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POWERBOX  
ENR500D Series



## High efficiency power converters for 750VDC transportation and Industrial applications

Dependent upon their location and the technology available at the time of installation, a wide variety of electrically powered traction systems are used in rapid transit systems around the world. Most metros operate from dc power either at 750VDC with a third rail, or 1.5kV with a third rail or from an overhead catenary. 750VDC is very common in light rail, powering both the rolling-stock equipment as well trackside signaling systems. The same voltage is also used in industrial equipment and in applications such as in mining.

Depending on the final equipment, type of propulsion, braking system, signaling and controlling, the 750V bus voltage must be converted into a sub voltage appropriate to each application. For safety reasons, when powering electronic systems the 750V must be converted to a voltage below 75VDC as defined by safety standards in order to protect operators and passengers.



## POWERBOX ENR500D Series

Secondary voltages could be 12V, 24V but very often 48V is the preferred level, offering the best compromise in terms of safety and reducing conduction power losses.

Taking into account the large range of applications and environmental conditions, designers have to consider where the power converter will be installed and as such, the environmental conditions. As specified in the European Standard EN 50124-1, Macro-environmental conditions (PD1 to PD4B), power converters can be part of an hermetically sealed equipment varying from no ventilation up to forced ventilation with clean filtered air from outdoors and requiring a flexible, robust design able to meet such a large range of environmental conditions.

To meet such conditions it is essential that the power converter has a high energy efficiency ratio in order to reduce power losses and heat build up. It must comply with EN 50124-1 for insulation, clearance and creepage distance requirements, thus guaranteeing the highest level of safety.

With more than 40 years experience in designing power solutions for demanding applications in railway and industrial applications, PRBX designers have developed the 500W ENR500D platform which is built on quasi-resonant flyback combined with the latest MOSFET technology and the use of high performance magnetics. The ENR500D is designed to comply with the EN 50124-1 standard and for the so-called Pollution Degree 2 (PD2) such as control cabinets in the driver's cabin or passenger compartments. ENR500D has ingress protection to IP20, and input to output double reinforced isolation. The unit complies with EMC emissions and immunity as specified in both EN 50124-1 and EN 50124-5.

### Input

- Nominal input voltage 750VDC
- Input voltage range 500 to 900VDC

### Output

- Nominal output voltage 48VDC (other voltage available on request)
- Output voltage range 48 to 60VDC adjustable
- Output power 500W

### Insulation

- In accordance to EN 50124-1 – Rated impulse voltage of 4.4 kV
- Input to Output – Double reinforced 1000V, Clearance 8.0 mm, Creepage Iso Class I 10.0 mm, Iso Class II 14,2 mm

### Environmental

- Environmental compliance and safety in accordance to EN 50155
- Natural convection cooling
- Operating temperature -40°C to +70°C
- All printed circuit boards are provided with protective coating

### Electrical Design

- Quasi-resonant flyback
- Efficiency >95%
- Low input power at no load <5W
- Load share for parallel or redundant operation
- MTBF (MIL-HDBK-217F GF 40°C) >250.000 hours

### EMC

- Emission and immunity in accordance to EN 50124-1 and EN 50124-5

### Mechanical

- Dimensions 163 x 230 x 80 mm
- Ingress protection class IP20
- Connector Male connector type H15 according to DIN 41612. Silver plated pins.

### 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.

### For more information

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