



## PU500-series 400 to 500 W

### INPUT / OUTPUT

- Optimized input voltage ranges
- Input ranges from 18 to 300 Vd.c.
- Single outputs from 24 to 60 Vd.c.
- Reverse input voltage protection

### FEATURES

- Overvoltage protection OVP
- Over/Under voltage alarm relay
- Remote sense
- Inhibit input / Power down
- Output voltage adjustable on frontpanel.

INPUT		
Nominal inputs	Input range	Code
24 Vd.c.	18-32 V	24
48 Vd.c.	38-60 V	48
110, 127 Vd.c.	88-150 V	110
220, 250 Vd.c.	175-300 V	220

Input voltages meeting train standard EN50155 IEC60571, can be made on demand.

### OPERATION

- Operating temperature range -25 to +55 °C
- High efficiency > 88%
- Fully encapsulated, meets IP20 as standard.
- Convection cooled

### EMC

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

OUTPUT		
Voltage	Current	Power
24 V	16.7-20.9 A	400-500 W
28 V	14.3-17.9 A	400-500 W
36 V	11.2-13.9 A	400-500 W
48 V	8.4-10.5 A	400-500 W
60 V	6.7-8.4 A	400-500 W

## OUTPUT RATING & TYPE CODE

OUTPUT			INPUT			
Voltage	Current	Power	18 - 32 V	38 - 60 V	88 - 150 V	175 - 300 V
24 V	16.7 A	400 W	PU500 24/24			
24 V	20.9 A	500 W		PU500 48/24	PU500 110/24	PU500 220/24
28 V	14.3 A	400 W	PU500 24/28			
28 V	17.9 A	500 W		PU500 48/28	PU500 110/28	PU500 220/28
36 V	11.2 A	400 W	PU500 24/36			
36 V	13.9 A	500 W		PU500 48/36	PU500 110/36	
48 V	8.40 A	400 W	PU500 24/48			
48 V	10.5 A	500 W		PU500 48/48	PU500 110/48	PU500 220/48
60 V	6.70 A	400 W	PU500 24/60			
60 V	8.40 A	500 W			PU500 110/60	PU500 220/60

How to read our product code: Example PU500 24/48

PU500 = Family code

24 = input voltage code 24

48 = Output voltage 48 V

## FEATURES

### Overvoltage protection OVP

The output voltage is limited to 15 % over nominal output voltage by an extra regulation circuit.

### External output voltage sense

External sense is used when the voltage regulation at the load is critical. The sense can compensate voltage drops up to 5% of the nominal voltage.

### Remote sense

External sense is used when the voltage regulation at the load is critical. The sense can compensate voltage drops up to 5% of the nominal voltage.

### Over / Under voltage alarm

The built in relay changes to alarm state if the converter output voltage is not within 90 to 115 % of nominal output. The user can select NO or NC relay function. The relay rating is 30 V 0.5 A (d.c. or a.c.)

### Inhibit input / Power down

This input allows remote start and shutdown of the converter by a signal voltage of 5 to 12V. Max 35mA.

## OPTIONAL FEATURES

### Output with series diode

Use the series diode output when the output is connected in parallel with other power supplies to achieve redundancy. The output current is derated with 10% on 24 to 48 V outputs.

### Inrush current limit with NTC

Reduces the inrush current during start up. The input voltage range will be affected. Only available on 110 & 220 input code.

### Conformally coating

For environment with high non condensing humidity max 85 % RH.

### Train input

Input voltage range according to train standard EN 50155 and IEC 60571. For train 36V use standard B-range and for 110V use standard C-range.

### Mounting brackets L216-1

See figure 3.

### 19" Rack mounting set

To mount two PU500 together to form a full 19" rack unit, see figure 2.

### 19" Rack mounting bracket L86-3

To mount one PU500 to form a full 19" rack unit, see figure 2.

### Empty box

To produce a full 19"-rack unit. Includes 19"-rack mounting set, see middle section of figure 2. (One converter replaced by empty box.)

## GENERAL DATA / INPUT DATA

LABEL	VALUE
Design topology	Push-Pull
Switching frequency	40 kHz
Emission / Immunity	See page 4
Safety EN IEC 60950	Class I
Max. accepted input ripple <sup>1</sup> 50-400 Hz	1 % of nominal voltage
Input power at no load	
Uout <36 V	Max 10 W
Uout 36-50 V	Max 12 W
Uout 60 V	Max 17 W
<b>Reverse input voltage protection</b>	
24, 48 input code	Parallel diode
110, 220 input code	Series diode
Dimensions (D x W x H)	232 x 210 x 86 mm
Weight	4.2 kg
Power connectors	0,5 - 4 mm <sup>2</sup>
Signal connectors	0,25 - 2,5 mm <sup>2</sup>

1. Higher ripple affects the input, contact factory

2. The output ripple might increase to 0.5% RMS of Vout, when EN IEC 61000-4-3, 10 V/m test is applied.

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

## OUTPUT DATA

LABEL	VALUE
Source regulation	0.1%
Load regulation (0 to 100% load)	0.2%
Transient recovery time for 10 to 90% load step to within 3% of nominal output voltage.	<3 ms
Output ripple (80 kHz) <sup>2</sup>	Typ. 15 mV p-p
Input ripple attenuation to output (50 to 400 Hz)	150:1
Emission / Immunity	See page 4
Temperature coefficient	0.02%/°C
Min output adjustment range adjustable with a 15 turn potentiometer	95 - 110%
Current limit, rectangular	105%
Remote sense	Yes
Soft start	Yes
Start-up time	1 s
Hold-up time, contact factory	2 - 25 ms
Efficiency <sup>3</sup>	88 - 91 %
Operating temperature range at 100% load. (Convection cooling) with derating <sup>4</sup>	-25 to +55 °C -25 to +70 °C
Storage temperature range	-40 to +85 °C

## MECHANICAL DRAWING

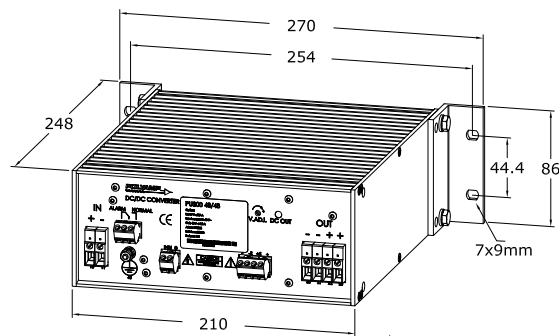
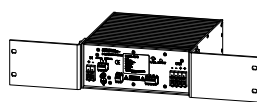
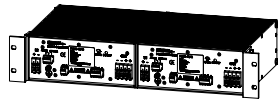


Figure 1. Dimensions

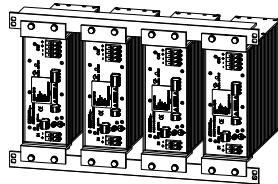
Weight: 4.2 kg



Single unit PU300/500 mounted as one 19" unit using L86-3 brackets (Optional).



2 units PU300/500 mounted side by side forming one 19" unit, using 19" rack mounting set (Optional).



4 units PU300/500 mounted vertically, using standard L86-1 brackets and L480-1 (Optional).

PU300/500 wall mounted. Using standard brackets L86-1

PU300/500 wall mounted. Using mounting brackets L216-1 (Optional)

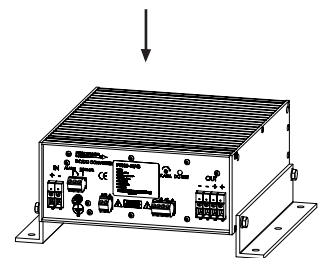


Figure 2. 19"-rack mounting

Figure 3. Wall and chassis mounting

## CE MARK

PU500 meets the requirements defined by CE mark as apparatus.

PU500 meets requirements of EMC directive and low voltage directive (LVD) and RoHS II directive.

The PU500 family is in respect to EMC, a 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

## SAFETY STANDARD EN/IEC 60950

ISOLATION TESTABLE LEVELS		TEST VOLTAGE
Input / Output	Input code: 24, 48	2 kVd.c.
	Input code: 110, 220	2.5 kVa.c. / 4 kVd.c.
Input / Signal*	Input code: 24, 48	2 kVd.c.
	Input code: 110, 220	2.5 kVa.c. / 4 kVd.c.
Input / Case	Input code: 24, 48	2 kVd.c.
	Input code: 110, 220	2.5 kVa.c. / 4 kVd.c.
Output / Case all outputs		2 kVd.c.
Output / Signal*		2 kVd.c.
Case / Signal*	Input code: 24, 48	2 kVd.c.
	Input code: 110, 220	2.5 kVa.c. / 4 kVd.c.

\* Signal = Alarm + Inhibit

## EMC

EMC STANDARDS	EMC PERFORMANCE		
<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	opt. 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		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 <sup>1</sup> , 220 <sup>1</sup>	± 1 kV / ± 2 kV	± 0.5 kV / ± 1 kV	Line-line 2 Ω / Line-case 12 Ω
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 <sub>RMS</sub>	10 V <sub>RMS</sub>	AM-Modulated
EN IEC 61000-4-8	Not sensitive		Enclosure test
EN IEC 61000-4-10	Not sensitive		Enclosure test

1. 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.



- A secure part of your system



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