

# Features

- 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

# Regulated Converters



## RACM65

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

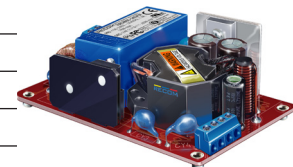


### Description

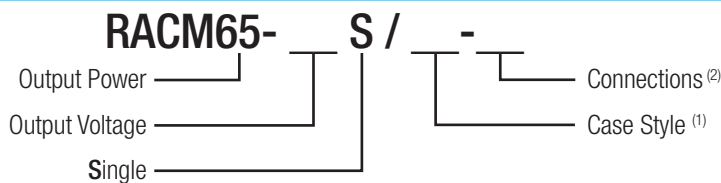
The RACM65 is a compact 3" x 2" high efficiency AC/DC power supply with 2xMOPP safety approval for medical applications. These space saving enclosed power supplies have an universal input voltage range (85-264VAC), 4kVAC isolation, require no minimum load and can be used at ambient temperatures of between -40°C and +85°C. The 5V, 12V, 15V, 24V or 48V output voltages are fully protected and have tolerances of less than ±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 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 <sup>(1,2)</sup>	85-264	5	10	90
RACM65-12S <sup>(1,2)</sup>	85-264	12	5.42	92.5
RACM65-15S <sup>(1,2)</sup>	85-264	15	4.34	93.5
RACM65-24S <sup>(1,2)</sup>	85-264	24	2.71	93.5
RACM65-48S <sup>(1,2)</sup>	85-264	48	1.36	93



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

CSA/CAN-C22.2 No 60601-1:14 Certified  
 ANSI/AAMI ES60601-1 Certified  
 EN60601-1-2  
 CISPR11  
 FCC Part 15 & 18

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

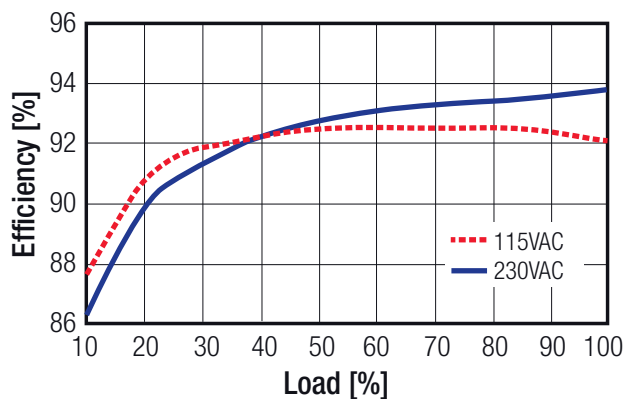
BASIC CHARACTERISTICS				
Parameter	Condition	Min.	Typ.	Max.
Input Voltage		85VAC 100VDC <sup>(3)</sup>	230VAC	264VAC 370VDC
Input Current	115VAC, full load 230VAC, full load			1.6A 0.9A
Inrush Current	cold start, 230VAC			60A
Input Power @ No Load				0.11W
Input Frequency Range	AC Input		50/60Hz	440Hz <sup>(3)</sup>
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 $\mu$ F/25V MLCC 24VDC, with 1 $\mu$ F/50V MLCC 48VDC, with 0.1 $\mu$ F/100V MLCC		75mVp-p 75mVp-p 150mVp-p	

**Notes:**

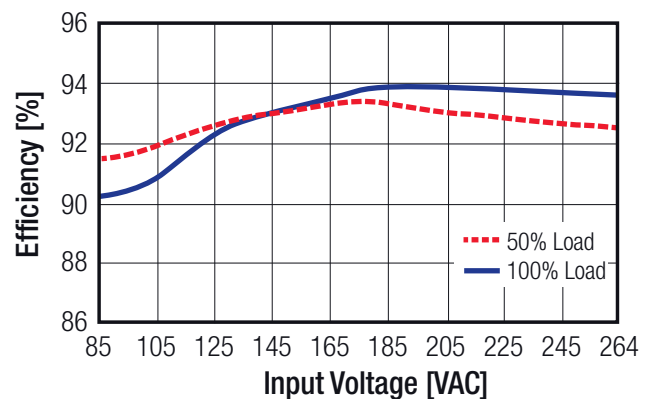
Note3: Confirmed performance, but not covered in certificates. 100V input voltage with derating.

## RACM65-24

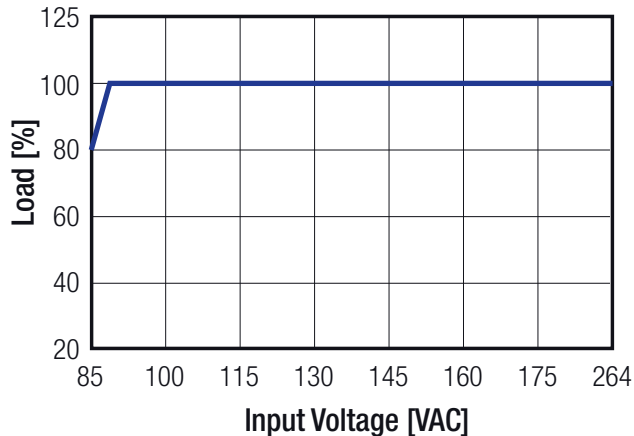
Efficiency vs. Load



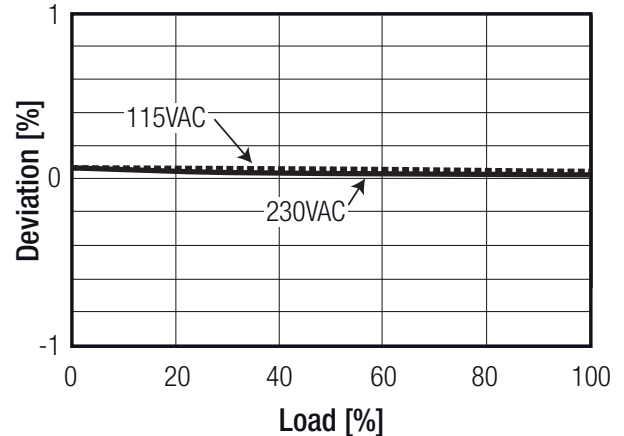
Efficiency vs. Input Voltage



Load vs. Input Voltage



Vout Deviation vs. Load



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

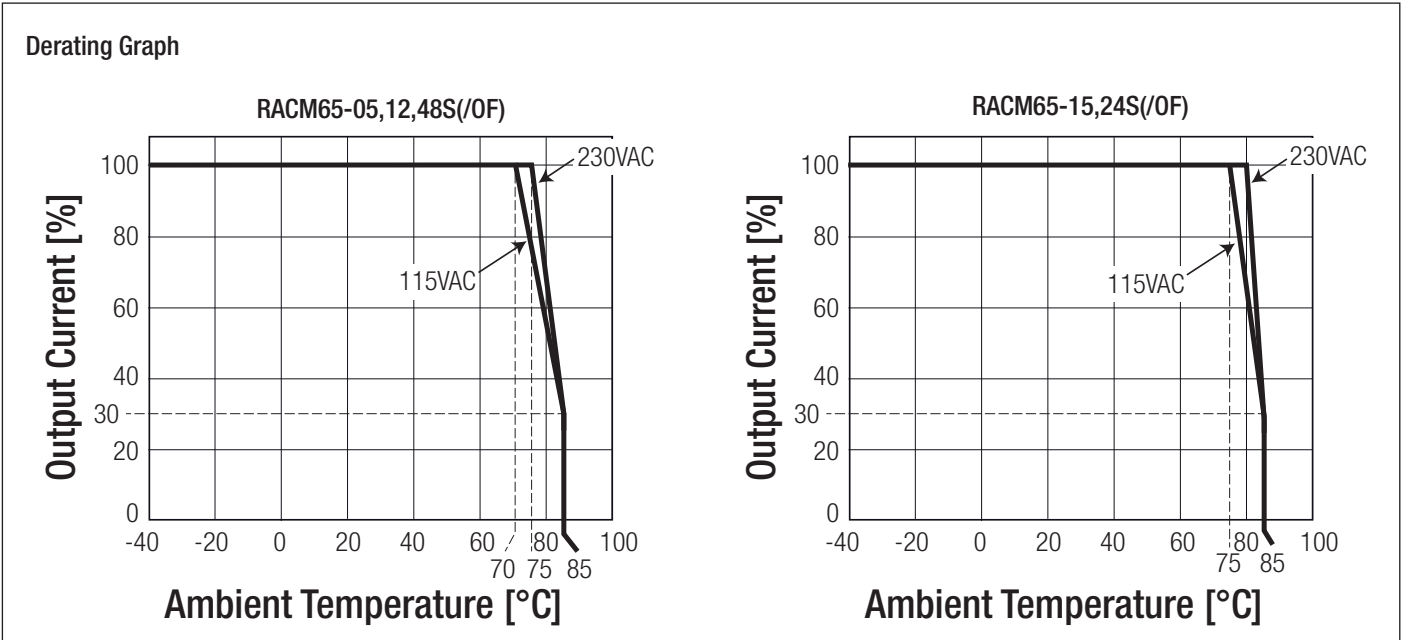
REGULATIONS		
Parameter	Condition	Value
Set Voltage Accuracy	230VAC, full load	$\pm 1\%$
Line Voltage Regulation	low line to high line, full load	$\pm 0.2\%$
Load Voltage Regulation	0% to 100% load 5VDC	$\pm 0.7\%$
	others	$\pm 0.5\%$
	10% to 90% load 5VDC	$\pm 0.6\%$
	others	$\pm 0.4\%$
Output Voltage Trim	on-board trimpot.	$\pm 10\%$
Transient Peak Deviation	load step from 50% - 75% change at 2.5A/ $\mu\text{s}$	3% Vout max.
Transient Recovery Time	load step from 50% - 75% change at 2.5A/ $\mu\text{s}$	600 $\mu\text{s}$ 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 Iout rated (Hiccup)	145% typ.
Over Voltage Protection (OVP)	% of Vout nominal (Latch off)	125% min / 140% max.
Isolation Voltage (2MOPP insulation)	I/P to O/P I/P to Chassis, O/P to Chassis working voltage	4kVAC / 1 minute 2.5kVAC / 1 minute 250VAC / continuous
Means of Protection		2MOPP
Leakage Current	264VAC	75 $\mu\text{A}$ max.
Medical Device Classification		suitable for use in B and BF applications
Internal Clearance	I/P to O/P	8mm min.
Creepage	I/P to O/P	8mm min.
Isolation Resistance	500VDC	100M $\Omega$ 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	with derating	$-40^\circ\text{C}$ to $+85^\circ\text{C}$
Operating Altitude		5000m max.
Shock		IEC60068-2-27
Vibration		IEC60068-2-6
MTBF	according to MIL-HDBK-217F, full load, $+25^\circ\text{C}$	$1494 \times 10^3$ hours

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



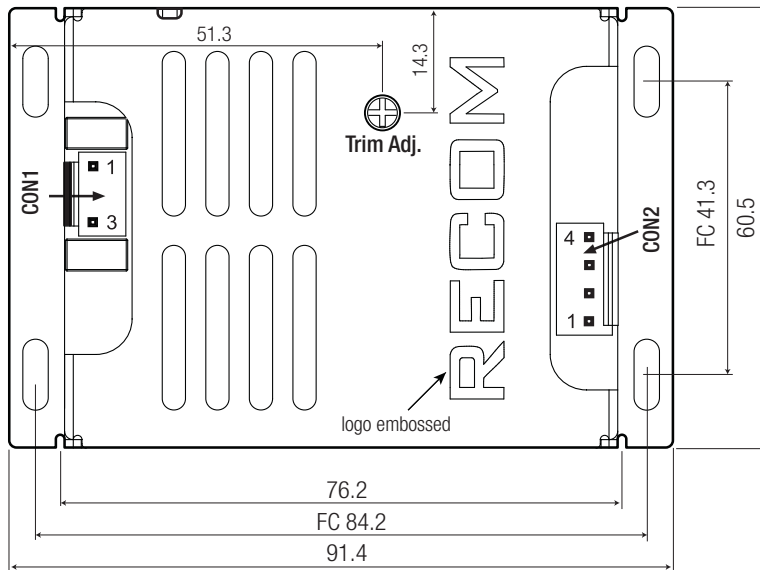
SAFETY AND CERTIFICATIONS		
Certificate Type (Safety)	Report / File Number	Standard
Medical Electric Equipment, General Requirements for Safety and Essential Performance	E314885	CAN/CSA-C22.2 No. 60601-1:14 ANSI/AAMI ES60601-1:2005 + A2:2010
Medical Electric Equipment, General Requirements for Safety and Essential Performance (CB Scheme)	151101302	IEC60601-1:2005 + A1:2014 3rd Edition EN60601-1:2006 + A12:2014
Certificate Type (Others)	Conditions	Standard / Criterion
Medical electrical equipment - Part 1-2: General requirements for basic safety and essential performance - Collateral standard: Electromagnetic compatibility - Requirements and tests		EN60601-1-2:2015
Industrial, scientific and medical equipment - Radio frequency disturbance characteristics - Limits and methods of measurement		CISPR11:2009 + A1:2010, Class B
ESD Electrostatic discharge immunity test	Air $\pm 15\text{kV}$ ; Contact $\pm 8\text{kV}$	IEC61000-4-2:2008
Radiated, radio-frequency, electromagnetic field immunity test	20V/m (80-2700MHz) 27V/m (385MHz) 28V/m (450MHz)	IEC61000-4-3:2006 + A2:2010
Fast Transient and Burst Immunity	AC Port: $\pm 2\text{kV}$	IEC61000-4-4:2012
Surge Immunity <sup>(6)</sup>	AC Port: L-L= $\pm 1\text{kV}$ L-GND= $\pm 2\text{kV}$	IEC61000-4-5:2014
Immunity to conducted disturbances, induced by radio-frequency fields	20Vr.m.s	IEC61000-4-6:2013
Power Frequency Magnetic Field	50Hz, 30A/m	IEC61000-4-8:2009
Voltage Dips and Interruptions	Dips: >95%; 30% Interruptions >95%	IEC61000-4-11:2009
Voltage Flicker		IEC61000-3-3:2013
Limitations on the amount of electromagnetic interference allowed from digital & electronic devices		47CFR FCC Part 15 Subpart B, Class B
Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz		ANSI C63.4:2014
Limitations on the amount of electromagnetic interference allowed from digital and electronics devices, industrial, scientific, and medical equipment		47 CFR FCC Part 18
FCC methods of measurement of radio noise emissions from industrial, scientific, and medical equipment		FCC OST/MP-5

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

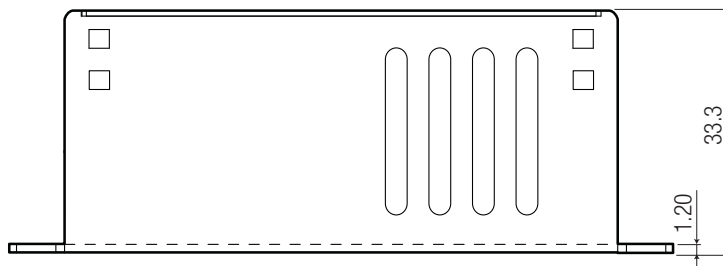
DIMENSION and PHYSICAL CHARACTERISTICS		
Parameter	Type	Value
Package Dimension (LxWxH)	enclosed case	91.4 x 60.5 x 33.3mm
	open frame	76.2 x 50.8 x 26.5mm
Package Weight	enclosed case	172g
	open frame + "-ST" version	137g
Case Material	enclosed case	Aluminum

**Dimension Drawing Enclosed Case (mm)**

Top View



Side View



Bottom 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)**

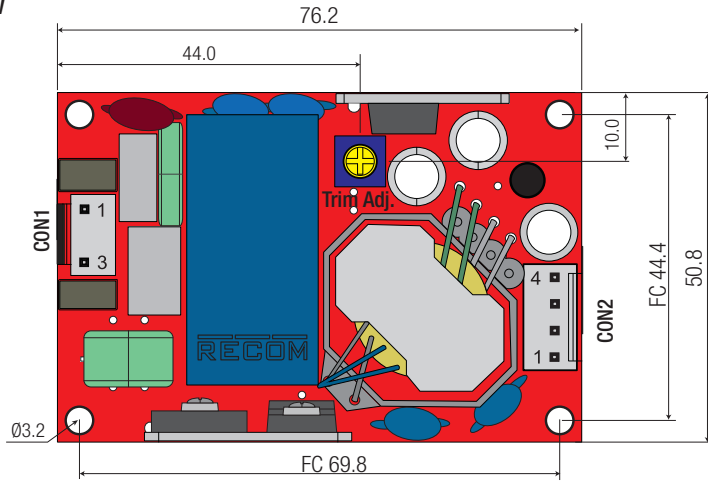
Pin#	Terminal	Mating Housing
1,2 V-	Molex KK156	Molex KK156
3,4 V+	(SD-2478)	(09508041)

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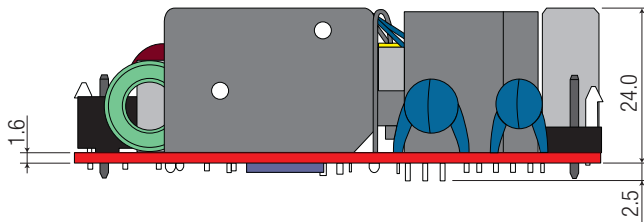
Specifications (measured at  $T_a = 25^\circ\text{C}$ , 250VAC, full load and after warm-up)

### Dimension Drawing Open Frame (/OF) (mm)

Top View



Side View



#### AC Input Connector (CON1)

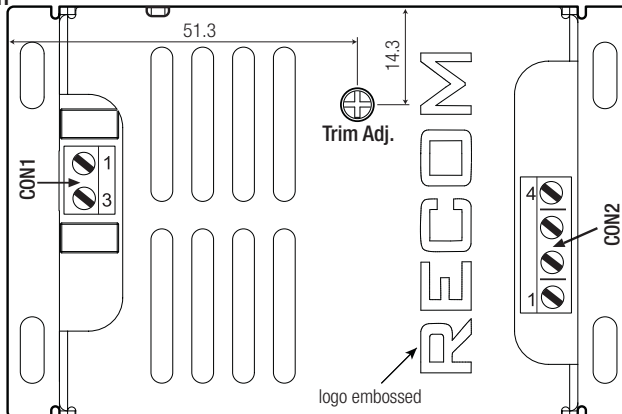
Pin#	Terminal	Mating Housing
1 AC/N	Molex KK156 (SD-2478)	Molex KK156 (09508031)
3 AC/L		

#### DC Output Connector (CON2)

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

### Screw Terminal Connection "-ST"

Enclosed Version



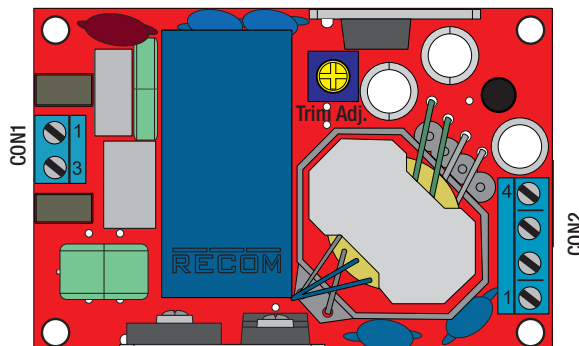
#### AC Input Connector (CON1)

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



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

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		1 pcs	
Storage Temperature Range		-40°C to +85°C	
Storage Humidity	non-condensing	5% to 95% RH	