DATASHEET

Turntide Battery Control Unit

The Turntide BCU (Battery Control Unit) is cell agnostic and flexible over multiple system voltages and parallel/serial battery pack arrangements.

The BCU works with IsoSPI networked battery-based CMUs (Cell Monitoring Unit) which connect to, control and monitor the voltage and temperature of a set of battery cells. The BCU provides the management for the CMU connected battery cells, the battery system & wider system integration.

BCU Enclosure with full HW connector options fitted with 250V DC application voltage, is shown above.

System integration can include DC Bus contactor control, Pre-charge management, Charge management, CAN based or I/O based application interfacing, Internally integrated High Voltage Interlock (HVIL) safety management, other system expansion options are available.

Lithium battery cells are chemical devices, which are life affected by temperature. The BCU provides thermal management to keep battery packs in an optimum condition.

Features

- 500k baud CAN communication for system data and battery controls (compliant with J1939)
- Management of battery voltage, temperature, cell balancing and load current limits
- State of Charge (SoC) and State of Health (SoH) battery tracking and reporting
- DC Bus and Pre-charge Contactor management
- HVIL management
- Battery Charger management
- Serial and/or Parallel battery pack connectivity
- Battery system Bus voltages (12 – 500V)
- RoHS, WEEE, UN38.3, R-100, IEC 62619
- EMC and ESD compliant
- Design and Safety compliant

BCU Hardware Build Options

- 5 off High Voltage Bus monitoring input channels, None fitted, 0-120V DC, 0-250V DC, 0 -500V DC
- HVIL Safety Interface with dedicated master drive and return monitor line
- CAN Expansion port, for battery system integrated devices. (Required for HVIL)
- 6 In and Out expansion Interface lines for none CAN battery to system control interface

Specifications

Device Operation			
Battery Controller Type	Central 'Battery Control Unit' networking to multiple battery 'Cell Monitoring Units' providing an intergrated battery solution with a high level of integrated system power and control Management interfaces.		
BCU Function	Takes multiple battery CMU cell voltage, temperature and current data sets, cell voltage balancing controls and multiple system/application controls and interfaces, to achieve an integrated battery and power delivery management solution.		
Connectable Number of Packs	Max = 18 Packs	**Cell Balancing Method**	Actively controlled passive balancing using CMUs within battery packs.
Charger Control*	Current control based on cell voltage/temperature	**Fault Management**	Battery component fault management maximises battery up time and system life.
HVIL (internal safety circuit)	High Voltage Interlock circuit monitoring for battery and operator protection.	**Power and Shutdown Control**	Automated battery safe shutdown is provided for when battery or monitored components require it.
Thermal Management	Battery Electrical Heating and Liquid Cooling/Heating temperature management options available.	**Battery Data Logging**	Battery status, faults and operational logs for post battery history analysis.
Battery High Voltage Bus Range	Multiple Direct 12V DC to 500V DC battery HV Bus voltage monitoring for enhanced power delivery management.		
** Dynamically de-rated by BMS message over CAN depending on cell condition*			
Communication and I/O			
System/Application CAN1 interface	SAE J1939 Compatible, @ 500k baud.	**Main DC Bus Contactors I/O**	For positive and negative Power Bus and Pre-Charger.
Battery Internal CAN Interface	TT protocol, @ 500k baud. Battery system expansion interface.	**Battery Expansion I/O**	6 digital outputs and 6 digital inputs. For simple control and monitoring.
High Voltage Monitoring	5 High Voltage DC Bus analogue I/P. (0-120V DC, 0-250V DC, 0-500V DC options available)	**Full HVIL loop circuit tester**	Pulse current, circuit contituity testing.
Pack IsoSPI Interface	This connects up to 18 Packs with individual CMU monitoring PCBs, to aquire battery status data. Aquiring Battery Temperatures, Voltages, Current, and Faults Status.		

Details are correct at time of publishing

Hardware Function			
IsoSPI Interface	Transformer Isolated data Network to Battery Packs.	**CAN Transceiver**	2 Isolated CAN Ports
Indicator LED	The Pack tri-color 'status' LED shows pack and battery system operational and fault status.	**Battery HV Connector Safety**	HV Connector has HVIL Interlocks
Connectors	P1, 35way AMPSEAL Header: 776231-1 (BMS Interface,Comms,PWR,L.S.Drives) P2, 23way AMPSEAL Header: 776228-1 (HVIL and I/O Expansion) P3, 14way AMPSEAL Header: 776262-1 (HV Monitor for 60V to 250V systems) P4, 12way Souriau Header: UTS71412P (HV Monitor for 250V to 500V systems)		
Power Supply Voltage	8-36V (12V and 24V typical)	**Working Isolation Voltage**	500V DC
Operation Temperature	-40°C to +85°C	**Storage Temperature**	-45°C to +105°C
Humidity	0 to 95% RH	**Altitude**	2000 meters
Housing IP Rating	IP67 Dye Cast Aluminium EMC Enclosure	**BCU Enclosure Dimensions**	L: 274mm, W: 173mm, H: 66mm, Mounting Holes: 4.5mm
Standards			
Design Certification	BS EN ISO 17409:2020, EN60068-2-6:2008, EN60068-2-64:2008+A1:2019, EN60068-2-27:2009, EN60068-2-1/2/14/30:2007, UL 2580		
EMC Certification	EN61000-6-2:2005 and EN61000-6-3:2007 + A1:2011.	**Transport**	Suitable for battery systems subject to UN38.3, R-100
Other Certification	RoHS, WEEE	**Safety Class**	IEC 62619, IEC 62620, EN6469-3:2021
Limited Warranty			
Customer application to be assessed by Turntide personnel to determine it's suitability for products use. Deviation from these conditions will be assessed on a case by case basis Only to be used in Turntide approved applications			

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TURNTIDE TECHNOLOGIES

Our breakthrough technologies accelerate electrification and sustainable operations for energy-intensive industries

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