

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

RACM65

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

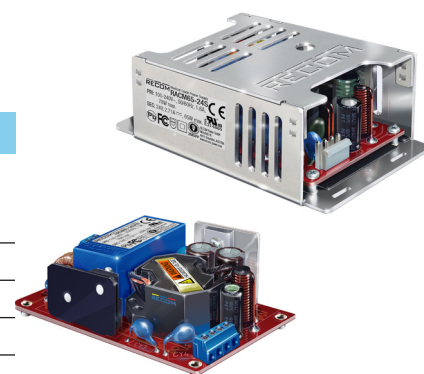


Description

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.

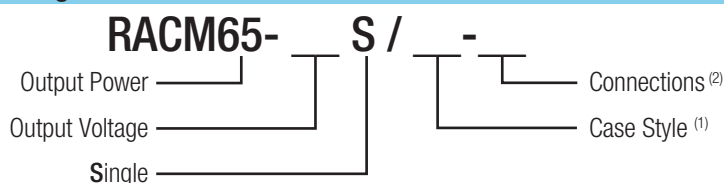
Selection Guide

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 = 48Vout, open frame style
RACM65-15S/OF-ST = 15Vout, open frame style with screw terminal connection



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

Refer to Applications Notes

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

BASIC CHARACTERISTICS

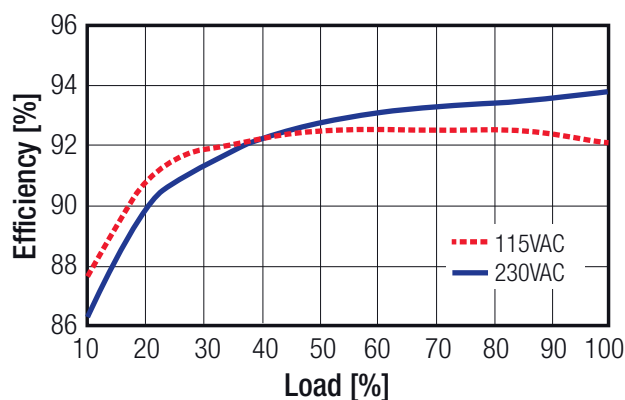
Parameter	Condition	Min.	Typ.	Max.
Input Voltage		85VAC 100VDC ⁽³⁾	230VAC	264VAC 370VDC
Input Current	115VAC, full load 230VAC, full load			1.6A 0.9A
Inrush Current	cold start, 230VAC			60A
Input Power @ No Load				0.11W
Input Frequency Range	AC Input		50/60Hz	440Hz ⁽³⁾
Start-up Time				1 Second
Rise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

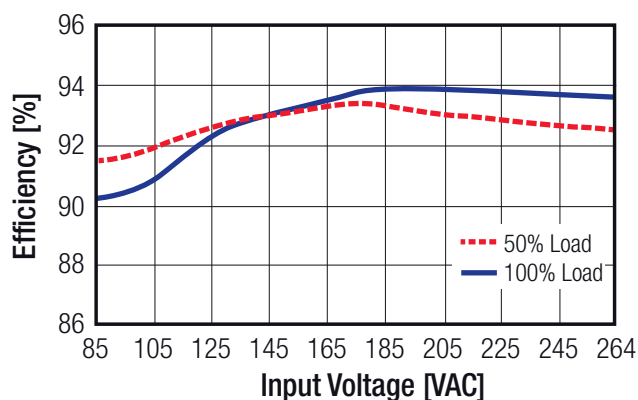
Note3: Confirmed performance, but not covered in certificates. 100V input voltage with derating.

RACM65-24

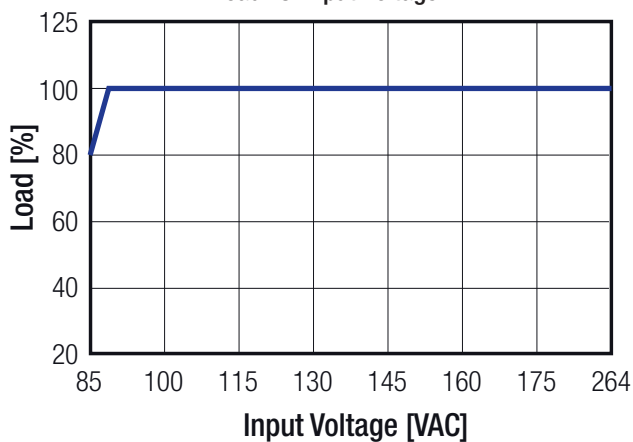
Efficiency vs. Load



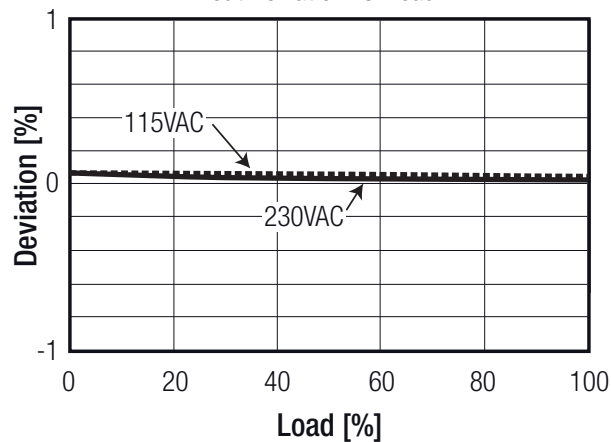
Efficiency vs. Input Voltage



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

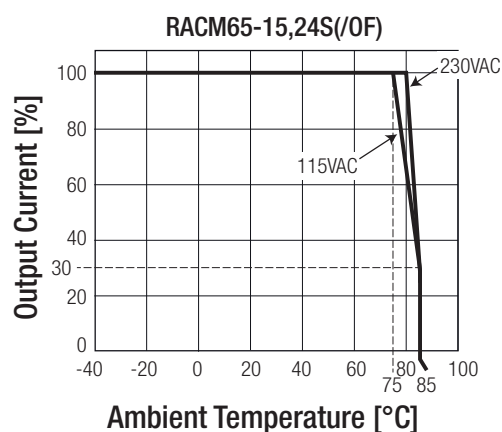
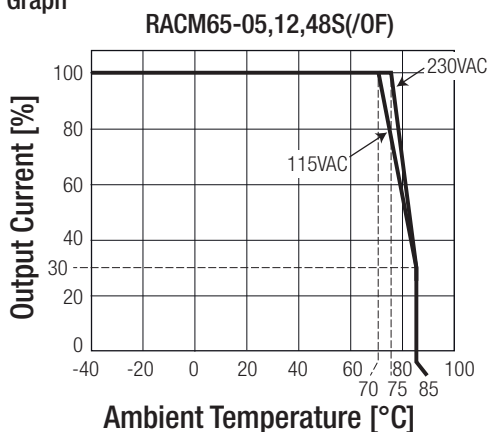
PROTECTIONS

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 I_{out} 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 μA max.
Medical Device Classification		Type BF applied device
Internal Clearance	I/P to O/P	8mm min.
Creepage	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°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	ISO 14971:2007 EN ISO 14971:2012

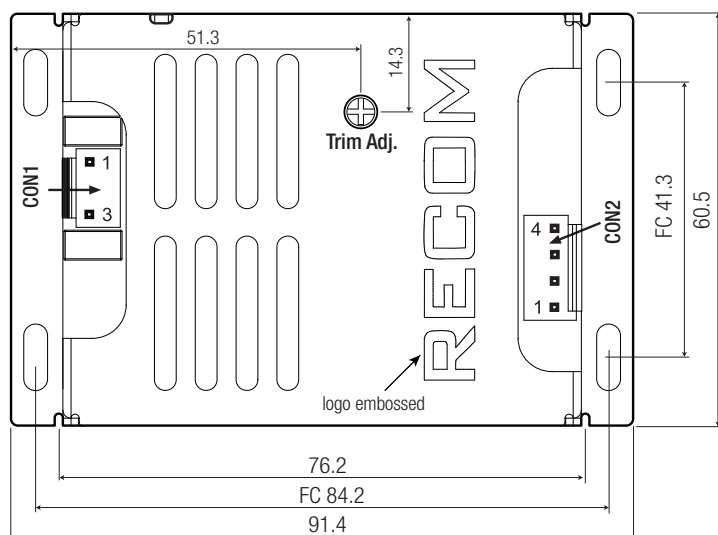
EMC Compliance	Condition	Standard / Criterion
EMI Standard		EN55011 + EN55022 + FCC18, Class B
ESD	Air ±8kV; Contact ±6kV 20V/m ±2kV L-N ±1kV and L-GND/N-GND ±2kV 20Vr.m.s 10A/m full load	EN61000-4-2, Criteria A
Radiated Immunity		EN61000-4-3, Criteria A
Fast Transient		EN61000-4-4, Criteria A
Surge		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	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

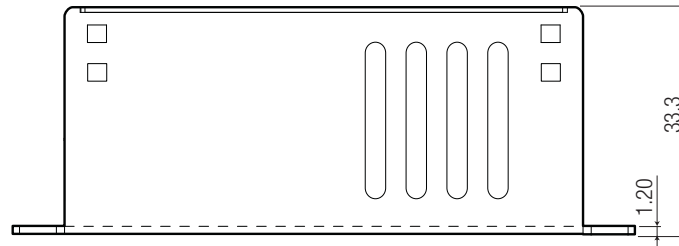
Pin Connector: Molex KK156

Tolerance: ±0.5mm
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

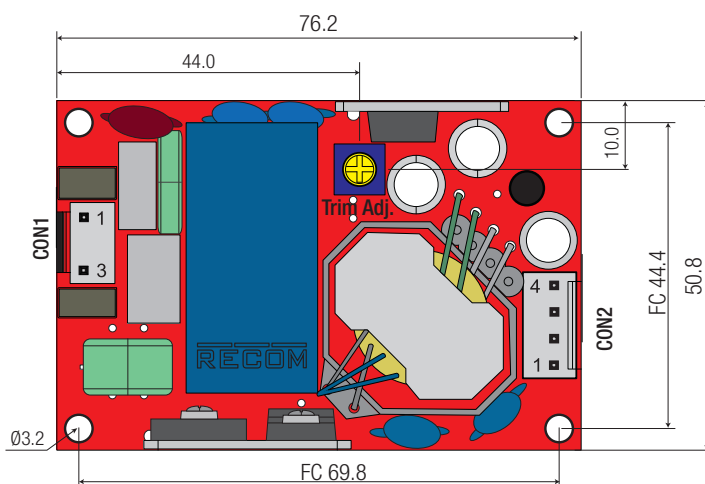


Bottom View



Dimension Drawing Open Frame (/OF) (mm)

Top View



AC Input Connector CON1

Pin1 Line

Pin3 Neutral

Pin Connector: Molex KK156

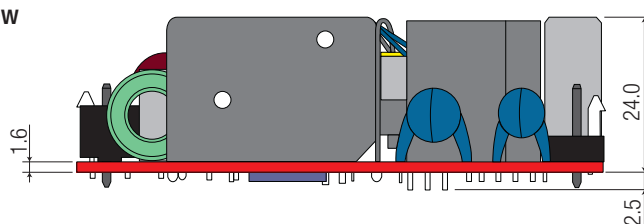
DC Output Connector CON2

Pin1,2 -Vout

Pin3,4 +Vout

Pin Connector: Molex KK156

Side View



Tolerance: $\pm 0.5\text{mm}$

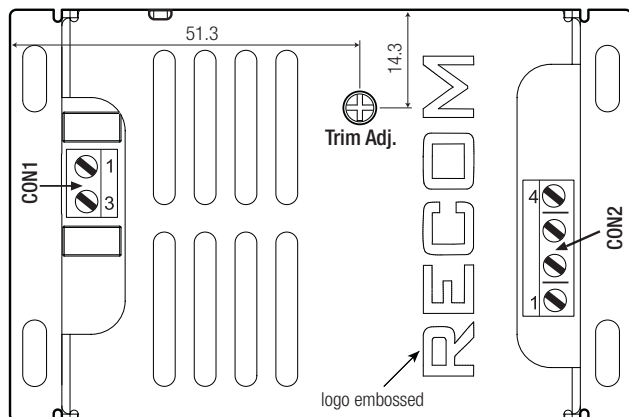
FC: fixing center

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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

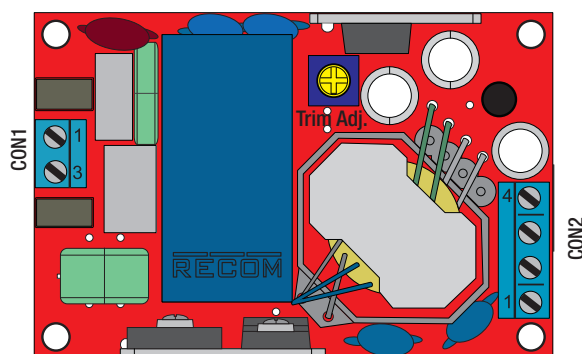
Pin1,2 -Vout

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

The product information and specifications are subject to change without prior notice. RECOM products are not authorized for use in safety-critical applications (such as life support) without RECOM's explicit written consent. A safety-critical application is defined as an application where a failure of a RECOM product may reasonably be expected to endanger or cause loss of life, inflict bodily harm or damage property. The buyer 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.