!NOT RECOMMENDED FOR NEW DESIGNS!

Features

Regulated Converter

- 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

5 YEAR warranty

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	Max. Cap. Load (1) [µF]
RACM150-12S	85-264	12	10.0 / 10.84	91	120 / 130	10400
RACM150-15S	85-264	15	8.33 / 9.0	92	125 / 135	6600
RACM150-24S	85-264	24	5.2 / 5.63	92	125 / 135	2600
RACM150-48S	85-264	48	2.5 / 2.71	91	120 / 130	650
RACM150-12S/F (1)	85-264	12	12.5	91	150	10400
RACM150-15S/F (1)	85-264	15	10.0	92	150	6600
RACM150-24S/F (1)	85-264	24	6.25	92	150	2600
RACM150-48S/F (1)	85-264	48	3.13	91	150	650

Notes:

Note1: Max Cap Load is tested at minimum input and full resistive load

2MOPP
250VAC

c UL us
E314885

Model Numbering

RACM150- __ S/ __

- Output Power + Output Voltage
- Fan Option (2)
- Single

Notes:

Note2: 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, without fan

Examples:

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

PREFERRED ALTERNATIVES
Please consider this alternatives:

RACM230-G/ENC Series

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

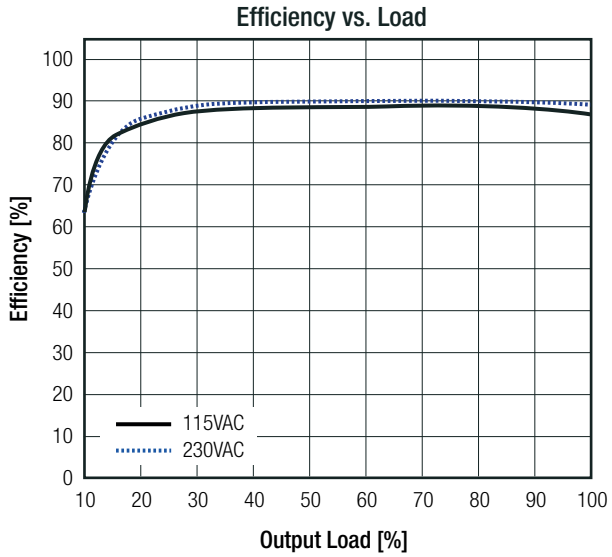
RECOM

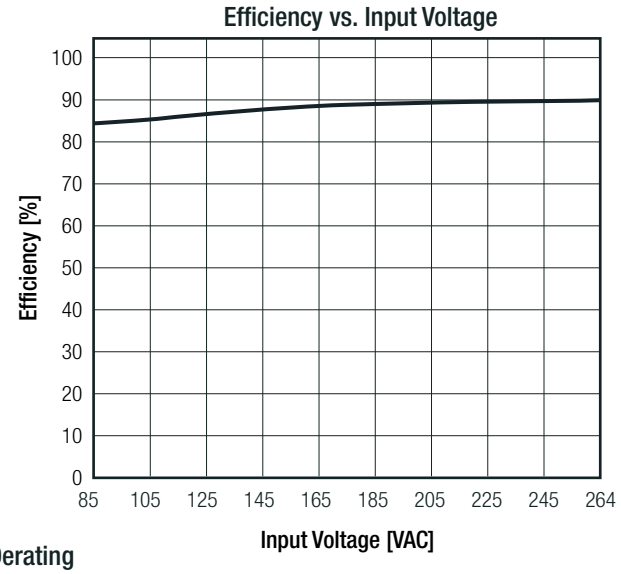
AC/DC Converter

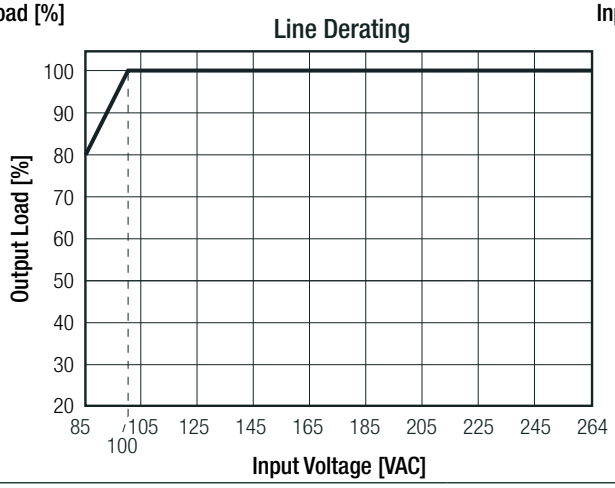
RACM150 Series

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
No load Power Consumption	230VAC, with fan 230VAC, without fan		0.6W 0.25W	1W 0.3W
Input Frequency Range	AC Input	47Hz		63Hz
Output Voltage Trimming			±10.0%	
Minimum Load		0%		
Power Factor		0.95		
Start-up Time			0.7s	1s
Rise Time			20ms	
Hold up Time			30ms	
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	







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AC/DC Converter

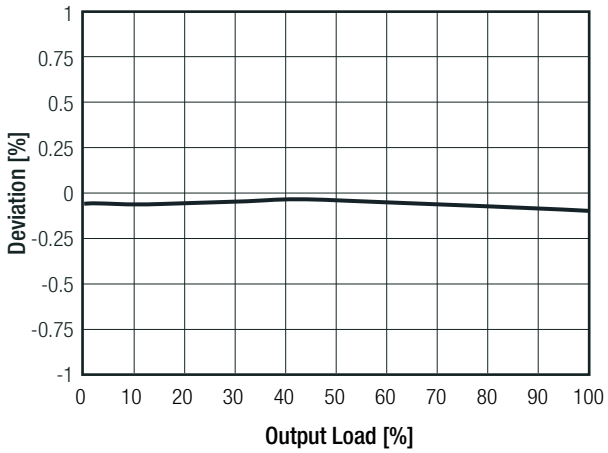
RACM150 Series

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

REGULATIONS

Parameter	Condition	Value
Output Accuracy	230VAC, full load	±1.0%
Line Regulation	low line to high line, full load	±0.2%
Load Regulation	0% to 100% load	0.1% typ. / 0.5% max.
Transient Peak Deviation	load step from 50% - 75% change at 2.5A/µs	3.0% Vout max.
Transient Recovery Time	load step from 50% - 75% change at 2.5A/µs	500µs typ.

Deviation vs. Load



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)		115% min. / 150% max.
Over Voltage Protection (OVP)	% of Vout nominal (Latch off)		115% min. / 135% max.
Isolation Voltage [5]	tested for 1 minute	I/P to O/P I/P to Case O/P to Case	4kVAC 2kVAC 2kVAC
Isolation Resistance	500VDC		100MΩ min.
Insulation Grade			reinforced
Leakage Current	264VAC		100µA max.
Means of Protection	working voltage 250VAC/continuous		2MOPP
Medical Device Classification			built-in power supply
Internal	clearance creepage		>8.0mm >8.0mm

Notes:

Note5: For repeat Hi-Pot testing, reduce the time and/or the test voltage

RECOM

AC/DC Converter

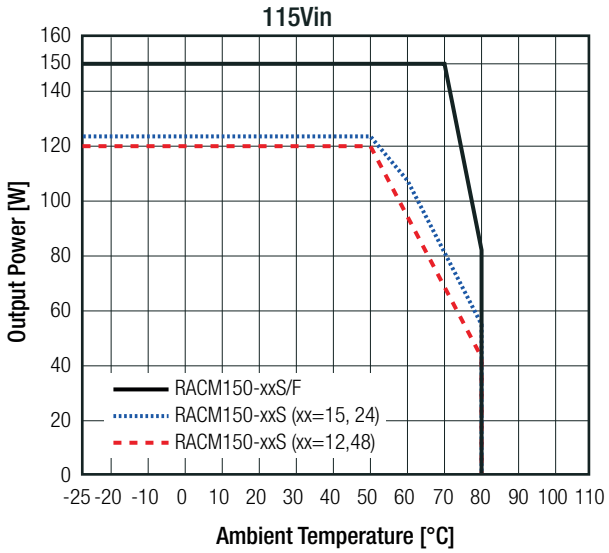
RACM150 Series

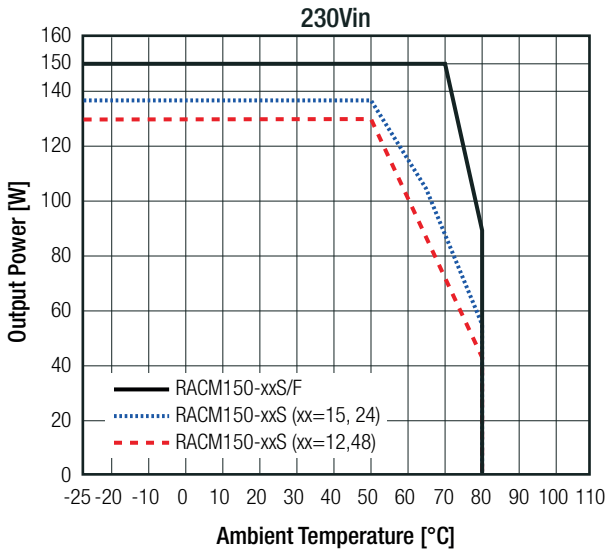
Specifications (measured @ Ta= 25°C, 230VAC, full load and after warm-up)

ENVIRONMENTAL			
Parameter	**Condition**		**Value**
	refer to derating graph	without fan	-25°C to +80°C
		with fan	-25°C to +80°C
Temperature Coefficient			±0.02%/K
Operating Altitude			5000m max.
Operating Humidity	non-condensing		5% to 95% RH
Pollution Degree			PD2
MTBF	according to MIL-HDBK-217F, full load, +25°C		786.1 x 10^3 hours

Derating Graph

(@ Chamber and natural convection 0.1m/s)





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)	181200102	IEC60601-1:2005 + A1:2012, 3rd Edition
Medical Electric Equipment, General Requirements for Safety and Essential Performance		EN60601-1:2006 +12:2014
Information Technology Equipment - General Requirements for Safety (LVD)	TW1708008-001	EN60950-1:2006 + A2:2013
Information Technology Equipment - General Requirements for Safety		IEC60950-1:2005, 2nd Edition + A2:2013
EAC	RU-AT.49.09571	TP TC 004/2011 TP TC 004/2011
RoHS2		RoHS-2011/65/EU + AM-2015/863

EMC Compliance (Medical)	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		EN55011:2009 + A1:2010 Class B Conducted, Class A Radiated
Industrial, scientific and medical equipment - Radio frequency disturbance characteristics - Limits and methods of measurement		CISPR11:2009 + A1:2010 Class B Conducted, Class A Radiated

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AC/DC Converter

RACM150 Series

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

EMC Compliance (Medical)	Conditions	Standard / Criterion
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 Power Port: ±2kV	IEC61000-4-4:2012
Surge Immunity	AC Port: L-N= ±1kV L-GND= ±2kV	IEC61000-4-5:2005
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
Limits of Harmonic Current Emissions		EN61000-3-2:2005 + A2:2009, Class D
Limits of Voltage Fluctuations and Flicker		EN61000-3-3:2013
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 9kHz to 40GHz		ANSI C63.4:2014
EMC Compliance (Industrial)	**Conditions**	**Standard / Criterion**
Electromagnetic compatibility of multimedia equipment – Emission Requirements		EN55032:2015+AC:2013, Class B
Information technology equipment - Immunity characteristics - Limits and methods of measurement		EN55024:2010+A1:2015
ESD Electrostatic discharge immunity test	Air ±8kV; Contact ±6kV	IEC61000-4-2:2008, Criteria A
Radiated, radio-frequency, electromagnetic field immunity test	3V/m (80-1000MHz) 20V/m (80-1000MHz) 3V/m (1-2.5GHz) 10V/m (1-2.5GHz)	IEC61000-4-3:2006 + A2:2010, Criteria A
Fast Transient and Burst Immunity	DC Port: ±2kV	IEC61000-4-4:2012, Criteria A
Surge Immunity	DC Port: ±1kV	IEC61000-4-5:2014, Criteria A
Immunity to conducted disturbances, induced by radio-frequency fields	DC Power Port 3V + 20V	IEC61000-4-6:2013, Criteria A
Power Frequency Magnetic Field	50Hz/60Hz 1A/m 50Hz/60Hz 10A/m	IEC61000-4-8:2009, Criteria A
Voltage Dips and Interruptions	Dips: >95%; 60%; 30% Interruptions >95%	IEC61000-4-11:2004, Criteria A IEC61000-4-11:2004, Criteria B
Limits of Harmonic Current Emissions		EN61000-3-2:2014, Class D
Limits of Voltage Fluctuations and Flicker		EN61000-3-3:2013

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

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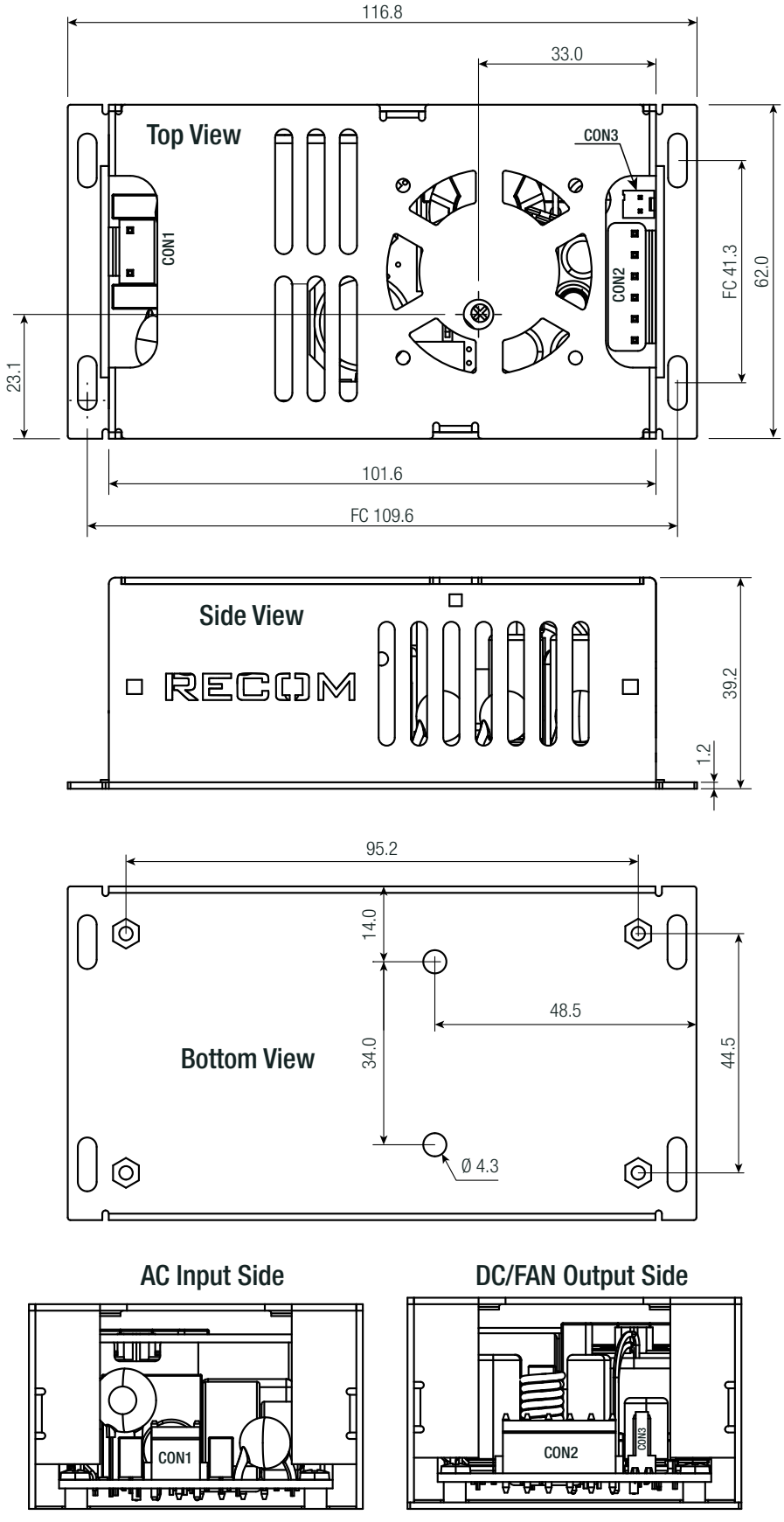
AC/DC Converter

RACM150 Series

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

Dimension Drawing without FAN (mm)



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: ±0.5mm
FC: fixing center
Recommended tightening torque for mounting holes= 0.49Nm

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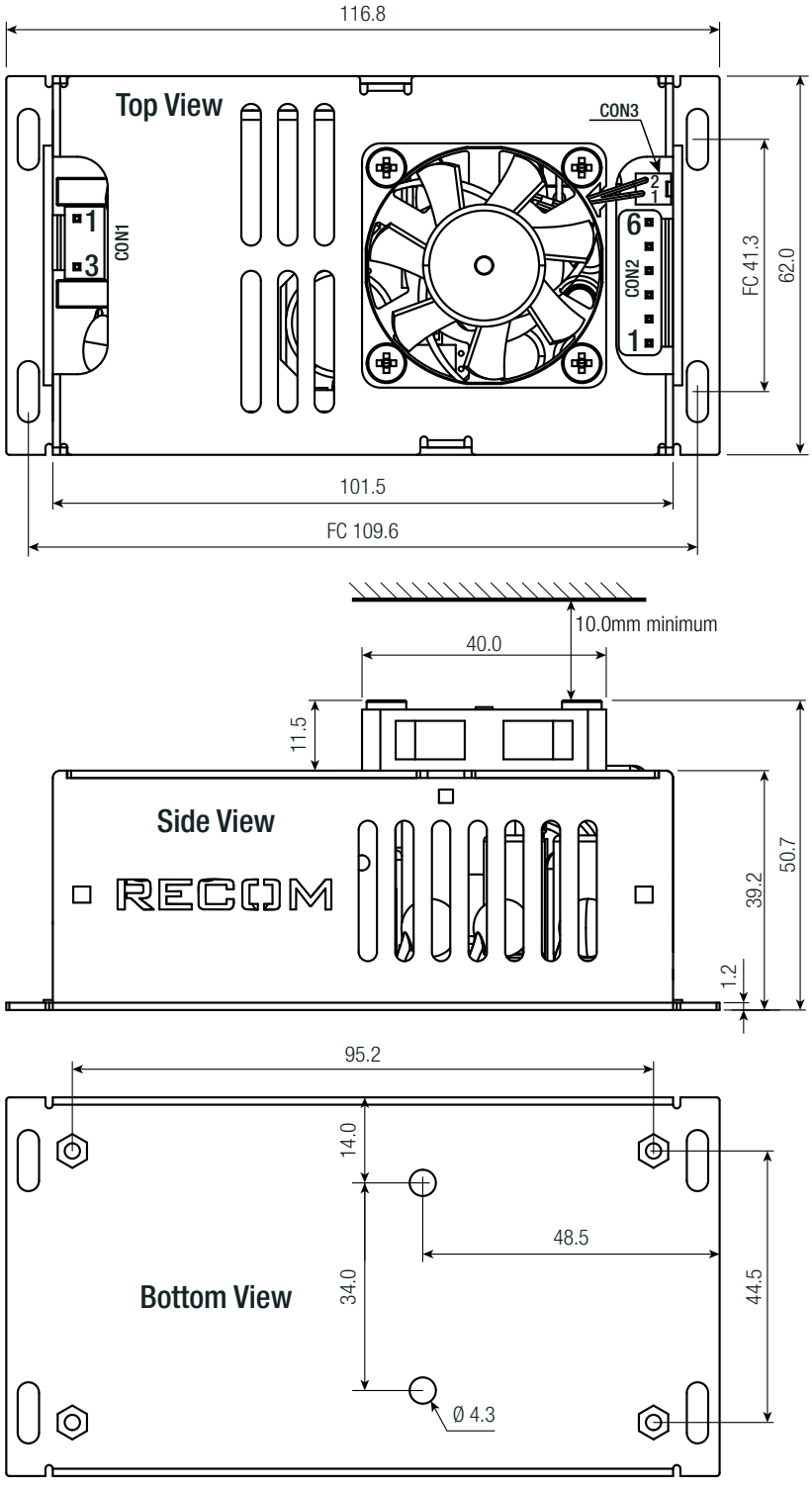
AC/DC Converter

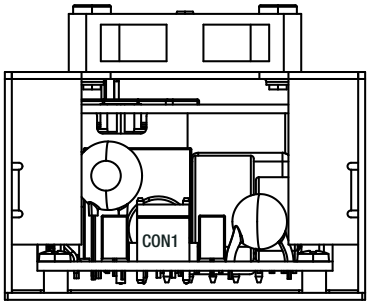
RACM150 Series

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

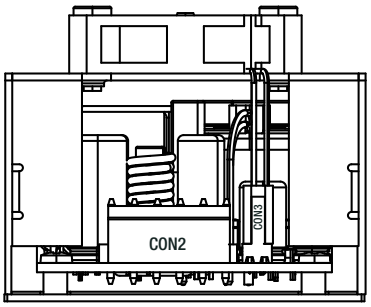
Dimension Drawing with FAN (mm)



AC Input Side



DC/FAN Output Side



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

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

Tolerance: ±0.5mm
FC: fixing center
Recommended tightening torque for mounting holes= 0.49Nm

RECOM

AC/DC Converter

RACM150 Series

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

PACKAGING INFORMATION		
Parameter	**Type**	**Value**
Packaging Dimension (LxWxH)	cardboard Box	418.0 x 308.0 x 105.0mm
Packaging Quantity		10pcs
Storage Temperature Range		-40°C to +80°C
Storage Humidity	non-condensing	5% to 95% RH

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