

NP08 Powers 2.4KW AC-DC with Battery Back-Up

INDUSTRY**Medical****SOLUTION****Neo Power NP08 Series****APPLICATION****MRI****CHALLENGE**

MRI systems require highly stable and noise-free power to maintain magnetic field homogeneity and ensure high-quality imaging. Power interruptions or fluctuations can lead to image artifacts, system downtime, or even damage other electronic parts of the MRI system.

A global medical leader in the MRI technology approached Advanced Energy to design a multiple output 2.4 KW AC-DC power supply system with battery backup for an MRI system. They wanted to ensure proper shutdown of the machine during power outages, minimal RF emissions, high reliability and safety, and seamless integration with MRI system infrastructure. They required a battery back-up to replace an external UPS (uninterruptible power supply) which not only added significant cost but also occupied sizeable space in the technical room.

SOLUTION

Advanced Energy (AE) proposed the new standard configurable NeoPower NP08 as the based model to provide 2.4 KW in a value-add (modified) solution. Two isolated outputs of 48 V, 1.2 KW each were supported by configuring total six modules of NPO8 connected in parallel in groups of three. There is no need for additional EMI (electromagnetic interference) filter as NP08 meets Class A limits with 5 dB margin for EMI emissions.

One module out of the available eight modules of NP08 is used as a battery charger to the 500 Whr lithium-ion battery to serve as the back-up power in case of AC loss. This is achieved by modifying the NP08 for constant current and constant voltage operation through firmware implementation. No separate charger circuits were necessary as NP08 supports wide output voltage range.

Key features of NP08 platform that are beneficial to MRI systems:

- High power density, 18 W/in³, compact form factor that is ideal for space-constrained MRI cabinets
- Medical-grade compliance, meets IEC 60601-1 standards, ensuring safety and reliability in medical environments
- Low ripple noise, NP08 offers market-leading low ripple noise which is critical to avoid image distortion
- Low EMI/RFI emissions: built-in EMI filter to prevent interference with sensitive MRI electronics
- Digital control interface, MODBUS, PMBUS, CANOPEN, for remote monitoring, control, and diagnostics
- Flexible configuration, supports series and parallel connectivity with eight output slots, allowing scalability for additional power requirements in the future



- 1) Gradient /RF cabinet
- 2) Power supply
- 3) Chiller
- 4) Helium pump



- 1) Power injector
- 2) Table
- 3) Cart with coils

RESULT/ CONCLUSION

AE's ability to support a value-add solution and accommodate modifications to the power supply allowed the customer to have a 2.4 kW power supply solution with integrated battery charger and therefore eliminated the need for an external UPS. With the small form factor of NP08, it fits the 19-inch enclosure of the customer with more than enough room to maintain good cooling for the 500 Whr lithium-ion battery pack. The NP08 is in-stock and has medical safety approvals to IEC60601-1, so AE team provided quick sampling. This reduced development costs and accelerated time-to-market for system launch.



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