

Features

Regulated Converter

- Unique, patent-pending design
- Isolated power supply with integrated mains filter
- Packaged inside of line filter case
- Safe, touchable DC outputs
- Easy installation
- Worldwide standard IEC input
- 85-264VAC universal input voltage

RECOM
AC/DC Converter

RAC05-K/C14

Description

The RAC05-K/C14 is a unique design that combines a mains filter and isolated power supply in the same case as a mains input filter alone, at a cost lower than many mains filters. It fits into a standard IEC "kettle connector" mounting hole, so installation time is only a few seconds. The touchable output spade terminals are safe extra-low voltage (SELV) available in 3.3V, 5V, 12V, 15V and 24V DC output voltages and are protected against short circuits, overload and overvoltage. The metal case offers secure fixing and enhances thermal dissipation allowing an operating temperature from -25°C to +70°C. The RAC05-K/C14 is ideal for powering single board computers such as the Raspberry Pi (including touchscreen), Arduino, BBC Micro:bit, etc.

**5 Watt
Single
Output**



**UL/IEC/EN62368-1 certified
IEC/EN60950-1 certified
FCC Part 15 compliant
ANSI C63.4 compliant
IEC/EN61204-3 compliant
EN55014-1 / +2 compliant
EN55024 compliant
EN55032 compliant
CB Report**

Selection Guide

| Part Number | Input Voltage Range [VAC] | Output Voltage [VDC] | Output Current [mA] | Efficiency typ ⁽¹⁾ [%] | Max. Capacitive Load ⁽²⁾ [μF] |
|-----------------|---------------------------|----------------------|---------------------|-----------------------------------|--|
| RAC05-3.3SK/C14 | 85-264 | 3.3 | 1510 | 76 | 6000 |
| RAC05-05SK/C14 | 85-264 | 5 | 1000 | 80 | 6000 |
| RAC05-12SK/C14 | 85-264 | 12 | 420 | 81 | 1500 |
| RAC05-15SK/C14 | 85-264 | 15 | 333 | 81 | 1000 |
| RAC05-24SK/C14 | 85-264 | 24 | 210 | 84 | 330 |

Notes:

Note1: Efficiency is tested at nominal input and full load at +25°C ambient

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

Model Numbering



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

| BASIC CHARACTERISTICS | | | | | |
|---|----------------------------------|--------------------------|-----------------|--------------|----------------------|
| Parameter | Condition | | Min. | Typ. | Max. |
| Internal Input Filter | | | Pi type | | |
| Input Voltage Range ^(3,4) | nom. Vin= 230VAC | | 85VAC 120VDC | 230VAC | 264VAC 370VDC |
| Input Current | 115VAC 230VAC | | | | 250mA 100mA |
| Inrush Current | cold start at 25°C | 115VAC 230VAC | | | 15A 30A |
| No Load Power Consumption | | | | 75mW | |
| ErP Standby Mode Conformity (Output Load Capability) | Input Power= | 0.5W 1.0W 2.0W | | | 0.3W 0.7W 1.5W |
| Input Frequency Range | AC Input | | 47Hz | | 63Hz |
| Minimum Load | | | 0% | | |
| Power Factor | 115VAC 230VAC | | 0.6 0.45 | | |
| Start-up Time | | | | 20ms | |
| Rise Time | | | | | 8ms |
| Hold-up Time | 115VAC 230VAC | | | 12ms 60ms | |
| Internal Operating Frequency | | | | | 130kHz |
| Output Ripple and Noise | 20MHz BW | 3.3Vout, 5Vout others | | 60mVp-p | 1% of Vout |

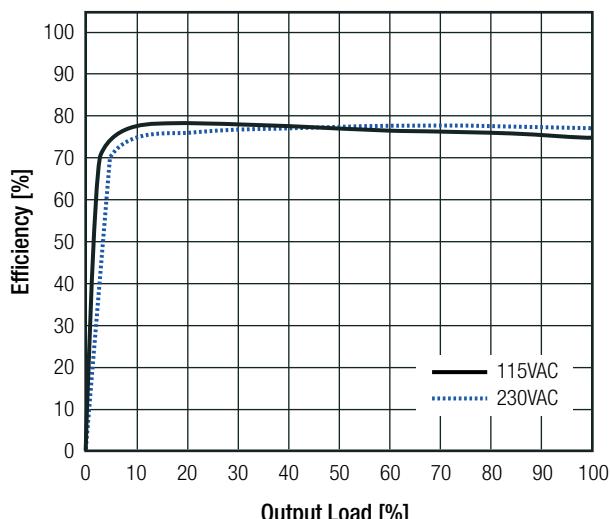
Notes:

Note3: The products were submitted for safety files at AC-Input operation

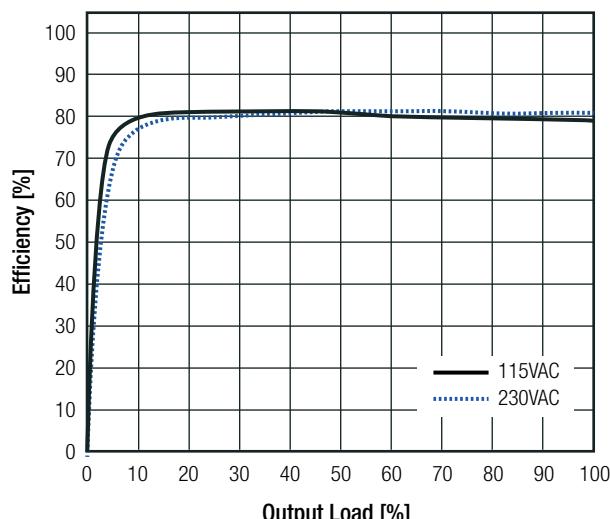
Note4: Refer to line derating graph on page PA-4

Efficiency vs. Load

RAC05-3.3SK/C14



RAC05-05SK/C14

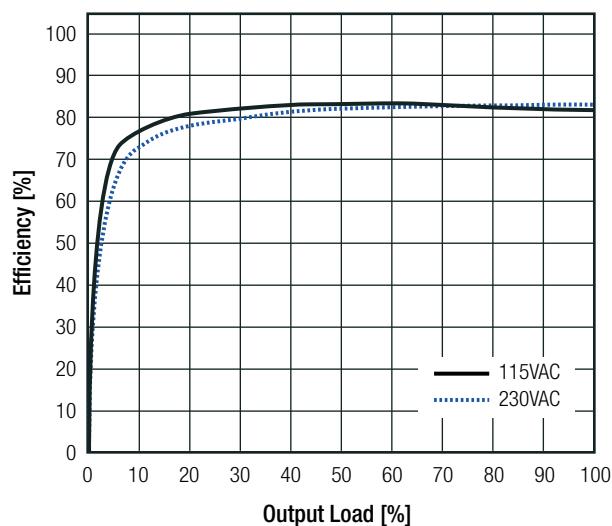


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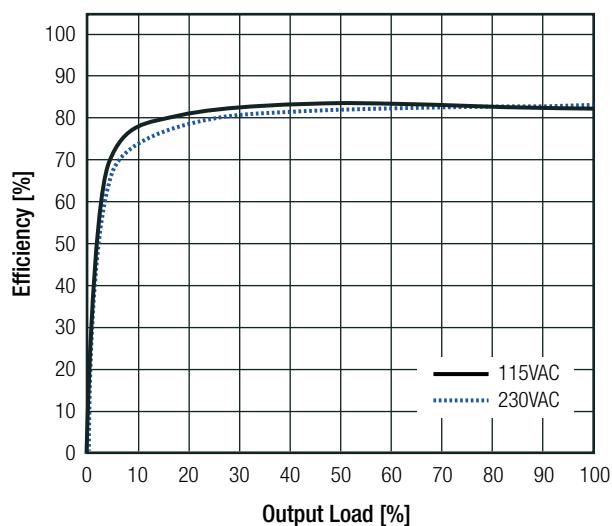
Specifications (measured @ $T_a = 25^\circ\text{C}$, nom. V_{in} , full load and after warm-up unless otherwise stated)

Efficiency vs. Load

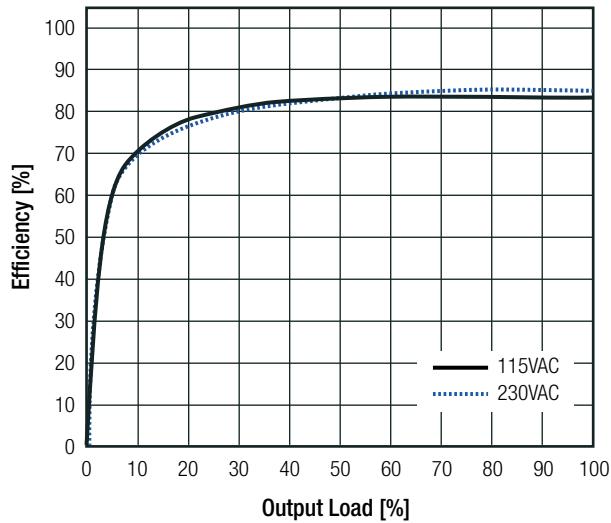
RAC05-12SK/C14



RAC05-15SK/C14



RAC05-24SK/C14



REGULATIONS

| Parameter | Condition | Value |
|--------------------|---------------------------------------|-------------------------------|
| Output Accuracy | | $\pm 2.0\%$ typ. |
| Line Regulation | low line to high line, full load | $\pm 0.5\%$ typ. |
| Load Regulation | 10% to 100% load | $\pm 1.0\%$ typ. |
| Transient Response | 25% load step change recovery time | 4.0% max. 500 μ s typ. |

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

| PROTECTIONS | | |
|----------------------------------|-------------------------------|-----------------------------------|
| Parameter | Type | Value |
| Input Fuse ⁽⁵⁾ | internal | T1A, slow blow |
| Short Circuit Protection (SCP) | below 100mΩ | Hiccup, automatic restart |
| Over Voltage Protection (OVP) | | 125% - 195%, Latch-off |
| Over Voltage Category | | OVCII |
| Over Current Protection (OCP) | | 125% - 195%, Hiccup auto recovery |
| Class of Equipment | | Class I |
| Isolation Voltage ⁽⁶⁾ | I/P to O/P; I/P to Case (GND) | rated for 1 minute |
| Isolation Resistance | | 3kVAC |
| Isolation Capacitance | | 100pF max. |
| Insulation Grade | | reinforced |
| Leakage Current | | 0.25mA max. |

Notes:

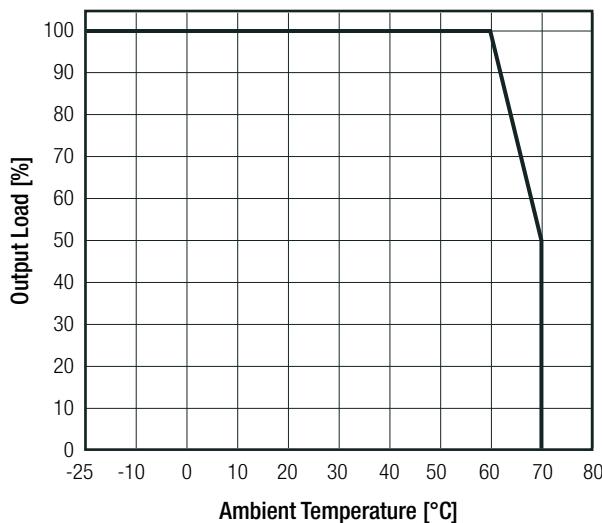
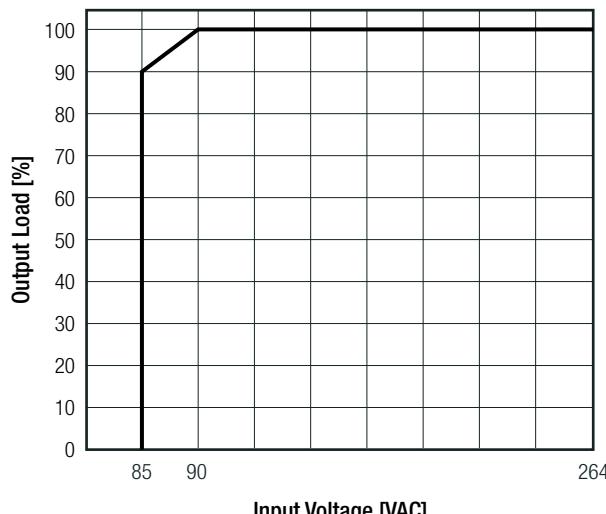
Note5: Refer to local safety regulations if input over-current protection is also required

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

| ENVIRONMENTAL | | |
|-----------------------------|---|--|
| Parameter | Condition | Value |
| Operating Temperature Range | @ natural convection 0.1m/s | -25°C to +60°C |
| | full load | -25°C to +70°C |
| Maximum Case Temperature | | +90°C |
| Temperature Coefficient | | ±0.05%/K |
| Operating Altitude | | 3000m |
| Operating Humidity | non-condensing | 5% - 95% RH max. |
| Pollution Degree | | PD2 |
| Vibration | 10-500Hz, 2G 10min./ 1 cycle, period o 60min. each along X,Y and Z axes | |
| MTBF | according to MIL-HDBK-217F, G.B. | +25°C +50°C |
| Design Lifetime | | 450 x 10 ³ hours 250 x 10 ³ hours |
| | | 136 x 10 ³ hours |

Derating Graph

(@ Chamber and natural convection 0.1m/s)


Line Derating


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

| SAFETY AND CERTIFICATIONS | | |
|---|--|---|
| Certificate Type (Safety) | Report / File Number | Standard |
| Audio/video, information and communication technology equipment - Safety requirements (CB) | ITAV-4788488757-A-2 E224736 | IEC62368-1:2014 2nd Edition |
| Audio/video, information and communication technology equipment - Safety requirements (LVD) | | EN62368-1:2014 + A11:2017 |
| Audio/video, information and communication technology equipment - Safety requirements | | UL62368-1, 2nd Edition, 2014 CAN/CSA-C22.2 No. 62368-1-14, 2nd Ed. |
| Information Technology Equipment, General Requirements for Safety (CB) | | IEC60950-1:2005 + A2:2013, 2nd Edition |
| Information Technology Equipment, General Requirements for Safety | | EN60950-1:2006 + A2:2013 |
| RoHS2 | | RoHS 2011/65/EU + AM2015/863 |
| EMC Compliance | | Condition |
| Low-voltage power supplies DC output - Part 3: Electromagnetic compatibility | LCS180702043BE | EN IEC61204-3:2018, Class B |
| Electromagnetic compatibility of multimedia equipment - Emission requirements | | EN55032:2015, Class B |
| Information technology equipment - Immunity characteristics - Limits and methods of measurement | | EN55024:2010 + A1:2015 |
| Electromagnetic compatibility of household appliances, electric tools and similar apparatus - Emission Requirements | | EN55014-1:2006 + A2:2011 |
| Electromagnetic compatibility of household appliances, electric tools and similar apparatus - Immunity Requirements | | EN55014-2:2015 |
| American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40GHz | LCS180702044BE | ANSI C63.4-2014, Class B |
| Limitations on the amount of electromagnetic interference allowed from digital and electronic devices | | FCC 47 CFR Part15, Supbart B |
| ESD Electrostatic Discharge Immunity Test | Air: ± 2 , 4, 8kV Contact: ± 2 , 4kV | EN61000-4-2 :2009, Criteria B |
| Radiated, Radio-Frequency, Electromagnetic Field Immunity Test | 10V/m, 80MHz-1GHz 3V/m, 1.4GHz-2GHz 1V/m, 2GHz-2.7GHz | EN61000-4-3:2006 + A1:2009, Cirteria A |
| Fast Transient and Burst Immunity | AC Port: ± 2 kV DC Port: ± 2 kV | EN61000-4-4:2012, Criteria B |
| Surge Immunity | AC Port (L-N): ± 1 kV DC Port: ± 0.5 kV | EN61000-4-5:2014+A1:2017, Criteria B |
| Immunity to Conducted Disturbances, Induced by Radio-Frequency Fields | AC+DC Port: 10V | EN61000-4-6:2014, Criteria A |
| Power Magnetic Field Immunity | 50Hz, 30A/m | EN61000-4-8:2010, Criteria A |
| Voltage Dips and Interruptions | Voltage Dips 20% Voltage Dips 30% Voltage Dips 60% Voltage Dips 100% Interruptions > 95% | EN61000-4-11:2004+A1:2017, Criteria C EN61000-4-11:2004+A1:2017, Criteria C EN61000-4-11:2004+A1:2017, Criteria C EN61000-4-11:2004+A1:2017, Criteria B EN61000-4-11:2004+A1:2017, Criteria C |
| Voltage Fluctuations and Flicker in Public Low-Voltage Systems $\leq 16\text{A}$ per phase | | EN61000-3-3:2013 |

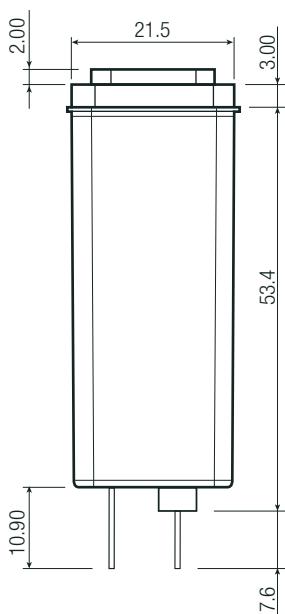
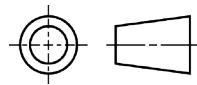
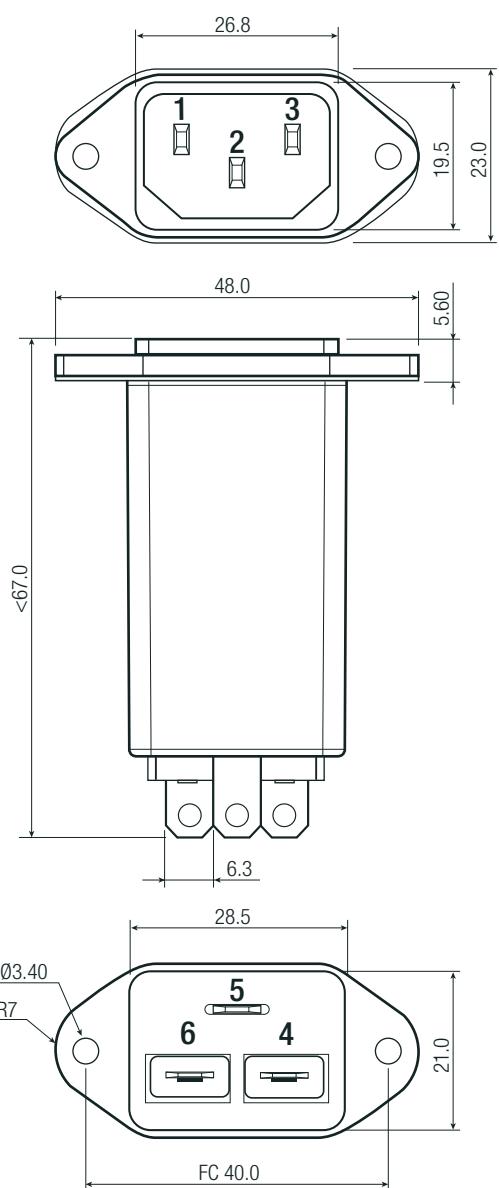
DIMENSION AND PHYSICAL CHARACTERISTICS

| Parameter | Type | Value |
|-------------------|-------------------------------|---|
| Material | case inner case potting | nickel-plated steel plastic (UL94 V-0) silicone rubber (UL96 V-0) |
| Dimension (LxWxH) | | 67.0 x 48.0 x 23.0mm |
| Weight | | 56g typ. |

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

Dimension Drawing (mm)



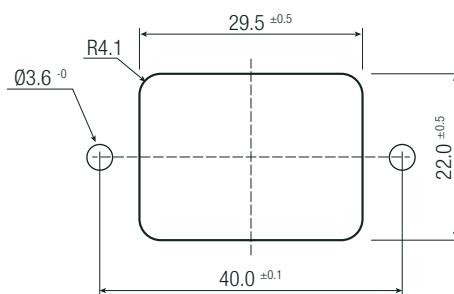
Pinning information

| Pin # | Single |
|-------|------------|
| 1 | VAC in (L) |
| 2 | Earth |
| 3 | VAC in (N) |
| 4 | +Vout |
| 5 | Earth |
| 6 | -Vout |

FC= fixing centers

Tolerance: xx.x= $\pm 0.5\text{mm}$
xx.xx= $\pm 0.25\text{mm}$

Mounting hole dimensions



PACKAGING INFORMATION

| Parameter | Type | Value |
|-----------------------------|----------------|------------------------|
| Packaging Dimension (LxWxH) | cardboard box | 166.0 x 123.0 x 91.0mm |
| Packaging Quantity | | 10pcs |
| Storage Temperature Range | | -40°C to +85°C |
| Storage Humidity | non-condensing | 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.