Technical Data Sheet

RPDD280-SEW / Converter

280W / Extended Wide Range

RECOM
DC/DC Converter

FEATURES

- Designed According to EN50155: 2017
- Input Voltage According:
  EN50163: 2006 and EN50124-2: 2017
- Fire and Smoke: EN45545-2 Pending
- High Input-Output Isolation 7kVrms
- Output ORing Diode
- Input Voltage OK LED
- Output Voltage OK LED
- Overtemperature Shutdown



Dimensions 243.0 x 162.0 x 65.0 mm (9.57" x 6.38" x 2.54")

APPLICATION



SAFETY & EMC

- The charger follows LVD Directive 2014/35/EU and EMC Directive 2014/30/EU.
- The converter is CE compliant. EMC radiation must be evaluated and tested in the complete system since mounting and wiring have a large influence on radiation behaviour.

DESCRIPTION

The RPDD280-SEW series is a range of high-performance isolated DC/DC converters designed for railway and industrial applications requiring high reliability, wide input voltage range, and compliance with international railway standards.
The converters operate from a wide DC input voltage range of 400 VDC to 1100 VDC, in accordance with EN 50155, EN 50163, and EN 50124, making them suitable for rolling stock power systems.
The series provides a maximum continuous output power of 280 W, with multiple regulated output voltage options (24 VDC, 48 VDC, 72 VDC, and 110 VDC). High efficiency operation and galvanic isolation between input and output ensure safe and reliable performance in harsh environments. An integrated ORing diode allows output redundancy and parallel operation with a battery.
The RPDD280-SEW converters include comprehensive protection features, such as input undervoltage shutdown, over-current protection, short-circuit protection with current limiting, inrush current protection, reverse polarity protection, and over-temperature shutdown. Visual status indication is provided by input and output voltage OK LEDs, while a low output voltage alarm is available through an isolated solid-state relay.
Designed for natural convection cooling, the units operate over a wide temperature range from -40 °C to +70 °C at full load, extending up to +85 °C at reduced load, with a long service life of > 20 years and an MTBF of 200,000 hours at 40 °C. The robust aluminium enclosure, compact dimensions, and IP20 protection make the RPDD280-SEW series suitable for body-mounted installation in vibration-prone environments.
The converters are CE, UKCA, and RoHS compliant and meet EMC, safety, shock, vibration, and fire & smoke requirements according to relevant European railway standards, making them a reliable power solution for demanding railway and transportation systems

MODELS

Part Number	Input Voltage nom. [VDC]	Input Current Max. [A]	Output Voltage nom. [VDC]	Output Current Max. [A]	Output Power Max [W]
RPDD280-750-24SEW	600 - 750	0.84	24	11.6	280
RPDD280-750-48SEW			48	5.8	280
RPDD280-750-72SEW			72	3.8	280
RPDD280-750-110SEW			110	2.5	280

* Accessories must be ordered in a separate order line

RPDD280- - -SEW-

Nominal power
Nominal Input
Options
Nominal Output

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RECOM
DC/DC Converter

BASIC CHARACTERISTICS				
Parameter	**Conditions**	**Min.**	**Typ.**	**Max.**
	INPUT			
Rated Input Voltage	according to EN50163:2006 and EN50124-2:2017	600VDC		750VDC
Input Voltage Range	3kV falling to 1.5 kV for 20ms, 4.5kV falling to 2.25 kV for 1ms	400VDC		1100VDC
Max. Input Current				0.84A
Input consumption at no load	Min at @600Vin			7W
	Max at @750Vin			9W
Efficiency	RPDD280-750-24SEW		88%	
	RPDD280-750-48SEW		88%	
	RPDD280-750-72SEW		89%	
	RPDD280-750-110SEW		89.5%	
	OUTPUT			
Rated Output Voltage	RPDD280-750-24SEW		24VDC	
	RPDD280-750-48SEW		48VDC	
	RPDD280-750-72SEW		72VDC	
	RPDD280-750-110SEW		110VDC	
Output Voltage Tolerance		-1%		+1%
Output Voltage Range	RPDD280-750-24SEW	23.76VDC		24.24VDC
	RPDD280-750-48SEW	47.52VDC		48.48VDC
	RPDD280-750-72SEW	71.28VDC		72.72VDC
	RPDD280-750-110SEW	108.9VDC		111.1VDC
Output Current Max.	RPDD280-750-24SEW			11.6A
	RPDD280-750-48SEW			5.8A
	RPDD280-750-72SEW			3.8A
	RPDD280-750-110SEW			2.5A
Output Peak Current (Max 500ms)	RPDD280-750-24SEW			16.6A
	RPDD280-750-48SEW			8.3A
	RPDD280-750-72SEW			5.67A
	RPDD280-750-110SEW			3.64A
Max. Continuos Output Power				280W
Max. Peak Output Power				400W
Total regulation		-1%		+1%
Ripple	Tamb > 0°C			100mVpp
	Tamb -40°C			240mVpp
Output Ripple & Noise	(0÷20MHz) @nominal output power			1%

CONTROLS				
Parameter	**Condition**	**Min.**	**Typ.**	**Max.**
Low output voltage alarm	Isolated solid-state relay open when alarm. Maximum rating contact capacity 100mA and 160V (closed <8 Ω)	0.90		0.95
Remote inhibit input	Inhibit voltage range: Nominal Output Voltage	-40%		+40%

ENVIROMENTAL CONDITIONS				
Parameter	**Conditions**	**Min.**	**Typ.**	**Max.**
Operating Temperature Range	At Iout = 100%	-40°C		+70°C
	At Iout = 62.5%	-40°C		+85°C
Storage Temperature Range		-40°C		+85°C
Operating Relative Humidity	No condensation	5%		95%
Storage and Transportation Humidity	No condensation	5%		95%
Operating Altitude	Above sea level			2500m
Cooling	Natural convection			
Service life		20 years		
MTBF	@40°C according to IEC61709		200000h	

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SAFETY AND PROTECTIVE FUNCTIONS				
Parameter	**Conditions**	**Min.**	**Typ.**	**Max.**
Dielectrics withstand voltage	Input – Output (50Hz – 10s)		7000VAC	
	Input – P.E. (50Hz – 10s)		5300VAC	
	Output – P.E. (50Hz – 1min)		1800VAC	
Input under-voltage shutdown	Vin nom.	45%		55%
Protection against input under-voltage	Under-voltage lock-out In case of lock-out, pulse of inhibit signal is needed to reset the converter (min 100ms); or remove the input supply voltage for at least 3 sec. Do not handle the connection terminals below -25°C			
Against reverse input voltage protection	By input diode in serial connection			
Against input overcurrent protection	Input fuse			
Over-temperature protection (OTP)	Shutdown when internal temperature rises 120 °C			
Overload protection (OLP)	Current limiting			
Short circuit protection (SCP)	Current limiting			
Conformal coating	PCB conformal coated with acrylic varnish			

CERTIFICATIONS	
Environmental	
Compliance	**Standard / Criterion**
RoHS2	2011/65/EU Annex II
RoHS Restriction of the use of certain hazardous substances in electrical and electronic equipment	2015/863/EU SI 2012 No. 3032
CE	CE marking year: 2020
UKCA	UKCA marking year 2021
Fire & Smoke	EN 45545-2:2013 + A1:2015

CERTIFICATIONS	
Safety	
Compliance	**Standard / Criterion**
Low voltage the electrical equipment (safety) regulations	2014/35/EU SI 2016 No 1101
Safety. Audio/video, information and communication technology equipment	EN 62368-1: 2014
Railway applications. Electronic equipment used on rolling stock material	EN 50155: 2017
Railway applications. Supply voltages of traction systems	EN 50163: 2016
Railway applications. Insulation coordination	EN 50124-1: 2017

CERTIFICATIONS	
EMC Compliance	
Compliance	**Standard / Criterion**
EMC Electromagnetic compatibility regulations	2014/30/EU SI 2016 No 1091
Generic emission standard	EN 61000-6-3: 2007 EN 50121-3-2:2016
Generic immunity standard	EN 61000-6-2: 2005 EN 50121-3-2:2016

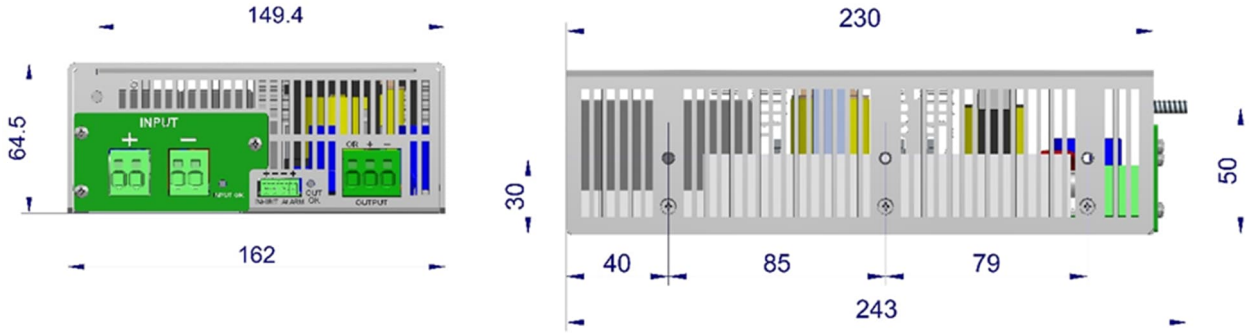
CERTIFICATIONS	
Shock and vibration	
Compliance	**Standard / Criterion**
Shock and Vibration	EN 61373: 2010 Cat. 1 Class B Body mounted

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MECHANICAL DATA

Parameter	Conditions	Min.	Typ.	Max.
Weight			1750g – 3.86lb	
Enclosure Material	Aluminum Casting		-	
IP Protection Class			IP20	
Height			230mm 9.57inc	
Width			162mm 6.37inc	
Length			65.0mm 2.54inc	

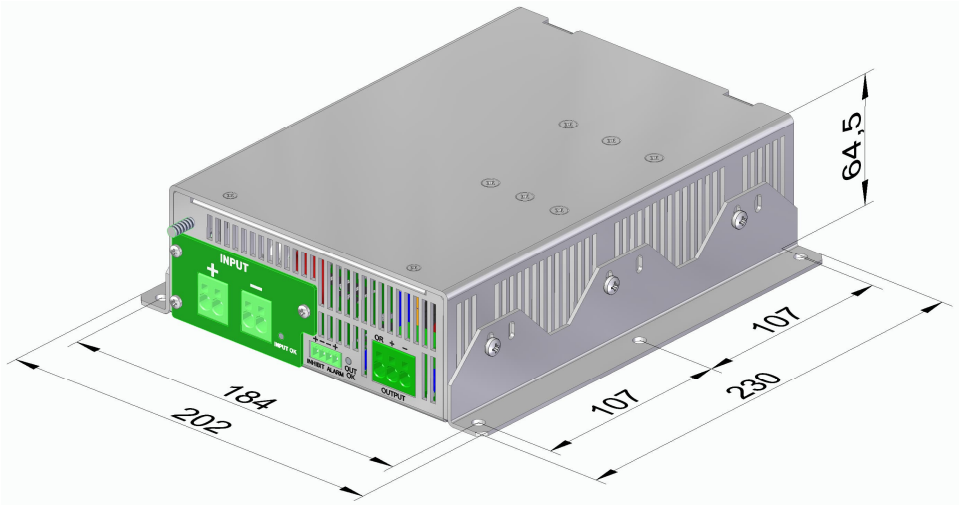
DIMENSIONS



Lateral fixing holes 6 x M4 (screw torque < 1.6 Nm). Maximum screw deep 6 mm.

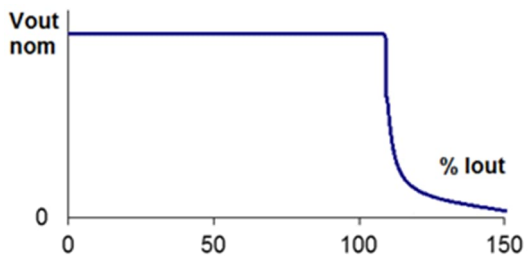
ACCESSORIES

Description	Notes	Code
Mounting brackets kit	Contains two brackets and screws	PR9435

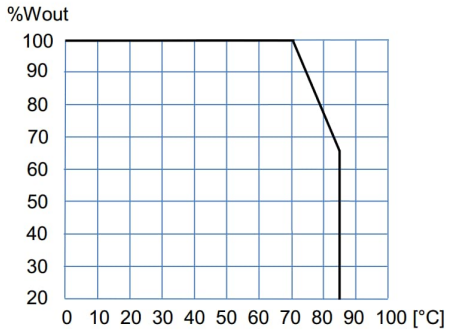


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TYPICAL OUTPUT CHARACTERISTIC



OUTPUT POWER DERATING CURVE WITH ENVIRONMENTAL TEMPERATURE



DIMENSIONS AND INSTALLATION INFORMATION

- The unit has 6 threaded holes for the fixation on a mounting surface.
- Make connections according to the connections picture and table.
- The ground connection can be done through the stud on the front side.

For safety reasons, the following requirements must be met:

- Provide the equipment with some kind of protective enclosure that complies with the electrical safety directives in effect within the country where the equipment is installed.
- Protect the input line using time lag fuses or circuit breaker curve D with a rating higher than the maximum input current.
- Use cables of adequate cross-section to connect inputs and outputs. The following table lists the maximum currents and the minimum cross-sections for the cables used for each power connection.

Max. current	16A	25A	32A	40A	63A
CABLE CROSS-SECTION	1.5mm^2	2.5mm^2	4mm^2	6mm^2	10mm^2

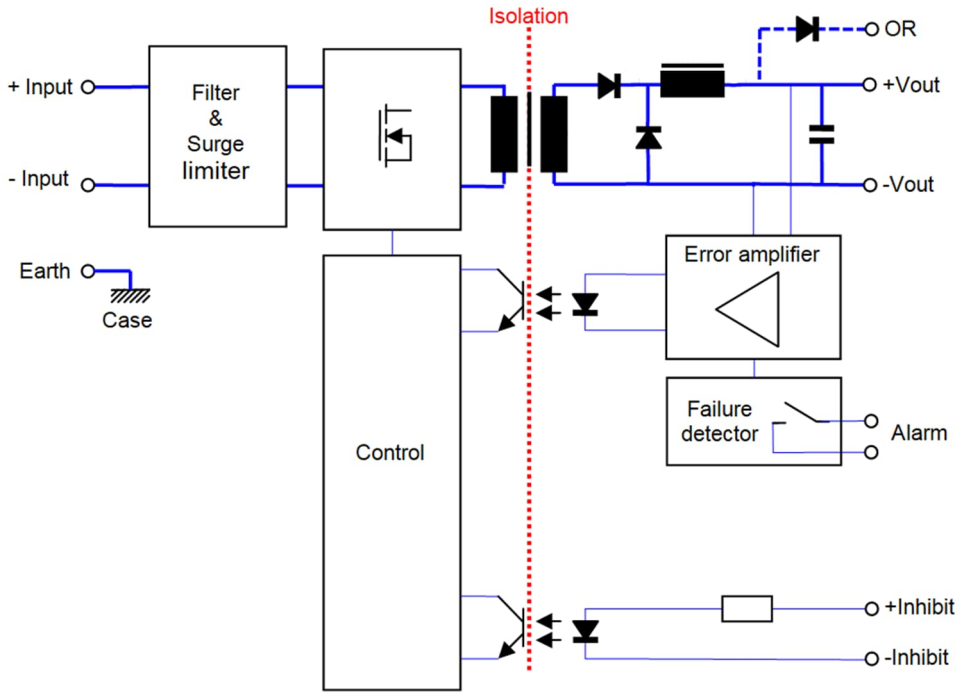
For the installation of converter, the following must be adhered to:

- The converter must be installed at a secure location out of reach of the user. This is to prevent dangers such as accidental touching of HV components or skin burns on the hot housing.
- The converter should be installed at a dry location, safe from splashing water, dirt and stone chipping.
- The tightness of the converter can only be guaranteed if all signal wires to the signal connectors are assembled and connected to a tight unit on both sides. If this is not the case for a cable or wire, it must be sealed separately.
- The mechanical fixture is designed in such a way that the device is installed in a fixed position and with as little vibrations as possible.
- All cable connections must be secured with strain relief elements near the device (not included in the scope of delivery).
- Cable connections must have sufficient play and must not meet sharp-edged components.
- The enclosure should be sufficiently ventilated (no heat accumulation).

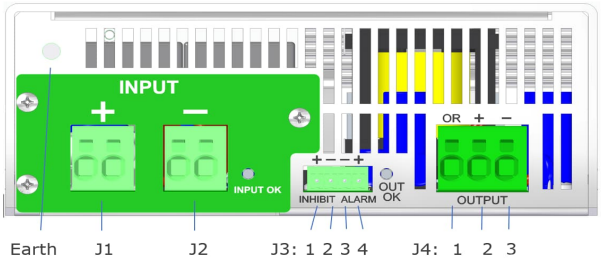
BLOCK DIAGRAM

The RPDD280-SEW series consists of DC/DC converters, with a galvanic isolation between input and output, operating at fixed switching frequency. It includes an output ORing diode which allows redundancy. It also allows paralleling with a battery. The device is protected against overload and short-circuits by means of a current limiting circuit. The device is also protected against reverse polarity input voltage by means of an input diode in series with the input line. When an input undervoltage condition occurs, the converter is disabled, thus preventing an improper output voltage. Once the input is within the range the unit restarts automatically. The failure output voltage detector circuit close the contact (NO) when the output voltage is higher than 90÷95% of the nominal output voltage.

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CONNECTIONS



	Function
Earth	M5 male earth connection
J1	Positive input clamp terminal (x2)
J2	Negative input clamp terminal (x2)
J3-1	Positive input inhibit signal
J3-2	Negative input inhibit signal
J3-3	Alarm output state contact 1
J3-4	Alarm output state contact 2
J4-1	Positive output clamp terminal by Oring
J4-2	Positive output clamp terminal
J4-3	Negative output clamp terminal

Note 1: maximum spring terminals cross section cable 6mm2 or 10 mm2 for solid
Note 2: J3 recommended female connector Phoenix Contact FMC 1,5/4-ST-3.81 or MC 1,5/4-ST-3,81
Note 3: maximum nut torque in M5 earth connection 1.9 Nm

WARRANTY AND GUARANTEE

The warranty corresponds to the regulations in our currently valid general terms and conditions.

INSTRUCTIONS REGARDING DISPOSAL

A basic requirement for the re-use and recycling of used electronic devices is the correct disposal. With the implementation of the electric and electronic device regulation, electronic devices may no longer be disposed of along with ordinary household waste but must be separately collected and recorded by a specialist service.
Disposal through a specialist service significantly helps to avoid dangers to people and nature. Therefore, in the case of disposal, we recommend contacting a recognized specialist disposal service.

The product information and specifications may be subject to changes even without prior written notice. The product has been designed for various applications; its suitability lies in the responsibility of each customer. The products are not authorized for use in safety-critical applications without RECOM's explicit written consent. A safety-critical application is an application where a failure may reasonably be expected to endanger or cause loss of life, inflict bodily harm or damage property. The applicant shall indemnify and hold harmless RECOM, its affiliated companies and its representatives against any damage claims in connection with the unauthorized use of RECOM products in such safety-critical applications.

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