

PRODUCT SPECIFICATION DOCUMENT

AP450 Module

Advanced, modular hybrid energy system
for ultimate industrial cost optimization.





AP450 Module

Key Performance Parameters

Rated Power : 450 kVA

Battery Capacity : 474 kWh

On/Off-Grid Switching : < 20ms (UPS-Grade)

System Efficiency : Up to 92.2%

Key Benefits



Ultimate OPEX Reduction

Achieve 30%-80% in total energy cost savings through comprehensive fuel optimization, peak shaving & valley filling (arbitrage), and demand charge management.



Open & Scalable Platform

Modular design for on-demand scaling. Standard APIs enable seamless integration with third-party asset management platforms, protecting your long-term investment.



Mission-Critical Reliability

<20ms UPS-grade seamless switching and BESS fault bypass capabilities ensure uninterrupted power for your critical loads.



Plug & Play Deployment

Standard 10-foot container design with integrated quick-connect interfaces simplifies global logistics and on-site deployment.

Typical Application Scenarios



Mining



Construction



Large Scale Events



Critical Facility
Backup Power



Microgrids



Equipment Rental

Detailed Technical Specifications

PERFORMANCE

Rated Power	450 kVA
Peak Power	600 kVA (60S)
System Round Trip Efficiency	Up to 92.2%
Total Harmonic Distortion, THD	< 3% (Current), < 2% (Voltage)
Off-Grid Voltage/Frequency Accuracy	±1% / ±0.1%
Power Response Time	< 200 ms
Grid/Off-Grid Switch Time	< 20 ms (UPS-level)
Power Control Accuracy	± 2% of Rated Power

ELECTRICAL

AC Connection	3-Phase 4-Wire + PE
Rated AC Voltage	400 VAC (Multi-voltage configurable)
Voltage Range	400 VAC (-10% ~ +15%)
Rated Frequency	50 / 60 Hz
Rated AC Current	650 A (@ 400V) / 627 A (@ 415V)
Max AC Current	866 A (60 seconds@ 400V) / 835 A (60 seconds@ 415V)
Power Factor Range	0 (ind) ... 1 ... 0 (cap)
Short-circuit Current Rating	50 kA, 0.5s

ENERGY

System Round Trip Efficiency	Up to 92.2%
Cell Chemistry	LiFePO4
Nominal Capacity	474.24 kWh
Usable Capacity	474.24 kWh (100% DoD)
Rated Charge/Discharge Time	1 hour (at 450 kW)
Cycle Life	>8000 cycles @ 80% DoD, 70% EoL
Battery Management System	Industrial-grade BMS with cell-level monitoring
Thermal Management	Intelligent liquid cooling system with low-temperature pre-heating

MECHANICAL

Dimensions L x W x H	2438 x 2185 x 2438 mm
Weight	~8,700 kg
Transport Compliance	UN 38.3 transportation safety certification
Transport Features	Standard Corner Castings, Forklift Pockets
Enclosure Material & Coating	High-strength Weathering Steel, Outdoor Anti-corrosion Coating
Structural Strength	Designed to meet local wind load, snow load, and seismic requirements (details available on request)
Cable Entry	Bottom/Side entry with quick-connect ports

ENVIRONMENTAL

Protection Class	IP54
Operating Temperature	-20°C to +50°C
Storage Temperature	-25°C to +55°C
Operating Humidity	0 ~ 95% (Non-condensing)
Operating Altitude	≤3000m
Noise Level	<60 dB(A) @7m
Corrosion Protection Class	ISO 12944 C4 Compliant (C5 Optional)

Vibration & Shock Resistance	Compliant with UN 38.3 transportation safety certification, including vibration & shock tests
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PROTECTION & SAFETY

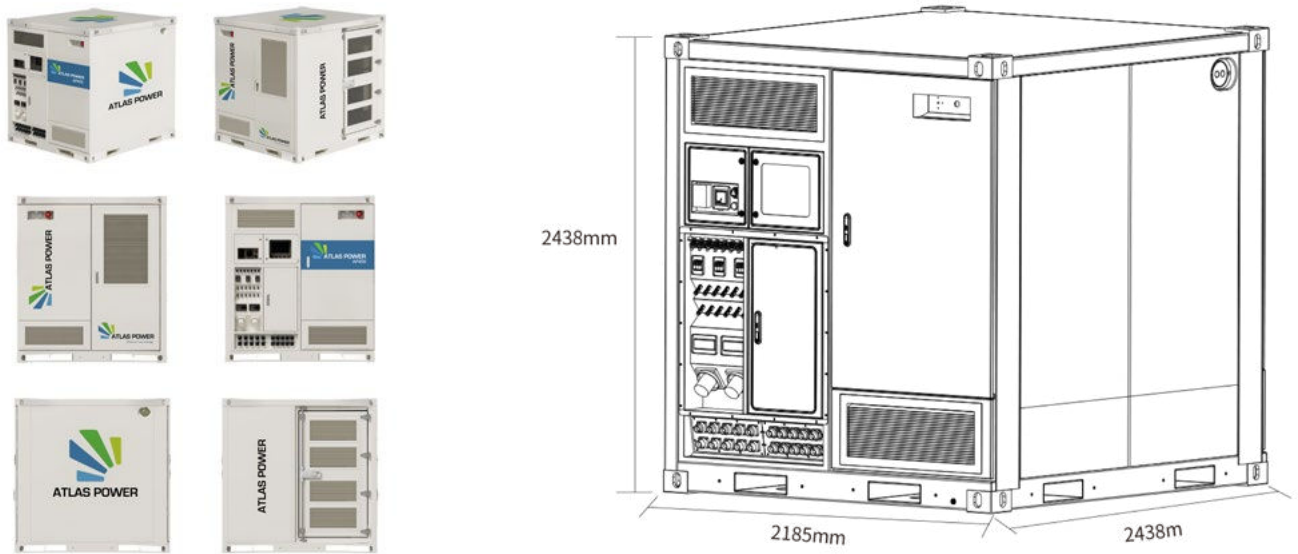
Fire Safety Sub-system	Multi-sensor Fusion Detection (Smoke, Thermal, Combustible Gas)
	FK-5-1-12 / Aerosol Fire Suppression Unit
Electrical & Personal Safety	System-level Safety Integration
	RCD Protection
	Grounding & Insulation Monitoring
	Multi-level Overcurrent/Short-circuit/Over-voltage Protection (MEN Link)Flexible Grounding Configuration

COMPLIANCE & CERTIFICATION

System Level Safety	CE Declaration of Conformity
Battery Safety	IEC 62619, UL 9540A
Transport Certification	UN 38.3
Grid Code Compliance	EN 50549, AS/NZS 4777, VDE-AR-N 4110, PEA/MEA, etc. (configured by region)
Fire Suppression	Integrated temperature-sensitive, smoke-sensitive, and perfluorohexane automatic fire suppression system
(EMC) (Electromagnetic Compatability)	CE Marking (EMC Directive 2014/30/EU)(Based on IEC/EN 61000 series standards)

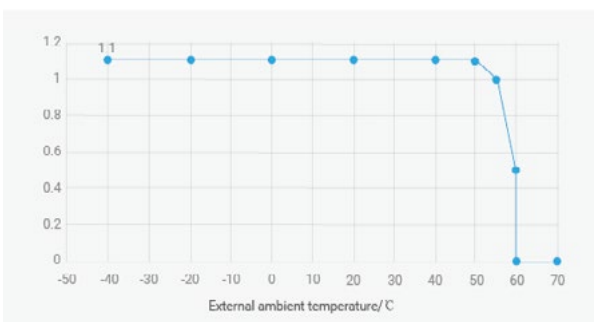
Dimension Drawing:

Top, Front, Side views with key dimensions

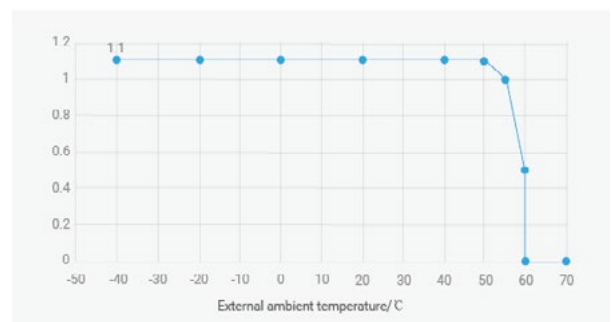


Performance Curve Chart:

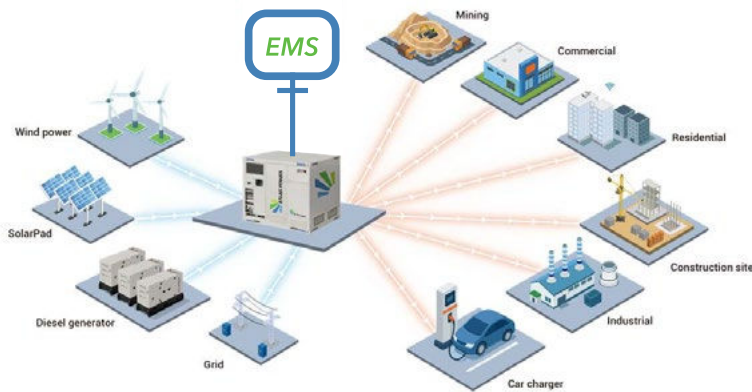
Power Derating Curve vs. Temperature:



Power Derating Curve vs. Temperature:



EMS & Platform Architecture



Business-Goal-Driven Intelligent Brain

EMS is the core intelligence of the AP450, transforming complex power scheduling into a straightforward solution aligned with your business objectives. You don't need to be an electricity expert—simply choose your desired outcome: reduce electricity costs, save fuel, or ensure critical power supply.

One Click Business Modes

Basic Mode: For all users, ready to use right out of the box

Grid Optimisation Mode

Connect to the grid, and it automatically saves on your electricity bills.

- **Peak Shaving & Valley Filling:** Automatically charges during off peak hours and discharges during peak hours to capitalize on electricity price differences (arbitrage).
- **Demand Charge Management:** Reduces power peaks in real-time to avoid costly demand charges.
- **PV Self-Consumption:** Prioritizes the use of solar power to maximize the return on your green energy investment.

Fuel Saver Mode

Connect to the genset, and it automatically saves on fuel.

- **Silent Run:** Automatically shuts down the genset during night-time or low-load periods, with the battery providing zero-noise, zero emission power.
- **Efficiency Optimization:** Intelligently starts and stops the genset, ensuring it always operates within its optimal fuel efficiency range.

Critical Power Mode

Protect your core equipment with an uninterruptable power supply.

- **Grid-interactive UPS (<20ms):** In case of a grid outage, it seamlessly switches to battery power in milliseconds (<20ms), providing uninterruptible power for servers, production lines, and other critical loads.
- **Redundant Bypass Mode:** In extreme scenarios, such as a BESS fault, the system can automatically start a backup genset and bypass the BESS to ensure critical loads remain powered without fail.

Advanced Mode: For professionals, unlocking full potential (License required)

Grid Optimisation Mode

Integrates multiple energy sources (grid, genset, PV) to form an adaptive, selfhealing, and resilient microgrid, enabling seamless on-grid and off-grid transitions.

Fuel Saver Mode

BESS works in tandem with the genset, utilizing "Virtual Synchronous" technology to smooth out power surges. This allows you to drive heavy loads like crushers with a smaller genset, significantly reducing CAPEX and fuel consumption while protecting the generator from impact.

Critical Power Mode

Leverages the BESS's rapid response capabilities to participate in grid ancillary services (such as frequency regulation), turning your energy storage asset into a revenue stream.

Born for Integration: Open Platform and Multi-Machine Parallel Operation

The AP450 is not just a product, but an expandable energy platform. We understand your need for unified management and secondary development capabilities



Open API:

- Provides a standard **RESTful API**, allowing you to seamlessly integrate all AP450 operational data and control functions into your existing asset management platforms or SCADA systems.
- We offer comprehensive API documentation, SDKs, and developer support/integration process.



Standard Protocols

- Natively supports protocols such as **Modbus-TCP, MQTT, and CAN** for easy integration into industrial field networks.



Extensive Genset Compatibility:

- Regardless of your diesel generator specifications—from small single units to large paralleled groups—the AP450 can be quickly integrated via preset control modes for plug and play collaboration.
- We have natively adapted and are deeply compatible with mainstream genset controller brands, including but not limited to ComAp, DeepSea (DSE), and DEIF, significantly simplifying the complexity and time of on-site commissioning.



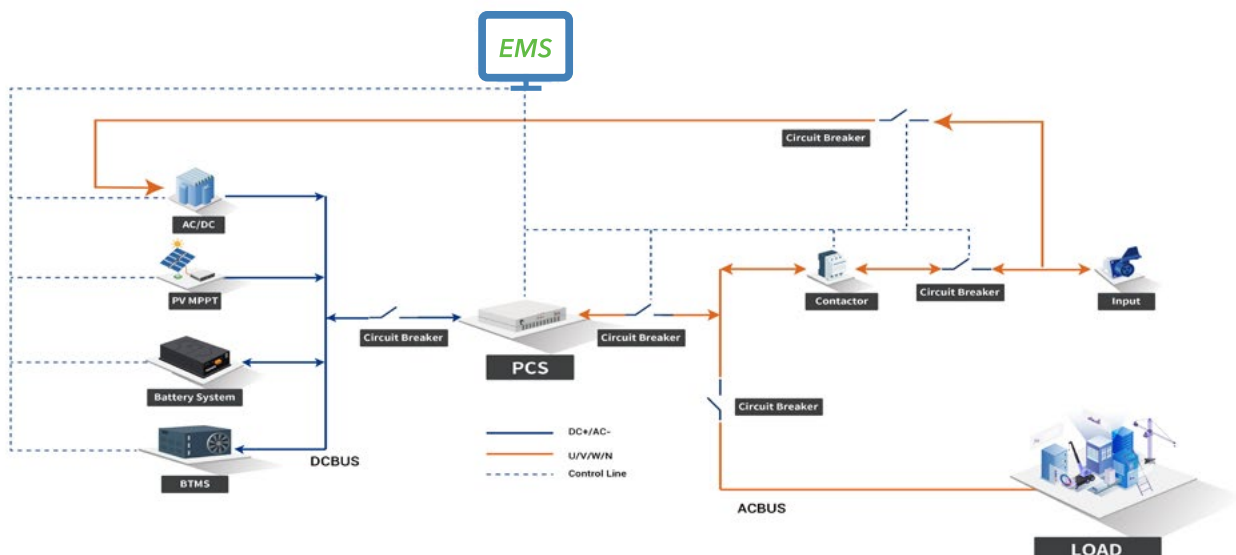
Seamless Parallel Operation:

- Multiple AP450 units can be orchestrated by a central controller (cEMS), **acting as a single, large-capacity unit**.
- Whether for MW-scale peak shaving or building an N+1 redundant power system, it can be easily achieved, protecting your long-term investment and enabling on-demand scalability.



Web & App

- Provides powerful remote monitoring, data analytics, fault diagnostics, and **Firmware Over-The-Air (FOTA)** upgrade services to ensure your assets are always operating at peak performance.



Configuration & Options

Customize your AP450 for specific project demands with these modular upgrades:

- **Harsh Environment Protection (IP65)**
Upgrades the standard IP54 liquid-cooled enclosure to an IP65 rating with industrial air conditioning, designed for extreme dust, salt spray, or humidity.
- **Critical Load High-Speed Switching (STS)**
Adds a standalone Static Transfer Switch (STS) unit to achieve <4ms transfer times for sensitive data center loads.
- **DC-Coupled PV Integration**
Adds a DC/DC MPPT module to the standard architecture, enabling direct connection of PV strings for maximum green energy efficiency.
- **Satellite Communication**
Adds satellite connectivity to the standard 4G/LTE module, ensuring reliable monitoring in remote off-grid locations.
- **Galvanic Isolation Transformer**
Integrates an isolation transformer for projects requiring full electrical separation between the BESS and the grid.
- **Advanced Grid Services Software**
Unlocks advanced algorithms (Frequency Regulation, Economic Dispatch) on top of the standard EMS for additional revenue generation.

Service & Support

Backed by a global network, we ensure maximum uptime and ROI for every AP450.

Global NOC (7x24)

Proactive remote monitoring and diagnostics for the cloud to resolve issues before the impact operations.

Localized Support

Proactive remote monitoring and diagnostics for the cloud to resolve issues before the impact operations.

Comprehensive Warranty

Standard 1-Year system / 5-Year battery warranty, extendable up to 5 years for total peace of mind.

Professional Training

Full operational enablement to help your team maximize system performance and revenue.

Contact our energy experts today to tailor your AP450 solution



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