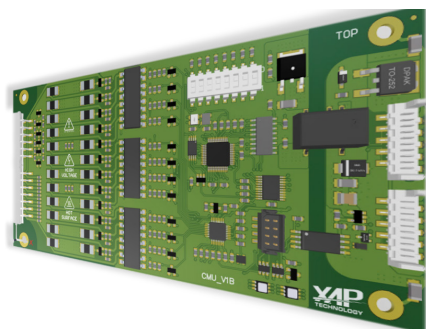


CMU-112



PRECISION AND SAFETY AT THE HEART OF YOUR BATTERY

The XAP CMU is the cornerstone of battery management, monitoring and balancing each cell with precision while securely transmitting data to the BMU.

Its modular and scalable design adapts to anything from compact 48 V batteries to high-voltage packs up to 800 V, with no hardware changes required. Each unit operates autonomously, with built-in acquisition, regulation, and diagnostics.

Built on motorsport engineering principles, the CMU delivers robustness, compactness, and rapid response. Redundant measurements, traceable configurations, and isolated CAN interfaces ensure continuous operation even under extreme conditions.

CMU-112: Standard 12-cell architecture, passive balancing, isolated CAN communication



METROLOGICAL RELIABILITY, GALVANIC SAFETY, OPERATIONAL MODULARITY

ISOLATED CELL VOLTAGE:

Filtered and oversampled channels with integrated micro-controller

TEMPERATURE MONITORING:

6 external NTC + 2 internal sensors; ADC with offset compensation and calibration; -20°C to $+70^{\circ}\text{C} \pm 1^{\circ}\text{C}$.

CELL BALANCING:

Passive controlled resistors ($\approx 4.7\ \Omega$, 3 W) via optocoupler; cyclic algorithm managed by MCU; preserves cell life

ISOLATED COMMUNICATION:

Galvanic CAN/TPL up to 3000 V, with ESD protection and common-mode filters.

DATA STORAGE:

Serial number, hardware configuration, and calibration parameters

AUTOMATIC IDENTIFICATION:

Dynamic addressing for easy wiring and in-field reconfiguration

SAFETY & SELF-CHECK:

Closed-loop control (pumps, valves, fans, heaters).

SUPERVISION:

Micro-controller manages measurement, fault detection, balancing, and communication; 512 kB memory for serial, calibration, and local history; isolated CAN stack with XAP proprietary protocol.

STABLE AND PROVEN DESIGN:

The foundation of the XAP modular BMS architecture

SIMPLIFIED INTEGRATION :

Via CAN bus with EEPROM identification

LOW MAINTENANCE AND HIGH RELIABILITY:

Suitable for both automotive and industrial environments.



► ELECTRICAL SOLUTIONS & POWERTRAIN:: CMU-112

FUNCTIONAL OVERVIEW

Voltage measurement	12 channels (0 – 5 V each), with ± 1 mV precision. Summed pack up to 48 V. Galvanic isolation 3 kV
Temperature monitoring	6 external NTC + 2 internal sensors (–20 to +70 °C). Local overheat detection & alert flag
Balancing method	Passive resistive ($\approx 4.7 \Omega$ / 3 W per cell). Discharge controlled by optocoupled MOSFET drivers
Balancing algorithm	Sequential discharge of higher-voltage cells; target $\Delta V < 25$ mV between cells
Microcontroller	Manages communication
Memory & traceability	Memory integrated: serial number, calibration constants, and firmware ID
Power supply	12–17 V DC from BMU (protected input)
Communication	1 isolated CAN bus. Watchdog reset
Isolation	3000 V galvanic separation between cell domain, logic, and CAN
Protections	Reverse polarity, ESD suppression, overvoltage clamping, open-wire detection
Current consumption	250 mA max
Diagnostics	Start-up self-test, watchdog timer

ENVIRONMENT & COMPLIANCE

Operating T° range	–40 °C to +85 °C
IP Rating	IP40 (bare board)
Vibration/shock	Automotive-grade (IEC 60068-2-6 / -27)
EMC/CEM	Compliant with UNECE R10 / ISO 11452 standards
Safety standards	ISO 26262 ASIL-B (CMU level) / UNECE R100 / R136 compliant
Reliability	> 13 000 h continuous operation
Maintenance	Annual verification; firmware updates via BMU interface

MECHANICS

Dimensions	144 × 70 × 10 mm
Weight	≈ 30 g

REFERENCE

PF0538	CMU-112
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