

DATASHEET

Product: Eco-Rail-2 5-100-240/24

Art. No: 85133

1 General

Eco-Rail-2 power supply is industrial class switch-mode power supply intended for professional use.

Eco-Rail-2 power supply units offer manufacturers of machinery and control cabinets the possibility to supply power to their consumers flexibly and economically. These units provide basic functionality and help to monitor the overall costs in the control cabinet.

The power supply is primary switched and designed for industrial applications. Product has galvanic isolated transformer with reinforced insulation.

The nominal input voltage is selectable by switch 100 - 120 VAC / 200 - 240 VAC.

The output voltage is adjustable from 23 - 28 VDC.

If not otherwise specified, the measured values are referring to an ambient temperature of 25°C, with nominal input voltage of 230 VAC and load 5 A / 24 VDC. All values are typical values.

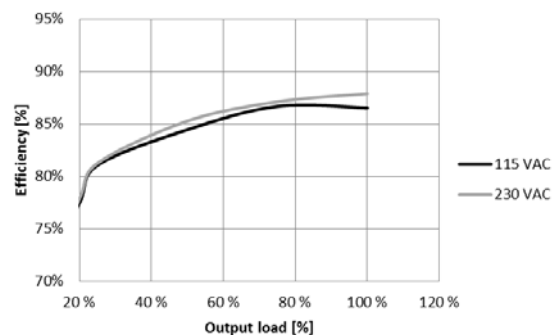
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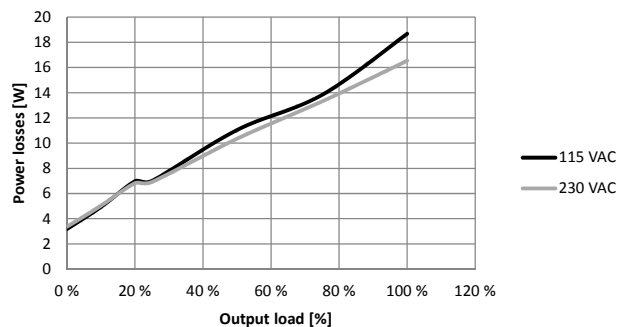
2 Electrical Data

2.1 Input

Description	Parameter
Nominal voltage	100 - 120 VAC / 200 - 240 VAC select by switch
Voltage range	90 - 132 VAC / 173 - 264 VAC select by switch
Power distribution systems	TN, TT Net Use only in star-architecture networks!
DC input operation	No
2-phase operation	No
Nominal frequency	50/60 Hz $\pm 6\%$
Nominal current (115 VAC)	2,4 A
Nominal current (230 VAC)	1,4 A
Inrush current	< 20 A
i^2t	1,0 A ² s
Leakage current	< 1,4 mA
Efficiency (115 VAC)	87 %
Efficiency (230 VAC)	88 %



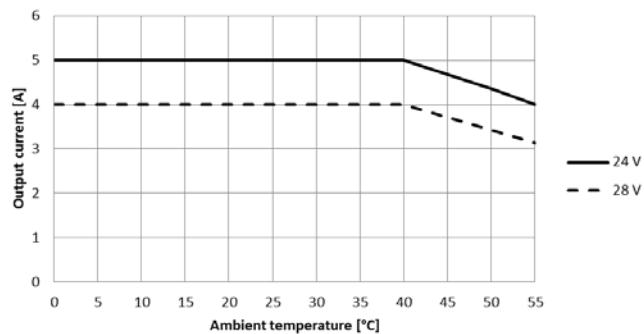
Description	Parameter
Power losses (100 % load / 115 VAC)	18,7 W
Power losses (100 % load / 230 VAC)	16,5 W
Power losses (50 % load / 115 VAC)	11,0 W
Power losses (50 % load / 230 VAC)	10,4 W
No-load power losses (115 VAC)	3,2 W
No-load power losses (230 VAC)	3,4 W



Power factor (115 VAC)	0,59
Power factor (230 VAC)	0,50
PFC	Passive
Internal switching frequency	70 kHz
Startup voltage (100 - 120 VAC mode)	76 VAC
Startup voltage (200 - 240 VAC mode)	140 VAC
Shutdown, undervoltage (100 - 120 VAC mode)	76 VAC
Shutdown, undervoltage (200 - 240 VAC mode)	140 VAC
Shutdown, overvoltage	No

2.2 Output

Description	Parameter
Nominal output voltage	24 VDC ±1%
Factory setting	24,1 VDC ±0,2%
Output voltage range	23 - 28 VDC
Line regulation	1 mV
Load regulation	60 mV
Dynamic regulation	< 1ms ±5%
Ripple (static)	< 10 mV
Spikes (static)	< 50 mV <i>p-p</i>
Current (24 VDC)	5,0 A
Current (28 VDC)	4,0 A
Current – Power Boost (24 VDC)	No
Current – Power Boost (28 VDC)	No
Power Boost duration	No
Output power	120 W
Output power – Power Boost	No
Derating +40°C (104°F) - +55°C (131°F)	- 1,60 W/°C (-0,89 W/°F)



Input failure bridging (115 VAC)	> 45 ms
Input failure bridging (230 VAC)	> 50 ms
Start-up time (115 VAC)	< 450 ms
Start-up time (230 VAC)	< 400 ms
Short-circuit current	8,6 A / constant current
Short-circuit energy (i²t)	Infinite
Extra current / hyper boost	No
Output capacitance	5 280 µF
Max. switchable capacity on the output	54 mF
Return current when switched-off	40 mA
Touch current (output)	0,05 mA

2.3 OTHER

Description	Parameter
Parallel connection	Not possible
Series connection	Yes Max. 2 units in series to guarantee the SELV output. With more than two units in series, the output voltage will exceed the SELV limits.
Usage as battery charger	No

3 Protections and isolation

3.1 Input protections

Description	Parameter
Branch circuit protection	Max. 20 A (T) in building installation
Recommended Branch Circuit Breaker	C13
Internal device protection	5 A (T)
Overvoltage protection (L ... N) - passive	Metal-Oxide-Varistor (300 VAC / 6 kA)
Overvoltage protection (L ... N) - active	No
Overvoltage protection (L/N ... PE)	No

3.2 Output protections

Description	Parameter
Overload protection	Yes, autorestart
Over temperature protection	Yes, autorestart
Short-circuit protection	Yes, continuous current
Overvoltage protection from device to load	Yes, typ. 30 VDC
Overvoltage protection from load to device	No
Resistance to back feeding loads	Max. 35 VDC, autorestart
Reverse polarity protection	No

3.3 Isolation voltages

3.3.1 Type testing

Description	Parameter
Input – Output	3000 VAC
Input – PE	3000 VAC
Output – PE	500 VAC

3.3.2 Routine testing

Description	Parameter
Input – Output	3000 VAC
Input – PE	1700 VAC
Output – PE	500 VAC
Current limit	15 mA

3.3.3 Field testing

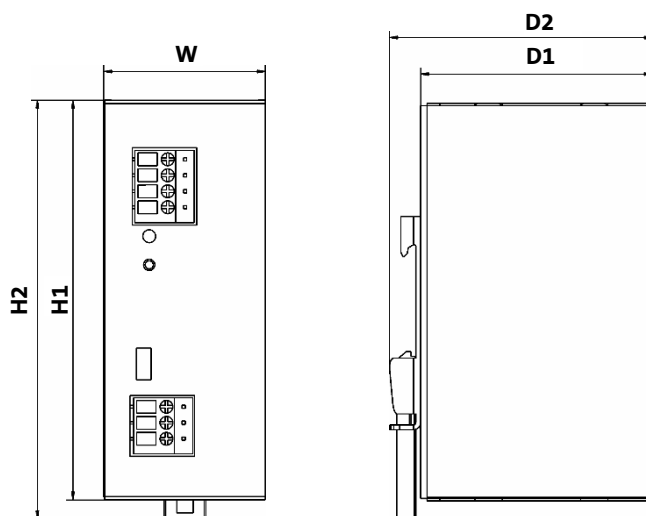
Description	Parameter
Input – Output	1500 VAC
Input – PE	1500 VAC
Output – PE	400 VAC
Current limit	15 mA

3.3.4 Isolation resistance

Description	Parameter
Input – Output	> 50 MOhm
Input – PE	> 50 MOhm
Output – PE	> 50 MOhm

4 Mechanical Data

4.1 Dimensions

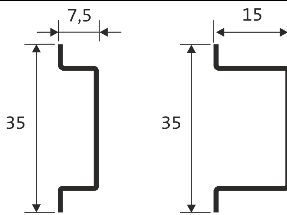


Symbol	Value
H1	125 mm (4,92 in)
H2	131 mm (5,16 in)
W	50 mm (1,97 in)
D1	123 mm (4,84 in)
D2	134 mm (5,28 in)

4.2 Housing and weight

Description	Parameter
Protection class acc. IEC 61140	1
Protection class of the housing	IP20
Material	Aluminium and stainless steel
Flammability of housing (UL 94)	N/A
Weight	0,69 kg (1,52 lbs)
Potting material	No
Cooling	Natural convection

4.3 Mounting and fitting

Description	Parameter
Fastening	DIN-rail mounting TH 35 to EN 60715. Please consider the maximum permissible load of your mounting rail according to EN 60715.
Suitable DIN-rail acc. EN 60715	
Installation orientation	Vertical only
Side clearance distance	15 mm
Top and bottom clearance distance	50 mm

5 Terminals

5.1 Input terminals

Description	Parameter
Terminal block	3 x 3 mm ² with screw terminal
Conductor size	
Solid	2,1 - 3 mm ² / 14 - 12 AWG
Stranded	2,1 - 3 mm ² / 14 - 12 AWG
Stranded with ferrule without plastic sleeve:	2,1 - 3 mm ² / 14 - 12 AWG
Stranded with ferrule with plastic sleeve	2,1 - 3 mm ² / 14 - 12 AWG
Stripping length	9 mm (0,35 in)
Torque	0,5 Nm (4,5 lb-in)
Wire temperature class	min. 75°C (167°F) @ Ta ≤ 50°C (≤ 122°F) min. 90°C (194°F) @ Ta > 50°C (> 122°F)

5.2 Output terminals

Description	Parameter
Terminal block	4 x 3 mm ² with screw terminal
Conductor size	
Solid	0,5 - 3 mm ² / 20 - 12 AWG
Stranded	0,5 - 3 mm ² / 20 - 12 AWG
Stranded with ferrule without plastic sleeve:	0,5 - 3 mm ² / 20 - 12 AWG
Stranded with ferrule with plastic sleeve	0,5 - 3 mm ² / 20 - 12 AWG
Stripping length	9 mm (0,35 in)
Torque	0,5 Nm (4,5 lb-in)
Wire temperature class	min. 75°C (167°F) @ Ta ≤ 50°C (≤ 122°F) min. 90°C (194°F) @ Ta > 50°C (> 122°F)






6 Environmental

Description	Parameter
MTBF acc. DIN EN 61709:1999-01, SN 29500, DIN EN ISO 13849-1:2008-12	> 105 000 h
Classification of climatic environmental conditions (EN60721)	3K3
Classification of chemical environmental conditions (EN60721)	3C1
Relative humidity:	5 - 95%, no condensation
Max. altitude	2000 m
Overvoltage category	OVC II (EN 60950-1)
Pollution degree	2
Environment (acc. CSA C22.2 No. 107.1)	Controlled environment
Operating temperature:	0°C (32°F) - +55°C (131°F) Derating from +40°C (104°F)
Max. case temperature (EN 61347-2-13)	N/A
Storage temperature (short-term)	-20°C (-4°F) - +85°C (185°F)
Storage temperature (long-term)	+5°C (41°F) - +35°C (95°F)
Conformal coated Circuit boards	No
Encapsulation	No

7 Signals and diagnostic

Description	Parameter
LED indicator	Green – output voltage OK (> 22 VDC)
	No color – Output voltage not OK
Alarm contact (13/14)	No
Input voltage selection switch	Yes

8 CONFORMITY AND APPROVALS

Description	Parameter	Status
EC declaration		Compliant
EMC directive	2014/30/EU	Compliant
LVD directive	2014/35/EU	Compliant
RoHS directive	2011/65/EU	Compliant
REACH		Compliant
WEEE		
China RoHS II		
LoHS		Compliant
Lead-free		Compliant
Halogen-free		No
cULus		E222272
cURus		E213413
EAC		No
DNV-GL		No
SEMI F47		No

9 Standards

9.1 EMC

Standard	Description	Parameter
EN 61204-3	Low-voltage power supplies, d.c. output – Electromagnetic compatibility (EMC)*	Emissions class: B (residential, commercial and light industry) Immunity: High severity level (Industrial)

**tested with ungrounded load*

9.1.1 Emissions

Standard	Description	Parameter	Class
EN 55022	Radiated emissions	30 – 1000 MHz	Class B
EN 55022	Conducted emissions	0.15 – 30 MHz	Class B
EN 61000-3-2	Harmonic currents		Class A
EN 61000-3-3	Voltage fluctuations, flicker		passed

9.1.2 Immunity

Standard	Description	Parameter	Criterion	
EN 61000-4-2	Electrostatic discharge	Contact discharge	±4 kV	Criterion A
		Air discharge	±8 kV	Criterion A
EN 61000-4-3	Electromagnetic RF field	0.08 - 1.0 GHz	10 V/m	Criterion A
		1.4 - 2.0 GHz	3 V / m	Criterion A
		2.0 - 2.7 GHz	1 V / m	Criterion A
EN 61000-4-4	Fast transient (Burst)	Input lines	±2 kV	Criterion A
		Output lines	±2 kV	Criterion A
EN 61000-4-5	Surge voltage	Line to Line (DM)	±1 kV	Criterion A
		Line to PE (CM)	±2 kV	Criterion A
EN 61000-4-6	Conducted disturbances	Input lines	10 V	Criterion A
		Output lines	10 V	Criterion A
EN 61000-4-11	Voltage dips and short interruptions	70% / 10 ms		Criterion A
		40% / 100 ms		Criterion A
		0% / 5 s		Criterion C

9.2 Mechanical

Standard	Description	Parameter	
IEC 60068-2-6	Test Fc: Vibration sinusoidal	10 cycles, 3 axis	5-17,8Hz: ±1,6 mm
		10 cycles, 3 axis	17,8-500 Hz: 2,0g
IEC 60068-2-27	Test Ea: Shock	1 shock/s, 3 axis,	15 g sinusoidal
		3 pos. & 3 neg. per axis	11 ms

9.3 Safety

Standard	Description	Parameter
IEC 60950-1 2nd edition	Safety of information technology equipment	
UL 60950-1 2nd ed. CSA C22.2 60950-1 2nd ed.	Safety of information technology equipment	
UL508	Industrial Control Equipment	
CSA C22.2 No. 107.1-01	General Use Power Supplies	
SELV / PELV*	<i>*For PELV requirements according to EN60204-1 §6.4.1: Connect either + or – terminal to protective earth (PE)</i>	

10 Accessories

Article number	Description
85396	MB Diode for de-coupling of two or more redundant power supply paths.
