Open Energy for All



All-in-one Energy Storage Battery Cabinet

Specification Manual

HoyUltra 100 kW/215 kWh All-in-one Energy Storage Battery Cabinet

Revision History

Revision	Revision Date	Revised Pages	Description of Revision
V1.0	2024-11-22	-	Initial release
V1.1	2024-12-20	Page 1, 2, 3, 4, 6, 7, 11	Updated the standards and compliance certifications listed on pages 1, 3, 4, 6, 7 and 11, and revised the cycle count on page 2.
V1.2	2025-01-06	Page 5 and Page 20	Updated the composition layout, fire-suppression diagram , and system topology diagram.

Abbreviations

Abbreviation	Meaning	Abbreviation	Meaning
BAU	Battery Array Unit	EMS	Energy Management System
BCU	Battery Control Unit	PCS	Power Conversion System
BMU	Battery Management Unit	UPS	Uninterruptible Power System
BMS	Battery Management System		

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1 Overview

This specification manual mainly describes the technical parameters, the structural features of each part of the system, and the electrical requirements of 100 kW/215 kWh all-in-one energy storage battery cabinet (hereinafter referred to as "all-in-one energy storage battery cabinet").

1.1 Overview

The HoyUltra 100 kW/215 kWh all-in-one energy storage battery cabinet is designed with an 'all-in-one' concept. It integrates storage batteries, a BMS (battery management system), a PCS (power conversion system), an EMS (energy management system), a thermal management system, and a fire suppression system into a single standardized outdoor cabinet. Its modular design allows for scalable capacity, ranging from 100 kW/215 kWh to 1 MW/2.15 MWh.

1.2 Standard and Compliance

GB/T 34120	Technical Specification for Power Conversion System of Electrochemical Energy Storage System
GB/T 34131	Testing code for power conversion system of electrochemical energy storage system
GB/T 34133	Testing Standards for Harmonics between Power Conversion Systems
GB/T 36276-2018	Li-ion battery for electrical energy storage
UN 38.3	UN Recommendations on the Transport of Dangerous Goods - Manual of Tests and Criteria - Part 3 Section 38.3 - Requirements of Li-ion Battery
IEC 61000-6-1-2019	Electromagnetic Compatibility (EMC) - Part 6-1: Generic Standards - Residential, Commercial and Light-industrial Environments
IEC 61000-6-2-2019	Electromagnetic Compatibility (EMC) - Part 6-2: Generic Standards - Immunity Standard for Industrial Environments
IEC 61000-6-3-2019	Electromagnetic Compatibility (EMC) - Part 6-3: Generic Standards - Emission Standard for Residential, Commercial and Light-industrial Environments
IEC 61000-6-4-2019	Electromagnetic Compatibility (EMC) - Part 6-4: Generic Standards - Emission Standard for Industrial Environments
IEC 62619-2017	Safety Requirements and Test Methods for Lithium Batteries and Lithium Battery Packs in Industrial Applications, Including Stationary Applications
IEC/UL 60730-1: 2016 Annex H; IEC/EN 60730-1: 2020 Annex H	Safety Standard for Automatic Electrical Controls – Part 1: General Requirements - Appendix H
ANSI/CAN/UL 1973: 2022	Safety Requirements for Batteries in Stationary, Vehicle Auxiliary Power and Light Electric Rail (LER) Applications
ANSI/CAN/UL 9540A: 2019	Standard for Safety for Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems
C10/11: 2019	Belgium Standards for Grid Connection
CEI 0-21	Italian Standards for Low-voltage Grid Connection
CEI 0-16	Italian Standards for Medium/High-voltage Grid Connection
EN 62477-1: 2012+A1: 2017	Safety Functional Requirements for Electrical Equipment and Systems
EN 50549-1: 2019+AC.2019-04; EN 50549-2:2019+AC:2019-03	European Standards for Grid Connection
EN 50549 & Deviations of Netherlands	Netherlands Standards for Grid Connection
EN 50549+Deviations of Greece	Greece Standards for Grid Connection
EN 50549+Deviations of Sweden	Sweden Standards for Grid Connection

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NC RFG; PTPiREE	Poland Standards for Grid Connection
NRS 097-21-1: 2017	South African Standards for Grid Connection
G99	Great Britain Standards for Grid Connection
UNE 217001: 2020; UNE 217002: 2020; NTS V2.1	Spanish Standards for Grid Connection
VDE-AR-N 4105: 2018; DIN VDE V 0124-100: 2020-06	German Standards for Grid Connection

1.3 Operating Environment

The basic environmental requirements of the all-in-one energy storage battery cabinet are:

Item	Requirement
Storage Ambient Temperature (°C)	-30 to 60
Operating Ambient Temperature (°C)	-30 to 55 (>45°C derating)
Operating Ambient Humidity	RH ≤ 95%
Operating Altitude (m)	≤ 3000 (>2000 m derating)

2 Performance Parameters and System Compositions

2.1 Product Parameters

Parameters of The All-in-One Energy Storage Battery Cabinet

DC Side	
Battery Type	Lithium Iron Phosphate
Combination Mode	1P240S
Rated Capacity (Ah)	280
Rated Energy (kWh)	215
Rated Voltage (V)	768
Rated Power (kW)	100
Rated Charge/Discharge Rate	0.5C
Operating Voltage Range (V)	672 to 864
Standard Charge/Discharge Current (A)	140
Cooling Mode	Liquid Cooling
Coolant	Ethylene Glycol: Aqueous Solution (50%v: 50%v)
Number of Cycles	8000
Fire Suppression System	NOVEC 1230 (Perfluoro)
Detector Type	Temperature Detector, Smoke Detector, Combustible Gas Detector
AC Side	
Rated AC Power (kW)	100
Ac Overload Capacity (kVA)	110
AC Connection	Three-Phase, Four-Wire

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Rated Grid Voltage (Vac)	380/400
Rated Grid Frequency (Hz)	50/60
Total Harmonic Distortion	＜ 3% (at rated power)
Power Factor	＞ 0.99 (at rated power)
Voltage Regulated Accuracy	≤ ±2%
Current Regulated Accuracy	≤ ±5%
Maximum Conversion Efficiency	98%
Cooling Mode	Air Cooling
System Parameters	
Operating Temperature Range (°C)	-30 to 55 (>45°C derating)
Noise (dB)	＜ 75
Dimensions (W × D × H [mm])	935 × 1250 × 2380
Weight (T)	2.3 ± 0.1
Anti-Corrosion Grade	C4
Protection Degree	Battery compartment: IP65; Electrical compartment: IP54
Operating Humidity Range (%RH)	0 to 95% (non-condensation)
Operating Altitude (m)	≤ 3000 (>2000 m derating)
Performance Ratio	Up to 86%
Communication Interface	CAN, Ethernet
Communication Protocol	Modbus, TCP
System Running Mode	
Peak Shaving and Valley Filling	Available
On-demand Control	Available
Economic Operation Mode	Available
Reactive Power Regulation	Available
Grid Dispatch Interface	Available
Remote Dispatch Interface	Available
Local Data Storage	Available
Anti-Reverse Current Management	Available
Standard and Compliance	
BMS	IEC/EN 60730-1: 2020 Annex H; IEC/UL 60730-1: 2016 Annex H; GB/T 34131-2017
Battery/System	GB/T 36276-2018; IEC 62619-2017; ANSI/CAN/UL 1973: 2022; ANSI/CAN/UL 9540A: 2019; UN 38.3; EN 62477-1: 2012+ A11: 2014 +A1: 2017 + A12: 2021; EN IEC 61000-6-1: 2019; EN IEC 61000-6-2: 2019; EN IEC 61000-6-3: 2021; EN IEC 61000-6-4: 2019
PCS	CE; GB/T 34120; GB/T 34133; EN 50549-1: 2019+AC: 2019-04; EN 50549-2: 2019+AC: 2019-03; CEI 0-21; CEI 0-16; NRS 097-2-1: 2017; EN 50549+Deviations of Netherlands; EN 50549+C10/11: 2019; EN 50549+Deviations of Greece; EN 50549+Deviations of Sweden; NC RFG; PTPiREE; G99; VDE-AR-N 4105: 2018, DIN VDE V 0124-100: 2020-06; UNE 217001: 2020, UNE 217002: 2020, NTS V2.1

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2.2 System Compositions

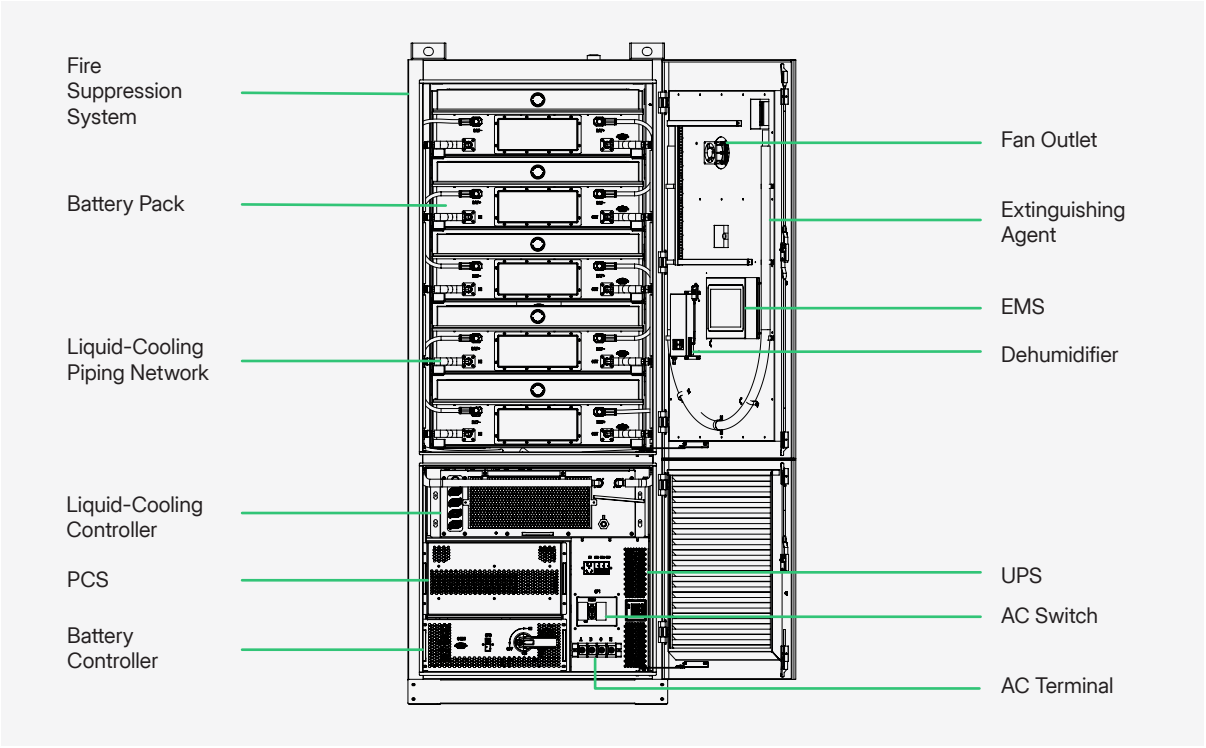
A single all-in-one energy storage battery cabinet is an independent energy storage unit. It includes five liquid-cooled battery packs, a battery controller, a PCS, BMS, EMS, a thermal management system, a fire suppression system, and an environmental management system.

Among them, cells are the basic unit of batteries. BMS mainly includes BAU, BCU, and BMU and is responsible for collecting information about cells, packs, and electric control cabinets. EMS is responsible for local energy management services and communication with other equipment. The thermal management system is responsible for cooling and heating the entire electric control cabinet system. The fire suppression system is responsible for the fire status detection and fire prevention of the entire electric control cabinet system. The environmental management system is responsible for the detection of water accumulation and dehumidification of the entire electric control cabinet system.

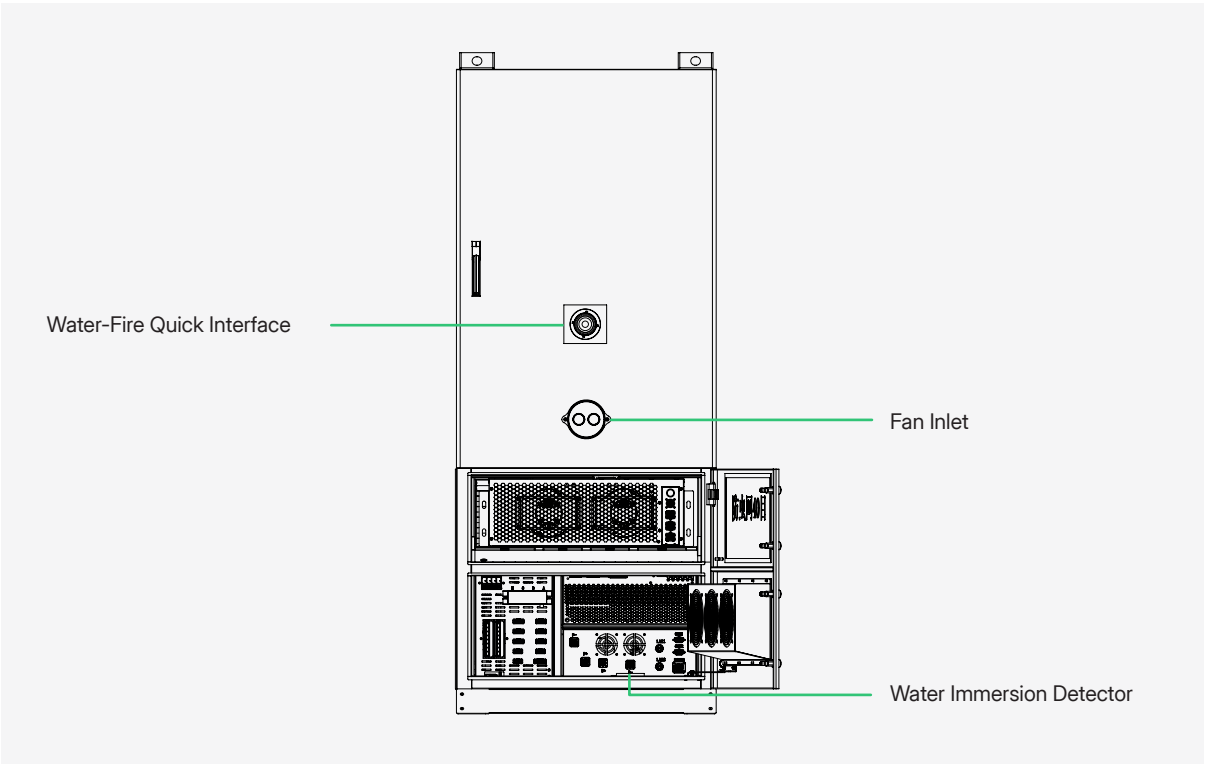
Compositions of The All-in-One Energy Storage Battery Cabinet

Component	Quantity	Remarks
Battery Pack	5	1P48S
Battery Controller	1	The battery controller mainly contains the testing device and protection device.
AC Control Box	1	Contains the main output switch, UPS, and surge protective device.
Thermal Management System	1	Including liquid-cooling controller and liquid-cooling pipeline Supporting cooling mode, heating mode, self-circulation mode, and standby mode.
PCS	1	Model: EPCS105-AM Supporting AC/DC conversion between the power grid and the battery, three-phase active and reactive power control, three-phase balancing, multiple devices in parallel connection, good scalability, and active and reactive power regulation.
BMS + EMS	1	5 BMUs + 1 BCU + 1 EMS* (EMS has integrated the function of managing the BAU.)
Fire Suppression System	1	Including smoke detector, temperature detector, and combustible gas detector.
Environment Management System	1	Including water immersion detector, dehumidifier

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Front view

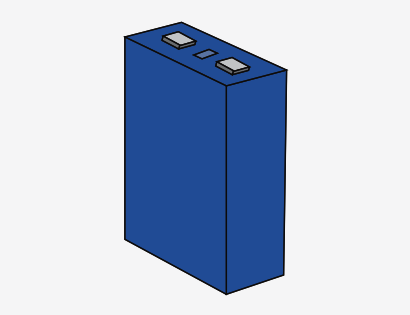


Rear view

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2.3 Cells

An aluminum shell lithium iron phosphate battery with a nominal voltage/capacity of 3.2 V/280 Ah.



Basic Parameters	
Chemical Material	LFP
Capacity (Ah)	280
Energy (Wh)	896
Voltage (Vdc)	3.2
Voltage Range (Vdc)	2.5 to 3.65
Temperature Range (°C)	Charging: 0 to 55 Discharge: -30 to 60
General Parameters	
Dimensions (W × D × H[mm])	173 × 71 × 208
Weight (kg)	5.34 ± 0.15
Storage Temperature (°C)	-30 to 60
Storage Humidity (%RH)	≤ 95
Standard and Compliance	
GB/T 36276-2018; IEC 62619-2017; ANSI/CAN/UL 1973: 2022; ANSI/CAN/UL 9540A: 2019; UN 38.3; EN 62477-1: 2012+ A11: 2014 +A1: 2017 + A12: 2021; EN IEC 61000-6-1: 2019; EN IEC 61000-6-2: 2019; EN IEC 61000-6-3: 2021; EN IEC 61000-6-4: 2019	

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2.4 Battery Packs

A pack contains 48 cells, one BMU, and 28 NTC temperature sampling circuits. The BMU is responsible for collecting the voltage and temperature of the cells in the pack. The following figure shows the appearance of a pack.

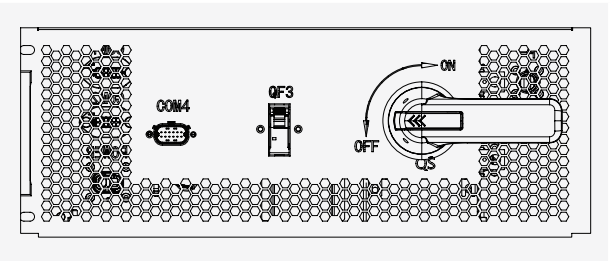


Basic Parameters		
Nominal Battery Capacity (kWh)	43.008	-
Number of Cells	48	-
Cell Self-Discharge/month (%)	≤ 3	25°C, 30% SOC, 3
Voltage Range (Vdc)	134.4 to 172.8	Cell: 2.8 V to 3.6 V
Rated Voltage (Vdc)	153.6	-
Rated Charge Rate	0.5P	-
Rated Discharge Rate	0.5P	-
Max. Continuous Current (A)	170 (for 1 min)	-
IP Rating	IP67	-
General Parameters		
Dimensions (W × D × H[mm])	761 × 1036 × 246	-
Weight (kg)	315 ± 5	-
Cooling Mode	Liquid Cooling	-
Communication Mode	Daisy Chain	-
Standard and Compliance		
GB/T 36276-2018; IEC 62619-2017; ANSI/CAN/UL 1973: 2022; ANSI/CAN/UL 9540A: 2019; UN 38.3; EN 62477-1: 2012+ A11: 2014 +A1: 2017 + A12: 2021; EN IEC 61000-6-1: 2019; EN IEC 61000-6-2: 2019; EN IEC 61000-6-3: 2021; EN IEC 61000-6-4: 2019		

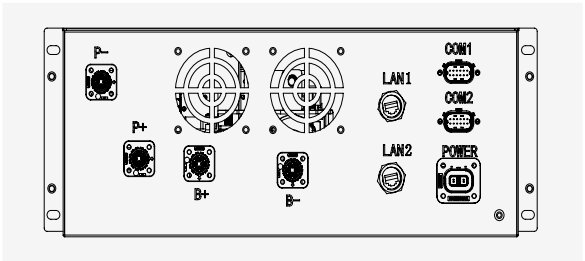
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2.5 Battery Controller

The battery controller primarily consists of a fuse, a contactor, and a BCU (Battery Control Unit). It is responsible for monitoring operational data, managing energy exchange, and facilitating signal communication for the battery rack. The structure diagram is shown below.



Front view

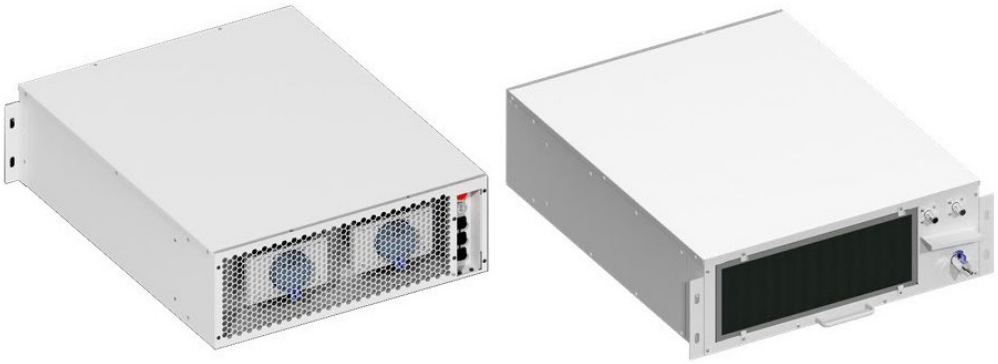


Rear view

2.6 Liquid-Cooling Controller

The all-in-one energy storage battery cabinet is equipped with a liquid-cooling controller that regulates the temperature of the antifreeze solution in the battery system and reduces ambient humidity using variable frequency control. The controller module supports both cooling and heating functions and includes a control module, high- and low-voltage power supply modules, and a support and protection structure module.

The liquid-cooling controller ensures the battery cells stay within their optimal operating temperature range, maintaining ideal conditions for normal operation and extending the battery's cycle life.



Parameters of the Liquid-Cooling Controller

Structure Parameters	
Outline Dimensions (W × D × H [mm])	700 × 870 × 240
Net Weight (kg)	65 (excluding coolant)
Installation Method	Drawer Type
Inlet/Outlet Piping	CQC18 Quick Connector
Refilling/Draining Connector	Φ12 Pagoda-Shape Connector
Environmental Protection and Performance	
Operating Ambient Temperature Range (°C)	-35 to +55
Storage Ambient Temperature Range (°C)	-40 to +70
Noise Level @L35/W18 (dB [A])	75
Appearance Color	RAL7035
IP Rating	IPX5
Refrigerant	R134A

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Coolant	Ethylene Glycol: Aqueous Solution (50%v: 50%v)
RoHS Certification	Compliant
CCC Certification	Compliant
CE Certification	Compliant
Cooling/Heating Capacity	
Cooling Capacity (kW)	3.0
Heating Capacity (kW)	2.0
Water Outlet Temperature (°C)	18.0
Parameter Settings	
Water Temperature Setting Range (°C)	10 to 35
Default Cooling Setpoint (°C)	20
Default Heating Setpoint (°C)	15
Communication Mode	RS-485 and CAN
Operating Mode	Cooling/Heating/Self-Circulation
Water Parameters	
Rated Circulating Water Flowrate (L/min)	30
Rated Outer Circulation Stroke (kPa)	90
Impurity Particle Requirements on Water Source (mm)	≤ 200
Power Dissipation	
Cooling Input Power (kW)	1.1
Heating Input Power @Tu=10°C (kW)	2.3
Power-On Self-Circulation Mode (kW)	0.2
Max. Power Dissipation (kW)	2.5
Power Supply Mode	
Rated Operating Voltage (V, Hz)	220, 50/60 ± 3 Hz
Voltage Range (V, Hz)	220± 15%, 50/60 ± 3 Hz
Max. Operating Current (V)	13.0

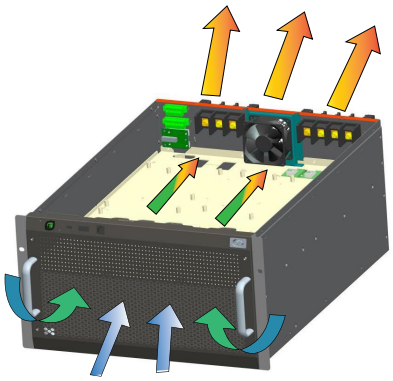
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2.7 Power Conversion System (PCS)

The power conversion system (PCS) is a bidirectional current controllable conversion device connecting the energy storage battery system and the power grid. The system mainly performs energy exchange between the battery and the power grid and controls and manages the charge and discharge of the battery.

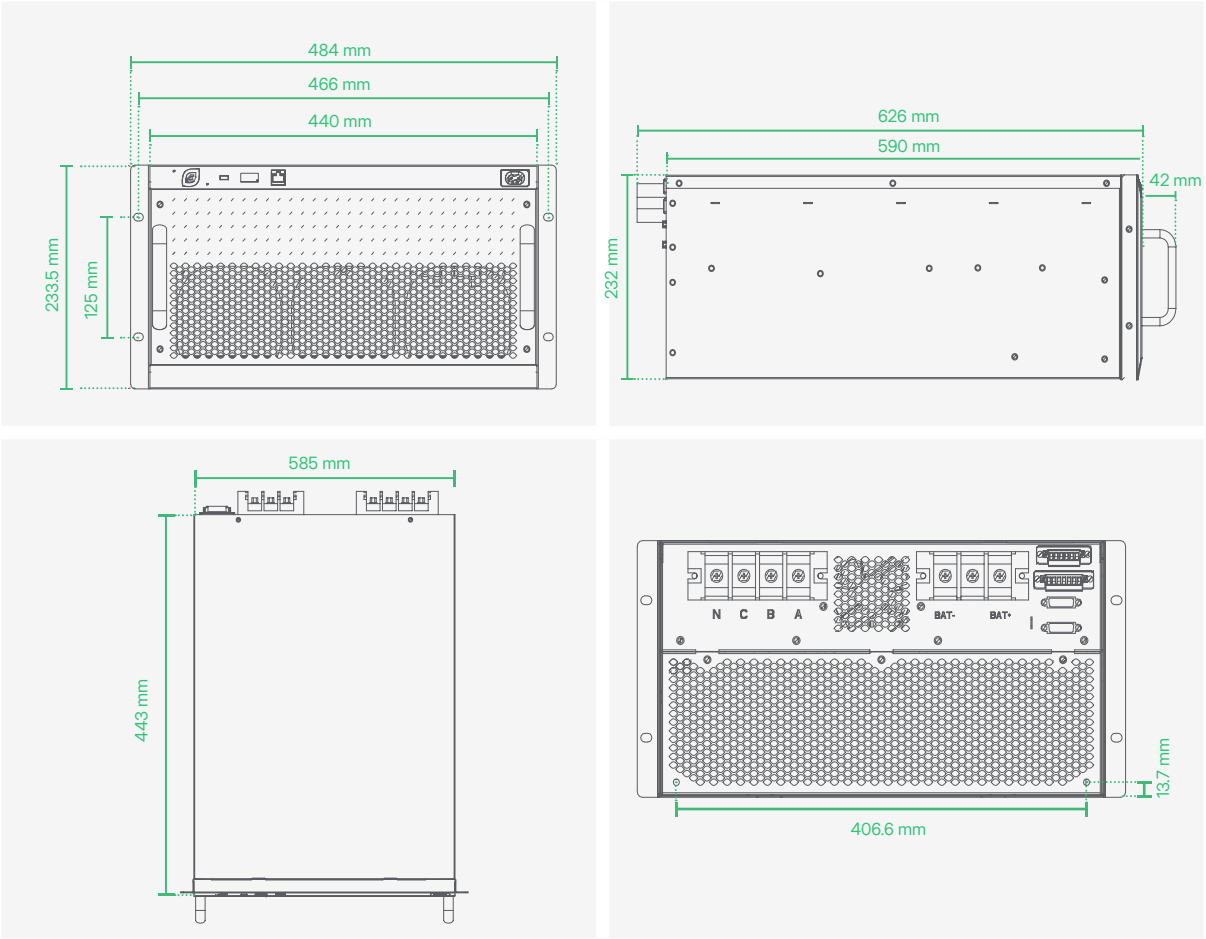
In grid-connected mode, the system can achieve peak-load shifting, peak regulating and frequency regulating, virtual capacity increase, and off-grid backup. At the same time, the PCS supports a variety of charge and discharge modes, including constant voltage, constant current, and floating charge.

** PCS model: EPCS105-AM*



Schematic Diagram of Heat Dissipation (Air Direction: Front-To-Back Airflow)

Dimensions



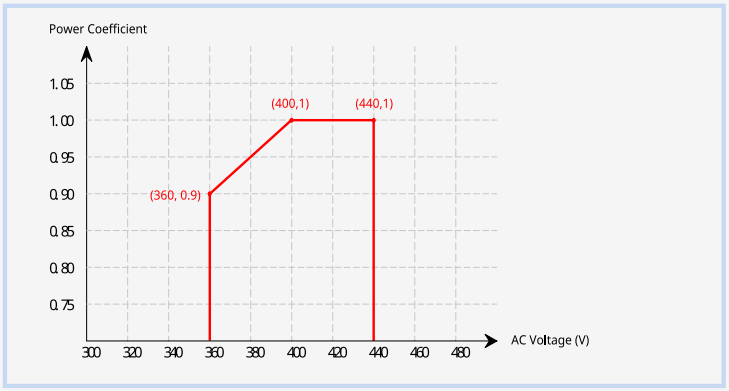
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Technical Parameters

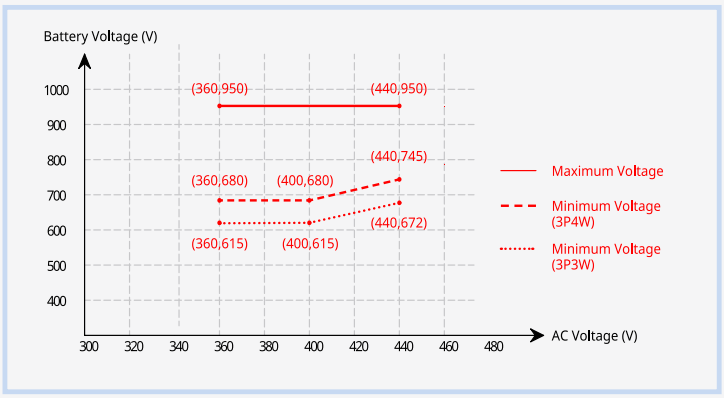
DC side	
Voltage Range (V)	615 to 950 (3P3L)/680 to 950 (3P4L)
Number of Inputs	1
Max. Charge/Discharge Current (A)	171
Ac Side (On-Grid)	
Rated Voltage (V)	230/400
Connection Method	Three-Phase, Three-Wire(3P3W) / Three-Phase, Four-Wire(3P4W)
Rated Output Power (kW)	105
Max. Apparent Power (kVA)	115.5
Max. Current (A)	167
Rated Grid Frequency (Hz)	50/60
Power Factor	0.99 (at rated power)
Power Factor Range	1 (leading) to 1 (lagging)
Total Harmonic Distortion	＜ 3% (at rated power)
DC Component	0.5%
Overload Capacity	110% (for continuous operation)
Max. Discharge Efficiency	98.2%
Ac Side (off-Grid)	
Rated Output Voltage	230/400
Ac Voltage Harmonic	＜ 3% (linear load)
Rated Frequency (Hz)	50/60
Rated Output Power (kW)	105
Max. Apparent Power (kVA)	115.5
Max. Output Current (A)	167
Protection Characteristics	
Features	AC Overcurrent Protection, AC Overvoltage Protection, AC Surge Protection, AC Short Circuit Protection, Anti-Islanding Protection, DC Reverse Connection Protection, and Surge Protection
System Parameters	
Dimensions (L ×D × H [mm])	484 × 703 × 256.5
Weight (kg)	50
Altitude (m)	4000 (> 2000 m derating)
Operating Temperature Range (°C)	-30 to 55 (> 45°C derating)
Humidity (% RH)	0 to 95 (non-condensation)
Cooling Mode	Smart Air Cooling
Protection Degree	IP20
Communication Interface	CAN/RS-485
Certifications	CE; GB/T 34120; GB/T 34133; EN 50549-1: 2019+AC: 2019-04; EN 50549-2: 2019+AC: 2019-03; CEI 0-21; CEI 0-16; NRS 097-2-1: 2017; EN 50549+Deviations of Netherlands; EN 50549+C10/11: 2019; EN 50549+Deviations of Greece; EN 50549+Deviations of Sweden; NC RFG; PTPiREE; G99; VDE-AR-N 4105:2018, DIN VDE V 0124-100: 2020-06; UNE217001: 2020, UNE217002: 2020, NTS V2.1

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Power Curve



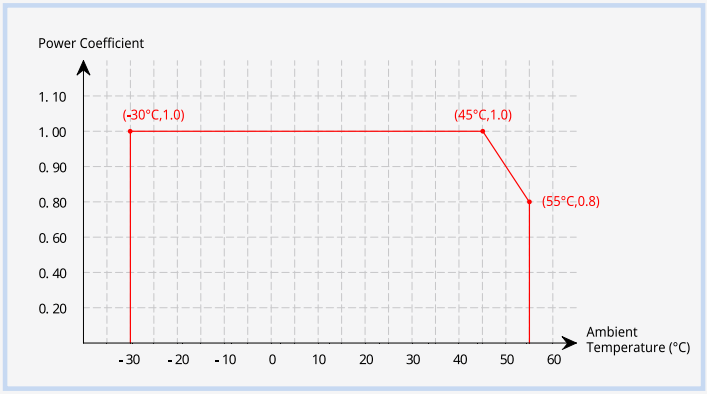
Line Chart 1-Power Coefficient VS AC Voltage



Line Chart 2-Battery Voltage VS AC Voltage



Line Chart 3-Power Coefficient VS Altitude



Line Chart 4-Power Coefficient VS Ambient Temperature

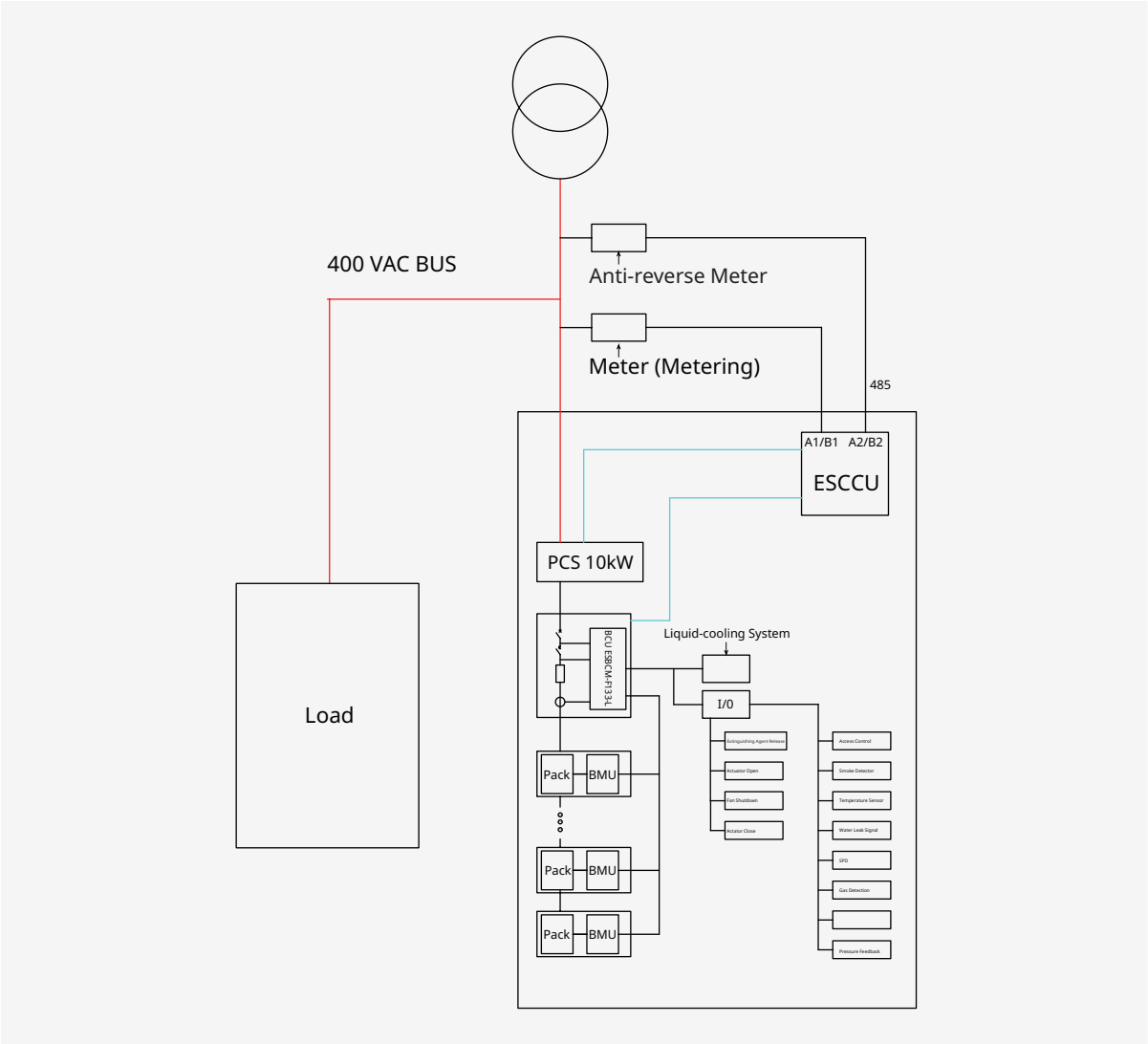
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2.8 Battery Management System (BMS)

The BMS is built on a three-level architecture, comprising a local Energy Management System (EMS), a Battery Control Unit (BCU), and a Battery Monitoring Unit (BMU), as shown in the figure below.

The BMU serves as the first-level control unit and is responsible for monitoring cell performance. It collects operational data from individual cells and manages them. The BCU processes this data, calculates the State of Charge (SOC), executes control commands, and carries out actions according to the system's control strategy. At the top level, the EMS acts as the central controller, overseeing and managing the BCU.

Topology of Battery Management System



Schematic diagram of BMS architecture

Basic Parameters of BMU

Item	Performance Parameter	Value	Remarks
Working Power Supply	Rated Voltage Range (V)	9 to 32	Typical value: 24 V
	Rated Power Consumption (W)	0.8	-
Cell Voltage Sampling	Number of Channels	6 to 48	Up to 48 channels are supported.
	Range (V)	0 to 5	-
	Accuracy	± 5 mV	-
		± (0.1%FS + 0.1%RD)	-

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Temperature Sampling	Number of Channels	12	-
	Range (°C)	-40 to +125	-
	Accuracy	± 1	± 1°C@-25°C to 65°C, ± 2°C@-40°C to -25°C, or 65°C to 125°C
Equalization	Equalizing Current (mA)	100	Passive equalization
CAN	Number of Channels	1	-
	Rate (kb/s)	125 to1000	Typical value: 250

Basic Parameters of BCU

Item	Performance Parameter	Value	Remarks
Working Power Supply	Rated Voltage Range (V)	9 to 32	-
	Rated Power Consumption (W)	3	DO has no external loads
12 V Voltage Output	Rated Voltage (V)	12	-
	Output Current (mA)	300	-
5 V Voltage Output	Rated Voltage (V)	5	-
	Output Current (mA)	300	-
Pack Voltage Sampling	Range (V)	0 to 1500	-
	Accuracy	± 0.5%FS	Typical value ± 0.1%FS
Current Sampling (Hall Current Sampling Only, Rather Than Shunt Current Sampling)	Range (A)	0 to ± 500	
	Accuracy	±(0.5%FS + 0.5%RD)	LEM DHAB series
	Accuracy	± 0.5%	Typical value ± 0.1%, LEM CAB series
Temperature Sampling	Number of Channels	4	-
	Range (°C)	-40 to +125	-
	Accuracy	± 1°C	± 1°C@-25°C to 65°C, ± 2°C@-40°C to -25°C, or 65°C to 125°C
Insulation Impedance	Range (mω)	0 to 10	-
	Accuracy	15%	15K error within 100K
DO	Number of Channels	8	For driving the relay
	Output Current (A)	1	Peak current 5 A@100 ms
DI	Number of Channels	8	-
	Low Level (V)	0 to 0.7	-
	High Level (V)	9 to 32	Typical value: 24 V
CAN	Number of Channels	3	CAN1 and CAN2 are isolated from each other. CAN0 has a 120 Ω termination resistor. You can use a jumper wire to connect a 120 Ω termination resistor on CAN1 and CAN2 when necessary.
	Rate (kb/s)	125 to1000	Typical value: 250
LAN	Number of Channels	1	-
	Rate (mb/s)	10/100	-
RS-485	Number of Channels	1	Isolated
	Rate (bps)	1200 to 115200	Typical value: 9600

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2.9 Energy Management System (EMS)

The EMS aggregates information from the energy storage system and supports local monitoring, energy management, on-demand control, peak-load shifting, and power export management. It also provides unified coordination and management of system equipment and data. Leveraging edge computing technology, the EMS can diagnose battery safety status within seconds and intelligently analyze health conditions and maintenance strategies. This reduces users' initial investment and O&M costs, enhances diagnostic efficiency, enables smarter operation, and increases the overall value of the energy storage system.

The EMS central control unit is highly versatile and can be applied to various energy storage systems on both the user and power supply sides. It offers data aggregation and collaborative diagnostic capabilities, supports wireless IoT interfaces, includes large-capacity SSD storage, and enables seamless cloud-edge interaction with cloud platforms or station-level systems. These features provide richer data services and an improved user experience.

Basic parameters of EMS

Item	Parameter
Central Processing Unit	ARM platform, 4 cores, 2.0 GHz main frequency
Memory	4 GB LPDDR4
Operating System	Linux
Storage	32 GB eMMC, 240 GB to 500 GB SSD, 32 GB SD card (optional)
Max. Number of Batteries That Can Be Tested	450 strings × 10 racks
LCD	10.1" true color touchscreen
Data Recording Interval	≥ 1 s
Querying Mode	Querying on touch panel or by remote access. Remote data export/download is supported.
Communication Interfaces	3 LAN interfaces, 3 isolated CAN interfaces, 5 isolated RS-485 interfaces, and 2 USB interfaces
DO/DI Interface	6 DIH inputs, with an optoelectronic isolator 6 DIL inputs, with an optoelectronic isolator 12 outputs, in a relay dry contact form 1 AC power loss testing interface
Communication Protocol	Modbus TCP
Event Log Database	More than 100,000 event records, including exceptions, time of occurrence, and protection actions. All data information can be stored throughout the life cycle.
Power Supply (Vdc)	24
Power Consumption (W)	＜ 10 (initial state when the screen lights up)
Baud Rate (bps)	9600@ RS485, 250@ CAN, 100Mbps/1000Mbps @ LAN
Dimensions (mm)	288 × 190 × 41.20
Weight (kg)	1.8
Material	Plastic case
Insulation Resistance Value	500 MΩ 1500 Vdc
Power Frequency Withstand Voltage (Vac)	2500
Ambient Temperature Range (°C)	-10 to +55
Storage Temperature Range (°C)	-40 to +85
Relative Humidity (%RH)	5 to 95 (non-condensation)
Altitude (m)	4000

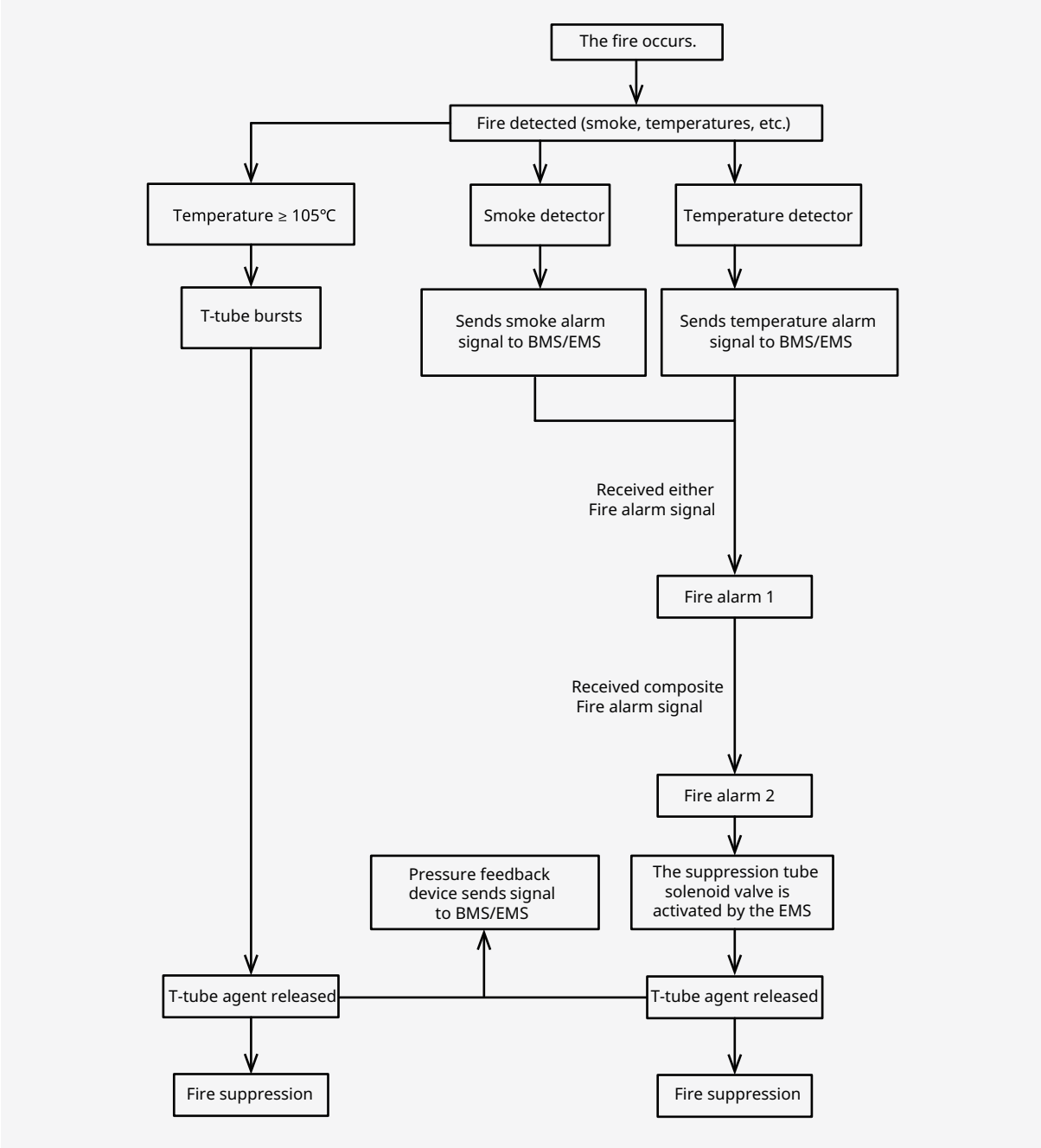
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2.10 Fire Suppression System

Composition of The Fire Suppression System

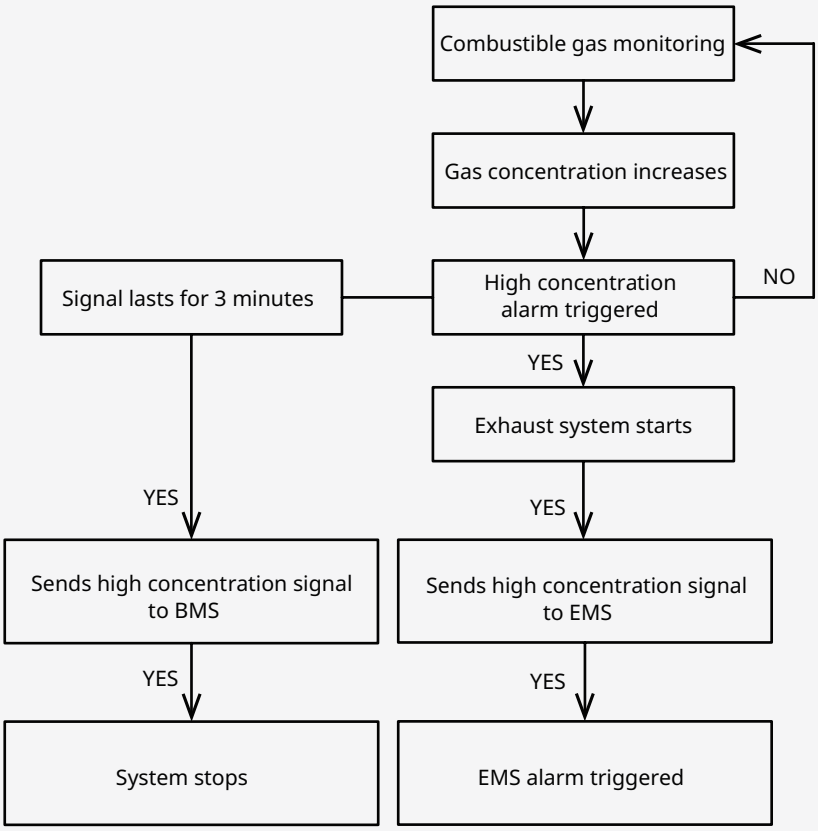
Name	Quantity	Function
Flexible T-Tube	1	Releases perfluoro (NOVEC1230)
Smoke Detector	1	Detects smoke concentration
Temperature Detector	1	Detects temperature
Combustible Gas Detector	1	Detects combustible gas concentration (hydrogen or carbon monoxide)
Water-Fire Suppression	1	DN65 Water-Fire suppression quick connector

Control Logic of Fire Suppression System



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Control Logic of Combustible Gas Detector



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2.11 Water Immersion Detector

A water immersion detector is a transducer integrating a probe and a transducer. The resistance value changes when the electrode at the needle probe is immersed in water, and the special integrated chip amplifies, shapes, and compares the signal and then outputs high and low level or relay alarms. The detector is suitable for triggering alarms in places at water accumulation risks.



Technical Parameters

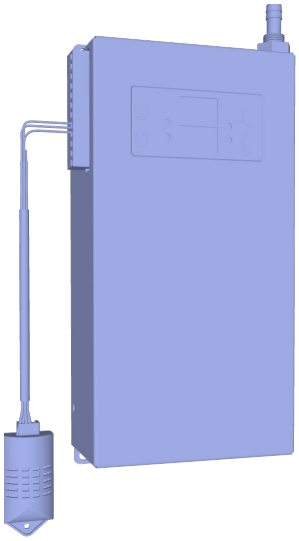
Supply Voltage (Vdc)	24 (12 V to 36 V)
Operating Temperature (°C)	0 to 60
Operating Humidity (%RH)	20 to 95
Error Rate (ppm)	< 100
Static Power Consumption (W)	0.5
Max. Power Consumption In Alarm Mode (W)	1.2
Output Mode	Relay (load current 100 mA)
Load Capacity (mA)	≤ 100 (Solid state relay)
Protection Degree	IP54
Weight (g)	240 (Approximately)

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2.12 Dehumidifier

A thermoelectric dehumidifier uses solid-state cooling technology based on the Peltier effect. The main component is a thermoelectric cooler (TEC). When DC power is supplied to the TEC, one side cools down while the other side heats up. Reversing the current direction swaps the cooling and heating sides.

To reduce humidity, the dehumidifier passes humid air over the TEC's cooling side. The temperature drop causes moisture in the air to condense on the surface of the cooling element. The condensed water is collected, lowering the humidity in the space



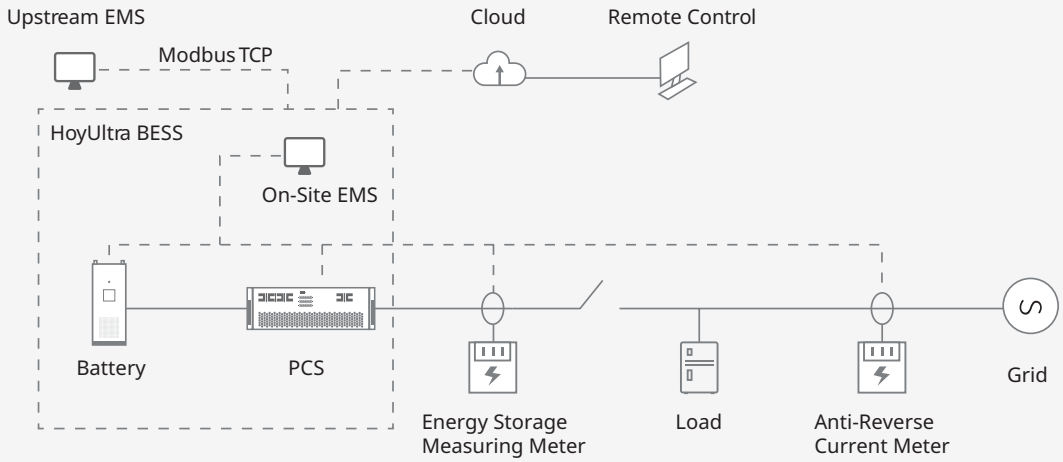
Technical Parameters

Operating Temperature Range (°C)	-10 to 55
Operating Humidity Range (%RH)	40 to 95
Storage Temperature Range (°C)	-40 to 70
Storage Humidity Range (%RH)	0 to 95
Rated Input Voltage (Vdc)	24
Steady-State Current (A)	2.65 ± 10%
Electric Power (W)	65 ± 10% (DC)
Dehumidification Capacity (mL/24 h)	550 (35°C/85%RH) 160 (39°C/40%RH)
Consistency	Error of dehumidification capacity ≤ 10%
Noise (dB)	≤ 65
Net Weight (kg)	≤ 1.6
IP Rating	IP20
EMC	Compliant with CE-EMC
Flame Retardant Requirement	UL94-V0
Humidity Detection Range of Sensor (%RH)	0 to 99
Temperature Detection Range of Sensor (°C)	-20 to +80
Sensor Accuracy	± 1°C (0°C to 60°C)/± 5%RH (0°C to 50°C)
Installation Method	35mm DIN rail mounting bracket R99-12 snap-fit
Dimensions (L × W × D [mm])	245 × 115 × 60
Certification Standards	CE-EMC and CE-LVD in Europe, UL in North America, UKCA in the UK, and SAA and C-tick in Australia
Compliance	Compliant with GB/T 2432 temperature cycling test requirements, Compliant with GB/T 10125 salt spray test requirements

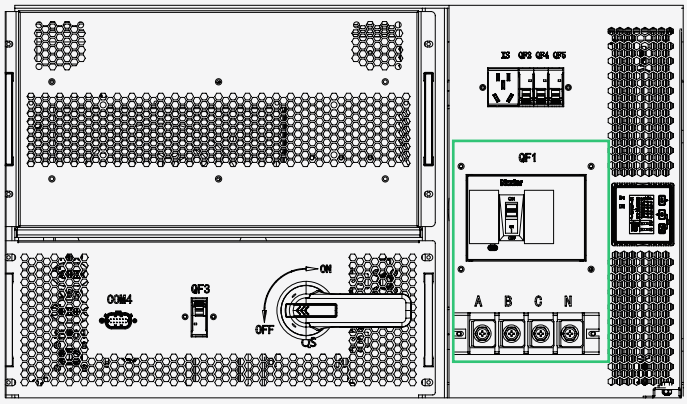
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3 Electrical Connections

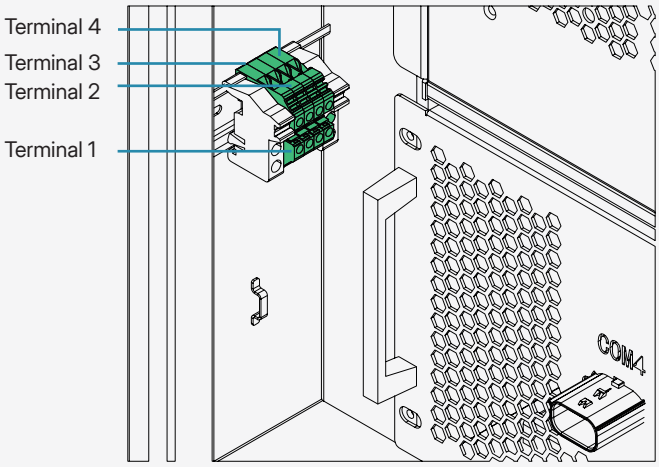
3.1 System Topology



3.2 Switches and Definitions



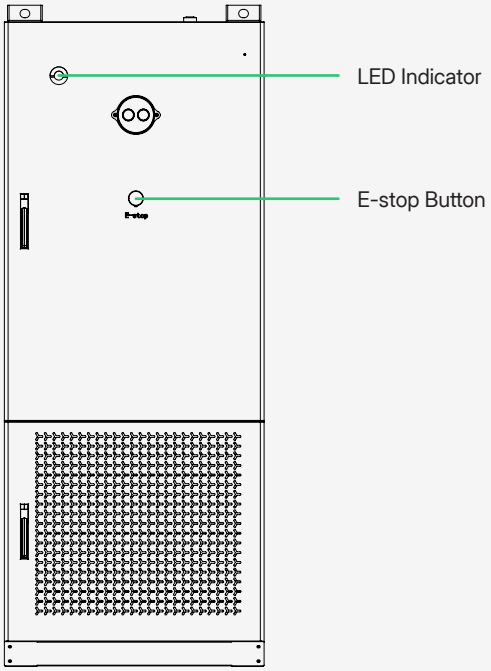
Label	Definitions
QF	Main circuit toggle switch
A	To grid A
B	To grid B
C	To grid C
N	To grid N



No.	Terminal	Definitions
Terminal 1	485A1	Energy storage metering meter (485A)
Terminal 2	485B1	Energy storage metering meter (485B)
Terminal 3	485A2	Anti-reverse current meter (485A)
Terminal 4	485B2	Anti-reverse current meter (485B)

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3.3 Definitions of Indicators and Buttons

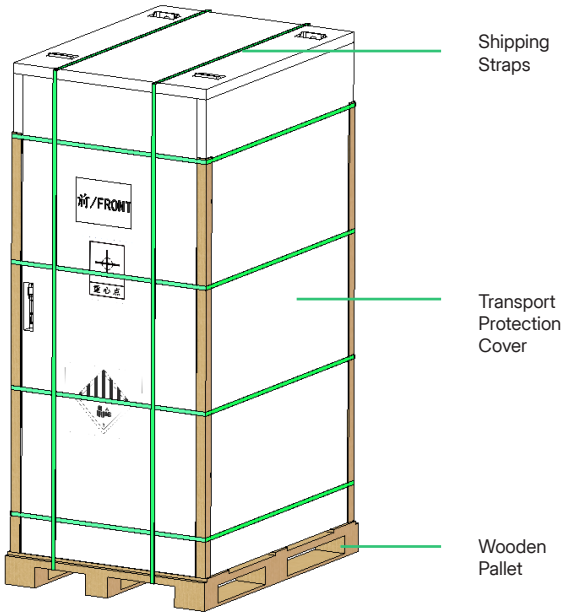


Interface	Definitions	Remarks
Red indicator	Fault	-
Green indicator	Normal	-
Emergency stop button	Emergency stop	In an emergency, you can press this button to stop the equipment.

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4 Transport Requirements

4.1 Packaging



4.2 Precautions

- The product is transported by a truck or a ship.
- Cover a tarpaulin and avoid direct sunlight during transportation. Load and unload the product properly.
- The packing box containing the product can be transported by any means of transport.
- The battery should be handled gently during loading and unloading and prevent throwing, turning upside down, and heavily pressing.
- Avoid mechanical impact or exposure to rain or moisture during transportation of the all-in-one energy storage battery cabinet.

4.3 Transportation Environment Requirements

To ensure optimal battery performance, the energy storage battery cabinet must meet the following conditions during storage and transportation:

- Storage temperature: -30°C to 60°C
- Storage humidity: 5%RH to 95%RH

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Hoymiles Power Electronics Inc.

Floor 6, Building 9, 99 Housheng Road, Gongshu District, Hangzhou
+ 4009681812
service@hoymiles.com
hoymiles.com/zh/