

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

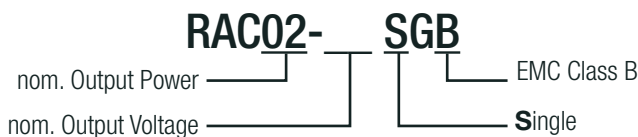
| Part Number | Input Voltage Range [VAC] | Output Voltage [VDC] | Output Current [mA] | Efficiency typ [%] | Max. Capacitive Load ⁽¹⁾ [µF] |
|--------------|---------------------------|----------------------|---------------------|--------------------|------------------------------------------|
| RAC02-3.3SGB | 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

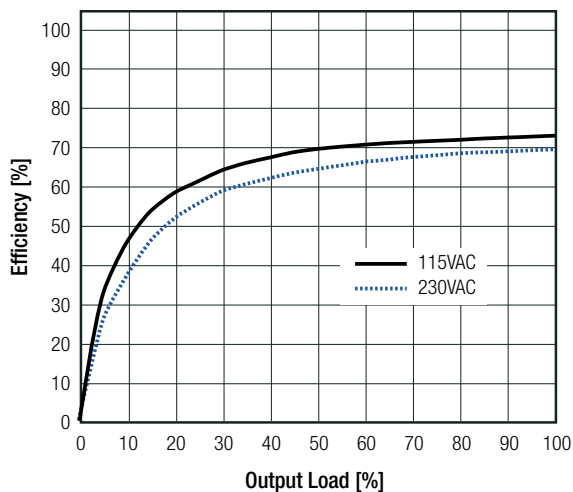
| Parameter | Condition | | Min. | Typ. | Max. |
|----------------------------------------|--------------------------|------------------|------------------------------------------------|----------------|----------------------------------------------------------|
| Internal Input Filter | | | Pi-type | | |
| Input Voltage Range ^(2,3,4) | 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:

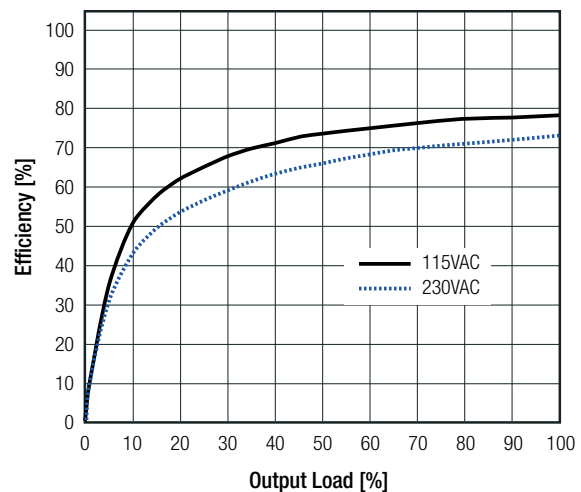
- Note2: No proper operation with DC input voltage
- Note3: The products were submitted for safety files at AC-Input operation
- Note4: Refer to "**Line Derating**"

Efficiency vs. Load

RAC02-05SGB



RAC02-12SGB

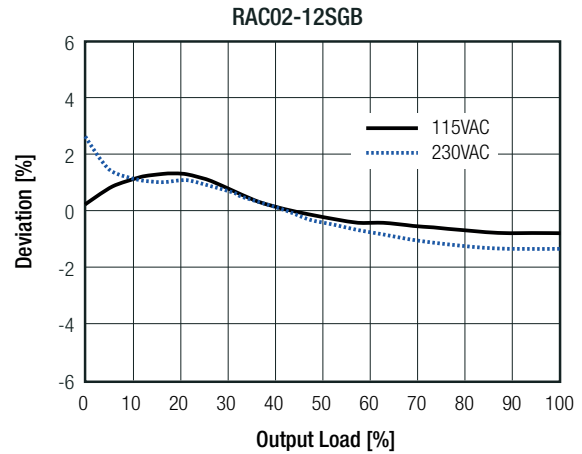
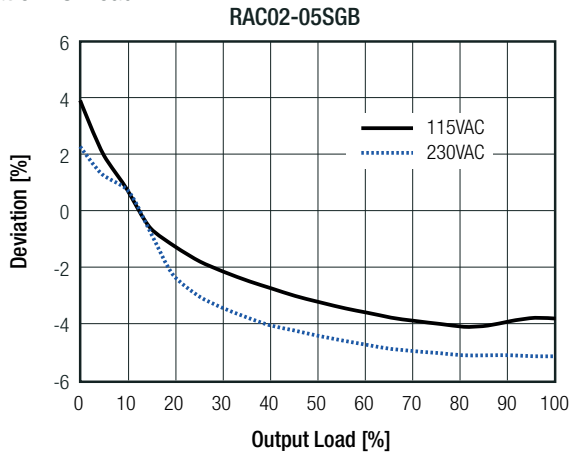


Specifications (measured @ $T_a = 25^\circ\text{C}$, nom. V_{in} (115/230VAC), full load and after warm-up unless otherwise stated)

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

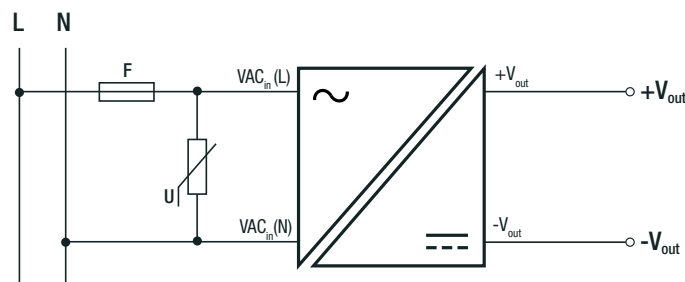
Notes:

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

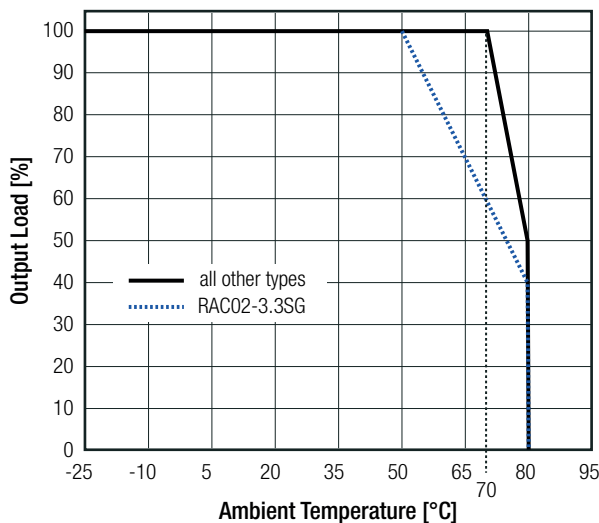
| Parameter | Condition | | Value |
|-----------------------------------|--------------------------------------|----------------------------------|-----------------------------------------------------------------|
| Operating Temperature Range | @ natural convection 0.1m/s | full load | -25°C to +70°C |
| | | refer to "Derating Graph" | -25°C to +80°C |
| Maximum Case Temperature | | | +120°C |
| Temperature Coefficient | | | 0.03%/K |
| Operating Altitude ⁽⁸⁾ | | | 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 ⁽⁹⁾ | according to MIL-HDBK-217F, method 2 | +25°C | 1691 x 10 ³ hours |
| | | +70°C | 424 x 10 ³ hours |

Notes:

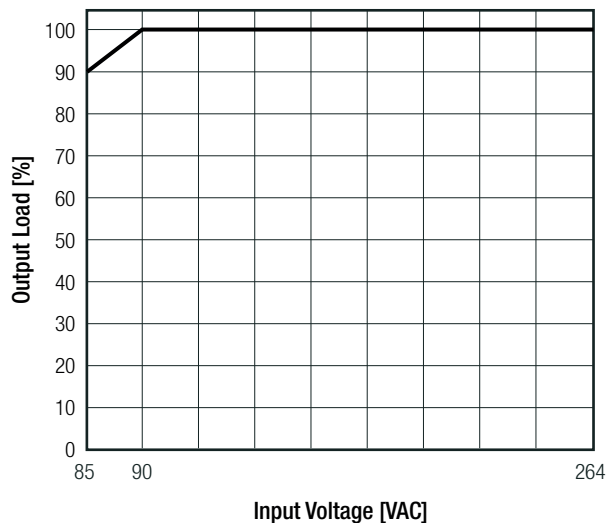
- Note8: Recognized by UL for safe operation up to 4000m. High altitude operation may impact the performance and lifetime. Contact RECOM Techsupport for detailed information
- Note9: Based on calculation for 5Vout

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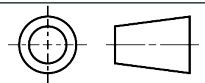
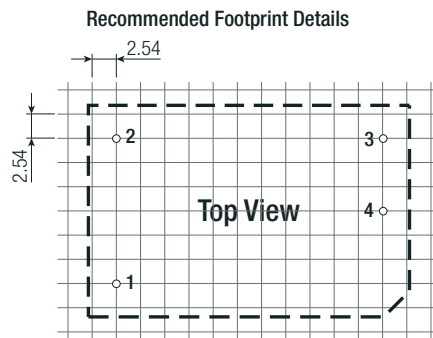
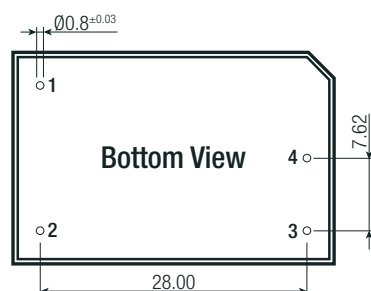
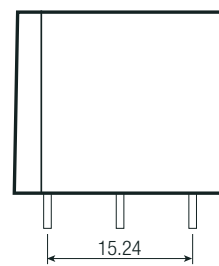
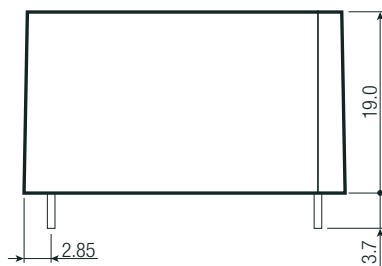
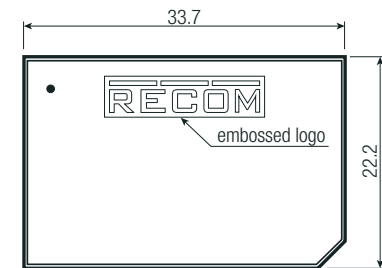
Specifications (measured @ Ta= 25°C, nom. Vin (115/230VAC), full load and after warm-up unless otherwise stated)

| 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.