

Features

Regulated Converters

- Compact low profile AC-DC power supply
- 30mW no load power consumption
- Class II power supply with 3kVAC isolation
- Universal input voltage range (80~264VAC)
- Low output ripple/noise
- EN, UL and CE certified

RECOM
AC/DC Converter

RAC01-C
RAC02-C

1-2 Watt
Single
Output



Description

The RAC01-SC and RAC02-SC series are ultra-compact universal input AC/DC power modules for PCB mounting. They feature high efficiency, low standby power, high operating temperature, soft start and short-circuit protection as well as a built-in EMC Class B filter. Output voltages range from 3.3VDC to 24VDC.

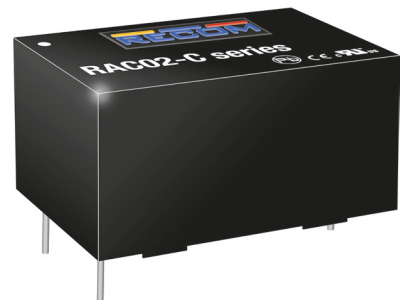
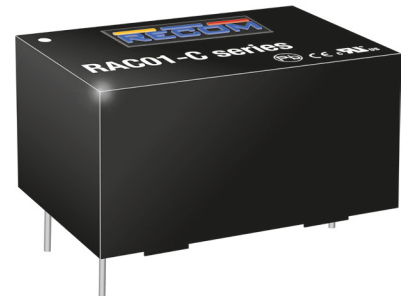
Selection Guide

Part Number	Input Voltage Range [VAC]	Output Voltage [VDC]	Output Current [mA]	Efficiency typ [%]	Max. Capacitive Load ^(1,2) [μF]
RAC01-3.3SC	80-264	3.3	300	65	2200
RAC01-05SC	80-264	5	200	68	1600
RAC01-09SC	80-264	9	111	70	470
RAC01-12SC	80-264	12	83	72	180
RAC01-15SC	80-264	15	67	72	180
RAC01-24SC	80-264	24	42	73	68
RAC02-3.3SC	80-264	3.3	600	66	2700
RAC02-05SC	80-264	5	400	70	2000
RAC02-09SC	80-264	9	222	72	560
RAC02-12SC	80-264	12	167	74	200
RAC02-15SC	80-264	15	133	74	200
RAC02-24SC	80-264	24	83	77	68

Notes:

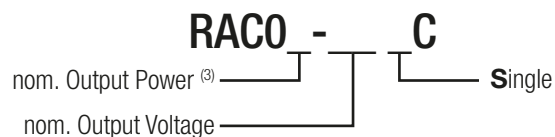
Note1: Measured @ 230VAC / 50Hz / Ta=25°C with constant resistive load

Note2: If used @ 115VAC / 60Hz with full load, max. capacitive load is less, please contact techsupportAT@recom-power.com for detailed information



EN60950-1 certified
UL60950-1 certified
*EN60335-1 certified (only 2W version)

Model Numbering



Notes:

Note3: „1“ for 1 Watt, „2“ for 2 Watt

Ordering Examples:

RAC01-12SC	1 Watt	12Vout	Single Output
RAC01-05SC	1 Watt	5Vout	Single Output
RAC02-3.3SC	2 Watt	3.3Vout	Single Output
RAC02-24SC	2 Watt	24Vout	Single Output

Specifications (measured at Ta= 25°C, nominal input voltage, full load otherwise noted)

BASIC CHARACTERISTICS

Parameter	Condition		Min.	Typ.	Max.
Input Voltage Range ⁽⁴⁾	nom. Vin = 230VAC		80VAC 115VDC		264VAC 370VDC
Input Current	RAC01-C	115VAC 230VAC			34mA 23mA
	RAC02-C	115VAC 230VAC			55mA 36mA
Inrush Current	<0.5ms cold start at 25°C		115VAC 230VAC		30A 60A
No load Power Consumption	115VAC 230VAC			30mW 80mW	
Input Frequency Range	AC Input		47Hz		63Hz
Minimum Load ⁽⁵⁾				0%	
Start-up Time	115VAC 230VAC			3ms 1.5ms	
Rise Time	115VAC/ 230VAC			20ms	
Hold-up time	115VAC 230VAC			10ms 60ms	
Internal Operating Frequency	100% load at nominal Vin			30kHz	
Output Ripple and Noise ⁽⁶⁾	20MHz BW	3.3Vout all others			150mVp-p 100mVp-p

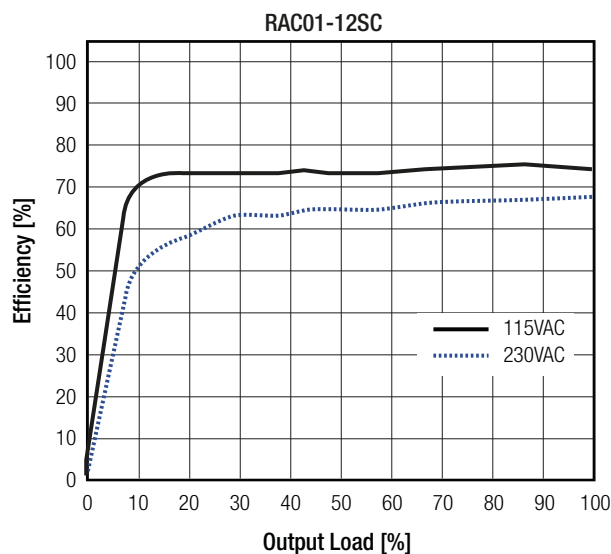
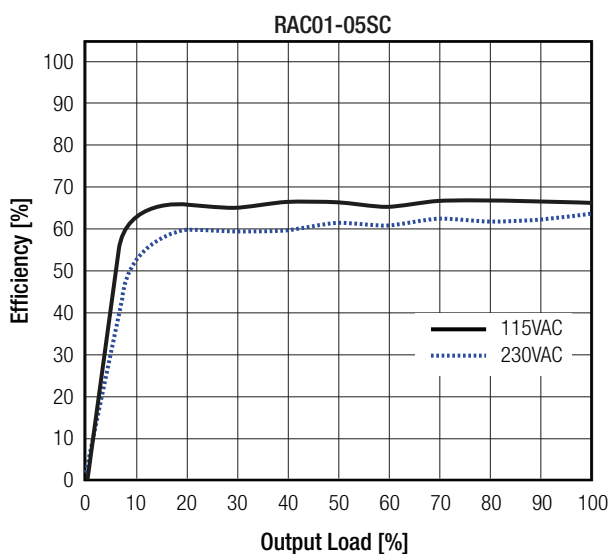
Notes:

Note4: Refer to line derating graph on page 3

Note5: Operation below 10% load won't harm the converter, but specifications may not be met

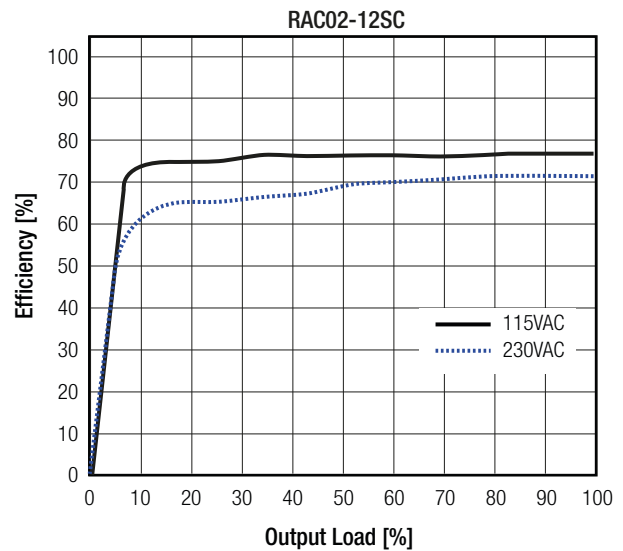
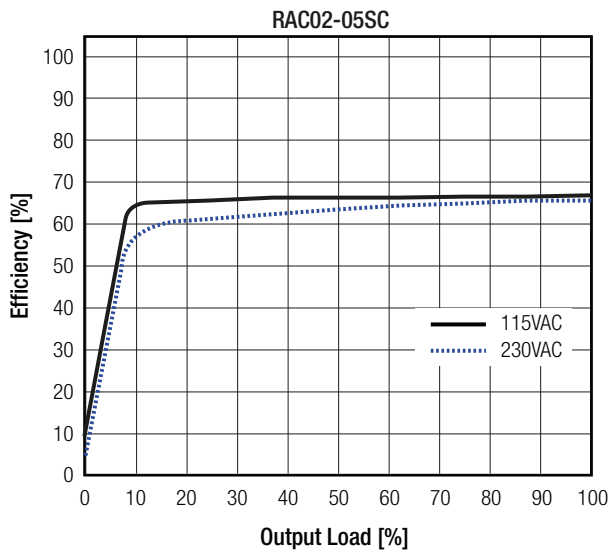
Note6: Ripple and Noise is the maximum peak-to-peak voltage value measured at the output with a 20MHz bandwidth, at rated line voltage and full load

Efficiency vs. Load

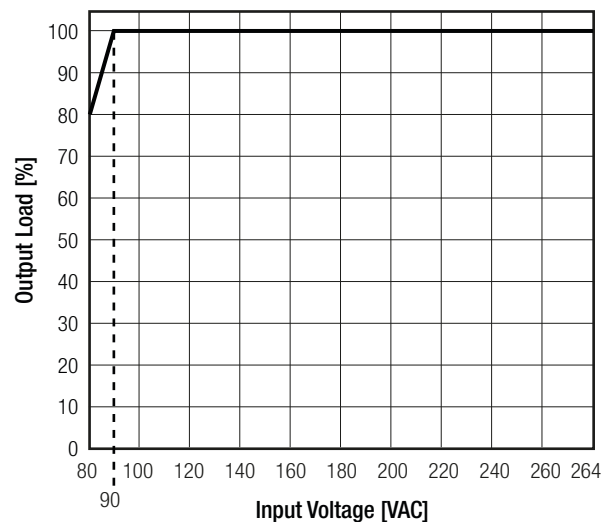


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Specifications (measured at Ta= 25°C, nominal input voltage, full load otherwise noted)



Line Derating



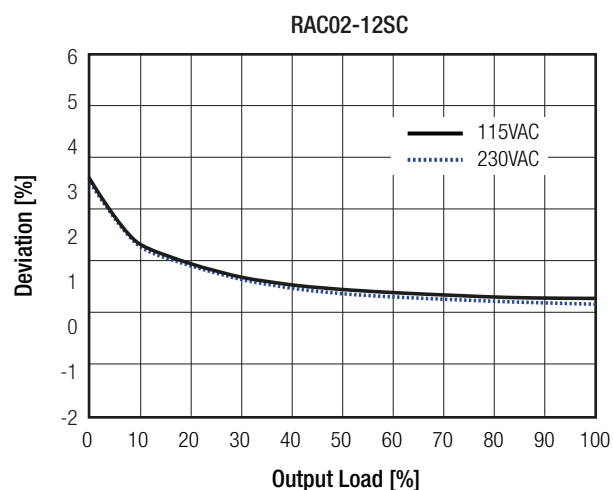
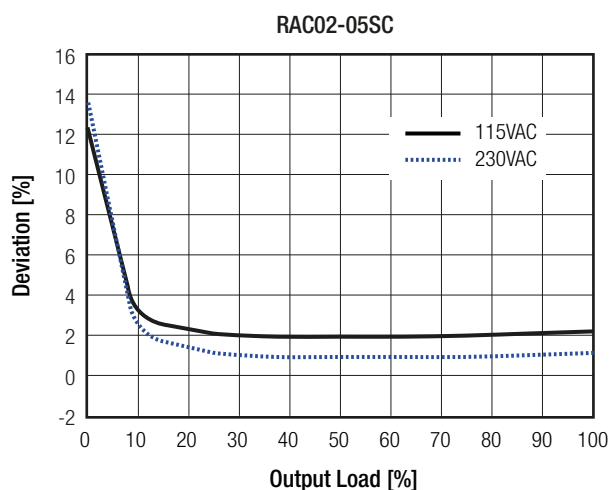
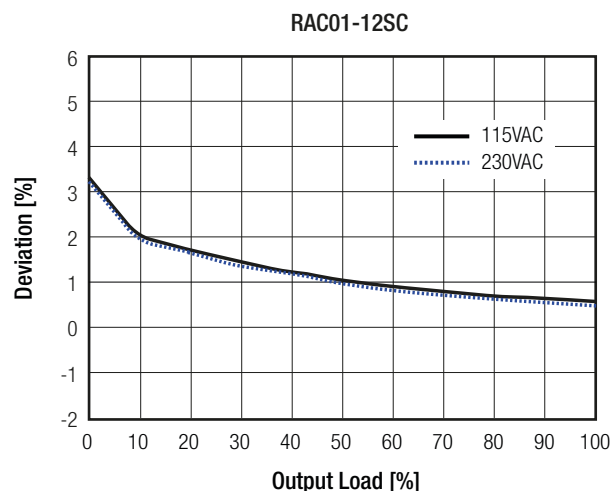
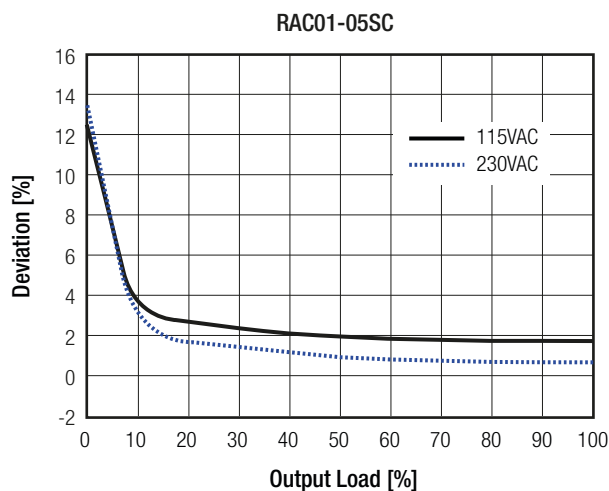
REGULATIONS

Parameter	Condition	Value
Output Accuracy		±5.0% typ.
Line Regulation	low line to high line	±2.0% max.
Load Regulation	10% to 100% load	6.0% max.

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Specifications (measured at Ta= 25°C, nominal input voltage, full load otherwise noted)

Deviation vs. Load



PROTECTIONS

Parameter	Type		Value
Short Circuit Protection (SCP)	below 100mΩ		Hiccup mode, automatic recovery
Over Voltage Category			OVCII
Class of Equipment			Class II
Isolation Voltage	I/P to O/P	rated for 1 minute	3kVAC
Isolation Resistance			1GΩ min.
Isolation Capacitance			1000pF max.
Insulation Grade			reinforced
Leakage Current			0.25mA max.

Notes:

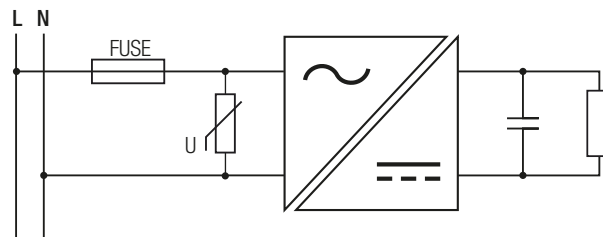
Note7: Refer to local wiring regulations if input over-current protection is also required

Note8: An external MOV is recommended for operation 230VAC. The Varistor should comply with IEC-61051-2. e.g. EPCOS S14 Series

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Specifications (measured at Ta= 25°C, nominal input voltage, full load otherwise noted)

Protection Circuit

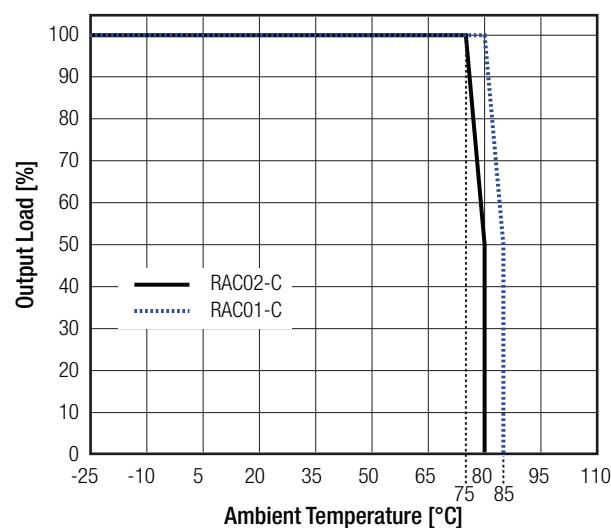


ENVIRONMENTAL

Parameter	Condition			Value
Operating Temperature Range	@ natural convection 0.1m/s	full load	RAC01-C	-25°C to +80°C
			RAC02-C	-25°C to +75°C
		refer to derating graph		-25°C to +85°C
Maximum Case Temperature				+95°C
Temperature Coefficient	+25°C to +75°C			0.1%/°C
Thermal Impedance	0.1m/s, horizontal			27°C/W
Operating Altitude				2000m
Operating Humidity	non-condensing			95% RH max.
Pollution Degree				PD2
Vibration				according to MIL-STD-810F
MTBF	according to MIL-HDBK-217F, G.B.	+25°C		666 x 10 ³ hours
		+55°C		395 x 10 ³ hours
		+80°C		125 x 10 ³ hours

Derating Graph

(@ Chamber and natural convection 0.1 m/s)



Notes:

Note9: Start-up is only guaranteed at temperatures down to -25°C; otherwise specifications may not be met

Specifications (measured at Ta= 25°C, nominal input voltage, full load otherwise noted)

SAFETY AND CERTIFICATIONS

Certificate Type (Safety)	Report / File Number	Standard
Information Technology Equipment - General Requirements for Safety	1606038	EN60950-1:2006 + A2:2013 IEC60950-1:2005, 2nd Edition + A2:2013
Information Technology Equipment - General Requirements for Safety (CB Scheme)	L0339m10-CB-1-B1	IEC60950-1:2005, 2nd Edition + A2:2013
Information Technology Equipment, General Requirements for Safety	E224736-A5	UL60950-1, 2nd Edition, 2007 CSA C22.2 60950-1, 2nd Edition, 2007
Household and similar electrical appliances - Safety - Part 1: General requirements ⁽¹⁰⁾	L0339L26-B2-L	EN60335-1:2012 + A11:2014
EAC Safety of Low Voltage Equipment	RU-AT.49.09571	TP TC 004/2011
RoHS2		RoHS-2011/65/EU + AM-2015/863

EMC Compliance (Industrial)

EMC Compliance (Industrial)	Condition	Standard / Criterion
Electromagnetic compatibility of multimedia equipment – Emission Requirements		EN55032:2015
Information technology equipment - Immunity characteristics - Limits and methods of measurement		EN55024:2010 + A1:2015
ESD Electrostatic discharge immunity test	±8kV air, ±4kV contact	IEC61000-4-2:2008, Criteria A
Radiated, radio-frequency, electromagnetic field immunity test	3V/m	IEC61000-4-3:2006 + A2:2010, Criteria A
Fast Transient and Burst Immunity	AC Power Port: ±1.0kV	IEC61000-4-4:2012, Criteria A
Surge Immunity	AC Power Port: L-N ±1.0kV	IEC61000-4-5:2005, Criteria A
Immunity to conducted disturbances, induced by radio-frequency fields	AC Power Port 3Vr.m.s.	IEC61000-4-6:2008, Criteria A
Voltage Dips and Interruptions	Voltage Dips >95% Voltage Dips 30% Voltage Interruptions >95%	IEC61000-4-11:2004, Criteria A IEC61000-4-11:2004, Criteria A IEC61000-4-11:2004, Criteria C
Limits of Voltage Fluctuations & Flicker		EN61000-3-3:2013

EMC Compliance (Household) only 2Watt version

EMC Compliance (Household) only 2Watt version	Condition	Standard / Criterion
Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 1: Emission		EN55014-1:2006+A2:2011
Information technology equipment - Immunity characteristics - Limits and methods of measurement		EN55014-2:2015
ESD Electrostatic discharge immunity test	±8kV air, ±4kV contact	IEC61000-4-2:2008, Criteria A
Radiated, radio-frequency, electromagnetic field immunity test	3V/m	IEC61000-4-3:2006 + A2:2010, Criteria A
Fast Transient and Burst Immunity	AC Power Port: ±1kV DC Output: ±0.5kV	IEC61000-4-4:2012, Criteria A
Surge Immunity	AC Power Port: L to N ±2kV DC Output: L to N ±1kV	IEC61000-4-5:2014, Criteria B
Immunity to conducted disturbances, induced by radio-frequency fields	3 Vr.m.s.	IEC61000-4-6:2013, Criteria A
Voltage Dips and Interruptions	Voltage Dips >95% Voltage Dips 30% Voltage Interruptions >95%	IEC61000-4-11:2004, Criteria B IEC61000-4-11:2004, Criteria C IEC61000-4-11:2004, Criteria C
Limits of Harmonic Current Emissions		EN61000-3-2:2014
Limits of Voltage Fluctuations & Flicker		EN61000-3-3:2013

Notes:

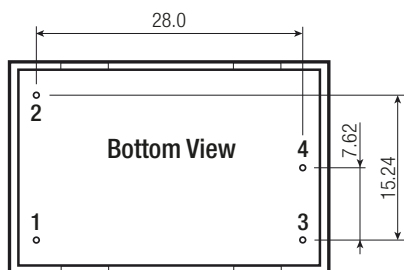
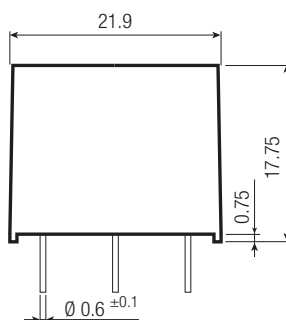
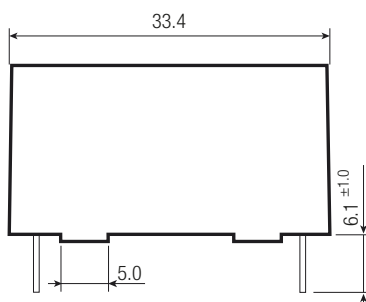
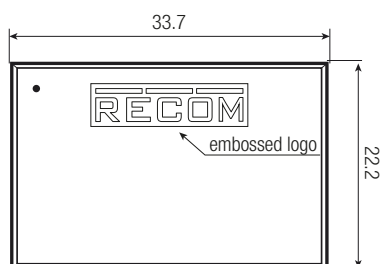
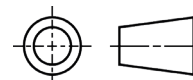
Note10: RAC01-C series is excluded

Specifications (measured at Ta= 25°C, nominal input voltage, full load otherwise noted)

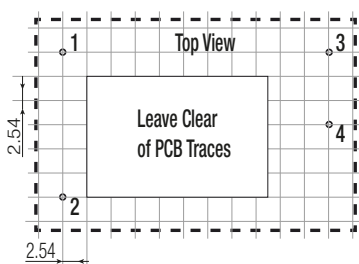
DIMENSION AND PHYSICAL CHARACTERISTICS

Parameter	Type	Value
Material	case	black plastic (UL94V-0)
	potting	silicone (UL94V-0)
	PCB	FR4, (UL94V-1)
Dimension (LxWxH)		33.7 x 22.2 x 17.75mm
Weight		25g typ.

Dimension Drawing (mm)



Recommended Footprint Details



Pin Connections

Pin #	Single
1	VAC in (N)
2	VAC in (L)
3	-Vout
4	+Vout
Tolerance: xx.x= ±0.5mm	
xx.xx= ±0.25mm	

Allow 5mm clearance around converter for air circulation

PACKAGING INFORMATION

Parameter	Type	Value
Packaging Dimension (LxWxH)	tube	520.0 x 37.0 x 28.0mm
Packaging Quantity		22pcs
Storage Temperature Range		-40°C to +100°C
Storage Humidity	non-condensing	95% RH max.

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