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POWERBOX
SMM650A-C



Power system for mobile medical electrical equipment

Power systems for mobile medical electrical equipment (MEE) can be very complex and depending on the final application, composed of multiple power level sub-systems such as a battery charger, a boost charger to supply energy to the high voltage element (e.g. laser, X-Ray), peak energy storage, and regenerative energy using supercapacitors. Power systems for MEE often include digital control and a communication capability with other medical equipment.

Powerbox's SMM650A is a power system purpose designed for Mobile Medical Electrical Equipment (MEE) applications and for use within professional healthcare environments, bringing advanced healthcare closer to the patient's location. This power system is developed for use specifically with imaging equipment, supporting both low



and high voltage areas as well as charging battery banks and handling regenerative power from motors with an environmental aspect in mind. The system's high voltage parts support approximately 35kW peak power with high repeatability. SMM650A complies with the medical safety standard IEC 60601-1 3rd edition and provides an isolation of 2xMOPP.

In order to deliver the different voltages and peak power required by medical imaging equipment, the SMM650A includes a high efficiency master power unit supplying voltage to a DC/DC battery charger especially designed for safe charging the system's high voltage Li-ion battery bank. The charger delivers 3.25A and a nominal output voltage of 200VDC. To deliver peak power to the high-voltage element, a booster charger pumps up the 200VDC to the desired voltage, charging a supercapacitor bank and making it possible to deliver a very high peak current without disturbing the main power supply.

The SMM650A power unit also supplies power to the DC propulsion motors, assuring the mobility of the MEE. For safety reasons the propulsion motors use 24VDC. A power converter steps down the 200VDC from the battery to 24VDC and when the MEE is stopped, the reverse energy is stored in the supercapacitor bank, saving energy and power dissipation. Being able to deliver peak-current, the supercapacitor bank can deliver the energy required by the DC motors without disturbing the main system voltage and also reducing stress on the battery.

Although the system supports high power, patient comfort has been a main focus in ensuring that audible noise originating from fans has been kept to a minimum. In taking a holistic system value approach, Powerbox's engineering team has solved complex system requirements while embracing enhanced efficiency and reliability.

Features

- Battery charger: PWM controlled charging cycle.
Fan output
- Boost charger: Constant current
- Load dump: Protecting the system against voltage raise during motor breaking. Storing regenerative energy in super capacitors

Control

- Battery charger: PWM pulse xxxxx

Input

- Battery charger: 50 VDC, ± 5 VDC (Start up at 40 VDC).
Power loss <38W efficiency
- Boost charger: 200 VDC
- Load dump: 24 VDC

Output

- Battery charger: 200 VDC, 3,25 A
- Boost charger: 100 VDC
- Load dump: 24 VDC, 42 A

Dimensions

- Battery charger: 130 x 95 x 50 mm
- Boost charger: 285 x 95 x 70 mm
- Load dump:

Environmental

- Operating temperature +10°C to +40°C

About Powerbox

Founded in 1974, with headquarters in Sweden and operations in 15 countries across four continents, Powerbox serves customers all around the globe. The company focuses on four major markets - industrial, medical, transportation/railway and defense - for which it designs and markets premium quality power conversion systems for demanding applications. Powerbox's mission is to use its expertise to increase customers' competitiveness by meeting all of their power needs. Every aspect of the company's business is focused on that goal, from the design of advanced components that go into products, through to high levels of customer service. Powerbox is recognized for technical innovations that reduce energy consumption and its ability to manage full product lifecycles while minimizing environmental impact. Powerbox is a Cosel Group Company.

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