

# Power Supply Controller for Telecommunication Node MC-30

## Purpose

A managed controller for uninterrupted power supply of a node (OLT / aggregation / transport), which monitors AC voltage, DC voltage, controls switching to batteries, provides charging and balancing of cells/batteries, climate control (heating/cooling), control of external actuators, full telemetry, and notifications.

---

## Supported Batteries and Configurations

- **Chemistries:** Li-ion, LiFePO<sub>4</sub> (lithium iron phosphate), lead-acid
  - **Lithium topology:** 3...16S (series-connected cells)
  - **Lead-acid:** up to 4×12 V in series
  - **Stack voltage range:** 10...70 V
  - **Balancing:** active-passive balancing of cells/batteries
- 

## Monitoring

- **AC monitoring:** continuous measurement of voltage, current, power, frequency; detection of dips/overvoltage; AC energy metering
  - **Switching logic:** automatic transition AC → battery (and back) based on thresholds/timing
  - **Anti-chatter protection:** delays/hysteresis for unstable grids
  - Battery cell temperature monitoring
  - Ambient/enclosure temperature monitoring
- 

## Energy Metrics and Analytics

- **AC metering:** real-time power, consumed energy (kWh)
- **Battery parameters:** current, voltage, capacity/energy (Ah/Wh), SoC, SoH, internal resistance, imbalance

- **Backup runtime estimation:** calculation of remaining runtime on battery under current load
  - Per-cell temperature monitoring
- 

## Battery Charging and Protection

- Controlled charging
  - Adjustable current limit up to 30 A
  - Chemistry-specific profiles: dedicated voltage/current/conditions; temperature limits (if required)
  - **Protections (general):**
    - Undervoltage/overvoltage (per cell and pack)
    - Overcurrent
    - Temperature limits
    - Low-voltage cutoff
- 

## Alerts and Events

- **Threshold alerts:** low SoC/energy, voltage/current/temperature out of range, system faults
  - **Network status:** AC loss/restore, source switching, anomalies
  - **Custom rules:** user-defined conditions/scripts for alerts
  - **Delivery:** local (indicators) and network-based (see “Interfaces”)
- 

## Remote Operations and Service

- **Remote restore:** remote power recovery/restart of the node
  - **Remote configuration:** all key parameters accessible online
  - **Upgradability/expandability:** adding/modifying functions based on customer needs (subject to hardware capability)
- 

## Interfaces and Integration

- **Ethernet interface** — wired connection for control/telemetry/alerts

- **Wi-Fi interface** — wireless access
  - **Configuration:** web interface, API
  - Analog inputs for custom use
  - Digital inputs for custom use
  - Temperature sensor inputs for custom use
  - Outputs for external control
  - Control of alternative power source / ATS / relays
- 

## **Configurable Parameters (Generalized)**

- AC voltage thresholds
  - Balancing parameter thresholds
  - Internal resistance measurement and cell equalization intervals
  - Battery heating thresholds
  - Charging current limits, cutoff thresholds, chemistry-specific charging profiles
  - SoC/energy thresholds for alerts, alert types and channels
  - Network parameters (Ethernet/Wi-Fi), access control, users, policies
  - Notification settings
- 

## **Electrical and Operational Specifications (Generalized)**

- Number of cells: 3–16S
  - Number of lead-acid batteries: 1–4 pcs
  - Maximum charging current: 30 A
  - Maximum AC voltage: 300 V
  - DC voltage range: 10–75 V
  - Maximum charge current: 30 A
  - Maximum discharge current: 45 A
  - Maximum AC current: 24 A
  - Dimensions (W×L×H): 185 × 140 × 45 mm
-

# System Overview Diagram

## WARNING!!!

1. Connect battery + terminal to controller B+ terminal **ONLY** after power supply is connected to PS+ and PS- controller terminals and power supply is ON(controller is powered from power supply).
2. **DO NOT** connect battery + terminal to controller B+ terminal unless battery - terminal **IS** connected to controller B- terminal.
3. If you connect less than 16 cells, **ALWAYS** connect last cell Bt+ controller terminal to Bt+16 controller terminal.

