

Advanced Energy's FC15M: Flexible Power Delivery for Aesthetic Lasers

INDUSTRY

Medical

SOLUTION

FlexiCharge FC1500 Series

APPLICATION

Aesthetic Lasers

CHALLENGE

A global medical equipment manufacturer of aesthetic laser and IPL systems was developing a range of new products to refresh their product line up.

Each piece of equipment had different charge voltage requirements for both the laser and IPL portions. One multi-function system required 1000 V for lasers and 400 V for IPL, whereas another system required 800 V for the laser and 300 V for the IPL. They also had a Laser only system that only required 800 V. Energy levels ranged from 800 J to 1200 J of charging power.

The system power (house-keeping power) for each piece of equipment was also different, ranging from 250 W to 600 W, powering cooling elements (TEC), micro-processors, touch panels, monitors and pumps. Each of these required discrete and very different voltages such as 5 V, 12 V, 24 V and 48 V.

Their traditional design approach was to have a different capacitor charger for each product and different single or multiple output power supplies to drive the system power in each product. Each system needed to be medically certified and due to the mobile nature of the equipment, size and weight were also important consideration.

SOLUTION

The customer assumed they required three different capacitor chargers and three different system power supplies, which aligned with how they had approached this traditionally. The specification requirements of each charger and system power supply were provided to Advanced Energy's field applications engineer (FAE).



During this review, it was seen that while each product had differing power needs for the charger and housekeeping power, the overall system power needs were between 1200 W and 1500 W.

The FlexiCharge FC15M from Advanced Energy (AE) was proposed as a power solution that could fulfil all their needs. The FC15M is a medically certified constant power charger, which can provide up to 1500 J of charging power over a wide range of charging voltages. The unique constant power performance over charge voltages from 250 V to 1000 V allowed them to not only charge at 1200 kJ at 1000 V for their laser but also charge at 1200 J at voltages as low as 300 V for IPL. Effectively they could standardise on using one capacitor charger across all three of their product platforms.

Additionally, the FC15M can provide up to 800 W of isolated low voltage DC outputs for housekeeping circuits. Our FAE demonstrated how they could select from a range of standard CoolX modules, which can be housed in the Flexicharge, to provide the various discrete DC outputs needed for their housekeeping power thereby eliminating the separate AC-DC power supply in each system. With this solution they were able to combine both the charger power and systems electronics power into one compact power supply.

RESULT

- The constant power capability of the FC15M capacitor charger allowed them to standardise on one capacitor charger that delivered all their charging needs. The constant power nature allowed them to charge faster at the lower voltages needed for IPL, permitting them to do faster treatments.
- Combining both the charger and system power into one power supply greatly simplified system safety compliance where they had one critical power supply component instead of two. System compliance specifications for IEC60601-1, such as system leakage current (<300 uA), medical isolation requirements were achieved without any issues and eliminated the needs for a bulky isolation transformer.
- One power supply also simplified system EMI compliance. The excellent flicker performance of FC15M was a major improvement over their previous charger. Having all the power (charger and system power) eliminated interference issues and simplified system filtering.
- Using the PMBus digital control and communications, the customer was able to adjust charge voltages, charge rates and monitor temperatures to arrive at the optimum performance.
- The FC15M solution reduced system weight by over 3 kg, while also providing a 30% space saving over their previous solution.
- The customer was effectively able to standardise on one power supply that provided the charging and housekeeping power across all their platforms. This helped reduce the number of part numbers used from six to one and brought about significant supply chain efficiencies.



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