## **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 +85°C
- Overvoltage and overcurrent protected
- EMC compliant without external components
- Encapsulated module with pins or wired

### **Description**

The RAC05-K/277 series are multipurpose 5 watt AC/DC power supplies for enhanced mains input conditions from 90VAC up to 305VAC with an extra wide operating temperature range from -40°C to +85°C. These modules are designed to supply worldwide applications in automation, Industry 4.0, IoT, household and smart buildings. For worldwide use they come with international safety certifications for industrial, domestic and ITE as well as household standards. With both PCB-mount and wired packages, fully protected outputs, and EMC class B emissions compliance without any external components, these are the easiest to use modular power solutions in the industry.

Selection Guide						
Part Number	Input Voltage Range [VAC]	Output Voltage [VDC]	Output Current [mA]	Efficiency typ <sup>(1)</sup> [%]	Max. Capacitive Load <sup>(2)</sup> [μF]	
RAC05-3.3SK/277	85-305	3.3	1510	77	10000	
RAC05-05SK/277	85-305	5	1000	80	8000	
RAC05-12SK/277	85-305	12	416	83	1500	
RAC05-15SK/277	85-305	15	330	83	1000	
RAC05-24SK/277	85-305	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 resisitive load

## **Model Numbering**



#### Notes:

Note3: Add suffix "W" for wired version without suffix, standard THT version

#### Ordering Examples:

ordering Examples.				
RAC05-05SK/277	5 Watt	5Vout	Single Output	THT version
RAC05-24SK/277	5 Watt	24Vout	Single Output	THT version
RAC05-05SK/277/W	5 Watt	5Vout	Single Output	Wired version
RAC05-12SK/277/W	5 Watt	12Vout	Single Output	Wired version



## **RAC05-K/277**

## 5 Watt Single Output

















UL62368-1 certified IEC/EN62368-1 pending IEC/EN60335-1 pending EN62233 pending CB Report



## **Series**

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

BASIC CHARACTERISTICS					
Parameter	Condi	Condition		Тур.	Max.
Internal Input Filter					Pi type
Input Voltage Range (4,5)	nom. Vin=	nom. Vin= 277VAC		277VAC	305VAC 430VDC
Input Current	115V. 230V. 277V.	AC			150mA 100mA 75mA
Inrush Current	cold start at +25°C	115VAC 230VAC 277VAC			15A 30A 35A
No Load Power Consumption					100mW
Input Frequency Range			47Hz		63Hz
ErP Lot 6 Standby Mode Confirmity (Output Load Capability)	Input Power=	0.5W 1.0W			0.34W 0.70W
Minimum Load			0%		
Power Factor	115V. 230V. 277V.	AC	0.60 0.45 0.40		
Start-up Time				20ms	
Rise Time				10ms	
Hold-up Time	230V	115VAC 230VAC 277VAC		20ms 60ms 80ms	
Internal Operating Frequency	100% load at	nominal Vin		130kHz	
Output Ripple and Noise (6)	20MHz BW	3.3, 5Vout others		60mVp-p 1% of Vout	

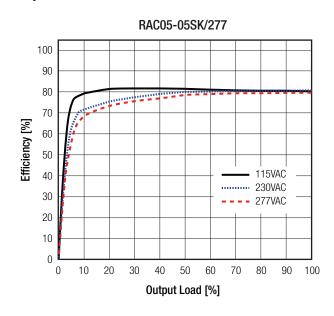
#### Notes:

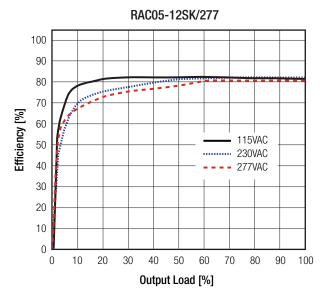
Note4: The products were submitted for safety files at AC-Input operation

Note5: Refer to line derating graph on page 4

Note6: Measurements are made with a 1.0µF MLCC across output (low ESR)

### Efficiency vs. Load







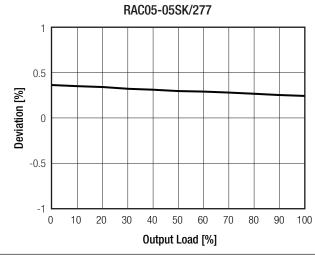
## **Series**

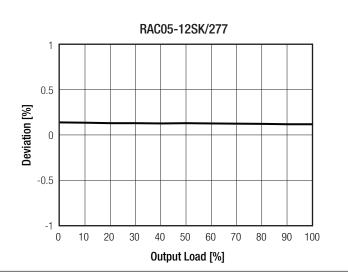
## **Specifications** (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

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

## Deviation vs. Load

(at 115VAC, 230VAC, 277VAC)





PROTECTIONS			
Parameter		Value	
Input Fuse (7)		internal	T1A, slow blow
Short Circuit Protection (SCP)	belo	ow 100mΩ	hiccup, automatic restart
Over Voltage Protection (OVP)			125% - 195%, hiccup mode
Over Voltage Category			OVCII
Over Current Protection (OCP)			125% - 195%, hiccup mode
legistion Voltage (8)	1/D +- 0 /D	tested for 1 minute	3kVAC
Isolation Voltage (8)	I/P to O/P	tested for 10 seconds	4kVAC
Isolation Resistance		Isolation Voltage 500VDC	$1G\Omega$ min.
Isolation Capacitance			100pF 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: For repeat Hi-Pot testing, reduce the time and/or the test voltage

ENVIRONMENTAL				
Parameter	Conditi	on	Value	
Operating Temperature Denge	@ natural convection 0.1 m/s	full load	-40°C to +70°C	
Operating Temperature Range	@ natural convection 0.1m/s	refer to derating graph	-40°C to +85°C	
Maximum Case Temperature			+95°C	
continued on next page				



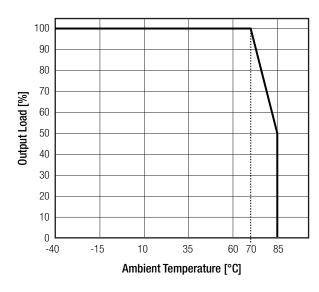
## Series

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

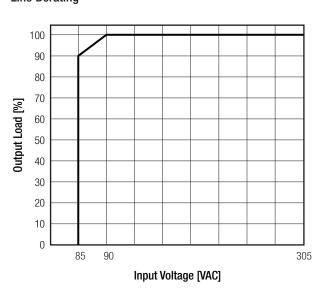
ENVIRONMENTAL			
Parameter	Condition		Value
Temperature Coefficient			0.05%/K
Operating Altitude			3000m
Operating Humidity	non-condensing		5% - 95% RH max.
Pollution Degree			PD2
Vibration	according to MIL-STD-20	2G	10-500Hz, 2G 10min./1cycle, period 60min. each along x,y,z axes
MTBF	according to MIL-HDBK-217F, G.B.	+25°C	>450 x 10 <sup>3</sup> hours
	230VAC	+25°C	105 x 10 <sup>3</sup> hours
Design Lifetime	230VAC	+70°C	23 x 10 <sup>3</sup> hours
	277VAC	+25°C	105 x 10 <sup>3</sup> hours
	ZITVAC	+70°C	18 x 10 <sup>3</sup> hours

#### **Derating Graph**

(@ Chamber and natural convection 0.1m/s)



## Line Derating



SAFETY AND CERTIFICATIONS		
Certificate Type (Safety)	Report / File Number	Standard
Audio/Video, information and communication technology equipment - Part1: Safety requirements	pending	IEC62368-1:2014 2nd Edition EN62368-1:2014 + A11:2017
Audio/Video, information and communication technology equipment - Part1: Safety requirements	pending	UL62368-1, 2nd Edition, 2014-12-01 CAN/CSA-C22.2 No. 62368-1-14, 2nd Edition, 2014-12
Household and similar electrical appliances – Safety – Part 1: General requirements	pending	IEC60335-1:2010 + C1:2016 5th Edition EN60335-1:2012 + A11:2014
Measurement methods for electromagnetic fields of household appliances and similar apparatus with regard to human exposure	pending	EN62233:2008
RoHs 2		RoHS-2011/65/EU + AM-2015/863



## **Series**

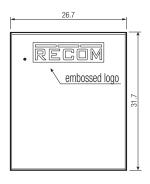
## **Specifications** (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

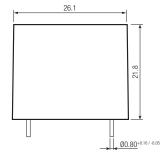
DIMENSION AND PHYSICAL CHARACTERISTICS			
Parameter	Туре	Value	
	case	plastic, (UL94V-0)	
Material	potting	silicone, (UL94V-0)	
Material	PCB	FR4, (UL94V-0)	
	baseplate	plastic, (UL94V-0)	
Dimension (LxWxH)	THT/wired	31.7 x 26.7 x 21.8mm	
Weight	THT	31.5g typ.	
	wired	37.0g typ.	

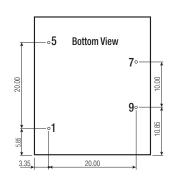
### **Dimension Drawing Single (mm)**

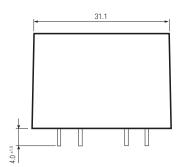




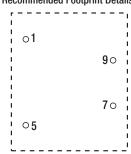








**Recommended Footprint Details** 



### **Pin Connections**

Pin #	Single			
1	VAC in (N)			
5	VAC in (L)			
7	+Vout			
9	-Vout			
Tolerance:	xx.x= ±0.5mm			

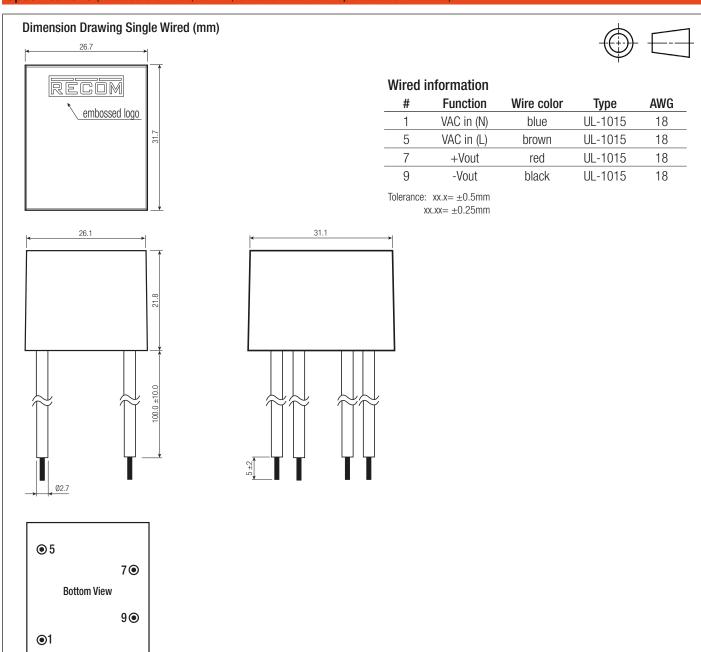
 $xx.xx = \pm 0.25$ mm

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## **Series**

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



PACKAGING INFORMATION				
Parameter	Type Value			
Dealersing Dimension (LyM/yll)	THT	tube	466.0 x 29.3 x 30.4mm	
Packaging Dimension (LxWxH)	wired	tray	478.0 x 46.0 x 198.0mm	
Declaring Quantity	T	HT	12pcs	
Packaging Quantity	W	ired	20pcs	
Storage Temperature Range			-40°C to +85°C	
Storage Humidity	non-co	ndensing	20% to 90% 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.