

# **Product Specifications**



Product Category: <u>All-In-One Energy Storage System for C&i</u> Version: <u>V1.0</u>



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# **1.** Scope of Application

This specification applies to All-In-One Energy Storage Systems for commercial & industrial application manufactured by Shenzhen Renergy Power Technology Co., Ltd.

The document provides an overview of the technical specifications, physical dimensions, installation, and transportation procedures for the energy storage system. It is intended for use with this product only.

Before placing an order for RPT products, buyers are required to confirm the most up-to-date product information with RPT.

This specification may be updated periodically due to product upgrades or other factors, without prior notice.



#### 2. Product Overview

#### **2.1. Product Introduction**

All-In-One energy storage system for C&I application from Shenzhen Renergy Power Technology Co., Ltd. is suitable for various scenarios such as smart buildings, industrial parks, wind farms, residential users, and small to medium-sized commercial centers. They efficiently perform peak shaving, load leveling, and provide backup power, enhancing power supply reliability, reducing electricity costs, and improving grid power quality.

All-In-One energy storage system includes battery cluster, PCS (Power Conversion System), BMS (Battery Management System), EMS (Energy Management System), STS (optional), MPPT (optional), control system, distribution system, and fire protection system.

RPT's All-In-One energy storage system features intelligent energy management strategies, support multiple operating modes, and offer optional solar PV integration with a unified solar-storage design.

The modular design of RPT's All-In-One energy storage system for C&I application allows flexible adaptation to different scenarios. They support multi-system parallel connection, cover a wider power range, and enable the rapid implementation of new projects, with the ability to switch between grid-connected and off-grid modes.

RPT's all-in-one energy storage system for C&I applications designed with a highly integrated system that is safe, reliable, and easy to transport and install.

#### 2.2. Part Number Definition

#### Commercial and Industrial Energy Storage System Model: Product Specification Naming

The naming convention is RPT + ESS + numerical sequence (e.g., RPT-ESS-01, where "0" represents the energy storage cabinet and "1" indicates the simplified version, while "2" denotes the standard version). For example, RPT-ESS-11, where the sequence "11" represents the container simplified version—"1" for the container and "1" for the simplified version.

RPT's all-in-one energy storage system for C&I application is represented by a combination of letters and numbers, indicating distributed energy storage system products. We offer a variety of energy storage system solutions, including centralized and distributed options.

**Rated Charge and Discharge Power:** The system is available in two specifications, 100kW and 120kW, representing the power for battery charging and discharging.

**Rated Capacity:** This indicates the amount of energy the battery can store and release, currently available in two specifications: 215kWh and 229kWh.



# 2.3. Product Configuration

This specification is applied to all models listed below, and the customers can select configurations based on their project requirements.

Items		215kWh							
DCS	50KW								
	100KW	٧	٧	v	v	v	٧	٧	٧
Solar PV MPPT (Ontional)	60KW	v	٧	٧	v	v	٧	٧	٧
	120KW	v	٧	v	v	٧	٧	٧	٧
STS Switch (Optional)	100KW								
	200KW	v	٧	v	v	٧	v	٧	v

Items		229kWh							
PCS	50KW								
	100KW	v	٧	v	v	v	٧	٧	٧
	60KW	v	٧	v	v	٧	٧	v	٧
	120KW	v	v	٧	٧	v	٧	٧	v
	100KW								
STS SWITCH (Optional)	200KW	v	v	v	v	٧	v	v	v

# 3. Operating Modes

# 3.1. Seamless Grid and Off-Grid Switching





## 3.2. Off-Grid Operation

Depending on the selected off-grid operating mode, PCS connects the battery bank on the DC side, allowing the system to output AC voltage and provide continuous power to the load.



#### 3.3. Grid-Tied Operation

Based on the selected operating mode, the PCS connects the battery bank on the DC side and the grid on the AC side, participating in peak shaving and other ancillary services in the electricity market.



## 4. Product Advantages

The advantages of this energy storage system are as follows:

- > Flexible installation locations, with a small footprint
- > Detailed management of battery grouping
- > Intelligent control that fully meets grid requirements
- > Modular design of battery modules, allowing for flexible total capacity combinations
- > Rigorous and robust protection system, ensuring safe operation under various working conditions
- Efficient PWM modulation algorithm to reduce switching losses



## 5. Product Parameters

# 5.1. All-In-One Energy Storage System

Product Model	Product Model RPT-ESS-01							
Battery Parameters								
Cell Model	LFP 3.2V/280Ah							
System Configuration	1×1P240S							
Rated Capacity	215 kWh							
	AC Grid Connection Parameters							
Rated Charge and Discharge Function	100kW							
Rated Voltage	AC400V							
Rated Grid Frequency	50 Hz /60Hz							
	AC Off-Grid Parameters							
Rated Output Power	100kW							
Rated Output Voltage	AC400V							
Rated Output Frequency	50 Hz /60Hz							
Unbalanced Load Capacity	100%							
General Parameters								
Dimensions (W × D× H)	1740×1100×2330mm							
Weight ≤2400KG								
Operating Temperature -20°C~50°C								
Relative Humidity	0-95%							
Cooling Method	Air-Cooled HVAC							
Noise Level	≤80dB							
Fire Protection System	Aerosol							
Communication Interface	Ethernet/RS485/CAN							
Communication Protocol	Modbus TCP/IP							
Compliance Standards	Battery cell: GB/T36276、IEC62619 PCS:GB/T34120、EN 50549-1:2019、IEC 62477-2022、IEC61000							
	Solar PV Parameters (Optional)							
Max. Input Module Power	120kW							
MPPT Voltage Range	200V-900V							
Number of MPPT Channels	r Channels 1							
Number of PV Input Channels 4								
STS Static Switch (Optional)								
Rated Power	200 kW							



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Switching Time

≤20ms

#### 5.2. Battery System

No.	Items			General Parameters
1		Nominal Capacity	Ah	280
		Nominal Voltage	V	3.2
		Internal Resistance	mΩ	<0.3
		Weight	kg	5.4±0.25
		Maximum Charging Current	A	140
	Battery Cell	Charging Cut-off Voltage	V	3.65
		Maximum Discharge Current	Α	140A
		Discharge Cut-off Voltage	V	2.75
		Charging Temperature Range	°C	0~50
		Discharge Temperature Range	°C	-20~50
		Cycle Life		6000
	Battery Module	Series and Parallel Connection Method of Individual Cells	PxS	1P16S
		Voltage Range	V	44.8V-57.6V
		Nominal Capacity	Ah	280
		Nominal Voltage	V	51.2V
		Rated Energy	kWh	14.336
2		Maximum Continuous Charging Current	A	140
		Maximum Continuous Discharge Current	A	140
		Storage Performance		Monthly Self-Discharge Rate < 4%
		Maximum Operating Temperature Range	°C	0~50
		Operating Humidity		5%C ~95%
		State of Charge at Shipment	%	30% to 50% (Recommended SOC)
	Battery Cluster	Series and Parallel Configuration	PxS	1P240S
		Battery Cluster Capacity	Ah	280
2		Nominal Voltage	V	768V
5		Battery Cluster Voltage Range	V	648~876V
		Rated Energy	kWh	215
		Dimension	mm	1740*1100*2330mm

#### 5.3. Fire Protection System

No.	Items	Qty.	Remarks
1	Aerosol	2	Release inert gas to extinguish open flames
2	Smoke Detector	1	Detect and provide early warning for the particulate matter in cabinet smoke
3	Heat Detector	1	Detect and provide early warning for the temperature of flames in the cabinet.

The fire protection system is designed to ensure the safety of the equipment. In the selection and design of the



equipment, we follow the principles of "prevention first, a combination of prevention and extinguishing, and self-defense and self-rescue." We also take into account the overall situation to facilitate management and ensure cost-effectiveness.

## **5.4.** Power Conversion System (PCS)

The Power Conversion System (Power Conversion System, abbreviated as PCS) is a device in electrochemical energy storage systems that facilitates bidirectional power conversion between the battery system and the grid (and/or loads). It controls the charging and discharging processes of the battery, performs AC/DC conversion, and can directly supply power to AC loads in the absence of a grid.

The PCS consists of a DC/AC bidirectional converter, a control unit, and other components. The PCS controller receives control instructions from the backend via communication, regulating the converter's charging or discharging of the battery based on the sign and magnitude of the power command. This allows for the adjustment of active and reactive power to the grid. Additionally, the PCS can communicate with the Battery Management System (BMS) through a CAN interface and dry contact transmission to obtain battery group status information, enabling protective charging and discharging to ensure the safe operation of the battery.

The 100kW-PCS converter facilitates AC/DC conversion between the grid and the battery, enabling bidirectional energy flow between the two. It serves as the main actuator and core component of the energy storage system.

It employs a three-phase four-bridge arm topology, allowing for single-phase and three-phase active and reactive power control, which effectively addresses three-phase imbalance issues.

It supports multi-machine parallel operation, providing excellent scalability.

It supports active and reactive power regulation functions.

## 5.5. Energy Management System (EMS)

No	Items	Items Description					
1	Basic Functions	It has peak shaving and valley filling capabilities, as well as grid-connected and off-grid switching functions.					
2	Communication Interface	Ethernet					
3	Communication Protocol	IEC61850/Modbus-tcp					
4	Time Synchronization Function	NTP Network Time Synchronization					



# 5.6. Product Appearance and Dimensions

5.6.1. Product Appearance



#### 5.6.2. Product Dimensions

