

# Features

## Regulated Converters

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

**RECOM**  
AC/DC Converter

## RAC150-G

150 Watt

4" x 2"

Open Frame or  
Enclosed Case



### 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

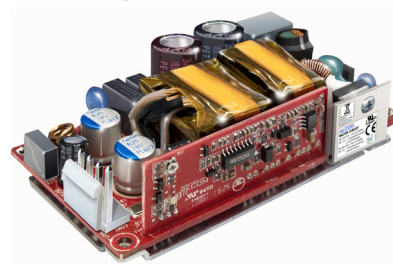
| Part Number                | Input Voltage Range [VAC] | Output Voltage [VDC] | max. Output Current <sup>(1)</sup> [mA] | typ. Efficiency <sup>(2)</sup> [%] | Max. Capacitive Load <sup>(3)</sup> [μF] |
|----------------------------|---------------------------|----------------------|-----------------------------------------|------------------------------------|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

#### Notes:

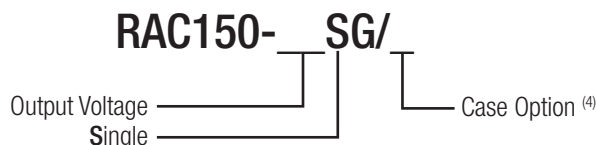
Note1: With forced air cooling, refer to derating graph.

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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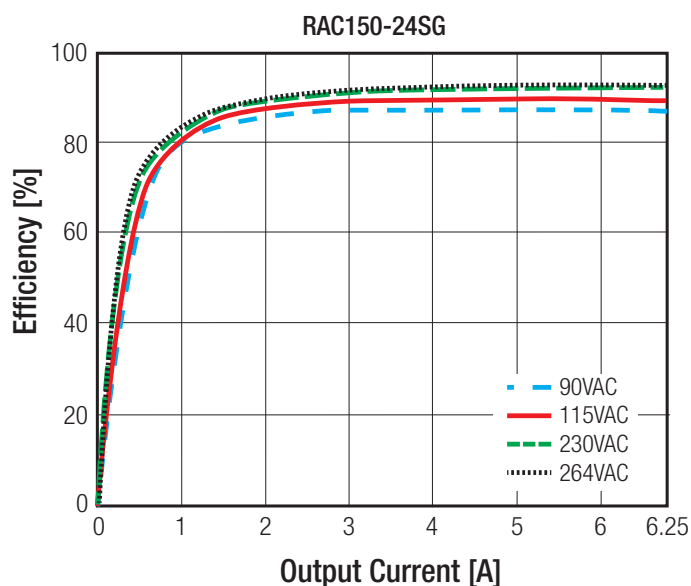
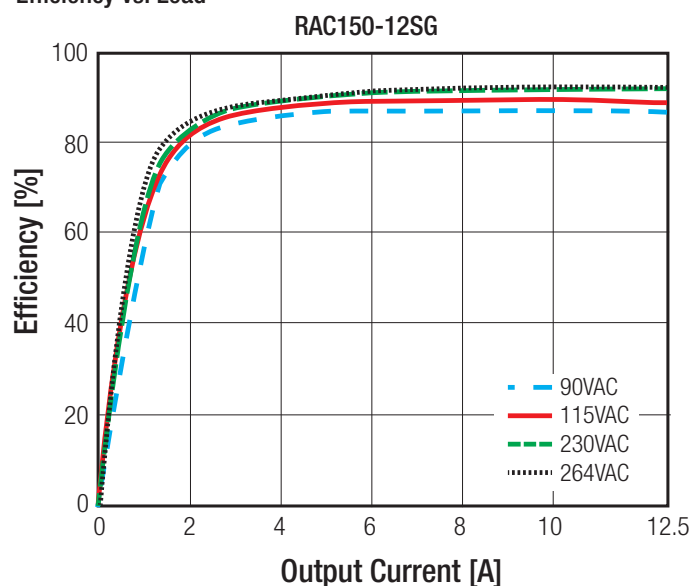


UL62368-1 Certified  
CAN/CSA C22.2 No. 62368-1-14 Certified  
UL60950 Certified  
CAN/CSA C22.2 N.60950-1-07 Certified  
IEC/EN60950-1 Certified  
EN55022/55024  
FCC Part 15  
CB Report

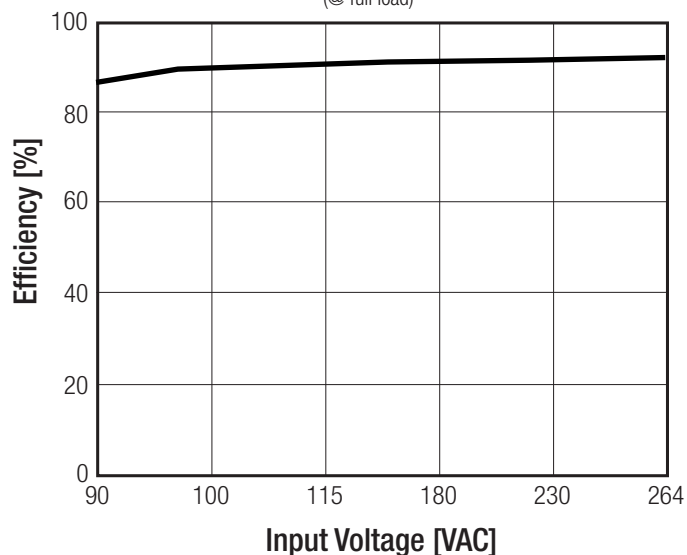
**Specifications** (measured @  $t_a = 25^\circ\text{C}$ , nominal input voltage, full load otherwise noted)

| Parameter                    | Condition       |                       | Min. | Typ.   | Max.     |
|------------------------------|-----------------|-----------------------|------|--------|----------|
| Rise Time                    | 115VAC/230VAC   |                       |      |        | 50ms     |
| Hold-up Time                 | 115VAC / 230VAC | 100% load<br>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 |        |          |

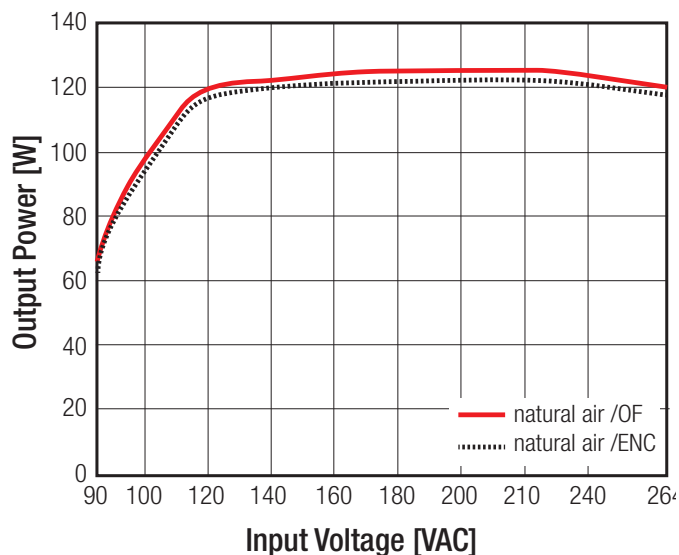
Efficiency vs. Load



Efficiency vs. Input Voltage  
(@ full load)



Output Power vs. Input Voltage



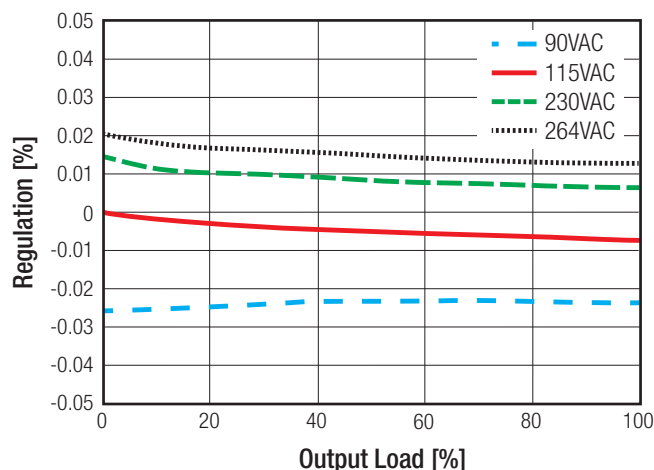
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**Specifications** (measured @  $t_a = 25^\circ\text{C}$ , nominal input voltage, full load otherwise noted)

## REGULATIONS

| Parameter          | Condition                                                 |                                    | Value                                                |
|--------------------|-----------------------------------------------------------|------------------------------------|------------------------------------------------------|
| Output Accuracy    | $-30^\circ\text{C}$ to $+70^\circ\text{C}$                |                                    | $\pm 2.0\%$ max.                                     |
| Load Regulation    | $-30^\circ\text{C}$ to $+70^\circ\text{C}$ , 0%-100% load |                                    | $\pm 0.2\%$ typ.                                     |
| Line Regulation    | $-30^\circ\text{C}$ to $+70^\circ\text{C}$                |                                    | $\pm 0.1\%$ typ.                                     |
| Transient Response | $-30^\circ\text{C}$ to $+70^\circ\text{C}$                | 25% load step change recovery time | $\pm 5.0\%$ $V_{out}$ max.<br>200 $\mu\text{s}$ max. |

### Normalized Output Regulation



## PROTECTIONS

| Parameter                        | Type                             |                                      | Value                                  |
|----------------------------------|----------------------------------|--------------------------------------|----------------------------------------|
| Input Fuse                       | internal                         |                                      | T3.15A                                 |
| Short Circuit Protection         | below 100m $\Omega$              |                                      | continuous, Hiccup Mode, auto recovery |
| Over Voltage Protection (OVP)    | 105%-150% of $V_{out}$ nominal   |                                      | Latch OFF                              |
| Over Voltage Category            |                                  |                                      | OVC II                                 |
| Isolation Voltage <sup>(6)</sup> | tested for 1 minute              | I/P to O/P<br>I/P to FG<br>O/P to FG | 3kVAC<br>1.5kVAC<br>0.5kVDC            |
| Isolation Capacitance            |                                  |                                      | 3300pF typ.                            |
| Isolation Resistance             | I/P to O/P; I/P to FG; O/P to FG |                                      | 10M $\Omega$ 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)    |                                                    | $-30^\circ\text{C}$ to $+70^\circ\text{C}$                 |
| Temperature Coefficient           |                                           |                                                    | $\pm 0.02\%/^\circ\text{C}$                                |
| Operating Humidity                | non-condensing                            |                                                    | 20% - 90% RH                                               |
| Operating Altitude <sup>(6)</sup> |                                           |                                                    | 5000m                                                      |
| Pollution Degree                  |                                           |                                                    | PD2                                                        |
| 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.<br>$+25^\circ\text{C}$ | natural convection (125W)<br>forced cooling (150W) | 100 x 10 <sup>3</sup> hours<br>200 x 10 <sup>3</sup> hours |

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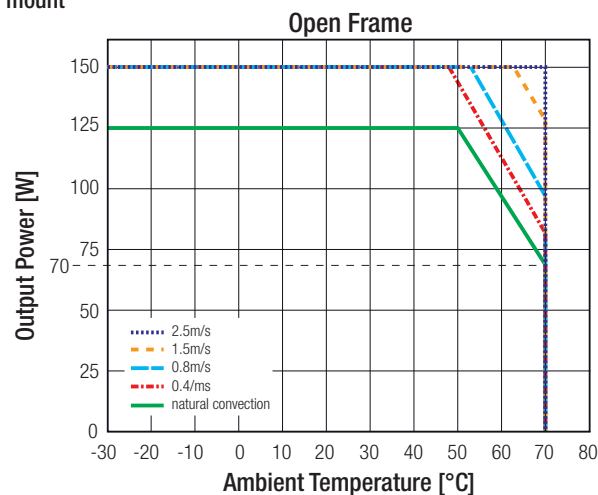
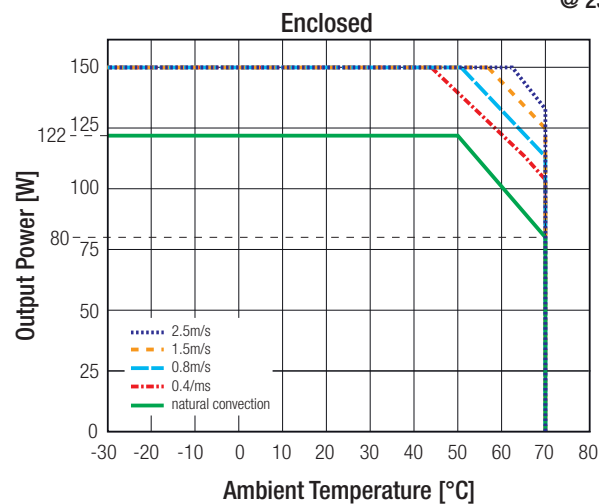
**Specifications** (measured @  $t_a = 25^\circ\text{C}$ , nominal input voltage, full load otherwise noted)

### Notes:

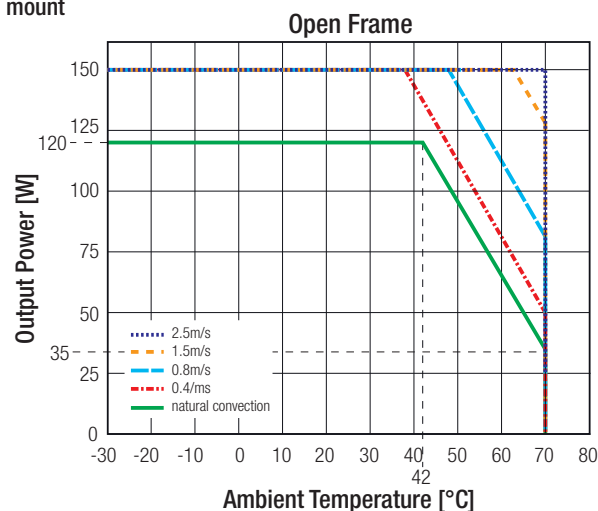
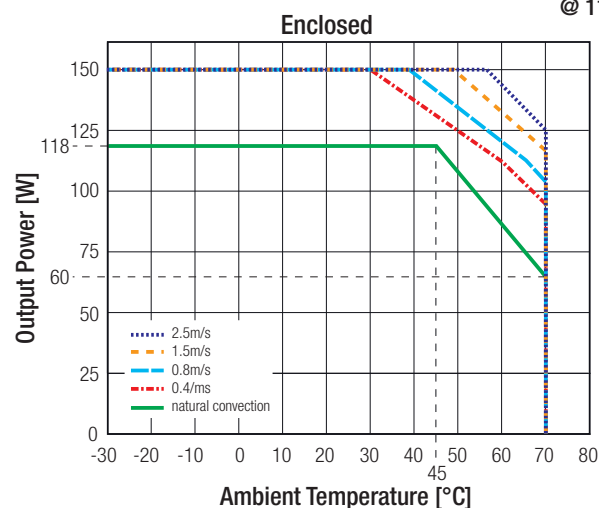
Note6: Recognized by UL for safe operation up to 5000m. High altitude operation may impact the performance and lifetime.  
Contact RECOM tech support for advice

### Derating Graph

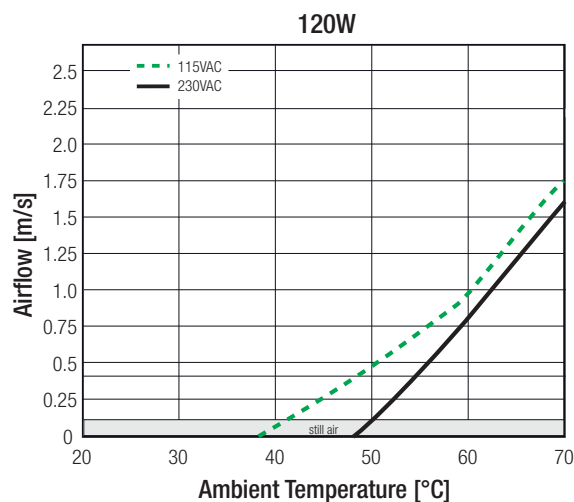
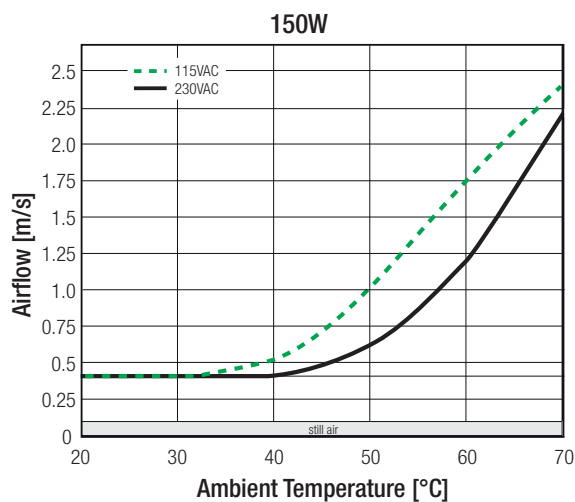
@ 230VAC, horizontal mount



@ 115VAC, horizontal mount



### Required Airflow



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

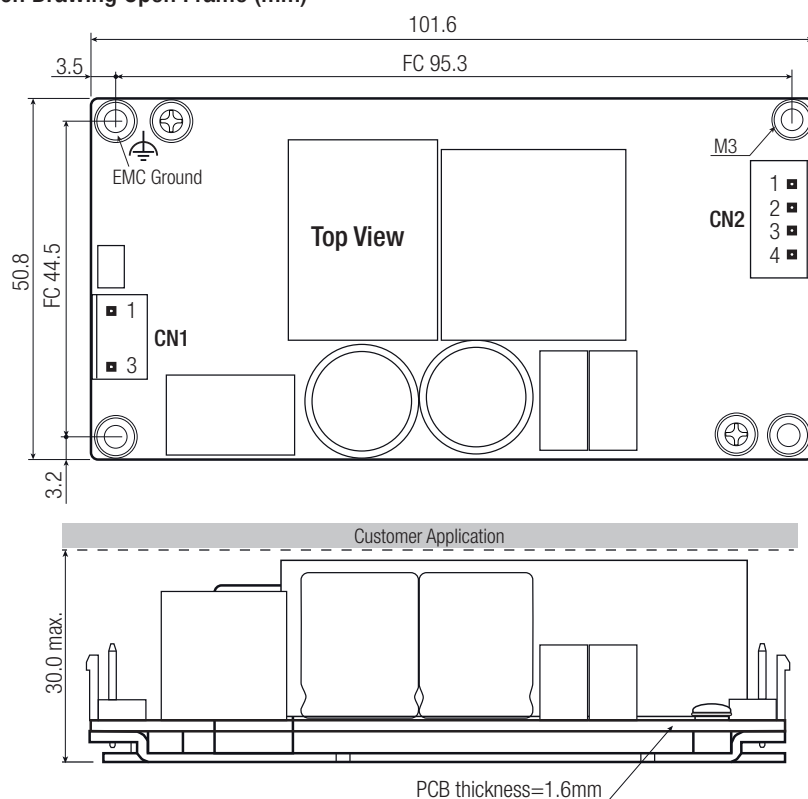
## Specifications (measured @ $t_a = 25^\circ\text{C}$ , nominal input voltage, full load otherwise noted)

| SAFETY AND CERTIFICATIONS                                                                                |                                                                    |                                                                         |
|----------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|-------------------------------------------------------------------------|
| Certificate Type (Safety)                                                                                | Report / File Number                                               | Standard                                                                |
| Information Technology Equipment, General Requirements for Safety                                        | E196683-A2                                                         | UL60950-1, 2nd Edition, 2014<br>CSA C22.2 No. 60950-1-07, 2nd Ed. 2014  |
| Audio/Video, information and communication technology equipment - Safety requirements                    |                                                                    | UL62368-1, 2nd Edition, 2014<br>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<br>EN62368-1, 2014                        |
| Audio/video, information and communication technology equipment - Safety requirements (CB Scheme)        | 16BAS07018 11                                                      | IEC60950-1, 2nd Edition + AM2, 2013<br>EN60950-1, 2nd Edition + A2:2013 |
| RoHS2                                                                                                    |                                                                    | RoHS 2011/65/EU + AM2015/863                                            |
| EMC Compliance                                                                                           | Conditions                                                         | Standard / Criterion                                                    |
| Information technology equipment - Radio disturbance 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 $\pm 1\text{kV}$<br>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<br>Interruption: $>95\%$                   | EN61000-4-11, Criteria B<br>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                                                             |

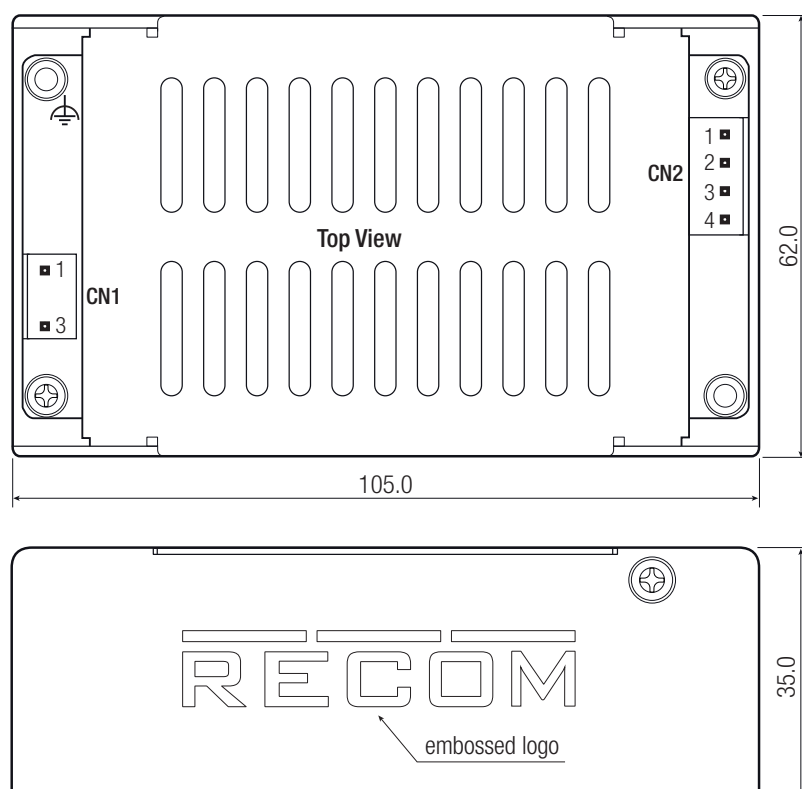
| DIMENSIONS and PHYSICAL CHARACTERISTICS |                |                       |
|-----------------------------------------|----------------|-----------------------|
| Parameter                               | Type           | Value                 |
| Material                                | PCB            | FR4 (UL94-V0)         |
|                                         | Case/Baseplate | Aluminium             |
| Package Dimension (LxWxH)               | OF -version    | 101.6 x 50.8 x 24.0mm |
|                                         | ENC-version    | 105.0 x 62.0 x 35.0mm |
| Package Weight                          | OF -version    | 200g                  |
|                                         | ENC-version    | 265g                  |
| continued on next page                  |                |                       |

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

**Dimension Drawing Open Frame (mm)**



**Dimension Drawing Enclosed Case (mm)**



## Connection via Connector

Suggested Plug: Connector SET OF

### AC Input (CN1)

| Pin #  | Pin Header           |
|--------|----------------------|
| 1 AC/N | LANDWIN 3961P0300TN2 |
| 3 AC/L |                      |

### DC Output Connector (CN2)

| Pin #  | Pin Header         |
|--------|--------------------|
| 1,2 V+ | LANDWIN 3962P0400T |
| 3,4 V- |                    |

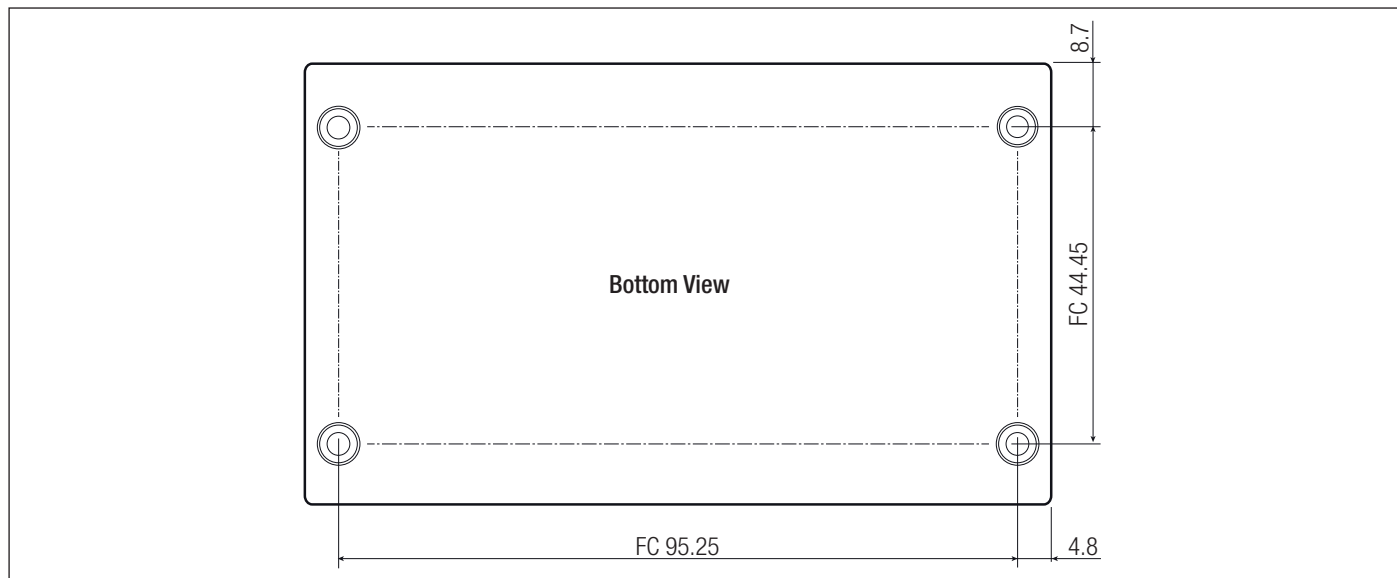
FC= fixing centers

Crimp Terminal AWG Range: 18-22AWG

Tolerance: xx.x=  $\pm 1.0\text{mm}$

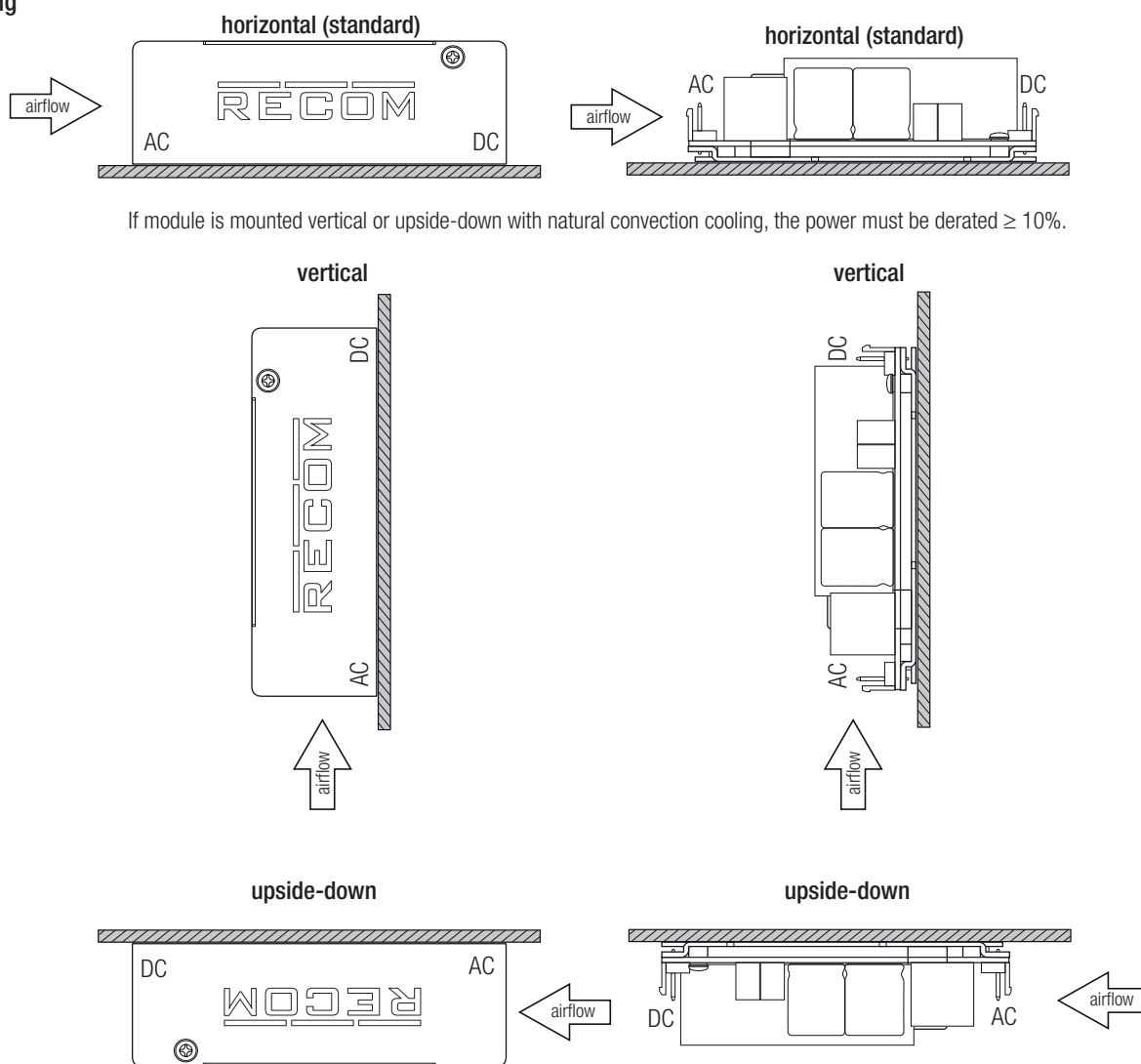
xx.xx=  $\pm 0.5\text{mm}$

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



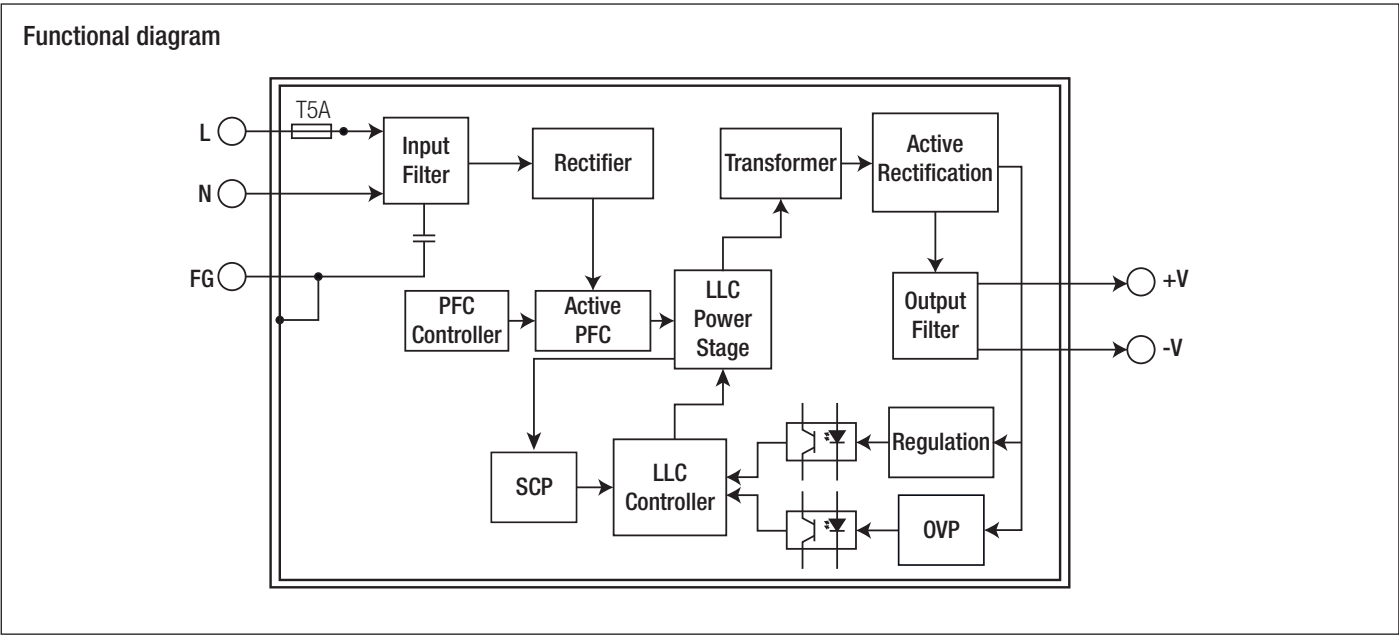
## APPLICATION and INSTALLATION

### Mounting



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



| 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.