

512V 100Ah High-Rate LFP UPS Battery System

Technical Specification Sheet

System Model: High-Rate LFP-512V100AH-4C UPS Cabinet

Application: Data Center / Industrial Modular UPS System (Fully compatible with INVT RM Series & 200kW–300kW UPS Systems)

1. System Overview

This high-rate Lithium Iron Phosphate (LiFePO4) battery system is designed for data centers, critical industrial loads, and modular UPS applications (such as the INVT RM series). Featuring an integrated high-voltage control box (HV-BMS), module-level active/passive balancing, and an automated aerosol fire suppression system, it delivers maximum power density and reliable 10–15 minute high-rate backup capability.

2. Technical & Electrical Specifications

Parameter Category	Technical Specification	Remarks & Conditions
Cell Chemistry	Prismatic LiFePO4 (LFP)	Grade-A High-Rate Cell
System Configuration	160S1P (10 Modules in Series)	16S1P per 51.2V Module
Nominal Voltage	512.0 Vdc	
Operating Voltage Range	448.0 Vdc ~ 560.0 Vdc	EOD Cut-off: 448V (2.8V/cell) Max Charge: 560V (3.50V/cell)
Nominal Capacity / Energy	100 Ah / 51.2 kWh	@ 0.5C, 25°C
Max. Continuous Discharge	400 A (4.0C Rate)	10–15 min High-Rate Discharge
Peak Discharge Current	500 A (5.0C Rate)	≤10 seconds
Max. Discharge Power	200 kW ~ 250 kW	Covers 180kW / 10min requirement
Recommended Charge Current	20 A ~ 50 A (0.2C ~ 0.5C)	Configurable via UPS Charger
Max. Continuous Charge	100 A (1.0C Rate)	
Round-Trip Efficiency (RTE)	≥97.5%	@ 0.5C, 25°C

3. High-Rate Discharge Performance (@ 25°C)

Duration (min)	Discharge Rate (C-Rate)	Constant Current (A)	Constant Power (kW)	Application Scenario
10 min	3.9C ~ 4.0C	390 A ~ 400 A	200 kW ~ 205 kW	180kW–200kW Emergency Ride-Through
15 min	3.0C	300 A	150 kW	Standard Data Center Backup

Duration (min)	Discharge Rate (C-Rate)	Constant Current (A)	Constant Power (kW)	Application Scenario
30 min	1.8C	180 A	90 kW	Medium-Duration Backup
60 min	1.0C	100 A	51 kW	Extended Runtime

4. System Structure & Bill of Materials (BOM)

Sub-System / Component	Model / Specification	Qty per Cabinet	Key Features
Battery Module	51.2V 100Ah (16S1P)	10 Modules	19-inch Rack-mount with internal BMS board
High Voltage Box	512V / 400A Master Control Box	1 Unit	Includes DC Breaker, Contactor, & Master BMS
Master BMS	3-Level Architecture BMS	1 Set	Voltage/Temp monitoring, Insulation detection
Cabinet Enclosure	600×1000×2000 mm	1 Cabinet	Cold-rolled steel, IP20 Indoor Enclosure
Fire Suppression	Aerosol Fire Extinguisher	1 Set	In-cabinet automatic thermal/electric triggering

5. Protection & Communication Matrix

Communication Interfaces: RS485, CAN2.0B, Ethernet (Modbus RTU / Modbus TCP), Dry Contacts (3 outputs, 1 input).

UPS Protocol Integration: Direct trip-signal and fault dry-contact alarm integration with INVT, Vertiv, Kehua, and Huawei UPS platforms.

BMS Protection Suite: Over/Under Voltage, Overcurrent, Short Circuit protection (response time ≤10ms), Multi-point Temperature monitoring, and Insulation Fault detection.

6. Environmental & Mechanical Parameters

Discharge Operating Temperature: −20° C to +65° C

Charge Operating Temperature: 0° C to +50° C

Relative Humidity: <95% RH (Non-condensing)

Cycle Life: ≥2,500 cycles (@ 25° C, 0.5C Charge / 2C Discharge, 100% DOD)

Design Lifetime: 15 Years

7. Standards & Compliance

Battery & Module: compliant IEC 62619, UL 1973, UL 9540A, UN38.3

System & Safety: compliant CE-LVD (EN 62477 / EN 62040), CE-EMC

Transport: MSDS, Sea/Air Freight Safety Qualification Reports