RENON

Technical Agreement

MPack 261A

E-mail: support@renon-usa.com

Buyer:

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Supplier:

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2025 1ST EDITION

Renon Power

We Care About Sustainability

With our own R&D team and automatic production factory, we are dedicated to delivering innovative, reliable, and affordable energy storage solutions to global customers.

At Renon, we believe that sustainable energy is the future. We are passionate about reducing carbon emissions and preserving our planet for future generations. That's why we invest heavily in research and development, leveraging the latest technologies to design and manufacture energy storage systems that are efficient, scalable, and adaptable.

Our products are designed to meet the needs of a wide range of applications, from residential and commercial buildings to industrial facilities and utility-scale projects. Whether you're looking to reduce your energy bills, increase your energy independence, or support your sustainability goals, Renon has the right solution for you.

Our commitment to quality and customer satisfaction is unwavering. We work closely with our clients to understand their unique needs and provide customized solutions that meet or exceed their expectations. We also provide comprehensive technical support, maintenance, and warranty services to ensure that our customers get the most out of their investment.

Join us on our mission to make renewable energy within reach.

PROVIDE INNOVATIVE, RELIABLE, AND AFFORDABLE ENERGY STORAGE SOLUTIONS TO CUSTOMERS WORLDWIDE.

Renewable · Reliable · Remarkable

CONTENTS

1. General Part

This Technical Agreement applies to the **RENON MPack 261A Energy Storage System (ESS)**. This document defines the technical specifications, scope of supply, and division of responsibilities related to the MPack 261A ESS, ensuring clarity and alignment between the Buyer and Supplier.

The agreement specifically outlines:

- Product specifications, including technical parameters, system functionality, and performance.
- Scope of supply detailing provided equipment, components, and accessories.
- Clear delineation of responsibilities between the Supplier and the Buyer.

This agreement shall be mutually reviewed, confirmed, and agreed upon by both parties prior to finalizing the order. Issues not explicitly addressed herein will be resolved through mutual consultation and supplementary documentation.

1.1 Scope of Supply by the Supplier

The MPack 261A battery cabinet supports multiple external equipment configurations for flexible expansion. It is compatible with external MPPT Unit for integrated PV-storage operation, as well as with STS Box for millisecond-level, uninterrupted power transfer. Available configurations and corresponding models include:

No.	Configuration	Product Model
1	MPack 261A Standard Cabinet	R-MP261135A1-US
2	Standard Cabinet + STS Box	R-MP261135A1-S-US
3	Standard Cabinet + MPPT Unit(120kW total) + MPPT PDU	R-MP261135A1-P-US
4	Standard Cabinet + MPPT Unit(120kW total) + MPPT PDU + STS Box	R-MP261135A1-SP-US

The Supplier shall provide the following equipment and components as part of the MPack 261A ESS:

Equipment	Description	Quantity	Remarks
Standard Cabinet	Integrated cabinet including Battery System, **PCS, EMS, BMS, Liquid cooling system**, and Fire Suppression System	1 set	No Optional Equipment Mounted
MPPT Unit (Optional)	**120 kW total**, enabling a higher energy utilization.	1 set	Externally mounted on the Cabinet
MPPT PDU (Optional)	For connecting the PV array to the battery's DC side, enabling DC input convergence and high-to-low voltage conversion.	1 set	
Static Transfer Switch (STS) Box (Optional)	An off-grid seamless transfer switch integrated with a control box, featuring fast switching speed, consistent disconnection time, and high reliability.	1 set	

Notes:

1) For a single MPack 261A, the matching STS Box adopts a single-module configuration. For two MPack 261A units, they share one dual-module STS Box.

2) Any additional equipment required for integration with external systems shall be provided by the Buyer unless otherwise specified.

1.2 Work of the Project Site Performed by the Buyer

The Buyer is responsible for the following tasks at the project site:

1.2.1 Transportation & Installation

- Installing the MPack 261A in the designated location.
- Lifting, positioning, and securing the MPack 261A at the site.
- Ensuring proper ventilation and cooling in the installation area.

1.2.2 Electrical Connections

- Connecting all external cables as required in section 3.6.
- Ensuring proper battery module connections inside the system.

1.2.3 Commissioning & Integration

- Providing necessary external power and communication infrastructure for the ESS.
- Cooperating with the Supplier during system debugging and final testing.

1.3 Buyer's Responsibility for Site Preparation

- The foundation must be levelled and prepared in accordance with engineering specifications to support the weight of the system.
- Adequate drainage must be implemented to prevent water accumulation around the system.
- Proper earthing and grounding must be established to meet safety requirements.
- If the installation site exceeds the specified environmental conditions, the Buyer must implement additional protective measures, such as shading, enclosures, or environmental controls.

1.4 Other Site-Specific Requirements

- Compliance with local regulations, safety codes, and grid connection standards.
- Any additional work not specified in the Supplier's scope shall be performed by the Buyer.

Notes:

- The Supplier will provide technical support and software debugging during commissioning, but the Buyer must ensure that all necessary site conditions are met before testing.
- Any additional installation requirements shall be agreed upon separately.

2. Terms and Definitions

2.1 Battery System

A collection of battery system that store electrical energy, composed of:

- **Battery Cells:** The smallest unit of energy storage in the system.
- **Battery Modules:** A combination of battery cells electrically connected in a protective casing.
- **Battery Rack:** A structure containing multiple battery modules to form a complete energy storage system.

2.2 Power Conversion System (PCS)

A bi-directional inverter that converts **DC power (from the battery) to AC power** for external use and vice versa.

2.3 Battery Management System (BMS)

Monitors and controls the battery's state of charge (SOC), state of health (SOH), temperature, and voltage to ensure safe operation and optimal performance. The BMS system adopts a three-tier control architecture, consisting of:

- Primary **BMU (Battery Monitoring Unit)** for cell-level data acquisition,
- Secondary **BC (Battery Controller)** for pack-level management and protection,
- Tertiary **BA (Battery Aggregator)** for multi-cluster coordination and external system interaction, forming a hierarchical control structure.

2.4 Energy Management System (EMS)

A system that enables **remote and local monitoring of the ESS,** facilitating real-time operation management and performance tracking. It consists of:

- Communication Interface: **Supports** Modbus (TCP/IP) or other industry-standard protocols **to integrate with external controllers and grid management systems.**
- Local Touchscreen Display: A device-mounted HMI (Human-Machine Interface) **for direct system control and monitoring.**
- Cloud-Based Software Platform: **Provides** remote monitoring, historical data analysis, and system diagnostics **via an internet connection.**

2.5 Fire Suppression System

A **built-in safety system** designed to **detect, alarm, and suppress fires** within the ESS. It includes:

- Smoke and heat detectors to identify potential hazards.
- Automatic suppression mechanisms **to mitigate fire risks.**
- Compliance with relevant safety regulations and industry standards.

2.6 Liquid Cooling System

A built-in cooling system aim to guarantees precise temperature management to maximize battery lifespan and efficiency.

2.7 Energy Storage System (ESS)

The complete MPack 261A Standard Cabinet , consisting of:

- Battery System
- EMS
- BMS
- PCS
- Fire Suppression System
- Liquid Cooling System

2.8 SOC (State of Charge) & SOH (State of Health)

- SOC (State of Charge): The remaining available energy in the battery, expressed as a percentage of its full capacity.
- SOH (State of Health): A measure of the battery's overall condition, indicating how much capacity it retains compared to its original state.

2.9 Maximum Power Point Tracking (MPPT)

An intelligent control technology used in photovoltaic (PV) systems. By continuously monitoring the output characteristics (voltage and current) of PV arrays and dynamically adjusting the operating parameters of power electronic converters, it ensures the PV system always operates at its Maximum Power Point (MPP). Thereby maximizing PV generation efficiency.

2.10 Static Transfer Switch (STS)

A hybrid solid-state transfer switch designed for off-grid systems, integrating electromagnetic actuation technology and semiconductor-based arc extinction. It enables seamless power switching with millisecond-level response, stable disconnection timing, and high operational reliability.

2.11 On-Grid & Off-Grid Mode

- **On-Grid Mode:** The ESS operates while connected to the grid, supporting grid stability and energy management.
- **Off-Grid Mode:** The ESS functions independently of the grid, supplying power to isolated loads when the grid is unavailable.

3. Technical Requirements

3.1 Scope of System Design

The MPack 261A is an outdoor battery energy storage system (ESS) compatible with both PV DC-coupled and AC-coupled technologies. It integrates **five battery modules**, a bidirectional **power conversion system (PCS)**, an **energy management system (EMS**), a **battery management system (BMS)**, a **liquid cooling system**, and a **fire suppression system**. Optional components including an MPPT Unit, an MPPT power distribution unit (PDU), and an STS Box can be externally mounted to the cabinet.

3.1.1 Parameters of the **MPack 261A Standard Cabinet**

Parameter	R-MP261135A1-US
Battery System	
Cell Type	LFP 3.2V/314Ah
Module Configuration	1P52S
System Combination(Modules)	5 in series
Capacity(kWh)	261.2
Nominal Voltage(V)	832
Operation Voltage Range(VDC)	702~936
Discharge Depth	90% DoD
AC Input/Output	
Rated Power(kW)	135
Max. Power(kW)	148.5
Rated Voltage(VAC)	480
Voltage Range(VAC)	408~528
Rated Grid Frequency(Hz)	60(-5~5)
Adjustable Power Factor	0.99/-1~1
THDi	≤3%
DC Input/Output	
Max. Power (kW)	270
Voltage Range (V)	702~936
Max. Current(A)	314 (On-grid Mode)
System Characteristic	
Maximum Parallel Units	With External STS Box: 2 units With On/Off-Grid Switching Cabinet: 5 units Off-Grid Application: 5 units On-Grid Application: Unlimited
Round-Trip Efficiency (Annual Average)	85%*
Thermal Management Mode	Liquid Cooling

Communication Interface	CAN,RS485, Ethernet
Dimensions-W*D*H (Standard Cabinet)	43.3 × 57.5 × 93.5 in (± 0.5in) 1100 × 1460 × 2376mm (± 10mm)
Weight (Standard Cabinet)	6393lb (2900kg) ± 5%
Noise Level @1m	<75 dB
IP Rating	IP54
Certifications	UL9540A:2025, NFPA 855, NFPA 68, ANSI/CAN/UL1973:2022,ANSI/CAN/UL9540:2023 UL1741:2012 Ed.3+R:19May2023, UL1741:2021 Ed.3(Supplement SB), CSA C22.2#1071:2016 Ed.4+U1, IEEE 1547:2018,EEE 15471:2020

*Test Conditions: Ambient temperature of 25°C ± 2°C. Prior to testing, the ESS shall be left undisturbed in the test environment for a sufficient period to ensure all components (including the battery and PCS) reach thermal equilibrium.

3.1.2 Parameters of the **MPPT Unit**

Parameter	**MPPT Unit(Optional)**
Rated Power (kW)	120
PV Side	
Maximum Input Voltage (V)	650
Start-up Voltage (V)	250
MPPT Voltage Range (V)	200~650 (575~650 @full load)
Number of MPPT	6
Number of PV Strings(per MPPT)	12(2)
Maximum Input Current of each MPPT (A)	35/35/35/35/35/35
General Specification	
Weight	106lb (48kg)

3.1.3 Parameters of the **STS Box**

Parameter	**STS (Optional)**
Max. Parallel STS Modules	2
Rated Working Current (A)	630 (Single-Module configuration); 1071 (Dual-Module configuration)
Rated Working Voltage (VAC)	380/400/480/690
Mode Switching Time (between on-grid and off-grid)	≤20ms

3.2 Charge and Discharge Limitations

The charge and discharge performance of the **MPack 261A ESS** is determined by the **EMS**. The system dynamically adjusts charge and discharge power based on **state of charge (SOC), temperature, and BMS protection settings** to ensure safe operation and long-term battery health. The EMS coordinates various factors through hierarchical decision-making, with the logical priority hierarchy as follows: Safety Protection > Battery Hard Constraints > External Power Demand.

Hierarchy	Factor	Logical Description
1	Safety Protection	When a fault signal from the BMS, PCS, or grid is triggered, the EMS immediately terminates charging/discharging (highest priority).
2	Battery Hard Constraints	SOC/SOH/temperature limits provided by the BMS directly restrict the power command range of the EMS.
3	External Power Dispatch	Real-time demands such as power dispatch from third-party EMS are prioritized within safe battery limits.

3.2.1 Charge and Discharge Power Limits

Parameter	Battery System
Maximum Charge/ Discharge Current (A)	186

3.2.2 Temperature and SOC-Based Charge/Discharge Limitations

Discharge Current Limitations (Continuous Current in Amperes, A)

The following table shows the **maximum allowable discharge current** under different SOC and **cell temperature** conditions:

%/℃	0<SOC<5	5≤SOC<10	10≤SOC<20	20≤SOC<30	30≤SOC<40	40≤SOC<50	50≤SOC<60	60≤SOC<70	70≤SOC<80	80≤SOC<90	90≤SOC<100	SOC=100
-31	0	0	0	0	0	0	0	0	0	0	0	0
-30≤T < -25	0	0	0	0	37	74	112	112	112	112	112	112
-25≤T < -20	0	0	0	37	37	74	112	112	112	112	112	112
-20≤T < -15	0	0	37	74	112	112	112	112	112	112	112	112
-15≤T < -10	0	0	37	74	112	112	112	112	112	112	112	112
-10≤T < -5	37	37	74	112	112	112	112	112	112	112	112	112
-5≤T < 0	37	37	112	112	112	112	112	112	112	112	112	112
0≤T < 5	37	74	112	112	112	112	112	112	112	112	112	112
5≤T < 10	37	74	186	186	186	186	186	186	186	186	186	186
10≤T < 15	37	74	186	186	186	186	186	186	186	186	186	186
15≤T < 20	37	74	186	186	186	186	186	186	186	186	186	186
20≤T < 25	37	74	186	186	186	186	186	186	186	186	186	186
25≤T < 30	37	74	186	186	186	186	186	186	186	186	186	186
30≤T < 35	37	74	186	186	186	186	186	186	186	186	186	186
35≤T < 40	37	74	186	186	186	186	186	186	186	186	186	186
40≤T < 45	37	74	157	157	157	157	157	157	157	157	157	157
45≤T < 50	37	74	74	74	74	74	74	74	74	74	74	74
50≤T < 55	37	37	37	37	37	37	37	37	37	37	37	37
T≥55	0	0	0	0	0	0	0	0	0	0	0	0

Charge Current Limitations (Continuous Current in Amperes, A)

The following table shows the **maximum allowable charge current** under different SOC and **cell temperature** conditions:

%/℃	0≤SOC<5	5≤SOC<10	10≤SOC<20	20≤SOC<30	30≤SOC<40	40≤SOC<50	50≤SOC<60	60≤SOC<70	70≤SOC<80	80≤SOC<90	90≤SOC<95	95≤SOC<99	99≤SOC<100	SOC=100
-1≤T＜0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0≤T＜5	37	37	37	37	37	37	37	37	37	37	37	0	0	0
5≤T＜10	74	74	74	74	74	74	74	74	74	74	74	0	0	0
10≤T＜15	74	74	74	74	74	74	74	74	74	74	74	0	0	0
15≤T＜20	157	157	157	157	157	157	157	157	157	157	157	157	74	0
20≤T＜25	186	186	186	186	186	186	186	186	186	186	186	186	74	0
25≤T＜30	186	186	186	186	186	186	186	186	186	186	186	186	74	0
30≤T＜35	186	186	186	186	186	186	186	186	186	186	186	186	74	0
35≤T＜40	186	186	186	186	186	186	186	186	186	186	186	186	74	0
40≤T＜45	157	157	157	157	157	157	157	157	157	157	157	157	74	0
45≤T＜50	157	157	157	157	157	157	157	157	157	157	157	157	74	0
50≤T＜55	74	74	74	74	74	74	74	74	74	74	74	74	0	0
T≥55	0	0	0	0	0	0	0	0	0	0	0	0	0	0

3.3 Operation Condition and Energy Retention

The **MPack 261A ESS** is designed to operate within specific environmental conditions to ensure optimal performance, longevity, and safety. This section outlines the operational requirements, energy retention capabilities, and transportation conditions based on industry standards.

3.3.1 Operation & Storage Environment Conditions

To ensure optimal battery performance, longevity, and safety, the **MPack 261A** must be operated and stored under the following conditions:

Parameter	Requirement
Operating Temperature	Without MPPT: -22~131°F(-30~55°C), derating above 104°F(40°C); With MPPT: -4~131°F(-20~55°C), derating above 104°F(40°C);
Storage Temperature Range	-22~131°F (-30~55°C)
Relative Humidity	0 to 95% RH (non-condensing)
Altitude Limit	≤9843ft (3000m)

- Temperature Impact: If the ambient temperature exceeds 104°F(40°C), the system will automatically reduce power output to prevent overheating.

3.3.2 Energy Retention Performance

The **MPack 261A ESS** is designed to **retain stored energy efficiently over time**, ensuring reliable performance when needed. The energy retention capabilities are defined based on industry-standard **self-discharge rates and idle consumption**.

Parameter	Retention Performance
Self-Discharge Rate (Monthly, at 77°F/25°C) (Shutdown State)	≤ 0.3%
Energy Retention After 24 Hours (Shutdown State)	≥ 99%

Note:

- Higher temperatures can accelerate self-discharge rates, which should be considered for long-term storage applications.

3.3.3 Transportation and Handling Requirements

To ensure the safety and integrity of the MPack 261A ESS during transportation, the system must comply with international shipping and handling standards.

The MPack 261A ESS is not approved for mobile/vehicle-mounted energy storage applications.

Aspect	Requirement
Transportation Mode	Suitable for land and sea transportation
Compliance Standard	UN38.3
Handling Precautions	Must be transported upright; avoid excessive tilting
Packing Standard	Secured with anti-vibration mounts and shock-absorbing materials
Storage During Transit	-4°F to 113°F(-20°C to 45°C) ,avoid prolonged exposure to extreme heat or moisture
Base Requirements	Level the base with a spirit level and ensure its surface is within 0.2in(5mm) of the floor level. If the levelness deviation is excessive, remove and reinstall the four base support brackets of the cabinet for leveling.

3.4 The Structure and Topology

3.4.1 Internal Structure

The internal layout and external mounting layout of a single MPack 261A are shown clearly in the provided layout diagram below. Major system components and their installation positions are directly marked on the diagram for quick reference during installation, commissioning, and maintenance (MPPT Unit, MPPT PDU, and STS Box are optional).

Front Door panel color: Signal White (RAL 9003)

Enclosure color: Light Grey (RAL 7035)

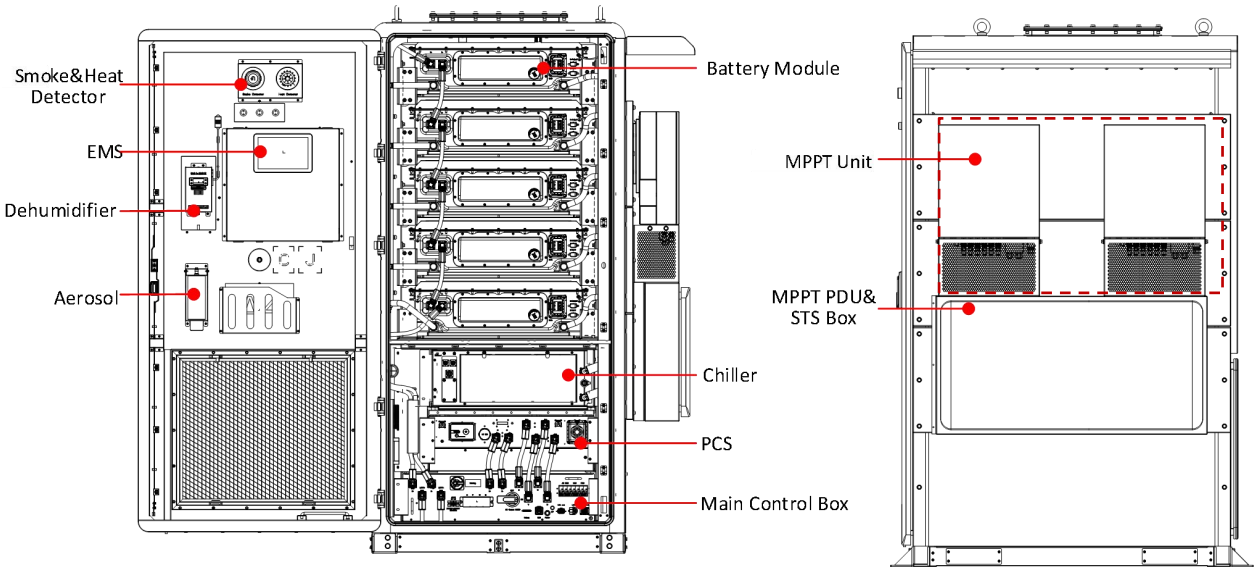


Figure 1 –MPack 261A Overall Layout

***Specifications for External Mounting Positions:**

1) The MPPT Unit and PDU are installed on the right side of the cabinet.

2) The STS Box is mounted on the right side when configured as single-module with an external MPPT on the cabinet (see Figure 1), and on the left side for all other cases.

3.4.2 Application Topology

MPack 261A supports flexible configurations. The application topology provided clearly demonstrates typical deployment scenarios, including necessary external connections and responsibilities.

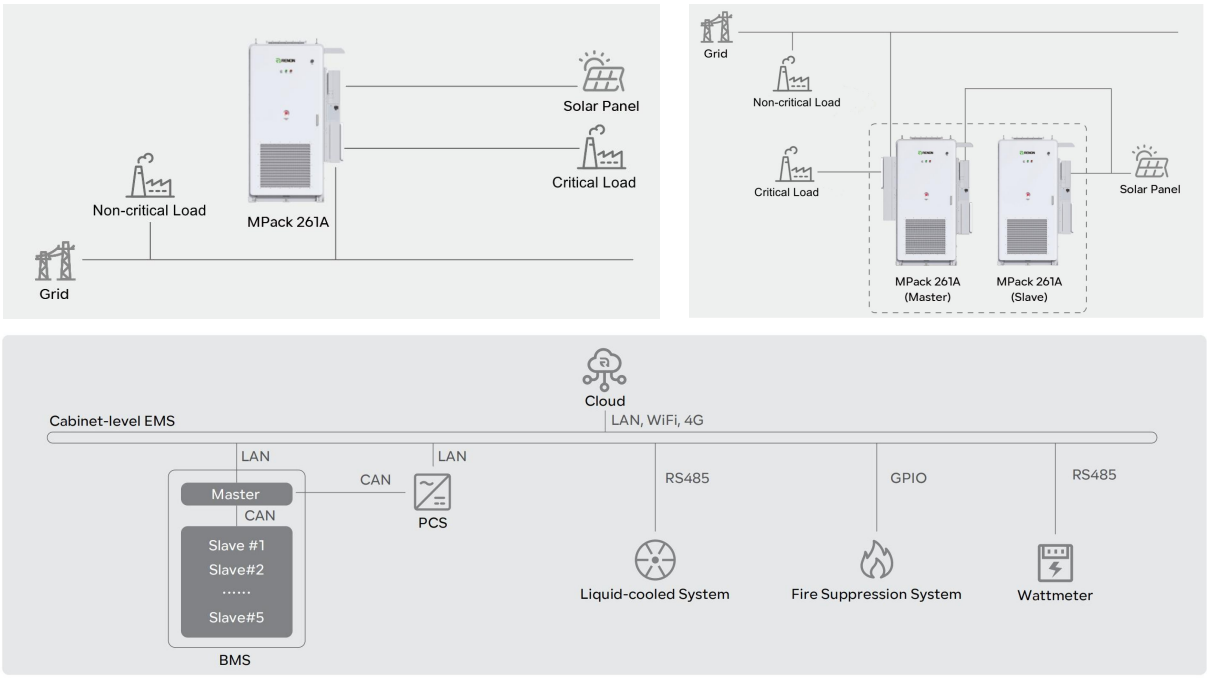


Figure 2 – Cabinet-Level System Layout & EMS Structure

For parallel operation of 3 to 5 MPack 261A units, external equipment is not supported. Instead, MPPT cabinet and on/off-grid switching cabinet can be optionally configured.

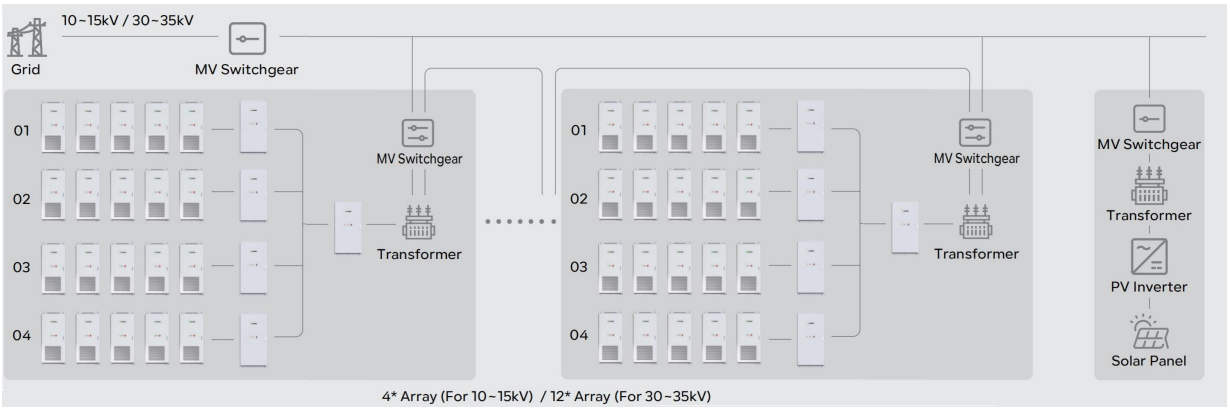
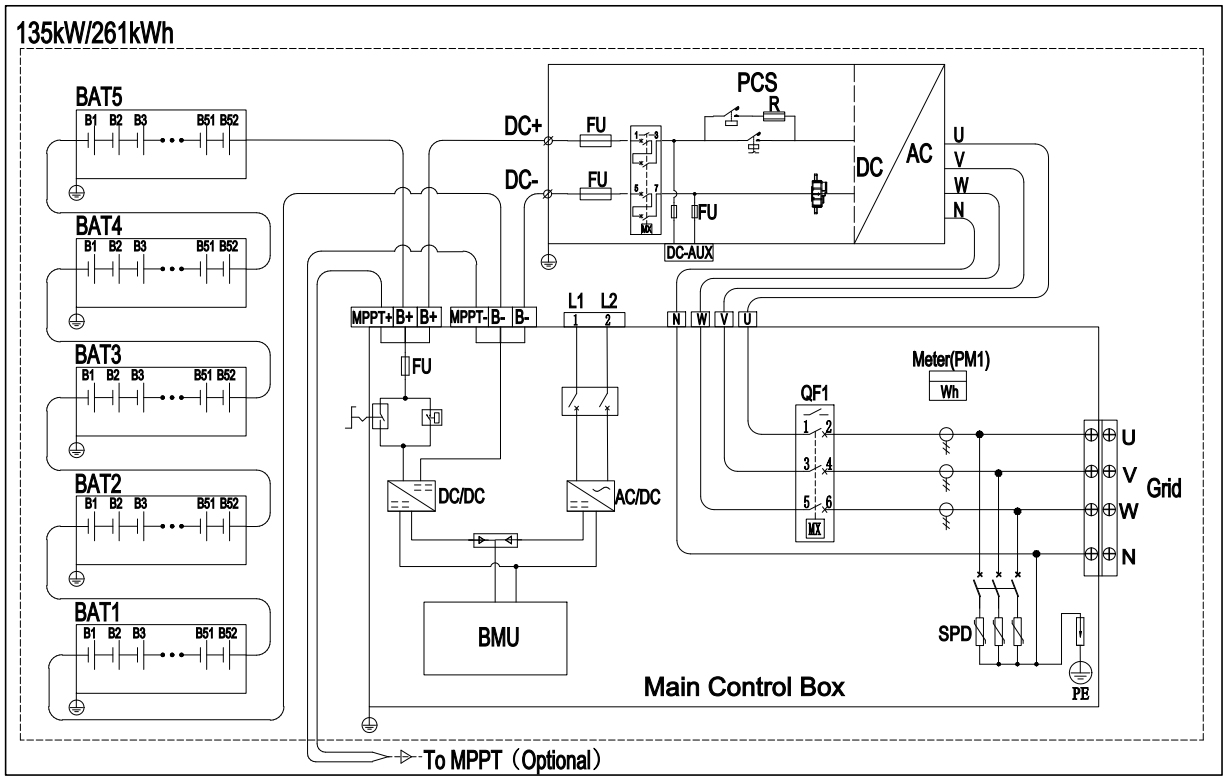


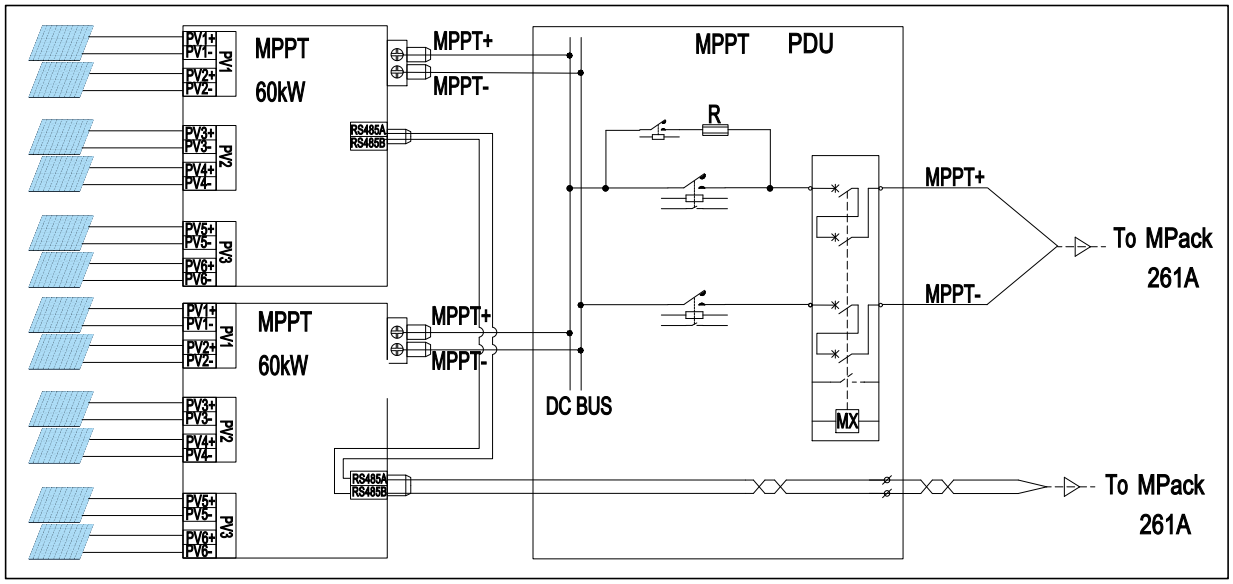
Figure 3 – Array-Level System Layout

3.5 Electrical Schematic Diagram

3.5.1 Standard Cabinet

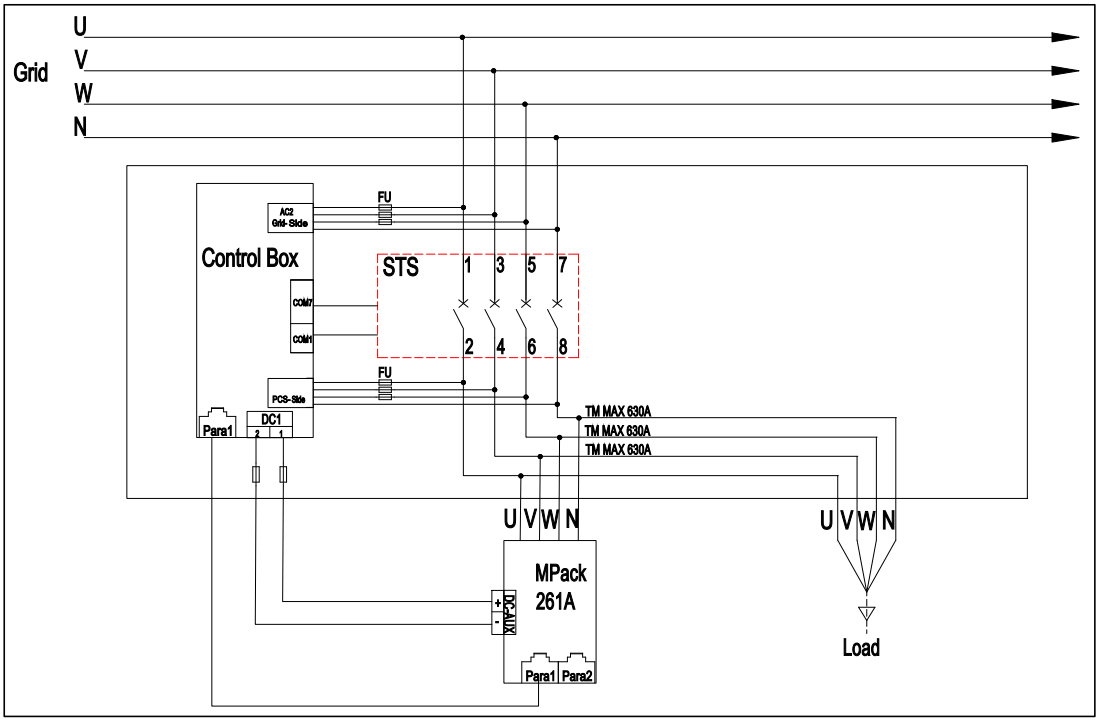


3.5.2 MPPT Unit& MPPT PDU (Optional)

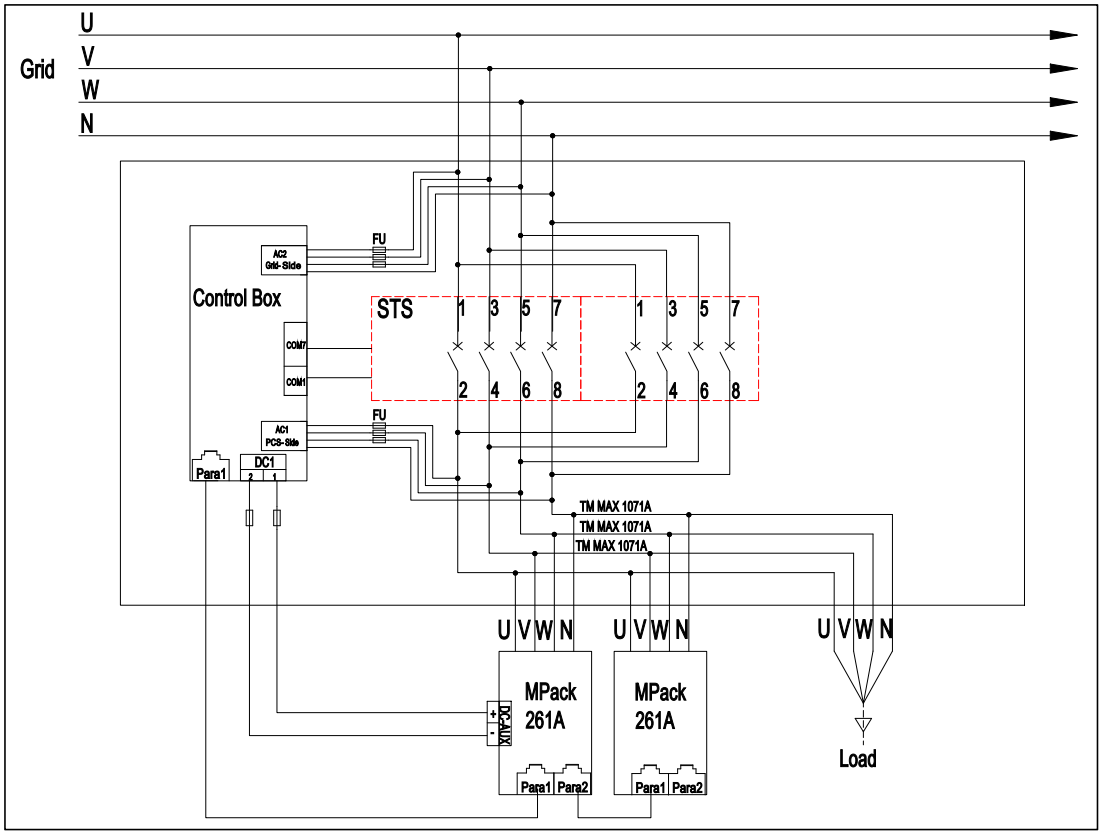


3.5.3 STS Box (Optional)

(1) Single-Module Configuration



(2) Dual-Module Configuration



3.6 External Interfaces

This section specifies all external interface requirements and standards of the MPack 261A ESS to ensure seamless and standardized onsite integration. Unless otherwise specified, the cables mentioned in the following sections shall be provided by the User.

3.6.1 AC Power Interface

External Interface	Quantity	Description
AC Power Interface	1 set	Three-phase four-wire (U/V/W/N); Recommend cable: flame-retardant copper cable; Cable specification: 70mm²(2/0AWG) per phase，Rated voltage> 600VAC; Terminal: SC70-8;

3.6.2 DC Power Interface

External Interface	Quantity	Description
DC Power Interface	1 set	(MPPT+/MPPT-); Recommend cable: flame-retardant copper cable; Cable specification: 70mm²(2/0AWG) ; Terminal: FSE80110P-95A4K 320A;

Note:

For the DC port of MPack 261A, strict adherence to the following requirements is mandatory:

- 【PROHIBITED】Direct connection to another battery cabinet.
- 【PROHIBITED】Hot swapping!
- 【PROHIBITED】Reverse polarity connection!
- 【PROHIBITED】Use without verified insulation.
- 【PROHIBITED】Operation without installing or using compliant protective devices.
- 【PROHIBITED】Operation or use in humid, flammable, or explosive environments.

3.6.3 Auxiliary Power Supply Interface

The User is required to provide an external auxiliary power supply **(AC 190-250V**, Power≥5kW) and connect it to the MPack 261A.

External Interface	Quantity	Description
Auxiliary Power Supply Interface	1 set	AC-IN (L1/L2), **(AC 190-250V,** Power≥5kW), 50/60Hz; Cable specification: 4mm²(12AWG), Rated voltage> 600VAC; Terminal: RNB 5.5-5;

Note:

- This split-phase configuration consists of two live wires (L1-L2) , typical for North American residential/commercial installations.

3.6.4 Communication and Control Interface

External Interface	Quantity	Description	Remark
Ethernet (LAN)	3 ports	1) ETH0: For connection to the host computer/ external network/ external EMS. Use a Cat.5e cable with an RJ45 connector. 2) Para1&Para2: For the communication cable between two parallel MPack 261 units. Use a Cat.5e cable with an RJ45 connector.	Buyer provides internet access. Supplier provides internal Ethernet wiring.
RS485	1 branch circuit	XT1 Terminal Block (XT1:18, XT1:20) For the grid/load-side meter communication.	For additional external device integration. The Buyer is responsible for external connection.
CAN	2 branch circuits	XT1 Terminal Block (XT1:9~12) Reserved for Buyer communication access.	
Control Interface	4 branch circuits	1) I/O Expansion Module (Y6, Y7, Y8): Dry Contact 2) I/O Expansion Module (INPUT: X4~8): DI (active high)	Reserved

Notes:

- Buyer shall ensure the availability of stable network connectivity.
- Supplier provides all internal communication cables and terminations within the ESS.
- External communication cables from ESS to Buyer's monitoring systems shall be provided by the Buyer.

3.6.5 Grounding Interface

External Interface	Quantity	Description	Remark
Protective Grounding (PE)	1 set	Recommended cable: flame-retardant grounding cable; Cable specification: 35mm²(2AWG) ; Terminal: SC35-10;	Ground resistance shall be ≤1Ω. Buyer responsible for external grounding construction and validation.
Functional Grounding (FG)	1 set	Recommended cable: flame-retardant grounding cable; Cable specification: 35mm²(2AWG) ; Terminal: SC35-8;	

3.6.6 Interface for External MPPT Unit &PDU

The MPack 261A can be optionally configured with MPPT unit and a MPPT PDU.

External Interface	Quantity	Description
PV Input Cable (From PV array to MPPT Unit)	2 sets	Copper busbar (PV+/PV-); Recommend cable: flame-retardant copper cable; Cable specification: 6mm²(10AWG) per phase, Rated voltage> 900VAC; Terminal: PV4-S1(RENON -supplied);
Protective Earth Cable	2 sets	Renon provides cables for user connection, each of which is marked with a corresponding Cable Code. For details, please refer to the installation manual.
Communication Cable (Internal Wiring of the MPPT Unit)	1 set	
Communication Cable (From MPPT Unit to PDU)	1 set	
Communication Cable (From PDU to MPack 261A)	1 set	
Power Cable (From MPPT Unit to PDU)	2 sets	

3.6.7 Interface for External STS Box

The MPack 261A can be optionally configured with an external STS Box.

(1) Single-Module Configuration

External Interface	Quantity	Description	Remark
Grid Cable	1 set	Copper busbar (U/V/W/N); Recommend cable: flame-retardant copper cable; Cable specification: 2x 120mm² per phase, Rated voltage> 600VAC; Terminal: SC120-10;	Based on the 630A specification of STS switch, specify the corresponding cable.
Load Cable	1 set	Copper busbar (U/V/W/N); Recommend cable: flame-retardant copper cable; Recommend cable specification: 120mm² per phase; Terminal: SC120-8; Rated voltage> 600VAC.	
BESS Cable	1 set	Copper busbar (U/V/W/N); Recommend cable: flame-retardant copper cable; Cable specification: 70mm²(2/0AWG) per phase; Terminal: SC70-8; Rated voltage> 600VAC.	
Communication Cable (From STS Box to MPack 261A)	1 set	Renon provides cables for user connection, each of which is marked with a corresponding Cable Code. For details, please refer to the installation manual.	
Auxiliary Power Supply Interface (From MPack 261A to STS Box)	1 set		

(2) Dual-Module Configuration

External Interface	Quantity	Description	Remark
Grid Cable	1 set	Copper busbar (U/V/W/N); Recommend cable: flame-retardant copper cable; Recommend cable specification: 4x 120mm² per phase; Terminal: SC120-10; Rated voltage> 600VAC.	Based on the 1071A specification of the STS switch, specify the corresponding cable.
Load Cable	1 set	Copper busbar (U/V/W/N); Recommend cable: flame-retardant copper cable; Cable specification: 2x 70mm²(2/0AWG) per phase; Terminal: SC70-8; Rated voltage> 600VAC.	
BESS Cable	2 sets	Copper busbar (U/V/W/N); Recommend cable: flame-retardant copper cable; Cable specification: 70mm²(2/0AWG) per phase; Terminal: SC70-8; Rated voltage> 600VAC.	
Communication Cable (1) From STS Box to MPack 261A 2) Between two MPack 261A)	2 sets	Renon provides cables for user connection, each of which is marked with a corresponding Cable Code. For details, please refer to the installation manual.	
Auxiliary Power Supply Interface (From MPack 261A to STS Box)	1 set		

3.7 Data Provided by ESS

The MPack 261A ESS provides comprehensive real-time monitoring data locally via an integrated Human-Machine Interface (LCD display) and remotely through network interfaces using Modbus TCP/IP communication protocols.

The following table summarizes monitoring data provided by the ESS

Data Item	Unit	LCD	Remote Access	Remark / Access Rights
System Voltage (DC)	V	√	√	Real-time monitoring
System Current (DC)	A	√	√	
Energy Capacity (State of Charge, SOC)	%	√	√	
Battery Cell Temperature	°C / °F	√	√	Real-time monitoring, alarm triggers
System Operating Temperature	°C / °F	√	√	
System Alarms and Faults	Alarm Codes	√	√	Real-time fault diagnosis, notification
Communication Status	Status Indicator	√	√	Indicate network /Communication health
Fire & Gas Detection Status	Status Indicator	√	√	Real-time safety monitoring
Historical Performance Data	Logs/Charts	√	√	Local and remote query, historical logs

Remote Monitoring Access and Permissions:

- Remote monitoring interface supports secure access via Ethernet connection using Modbus TCP/IP protocols.
- Buyer authorized personnel can access real-time data, historical performance records, system alarms, and diagnostics remotely.
- Supplier retains remote access for system diagnostics, troubleshooting, and technical support purposes.

3.8 Fire Suppression System

The MPack 261A ESS cabinet integrates a comprehensive aerosol-based fire extinguishing system designed to quickly detect and respond to potential fire hazards, thereby ensuring system safety and reliability.

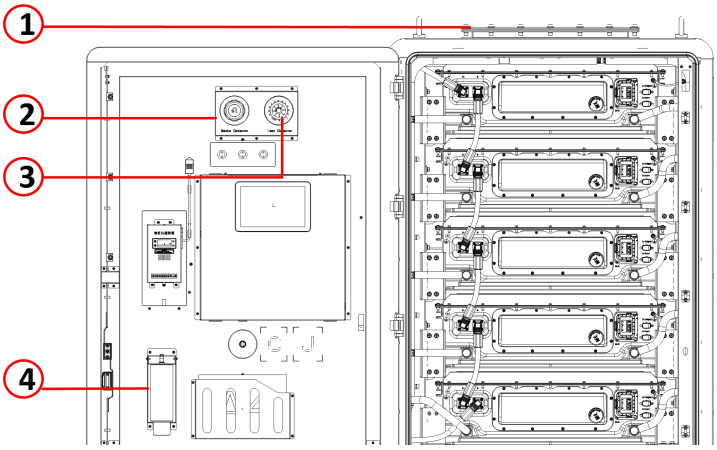


Figure 4 -Detailed Fire Suppression System

Integrated Components and Functions:

No.	Component	Function/Remarks
1	Explosion Vent Panel	ESS explosion vent rapidly relieves pressure during thermal runaway.
2	Smoke Detector	Real-time smoke concentration detection
3	Heat Detector	Real-time temperature monitoring and detection of abnormal heat conditions
4	Aerosol Fire Extinguisher	Aerosol-based automatic fire suppression triggered upon detection of smoke and/or excessive heat

Operational Features:

- Automatic detection and activation, no manual intervention required.
- Real-time status monitoring accessible via local LCD and remote monitoring interface.
- Provides immediate notifications and alarms upon activation, ensuring timely incident response.

3.9 Installation Site Environmental Requirements

This section provides essential physical specifications and site installation requirements to ensure smooth onsite planning and installation.

The Buyer must ensure that the installation environment meets the following requirements to ensure the safe and reliable operation of the MPack 261A ESS.

3.9.1 General Environmental Requirements

- Relative Humidity: The system should be installed in an environment with a humidity range of 0 to 95% (non-condensing).
- Altitude: The installation site should not exceed an altitude of 9843ft (3000m).

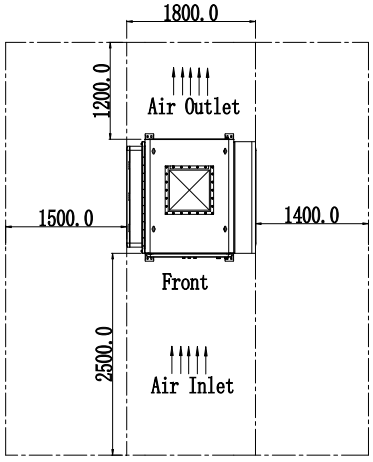
3.9.2 Site Selection Considerations

The **MPack 261A ESS must not be installed in the following locations:**

- Areas with high levels of dust, sand, or salt spray, **unless** adequate protective measures are implemented .
- Locations exposed to corrosive gases (e.g., H_2, SO_2) or potentially explosive atmospheres.
- Spaces with insufficient ventilation, as this may lead to component overheating.
- Areas within a straight-line distance of 1.55 miles (2.5 km) from the coastline. If installation within 1.55 miles (2.5 km) of the coastline is unavoidable, consult RENON for a validated technical protection solution.

3.9.3 Installation and Spacing Requirements:

- Maintain minimum clearances for proper ventilation and maintenance access:

		Minimum Clearance
Front		98.4in (2500mm)
Back		47.2in (1200mm)
Side	no external equipment	3.9in (100mm)
	with external equipment	 Refer to the figure on the left.

- Installation surface must be flat, stable, and capable of bearing the full operational weight.
- Ensure the site provides adequate drainage and protection from flooding.

3.9.4 Handling and Installation Precautions

- Utilize appropriate lifting equipment for handling; ensure safe operation following OSHA and applicable local safety standards.
- Avoid impact or collision during transportation and installation.
- It is suggested to use an internal combustion engine-driven forklift (however, under the condition that the side inverter wiring harness is connected to the bottom of the battery cabinet, the use of a forklift is not allowed). Choose a forklift with a load capacity ≥ 8818.5lb (4000kg).
- It is recommended to use crane lifting. Ensure that the lifting strap specifications match the load, without aging or damage. Slowly lift the junction cabinet 7.9in-11.8in (200mm~300mm) off the ground. Choose a crane with a load capacity≥ 11023lb (5000kg), using four lifting ropes, each rope should have a load capacity suggestion ≥ 4409.3lb (2000kg).
- Comply with provided installation manual.

4. EMS Control

4.1 Control Modes and Authority

The MPack 261A ESS supports both local and remote control modes, providing flexibility and security in system operation management. Clear control authority definitions are outlined as follows:

- Local Control

  Local operation is executed via the ESS cabinet-mounted Human-Machine Interface (LCD touchscreen), enabling on-site manual control, monitoring, and emergency intervention.
- Remote Control

  Remote operation utilizes secure network communication (Ethernet Modbus TCP/IP) to execute control commands and real-time monitoring. Authorized personnel can remotely start/stop, configure operation modes, adjust operational parameters, and monitor system status.

Priority and Switching between Control Modes:

- The system defaults to Remote Control mode under standard operation conditions.
- Local manual intervention always has higher priority over remote control for safety and emergency situations. Local actions will immediately override any remote commands.
- After local manual control intervention, remote control can be re-enabled by authorized personnel via the local interface.

4.2 Automatic and Manual Control Priority

- ESS operates in Automatic Control Mode during regular system operations, governed by pre-set operation parameters and protection algorithms.
- Local Manual Control mode, initiated at the cabinet interface, will override automatic or remote operations immediately upon activation. This ensures personnel and equipment safety during emergencies or maintenance scenarios.
- Returning the system from Manual Control back to Automatic Control mode must be manually confirmed by authorized operators after ensuring safe operation conditions.

4.3 Local EMS Function of Standard Cabinet

The local Energy Management System (EMS) collects real-time data from battery storage and power distribution via protocols like Modbus, with capability to forward data to third-party systems for coordinated equipment control and remote adjustment. Featuring WiFi/4G dual-mode communication, it supports customizable charge/discharge strategies, rigorous user access control, and safety alarms triggered by voltage/current anomalies, while its intelligent algorithms enable load tracking and demand management to optimize energy costs.

4.4 PV–Storage Synergy Functions

By integrating external MPPT Unit &PDU, a PV–storage DC-coupled system can be formed, enabling the following key functions:

- PV Self-Consumption with Surplus Energy Storage

PV power is used to supply local loads first, and surplus energy directly charges the battery to maximize self-consumption.

- Peak–Valley Arbitrage

The battery charges from the grid or PV during off-peak periods and discharges together with PV during peak periods to reduce high-cost grid consumption.

- Backup Power / UPS Function

During normal grid operation, the system stays grid-connected; during outages, it automatically switches to off-grid mode, with PV + battery powering critical loads without interruption.

- Coordinated MPPT & Battery Charging Optimization

When PV output is high and load demand is low, the system intelligently allocates PV power between direct load supply and optimal battery charging, maintaining MPPT at maximum power and preventing curtailment.

4.5 On/Off-Grid Switching Functions

By integrating external STS Box, if the STS detects an abnormality or loss of voltage in the main circuit (power grid), it will automatically and seamlessly switch the load to the battery-powered mode within milliseconds (≤20ms), ensuring no power interruption for critical loads.

5. Installation Instruction

For detailed installation guidance, cable connection methods, and equipment commissioning procedures, please refer to the **Installation Manual - MPack 261A - US**.

6. Revision Table

The document revision history is tracked in the following table:

Revision Number	Date (MM/DD/YYYY)	Description
1.0	Dec 20, 2025	Initial version

(Supplier): _____

Representative:

Signature:

Title:

Date:

(Buyer): _____

Representative:

Signature:

Title:

Date:

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