

Smart Matrix One-Stop Solution

Prefabricated One-Stop Turnkey Energy Storage Solution

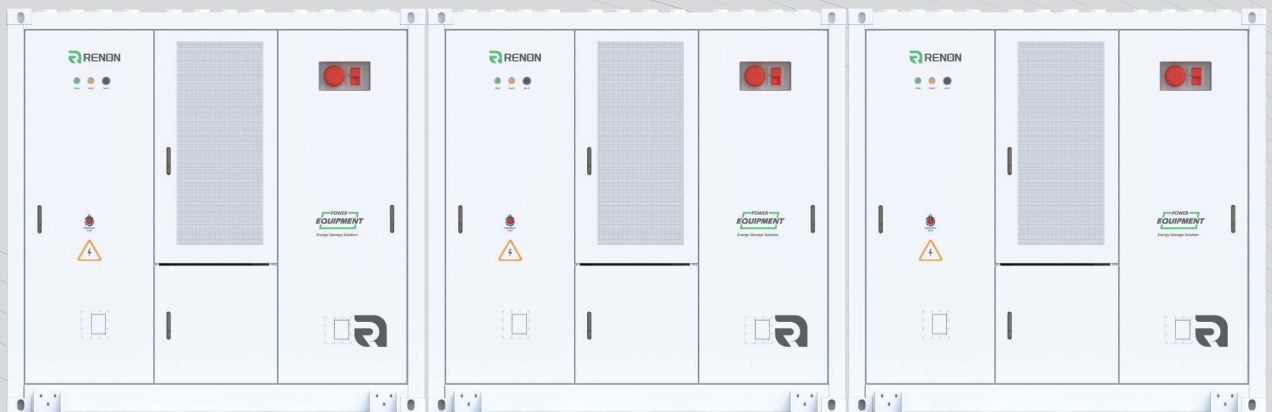
Covering system configuration, key components, application scenarios, and grid-connected topology diagrams.

Core Energy Storage Unit

- Smart Matrix A: Includes PCS, 690 VAC output, rated power 836 kW (per unit), can be connected in parallel
- Smart Matrix B: Does not include PCS, battery DC output (1500 V DC rating), requires an external centralized PCS

Key Components (forming a complete system)

- AC Matrix Combiner
- DC Matrix Combiner
- PCS Cabinet
- US Standard Transformer
- Communication Cabinet
- Auxiliary Power Distribution Cabinet



Product Overview

Renon Technology's 1.67 MWh container series is a high-performance liquid-cooled energy storage system designed for commercial, industrial, and grid-side applications. Built in a standard 10-foot shipping container, it offers high integration and flexible deployment. Centered around AC and DC container units, Renon provides a complete suite of system-level components, enabling the construction of two solutions: 13.8 kV medium-voltage grid-connected systems and 34.5 kV medium-voltage grid-connected systems.

Core Energy Storage Unit



Smart Matrix A
P06



Smart Matrix B
P07

Key Components (forming a complete system)



AC Matrix Combiner
P08



DC Matrix Combiner
P08



PCS Cabinet
P09



US Standard
Transformer
P10



Communication Cabinet
P11



Auxiliary Power
Distribution Cabinet
P11



Smart Matrix Series

10ft Battery & Converter One Stop Solution

Core Energy Storage Unit

High Energy Density: 1P104S or 4*1P104S LFP cell configuration, with a single-container capacity of 1,672 kWh

Long Service Life: ≥8,000 cycles at 90% DOD, with a 10-year design life

High-Efficiency Conversion: High PCS efficiency, THDi ≤3%, millisecond-level response

Safe and Reliable: IP54 protection rating, aerosol fire suppression, and multi-level BMS protection



Product Function



High-Capacity Energy Storage

Single-container capacity of 1.67 MWh, scalable in parallel to station-level systems of 5 MWh, 20 MWh, 60MWh, and up to 240 MWh.



Efficient Liquid-Cooling Temperature Control

Liquid-cooling thermal management with a wide operating temperature range from -20°C to +55°C.



High Safety and Reliability

IP54 protection rating, aerosol fire suppression, and UL1973/UL9540 certification.



Intelligent Energy Management

Self-developed EMS supporting remote monitoring, dispatching, and data analysis.



Flexible Grid Connection

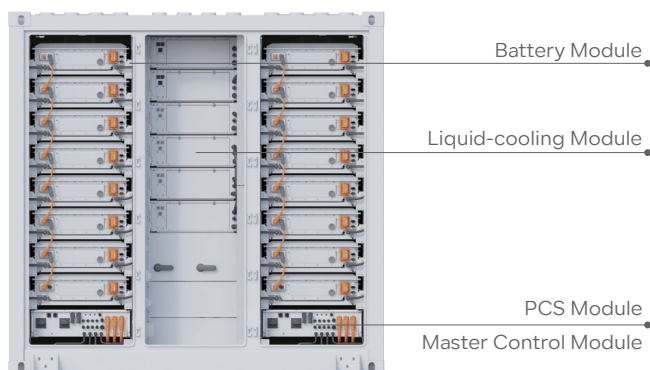
Supports 13.8 kV or 34.5 kV medium-voltage grid connection, adaptable to different grid requirements.



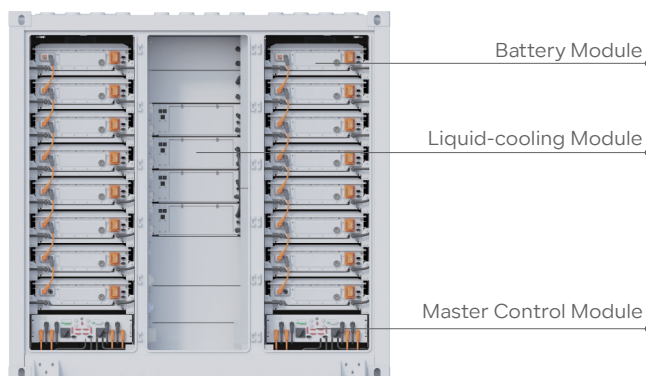
Modular Design

10 ft container design for easy transportation, installation, and capacity expansion.

Smart Matrix A System Overview

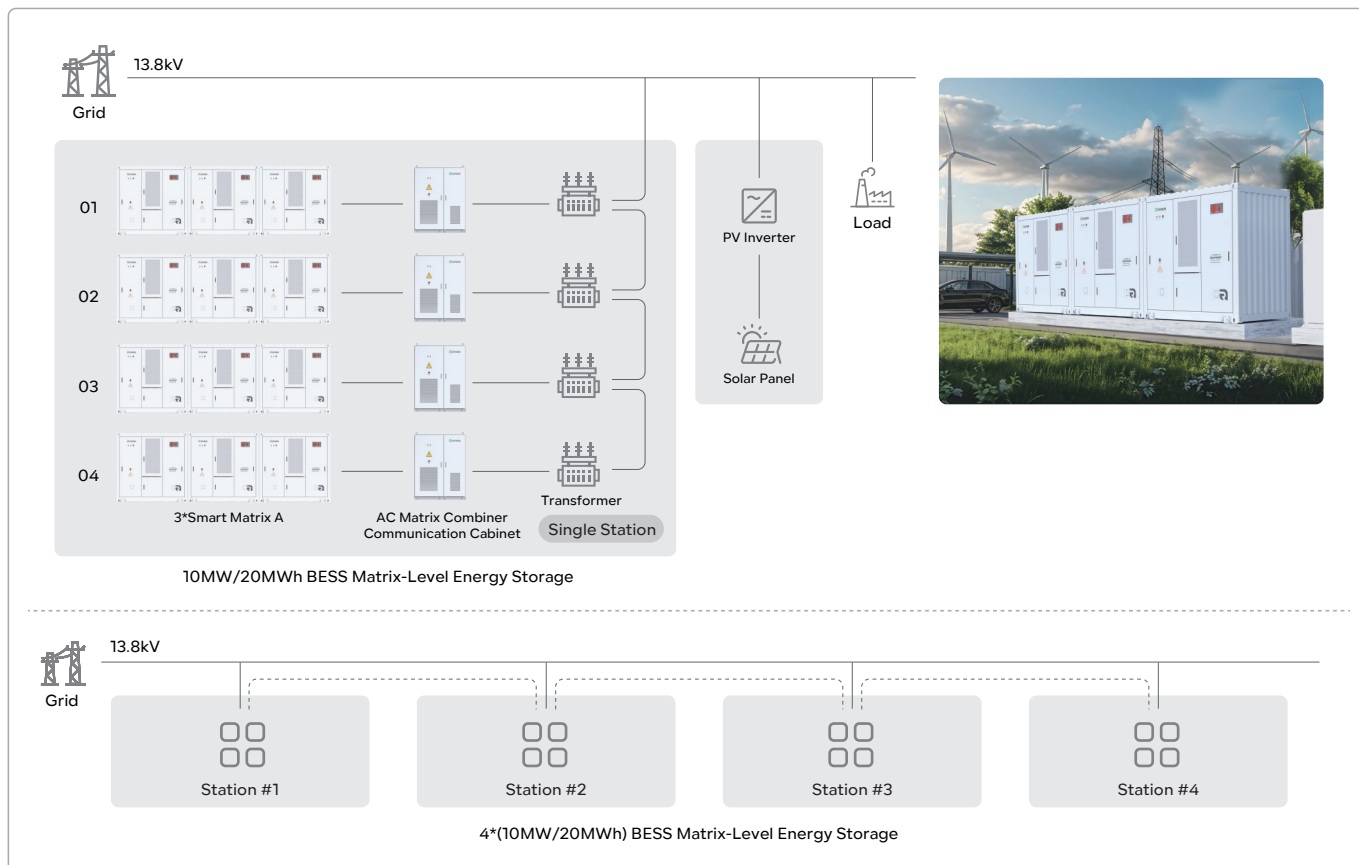


Smart Matrix B System Overview



On-Grid Applications (13.8kV) - Smart Matrix A

Use the Smart Matrix A system for large factories, industrial parks, commercial complexes, and data centers. The system uses AC containers with integrated PCS, consolidated through a matrix distribution cabinet, stepped up by a transformer, and connected to the user's internal 13.8 kV medium-voltage network. It supports coordinated operation with loads and PV systems to enable peak shaving, demand management, backup power, and solar-storage integration, reducing electricity costs while improving renewable energy utilization.



Configuration List (Single Station Configuration)

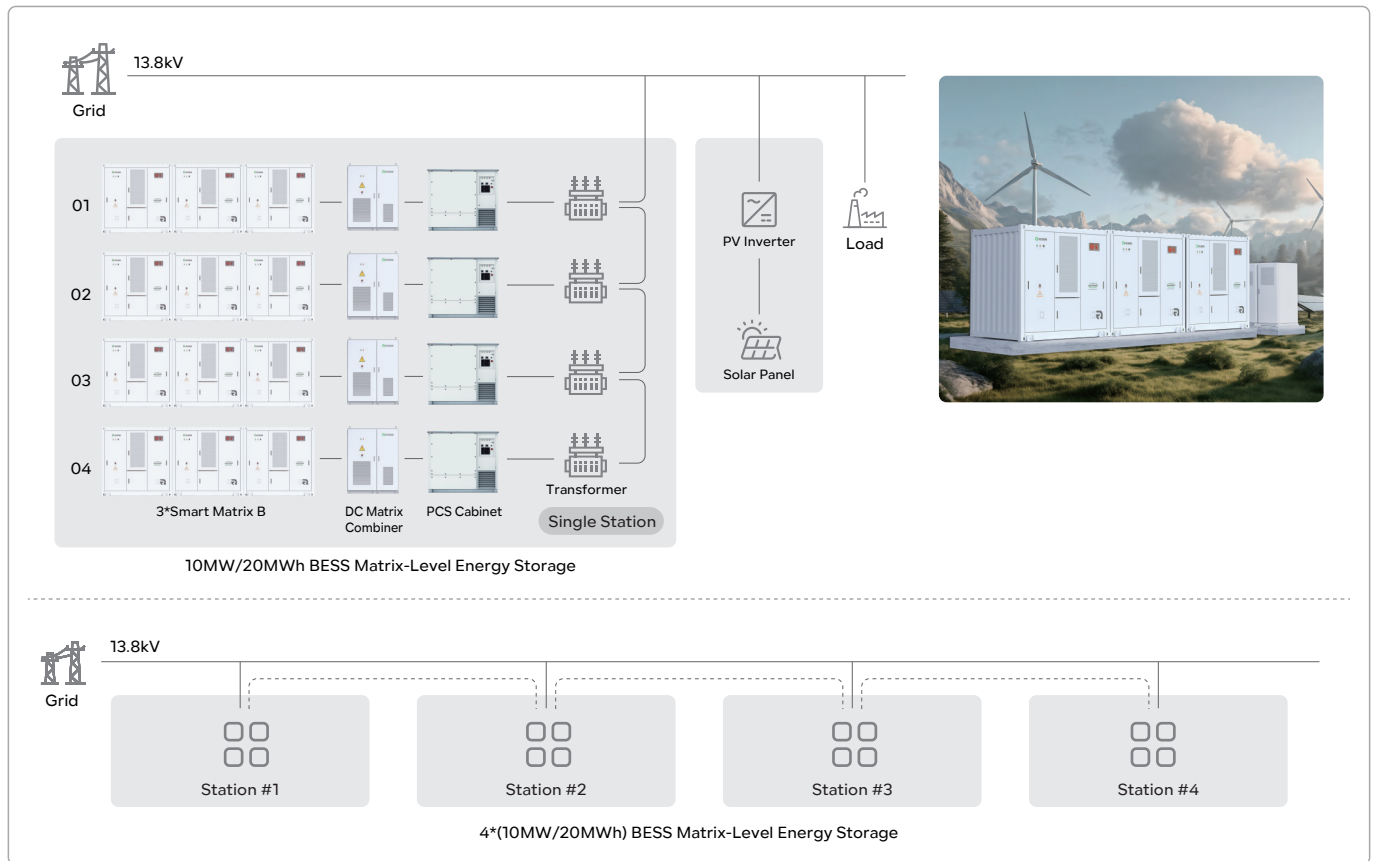
Components	Quantity	Remarks
Smart Matrix A	4*3 units	1672kWh/836kW per unit, 690V output
AC Matrix Combiner	4 units	input (from PCS AC side), output (to grid)
Communication Cabinet	4 units	Site-Level Communication Management
Transformer	4 units	690V/13.8kV, 2750kVA
Auxiliary Power Distribution Cabinet	1 unit	The APDC house the auxiliary power transformer.

Configuration List (Max. Station Configuration)

Components	Quantity	Remarks
Smart Matrix A	4*4*3 units	1672kWh/836kW per unit, 690V output
AC Matrix Combiner	4*4 units	input (from PCS AC side), output (to grid)
Communication Cabinet	4*4 units	Site-Level Communication Management
Transformer	4*4 units	690V/13.8kV, 2750kVA
Auxiliary Power Distribution Cabinet	4*1 units	The APDC house the auxiliary power transformer.

On-Grid Applications (13.8kV) - Smart Matrix B

Use the Smart Matrix B system for large factories, industrial parks, commercial complexes, and data centers. The system uses DC containers connected to a DC combiner cabinet, then to independent PCS cabinets, stepped up by a transformer, and connected to the user's internal 13.8 kV medium-voltage network. It supports coordinated operation with loads and PV systems to enable peak shaving, demand management, backup power, and solar-storage integration, reducing electricity costs while improving renewable energy utilization.



Configuration List (Single Station Configuration)

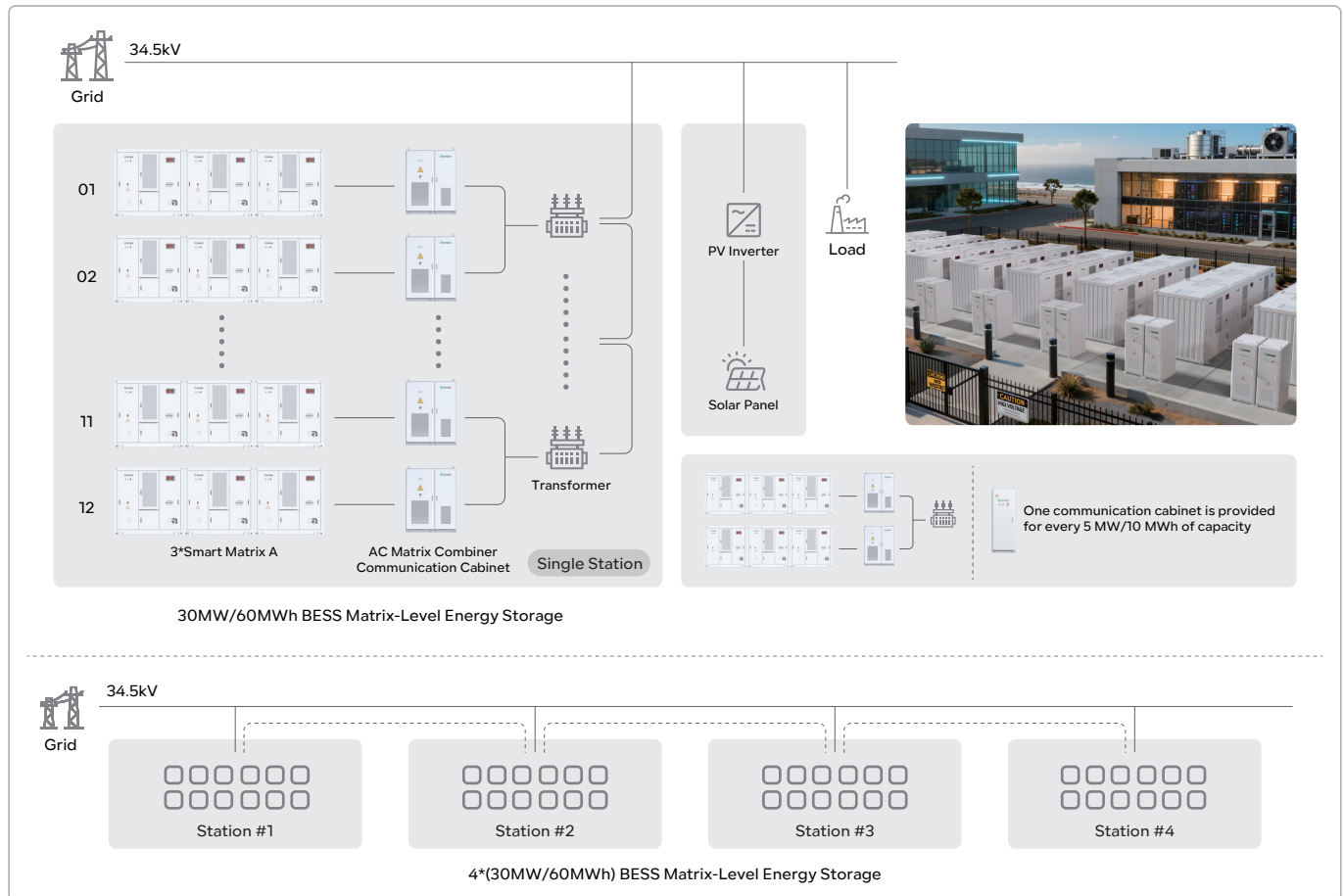
Components	Quantity	Remarks
Smart Matrix B	4*3 units	1672kWh per unit
PCS Cabinet	4 units	690V output per unit
DC Matrix Combiner	4 units	12 incoming(from Battery), 1 outgoing (to Grid)
Communication Cabinet	4 units	Site-Level Communication Management
Transformer	4 units	690V/13.8kV, 2750kVA
Auxiliary Power Distribution Cabinet	1 unit	The APDC house the auxiliary power transformer.

Configuration List (Max. Station Configuration)

Components	Quantity	Remarks
Smart Matrix B	4*4*3 units	1672kWh per unit
PCS Cabinet	4*4 units	690V output per unit
DC Matrix Combiner	4*4 units	12 incoming(from Battery), 1 outgoing (to Grid)
Communication Cabinet	4*4 units	Site-Level Communication Management
Transformer	4*4 units	690V/13.8kV, 2750kVA
Auxiliary Power Distribution Cabinet	4*1 units	The APDC house the auxiliary power transformer.

On-Grid Applications (34.5kV) - Smart Matrix A

Use the Smart Matrix A system for utility-side energy storage stations and large-scale renewable energy storage projects. The system adopts an AC container architecture with integrated PCS. AC containers are consolidated through a Matrix Combiner, then stepped up by a transformer and connected to the 34.5 kV medium-voltage grid. The system supports rapid response to grid dispatch commands, including AGC/AVC, and can provide peak shaving, frequency regulation, reserve capacity, and other auxiliary services. It can be expanded to 30 MW / 60 MWh and above for station-level applications.



Configuration List (Single Station Configuration)

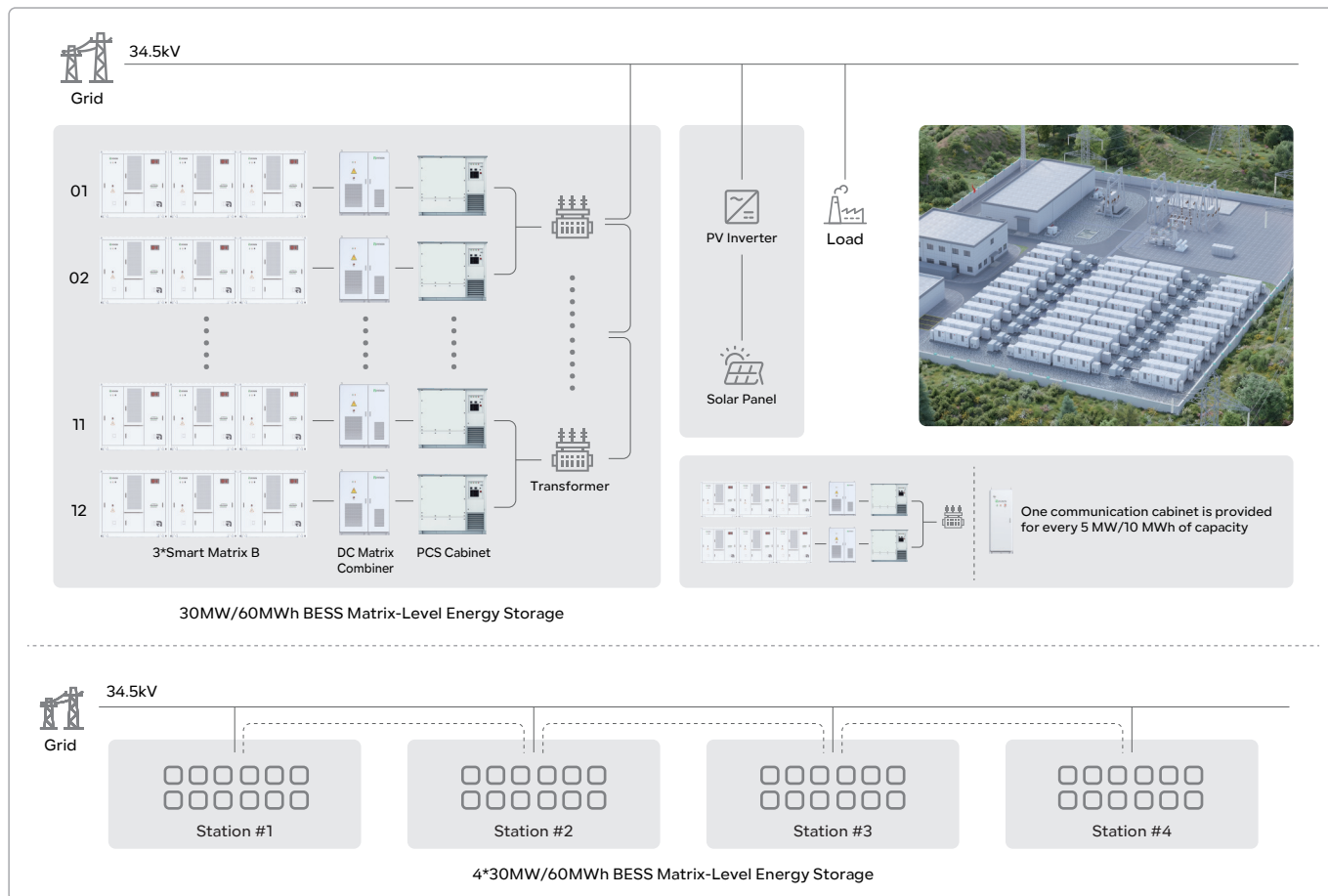
Components	Quantity	Remarks
Smart Matrix A	3*12 units	1672kWh/836kW per unit, 690V output
AC Matrix Combiner	12 units	input (from PCS AC side), output (to grid)
Communication Cabinet	6 units	Site-Level Communication Management
Transformer	6 units	690V/34.5kV, 5500kVA
Auxiliary Power Distribution Cabinet	6 units	The APDC house the auxiliary power transformer.

Configuration List (Max. Station Configuration)

Components	Quantity	Remarks
Smart Matrix A	4*3*12 units	1672kWh/836kW per unit, 690V output
AC Matrix Combiner	4*12 units	input (from PCS AC side), output (to grid)
Communication Cabinet	4*6 units	Site-Level Communication Management
Transformer	4*6 units	690V/34.5kV, 5500kVA
Auxiliary Power Distribution Cabinet	4*6 units	The APDC house the auxiliary power transformer.

On-Grid Applications (34.5kV) - Smart Matrix B

Use the Smart Matrix B system for utility-side energy storage stations and large-scale renewable energy storage projects. The system adopts a DC container + DC Matrix Combiner cabinet + centralized PCS architecture. Battery containers are connected to the DC Matrix Combiner cabinet, then converted through centralized PCS, stepped up by a transformer, and connected to the 34.5 kV medium-voltage grid. The system supports rapid response to grid dispatch commands, including AGC/AVC, and can provide peak shaving, frequency regulation, reserve capacity, and other auxiliary services. It can be expanded to 30 MW / 60 MWh and above for station-level applications.



Configuration List (Single Station Configuration)

Components	Quantity	Remarks
Smart Matrix B	3*12 units	1672kWh per unit
PCS Cabinet	12 units	690V output per unit
DC Matrix Combiner	12 units	12 incoming(from Battery), 1 outgoing (to Grid)
Communication Cabinet	6 units	Site-Level Communication Management
Transformer	6 units	690V/34.5kV, 5500kVA
Auxiliary Power Distribution Cabinet	6 units	The APDC house the auxiliary power transformer.

Configuration List (Max. Station Configuration)

Components	Quantity	Remarks
Smart Matrix B	4*3*12 units	1672kWh per unit
PCS Cabinet	4*12 units	690V output per unit
DC Matrix Combiner	4*12 units	12 incoming(from Battery), 1 outgoing (to Grid)
Communication Cabinet	4*6 units	Site-Level Communication Management
Transformer	4*6 units	690V/34.5kV, 5500kVA
Auxiliary Power Distribution Cabinet	4*6 units	The APDC house the auxiliary power transformer.

Smart Matrix A Parameters

Battery Energy Storage	1672kWh	3344kWh	5016kWh
Cell Type	LFP 3.2V/314Ah		
Module Configuration	1P104S		
String Configuration	1P416S		
Number of Strings	4	8	12
Capacity(kWh)	1672	3344	5016
Nominal Voltage(V)	1331.2		
Operation Voltage Range(VDC)	1040~1497.6		
Discharge Depth	90% DoD		
Thermal Management Mode	Liquid-cooled		
Thermal Control Management	Aerosol Extinguishing or PFH		
AC Output			
Rated AC Output Power(kVA)	836	1670	2500
Max.AC Output Power(kVA)	860	1725	2580
Rated Output Voltage(VAC)	690		
Output Voltage Range(VAC)	690(-15%~ +10%)		
Rated Grid Frequency(Hz)	50/60		
AC PF	0.99/-1~1		
THDi	≤3%		
System Characteristic			
Communication Interface	CAN, RS485, Ethernet		
Warranty	5 years free, paid from the 6th to the 15th year		
Certifications	UL 1973, UL 9540, UL 9540A, NFPA 855, NFPA68/69		
General Parameters			
Product Model	R-SM1672860A1-US	R-SM33441720A1-US	R-SM50162580A1-US
Dimensions - D*H (in)	96*102.1	96*102.1	96*102.1
Dimensions - W (in)	117.76	235.52	353.27
Battery System Total Weight (lb)	~33069	~66138	~99208
Operation Altitude	4000m / 13000feet (>3000m/10000feet derating)		
Nosie Level@1m	<75dB		
IP Rating	IP54		
Operation Temperature (°C/°F)	-20~55 / -4~131 (De-rating over 45°C / 113°F)		
Operation Humidity (RH)	≤95%, No condensation		
Storage Conditons	-20°C to 30°C, Up to 95% RH, non-condensing, State of Energy (SoE): 50% initial		

Smart Matrix B Parameters

Battery Energy Storage	1672kWh	3344kWh	5016kWh
Cell Type	LFP 3.2V/314Ah		
Module Configuration	1P104S		
String Configuration	1P416S		
Number of Strings	4	8	12
Capacity(kWh)	1672	3344	5016
Nominal Voltage(V)	1331.2		
Operation Voltage Range(VDC)	1040~1497.6		
Discharge Depth	90% DoD		
Thermal Management Mode	Liquid-cooled		
Thermal Control Management	Aerosol Extinguishing or PFH		

System Characteristic

Communication Interface	CAN, RS485, Ethernet
Warranty	5 years free, paid from the 6th to the 15th year
Certifications	UL 1973, UL 9540, UL 9540A

General Parameters

Product Model	R-SM1672LCB01-US	R-SM3344LCB01-US	R-SM5016LCB01-US
Dimensions - D*H (in)	96*102.1	96*102.1	96*102.1
Dimensions - W (in)	117.76	235.52	353.27
Battery System Total Weight (lb)	~30,865	~61,730	~92,595
Operation Altitude	4000m / 13000feet (>3000m/10000feet derating)		
Nosie Level@1m	<75dB		
IP Rating	IP54		
Operation Temperature (°C/°F)	-20~55 / -4~131 (De-rating over 45°C / 113°F)		
Operation Humidity (RH)	≤95%, No condensation		
Storage Conditons	-20°C to 30°C, Up to 95% RH, non-condensing, State of Energy (SoE): 50% initial		

■ AC Matrix Combiner Cabinet Parameters

General Parameters	
Product Model	R-MC2500ACC01-US
Rated Power (kW)	2500
Functions	Matrix-level low-voltage AC power distribution and combiner
Cable Entry/Exit Method	3 incoming (from PCS AC Side), 1 outgoing (to Grid)
Grid-Side	Built-in
Operating Temperature	-20°C to +55°C
Ingress Protection Rating (IP Rating)	IP54
Corrosion Protection Rating	C5
Certifications	US standard

■ DC Matrix Combiner Parameters

General Parameters	
Product Model	R-DP12D250000-US
Rated Power (kW)	2500
Rated Voltage (Vdc)	1500
Input/Output Connection Type	12 incoming(from Battery), 1 outgoing (to Grid)
Input Circuit Breaker	3200 A frame
Output Circuit Breaker	250 A molded case circuit breakers × 12
Function	Supports DC connection of 12 battery clusters, includes I/O control board
Operating Temperature	-20°C to +55°C
Protection Rating	IP54
Corrosion Resistance Rating	C5
Certifications	US standard

PCS Cabinet Parameters

DC Input

Operating DC Voltage Range (Vdc)	962~1500
Max. DC current IDC(A)	3200
Max. DC Short-circuit Current (kA)	500

AC Output

Grid-Feed mode: Maximum Nominal AC active power at $\cos \phi = 1$ (at 35°C / at 50°C) (kW)	2499
Grid-Feed mode: AC apparent power (at 35°C / at 40°C / at 50°C) (kVA)	2933/2835/2640
Charging mode: Maximum Nominal AC active power at $\cos \phi = 1$ (at 35°C / at 50°C) (kW)	2499
Charging mode: AC apparent power (at 35°C / at 40°C / at 50°C) (kVA)	2933/2835/2640
Max. AC current IAC, max (< 5 MW / at 35°C / at 40°C / at 50°C) (A)	2186/2566/2480/2310
Max. Total Harmonic Distortion	< 3% at nominal power
Nominal Voltage / Voltage Range (V)	660/528~792
Frequency (Hz)	50/60
Min. short-circuit ratio at the AC terminals	> 2

Efficiency

Max. Efficiency	99.2%
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General Data

Dimensions - W*D*H (in)	110.8*62.5*91.3
Weight (lb)	7500
Sound Power LWA with Rated Power Inverter / Inverter & Silencer	89 dB(A) / 83 dB(A)
Operating Temperature Range (optional)8)	(-40°C) -25°C to 60°C / (-40°F) -13°F to 140°F
Temperature Range (storage)	-40°C to 70°C / -40°F to 158°F
Max. Permissible Value for Relative Humidity (condensing / non-condensing)	95% to 100% (2 month/year) / 0% to 95%

US Standard Transformer (For 13.8kV)

General Parameters	
Product Model	R-MT2750PT01-US
Rated Capacity (kVA)	2750
Number of Phases	3-phase
Frequency (Hz)	60
Primary Voltage (kV)	13.8
Secondary Voltage (V)	690
Impedance	5.75~7.5%
Cooling Method	KNAN
Insulating Fluid	High Flash Point Fluid (FR3)
Enclosure Protection	IP54
Certifications	ANSI/IEEE C57.12, DOE 2016

US Standard Transformer (For 34.5kV)

General Parameters	
Product Model	R-MT5500PT01-US
Rated Capacity (kVA)	5500
Number of Phases	3-phase
Frequency (Hz)	60
Primary Voltage (kV)	34.5
Secondary Voltage (V)	690
Impedance	6.5~8.5%
Cooling Method	KNAN
Insulating Fluid	High Flash Point Fluid (FR3)
Enclosure Protection	IP54
Certifications	ANSI/IEEE C57.12, DOE 2016

■ Communication Cabinet Parameters

General Parameters	
Product Model	R-CC01C00800
Applicable Area	EU/US
Built-in Equipment	Internal/external switches, routers, EMS industrial PC, small UPS module, 600 W air-cooled air conditioner
Functions	Supports integration with Station EMS and third-party EMS equipped with multiple RS485 and Ethernet ports for data acquisition, communication, and control
Installation Method	Outdoor floor-mounted
Operating Temperature	-30°C to 55°C
Ingress Protection Rating	IP55
Corrosion Protection Rating	C5

■ Auxiliary Power Distribution Cabinet

General Parameters	
Function	Provides low-voltage auxiliary power for control, lighting, HVAC, and heating of the energy storage system
Input Voltage (Vac)	690 (sourced from the point of interconnection or the low-voltage side of the transformer)
Output Voltage (Vac)	400 (typical, customizable as required)
Capacity	Determined by system configuration (typically 30 kVA–120 kVA)
Supply Method	Can be supplied by the customer or optionally provided by Renon
Installation Method	Floor-mounted
Ingress Protection Rating	IP54 or higher recommended

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