XALT Energy®

XPAND
BATTERY SYSTEM
CONTROLS

# XPAND Battery System Controllers: BDU (w/SCU) and MCU

## Introducing the XPAND® Energy Storage System

The XPAND Energy Storage System uses XPAND Battery System Controllers and XPAND Modular Packs (XMP), based on XALT Energy's world-class lithium-ion cells. XPAND is designed for use in commercial truck, bus, and heavy duty transportation, as well as marine and stationary applications.

**The XPAND Battery System using XALT's MCU, BDU and XMP71P is DNV-GL Type Approved (Cert# TAE00002YC).**

## Battery Disconnect Unit (BDU)
**(F970-0003)**

The BDU manages individual strings of series-connected XMP sub-packs through its on-board String Controller Unit (SCU), pre-charge circuit, current sensor, and contactors. For large XPAND systems of multiple parallel-connected strings, BDUs are connected in parallel.

**Features:**
- Compatible with 12V or 24V low voltage supply
- Isolated high voltage measurements up to 1250 VDC
- Current sensing capability -500A to +500A standard; up to ±1200A optional
- Redundant dual contactor controls ensure safe operation
- Self-addressing provides simple installation and service
- IP69 compliant (with connectors mated)

**Interfaces:**
- With XMP subpack Voltage-Temperature-Balance (VTB) boards via isolated two-wire communications bus
- With XALT MCU via internal CAN bus
- With high voltage via 50mm$^2$ or 70mm$^2$ shielded cable

## Master Control Unit (MCU)
**(F970-0004)**

The MCU manages multiple parallel strings (up to 24) while providing a single and simple interface to the application controller.

**Features:**
- Compatible with 12V or 24V low voltage supply
- Autonomously controls balancing of battery strings
- Provides autonomous addressing to individual battery strings, supporting a true modular architecture
- HV Interlock Loop (HVIL) monitoring of each battery string
- Provides collective system and diagnostic information to the application
- IP69 compliant (with connectors mated)

**Interfaces:**
- With BDU via internal CAN bus
- With application controller via CAN 2.0A, CAN 2.0B, or J1939

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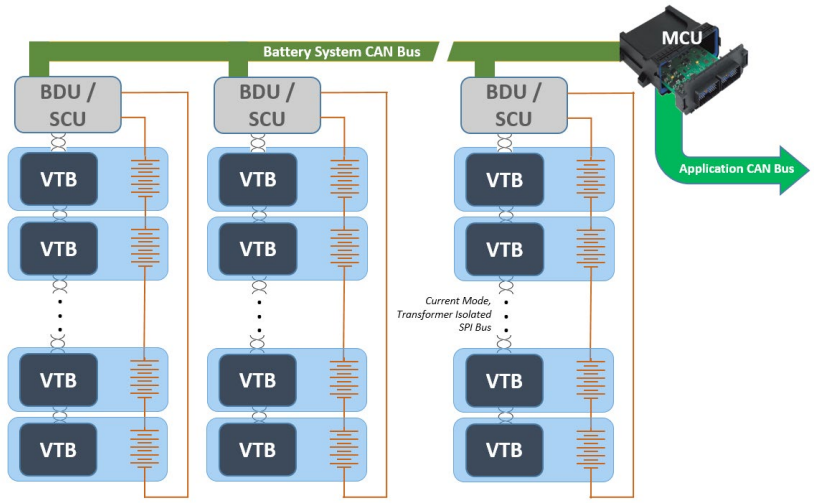
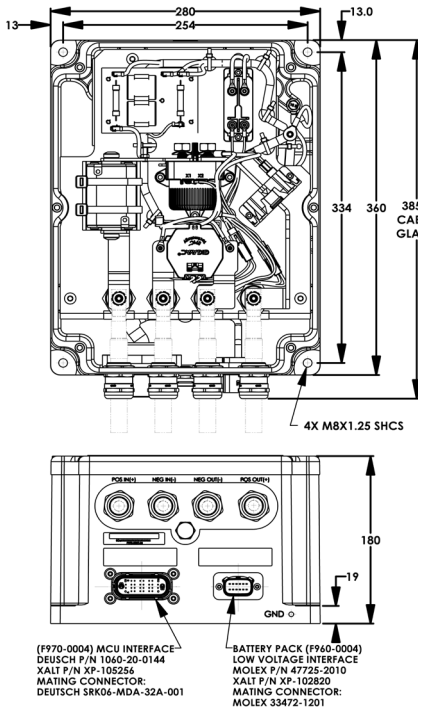
### Features

- High quality/reliable performance
- Proven, AEC qualified components
- Sealed enclosures (IP69)
- Scalable from 1 to 12 series packs per string; 1-24 strings in parallel
- Auto-configures sub-packs for ease of integration and service
- Thermal system control and interface
- Charger control interface
- 2-wire SPI communication demonstrates exceptional noise immunity in the harshest E and H fields
- CAN 2.0A, CAN 2.0B, J1939 application interfaces
- System voltage range 22-1250 Vdc
- System current range -500A to +500A standard; optional to ±1200A
- Compatible with 12V or 24V system voltage
- Selectable cell balancing: autonomous, on-plug only, off
- XALT Battery Viewer (XBV) Telematics available

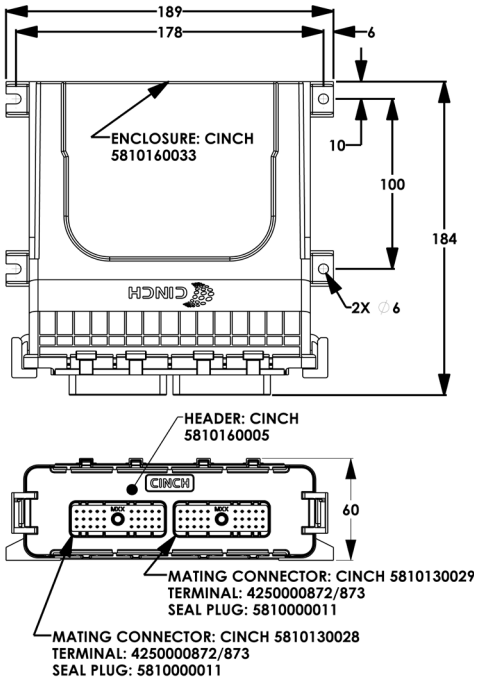
## XPAND® Battery Management System Topology




## BDU Outline Dimensions




## MCU Outline Dimensions




## Validation & Compliance

### Environmental/Handling

- Thermal Shock (IEC 60068)
- Powered Temp Cycle Endurance (IEC 60068)
- Thermal Humidity (IEC 60068)
- High Temp Operating Endurance (IEC 60068)
- Humid Heat (IEC 60068)
- Shipping / Storage (ISO 16750)
- Mechanical Shock [50G and 100G] (ISO 16750)
- Mechanical Vibration 2.84grms (ISO 16750)
- Dust (IEC 60529)
- Water Intrusion (IEC 60529)
- Water Immersion (IEC 60529)
- Salt Spray (ISO 16750)
- Fluid Compatibility (ISO 16750)
- Drop (GMW 3172)

### Electromagnetic Immunity

- RI ALSE, Magnetic Fields, BCI, CI (ISO 11452)
- Pulse, Conducted Immunity (ISO 7637)
- Coupled Immunity, Transients, Surge (EN 61000)
- Abnormal Connections and Supply Voltage [Jump start, Reverse polarity, Super-imposed AC Voltage] (ISO 16750)
- ESD: Operating, Handling, Remote I/O (ISO 10605)

### Electromagnetic Emissions

- CE, ALSE RE (CISPR 25)

XALT Energy®
2700 S. Saginaw Road, Midland, MI 48640 • +1 (989) 486-8501
Email: powerup@xaltenergy.com
Web: xaltenergy.com

MADE IN USA



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