



PSC600-series DC/DC 300 - 800 W

The PSC600 series convection cooled DC/DC converters has a wide range of input and output combinations. The basic mechanical design is based around the Euro format 6HE 230 mm depth with two DIN 41612 H15 connectors on the back. However due to its sturdy aluminum case it can also be mounted in vehicle chassis or other type of cabinets. The basic design can accommodate two extra heat sinks to supply higher power or provide higher operating temperatures (e.g. EN 50155 T3). The input and output can also be supplied with M6 studs or circular connectors for Military applications with high demands on EMC immunity and also up to IP65 ingress classification. Polyamp can also provide so called hot swap power systems in 6U 19"-rack units or special ruggedized cabinets for mobile applications. Very high practical MTBF and CE marked as free standing unit. Operating temperature range -25 to +70 °C.



INPUT / OUTPUT

- Optimized input voltage from 24 to 440 V nominal battery voltages.
- Single outputs from 5 to 125 V.
- Zero Inrush current limit.
- Reverse input voltage protection

FEATURES

- Conformally coating, tropic.
- Alarm relay output.
- Accesible from front panel:
 - Output voltage adjustment.
 - Output voltage measurement.
 - Output OK status green LED.

INPUT AND OUTPUT RATINGS

| INPUT | | | |
|----------------|-------------|--------------|------|
| Nominal inputs | Input range | Stop level | Code |
| 24 Vd.c. | 20 - 32 V | < 16.8 Vd.c. | 24 |
| 48 Vd.c. | 41 - 60 V | < 33.6 Vd.c. | 48 |
| 110, 127 Vd.c. | 93 - 150 V | < 77 Vd.c. | 110 |
| 220, 250 Vd.c. | 187 - 300 V | < 154 Vd.c. | 220 |
| 440 Vd.c. | 350 - 550 V | < 330 Vd.c. | 440 |

Other input ranges on demand.

Input range, is the range we guaranty

full output performance, $U_{out} +10\%$ $I_{out} +5\%$.

The converter works down to the stop level.

The output voltage might decrease to approx -10% of nominal output voltage at the stop level.

OPERATION

- High efficiency > 90%.
- Operating temperature range -25 to +70 °C with no derating.
- Fully encapsulated, meets IP20 as standard.
- Convection cooled.

EMC

- EN 61000-6-3, Emission.
- EN 61000-6-2, Immunity.
- EN/IEC 61000-4-4, 4 kV.
- EN/IEC 61000-4-5 level 2 & 3.

| OUTPUT | | |
|---------|-------------|-------------|
| Voltage | Current | Power |
| 5 V | 60.0 A | 300 W |
| 12 V | 30 - 60 A | 400 - 700 W |
| 15 V | 27 - 54 A | 400 - 800 W |
| 24 V | 16 - 33 A | 400 - 800 W |
| 48 V | 8 - 16.7 A | 400 - 800 W |
| 110 V | 5.5 - 7.3 A | 600 - 800 W |
| 125 V | 4.8 - 6.4 A | 600 - 800 W |

Higher voltage on demand

OUTPUT RATING & TYPE CODE

| OUTPUT | | | INPUT | | | | | |
|---------|---------|-------|---------------|---------------|----------------|----------------|-------|------|
| Voltage | Current | Power | 20 - 32 V | 41 - 60 V | 93 - 150 V | 187 - 300 V | Case | 6HE |
| 5 V | 60.0 A | 300 W | PSC300 24/5 | PSC300 48/5 | PSC300 110/5 | PSC300 220/5 | 46 mm | 10TE |
| 12 V | 33.0 A | 400 W | PSC400 24/12 | PSC400 48/12 | PSC400 110/12 | PSC400 220/12 | 46 mm | 10TE |
| 12 V | 42.0 A | 500 W | | PSC500 48/12 | PSC500 110/12 | PSC500 220/12 | 56 mm | 12TE |
| 15 V | 27.0 A | 400 W | PSC400 24/15 | PSC400 48/15 | PSC400 110/15 | PSC400 220/15 | 46 mm | 10TE |
| 15 V | 40.0 A | 600 W | | PSC600 48/15 | PSC600 110/15 | PSC600 220/15 | 56 mm | 12TE |
| 24 V | 25.0 A | 600 W | PSC600 24/24 | PSC600 48/24 | PSC600 110/24 | PSC600 220/24 | 46 mm | 10TE |
| 24 V | 33.0 A | 800 W | | PSC800 48/24 | PSC800 110/24 | PSC800 220/24 | 56 mm | 12TE |
| 48 V | 12.5 A | 600 W | PSC600 24/48 | PSC600 48/48 | PSC600 110/48 | PSC600 220/48 | 46 mm | 10TE |
| 48 V | 17.0 A | 800 W | | PSC800 48/48 | PSC800 110/48 | PSC800 220/48 | 56 mm | 12TE |
| 110 V | 5.50 A | 600 W | PSC600 24/110 | PSC600 48/110 | PSC600 110/110 | PSC600 220/110 | 46 mm | 10TE |
| 110 V | 7.30 A | 800 W | | PSC800 48/110 | PSC800 110/110 | PSC800 220/110 | 56 mm | 12TE |
| 125 V | 4.80 A | 600 W | PSC600 24/125 | PSC600 48/125 | PSC600 110/125 | PSC600 220/125 | 46 mm | 10TE |
| 125 V | 6.40 A | 800 W | | PSC800 48/125 | PSC800 110/125 | PSC800 220/125 | 56 mm | 12TE |

Other input and outputs combination on demand.

FEATURES

Over voltage protection OVL

A second independent regulation circuits limits the output voltage to 15% over nominal output voltage, in case the normal regulation fails.

Under voltage alarm

A built in alarm changes to alarm state if the converter output voltage drops 10% below nominal output. The DC OK LED is also controlled by the alarm circuit.

The alarm has an relay output with both [NO] and [NC] function. The relay rating is 30V 1A (a.c. & d.c.)

Reverse input voltage protection

On input code 24 and 48 the reverse voltage protection is provided by a parallel diode. This diode is only intended to blow an external input fuse.

On input code 110 and 220 the reverse voltage protection is provided by a series diode. The converter will never start.

Inrush current limit

On input code 110 and 220 the inrush limit circuit is always active thus acting at voltage dips below the stop level >10 ms. On input code 24 and 48 this function is optional.

Adjustment & measurement

Output voltage adjustment potentiometer and output voltage measurement points are accessible from the front panel.

Conformal coating

The PSC-series is conformally coated to withstand non-condensing tropical environment.

OPTIONAL FEATURES

Wider input range

The PSC600 series can be supplied with wide input range to meet train or mobile application demands.

Built in series diode - C

Series diode on the output, which is mounted inside the case. Use this option when the output is connected in parallel with other power supply to achieve redundancy.

Built in series diode with resistor - CR

The CR option automatically balance the load between 2 or more paralleled PSC600 units. Used in hotswap.

Remote Sense - S

The voltage sensing can be put at the load to compensate for voltage drop.

The sense circuit is a standard feature on 5 V outputs.

Inrush current limit

On input code 24 and 48 the inrush limit circuit is optional. This option affects the input voltage range. The circuit is always active thus acting at voltage dips below the stop level >10 ms.

Higher Insulation on output - E2

E2 - Output/case 2.5 kVa.c. for 12 to 125 Vd.c.

-40°C ambient temperature

Over Current Shut Down - OCSD

The PSC600 series can provide over current during a limited time.

The OCSD circuit shut down the unit when a preset time has passed. This delay can be pre-set between 100 ms to 3 seconds.

GENERAL DATA / INPUT DATA

| LABEL | VALUE |
|---|-------------------------|
| Design topology | Push-Pull / Full-Bridge |
| Switching frequency | 50 kHz |
| Emission / Immunity | See page 7 |
| Safety EN/IEC 60950 | Class I |
| Max. accepted input ripple 50-400 Hz | 2 % of nominal voltage |
| Input power at no load | 3 - 5 W |
| Reverse input voltage protection | |
| 24, 48 input code | Parallel diode |
| 110, 220 input code | Series diode |
| Insulation | See page 7 |
| Dimensions and Weight | See page 4 to 6 |

OPTIONAL T-INPUT

| DC INPUTS MOBILE | | |
|-------------------------|------------------|------|
| U _{in} 0.1s-S2 | Continous range | Code |
| 14.4 - 33.6 Vd.c. | 16.8 - 30 Vd.c. | 24T |
| 21.6 - 50.4 Vd.c. | 25.2 - 45 Vd.c. | 36T |
| 28.8 - 67.2 Vd.c. | 33.6 - 60 Vd.c. | 48T |
| 43.2 - 100.8 Vd.c. | 50.4 - 90 Vd.c. | 72T |
| 66 - 154 Vd.c | 77 - 137.5 Vd.c. | 110T |

The total output power can be derated on a T-range compared to the above output rating table.
Input according to EN 50155:2007 and IEC 60571:2011

PIN-OUT, SINGLE OUTPUT

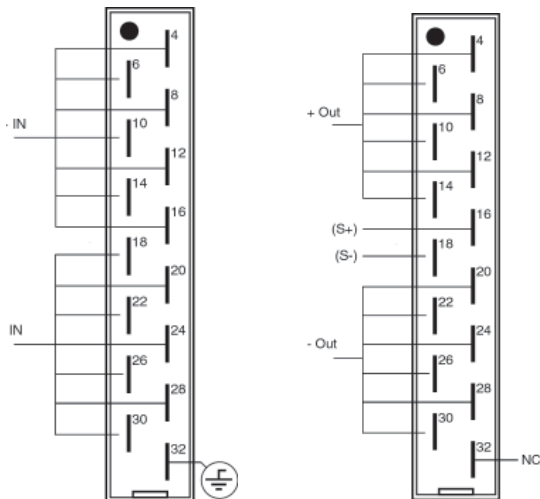


Figure 1. Pin-out with Connector DIN41612, H15.



Picture 3. Case 46 mm with wall mounting mechanics N and optional H15-S female screw connectors

OUTPUT DATA

| LABEL | VALUE |
|---|----------------------|
| Source regulation | 0.2 % |
| Load regulation (0-100% load) master | 0.2 % |
| Transient recovery time for a load step 10 to 90% voltage deviation. | < 2 ms 3% |
| Output ripple (50 kHz) V _{p-p} ² Input ripple attenuation on output 50 to 40 Hz | Typ. 20 mV 150:1 |
| Emission / Immunity | See page 7 |
| Temperature coefficient | 0.02 %/°C |
| Output voltage adjustment range adjustable with a 15 turn potentiometer | 90 to 110% |
| Current limit, rectangular | 105% |
| Remote sense | Option 5 |
| Soft start | Yes |
| Isolation output / case | See page 7 & opt. E2 |
| Start-up time | 1 s |
| Hold-up time, contact factory | 2 - 25 ms |
| Efficiency ³ | 80 - 93 % |
| Operating temperature range at 100 % load. Conduction cooling Single outputs > 10 V | -25 to +70 °C |
| Operating temperature range at 100 % load. Conduction cooling Single outputs < 10 V | -25 to +55 °C |
| Storage temperature range | -40 to +85 °C |

- Output ripple might increase when IEC/EN 61000-4-3 20 V/m test is applied to max 0.5% VRMS
- Lowest efficiency measured within the whole input voltage range at 100% load.

Standard connector



Picture 1. FastOn 6.3mm tab Connector H15-T

Option connector



Picture 2. H15 female Screw Connector H15-S



Picture 4. Case 56 mm with wall mounting mechanics N, front view

N-MECHANICS: WALL & CHASSIS MOUNTING WITH H15 CONNECTORS

The standard version of PSC600 series is this N-mechanics, which includes H15 connector holder and 2 x H-15-T female connector, see page 3. Next page shows PSC600 series with M6 screws that is an optional connection method using the same basic mechanics. The basic case can be added with one or two extra heat sinks. Depending on output power or options. Its also possible to mount against a larger heat sink, by using spacers. The spacers also fix the H15 connector. Optionally TS-35 DIN mounting clips can be provided.

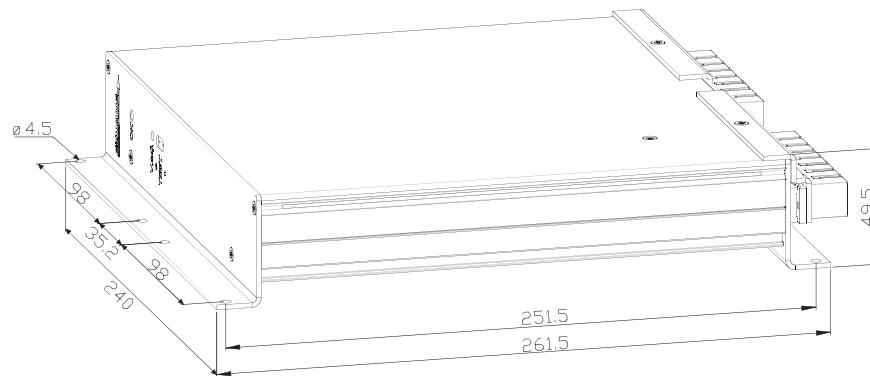


Figure 5. Side view PSC600 with option N

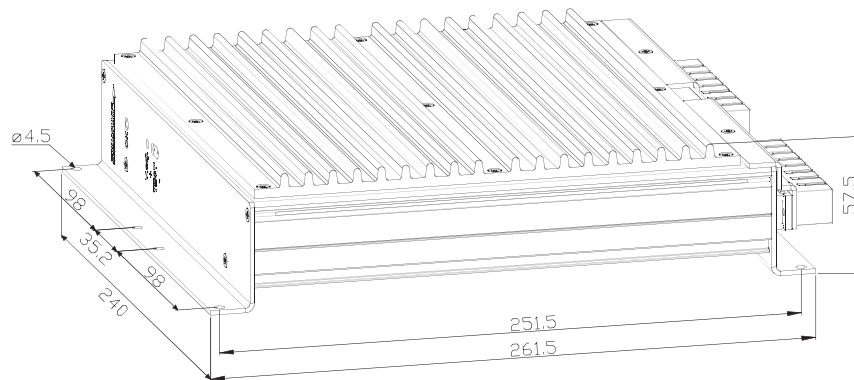


Figure 6. Side view PSC800 with option N

| Mechanics | Weight |
|---|--------|
| Base mechanic unit | 3.3 kg |
| Base mechanic unit + one extra heat sink | 4.0 kg |
| Base mechanic unit + two extra heat sinks | 4.7 kg |

The PSC600-family are built in aluminium extrusion, with high thermal conductance which also work as a good EMC shield. The mechanical design permits use in vehicles and heavy industrial environments. The IP class is IP20.

Vibration and shock/bump are based on IEC 60721-3-5 Ground vehicle installations Class 5M2 with random vibration according to IEC 60068-2-64 and bump IEC 60068-2-27:2008 which are 3 dimensional tests. The vibration test has a 1.68 gRMS value during a certain time. In trains its 5 h according to IEC/EN61373. The bump is tested at 30 g, 6 ms. The PSC600 series has also been tested in military vehicles.

Military grade version of PSC600 series is shown on Picture 6, page 8. Depends on the customer requirement to be mentioned:

Input: MIL-STD 1275E; MIL-STD 1399-390

EMC: MIL-STD 461F RS-103 up to 200 V/m

Environment: MIL-STD 801 (customer specification); IP54/IP65

N-MECHANICS: OPTION M6, STUDS / SCREW CONNECTORS

PSC600 family with N-mechanics and M6 Screws/Studs called the N-mechanics with B-option. The standard version has a connector with remote sense, see option S, and relay NO, NC relay function. The unit is also supplied with a Polycarbonate electric touch safety cover. For higher Ingression Protection IP rating we use panels that are fully covered (except the connectors) without Sense and Alarm connectors.

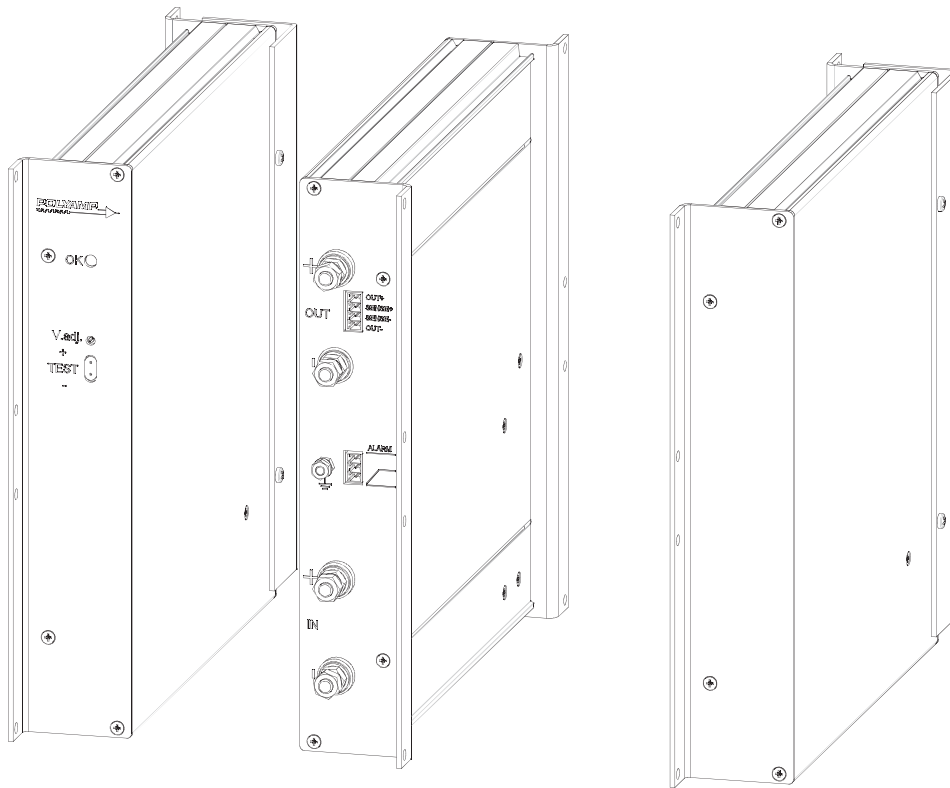


Figure 9. Front panel

In / Out panel with M6 bolts/studs

Optional sealed panel for higher IP grade up to IP54.

Dimension: Please see Figure 5 and 6, page 4.

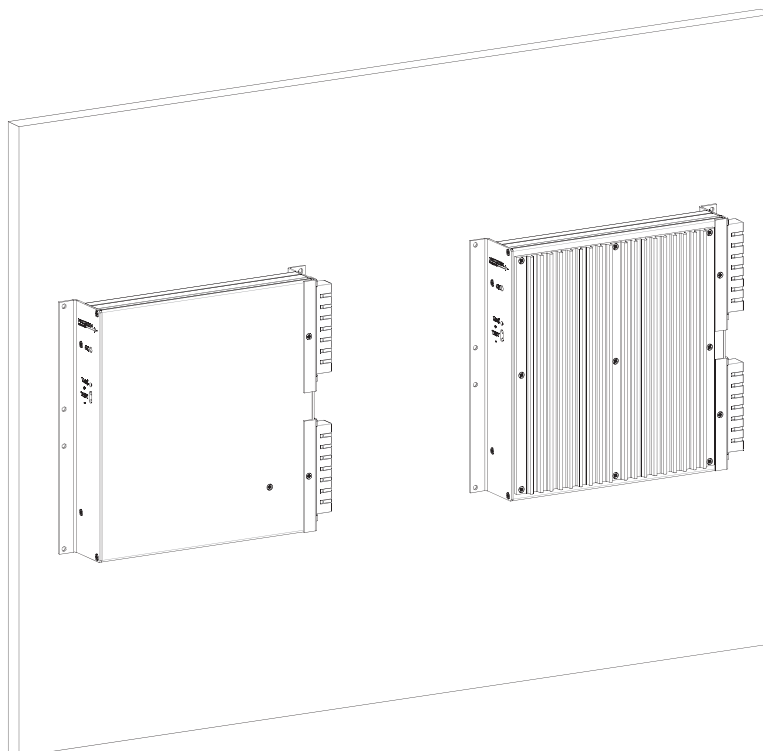


Figure 8. Recommended mounting direction.

L-MECHANICS: OPTION L, 6HE FOR 6U 19"-SUBRACK PLUGG-IN MODULES

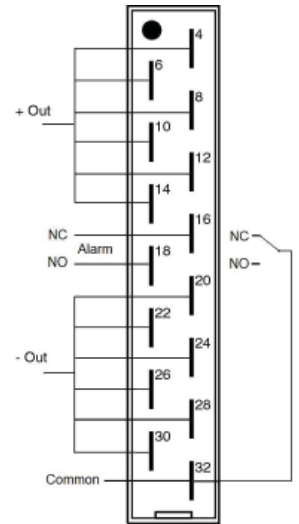
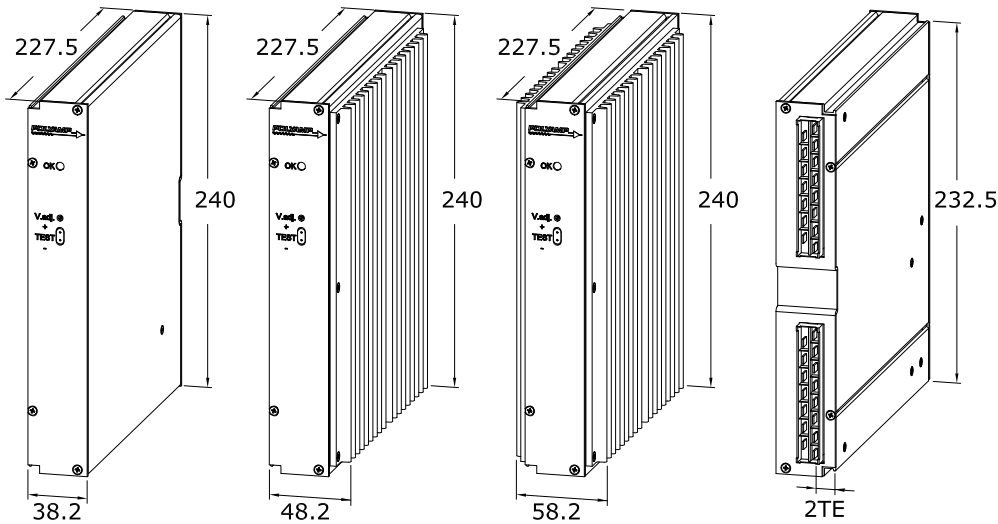


Figure 2. Front view

Back view

Figure 3. The alarm signal

The 6HE mechanics is intended to be mounted in 19"-subrack as plug-in module. Either the unit is mounted behind a covering door as figure 2 units or as plug-in module with optional 8, 10, 12 or 14 TE panels as displayed in figure 4.

Option Panels: 8TE (care about cooling distances). 10TE, 12TE and 14TE.

Alarm signal: The 6HE version has no separate alarm connector. The alarm signal is connected according to figure 3 on the output connector.

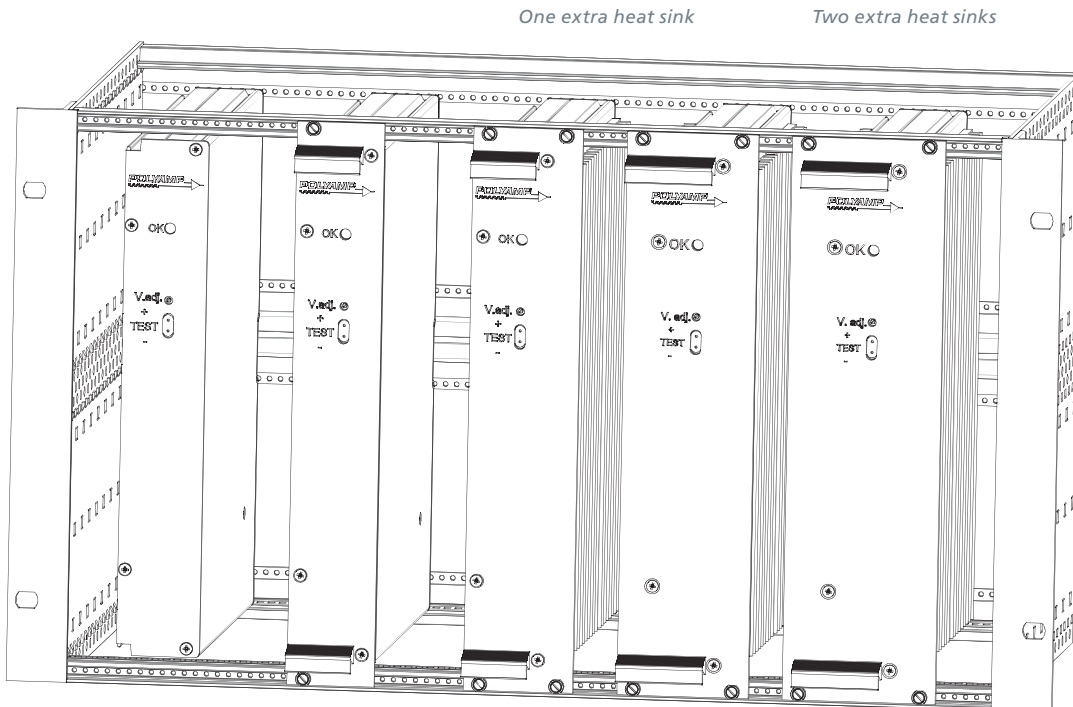


Figure 4. Mounted in a 6U 19"-subrack, without panel, with 8TE, 10TE, 12TE and 14TE panel.

Option: Aluminium Guiders for Schroff cabinets

| Mechanics | Weight |
|---|--------|
| Base mechanic unit | 3.3 kg |
| Base mechanic unit + one extra heat sink | 4.0 kg |
| Base mechanic unit + two extra heat sinks | 4.7 kg |

SAFETY AND EMC

PSC-series meets the requirements defined by CE mark as apparatus. PSC-series meets requirements of EMC directive and low voltage directive (LVD).

Thus a PSC-series can be used as free standing unit or in installations as well as systems designed according to "The modular approach". PSC-series can be used in installation without further EMC tests, if our installation instructions are followed.

Please note that product standards can demand different levels or other basic standard tests. We test according to levels below. For higher levels or other tests, contact factory.

SAFETY STANDARD EN/IEC 60950

| ISOLATION TESTABLE LEVELS | TEST VOLTAGE |
|--------------------------------|-----------------------|
| Input / Output | 2.5 kVa.c. / 4 kVd.c. |
| Input / Case | 2.5 kVa.c. / 4 kVd.c. |
| Output / Case all outputs | 2 kVd.c. |
| ISOLATION TESTABLE LEVELS | SAFETY ISOLATION |
| Transformer isolation In / Out | 4 kVa.c. / 8 mm |

We use the product standard Low voltage power supplies, DC outputs EN/IEC 61204-3.

The EMC level follows the generic EMC standards:
EN/IEC 61000-6-2 (Immunity)
EN/IEC 61000-6-3 (Emission)

EMC

| EMC-STANDARDS | EMC-PERFORMANCE | | Remarks |
|--|---------------------|---------------------|---|
| Emission standards | Input | Output | |
| EN 55016 / CISPR16 (0.15-30 MHz) | OK | OK | |
| EN 55016 / CISPR16 (30-1000 MHz) | OK | | Enclosure test |
| Immunity standards | EN/IEC 61000-6-2 | | |
| EN/IEC 61000-4-2 | 8 kV / 15 kV | | Contact / air, Enclosure test |
| EN/IEC 61000-4-3 | 20 V/m AM-Modulated | | Output ripple can increase to 0.5 % of Vout. Enclosure test |
| EN/IEC 61000-4-4 | 4 kV | 4 kV | |
| EN/IEC 61000-4-5, Input code 24, 48 | 0.5 kV / 1 kV | 0.5 kV / 1 kV | Line-line 2 Ω / Line-case 12 Ω |
| EN/IEC 61000-4-5, Input code 110 ¹ , 220 ¹ | 1 kV / 2 kV | 0.5 kV / 1 kV | |
| EN 50121-3-2 / IEC 62236-3-2 | 1 kV / 2 kV | 1 kV / 2 kV | Line-line 42 Ω / Line-case 42 Ω |
| EN/IEC 61000-4-6 | 10 V _{RMS} | 10 V _{RMS} | AM-Modulated |
| EN/IEC 61000-4-8 | 30 A/m | | Enclosure test |
| EN/IEC 61000-4-10 | Not sensitive | | Enclosure test |

1. Higher level 2 kV / 4 kV with external filters, contact factory.

Note:

All PSC600 series models meets Railway EMC standards EN 50121-3-2 and EN 50121-4 (IEC 62236-3-2 and IEC 62236-4).



Picture 5. 19" rack for a special project in a power plant.



Picture 6. Military grade version of PSC600 series.



Switch Craft Plant

Switch Craft S.A. is located in La Chaux-de-Fonds in the Jura mountains in Switzerland. The main products are the Eurocassette families of PSC and PSE converters. Polyamp supports the sales and marketing activities but Switch Craft handle all support to the distributors.

Picture 6. The Switch Craft Plant, 1100 m above sea level



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