

Features

Regulated Converters

- Universal Input 90-264VAC
- Efficiency 91%
- Short Circuit And Over Voltage Protected
- Active PFC Function, PF>0.95
- Power Indicator LED
- UL, CE Marked (CB Report)
- Conformal Coated Product
- RECOM Connector Set Available

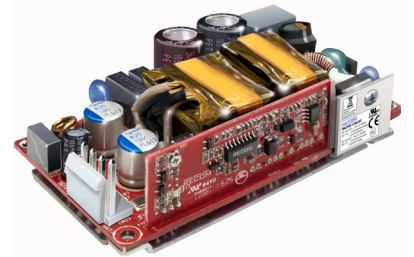


RAC150-G

150 Watt

4" x 2"

Open Frame or Enclosed Case



UL62368-1 Certified
 CAN/CSA C22.2 No. 62368-1-14 Certified
 UL60950 Certified
 CAN/CSA C22.2 N.60950-1-07 Certified
 IEC/EN60950-1 Certified
 EN55022/55024
 FCC Part 15
 CB Report

Description

The RAC150 series are cost-efficient 150 Watt AC/DC power supplies in a standard 2"x4" footprint with a universal input range of 90-264VAC for worldwide usage. They are built to deliver up to 125 Watt with natural air convection for use in tight, space-critical housings with low available airflow. UL and CE marks with CB-reports include the new 62368 safety standard as well as the usual 60950 safety standard. The RAC150 series offers tightly regulated 12V, 24V and 48VDC outputs with 3kVAC isolation and Class B EMC certifications and come with a three year warranty.

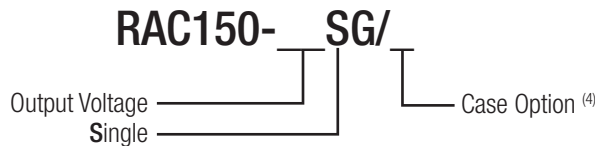
Selection Guide

Part Number	Input Voltage Range [VAC]	Output Voltage [VDC]	max. Output Current ⁽¹⁾ [mA]	typ. Efficiency ⁽²⁾ [%]	Max. Capacitive Load ⁽³⁾ [µF]
RAC150-12SG ⁽⁴⁾	90-264	12	12500	91	2000
RAC150-24SG ⁽⁴⁾	90-264	24	6250	91	1000
RAC150-48SG ⁽⁴⁾	90-264	48	3125	91	500

Notes:

- Note1: With forced air cooling, refer to derating graph.
 Note2: Typ. efficiency is tested @ 230VAC and full load.
 Note3: Max. cap load is tested @ 90-264VAC and full resistive load.

Model Numbering



Notes:

- Note4: add suffix "OF" for open frame version
 add suffix "ENC" for enclosed version

Ordering Examples:

- RAC150-24SG/OF, 24Vout Single, open frame version.
 RAC150-12SG/ENC, 12Vout Single, enclosed version.

Specifications (measured @ ta = 25°C, nominal input voltage, full load otherwise noted)

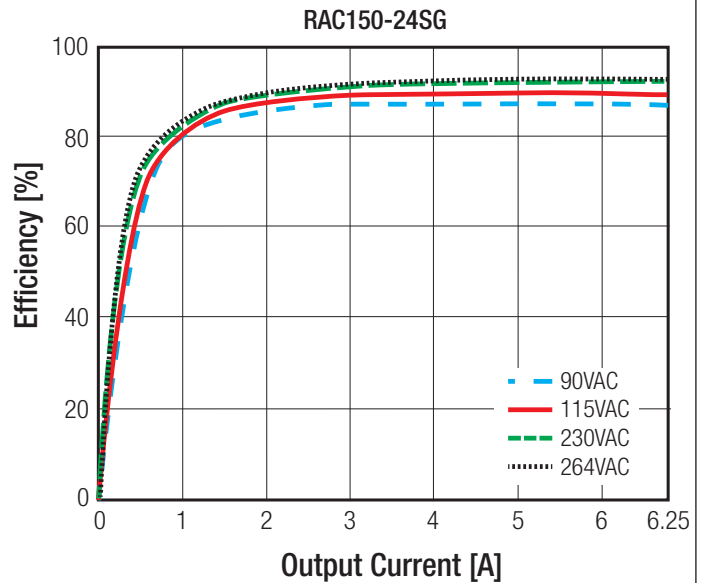
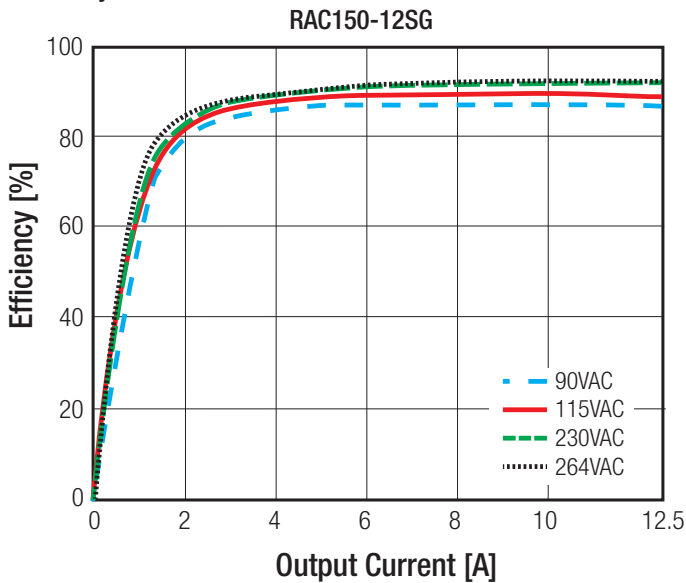
BASIC CHARACTERISTICS				
Parameter	Condition	Min.	Typ.	Max.
Output Power	90-264VAC, with forced airflow			150W
	230VAC, natural convection			125W
	115VAC, natural convection			120W
	90-115VAC	refer to derating guidelines (PA-4)		
Internal Input Filter		Pi type		
Input Voltage Range		90VAC	230VAC	264VAC
Input Current				2A
Inrush Current	cold start, 115VAC			40A
	cold start, 230VAC			60A
Input Frequency Range		47Hz		63Hz

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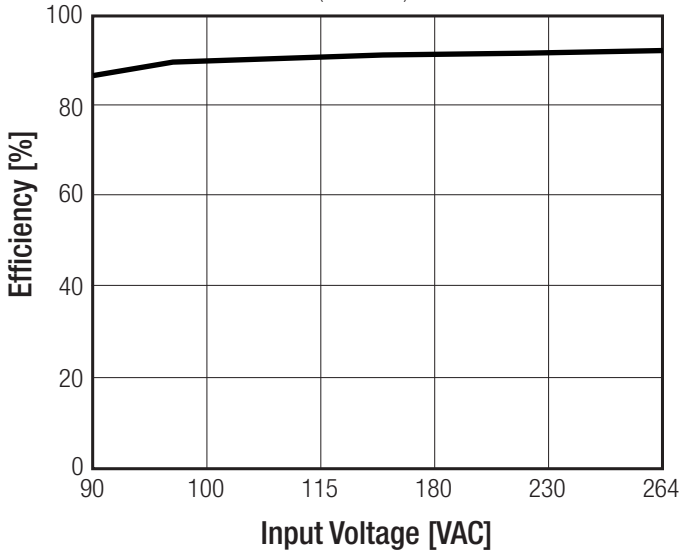
Specifications (measured @ $t_a = 25^\circ\text{C}$, nominal input voltage, full load otherwise noted)

Parameter	Condition		Min.	Typ.	Max.
Rise Time	115VAC/230VAC				50ms
Hold-up Time	115VAC / 230VAC	100% load 50% load	6ms	20ms	
Minimum Load			0%		
Internal Operating Frequency				132kHz	
Output Ripple & Noise	+70°C	12VDC			150mVp-p
		24VDC			240mVp-p
		48VDC			360mVp-p
	-30°C	12VDC			300mVp-p
		24VDC			480mVp-p
		48VDC			720mVp-p
Power Factor	115VAC		0.98		
	230VAC		0.95		

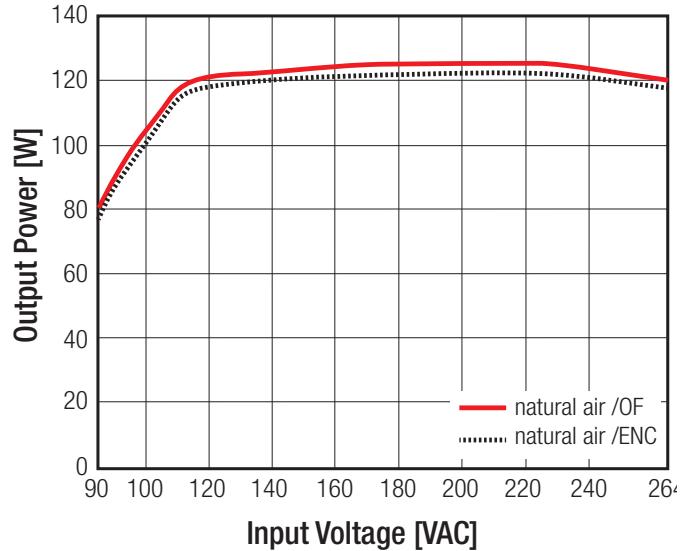
Efficiency vs. Load



Efficiency vs. Input Voltage
(@ full load)



Output Power vs. Input Voltage

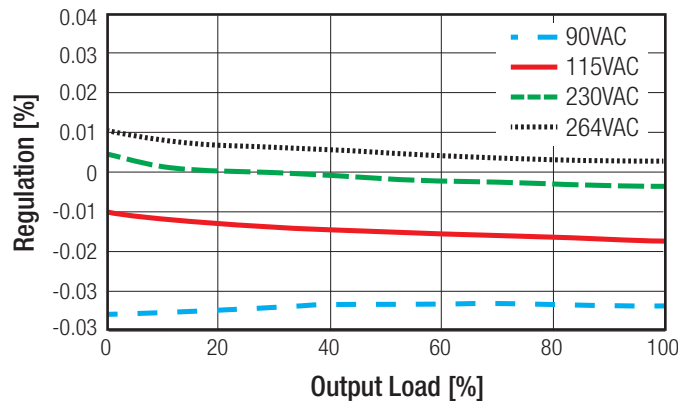


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Specifications (measured @ $t_a = 25^\circ\text{C}$, nominal input voltage, full load otherwise noted)

REGULATIONS			
Parameter	Condition		Value
Output Accuracy	-30°C to +70°C		±2.0% max.
Load Regulation	-30°C to +70°C, 0%-100% load		±0.2% typ.
Line Regulation	-30°C to +70°C		±0.1% typ.
Transient Response	-30°C to +70°C	25% load step change recovery time	±5.0% V_{out} max. 200µs max.

Normalized Output Regulation



PROTECTIONS			
Parameter	Type		Value
Input Fuse	internal		T3.15A
Short Circuit Protection	below 100mΩ		continuous, Hiccup Mode, auto recovery
Over Voltage Protection (OVP)	105%-150% of V_{out} nominal		Latch OFF
Over Voltage Category			OVC II
Class of Equipment			Class I
Isolation Voltage ⁽⁶⁾	tested for 1 minute	I/P to O/P I/P to FG O/P to FG	3kVAC 1.5kVAC 0.5kVDC
Isolation Capacitance			3300pF typ.
Isolation Resistance	I/P to O/P; I/P to FG; O/P to FG		10MΩ min.
Leakage Current	240VAC, 63Hz		0.25mA max.
Insulation Grade			reinforced

Notes:

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

ENVIRONMENTAL			
Parameter	Condition		Value
Operating Temperature Range	with derating (see graph on next page)		-30°C to +70°C
Temperature Coefficient			±0.02%/°C
Operating Humidity	non-condensing		20% - 90% RH
Operating Altitude ⁽⁶⁾			5000m
Pollution Degree			PD2
Conformal Coating			conformal coated product
Shock			20G, 11ms, 3 times for X,Y,Z axis
Vibration			10-500Hz, 3G, 10min. for each, 6cycles for each X,Y,Z
MTBF	MIL-HDBK-217F G.B. +25°C	natural convection (125W) forced cooling (150W)	100 x 10 ³ hours 200 x 10 ³ hours

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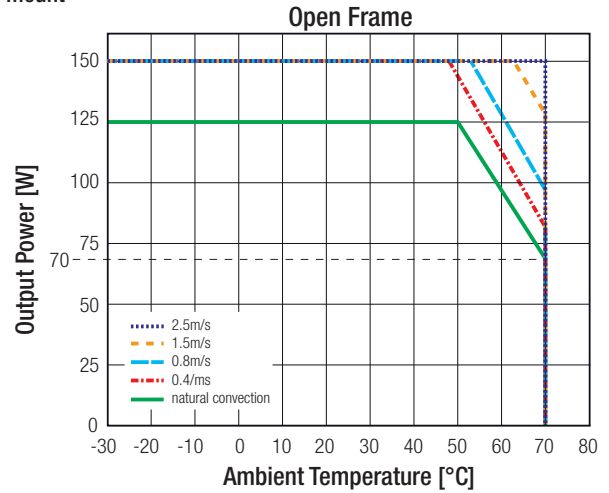
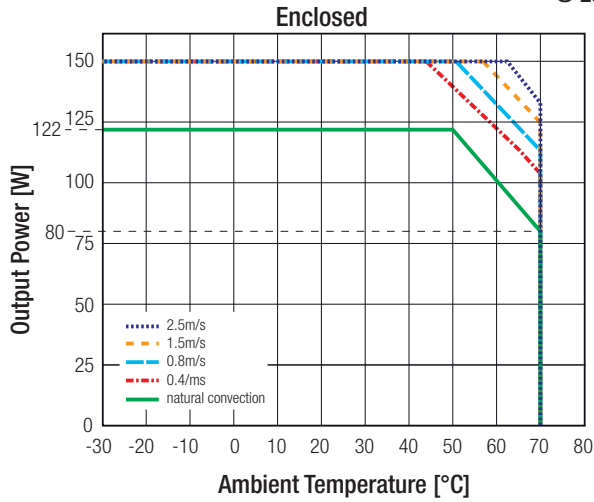
Specifications (measured @ $t_a = 25^\circ\text{C}$, nominal input voltage, full load otherwise noted)

Notes:

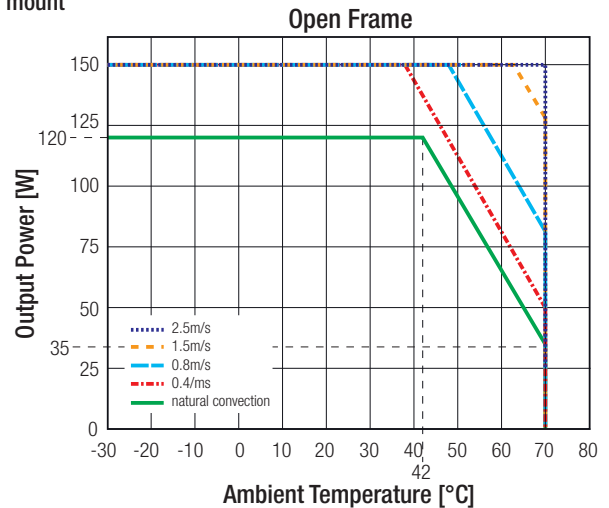
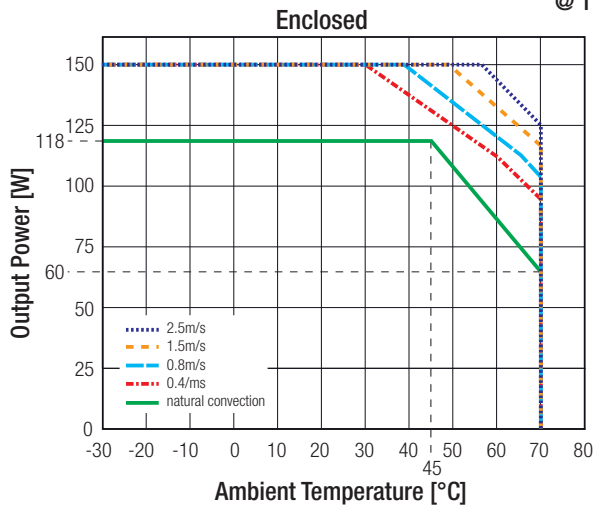
Note6: Recognized by UL for safe operation up to 5000m. High altitude operation may impact the performance and lifetime. Contact RECOM tech support for advice

Derating Graph

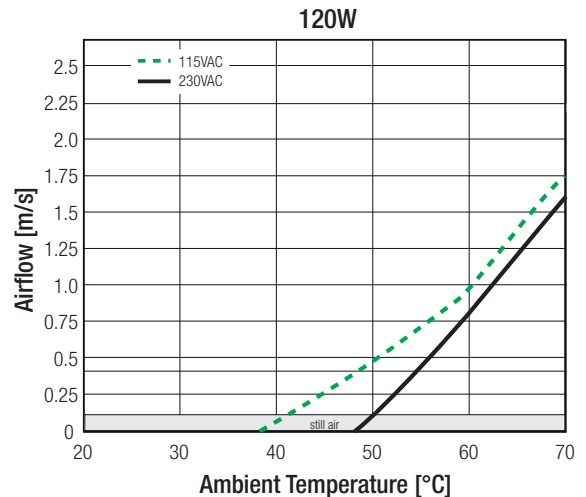
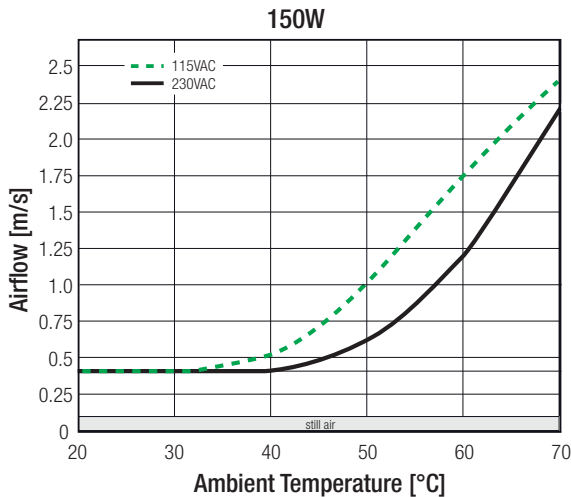
@ 230VAC, horizontal mount



@ 115VAC, horizontal mount



Required Airflow



<0.1m/s = still air
0.1 - 0.2m/s = natural convection

Specifications (measured @ $t_a = 25^\circ\text{C}$, nominal input voltage, full load otherwise noted)

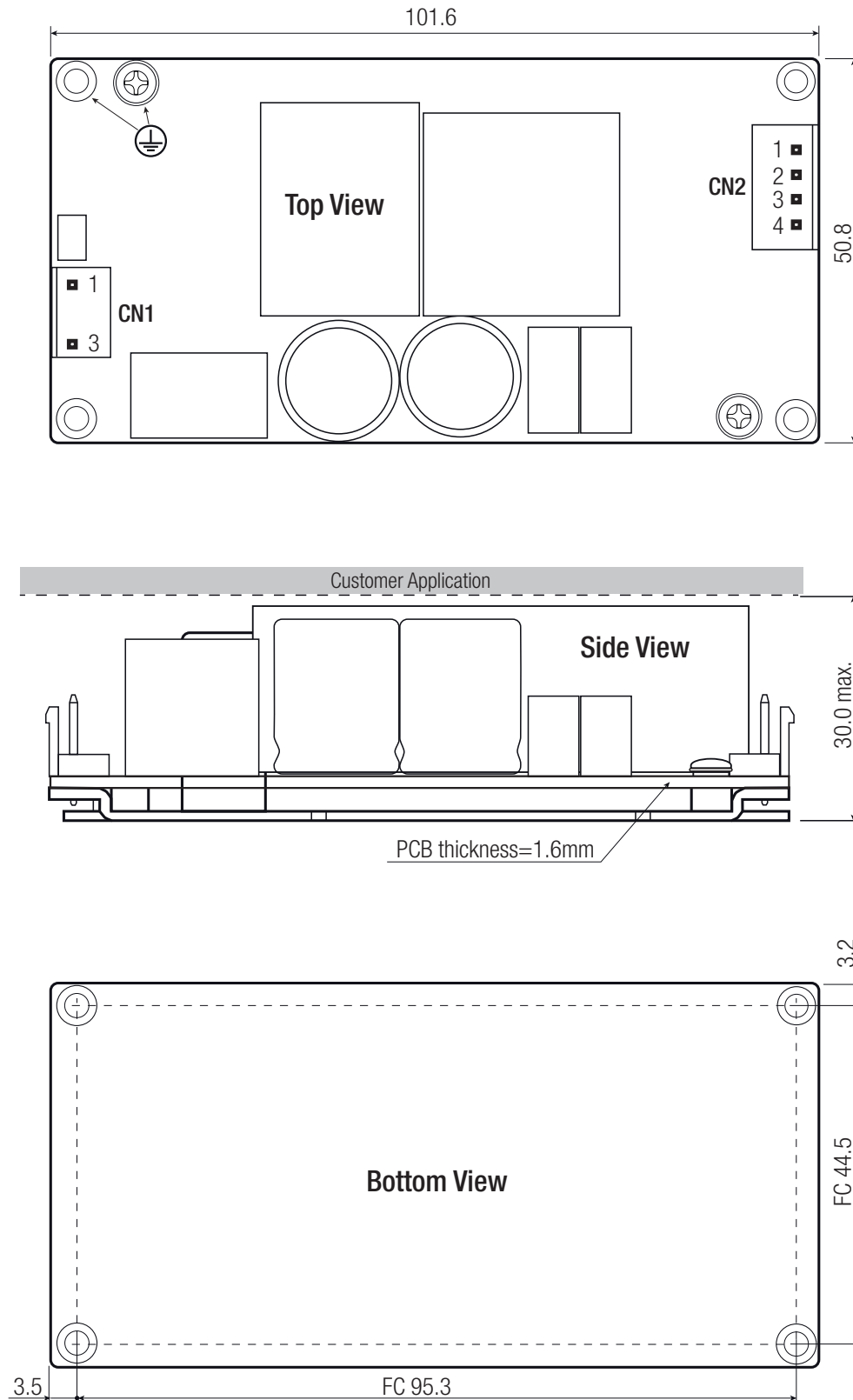
SAFETY AND CERTIFICATIONS		
Certificate Type (Safety)	Report / File Number	Standard
Information Technology Equipment, General Requirements for Safety	E196683-A2	UL60950-1, 2nd Edition, 2014 CSA C22.2 No. 60950-1-07, 2nd Ed. 2014
Audio/Video, information and communication technology equipment - Safety requirements		UL62368-1, 2nd Edition, 2014 CSA C22.2 Nr. 62368-1-14, 2nd Ed. 2014
Audio/video, information and communication technology equipment - Safety requirements (CB Scheme)	16BCS07071821	IEC62368-1, 2nd Edition, 2014 EN62368-1, 2014
Audio/video, information and communication technology equipment - Safety requirements (CB Scheme)	16BAS07018 11	IEC60950-1, 2nd Edition + AM2, 2013 EN60950-1, 2nd Edition + A2:2013
RoHS2		RoHS 2011/65/EU + AM2015/863
EMC Compliance	Conditions	Standard / Criterion
Information technology equipment - Immunity characteristics - Limits and methods of measurement	16EAS07018 11	EN55022, Class B
Information technology equipment - Immunity characteristics - Limits and methods of measurement		EN55024, 2015
Limitations on the amount of electromagnetic interference allowed from digital and electronic devices		47 CFR FCC Part 15, Subpart, Class B
ESD Electrostatic discharge immunity test	$\pm 8\text{kV}$ Air; $\pm 4\text{kV}$ Contact	EN61000-4-2, Criteria B
Radiated, radio-frequency, electromagnetic field immunity test	3V/m	EN61000-4-3, Criteria A
Fast Transient and Burst Immunity	AC Power Port: $\pm 1\text{kV}$	EN61000-4-4, Criteria B
Surge Immunity	AC Power Port: L-N $\pm 1\text{kV}$ L-PE & N-PE $\pm 2\text{kV}$	EN61000-4-5, Criteria B
Immunity to conducted disturbances, induced by radio-frequency fields	AC Power Port: 3V	EN61000-4-6, Criteria A
Voltage Dips and Interruptions	Dips: >95% reduction Interruption: >95%	EN61000-4-11, Criteria B EN61000-4-11, Criteria C
Limits of Harmonic Current Emissions		EN61000-3-2, Criteria A
Voltage Fluctuations and Flicker in Public Low-Voltage Systems $\leq 16\text{A}$ per phase		EN61000-3-3

DIMENSIONS and PHYSICAL CHARACTERISTICS		
Parameter	Type	Value
Material	PCB	FR4 (UL94-V0)
	Case/Baseplate	Aluminium
Package Dimension (LxWxH)	OF -version	101.6 x 50.8 x 30.0mm
	ENC-version	105.0 x 62.0 x 35.0mm
Package Weight	OF -version	200g
	ENC-version	265g

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Specifications (measured @ $t_a = 25^\circ\text{C}$, nominal input voltage, full load otherwise noted)

Dimension Drawing Open Frame (mm)



Connections

AC Input (CN1)

Pin #	Terminal
1 AC/L	3 Pins (Pin2 removed) with 3.96mm pitch
3 AC/N	3.96mm pitch

DC Output Connector (CN2)

Pin #	Terminal
1,2 V-	4 Pins with 3.96mm pitch
3,4 V+	3.96mm pitch

FC= fixing centers
Crimp Terminal AWG Range: 18-22AWG
Tolerance: xx.x= $\pm 1.0\text{mm}$
 xx.xx= $\pm 0.5\text{mm}$

Compatible Connectors

Connector Set available: **20900009**

Housing

Landwin 3960S Series
JST VHR
Molex 51144 Series

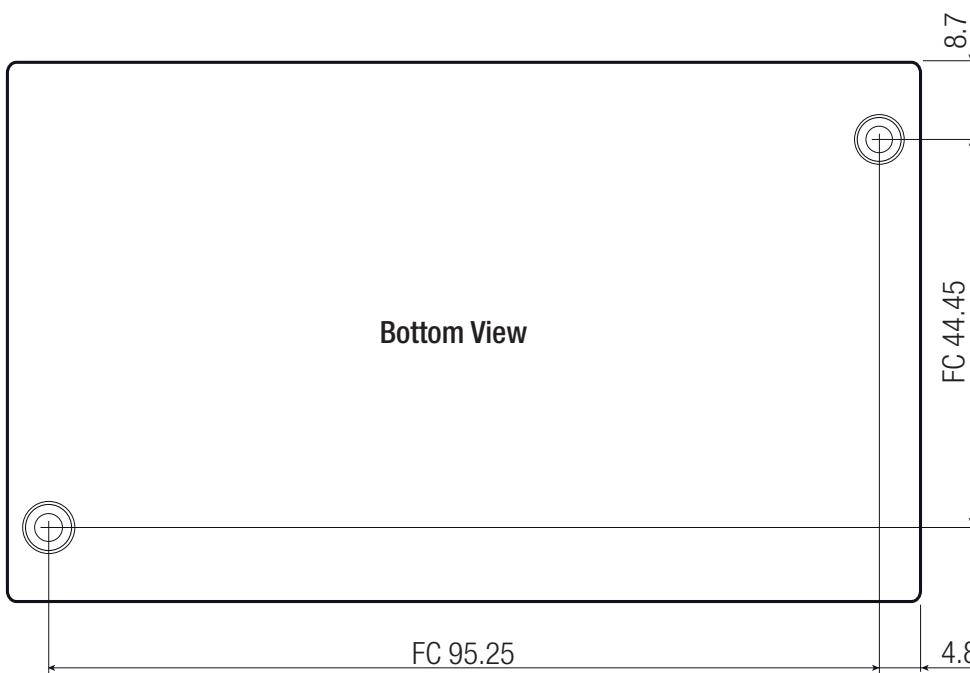
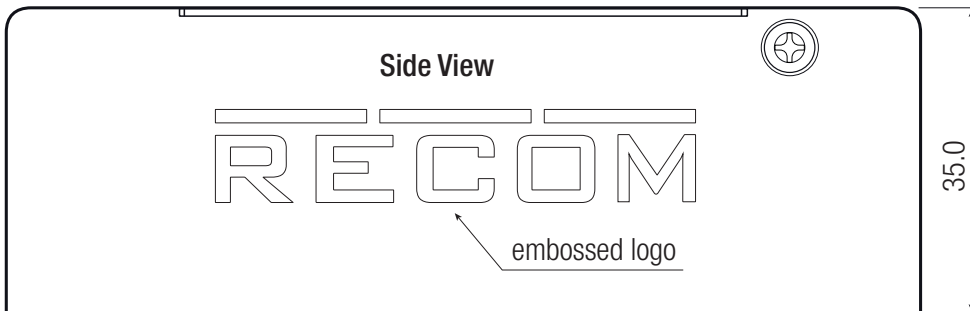
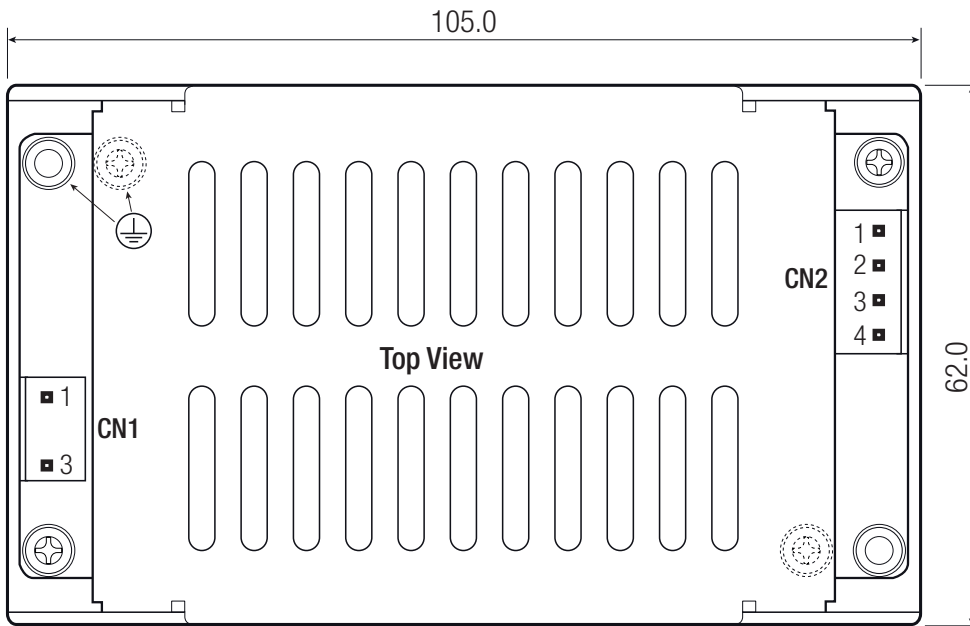
Crimp Terminal

Landwin 3963T011R
JST SVH-21T-P1.1
Molex 50539

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Specifications (measured @ ta = 25°C, nominal input voltage, full load otherwise noted)

Dimension Drawing Enclosed Case (mm)



Connections

AC Input (CN1)

Pin #	Terminal
1 AC/L	3 Pins (Pin2 removed) with
3 AC/N	3.96mm pitch

DC Output Connector (CN2)

Pin #	Terminal
1,2 V-	4 Pins with
3,4 V+	3.96mm pitch

FC= fixing centers
Crimp Terminal AWG Range: 18-22AWG
Tolerance: xx.x= ±1.0mm
 xx.xx= ±0.5mm

Compatible Connectors

Connector Set available: 20900009

Housing

- Landwin 3960S Series
- JST VHR
- Molex 51144 Series

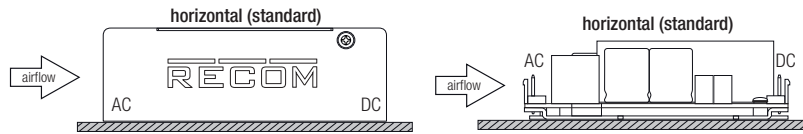
Crimp Terminal

- Landwin 3963T011R
- JST SVH-21T-P1.1
- Molex 50539

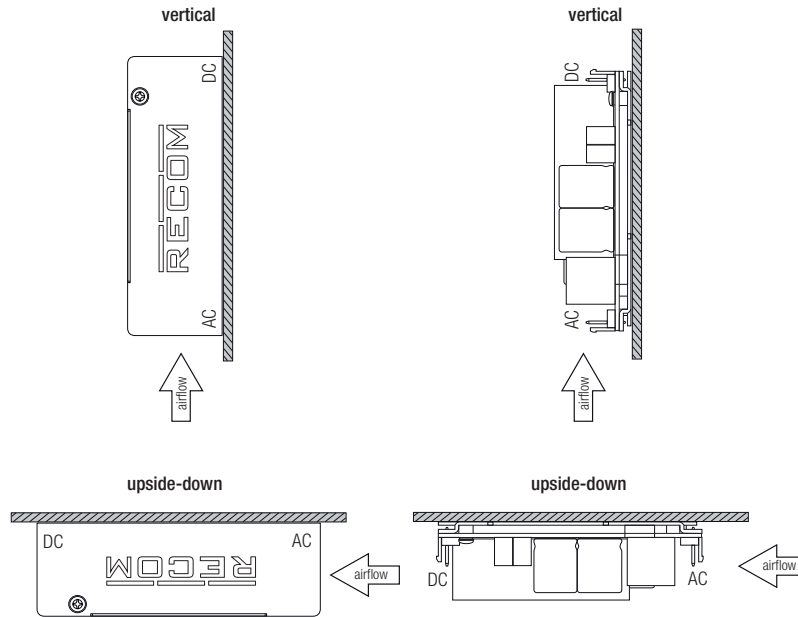
Specifications (measured @ $t_a = 25^\circ\text{C}$, nominal input voltage, full load otherwise noted)

APPLICATION and INSTALLATION

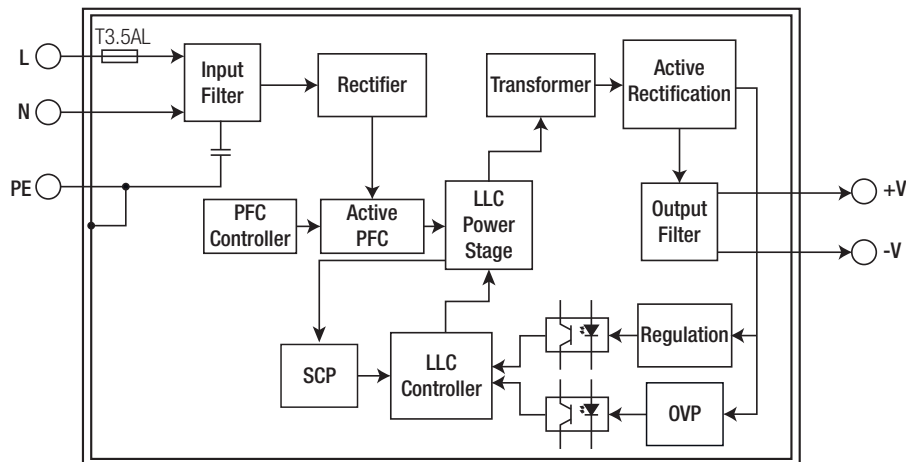
Mounting



If module is mounted vertical or upside-down with natural convection cooling, the power must be derated $\geq 10\%$.



Block Diagram



PACKAGING INFORMATION

Parameter	Type	Value
Packaging Dimension (LxWxH)	cardboard box	112.0 x 80.0 x 50.0mm
Packaging Quantity		1pcs
Storage Temperature Range		-40°C to +85°C
Storage Humidity	non-condensing	10% - 95% RH

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.