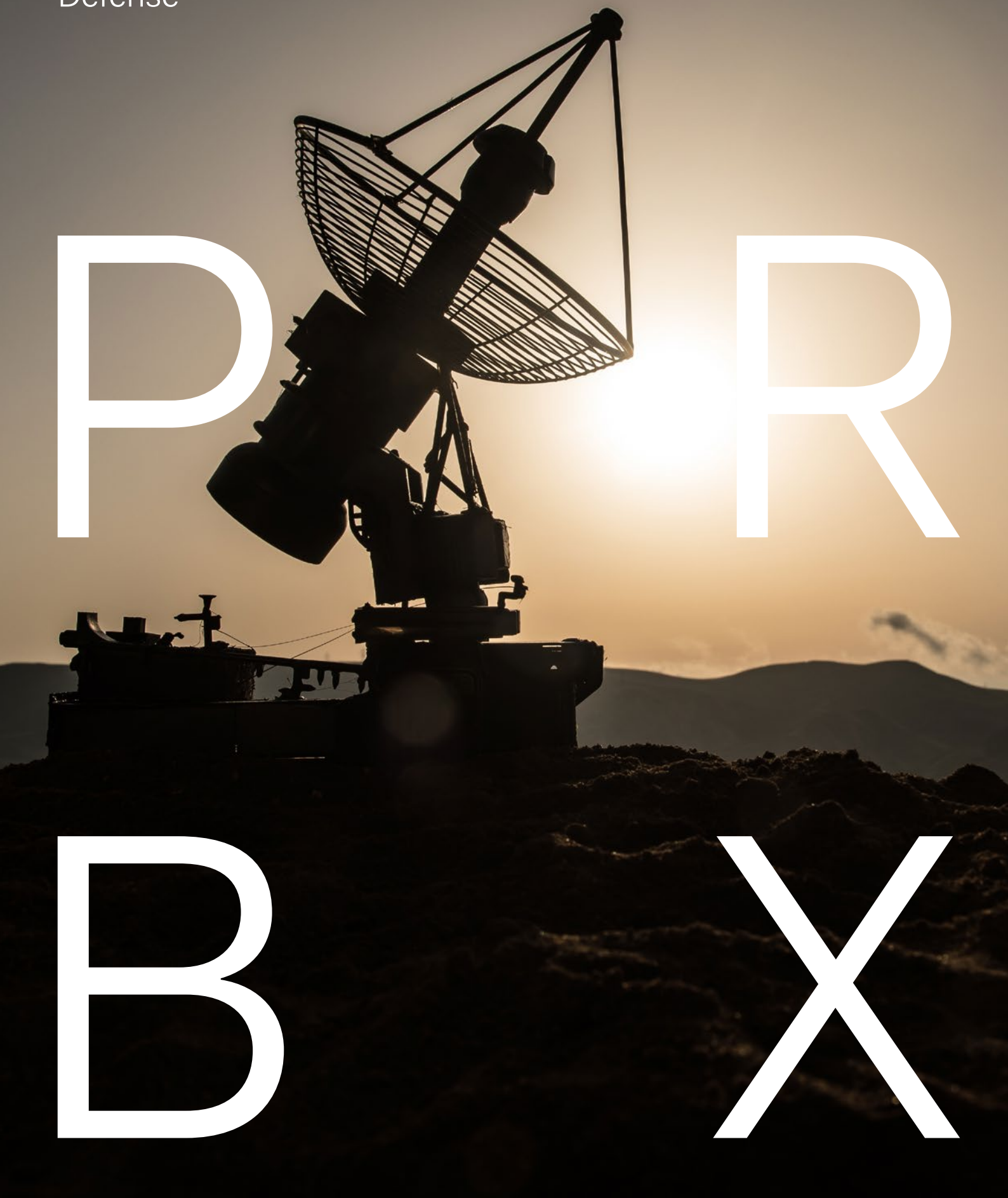
POWERBOX

Engineering Reliable Power

Defense



POWERBOX



Power supplies for defense applications

From watts to kilowatts
Defense applications are among the most demanding in the world. The successful operation of modern systems requires a strong understanding of performance needs, qualification demands and the environmental conditions in which this equipment must operate.

Very high reliability expectations are often combined with harsh environments and strict limits on size, weight and power. Meeting these requirements while staying cost effective often leads us to use high power DC/DC bricks as modular building blocks. This allows us to take a practical COTS approach to creating customized solutions for the defense sector. This method of combining proven standard products into optimized designs has been a Powerbox practice for decades.

Our experience covers power solutions from a few watts to many kilowatts. These are used in single, multiple and fully redundant architectures. Input sources can be AC, in single or three phase up to 880Hz, or DC ranges from low voltage to several thousand volts. Some applications require dual feeds or battery backed inputs for secure operation. Most systems request between one and five outputs, although we have delivered up to fourteen for complex projects.

A wide range of mechanical options is available, including open frame, enclosed and sealed designs. High IP rated housings can be supplied when protection against dust, moisture or accidental contact is required.

Managing thermal considerations
Thermal design is a key aspect of any defense power system. Each application presents its own limits on mechanical space, cooling method and environmental exposure, and our designs take these factors into account from the start. We work with convection cooling where airflow is available, fan assisted approaches for higher power density, and baseplate cooled or fully sealed solutions for enclosed or harsh environments. This focus on thermal performance is essential in ensuring power systems function reliably throughout the full operating profile of modern defense equipment.

International standards
We understand and work to the standards required across the defense industry. Military standards provide a common framework for interoperability, reliability and electrical compatibility, and applying them correctly helps ensure that equipment integrates smoothly into larger systems.

Powerbox is experienced with the requirements of DEF STAN61-5, DEF STAN59-411, MIL-STD-1275D/E/F, MIL-STD-704, MIL-STD-810E/F, MIL-STD-461E, MIL-STD-901C, EN61000-3-2 and similar standards used in land, naval and fixed installations. Certification can be a time-consuming and costly process, and customers rely on our knowledge of power design to reduce qualification risk, manage project cost and help accelerate time to market.

Defense solutions

Standard products
Our range of standard converters for defense applications includes products developed by our engineering teams and manufactured in world-class facilities. These solutions support a wide set of platform needs and provide reliable power for equipment used across land, naval and fixed installations. Successful system design requires a complete understanding of the power architecture, and our standard products offer a strong foundation for meeting these requirements.

Custom products
When a suitable product cannot be found within our standard range, we can supply modified, semi custom or fully custom solutions. Our design capability, together with long experience in defense power electronics, allows us to deliver solutions that meet exact electrical, mechanical and environmental requirements. After working in the defense market for more than 40 years, the chances are high that Powerbox will be able to produce a supply tailored to your specification.

Services
Power hardware is important, but it is only one part of the complete solution. We provide a comprehensive range of services that support the full lifecycle of a project. These include design analysis, qualification support, thermal reviews, demand planning, logistics, and after-sales assistance. Our aim is to simplify the process for our customers and ensure dependable performance throughout installation, operation and maintenance.

Systems
Some applications require more than a single converter. We have extensive experience combining standard, semi custom and custom units into complete system solutions. These can include battery backup, filtering, communications interfaces, intelligent charging, distribution panels and enclosures. With over 40 years of experience, we draw on our system-level understanding to identify the most effective approach for each power conversion challenge.

Working to defend lives & livelihoods







Modern defense equipment is used in a wide range of environments, from surveillance and sensor systems to ground platforms, naval systems,and fixed installations. Each environment places different demands on power conversion, and all require solutions that deliver reliable, durable and long-term performance.

In surveillance and sensor applications, power supplies support imaging systems, radars,and other detection technologies where stable, low noise operation is essential. Ground systems such as vehicles, command units and mobile support equipment operate under varying electrical and environmental conditions and depend on rugged and efficient power conversion.

Naval applications require robust behavior under vibration, shock,and exposure to harsh maritime environments. Fixed installations, including infrastructure and monitoring systems, rely on continuous availability and predictable long-term operation.

With more than 50 years of experience in defense power electronics, Powerboxsupports a wide range of systems that contribute to mission readiness and help protect lives across these diverse operational environments.

Standard products – Defense line



Defense line ECDA AC
1000W, Enclosed IP65, rugged design
AC/DC switch mode power supply
85-305VAC input with PFC
Isolated output



Defense line OFD AC
1200W, Enclosed, rugged design
AC/DC switch mode power supply
85-264VAC input with PFC
Isolated output



Defense line 150 AC
150W, Enclosed, rugged design
AC/DC switch mode power supply
85-264VAC input with PFC
Isolated output



Defense line 300 AC
300W, Enclosed, rugged design
AC/DC switch mode power supply
85-264VAC input with PFC
1-2 isolated outputs



Defense line 600 AC
600W, Enclosed, rugged design
AC/DC switch mode power supply
85-264VAC input with PFC
1-3 isolated outputs



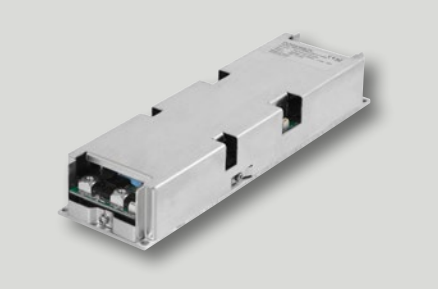
Defense line 1200 AC
1200W, Enclosed, rugged design
AC/DC switch mode power supply
85-264VAC or 120-350VDC input voltage
1-6 isolated outputs



Defense line PBUS AC
36W, 48W and 80W, rugged external design
AC/DC switch-mode power adaptor
100–240VAC input
MIL-STD-461E/F EMC performance



Defense line ECDD DC
250W & 350W, sealed IP65, rugged design
DC/DC converter, baseplate cooled11–33VDC
or 18–33VDC inputMIL-STD-1275, 461, 810
compliant



Defense line 500 DC
500W, Enclosed, rugged design
DC/DC converter
12, 24, 48, 72, 110VDC inputs
Output from 3V3 to 48VDC

Custom products

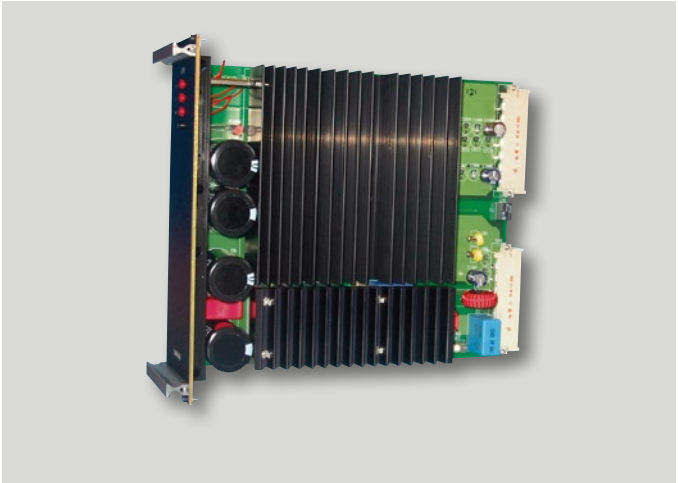


Application Compact power supply for defense camera system

Outline Specification Five fully regulated outputs in an extremely compact 148x110x25mm conduction cooled chassis. 18-36 VDC input with full MIL-STD-461F and MIL-STD-1275D compliance.

Design Customized compact design usingdense component placement with baseplate cooling. Integrated isolated I^2C, RS422 and remote ON/OFF control for all outputs.

Reason for Success Powerboxsuccess to delivering multiple regulated outputs within tight space constraints while meeting full military EMC requirements.



Application Naval sonar application

Outline Specification 800W AC/DC converter with outputs i.e 3.3VDC, 6VDC and 12VDC. Approved to MIL-STD-461E, MIL-STD-1676-1, MIL-STD-901C and EN61000-3-2

Design Customized using 3 standard brick converters with a discrete PFC stage

Reason for Success Powerbox success was due to providing a highly efficient power supply incorporating extremely low noise output voltages.



Application Anti-ship missile test system

Outline Specification 1kW convection cooled AC/DC converter. 115Vac three phase input with 5 output voltages.

Design Customized using 5 standard brick converters and 5 discrete outputs

Reason for Success The reason for Powerbox's success was simple – the customer could find no one else who would design & manufacture a unit to their specification!



Application Power supply for antenna aerial

Outline Specification 60W DC/DC converter with 28VDC input and 3 DC output voltages.

Design Discrete component design.

Reason for Success Powerbox success was due to being able to produce a mechanically complex designed unit with a difficult high voltage rail delivered with low NRE charges.

Custom products



Application Vehicle mounted missile guidance system

Outline Specification 85W DC/DC converter, 22-33VDC input. Outputs: 24VDC, 5VDC, 3.3VDC with current limited filter output. Approved to MIL-STD1275B (Military vehicle voltage standard) MIL-STD461E (Military EMC standard) MIL-STD810F (Military environmental)

Design Customized design using board mount converters.

Reason for Success Powerbox success was due to quick time to market and compact size.



Application Mobile military VHF radio (illustration image)

Outline Specification AC/DC converter 28VDC@400W output, with customized mechanics. Approved to MIL-STD-461E, MIL-STD-810E/F

Design Customized modular design.

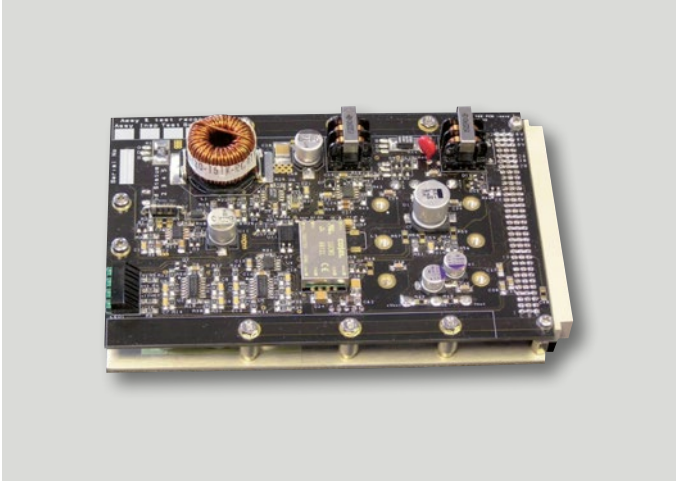
Reason for Success Powerbox success was due to quick time to approve and get to market.



Application Missile launcher control module

Outline Specification 1.5KW DC/DC converter, several DC output voltages. Conformally coated designed unit with ruggedized chassis.

Design Customized using board mount converters with some discrete design circuitry.
Reason for Success Powerbox success was due to fulfilling extreme specification requirements, with very high temperature/environmental conditions.



Application Powering a controller for embedded computing and sensor electronics on helicopters

Outline Specification 60W mini-CPCI DC/DC converter with 28VDC i/p and 3 DC voltage o/p's . The unit was a ruggedized, conformally coated, baseplate design incorporating a Calmark locking system.

Design Discrete component design, incorporating board mount converters.

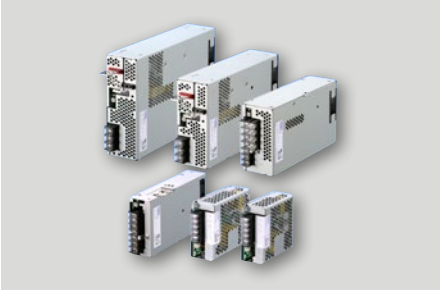
Reason for Success Powerbox success was due to being able to replace expensive custom power products by offering flexible customized units utilizing board mount converters

Standard Powerbox Products

In addition to our defence-focused solutions, Powerbox offers a comprehensive range of standard power conversion products. The portfolio includes AC-DC power supplies, DC-DC converters, power modules, EMI filters, configurable power systems, and DIN-rail solutions for a wide variety of applications.



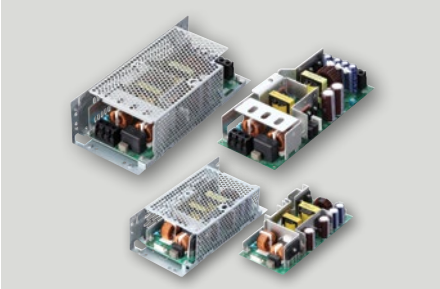
Programmable
300W-1500W



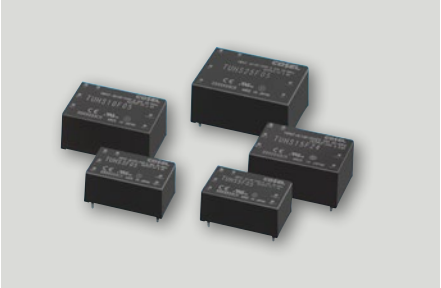
Enclosed
10W – 10KW



Configurable
300W – 1200W



Open Frame
10W – 300W



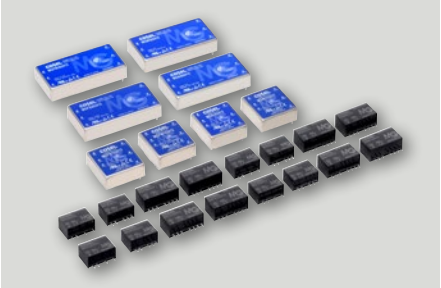
PCB AC/DC
3W – 25W



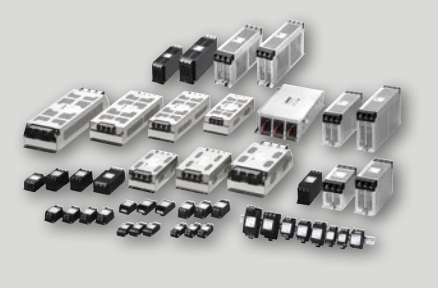
PCB Power Modules
50W-1200W



DIN-Rail
30W – 480W



Low power series
1.5W – 80W



EMI filters

Power solution examples

Shipboard lighting
The challenge: The US Navy is moving to Solid State Lighting (SSL) with very long-life LEDs. Among the reasons are to avoid drawbacks of traditional lighting, such as the relatively short life of Incandescent bulbs, the too long warm up for HSP lights, and the mercury content in fluorescent lights. For being able to do this they needed LED drivers which not only meet the very demanding USN requirements and military specifications but also are backwards compatible with existing lighting solutions. One example is fitting into the existing standard fixtures. Another is having three separate AC inputs which provide three levels of brightness in a LED array, depending on how many of the inputs are turned on. This is to replace an older fixture where three separate light bulbs were used for the same purpose.

The solution: Powerbox developed very rugged, cost-effective, long-lasting LED drivers that meet the rigorous requirements of USN ships, most notably MIL-DTL-16377, General Specification For Fixtures, Lighting, and Associated Parts for Shipboard Use, MIL-STD-461, Military Standard Requirement for the Control of Electromagnetic Interference Emissions and Susceptibility, and MIL-STD-1399/300A, Interface Standards for Shipboard Systems. Powerbox' drivers also meet all the compatibility requirements.

Added value: Powerbox' long-life, high efficiency supplies coupled with LEDs remove the drawbacks of traditional lighting, dramatically reduce maintenance activities and stock for "changing a light bulb," while simultaneously notably lowering the electrical load for lighting reducing fuel consumption.

Electronic surveillance measurement system for mobile defense units
The challenge: The application was an ESM (Electronic Surveillance Measure) system for a mobile defense unit.
Seven different DC outputs were required. In addition to all the requirements typical for an application like this our customer particularly highlighted size and weight as key parameters.

The solution: We developed a solution comprising one AC/DC front end and two different DC/DC converters, together providing the seven required outputs. Based on standard brick converters the power supply was made very component lean, with high efficiency.

Added value: The combination of component lean design and high efficiency, reducing heat generation, allowed for a uniquely compact and low weight solution. Basing the design on standard proven modules also shortened design lead time and reduced required testing and verification.

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.

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