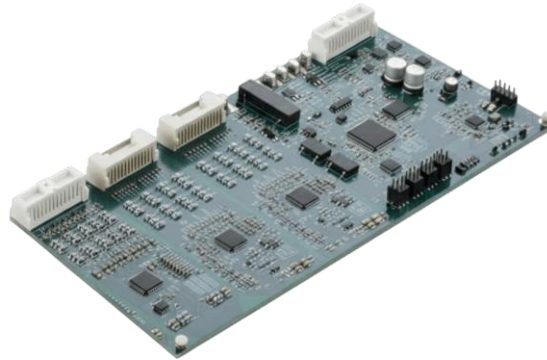




FEATURES

- Designed for Indian EV & ESS applications
- Adjustable functional-safety parameters
- LFP-optimized; up to 42 cells in series (≈ 134 V nominal)
- Up to 200 A continuous / 300 A peak discharge variants
- Passive cell balancing up to 300 mA
- CAN (UDS) + UART tool interface
- FOTA - firmware over-the-air updates

INTRODUCTION

The Xbattery BharatBMS™ (110V) is a compact, LFP-optimized Battery Management System engineered in India for the next generation of electric mobility and stationary energy-storage applications. Built around three high-precision cell-monitoring ICs and a robust MCU, it manages up to 42 series-connected LFP cells with ± 3 mV cell-voltage accuracy and 20ms sampling.

The platform operates from a 12 V logic supply and provides four high-side contactor drivers with feedback plus a pre-charge relay output. Three internal and eighteen external NTC channels deliver comprehensive thermal coverage across the pack.

Communications include one isolated CAN and one non-isolated CAN - both with UDS (ISO 14229) protocol support - plus two UART ports that carry a proprietary protocol for the Xbattery PC tool. The PC tool provides live monitoring, parameter configuration, and FOTA updates for fleet-wide rollouts.

KEY CAPABILITIES

SAFETY	USABILITY	BATTERY LIFE	PERFORMANCE
▶ Insulation monitoring (250 Ω/V – 1000 Ω/V) ▶ ASIL-D safety SBC — watchdog & fail-safe ▶ Adjustable functional-safety parameters ▶ 4 $\times$ contactor feedback + pre-charge	▶ PC tool: live monitoring & configuration ▶ FOTA — firmware over-the-air updates ▶ CAN (UDS) + UART / RS485 interface ▶ RTC, EEPROM & MEMS motion sensing	▶ ± 3 mV cell-voltage accuracy ▶ 20 ms cell sampling ▶ Passive balancing up to 300 mA ▶ 24 NTC channels (18 external + 6 onboard)	▶ Up to 42S LFP, 134.4 V nominal ▶ 100 / 150 / 200 A continuous variants ▶ Peak 150 / 300 / 400 A @ 10 s ▶ 2 $\times$ isolated CAN, 1 $\times$ UART + RS485

APPLICATIONS



E-Rickshaw / E-Auto

Passenger three-wheeler mobility



3-Wheeler Cargo

Last-mile cargo & delivery



Light Commercial EV

Vans & small commercial fleets



E-Tractor / Utility

Off-road & agricultural EVs



Stationary ESS

Backup & off-grid storage

GENERAL SPECIFICATIONS	
Power supply	12 V DC Auxiliary Supply (or) On Board Converter (Vin = 40V – 55V)
Cell chemistry supported	Lithium Iron Phosphate (LFP) optimized
Maximum cells in series	42s (Configurable as per requirement)
Nominal pack voltage	Up to 134.4 V DC (42S × 3.2 V/cell)
Range of high-voltage measurement	0 – 153.3V DC ±0.5V @ 25°C
Range of current measurement input (Shunt)	–1500 A to 1500 A with 6mA Resolution Using 100 µΩ shunt resistor
Accuracy of current measurement input (Shunt)	±1% accuracy from milliamps to kiloamps
Isolation Monitoring	Calibratable, 250 Ω/V – 1000 Ω/V
Continuous discharge current	100 / 150 / 200 A (variant dependent)
Peak discharge current	150 / 300 / 400 A @ 10 s (variant dependent)
Contactors / relays	4 × contactors with auxiliary feedback, 1 × pre-charge relay output
Safety SBC	ASIL-C certified, independent MCU watchdog, supply rail monitoring & hardware fail-safe output
Cooling & Heating	12 V switched output (control-signal enabled), max 5A
COMMUNICATION & ADDITIONAL FEATURES	
CAN interfaces	2 × Isolated CAN
CAN protocol support	CAN 2.0A (11-bit) / CAN 2.0B (29-bit); UDS (ISO 14229)
Serial interfaces	1 × UART port + 1 × RS485 port (non-isolated)
UART protocol	Xbattery proprietary protocol (PC tool communication)
PC tool	Live monitoring, parameter configuration, diagnostics
Firmware Upgrade	Firmware Over-The-Air updates supported
Environmental sensor	Onboard ambient temperature and humidity monitoring
Memory & Storage	64MB External Flash & 1 Mbit EEPROM
Motion sensor	3-axis MEMS gyroscope — orientation/motion detection
RTC (Real Time Clock)	Coin cell battery backed
CELL & THERMAL MONITORING	
Detectable cell voltage	0.5 – 5.0 V DC
Cell-voltage accuracy	Maximum ± 3 mV (Vcell =3.3V Ta = 25°C)
Cell balancing topology	Passive
Cell balancing current	Up to 240 mA per cell
Temperature Sensors	18 External & 6 On Board NTCs
Temperature accuracy	±1 °C
MECHANICAL & ENV.	
Dimensions (PCB)	306mm × 110mm × 50mm
Operating Temperature	–20 °C to +80 °C
Storage Temperature	–40 °C to +80 °C
Humidity	10 – 90 % RH, non-condensing
Ingress Protection	IP20 – IP65 (enclosure dependent)