RENEPOLY

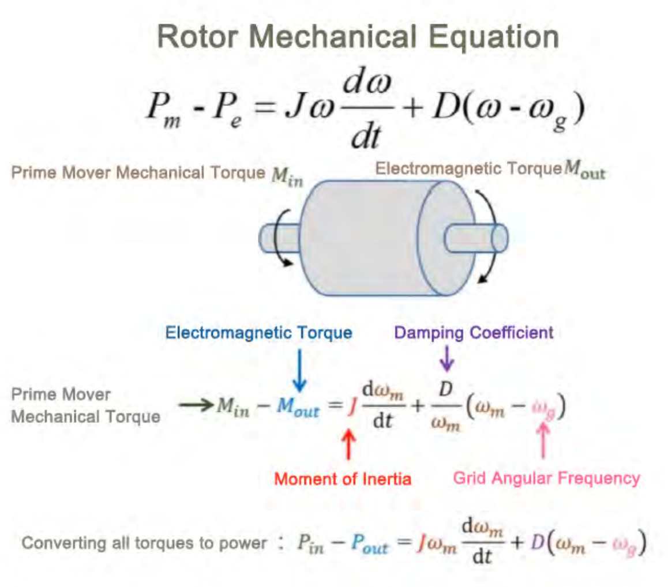
Real 0 Sec. Seamless Switching Function: The Cornerstone of Grid Stability, from Lab Validation to Commercial Application

The technology is now mature, and the future is within reach — we have successfully completed the practical validation for the commercialization of real 0 sec. seamless switching technology.

What is Real 0 Sec. Seamless Switching between grid-tied and off-grid?

In high-reliability scenarios such as critical power supply and continuous processes, real 0 sec. seamless switching technology has become a standard capability, enabling microgrids to truly achieve "unnoticeable power outages and seamless switching."

During a grid power outage, the system can quickly and smoothly switch to the energy storage system for independent power supply, thereby ensuring uninterrupted critical load and making the power outage process imperceptible to users.



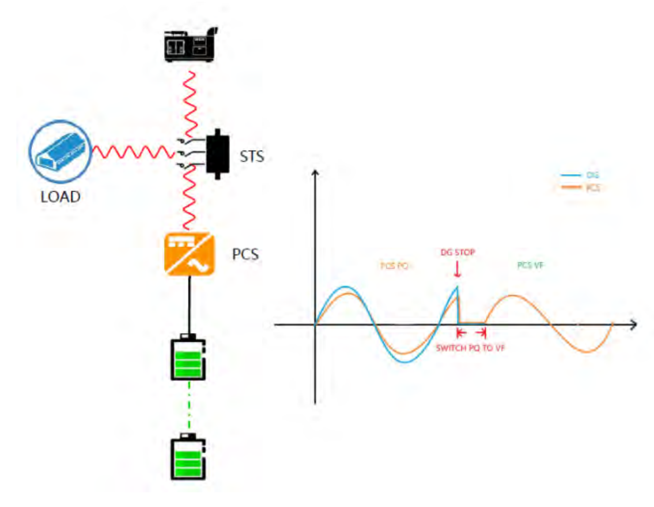
Breakthrough at Renepoly's Lab:
A Key Step from Research and Development (R&D) to Commercialization!

In our microgrid laboratory, through fully independent design and R&D, we have successfully completed the practical application testing of the real 0 sec. seamless switching technology.
This marks the successful transition of real 0 sec. seamless switching technology from the laboratory stage. Its stability, effectiveness, and reliability have been empirically proven, paving the way for subsequent large-scale commercial application.

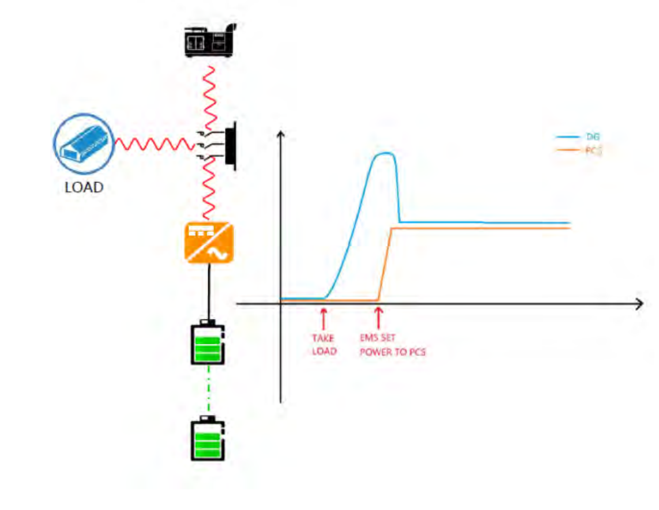
Core Advantage Comparison
(Microgrid System with real 0 sec. seamless switching vs. Ordinary Microgrid/Energy Storage System)

Ordinary Microgrid System:

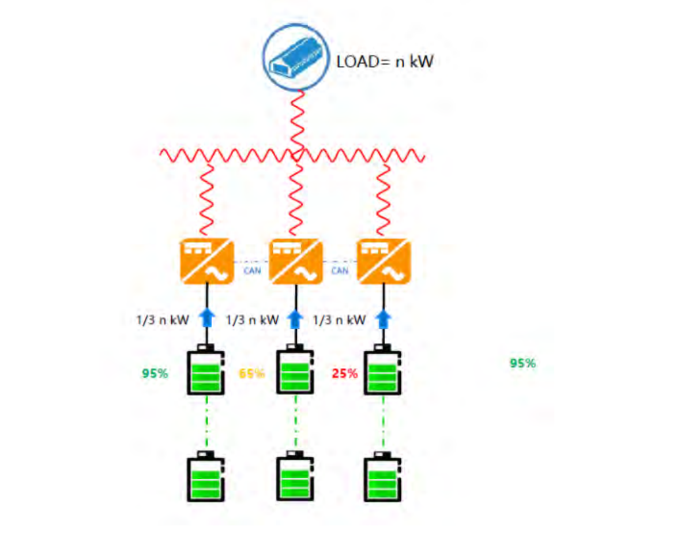
Traditional microgrid systems require adding a Static Transfer Switch for grid tied and off-grid switching. During the switching process, there is a 20ms power gap, which affects the load capacity of both precision loads and inductive loads. In normal operation mode, the energy storage system jointly powers the loads with the diesel generator or the grid, requiring the Energy Management System (EMS) to allocate storage power in real-time. Furthermore, the energy storage system cannot provide transient power support.



Traditional oil machinery coupled with energy storage



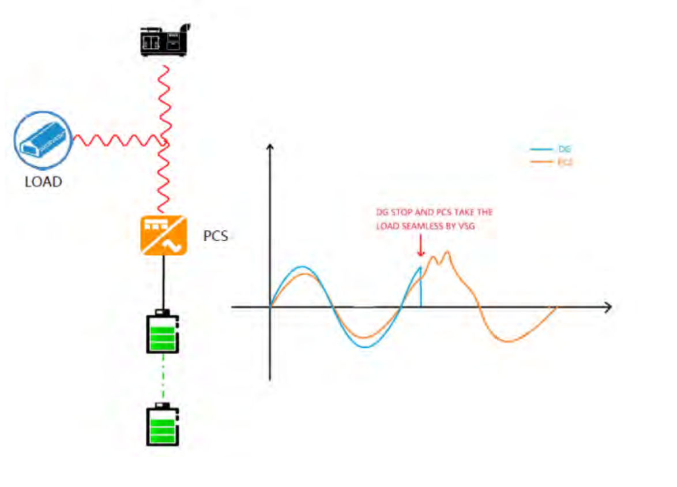
Weak network support



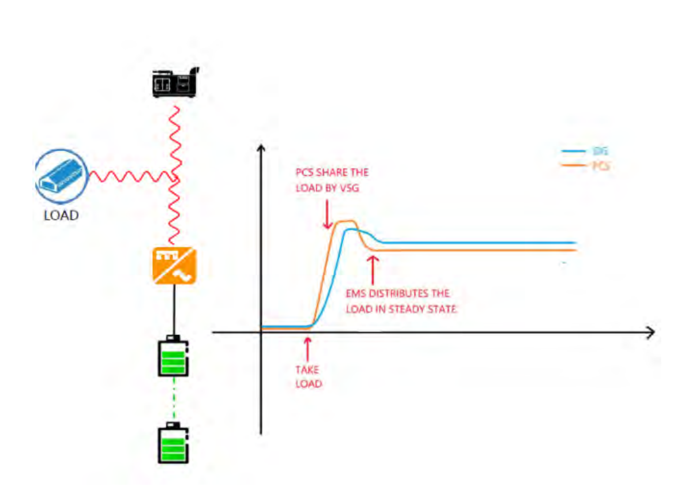
Multiple PCS units operating in parallel

Microgrid System with Real 0 Sec. Seamless Switching between grid-tied and off-grid :

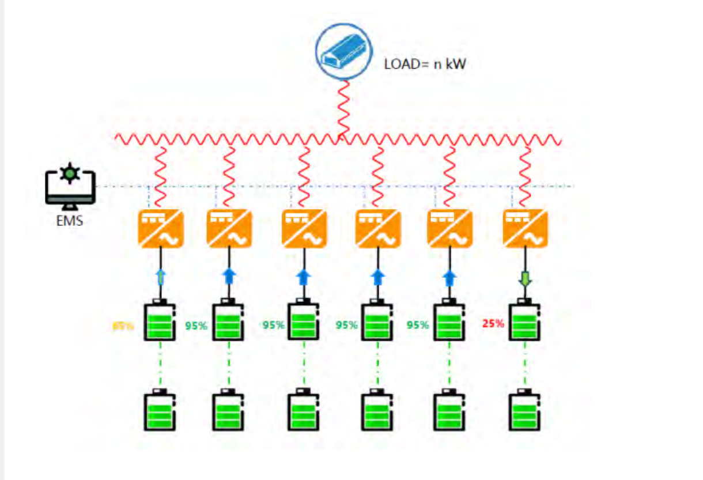
Under the control of real 0 sec. seamless switching , the microgrid system does not require a mode switch when transitioning from the grid or diesel generator to the energy storage system. The energy storage system seamlessly takes over the load through brief adjustments, enhancing load reliability. Real 0 sec. seamless switching requires no STS for grid connection and can be achieved using synchronization device. It provides power support during transients without needing the EMS, and in some cases, operates without EMS involvement.



Seamless switching with the diesel engine



Weak network support



Multiple PCS units operating in parallel support off-grid SOC balancing.

Three Core Values of
Real 0 Sec. Seamless Switching between grid-tied and off-grid

Power Continuity

Value Points:

- Real 0 sec. seamless switching means the system imperceptibly switches to off-grid mode for power supply during grid outages or fluctuations, preventing load flicker and shutdown.
- Crucial for critical loads (e.g., data centers, hospitals, semiconductors, precision manufacturing, communication base stations).
- Avoids delays (typically tens of milliseconds to several seconds) associated with traditional UPS or diesel generator switching.

The value it brings:

- Ensures continuous production, avoiding losses caused by equipment downtime.
- Improves system power quality and stability.
- Establishes an "uninterrupted power supply" brand image.

System Reliability and Safety

Value Points:

- Seamless grid-connected/off-grid switching prevents instantaneous voltage dips, current surges, and phase shifts.
- Maintains electrical synchronization of the system, preventing equipment malfunction.
- Reduces the impact on the Power Conversion System (PCS), controllers, and busbars during the switching process.

The value it brings:

- Increases overall system reliability and extends service life.
- Reduces maintenance frequency and costs.
- Enhances system resilience under extreme operating conditions.

Economic and Operational Benefits

Value Points:

- Enables seamless coordination between the grid and energy storage without needing additional UPS or diesel generators for switching.
- Simplifies system architecture, reducing investment and operational costs.
- Enhances customer experience and system premium capability.

The value it brings:

- Lowers system construction and energy switching costs (CAPEX/OPEX).
- Improves the intelligence level and market competitiveness of the microgrid system.
- Enables advanced functions such as VPP dispatch, rapid islanding operation, and peak shaving and valley filling.

Typical Application Scenarios

Critical Load Assurance Scenarios

Facilities with extremely high requirements for "uninterrupted power," where outages would cause significant losses or safety risks.

Typical Applications:

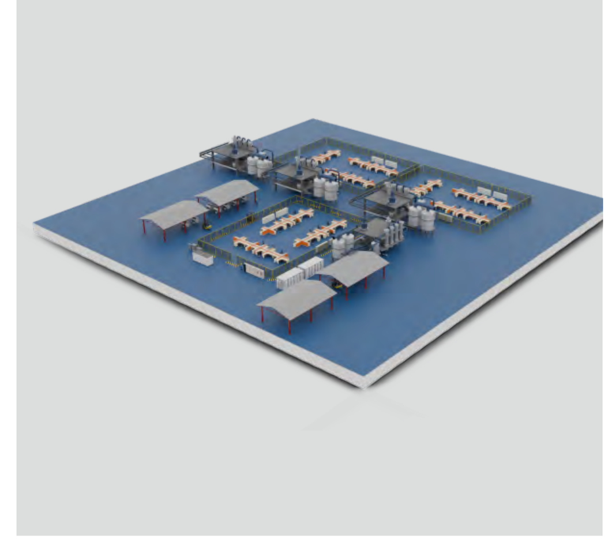
- Data Centers / Server Rooms
- Ensure IT loads remain online without rebooting.
- Replace UPS and diesel generator systems, simplifying architecture and reducing maintenance costs.
- Hospitals and Medical Equipment
- Ensure continuous power for operating rooms, ICU, and imaging equipment.
- Prevent medical interruptions or equipment damage due to instantaneous power loss.
- Communication Base Stations and Dispatch Centers
- Guarantee communication continuity during grid faults.
- Particularly suitable for remote areas or emergency command systems.

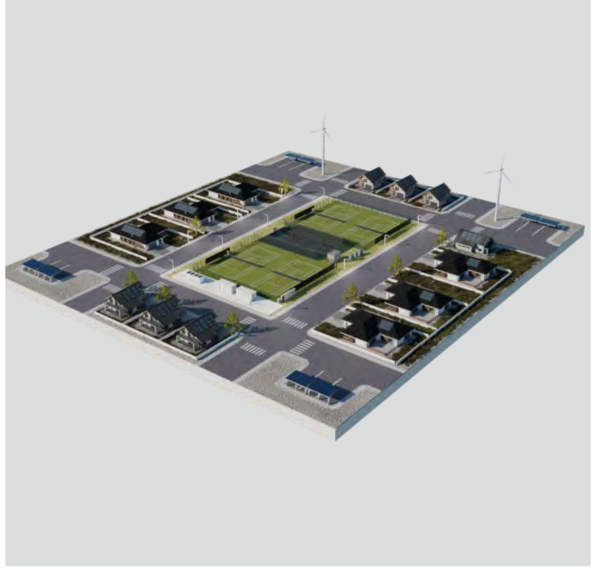
Industrial Production and Continuous Process Scenarios

Industrial systems highly sensitive to production process continuity and voltage fluctuations.

Typical Applications:

- Semiconductor, PV, Lithium Battery Production Lines
- Prevent yield reduction and equipment reboots caused by brief power interruptions.
- Ensure constant power quality and process stability.
- Precision Manufacturing / Automated Production Lines
- Ensure CNC machine tools, robots, and automated assembly systems operate undisturbed under zero-second switching.
- Chemical / Metallurgical / Food Continuous Production Lines
- Avoid production interruptions, equipment damage, or safety incidents caused by sudden shutdowns.





Commercial and Civil High-Reliability Scenarios

Primarily focused on user experience and economic loss prevention.

Typical Applications:

- High-end Commercial Complexes / Smart Parks
- Achieve zero-interruption power supply for public lighting, elevators, surveillance, and air conditioning systems.
- Enhance the park's intelligent power image and investment appeal.
- Office Buildings / Government Agencies / Financial Centers
- Avoid transaction interruptions, data loss, or system reboots caused by power outages.
- Residential and Villa Energy Storage Systems (High-end Home Use)
- Instantly switch to off-grid mode during power outages, making the outage imperceptible to users.
- Especially suitable for regions with frequent grid fluctuations, such as Europe, America, and Southeast Asia.

Special and Emergency Power Supply Scenarios

Addressing stable power supply demands under complex environments and extreme conditions.

Typical Applications:

- Off-grid Islands and Remote Area Microgrids
- Achieve stable transition during grid fluctuations or outages.
- Improve the utilization rate of renewable energy output.
- Military, Scientific Research, Emergency Power Systems
- Guarantee power continuity for critical facilities, supporting combat readiness or disaster emergency response.
- Airport / Subway / Railway Signaling Systems
- Real 0 sec. seamless switching ensures the safe operation of signaling and control systems.

Real 0 Sec. Seamless Switching Technology is Ready for Immediate Commercial Use.

Welcome to Renepoly microgrid lab. Get a close-up look at the stabilizing core of the future grid in operation!

Connect with Renepoly for Quick, Efficient Responses

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