



Magna-UTL-520-0.25/0.5P Energy Storage System Specification

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1. Introduction

1.1. Introduction to Energy Storage System

The Magna-UTL-520-0.25/0.5P energy storage battery system is designed with independent auxiliary power distribution, liquid cooling, alarm, fire suppression, and automated control systems for safety assurance. It features simple operation and convenient wiring. Composed of Guangzhou Great Power Energy Technology Co., Ltd.'s 314Ah battery cells, the system delivers high energy density, long cycle life, high efficiency, and adaptability to low-temperature and high-altitude environments. In smart grid energy storage applications, based on the energy time-shift characteristics of energy storage, it effectively regulates power resources, balances day-night and seasonal electricity demand variations, optimizes supply-demand gaps, ensures grid stability, and serves as a critical enabler for renewable energy integration and intelligent grid management.

1.2. Standard compliance

Meet the following standards

UN38.3	Lithium metal and lithium-ion batteries
NFPA 69	Standard on Explosion Prevention Systems
NFPA 855	Standard for the installation of stationary energy storage systems
UL 9540A	Standard for safety test method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems
UL 9540	Standard for safety energy storage systems and equipment
UL1973	Standard for safety batteries for use in stationary and motive auxiliary power applications
IEC 62619	Secondary cells and batteries containing alkaline or other non-acid Electrolytes-Safety requirements for secondary lithium cells and batteries for use in industrial applications
IEC60730-1	Software safety requirements for automatic embedded control systems

IEC 62477-1	Safety requirements for power electronic converter systems and equipment -Part 1: general
IEC 61000-6-2	Electromagnetic compatibility (EMC) – Part 6-2: Generic standards Immunity standard for industrial environments
IEC 61000-6-4	Electromagnetic compatibility (EMC) – Part 6: Generic standards Section 4: Emission standard for industrial environments

2. Product Overview

The DC cabinet energy storage system mainly consists of the battery cluster including BMS, PDU fire suppression system, liquid cooling system, and other equipment. As shown in Figures 1 below.

Figure 1 Magna-UTL-520-0.25/0.5P Energy Storage System

External Appearance Diagram (For Reference Only)

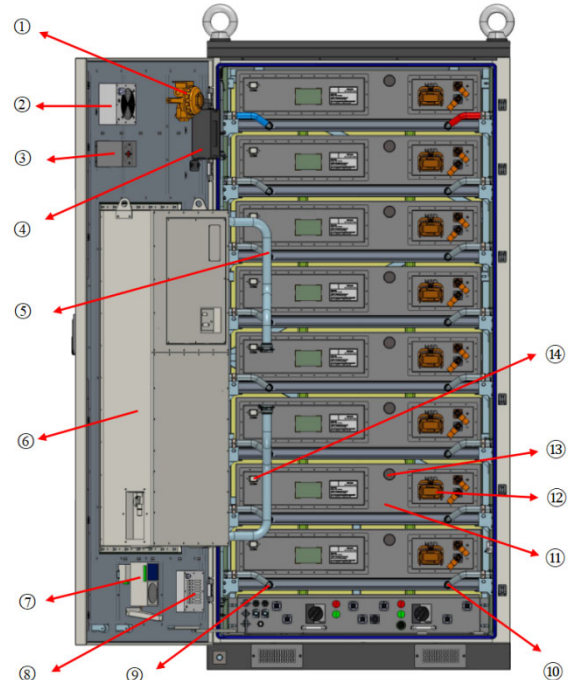


Table 1 Magna-UTL-520-0.25/0.5P BESS Configuration

Item	Name	REMARK
①	Flammable Gas Detector	Detects the concentration of flammable gas (H ₂) inside the cabinet. The ventilation assembly will be activated when the concentration exceeds the set value.
②	Ventilation Assembly	After receiving the start signal, works with the air intake assembly to ventilate the cabinet.
③	Fire Audible and Visual Alarm	When there is a fire hazard inside the cabinet, the system automatically activates the fire protection device and issues an alarm. For details, refer to 5.5 Fire Protection System
④	Aerosol Fire Extinguishing Device	Automatically activated by the system in case of fire hazard inside the cabinet.
⑤	Liquid Cooling Pipeline	Passage for the circulation of cooling fluid inside the cabinet.
⑥	Liquid Cooling Unit	Circulates cooling fluid to cool the battery pack. For details, refer to 5.3 Thermal Management System
⑦	Dehumidifier	Maintains the humidity level in the battery compartment.
⑧	Air Intake Assembly	After receiving the start signal, works with the exhaust assembly to ventilate the cabinet.
⑨	Cooling Fluid Inlet	After heat exchange between cooling fluid and battery pack via the liquid cooling plate, the fluid returns to the liquid cooling unit through this port for circulation.
⑩	Cooling Fluid Outlet	Cooling fluid flows out from the liquid cooling unit and enters the liquid cooling plate through this port for heat exchange with the battery pack.
⑪	Battery Pack	1P65S, 208V, 65.3kWh.
⑫	MSD	Manual Service Disconnect.
⑬	Pressure Relief Valve	Pops up forward when the fire protection device inside the energy storage battery pack is activated due to thermal runaway or fire.
⑭	Communication Port	Used for communication between BMU inside the battery pack and BCMU.

3. DC Cabinet specifications

Table 2 DC Cabinet specifications

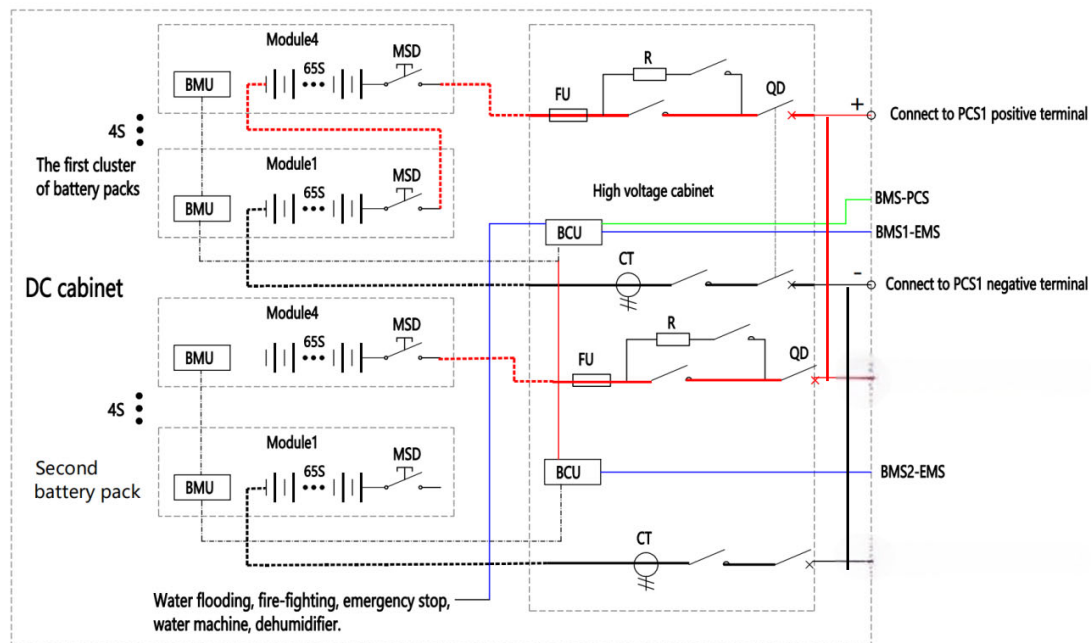
Category	Item	Parameters		Remark
DC Parameters	Product Model	Magna-UTL-520-0.25C	Magna-UTL-520-0.5C	
	Cooling Method	liquid cooling	liquid cooling	
	Cell Type	GSP71173204F- 314Ah, 3.2V	GSP71173204F- 314Ah, 3.2V	
	Battery System Configuration	2P260S	1P260S*2	
	Charge/Discharge Rate	≤0.25P/0.25C	≤0.5P/0.5C	
	System Energy (kWh)	520	520	
	Max DOD	0~100%	0~100%	Recommended 5%~95%SOC
	Rated Voltage (V d.c)	832	832	
	Operating voltage range (V d.c)	728 ~ 936	728 ~ 936	2.8V~3.6V/cell
	Rated Charge Powe (kW)	≤120kW	≤120kW*2	Connect PCS
	Rated current (A)	157A	157A*2	
	Rated Discharge Powe (kW)	≤120kW	≤120kW*2	Connect PCS
	Rated discharge current (A)	157A	157A*2	
	Cycle Times	≥8000 (25℃, 0.5C,EOL70%)	≥8000 (25℃, 0.5C,EOL70%)	
	Cycle Efficiency (RTE)	94%	94%	≤0.5P (25℃)
Protection	DC Input	Circuit breaker	Circuit breaker	
	DC lightning protection	\	\	
	Fire Protection System	Aerosol	Aerosol	
Mechanical and	Dimensions W*D*H (mm)	1175*1500*2440	1175*1500*2440	
	Weight (kg)	≈4430	≈4430	

Category	Item	Parameters		Remark
Environmental Parameters	Weight (kg) (without pack)	≈400	≈400	
	Inlet Method	Bottom inlet	Bottom inlet	
	IP Class	IP55	IP55	
	Noise level (dB)	≤75	≤75	1.5m
	Permissible Ambient Temperature (°C)	-20~+55	-20~+55	
	Storage Ambient Temperature (°C)	-35~+55	-35~+55	
	(%RH) Permissible Ambient Humidity	0~85	0~85	
	Working Altitude (m)	4000m,	4000m,	> 2000m need to be derated

4. Primary Schematic of DC Cabinet

4.1 0.25 C/P system

Figure 2 0.25 C/P Primary Schematic of the DC Cabinet



NO.	Name	Specification	Remarks
4	Nominal Voltage(V)	3.2	
5	Voltage Range(V)	2.5~3.65@T > 0℃ 2.0~3.65@T≤0℃	
6	Charge Temperature (℃)	0~60	
7	Discharge Temperature (℃)	-30~60	
8	Storage Temperature (℃)	-40~60	建议-10℃~35℃
9	Cycle Life	≥8000@70%	
10	Operating Altitude(m)	≤5000	
11	Certifications	GB/T36276、UL1973、UL9540A、IEC62619 UN38.3、RoHS、Reach	

5.1.2 Battery Pack

Figure 4 Battery Pack Component Diagram

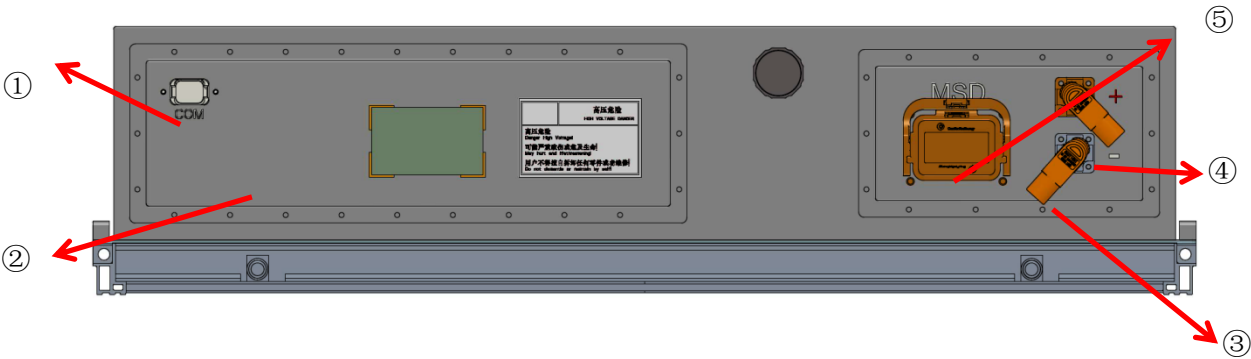


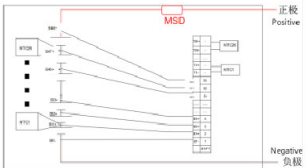
Table 4 Battery Enclosure Interface Definition Table

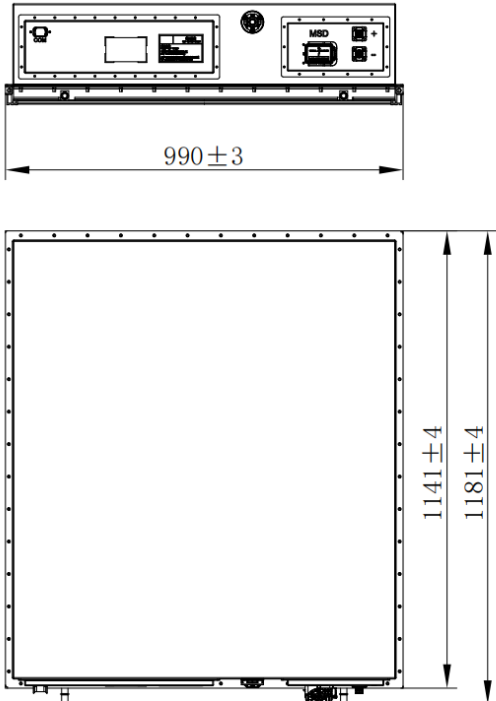
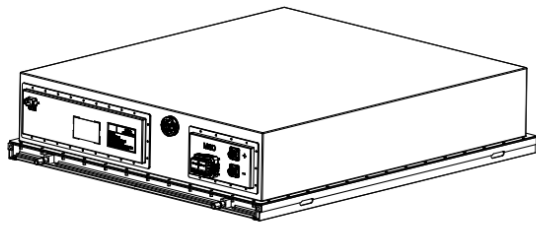
No.	Name	Component Description
①	Battery Pack Communication Port	Used for communication with peer BMU/superior BPU
②	Battery Pack Maintenance Port	For maintaining BMU, wiring harness, etc.
③	Battery Pack Negative Connector	Negative DC output of the battery pack

④	Battery Pack Positive Connector	Positive DC output of the battery pack
⑤	MSD	Manual Service Disconnect switch

The battery pack contains 4 modules. Each module consists of 13 cells connected in series. Temperature is measured within each module using 6 or 7 temperature sensors (NTC), and the voltage of each cell is monitored via 14 data acquisition points per module. Internal parameters are as follows:

Table 5 Battery Pack Parameters

NO.	Item	Specification	Remark
1	Product Model	PLL03C2-DIP65S	
2	Configuration	1P65S	
3	Rated Energy (kWh)	65.3	
4	Rated Voltage (V d.c)	208	
6	Recommended Voltage Range (V d.c)	182~234	2.8V~3.6V/cell
7	Maximum Voltage Range (V d.c)	157	0.5C
8	Rated Charge Current (A)	235	≤30s
9	Maximum Charge Current (A)	157	0.5C
10	Rated Discharge Current (A)	235	≤30s
11	Maximum Discharge Current (A)	CAN	
12	Communication Protocol	D1181*W990*H239	Depth excludes connector size
13	Dimensions (mm)		Temperature sensor quantity is customizable based on application requirements.

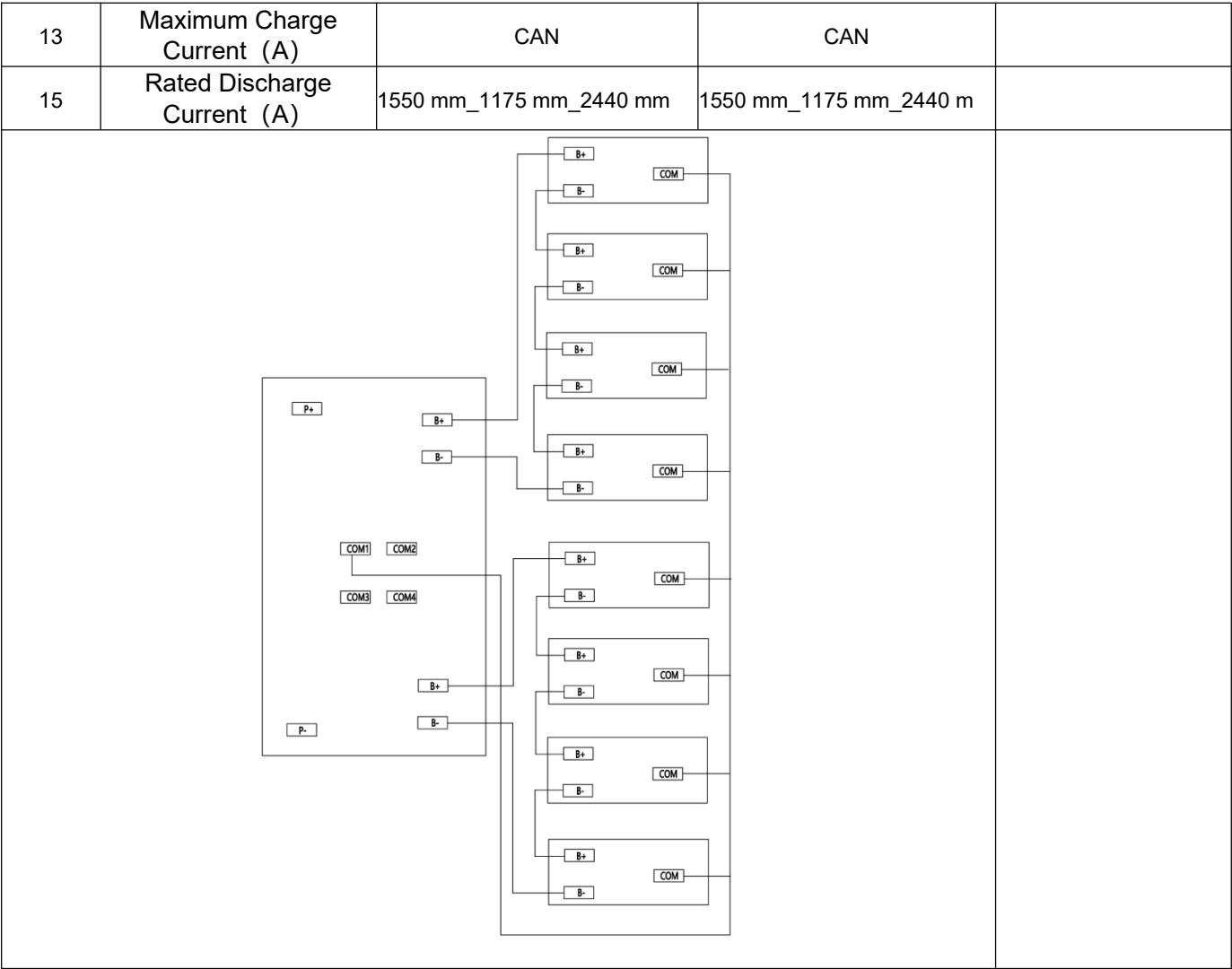
NO.	Item	Specification	Remark
			
			

5.1.3 System Cabinet

A single-row battery rack consists of 2 battery clusters, 1 high-voltage box, 1 liquid cooler and its supporting wiring harness, forming a complete single-row battery rack. It adopts a modular universal design with strong replaceability. The parameters of the battery cluster are as follows:

Table 6 Battery cluster specifications

NO.	Item	Specification		Remark
1	Product Model	Magna-520-0.25P	Magna-520-0.5P	
2	Configuration	1P260S*2	2P260S	
3	Rated Energy (kWh)	520	520	
6	Rated Energy (V d.c)	832	832	
8	Rated Voltage (V d.c)	728~936	728~936	2.8V~3.6V/cell
9	Recommended Voltage Range (V d.c)	157	157	
11	Rated Charge Current (A)	157	157	



5.2 Battery Management System

The DC system in theMagna-UTL-520-0.25/0.5P energy storage system consists of 2 battery clusters, each composed of 4 battery packs. The battery management system for each battery cluster is divided into 1 secondary architecture, and each secondary architecture manages 4 battery packs.

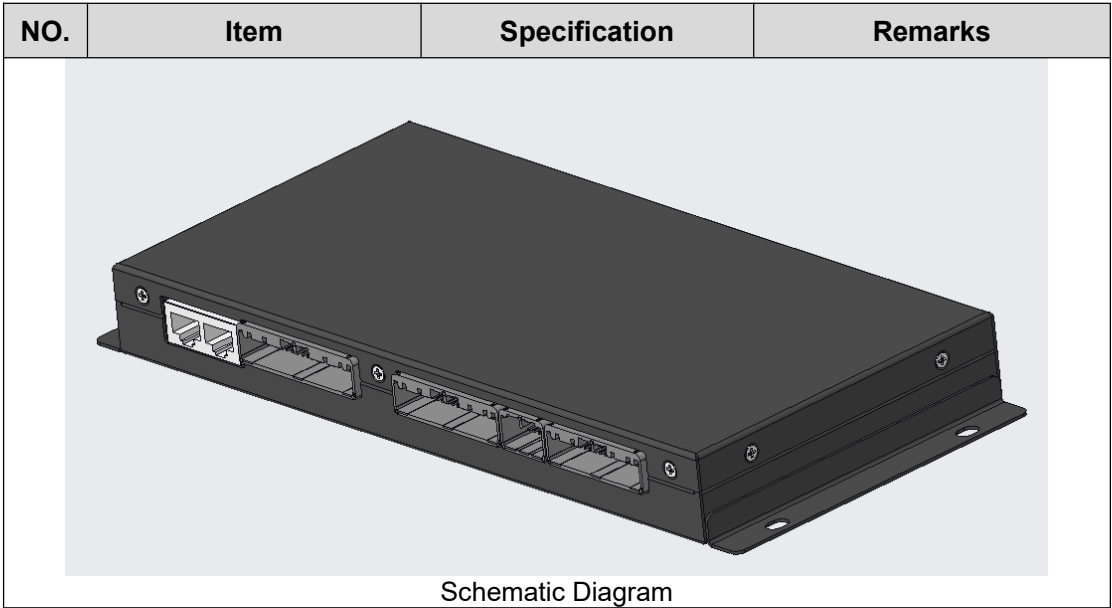
5.2.1 Cluster Control Unit (BCU)

This module manages the battery clusters in the energy storage battery system and is generally placed in the high-voltage control box of the battery cluster. It is mainly responsible for voltage collection and current collection of the battery cluster, summarizing the voltage and temperature information of the single cells in the cluster, calculating the SOC/SOH and other states of the battery cluster, executing the equalization strategy judgment and battery fault diagnosis

functions, and realizing the local protection of the battery cluster and relay control according to the battery fault information. The BCU has a CAN communication interface to communicate with the Battery Management Unit (BMU). The BCU has insulation collection function and state calculation functions such as single cell SOC/SOH, and is equipped with redundant CAN communication interfaces, RS-485 communication interfaces and Ethernet communication interfaces for communication with external devices. The control and management module BCU is the core module of the energy storage battery management system and a key device to ensure the safe, reliable and efficient operation of the energy storage system. The hardware parameters are as follows:

Table 7 Cluster Control Unit BCU Parameters

NO.	Item		Specification	Remarks
1	Model Number		QT-SBCU-3131	
2	Input Voltage(V d.c)		24	
3	Power Consumption (W)		≤4W@24V	
4	Voltage Measurement (V d.c)		0~1500	Accuracy±5%
5	Current Measurement Accuracy		±0.5%	
6	Operrating Temperature (°C)		-40~+85℃	
7	Communica tion Interface	LAN	2 ports	
8		CAN	3 ports	
9		RS485	2 ports	
10	I/O interface	DI	4 ports	
11		DO	2 ports	
12		Configurable DI/DO	4 ports	
13	Dimensions L*W*D (mm)		276*125*29.8	



5.2.2 Slave Control BMU

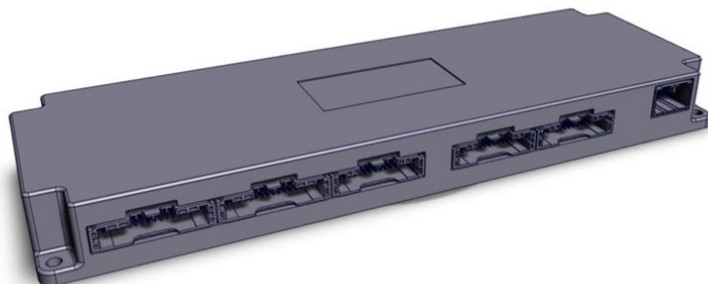
This slave BMU provides real-time detection functions for single-cell battery voltage and temperature, and also has thermal management and balancing capabilities. It can form a highly flexible cluster battery management system with the master control unit QT-SBCU-3131 through the CAN bus.

This slave BMU supports a maximum of 70 single cells in series and up to 40 temperature detection channels. It supports SOC/SOH calculation functions for single cells, alarm functions for single-cell voltage (overvoltage, undervoltage), temperature (overtemperature), communication faults, etc., and also supports detection functions for disconnection of acquisition harnesses (voltage, temperature).

Table 8 Passive Balancing Slave BMU

NO.	Item		Specification	Remake
1	Model Number		QT-SBMU-70T40M5	
2	Input Voltage(V d.c)		12/24	
3	Power Consumption (W)		≤1	
4	Voltage Measurement	Channels	70	
5		Range (V d.c)	0~5	±5mV

NO.	Item		Specification	Remake
6	Temperature Measurement	Channels	40	±1℃@-10℃~70℃ ±2℃@other range
7		Range (℃)	-40~125	
8	Balancing Current (mA)		100	
9	Communication		CAN	
10	Dimensions L*W*D (mm)		272mm ×89mm × 27mm。	
11	Operating Temperature (℃)		-40~75	
12	Relative Humidity (RH)		5~95%	
13	Weight (g)		149	
14	Oprating Altitude (m)		≤5000	



5.3 Thermal Management System

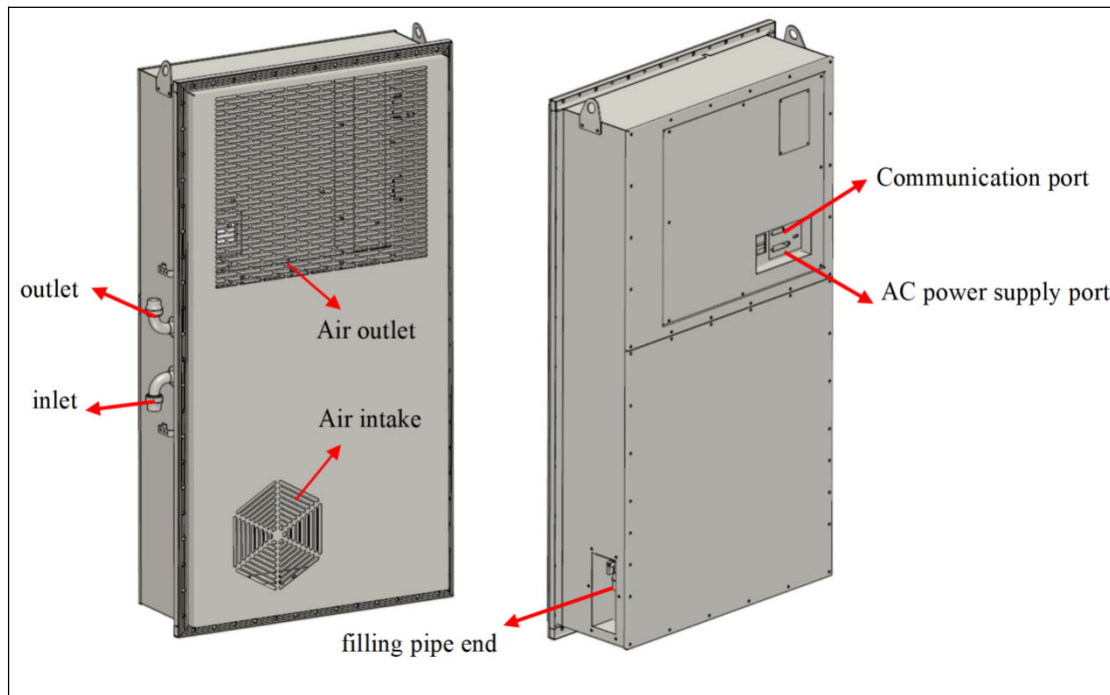
The thermal management system of the Magna-UTL-520-0.25/0.5P energy storage system, its main function is to maintain the temperature of the battery system within an appropriate operating range, allowing the battery to charge, discharge, and stand at the optimal temperature, thereby extending the service life of the battery.

The thermal management system is a liquid cooling circulation system composed of a powerful liquid cooling host, liquid cooling pipelines, and liquid cooling base plates distributed in each battery pack. It uses

heat transfer to achieve battery heat dissipation and temperature equalization, effectively controlling the temperature rise and temperature difference of the entire system's batteries. The hardware parameters of the liquid cooling host are as follows: Table 3 Liquid Cooling Unit Parameters

Table 9 Liquid Cooling Unit Parameters

NO.	Item	Technical Specification	Remarks
1	Model	LCI-60CR-05NS4Z3-3385C	
2	Rated Cooling Capacity (KW)	6	Ambient temp: 35℃, Water temp: 20℃
3	Rated Heating Capacity (KW)	2	
4	Voltage Range (V a.c)	3/N/PE AC 380V±10%	
5	Frequency (Hz)	50	
8	Cooling Power Consumption (KW)	0.3	
9	Heating Power Consumption (KW)	R410A	
10	Self-Circulation Power (KW)	60	
11	Refrigerant Type	≤75	
12	Flow Rate (L/min)	RS485	
13	Noise Level (dBA)	744*265*1354	
14	Communication Protocol	-30 ~ 55	
15	Dimensions L*W*H (mm)	≤4000	
16	Operating Temperature (℃)	IP55	



5.4 Dehumidification System

The Magna-UTL-520-0.25/0.5P energy storage system is equipped with a built-in dehumidification system, which adopts the semiconductor refrigeration dehumidification method. It actively draws the humid air in the battery compartment into the dehumidification air duct under the action of a fan. The water vapor in the air is condensed into water after passing through the semiconductor refrigeration chip, and then discharged through the drain pipe, which can achieve a good dehumidification effect. By reducing the moisture content in the air, both the relative humidity and absolute humidity are decreased simultaneously, with almost no increase in temperature and no negative impact caused by temperature difference, fundamentally preventing or reducing the occurrence of accidents. It effectively prevents potential safety hazards such as equipment aging, reduced insulation strength, and corrosion of structural parts in the battery compartment, ensuring the safe operation of the energy storage system.

The semiconductor dehumidification device is composed of a power supply system, a supply air system, semiconductor cooling plates and a drainage pipeline.

Power Supply System: Provides stable electrical energy to ensure normal operation of the dehumidification unit

Air Delivery System: Utilizes fans to draw moist air into the internal air ducts.

Semiconductor Cooling Modules: Cools the humid air below its dew point to induce condensation.

Condensed water droplets flow by gravity into collection channels

Drainage System: Channels collected condensate out of the battery compartment

The operational schematic of the system is illustrated below: :

Figure 10 Dehumidifier Working Principle Diagram

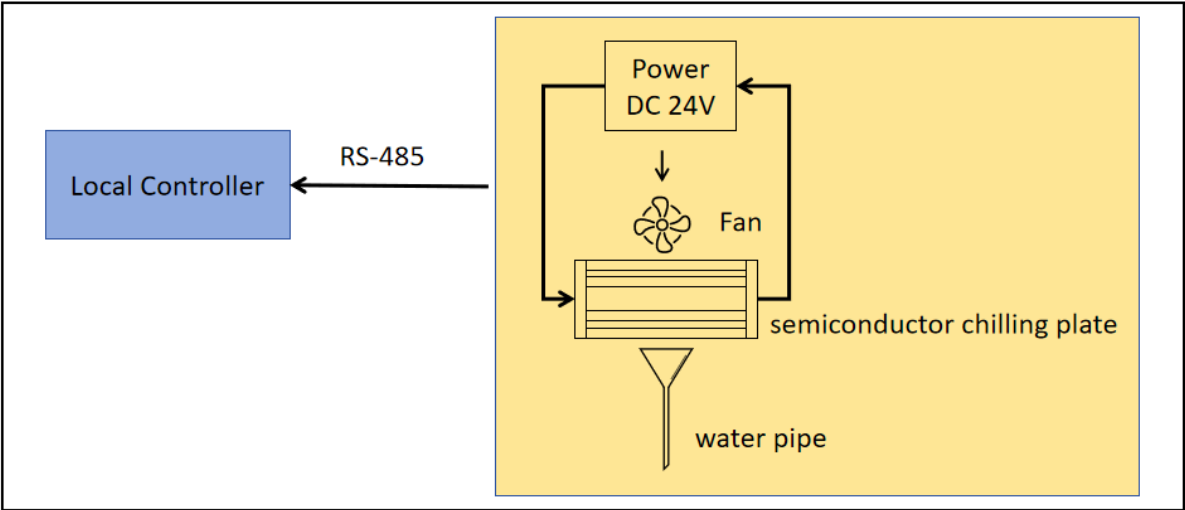
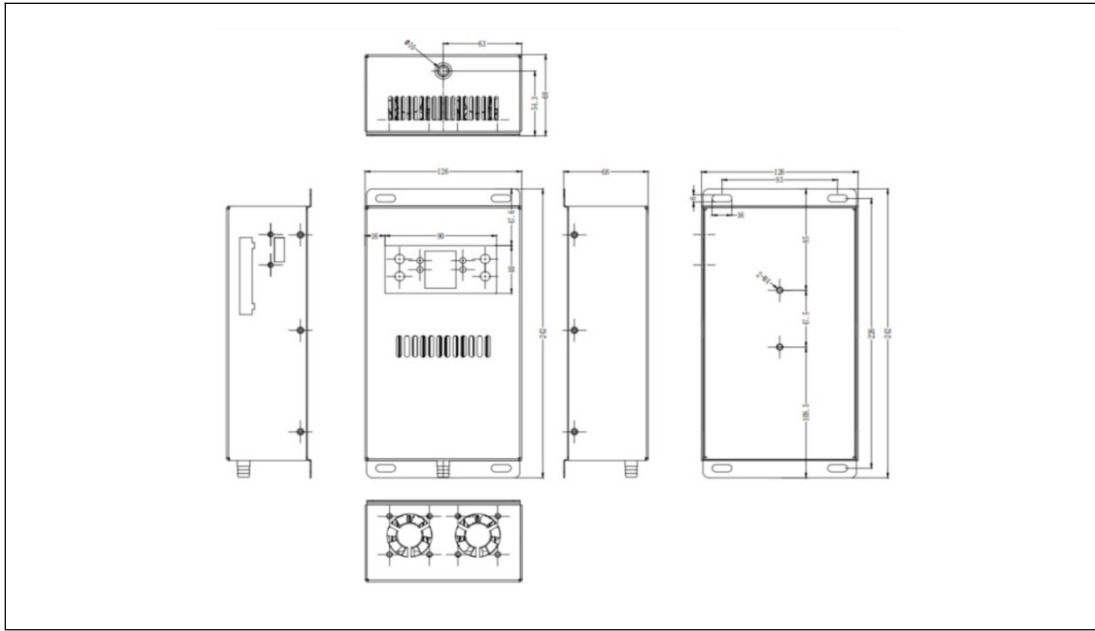


Table 11 Dehumidifier Specifications

NO.	Item	Specification	Remark
1	Model	SDUL-60A	
2	Rated Voltage(V d.c)	AC110~240V 50/60Hz	
3	Dehumidification Power (W)	60	
4	Dehumidification Efficiency (mL/day)	≥480	±10mL
5	Humidity Range (RH)	20%~95%	±3%RH
6	Temperature Detection Range (℃)	-25~95	±1%℃
7	Communication Protocol	RS485	
8	Dimensions L*W*H (mm)	242*126*68	



5.5 Fire Protection System

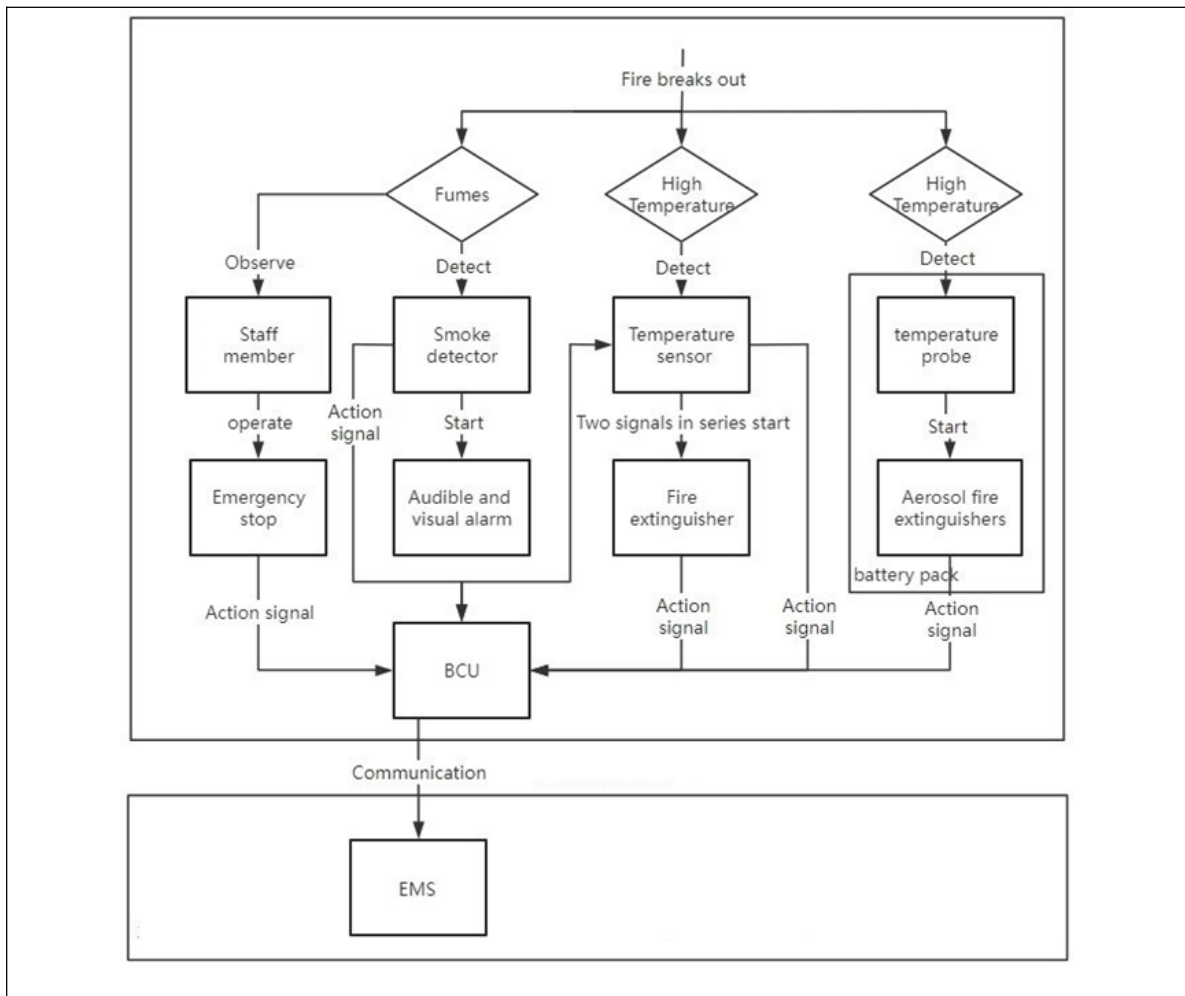
The Magna-UTL-520-0.25/0.5P energy storage system incorporates a multi-level fire protection system comprising PACK-level and cluster-level fire suppression.

PACK-level fire protection: Aerosol fire protection safeguards battery boxes through two methods: BMU electrical activation and temperature thermal activation. Each PACK is equipped with one aerosol fire protection device, and there are 4 such devices in each cluster for fire extinguishing.

Cluster-level fire protection: When a smoke detector is triggered, it will activate an audible and visual alarm and feed back to the BCU; when both the smoke detector and the heat detector are triggered simultaneously, it will trigger the activation of cluster-level aerosol fire extinguishing to extinguish the fire;

The fire protection system control logic diagram is as follows::

Figure 12 Fire Protection Logic Diagram

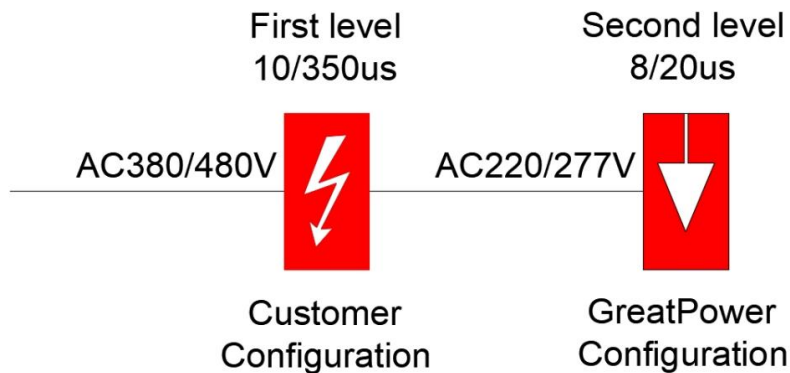


5.6.Lightning Surge Protection System

The Surge Protective Device (SPD) can effectively absorb transient overvoltages and overcurrents in the power system. As an important measure for internal lightning protection, SPD needs to discharge lightning current step by step to achieve the purpose of protecting equipment.

The SPD installed in the outdoor cabinet is a Class 2 surge protection device (with a lightning impulse current of 8/20 us), and the customer needs to configure a Class 1 surge protection device (with a lightning impulse current of 10/350 us) at the AC front end of the outdoor cabinet by themselves.

Figure 5 Surge Protective Device Configuration Diagram



6. The End

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The Magna-UTL-520-0.25/0.5P energy storage system has been designed with a focus on safety, efficiency, and reliability, adhering to the highest industry standards.

For further details or inquiries regarding the product, please contact our technical support team or visit our website.