

# DC/DC converters

## PSC-series 80 - 240 W



Compatible AC inputs models. Please download PSC-AC datasheet

### 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
- Alarm circuit with relay
- Accessible on front:
  - Output OK status green LED
  - Output voltage adjustment
  - Output voltage measurement

### 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 > 88%

### 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 train

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
350, 440 Vd.c.	250 - 550 V	E
OPTIMIZED INPUT PSC80 -240		
Nominal inputs	Input range	Code
12 Vd.c.	10 - 18 V	12 (*)
24 Vd.c.	18 - 32 V	24
48 Vd.c.	38 - 60 V	48
110, 127 Vd.c.	90 - 150 V	110
220, 250 Vd.c.	180 - 300 V	220
440 Vd.c.	350 - 550 V	E

(\*) Please contact factory

OUTPUT		
Voltage		Power
5 V		80 W
12 V		80 - 210 W
13.2 V		80 - 240 W
15 V		80 - 240 W
24 V		80 - 240 W
48 V		80 - 240 W
110 V		240 W Uin> 20 V
220 V		240 W Uin>100 V

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.

## 24 V INPUTS / OUTPUT RATING & TYPE CODE 80 - 240 W

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

DC OUTPUT			DC INPUT
V	A	P	18 - 32 V (*)
12 V	17.5 A	210 W	PSC200 24/12
13.2 V	12.5 A	210 W	PSC200 24/13.2
15 V	14 A	210 W	PSC200 24/15
24 V	10 A	240 W	PSC240 24/24
48 V	5 A	240 W	PSC240 24/48
110 V	2.18 A	240 W	PSC240 24/110

(\*) The input, is supplied with pinning no 2 on the connector.  
The above voltage and currents are rated at -25 to +55°C, continuous operation. For higher ambient temperature see option T3.

**How to read our product code:**  
Example **PSC150 24T/48**  
PSC150 = Family code and power  
24T = Input voltage code 24T  
48 = Output voltage 48 V

## 24 to 400 V WIDE INPUTS / OUTPUT RATING & TYPE CODE 80 - 240 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

## 48 to 400 V OPTIMIZED INPUTS / OUTPUT RATING & TYPE CODE 80 - 240 W

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

The above voltage and currents are rated at -25 to +55°C continuous operation. For higher ambient temperature, see option T3. Other input like 36, 60, 72, 96 can be specified.  
Also outputs up to 220 Vdc.

**How to read our product code:**  
Example **PSC240 110/24**  
PSC240 = Family code and power  
110 = Input voltage code 110  
24 = Output voltage 24 V

## GENERAL DATA | INPUT DATA

LABEL	VALUE
Design topology	Full bridge
Switching frequency	50 kHz
Emission / Immunity	See page 8
Electric Safety EN IEC 61204-7:2018	See page 8
Humidity	5 - 90% non condensing
Ingression Protection IP	IP30
Max. accepted input ripple <sup>1</sup> 50 - 400 Hz	1 % of nominal voltage
Input power at no load	3 to 5 W
Reverse input voltage protection	Parallel diode <sup>2</sup>
Inrush current limit	
> 75 Vdc input code	Optional NTC
> 150 Vdc input code	Yes with NTC
Fire protection EN 45545-2 HL3 level 4.3.2 rule 1, fig 1	"Non listed product" <100 g
Dimensions	See page 6 & 7
Weight	See page 7

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

Other input ranges can be made on demand. The input range, is the range we guarantee full output performance,  
The converter works down to the stop levels.  
The output voltage might decrease to approx. 90% of nominal output at the stop level.  
Compatible AC inputs models. Please ask for PSC-AC

## OUTPUT DATA

LABEL	VALUE
Source regulation	0.2%
Load regulation (0 to 100% load) with sense connected	0.2%
Load regulation, 10 - 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 <sup>3</sup>	20 mV
Input ripple attenuation to output (50 to 400 Hz)	150:1
Emission / Immunity	See page 8
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 <sup>4</sup>
Start up time	< 1 s
Hold up time, contact factory	2 - 25 ms
Efficiency <sup>5</sup> < 10 V > 10 V	78 - 85% 89 - 93%
Operating temperature range at 100% load. (Convection cooling) With derating <sup>6</sup>	-25 to +55°C -25 to +70°C
Storage temperature range	-40 to + 85°C

## T-INPUT RANGES FOR MOBILE APPLICATIONS

INPUT			
Input	Uin range S1	Uin 0.1s S2	Code
24 V	16.8 - 32 V	14.4 - 33.6 V	24T
36 V	25.2 - 45 V	21.6 - 50.4 V	36T
48 V	33 - 60 V	28.8 - 69 V	48T
72 V	50.4 - 90 V	43 - 101 V	72T
110 V	77 - 138 V	66 - 154 V	110T

### Railway EN 50155 input voltage options

S1 level - Standard  
S2 - 10 ms hold-up time - Option S2  
C1 - 60 % input 100 ms - Option C1  
C2 - 30 ms hold-up time - Option C2  
(C2 is not available .)

FEATURES

Adjustment & measurement

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

Output Over voltage limiter OVL

The OVL circuit limits the output voltage to about 15% above nominal in case the regulator fails.

Undervoltage alarm with relay

The logic alarm is replaced by a dual relay NO/NC (Normally Open) in alarm state. (Alarm state = no input or low output), see figure. The relay rating is 30 V 0.5 A (a.c. & d.c.). Other ratings on demand.

Sturdy mechanics

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. See next page.

Conformal coating

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

Reverse input voltage protection

Is provided by a parallel diode on the input. This diode is only intended to blow an external input fuse. See option K for more possibilities.

Inrush current limit

A NTC resistor is provided on models with input code D, and 220.



Two basic shapes:

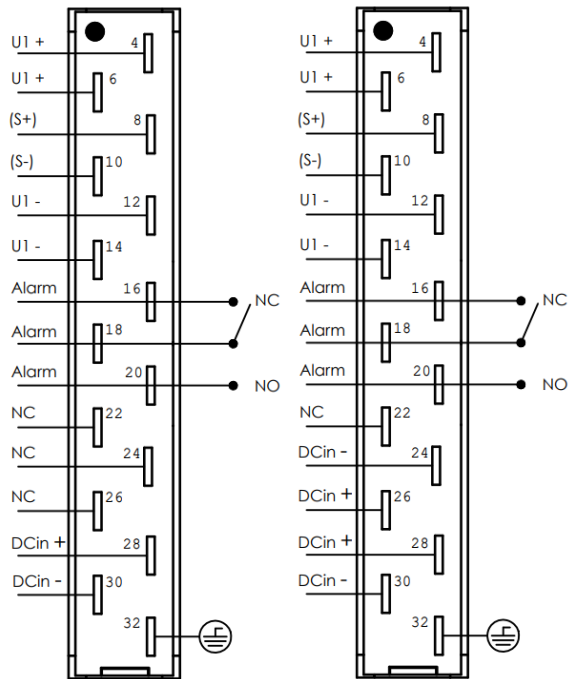
- The standard, screw mounted or DIN-rail.
- The optional 19" -Euro-subrack 8 - 14 TE module

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. PSC150C24

PSC 150 C 24 C, L-10TE NTC



H15 connector pinout  
Standard configuration      12 to 28 V inputs

24T B C D	24 48 110 220	5 12 13.2 15 24 28 48 110 125	A C CR G P S	L-8TE L-10TE L-12TE  N-H15T N-sp T3 2xT3	NTC K1
80 W 100 W 150 W	200 W 240 W				
Wide	Optimized	V	Options	Options	Options
Input voltage range		Output voltage		Mechanic	Input

## 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.

### Output under voltage alarm, Logic Signal - G

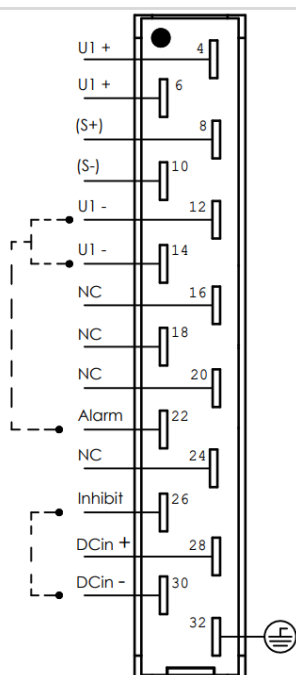
A built in logic alarm changes to alarm state if the converter output voltage drops 10 % below nominal output. The DC OK LED is also controlled by the alarm circuit.

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 voltage of 60 V.

### Inhibit – P

To stop the converter via a power down signal, an external voltage (5 to 24 V) can be put between pin 26 and input zero (pin 30), see figure.

Do not use the output voltage to supply the inhibit.



### Built in output series diode - C

A series diode is provided inside the unit. At outputs above 4.2 A it requires an extra cooler, see option T3.

### Built in output series diode - CR

For “hot-plug in” application the above series diode incorporates balancing resistor. Then this will automatically balance the load between two or more paralleled units. Requires an extra cooler, see option T3.

### Remote sense - S

The voltage sensing can be put at the load to compensate for voltage drop. Is a standard feature on 5 V output. See, connector page 4. Pin 8 (+S) and Pin10 (-S).

### Inrush current limit with NTC

Reduces the inrush current during start up. The input voltage range might be affected. This feature or option is not recommended for stand-by operation (One supply the load and the other is used as an idling back-up). The stand-by unit might not be able to supply enough current until the NTC warms up.

### Input diode for reverse voltage protection - K

Parallel diode reverse protection is a standard feature.

**K1.** Reverse protection with a series diode on the input. The input voltage range is affected with 1 V higher start/stop voltage. On A and B this option decrease the output power by the increased heat losses produced by such diode. Contact factory for details.

### Extra cooler, option T3

The PSC case can accommodate 2 extra coolers, see page 6-7.

The basic models are rated at -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 10-20%

### Mounting against external case/cooler, option N-Sp

The N-Mechanics, use spacers to hold the H15 connector. 4x spacers are supplied.

Also possible to add one T3 cooler, see figure 4.



Figure 4. N-Mechanics, fixed against external cooler. The spacers hold the H15 connector.

## Customized systems



Figure 5. Customized system in a Euro-format 3U 19"-subrack.



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

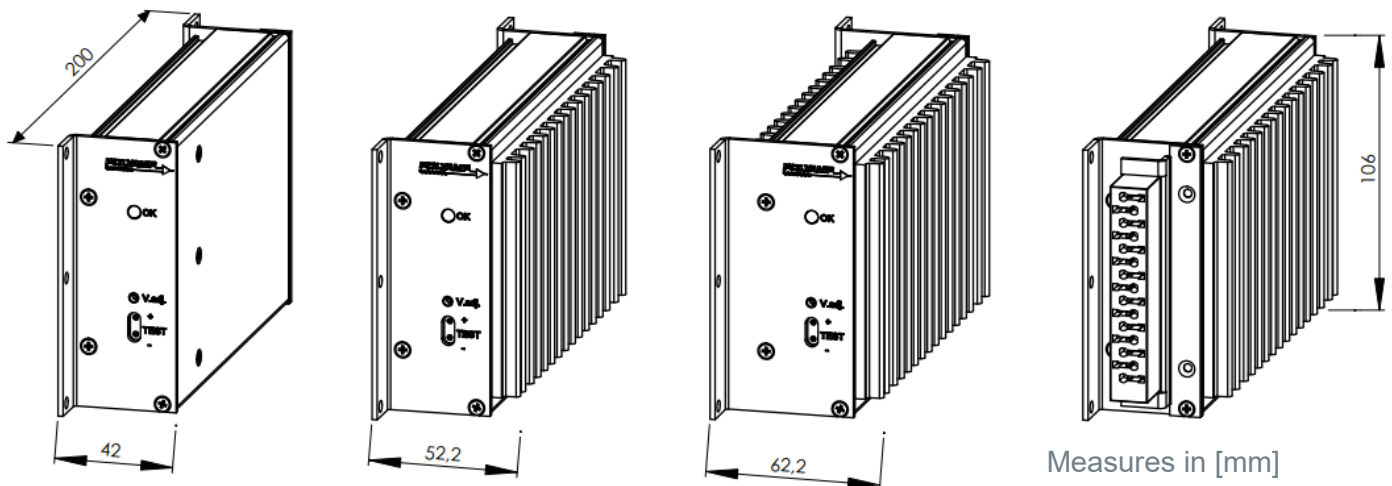


Figure 5. Front and connector view of N-Mechanics, includes connector holder. Female H15 connector is optional.

### Mechanical Design

The PSC has two basic mechanical styles;

- 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 8. H15 Cage Clamp type female - H15-CC  
The cable rating is AWG16 or  $<1.5 \text{ mm}^2$ . That makes it not usable for 24T-input and 5 V outputs.



Figure 9. H15 FastOn 6.3 mm female - H15-T  
The TABS are rated 12 A 70°C or 15 A 55°C thus  $2.5 \text{ mm}^2$  or AWG13

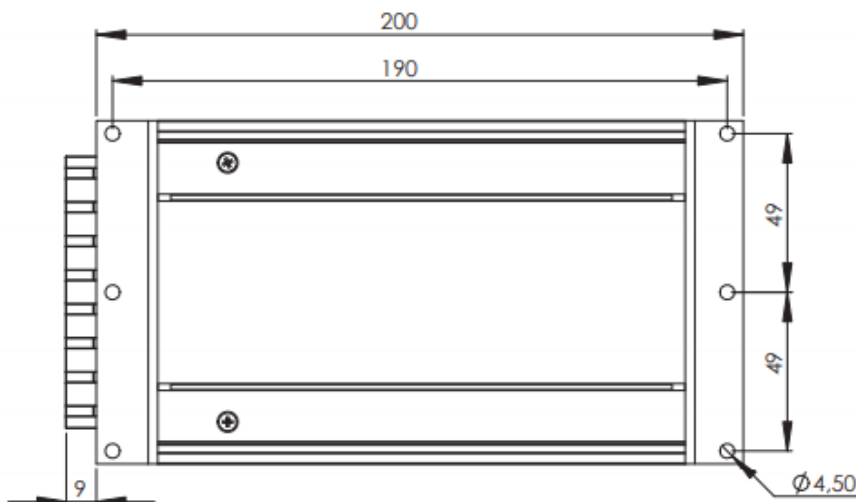
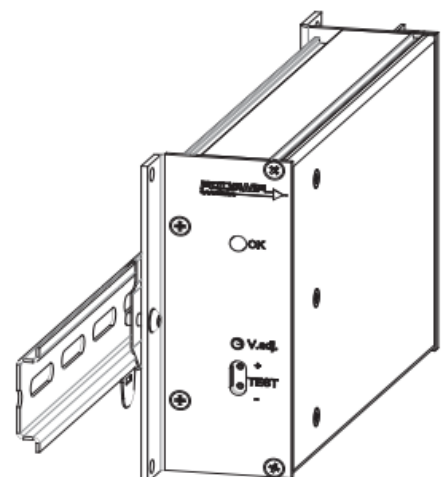


Figure 6. Top view on N-Mechanics

Figure 7. N-Mechanics mounted on DIN-rail TS35 with 2 clips, option Q



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

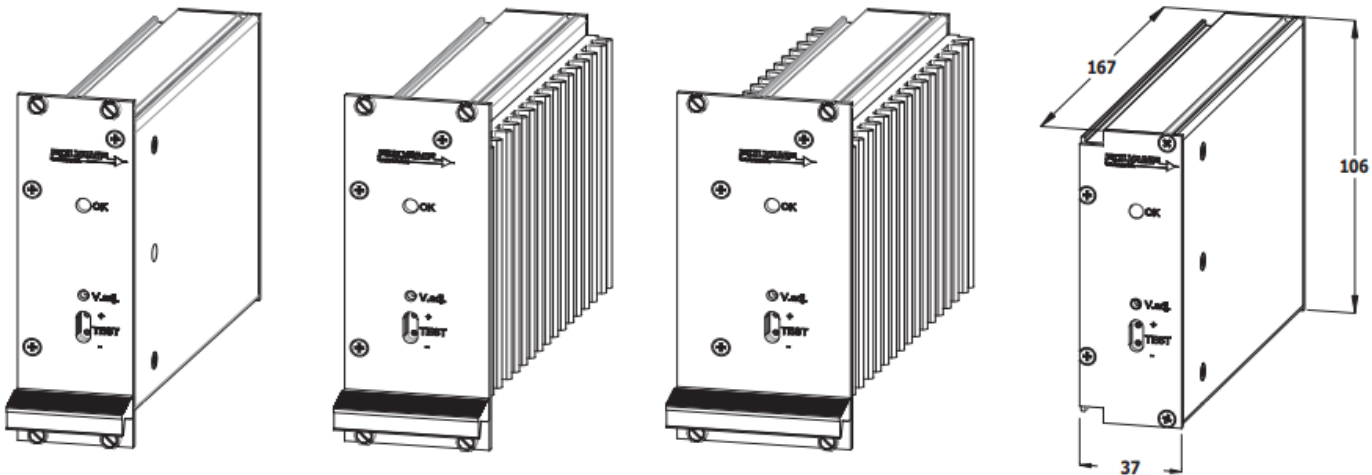
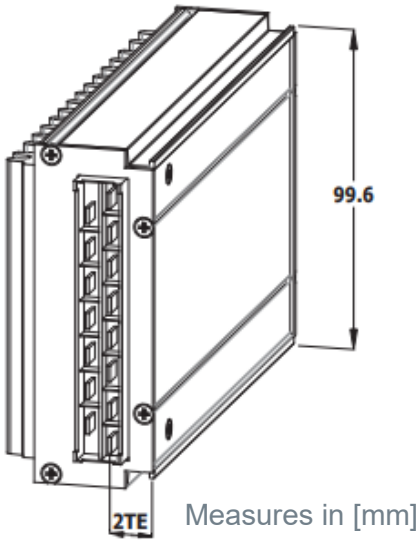


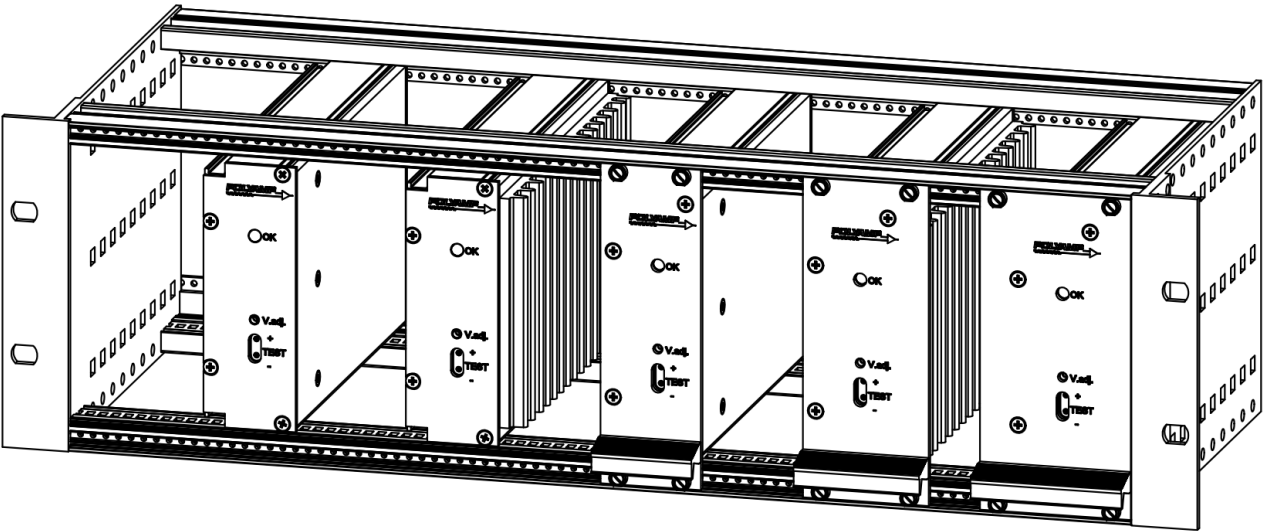
Figure 10. L-Mechanics 8TE standard | 10TE with T3 cooler 12TE with 2xT3 cooler Figure 11. PSC without L-panel

L-Mechanics	PSC	Option 1xT3	Option 2xT3
Width [mm] fig. 11	37	47	57
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
See figure 5 [mm]	42	54.2	64.2
Weight ex, connector	0.85 kg	1.05 kg	1.25 kg



Polyamp can supply complete power systems in 19"-subrack in Euro format. The solution can be cabled to common in and out connector, or we can design backplanes

Figure 12. Connector side



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 8TE to 14 TE.

## 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)	110, 220
Primary circuit	Class I (2)	110, 220
Secondary circuit	Class I (2)	all
SELV circuit	Class I (2)	24, 48

1. Pollution degree 2    2. Pollution degree 3

ISOLATION TESTABLE LEVELS	VOLTAGE
Input/Output	Input code 24, 48, 72 Input code 110, 220
Input/Alarm	Input code 24, 48, 72 Input code 110, 220
Input/Case	Input code 24, 48, 72 Input code 110, 220
Alarm/Case	Input code 24, 48, 72 Input code 110, 220
Output/Case	On <75 Vd.c. output
Output/Alarm	

## EMC

EMC STANDARDS	TEST VOLTAGE		NOTES
<b>Emission standards</b>	<b>EN IEC 61000-6-3</b>		<b>Commercial and light-industrial environments</b>
	<b>Input</b>	<b>Output</b>	
EN 55016 CISPR16 (0.15 - 30 MHz)	OK	OK	Optional EN 55022 level B
EN 55016 CISPR16 (30 - 1000 MHz)	OK		Enclosure test
<b>Immunity standards</b>	<b>EN IEC 61000-6-2</b>		<b>Industrial environments</b>
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 Input code 24,48, 72 Input code 110, 220	±0.5 kV   ±1 kV ±1 kV   ±2 kV	±0.5 kV   ±1 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 <sub>RMS</sub>	10 V <sub>RMS</sub>	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.

Distributor / Your contact:



**Schulz-Electronic**  
Professional Power Supplies

Schulz-Electronic GmbH  
Dir.-Rudolf-Eberle-Straße 2  
D-76534 Baden-Baden  
Fon + 49.7223.9636.0  
Fax + 49.7223.9636.90  
vertrieb@schulz-electronic.de  
www.schulz-electronic.de



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