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Reliable Power Protection for Critical Applications - ES-SU/TU Online UPS

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In modern digital and intelligent systems, power availability alone is no longer sufficient. What matters is whether the power supply is stable, continuous, and controllable. Voltage fluctuations, momentary outages, surges, and harmonic distortion can lead to system reboot, data loss, service interruption, and even hardware damage.

A UPS, therefore, is not only a backup device for power failures, but a critical component for maintaining power quality during normal operation.

The ES-SU/TU online UPS series is designed to meet these demands, covering typical capacities of 1 kVA, 3 kVA, 6 kVA, and 10 kVA. It features a true double-conversion architecture, unity output power factor, high input power factor, and low input current total harmonic distortion (THDi). With support for ECO mode, Emergency Power Off function (EPO), USB/RS-232 communication, and LCD display, it provides a reliable and manageable power solution for data centers, industrial systems, and communication infrastructure.

Core Advantages of ES-SU/TU:

1. True online double-conversion architecture, delivering stable power output

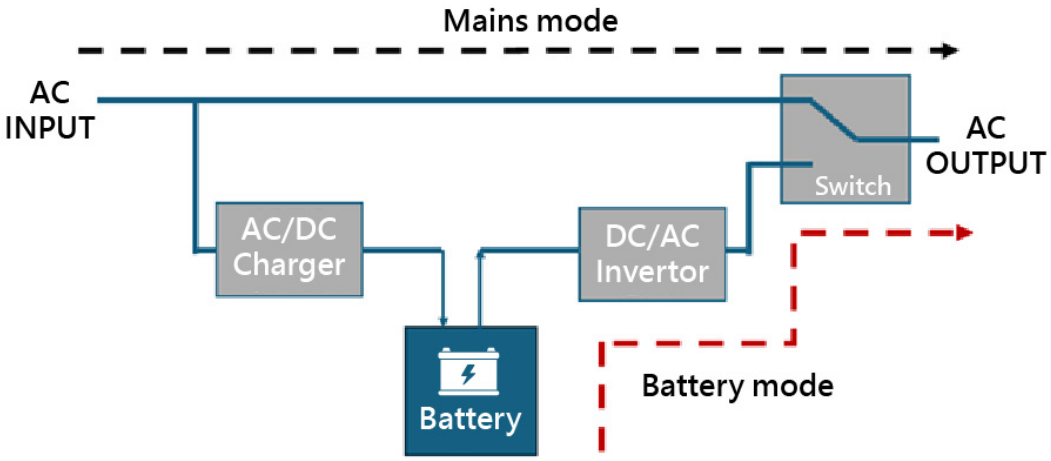
The ES-SU/TU adopts a double-conversion online topology, where incoming AC power is first rectified into DC and then inverted back into a stable AC output. The load is always powered by the inverter, rather than being directly supplied from the utility.

Unlike standby UPS systems that switch to battery only after a disturbance, or line-interactive UPS systems that still involve transfer time, the architecture of Online UPS continuously conditions and isolates the input power. As a result, it delivers zero transfer time and effectively mitigates voltage fluctuations, frequency deviations, and grid disturbances. The table below compares the operating modes of three UPS types; their typical architectures are illustrated in the diagrams below.

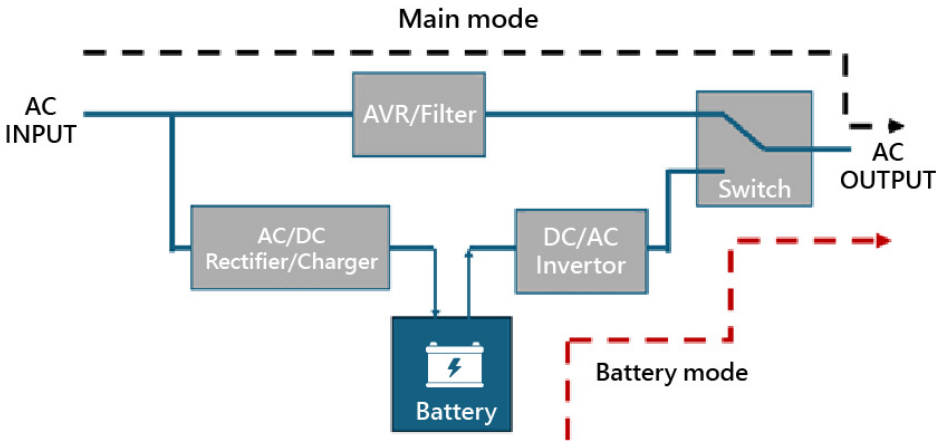
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Conditions / UPS Type	Mains Normal	Mains fluctuation	Mains interruption/fault
Standby UPS	Mains supply directly powers the load.	Automatically switches modes based on mains voltage; frequent switching may occur under unstable voltage conditions.	Switches to battery power; long transfer time.
Line-interactive UPS	Mains power supplies the load through AVR/filter.	Mains passes through AVR/filter to supply the load; output quality still depends on input mains.	Switches to battery power; fast transfer, but not “zero transfer time”.
Online UPS*	AC input is rectified to DC, then inverted back to AC; the load is continuously powered by the inverter path, ensuring very high output power quality.		Switches to battery power, zero transfer time.

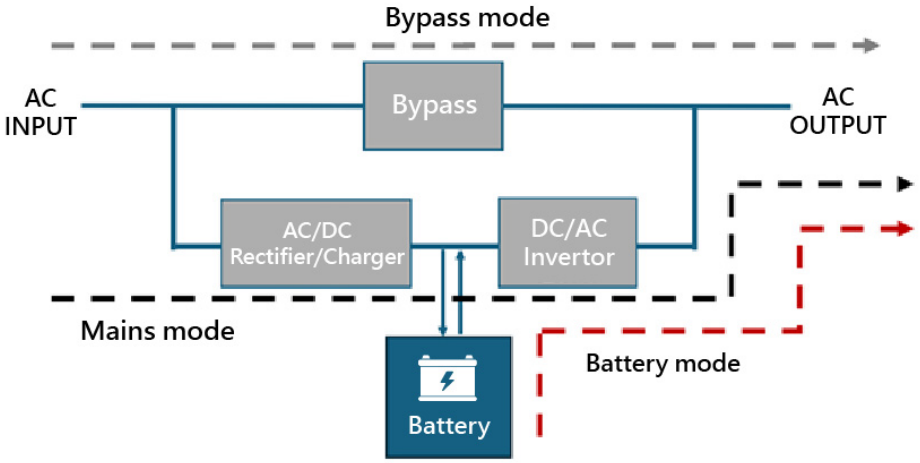
* Online UPS also features Bypass mode; under good mains conditions, the load can be powered directly via bypass to improve efficiency.



▲Standby (Offline) UPS



▲Line-Interactive UPS



▲Online UPS

Even when the utility fails and the system switches to battery mode, the inverter of online UPS remains continuously active, ensuring that the load experiences no interruption. This makes the ES-SU/TU particularly suitable for sensitive loads such as servers, network switches, industrial controllers, and critical monitoring systems.

ES-SU/TU also supports 50 Hz / 60 Hz frequency conversion, enabling flexible adaptation to different regional standards and system interface requirements. With the output power factor (PF = 1), ES-SU/TU delivers higher usable active power under the same rated capacity, improving utilization efficiency and aligning well with modern load profiles dominated by IT and industrial electronic equipment.

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2. High input power factor and low harmonics to reduce upstream power system stress

Beyond output performance, the interaction between the UPS and the upstream power system is equally critical.
The ES-SU/TU achieves an input power factor of up to ≥0.99 and low input current THDi, reducing distortion and stress on the upstream power infrastructure. This helps minimize reactive power demand and harmonic pollution, easing the load on cables, circuit breakers, and distribution systems while improving overall power quality.

In practice, these characteristics enhance compatibility with existing power distribution systems and reduce the likelihood of unnecessary transfers to battery mode caused by poor input conditions.

ES-SU/TU is also compatible with fuel generator systems. High input power factor and low harmonic distortion contribute to more stable generator operation and improved reliability across the entire power chain.

3. Integrated support for operational efficiency, energy optimization, and system safety

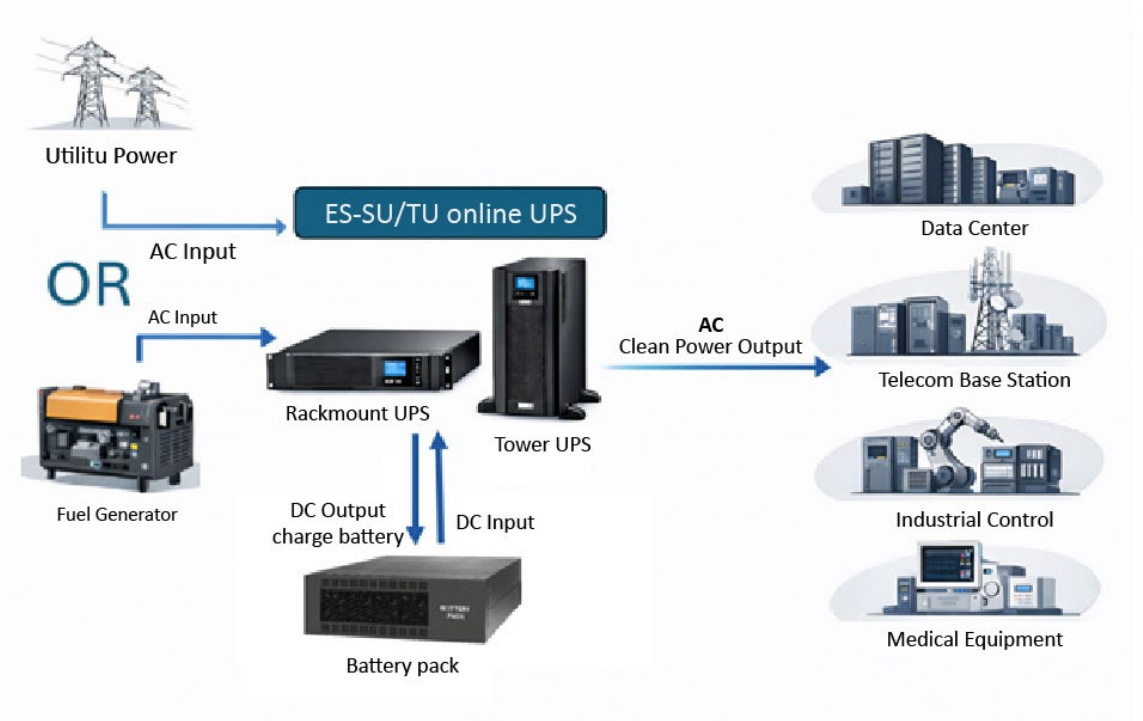
The ES-SU/TU is designed not only for stable power delivery, but also for efficient operation and reliable system protection.
For operation and maintenance, ES-SU/TU supports USB and RS-232 communication and features an LCD panel for real-time monitoring of system status, input/output parameters, and alarms. This improves visibility and reduces response time during fault conditions.

To enhance energy efficiency, ES-SU/TU supports ECO mode. When utility power is within acceptable limits, the load is supplied via the bypass to improve efficiency; when abnormalities occur, the system automatically returns to inverter mode to maintain power continuity.

For battery management and system protection, the ES-SU/TU supports adjustable charging voltage/charging current to accommodate different battery configurations. It also features an Emergency Power Off (EPO) function and an AC input circuit breaker, enabling user to manually disconnect the input power when required.

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Typical Application Scenarios for ES-SU/TU:



1. Data Centers and Server Rooms

For servers, storage devices, switches, and network cabinets, even a brief power interruption can result in reboot, service interruption, or data risk. With zero transfer time, continuous output conditioning, and PF = 1 output capability, the ES-SU/TU is well suited to small and medium-sized server rooms, edge computing nodes, and critical IT cabinets.

2. Industrial Automation and Control Systems

In industrial control environments, power instability may interrupt production processes, trigger control faults, or affect sensitive electronic devices. The ES-SU/TU helps provide a regulated and continuous power source for PLCs, industrial PCs, automation controllers, and related systems, improving operational continuity in electrically demanding environments.

3. Telecommunication and Network Infrastructure

Communication nodes, equipment rooms, and network infrastructure often require both high supply continuity and monitoring capability. The ES-SU/TU combines protection with communication interfaces and status monitoring, making it suitable for distributed telecom and network applications where uptime and maintainability are both important.

4. Medical Equipment

For medical electronics, diagnostic devices, and other precision instruments, power disturbances may lead to reset, abnormal readings, or operational interruption. The ES-SU/TU provides continuous, regulated output power to help reduce such risks in applications where power quality and continuity are essential.

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For critical applications, the role of a UPS is not limited to providing backup energy during a blackout. It also includes isolating the load from utility disturbances, maintaining output quality, and supporting safer and more efficient system operation.

The ES-SU/TU online UPS, featuring a double-conversion architecture, optimized power factor, and low harmonic design, combined with comprehensive monitoring and protection functions, provides a stable, efficient, and manageable power protection solution for critical equipment.

For related products and application needs, please contact MEAN WELL distributors or technical personnel. You are also welcome to follow MEAN WELL's online exhibition hall for more product information and solution courses.

