

Features

Regulated Converter

- Ultra-wide input range 85-528VAC
- OVC III input rating without additional fuses
- Operating temperature range: -40°C to +80°C
- Overvoltage and overcurrent protected
- EMC compliant without external components
- No load power consumption <0.5W



RAC05-K/480

**5 Watt
Single
Output**



IEC/EN62368-1 certified
CB Report

Description

The RAC05-K/480 series of 5 watt AC/DC units are specially designed for harsh industrial and outdoor mains conditions. These PCB-mount power supplies are rated to OVC III conditions from 100-480VAC nominal input lines with phase-to-phase or single phase operation without any external components needed. The modules support an operating temperature range from -40°C to +80°C and come with fully protected outputs as well as EMC class A and B compliance. All these features make them an ideal fit for integration into smart grid, renewable energy, smart metering and IoT applications.

Selection Guide

Part Number	Input Voltage Range [VAC]	Output Voltage [VDC]	Output Current [mA]	Efficiency typ ⁽¹⁾ [%]	Max. Capacitive Load ⁽²⁾ [µF]
RAC05-05SK/480	85-528	5	1000	63	10000
RAC05-12SK/480	85-528	12	420	65	1200

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

Model Numbering



Ordering Examples:

RAC05-05SK/480	5Vout	Single Output
RAC05-12SK/480	12Vout	Single Output

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

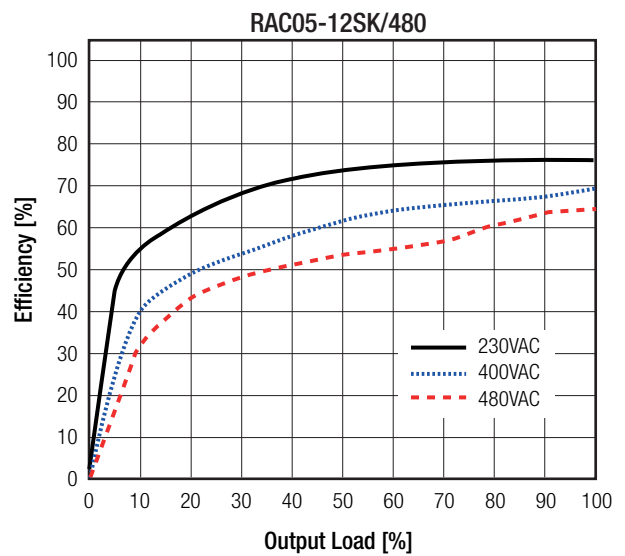
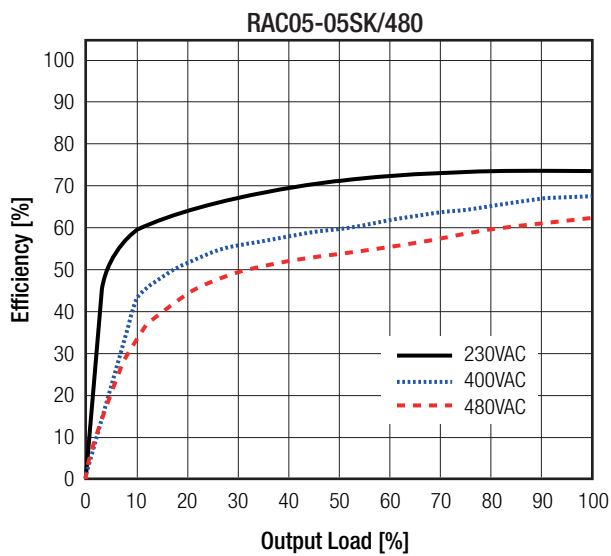
BASIC CHARACTERISTICS

Parameter	Condition		Min.	Typ.	Max.
Internal Input Filter			Pi type		
Input Voltage Range ^(3,4)	nom. Vin= 480VAC		85VAC 120VDC	480VAC	528VAC 745VDC
Input Current	400VAC 480VAC				40mA 35mA
Inrush Current	cold start at +25°C	400VAC 480VAC		18A 20A	
No load Power Consumption					500mW
Input Frequency Range	AC Input		47Hz		63Hz
Minimum Load			0%		
Power Factor	400VAC/480VAC		0.45		
Start-up Time				25ms	
Rise Time					20ms
Hold-up Time	400VAC 480VAC			150ms 200ms	
Internal Operating Frequency				130kHz	
Output Ripple and Noise ⁽⁵⁾	20MHz BW	400VAC 480VAC		50mVp-p	

Notes:

- Note3: The products were submitted for safety files at AC-Input operation
- Note4: Refer to line derating graph on page 4
- Note5: Measurements are made with a 1.0µF MLCC across output (low ESR)

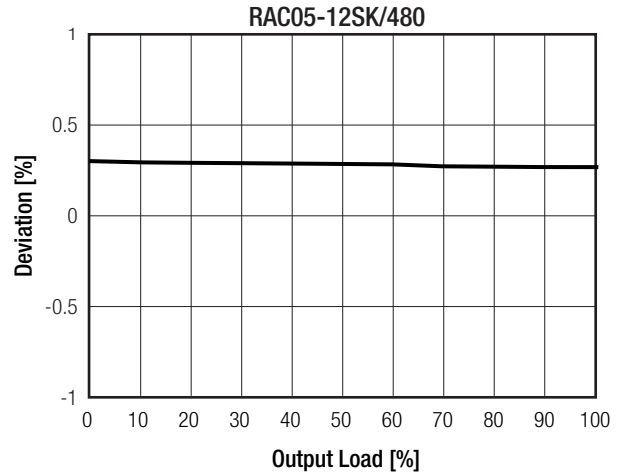
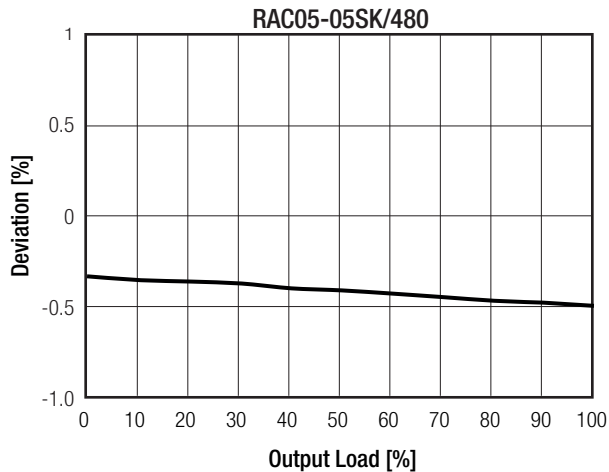
Efficiency vs. Load



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

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

Deviation at 400/480VAC



PROTECTIONS		
Parameter	Type	Value
Input Fuse ⁽⁶⁾	internal	fusible resistor 5Ω
Short Circuit Protection (SCP)	below 100mΩ	hiccup, automatic restart
Over Voltage Protection (OVP)		150% - 195%, hiccup mode
Over Voltage Category		OVCIII
Over Current Protection (OCP)		150% - 195%, hiccup mode
Isolation Voltage ⁽⁷⁾	tested for 1 minute	I/P to O/P I/P to case and O/P to case 4kVAC
Isolation Resistance		1GΩ min.
Isolation Capacitance		100pF max.
Insulation Grade		reinforced
Leakage Current		25µA max.

Notes:

- Note6: Refer to local wiring regulations if input over-current protection is also required
- Note7: For repeat Hi-Pot testing, reduce the time and/or the test voltage

ENVIRONMENTAL			
Parameter	Condition	Value	
Operating Temperature Range	@ natural convection 0.1m/s	full load	-40°C to +60°C
		refer to derating graph	-40°C to +80°C
Maximum Case Temperature		+100 °C	
Temperature Coefficient		0.05%/K	
Thermal Impedance	0.1m/s, horizontal (vertical)	16K/W	
Operating Altitude		3000m	
Operating Humidity	non-condensing	5% - 95% RH max.	

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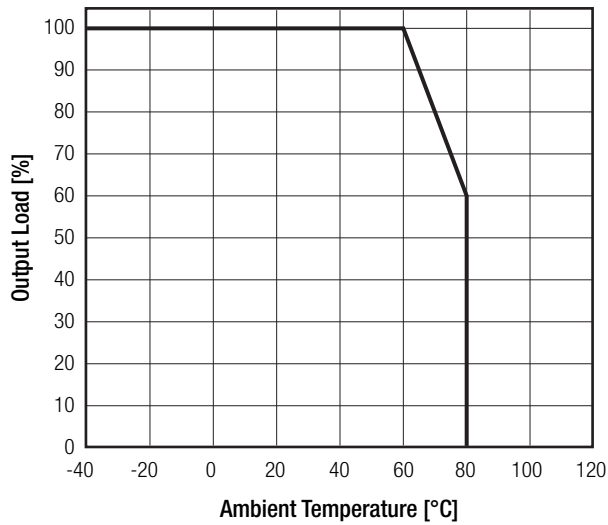
Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

ENVIRONMENTAL

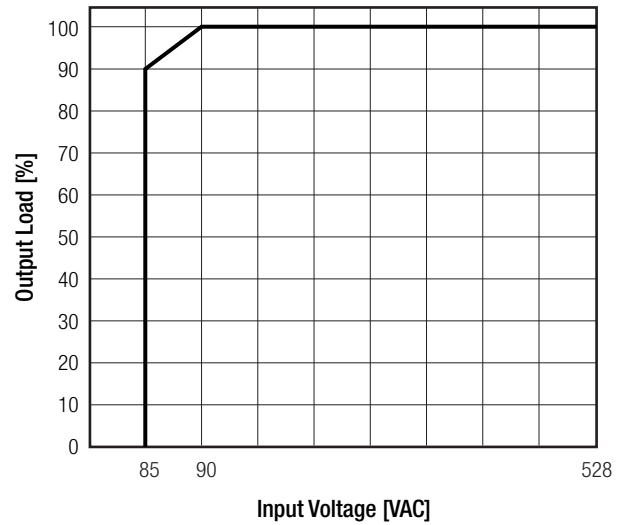
Parameter	Condition		Value
Pollution Degree			PD2
Vibration	according to MIL-STD-202G		10-500Hz, 2G 10min./1cycle, period 60min. each along x,y,z axes
Design Lifetime	+25°C		105 x 10 ³ hours
	+60°C		40 x 10 ³ hours
MTBF	according to MIL-HDBK-217F, G.B.	+25°C	>450 x 10 ³ hours
		+60°C	>37.5 x 10 ³ hours

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. Safety requirements	pending	EN62368-1:2014 + A11:2017
RoHs 2		RoHS-2011/65/EU + AM-2015/863

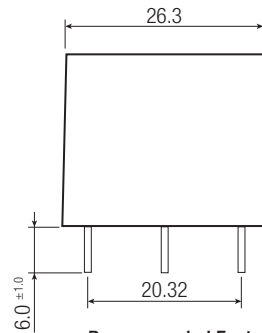
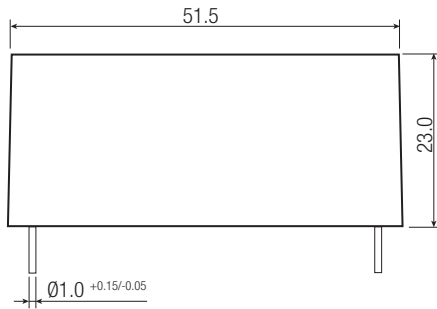
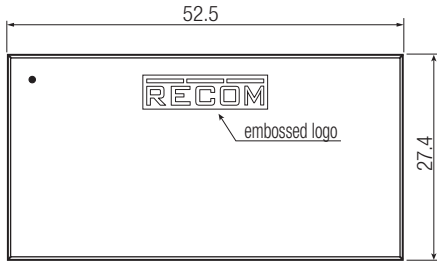
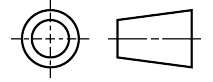
DIMENSION AND PHYSICAL CHARACTERISTICS

Parameter	Type	Value
Material	case	black plastic, (UL94V-0)
	potting	silicone, (UL94V-0)
	PCB	FR4, (UL94V-0)
	baseplate	plastic, (UL94V-0)
Dimension (LxWxH)		52.5 x 27.4 x 23.0mm
Weight		58g typ.

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

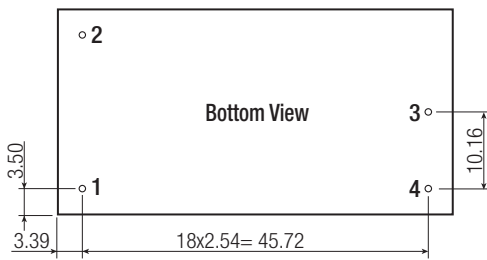
Dimension Drawing (mm)



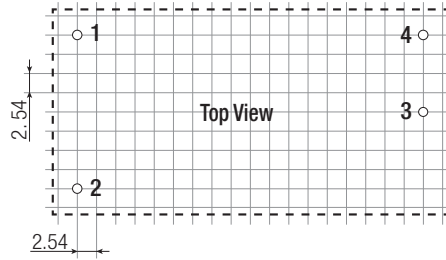
Pin Connections

Pin #	Single
1	VAC in (N) (L2)
2	VAC in (L) (L1)
3	+Vout
4	-Vout

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

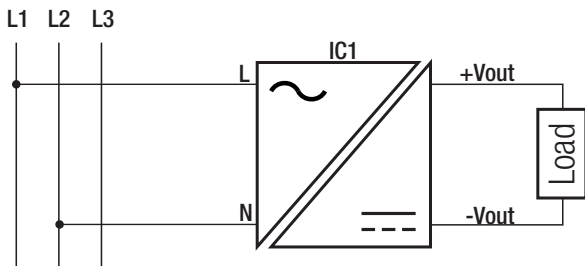


Recommended Footprint Details

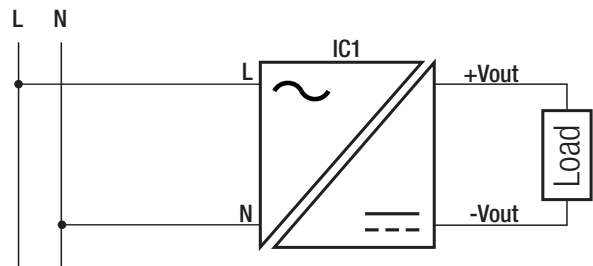


INSTALLATION AND APPLICATION

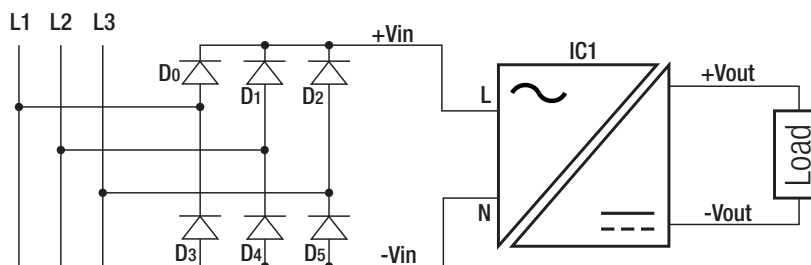
Phase to Phase Application



Standard L to N Application



Phase Redundancy B6U Application



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

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

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