

Features

Regulated Converter

- Wide input range 85-305VAC
- Standby mode optimized (eco design Lot 6)
- High efficiency over the entire load range
- Operating temperature range: -40°C to +90°C
- Class II installations (without FG)
- Overvoltage and overcurrent protected
- EMC compliant without external components

RECOM
AC/DC Converter

RAC3.5-K/277

**3.5 Watt
Single
Output**



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

Selection Guide

Part Number	Input Voltage Range [VAC]	Output Voltage [VDC]	Output Current [mA]	Efficiency typ ⁽¹⁾ [%]	Max. Capacitive Load ⁽²⁾ [μF]
RAC3.5-3.3SK/277	85-305	3.3	1060	77	10000
RAC3.5-05SK/277	85-305	5	700	80	8000
RAC3.5-12SK/277	85-305	12	291	83	1500
RAC3.5-15SK/277	85-305	15	233	83	1000
RAC3.5-24SK/277	85-305	24	146	84	330

Model Numbering



Ordering Examples:

RAC3.5-05SK/277 3.5 Watt 5Vout Single Output
RAC3.5-24SK/277 3.5 Watt 24Vout Single Output

UL62368-1 certified
EN62368-1 certified
IEC/EN60335-1 certified
EN62233 certified
IEC/EN61558-1 certified
IEC/EN61558-2-16 certified
EN55032 compliant
EN55014-1(-2) compliant
CB Report

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		
Input Voltage Range ^(3,4)	nom. Vin = 277VAC		85VAC 120VDC	277VAC	305VAC 430VDC
Input Current	115VAC 230VAC 277VAC			110mA 80mA 60mA	
Inrush Current	cold start at +25°C	115VAC 230VAC 277VAC			15A 30A 35A
No Load Power Consumption					100mW
ErP Lot 6 Standby Mode Conformity (Output Load Capability)	Input Power= 0.5W 1.0W				0.34W 0.70W
Input Frequency Range			47Hz		63Hz
Minimum Load			0%		
Power Factor	115VAC 230VAC 277VAC		0.50 0.40 0.35		
Start-up Time				20ms	
Rise Time				10ms	
Hold-up Time	115VAC 230VAC 277VAC			20ms 25ms 90ms	
Internal Operating Frequency	100% load at nominal Vin			130kHz	
Output Ripple and Noise ⁽⁵⁾	20MHz BW	3.3, 5Vout others		60mVp-p 1% of Vout	

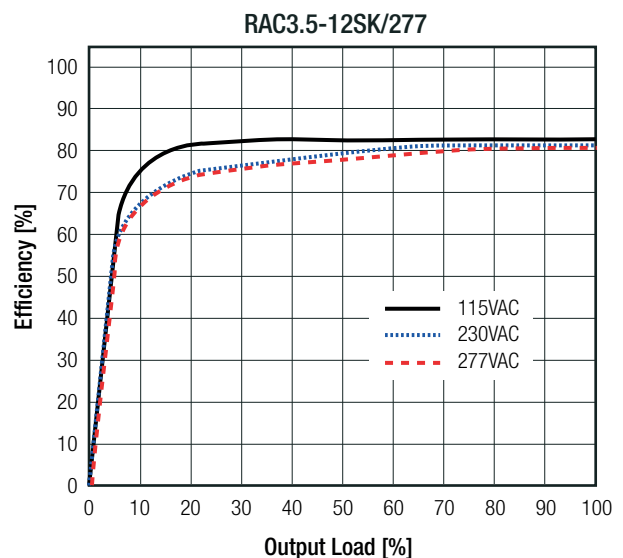
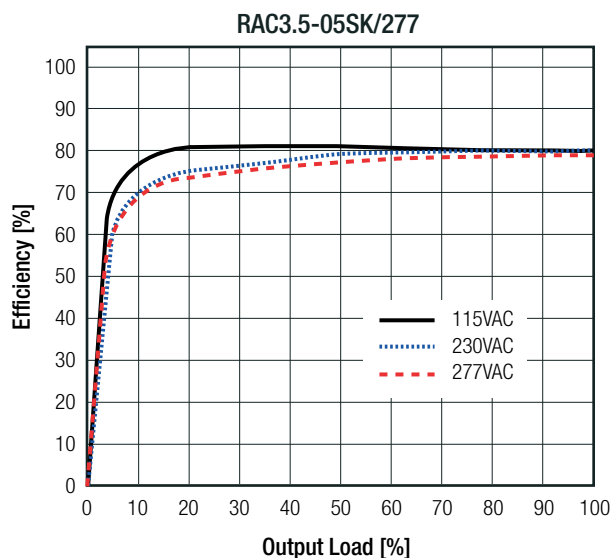
Notes:

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

Note4: Refer to „*Line Derating*“

Note5: Measurements are made with a 0.1µF MLCC & 10µF E-cap in parallel across output. (low ESR)

Efficiency vs. Load



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

REGULATIONS

Parameter	Condition	Value
Output Accuracy		±1.0% typ.
Line Regulation	low line to high line, full load	±0.5% typ.
Load Regulation ⁽⁶⁾	10% to 100% load	1.0% typ.
Transient Response	25% load step change	4.0% max.
	recovery time	500µs typ.

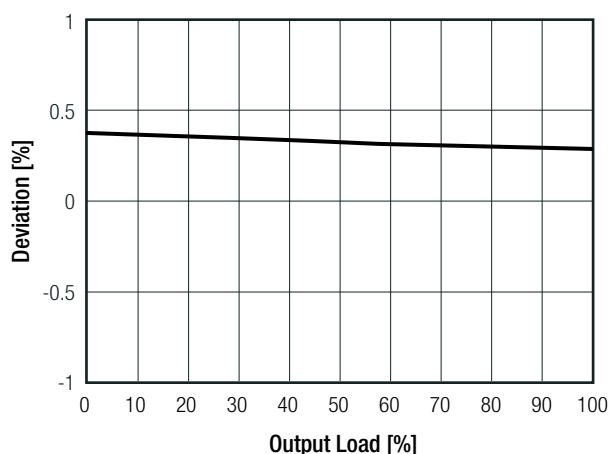
Notes:

Note6: Operation below 10% load will not harm the converter, but specifications may not be met

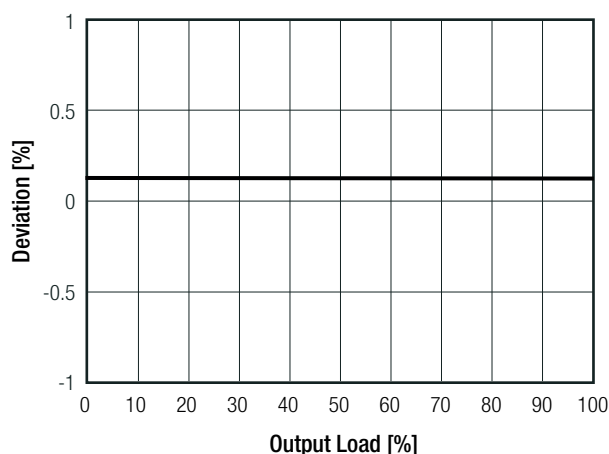
Deviation vs. Load

(at 115VAC, 230VAC, 277VAC)

RAC3.5-05SK/277



RAC3.5-12SK/277



PROTECTIONS

Parameter	Type		Value
Input Fuse ⁽⁷⁾	internal		T1A, slow blow
Short Circuit Protection (SCP)	below 100mΩ		hiccup, automatic restart
Over Voltage Protection (OVP)			125% - 195%, latch of mode
Over Voltage Category			OVCII
Over Current Protection (OCP)			175% - 275%, hiccup mode
Class of Equipment			Class II
Isolation Voltage ⁽⁸⁾	I/P to O/P	1 minute	4.2kVAC
Isolation Resistance		Viso= 500VDC	1GΩ min.
Isolation Capacitance			100pF max.
Insulation Grade			reinforced
Leakage Current			0.25mA max.

Notes:

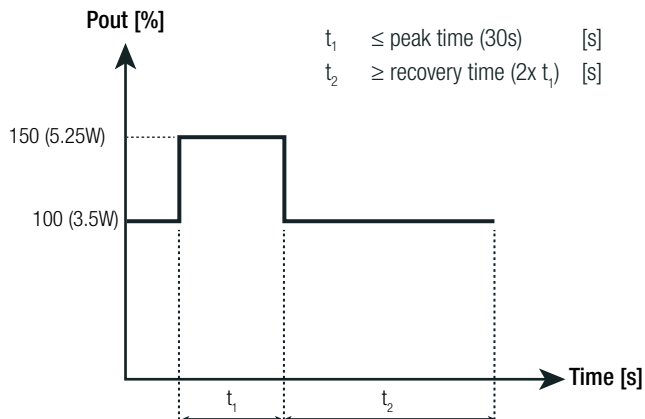
Note7: Refer to local safety regulations if input over-current protection is also required

Note8: For repeat Hi-Pot testing, reduce the time and/or the test voltage

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

Peak Load Capability



ENVIRONMENTAL

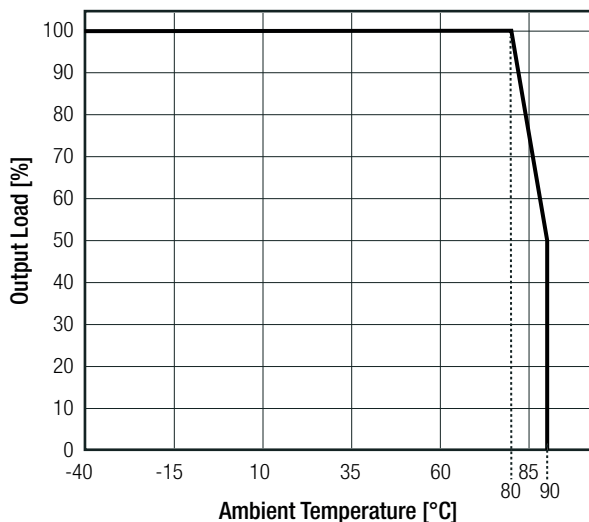
Parameter	Condition		Value
Operating Temperature Range	@ natural convection 0.1m/s	full load	-40°C to $+80^\circ\text{C}$
		refer to „Derating Graph“	-40°C to $+90^\circ\text{C}$
Maximum Case Temperature			$+95^\circ\text{C}$
Temperature Coefficient			0.05%/K
Operating Altitude ⁽⁹⁾			5000m
Operating Humidity	non-condensing		5% - 95% RH max.
Pollution Degree			PD2
Vibration	according to MIL-STD-202G		10-500Hz, 2G 10min./1cycle, period 60min. each along x,y,z axis
MTBF	according to MIL-HDBK-217F, G.B.	$+25^\circ\text{C}$	$>2252 \times 10^3$ hours
		$+40^\circ\text{C}$	$>1806 \times 10^3$ hours
Design Lifetime	230VAC	$+25^\circ\text{C}$	125×10^3 hours
		$+70^\circ\text{C}$	34×10^3 hours
	277VAC	$+25^\circ\text{C}$	105×10^3 hours
		$+70^\circ\text{C}$	27×10^3 hours

Notes:

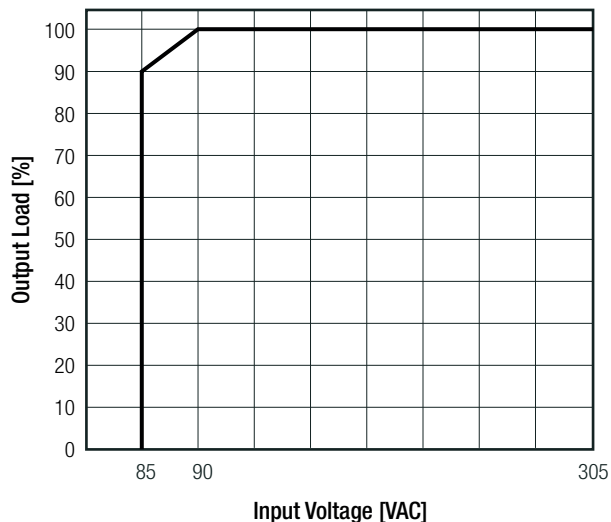
Note9: Recognized by UL for safe operation up to 5000m. High altitude operation may impact the performance and lifetime.
Contact RECOM tech support for advice

Derating Graph

(@ Chamber and natural convection 0.1m/s)



Line Derating



Specifications (measured @ Ta= 25°C, nom. Vin, 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 - Part 1: Safety requirements	E491408-A6004-UL	UL62368-1, 2nd Edition, 2014-12-01 CAN/CSA-C22.2 No. 62368-1-14, 2nd Edt., 2014-12
Audio/Video, information and communication technology equipment - Part 1: Safety requirements (CB Scheme)	E491408-A6007-CB-1	IEC62368-1:2014 2nd Edition
Audio/Video, information and communication technology equipment - Part 1: Safety requirements (LVD)		EN62368-1:2014 + A11:2017
Household and similar electrical appliances - Safety - Part 1: General requirements	LCS190308001CS	IEC60335-1:2010 + A2:2016 + C1:2016, 5th Edt. EN60335-1:2012 + A13:2017
Measurement methods for electromagnetic fields of household appliances and similar apparatus with regard to human exposure		EN62233:2008
Safety of power transformers, power supplies, reactors and similar products for supply voltages up to 1100 V (CB Scheme)	50230493 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 Part 2: Particular requirements (CB Scheme)		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		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		EN61558-2-16:2009 + A1:2013
EAC	RU-AT.03.67361	TP TC 004/2011
RoHS2		RoHS-2011/65/EU + AM-2015/863

EMC Compliance	Conditions	Standard / Criterion
Low-voltage power supplies DC output - Part 3: Electromagnetic compatibility		EN61204-3: 2018, Class B
Electromagnetic compatibility of multimedia equipment - Emission requirements ⁽¹¹⁾		EN55032:2015, Class B
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		EN55024:2010 + A1:2015
Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 2: Immunity		EN55014-2:2015
ESD Electrostatic discharge immunity test	Air: $\pm 2, 4, 8\text{kV}$ Contact: $\pm 2, 4\text{kV}$	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, Criteria A
Fast Transient and Burst Immunity	AC and DC Port: $\pm 2\text{kV}$	EN61000-4-4: 2012, Criteria B
Surge Immunity	AC In Port (L-N): $\pm 1\text{kV}$ DC Output Port: $\pm 0.5\text{kV}$	EN61000-4-5: 2014 + A1:2017, Criteria B
Immunity to conducted disturbances, induced by radio-frequency fields	AC and 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: 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 EN61000-4-11:2014 + A1:2017, Criteria B EN61000-4-11: 2014 + A1:2017, Criteria C
Voltage Fluctuations and Flicker in Public Low-Voltage Systems $\leq 16\text{A}$ per phase		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
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

Notes:

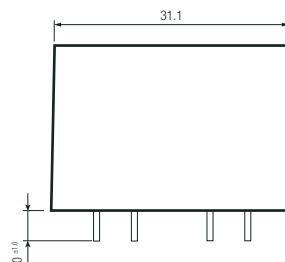
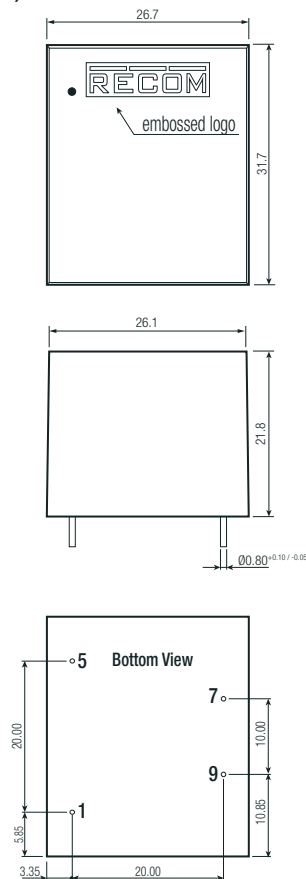
Note11: If output is connected to GND, please contact RECOM tech support for advice

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

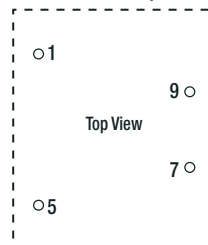
DIMENSION AND PHYSICAL CHARACTERISTICS

Parameter	Type	Value
Material	case, baseplate potting PCB	black plastic, (UL94V-0) silicone, (UL94V-0) FR4, (UL94V-0)
Dimension (LxWxH)		31.7 x 26.7 x 21.8mm
Weight		31.5g typ.

Dimension Drawing (mm)



Recommended Footprint Details



Pin Connections

Pin #	Single
1	VAC in (N)
5	VAC in (L)
7	+Vout
9	-Vout
Tolerance: xx.x= ±0.8mm	
xx.xx= ±0.25mm	

PACKAGING INFORMATION

Parameter	Type	Value
Packaging Dimension (LxWxH)	tube	466.0 x 30.4 x 29.3mm
Packaging Quantity	tube	12pcs
Storage Temperature Range		-40°C to +85°C
Storage Humidity	non-condensing	20% to 90% RH max.

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