MegaCool BESS DC 20F5015KWH

2508KW/5015KWH

Product Specifications

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CONTENT

1. Product Specification

Liquid-cooled energy storage container			
Product Type			
Product Mode		**LFP battery energy storage system**	
S.N.	**Item**		**Specification**
1	Configuration		12P416S
2	Battery Cells		314Ah LFP, CALB L173F314A
3	Rated Energy		5.015MWh
4	Rated Voltage		1331.2 V
5	Voltage Range		1164.8~1497.6V
0.5P SYSTEM			
6	Charging Current (0.5P)	Rated	157A
		Maximum	200.96A
7	Charging Power (0.5P)	Rated	2508kW
8	Discharging Current (0.5P)	Rated	157A
		Maximum	200.96A
9	Discharging Power (0.5P)	Rated	2508kW
10	Auxiliary power supply (0.5P)	Voltage range	3AC 380~480V
		Power①	Max. 39.0 kW (Including BMS & Chiller consumption)
11	Operating Ambient Temperature	Charge②	-20℃~+55℃
		Discharge	-20℃~+55℃
12	Environment condition	Storage Temperature③	-30℃~+60℃
		Application altitude	≤3000 m.a.s.l.
13	General Parameters	Size	2438mm(W)*6058mm(D)*2896mm(H)
		Weight	≤43t
		IP Level	IP67 (Battery Module) / IP55 (Battery container)
			IPX5 (Electrical cabin) / IPX6(Cooling unit)
		Cooling mode	Liquid Cooling
		Communication protocol	CAN, TCP/IP
		Communication port	RS485, Fiber ST
		Power connection	Cable lug: External: 8 x M12 single hole or double hole / phase Internal: 10 x M8 single hole or double hole /phase
		Communication connection	Fast plug
		Aux Power connection	Terminal
		Coolant	50% Ethylene glycol aqueous solution
14	Compliance	Battery cell	IEC62619 / UL1973 / UL9540A / UN38.3
		Battery Module	UL 9540A
		Battery cluster	IEC 62619/IEC 63056/IEC 61000-6-2/4
			UL1973/UL 9540A
		Container	UN38.3/UN3536

Note:

① The actual power consumption is dependent on the ambient temperature and Charge/Discharge working profile.

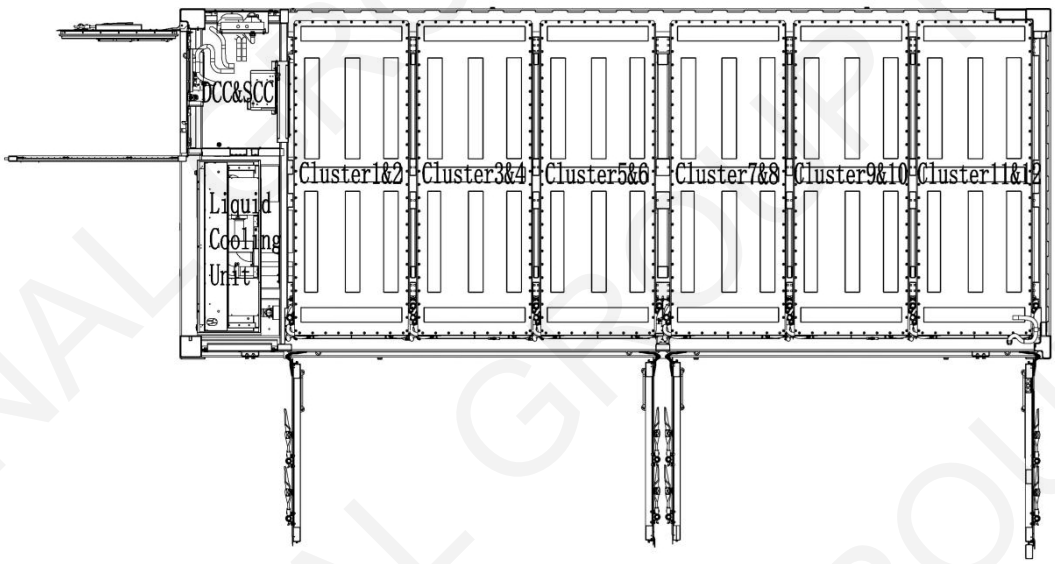
② If cold staring for battery cell temperature below 0 degree, a pre-heating process via chiller is necessary, otherwise it's not allowed to charge.

③ If the battery cell temperature above 25 ℃ without any cooling during storage, the SOH degradation will be speed up, separate SOH degradation evaluation need be done case by case according to average storage temperature.

2. Product Description

MegaCool BESS DC 20F5015KWH liquid-cooled energy storage battery container is an integrated high energy density system, which consisting of battery cluster system, battery management system (BMS), fire suppression system (FSS), thermal management system (TMS) and auxiliary distribution system.

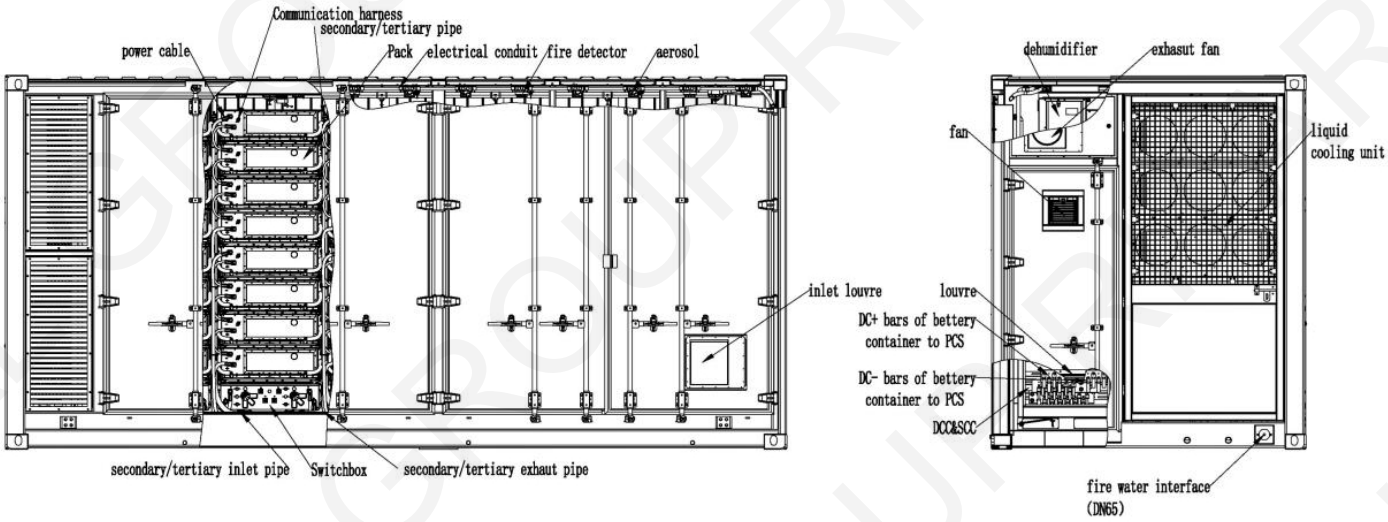
The basic units for whole system is list as following:



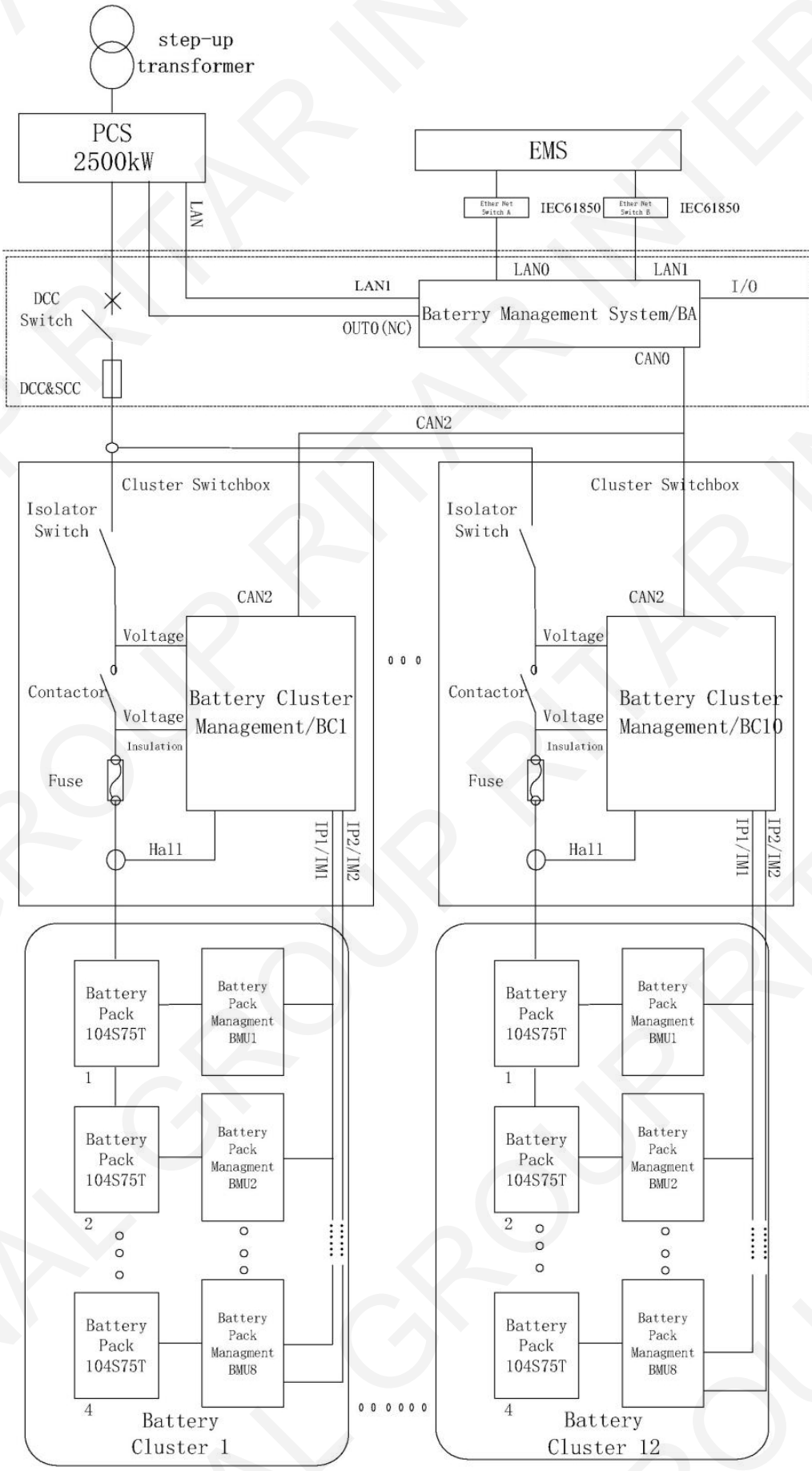
System	Sub-Components	Qty	Remark
Battery Container	-	1	2438mm(W)*6058mm(D)*2896mm(H)
Batteries	Battery clusters	12	Each racks contains 4 Battery pack and a part of HV box, total 1P416S 314Ah LFP battery cells.
BMS	Main Control Box	6	Including SBMU, fuse, isolation switch and so on. Each HV box can control 2 clusters.
	Master control box	1	Including IMM, MBMU, ETH, Fiber Conversion Module
TMS	Cooling unit	1	Including compressor, pump, fan, heater and others
FSS	Fire Suppression System	1	Including Fire Suppression Control Panel, Smoke detector, Gas detector and so on
Auxiliary distribution system	Distribution box	1	Auxiliary power supply system

2.1. Battery system overview

The battery system is composed of 12 battery clusters in parallel.



The battery system is composed of 12 battery clusters in parallel. Each battery cluster contains 4 battery pack by series connection, each battery module is composed of 104 battery cells in series connection also, so each rack contains 416 battery cells. Totally, liquid-cooled container's configuration is 12P416S.


step-up
transformer
PCS
2500kW
LAN
EMS
Ether Net Switch A
IEC61850
Ether Net Switch B
IEC61850
LAN0
LAN1
I/O
LAN1
DCC
Switch
OUT0(NC)
Baterry Management System/BA
CAN0
DCC&SCC
CAN2
Cluster Switchbox
Isolator
Switch
CAN2
Voltage
Contactor
Voltage
Insulation
Fuse
Battery Cluster
Management/BC1
Hall
IP1/IM1
IP2/IM2
Cluster Switchbox
Isolator
Switch
CAN2
Voltage
Contactor
Voltage
Insulation
Fuse
Battery Cluster
Management/BC10
Hall
IP1/IM1
IP2/IM2
Battery
Pack
104S75T
1
Battery
Pack
Managment
BMU1
Battery
Pack
104S75T
2
Battery
Pack
Managment
BMU2
Battery
Pack
104S75T
4
Battery
Pack
Managment
BMU8
Battery
Cluster 1
Battery
Pack
104S75T
1
Battery
Pack
Managment
BMU1
Battery
Pack
104S75T
2
Battery
Pack
Managment
BMU2
Battery
Pack
104S75T
4
Battery
Pack
Managment
BMU8
Battery
Cluster 12

2.1.1. Battery Cell

The 314 Ah square aluminum shell lithium-iron-phosphate battery cell with long cycle life, high energy density and high safety is selected and used exclusively in power energy storage. The basic parameters of the cell are as follows:

SN	Item	Parameter	Remarks
1	Model	L173F314A	CALB
2	Battery type	LFP	Square aluminum shell
3	Nominal voltage (V)	3.2	
4	Nominal capacity (Ah)	314	
5	Nominal energy (Wh)	1004.8	
6	Voltage range (V)	2.5 ~ 3.65	Limit range
7		2.8 ~ 3.55	Recommended scope of application
8	Rated charge-discharge rate	0.5P	
9	Number of cycles	6000	0.5P/0.5PEOL ≥80% SOH, 100%DOD @25℃
10	Mass energy density	≥180.7Wh/kg	
11	Storage temperature range (°C)	-40℃~60℃	Optimum storage temperature: 10°C~30° C
12	Operating temperature range (°C)	Charging: 0°C~55°C Discharging: -30°C~55°C	
13	Dimensions (W*D*H)	71.57×174.70×207.2mm	
14	Weight	5.56±0.15kg	

The data of degradation are shown as follows:

Years	@100%DOD, 01 cycle/day, 25℃	@100%DOD, 02 cycle/day, 25℃
0	100.00%	100.00%
1	97.20%	96.60%
2	95.10%	92.00%
3	92.30%	88.00%
4	89.70%	84.40%
5	87.10%	80.90%
6	84.80%	77.60%
7	82.50%	74.50%
8	80.40%	71.20%
9	79.10%	68.10%
10	77.80%	64.90%
11	76.60%	-
12	75.40%	-
13	74.40%	-
14	73.80%	-
15	72.30%	-
16	70.80%	-
17	69.40%	-
18	67.50%	-
19	65.70%	-
20	64.00%	-

2.1.2. Battery Module

Total 104 pieces lithium iron cells (314Ah/3.2V) in series connection are used for every battery module. For safety protection, an internal high speed DC fuse is included.

SN	Item	Specification	Remarks
1	Product Model	CPESA11-M104S	
2	Cell Type	L173F314A-314Ah	
3	Configuration	1P104S	
4	Rated Energy（Ah）	314	
5	Rated Power（kWh）	104.499	
6	Nominal voltage（V）	332.8	
7	Rated charge/discharge ratio	0.5P	
8	Operating voltage range（V）	291.2 ~ 374.4	104×(2.8 ~ 3.6V DC)
9	Cooling method	liquid cooling	
10	Size（W*D*H）	790×2200×243mm	
11	weights（kg）	680±5	

2.1.3. HV box

The 1,500 VDC energy-storage HV box is a cluster-level control unit tailored for the energy-storage battery system, serving as an intermediate unit connecting the battery sub-rack and the DC confluence cabinet. In the HV control box, the components installed include the disconnector/circuit breaker, contactor, fuse, circulating current control circuit, current sensor, battery cluster control management module and switching power supply. The electrical characteristics, heat dissipation performance, safety performance and operability and maintainability of each component have been fully considered in the design of the HV control box. The HV control box has the characteristics including the proper spatial layout, structural compactness, flexible configuration, safety and reliability. The HV control box has a built-in energy storage battery cluster management (ESBCM) module, with CAN and RS-485 communication bus interfaces. These interfaces can fulfill the function of communication between the HV control box and the energy storage battery management module (ESBMM), the energy storage management unit (ESMU) and the energy storage converter; they can also fulfill the control, protection and data communication of the energy storage battery cluster.

The HV box has the following functions:

1) It supports AC 220V power supply;
2) It supports the power supply to the BMU of the ESBMM. The supply power can be configured according to the number of BMU modules;
3) It establishes a daisy chain communication with the BMU of the ESBMM to upload battery cluster information and fulfill charging and discharging management;
4) It is provided with a DC circuit breaker, which can disconnect the battery cluster output in an emergency;
5) It can detect the terminal voltage and terminal current as well as the insulation state of the battery cluster;
6) The power line, communication line and connector are all arranged on the front panel for easy maintenance.

Technical parameters of the HV box are as follows:

SN	Item	Specification	Remarks
1	Size	790*950*210mm	
2	Operating voltage range	0~1500V DC	
3	Operating current range	0~250A	
4	Allowable ambient temperature	-10℃~+55℃	
5	Allowable relative humidity	5%~95%RH	No condensation
6	Allowable altitude	≤3000 m	
7	Protection level	IP54	
8	External communication mode	CAN or Ethernet	
9	Weight	45kg	

2.1.4. Battery clusters

The battery cluster consists of 4 battery pack connected in series and a part of 1 HV box, which are grouped in the mode of 1P416S. For the battery cluster, a battery cluster structure is adopted. The battery pack and HV boxes are arranged in the battery cluster in a proper order. The power circuit between the battery module and the HV box is connected in series with the power cable through the quick plug on the front panel. The BMU of each battery pack collects the data of battery cell voltage and temperature and uploads the data to the BC of the HV box through the communication harness. After data collection and analysis, BC reports the data to BA and receives the control instructions from BA. The structure of a battery cluster is shown in the following figure:

The technical parameters of the battery cluster are as follows:

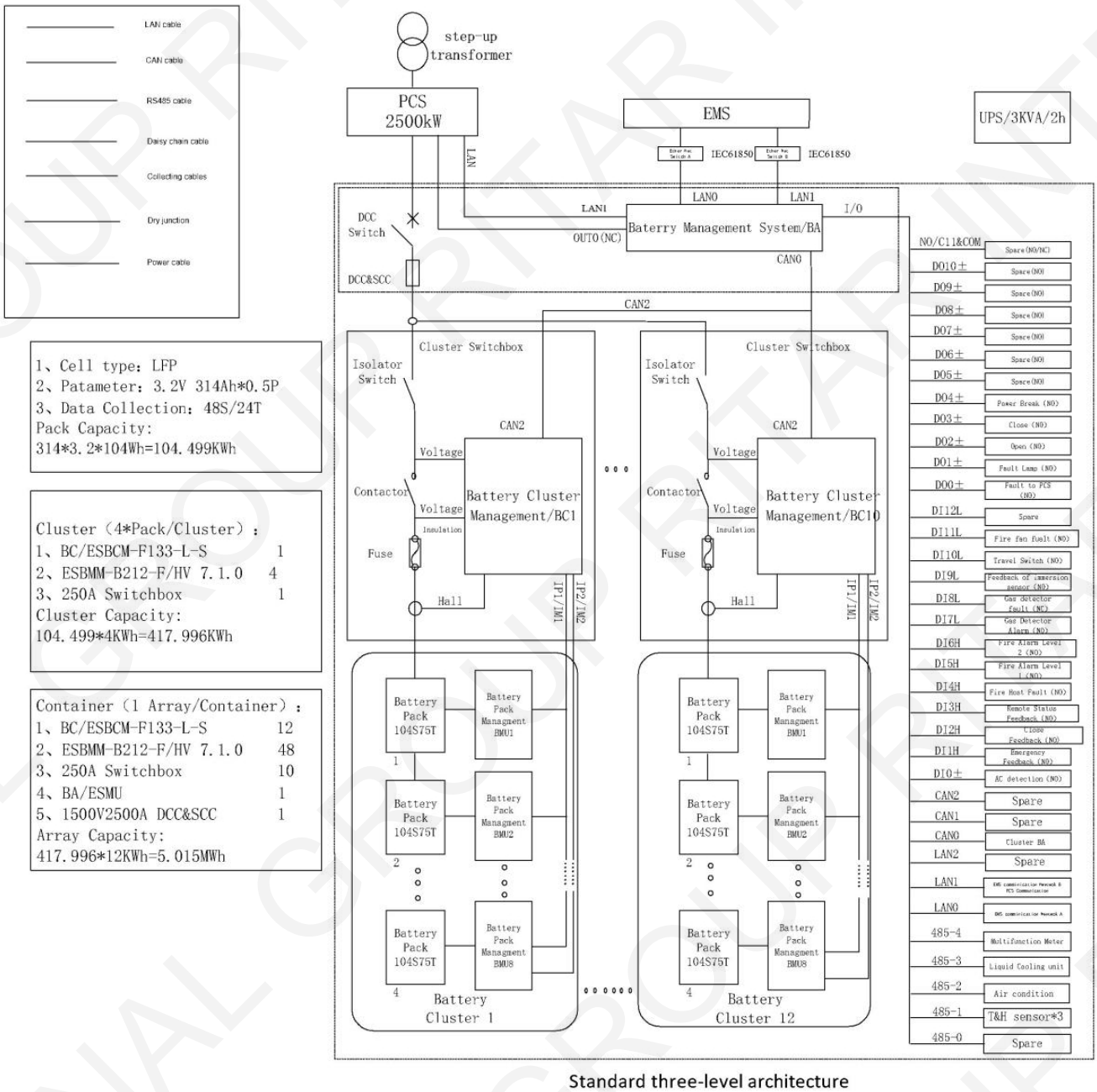
Each battery cluster consists of 8 battery pack (153.6 V/314 Ah) and a HV box;

S/N	Item	Parameter	Remarks
1	Model	CPESA113-C4S	
2	Type of cell	L173F314A-314Ah	
3	Module type	CPESA11-M104S	
4	Combination mode	1P416S	
5	Nominal voltage of battery cluster (V)	1331.2	
6	Voltage range of battery cluster (V)	1164.8 ~ 1497.6	
7	Rated capacity (Ah)	314	
8	Nominal capacity of battery cluster (kWh)	417.996	
9	Rated charge-discharge rate	0.5P	
10	Operating temperature range (°C)	Charging: 0°C–55°C Discharging: -30°C–55°C	
11	Humidity (%)	5%~95%RH	No condensation
12	Cooling mode	Liquid cooling	

2.2. BMS system overview

The core function of the battery management system (BMS) is to monitor and control the charging and discharging process of the battery according to the service environment, so as to maximize the use of energy stored in the battery on the premise of ensuring battery safety.

The battery management system is designed with a three-layer control architecture, as shown in the figure, including the battery management unit (BMU), battery clusters system (BC) and battery array management unit (BA).



Standard three-level architecture

1) BMU realizes the accurate collection of cell voltage, battery pack voltage, current and temperature through high-precision voltage and temperature acquisition circuits, in combination with analog-to-digital conversion circuits. At the same time, according to the corresponding equalization strategy, it can equalize the

inconsistent electric quantity between battery cells.

2) BC summarizes the collected data of BMU for battery cluster capacity estimation, battery cluster state of charge (SOC) estimation, battery cluster fault diagnosis, equalization control strategy, safety control strategy, etc.
3) BA realizes comprehensive control and protection of the energy storage battery system, as well as communication with PCS and local monitoring layer of energy storage.

Main Parameters of BMS are shown as follows:

S/N	Technical Indicators	Technical parameter
1	Rated operating voltage (V)	AC 220V
2	Voltage sampling accuracy (mV)	±2
3	Voltage sampling period (ms)	15 ms, adjustable
4	Current sampling accuracy	±0.5%
5	Current sampling period (ms)	20 ms, adjustable
6	Temperature sampling accuracy (°C)	±1 (0~40 °C) ±2 (-40~85 °C)
7	Temperature acquisition range (°C)	-40~+85
8	Temperature sampling period (ms)	20 ms, adjustable
9	Cell equalizing current (mA)	100
10	SOC	Estimation accuracy ≤8%, period 50 ms, adjustable
11	Operating temperature range (°C)	-40~+85
12	Internal communication period (ms)	100
13	External communication interface	Modbus/TCP, RTU
14	BMU event record storage	≥10000 pieces, 30G
15	Historical data storage	≥90 days

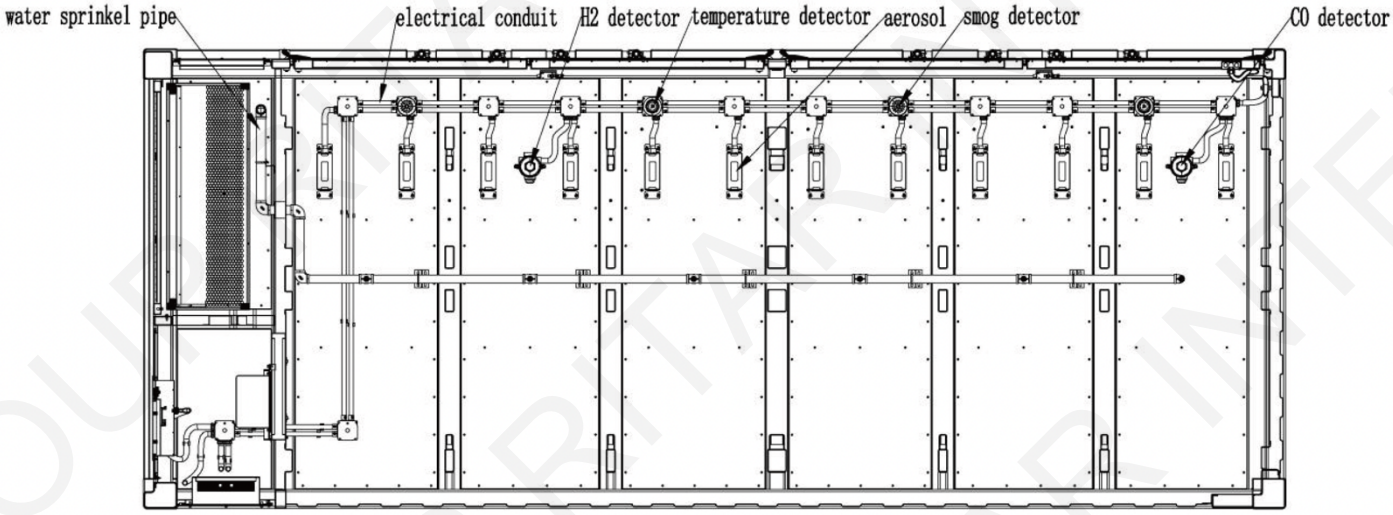
2.3. Communication Protocol

Communication port function:

Item	Port	Function	Protocol & Version
ESMU	RJ45 LAN0	Communication with EMS (backstage)	EMS protocol: "IEC61850"
	RJ45 LAN1	Communication with EMS (backstage) PCS communication	EMS protocol: “IEC61850”. Communication protocol: “NR Relay Energy Storage Converter (PCS) and BMS Communication Statute”.
	RJ45 LAN2	——	——
	CAN0 (6H/5L)	Communication with ESBCM master	Internal Standard Agreement of Gold-Electronic
	CAN1 (4H/3L)	——	——
	CAN2 （2H/1L）	Communication with F133 [Detection Module]	Gold- Electronic ESBCM Outline Message Intercommunication Protocol v1.12 20230910
	RS485 (COM1)	Communication with thermohydrometer	Device quantity: 3pcs; Equipment address: 1-3# Communication protocol: “Flat card rail temperature and humidity transmitter use instructions. Baud rate: 9600. Data transmission: data transmission EMS in the agreement + display control display. Communication lost strategy: communication lost, in accordance with the first level of warning tips + report EMS
	RS485 (COM2)	Communication with HVAC	Device quantity: 1pcs; Device address: 1#; Communication protocol: “Communication protocol-MC06~MC50-REV20200224; Baud rate: 9600; Data transmission: data transmission EMS + display control display in the agreement.; Communication lost strategy: communication lost, according to the first level of warning tips + report EMS
	RS485 (COM3)	Communication with liquid cooling system	Device quantity: 1pcs; Equipment address: 1#; Communication protocol: “EMW Series Single-Double; System Unit Communication Protocol-A0.7-20240229; Baud rate: 9600; Data transmission: All data in the agreement is transmitted to EMS + display control. Communication loss strategy: communication loss, according to the second level fault processing + report to EMS Control Strategy. BMS provides real-time battery temperature data through the communication protocol, including Tmax, Tmin, Tvag, etc., which is controlled by TMS autonomously.
	RS485 (COM4)	Communication with the meter	Device quantity: 1pcs; Device Address: 1#; Communication protocol：《Specification-T253. ADL3000-E-B DIN-Rail Multifunction Power Meter. Installation and Use Chinese and English Manual V1.0; Baud rate: 9600; Data transmission: data transmission EMS + display control display in the agreement [see special requirements]. Communication loss of connection strategy: communication loss of connection, according to the first level of warning tips + report EMS

2.4. FSS system overview

The FSS system is composed of fire control panel, smoke detectors, gas detectors and aerosols, which main function is to prevent fire spread in time when any open flame signal or gas signal appears in the battery system and sent out fire signal to EMS system. The main components layout is shown as following

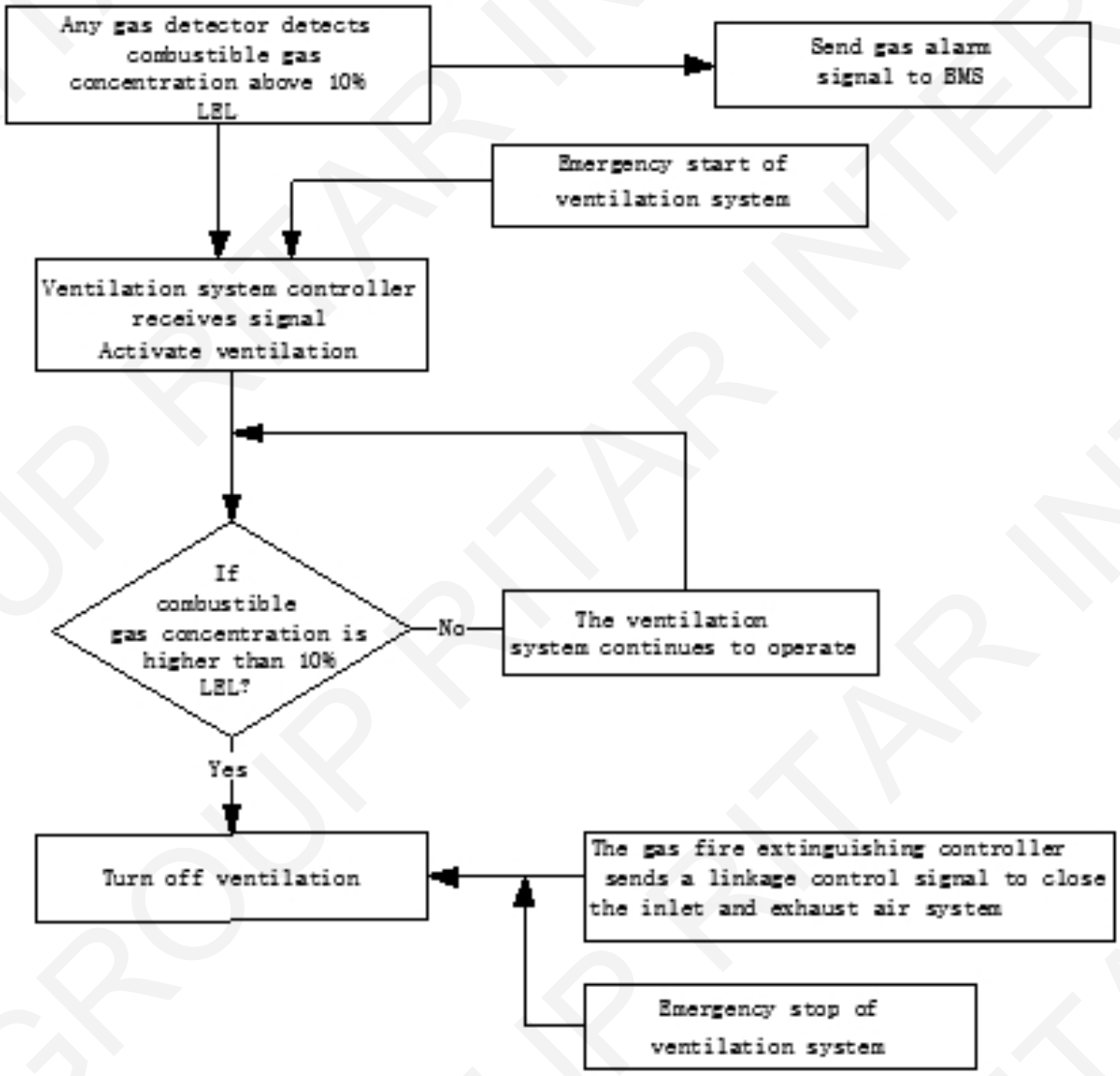


2.4.1. Main components

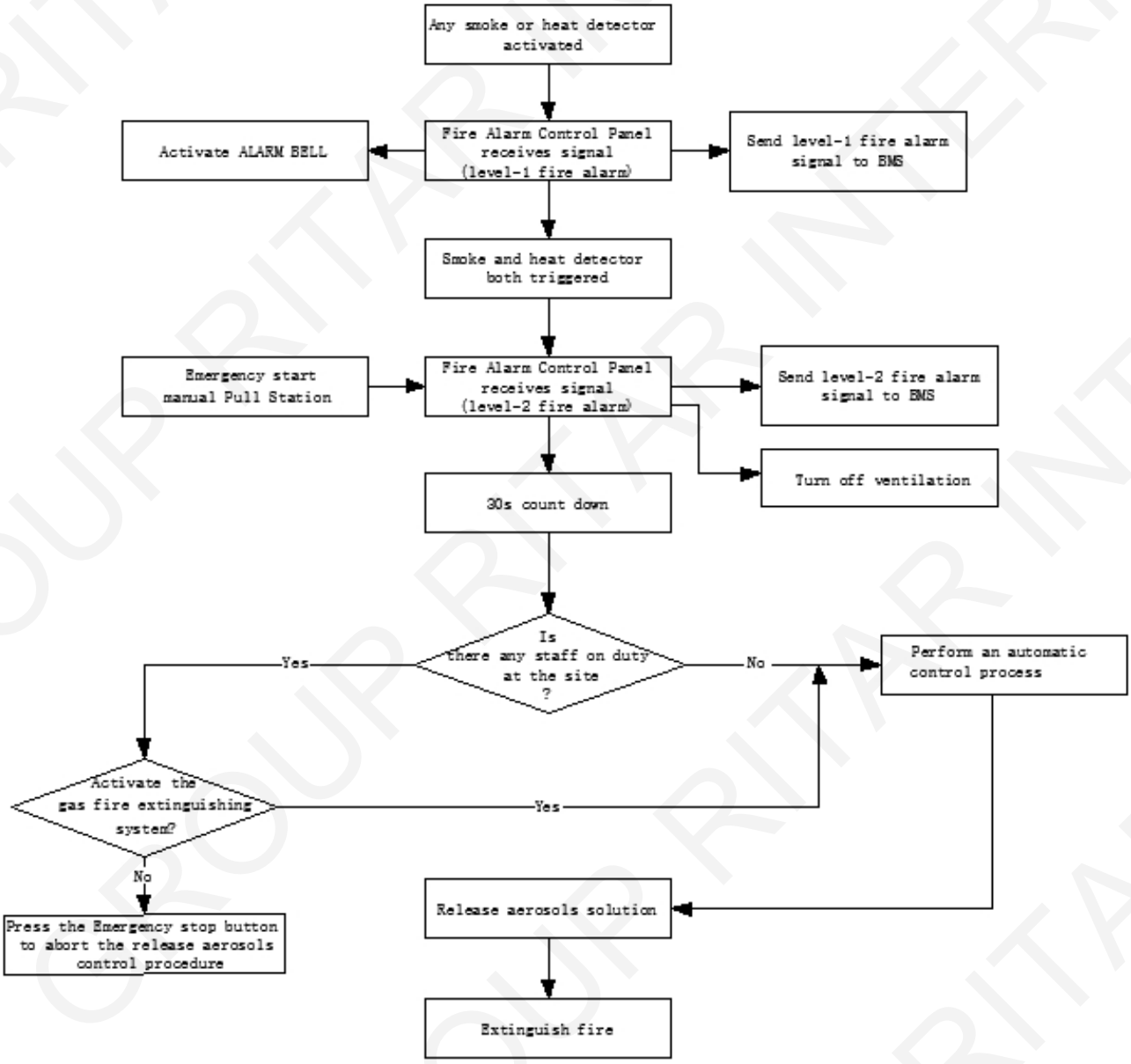
S/N	Name of equipment	Specification/Model	Qty	Remarks
1	Gas fire extinguishing controller	K1810-13	1	AC220V/DC24V
2	Smoke detector	SOC-24V	2	
3	Heat detector	DCD-190	2	
4	Emergency release pull box	HPS-DAK-WP	1	
5	Service switch	K1832-10	1	
6	Emergency stop button	K1823-10	1	
7	Audible and visual alarm	WHEC24-75WR	1	
8	Alarm bell	B6-24	1	
9	Aerosol fire extinguishing device	FP-250S	12	
10	Combustible gas detector (H2)	Xgard Type 5	1	
11	Combustible gas detector (CO)	Xgard-Type 2	1	
12	Electric ventilation louver	TPF14	1	(RAL7035) orange peel
13	Exhaust fan	TPF13	1	(RAL7035) orange peel
14	Emergency start/stop switch	SSB01	1	
15	Pendent sprinkler	Ut0005	5	
16	Quick coupling	DN65	1	

2.4.2. Fire Control Logic

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



The control logic diagram for the air intake and exhaust system is shown in the following figure.



1) Control mode of protection area:

The protection area operates through both automatic and manual control modes. Regardless of manned presence in the protection area, the automatic control mode shall be employed. In case of any abnormal situation, the emergency start can be initiated through the emergency release pull box. The audible and visual alarms will start simultaneously for early warning. The aerosol will be released after a delay of 30 seconds (this fire extinguishing operation can be terminated by pressing the emergency stop button).

2) Control mode of fire early warning detector:

The fire early warning system utilizes multiple detectors for detection and alarm of temperature, smoke and combustible gas.

Within the container, there are a total of 2 heat detectors and 2 smoke detectors. Alarm strategies are categorized into Level I and Level II alarms. Upon reaching the Level II alarm, the fire extinguishing system will automatically activate after a 30-

second delay, and the air intake and exhaust system will be shut down.

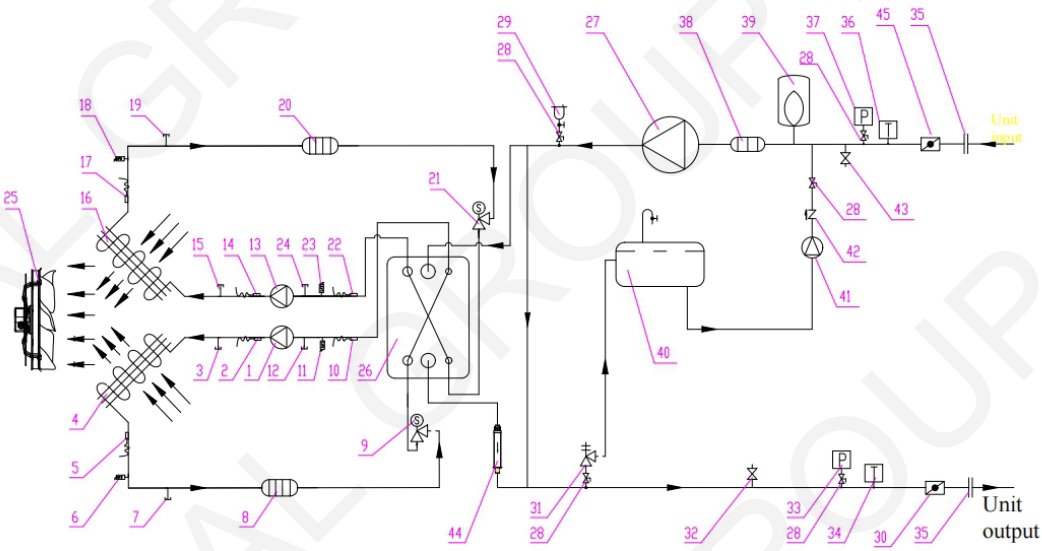
In the container, there are 2 H2 gas detectors and 2 CO gas detectors. The alarm thresholds are categorized as high and low alarms. The specific alarm strategy is as follows: a. The first-level threshold of the detector is set between 5% LEL to 20% LEL, with a measurement error of less than 1% LEL, b. The second-level threshold is set between 20% LEL to 50%LEL, with a measurement error of less than 2% LEL; when any of the combustible gas detectors detect a gas concentration reaching the alarm linkage threshold of 10% LEL, the air intake and exhaust system will be activated.

2.5. TMS system overview

The energy storage system adopts liquid cooling for temperature control. Through the internal refrigeration and heating unit of the system, the working temperature of the cell can be effectively controlled to reduce the system temperature difference.

The liquid-cooling system is mainly composed of the liquid-cooling unit, liquid cooling pipeline and liquid cooling plate. The cooling medium is evenly transported to the liquid cooling plate in the sub rack through the liquid cooling pipeline by the power of the pump in the liquid-cooling unit, and the working temperature of the cell is controlled through heat exchange to maintain the consistency of the operating temperature of the cell.

The liquid-cooling unit consists of a refrigeration circulation system and a coolant circulation system. The principle of the system is shown in the figure:



			45		Return pipe butterfly valve
22		B# heat absorption temperature sensor	44		Pipeline heater
21		B# electronic expansion valve	43		Drain valve
20		B # filter	42		Make-up water check valve
19		B# needle valve 2	41		Make-up pump
18	HPS	B# HP pressure sensor	40		Make-up water tank
17		B# liquid pipe temperature sensor	39		Expansion pipe
16		B# condenser	38		Straight pipe filter
15		B# needle valve 1	37	P	Return water pressure sensor
14		B# exhaust temperature sensor	36	T	Return water temperature sensor
13		B# compressor	35		Quick-connect chuck
12		A# needle valve 3	34	T	Supply water temperature sensor
11	LPS	A# L P pressure sensor	33	P	Supply water pressure sensor
10		A# exhaust temperature sensor	32		Filling valve
9		A# electronic expansion valve	31		Pressure relief valve
8		A# filter	30		Butterfly valve of water supply pipe
7		A# needle valve 2	29		Automatic exhaust valve
6	HPS	A# HP pressure sensor	28		Mini ball valve
5		A# liquid pipe temperature sensor	27		Circulating pump
4		A# condenser	26		Plate heat exchanger
3		A# needle valve 1	25		Condenser fan
2		A# exhaust temperature sensor	24		B# needle valve 3
1		A# compressor	23		A# L P pressure sensor
S/N	SYMBOL	DES.	S/N	SYMBOL	DES.

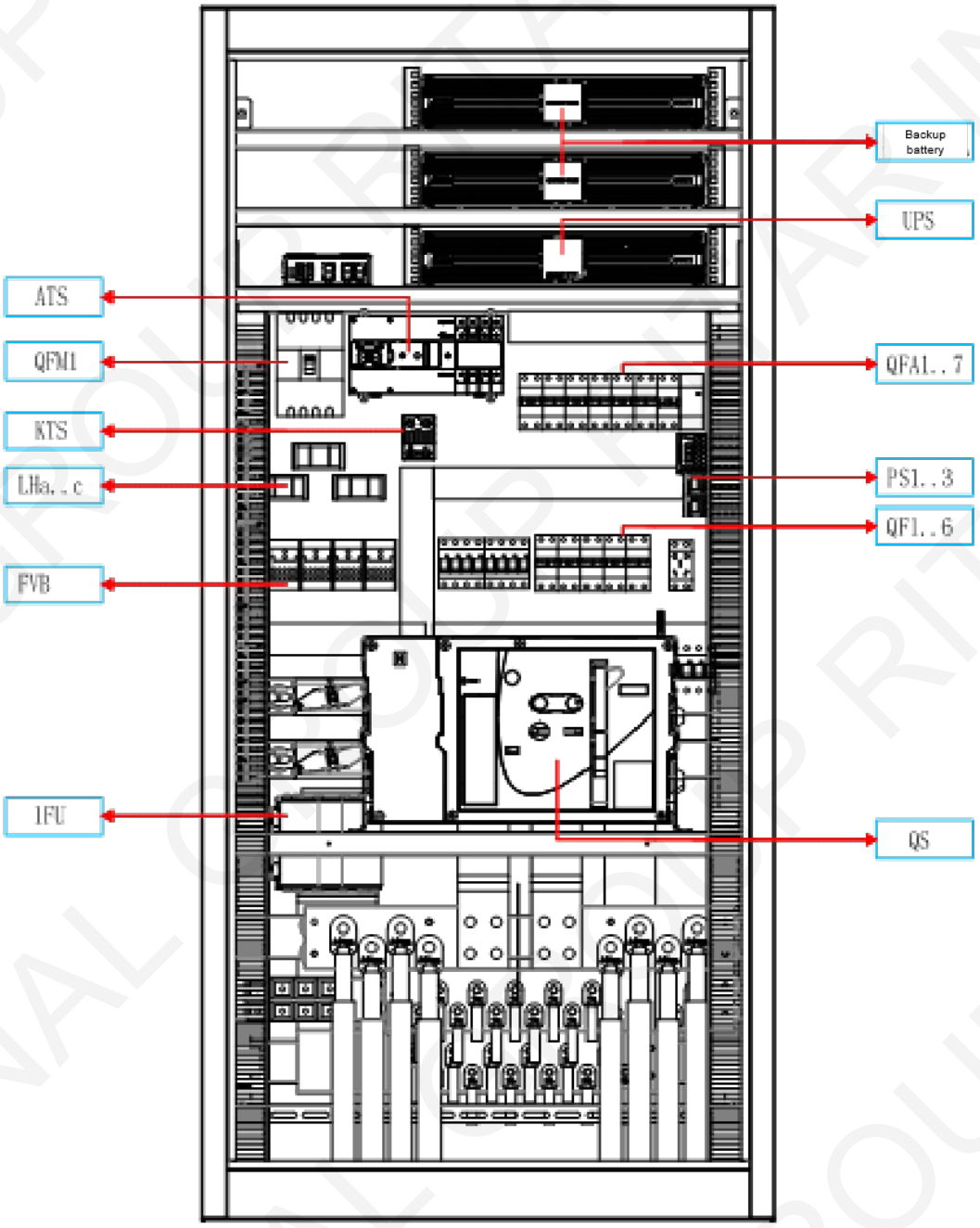
Parameters of Liquid-cooling System are as followings:

SN	Item	MoU	Parameter value
Electrical parameters			
1	Power supply system		3/N/PE AC 380V 50/60Hz（480V 60Hz）
2	Power/current of complete machine	kW/A	≤26 (refrigeration at ambient temperature of 35°C)
3	Heating power	kW	≥24
4	Withstand voltage fluctuation range	%	±15
5	Surges withstand capability		Power terminal: common mode ± 4KV, differential mode ± 2KV; signal terminal: common mode ±1KV
Refrigeration capacity parameters			
6	Medium		50% ethylene glycol aqueous solution (volume ratio)
7	Refrigerating capacity	kW	≥60(@L35/W18)
Air and fluid parameters			
8	Coolant supply flow	L/min	≥500@150kPa
9	Coolant supply pressure	Bar	≥1.4
10	Maximum coolant supply pressure	Bar	≥3.0
11	Maximum bearing pressure on the coolant side	Bar	≥6.0
12	Coolant temperature setting range	℃	15~21 (included)
13	Coolant temperature control accuracy	K	±1
14	Operating mode		Cooling mode, heating mode, standby mode and self-circulation mode
15	Factory default		Automatic mode, factory default of liquid temperature: 18°C
Functional requirements			
16	Automatic fluid supplement	Fluid supplement tank ≥ 8 L, with filter screen installed at the filling port	
17	Level display	A level gauge shall be set at a prominent position of the unit, with maximum and minimum liquid level lines and a low-level alarm function.	
18	Human-machine interaction interface	Always display operation flow chart & operation data & support manual setting of parameters.	
19	EMC	The control panel is designed to be electrically isolated to avoid external interference.	
20	Automatic exhaust	With automatic exhaust function	
Appearance and dimensional parameters			
21	Size	mm	120(W)×440(D)×2400(H)
22	Coolant interface dimension		DN65 (ϕ63.5) chuck
23	Dimension of filling/drain port		DN15
24	Appearance and color		RAL7035
Other parameters			
25	Energy efficiency ratio of the complete machine	W/W	≥1.9(18℃@45℃)
26	Refrigerant		R410A
27	Controller type		LCD screen with operation buttons, friendly human-machine interaction interface
28	Noise	dB(A)	≤ 85 (ambient temperature: 45°C)
29	Protection rating of electric cabinet		IPX5
30	Net weight	kg	≤600
31	Communication mode		RS485/CAN

2.6. DC Confluence Cabinet overview

The DC confluence cabinet integrates the distribution cabinet and the confluence cabinet, possessing confluence, distribution, and control functions. The functions and layout of elements in the confluence and distribution cabinet are as follows:

1) Auxiliary power input: three-phase AC380V, 50HZ.
2) UPS and backup power supply: provide uninterrupted AC220V power supply, with a battery backup for 2h.
3) AC220V to DC24V power supply module.
4) Emergency stop circuit.
5) Power distribution protection and power on/off control circuit.
6) Automatic switching device of AC dual power supply.
7) DC confluence circuit: Parallel confluence of each battery cluster and output.



ABBV.	Name	Function	Remarks
ATS	Dual power automatic switching device	Reliable switching between two AC power supplies	Optional
QFM1	Circuit Breaker	Auxiliary AC power distribution switch and protection function	
KTS	Temperature controller	Control and adjust the temperature in the container	
FVB	Surge protector	Limits overvoltage and discharges surge currents	
1FU	Fuse	Provides short-circuit protection in the DC circuit	
UPS	Uninterruptible power supply	Provide stable and uninterrupted AC power supply	
QFA1..7 QF1..6	Miniature circuit breaker	Connects, carries, and disconnects distribution branches	
PS1..3	Power supply conversion module	AC220V to DC24V power supply	
QS	DC disconnector	Provide reliable disconnect points, enhances system safety	

3. Site installation

3.1. Site and environment requirements

MegaCool BESS DC 20F5015KWH applies to general outdoor scenarios. In accordance with local laws and regulations, the site selection requirements are as follows:

1) The installation position of the node cannot be in a low-lying area, and the site level is higher than the highest historical water level in the area.
2) The soil condition is good, and the ground is solid. No bad geological conditions such as rubber soil and soft soil layer are allowed. The ground that is easy to accumulate water and sink should be avoided.
3) Invest in a well-ventilated place.
4) Keep away from strong vibration, noise sources, and electromagnetic interference areas. Try to avoid places with existing underground facilities.
5) Keep away from places that produce dust, fume, harmful gases, and produce or store corrosive, flammable, and explosive materials. The distance from the airport, landfill, riverbank, shore or dam should not be less than 500m.
6) Choose an open location according to the requirement of Table 13 & Table 14, and
7) ensure that there are no obstacles from the surrounding area.
8) Keep at least 50m away from residential areas to avoid noise pollution.
9) The recommended minimum spacing is as follows: two battery compartments can be arranged back-to-back, with the other sides spaced three meters apart from walls, other battery compartments, and obstacles.

Remarks:

- L0≧ 4000mm L2≧ 4000mm L3≧ 4000mm
- Maintenance space for forklift need be cosidered

- Airflow requirement: 7400 m^3/h

3.2. Foundation Requirement

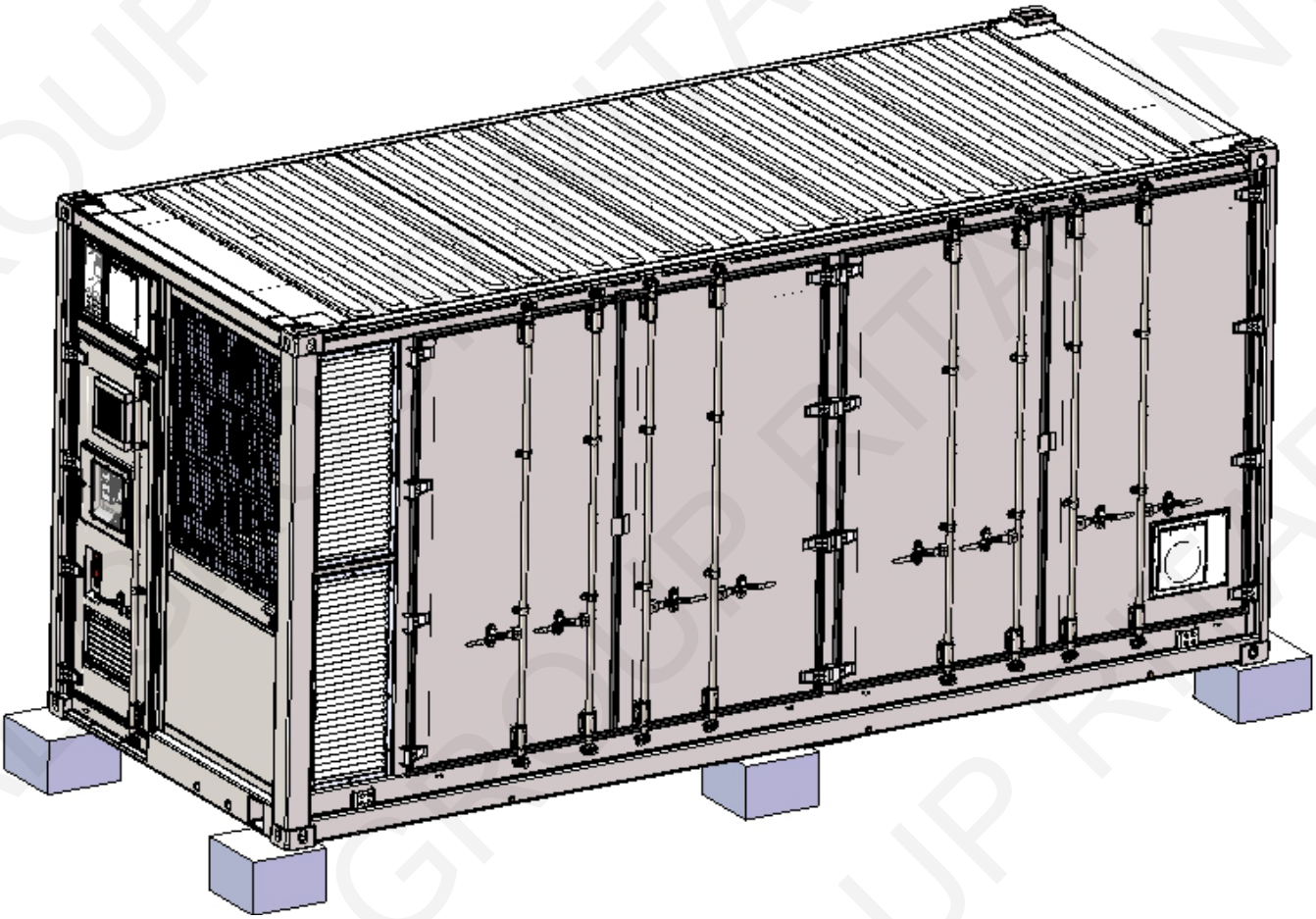
Before installing this container, build the foundation and trench on the selected ground. The requirements for foundation construction are as follows:

1) The size of foundation meets the requirements of container installation and bearing capacity as following shown.

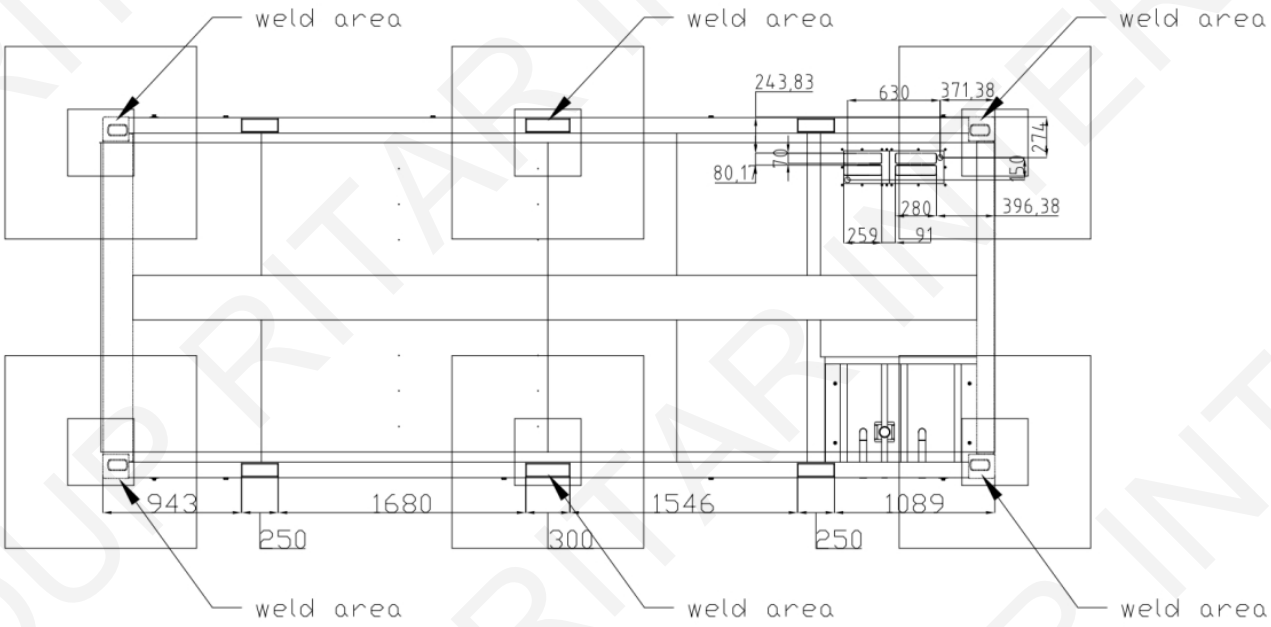
Ground type	Condition requirements	Remarks
Concrete floor	The ground shall be able to bear a load of 43 tons and no deformation within 20 years	Ground should fulfill:
Plain land surface		Level deviation ≤±10mm Flatness deviation ≤±5mm per 2m area

2) Foundation requirement:

a) At least six foundation points need be supported as following 2 options:



b) Mandatory to fix four corner foundation points as follows



Container bottom fitting x 6 (compliance with ISO 1161)
Fixed with Bolts or welded (6 places)

c) Diameter for every foundation point ≥250mm,

3) Bury the ground grid and reserve a ground bar at the ground position of the container. Connect one end of the ground grid to the embedded ground grid and the other end to the container ground point. When the ground network is embedded, reserve enough length for the ground lug to connect to the ground point on the container.
4) The grounding resistance of the container is less than or equal to 0.1Ω.
5) The container energy storage system uses underside cabling, so the cables need to be buried under the power cabin in advance.
6) The inner diameter of the protective pipe should not be less than 1.5 times the outer diameter (including the protective layer) of the cable.
7) Foundation construction should meet the local historical maximum rainfall drainage requirements.
8) The discharged water shall be treated in accordance with local laws and regulations.