

Component Power for the Medical Environment



Vicor's Experience

Vicor's modular power components and complete power systems are used by customers throughout the world to create solutions that enhance diagnosis and treatment procedures. Applications in the medical environment such as medical lasers, respiration systems, ultrasound imaging, programmable fluid valves, blood pumps, magnetic resonance imaging scanners and a wide range of other equipment for diagnosis and treatment benefit from Vicor's extensive product portfolio, some of which are highlighted in this brochure.

Vicor's long, successful record supporting customers in this demanding market, our understanding of standards and regulations, and our comprehensive range of modular converters and accessory products makes Vicor the ideal choice for your next design.

Many applications in the medical environment do not require the power supply to have specific medical approvals, allowing engineers to select from the entire range of Vicor products. For more demanding applications, however, the VI-200 family offers several products that meet medical standards UL 544 and UL 2601-1.

Application Examples



Portable Respiration Systems —

Vicor's modules are small and offer outstanding shock and vibration resistance, making them the ideal choice for battery-powered equipment. Portable medical equipment developed using Vicor converters are robust and reliable, and can be compact, lightweight and easily carried.

Medical lasers — Medical and cosmetic lasers require supplies with PFC to meet regulatory requirements and high power density to fit in the limited space. Vicor offers a range of modular options to meet these demands, as well as complete integrated solutions such as the PFC Mini, with modified versions available that reduce fan noise enabling quiet operation.



Programmable Fluid Valves — Implantable devices are controlled by magnetic actuators driven by an external box controlling the valves. As the control boxes must be moved between different doctors' offices, size and weight are very important: Vicor offers a range of compact, high power density and lightweight modules that are ideal for such applications.

3D Ultrasound — Vicor modules offer excellent power density, enabling the development of portable Ultrasound systems with complex signal processing systems. The inherent low noise of Vicor modules and the additional suppression available with Vicor's active filter modules ensure the best quality image and prevent the ultrasound system interfering with other sensitive equipment.



Portable Cardiac-Pulmonary Support System —

The compact size and light weight of Vicor modules are critical in enabling the development of portable life-support systems for patients with acute heart failure. The high efficiency of the Vicor converters allows designers to select heatsinks that are smaller and lighter than those required by other solutions, further enhancing the system's portability.

Blood Pump — Vicor modules are ideal for battery-powered blood pumps as wide input ranges allow the full battery charge to be used, extending the operating time between charges. Pump speed can also be controlled accurately using the output trim, something that is made possible by the exceptionally wide trim range of Vicor DC-DC modules.



Magnetic Resonance Imaging — Magnets in MRI scanners require a high-current supply and a temperature control system to keep them at a constant temperature. The high efficiency and compact size of Vicor's solutions maximises space and reduces the excess heat, reducing the system size and simplifying the thermal design.


Echo Cardiogram — The Vicor range of compact, high power density DC-DC converters is ideal for equipment such as ultrasound cardiac imaging. Their electrically-quiet operation and the comprehensive range of accessory and filter products ensure that other sensitive equipment operates free of interference.



Vicor's Products

Vicor offers component power solutions from watts to kilowatts that are ideal for the medical environment. Vicor modules offer many advantages for such systems, including high power density, compact size, low noise, wide input range and rugged construction.

Meeting the Requirements

	Requirement	Met By
	Small size and low profile	High power density up to 7.3 W/cm ³
	High efficiency	Maxi/Mini/Micro efficiency in excess of 88%
	Wide choice of input and output voltage ranges	VI-200/VI-J00 & Maxi/Mini/Micro product range in excess of 3000 different part numbers
	Low electromagnetic emissions	ZCS resonant converter topology intrinsically produces low emissions
	No forced ventilation cooling	Baseplate cooling capabilities allows mounting within closed, waterproof chassis
	High insulation	3 kV in-out insulation 4 kV also possible on request
	Acceleration resistance	Exceeds 9G operational on three axis, thanks to full encapsulation (meeting requirements for transportable and rotating systems)

Typical Custom Power Supplies

Application	PSU with Ni-MH Charger	Convection-cooled medical power supply	Low-profile PSU for medical imaging
Input	85-264 Vac, 18-36 Vdc	10-35 Vac, 25-40 Vdc	200-400 Vdc
Output	30 Vdc/5 A, 5V/4 A, 12 Vdc/3 A	—	30 Vdc/5 A, 5 V/4 A, 12 Vdc/3 A
Total Power	200 W	50 W	200 W
Dimensions	155 x 190 x 45 mm	3 U x 8 TE x 160 mm	270 x 160 x 35 mm
Cooling	Forced air	Convection-cooled	Forced air
Safety	EN60601-1	—	Safety: EN60950
EMI	EN55022B	—	EN55022B, conducted
Efficiency	82% typical	95% typical	85% typical

Vicor: Supporting your Design

Vicor has a unique understanding of the challenges that face engineers developing power supply solutions for the medical environment. We offer expert technical support, ranging from applications notes and qualification reports about the environmental testing of our products to on-site assistance from our team of highly qualified field applications engineers. Our technical support team includes engineers that understand how to maximise available board space; simplify thermal design; and minimise EMI and noise by selecting the right power supply solution for the application.

For more information visit **vicoreurope.com** or
Talk to us on **00 800 8426 7000** (international free phone number)

Comprehensive technical library

Access technical information related to using Vicor products in medical environments online:

Testing & Qualification

VI-200 Qualification report - **vicoreurope.com/medagency**
Safety Agency Approvals - **vicoreurope.com/safetyapprovals**

Application Notes

Access our comprehensive range of applications notes and other technical documentation at - **vicoreurope.com/applicationnotes**



Request Our Catalogue

For a full overview of all our products, request a copy from your local office or visit **vicoreurope.com/catalogue**

Design Exactly the Product You Need...As Standard

Design your own DC-DC converter or configurable power supply to meet your application's exact needs.
PowerBench, Vicor's custom configuration tools is available online at **vicoreurope.com/powerbench**



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