POWERBOX
Mastering Power

Transportation
Marine

A Cosel Group
Company

Marine solutions

Marine power supplies that meet anywhere
Powerbox has focused on developing switching power supplies for the marine market for 30+ years. The requirements imposed on products responsible for shipping and offshore installations are heavier than the average for industrial and office environment. In addition, that standardization in the requirements is complex, requiring in depth knowledge of the application and where it will be operated.

Generally two zones are distinguished on a ship; the "bridge and the open deck zone", and the "general power zone", which basically intend all other spaces in the ship.

The areas open deck and bridge have extra demands on the electromagnetic emission and immunity (EMC), as a lot of sensitive equipment is positioned here, such as communication, radar and navigation devices. These EMC requirements regarding emissions are well below the known EN55022 Level B and measurement starts already at 10 kHz, instead of the usual 150 kHz.

The limits regarding mechanical and climatic requirements are also higher than for the average industrial application. Vibration levels up to 4g are common, as well as large temperature fluctuations from -25°C and +70°C and high relative humidity where condensation cannot be excluded.

The rules
Just about every country with a maritime sector has its own certification authority which provides type approvals. A large part of the demands placed on the type approvals are the same for all certificates, but often there are a number of different requirements as well. In order to ensure that the products of Powerbox can be utilized all over the world, they have put the requirements of the various countries next to each other. For the tests to be performed on their products they have always chosen the toughest requirements of each subject. This has led them to drawing up their own test protocol according to which all marine products need to be tested at a notified body. The resulting test reports are the basis for their clients in order to demonstrate that the product meets all requirements - even the local requirements. This simplifies the approval process for new installations.

The products carry the type approval logo of Germanischer Lloyd (GL), but because of the extensive testing also meet EN60945 and will be approved without issues by Bureau Veritas (BV), Lloyds Register (LRS), America Bureau of Shipping (ABS), Det Norske Veritas (DNV), Korean Register of Shipping (KR) and many other notified bodies in the maritime world.

Powerbox delivers a complete range of marine power supplies which are type approved for use in all spaces in ships and offshore installations. This means that the user no longer needs different types for different applications, but can cover all needs with those standard power supplies.

Also in the marine industry there is a need for more and more functionality in a smaller space. Ship owners nowadays want to equip their vessels with broadband internet connections for both passengers and crew with as much as possible the same features than when ashore.

Furthermore, for instance position tracking systems are built-in to monitor navigation through areas with piracy and to further streamline the logistics process.

Like everywhere else also to a ship applies that the power supplies should be as small as possible with as much as possible functionality inside.

The small dimensions require a high degree of integration of the power circuits. The efficiency should be as high as possible, because a small housing also means that the cooling surface is small. By making use of the most recent resonant circuits an efficiency of 92 to 95% is achieved. This is much higher than was previously possible, especially if we take into consideration that there is an active power factor correction circuit with a DC/DC converter and a diode in series. The Powerbox Marine Line is designed using the latest technologies, analog and digital making products to work in demanding environment such as in the Marine Industry.

Marine solutions

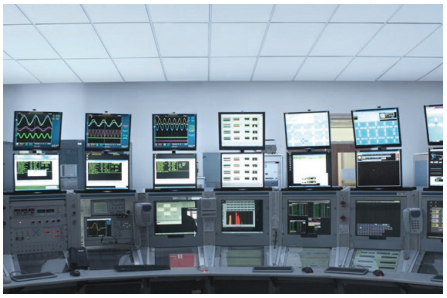
Standard products
Our extensive range of standard converters, for marine applications, comprises of both our own products, designed by our engineers and manufactured at world class manufacturing facilities, as well as products from our leading product partners. After working in the marine markets for 30+ years chances are good we have a standard power supply to meet your needs.

Custom products
If a suitable product cannot be found from our standard product range, we can consider providing modified standard, semi or full custom solutions. Our custom design capability and reputation is second to none. We have completed more than 3,500 custom design projects to date, whereof 2,000 at our Gnesta, Sweden, design center.

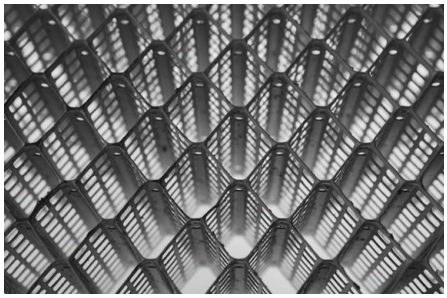
Services
The right product is essential, but it is not everything. In addition to product offerings we include a comprehensive range of services, from analysis and qualification in the development stage, demand planning and special logistics in the production phase, to RMA handling and end user support in the after-market. We aim to serve you with simplicity to ensure your customers return time and again.

Systems
An application might require more than a single converter. We then use our product range and our custom capability to build systems. These can feature multiple standard, semi-custom, and/or full-custom converters, battery backup, communications, remote control, intelligent charging, distribution panels, sub racks, enclosure etc., and maybe also a number of value-added services. We lean confidently on over 40 years of experience and subject matter expertise to identify the best means of solving every particular power conversion challenge. Together with our customers we find the optimized solution.

Some defining qualities of our marine power supplies



Reliability
Long life components
Redundancy
High efficiency



Electrical
Surge & burst
Transients
EMC/EMI

Environment
Temperature and humidity
Shock and vibration
Gases
Sustainability

Standard products

KHEA/KHNA120 Series
120W Din-rail power supply
In: 85-264VAC
Out: 24VDC/5A (peak 7,5A)
DNV/GL certificate

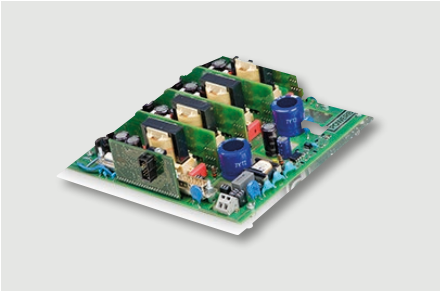
KHEA/KHNA240 Series
240W Din-rail power supply
In: 85-264VAC
Out: 24VDC/10A (peak 15A)
DNV/GL certificate

KHEA/KHNA480 Series
480W Din-rail power supply
In: 85-264VAC
Out: 24VDC/20A (peak 30A)
DNV/GL certificate

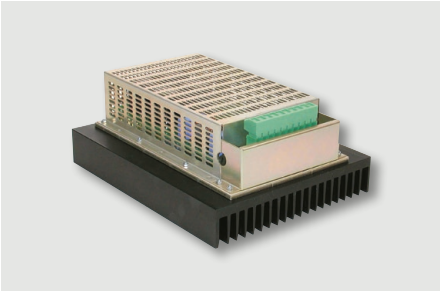
Custom products

Rugged DC/DC Booster for Marine diesels engine delivering constant voltage to the engine monitoring system during startup. The unit generates boosted voltage to compensate lower battery voltage during the ignition phase.

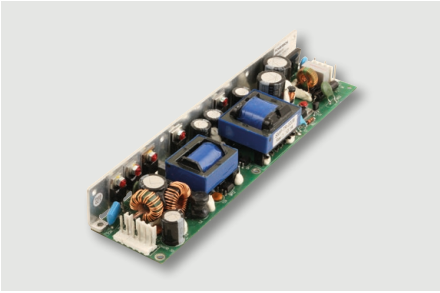
Marine diesel battery control unit, including battery switch controller (300A continuous, 600A peak) with load balancing. The unit includes remote control and design to comply with engine compartment requirements.



This Power Supply Unit for Subsea Equipment are extremely reliable – they have to be, because we need them to work for years at a time in the deep sea without maintenance service and can be modified and customized to specific requirements!



500W ruggedized AC/DC power supply for ship crane application.
Single output 25.5V, input voltage range 115-230VAC.



Industrial computers/screens for marine and defence applications.
Output 12V 60W, input universal AC and 24VDC, dual input.
Conformal coated and rugged design.

Dual channel 2x27 VDC/10A DC/DC converter for Marine engine control. Typically used for safety equipment requiring redundant power sources, when redundancy is not required but the application requires two independent outputs, the ENMA500D24/2x27-CC offers two 27VDC fully isolated outputs.


S.W.L 2.5Ton
EXIT

Power solutions examples

Powering internet through underwater cables
The challenge: We are all used to surfing the internet, e-mailing and communicating via social media, though few of us appreciate that 99 % of the internet traffic goes through almost 300 underwater-cables. Cables are generally preferred over satellite transmission because of their speed, reliability, and quick backup routes in case of problems. Cables are covering long distances and, due to natural losses in the transmission, repeaters are required to amplify and boost the signal to keep speed and data integrity high. The repeaters and amplifiers installed along the cable laying on the seabed, require extremely reliable power supplies, with the same quality as for a mission to space. In addition, the power supplies should be able to communicate information to a monitoring station supervising the state of the network in real time.

The solution: When failure is not an option, designers have to think far beyond what is conventionally required for powering demanding applications and consider how to keep systems operating during their entire lifetime. Based on a standard platform, integrating high efficiency multiple power supplies, we have developed a custom power solution, the VB500 power system, which guarantees intelligent redundancy, comprising of components with high life time expectancy and a mechanical design optimized to transfer heat to the chassis, incorporating a very advanced monitoring system. The solution operates from 400 VDC to 1200 VDC input and provides four independent 24V / 4A power supplies monitored by voltage, current and temperature.

The added value: Combining a pre-regulator stage and four separate channel converters, the power solution offers high flexibility to supply energy to a large range of underwater applications such as seabed oil and gas monitoring stations. The secondary converters can be used on short range-cables operating within 300V to 380V thus saving costs by reducing inventory levels. This combination means that Powerbox is good at offering highly efficient solutions to powering underwater cables and monitoring equipment.

Universal input AC & DC simplifies integration
The Challenge: As part of inventory simplification and standardization for future applications, a Marine equipment manufacturer considered to replace two standalone power supplies, one AC/DC and one DC/DC by a single unit able to sustain independently of the application, universal (85VAC to 264VAC) from the main line power distribution, or wide input 24VDC (18VDC to 32VDC) to deliver fully regulated and stable 12VDC output voltage at 60-100W power. In addition to the electrical requirement and complexity to integrate to full functions power stages, the unit had to fit existing products form factor of 3 x 5 inch but as well, the design made in a way, it could be later integrated in slimmer packaging for new generation of equipment. The product must comply with a broad range of Marine Standards to guarantee, when assembled in the final equipment it will simplify the full qualification.

The solution: In close cooperation with the customer, we investigated different possibilities based on conventional building practices but, considering the second step of the project of a slimmer version, we decided to use a low components-count approach, reducing the number of components by optimizing certain functions farther than usual. This approach increases the reliability and simplify the integration is smaller packaging. Aimed to be operated in low or, no airflow condition, the mechanical design is optimized for conduction cooling and cold-wall mounting. The PBN0918 is the full, true, dual input power supply simplifying installation and operation within a large range of applications in the Marine environment.

The added value: Combining two power supplies into a standalone unit simplifies inventory management and installation within the final equipment. The dual mode input offers higher security to new applications requiring longer hold-up, which can be achieved by external local battery backup powering the unit through the DC input. “One unit to fit many” reduces Time-To-Market and cost.

About Powerbox

Who we are
The combination of our extensive standard product range, our custom design capability, and our service offering, is truly unique. 40+ years of designing power supplies for demanding applications has built a rock solid experience. Our "Making the complex simple" business idea runs throughout our operation, from our customer interface and cooperation to how we design our products.

Improving your competitiveness
The power solution chosen for any electronics has an impact on competitiveness. Function and reliability are given basics. Size, weight and audible noise might be important. Cost is always a consideration. Standards fulfillment can open up new markets. Time to market might be critical. Well executed supply chain management can generate savings. Aftermarket support has a lasting long term impact. The list goes on.
Our extensive experience and market awareness makes it simple to explain to us what you need. Together we define which power solution will serve your application the best.

Making the complex simple
With our global presence we are close to you, and our knowledge and experience of working with so many different applications helps to make life easier for you. We can assist at all stages of product development, including evaluations, validations, and the writing of specifications. We aim for simplicity in design, referring both to lean design with fewer components and to a modular approach reusing proven circuits and building blocks, maybe with some modifications.

Quality assurance and follow-up
Quality is an integrated part of everything we do. Our design process includes extensive testing, internal as well as external. Tests are also frequently run by our customers in their respective applications. In addition to the information we gain by tracking repairs and service requests, we also do regular quality follow up together with our customers, all to ensure a long and trouble-free life for our products. Powerbox is also certified by DNV according to ISO 9001:2008.

Manufacturing
We manufacture at selected CEMs (Contract Equipment Manufacturer), where we apply rigorous process and quality requirements. We aim for long-term relationship with our manufacturing partners. A dedicated team for CEM Management and Quality Assurance work closely with them.

Caring for the environment
At Powerbox we take an active role in protecting our environment. Our contribution includes:

Streamlined solutions and lean design using fewer components reduces material used. RoHS, WEEE and REACH are among the standards governing choice of materials.

High efficiency reduces energy consumption both directly by reducing losses and indirectly by reducing the need for cooling.

Energy efficient transportation and well developed use of online meetings are important elements in our determination to meet or exceed international standards by sustaining ISO-14001 compliance or the equivalent.

Providing peace of mind
Even the best designed power solutions might require midlife support. Components involved in the design might be discontinued, or the application might be modified or changed, requiring changes in the power solution. In situations like this Powerbox' stability and endurance, and long term approach to customer relations, are true comforts.

About Cosel
Established in Japan 1969, COSEL is one of the world's leading designers and manufacturers of high performance AC-DC Power Supplies, DC-DC Converters and EMI Filters. With quality, reliability & flexibility as our main focus, we pride ourselves on developing some of the highest quality and most reliable products seen anywhere in the world today. Our product range is aimed mostly at demanding applications within the Industrial, Factory Automation, Medical, Telecoms, Lighting, Audio/ Broadcast & Renewable Energy sectors. A flexible approach with full in-house design means we deliver products using the very latest technology meeting the growing demands of our customers.

POWERBOX offices

POWERBOX Europe HQ

Västberga Allé 36A, 5tr
126 30 Hägersten
Sweden

Phone: + 46 158 703 00
Email: info.se@prbx.com

POWERBOX Benelux

Phone: + 31 76 501 58 56
Email: info.nl@prbx.com

POWERBOX China

Phone: + 86-512-57720011
Email: info.cn@prbx.com

POWERBOX Denmark

Phone: + 46 158 703 00
Email: info.dk@prbx.com

POWERBOX Finland

Phone: + 358 2 273 6100
Email: info.fi@prbx.com

POWERBOX France

Phone: + 33 (0)1 64 11 43 43
Email: info.fr@prbx.com

POWERBOX Germany

Phone: +49 421 949 30 0
Email: info.de@prbx.com

POWERBOX Italy

Phone: + 39 02 998 88 45
Email: info.it@prbx.com

POWERBOX Norway

Phone: + 47 67 16 44 00
Email: info.no@prbx.com

POWERBOX Spain

Barcelona Office
Phone: + 34 93 2969080
Email: info.es@prbx.com

Madrid Office
Phone: + 34 91 3260436
Email: info.es@prbx.com

POWERBOX United Kingdom

Phone: +44 7899 807 707
Email: info.uk@prbx.com

POWERBOX North America

Phone: +1 (603) 361-4509
Email: info.us@prbx.com

Find more about PRBX Offices locations:

www.prbx.com

COSEL offices

COSEL Head Office
1-6-43 Kami-Akae Machi,
Toyama City, Toyama Prefecture,
930-0816, Japan
https://en.cosel.co.jp

COSEL ASIA LTD.
Room 601, 9 Chong Yip Street,
Kwun Tong
Kowloon, Hong Kong, China
www.coselasia.com

COSEL EUROPE GmbH
Lurgiallee 6-8,
60439 Frankfurt am Main,
Germany
www.coseleurope.eu

COSEL USA INC.
2055 Gateway Place, Suite 240
San Jose, CA 95110
USA
www.coselusa.com

www.prbx.com