CASE STUDY

Efficient Charging Solution for High-Performance Aesthetic Laser and IPL Systems

INDUSTRY	SOLUTION	APPLICATION
Medical	Excelsys FlexiCharge	Medical Lasers

CHALLENGE

A manufacturer of high-performance aesthetic laser and IPL systems approached Advanced Energy (AE) for a capacitor charging power supply for their next generation of IPL and laser equipment. They needed a charger to charge capacitors for both the IPL treatments at 400 V and laser treatment at 800 V. In their previous generation the system used a constant current charger. To meet the charge times required for IPL at lower voltages, the customer had to oversize the charger (effectively using a 4 kJ charger), even though the system only needed 2 kJ.

They also required a total of 600 W power for system electronics including 24 V for Thermo Electric Cooling (TEC) element, 5 V for microprocessors, 12 V for touch panel/monitor (12 V) and 24 V for pumps. The previous generation of products used a sperate multiple output power supply for this requirement which created challenges for system safety approval and EMI compliance. Finally, they also had a target to reduce the overall size and weight of equipment.

SOLUTION

AE's Field Applications Engineer proposed the FlexiCharge FC25M capacitor charger for their charging requirements. The FC25M is a medically certified constant power charger, which can provide up to 2.5 kJ of charging power over a wide range of charging voltages. The unique constant power performance allowed them to not only charge at 2.5 kJ at 800 V for their Laser but also charge at 2.5 kJ at 400 V for IPL. Additionally, the FC25M can deliver up to 800 W of system power.

The customer are long term users of Advanced Energy's CoolX modular power supplies to drive their system electronics and have had an excellent experience in terms of performance and reliability. The FC25M uses the same CoolX output modules they are so familiar with and trust. With this solution they were able to combine both the charger power and systems electronics power into one compact power supply.

RESULT / CONCLUSION

Combining both the charger and system power into one power supply greatly simplified system safety compliance, reducing the need for multiple critical power supply components and bulky isolation transformers. This streamlined approach ensured that system compliance specifications for IEC60601-1, such as system leakage current (<300 uA) and medical isolation requirements, were met without any issues.

The single power supply also simplified system EMI compliance. The excellent flicker performance of the FlexiCharge FC25M was a significant improvement over their previous charger, eliminating interference issues and simplifying system filtering.

The constant power performance of the Flexicharge allowed them to charge faster at lower voltages, thereby reducing treatment time for patients and clients.

Utilizing PMBus digital control and communications, the customer could adjust charge voltages, charge rates, and monitor temperatures to achieve optimal performance.

The FC25M solution reduced system weight by over 5 kg and provided a 30 % space saving compared to their previous solution.

In summary, the FC25M solution not only enhanced the system's performance but also contributed to a more efficient and streamlined design.

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