POLYAMP

- A secure part of your system

DC/DC converters PSC-series 80 - 240 W

80 - 240 W 5 - 220 VDC

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

INPUT / OUTPUT

- PSC80 - 150 wide input ranges 10 - 500 Vdc
- Single outputs 5 - 48 V, 80 - 150 W
- PSC240 optimized input 18 - 500 Vdc
- Single outputs 12 - 220 V, 200 - 240 W
- Reverse input voltage protection

FEATURES

- CE mark, EMC, LVD, ROHS
- Alarm circuit with relay
- Conformally coated
- Accessible on front:
  - Output status green/red 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**
12, 24 Vd.c.	10 - 30 V	A
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

OPTIMIZED INPUT PSC80 -240		
Nominal inputs	**Input range**	**Code**
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
400, 440 Vd.c.	350 - 550 V	440

OUTPUT		
Voltage	**Up to current**	**Power**
5 - 8 V	- 16 A	80 W
12 V	- 17.5 A	80 - 210 W
13.2 - 18 V	- 18 A	80 - 240 W
24 - 28 V	- 10 A	80 - 240 W
36 V	- 6.7 A	80 - 240 W
48 - 53 V	- 5 A	80 - 240 W
110 V	- 2.2 A	240 W Uin > 20 V
220 V	- 1.1 A	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.
(*) Pease contact factory

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

DC OUTPUT			DC INPUT	Case
V	A	P	10 - 30 V	
5 V	16 A	80 W	PSC80A5	8 TE
12 V	8.5 A	100 W	PSC100A12	8 TE
13.2 V	7.6 A	100 W	PSC100A13.2	8 TE
15 V	6.7 A	100 W	PSC100A15	8 TE
24 V	4.2 A	100 W	PSC100A24	8 TE
48 V	2.1 A	100 W	PSC100A48	8 TE

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

The above voltage and currents are rated at -25 to +55°C, continuous operation. For higher ambient temperature see option T3, which increase case 2TE.

How to read our product code:
Example **PSC100A48**
PSC100 = Family code and power
A = Input voltage code 10 - 30 V
48 = Output voltage 48 V

24 to 500 V WIDE INPUTS / OUTPUT RATING & TYPE CODE 80 - 150 W

DC OUTPUT			DC INPUT					
V	A	P	20- 60 V	38 - 100 V	50 - 150 V	90 - 270 V	260 - 500 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		10TE
13.2 V	7.6 A	100 W	PSC100B13.2	PSC100CT13.2	PSC100C13.2	PSC100D13.2	PSC100E13.2	8TE
13.2 V	11.4 A	150 W	PSC150B13.2	PSC150CT13.2	PSC150C13.2	PSC150D13.2		10TE
15 V	6.7 A	100 W	PSC100B15	PSC100CT15	PSC100C15	PSC100D15	PSC100E15	8TE
15 V	10 A	150 W	PSC150B15	PSC150CT15	PSC150C15	PSC150D15		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		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		10TE

48 to 550 V OPTIMIZED INPUTS / OUTPUT RATING & TYPE CODE 200 - 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 48/13.2	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
53.2 V	4.5 A	240 W	PSC240 48/53.2	PSC240 110/53.2	PSC240 220/53.2	PSC240 440/53.2	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.

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

INTRODUCTION

Two basic shapes:

1. The L with 8 -12 TE Euro format
2. N-mechanics for wall, chassis, DIN mount

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 some options.

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 K1 for more possibilities.

FEATURES

Adjustment & measurement

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

Output Over voltage limit OVL

The OVL circuit limits the output voltage to around +25% above **Vnom,** the nominal output voltage, in case the regulator fails.

Output voltage status with LED and Alarm B

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. See figure 1.

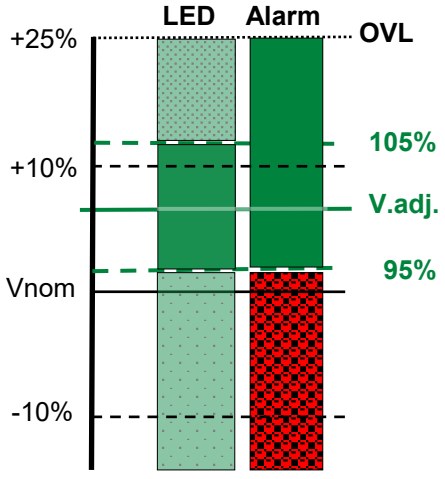


Figure 1. LED and alarm relay signaling

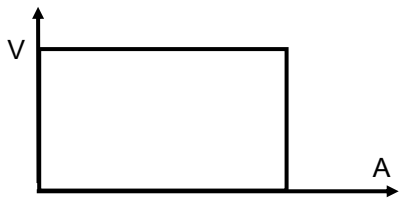


Figure 2. Rectangular current limit

Figure 3. N-mechanics STD and 1 or 2 extra T3 coolers.

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

Output voltage status with LED and Alarm relay

- When the output voltage is in normal operation mode the LED is green.
- 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, then this indicate a general fault or temporally during the 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.

The relay rating is 30 V 0.5 A (a.c. & d.c.).

Temperature controlled current limit

Optionally for temperature sensitive application, the circuit can decrease the maximum available current, which basically lower the maximum current rating limit, that results in figure 5 current limit characteristic.
In the case the load reach this, by temperature set current limit level, then the alarm and LED switch over to alarm state.

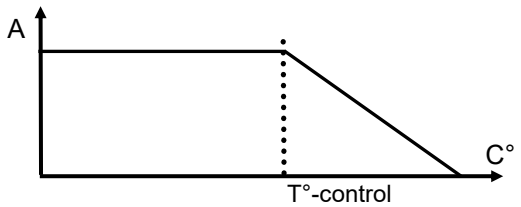


Figure 5. Temperature current control

OPTIONAL FEATURES

Over Voltage Protection OVP - A
The OVP shuts down the output by activating the Inhibit. This inhibit can only be released by switching off the input. Cannot be used together with **C** optional diode. On 5 V output the OVP is standard and trigs at 6.2 V. External over voltages are covered by the OVP.

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. Series diode is needed for redundant paralleled systems.

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.

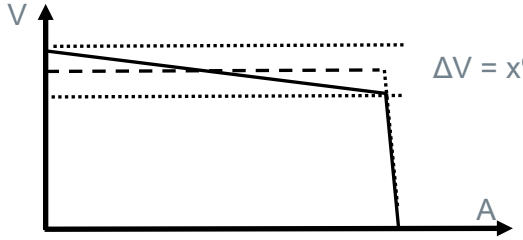


Figure 6. Virtual series resistance regulation

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.

Remote sense - S
The voltage sensing can be put at the load to compensate for voltage drop. Is a standard feature on 5-8 V output. See, connector page 4. Pin 8 (+S) and Pin10 (-S). Cannot be combined with option C and VR.

Output under voltage alarm, Logic Signal - G
A built in logic alarm changes to alarm state if the 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 is 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.

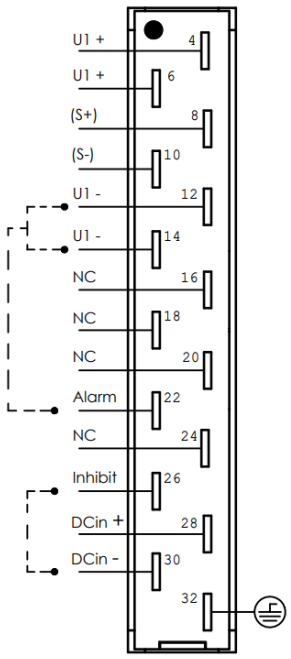


Figure 7. Pinout logic signal G & Inhibit from input coded P.

Inrush current limit with NTC
Is a standard feature on D, 220, E, 440 input code units. 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 input voltage ranges 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
See Figure 4, page 3.
The N-Mechanics, use 4 spacers to fix the unit “upside down” The H15 female connector blocked by the spacers. Also possible to add one T3 cooler.

DIN-rail TS35 mounting with 2 clips
DIN rail clips are delivered with N-mechanics.

How to code the unit?
First, you have to select mechanics between either :

- L - Euro format
- N - Case or DIN mount

Use type code from table on page 2: e.g. PSC150C24

PSC 150 C 24 C, L-10TE NTC

A B C D E 80 W 100 W 150 W	24 48 110 220 440 200 W 240 W	5 12 13.2 15 24 28 48 53.2 110 125 220	A C VR S G P	L-8TE L-10TE L-12TE N-H15-T N-sp T3 2xT3	NTC K1
Wide	Optimized	V	Options	Options	Options
Input voltage range		Output voltage		Mechanic	Input

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[1] 50 - 400 Hz	1 % of nominal voltage
Input power at no load	3 to 5 W
Reverse input voltage protection	Parallel diode[2]
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

Notes

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 to 300 Vdc 20 mA.
   The switch current depends on the 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

T-INPUT RANGES FOR MOBILE APPLICATIONS

INPUT			
Input	Uin range S1	Uin 0.1s S2	Code
24 V	16.8 - 33 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 is not available, needs external capacitor bank and diode.

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 are available. Please ask for PSC-AC datasheet.

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[3]	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[4]
Start up time	< 1 s
Hold up time, contact factory	2 - 25 ms
Efficiency[5] < 10 V > 10 V	78 - 85% 89 - 93%
Operating temperature range at 100% load. (Convection cooling) With derating, see note 6 and figure 1	-25 to +55°C -25 to +70°C
Storage temperature range	-40 to + 85°C

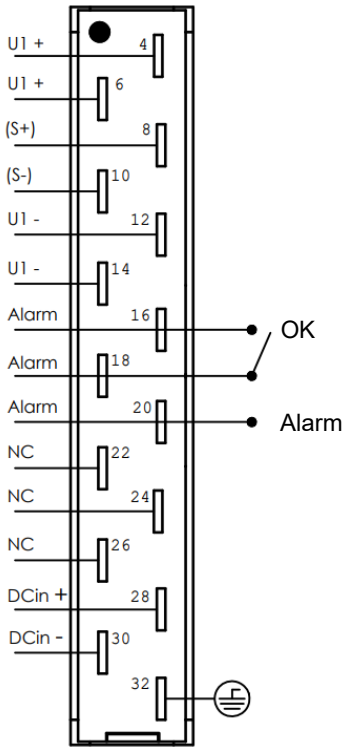


Figure 8. Standard configuration
DIN41612 H15 connector

N-MECHANICS: WALL & CHASSIS MOUNTING WITH H15 CONNECTORS

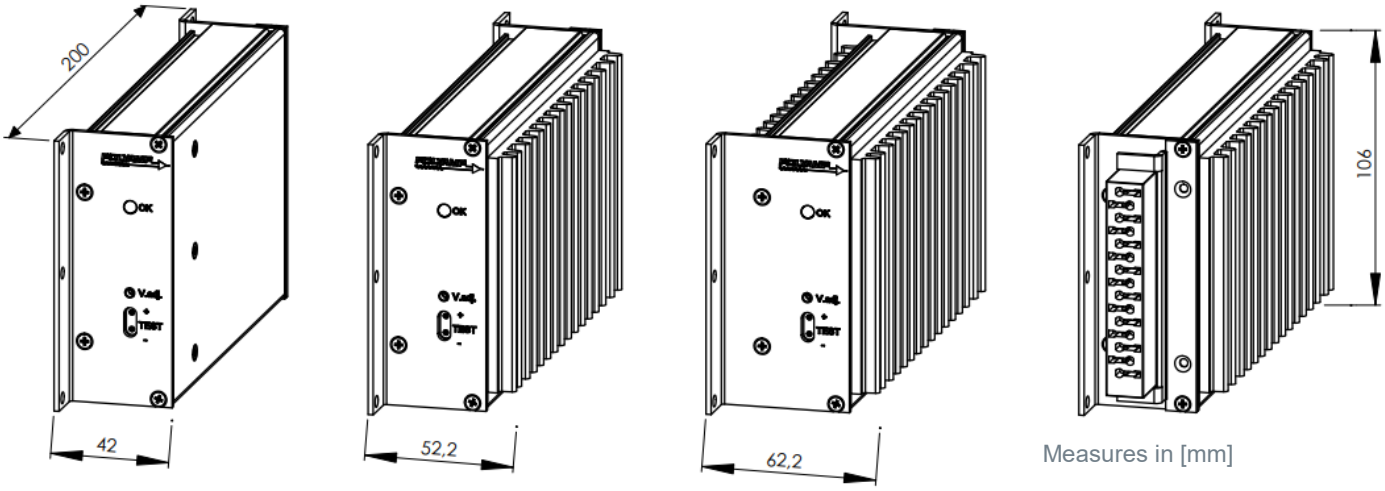


Figure 9. Front and connector view of **N-H15 Mechanics**, includes connector holder and H15-CC female connector.

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.

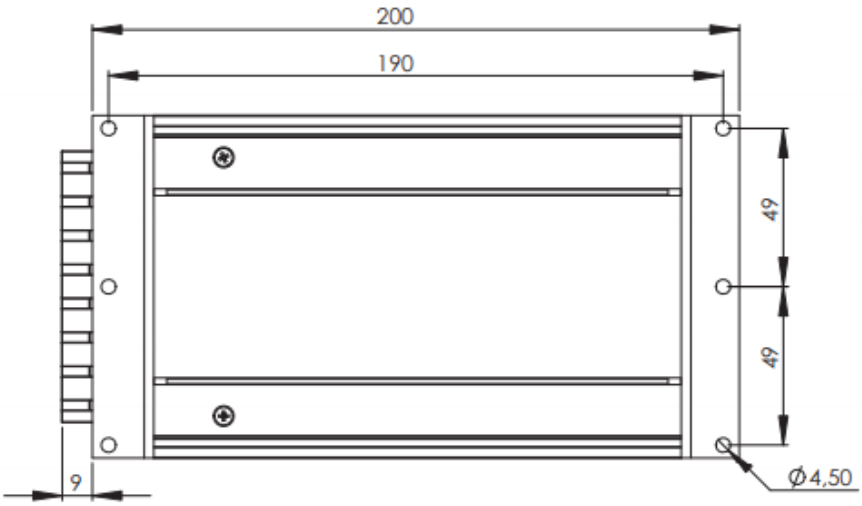


Figure 10. Top view on N-Mechanics

Figure 11. **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 12. **Optional**
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

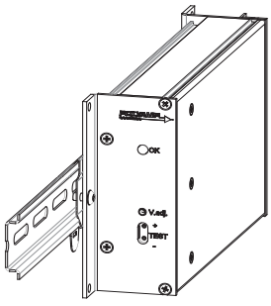
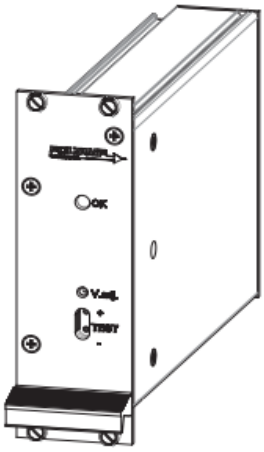


Figure 13.
N-Mechanics mounted on DIN-rail TS35 with 2 clips,
Q- clips included in delivery of N-mechanics

Figure 14.
N-Mechanics STD, with 1 & 2 extra T3 coolers

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



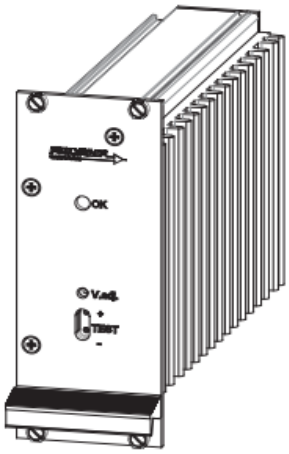
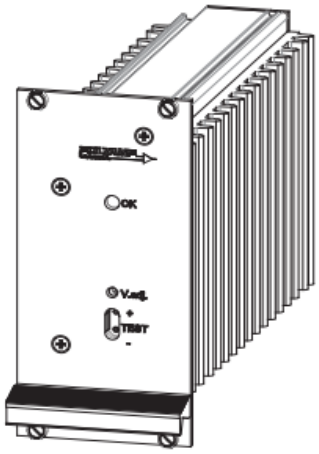


Figure 15.
L-Mechanics 8TE standard | 10TE with T3 cooler



12TE with 2xT3 cooler

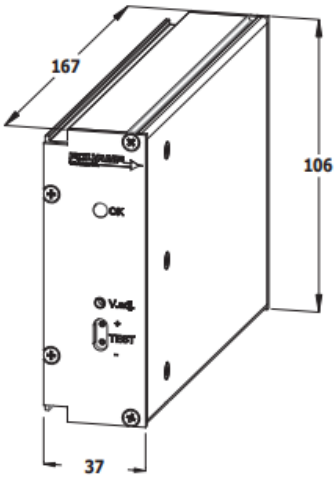
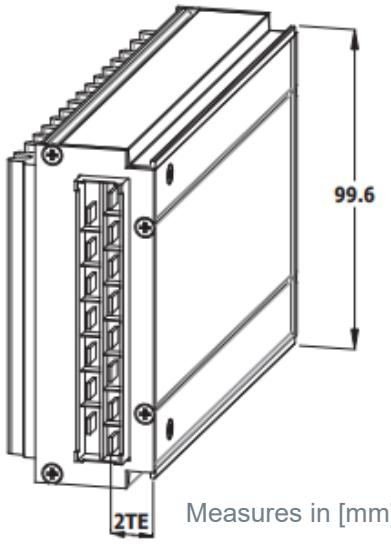


Figure 16.
PSC without L-panel

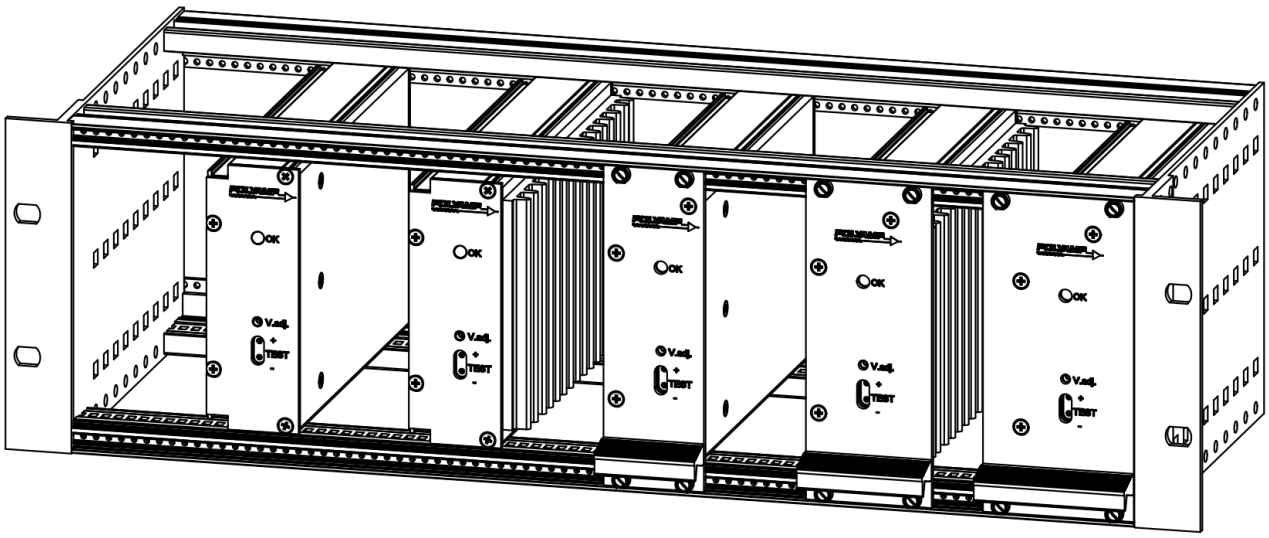
L-Mechanics	PSC	Option 1xT3	Option 2xT3
Width fig. 15 [mm]	37	47	57
Width fig. 14 [TE]	8 TE	10 TE	12 TE
Weight ex, connector	0.8 kg	1.0 kg	1.2 kg
N-Mechanics	**PSC**	**Option 1xT3**	**Option 2xT3**
See figure 9 [mm]	42	54.2	64.2
Weight ex, connector	0.85 kg	1.05 kg	1.25 kg



Measures in [mm]

Figure 17. Connector side

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



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

1. Pollution degree 2 2. Pollution degree 3

ISOLATION TESTABLE LEVELS		
Configuration	Input code	Voltage
Input/Output	A, B, 24, 48, 72 C, 110, D, 220, E, 440	2.0 kVd.c. 2.5 kVd.c.
Input/Alarm	A, B, 24, 48, 72 C, 110, D, 220, E, 440	2.0 kVd.c. 2.5 kVd.c.
Input/Case	A, B, 24, 48, 72 C, 110, D, 220, E, 440	2.0 kVd.c. 2.5 kVd.c.
Alarm/Case	A, B, 24, 48, 72 C, 110, D, 220, E, 440	2.0 kVd.c. 2.5 kVd.c.
Output/Case	On <75 Vd.c. output	2.0 kVd.c.
Output/Alarm		2.5 kVd.c.

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	Optional EN 55022 level B
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 A, B, 24, 48, 72 C, 110, D, 220, E	±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_{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.

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