



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. However we have three mechanical versions; the N-Mechanics with 2 x H15 connectors for in and output and N-M6 mechanics with M6 Screw/Studs, those have also a separate alarm connector. The third mechanic is the L-mechanics with 2 x H15 connectors for plugin into a Euro sub rack 6HE. The alarm is moved to the output connector. All versions can accommodate up to 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 circular connectors for Military applications with high demands on EMC immunity and also up to IP65 ingress classification. Very high practical MTBF and CE marked as free standing unit.



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.
- Accessible on front:
 - 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	350 - 550 V	6HE
5 V	60.0 A	300 W	PSC300 24/5	PSC300 48/5	PSC300 110/5	PSC300 220/5	PSC300 440/5	10TE
12 V	33.0 A	400 W	PSC400 24/12	PSC400 48/12	PSC400 110/12	PSC400 220/12	PSC400 440/12	10TE
12 V	42.0 A	500 W		PSC500 48/12	PSC500 110/12	PSC500 220/12	PSC500 440/12	12TE
15 V	27.0 A	400 W	PSC400 24/15	PSC400 48/15	PSC400 110/15	PSC400 220/15	PSC400 440/15	10TE
15 V	40.0 A	600 W		PSC600 48/15	PSC600 110/15	PSC600 220/15	PSC600 440/15	12TE
24 V	25.0 A	600 W	PSC600 24/24	PSC600 48/24	PSC600 110/24	PSC600 220/24	PSC600 440/24	10TE
24 V	33.0 A	800 W		PSC800 48/24	PSC800 110/24	PSC800 220/24	PSC800 440/24	12TE
48 V	12.5 A	600 W	PSC600 24/48	PSC600 48/48	PSC600 110/48	PSC600 220/48	PSC600 440/48	10TE
48 V	17.0 A	800 W		PSC800 48/48	PSC800 110/48	PSC800 220/48	PSC800 440/48	12TE
110 V	5.50 A	600 W	PSC600 24/110	PSC600 48/110	PSC600 110/110	PSC600 220/110	PSC600 440/110	10TE
110 V	7.30 A	800 W		PSC800 48/110	PSC800 110/110	PSC800 220/110	PSC800 440/110	12TE
125 V	4.80 A	600 W	PSC600 24/125	PSC600 48/125	PSC600 110/125	PSC600 220/125	PSC600 440/125	10TE
125 V	6.40 A	800 W		PSC800 48/125	PSC800 110/125	PSC800 220/125	PSC800 440/125	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 above the reverse voltage protection is provided by a series diode. The converter will never start.

Inrush current limit

On input code 110 and above 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

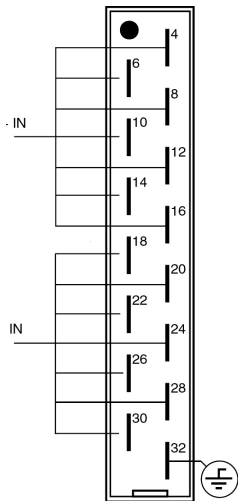


Figure 1. Input pinout with Connector DIN41612, H15.



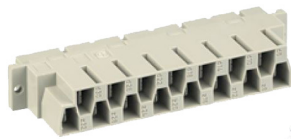
Picture 3. Case 46 mm with N-mechanics, wall mounting, and optional female H15-connectors.

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 ouput 50 to 400 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 increases when EN IEC 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. H15 FastOn 6.3 mm female - H15-T

Option connector



Picture 2. H15 cage clamp type female - H15cc

The cable rating is AWG16 or < 1.5 mm².
Not recommended on certain models with 24 V input or 5 to 12 V output.



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

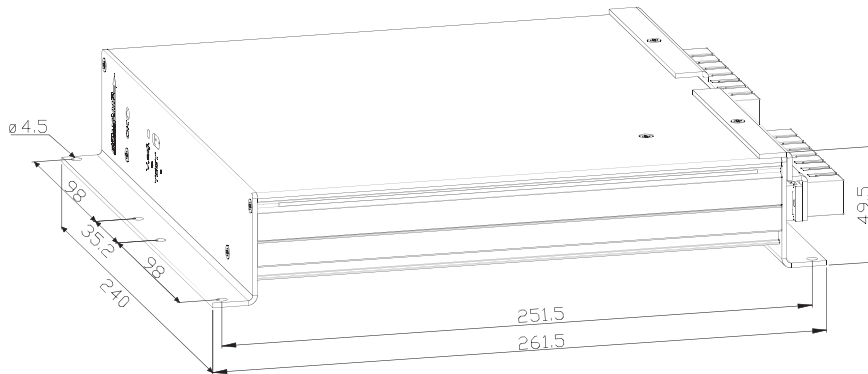


Figure 2. N-Mechanics, side view PSC600

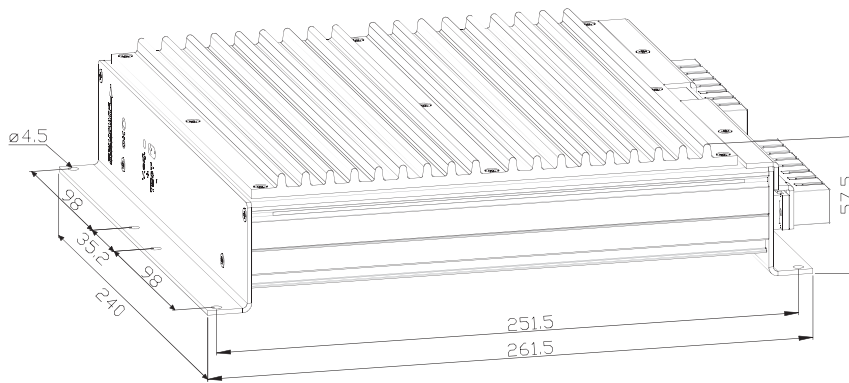


Figure 3. N-Mechanics, side view PSC800 with one extra cooler, T3

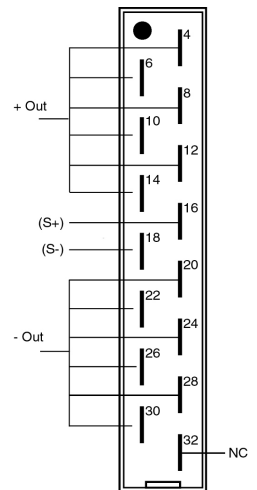


Figure 4. Output pinout with N-mechanics using connector DIN41612, H15.

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 EN IEC 61373. 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-M6 MECHANICS: M6 SCREW / STUDS CONNECTORS

The PSC600 family with N-M6 mechanics using M6 screws. The standard version has separated Combicon connectors for remote sense, see option S, and 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.

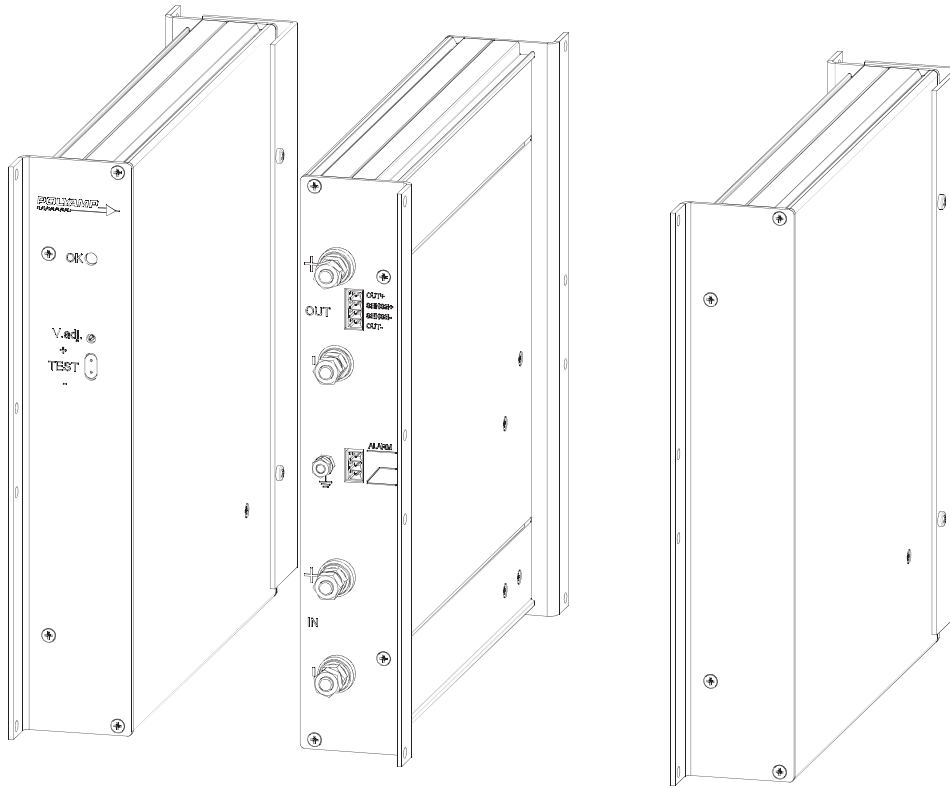


Figure 5. Front panel In / Out panel with M6 bolts/studs Optional sealed panel for higher IP grade up to IP54.

Dimension: Please see Figure 2 and 3, page 4.

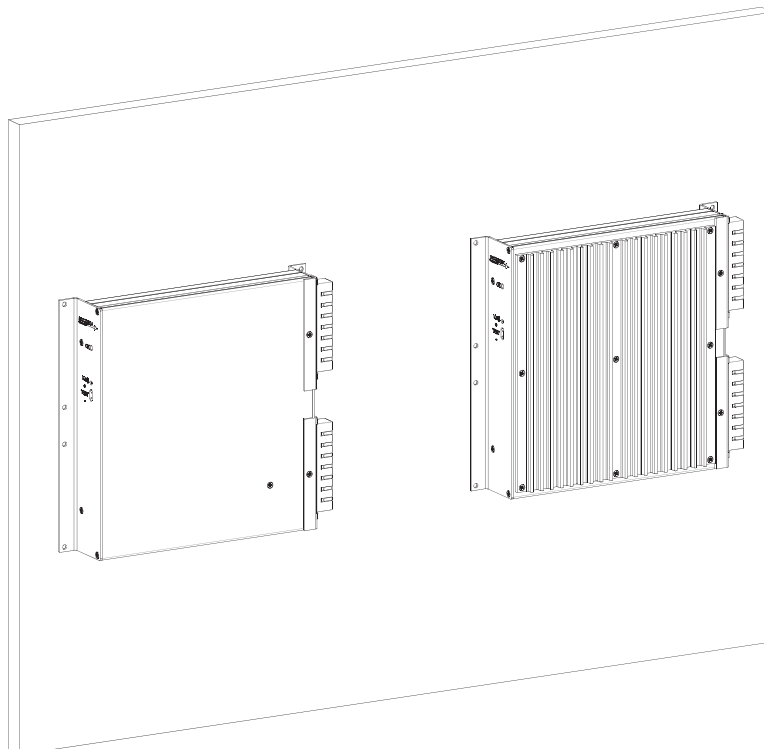


Figure 6. Recommended mounting directions on N- and N-M6 mechanics.

L-MECHANICS: 6HE FOR 6U 19"-SUBRACK PLUGIN MODULES

One extra heat sink

Two extra heat sinks

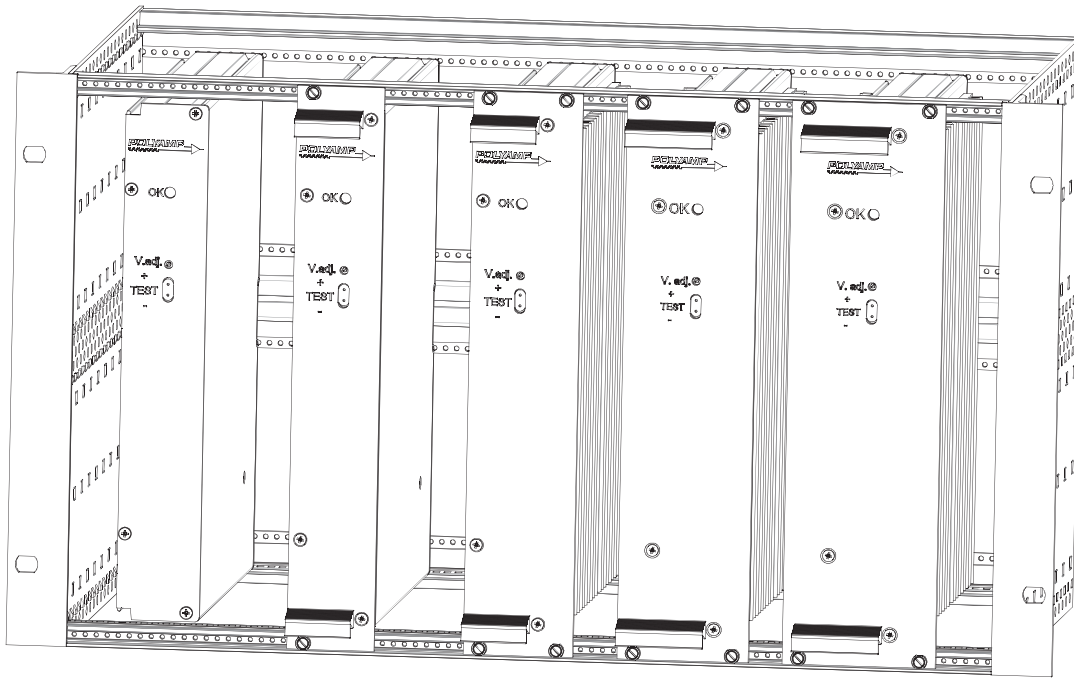


Figure 7. Mounted in a 6U 19"-subrack, without panel, with 8TE, 10TE, 12TE and 14TE panel.

Option: Aluminium Guiders for Schroff cabinets

The 6HE mechanics is intended to be mounted in 19"-subrack as plugin module. Either the unit is mounted behind a covering door as left unit in figure 9 or as plugin module with optional 8, 10, 12 or 14 TE panels as displayed with other units in figure 9.

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 8 on the output connector.

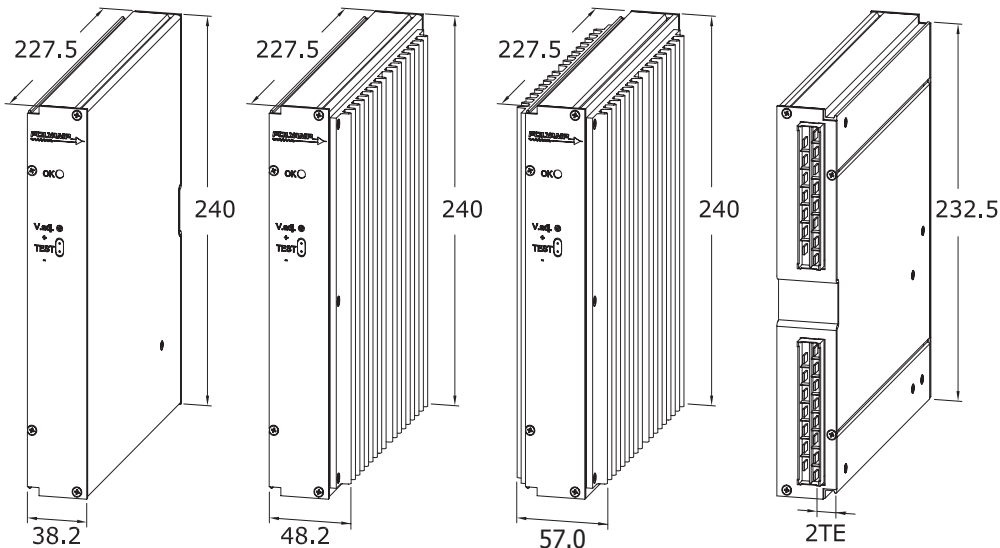


Figure 8. Front view

Back view

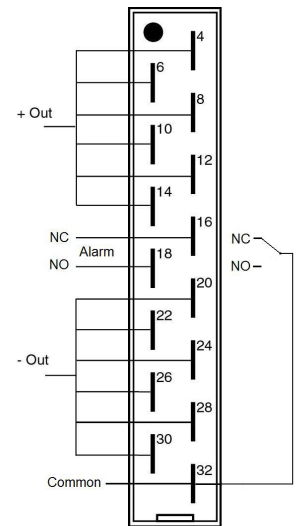


Figure 9. L-mechanics H15 output pinout, with alarm signal

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) and RoHS II directive.

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		
Emission standard	EN IEC 61000-6-3		
	Input	Output	Remarks
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

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.



Picture 7. The Switch Craft Plant, 1100 m above sea level

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.



- A secure part of your system



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