

Vicor's Experience

Our products are used in almost every European rail network, including the Transrapid (magnetic field control of the motor), the ICE (door opener, reading lamps, service display panels), the Czech Metro (speedometer), the TGV, the AVE and many more.

Application Examples



Braking System — The power supply and drive circuits of the train braking system controller are normally recessed under the wagon in small, sealed cabinets. The wide operating temperature and small size, coupled with the ruggedness and resistance to shock and vibration provided by their encapsulated construction, make Vicor converters the ideal choice for braking systems.

Drive Controllers — The rugged, vibration-resistant design of the Vicor modules, coupled with their ability to deal with high-voltage transients, allows our customers to develop drive controllers that operate reliably in the harshest rail environments.

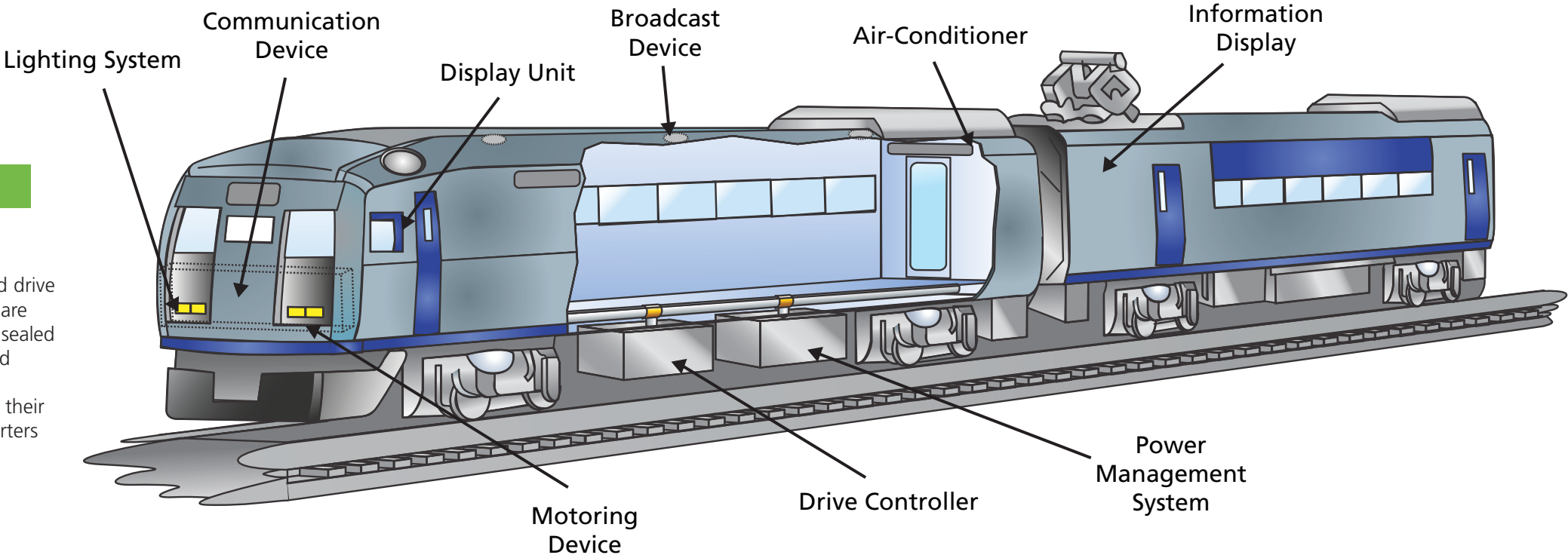


Electric Door Opener — Electric doors need to cope with very wide input voltage ranges, offer a wide operating temperature range and deal with large transients. Vicor products have been used by leading manufacturers to create cost-effective and reliable solutions.

Lighting System — The wide input voltage range, high MTBF and full rail industry qualifications make Vicor modules ideal for lighting systems, both trackside and on rolling stock. All Vicor converters are potted, ensuring excellent shock and vibration resistance, allowing the module to be placed in the most convenient position.



Typical Vicor Applications



Ticket Machines — Ticket machines must operate in freezing Nordic winters and hot Mediterranean summers. Vicor modules can operate from –55 to +100°C, ensuring high reliability in the harshest environments. Portable ticket machines often use Vicor modules for their high efficiency, wide input voltage ranges, and outstanding shock and vibration resistance.



Passenger Information Displays — By using Vicor power modules, customers have been able to develop passenger information displays that can easily be retrofitted to existing rolling stock, as well as deployed in new carriages. The high power density and outstanding efficiency of Vicor converters allows systems to be retrofitted in rolling stock with little available space.

Electronic displays provide destination and route information, in addition to added-value services such as news and weather forecasts. Vicor modules offer sufficient power for complex graphical displays, and are used in leading-edge multi-colour LED systems.

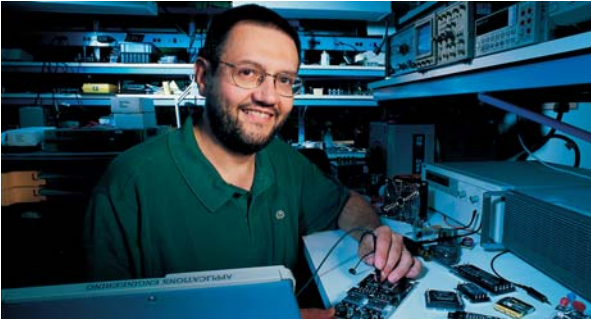
Security Cameras — CCTV camera systems carry the supply voltage, as well as the low level video signals on the same cable harnesses. Power supply systems must minimise conducted emissions to ensure that the video signals are not disturbed or degraded.

Vicor's high power density is ideal for security applications that are often space constrained. The inherent low EMI noise of Vicor's ZCS topology also allows the use of smaller and simpler filters.



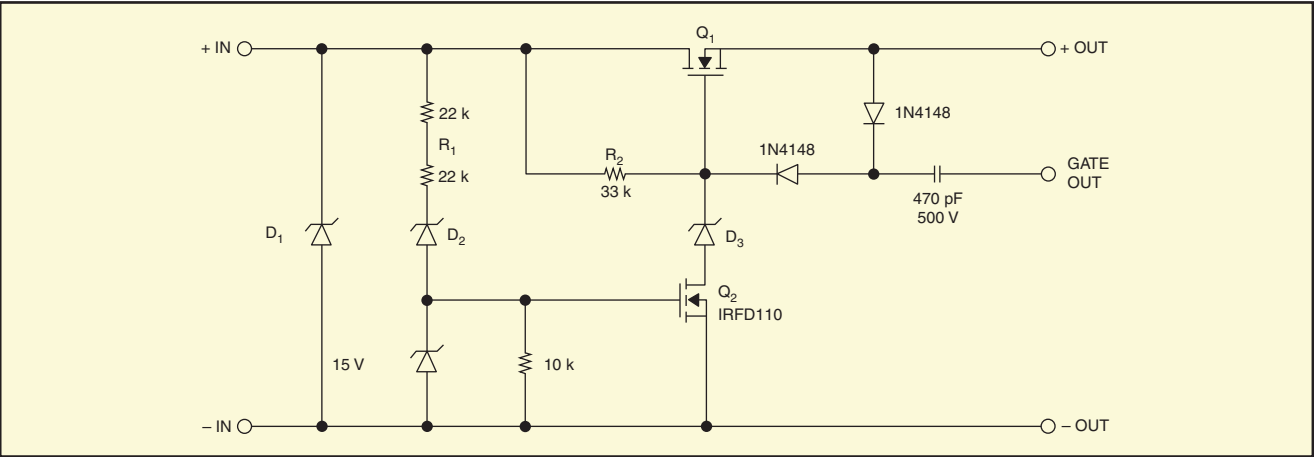
Technical Support

Vicor has a unique understanding of the challenges faced by engineers developing power products that meet today's rail industry standards, including EN50155 (IEC571) and RIA12. 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. For more information visit vicoreurope.com or contact your local technical support centre.



Application Example

Meeting the specifications: surge suppression in 110 V battery systems for use with Vicor's VI-200 / VI-J00 families of products.




Typical Custom Power Supplies

Application	DC-DC, 200 W, 21.6 – 50.4 Vdc, 4 outputs	DC-DC, 200 W, 72 Vdc, 1 output	DC-DC, 1000 W, 110 Vdc, 1 output
Input:	21.6 – 50.4 Vdc	55 – 100 Vdc	77 – 134 Vdc
Output:	+24 Vdc, + 24 Vdc, +15 Vdc, –15 Vdc	24 Vdc	24 Vdc
Total Power:	500 W	200 W	1000 W
Dimensions:	250 x 250 x 85 mm	150 x 150 x 52 mm	310 x 170 x 81 mm
Cooling:	n/a	Convection cooled	Fan cooled
Safety:	EN60950	EN60950	EN60950
EMI:	EN50121-3-2, EN50155, 10.2.7	EN55022A, conducted	EN55022A, EN50155, conducted
Efficiency:	85% typ.	83% typ.	82% typ.

Vicor’s Products

Vicor designs, manufactures and markets modular power components and complete power systems that range from watts to kilowatts. With a unique custom manufacturing capability and outstanding reliability, even in the most demanding environments, we meet the needs of a wide range of applications, including the rail industry.

	Requirement	Met By
	Small size and low profile	High power density of up to 7.3 W/cm ³
	High reliability	Typical MTBF of > 300,000 hours @ 70°C, ground mobile
	Surge & spike immunity	Easy-to-implement external transient protection circuit
	Low electromagnetic emissions	ZCS Resonant converter topology intrinsically produces low emissions
	Corrosion resistant	Anti-corrosion finish and module encapsulation for high humidity and salt-fog environments
	Shock and vibration resistant	Module encapsulation, far exceeding EN50155 (requiring 50 m/s ²)
	Watertight	Baseplate cooling capabilities allows mounting within closed, waterproof chassis
	High isolation	3 kV AC input to output isolation (exceeding requirement for EN50155 – 2 kV)
	Operating temperature	–55°C / +100°C operating range (exceeding the +85°C requirement for EN50155)

Input Specifications for EN50155 vs. Vicor DC-DC Converters

Nominal Input (V _N)	Input Ranges 0.7 (V _N) – 1.25 (V _N)	Transients		VI-200 / VI-J00 DC-DC Converter Input Ranges	Maxi, Mini, Micro Converter Input Ranges
		Low (0.1s) 0.6 (V _N)	High (1s) 1.4 (V _N)		
24 V	17 – 30 V	14 V	34 V	18 – 36 V ¹	16 – 36 V
36 V	25 – 45 V	22 V	61 V	21 – 56 V	–
48 V	34 – 60 V	29 V	67 V	36 – 76 V ²	36 – 76 V ²
72 V	50 – 90 V	43 V	101 V	55 – 100 V ³	43 – 110 V
96 V	67 – 120 V	58 V	135 V	66 – 160 V	66 – 154 V
110 V	77 – 137 V	66 V	154 V	66 – 160 V	66 – 154 V

¹ Low limit at 18 V
² Low limit at 36 V
³ Power derates to 75% of rated load at 45 V

For more information on railway applications visit www.vicoreurope.com



Specify, Configure, Find or Customize Your Power Solution

PowerBench™, a suite of advanced power design tools, enables power designers to specify on-line and verify in real time the performance and attributes of custom power design solutions. These tools give power designers unprecedented capability to design the solution they need quickly, easily and cost effectively.



www.vicorpower.com/technical_library/powerbench

Vicor offers component and custom power solutions that are ideal for the rail industry. Our long, successful record 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.

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Component Power for Railway Applications

Vicor’s solutions for a wide variety of rail applications for the European rail network.



Brick, Configurable and Custom Power Systems

Vicor has worked with customers throughout the world to create solutions for a wide variety of rail applications such as information display (for both rolling stock and stations), safety monitoring equipment, drive controllers, power management systems, communication systems (including wireless communication equipment and emergency communication equipment), air conditioning, lighting and audible announcement systems.

