Features customized Regulated Converter

- OVC III and PD3 rating
- Continuous max withstanding voltage 528VAC
- UL certified input 90-318VAC
- Operating temperature range: -40°C to +85°C
- Class II installations (without FG)
- EN55032 class "B" with floating outputs
- No load power consumption <0.5W

RECOM
AC/DC Converter

RAC05-K/PD3/H

5 Watt
2" x 1"
Single Output

YEAR 3 warranty

Description

The RAC05-K/PD3/H series of 5 watt AC/DC are IEC61010 safety rated to PD3 and OVCIII by UL for 100-277VAC nominal input lines (-10/+15%). The modules support an operating temperature range from -40°C to +85°C in harsh environments with a possible excessive increase in the input conditions up to 400Vac / 480Vac, permanently without damage. Fully protected outputs as well as EMC class A and B compliance without external components for floating installations. All these features make them an ideal fit for integration into smart grid, renewable energy, smart metering and IoT applications.

Selection Guide

Part Number	Input Voltage Range [VAC]	Output Voltage [VDC]	Output Current [mA]	Efficiency typ (1) [%]	Max. Capacitive Load (2) [µF]
RAC05-05SK/PD3/H	90-318	5	1000	73	10000
RAC05-12SK/PD3/H	90-318	12	420	74	1200

On Request

RAC05-15SK/PD3/H	90-318	15	330	74	1000

Notes:

Note1: Efficiency is tested at 277VAC and full load at +25°C ambient

Note2: Max Cap Load is tested at nominal input and full resistive load

Model Numbering

RAC05-__ _K/PD3/H

nom. Output Power

Output Voltage

Single

Ordering Examples:

RAC05-05SK/PD3/H	5Vout	Single Output
RAC05-12SK/PD3/H	12Vout	Single Output

RECOGNIZED COMPONENT
Intertek 5003727

E470721

IEC/EN62368-1 compliant
UL61010-1 certified (4)
CSA C22.2 No. 61010-1 certified (4)
IEC/EN61010-1 certified
IEC/EN61204-3 compliant
EN55032 compliant
EN55014-1 compliant
EN55014-2 compliant
EN55024 compliant
EN61000 compliant
CB Report

Specifications (measured @ Ta= 25°C, 277VAC, full load and after warm-up unless otherwise stated)

BASIC CHARACTERISTICS

Parameter	Condition	Min.	Typ.	Max.
Nominal Input Voltage	50/60Hz	100VAC		277VAC
Operating Range (3)	47-63Hz	90VAC	277VAC	318VAC
Absolute Maximum Input Voltage (4)				528VAC
Input Current	100VAC 277VAC			110mA 60mA
Inrush Current	cold start at +25°C		20A	
No load Power Consumption				500mW
Minimum Load		0%		

Notes:

Note3: Refer to *„Line Derating"*

Note4: UL61010-1 valid for Input Range 90-318VAC only

continued on next page

sales@prom-elec.com / ООО ПРОМЭЛЕКТРОНИКА

Specifications (measured @ Ta= 25°C, 277VAC, full load and after warm-up unless otherwise stated)

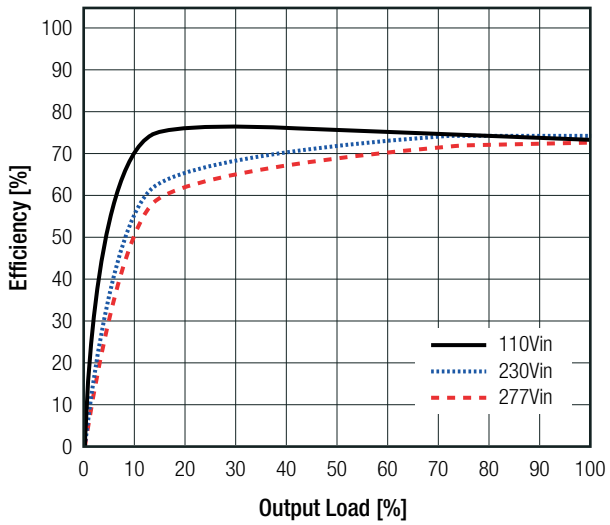
Parameter	Condition		Min.	Typ.	Max.
Power Factor	230VAC/277VAC		0.50		
Start-up Time				25ms	
Rise Time					20ms
Hold-up Time	100VAC 230VAC 277VAC			14ms 50ms 60ms	
Internal Operating Frequency				130kHz	
Output Ripple and Noise (5)	20MHz BW	277VAC		50mVp-p	

Notes:

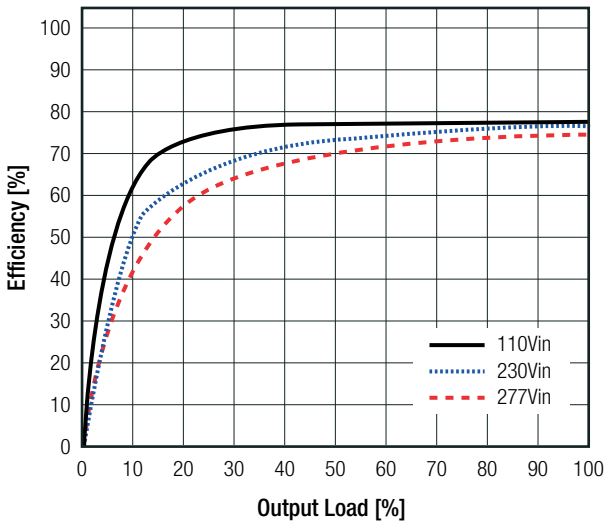
Note5: Measurements are made with a 0.1µF MLCC & 10µF E-cap in parallel across output. (low ESR)

Efficiency vs. Load

RAC05-05SK/PD3/H



RAC05-12SK/PD3/H

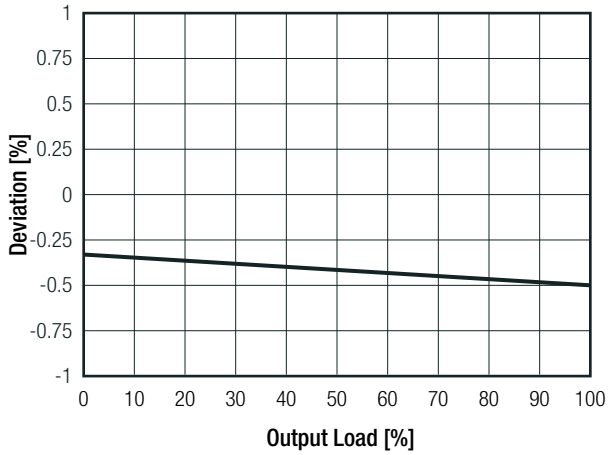


REGULATIONS

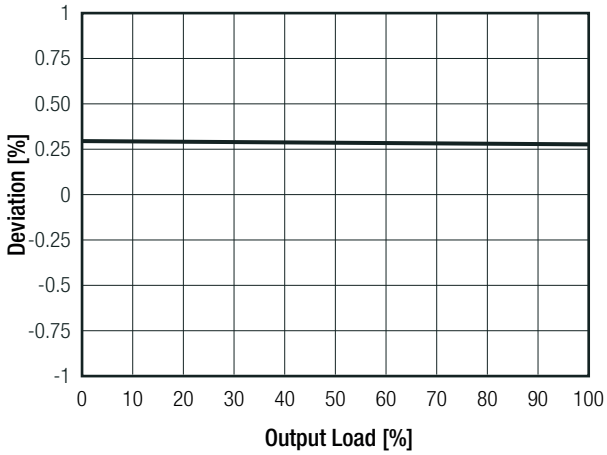
Parameter	Condition	Value
Output Accuracy		±1.0% typ.
Line Regulation		±0.5% typ.
Load Regulation	10% to 100% load	1.0% typ.
Transient Response	25% load step change recovery time	4.0% max. 500µs typ.

Deviation at 100-277VAC

RAC05-05SK/PD3/H



RAC05-12SK/PD3/H



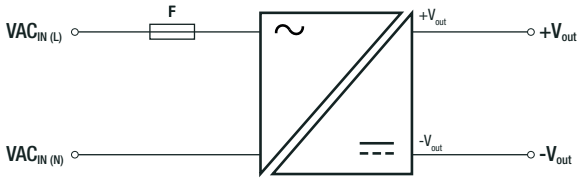
Specifications (measured @ Ta= 25°C, 277VAC, full load and after warm-up unless otherwise stated)

PROTECTIONS

Parameter	Type	Value
Input Fuse [6]	external	slow blow 350VAC, 2A
Limited Power Source (LPS)		according to IEC62368-1 CB Report
Short Circuit Protection (SCP)	below 100mΩ	hiccup, automatic restart
Over Voltage Protection (OVP)		150% - 195%, hiccup mode
Over Voltage Category		OVCIII
Over Current Protection (OCP)		150% - 195%, hiccup mode
Class of Equipment		Class II

Parameter	Type		Value
Isolation Voltage [7]	I/P to O/P	1 minute	5.4kVAC
Isolation Resistance			1GΩ min.
Isolation Capacitance			100pF max.
Insulation Grade			reinforced
Leakage Current			25µA max.

Protection Circuit [6]



Notes:

Note6: An external fuse is mandatory in order to protect the device in addition on the AC input side. Fuse rating: slow blow type, 350Vac, 2A. Recom recommends Littlefuse model No. 885 (UL No. E10480)

Note7: For repeat Hi-Pot testing, reduce the time and/or the test voltage

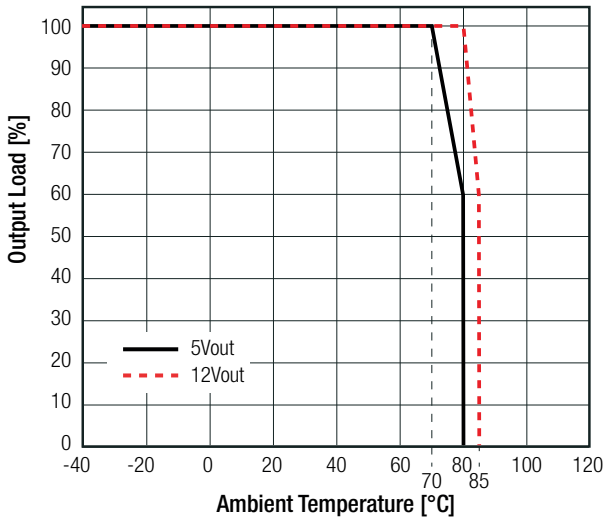
ENVIRONMENTAL

Parameter	Condition			Value
Operating Temperature Range	@ natural convection 0.1m/s	5Vout	full load	-40°C to +70°C
			refer to ***„Derating Graph“***	-40°C to +80°C
		12Vout	full load	-40°C to +80°C
			refer to ***„Derating Graph“***	-40°C to +85°C
Maximum Case Temperature				+100°C
Temperature Coefficient				0.05%/K
Thermal Impedance	0.1m/s			16K/W
Operating Altitude				5000m
Pollution Degree				PD3
Operating Humidity	non-condensing			5% - 95% RH max.
Vibration	according to MIL-STD-202G			10-500Hz, 2G 10min./1cycle, period 60min. each along x,y,z axes
Design Lifetime	+25°C +60°C			105 x 10^3 hours 40 x 10^3 hours
MTBF	according to MIL-HDBK-217F, G.B.		+25°C +40°C	>1726 x 10^3 hours >1585 x 10^3 hours

continued on next page

Specifications (measured @ Ta= 25°C, 277VAC, full load and after warm-up unless otherwise stated)

Derating Graph
(@ Chamber and natural convection 0.1m/s)



SAFETY AND CERTIFICATIONS		
Certificate Type (Safety)	**Report Number**	**Standard**
Audio/video, information and communication technology equipment - Safety requirements (LVD)	200811140GZU-001	IEC62368-1:2014, 2nd Edition EN62368-1:2014 + A11:2017
Safety requirements for electrical equipment for measurement, control and laboratory use - Part 1: General requirements	E470721	UL61010-1 CAN/CSA C22.2 No. 61010-1
Safety requirements for electrical equipment for measurement, control and laboratory use - Part 1: General requirements	190415125GZU-001	EN61010-1:2010
Safety requirements for electrical equipment for measurement, control and laboratory use - Part 1: General requirements (CB Scheme)		IEC61010-1:2010 + A1:2016 3rd Edition
EAC	RU-AT.03.67361	TP TC 004/020, 2011
RoHS2		RoHS-2011/65/EU + AM-2015/863

EMC Compliance	Condition	Standard / Criterion
Low-voltage power supplies DC output - Part 3: Electromagnetic compatibility	LCS180508025BE	IEC/EN61204-3:2018, Class B
Electromagnetic compatibility of multimedia equipment – Emission Requirements (8)		EN55032:2015, Class B
Electromagnetic compatibility of household appliances, electric tools and similar apparatus - Emission Requirements		EN55014-1:2006+A2:2011
Information technology equipment - Immunity characteristics - Limits and methods of measurement		EN55024:2010+A1:2015
Electromagnetic compatibility of household appliances, electric tools and similar apparatus - Immunity Requirements		EN55014-2:2015
ESD Electrostatic discharge immunity test	Air: ±15, 8, 4, 2kV Contact: ±8, 4, 2kV	EN61000-4-2: 2009, Criteria A
Radiated, radio-frequency, electromagnetic field immunity test	10V/m, 80MHz-1GHz 3V/m, 1.5GHz-2GHz 1V/m, 2GHz-2.7GHz	EN61000-4-3: 2006 + A1:2009, Criteria A
Fast Transient and Burst Immunity	AC In Port: ±2.0kV DC Out Port: ±2.0kV	EN61000-4-4:2012, Criteria A
Surge Immunity	AC IN Port: L-N ±4.0kV DC Out Port: ±0.5kV	EN61000-4-5:2014+A1:2017, Criteria A
Immunity to conducted disturbances, induced by radio-frequency fields	10Vrms	EN61000-4-6:2014, Criteria A
Power Magnetic Field Immunity	50Hz, 30A/m	EN61000-4-8:2010, Criteria A

continued on next page

Specifications (measured @ Ta= 25°C, 277VAC, full load and after warm-up unless otherwise stated)

EMC Compliance	Condition	Standard / Criterion
Voltage Dips and Interruptions	Dips 100% Dips 60, 30, 20% Interruptions > 95%	EN61000-4-11:2004+A1:2017, Criteria B EN61000-4-11:2004+A1:2017, Criteria C EN61000-4-11:2004+A1:2017, Criteria C
Limits of Voltage Fluctuations & Flicker		EN61000-3-3:2013

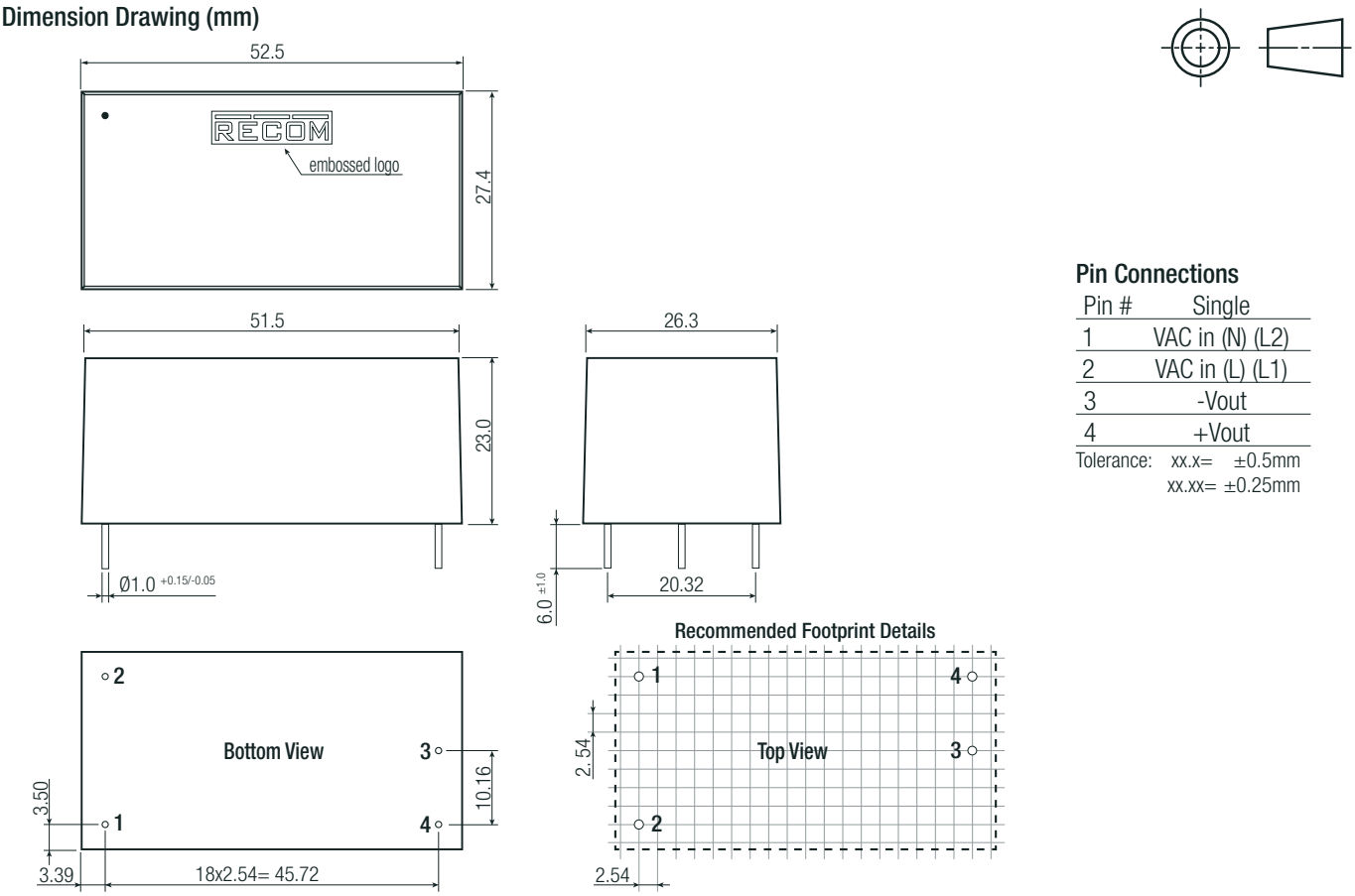
Notes:

Note8: If output is connected to GND, please contact RECOM tech support for advice

DIMENSION AND PHYSICAL CHARACTERISTICS

Parameter	Type	Value
Material	case/baseplate potting PCB	black plastic, (UL94V-0) polyurethane, (UL94V-0) FR4, (UL94V-0)
Dimension (LxWxH)		52.5 x 27.4 x 23.0mm
Weight		58g typ.

Dimension Drawing (mm)



Pin Connections

Pin #	Single
1	VAC in (N) (L2)
2	VAC in (L) (L1)
3	-Vout
4	+Vout

Tolerance: xx.x= ±0.5mm
xx.xx= ±0.25mm

PACKAGING INFORMATION

Parameter	Type	Value
Packaging Dimension (LxWxH)	tube	490.0 x 56.0 x 40.0mm
Packaging Quantity		15pcs
Storage Temperature Range		-40°C to +85°C
Storage Humidity	non-condensing	20% to 90% RH max.

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.