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 (<100µA)
- 5000m Operation
- Active Power Factor Correction

RECOM
AC/DC Converter

RACM150

150 Watt Enclosed Case Style Single Output

Description

The RACM150-S(/F) is a compact 4" x 2" high efficiency AC/DC power supply with 2xMOPP safety approval for medical applications. These space saving enclosed power supplies have a universal input voltage range (85-264VAC), 4kVac isolation, require no minimum load and can be used at ambient temperatures of between -25°C and +80°C. The 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 RACM150-S(/F) series is certified to medical safety standard IEC/ES/EN-60601-1 3rd Edition and with less than 100µA leakage current. It has a built-in Class B EMI filter and comes with a five year warranty.

2MOPP
250VAC

IEC/EN60601 certified
ANSI/AAMI ES60601 certified
EN55011 certified
CISPR11
FCC Part 15

Selection Guide

Part Number	Input Voltage Range [VAC]	Output Voltage [VDC]	Output Current [A] 115/230VAC	Efficiency typ. [%]	max. cont. Power Rating [W] 115/230VAC
RACM150-12S	85-264	12	10.0 / 10.84	91	120 / 130
RACM150-15S	85-264	15	8.33 / 9.0	92	125 / 135
RACM150-24S	85-264	24	5.2 / 5.63	92	125 / 135
RACM150-48S	85-264	48	2.5 / 2.71	91	120 / 130
RACM150-12S/F [1]	85-264	12	12.5	91	150
RACM150-15S/F [1]	85-264	15	10.0	92	150
RACM150-24S/F [1]	85-264	24	6.25	92	150
RACM150-48S/F [1]	85-264	48	3.13	91	150

Model Numbering

RACM150- __ S/ __

Output Power
Output Voltage
Fan Option [1]
Single

Notes:

Note1: with suffix "/F" = mounted fan (Please note that removing the fan from the /F version will not give the same performance as the equivalent fanless type. The two versions are not identical)
without suffix, standard enclosed case package

Ordering Examples:

RACM150-12S = 12Vout, without fan
RACM150-24S/F = 24Vout, with fan

Specifications (measured @ ta= 25°C, 230VAC, full load and after warm-up)

BASIC CHARACTERISTICS				
Parameter	**Condition**	**Min.**	**Typ.**	**Max.**
Input Voltage		85VAC 120VDC		264VAC 370VDC
Input Current	115VAC, fulll load 230VAC, full load			1.7A 0.8A
Inrush Current	cold start, 115VAC cold start, 230VAC			30A 60A

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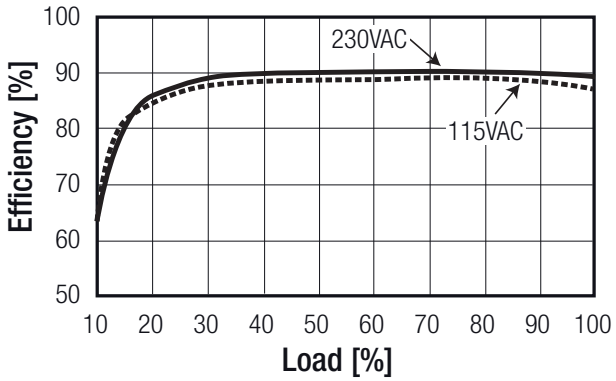
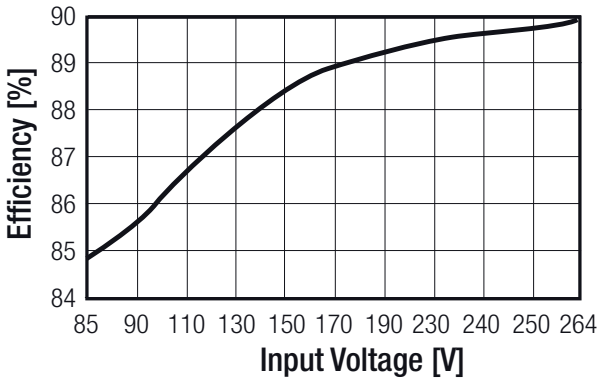
Specifications (measured @ ta= 25°C, 230VAC, full load and after warm-up)

Parameter	Condition	Min.	Typ.	Max.
No Load Input Power	230VAC, with fan 230VAC, without fan		0.6W 0.25W	1W 0.3W
Input Frequency Range	AC Input	47Hz		63Hz
Start-up Time			0.7s	1s
Rise Time			20ms	
Hold up Time			30ms	
Minimum Load				0%
Power Factor		0.95		
Internal Operating Frequency			60kHz	
Output Ripple and Noise (measured @ 20MHz BW)	12VDC, with 1µF/25V MLCC 15VDC, with 1µF/25V MLCC 24VDC, with 1µF/50V MLCC 48VDC, with 0.1µF/100V MLCC		120mVp-p 150mVp-p 220mVp-p 250mVp-p	

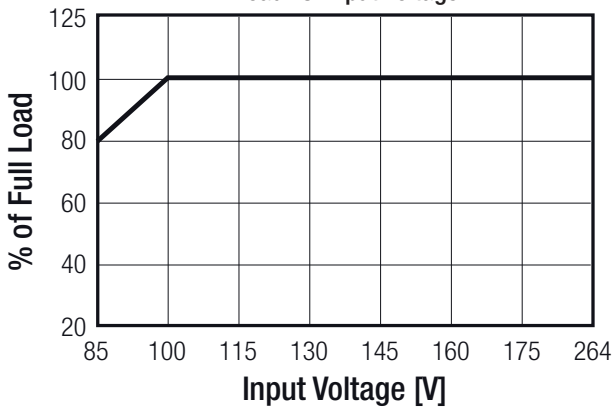
Efficiency vs. Load



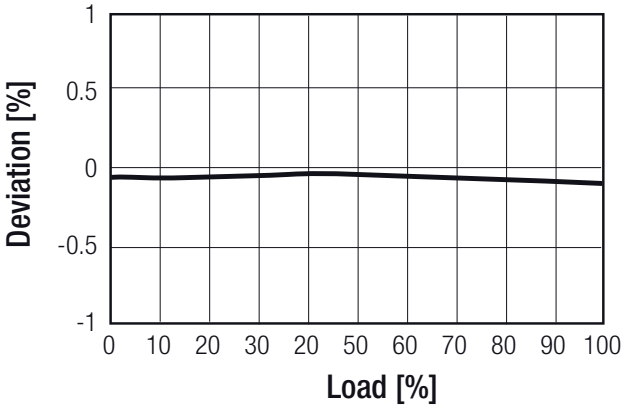
Efficiency vs. Input Voltage



Load vs. Input Voltage



Deviation vs. Load



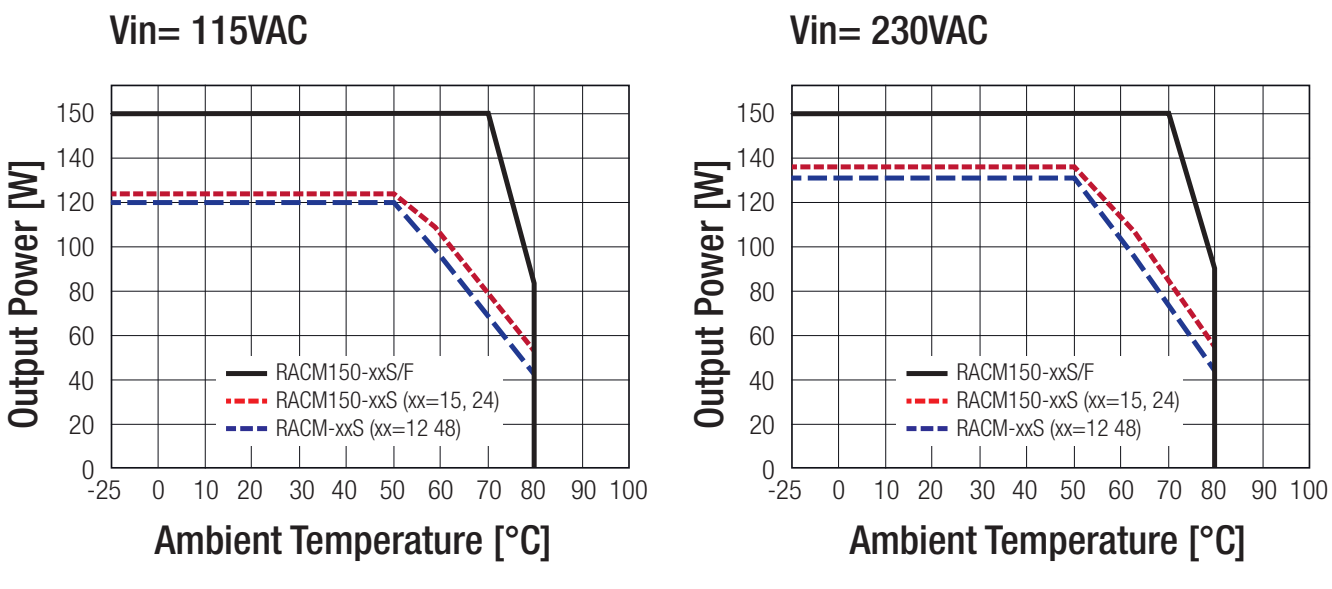
REGULATIONS		
Parameter	**Condition**	**Value**
Output Voltage Accuracy	230VAC, full load	±0.1% typ. / ±1% max.
Line Voltage Regulation	low line to high line, full load	±0.1% typ. / ±0.2% max.
Load Voltage Regulation	0% to 100% load	±0.1% typ. / ±0.5% max.
Output Voltage Trim		±10%
Transient Peak Deviation	load step from 50% - 75% change at 2.5A/µs	3% Vout max.
Transient Recovery Time	load step from 50% - 75% change at 2.5A/µs	500µs typ.

Specifications (measured @ ta= 25°C, 230VAC, full load and after warm-up)

PROTECTIONS		
Parameter	**Condition**	**Value**
Input Fuse	internal line and neutral	T3.15A / 250VAC, slow blow type
Short Circuit Protection (SCP)		continuous, auto-recovery
Over Load Protection (OLP)	% of Iout rated	Hiccup Mode, 115% min. / 150% max.
Over Voltage Protection (OVP)	% of Vout nominal	Latch Mode, 115% min. / 135% max.
Isolation Voltage	I/P to O/P I/P to Chassis O/P to Chassis working voltage	4kVAC / 1 minute 2kVAC / 1 minute 2kVAC / 1 minute 250VAC / continuous
Means of Protection		2MOPP
Leakage Current	264VAC	100µA max.
Medical Device Classification		suitable for use in B and BF applications
Internal Clearance Creepage	I/P to O/P I/P to O/P	8mm min. 8mm min.
Isolation Resistance	500VDC	100MΩ min.
Insulation Grade		Reinforced Insulation

ENVIRONMENTAL		
Parameter	**Condition**	**Value**
Relative Humidity	non-condensing	5% to 95% RH
Temperature Coefficient		±0.02% / °C
Operating Temperature Range (refer to derating graph)	without fan and with derating with fan and with derating	-25°C to +80°C -25°C to +80°C
Operating Altitude		5000m max.
MTBF (+25°C)	according to MIL-HDBK-217F, full load	786.1 x 10^3 hours

Derating Graph



Specifications (measured @ ta= 25°C, 230VAC, 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 + C2:2007, 3rd Edition EN60601-1:2006
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 EN55011:2009 +A1:2010 — Class B conducted & Class A radiated
ESD Electrostatic discharge immunity test	Air ±15kV; Contact ±8kV	IEC61000-4-2:2008
Radiated, radio-frequency, electromagnetic field immunity test	10V/m (80-2700MHz) 27V/m (385MHz) 28V/m (450MHz)	IEC61000-4-3:2006 + A2:2010
Fast Transient and Burst Immunity	AC Port: ±2kV	IEC61000-4-4:2012
Surge Immunity (6)	AC Port: L-L= ±1kV L-GND= ±2kV	IEC61000-4-5:2014
Immunity to conducted disturbances, induced by radio-frequency fields	6Vr.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%	IEC61000-4-11:2004
Harmonic Current		IEC61000-3-2:2005, A2:2009, Class D
Voltage Flicker		IEC61000-3-3:2013
Limitations on the amount of electromagnetic intererence 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 C63.4:2009
Limitations on the amount of electromagnetic intererence allowed from digital and electronics devices, industrial, scientific, and medical equipment		47 CFR FCC Part 18 2007, Class B

DIMENSION and PHYSICAL CHARACTERISTICS		
Parameter	**Type**	**Value**
Case Material		Aluminum
Package Dimension (LxWxH)	with Fan without Fan	116.8 x 62.0 x 49.2mm 116.8 x 62.0 x 39.2mm
Package Weight	with Fan without Fan	270g 255g

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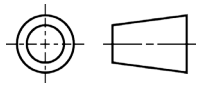
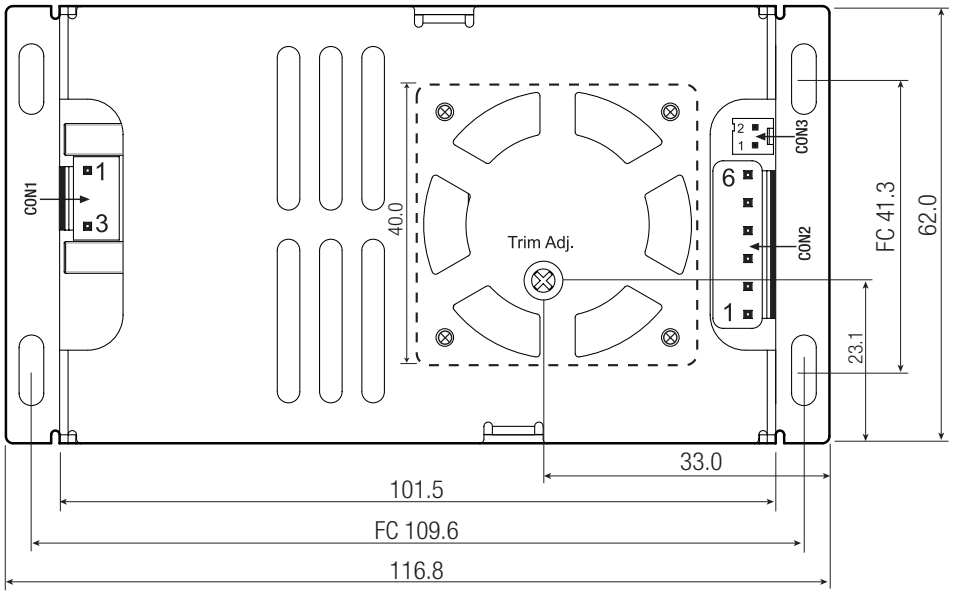
RACM150 Series

Specifications (measured @ ta= 25°C, 230VAC, full load and after warm-up)

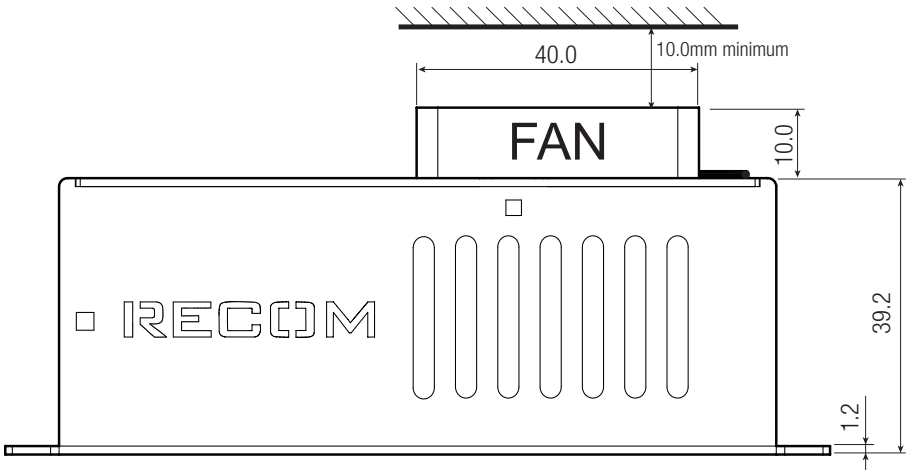
Dimension Drawing (mm)



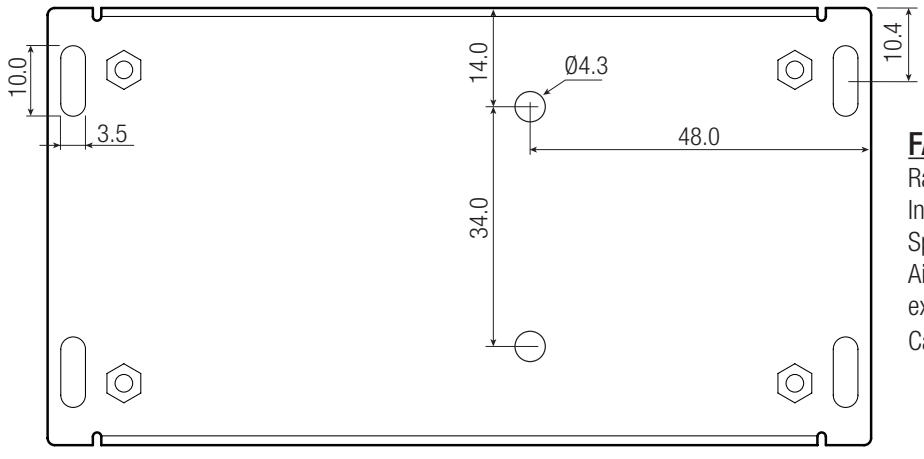
Top View



Side View



Bottom View



AC Input Connector CON1

Pin1 Line
Pin3 Neutral
Mates with
JST housing: VHR-3N
JST crimp terminals: SVH-21T-P1.1

DC Ouptut Connector CON2

Pin1,2,3 -Vout
Pin4,5,6+Vout
Mates with
JST housing: VHR-6N
JST crimp terminals: SVH-21T-P1.1

FAN Ouptut Connector CON3

Pin1 -Fan
Pin2 +Fan
Mates with
Molex housing: 22-01-1022
Molex crimp terminals: 2759

Tolerance: ±0.5mm
FC: fixing center

FAN

Rated Voltage:	12V (7-13.8)
Input Power:	0.96W typ. 1.8W max.
Speed:	6000RPM
Air Flow:	7CFM/Min.; 30dBA max.
exp. Lifetime (40°C):	>70khours continuous
Cable length:	55mm inlcuding connector

Specifications (measured @ ta= 25°C, 230VAC, full load and after warm-up)

PACKAGING INFORMATION		
Parameter	**Type**	**Value**
Packaging Dimension (LxWxH)	Cardboard Box	418 x 308 x 105mm
Packaging Quantity		10pcs
Storage Temperature Range		-40°C to +80°C
Storage Humidity	non-condensing	5% to 95% RH