Features

Regulated Converters

- Wide input range 85-305Vac
- Full load temperature range: -40°C to +65°C
- Ultra-high efficiency over entire load range
- No external components necessary
- International EMC compliant
- Lowest total cost of ownership
- 140% Peak Load Capability

RECOM

AC/DC Converter

RAC10-K/277

10 Watt 2“ x 1“ Single and Dual Output

3 YEAR warranty

Description

The RAC10-K/277 series are highly efficient PCB-Mount power conversion modules with ultra-low energy losses even in light load conditions. Built for worldwide usage, the AC/DC units cover an enhanced mains input range of 85Vac up to 305Vac and come with international safety certifications for both industrial and household standards. These AC/DC modules offer fully protected single or dual outputs as well as EMC class B compliance without the need of any external components. The 150% peak power capability makes the RAC10-K/277 series suitable for inductive, high start-up current or nonlinear loads. With a full load temperature range of -40°C to +65°C, they are ideal for always-on and standby mode operations in process automation, IoT and smart building applications.

Selection Guide

Part Number	Input Voltage Range [VAC]	Output Voltage [VDC]	Output Current [mA]	Efficiency typ. (1) [%]	Max. Capacitive Load [µF]
RAC10-3.3SK/277	85-305	3.3	2500	79	10000
RAC10-05SK/277	85-305	5	2000	82	8000
RAC10-12SK/277	85-305	12	840	84	1500
RAC10-15SK/277	85-305	15	670	85	1000
RAC10-24SK/277	85-305	24	420	84	330
RAC10-12DK/277	85-305	±12	±420	82	±1200
RAC10-15DK/277	85-305	±15	±340	83	±1000

Notes:

Note1: Efficiency is tested at 25°C with constant resistant mode at full load and 230VAC

E491408

UL/IEC/EN62368-1 (pending)
UL/IEC/EN60950-1 (pending)
IEC/EN60335-1 (pending)
CSA C22.2 No. 60950-1-07 (pending)
CSA C22.2 No. 62368-1-14 (pending)
EN61204-3 (pending)
EN55022/EN55024 (pending)
FCC Part 15 (pending)

Model Numbering

RAC10-___ _K/277

Output Voltage — **S**ingle or **D**ual Output

RAC10-K/277 Series

Specifications (measured @ ta= 25°C, nominal input voltage (115/230VAC), full load and after warm-up)

BASIC CHARACTERISTICS

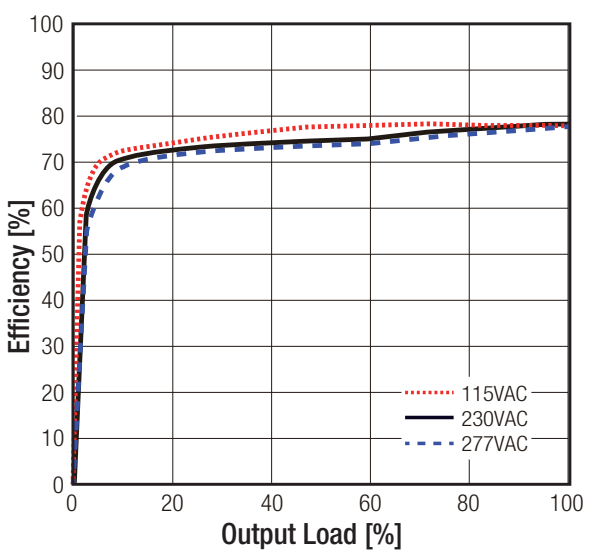
Parameter	Condition		Min.	Typ.	Max.
Internal Input Filter					Pi Type
Input Voltage Range (2)	(refer to line derating graph on PA-5)		85VAC 120VDC		305VAC 430VDC
Input Current	115VAC 230VAC				0.25A 0.21A
Inrush Current	230VAC				0.06A²s
No load Power Consumption				150mW	250mW
ErP Standby Mode Conformity (Output Load Capability)	Input Power= 0.5W 1.0W 2.0W				0.3W 0.7W 1.4W
Input Frequency Range			47Hz		63Hz
Overload Capability	peak duty cycle: 10%; TAMB +50°C max.				140%/10s
Start-up Time				30ms	
Rise Time					25ms
Hold-up time	115VAC 230VAC			15ms 90ms	
Minimum Load			0%		
Internal Operating Frequency					100kHz
Output Ripple and Noise	20MHz BW	3.3Vout, 5Vout others		60mVp-p	 1% of Vout
Power Factor	115VAC 230VAC		0.6 0.5		

Notes:

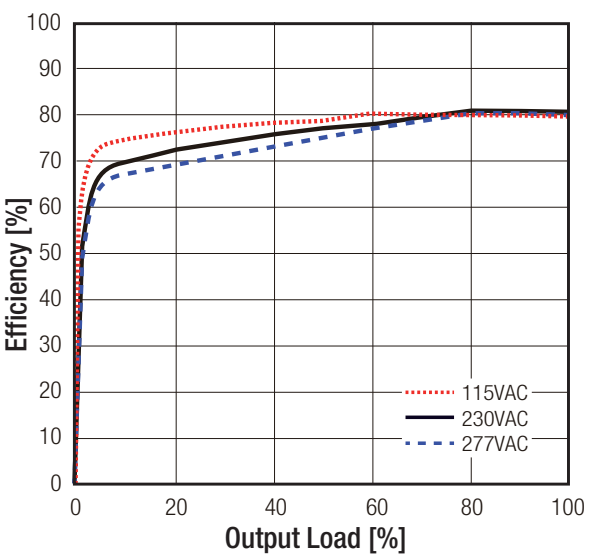
Note2: The products were submitted for safety files at AC-Input operation.

Efficiency vs. Load

RAC10-3.3SK/277



RAC10-05SK/277



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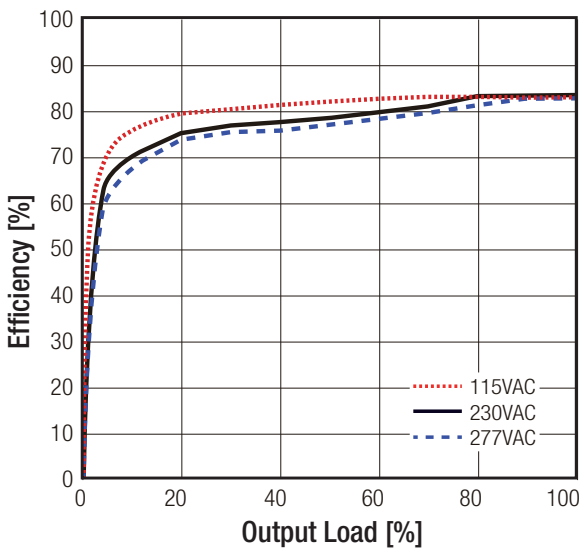
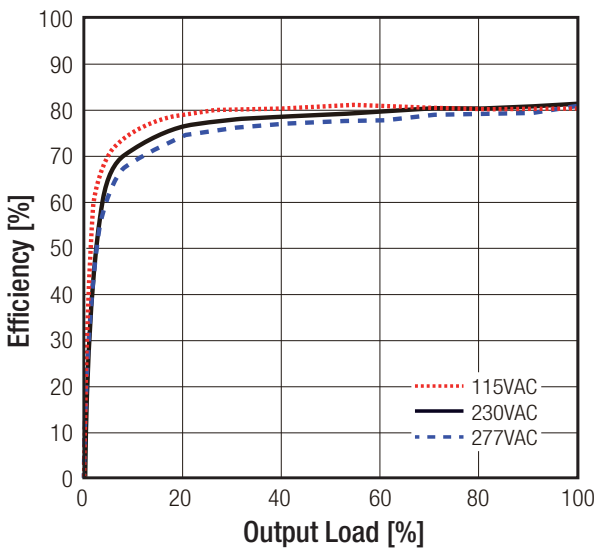
RAC10-K/277 Series

Specifications (measured @ ta= 25°C, nominal input voltage (115/230VAC), full load and after warm-up)

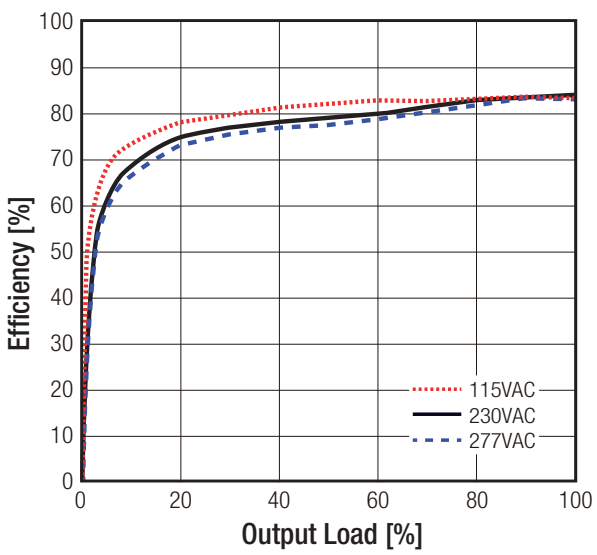
RAC10-12SK/277



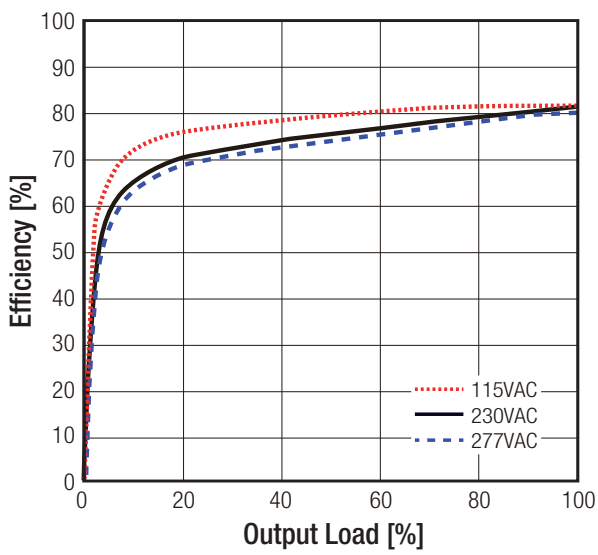
RAC10-12DK/277



RAC10-15SK/277



RAC10-24SK/277



REGULATIONS			
Parameter	**Condition**		**Value**
Output Accuracy			±1.0% typ.
Line Regulation	low line to high line		±0.5% typ.
Load Regulation	0-100% load	3.3,5Vout others	±1.5% typ. ±1.0% typ.
Transient Response	25% load step change Recovery Time		4.0% max. 500µs

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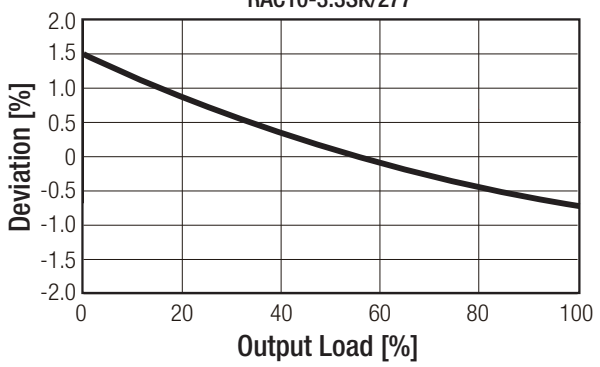
RAC10-K/277 Series

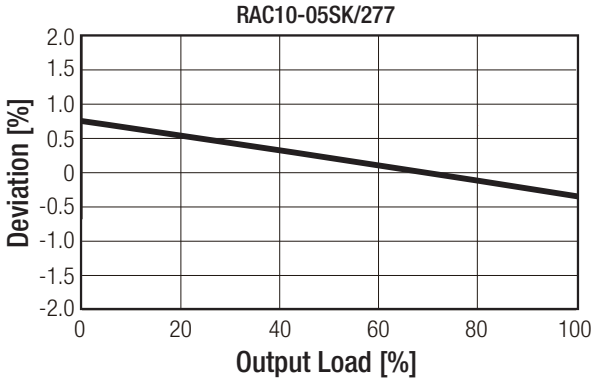
Specifications (measured @ ta= 25°C, nominal input voltage (115/230VAC), full load and after warm-up)

Accuracy vs Load

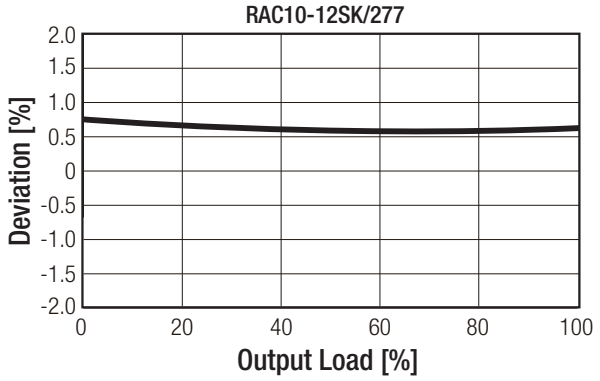
RAC10-3.3SK/277



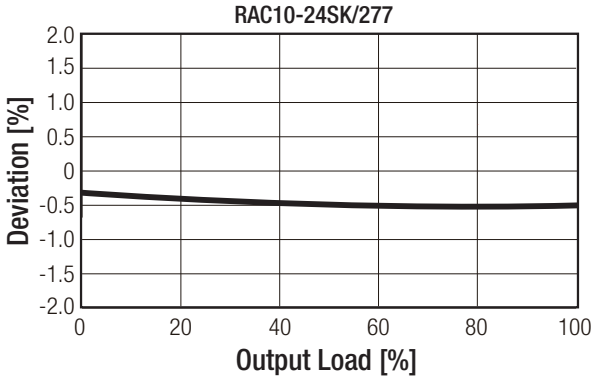
RAC10-05SK/277



RAC10-12SK/277



RAC10-24SK/277



PROTECTIONS

Parameter	Type	Value
Internal Input Fuse		T2A, slow blow
Short Circuit Protection (SCP)		Hiccup, automatic restart
Over Voltage Protection (OVP)		150% - 195%, Hiccup Mode
Over Load Protection (OLP)		150% - 195%, Hiccup Mode
Over Voltage Category (OVC)		OVC II
Isolation Voltage	tested for 1 minute	4KVAC
Isolation Resistance	I/P to O/P, Isolation Voltage 500VDC	1GΩ min.
Isolation Capacitance	I/P to O/P, 100kHz/0.1V	100pF max.
Insulation Grade		reinforced
Leakage Current		0.25mA max.

ENVIRONMENTAL

Parameter	Condition		Value
Operating Temperature Range	with derating (see graph)		-40°C to +80°C
Maximum Case Temperature			+100°C
Temperature Coefficient			±0.05%/°C
Operating Altitude			3000m
Operating Humidity	non-condensing		20% to 90% RH
Design Lifetime	115VAC/60Hz and full load at +25°C		>10 x 10^3 hours
MTBF	according to MIL-HDBK-217F, G.B.	+25°C +65°C	>450 x 10^3 hours >28 x 10^3 hours
Pollution Degree			PD2
Vibration			10-500Hz, 2G 10min./1cycle, period 60min. each along x,y,z axes

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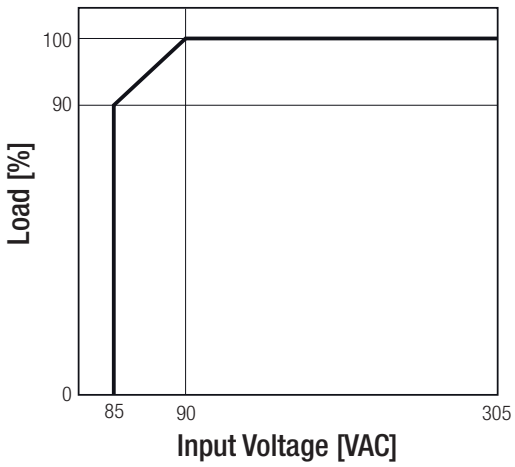
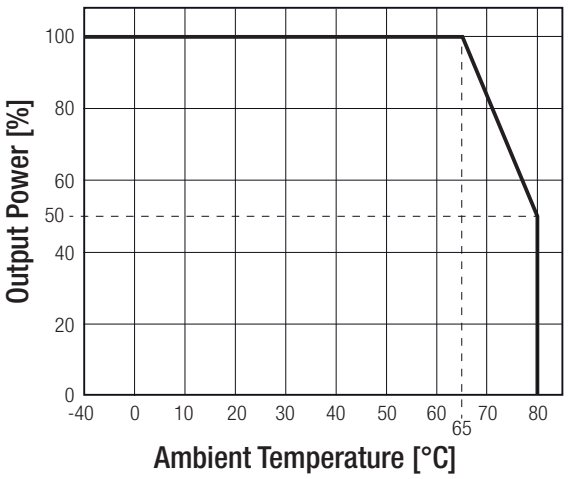
Specifications (measured @ ta= 25°C, nominal input voltage (115/230VAC), full load and after warm-up)

Line Derating [3]



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



Notes:

Note3: No derating required for the specified DC-input range

SAFETY AND CERTIFICATIONS

Certificate Type (Safety)	Report / File Number	Standard
Information Technology Equipment, General Requirements for Safety	pending	UL60950-1, 2nd Edition, 2014 CSA C22.2 No. 60950-1-07, 2nd Ed. 2014
Audio/Video, information and communication technology equipment - Safety requirements	pending	UL62368-1, 2nd Edition, 2014 CSA C22.2 Nr. 62368-1-14, 2nd Ed. 2014
Information Technology Equipment, General Requirements for Safety (CB)	pending	IEC60950-1:2005, 2nd Edition +A2:2013
Household and similar electrical appliances - Safety - Part 1: General requirements	pending	IEC60335-1,2010+A1,2013 EN60335-1,2012+A11,2014
Information Technology Equipment, General Requirements for Safety (LVD)	pending	IEC60950-1, 2nd Edition + AM2, 2013 EN60950-1, 2nd Edition, 2014
Audio/Video, information and communication technology equipment - Safety requirements (CB)	pending	IEC/EN62368-1, 2nd Edition, 2014
Risk-Analysis		ISO 14121-2
RoHS2	pending	RoHS 2011/65/EU + AM2015/863

EMC Compliance	Conditions	Standard / Criterion
Low-voltage power supplies DC output - Part 3: Electromagnetic compatibility		EN61204-3:2000
Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement	pending	AZS/NZS CSPR 22:2009 + A1:2010, Class B
ESD Electrostatic discharge immunity test	±8kV Air; ±4kV Contact	EN61000-4-2:2009, Criteria B
Radiated, radio-frequency, electromagnetic field immunity test	10V/m	EN61000-4-3:2006 + A2:2010, Criteria A
Fast Transient and Burst Immunity	AC In Port: ±2kV	EN61000-4-4:2012, Criteria B
Surge Immunity	AC In Port: ±1.0kV DC Out Port: ±2.0kV	EN61000-4-5:2014, Criteria B
Immunity to conducted disturbances, induced by radio-frequency fields	10Vrms	EN61000-4-6:2014, Criteria A
Power Magnetic Field Immunity	50Hz/ 1A/m	EN61000-4-8:2010, Criteria A
Voltage Dips	>90% >30%	EN61000-4-11:2004, Criteria B EN61000-4-11:2004, Criteria C
Voltage Interruptions	>95%	EN61000-4-11:2004, Criteria C
Voltage Fluctuations and Flicker in Public Low-Voltage Systems <=16A per phase		EN61000-3-3:2013

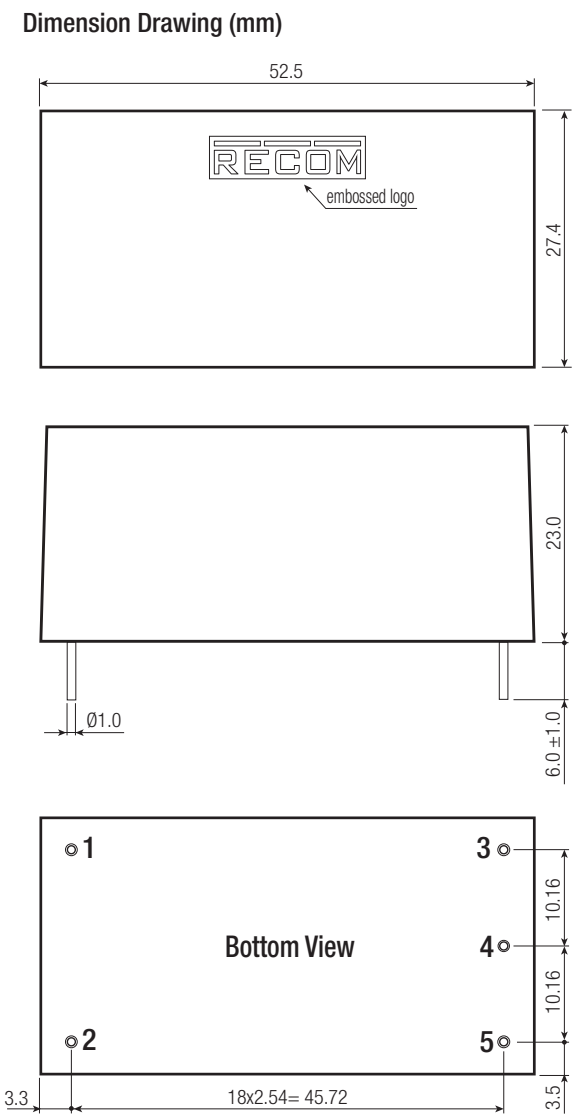
RAC10-K/277 Series

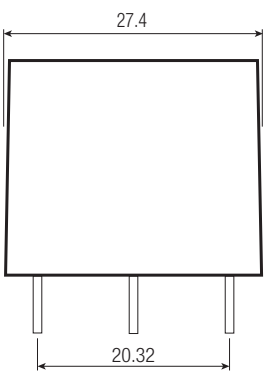
Specifications (measured @ ta= 25°C, nominal input voltage (115/230VAC), full load and after warm-up)

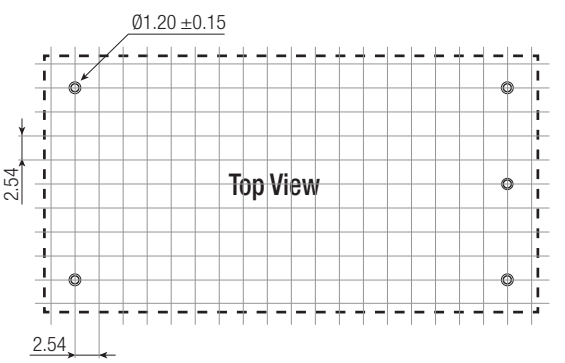
DIMENSION and PHYSICAL CHARACTERISTICS

Parameter	Type	Value
Material	Case Potting PCB Baseplate	black plastic (UL94V-0) silicone (UL94V-0) FR4 (UL94V-0) plastic (UL94V-0)
Package Dimension (LxWxH)		52.5 x 27.4 x 23.0mm
Package Weight		65g typ.

Dimension Drawing (mm)







Pin Connections

Pin #	Single	Dual
1	VAC in (N)	VAC in (N)
2	VAC in (L)	VAC in (L)
3	No Pin	-Vout
4	-Vout	COM
5	+Vout	+Vout

NC= no connection
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	non-condensing	-40°C to +85°C
Storage Humidtiy		20% to 90% RH