

Features

Regulated Converters

- Long 5 Year Warranty
- 2MOPP/250VAC
- Suitable for built in Class II Applications
- Wide Input Voltage Range (85-264VAC)
- Low Leakage Current (<75µA)
- 5000m Operation
- -40°C to +85°C Operating Temperature

RECOM
AC/DC Converter

RACM40

**40 Watt
Enclosed &
Open Frame
Case Style
Single Output**



Description

The RACM40 is a compact 3" x 2" high efficiency AC/DC power supply with 2xMOPP safety approval for medical applications. These space saving enclosed power supplies have an universal input voltage range (85-264VAC), 4kVAC isolation, require no minimum load and can be used at ambient temperatures of between -40°C and +85°C. The 5V, 12V, 15V, 24V or 48V output voltages are fully protected and have tolerances of less than $\pm 0.2\%$ over the entire input voltage range and less than $\pm 0.5\%$ over the entire load range. The output voltage can be trimmed over a $\pm 10\%$ range. The RACM40 series is certified to medical safety standard IEC/ES/EN-60601-1 3rd Edition and feature BF rated outputs with less than 75µA leakage current. It has a built-in Class B EMI filter and comes with a 5 year warranty.

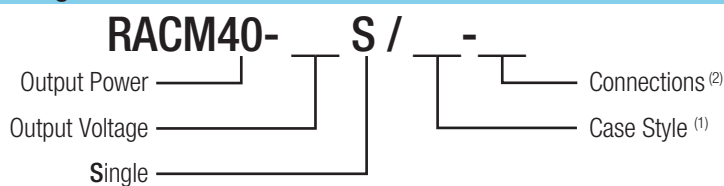
Selection Guide

Part Number	Input Voltage Range (VAC)	Output Voltage (VDC)	Output Current (A)	Efficiency typ. (%)
RACM40-05S ^(1,2)	85-264	5	8.0	90
RACM40-12S ^(1,2)	85-264	12	3.34	92
RACM40-15S ^(1,2)	85-264	15	2.67	92
RACM40-24S ^(1,2)	85-264	24	1.67	92
RACM40-48S ^(1,2)	85-264	48	0.84	93



2MOPP
250VAC

Model Numbering



Notes:

- Note1: Case Style: without suffix, standard enclosed case
add suffix "/OF" for open frame style
- Note2: Connections: without suffix, standard connection with connector
with suffix "-ST" connection with screw terminals

Examples:

- RACM40-12S = 12Vout, standard enclosed case
RACM40-48S/OF = 24Vout, open frame style
RACM40-15S/OF-ST = 15Vout, open frame style with screw terminal connection



IEC/EN-60601 Certified
ANSI/AAMI ES-60601 Certified
EN-55011
EN-55022

Specifications (measured at $T_A = 25^\circ\text{C}$, 250VAC, full load and after warm-up)

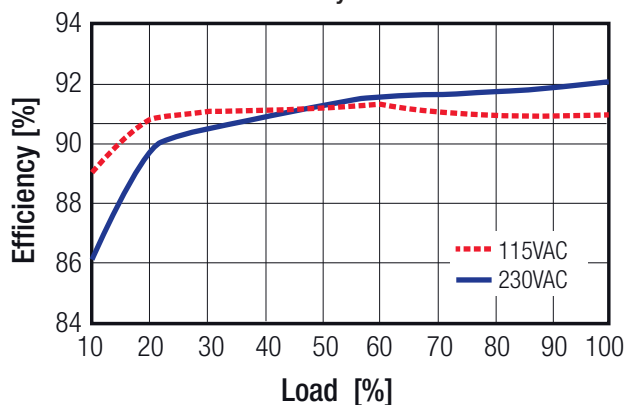
BASIC CHARACTERISTICS				
Parameter	Condition	Min.	Typ.	Max.
Input Voltage		85VAC 100VDC ⁽³⁾	230VAC	264VAC 370VDC
Input Current	115VAC, full load 230VAC, full load			1.0A 0.5A
Inrush Current	230VAC			60A
Input Power @ No Load				0.11W
Input Frequency Range	AC Input		50/60Hz	440Hz ⁽³⁾
Start-up Time				1 Second
Rise Time			20ms	
Hold up Time	115VAC, full load		25ms	
Minimum Load				0%
Operating Frequency Range	5VDC, 230VAC others, 230VAC		70kHz 120kHz	
Output Ripple and Noise (measured @ 20MHz BW)	5VDC, 12VDC and 15VDC with 10 μ F/25V MLCC 24VDC, with 1 μ F/50V MLCC 48VDC, with 0.1 μ F/100V MLCC		75mVp-p 75mVp-p 150mVp-p	

Notes:

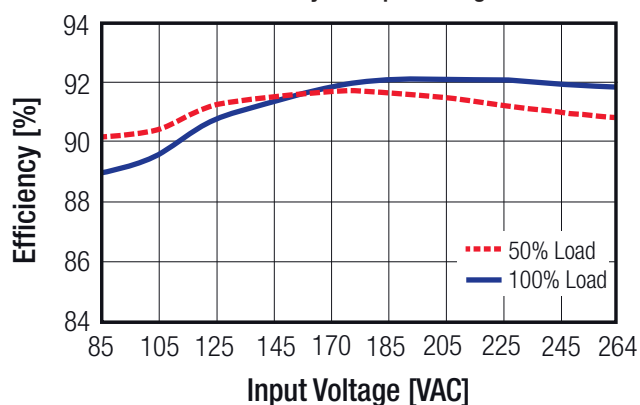
Note3: Confirmed performance, but not covered in certificates. 100VDC input voltage with derating.

RACM40-24

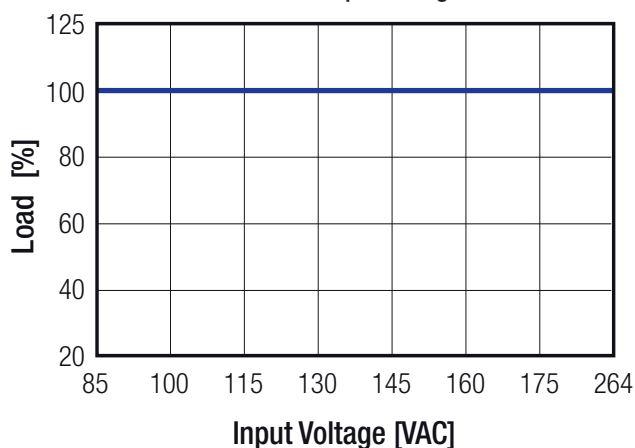
Efficiency vs. Load



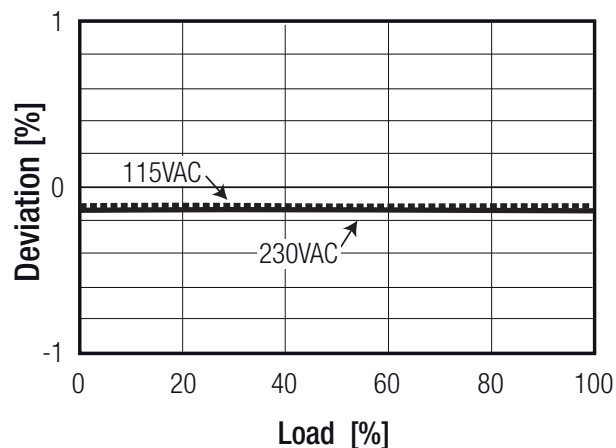
Efficiency vs. Input Voltage



Load vs. Input Voltage



Vout Deviation vs. Load



Specifications (measured at $T_a = 25^\circ\text{C}$, 250VAC, full load and after warm-up)

REGULATIONS

Parameter	Condition	Value
Set Voltage Accuracy	230VAC, full load	$\pm 1\%$
Line Voltage Regulation	low line to high line, full load	$\pm 0.2\%$
Load Voltage Regulation	0% to 100% load 5VDC	$\pm 0.7\%$
	others	$\pm 0.5\%$
	10% to 90% load 5VDC	$\pm 0.6\%$
	others	$\pm 0.4\%$
Output Voltage Trim	on-board trimpot.	$\pm 10\%$
Transient Peak Deviation	load step from 50% - 75% change at $2.5\text{A}/\mu\text{s}$	3% V_{out} max.
Transient Recovery Time	load step from 50% - 75% change at $2.5\text{A}/\mu\text{s}$	$500\mu\text{s}$ typ.

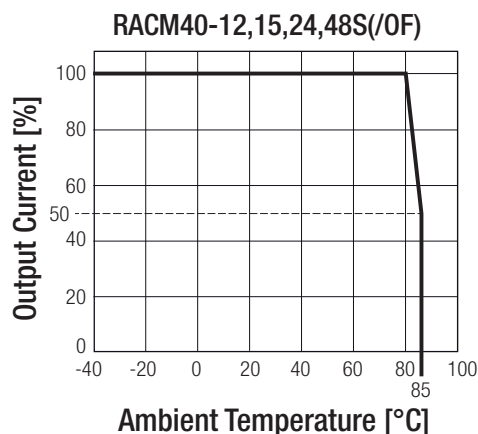
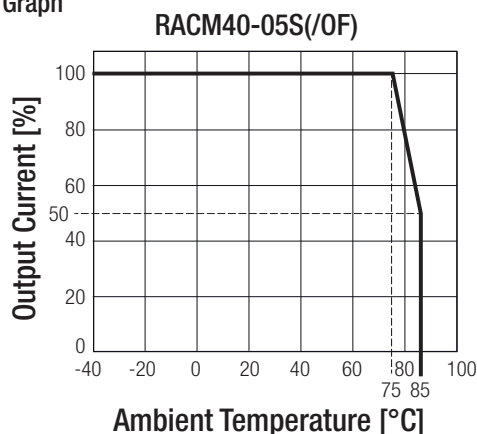
PROTECTIONS

Parameter	Condition	Value
Input Fuse	internal line neutral	T3.15A / 250VAC, slow blow type T3.15A / 250VAC, slow blow type
Short Circuit Protection (SCP)		continuous, auto-recovery
Over Load Protection (OLP)	% of lout rated (Hiccup)	145% typ.
Over Voltage Protection (OVP)	% of V_{out} nominal (Latch off)	125% min / 140% max.
Isolation Voltage (2MOPP insulation)	I/P to O/P	4kVAC / 1 minunte
	I/P to Chassis, O/P to Chassis	2.5kVAC / 1 minute
	working voltage	250VAC / continuous
Means of Protection		2MOPP
Leakage Current	264VAC	$75\mu\text{A}$ max.
Medical Device Classification		Type BF applied device
Internal Clearance Creepage	I/P to O/P	8mm min.
	I/P to O/P	8mm min.
Isolation Resistance	500VDC	$100\text{M}\Omega$ min.
Insulation Grade		Reinforced Insulation

ENVIRONMENTAL

Parameter	Condition	Value
Operating Humidity	non-condensing	5% to 95% RH
Temperature Coefficient		$\pm 0.02\%$ / $^\circ\text{C}$
Operating Temperature Range	115/230VAC, with derating	-40°C to $+85^\circ\text{C}$
Operating Altitude		5000m max.
MTBF	according to MIL-HDBK-217F, full load, $+25^\circ\text{C}$	3010×10^3 hours

Derating Graph



Specifications (measured at T_a= 25°C, 250VAC, full load and after warm-up)

SAFETY AND CERTIFICATIONS

Certificate Type	Report / File Number	Standard
IEC/EN Medical Safety (CB Scheme)	151101302	IEC60601-1, 3rd Edition, 2012
ANSI/AAMI Medical Safety		EN60601-1, 3rd Edition, 2014
Risk Management	151101301_2037	ES60601-1, 2012
		ISO 14971:2007
		EN ISO 14971:2012

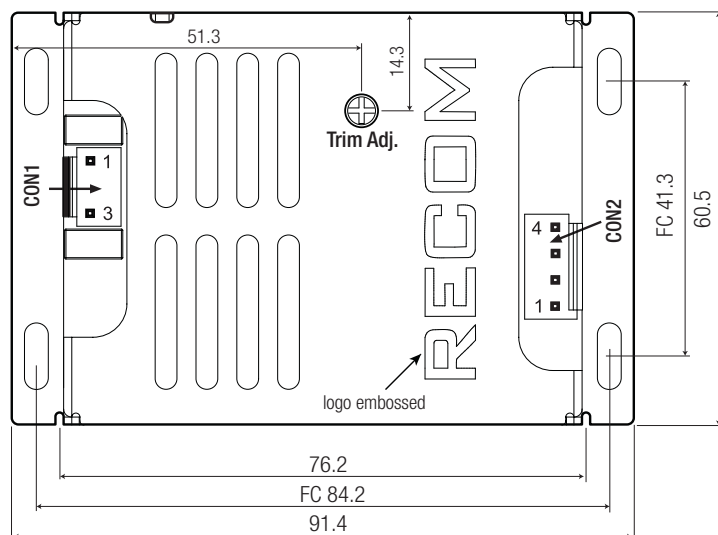
EMC Compliance	Condition	Standard / Criterion
EMI Standard		EN55011 + EN55022 + FCC18, Class B
ESD	Air ±8kV; Contact ±6kV 20V/m ±2kV L-N ±1kV and L-GND/N-GND ±2kV 20Vr.m.s 10A/m full load	EN61000-4-2, Criteria A
Radiated Immunity		EN61000-4-3, Criteria A
Fast Transient		EN61000-4-4, Criteria A
Surge		EN61000-4-5, Criteria A
Conducted Immunity		EN61000-4-6, Criteria A
Power Frequency Magnetic Field		EN61000-4-8, Criteria A
Harmonic Current		EN61000-3-2, Class A
Voltage Flicker		EN61000-3-3
Shock		IEC60068-2-27
Vibration		IEC60068-2-6
Dip and Interruptions, 230VAC 50Hz	30% 500ms 60% 100ms >95% 10ms >95% 5000ms	EN60601-1-2, Criteria A EN60601-1-2, Criteria A EN60601-1-2, Criteria A EN60601-1-2, Criteria B

DIMENSION and PHYSICAL CHARACTERISTICS

Parameter	Type	Value
Package Dimension (LxWxH)	enclosed case	91.4 x 60.5 x 33.3mm
	open frame	76.2 x 50.8 x 26.5mm
Package Weight	enclosed case	169g
	open frame + "-ST" Version	154g
Case Material	enclosed case	Aluminum

Dimension Drawing Enclosed Case (mm)

Top View



AC Input Connector (CON1)

Pin#	Terminal	Mating Housing
1 AC/N	Molex KK156 (SD-2478)	Molex KK156 (09508031)
3 AC/L		

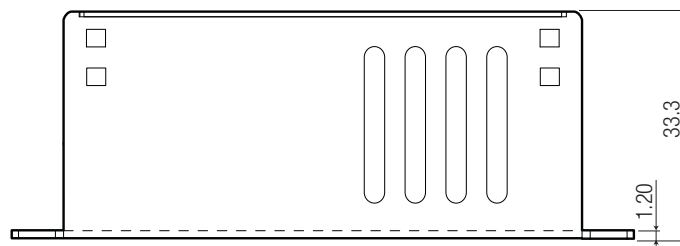
DC Output Connector (CON2)

Pin#	Terminal	Mating Housing
1,2 V- 3,4 V+	Molex KK156 (SD-2478)	Molex KK156 (09508041)

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Specifications (measured at $T_a = 25^\circ\text{C}$, 250VAC, full load and after warm-up)

Side View

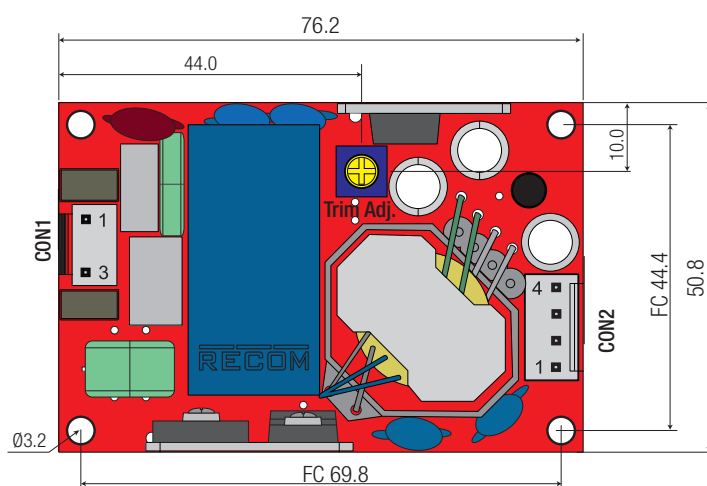


Bottom View



Dimension Drawing Open Frame (/OF) (mm)

Top View



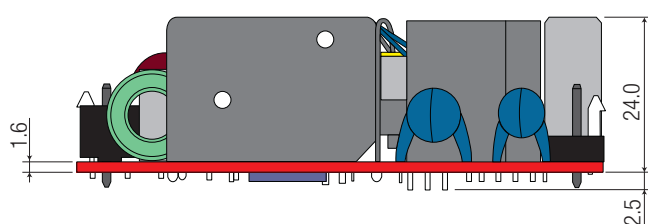
AC Input Connector (CON1)

Pin#	Terminal	Mating Housing
1 AC/N	Molex KK156	Molex KK156
3 AC/L	(SD-2478)	(09508031)

DC Output Connector (CON2)

Pin#	Terminal	Mating Housing
1,2 V-	Molex KK156	Molex KK156
3,4 V+	(SD-2478)	(09508041)

Side View

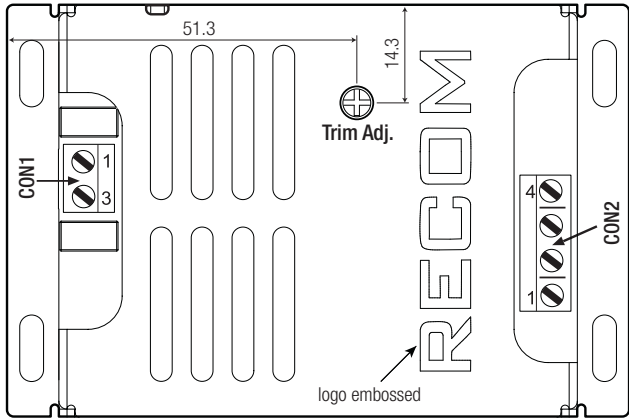


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Specifications (measured at T_a= 25°C, 250VAC, full load and after warm-up)

Screw Terminal Connection “-ST”

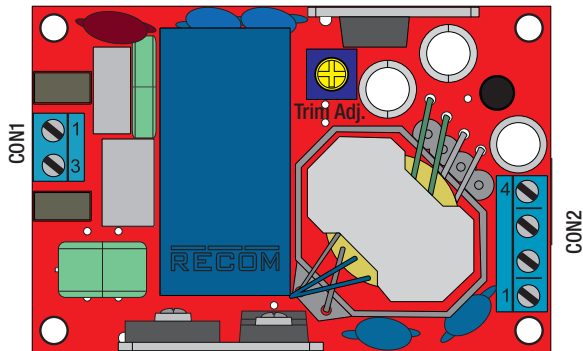
Enclosed Version



AC Input Connector (CON1)	
Pin#	Screw Terminal
1 AC/N	ETB30
3 AC/L	(EK381V)

DC Output Connector (CON2)	
Pin#	Screw Terminal
1,2 V-	ETB30
3,4 V+	(EK381V)

Open Frame Version



PACKAGING INFORMATION			
Parameter	Type		Value
Packaging Dimension (LxWxH)	cardboard box	enclosed case	111.0 x 94.0 x 51.0mm
		open frame	120.0 x 80.0 x 85.0mm
Packaging Quantity			1pcs
Storage Temperature Range			-40°C to +85°C