# Product Catalogue

**DC/DC Converters and AC/DC power supplies**

**30 W to 2000 W units, inputs 10 to 500 VDC, outputs 5 V to 220 V**

**50 W to 240 W units, inputs 100 to 240 VAC, outputs 5 V to 110 V**

POLYAMP

*- A secure part of your system*

# About Polyamp

Polyamp Power specializes in design and production of mainly DC/DC converters and some compatible Power supplies.
Our DC/DC converters are used in applications demanding high reliability in rough environments. Thru the years countless applications in sectors like Railway, Energy, Process control, Vehicles, Military, Radio and Telecom etc.

We provide our DC/DC converters to customers worldwide, with an established sales distributor network or directly where we do not have a distributor. Polyamp have two locations; the head office in Sollentuna suburb to Stockholm, Sweden. We have design and manufacturing in Åtvidaberg 230 km south of Stockholm.

Our DC/DC converters have practical MTBF > 1 Million hours and our official warranty is five years. However in case we discover a fault due to workmanship the warranty is much longer than that. We have no dedicated service department as we have worked with quality assurance methods since end of 1980-ties. Our delivery accuracy is around 98% on time, in a day to day basis and delivers to just-in-time schemes. Our ISO 9001-2015 quality system is also approved for Nuclear Plants Class.

The Systems specializes in the design, manufacture and supply of Underwater Electromagnetic Signature Management and control Systems for Worldwide application within the International Naval Industry / International Navy authorities.

The types of system supplied are:

- Degaussing systems for surface and submarine naval vessels. Steel hulled or non magnetic hull vessels.
- SWECADE is a software suite that can predict and design coil systems, dimension Degaussing systems, control fixed and movable ranges, support signature analyze and document the fleet vessels signature history.
- Underwater multisensory measurement systems. Magnetic, UEP/ELFE, Pressure, Acoustics
- Underwater Electric Potential (UEP/ELFE) sensors
- Light Electromagnetic Mine Sweep indented for Drones or Vessels of opportunity.

Those are summarized on page 30 and 31, however separate documentation can be provided on demand.

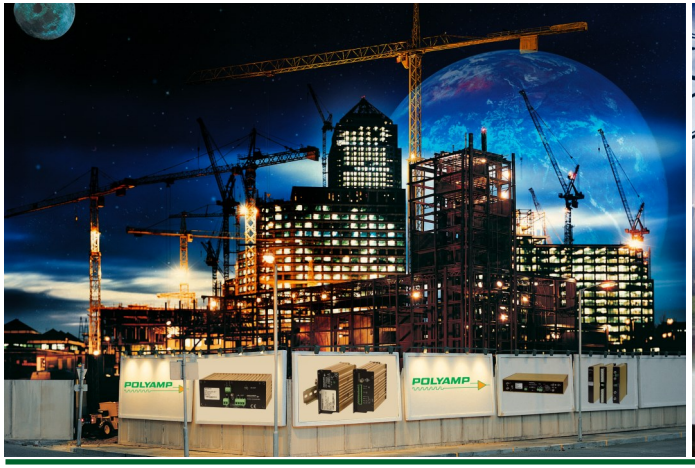
# Content

# Proven high reliability in rough environments

- On-board trains
- Industry, Process control
- Power plants, including Nuclear
- Vehicles: Electric & Military
- Telecom & Radio com
- Naval, Off-shore platforms


# DC/DC converters functions

- Voltage transformer
- Galvanic separation
- Polarity changer
- Voltage stabilizer
- Substitute to batteries
- EMC Filter
- Combination of functions



# Why Polyamp

## Installed within 5 minutes
Mounting brackets are provided with the delivery. Wall, chassis, DIN-rail and 19" rack mounting methods are available depending on the model selected. Plug-in units for Euro format, 3HE & 6HE are also available.

## Quality system
100% reliable products assured. We have a proven record of 98% on time delivery on a day base. We are what some customer call a 100% supplier, 100% quality and 100% on time.

## MTBF & Life expectancy
Our design is carefully made by our experienced de-sign team. This leads to very high practical MTBF and long life expectancy of our converters. Some units have predicted MTBF > 3 Million hours and most products will live 15-25 years.

## Input well filtered
We use well dimensioned EMC filters meeting low emission and high immunity requirements.

## Products are CE marked
as an apparatus in respect of Safety, EMC and also RoHS.

## Output well filtered
We have well designed EMC filters on the output, meeting low emissions and high immunity requirements. The output can therefore be used for voltage distribution without any additional EMC filters. Most competitors have no EMC filters on the output at all.

## We specify working temp. without derating
-25˚to +55℃ is standard for our modules and -25˚to +70℃ for our Euro cassettes.

## Run a Polyamp at full load continuously
We have about 10% margin on the rated output power. Not always the case with competitors.

## Integrated mechanics and electronics
We start a design with the mechanical considerations before integrating the electronics. This ensure very good cooling of all components. Low working temperature result in long life.

## "Gold" colour not black
The gold colour of our cases is chosen not only for its look. The thermal radiation at operating temperature is the same as black, but it absorbs much less heat from other equipment's. Low working temperature = Long life expectancy.

## Aluminum cover
Gives good cooling and also easy to recycle. We have an environmental program that minimize unfriendly materials and workmanship. With small modifications it also permits to meet the EN 45545 Fire and Smoke standard.

## Convection cooled
Our designs are made for convection cooling. Self standing units with no need for forced ventilation. Can be mounted in any direction.

## No ventilation holes
Minimize the risk of dust entering into the unit, which is important in industrial and mobile applications. Can be mounted in any direction.

## Transport packing
We ship all units in single boxes or in cleaver card box frames. Safely protecting the product during transportation. As there is only one material in the box it´s easy to recycle. Meets Grüne punkt.


*PM500-series*

# General data

**DC/DC converters from Polyamp are a free standing unit which will be installed within 5 minutes. The aluminum cover gives good cooling and also easy to recycle. We have an environmental program that minimize unfriendly materials and workmanship. Most of Polyamp's converters are design for convection cooling. The in- and output have well designed EMC-filters, meeting low emissions and high immunity requirements.**

## Input protection

In general we don´t supply our DC/DC converters with fuses because the fuse specifications vary between applications on dc voltages and another reason is that on DC distribution networks the fuse to the DC/DC converters should be at the distribution point, to protect the cables from short circuits. All models have a parallel or series diode to protect against input reverse voltages.

## Inrush current

On the input side there is an inrush current to charge the input capacitor. The level of inrush current depends on the systems impedance and voltage. Some models has inrush current limit circuits with NTC resistor and it can be optional on some. The PSC600-, PU1000- and PC2000-series has an active inrush current limit. Basically we are reluctant to use NTC as inrush-current limit. In many DC/DC converter applications they are connected in redundancy or in by-pass to an AC/DC power supply. In such cases, the converter will not be able to supply enough current until the NTC warms up.

All converters from Polyamp has softstart which will charge the output capacitors in a controlled manner during start up.

## Parallel connection for more power

By connecting two or more units in parallel you can achieve higher power systems. As Polyamp can supply converters up to 2000 W it´s usually suitable for very large systems.

## Parallel connection for redundancy

Each converter is specified to carry the whole load. The converters must have series diode and output alarms to provide fault indication in case of failure. The PU1000- and PC2000-series have an active current sharing control. The PSC-series has a passive balancing resistor that provide current sharing with option CR or share feed

## MTBF

The statistical figure MTBF can be put at more than 1 Million hours at 40°C ambient temperature. This is based upon our historical data. However, the MTBF should not be confused with life expectancy. We design our converters for long life expectancy. As a result we get good practical MTBF values. Calculated MTBF values might be lower.

## How to load / How to cool

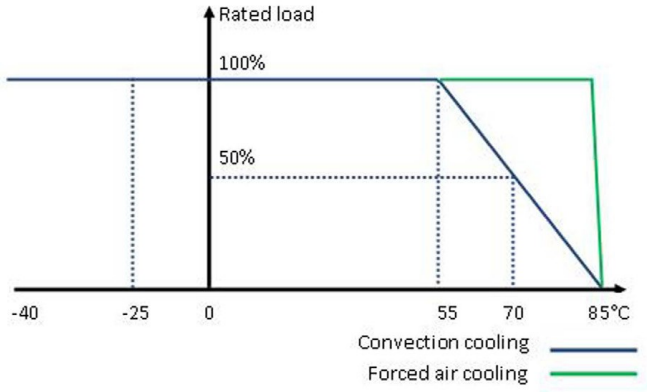
Our converters are specified and tested to work at a full ambient temperature range of -25 to +55°C or +70°C at 100% load. Continuous operation at high ambient temperatures reduces the life expectancy of a unit. It´s very efficient to arrange a small airflow around the converters. A 10°C lower ambient temperature will basically doubles the life expectancy of the unit. A general feature of a Polyamp converter is that it´s relatively cool at full load. Consult Polyamp on general thermal management questions for your application.

## Ambient temperature and output power

Our standard operating temperature range is -25 to +55°C with 100% load. It means that the temperature around the case has that temperature. Our DC/DC converters has relatively large coolers which provides some thermal after lag. Therefore temporary temperature peaks outside the range can be accepted. E.g. the railway standards EN50155 demands 15°C increase during 10 minutes.

Operating temperature up to +70°C can be achieved with derating and with forced air cooling up to 85°C. See below figure. The PSC and PSE series are specified up to +70°C without derating.

Please note that the life expectancy of a power supply unit is very linked to the ambient temperature. A rule of thumb is that 8-10°C temperature increase halves the life expectancy. In reality this is valid from about 30-40°C ambient temperature.
-40°C is optional as we need to test that the unit starts at this temperature.



# Why a CE mark?

**Product responsibility is always with the manufacturer. To help achieving a safe product a number of EU directives have been issued. Using these directives and related harmonized standards the manufacturer ust create a technical construction file (TCF), which will point to a number of requirements that have to be met to achieve product safety.**

**A CE-mark indicates that the requirements have been investigated and the product found to be safe for the intended use. Together with the product documentation we provide a CE- declaration that not only specify to which Directives this product comply to but for the EMC directive also indicates the performance on both input and output.**

## EMC

There are several Directives that involve EMC and the EMC directive 2014/30/EU itself generated many Product standards for different sectors. However the same Basic standards are used to measure the EMC performance, except for military applications. Our performance covers most of them e.g. Telecom, Power industry, Railways, Process industry etc.
We use the EMC product standard ”Low voltage power supplies DC output” EN 61204-3 as base for measurement principles.
The Immunity EMC levels are elevated in order to comply to EN 50121-3-2 (IEC 62236-3-2) Railway application: Rolling stock – Apparatus, and EN 50121-4 (IEC 62236-4) Railway application: Signalling and telecommunication apparatus. Also to meets relevant parts of IEC 61000-6-5 Generic Standards – Immunity for power stations.

## Safety

The Low voltage directive, 2014/35/EU has priority over the 2006/42/EC Machinery safety directive, for electric and electronic products.
The voltage limit of 50 Va.c. or 75 Vd.c, which in fact means that DC/DC converters using voltages below that shall not refer to safety in the CE mark. However the revised directive accepts a CE mark on lower voltages if the product is made according to a harmonized safety standard, e.g. EN 61204-7.
The train industry is very conscious of fire and smoke and have a specific standard for that; Fire Protection EN 45545. We meet EN 45545-2, 4.3.2 rule 1 and figure 1 the levels HL1, HL2 and HL 3.

## Environmental

The RoHS 2011/65/EC directive is base for a CE mark of our type of products. All our components and materials are RoHS compliant according to the directive with EN50521: 2012 Technical documentation as a base.

**The conclusion is that a Polyamp CE mark means EMC and LVD directive (also below 75 Vd.c.) and the RoHS directive.**

CE

## Other Directives

However the REACH 2006/21/EC directive complicates the situation.

The main difference between RoHS and REACH is that RoHS bans substances that are present in electrical equipment that is within the directive.

REACH, however, pertains to all chemicals including those used to make a product. This can include materials, solvents, paints, chemicals, and more.

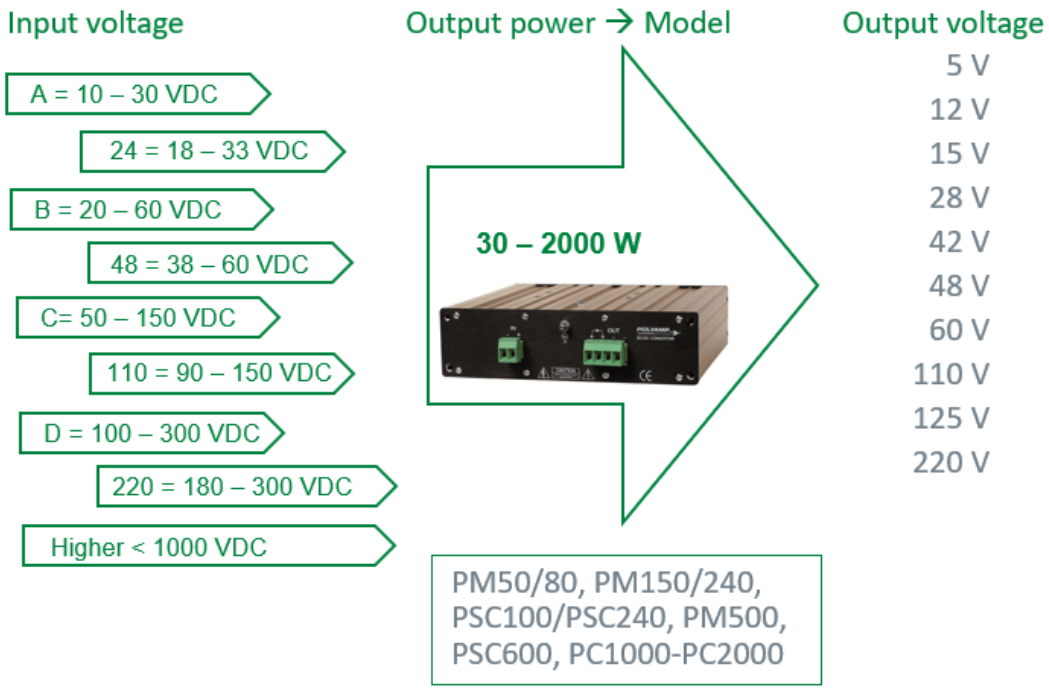
The REACH 2006/21/EC directive has many aspects around substances. For most electronic manufacturers it is today and in future the list of reportable chemicals, that get successively longer, which causes problems. Polyamp has done a material analyze to screen critical areas.

The difference between the RoHS directive and REACH is that RoHS specify from homogeneous materials thus all single components, while the REACH consensus at the moment is the LRU level (Least Replaceable Unit) even the authorities has “substance is always a substance” attitude. As our units have a sturdy integrated mechanics, typically 80% of the weights of a unit consist of metals, mostly Aluminum, Copper and Iron (Ferrites).

The current WEEE (2012/19/EU) directive does not affect us as our products are included in other equipment.

The EuP directive was amended to Directive (2009/125/EC). The most important amendment concerns the Directive’s scope, which has been extended from “energy-using” to so-called “energy-related” products. However this directive regards Eco design in general. Initial life cycle analyses (LCA) resulted in a focus on “in use efficiency” as it was the main environmental factor. As efficiency is a selling parameter, then switch mode PSU are not affected.

# Polyamp standard DC/DC converters




**Our DC/DC converter program covers a wide range of dc inputs from 10 V up to 750 Vd.c. This page helps you select the right DC/DC converter family depending on what demands you have. Polyamp guarantee full performance within the specified input range, which means 105% load, 110% output voltage level at max rated operational temperature. Our input voltages ranges are selected to meet international market demands.**

## 12 V input

Is used mainly in car related applications or small mobile systems or in back-up systems.
12 V input voltage is handled by the A input voltage range 10 - 30 V or an input range coded 12 (11-16 V).

| Input range | Family codes |
|---|---|
| A = 10 - 30 Vd.c. | PM50, PSC80-150, PM150, PU300, PSC400 |
| 12 = 11 -16 Vd.c. | PU300 12/27, |

A common question is if we can handle cranking down to 6 V. The converter switch off at <9.5 V. The PM50A input handles 6 V with derating, consult the datasheet for more information.

## 24 - 28 V input

Is used in many applications. Use the B input code 20-60 V or the 24 input code 20-32 V.

| Input range | Family codes |
|---|---|
| B = 20 - 60 Vd.c. | PM50, PSC150, PM150, PU300, PU600 |
| 24 = 18 - 32 Vd.c. | PM80, PM240, PSC240, PU500, PSC600,PU1000 |
| 24 = 20 - 32 Vd.c. | PM250, PC1000 |

For train EN 50155/IEC 60571 and forklifts, on demand. 24T = 14.4 - 33.6 Vd.c.

24T = 14 - 40 Vd.c. is our input
For some train markets, on demand

28T = 16 - 40 Vd.c. MIL-STD 1275-D (28V) / ISO 7637-2 (24V), on demand.

An alternative in case you have cranking voltages is to use A input, see 12 V input.
An A input version has always lower efficiency than above mentioned inputs.

## 36 V input

Is today mostly used in train applications and on the North American markets. Use the B input (20 -60 V) or ask for a specific 36 input range. The 36 input code it is not in our standard input range, however can be made on demand.

| Input range | Family codes |
|---|---|
| B = 20 - 60 Vd.c. | PM50, PSC150, PM150, PU300, PU600 |
| 36 = 28 - 60 Vd.c. | PM80, PM240, PSC240, PU500, PSC600,PU1000 |
| 36 = 30 - 60 Vd.c. (*) | PC1000, PC1400 |

36T = 21.6 - 50.4 Vd.c. For train EN 50155/IEC 60571 and forklifts, on demand 36T = 18 - 60 Vd.c. For some train markets, on demand.

## 48 V input

Is used mainly in telecom related applications, where low emission is required.
We have EN50022 level B on all such inputs. Use the B input code or 48. For EN50155, IEC60571 train standards use input code 48T with this the output power can be derated.

| Input range | Family codes |
|---|---|
| B = 20 - 60 Vd.c. | PM50, PSC80-150, PM150, PU300, PU600 |
| 48 = 38 - 60 Vd.c. | PM80, PM240, PSC240, PU500, PSC600, PU1000 |
| 48 = 41 - 60 Vd.c. | PSC600, PM500, PC1000, PC1400, PC2000 |

48T = 28.8 – 68 Vd.c.

For train EN 50155/IEC 60571 and forklifts, on demand 48T = 24 - 140 Vd.c. For some train markets, on demand.

## 60 - 96 V input

60 Vd.c. is used mainly in telecom applications on certain markets. We can make
special inputs for 48-60 V input with 38-72 V input. 72 Vd.c. is used mainly in trains.
Use our C input range or 72T. 96 Vd.c. is not very common these days, it has mainly been used in large fork-lifts. Use our C input range and require a series diode on the input.

| Input range | Family codes |
|---|---|
| C = 50 - 150 Vd.c. | PM50, PSC80-PSC150, PM150, PU300, PU600 |
| 72 = 60 - 100 Vd.c. | On demand |

72T =43.2 -100.8 Vd.c for train EN50155/ IEC60571 and forklifts, on demand.

## 110 - 125 V input

Is used mainly on trains, in power plants and sub -station applications. High immunity levels are required. Use the D input (90-270 V) or 110 (93-150 V). For EN50155, IEC60571 train standards use our C-input (50-150 V) or 110T (66 – 154 V).

| Input range | Family codes |
|---|---|
| C = 50 -150 Vd.c. | PM50, PSC80-150, PM150, PM260 PU300, PU600 |
| 110 = 88 - 150 Vd.c. | PM80, PM240, PSC240, PSC600 PU500, PU1000 |
| 110 = 93 - 150 Vd.c. | PM500, PSC600 PC1000, PC1400, PC2000 |
| 110T = 66 - 154 Vd.c. Train input | PM50, PSC80-150, PM150, PU300, PU600 PM500, PSC600 PC1000, PC1400, PC2000 |

## 220 - 250 V input

Is used mainly in power plants and sub-station applications. High immunity levels are required. Use the D input code or 220. The 250 V battery is not very common but can only be used with 220 inputs. Hybrid cars and submarines uses similar voltages, please contact us.

| Input range | Family codes |
|---|---|
| D = 90 - 270 Vd.c. | PM50, PSC150, PM150, PM260, PU300, PU600 |
| 220 = 175 - 300 Vd.c. | PM80, PM240, PSC240, PSC600, PU500, PU1000 |
| 220 = 187 - 300 Vd.c. | PM500, PSC600, PC1000, PC1400, PC2000 |

## >300 V input

>300 V input are used mainly in power plants, oil platforms, hybrid / electric car applications or in ROV and submarines.

There are also applications for 600/750 Vd.c. in Traction & Metro applications according to IEC 60850. All those are special executions. The standard models we have are:

| Input range | Family codes |
|---|---|
| E = 260 - 550 Vd.c. | PSC150 |
| 440 = 350 - 550 Vd.c. | PSC240, PSC600 |
| 440 = 300 - 600 Vd.c. (*) | PU1000 |

(*) Peak 1100 V


# AC/DC Power Supplies PSC-series 80 - 240 W 8 - 12 TE, DIN, chassis

## INPUT / OUTPUT

- PSC80 - 150 world wide input ACW
- PSC80 - 240 optimized inputs ACR, ACW
- Single outputs 5 - 48 V, 100 - 150 W
- Single outputs 12 - 220 V, 200 - 240 W
- Output over voltage limit OVL

## FEATURES

- CE mark, EMC, LVD, ROHS
- Temperature power limit
- Alarm circuit with relay
  Accessible on front panel:
  - Output OK status green/red LED
  - Output voltage adjustment
  - Output voltage measurement
- Wall, case, DIN mounting
- Optional Euro format 3HE, 8 - 14 TE

## OPTIONS

- Chare feed for parallel units
- Series diode on output
- Remote sense
- Different mechanical options

## CE-marking

- Electric safety
- RoHS Directive
- EMC low emissions high immunity

## OUTPUT RATING & TYPE CODE 80 – 240 W

| DC OUTPUT | | | TYPE CODE AC-inputs | | |
|---|---|---|---|---|---|
| | | | AC | ACW | ACR |
| V | A | P | 176 - 264 Va.c. | 85 - 264 Va.c. | 85 - 135 Va.c. |
| 5 V | 16 A | 80 W | PSC80 AC5 | PSC80 ACW5 | PSC80ACR5 |
| 12 V | 10 A | 120 W | PSC120 AC12 | PSC120 ACW12 | PSC120ACR12 |
| 13.2 V | 7.6 A | 100 W | PSC100 AC13.2 | PSC100ACW13.2 | PSC100ACR13.2 |
| 13.2 V | 11.4 A | 150 W | PSC150 AC13.2 | PSC150ACW13.2 | PSC150ACR13.2 |
| 15 V | 6.7A | 100 W | PSC100 AC15 | PSC100ACW15 | PSC100ACR15 |
| 15 V | 10 A | 150 W | PSC150 AC15 | PSC150ACW15 | PSC150ACR15 |
| 24 V | 4.2 A | 100 W | PSC100 AC24 | PSC100 ACW24 | PSC100ACR24 |
| 24 V | 6.3 A | 150 W | PSC150 AC24 | PSC150 ACW24 | PSC150ACR24 |
| 24 V | 10 A | 240 W | PSC240 AC24 | —— | PSC240ACR24 |
| 48 V | 2.1 A | 100 W | PSC100 AC48 | PSC100 ACW48 | PSC100ACR48 |
| 48 V | 3.1 A | 150 W | PSC150 AC48 | PSC150 ACW48 | PSC150ACR48 |
| 48 V | 5 A | 240 W | PSC240 AC48 | —— | PSC240ACR48 |
| 60 V | 4 A | 240 W | PSC240 AC60 | | |
| 110 V | 2.2 A | 240 W | PSC240 AC110 | | |
| 220 V | 1.1 A | 240 W | PSC240 AC220 | | |

Mounting and mechanics, see page 17 & 19.


# AC/DC Power supplies
# PSC-series 80 - 150 W
# 2 & 3 outputs
# 10 - 12 TE, chassis, DIN

## FEATURES

- CE mark, EMC, LVD, ROHS
- Alarm circuit with relay
  Accessible on front panel:
  - Output OK status green/red LED
  - Output voltage adjustment
  - Output voltage measurement
- Wall , case, DIN mounting
- Optional Euro format 3HE, 10 - 14 TE

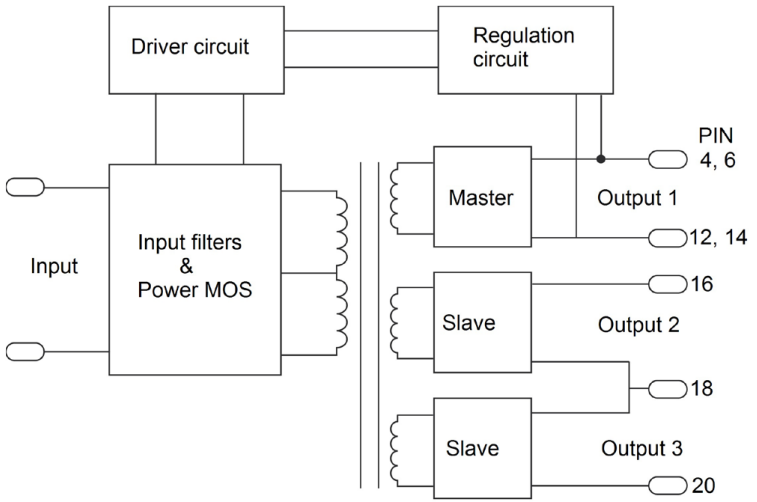
## INPUT / OUTPUT

- PSC80 - 120 world wide input ACW
- PSC80 - 120 optimized inputs ACR, ACW
- Single outputs 5 - 48 V, 80 - 120 W
- Dual or bipolar ±(5 - 30 V), 80 - 120 W

## OUTPUT RATING & TYPE CODE 80 – 150 W

| MASTER OUTPUT | | | SLAVE OUTPUT TYPE CODE | | | |
|---|---|---|---|---|---|---|
| V | A | P | V | A | Output 2&3 | Ptot |
| 5 V | 16 A | 80 W | 3 - 6 V | ±2 A | PSC100 IN 5S 3 - 6 | 100 W |
| 5 V | 16 A | 80 W | 12 - 30 V | ±1.2 A | PSC120 IN 5S 12 - 30 | 120 W |
| 12 V | 6 A | 80 W | 3 - 6 V | ±2 A | PSC100 IN 12S 3 - 6 | 100 W |
| 12 V | 10 A | 120 W | 12 - 30 V | ±1.2 A | PSC120 IN 12S 12 - 30 | 150 W |
| 15 V | 6.7A | 80 W | 3 - 6 V | ±2 A | PSC100 IN 15S 3 - 6 | 100 W |
| 15 V | 8 A | 120 W | 12 - 30 V | ±1.2 A | PSC120 IN 15S 12 - 30 | 150 W |
| 24 V | 6.7A | 80 W | 3 - 6 V | ±2 A | PSC100 IN 24S 3 - 6 | 100 W |
| 24 V | 8 A | 120 W | 12 - 30 V | ±1.2 A | PSC120 IN 24S 12 - 30 | 150 W |
| 48 V | 6.7A | 80 W | 3 - 6 V | ±2 A | PSC100 IN 48S 3 - 6 | 100 W |
| 48 V | 8 A | 120 W | 12 - 30 V | ±1.2 A | PSC120 IN 48S 12 - 30 | 150 W |

| AC INPUT RANGES | | |
|---|---|---|
| Nominal inputs | Input range | Code |
| 100, 110, 220, 230, 240 Va.c. | 85 - 264 Va.c. | ACW |
| 100, 110, 125 Va.c. | 85 - 135 Va.c. | ACR |
| 85 - 264 Va.c. | 176 - 264 Va.c. | AC |




The master output require a base load of minimum 30% of total load. The secondary output needs to be specified as not adjustable. When 2 second outputs they are symmetric ± fixed voltages.

Mounting and mechanics,
see page 18.


## FEATURES

- Wide input range ranges
- Single outputs 12 - 132 V
- Dual outputs 12 - 60V
- Low ripple and noise outputs
- Operating temp. –25 to +55°C
- DIN-rail or wall mounting
- Pluggable connector Combicon
- EN45545-2 HL1, HL2, HL3

## OPTIONS

- Tropical coating
- Mounting bracket L60-1

## CE-marking

- Electric safety
- RoHS Directive
- EMC low emissions high immunity

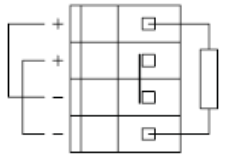
# DC/DC Converters PM50 30 - 55 W 1&2 adjustable outputs Chassis, DIN

"What shall I say.. they are really low noise and never give up" told a test manager of German car manufacturer.

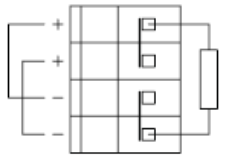
Mounting displays, see next page.

## OUTPUT RATING | 12 to 220 VDC WIDE INPUTS TYPE CODE 30 – 55 W

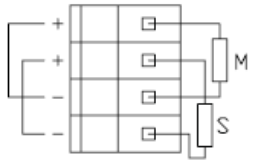
| 1 x DC OUTPUT | | | DC INPUT | 1 x DC OUTPUT | | | DC INPUT | | |
|---|---|---|---|---|---|---|---|---|---|
| V | A | P | 10 - 30 V | V | A | P | 20 - 60 V | 50 - 150 V | 90 - 270 V |
| 12 V | 2.67 A | 32 W | PM50A15-15 | 12 V | 3.34 A | 40 W | PM50B15-15 | PM50C15-15 | PM50D15-15 |
| 15 V | 2.67 A | 40 W | PM50A15-15 | 15 V | 3.34 A | 50 W | PM50B15-15 | PM50C15-15 | PM50D15-15 |
| 18 V | 2.6 A | 47 W | PM50A18-18 | 18 V | 3.20.6 | 57 W | PM50B18-18 | | |
| 18 V | | | | 18 V | 2.78 A | 47 W | | PM50C18-18 | |
| 24 V | 1.34 A | 32 W | PM50A15-15 | 24 V | 1.67 A | 40 W | PM50B15-15 | PM50C15-15 | PM50D15-15 |
| 28 V | 1.34 A | 37 W | PM50A15-15 | 28 V | 1.67 A | 47 W | PM50B15-15 | PM50C15-15 | PM50D15-15 |
| 36 V | 1.3 A | 47 W | PM50A18-18 | 36 V | 1.60 A | 57 W | PM50B18-18 | | |
| 36 V | | | PM50A18-18 | 36 V | 1.39 A | 50 W | | PM50C18-18 | |
| 60 V | 0.67 A | 40 W | PM50A60-60 | 60 V | 0.84 A | 50 W | PM50B60-60 | PM50C60-60 | PM50D60-60 |
| 110 V | 0.34 A | 37 W | PM50A60-60 | 110 V | 0.42 A | 46 W | PM50B60-60 | PM50C60-60 | PM50D60-60 |
| **2 x DC OUTPUT** | | | **DC INPUT** | **2 x DC OUTPUT** | | | | | |
| 2x12 V | 1.34 A | 32 W | PM50A15-15 | 2x12 V | 1.34 A | 32 W | PM50B5-15 | PM50C15-15 | PM50D15-15 |
| 2x15 V | 1.34 A | 40 W | PM50A15-15 | 2x15 V | 1.34 A | 40 W | PM50B15-15 | PM50C15-15 | PM50D15-15 |
| 2x18 V | 1.30 A | 47 W | PM50A18-18 | 2x18 V | 1.40 A | 50 W | PM50B18-18 | PM50C18-18 | |
| 2x60 V | 0.34 A | 40 W | PM50A60-60 | 2x60 V | 0.42 A | 50 W | PM50B60-60 | PM50C60-60 | PM50D60-60 |



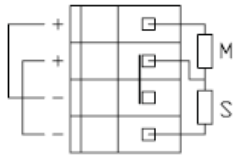
*Series*
*24 to 32 V*
*36 V*
*110 to 130 V*



*Parallel*
*12 to 16 V*
*18 V*
*60 V*




*Dual*
*2x12 V*
*2x18 V*
*±60 V*




*± Outputs*
*±12 to 16 V*
*±18 V*
*±60 V*


## FEATURES

- Wide input range ranges
- Single outputs 24 - 72 V
- Dual outputs 24 / 36V
- Low ripple and noise outputs
- Operating temp. –25 to +55°C
- DIN-rail or wall mounting
- Pluggable connector Combicon
- EN45545-2 HL1, HL2, HL3

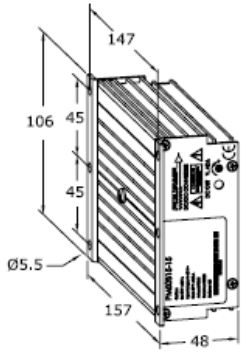
## OPTIONS

- Tropical coating
- Mounting bracket L60-1

## CE-marking

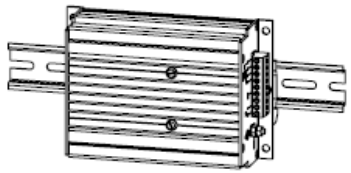
- Electric safety
- RoHS Directive
- EMC low emissions high immunity

# DC/DC Converters PM80 60 - 80 W 1&2 adjustable outputs Chassis, DIN

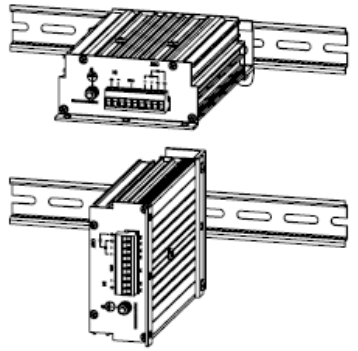



## OUTPUT RATING | 24 to 220 VDC INPUTS & TYPE CODE 60 – 80 W

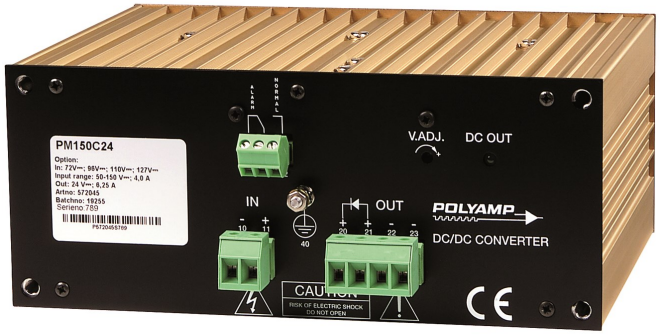
| 1 x DC OUTPUT | | | DC INPUT | | | |
|---|---|---|---|---|---|---|
| V | A | P | 18 - 32 V | 40 - 60 V | 88 - 150 V | 175 - 270 V |
| 24 V | 2.50 A | 60 W | PM80 24/24-24 | | | |
| 24 V | 3.34 A | 80 W | | PM80 48/24-24 | PM80 110/24-24 | PM80 220/24-24 |
| 36 V | 1.68 A | 60 W | | | | |
| 36 V | 2.24 A | 80 W | PM80 24/36-36 | PM80 48/36-36 | PM80 110/36-36 | PM80 220/36-36 |
| 48 V | 1.25 A | 60 W | PM80 24/24-24 | | | |
| 48 V | 1.67 A | 80 W | | PM80 48/24-24 | PM80 110/24-24 | PM80 220/24-24 |
| 72 V | 0,84 A | 60 W | PM80 24/36-36 | | | |
| 72 V | 1.12 A | 80 W | | PM80 48/36-36 | PM80 110/36-36 | PM80 220/36-36 |
| **2 x DC OUTPUT** | | | | | | |
| 2x24 V | 1.25 A | 60 W | PM80 24/24-24 | | | |
| 2x24 V | 1.67 A | 80 W | | PM80 48/24-24 | PM80 110/24-24 | PM80 220/24-24 |
| 2x36 V | 0.84 A | 60 W | PM80 24/36-36 | | | |
| 2x36 V | 1.12 A | 80 W | | PM80 48/36-36 | PM80 110/36-36 | PM80 220/36-36 |



*PM50/80 DIN-rail mounted (standard)*



*PM50/80 DIN-rail mounted L60-1 (option)*




## FEATURES

- Wide input range ranges
- Single outputs 12 - 48 V
- 2.5 kVa.c. isolation output/case
- Over voltage protection
- Output voltage alarm
- Series diode on output
- Operating temp. –25 to +55°C, without derating
- EN45545-2 HL1, HL2, HL3
- DIN-rail, wall mounting or 19” rack

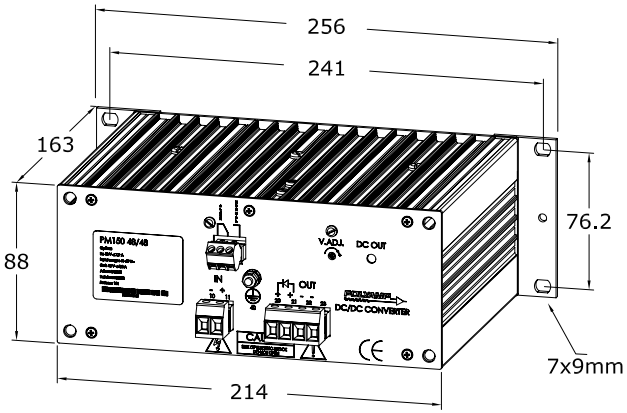
## OPTIONS

- Train inputs
- Tropical coating

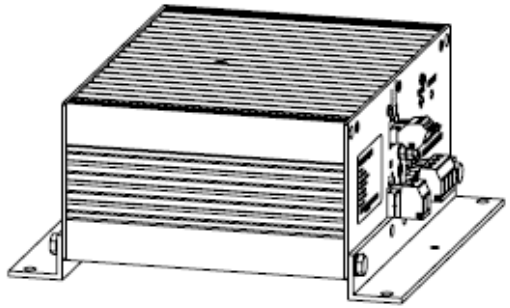
## CE-marking

- Electric safety
- RoHS Directive
- EMC low emissions high immunity

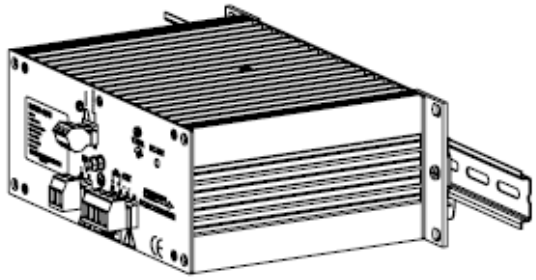
# DC/DC Converters PM150 120 - 150 W Wall, DIN, 1/2 19”-rack




*PM150/PM240 wall mounted. Brackets PL88-1 (standard)*



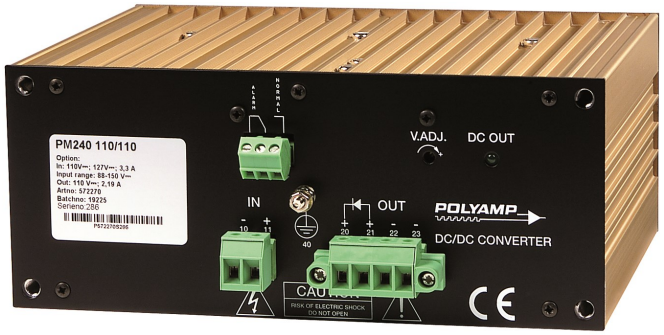
*PM150/PM240 wall mounted. Brackets PL214-1 (optional)*



*PM150/PM240 DIN mounted. TS35 clips +standard brackets*

## 12 to 48 VDC OUTPUTS | WIDE INPUTS / TYPE CODE 150 W

| DC OUTPUT | | | DC INPUT | | | |
|---|---|---|---|---|---|---|
| V | A | P | 10 - 30 V | 20 - 60 V | 50 - 150 V | 90 - 270 V |
| 12 V | 10 A | 120 W | PM150A12 | | | |
| 12 V | 12.5 A | 150 W | | PM150B12 | PM150C12 | PM150D12 |
| 13.8 V | 8.7 A | 120 W | PM150A13.8 | | | |
| 13.8 V | 10.9 A | 150 W | | PM150B13.8 | PM150C13.8 | PM150D13.8 |
| 15 V | 8 A | 120 W | PM150A15 | | | |
| 15 V | 10 A | 150 W | | PM150B15 | PM150C15 | PM150D15 |
| 24 V | 5 A | 120 W | PM150A24 | | | |
| 24 V | 6.25 A | 150 W | | PM150B24 | PM150C24 | PM150D24 |
| 28 V | 5.36 A | 150 W | | PM150B28 | PM150C28 | PM150D28 |
| 36 V | 4.17 A | 150 W | | PM150B36 | | |
| 48 V | 2.5 A | 120 W | PM150A48 | | | |
| 48 V | 3.13 A | 150 W | | PM150B48 | PM150C48 | PM150D48 |




## FEATURES

- Single outputs 24 - 110 V
- 2.5 kVa.c. isolation output/case
- Over voltage protection
- Output voltage alarm
- Selectable series diode on output
- Operating temp. –25 to +55°C, without derating
- EN45545-2 HL1, HL2, HL3
- DIN-rail, wall mounting or 19” rack

## OPTIONS

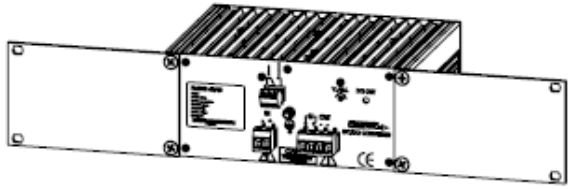
- Train inputs
- Tropical coating

## CE-marking

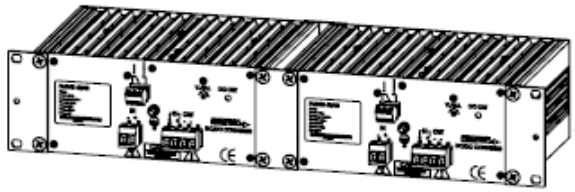
- Electric safety
- RoHS Directive
- EMC low emissions high immunity

# DC/DC Converters PM240 216 - 240 W Wall, DIN, 1/2 19”-rack 2U

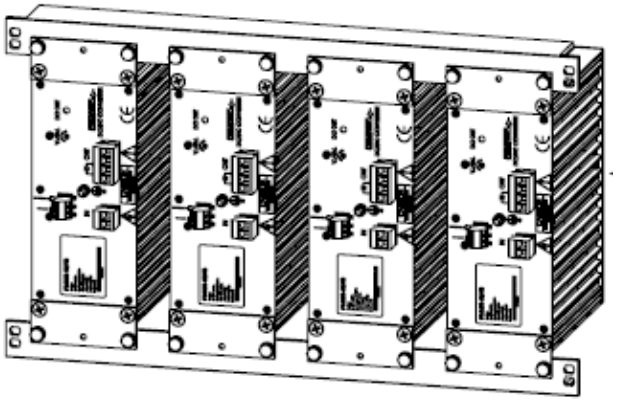
### PM150/240 Mounting in 19” rack



1) Optional brackets PL88-3



2) Standard brackets PL88-1 + PL88-2(optional)



3) Optional vertical 19”-rack mount 1 to 4 units
Standard brackets PL88-1 + L480-1

## 24 to 110 VDC OUTPUTS | INPUT RANGE & TYPE CODE 216 – 240 W

| | | | DC INPUT | | | |
|---|---|---|---|---|---|---|
| V | A | P | 18 - 32 V | 38 - 60 V | 88 - 150 V | 175 - 300 V |
| 24 V | 9 A | 216 W | PM240 24/24 | | | |
| 24 V | 10 A | 240 W | | PM240 48/24 | PM240 110/24 | PM240 220/24 |
| 36 V | 6.67 A | 240 W | | PM240 48/36 | | |
| 48 V | 4.5 A | 216 W | PM240 24/48 | | | |
| 48 V | 5 A | 240 W | | PM240 48/48 | PM240 110/48 | PM240 220/48 |
| 60 V | 3.6 A | 216 W | PM240 24/60 | | | |
| 60 V | 4 A | 240 W | | PM240 48/60 | PM240 110/60 | PM240 220/60 |
| 110 V | 1.97 A | 216 W | PM240 24/110 | | | |
| 110 V | 2.19 A | 240 W | | PM240 48/110 | PM240 110/110 | PM240 220/110 |


More mounting displays,
see page 17 & 19.

# DC/DC converters PSC-series 80 - 150 W

# 8 - 12 TE, chassis, DIN

## INPUT / OUTPUT

- PSC80 - 150 wide input ranges 10 - 550 Vdc
- PSC240 optimized input 18 - 550 Vdc
- Single outputs 5 - 48 V, 100 - 150 W
- Single outputs 12 - 125 V, 200 - 240 W
- Reverse input voltage protection

## FEATURES

- CE mark, EMC, LVD, ROHS
- Conformally coated
- Temperature power limit
- Alarm circuit with relay
- Inhibit input / Power down
  Accessible on front panel:
  - Output OK status green/red LED
  - Output voltage adjustment
  - Output voltage measurement
- Wall , case, DIN mounting
- Optional Euro format 3HE, 8 - 14 TE

## OUTPUT RATING 5 - 48 V 24T INPUTS

| DC OUTPUT | | | DC INPUT |
|---|---|---|---|
| V | A | P | 16 - 34 V (*) |
| 5 V | 16 A | 80 W | PSC8024T/5 |
| 12 V | 8.5 A | 100 W | PSC150 24T/12 |
| 13.2 V | 7.6 A | 100 W | PSC150 24T/13.2 |
| 15 V | 6.7 A | 100 W | PSC100 24T/15 |
| 24 V | 4.2 A | 100 W | PSC100 24T/24 |
| 24 V | 6.3 A | 150 W | PSC150 24T/24 |
| 48 V | 2.1 A | 150 W | PSC100 24T/48 |
| 48 V | 3.1 A | 150 W | PSC150 24T/48 |

(*) 16 - 34 V Meets EN50155 train inputs and MIL-STD 461-F

## OUTPUT RATING 5 - 48 V | 24 to 400 V WIDE INPUTS & TYPE CODE 80 – 150 W

| DC OUTPUT | | | DC INPUT | | | | | |
|---|---|---|---|---|---|---|---|---|
| V | A | P | 20- 60 V | 40 - 100 V | 50 - 150 V | 90 - 270 V | 250 - 550 V | Case |
| 5 V | 16 A | 80 W | PSC80B5 | PSC80CT5 | PSC80C5 | PSC80D5 | PSC80E5 | 8TE |
| 12 V | 8.5 A | 100 W | PSC100B12 | PSC100CT12 | PSC100C12 | PSC100D12 | PSC100E12 | 8TE |
| 12 V | 12.5 A | 150 W | PSC150B12 | PSC150CT12 | PSC150C12 | PSC150D12 | PSC150E12 | 10TE |
| 13.2 V | 7.6 A | 100 W | PSC100B13.2 | PSC100CT13.2 | PSC100C13.2 | PSC100E13.2 | PSC100E13.2 | 8TE |
| 13.2 V | 11.4 A | 150 W | PSC150B13.2 | PSC150CT13.2 | PSC150C13.2 | PSC150D13.2 | PSC150E13.2 | 10TE |
| 15 V | 6.7 A | 100 W | PSC100B15 | PSC100CT15 | PSC100C15 | PSC100D15 | PSC100E15 | 8TE |
| 15 V | 10 A | 150 W | PSC150B15 | PSC150CT15 | PSC150C15 | PSC150D15 | PSC150E15 | 10TE |
| 24 V | 4.2 A | 100 W | PSC100B24 | PSC100CT24 | PSC100C24 | PSC100D24 | PSC100E24 | 8TE |
| 24 V | 6.3 A | 150 W | PSC150B24 | PSC150CT24 | PSC150C24 | PSC150D24 | PSC150E24 | 10TE |
| 48 V | 2.1 A | 100 W | PSC100B48 | PSC100CT48 | PSC100C48 | PSC100D48 | PSC100E48 | 8TE |
| 48 V | 3.1 A | 150 W | PSC150B48 | PSC150CT48 | PSC150C48 | PSC150D48 | PSC150E48 | 10TE |

# DC/DC converters
# PSC-series 200 - 240 W
# 8 - 12 TE, chassis, DIN

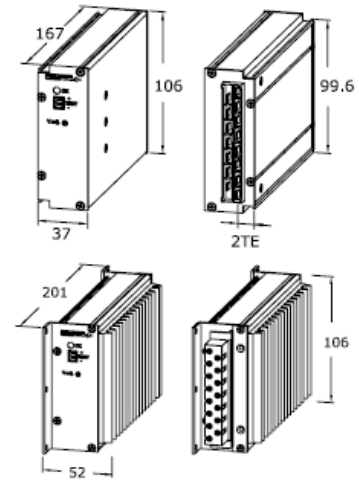
Mounting and pinout, see also page 19.

## INPUT / OUTPUT

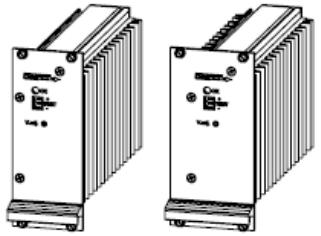
- PSC240 optimized input 18 - 550 Vdc
- Railway EN 50155 inputs S1
  T input code 80 - 240 W
- Single outputs 12 - 220 V, 200 - 240 W
- Reverse input voltage protection

## FEATURES

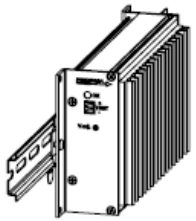
- CE mark, EMC, LVD, ROHS
- Conformally coated
- Temperature power limit
- Alarm circuit with relay
- Inhibit input / Power down
  Accessible on front panel:
  - Output OK status green/red LED
  - Output voltage adjustment
  - Output voltage measurement
- Wall , case, DIN mounting
- Optional Euro format 3HE, 8 - 14 TE




*DIN or wall mounting*
*Model with N (standard)*



*19" subrack mounting*
*Model with L-panel (optional)*



*DIN-rail mounted*
*Model with N (standard) + TS35 clips*

## 12 to 220 V outputs | 24 to 400 V optimized inputs & type code 210 – 240 W

| DC OUTPUT | | | DC INPUT | | | | | |
|---|---|---|---|---|---|---|---|---|
| V | A | P | 18 - 32 V (*) | 38 - 60 V | 88 - 150 V | 175 - 300 V | 350 - 550 V | Case |
| 12 V | 17.5 A | 210 W | PSC200 24/12 | PSC200 48/12 | PSC200 110/12 | PSC200 220/12 | PSC200 440/12 | 10TE |
| 13.2 V | 12.5 A | 210 W | PSC200 24/13.2 | PSC200 48/13.8 | PSC200 110/13.2 | PSC200 220/13.2 | PSC200 440/13 | 10TE |
| 15 V | 14 A | 210 W | PSC200 24/15 | PSC200 48/15 | PSC200 110/15 | PSC200 220/15 | PSC200 440/15 | 10TE |
| 24 V | 10 A | 240 W | PSC240 24/24 | PSC240 48/24 | PSC240 110/24 | PSC240 220/24 | PSC240 440/24 | 10TE |
| 48 V | 5 A | 240 W | PSC240 24/48 | PSC240 48/48 | PSC240 110/48 | PSC240 220/48 | PSC240 440/48 | 10TE |
| 110 V | 2.18 A | 240 W | PSC240 24/110 | PSC240 48/110 | PSC240 110/110 | PSC240 220/110 | PSC240 440/110 | 10TE |
| 220 V | 1.1 A | 240 W | | - - - | PSC240 110/220 | PSC240 220/220 | PSC240 440/220 | 10TE |


## FEATURES

- CE mark, EMC, LVD, ROHS
- Alarm circuit with relay
  Accessible on front panel:
  - Output OK status green/red LED
  - Output voltage adjustment
  - Output voltage measurement
- Wall , case, DIN mounting
- Optional Euro format 3HE, 10 - 14 TE

# DC/DC Converter
# PSC-series 80 - 150 W
# 2 & 3 outputs
# 10 - 14 TE, chassis, DIN

## INPUT / OUTPUT

- PSC80 - 120 world wide input ACW
- PSC80 - 120 optimized inputs ACR, ACW
- Single outputs 5 - 48 V, 80 - 120 W
- Dual or bipolar ±(5 - 30 V), 80 - 120 W

## OUTPUT RATING & TYPE CODE 80 – 120 W

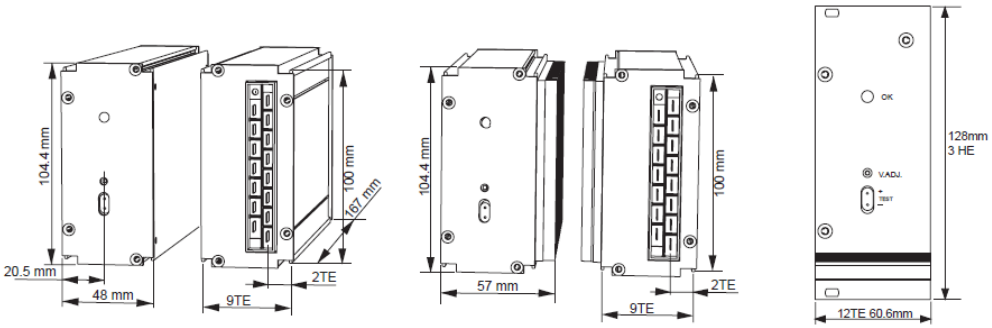
| MASTER OUTPUT | | | SLAVE OUTPUT TYPE CODE | | | |
|---|---|---|---|---|---|---|
| V | A | P | V | A | Output 2 &3 | Ptot |
| 5 V | 16 A | 80 W | 3 - 6 V | ±2 A | PSC100 IN 5S 3 - 6 | 100 W |
| 5 V | 16 A | 80 W | 12 - 30 V | ±1.2 A | PSC120 IN 5S 12 - 30 | 120 W |
| 12 V | 6 A | 80 W | 3 - 6 V | ±2 A | PSC100 IN 12S 3 - 6 | 100 W |
| 12 V | 10 A | 120 W | 12 - 30 V | ±1.2 A | PSC120 IN 12S 12 - 30 | 150 W |
| 15 V | 6.7A | 80 W | 3 - 6 V | ±2 A | PSC100 IN 15S 3 - 6 | 100 W |
| 15 V | 8 A | 120 W | 12 - 30 V | ±1.2 A | PSC120 IN 15S 12 - 30 | 120 W |
| 24 V | 6.7A | 80 W | 3 - 6 V | ±2 A | PSC100 IN 24S 3 - 6 | 100 W |
| 24 V | 8 A | 120 W | 12 - 30 V | ±1.2 A | PSC120 IN 24S 12 - 30 | 120 W |
| 48 V | 6.7A | 80 W | 3 - 6 V | ±2 A | PSC100 IN 48S 3 - 6 | 100 W |
| 48 V | 8 A | 120 W | 12 - 30 V | ±1.2 A | PSC120 IN 48S 12 - 30 | 120 W |

| WIDE INPUT PSC100 - PSC150 | | |
|---|---|---|
| Nominal inputs | Input range | Code |
| 24 Vd.c. | 16 - 32 V | 24T |
| 24, 28, 36, 48 Vd.c. | 20 - 60 V | B |
| 48, 60, 72 Vd.c | 38 - 100 V | CT |
| 72, 96, 110, 127 Vd.c | 50 - 150 V | C |
| 110, 127, 220, 250 Vd.c. | 90 - 270 V | D |

Mounting and pinout, see page 19.

## 2 & 3 output PSC modells

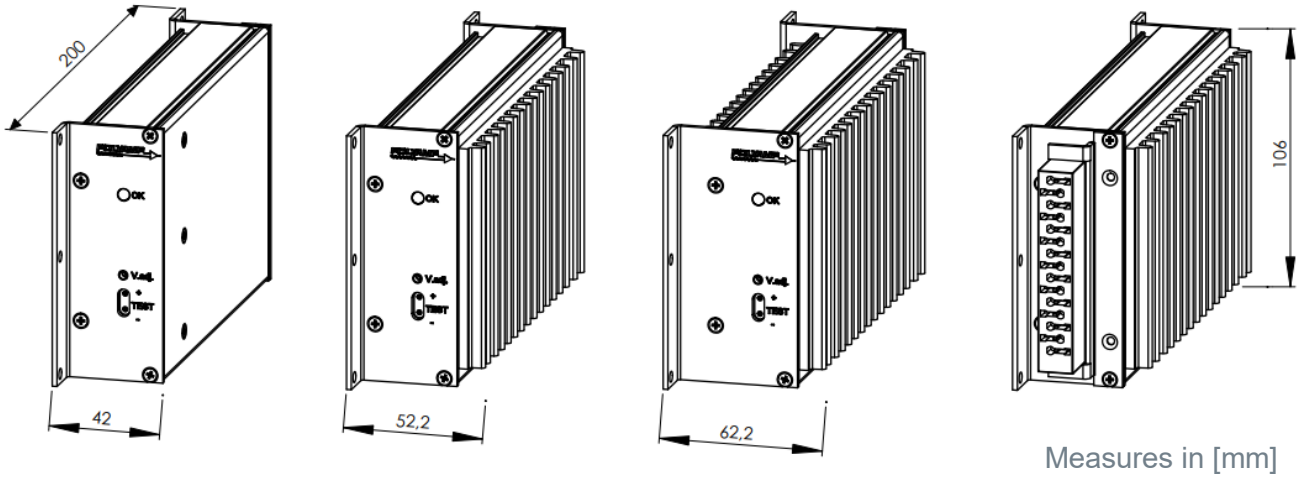
Page 11 describes the functionality of the 2 to 3 output models. The master output require a base load of minimum 30% of total load.
The secondary output needs to be specified as not adjustable.
When 2 second outputs they are symmetric ± fixed voltages.




The mechanics of 2 to 3 output models is slightly larger to accommodate extra components. Instead of “8TE” the basic case is “10TE”. All other mechanic features are the same.

# DC/DC converters
# PSC-series mechanics
# 8 - 12 TE, chassis, DIN

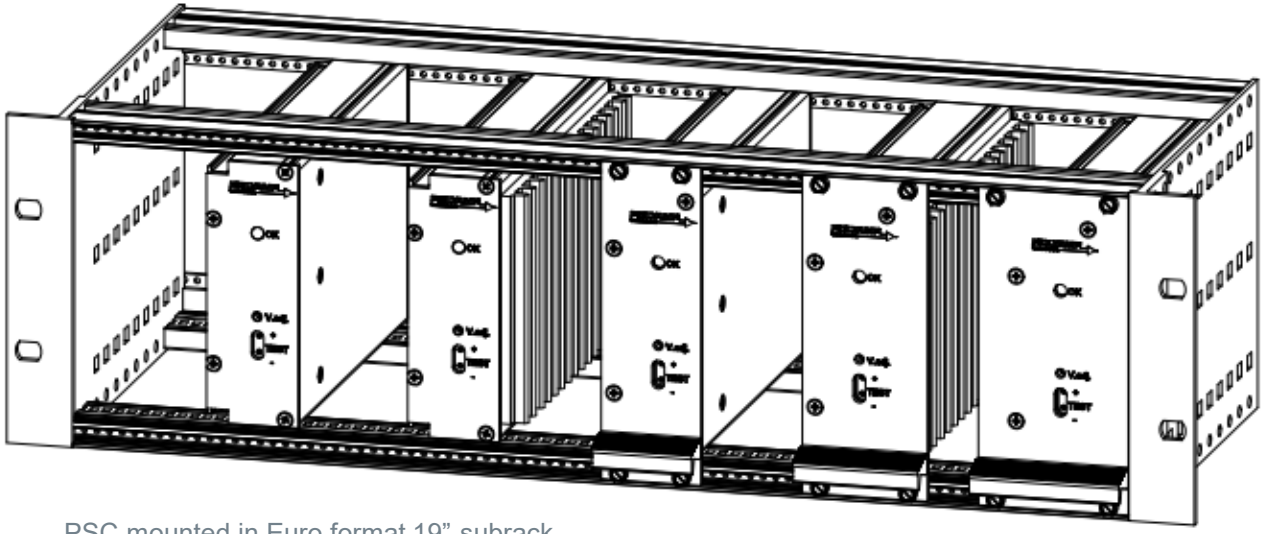
## N-MECHANICS: WALL & CHASSIS MOUNTING WITH H15 CONNECTORS




Measures in [mm]

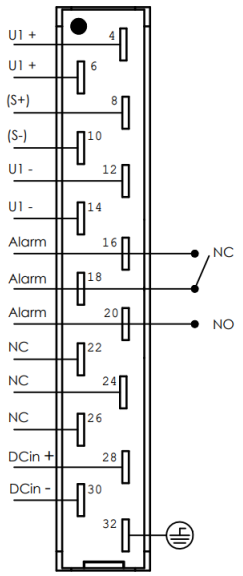
Front and connector view of N-Mechanics, includes connector holder. Female H15 connector is optional.

## L-MECHANICS: 3HE FOR 8-12TE PLUGIN MODULES

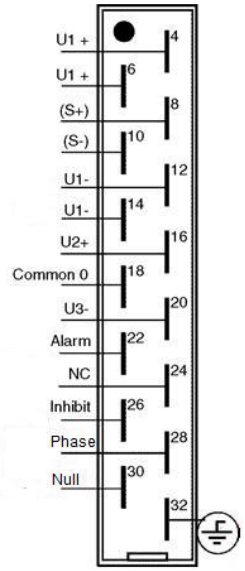


PSC mounted in Euro format 19”-subrack without TE panel. The type code do not include the letter L (L-panel).

PSC with standard L-mechanic mounted in a Euro format 19” -sub rack. L-8 indicates 8TE etc.




*H15 connector Pinout*
*Single output*
*DC input*




*H15 connector Pinout*
*2 - 3 outputs*
*AC input*

| L-Mechanics | PSC | Option 1xT3 | Option 2xT3 |
|---|---|---|---|
| Width (mm) | 36 | 46.6 | 56.2 |
| Width TE | 8 TE | 10 TE | 12 TE |
| Weight ex, connector | 0.8 kg | 1.0 kg | 1.2 kg |
| **N-Mechanics** | **PSC** | **Option 1xT3** | **Option 2xT3** |
| **e** see figure 5 (mm) | 42 | 54.2 | 64.2 |
| Weight ex, connector | 0.85 kg | 1.05 kg | 1.25 kg |

# DC/DC converters PSC-series 300 - 800 W

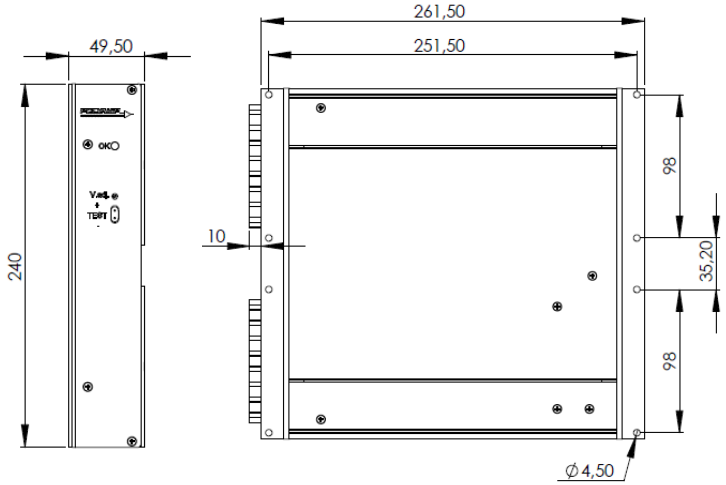
# 8 - 14 TE, chassis, DIN

## INPUT / OUTPUT

- Optimized inputs 24 to 440 VDC
- Single outputs 5 to 220 V
- Zero inrush current limit
- Reverse input voltage protection

## FEATURES

- CE mark, EMC, LVD, ROHS
- Conformally coated
- Temperature power limit
- Alarm circuit with relay
- Inhibit input / Power down
  Accessible on front panel:
  - Output OK status green/red LED
  - Output voltage adjustment
  - Output voltage measurement
- Wall , case, DIN mounting
- Optional Euro format 3HE, 10 - 14 TE




*Wall mounted version, see page 28 for rack 6 HE.*

## 24 V INPUT/OUTPUT RATING & TYPE CODE

| DC OUTPUT | | | DC INPUT |
|---|---|---|---|
| V | A | P | 18 - 32 V |
| 13.2 V | 38 A | 500 W | PSC500 24/13.2 |
| 15 V | 33 A | 500 W | PSC500 24/15 |
| 28 V | 21 A | 600 W | PSC600 24/28 |
| 53 V | 11 A | 600 W | PSC600 24/53 |
| 110 V | 5.5 A | 600 W | PSC600 24/110 |
| 125 V | 4.8 A | 600 W | PSC600 24/125 |

## 48 to 400 V INPUTS / OUTPUT RATING & TYPE CODE

| DC OUTPUT | | | DC INPUT | | | |
|---|---|---|---|---|---|---|
| V | A | P | 38 - 60 V | 88- 150 V | 175 - 300 V | 350 - 550 V |
| 12 V | 17.5 A | 400 W | PSC400 48/12 | PSC400 110/12 | PSC400 220//12 | — |
| 13.2 V | 12.5 A | 400 W | PSC400 48/13.2 | PSC400 110/13.2 | PSC400 220/13.2 | PSC400 400/13.2 |
| 15 V | 14 A | 400 W | PSC400 48/15 | PSC400 110/15 | PSC400 220/15 | — |
| 24 V | 25 A | 600 W | PSC600 48/24 | PSC600 110/24 | PSC600 220/24 | PSC600 400/24 |
| 28 V | 22 A | 600 W | PSC600 48/28 | PSC600 110/28 | PSC600 220/28 | PSC600 400/28 |
| 48 V | 12.5 A | 600 W | PSC600 48/48 | PSC600 110/48 | PSC600 220/48 | PSC600 400/48 |
| 53 V | 12 A | 600 W | PSC600 48/53 | PSC600 110/53 | PSC600 220/53 | PSC600 400/53 |
| 110 V | 5.5 A | 600 W | PSC600 48/110 | PSC600 110/110 | PSC600 220/110 | PSC600 400/110 |
| 125 V | 5.0 A | 600 W | PSC600 48/125 | PSC600 110/125 | PSC600 220/125 | PSC600 400/125 |
| 220 V | 2.7 A | 600 W | - - - | PSC600 110/220 | PSC600 220/220 | PSC600 400/220 |

# DC/DC Converters
# PM500 series 500 W
# Wall, DIN, 1/2 19”-rack 2U


## FEATURES

- Single outputs 13.2 - 110 V
- Over voltage protection
- Output voltage alarm
- Selectable series diode on output
- Remote sense
- Inhibit / Power down input
- Inrush current limit
- Convection cooled
- Operating temp. –25 to +70°C, without derating
- EN45545-2 HL1, HL2, HL3
- Wall/DIN mounting or 1/2 19” rack

## OPTIONS

- Train inputs
- Tropical coating

## CE-marking

- Electric safety
- RoHS Directive
- EMC low emissions high immunity

**Option:19” rack mounting** **Standard mechanics** **Option: DIN rail**

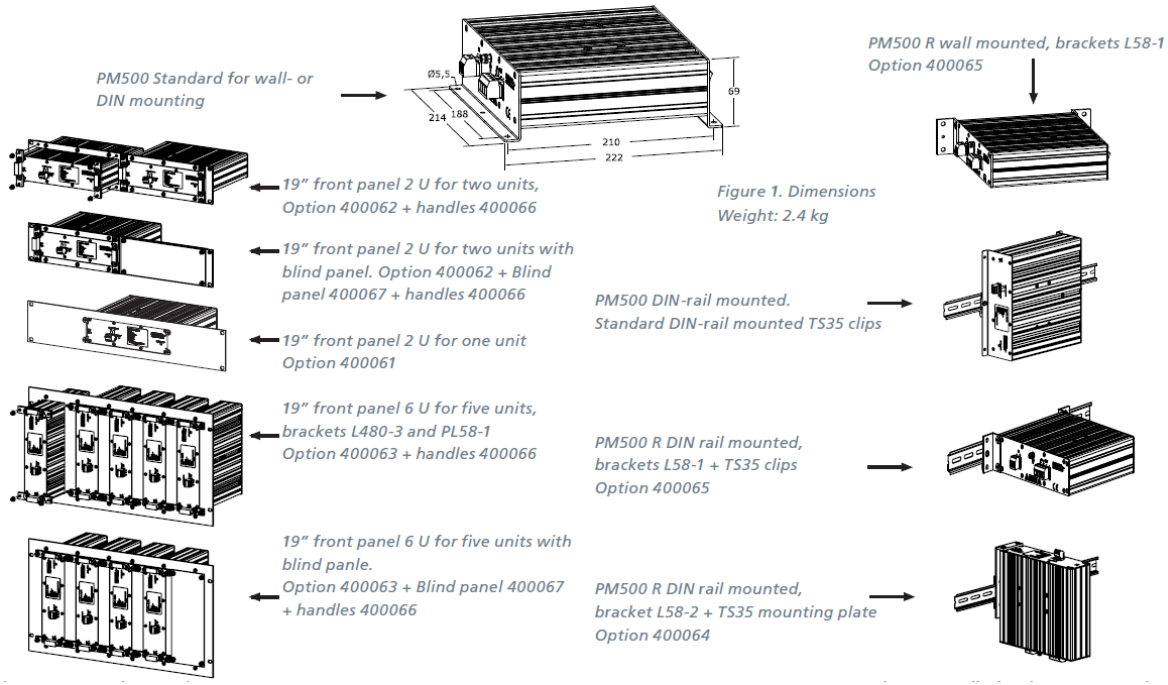



*Figure 1. Dimensions*
*Weight: 2.4 kg*

## 12 - 110 V OUTPUT | 48 to 250 VDC WIDE INPUTS & TYPE CODE 260 – 500 W

| DC OUTPUT | | | DC INPUT | | |
|---|---|---|---|---|---|
| Voltage | Current | Power | | 50 - 150 V | 100 - 300 V |
| 13.2 | 20 A | 260 W | | PM260 110C/13.2 | PM260 220D/13.2 |
| Voltage | Current | Power | 43 - 60V | 93 - 150 V | 187 - 300 V |
| 24 V | 20.0A | 500 W | PM500 48/24 | PM500 110/24 | PM500 220/24 |
| 28 V | 15.0 A | 420 W | PM500 48/28 | PM500 110/T28 | PM500 220/T28 |
| 48 V | 10.5 A | 500 W | PM500 48/48 | PM500 110/48 | PM500 220/48 |
| 53.2V | 9.5 A | 500 W | PM500 48/53 | PM500 110/53 | PM500 220/53 |
| 110 V | 4.5 A | 500 W | PM500 48/53.2 | PM500 110/110 | PM500 220/110 |


## FEATURES

- Wide input range ranges
- Single outputs 12 - 60 V
- Over voltage protection
- Output voltage alarm
- Series diode on output
- Remote sense
- Inhibit / Power down input
- Operating temp. –25 to +55°C, without derating
- EN45545-2 HL1, HL2, HL3
- DIN-rail, wall mounting or
- 19” rack mountin options

# DC/DC Converters PU300 216 - 300 W Wall, DIN, 1/2 19”-rack 2U

## CE-marking

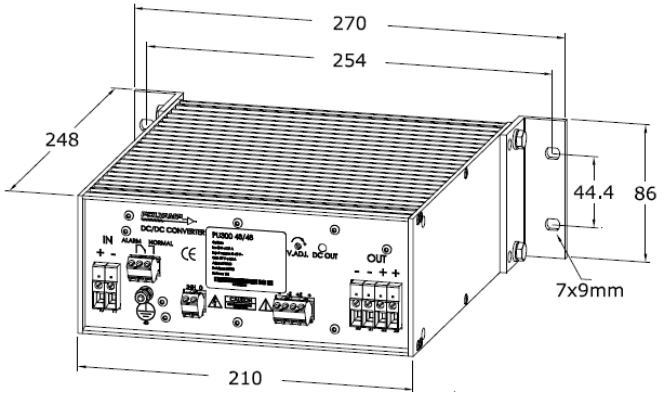
- Electric safety
- RoHS Directive
- EMC low emissions high immunity

## OPTIONS

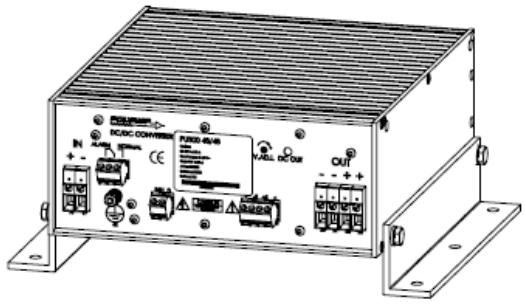
- Train inputs
- Tropical coating

## 12 - 60 V OUTPUT | 12 to 220 VDC WIDE INPUTS & TYPE CODE 216 – 300 W

| DC OUTPUT | | | DC INPUT | | | |
|---|---|---|---|---|---|---|
| V | A | P | 10 - 30 V | 20 - 60 V | 50 - 150 V | 90 - 270 V |
| 12 V | 18 A | 216 W | PU300A12 | | | |
| 12 V | 25 A | 300 W | | PU300B12 | PU300C12 | PU300D12 |
| 13.8 V | 16 A | 220 W | PU300A13.8 | | | |
| 13.8 V | 21.8 A | 300 W | | PU300B13.8 | PU300C13.8 | PU300D13.8 |
| 15 V | 16 A | 240 W | PU300A15 | | | |
| 15 V | 20 A | 300 W | | PU300B15 | PU300C15 | PU300D15 |
| 24 V | 10 A | 240 W | PU300A24 | | | |
| 24 V | 12.5 A | 300 W | | PU300B24 | PU300C24 | PU300D24 |
| 28 V | 8.58 A | 240 W | PU300A28 | | | |
| 28 V | 10.8 A | 300 W | | PU300B28 | PU300C28 | PU300D28 |
| 36 V | 6.67 A | 240 W | PU300A36 | | | |
| 36 V | 8.34 A | 300 W | | PU300B36 | PU300C36 | PU300D36 |
| 48 V | 5 A | 240 W | PU300A48 | | | |
| 48 V | 6.25 A | 300 W | | PU300B48 | PU300C48 | PU300D48 |
| 60 V | 4 A | 240 W | PU300A60 | | | |
| 60 V | 5 A | 300 W | | PU300B60 | PU300C60 | PU300D60 |




*PU300/PU500 wall mounted. Std brackets L86-1*



*PU300/PU500 wall mounted, optional L216-1*


## FEATURES

- Single outputs 24 - 60 V
- Over voltage protection
- Output voltage alarm
- Series diode on output
- Remote sense
- Inhibit / Power down input
- Operating temp. –25 to +55°C,
- without derating
- DIN-rail, wall mounting
  or 19” rack

## OPTIONS

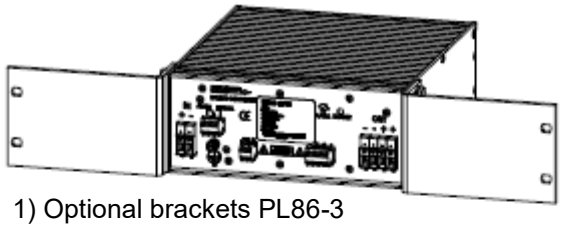
- Train inputs
- Tropical coating

## CE-marking

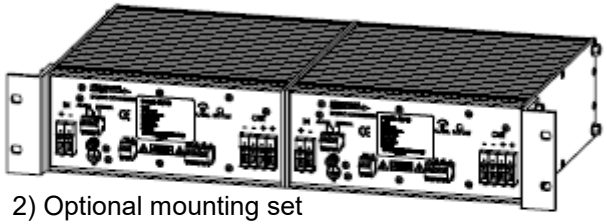
- Electric safety
- RoHS Directive
- EMC low emissions high immunity

# DC/DC Converters
# PU500 360 - 500 W
# Wall, DIN, 1/2 19”-rack 2U

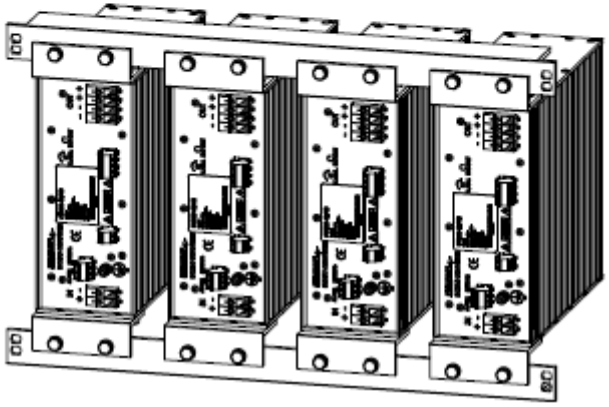
### PU300/PU500 mounting in 19” rack



1) Optional brackets PL86-3



2) Optional mounting set



3) Vertical 19”-rack mount 1 to 4 units (optional)

## 24 - 60 V OUTPUT | 24 to 220 VDC INPUTS & TYPE CODE 400 – 500 W

| DC OUTPUT | | | DC INPUT | | | |
|---|---|---|---|---|---|---|
| V | A | P | 18 - 32 V | 38 - 60 V | 88 - 150 V | 175 - 300 V |
| 24 V | 16.7 A | 400 W | PU500 24/24 | | | |
| 24 V | 20.9 A | 500 W | | PU500 48/24 | PU500 110/24 | PU500 220/24 |
| 28 V | 14.3 A | 400 W | PU500 24/28 | | | |
| 28 V | 17.9 A | 500 W | | PU500 48/28 | PU500 110/28 | PU500 220/28 |
| 36 V | 11.2 A | 400 W | PU500 24/36 | | | |
| 36 V | 13.9 A | 500 W | | PU500 48/36 | PU500 110/36 | PU500 220/36 |
| 48 V | 8.34 A | 400 W | PU500 24/48 | | | |
| 48 V | 10.5 A | 500 W | | PU500 48/48 | PU500 110/48 | PU500 220/48 |
| 60 V | 6.67 A | 400 W | PU500 24/60 | | | |
| 60 V | 8.34 A | 500 W | | PU500 48/60 | PU500 110/60 | PU500 220/60 |


# DC/DC Converters PU600 600 W 19”-rack 2U, wall

## FEATURES

- Single outputs 24 - 60 V
- Over voltage protection
- Output voltage alarm
- Series diode on output
- Remote sense
- Inhibit / Power down input
- Operating temp. –25 to +55°C, without derating
- EN45545-2 HL1, HL2, HL3
- DIN-rail, wall mounting or 19” rack

## OPTIONS

- Train inputs
- Tropical coating
- Mechanical features

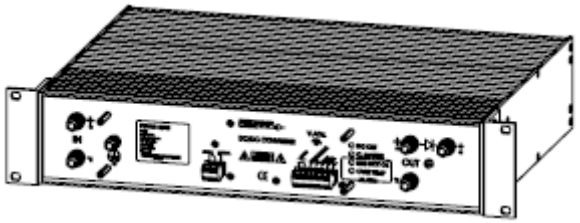
## CE-marking

- Electric safety
- RoHS Directive
- EMC low emissions high immunity

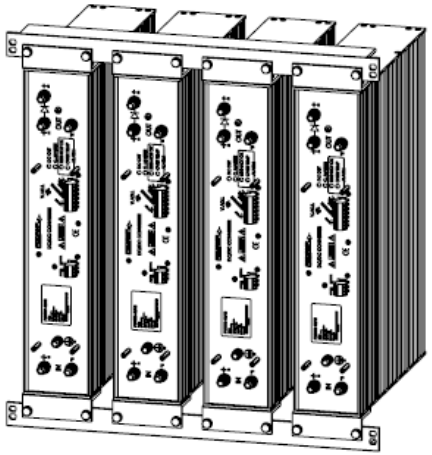
## OUTPUT RATING 12 - 48 V | 24 to 220 VDC INPUTS & TYPE CODE

| DC OUTPUT | | | DC INPUT | | |
|---|---|---|---|---|---|
| V | A | P | 20 - 60 V | 50 - 150 V | 90 - 270 V |
| 12 V | 40.0 A | 480 W | PU600B12 | PU600C12 | NRE |
| 13.8 V | 40.0 A | 550 W | PU600B13.8 | PU600C13.8 | NRE |
| 24 V | 25.0 A | 600 W | PU600B24 | PU600C24 | PU600D24 |
| 48 V | 12.5 A | 600 W | PU600B48 | PU600C48 | PU600D48 |

### PU600/PU1000 mounting in 19” rack



1) Standard brackets 2x PL89-1



2) Optional vertical 19”-rack mount 1 to 4 units
Standard brackets PL89-1 + L480-2


# DC/DC Converters PU1000 800 - 1000 W 19”-rack 2U, wall

## FEATURES

- Single outputs 24 - 110 V
- Over voltage protection
- Output voltage alarm
- Series diode on output
- Remote sense
- Inhibit / Power down input
- Operating temp. –25 to +55°C, without derating
- EN45545-2 HL1, HL2, HL3
- DIN-rail, wall mounting or 19” rack

## OPTIONS

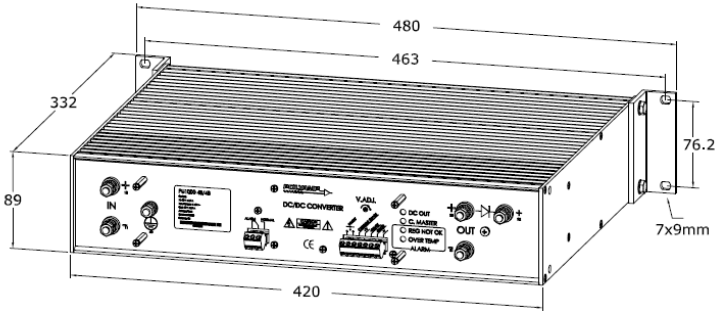
- Train inputs
- Tropical coating
- Mechanical features

## CE-marking

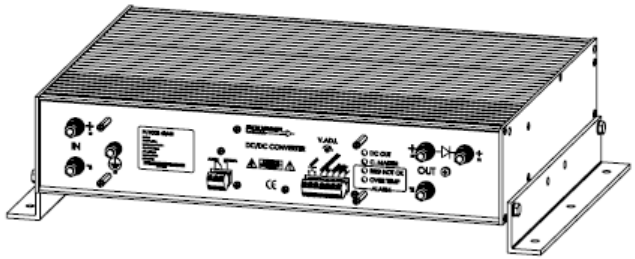
- Electric safety
- RoHS Directive
- EMC low emissions high immunity

## OUTPUT RATING 24 - 110 V | 24 to 250 VDC INPUTS & TYPE CODE

| DC OUTPUT | | | DC INPUT | | | | |
|---|---|---|---|---|---|---|---|
| V | A | P | 18 - 32 V | 38 - 60 V | 50 - 90 V | 88 - 150 V | 175 - 300 V |
| 24 V | 33.4 A | 800 W | PU1000 24/24 | | | | |
| 24 V | 41.7 A | 1000 W | | PU1000 48/24 | PU1000 72/24 | PU1000 110/24 | PU1000 220/24 |
| 28 V | 28.6 A | 800 W | PU1000 24/28 | | | | |
| 28 V | 35.7 A | 1000 W | | PU1000 48/28 | PU1000 72/28 | PU1000 110/28 | PU1000 220/28 |
| 48 V | 16.7 A | 800 W | PU1000 24/48 | | | | |
| 48 V | 20.9 A | 1000 W | | PU1000 48/48 | PU1000 72/48 | PU1000 110/48 | PU1000 220/48 |
| 53.2 V | 13.4 A | 1000 W | | PU1000 48/53.2 | | | |
| 60 V | 16.7 A | 800 W | PU1000 24/60 | | | | |
| 60 V | 11.8 A | 1000 W | | PU1000 48/60 | PU1000 72/60 | PU1000 110/60 | PU1000 220/60 |
| 85 V | 7.28 A | 1000 W | | PU1000 48/85 | PU1000 72/85 | PU1000 110/85 | PU1000 220/85 |
| 110 V | 9.09 A | 800 W | PU1000 24/110 | | | | |
| 110 V | 9.09 A | 1000 W | | PU1000 48/110 | PU1000 72/110 | PU1000 110/110 | PU1000 220/110 |




1) Standard PU600/PU1000 19”-rack mount brackets PL89-1



2) Optional wall mounted mounting bracket L-300-1


# DC/DC Converters PC1000 - 1000 W 19”-rack 2U, wall

## FEATURES

- Single outputs 24 - 60 V
- Over voltage protection
- Output voltage alarm
- Series diode on output
- Remote sense
- Inhibit / Power down input
- Inrush current limit
- Convection cooled
- Operating temp. –25 to +55°C, without derating
- EN45545-2 HL1, HL2, HL3
- Wall mounting or 19” rack

## OPTIONS

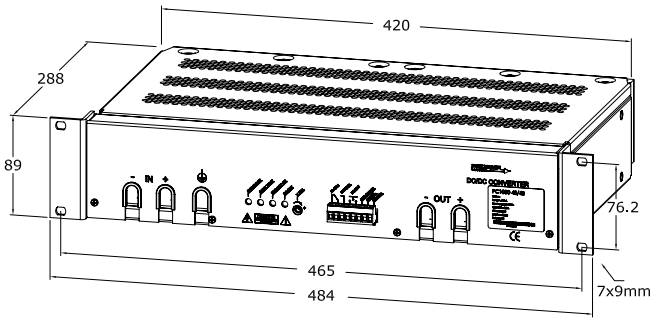
- Train inputs
- Tropical coating

## CE-marking

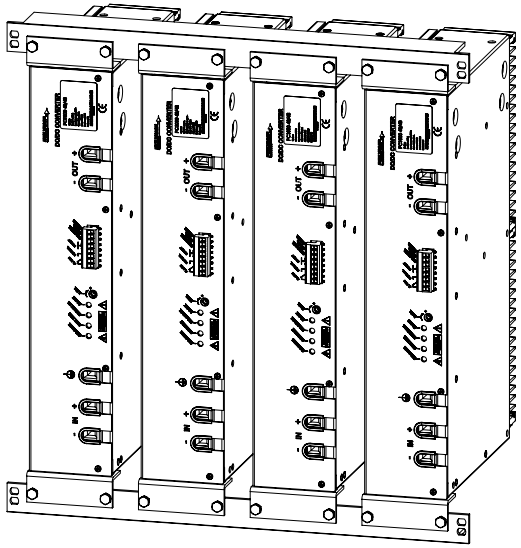
- Electric safety
- RoHS Directive
- EMC low emissions high immunity

## OUTPUT RATING 24 - 53 V | 24 to 250 VDC INPUTS & TYPE CODE

| DC OUTPUT | | | DC INPUT | | | |
|---|---|---|---|---|---|---|
| V | A | P | 20 - 32 V | 43 - 60 V | 93 - 150 V | 187 - 300 V |
| 24 V | 42 A | 1000 W | PC1000 24/24 | PC1000 48/24 | PC1000 110/24 | PC1000 220/24 |
| 28 V | 36 A | 1000 W | PC1000 24/28 | PC1000 48/28 | PC1000 110/28 | PC1000 220/28 |
| 36 V | 28 A | 1000 W | PC1000 24/36 | PC1000 48/36 | PC1000 110/36 | PC1000 220/36 |
| 48 V | 21 A | 1000 W | PC1000 24/48 | PC1000 48/48 | PC1000 110/48 | PC1000 220/48 |
| 53 V | 19 A | 1000 W | PC1000 24/53 | PC1000 48/53 | PC1000 110/53 | PC1000 220/53 |




*PC1000 convection cooled mechanics.*
*Rack mounted 19” 2U. Brackets L89-3 (standard)*



*1 to 4 units PC1000/2000 mounted vertical, using standard L89-3 brackets and L480-2 (Optional).*


# DC/DC Converters PC2000 1400 - 2000 W 19”-rack 2U, wall

## FEATURES

- Single outputs 24 - 60 V
- Over voltage protection
- Output voltage alarm
- Series diode on output
- Remote sense
- Inhibit / Power down input
- Inrush current limit
- Convection cooled
- Operating temp. –25 to +55°C, without derating
- EN45545-2 HL1, HL2, HL3

## OPTIONS

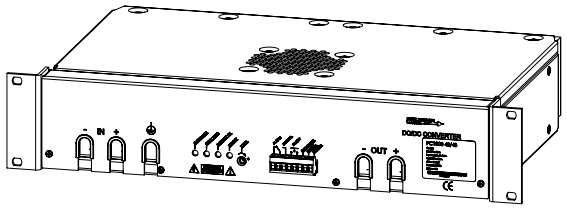
- Train inputs
- Tropical coating

## CE-marking

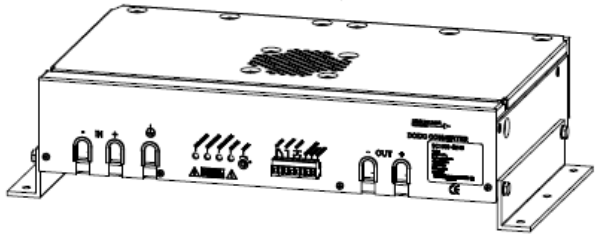
- Electric safety
- RoHS Directive
- EMC low emissions high immunity

## OUTPUT RATING 24 - 53 V | 24 to 250 VDC INPUTS & TYPE CODE

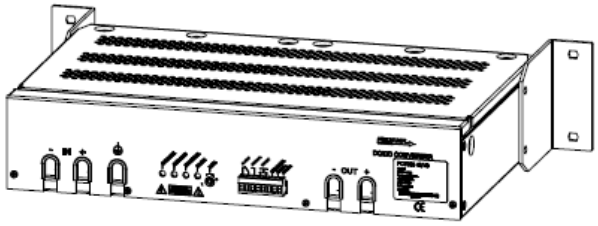
| DC OUTPUT | | | DC INPUT | | | | |
|---|---|---|---|---|---|---|---|
| V | A | P | 43 - 60 V | 48 - 69 V | 93 - 150 V | 187 - 300 V | Cooling |
| 24 V | 58 A | 1400 W | PC1400 48/24 | | PC1400 110/24 | PC1400 220/24 | FAN |
| 28 V | 50 A | 1400 W | PC1400 48/28 | | PC1400 110/28 | PC1400 220/28 | FAN |
| 36 V | 39 A | 1400 W | PC1400 48/36 | | PC1400 110/36 | PC1400 220/36 | FAN |
| 36 V | 56 A | 2000 W | PC2000 48/36 | | PC2000 110/36 | PC2000 220/36 | FAN |
| 42 V | 48 A | 2000 W | | | | PC2000 220/42 | FAN |
| 48 V | 42 A | 2000 W | | PC2000 60/48 | | | FAN |
| 53.2 V | 38 A | 2000 W | | | PC2000 110/53.2 | PC2000 220/53.2 | FAN |



*PC1000/PC1400/2000 Rack mounted 19” 2U. Brackets L89-3 (standard). Fan cooling mechanics on display.*



*PC1000/PC1400/PC2000 L216-1 brackets for wall mounting, optional*



*PC1000/PC1400/PC2000 L100-1 wall mounting, optional*

# Customising

## Customizing from our standard program

In this catalogue we show basically our standard program. Which is made to cover most applications, with our experience.

However we can modify or adjust parameters to fit new or old applications. Our designs are basically made to be very flexible.

Polyamp is used in Security qualified application in **Nuclear Power plants**, where the customer require special parameters on components.

We have units installed in **trains** almost 30 years ago that are still operational, without failures. However the supplied equipment has been changed a number of times.

Even we have a wide range inputs see page 8, we can adjust to meet other requirements like **MIL-STD 1275 inputs**, see this page. This unit has stringent vibration and shock demand as well as high immunity demands.

**PM50A15-15** page 12 is very popular in **Car testing applications**. The reason is that the supply is regarded as safe and noiseless that will not affect any sensors in any condition.

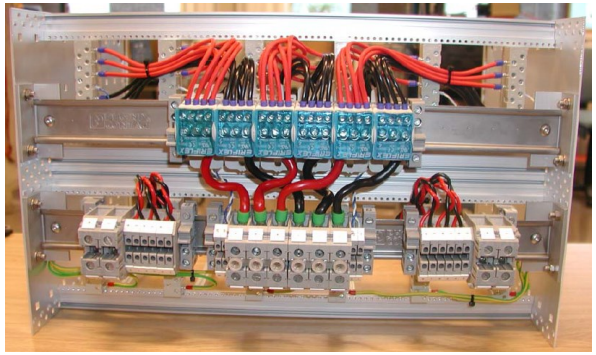
We can also provide assemblies for different applications.

The most obvious is like 19”-rack solutions with examples on this page.

The PSC series can be mounted in 3U or 6U 19”-rack cabinets slots using the Euro format. The above display has a small controller to run a fuel cell process intended for outdoor vehicles.

## Safe voltage applications

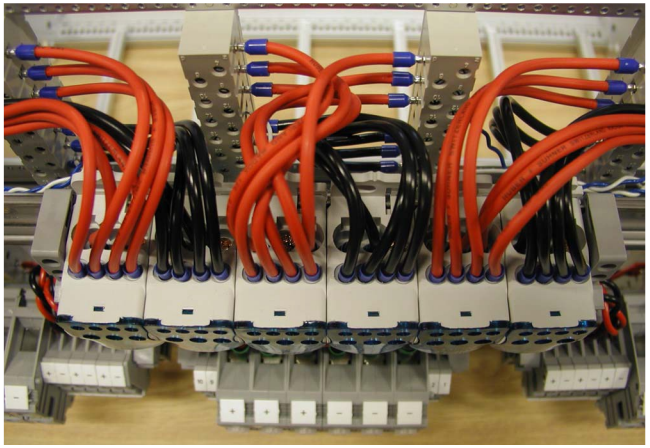
Most common is in Power plants or Process plants where a safe 24, 48, 60, 110/120 VDC is distributed in the plant(*). Then there is a basic configuration N+1 usually is N=2 or 3 then additional modules can be plugged in when more equipment is added later. The back plane cater the series diodes on output and power distribution. Redundant input configuration can be added.



## Military vehicle applications

DC/DC converters for Military vehicle applications with MIL-STD 1275D 28 V input and output 12, 24, 48 V for equipment supply and 100 to 150 V for motor drive of moving equipment’s. Continuous output power 500 W with peak current capacity for motor drive applications.

MIL-STD 461F very high immunity 100 V/m and low emissions. Case and connection rated IP54. Black anodized case.



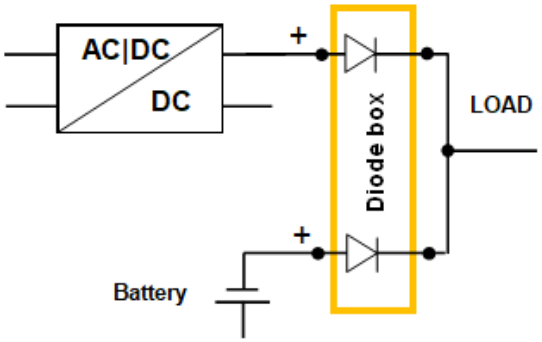
High current distribution backplanes

# Customising

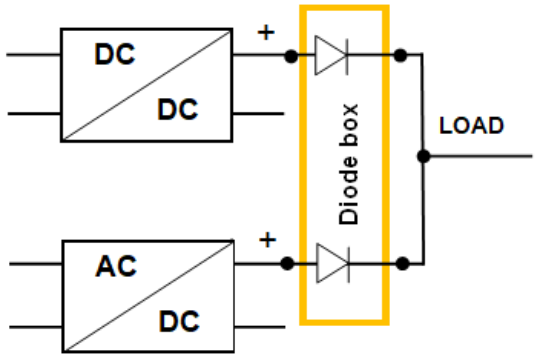
## Series diode boxes

We have several series diode boxes with different voltage and current ratings.
The purpose is either to keep the series diode heat losses outside the DC/DC converter or to include other voltage sources like AC/DC outputs into a distribution system or one or two batteries.

The Diode box 1 & 2 only provide connection for the diodes. Diode box 3 handles both polarities for easier connection. The zero is common rail, thus we have two versions. The Diode box 3 handles currents up to 60 A.


*Two different input sources, where the DC/DC stabilizes the output voltage*



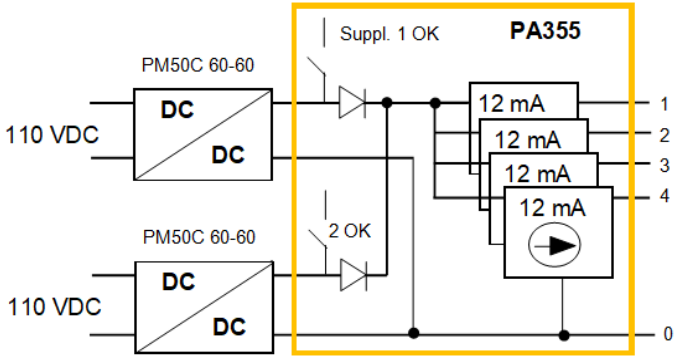

*Two different stabilized voltage sources to one load*

| Part No | Rating | Diode box |
|---|---|---|
| 803550 | 2x 24 V 21 A | 1 |
| 803551 | 2x 110 V 14 A | 1 |
| 803552 | 2x 220 V 12 A | 1 |
| 803554 | 2x 24 V 17 A | 2 |
| 803553 | 2x 48 V 60 A Common + | 3 |
| 803555 | 2x 24 V 35 A Common - | 3 |
| 803556 | 2x 24 V 60 A Common - | 3 |
| | MAX = Rated current @ +55°C | |

## PA355 4 x 10 - 12 mA constant current source

Used to supply a constant current to safety relays either 10 or 12 mA on train or track-side service applications. The regulator automatically compensate for changes in feeding cable lengths up to 4 km. The voltage can vary 40 - 120 V.
PA355 is able to feed 4 individual relays, with common zero. Each regulator output has surge arrestors as protection.

The voltage source is usually one or two (for redundancy) DC/DC units PM50C60-60 with 110 V input, please consult page 13. Relays signals tells which one or if both are in operation.




*The principal PA355 system layout and ratings*

## Ratings

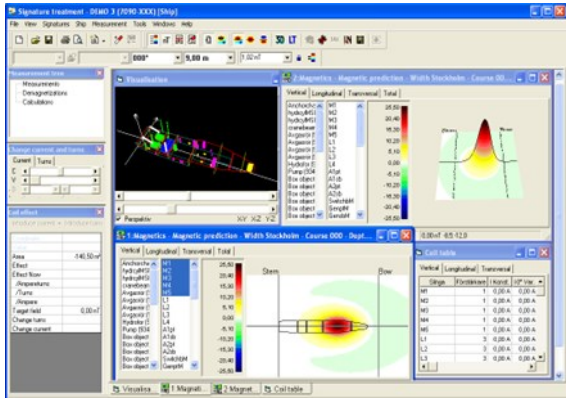
Uout = 40 - 120 V

Iout-1= 10 or 12 mA
Iout-2= 10 or 12 mA
Iout-3= 10 or 12 mA
Iout-4= 10 or 12 mA

Ta = -20 to +55°C

Uin alarm relay:
Rated 30 Vd.c.; 0.1 A

## Signature Management



SWECADE© is an underwater signature management software for magnetics, electrics and pressure.

SWECADE© has been used at all RSwN fixed and transportable magnetic ranges since 1995.

SWECADE© runs on any standard PC´s with WinX. The SWECADE© software can be operated for training and study or as an analytic tool that can read sensor values from a file or use an ADC-board input for direct sensor data acquisition.

**The Signature Prediction module offers:**

- The calculated magnetic signature at any depth in any ambient magnetic field
- Modular build up and calculation of signature for a whole shipset of components (engines, gears etc.)

**The loop-coil design package features:**

- Design of loop-coils for component coils or/and ship sections coils
- Prediction of coil-effects at any distance
- 3D graphic displays of cable routes

**The range utilities are optimised for:**

- Signal processing and data management
- Quick, semi-automatic definition of optimum settings
- Powerful display routines
- Trial and error functionality
- Built in training for Navy personnel

## Degaussing systems

USS George H.W. Bush (CVN77 ) - Nimitz-class

Polyamp specialises in the design, manufacture and support of Advanced Degaussing Systems (ADG).

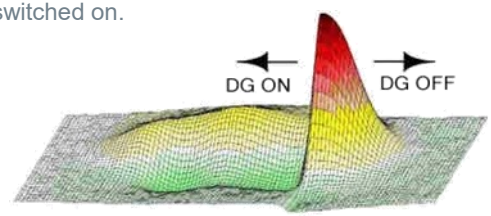
The Naval priority in Littoral waters means that the influence sea mine threat for Navy operations has increased significantly.

The effective answer to this increased sea mine threat is to incorporate on-board Advanced Degaussing System on all Naval ships.

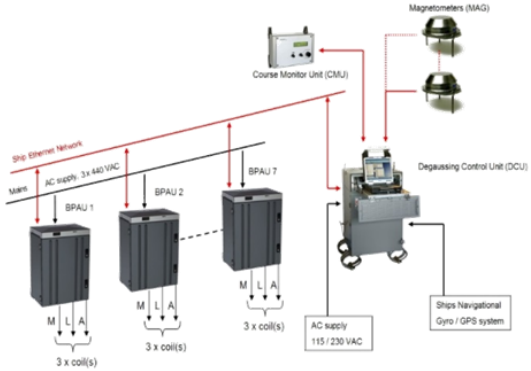
Polyamp implement a modular design philosophy and offer several types of ADG equipment for all types of vessels. Some good examples of projects where Polyamp designed and delivered the ADG is the USN Carrier CVN77 and the RSwN Visby class.

Polyamp have more than 45 years of experience in the area including all design phases feasibility and design studies, through system development to manufacture and supply of all types of on-board Advanced Degaussing Systems.

Below picture will in a nutshell show the effect of an ADG system on a Naval vessel; the large and revealing peak in the signature is significantly reduced when the ADG system is switched on.




## Degaussing systems




An Advanced Degaussing Systems (ADG) with a full 3-dimensional coil arrangement supplied by distributed Bipolar Amplifier Units (BPAU) are required to meet modern performance requirements.

A computerized Degaussing Control Unit (DCU) controls the amplifiers with input from Magnetometer and Navigational data for worldwide operation.

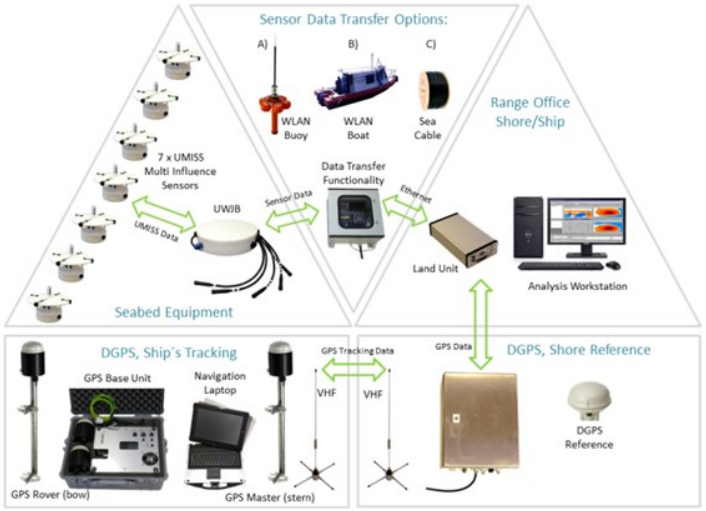
Polyamp was the first company in the world-market with a digital ADG controller and Polyamp delivers now the third generation of ADG controller.

Polyamp have a proven record of using magneto-meter controlled ADGs on steel hulled vessels using a unique distortion compensation algorithm. Polyamp is also providing multiple magnetometer controlled ADGs for MCMVs and stealth vessels.

Automatic backup modes of control can use input from GPS, Gyro or Operator. In this case the DCU determines the magnitude and direction of the Earth´s magnetic field in relation to the vessel´s attitude by reference to an inbuilt magnetic map.

USS San Antonio-Class (LPD17-28)

## Signature Management




UMISS© MkII is the base for our family of Underwater multi-Influence Sensor systems, designed to measure surface and submarine Naval vessels underwater signatures.
An UMISS© MkII platform integrates Magnetic, UEP, Pressure, Acoustic and other sensor signals. The signals are digitized and sent by Ethernet traffic to an Underwater junction box (UWJB) that transfers the data to the range office or to a support vessel.
The measured signatures are used for fixed and mobile Ranging and Harbor protection.
UMISS©MkII is designed for easy deployment from a small workboat with non or minimal diver assistance. The sea module is equipped with an inclinometer together with the static 3-axis magnetometer that enables compensation for non-horizontal positions of the UMISS©MkII on the seabed if divers are not used. Next page shows a single UMISS©MkII system, with the three axis UEP/ELFE disc mounted.

The measured data is time stamped and transferred to shore by either Ethernet cable, optical fiber or alternatively by double encrypted WLAN. The WLAN solution permits up to 5 km to a fixed station or 500 m via WLAN buoy to an operator onboard the measured vessel or 1000 m to a support vessel. A full range application requires the SWECADE© software, which also includes coil modelling for Degaussing system adjustment and documentation.

**Several software modules are available depending on measurement system purpose:**

- **POLYSERA©** system for Self-Check Ranging
- **POEMS©** mine simulation functionality
- **UMISS©MkII** software for 1 to 5 platforms

## UMISS©MkII platform

Underwater electric fields are generated by corrosion currents from a vessel in the water volume. It has two aspects; the near field that create a vessel signature like the magnetic, called UEP and the frequency aspect that can be detected near field and at
distance like acoustics, called ELFE.

The UMISS© MkII system, displayed above, use a disc that creates a 3-dimensional measure of the electric field with nominal 0.5 m distance, intended for a ranging application.

For Harbor protection or more long-distance recognizance the X and Y sensors can be distanced 1.5 to 50 m, creating 3 to 100 m sensor distance.

The ELFE is efficient to measure below 50/60 Hz (16.7 Hz in some nations). As the ELFE propagation speed is just a factor below the speed of light, it can use as a wake-up for acoustic systems.

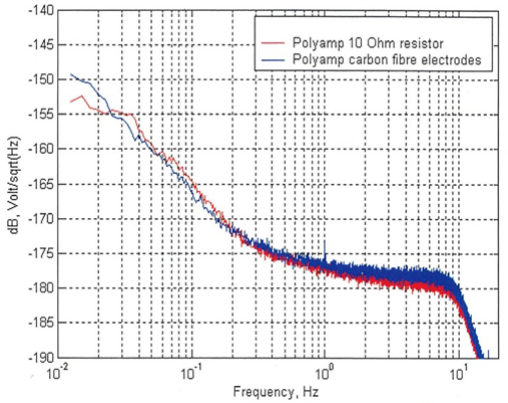
Our robust and high sensitivity Carbon Fiber sensors PA3001 family is the base in our system. However we sell more sensors to other customers.

**Possible applications:**

- Upgrading conventional ranges
- Transportable sea- and harbor entrance ranges
- Reconnaissance, fixed equipment
- Influence sea mines
- Oil & Gas prospection
- Geological measurements

## ULF/ELFE Sensors & amplifier

The Carbon fibre sensor is very sensitive and its noise is lower than the PA3004 amplifier (see diagram below). In differential mode low Ohm measurements, the characteristic of the sensor is Capacitive, which means a virtual DC voltage will occur.
For that reason the amplifier is equipped with a High Pass filter (5 mHz) to provide stable zero level. This filter also protects from amplifier saturation, due to DC noise that is the most common cause of saturation on this type of highly sensitive amplifiers.
Therefore such HP filter is also especially relevant for AgAgCl sensor systems.




*The plot above shows noise performance of the amplifier inputs with a 10 Ohm resistor (Red) and connected to carbon fibre sensors (Blue) in the frequency range 0.01 Hz to 10 Hz. Conclusion; the sensors are not the limit..*

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*- A secure part of your system*