Faith
Technologies

www.faithtechate.com

AI Data Center Power Five Application Test Solution

ABOUT FAITHTECH

20th 2006-2026 Faith Technologies

Mission

Technology changes the world, making it greener and more sustainable.

FaithTech is rooted in the field of new energy power electronics simulation and test instrumentation, providing world-class programmable power supplies, electronic loads, and comprehensive test & measurement solutions.

FAITHTECH QUALIFICATIONS & CERTIFICATIONS

Recognized by Government Authorities for Innovation, Technology and Excellence

- National Specialized and Innovative "Little Giant" Enterprise ★★★★★
- Shenzhen Specialized and Innovative SME ★★★★★
- National High-tech Enterprise ★★★★★
- Shenzhen High-tech Enterprise ★★★★★
- Shenzhen Software Enterprise ★★★★★

ISO 9001 CE RoHS

- Electronic Loads: 11 series ~400 models
- Power Supplies: 12 series ~1000 models
- Battery Simulators: 4 series ~200 models

TECHNOLOGY EVOLUTION

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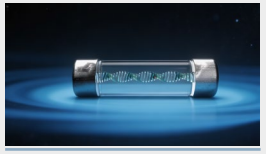
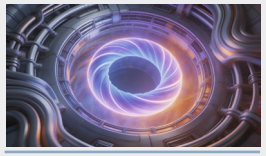
20 years of industry accumulation

full coverage of AI server power test challenges

Hydrogen fuel cells
low-voltage high-current



Aerospace fuse & breaker
10kA+ level



Fusion energy systems
superconducting coil power supply

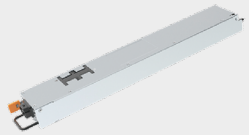
EV Battery systems
discharge testing & cell emulation

Marine electric propulsion
MW-level delivery

EV charging modules
high surge & overload testing

MW-level（Power rack、Power shelf、Sidecar）

MW-level system load step response testing



HVDC PSU

Multi-standard compatibility

GPU

Ultra-low voltage & high current applications

BBU

High-speed dynamic response testing & Energy regenerative capability

BUSBAR

High-current simulation up to 10kA class

FIVE CORE APPLICATION SCENARIOS

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01 GPU Power Delivery Testing

02 Busbar High Current Testing

03 HVDC MW-level System Validation (Sidecar architecture)

04 PSU Module Testing

05 BBU Backup Power System Testing

GPU POWER TESTING: TECH BACKGROUND & KEY CHALLENGES

AI Computing Surge • VPD Architecture Evolution

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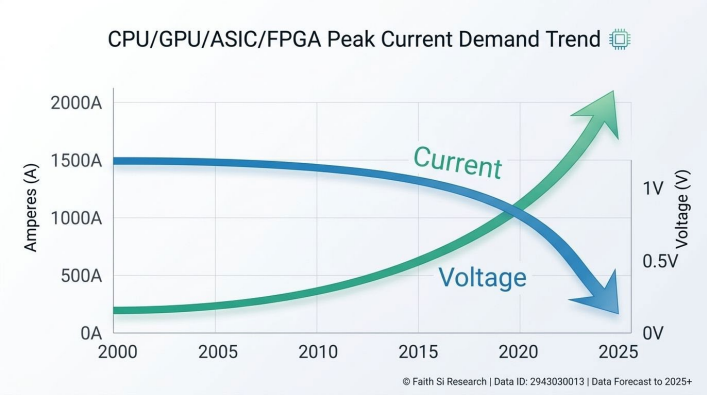
Technology Evolution Trends

As AI training complexity increases, GPU peak current demand is expected to reach 2000A–5000A+, while core voltage continues to drop to 0.5V or lower.



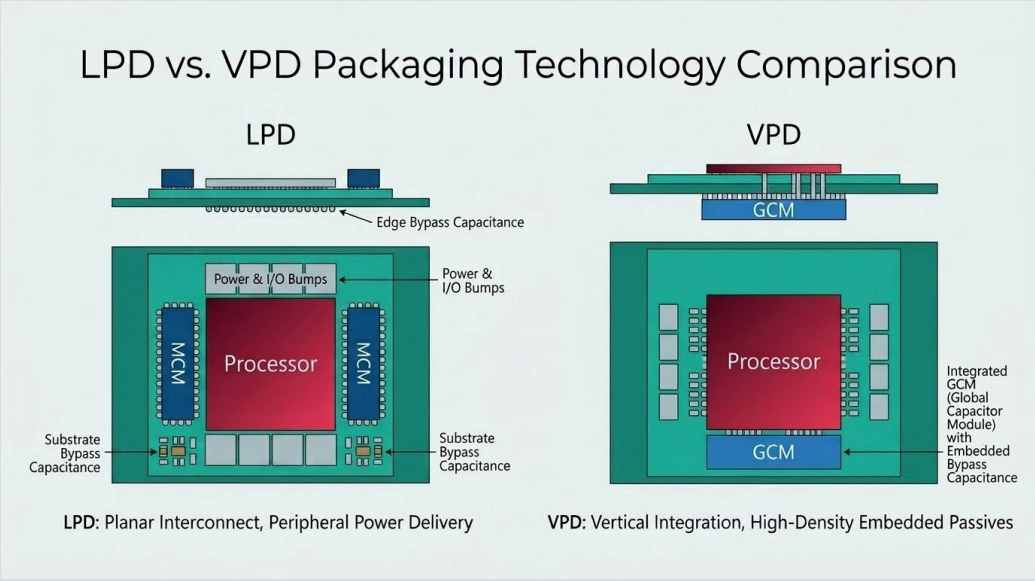
Key challenges

1. **Ultra-low voltage loading difficulty**
   Conventional electronic loads cannot operate stably below 0.3V, leading to high test failure rates.
2. **Insufficient transient response**
   Inadequate current slew rate prevents accurate simulation of GPU workload transients.
3. **Lack of validation accuracy**
   Existing test platforms cannot accurately verify performance below 0.3V.

VPD Architecture – Defining the Future Path

NVIDIA's Rubin architecture is the first to adopt VPD (Vertical Power Delivery), followed by Intel, Google, and Huawei. VPD requires test systems capable of sinking thousands of amperes at ultra-low voltages down to 0.2V or even lower.

> VPD is a deterministic industry direction, and our test solutions directly address the "survival threshold" of next-generation GPU power validation.



FAITHTECH N SERIES LOAD: VPD TESTING SPECIALIZED INSTRUMENT

Specialized for VPD architecture design and ultra-low voltage, high current electronic load testing

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Key Features & Specifications

Ultra-low Voltage Load

0.2V@5000A

Minimum resolution < 0.2mΩ

Ultra-high Current Range

3U@1000A

Expandable to 12U@5000A

Ultra-fast Dynamic Response

> 20 ~ 100A/μs

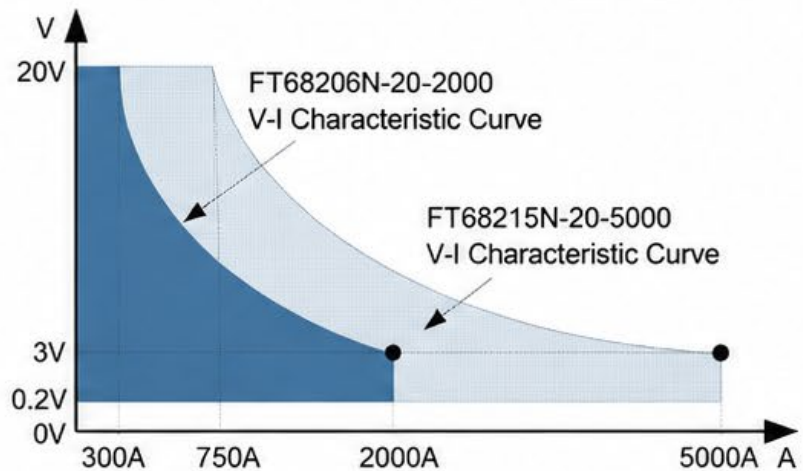
Bandwidth up to 20kHz

High Measurement Accuracy

0.05%+0.05%

Current accuracy

Application Area	Test Objective	Recommended Model	Value to Power Supply Development
PMIC/VRM R&D Validation	Transient response under VPD architecture	**FT68203N-20-1000**	High dynamic load simulation + transient capture
GPU System Integration Testing	AI training load simulation	**FT68215N-20-5000**	5000A expandable capability + 0.2V low voltage load
GaN Module Testing	High-frequency switching characterization	**FT68206N-20-2000**	High precision load + low noise design
CPU Vcore Testing	Processor core power verification	**FT68203N-20-1000**	**Ultra-low voltage, high current + high accuracy measurement**
Production Line Testing	Stability & consistency testing	**FT68203N-20-1000**	**Ultra-low voltage, high current + high accuracy measurement**



BUSBAR TESTING: TECH BACKGROUND & KEY CHALLENGES

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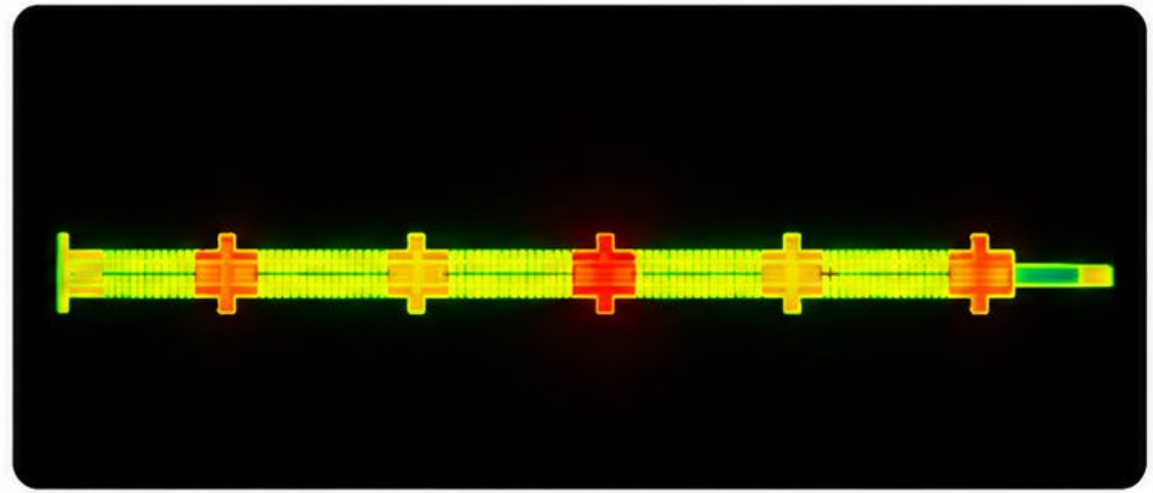
Test Background

Server busbars must carry extremely high currents and operate under elevated temperatures. As temperature rises, electrical resistance increases, which may lead to current overheating, insulation aging, and even safety risks.

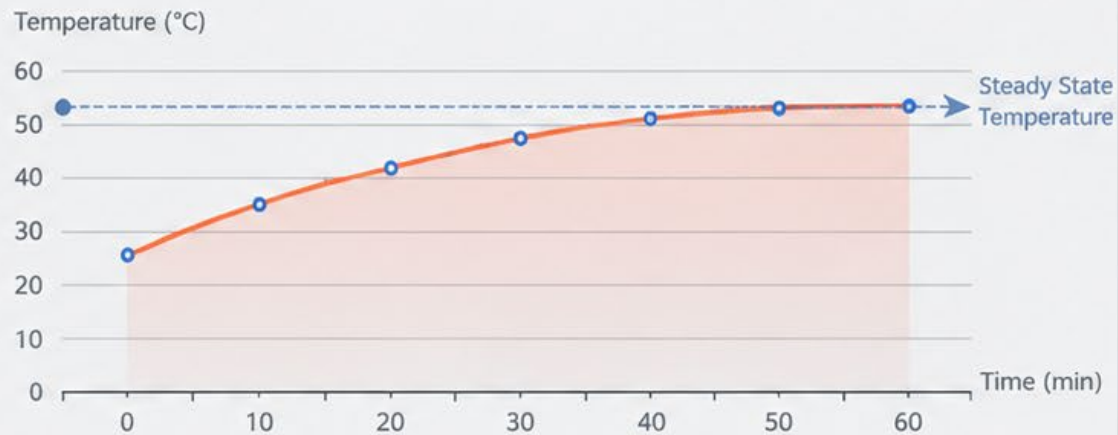
Current Range	Test Focus
8000 – 15000A	Temperature Rise



Key Challenges

1. **Ultra-High Current Output**
   Electronic loads must deliver extremely high currents, ensuring stable output and strong capability to withstand short-circuit conditions.
2. **Long-Term Stable Output**
   Busbar testing requires continuous operation for extended periods, with minimal current fluctuation and stable output (e.g., 10000A, 20000A, 4000A, etc.).
3. **Test Solution Flexibility**
   R&D stage requires dynamic load simulation (e.g., GPU workload characteristics), while production stage requires multi-point temperature rise measurement.

Busbar Temperature Rise Curve



Busbar Testing: Solution Comparison

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Solution 1: Static Short-Circuit Testing Solution

Suitable for fast production line screening

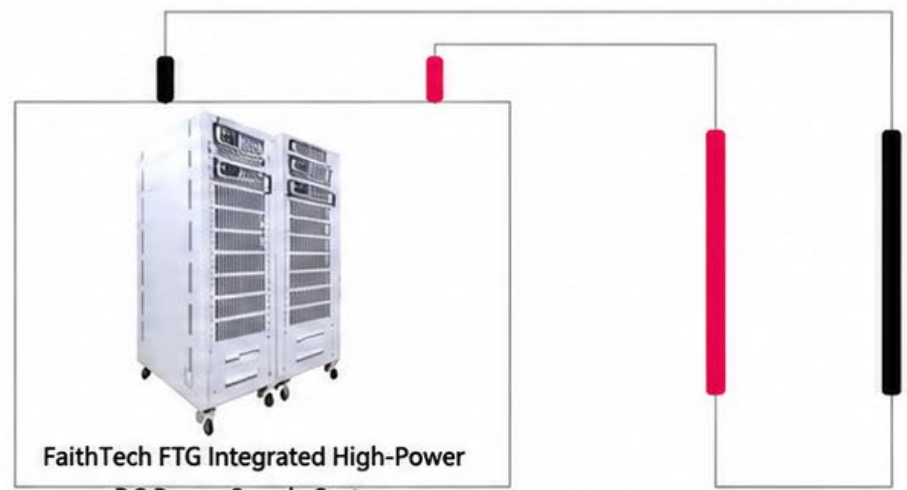
Working Principle

The FTG high-power supply is directly connected in series
with the busbar at both ends, delivering a constant high current.
The busbar temperature rises due to concentrated
Joule heating.

Faithtech Advantages

FTG modular parallel design, 3U high-density system supports 1800A.
Maximum parallel expansion up to 40000A.
Even under short-circuit conditions, accuracy remains
0.1% + 0.1% F.S.
Built-in protection functions:
OVP (Over Voltage Protection)
OCP (Over Current Protection)
OTP (Over Temperature Protection)

DC Short-Circuit Method for Rapid Busbar Temperature Rise Evaluation
— Test Schematic Diagram



FaithTech FTG Integrated High-Power
DC Power Supply System

Simulates extreme temperature-rise conditions – ultra-low voltage,
high current, all electrical energy converted into heat,
to evaluate the busbar's ultimate current-carrying capacity.
FTG series can simulate stepped current profiles,
closely matching real-world load variations.

Busbar Testing: Solution Comparison

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Solution 2: Dynamic Power + Load Testing Solution

Suitable for R&D validation and dynamic aging tests

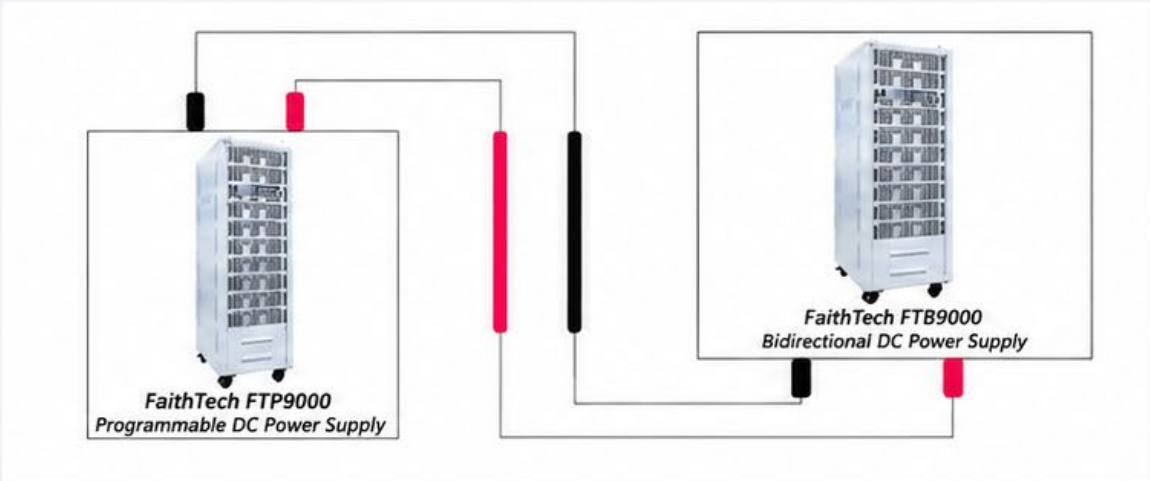
Working Principle

FTP9000 simulates PSU output (12V/48V)
FTB9000 bidirectional power supply acts as electronic load,
drawing current and returning energy to the grid

FaithTech Advantages

The FTB9000 series offers 95% energy recovery efficiency,
programmable GPU current profile,
and transient response time < 2ms

Simulation of Real Operating Conditions for
Accurate Busbar Temperature Rise Evaluation — Test Schematic Diagram



Dynamic Power + Load Testing Method Simulates Real Systems

Recreates the complete electrical environment of a PSU (power supply) and busbar under full-load conditions.
Supports dynamic current profile changes to evaluate busbar temperature rise under transient conditions.
Test results provide more reference value.
Energy recovery significantly reduces long-duration test energy consumption and heat dissipation costs.

HVDC MW-CLASS SYSTEM VALIDATION

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Test Background

The HVDC system serves as the MW-class high-voltage DC power supply for AI data centers, enabling dynamic response, **overload capacity, and high efficiency. It ensures the system's stability and reliability under high-load conditions.**

Feature	NVIDIA Solution	OCP (Open Compute Project) Solution
Core Concept	AI-native GPU architecture, building a highly integrated, high-performance computing ecosystem	Promotes openness, standardization, and operability, reducing industry costs
Key Drivers	NVIDIA and partners ecosystem and collaboration	OCP organization, driven by members such as Microsoft, Meta, etc.
Voltage Specification	800V HVDC high-voltage DC bus, up to 1500V	Current mainstream core spec is ±400V HVDC (equivalent to 800V voltage).
Target Power	Supports 1.2 – 1.5MW per power cabinet	Targets power cabinets in the range of 100kW to 1MW, with standardized implementation.
Industry Positioning	Proprietary technology path, building NVIDIA ecosystem	Open ecosystem approach, any manufacturer can participate, forming a broad supply chain
Key Advantages	Deep integration with NVIDIA GPUs, delivering high performance and efficiency, accelerating AI training	Open standards to avoid vendor lock-in, enabling large-scale procurement to reduce overall costs
	Leading with ultimate performance and proprietary ecosystem, a "premium path"	Leading with openness and ecosystem collaboration, a "mainstream path"

HVDC MW-Level System Validation

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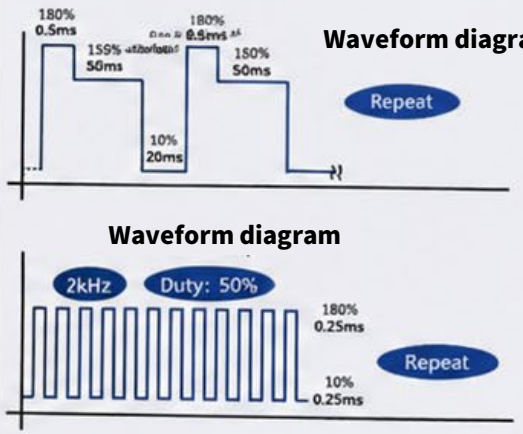
Key Challenges

1. **MW-Level Load Demand**
   Requires 1.5MW~3MW bandwidth capability;
   standard DC load solutions cannot reach this level
2. **High Dynamic Response Requirement**
   Requires >60A/μs current slew rate
   to verify dynamic performance
3. **Long-Term Cost Efficiency**
   Long-duration aging tests increase energy consumption;
   need rapid energy recovery solutions

OCP-Required Test EDPP (Example)



OCP-Required Current Slew Rate (Current Rated)

1 PSU: 1A/μs
1 Shelf: 6A/μs
1 Power Rack: 60A/us


PSU


Shelf


Power Rack

Voltage Range	Advantages	Considerations
0–400VDC	1. Mature ecosystem in the EV industry 2. Better safety and lower insulation requirements, but higher EDC/DC density 3. Uses 2-wire control power supply	1. High-power racks require large DC busbar volume, which may become a bottieneck 2. Module count increases, thermal dissipation efficiency may be limited below 800V architecture
0–800VDC	1. Higher voltage reduces current/wiring/component count and lowers heat loss 2. Lower current reduces battery power density requirements 3. Uses 2-wire control power supply	1. Ecosystem still evolving 2. Higher safety and DC/DC density requirements pose challenges
±400VDC	Combines the advantages of the above architectures	1. Requires 3-wire control power supply 2. Requires power management control to achieve load balancing

MARKET
ANALYSIS

Key Testing Challenges and Industry Standards

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⚠ Testing Challenges

AI Chip Characteristics: GPU/TPU/NPU experience microsecond-level power step changes (from 10kW to 100kW level).

MW-Level System Risks: High current and high di/dt easily cause bus resonance, protection misoperation, and module damage.

OCP Standard Positioning: EDDP is an AI power standardization initiative for power delivery, aiming to improve testability beyond traditional server test standards.

⚠ EDPP (Enhanced Dynamic Power Profile)

- **Base Load Stability:** 10% ~ 30% of rated power ; **Transient Overshoot:** 150 ~ 180% of rated power (<2ms) **High Sustain:** 120 ~ 150% (50 ~ 200ms)
- **Baseline Verification:** ≥ 2 hours
- **Energy Throughput:** ≥ 12 hours
- **MW System:** 24 ~ 72 hours (continuous cycles)

⚠ Scope of Application

- **Powershelf:** Centralized power rack (100 ~ 300kW)
- **Sidecar:** Power sidecar or other MW-level DC systems (1 ~ 1.2MW)
- **BBU backup system** (battery + supercapacitor)
- Current distribution panel
- Paralleled load control, inrush / short-circuit protection

HVDC System-Level Testing – Recommended Solutions

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Overview Comparison of Solutions

Type	Core Equipment	Power Range	Key Specifications	Application Scenarios
Model High Performance	FT682144H ×10pcs	1.44MW (1200V)	80–150A/μs slew rate 50kHz dynamic bandwidth	R&D validation Compliance testing, certification
Model High Regenerative	FTR7300 ×4pcs	1.2MW (1000V)	93% efficiency 0.99 power factor	Production aging EOL testing, energy saving priority
Model High Speed & Regenerative	FTR7100H ×12pcs	1.2MW (1000V)	80% efficiency 40A/μs slew rate	System integration testing Cost-performance optimized

FT68200H High-Speed Electronic Load

Power Rating	Scalability
6kW/3U	1.4MW+
Current Slew Rate	**Overload Capability**
80A/μs	200%

FTR7000 Bidirectional DC Power Supply

Power Rating	Regenerative Efficiency
50kW/4U	94%
Transient Response	**Power Factor**
2mS	0.99

FTR7000H High-Speed Regenerative Load

Power Rating	Regenerative Efficiency
100kW/37U	80%
Current Slew Rate	**Overload Capability**
30A/μs	180%

PSU Testing: Technical Background and Key Challenges

Architecture Compatbillity · Power Coverage · High-Speed Dynamics · Bus Simulation

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Test Background

AI server PSUs must support various high-voltage architectures (**±400V, 800V, Busbar, HVDC**), with **power coverage of 5.5kW to 33kW.** Test platforms require high architecture compatibility and flexibility.

Comparison of Four High-Voltage Architectures

±400V Architecture — OCP
Adopted by OCP and major vendors

800V Architecture — NV
High-voltage DC, reduced transmission loss

HVDC Architecture — HW
Huawei data center standard

Busbar Architecture — ALI
Alibaba data center standard

FT68200H is compatible with all mainstream high-voltage architectures

Key Challenges

1. **Architecture Inconsistency**
   Different vendor architectures make it difficult for test platforms to support multiple standards
2. **Power Density Requirement**
   Requires high power density (6kW/3U) to save rack space
3. **Dynamic Response Requirement**
   Requires high dynamic response (±10A/μs) to capture transient performance

FT68200H Key Specifications

Power Coverage **6kW ~ 72kW+**	Power Density **6kW/3U**
Current Slew Rate **40 ~ 96A/μs**	Overload Test **200% 5000ms**

Communication Interface: LAN/RS232/CAN, SCPI/ModBus, PC software

BBU Testing: Test Background and Key Challenges

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Test Background

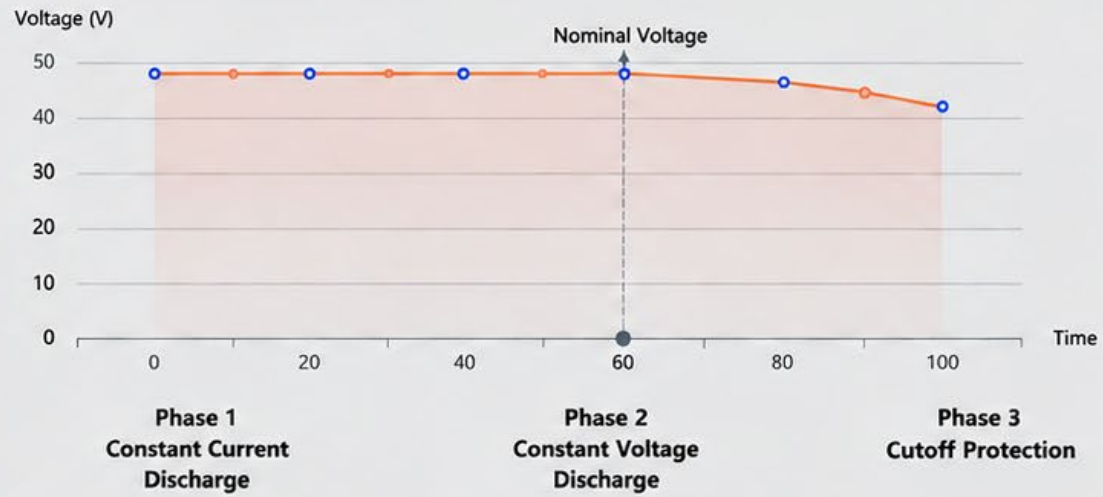
Data center BBU (battery backup unit) must comply with ORV3 standard, verifying discharge performance and BMS balancing capability to ensure the reliability and safety of the power system.

Standard	Test Focus
ORV3	**BMS + Balancing**

Key Challenges

1. **ORV3 Compliance is Complex**
   Discharge test must comply with ORV3 standard, making standardization difficult to implement
2. **High Accuracy Requirement for BMS Validation**
   Requires high-precision cell simulators (μA-level), most conventional equipment cannot meet the requirement
3. **Balancing Test Capability**
   Requires active balancing test capability to validate the battery management system

ORV3 Discharge Profile



Measurement Accuracy Comparison

BBU TESTING: SOURCE + LOAD + BATTERY SIMULATION

ORV3 Discharge Curve · BMS Balancing · µA Leakage Current · All-in-One Solution

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ORV3 Discharge Curve

Customer Requirement

Output specified power/current within a given time window

Solution

FTP9000 Power Supply + FT63200H Electronic Load Series enables precise ORV3 waveform reproduction

BMS Balancing Performance

Customer Requirement

Verify passive and active cell balancing effectiveness

Solution

FT8330 configurable channels support independent editing and measurement of cell balancing currents

µA Leakage Current

Customer Requirement

Measure BMS standby power consumption and detect µA-level leakage current

Solution

FT8330 Series provides µA-level current measurement accuracy

BBU Test Three-Component Suite

FTP9000 Power Supply

- Voltage accuracy: 0.02%
- Transient response <2ms
- Sequencing capability

→ Simulates BBU charging scenario

FT63200H Electronic Load

- High-speed dynamic: 40A/µs
- Multiple operating modes
- High-precision measurement

→ Simulates ORV3 discharge waveform

FT8330 Battery Simulator

- 3U / 24 channels
- µA-level current measurement accuracy
- Active cell balancing support

→ BMS HIL testing

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Q&A

THANKS

CHINA / KOREA / INDIA / GERMAN / FRANCE / ENGLAND / ITALY / UNITED STATES