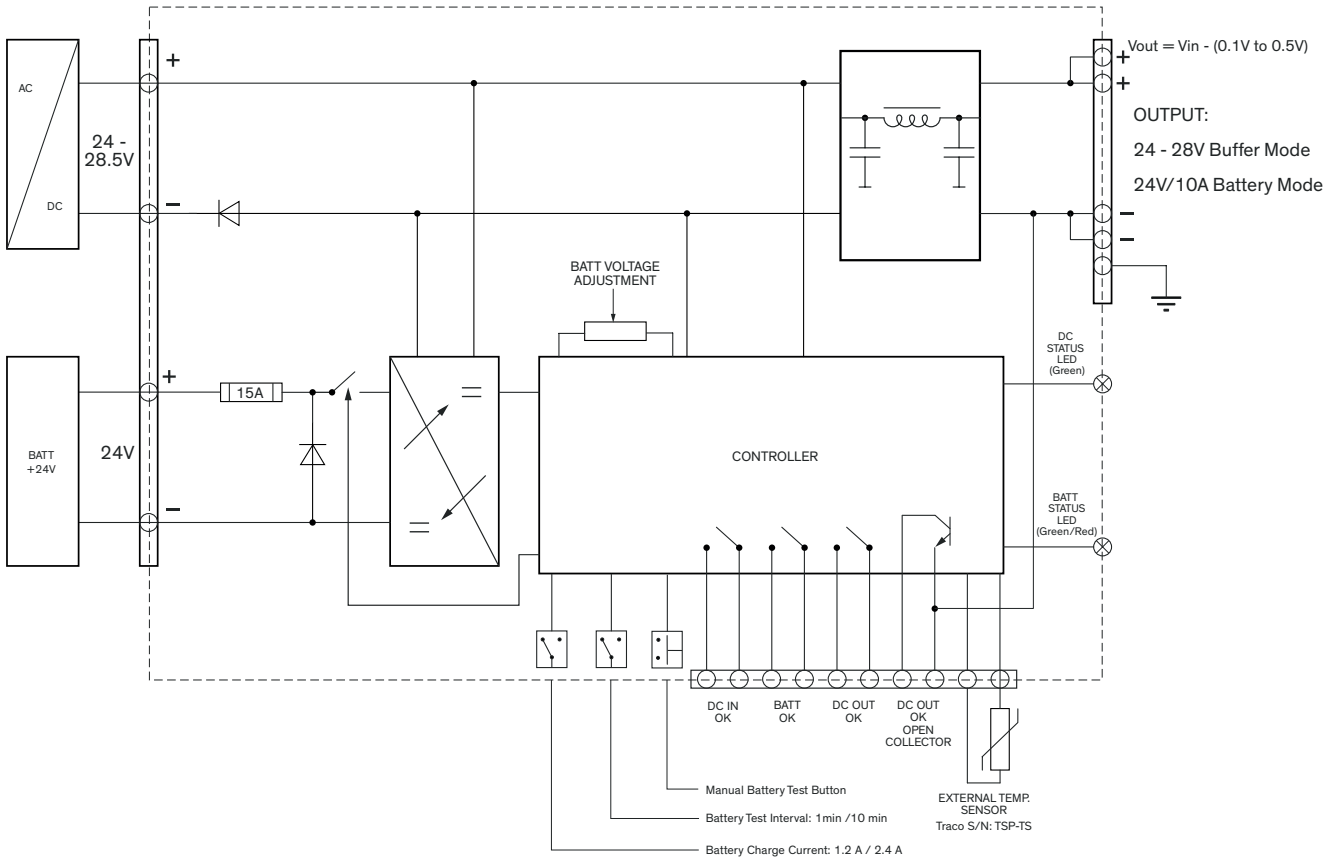
Function Specification

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)
Green Blink On/Off	500/500	Battery Charging (22 V ≤ VBATT ≤ VEOC)
	100/100	Battery not charging due to overload (internal setting)
	1500/500	Discharging (VBATT ≤ 22 V)
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)

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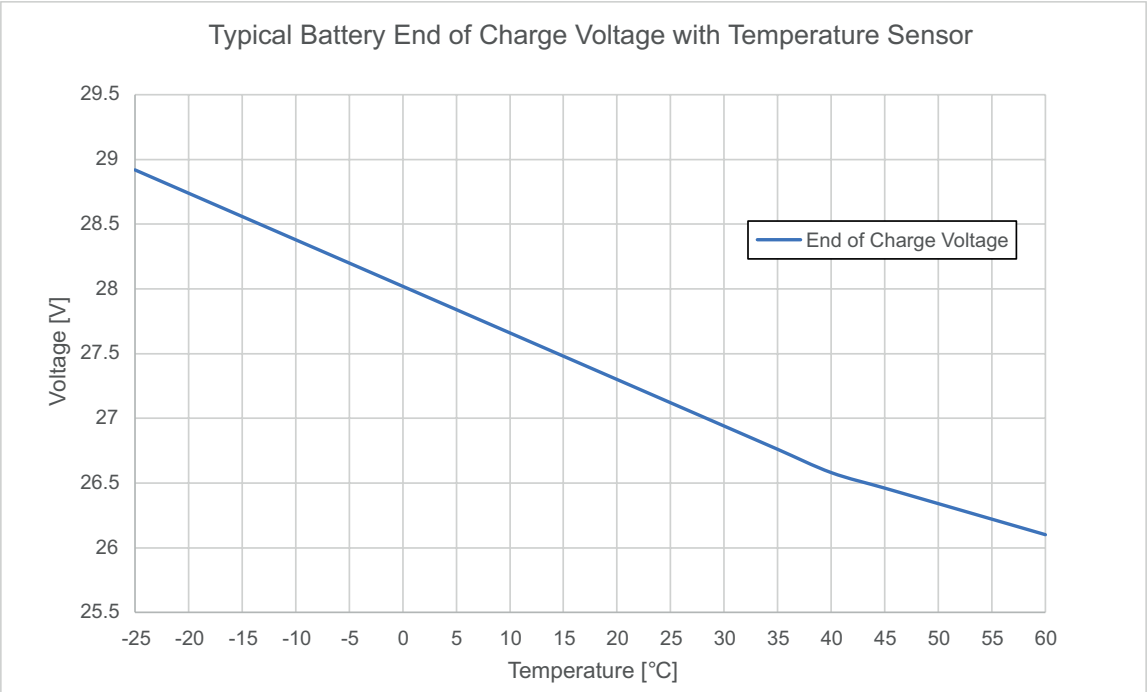
Function Specification (continued)

Battery:



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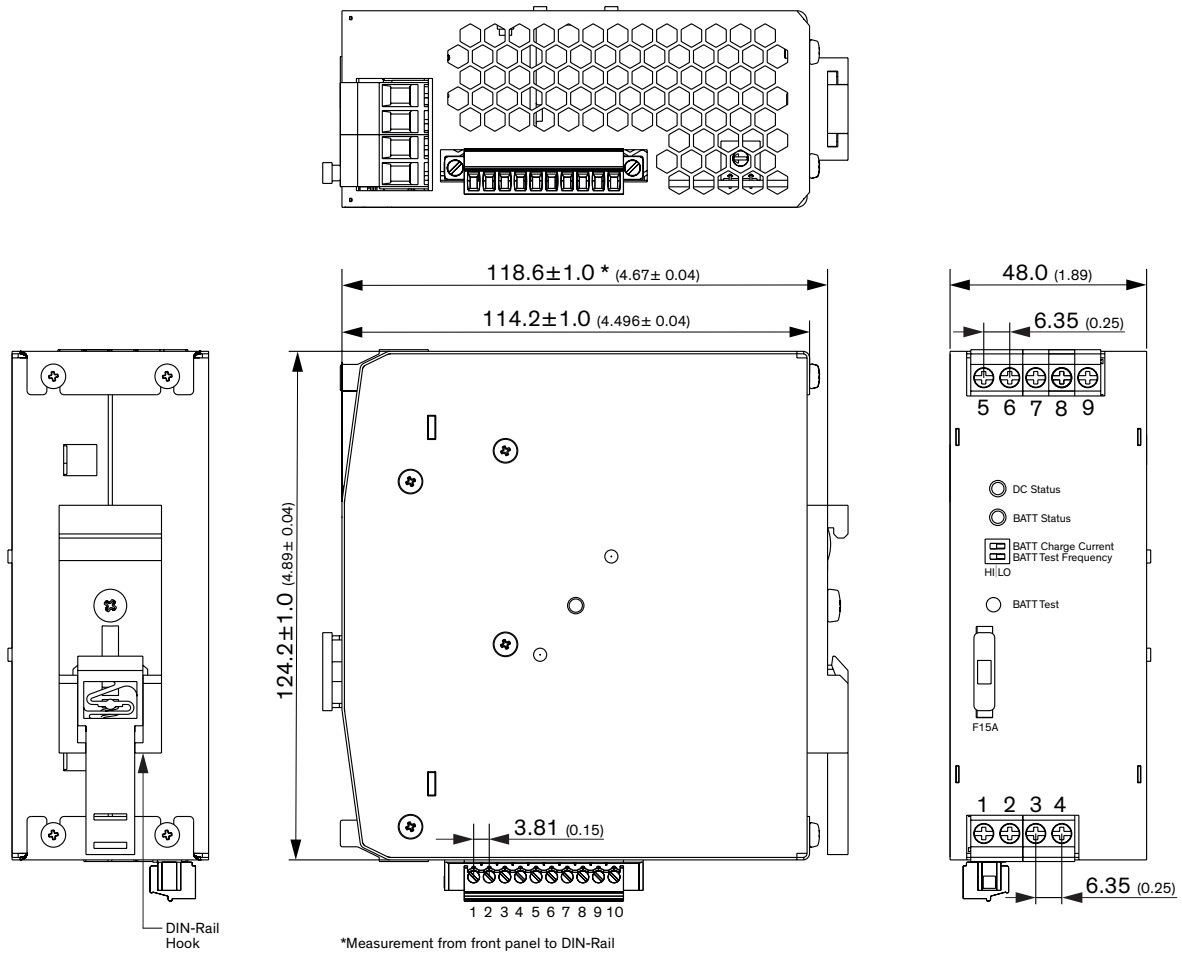
Outline Dimensions



*Measurement from front panel to DIN-Rail

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

Input: 4-port Screw Terminal
Stranded & Solid
Torque: 0.7 Nm
Wire dimension range: 16 - 10 AWG
1.5 - 4.0 mm²

Output: 5-port Screw Terminal
Stranded & Solid
Torque: 0.7 Nm
Wire dimension range: 16 - 10 AWG
1.5 - 4.0 mm²

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 mm²