

# Features

- Universal input 85-264VAC
- <250mW No load power consumption
- -25°C to +80°C Operating temperature, with derating
- Class II installations (without FG)
- Continuous SCP, OCP
- IEC/EN/UL60950 & IEC/EN/UL62368 certified

# Regulated Converter

# RECOM AC/DC Converter

## RAC02-GB

2 Watt  
Single  
Output  
EMC Class B



### Description

The RAC02-GB series are low cost AC/DC power supplies, ideal for PCB mounted, compact, board level industrial applications. They feature universal AC input voltage range, regulated and short-circuit-proof isolated DC outputs, low standby power consumption and -25°C to +80°C operating temperature range. The RAC02-GB have a built-in Class B / FCC Part 15 EMC filter, are certified to EN60950 and EN62368 safety standards and come with a three year warranty.



### Selection Guide

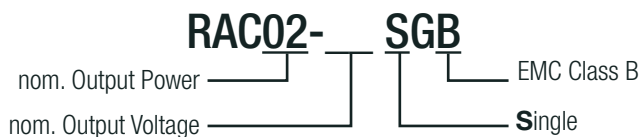
Part Number	Input Voltage Range [VAC]	Output Voltage [VDC]	Output Current [mA]	Efficiency typ [%]	Max. Capacitive Load <sup>(1)</sup> [µF]
RAC02-3.3SGB	85-264	3.3	500	63	500
RAC02-05SGB	85-264	5	400	63	500
RAC02-12SGB	85-264	12	167	68	200
RAC02-15SGB	85-264	15	140	63	200
RAC02-24SGB	85-264	24	83	63	200

#### Notes:

Note1: Measured with all input voltages at +25°C with constant resistant mode at full load



### Model Numbering



#### Ordering Examples:

RAC02-12SGB      12Vout      Single Output      EMC Class B

ULIEC/EN60950-1 certified  
 UL/IEC/EN62368-1 certified  
 CAN/CSA-C22.2 No. 62368 certified  
 IEC/EN62368-1 certified  
 CB Report

**Specifications** (measured @ Ta= 25°C, nom. Vin (115/230VAC), full load and after warm-up unless otherwise stated)

### BASIC CHARACTERISTICS

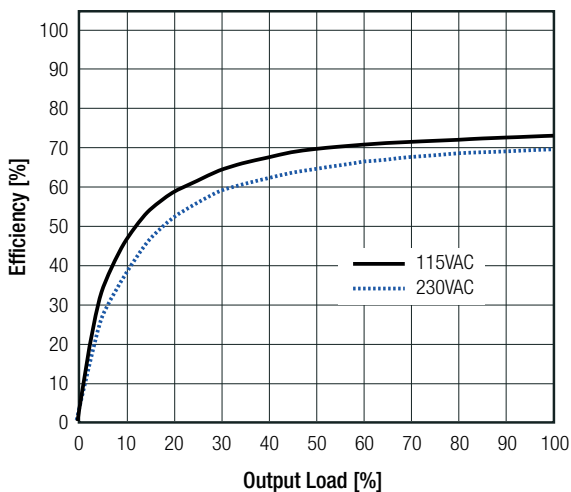
Parameter	Condition		Min.	Typ.	Max.
Internal Input Filter			Pi-type		
Input Voltage Range <sup>(2,3,4)</sup>	nom. Vin = 230VAC		85VAC	230VAC	264VAC
Input Current	115VAC 230VAC				50mA 30mA
Inrush Current	cold start at +25°C	115VAC 230VAC			30A 40A
No load Power Consumption				180mW	250mW
Input Frequency Range			47Hz		63Hz
Minimum Load			0%		
Power Factor	115VAC 230VAC			0.55 0.42	
Start-up Time	115VAC 230VAC			250ms 200ms	2s 2s
Hold-up time	115VAC 230VAC				20ms 80ms
Internal Operating Frequency	100% load at nominal Vin			65kHz	
Output Ripple and Noise	20MHz BW	0°C to 80°C	3.3Vout 5Vout 12Vout 15Vout 24Vout		100mVp-p 100mVp-p 200mVp-p 200mVp-p 240mVp-p
		-25°C to 0°C	3.3Vout 5Vout 12Vout 15Vout 24Vout		200mVp-p 200mVp-p 300mVp-p 300mVp-p 300mVp-p

#### Notes:

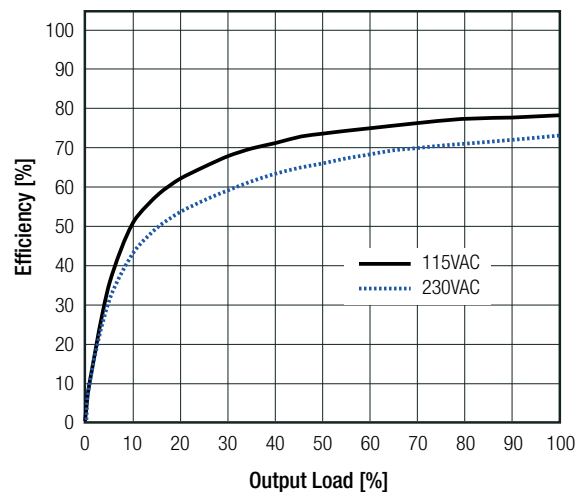
- Note2: No proper operation with DC input voltage
- Note3: The products were submitted for safety files at AC-Input operation
- Note4: Refer to "**Line Derating**"

#### Efficiency vs. Load

RAC02-05SGB



RAC02-12SGB

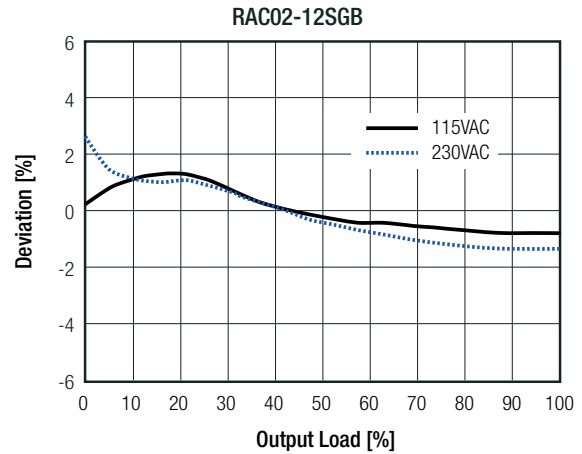
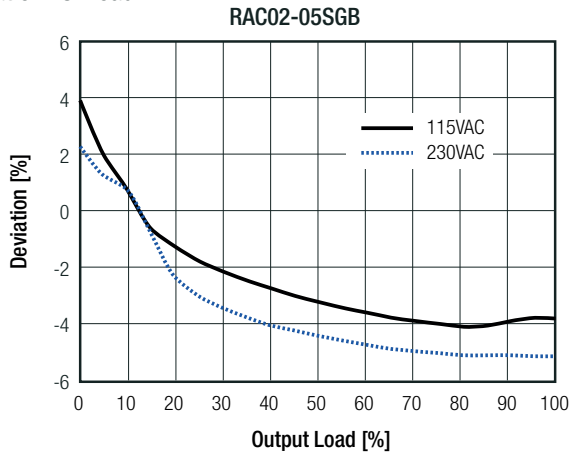


**Specifications** (measured @  $T_a = 25^\circ\text{C}$ , nom.  $V_{in}$  (115/230VAC), full load and after warm-up unless otherwise stated)

### REGULATIONS

Parameter	Condition	Value
Output Accuracy	-25°C to +80°C	±6.0% max.
Line Regulation	-25°C to +80°C	±2.0% max.
Load Regulation	-25°C to +80°C	6.0% max.

### Deviation vs. Load



### PROTECTIONS

Parameter	Type	Value
Input Fuse <sup>(5)</sup>	internal	fusible resistor, 1Ω/1W
Short Circuit Protection (SCP)	below 100mΩ	continuous, auto recovery
Over Voltage Category		OVCII
Over Current Protection (OCP)	3.3V <sub>out</sub>	0.67A - 1.81A
	5V <sub>out</sub>	0.44A - 1.20A
	12V <sub>out</sub>	0.18A - 0.50A
	15V <sub>out</sub>	0.15A - 0.42A
	24V <sub>out</sub>	0.09A - 0.25A
Class of Equipment		Class II
Isolation Voltage <sup>(6)</sup>	I/P to O/P	rated for 1 minute 3kVAC
Isolation Resistance		100MΩ min.
Insulation Grade		reinforced
Leakage Current	I/P to O/P	0.25mA max.

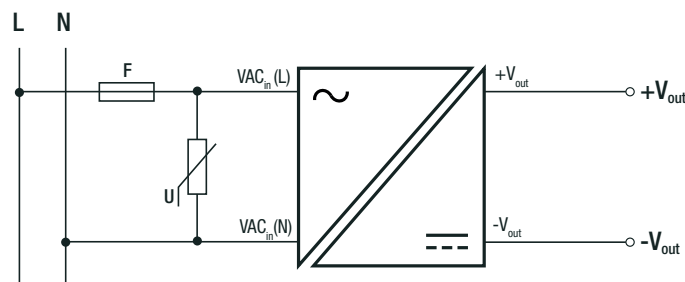
#### Notes:

Note5: Refer to local safety regulations if input over-current protection is also required

Note6: For repeat Hi-Pot testing, reduce the time and/or the test voltage

Note7: For operation at 230VAC, an external MOV is recommended. The Varistor should comply with IEC-61051-2. e.g. EPCOS S14 series

### Protection Circuit



**Specifications** (measured @ Ta= 25°C, nom. Vin (115/230VAC), full load and after warm-up unless otherwise stated)

### ENVIRONMENTAL

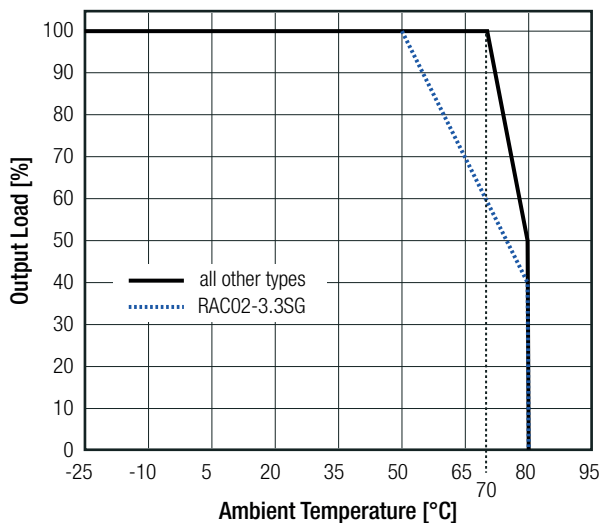
Parameter	Condition		Value
Operating Temperature Range	@ natural convection 0.1m/s	full load	-25°C to +70°C
		refer to <b>"Derating Graph"</b>	-25°C to +80°C
Maximum Case Temperature			+120°C
Temperature Coefficient			0.03%/K
Operating Altitude <sup>(8)</sup>			4000m
Operating Humidity	non-condensing		5% - 95% RH max.
Pollution Degree			PD2
Shock			10-150Hz, 2G 10min./1cycle, period 60min. each along x,y,z axes
Vibration	according to MIL-STD-202G		20G/11ms pulse, 3 times at each x, y, z axes
MTBF <sup>(9)</sup>	according to MIL-HDBK-217F, method 2	+25°C	1691 x 10 <sup>3</sup> hours
		+70°C	424 x 10 <sup>3</sup> hours

**Notes:**

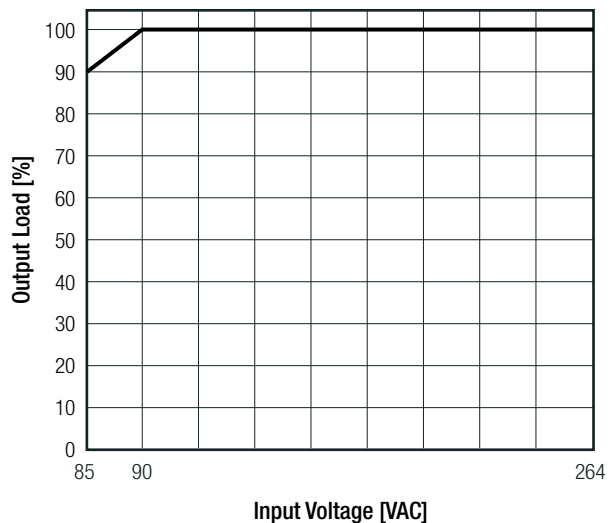
- Note8: Recognized by UL for safe operation up to 4000m. High altitude operation may impact the performance and lifetime. Contact RECOM Techsupport for detailed information
- Note9: Based on calculation for 5Vout

### Derating Graph

(@ Chamber and natural convection 0.1m/s)



### Line Derating



### SAFETY AND CERTIFICATIONS

Certificate Type (Safety)	Report / File Number	Standard
Information Technology Equipment, General Requirements for Safety	SA1804152L01001	IEC60950-1:2005 2nd Edition + Am2:2013 EN60950-1:2006 + A12:2011 + A2:2013
Audio/Video, information and communication technology equipment - Part1: Safety requirements	E196683-A5 and E19668-A6001	UL62368-1, 2nd Edition CAN/CSA-C22.2 No. 62368-1-14
Audio/Video, information and communication technology equipment - Part1: Safety requirements (CB Scheme)	SA1804152S 001	IEC62368-1:2014 2nd Edition
Audio/Video, information and communication technology equipment - Part1: Safety requirements		EN62368-1:2014+A11:2017
RoHS2		RoHS 2011/65/EU + AM2015/863

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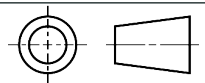
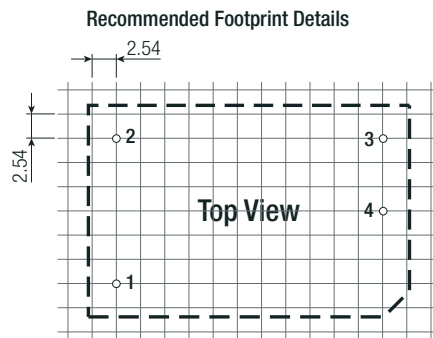
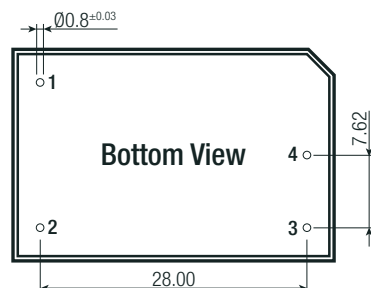
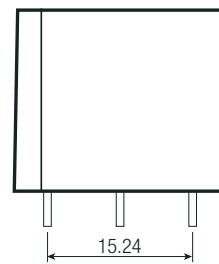
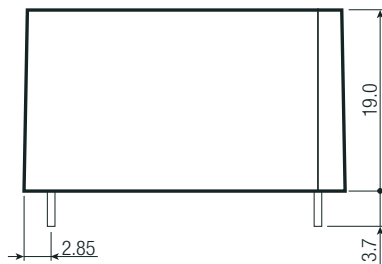
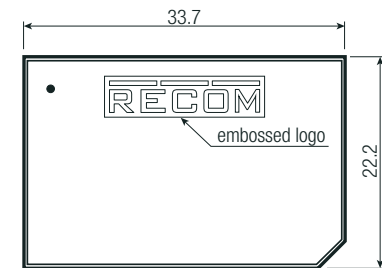
### Specifications (measured @ Ta= 25°C, nom. Vin (115/230VAC), full load and after warm-up unless otherwise stated)

EMC Compliance	Condition	Standard / Criterion
Electromagnetic compatibility of multimedia equipment - Emission requirements	EA1804152E 01001	EN55032, Class B
Information technology equipment - Immunity characteristics - Limits and methods of measurement		EN55024:2010 + A1:2015
ESD Electrostatic discharge immunity test	Air ±2, 4, 8kV Contact ±2, 4kV	EN61000-4-2:2009, Criteria A
Radiated, radio-frequency, electromagnetic field immunity test	3V/m	EN61000-4-3:2006 + A2:2010, Criteria A
Fast Transient and Burst Immunity	AC Power Port: ±1.0kV	EN61000-4-4:2012, Criteria A
Surge Immunity	AC Power Port: L-N ±1.0kV	EN61000-4-5:2014, Criteria B
Immunity to conducted disturbances, induced by radio-frequency fields	AC Power Port 3V	EN61000-4-6:2014, Criteria A
Power Magnetic Field Immunity	50Hz, 1A/m	EN61000-4-8:2009, Criteria A
Voltage Dips and Interruption	Voltage Dips >95%	EN61000-4-11:2004, Criteria A
	Voltage Dips 30%	EN61000-4-11:2004, Criteria B
	Voltage Interruptions >95%	EN61000-4-11:2004, Criteria B
Limits of Voltage Fluctuations & Flicker		EN61000-3-3:2013

### DIMENSION AND PHYSICAL CHARACTERISTICS

Parameter	Type	Value
Material	case PCB	black plastic (UL94V-2) FR4 (UL94V-0)
Dimension (LxWxH)		33.7 x 22.2 x 19.0mm
Weight		12g typ.

#### Dimension Drawing (mm)



#### Pin Connections

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

Tolerance:  
Pin length: -0.5/+0.9  
xx.xx= ±0.5mm  
x.xx= ±0.25mm

**Specifications** (measured @ Ta= 25°C, nom. Vin (115/230VAC), full load and after warm-up unless otherwise stated)

PACKAGING INFORMATION		
Parameter	Type	Value
Packaging Dimension (LxWxH)	tube	470.0 x 36.4 x 26.4mm
Packaging Quantity		20pcs
Storage Temperature Range		-25°C to +85°C
Storage Humidity	non-condensing	5% - 95% 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.

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