



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

**BASIC CHARACTERISTICS**

Parameter	Condition		Min.	Typ.	Max.
Internal Input Filter			Pi type		
Nominal Input Voltage <sup>(5,6)</sup>	50/60Hz	standard version "/277" version	100VAC		240VAC 277VAC
Operating Range	standard	47-63Hz DC	85VAC 120VDC		264VAC 370VDC
	"/277" version	47-63Hz DC	85VAC 120VDC		305VAC 430VDC
Input Current	115VAC 230VAC 277VAC				450mA 400mA 300mA
Inrush Current	cold start at +25°C	115VAC 230VAC 277VAC			20A 40A 50A
No Load Power Consumption	230VAC			40mW	
ErP Lot 6 Standby Mode Conformity (Output Load Capability)	Input Power = 0.5W 1.0W 2.0W				0.3W 0.7W 1.6W
Input Frequency Range	AC Input		47Hz		63Hz
Minimum Load <sup>(9)</sup>	single dual (required for regulation on both outputs)		0%	10%	
Power Factor	115VAC 230VAC 277VAC		0.6 0.5 0.45		
Start-up Time				150ms	
Rise Time				40ms	
Hold-up Time	115VAC 230VAC 277VAC			12ms 60ms 90ms	
Internal Operating Frequency					100kHz
Output Ripple and Noise <sup>(7)</sup>	20MHz BW	5Vout others		100mVp-p	1% of Vout

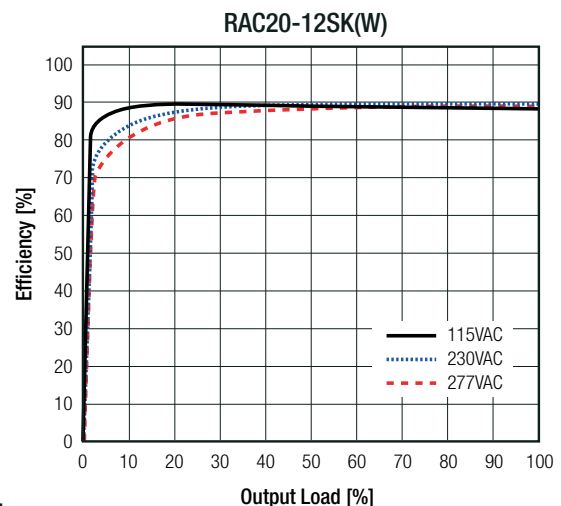
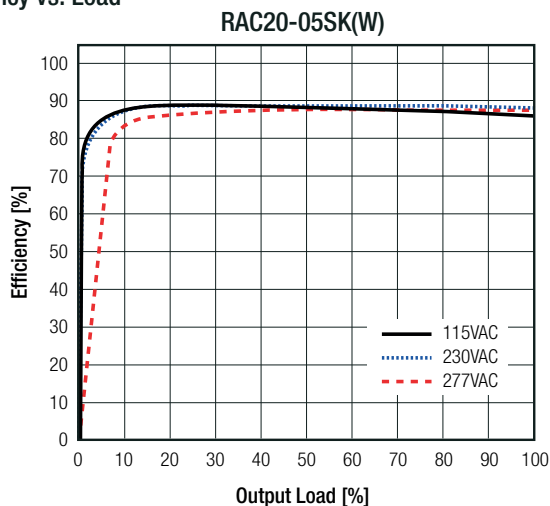
**Notes:**

Note5: The products were submitted for safety files at AC-Input operation

Note6: Refer to "Derating Graph"

Note7: Measurements are made with a 1.0µF MLCC across output (low ESR)

**Efficiency vs. Load**

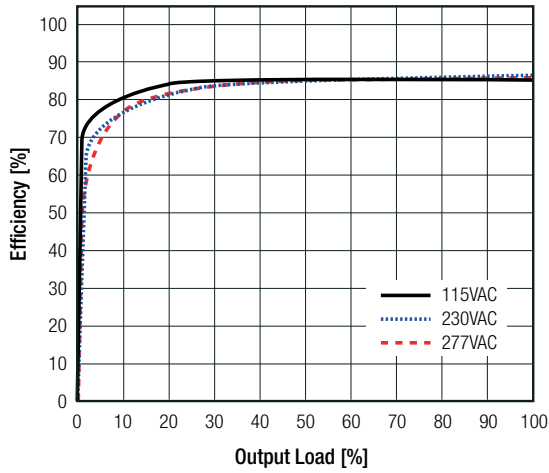


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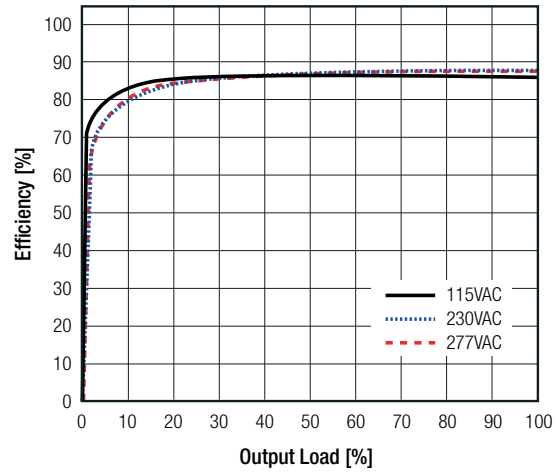
**Specifications** (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

Efficiency vs. Load

RAC20-15DK



RAC20-24SK(W)



**REGULATIONS**

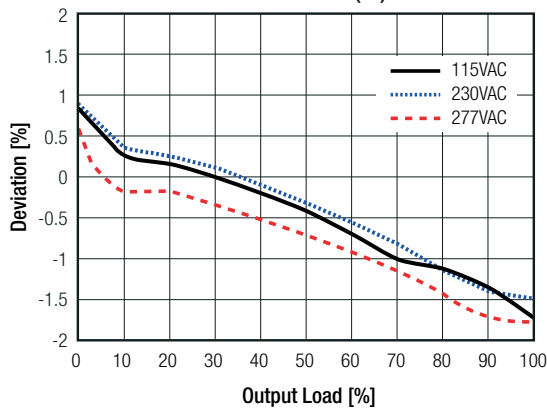
Parameter	Condition	Value
Output Accuracy		±2.0% typ.
Line Regulation	low line to high line	±0.5% typ.
Load Regulation <sup>(8)</sup>	10% to 100% load	2.0% typ.
Cross Regulation	dual output only	±10.0% typ.
Transient Response	25% load step change recovery time	4.0% max. 500µs typ.

**Notes:**

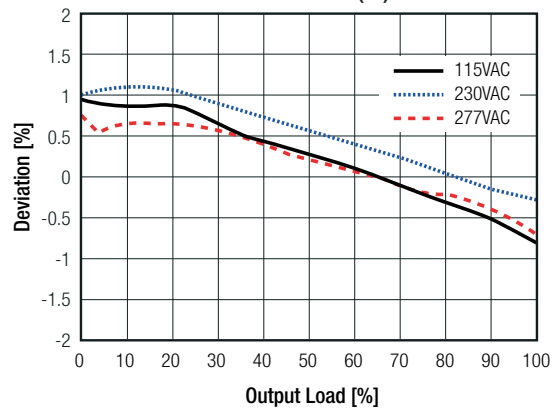
Note8: Operation below 10% load will not harm the converter, but specifications may not be met

Deviation vs. Load

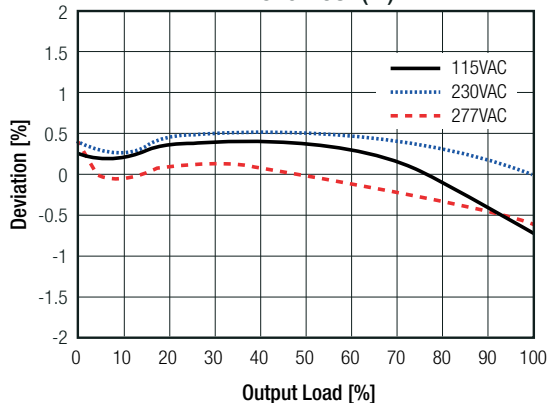
RAC20-05SK(W)



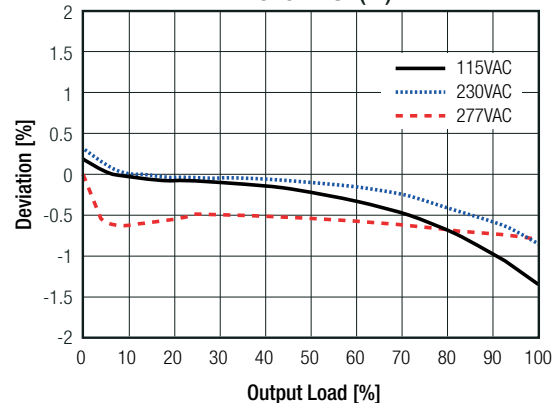
RAC20-12SK(W)



RAC20-15SK(W)



RAC20-24SK(W)



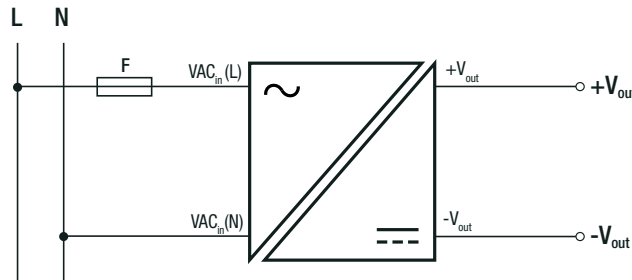
**Specifications** (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

PROTECTIONS		
Parameter	Type	Value
Input Fuse <sup>(9)</sup>	internal	standard version
		/277 versions
Short Circuit Protection (SCP)	below 100mΩ	hiccup, auto recovery
Over Voltage Protection (OVP)		150% - 195%, latch off mode
Over Current Protection (OCP)		110% - 130%, hiccup mode
Over Voltage Category <sup>(10)</sup>		OVCII
Class of Equipment		Class II
Isolation Voltage <sup>(11)</sup>	I/P to O/P	tested for 1 minute
Isolation Resistance		V <sub>iso</sub> = 500VDC
Isolation Capacitance		100pF max.
Insulation Grade		reinforced
Leakage Current		0.25mA max.

**Notes:**

- Note9: Refer to local safety regulations if input over-current protection is also required  
/277 Versions have no fuse integrated, it is recommended to use an external fuse recognized by UL or evaluated by TUV, refer to below schematic
- Note10: For OVC III requirements please contact RECOM tech support for advice
- Note11: For repeat Hi-Pot testing, reduce the time and/or the test voltage

**Protection Circuit for /277 Versions**



ENVIRONMENTAL		
Parameter	Condition	Value
Operating Temperature Range	@ natural convection 0.1m/s	full load
		refer to "Derating Graph"
Maximum Case Temperature		+95°C
Temperature Coefficient		0.05%/K
Operating Altitude <sup>(12)</sup>		5000m
Operating Humidity	non-condensing	20% - 90% RH max.
IP Rating		IP20
Pollution Degree		PD2
Vibration	according to MIL-STD-202G according to IEC 60068-2-27 according to IEC 60068-2-65 according to IEC 60068-2-64	10-500Hz, 2G 10min./1cycle, period 60min. along x,y,z axes 3 axis, 40 g half sine, 11 ms shock 5-500Hz, 20m/s <sup>2</sup> , 1 Oct/min, 15min 10-500Hz; RMS 23,4m/s <sup>2</sup> ; 15min

**Notes:**

- Note12: Recognized by safety agency for safe operation up to 5000m. High altitude operation may impact the performance and lifetime. Please contact RECOM tech support for advice

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

ENVIRONMENTAL			
Parameter	Condition		Value
Design Lifetime	+25°C		130 x 10 <sup>3</sup> hours
	+55°C		16 x 10 <sup>3</sup> hours
MTBF	according to MIL-HDBK-217F, G.B.	+25°C	>1196 x 10 <sup>3</sup> hours
		+40°C	>955 x 10 <sup>3</sup> hours

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

**Notes:**  
Note13: Output power derating for Line-input of less than 90VAC (de-rate linearly from 100% at 90VAC to 90% at 85VAC)

SAFETY AND CERTIFICATIONS		
Certificate Type (Safety)	Report / File Number	Standard
Audio/Video, information and communication technology equipment - Safety requirements	E224736	UL62368-1, 2nd Edition, 2014 CAN/CSA C22.2 Nr. 62368-1-14, 2nd Ed. 2014
Audio/Video, information and communication technology equipment - Safety requirements (CB Scheme)	E491408-A6008-CB-1	IEC62368-1:2014 2nd Edition
Audio/Video, information and communication technology equipment - Safety requirements (LVD)		EN62368-1:2014 + A11:2017
Household and similar electrical appliances – Safety – Part 1: General requirements (CB Scheme)	4392216.50 4397422.50	IEC60335-1:2010 5th Edition + AM1:2013
Household and similar electrical appliances – Safety – Part 1: General requirements	LCS180508046AS	IEC60335-1:2010 + AMD2:2016 + COR1:2016 EN60335-1:2012 + A11:2014 + A13:2017
Safety of power transformers, power supplies, reactors and similar products for supply voltages up to 1100 V (CB Scheme)	50198090 001	IEC61558-1:2005 2nd Edition + A1:2009
Safety of power transformers, power supplies, reactors and similar products for supply voltages up to 1100 V		EN61558-1:2005 + A1:2009
Safety of power transformers, power supplies, reactors and similar products for supply voltages up to 1100 V Part 2: Particular requirements (CB Scheme)	50198090 001	IEC61558-2-16:2009 1st Edition + A1:2013
Safety of power transformers, power supplies, reactors and similar products for supply voltages up to 1100 V Part 2: Particular requirements		EN61558-2-16:2009 + A1:2013

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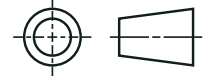
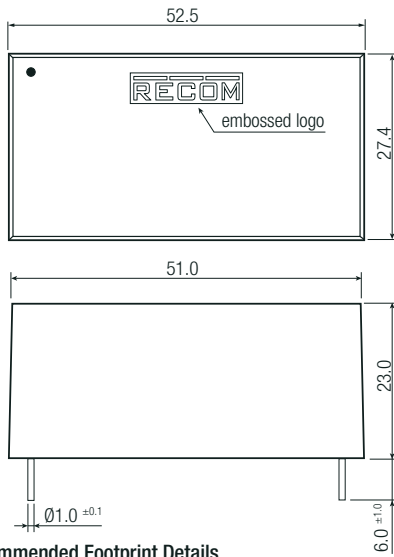
**Specifications** (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

Certificate Type (Safety)	Report / File Number	Standard
Safety requirements for power electronic converter systems and equipment - Part 1: General (CB Scheme)	CN21R4QC001	IEC62477-1:2012 + A1:2016, 1st Edition
Safety requirements for power electronic converter systems and equipment - Part 1: General (LVD)		EN62477-1:2012 + A11:2014 + A1:2017
EAC	RU-AT.03.67361	TP TC 004/2011
RoHS2		RoHS-2011/65/EU + AM-2015/863
EMC Compliance	Condition	Standard / Criterion
Low voltage power supplies, d.c. output Part 3: Electromagnetic compatibility (EMC)		IEC/EN61204-3:2018, Class B
Electromagnetic compatibility of multimedia equipment - Emission requirements	without external filter	EN55032:2015, Class B
Electromagnetic compatibility of household appliances, electric tools and similar apparatus - Emission Requirements		EN55014-1:2006 + A2:2011
Information technology equipment - Immunity characters - Limits and methods of measurement		EN55024:2010 + A1:2015
Electromagnetic compatibility of household appliances, electric tools and similar apparatus - Immunity Requirements		EN55014-2:2015
ESD Electrostatic discharge immunity test	Air ±8kV, Contact ±4kV	EN61000-4-2:2009, Criteria B
Radiated, radio-frequency, electromagnetic field immunity test	80MHz - 6GHz: 10V/m 1.4GHz - 2GHz: 3V/m 2.0GHz - 2.7GHz: 1V/m	EN61000-4-3:2006 + A1:2008, Criteria A
Fast Transient and Burst Immunity	AC Port: ±2.0kV DC Port: ±2.0kV	EN61000-4-4:2012, Criteria B
Surge Immunity	AC Port: L-N ±1.0kV DC Port: ±0.5kV	EN61000-4-5:2014 + A1:2017, Criteria B
Immunity to conducted disturbances, induced by radio-frequency fields	AC Port: 10V 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% Voltage 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
Limits of Voltage Fluctuations & Flicker		EN61000-3-3:2013
Limitations on the amount of electromagnetic interference allowed from digital and electronic devices		FCC 47 CFR Part 15 Subpart B, Class B
American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz		ANSI C63.4-2014, Class B
<p><b>Notes:</b></p> <p>Note14: If output is connected to GND, please contact RECOM tech support for advice</p>		

DIMENSION AND PHYSICAL CHARACTERISTICS		
Parameter	Type	Value
Material	case	black plastic, (UL94V-0)
	potting	silicone, (UL94V-0)
	PCB	FR4, (UL94V-0)
	baseplate	black plastic, (UL94V-0)
Dimension (LxWxH)		52.5 x 27.4 x 23.0mm
Weight	THT	60g typ.
	wired	65g typ.
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Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

**Dimension Drawing (mm)**

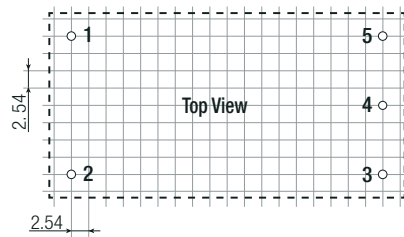
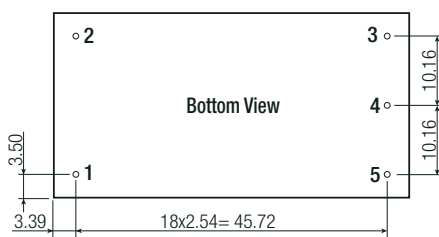


**Pinning information**

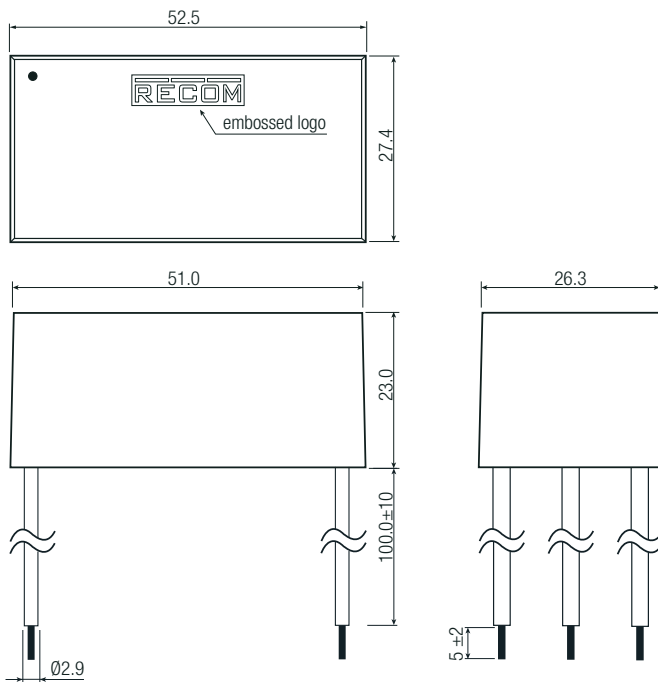
Pin #	Single	Dual
1	VAC in (N)	VAC in (N)
2	VAC in (L)	VAC in (L)
3	no pin	-Vout
4	-Vout	Com
5	+Vout	+Vout

Tolerance: xx.x= ±0.5mm  
xx.xx= ±0.25mm

**Recommended Footprint Details**



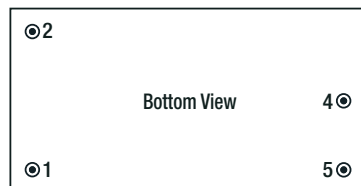
**Dimension Drawing Single Wired (mm)**



**Wired information**

#	Function	Wire color	Type	AWG
1	VAC in (N)	blue	UL-1015	18
2	VAC in (L)	brown	UL-1015	18
4	-Vout	black	UL-1015	18
5	+Vout	red	UL-1015	18

Tolerance: xx.x= ±0.5mm  
xx.xx= ±0.25mm



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

PACKAGING INFORMATION			
Parameter	Type		Value
Packaging Dimension (LxWxH)	pin wired	tube tray	490.0 x 56.0 x 40.0mm
			488.0 x 202.0 x 47.0mm
Packaging Quantity	tube		15pcs
	tray		20pcs
Storage Temperature Range			-40°C to +85°C
Storage Humidity	non-condensing		20% to 90% RH max.

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