

## PM150-series 120 to 150 W

### INPUT / OUTPUT

- Wide input voltage ranges
- Input ranges from 10 to 270 Vd.c.
- Single outputs from 12 to 48 Vd.c.
- Reverse input voltage protection
- 2.5 kVa.c. isolation input/output, input/case, output/case

### FEATURES

- Overvoltage protection OVP
- Extra output with series diode
- Over/Under voltage alarm relay

INPUT		
Nominal inputs	Input range	Code
12, 24 Vd.c.	10-30 V	A
24, 28, 36, 48 Vd.c.	20-60 V	B
72, 96, 110, 127 Vd.c.	50-150 V	C
110, 127, 220 Vd.c.	90-270 V	D

### OPERATION

- Operating temperature range -25 to +55 °C and +70 ° with derating.
- High efficiency.
- Fully encapsulated, meets IP20 as standard.
- Convection cooled.
- Output voltage adjustable on frontpanel.

### 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
12 V	10-12 A	120-150 W
13.8 V	8.7-10.9 A	120-150 W
15 V	8-10 A	120-150 W
24 V	5-6.25 A	120-150 W
28 V	5.36 A	150 W
36 V	4.17 A	150 W
48 V	2.5-3.13 A	120-150 W

## OUTPUT RATING & TYPE CODE

OUTPUT			INPUT			
Voltage	Current	Power	10 - 30 V	20 - 60 V	50 - 150 V	90 - 270 V
12 V	10.0 A	120 W	PM150A12			
12 V	12.5 A	150 W		PM150B12	PM150C12	PM150D12
13.8 V	8.70 A	120 W	PM150A13.8			
13.8 V	10.9 A	150 W		PM150B13.8	PM150C13.8	PM150D13.8
15 V	8.00 A	120 W	PM150A15			
15 V	10.0 A	150 W		PM150B15	PM150C15	PM150D15
24 V	5.00 A	120 W	PM150A24			
24 V	6.25 A	150 W		PM150B24	PM150C24	PM150D24
28 V	5.36 A	150 W		PM150B28	PM150C28	PM150D28
36 V	4.17 A	150 W		PM150B36		
48 V	2.50 A	120 W	PM150A48			
48 V	3.13 A	150 W		PM150B48	PM150C48	PM150D48

How to read our product code: Example PM150B12

PM150 = Family code

B = input voltage code B

12 = Output voltage 12 V

## FEATURES

### Overvoltage protection OVP

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

### Extra output with series diode

Use the series diode output when the output is connected in parallel with other power supplies to achieve redundancy.

### 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.)

## OPTIONAL FEATURES

### Inrush current limit with NTC

Reduces the inrush current during start up. The input voltage range will be affected. Only available on C & D inputs.

### Conformally coating

For environment with high non condensing humidity max 98 % RH.

### +70 °C operating temperature

Contact factory for derating as it depends on model. The alarm can not be used at +70 °C.

### Mounting brackets L214-1

See figure 3.

### 19" Rack mounting set PL88-2

To mount two PM150 together to form a full 19" rack unit, see figure 2.

### 19" Rack mounting bracket PL88-3

To mount one PM150 to form a full 19" rack unit, see figure 2.

### EN IEC 61000-4-5 level 4

External varistor + surge arrestor mounted from pole to ground. With this filter the input meets level 4 of EN IEC 61000-4-5 (+/-2 kV line to line, 4 kV line to ground)

### DIN-rail clips

Clips to mount PM150 on a 35 mm DIN-rail. (Used with PL88-1 & L-214 see figure 3)

### Train input

Input voltage range according to train standard EN 50155 and IEC 60571.

## GENERAL DATA / INPUT DATA

LABEL	VALUE
Design topology	Push-Pull
Switching frequency	30 kHz
Emission / Immunity	See page 4
Safety EN IEC 60950	Class I
Max. accepted input ripple <sup>1</sup> 50-400 Hz	2 % of nominal voltage
Input power at no load	Max. 9 W
Inrush current limit	No
<b>Reverse input voltage protection</b>	
A, B input code	Parallel diode
C, D input code	Series diode
Dimensions (D x W x H)	160 x 214 x 88 mm
Weight	2.5 kg
Power connectors	0,25 - 4 mm <sup>2</sup>
Signal connector	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  $V_{out}$ , 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)	0.3%
Transient recovery time for 10 to 90 % load step to within 3 % of nominal output voltage.	<3 ms
Output ripple (60 kHz) <sup>2</sup>	30 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	No
Soft start	Yes
Start-up time	1 s
Hold-up time, contact factory	2 - 25 ms
Efficiency <sup>3</sup>	80 - 88 %
Operating temperature range at 100% load. (Convection cooling) with derating <sup>4</sup>	-25 to +55 °C +70 °C
Storage temperature range	-40 to +85 °C

## MECHANICAL DRAWING

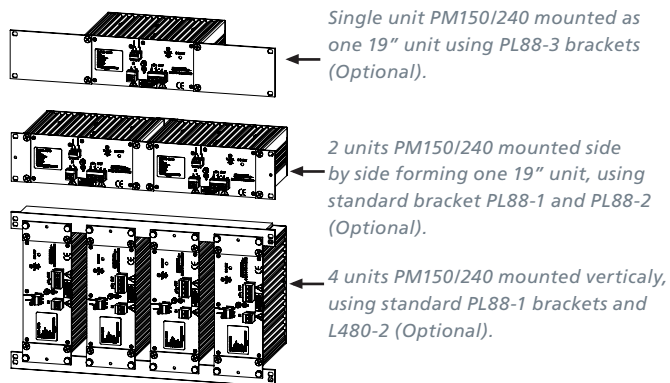
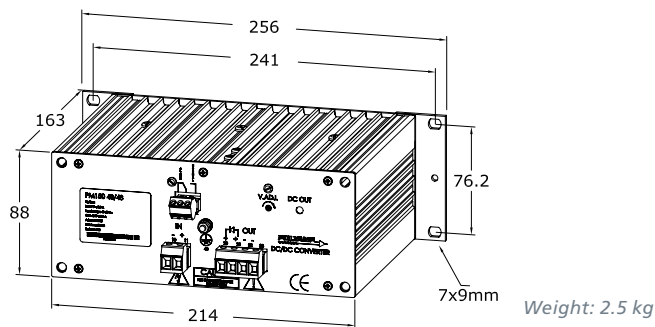


Figure 2. 19"-rack mounting

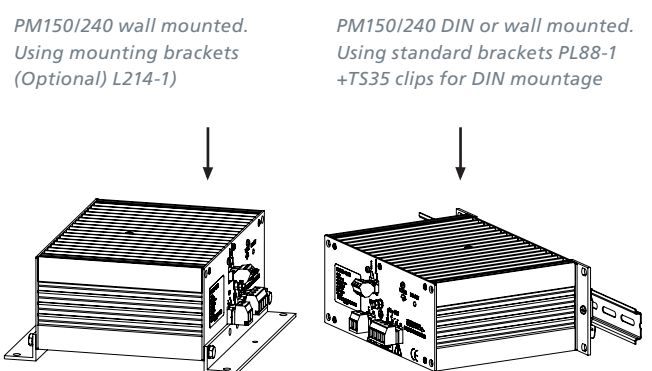


Figure 3. Wall and chassis mounting

## CE MARK

PM150 meets the requirements defined by CE mark as apparatus.

PM150 meets requirements of EMC directive and low voltage directive (LVD) and RoHS II directive.

The PM150 family is in respect to EMC, a stand alone unit that 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	2.5 kVa.c. / 4 kVd.c.
Input / Case	2.5 kVa.c. / 4 kVd.c.
Output / Case all outputs	2.5 kVa.c. / 4 kVd.c.
Input / Alarm	2.5 kVa.c. / 4 kVd.c.
Output / Alarm	2.5 kVa.c. / 4 kVd.c.
Case / Alarm	2.5 kVa.c. / 4 kVd.c.

## EMC

EMC STANDARDS	EMC PERFORMANCE		REMARKS
<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 CISPR 16 (0.15-30 MHz)	OK	OK	opt.EN 55022 level B
EN 55016 CISPR 16 (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 / 8 kV		Contact / air, Enclosure test
EN IEC 61000-4-3	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 A, B	± 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 C, D	± 1 kV / ± 2 kV <sup>1</sup>	± 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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