Turntide Battery Control Unit (BCU)

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

The BCU interfaces with IsoSPI networked battery-based Cell Monitoring Unit (CMU) which connect to, control and monitor the voltage, current and temperature of a set of battery packs. The BCU and CMU in connected battery packs forms the battery management system (BMS), control the battery system, and interact with the application.



BCU Enclosure with full HW connector options fitted with 250V_{DC} application voltage

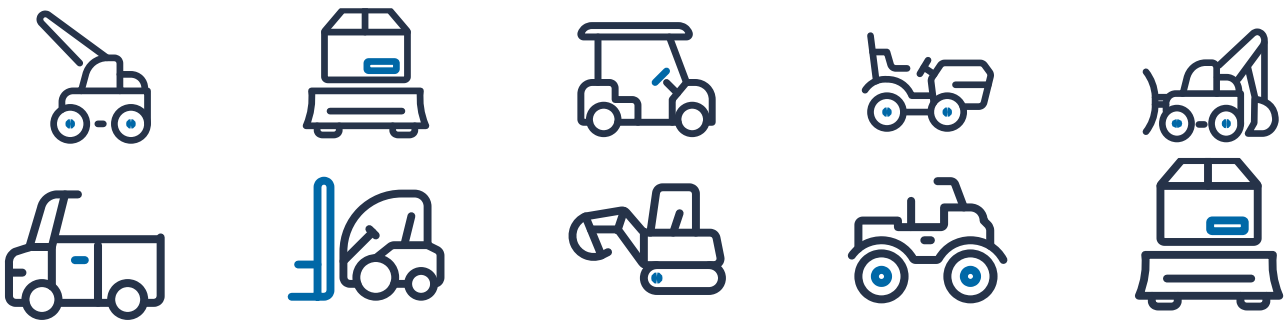
System integration can include multiple DC Bus contactor control, pre-charge management, charge management, and CAN based or I/O based application interfacing.

The chemistry of lithium-ion batteries is affected by temperature. The BCU provides thermal management to keep battery packs in an optimum condition.

Features

- 250k/500k/IM baud CAN communication for system data & control (compatible with J1939)
- Management of battery voltage, temperature, cell balancing and load current limits
- Safe management of DC-bus contactor isolation and pre-charge contactor devices
- State-of-Charge (SoC) and State-of-Health (SoH) battery tracking and reporting
- Battery charger management
- Serial and/or parallel battery pack connectivity
- Battery system bus voltages (38– 500V)
- RoHS, WEEE, R100
- Complaint to EMC, shock, vibration, and temperature standards
- 5-off HV bus monitoring input channels
- Various build options: 0-120V_{DC}, 0-250V_{DC} and 0-500V_{DC}.

Applications



Specification

Key Features			
Battery Controller Function	Central BCU networking to multiple packs providing an integrated battery solution with a high level of system power and control management.		
Max' Connectable Packs	18	**Cell & System Balancing**	Managed passive
Battery HV Bus Range	Multiple direct 38V_{DC} to 500V_{DC} battery HV Bus voltage monitoring for enhanced power delivery management.	**Fault Management**	Battery component fault management for voltage, temperature and current
Charge Control	Current control based on cell voltage/temperature*	**Battery Data Logging**	Battery status, faults and operational logs for battery analysis
Power Supply Voltage	9 to 36V (12V and 24V typical)	**Working Isolation Voltage (V_{DC})**	120V, 250V, and 500V (depending on BCU variant)
** Dynamically de-rated by BMS message over CAN depending on cell condition.*			
Environmental			
Operation Temperature (°C)	-25°C to +60°C	**Altitude (metres)**	2000
Storage Temperature (°C)	-40°C to +60°C	**IP Rating**	IP66
Humidity (%RH)	5 to 95		
I/O Interface Connections			
Connectors	BCU model specific: • P1, 35way AMPSEAL Header: 776231-1 (BMS Interface, Comms, PWR, Input/output LSD/HSD) • P2, 23way AMPSEAL Header: 776228-1 (I/O Expansion) • P3, 14way AMPSEAL Header: 776262-1 (HV Monitor for 38V to 250V applications) • P4, 12way Souriau Header: UTS71412P (HV Monitor for 250V to 500V applications)		
Application CAN 1 interface	• SAE J1939 compatible at 250k/500k/IM baud. • Customised HDI Modular Pack CAN-protocol	**DC Bus Voltage Monitoring**	• 5 x HV DC-bus analogue I/O ○ 0-120 V_{DC} ○ 0-250 V_{DC} ○ 0-500 V_{DC}
Main DC Bus Contactor /IO	• 5 positive & negative power bus and pre-charger	**Pack IsoSPI Interface**	• Connect up to 18 packs and acquire temperature, voltage, current and fault status.
Battery Expansion I/O	• 5 digital outputs & 5 digital inputs for simple application control and monitoring.		
Mass and Dimensions			
Weight (g)	1330 *(Max depending on variant)*	**Length (mm)**	274
Width (mm)	173	**Height (mm)**	66
Mounting	M5 with optional mounting attachments		
Safety and Compliance			
Shock and Vibration	• EN60068-2-27:2009 • EN60068-2-6:2008 • EN60068-2-64:2008+A1:2019	**Temperature and Humidity**	• EN60068-2-1: 2007 • EN60068-2-2: 2007 • EN60068-2-14: 2023 • EN60068-2-30: 2005
EMC	• EN61000-6-2:2019 • EN61000-6-3:2021	**Other**	• RoHS • WEEE • REACH

For more information on this product or Turntide's range of inverters, motors, batteries, pumps and fans, please visit our web-site or contact our team of experts at electrificationsales@turntide.com.