POLYAMP

- A secure part of your system

AC/DC Power supplies
PSC-series
80 - 240 W 5 - 220 V

Euro format 8-12TE or N-mounting, screw mount and DIN TS35 clips.
Also compatible DC inputs models. Please download PSC-DC datasheet

INPUT / OUTPUT

- Input 85 – 264 Va.c. 48 - 420 Hz
- PSC80 - PSC150 wide input ranges ACW
- PSC100 - PSC240 region inputs ACR, AC
- 5 to 220 Vdc outputs

FEATURES

- CE mark, EMC, LVD, RoHS
- Alarm circuit with relay

Accessible on front panel:

- Output OK status green LED
- Output voltage adjustment
- Output voltage measurement

Wall , case, DIN mounting
Optional Euroformat 3HE, 8 - 12 TE

OPERATION

- Convection cooled
- Operating temperature range -25 to +55°C optional –40°, +70°C (+85°C 10 min)
- Fully encapsulated IP30, conformally coated
- High efficiency

EMC

- EN IEC 61000-6-3, Emission.
- EN IEC 61000-6-2, Immunity.
- EN IEC 61000-4-3, 10 V/m (option 20V/m)
- EN IEC 61000-4-4, ±4 kV.
- EN IEC 61000-4-5 level 2 & 3.
- EN 50121-3-2 Railway

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
220, 230, 240 Va.c.	176 - 264 Va.c.	AC

OUTPUT		
Voltage	**Current**	**Power**
5 - 8 V	- 16 A	80 W
12 V	- 17.5 A	80 - 210 W
13.2 V	- 18 A	80 - 240 W
15 V	- 16 A	80 - 240 W
24 V	- 10 A	80 - 240 W
48 V	- 5 A	80 - 240 W
110 V	2.2 A	80 - 240 W
220 V	1.1 A	80 - 240 W

The rated output current indicates the max continuous output current. We have model name shows the power rating. PSC80 = 80 W to PSC240 = 240 W
See next page.

OUTPUT RATING & TYPE CODE

DC OUTPUT			INPUT
V	A	P	AC
5 V	16 A	80 W	PSC80 AC5
12 V	10 A	120 W	PSC120 AC12
13.2 V	7.6 A	100 W	PSC100 AC13.2
13.2 V	11.4 A	150 W	PSC150 AC13.2
15 V	6.7A	100 W	PSC100 AC15
15 V	10 A	150 W	PSC150 AC15
24 V	4.2 A	100 W	PSC100 AC24
24 V	6.3 A	150 W	PSC150 AC24
24 V	10 A	240 W	PSC240 AC24
48 V	2.1 A	100 W	PSC100 AC48
48 V	3.1 A	150 W	PSC150 AC48
48 V	5 A	240 W	PSC240 AC48
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

DC OUTPUT			INPUT	INPUT
V	A	P	ACW	ACR
5 V	16 A	80 W	PSC80ACW5	PSC80ACR5
12 V	10 A	120 W	PSC120ACW12	PSC120ACR12
13.2 V	7.6 A	100 W	PSC100ACW13.2	PSC100ACR13.2
13.2 V	11 A	150 W	PSC150ACW13.2	PSC150ACR13.2
15 V	6.7 A	100 W	PSC100ACW15	PSC100ACR15
15 V	10 A	150 W	PSC150ACW15	PSC150ACR15
24 V	4 A	100 W	PSC100ACW24	PSC100ACR24
24 V	6 A	150 W	PSC150ACW24	PSC150ACR24
24 V	10 A	240 W	—-	PSC240ACR24
48 V	2.1 A	100 W	PSC100ACW48	PSC100ACR48
48 V	3.1 A	150 W	PSC150ACW48	PSC150ACR48
48 V	5.1 A	240W	—-	PSC240ACR48

The above voltage and currents are rated at -25 to +55°C, continuous operation. For higher ambient temperature see option T3.
Other input and output combination on demand. Outputs up to 220 Vdc.

How to read our product code:
Example **PSC150AC24**
PSC150 = Family code power rating
AC = Input voltage range
24 = Output voltage 24 V

How to code the unit?

First, you have to select mechanics between either:
N - Case or DIN mount
L - Euro format

Use type code from table at page 2: e.g. PSC150AC24

PSC 150 AC 24 A, L-10TE

.

ACW	AC ACR	5 12 13.2 15 24 28 48 110 220	A C CR S	L-8TE L-10TE L-12TE N-H15T N-sp T3 2xT3
80 W 100 W 120 W 150 W	80 W 100 W 120 W 150 W 240 W			
Wide	Optimized	V	Options	Options
Input voltage range		Output voltage		Mechanic

Mechanical Design

The PSC has two basic mechanical stiles;

- N-mechanics for wall, chassis, DIN mount
- 3HE Euro format L-mechanics 8 to 12TE.
- Connector pinning, see figure 2, page 3.

The PSC series case is based on a convection cooled extruded aluminum tube with thick material for best heat distribution and EMC performance. The IP rating is IP30. For additional cooling capacity we have add-on coolers, used for wider temperature range and certain options.

Conformal coating

The PSC-series is conformally coated to withstand non-condensing tropical environment Rh 95 %.

FEATURES

Adjustment & measurement
Output voltage adjustment potentiometer **V.adj**. and measurement points are accessible from the front panel.

Output Over voltage limit OVL
The OVL circuit limits the output voltage to +25% above **Vnom,** the nominal output voltage, in case the regulator fails. See options for OVP.

Output voltage status with LED and Alarm relay
The output voltage can be adjusted ±10% of the nominal voltage indicated in the type code. The alarm relay and status green LED shows normal operation if the output voltage is within ±5% of the **adjusted V.adj**. output voltage with fixed green LED.
If the output voltage is >105% of the adjusted voltage the LED blinks fast green. If the output voltage is below – 95% the LED blinks slower green till the output is not operating. If the LED is red, this indicate a general fault or during Power-up/Power-down process.

The Dual relay NO/NC (Normally Open) switch to alarm state when the output < -95% = red area below or due to high temperature), see figure 1 to 3 below.
The relay rating is 30 V 0.5 A (a.c. & d.c.).

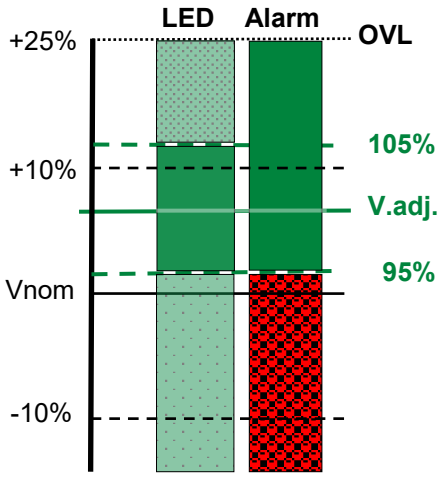


Figure 1. LED and alarm relay signaling

Temperature regulated current limit

The current regulation has a rectangular Current Limit characteristic.

Due to operation temperature, the circuit can decrease the maximum available current, which basically lower the maximum current rating limit see figure 2 and 3.
In the case the load reach this, by temperature set current limit level, then the alarm and LED switch over to alarm state.
This function is only factory set, however can be omitted on request.

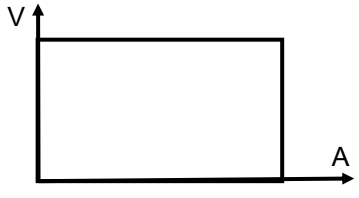


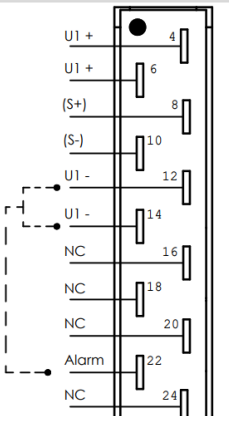
Figure 2. Rectangular current limit

OPTIONAL FEATURES

Overvoltage protection OVP - A
The OVP shuts down the output by activating the Inhibit. This inhibit can only be released by switching off the input. On 5 V output the OVP is standard and trigs at 6.2 V. Cannot be used together with **C** or **CR** optional diode. External over voltages are covered by the diode, still internal OVL active.

Built in output series diode - C
A series diode is provided inside the unit. Outputs above 4.2 A requires an extra cooler, see option T3.

Output under voltage alarm, Logic Signal - G
A built in logic 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 open collector configuration. A voltage < 1 V is normal operating condition. In alarm state the output can drive max 20 mA 60 V.
The logic alarm works if a voltage is applied through a resistor on the collector output, max 60 V.

Remote sense -S
The voltage sensing can be put at the load to compensate for voltage drop. Is a standard feature on 5 V outputs.

Virtual Resistance -VR
In a system with multiple paralleled outputs this option assure equal load sharing. See figure 4 and next page 4.

Extra cooler, option T3
The PSC case can accommodate 2 extra coolers, see page 5 - 6. The basic models are rated -25 to +55°C, continuous operation.
If +70°C or EN50155/IEC 60571 T3 +85°C during 10 min classification is specified, an extra cooler T3 is needed. Some options e.g. series diode on output will require T3 cooler in order to avoid derating the output current with 10 - 20%.

Mounting against external case/cooler, N-Sp
The N-Mechanics, use spacers to fix the unit and hold the H15-CC connector. 4x spacers are supplied. See figure 4. Also possible to add one T3 cooler.

Figure 4. *Nsp-Mechanics, fixed against external cooler. The spacers also hold the H15 female connector.*

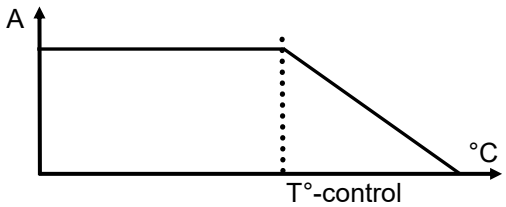


Figure 3. Temperature current control

GENERAL DATA | INPUT DATA

LABEL	VALUE
Design topology	Full bridge
Switching frequency	50 kHz
AC frequency	48 - 420 Hz
Emission / Immunity	See page 7
Electric Safety EN IEC 61204-7:2018	See page 7
Humidity	5 - 90% non condensing
Ingression Protection IP	IP30
Input power at no load	3 to 5 W
Inrush current limit	Yes with NTC
Fire protection EN 45545-2 level 4.3.2 rule 1, fig 1	“Non listed product” <100 g HL1, HL2, HL3
Dimensions	See page 5 & 6
Weight	See page 6

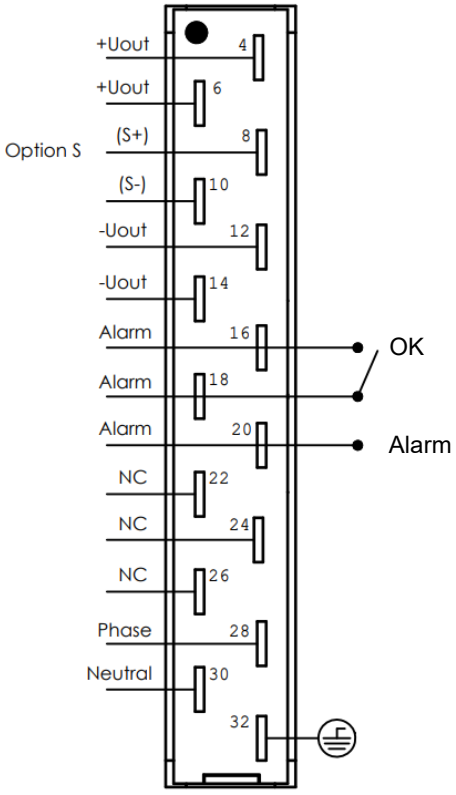


Figure 5. Standard H15 connector pinout

Figure 6. Redundant system in 19” 3U Euro format with L-10TE panels

OUTPUT DATA

LABEL	VALUE
Source regulation	0.2%
Load regulation (10 to 100% load) with sense connected	0.2%
Load regulation (0-100% load)	0.5%
Transient recovery time for 10 to 90% load step to within 3% of nominal output voltage.	<2 ms
Output ripple (50 kHz) RMS[1]	20 mV
Input ripple attenuation to output (50 to 400 Hz)	150:1
Emission / Immunity	See page 7
Temperature coefficient	0.02%/°C
Min output adjustment range adjustable with 15 turn potentiometer	90 - 110%
Current limit, rectangular	105%
Remote sense	Option S
Softs start	Yes
Alarm relay rating (a.c. & d.c.)	30 V 300 mA(2)
Start up time	< 1 s
Hold up time, contact factory	2 - 25 ms
Efficiency[3] < 10 V > 10 V	78 - 85% 84 - 93%
Operating temperature range at 100% load. (Convection cooling) With derating[4]	-25 to +55°C -25 to +70°C
Storage temperature range	-40 to + 85°C

1. The output ripple might increase to 0.5% RMS of Vout, when EN IEC 61000-4-3, 20 V/m test is applied
2. Relay is also rated 300 Vdc 20 mA, switch current depends on voltage
3. Lowest efficiency measured within the whole input voltage range at 100% load
4. Contact factory for derating as depends on model. The alarm relay can not be used at +70 °C.

Virtual Resistance -VR

In a system like figure 6, a number of units can supply a common load distribution. With the VR function the paralleled units share the load by adjusting the voltage due to the load, illustrated in figure 4 below.

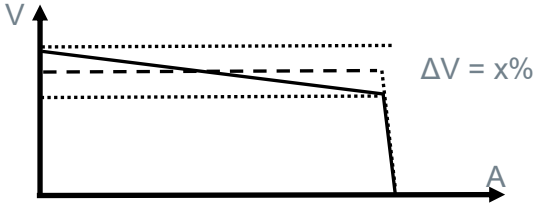


Figure 7. Virtual series resistance voltage control

The voltage slope is dependent on the voltage level and the accuracy needed in the system.
The potential fault conditions in such system do not require series diode. Only in the case another voltage source is present on the load side.

N-MECHANICS: WALL & CHASSIS MOUNTING WITH H15 CONNECTORS

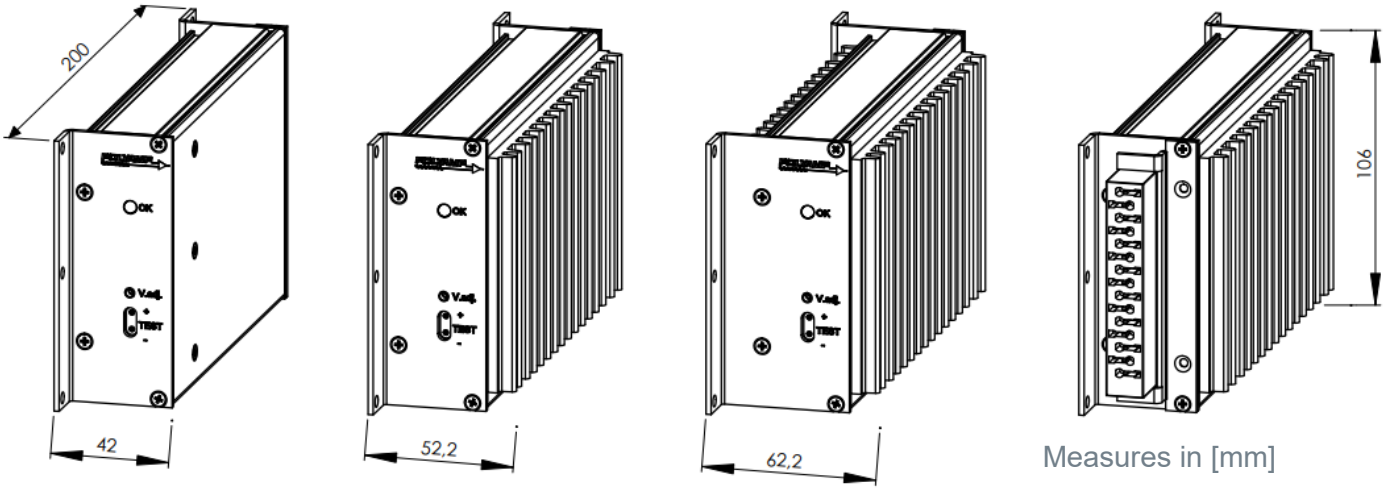


Figure 8. Front and connector view of N-Mechanics, includes connector holder. Female H15 connector is optional.

Mechanical Design

The PSC has two basic mechanical stiles;

- N-mechanics for wall, chassis, DIN mount
- 3HE Euro format L-mechanics 8 to 12TE.

Additional coolers (T3) can be added for higher operating ambient temperatures or accommodate built in series diode and other options.

The PSC series case is based on a convection cooled extruded aluminum tube with thick material for best heat distribution. This also assure the efficiency of the extra coolers T3. Extruded aluminum is easy to recycle.

Figure 9. **Standard with N-mechanics**
H15 Cage Clamp type female - **H15-CC**

The cable rating is AWG16 or <1.5 mm^2. That makes it not usable for 24T-input and 5 V outputs.

Figure 10. **Optional connector**
H15 FastOn 6.3 mm female **N-H15-T**
The TABS are rated 12 A 70°C or 15 A 55°C thus 2.5 mm^2 or AWG13

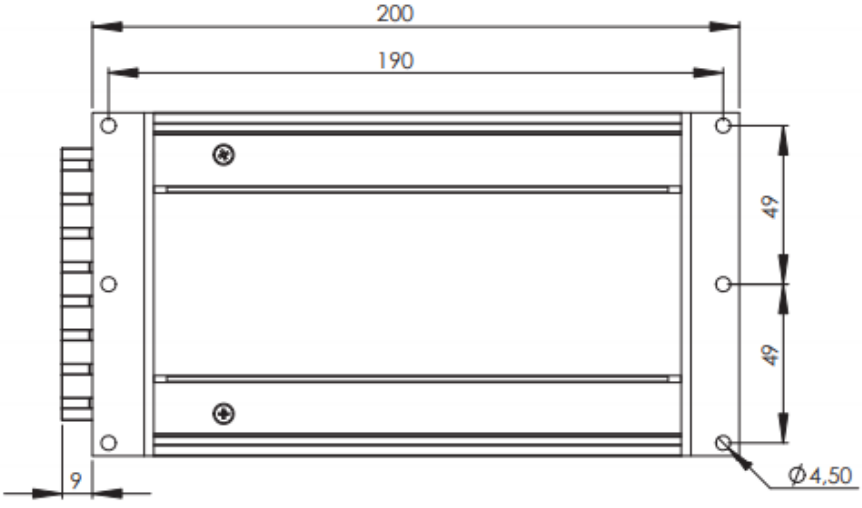
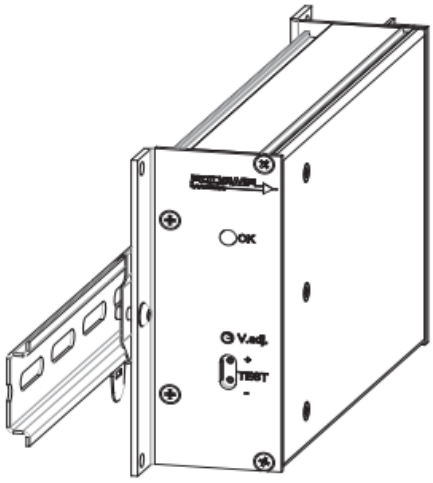
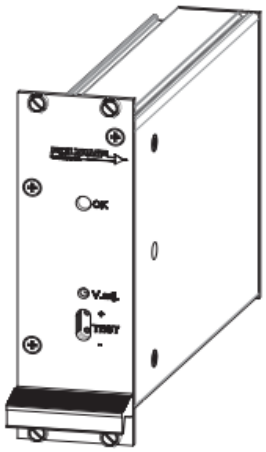


Figure 11. Top view on N-Mechanics

Figure 12. N-Mechanics mounted on DIN-rail TS35 with 2 clips, Included in the delivery.



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



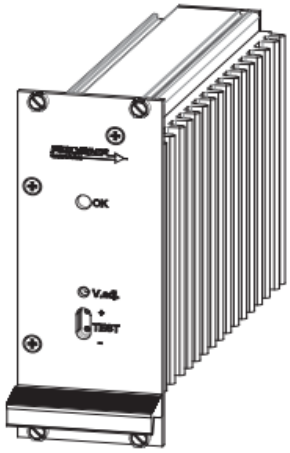
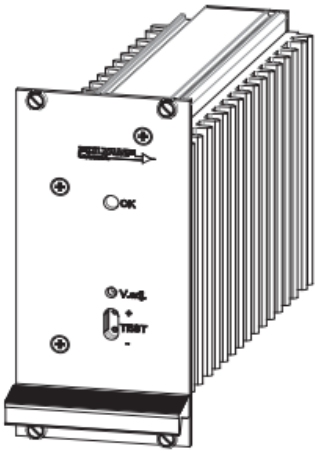


Figure 13.
L-Mechanics 8TE standard | 10TE with T3 cooler



12TE with 2xT3 cooler

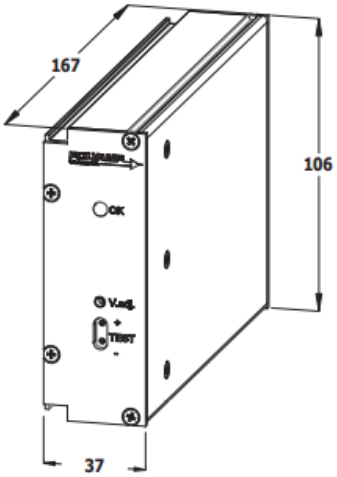


Figure 12. PSC without L-panel

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

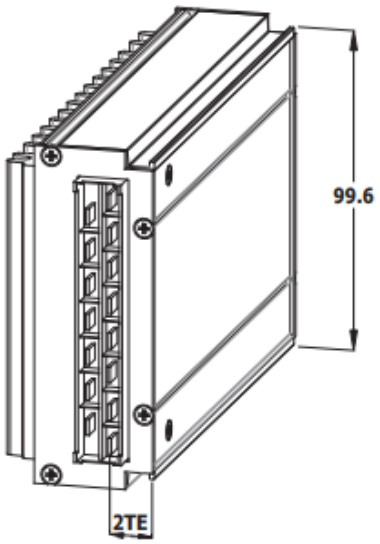


Figure 14. Connector side

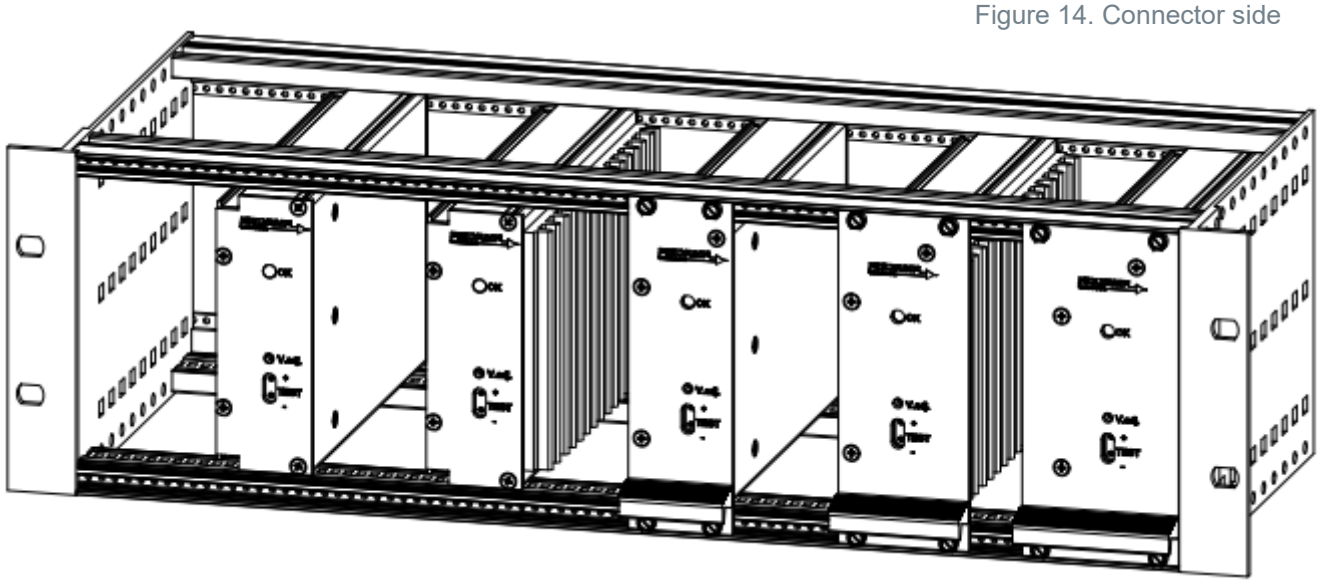


Figure 15. PSC mounted in Euro format 19”-subrack without TE panel. The type code do not include the letter L (L-panel)

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

CE MARK

PSC-series meets the requirements defined by CE mark as an apparatus.

PSC-series meets requirements of EMC directive and low voltage directive (LVD) as well as 2015/863 (RoHS 3) directive.

PSC-series family is in respect to EMC, as stand alone unit. Can also be installed in any other environment by a professional installer.

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.

The PSC-series use the electric safety standard EN IEC 61204-7:2018. On EMC it meets the requirements of EN IEC 61204-3:2018, and the generic EMC standards:

EN IEC 61000-6-2 (Immunity)
EN IEC 61000-6-3 (Emission)

SAFETY STANDARD

NETWORK	INSTALLATION	INPUT CODE
Primary circuit	Class II (1)	all
Primary circuit	Class I (2)	all
Secondary circuit	Class I (2)	all

1. Pollution degree 2 2. Pollution degree 3

ISOLATION TESTABLE LEVELS		TEST VOLTAGE
Input/Output	All	2.5 kVd.c.
Input/Case	All	2.5 kVd.c.
Alarm/Case	All	2.0 kVd.c.
Output/Alarm	All	Same as case below
Output/Case	<75 Vd.c. output	2.0 kVd.c.
Output/Case	>75 Vd.c. output	2.0 kVd.c.

a.c. test is not recommended as affect Y-cap life expectancy.

EMC

EMC STANDARDS	TEST VOLTAGE		NOTES
Emission standards	**EN IEC 61000-6-3**		**Commercial and light-industrial environments**
	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**		**Industrial environments**
EN IEC 61000-4-2	8 kV | 15 kV		Connectors | Air, Enclosure test
EN IEC 61000-4-3, see note 3	10 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	±1 kV | ±2 kV	±0.5 kV | ±1 kV	Line-line 2 Ω | Line-case 12 Ω, See note 4
EN 50121-3-2 train	±1 kV | ±2 kV	±0.5 kV | ±1 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	20 A/m		Enclosure test
EN IEC 61000-4-10	Not sensitive		Enclosure test

3. 20 V/m do not show any influence.
4. Higher level 2 kV / 4 kV with external filters, contact factory.
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: Signaling and telecommunication apparatus. Also to meet relevant parts of IEC 61000-6-5 Generic Standards – Immunity for power stations and substation environments.

HOT PLUGIN REDUNDANT SYSTEMS OR MULTI VOLTAGE SYSTEM

Polyamp supplies customized power systems with AC/DC and DC/DC converters in 19”-sub rack 3U/3HE or 6U/6HE units. They are based on our 3HE Euro cassettes with PSC-series up to 240 W per unit or PSC600 series with 6HE units, please see separate datasheet for PSC600-series.

The solutions can be convection cooled or cooled from cabinet ventilation. We have specially designed smaller sub racks for Railway applications or used standard 19”-sub racks for Telecom, Power plants, Process industry and other applications. We use solutions with backplanes or cabled with distribution and fuses.

At high DC input or output voltages e.g. 110 Vd.c. ”Hot plug-in” is not recommended, due to arcing on the connectors. The photo and figure 3 above is an example of Safety Critical power supply system where 2 different input batteries are used (A and B) with 2 or 3 redundant units per group. All outputs are parallel connected with alarm signalization. One side can also be supplied by AC.

Distributor

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POLYAMP
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