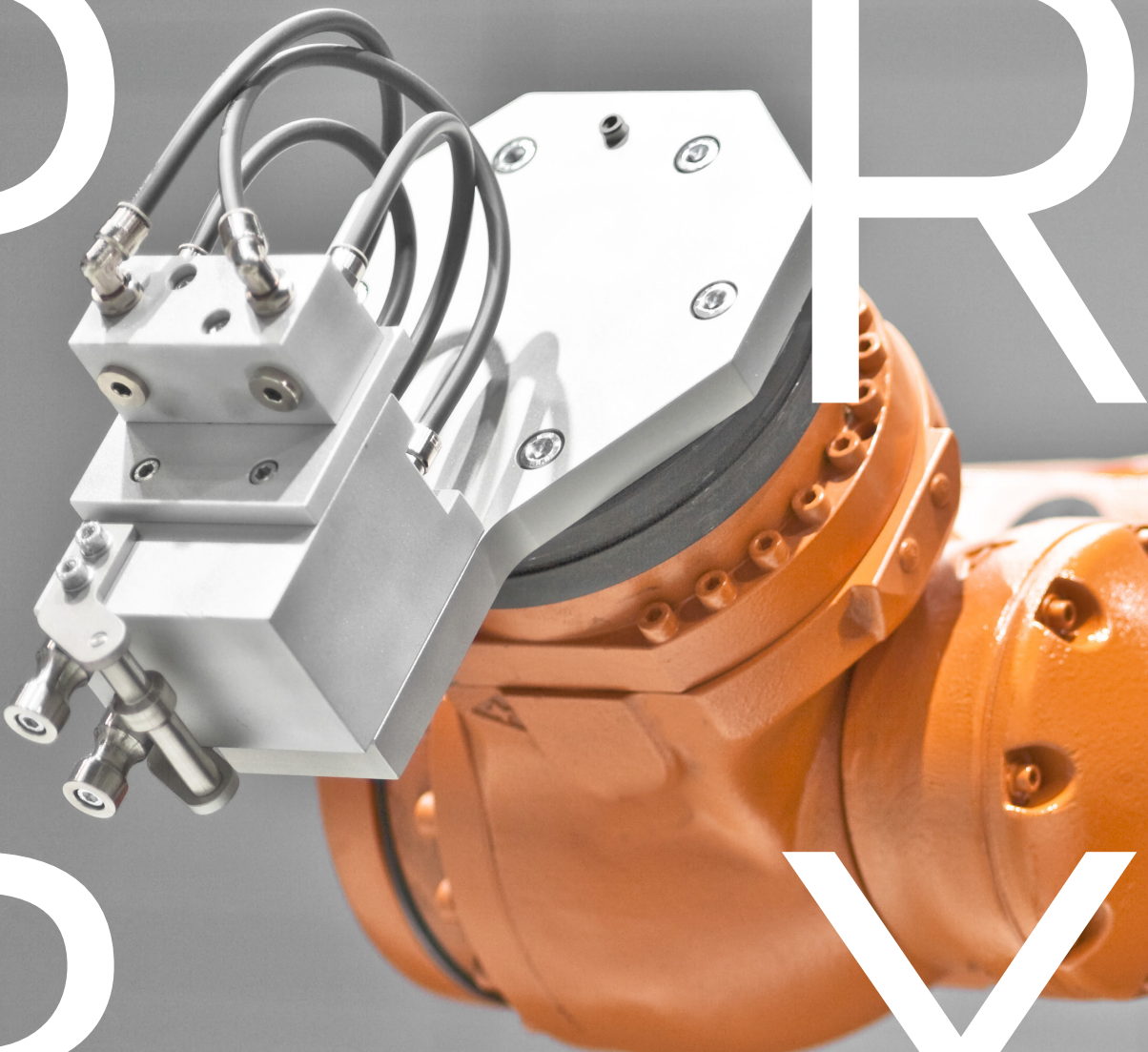


POWERBOX  
Mastering Power

Industrial



# POWERBOX





# Powering demanding industrial applications

## From watts to kilowatts

We have been powering demanding industrial applications for more than 40 years. The more demanding the application, the better the odds we can offer you a differentiating advantage in the form of an optimized solution. "Demanding" might for instance refer to electrical specification, environmental conditions, EMC requirements, or number of outputs. Our solutions span from single output converters to systems with multiple outputs, redundancy, back-up, etc.

Our range of power converters covers AC/DC, DC/AC, DC/DC with a wide span of voltages and power, from a few watts to many kilowatts. The extensive standard range, comprising a combination of our own designs and products from our leading partners, is complemented by our custom design capabilities, ensuring we can always provide optimized solutions. We accommodate any mechanical format and several different cooling principles. Communications interfaces and control software can also be incorporated.

We have a long term approach to customer relations. Working together we create competitive advantages by means of optimized power solutions.

## Typical demanding industrial applications

Our extensive experience in powering industrial applications covers many different application areas, as automation, building control, signaling, test & measurement and many more. Some examples are:

- Automation
- Building
- Information and communications technology
- Test and measurement
- LED
- Environmental technology

## Standards

The standard which to us in itself is a definition of the Industrial segment is EN/UL60950.

With 40 years of designing Industrial power supplies and systems we are not only experienced in meeting various standards for different types of applications or different parts of the world. We have also followed the development of new standards and are well prepared for the requirements to come.



# Industrial power solutions

## Standard products

Our extensive range of standard converters for industrial 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 industrial market for 40+ 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. Together with our customers we find the optimized solution.

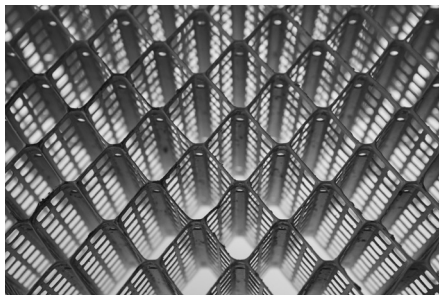
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## Some defining qualities of our industrial power supplies



### Reliability

- Low component count
- Long life components
- Redundancy
- High efficiency



### Electrical

- Surge & burst
- Transients
- EMC/EMI



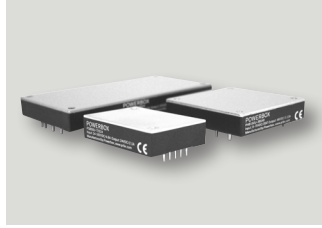
### Environment

- Temperature and humidity
- Shock and vibration
- Gases
- Sustainability

# Standard products – Industrial line



**Industrial line modules**  
1-60W  
2:1 or 4:1 input voltage range  
SIP, DIP, 1x1", 1x2", 1.6x2", 2x2"  
DC/DC converter



**Industrial line bricks**  
50-750W  
Up to 12:1 input voltage range  
Full, half or quarter  
DC/DC converter



**Industrial line enclosed**  
15-400W  
DC/DC converter



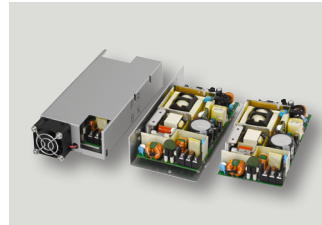
**Industrial line DIN-Rail**  
15-500W, DIN-Rail mounting  
DC/DC converter  
AC/DC switch mode power supply



**Industrial line 100, 150**  
**OFM100, OBM33 Series**  
100W, Open frame  
Single output  
AC/DC switch mode power supply



**Industrial line 200**  
**OBM35 Series**  
200W, U bracket/Enclosed  
Single output  
AC/DC switch mode power supply



**Industrial line 300**  
**OBP37 Series**  
300W, Open frame/U bracket/  
Enclosed, single output  
AC/DC switch mode power supply



**Industrial line 400**  
**OBP38 Series**  
400W, U bracket/Enclosed  
Single output  
AC/DC switch mode power supply



**Industrial line 200, 250, 300, 400**  
**CBN43/44 Series**  
**CBP45/46 Series**  
200-400W, Enclosed  
Convection cooling, single output  
AC/DC switch mode power supply



**PD25S Series**  
25W, Enclosed  
Single output  
AC/DC switch mode power supply



**PDF Series**  
600W or 800W, Enclosed  
Single output  
AC/DC switch mode power supply



**Switchbox line**  
External power supplies  
Wall plug adapter and desktop  
12-180 watt

# Partner standard products

Products from our world class product partners add significantly to our range of Powerbox designed standard products. The combined range comprises about 1,000 products in close to 250,000 possible variants.

The size of this range increases the likelihood of finding a suitable standard product. It also forms a unique platform for modified standard and value added designs.

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## Our network



**AMETEK**<sup>®</sup>  
PROGRAMMABLE POWER



**COSEL**<sup>®</sup>



**DELTA**



**PHIHONG**



**EFORE**  
TRUSTED POWER PARTNER

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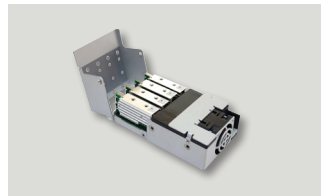
## Examples of partner standard products



Din-rail power for quick installations.



Sealed power for demanding applications.



Modular design for quick configurations.



Precision high power control for programmable applications.



High power in standard packages.



Power for ruggedized environmental



Low power AC/DC modules for board mounting



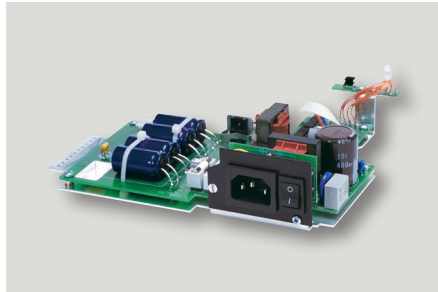
High power AC/DC bricks, 700W

# Custom products

Here are examples of customized products we have provided to industrial customers in the past. Powerbox has to date completed more than 2500 custom design projects.



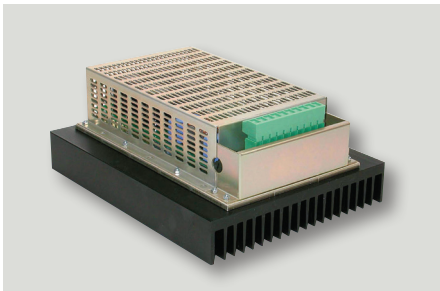
650W AC/DC power supply for control system for automated production line.



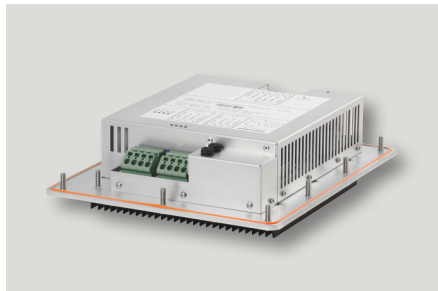
250W AC/DC power supply with peak current capability for industrial printer.



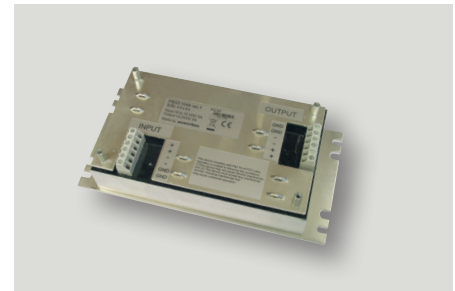
AC/DC power supply 1200W, double OVP protection for chemical process control systems.



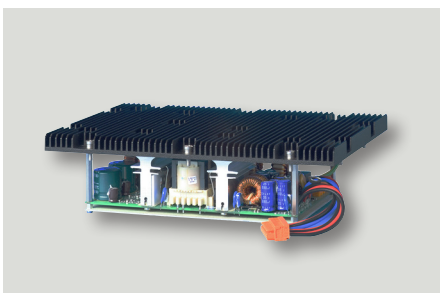
Ruggedized 500W AC/DC power supply for industrial crane application.



Ruggedized 250W DC/DC converter for fuel control management system.



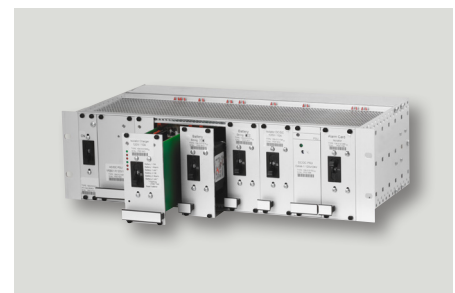
75W DC/DC Converter for powering a PC on any fork lift



Power supply for IP65 enclosure.



Power for roller conveyor. 150W with 500W peak power in IP54 enclosure.



Flexible power systems.







# Power solution examples

## Compact power for oil and gas leakage monitoring

The challenge: The customer is marketing an oil and gas leakage monitoring system, involving installation in limited spaces with sometimes cramped access ways. The power system shall include battery backup (external batteries) and meet, among other standards, EN54 and NFPA standards for installation in oil and gas environment globally. They had an existing power solution meeting all the electric and regulatory requirements, but it was too bulky and too heavy. The bulk required mounting on top of the cabinet and the weight created both installation difficulties and a stability problem for the cabinet. A communications interface compatible with previous generations of the monitoring system was also on the wish list.

The solution: Powerbox designed a very compact software controlled power solution, meeting all the requirements, where some of the space and weight saving measures were:

- Lean design with low component count made the converter smaller and lighter.
- Higher efficiency allowed more dense packing of the converter and required less space for heat removal, both inside the system and on the outside.

A parallel option allowed for handling sites requiring higher power without involving larger units.

The software and communications interface made the power system compatible with several previous generations. It also facilitated commissioning by a self-instructing user interface for setting battery type etc.

Added value: By the significantly reduced size and weight site access and installation were greatly facilitated. The communications compatibility with previous generations made expansion of existing installations much more attractive. The user interface for parameter settings both facilitated commissioning and ensured correct settings were chosen irrespective of battery type and size. Taken together this greatly enlarged the available market for the leakage monitoring system.

## Powering a PC on any fork lift

The challenge: The customer was marketing a computer system including PCs mounted on fork lifts. As the PC battery typically had a shorter operating time than what the fork lift batteries had the PC battery limited the usable operating time for the fork lift, creating a significant obstacle in selling the computer system. The customer wanted a solution powering the PC from the fork lift battery, and made trials with some standard converters. The result was discouraging due to a number of challenges:

- The nominal voltage for fork lift batteries varies from 12V to 110V, giving a 9V to 150V input voltage window from min voltage during discharge to max voltage during charge. This led to more variants than what was desirable for logistic reasons.
- The electrical environment is harsh with a lot of electrical noise from the fork lift drive system and rapid voltage variations due to load changes on the fork lift battery.
- The environment can be equally harsh with rapid and large temperature shifts, a lot of dust, vibrations, and even severe mechanical shocks when passing rails etc. in the floor.

The solution: Powerbox designed a ruggedized potted DC/DC converter meeting all the electrical and environmental challenges. In cooperation with the customer three input voltage versions was identified as the optimized combination of product characteristics and logistics.

Added value: Powering the PC from the fork lift battery eliminated the drawback of reducing fork lift operating time. Minimizing the number of variants to three avoided logistic difficulties. The rugged design lived up to expectations and then some with zero field defects to date, minimizing service requirements.

# 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. This close cooperation continues from conception and design, throughout production and taking into operation, well into the aftermarket phases of your product life-cycle. We contribute to your competitiveness all the way.

## **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.

Our services for logistics, implementation and aftermarket support makes life simpler both for you and for your customers, and our endurance makes sure it stays that way.

## **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. Both when selecting a new partner and in the ongoing relationship with our existing partners we evaluate a large number of parameters, covering company profile, organization, manufacturing processes, and quality assurance.

## **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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