

Home-Accessible High Power Charging Solution for Service Robot –

MEAN WELL UHP-2500/PHP-3500 Series

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Industry: Robotics / Automation

Application: Robot Battery Charger

Power Solution: UHP-2500/PHP-3500 Series

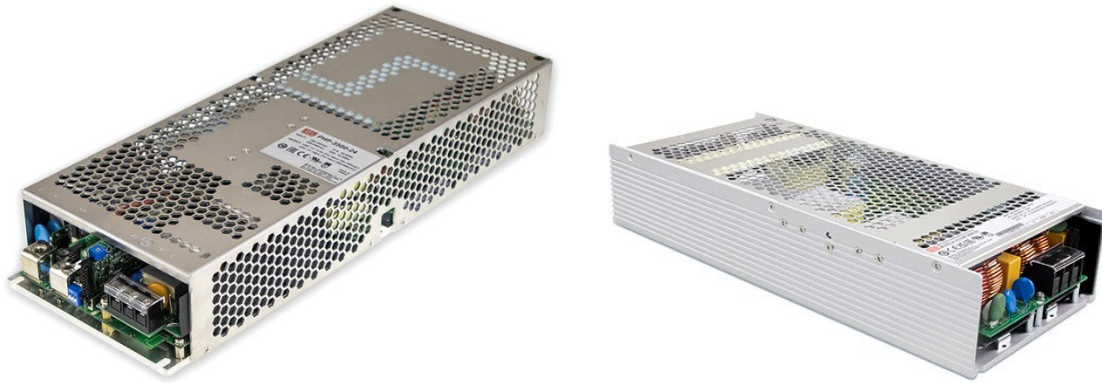
Home and service robots are rapidly transitioning from experimental platforms into practical, continuously operating systems deployed in residential, commercial, and public environments. As these robots take on longer duty cycles and more energy-intensive tasks, power and charging infrastructure has become a critical design consideration rather than a secondary component.

Modern service robots, particularly mobile platforms such as quadruped robots, are equipped with large-capacity battery packs to support extended operation, high payloads, and advanced sensing and computing. As a result, high-power charging is essential to minimize downtime and maintain operational availability. Low-power chargers lead to prolonged charging cycles, directly limiting robot productivity.

As these robots are increasingly charged in human-centric environments such as homes, offices, and public buildings, charging solutions must meet additional requirements, including silent operation, high efficiency, and compatibility with standard 120Vac single-phase outlets commonly available in North America. Dependence on industrial 240Vac or three-phase power is impractical in these settings and significantly limits deployment flexibility. As a result, there is a growing demand for high-power, fanless, and universally accessible charging solutions that effectively bridge industrial-level performance with residential power infrastructure.



The UHP-2500 and PHP-3500 series deliver kilowatt-level output to support fast charging of large-capacity robot batteries while maintaining high efficiency and reliability. Both series feature a fanless, conduction-cooled design, enabling silent operation and eliminating the maintenance and failure risks associated with cooling fans. This makes them ideal for indoor charging in homes, hospitals, and offices, where noise and long-term reliability are critical. In addition, support for a full-range 90–264Vac AC input allows these power supplies to operate directly from standard 120Vac single-phase outlets in North America, removing the need for industrial 240Vac or three-phase power infrastructure.



Equally important, the UHP-2500 and PHP-3500 series support digital communication via PMBus and optional CANBus, enabling real-time monitoring, voltage and current adjustment, and seamless integration with robot battery management systems. These capabilities allow intelligent charging control and system-level optimization, making them a strong foundation for next-generation home and service robot platforms.