

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



RACM65

65 Watt
Enclosed & Open Frame Case Style
Single Output

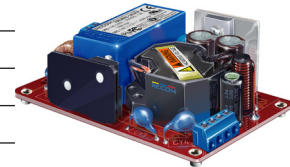


Description

The RACM65 is a compact 3.6"x2.38" 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 ±0.2% over the entire input voltage range and less than ±0.5% over the entire load range. The output voltage can be trimmed over a ±10% range. The RACM65 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.

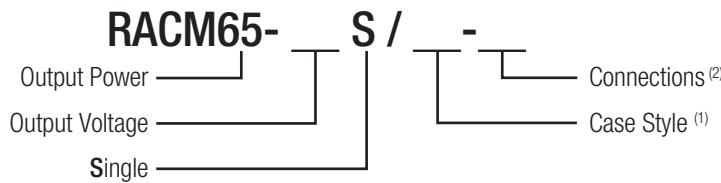
Selection Guide

Part Number	Input Voltage Range (VAC)	Output Voltage (VDC)	Output Current (A)	Efficiency typ. (%)
RACM65-05S ^(1,2)	85-264	5	10	90
RACM65-12S ^(1,2)	85-264	12	5.42	92.5
RACM65-15S ^(1,2)	85-264	15	4.34	93.5
RACM65-24S ^(1,2)	85-264	24	2.71	93.5
RACM65-48S ^(1,2)	85-264	48	1.36	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:

- RACM65-12S = 12Vout, standard enclosed case
 RACM65-48S/OF = 24Vout, open frame style
 RACD65-15S/OF-ST = 15Vout, open frame style with screw terminal connection



EN-55011 (Pending)
 EN-55022 (Pending)
 IEC/EN-60601 Certified
 ANSI/AAMI ES-60601 Certified

Refer to Applications Notes

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

BASIC CHARACTERISTICS

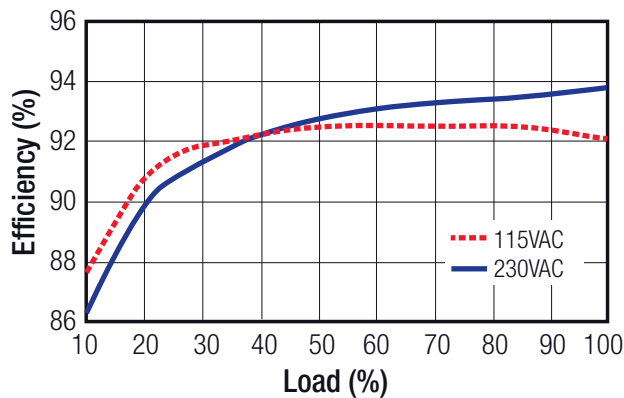
Parameter	Condition	Min.	Typ.	Max.
Input Voltage		85VAC 100VDC ⁽³⁾	230VAC	264VAC 370VDC
Input Current	115VAC, full load 230VAC, full load			1.6A 0.9A
Inrush Current	cold start, 230VAC			60A
Input Power @ No Load				0.11W
Input Frequency Range	AC Input		50/60Hz	440Hz ⁽³⁾
Start-up Time				1 Second
Rise Time			20ms	
Hold up Time	115VAC, full load		16ms	
Minimum Load				0%
Operating Frequency Range	5VDC, 230VAC others, 230VAC		60kHz 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:

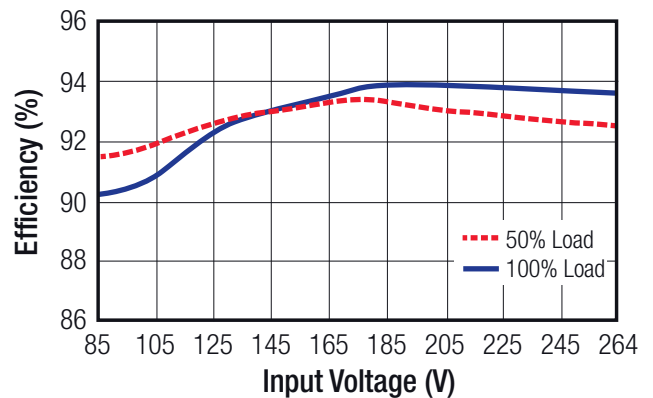
Note3: Confirmed performance, but not covered in certificates. 100V input voltage with derating.

RACM65-24

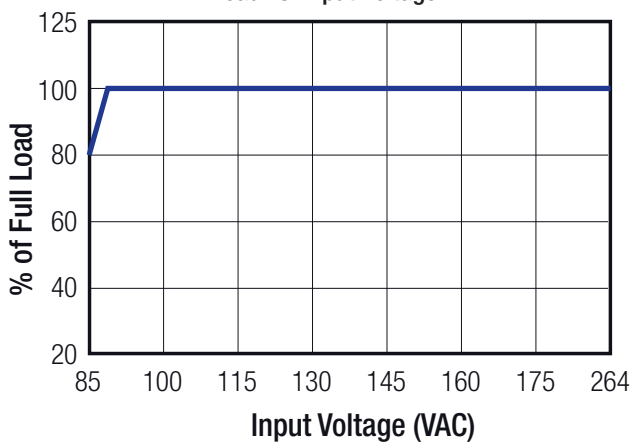
Efficiency vs. Load



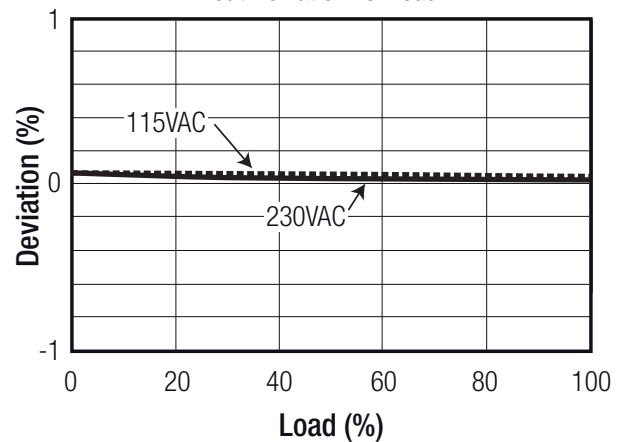
Efficiency vs. Input Voltage



Load vs. Input Voltage



Vout Deviation vs. Load



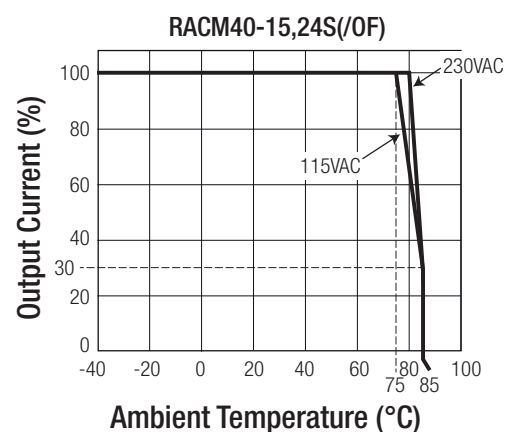
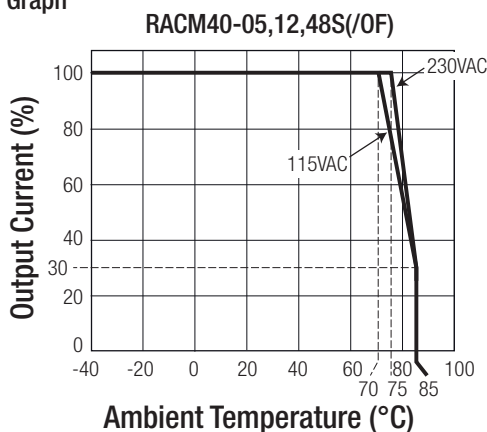
Specifications (measured at $T_a=25^\circ\text{C}$, 250VAC, full load and after warm-up)

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 $2.5\mu\text{s}$	3% V_{out} max.
Transient Recovery Time	load step from 50% - 75% change at $2.5\mu\text{s}$	600 μs typ.

PROTECTIONS		
Parameter	Condition	Value
Input Fuse	internal line and neutral	2x T3.15A / 250VAC, slow blow type
Short Circuit Protection (SCP)		continuous, auto-recovery
Over Load Protection (OLP)	% of Iout 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 minute
	I/P to Chassis, O/P to Chassis	2.5kVAC / 1 minute
	working voltage	250VAC / continuous
Means of Protection		2MOPP
Leakage Current	264VAC	75 μA 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	100M Ω 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	with derating	-40°C to $+85^\circ\text{C}$
Operating Altitude		5000m max.
MTBF	according to MIL-HDBK-217F, full load, $+25^\circ\text{C}$	1494×10^3 hours

Derating Graph



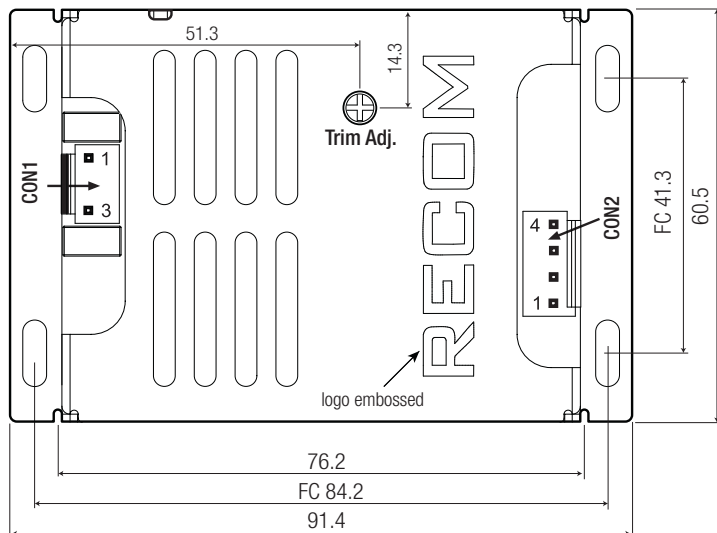
Specifications (measured at $T_a=25^{\circ}\text{C}$, 250VAC, full load and after warm-up)

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		
EMC Compliance	Condition	Standard / Criterion
EMI Standard		EN55011 + EN55022 + FCC18, Class B
ESD	Air $\pm 8\text{kV}$; Contact $\pm 6\text{kV}$	EN61000-4-2, Criteria A
Radiated Immunity	20V/m	EN61000-4-3, Criteria A
Fast Transient	$\pm 2\text{kV}$	EN61000-4-4, Criteria A
Surge	DM $\pm 1\text{kV}$ and CM $\pm 2\text{kV}$	EN61000-4-5, Criteria A
Conducted Immunity	20Vr.m.s	EN61000-4-6, Criteria A
Power Frequency Magnetic Field	10A/m	EN61000-4-8, Criteria A
Harmonic Current	full load	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 A

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	172g
	Open Frame + "-ST" Version	137g
Case Material	enclosed case	Aluminum

Dimension Drawing Enclosed Case (mm)

Top View



AC Input Connector CON1

- Pin1 Line
- Pin3 Neutral

Pin Connector: Molex KK156

DC Output Connector CON2

- Pin1,2 -Vout
- Pin3,4 +Vout

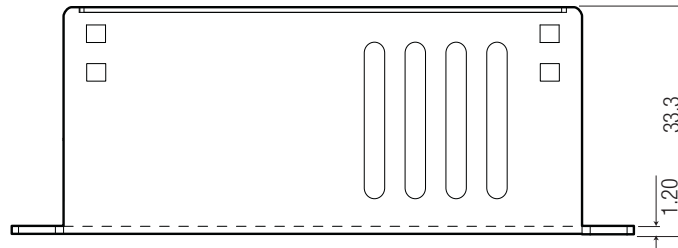
Pin Connector: Molex KK156

Tolerance: $\pm 0.5\text{mm}$
FC: fixing center

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

Side View

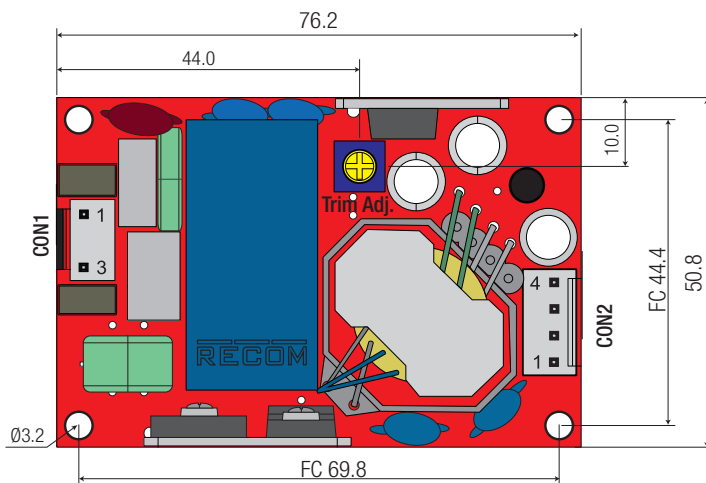


Bottom View



Dimension Drawing Open Frame (/OF) (mm)

Top View



AC Input Connector CON1

Pin1 Line

Pin3 Neutral

Pin Connector: Molex KK156

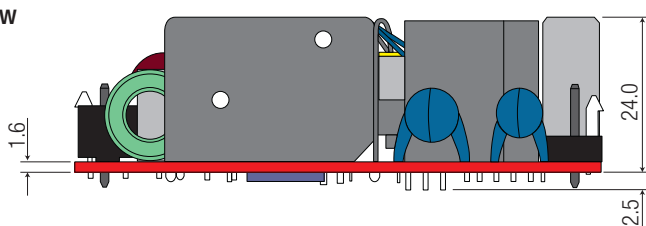
DC Output Connector CON2

Pin1,2 -Vout

Pin3,4 +Vout

Pin Connector: Molex KK156

Side View



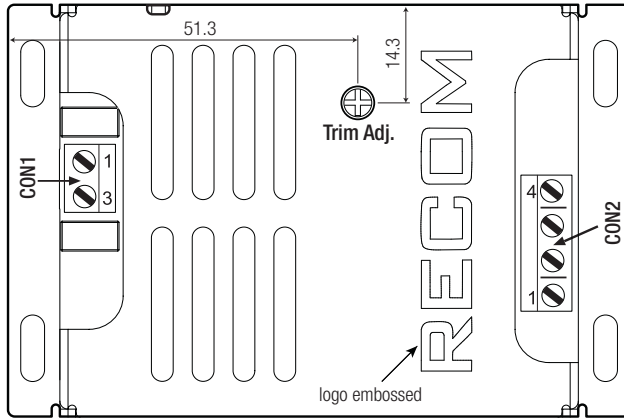
Tolerance: $\pm 0.5\text{mm}$
FC: fixing center

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

Screw Terminal Connection "-ST"

Enclosed Version



AC Input Connector CON1

Pin1 Line

Pin3 Neutral

Screw Terminal: ETB30

DC Output Connector CON2

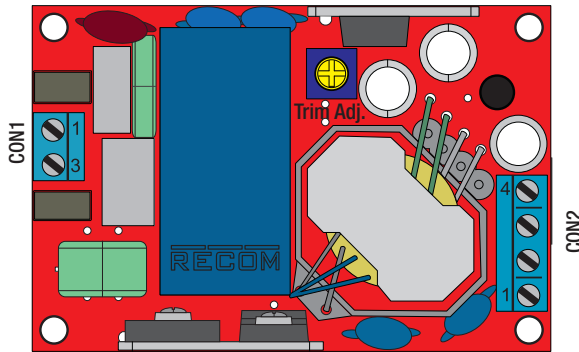
Pin1,2 -Vout

Pin3,4 +Vout

Screw Terminal: ETB30

Tolerance: $\pm 0.5\text{mm}$
FC: fixing center

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