

Residential Energy Storage System POWER DEPO R Series

1. Overview

To achieve a decarbonized society while addressing the instability of renewable energy sources, it is essential to adjust power supply and demand using storage batteries and demand response (DR).

For general households, an energy storage system enables surplus solar power to be used at night and early in the morning. It also provides households with essential power supply in the case of emergency outages caused by disasters or other troubles.

To promote the adoption of energy storage systems, our company has been selling the POWER DEPO series of residential energy storage systems, known for their ease of installation, since 2012. We have just released the new product named POWER DEPO R (PDR), which inherits the high specifications and the all-in-one concept that have been highly regarded in our previous products, while solving the challenges related to shipping and installation space.

2. Features of POWER DEPO R

2-1 Storage capacity and function

The residential energy storage system uses products with a storage capacity up to approximately 20 kWh. It is segmented into three categories: the small capacity range (under 6 kWh), the medium capacity range (6 kWh to under 10 kWh), and the large capacity range (10 kWh to under 20 kWh). Additionally, the systems are categorized into single-function systems, which include only a power conversion circuit (power conditioning system) for the storage battery, and hybrid systems that also incorporate the functions of a power conditioning system for solar power generation.

Our previous product, POWER DEPO V (PDV), is a single-function system with a small capacity of 3.3 kWh. POWER DEPO H (PDH) is a single-function / hybrid dual-use system with a large capacity of 12.8 kWh. We have now developed the POWER DEPO R (PDR) as the successor to the PDH, which includes a new medium-capacity model in addition to the large-capacity model. Like the PDH, the PDR supports both single-function and hybrid modes, allowing users to select between two different battery capacities for a common power conditioning system. The large-capacity 13.0 kWh model is called POWER DEPO Rx (PDRx), and the medium-capacity 7.7 kWh model is called POWER DEPO Rm (PDRm).

Table 1. Battery market segments and our products

	Single-function type	Hybrid type
Large capacity	PDH(12.8 kWh) →PDRx (13.0 kWh)	PDH (12.8 kWh) →PDRx (13.0 kWh)
Medium capacity	None →PDRm (7.7 kWh)	None →PDRm (7.7 kWh)
Small capacity	PDV (3.3 kWh)	None

2-2 Stackable all-in-one design

Most standard residential energy storage systems consist of a power conditioning system and storage battery as separate units. While the compact size of each component is an advantage, it requires time-consuming wiring work between the power conditioning system and storage battery, and it also looks unsightly. Additionally, it requires the automatic transfer switch to disconnect the home's wiring from the utility grid and supply power from the storage system during a power outage, as well as a current sensor to measure power near the home's distribution panel. The POWER DEPO series features an all-in-one design that houses the power conditioning system and storage battery in a single housing.

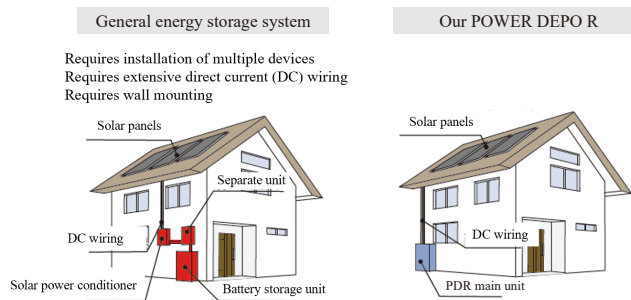


Fig. 1. Comparison of separate and integrated types

The PDH is the only product on the market that integrates not only the power conditioning system and storage battery, but also an automatic transfer switch and current sensor. It has been well received for its excellent workability. However, due to its large size and heavy weight, shipping costs are high and it could not be installed in limited spaces such as urban areas.

Therefore, the new PDR inherits the all-in-one concept of the PDH, incorporating the power conditioning system, storage battery, automatic transfer switch, and current sensor. By adopting a new design in which the power conditioning system is stacked on top of the storage battery, we have achieved reduced shipping costs and a smaller installation area.

The stackable design allows the power conditioning system and storage battery to be packaged and transported separately, further reducing shipping costs. Additionally, the new design has achieved approximately half the installation footprint of the PDH. Like a typical air conditioner outdoor unit, it can be installed with a depth of approximately 600 mm from the wall, which is more compact than the 900-mm depth required for PDH. Consequently, it can be installed in limited spaces adjacent to residential buildings in urban area.

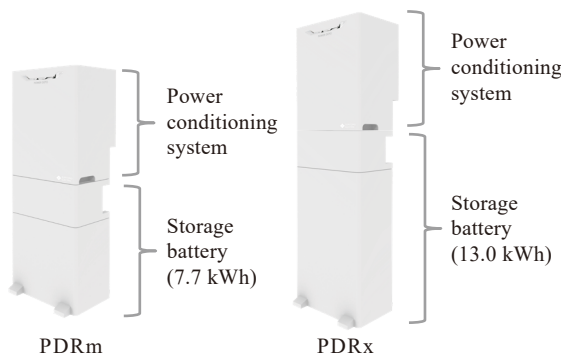


Fig. 2. Appearance and configuration of PDRm and PDRx

2-3 Operating conditions and warranty

Table 2 shows the PDR specifications.

The PDR employs a lithium iron phosphate battery. Nail penetration tests have confirmed its safety: it will not emit smoke, fire, or explode even if an internal short circuit occurs. Moreover, it can charge and discharge without issues even at -20°C , allowing for outdoor installation in cold regions.

The input current for solar power generation is set to a maximum short-circuit current of 19.0 A, and a maximum operating current of 15.5 A, which is compatible with high-current solar panels. This allows connections not only to residential solar panels but also to larger and more affordable industrial panels.

The PDR unit is guaranteed for long-term operation of 15 years from the date of installation completion, or until the storage capacity declines to 50% of the initial effective capacity, whichever comes first. Moreover, we

guarantee that the battery capacity will maintain at least 60% of the initial effective capacity for up to 15 years under normal conditions of use, equivalent to one cycle per day.

3. Future Outlook

The POWER DEPO series has been sold either individually or as set with residential solar panels in order to promote self-consumption of residential solar power generation systems after the Feed-in Tariff (FIT) period ends. Interest is growing as the government plans to make installation of storage batteries mandatory as a requirement for newly built detached homes to be Net Zero Energy House (ZEH). We will contribute to their widespread adoption with a lineup of models to suit various residential conditions, including PDV (3.3 kWh), PDRm (7.7 kWh), and PDRx (13.0 kWh).

While the residential energy storage system can independently moderate the power fluctuations from solar power generation and home consumption, it will make adjustments in response to requests from retail electricity suppliers or general transmission and distribution operators via communication when power adjustments are required to stabilize the grid.

Furthermore, by combining multiple PDR units, output and battery capacity can be increased, which makes it possible to operate as an industrial energy storage system.

For services such as demand response and industrial deployment, we will expand our solutions by utilizing products and proprietary technologies from other divisions within the Power Transmission, Distribution & Energy Solution Business Unit.

- POWER DEPO is a trademark or registered trademark of Sumitomo Electric Industries, Ltd.
- ECHONET Lite is a trademark or registered trademark of ECHONET Consortium.

Table 2. PDR Specifications

Model	PDR-5900S01A-M (PDRm) PDR-5900S01A-X (PDRx)
Type of storage battery	Lithium-ion battery(lithium iron phosphate battery)
Storage capacity	7.7 kWh (PDRm) 13.0 kWh (PDRx)
Initial effective capacity	7.3 kWh (PDRm) 12.3 kWh (PDRx)
Solar input power	$\leq 8.8 \text{ kW}$ Rated 14.4 kW panels can be connected
Solar Input Current	Short-circuit current: $\leq 19.0 \text{ A}$ Operating current: $\leq 15.5 \text{ A}$
Grid-connected output	5.9 kW
Standalone output	6.0 kVA (Single-phase 3-wire 200 V / 100 V)
Operating temperature	-20°C – 45°C
Dimensions	W462 mm×H1,157 mm×D317 mm(PDRm) W462 mm×H1,388 mm×D317 mm(PDRx)
Communication function	Wi-Fi
HEMS integration	Compatible with ECHONET Lite
Server connection	<ul style="list-style-type: none"> • Our monitoring server • General power transmission and distribution operators' servers
AI control	<ul style="list-style-type: none"> • AI control for maximizing self-consumption • Emergency charging during weather alerts
Visualization	<ul style="list-style-type: none"> • Indoor remote control • Smartphone monitor (check while out)