

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

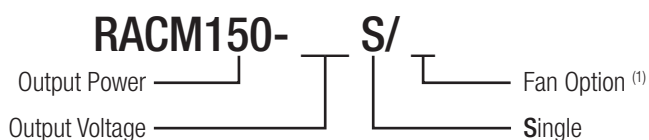
Description

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.

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



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, full load 230VAC, full load			1.7A 0.8A
Inrush Current	cold start, 115VAC cold start, 230VAC			30A 60A
continued on next page				

RECOM
AC/DC Converter

RACM150

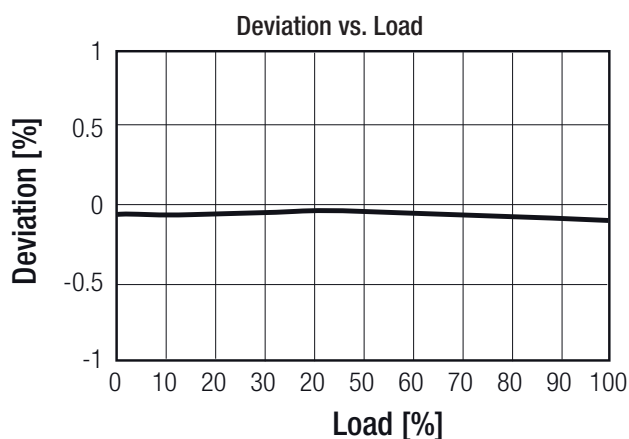
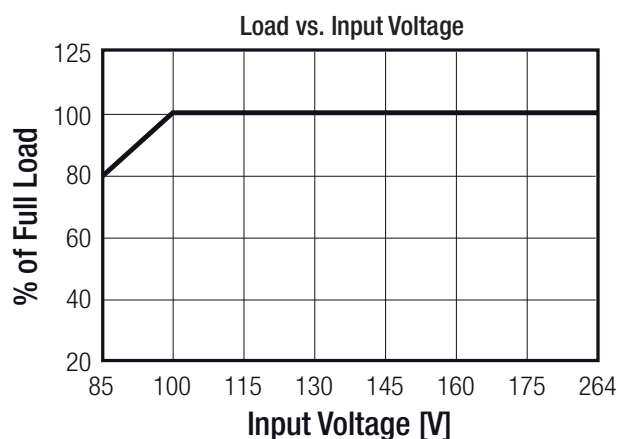
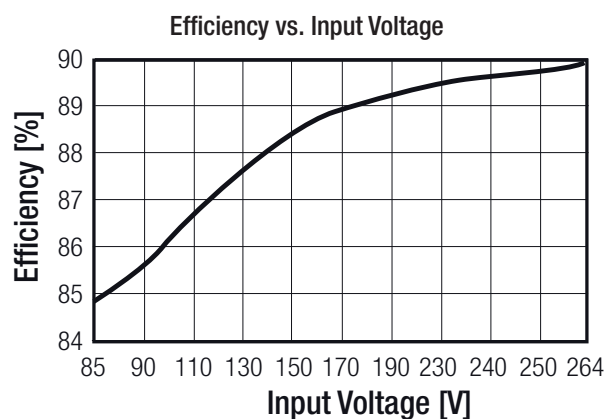
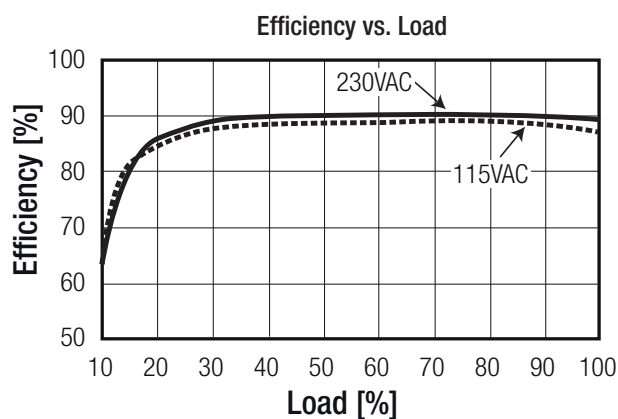
**150 Watt
Enclosed
Case Style
Single Output**



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

Specifications (measured @ $t_a = 25^\circ\text{C}$, 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 1 μ F/25V MLCC 15VDC, with 1 μ F/25V MLCC 24VDC, with 1 μ F/50V MLCC 48VDC, with 0.1 μ F/100V MLCC		120mVp-p 150mVp-p 220mVp-p 250mVp-p	



REGULATIONS

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

Specifications (measured @ $t_a = 25^\circ\text{C}$, 230VAC, full load and after warm-up)

PROTECTIONS

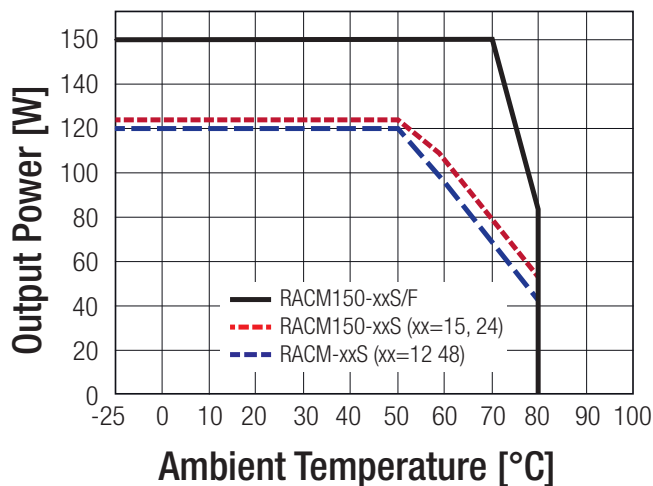
Parameter	Condition	Value
Input Fuse	internal line and neutral	T3.15A / 250VAC, slow blow type
Short Circuit Protection (SCP)		continuous, auto-recovery
Over Load Protection (OLP)	% of lout rated	Hiccup Mode, 115% min. / 150% max.
Over Voltage Protection (OVP)	% of Vout nominal	Latch Mode, 115% min. / 135% max.
Isolation Voltage	I/P to O/P	4kVAC / 1 minute
	I/P to Chassis	2kVAC / 1 minute
	O/P to Chassis	2kVAC / 1 minute
	working voltage	250VAC / continuous
Means of Protection		2MOPP
Leakage Current	264VAC	100 μ 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 Ω min.
Insulation Grade		Reinforced Insulation

ENVIRONMENTAL

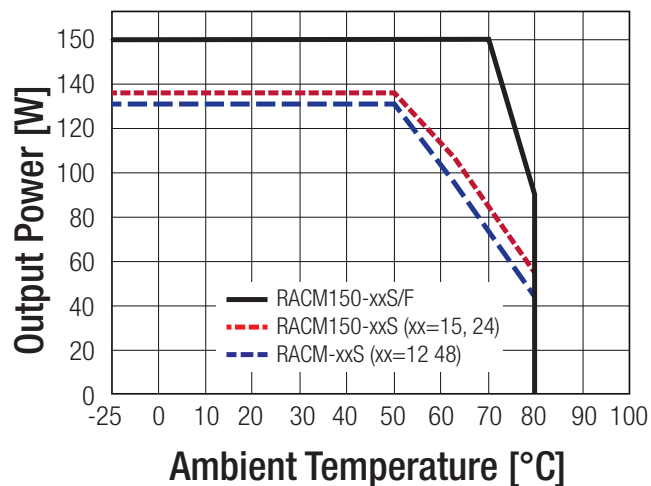
Parameter	Condition	Value
Relative Humidity	non-condensing	5% to 95% RH
Temperature Coefficient		$\pm 0.02\%$ / $^\circ\text{C}$
Operating Temperature Range (refer to derating graph)	without fan and with derating	-25°C to $+80^\circ\text{C}$
	with fan and with derating	-25°C to $+80^\circ\text{C}$
Operating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

Derating Graph

Vin= 115VAC



Vin= 230VAC



Specifications (measured @ $t_a = 25^{\circ}\text{C}$, 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 $\pm 15\text{kV}$; Contact $\pm 8\text{kV}$	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: $\pm 2\text{kV}$	IEC61000-4-4:2012
Surge Immunity ⁽⁶⁾	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	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 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 C63.4:2009
Limitations on the amount of electromagnetic interference allowed from digital and electronics devices, industrial, scientific, and medical equipment		47 CFR FCC Part 18 2007, Class B

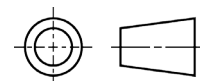
DIMENSION and PHYSICAL CHARACTERISTICS

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

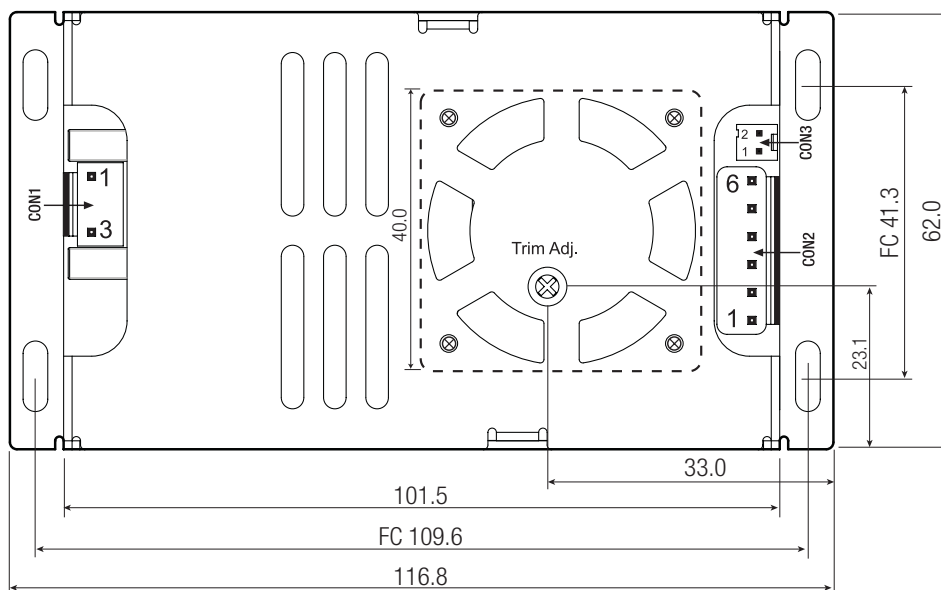
continued on next page

Specifications (measured @ $t_a = 25^\circ\text{C}$, 230VAC, full load and after warm-up)

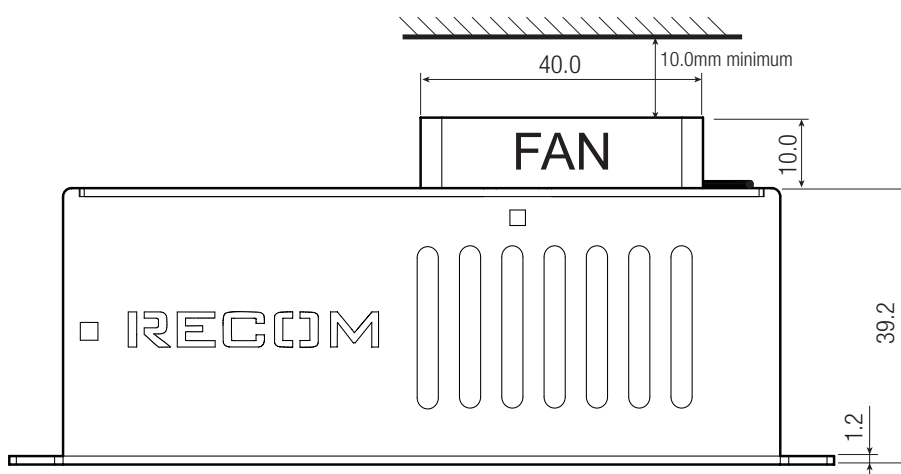
Dimension Drawing (mm)



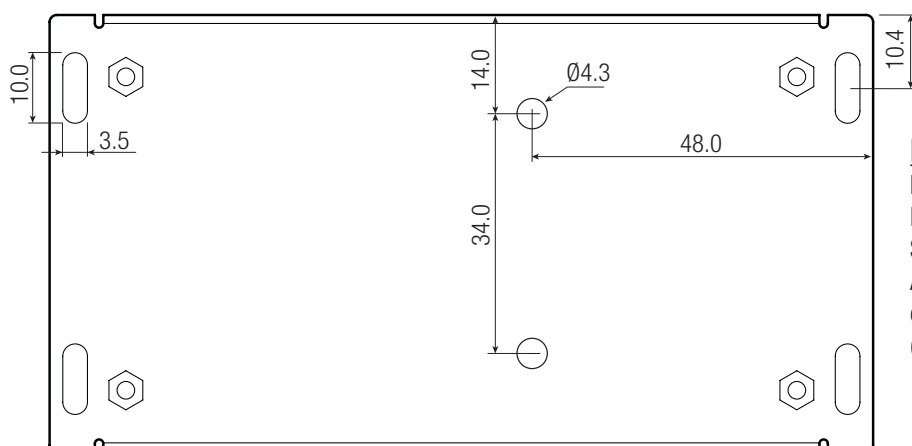
Top View



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 Output Connector CON2

Pin1,2,3 -Vout

Pin4,5,6 +Vout

Mates with

JST housing: VHR-6N

JST crimp terminals: SVH-21T-P1.1

FAN Output Connector CON3

Pin1 -Fan

Pin2 +Fan

Mates with

Molex housing: 22-01-1022

Molex crimp terminals: 2759

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

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 including connector

Specifications (measured @ $t_a = 25^{\circ}\text{C}$, 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