



## PM50-series 32 to 50 W 1&2 outputs

### INPUT / OUTPUT

- Wide input voltage ranges
- Input ranges from 10 to 270 Vd.c.
- Single outputs from 12 to 132 Vd.c.
- Two isolated outputs 12-16, 18 or 60 Vd.c.
- Reverse input voltage protection

### OPERATION

- Operating temperature range -25 to +55 °C (-40 °C on request)
- Fully encapsulated, meets IP20 as standard.
- Convection cooled

### SINGLE OUTPUTS

OUTPUT			INPUT				Connection
Voltage	Current	Power	10 - 30 V	20 - 60 V	50 - 150 V	90 - 270 V	
12 V	2.67 A	32 W	PM50A15-15				Parallel
12 V	3.34 A	40 W		PM50B15-15	PM50C15-15	PM50D15-15	Parallel
15 V	2.67 A	40 W	PM50A15-15				Parallel
15 V	3.34 A	50 W		PM50B15-15	PM50C15-15	PM50D15-15	Parallel
18 V	2.60 A	47 W	PM50A18-18				Parallel
18 V	3.20 A	57 W		PM50B18-18			Parallel
18 V	2.78 A	50 W			PM50C18-18		Parallel
24 V	1.34 A	32 W	PM50A15-15				Series
24 V	1.67 A	40 W		PM50B15-15	PM50C15-15	PM50D15-15	Series
28 V	1.34 A	37 W	PM50A15-15				Series
28 V	1.67 A	47 W		PM50B15-15	PM50C15-15	PM50D15-15	Series
36 V	1.30 A	47 W	PM50A18-18				Series
36 V	1.60 A	57 W		PM50B18-18			Series
36 V	1.39 A	50 W			PM50C18-18		Series
60 V	0.67 A	40 W	PM50A60-60				Parallel
60 V	0.84 A	50 W		PM50B60-60	PM50C60-60	PM50D60-60	Parallel
110 V	0.34 A	37 W	PM50A60-60				Series
110 V	0.42 A	46 W		PM50B60-60	PM50C60-60	PM50D60-60	Series

How to read our product code: Example PM50B15-15

PM50 = Family code, B = input voltage code B, 15-15 = Two outputs with nom. voltage 12-16 V

### FEATURES

- Wall or DIN-rail mounting
- One unit covers many output voltages
- Output voltage adjustable on frontpanel.

### OPTIONAL FEATURES

- Conformally coating; tropical version for environment with high non condensing humidity max 98 % RH.

### 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.

# DUAL OUTPUTS

OUTPUT					INPUT			
Voltage	Current	Voltage	Current	Power	10 - 30 V	20 - 60 V	50 - 150 V	90 - 270 V
12 V	1.34 A	12 V	1.34 A	32 W	PM50A15-15			
12 V	1.67 A	12 V	1.67 A	40 W		PM50B15-15	PM50C15-15	PM50D15-15
15 V	1.34 A	15 V	1.34 A	40 W	PM50A15-15			
15 V	1.67 A	15 V	1.67 A	50 W		PM50B15-15	PM50C15-15	PM50D15-15
18 V	5.00 A	18 V	5.00 A	47 W	PM50A18-18			
18 V	6.25 A	18 V	6.25 A	57 W		PM50B18-18		
18 V	5.36 A	18 V	5.36 A	50 W			PM50C18-18	
60 V	4.17 A	60 V	4.17 A	40 W	PM50A60-60			
60 V	2.50 A	60 V	2.50 A	50 W		PM50B60-60	PM50C60-60	PM50D60-60

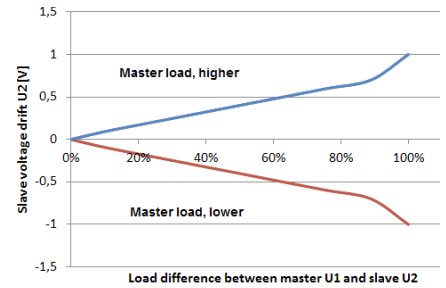


Figure 1. Voltage different between U1 & U2 depending on load difference on PM50\*15-15. On PM50\*60-60 the voltage different is relatively smaller.

# DC INPUTS

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, 250 Vd.c.	90 - 270V	D

Input voltages meeting train standard EN 50155/IEC 60571, can be made on demand

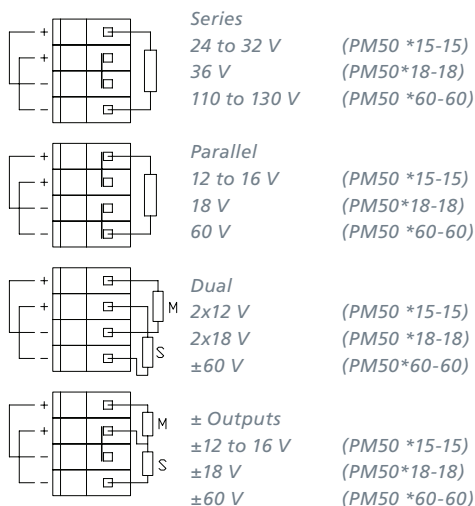
# GENERAL DATA / INPUT DATA

LABEL	VALUE
Design topology	Flyback
Switching frequency	typ. 45 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	< 5 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)	157 x 106 x 48 mm
Weight	0.65 kg

1. Higher ripple affects the input, contact factory

# HOW TO CONNECT THE OUTPUTS

Use the supplied jumpers shown below



\* = Input voltage code. M = Master output U1. S = Slave output U2.

Figure 2. Jumper position on PM50 connector (Series & Parallel)

# OUTPUT DATA

LABEL	VALUE
Source regulation	0.2%
Load regulation parallel outputs	0.2%
Load regulation with series connected outputs 10-100% load	1%
Load regulation on U1	0.2%
Load regulation on U2	See figure 1
Transient recovery time for 10 to 90% load step to within 3% of nominal output voltage.	Typ. <3 ms
<b>Output ripple (45 kHz)<sup>2</sup></b>	
PM50A15-15, PM50*15-15	Typ. 1 mV <sub>RMS</sub>
PM50A60-60, PM50*60-60	Typ. 2 mV <sub>RMS</sub>
Input ripple attenuation to output (50 to 400 Hz)	150:1
Emission / Immunity	See page 4
Temperature coefficient	0.02%/°C
<b>Output adjustment range adjustable with a 15 turn potentiometer</b>	
PM50*15-15	12 - 16 V
PM50*18-18	17 - 20 V
PM50*60-60	54 - 66 V
Current limit, fold-back	See figure 3
Remote sense	No
Soft start	No
Start-up time	1 s
Hold-up time, contact factory	2 - 25 ms
Efficiency <sup>3</sup>	78 - 85 %
Operating temperature range at 100% load <sup>4</sup>	-25 to +55 °C
Storage temperature range	-40 to +85 °C

- The output ripple might increase to 0.5% RMS of Vout, when EN IEC 61000-4-3, 10 V/m test is applied.
- Lowest efficiency measured within the whole input voltage range at 100% load.
- 40 °C on request.

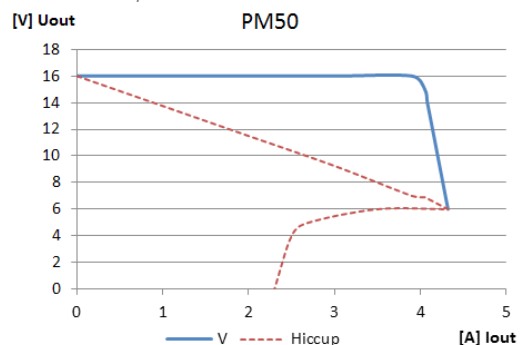


Figure 3. Current limit characteristic for PM50\*15-15 with outputs connected in parallel.

## MECHANICAL DRAWING

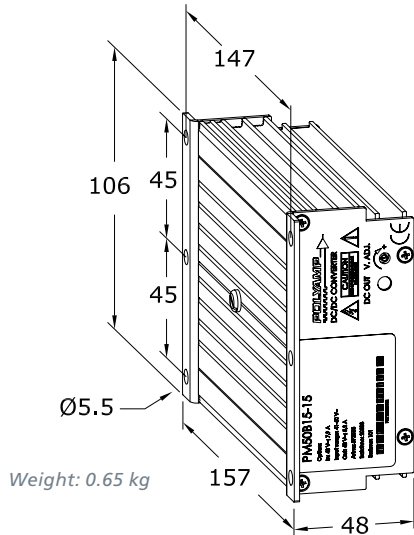
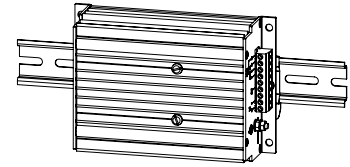
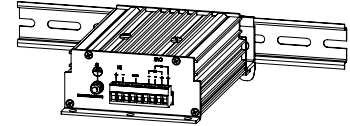


Figure 4. Dimensions



PM50/80 Wall or DIN-rail mounted (standard)



PM50/80 DIN-rail mounted L60-1 (option)

## OUTPUT VOLTAGE/POWER CHARACTERISTICS

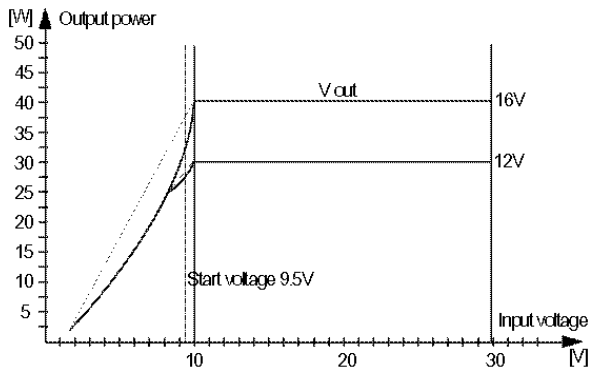


Figure 5. Output power PM50A15-15

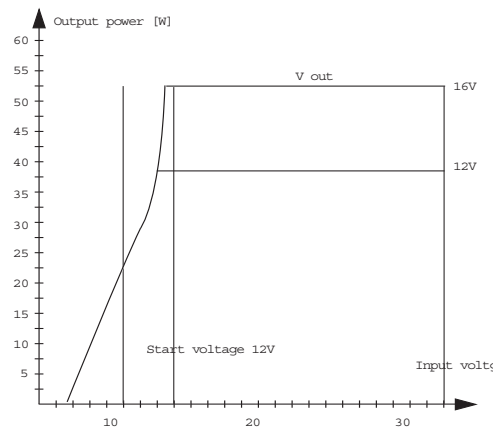


Figure 6. Output power PM50B15-15

The PM50 series have no low input voltage lock-out, which stops the converter. The output power is instead automatically derated, see figures 5 to 8. Example: PM50A15-15, figure 6, has start voltage at 9.5 V and can supply 15 W output power at 6 V input.

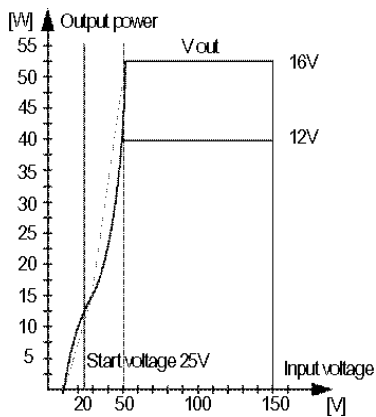


Figure 7. Output power PM50C15-15

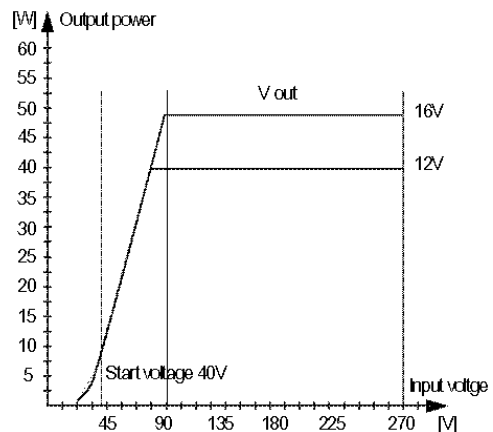


Figure 8. Output power PM50D15-15

## CE MARK

PM50 meets the requirements defined by CE mark as apparatus.

PM50 meets requirements of EMC directive and low voltage directive (LVD).

The PM50 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: Input code A, B	2 kVd.c.
Input code C, D	2.5 kVa.c. / 4 kVd.c.
Input / Case: Input code A, B	2 kVd.c.
Input code C, D	2.5 kVa.c. / 4 kVd.c.
Output / Case all outputs	1 kVd.c.
Between U1 / U2	500 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 / 15 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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