

**!NOT RECOMMENDED FOR NEW DESIGNS!**

**RECOM**  
AC/DC Converter

## Features

- Long 5 year warranty
- 2MOPP/250VAC
- Suitable for built in Class II applications
- Wide input voltage range (85-264VAC)
- Low leakage current (<75µA)
- 5000m operation
- -40°C to +85°C operating temperature

## Regulated Converter

## RACM40

**40 Watt Enclosed & Open Frame Case Style Single Output**



### Description

The RACM40 is a compact 3" x 2" high efficiency AC/DC power supply with 2xMOPP safety approval for medical applications. These space saving enclosed power supplies have an universal input voltage range (85-264VAC), 4kVAC isolation, require no minimum load and can be used at ambient temperatures of between -40°C and +85°C. The 5V, 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 output voltage can be trimmed over a ±10% range. The RACM40 series is certified to medical safety standard IEC/ES/EN-60601-1 3rd Edition and with less than 75µA leakage current. It has a built-in Class B EMI filter and comes with a 5 year warranty.



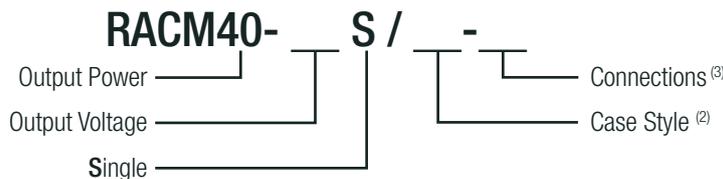
### Selection Guide

| Part Number                 | Input Voltage Range [VAC] | Output Voltage [VDC] | Output Current [A] | Efficiency typ. [%] | Max. Capacitive Load <sup>(1)</sup> [µF] |
|-----------------------------|---------------------------|----------------------|--------------------|---------------------|--|
| RACM40-05S <sup>(1,2)</sup> | 85-264                    | 5                    | 8.0                | 90                  | 16000                                    |
| RACM40-12S <sup>(1,2)</sup> | 85-264                    | 12                   | 3.34               | 92                  | 2785                                     |
| RACM40-15S <sup>(1,2)</sup> | 85-264                    | 15                   | 2.67               | 92                  | 1780                                     |
| RACM40-24S <sup>(1,2)</sup> | 85-264                    | 24                   | 1.67               | 92                  | 700                                      |
| RACM40-48S <sup>(1,2)</sup> | 85-264                    | 48                   | 0.84               | 93                  | 175                                      |

#### Notes:

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

### Model Numbering



#### Notes:

- Note2: Case Style: without suffix, standard enclosed case  
add suffix "/OF" for open frame style
- Note3: Connections: without suffix, standard connection with connector  
with suffix "-ST" connection with screw terminals

#### Examples:

- RACM40-12S = 12Vout, standard enclosed case  
RACM40-48S/OF = 48Vout, open frame style  
RACM40-15S/OF-ST = 15Vout, open frame style with screw terminal connection

CSA/CAN-C22.2 No 60601-1:14 certified  
ANSI/AAMI ES60601-1 certified  
EN60601-1-2  
CISPR11  
FCC Part 15 & 18

### PREFERRED ALTERNATIVES

Please consider this alternatives:

**RACM40-K Series**

### YOU MAY ALSO LIKE

Please consider this alternatives:

**RACM60-K Series**

**Specifications** (measured at Ta= 25°C, 250VAC, full load and after warm-up)

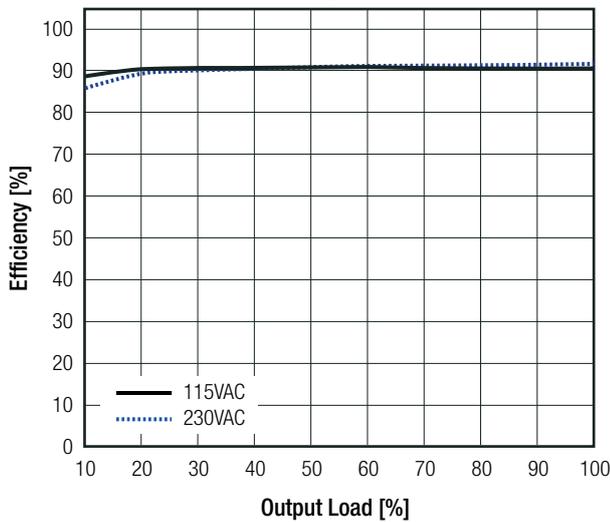
| BASIC CHARACTERISTICS                            |   |                                |                                |                      |
|--|---|--------------------------------|--------------------------------|----------------------|
| Parameter  | Condition   | Min.                           | Typ.                           | Max.                 |
| Input Voltage                                    |   | 85VAC<br>100VDC <sup>(4)</sup> | 230VAC                         | 264VAC<br>370VDC     |
| Input Current                                    | 115VAC, full load<br>230VAC, full load  |                                |                                | 1.0A<br>0.5A         |
| Inrush Current                                   | 230VAC  |                                |                                | 60A                  |
| No load Power Consumption                        |   |                                |                                | 0.11W                |
| Input Frequency Range                            | AC Input  |                                | 50/60Hz                        | 440Hz <sup>(4)</sup> |
| Output Voltage Trimming                          | on-board trimpot  |                                | ±10.0%                         |                      |
| Minimum Load                                     |   | 0%                             |                                |                      |
| Start-up Time                                    |   |                                |                                | 1s                   |
| Rise Time  |   |                                | 20ms                           |                      |
| Hold up Time                                     | 115VAC, full load   |                                | 25ms                           |                      |
| Internal Operating Frequency                     | 5VDC, 230VAC<br>others, 230VAC  |                                | 70kHz<br>120kHz                |                      |
| Output Ripple and Noise<br>(measured @ 20MHz BW) | 5VDC, 12VDC and 15VDC with 10µF/25V MLCC<br>24VDC, with 1µF/50V MLCC<br>48VDC, with 0.1µF/100V MLCC |                                | 75mVp-p<br>75mVp-p<br>150mVp-p |                      |

**Notes:**

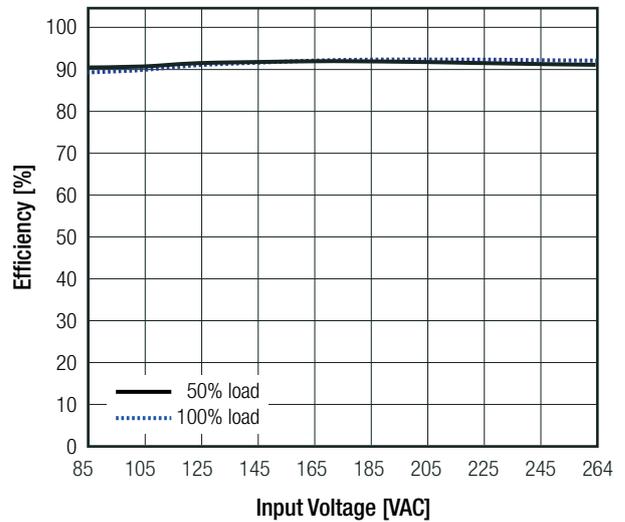
Note4: Confirmed performance, but not covered in certificates. 100V input voltage with derating

**RACM40-24S**

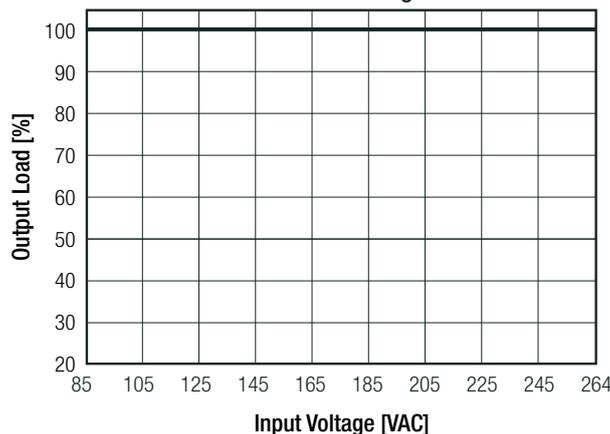
**Efficiency vs. Load**



**Efficiency vs. Input Voltage**



**Line Derating**

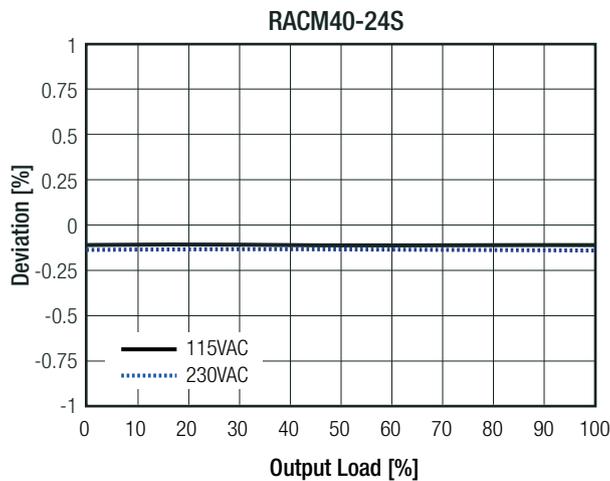


**Specifications** (measured at Ta= 25°C, 250VAC, full load and after warm-up)

**REGULATIONS**

| Parameter                | Condition                                  |                | Value          |
|--------------------------|--|----------------|----------------|
| Output Accuracy          | 230VAC, full load                          |                | ±1.0%          |
| Line Regulation          | low line to high line, full load           |                | ±0.2%          |
| Load Voltage Regulation  | 0% to 100% load                            | 5VDC<br>others | 0.7%<br>0.5%   |
|                          | 10% to 90% load                            | 5VDC<br>others | 0.6%<br>0.4%   |
| 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<br>neutral          |  | T3.15A / 250VAC, slow blow type<br>T3.15A / 250VAC, slow blow type |
| Short Circuit Protection (SCP)   |                                   |  | continuous, auto-recovery  |
| Over Load Protection (OLP)       | % of Iout rated (Hiccup)          |  | 145% typ.  |
| Over Voltage Protection (OVP)    | % of Vout nominal (Latch off)     |  | 125% min / 140% max.   |
| Isolation Voltage <sup>(5)</sup> | tested for 1 minute               | I/P to O/P<br>I/P to Case, O/P to Case | 4kVAC<br>2.5kVAC   |
| Isolation Resistance             | 500VDC                            |  | 100MΩ min.   |
| Insulation Grade                 |                                   |  | reinforced   |
| Leakage Current                  | 264VAC                            |  | 75μA max.  |
| Means of Protection              | working voltage 250VAC/continuous |  | 2MOPP  |
| Medical Device Classification    |                                   |  | built-in power supply  |
| Internal                         | clearance<br>creepage             |  | >8.0mm<br>>8.0mm   |

**Notes:**

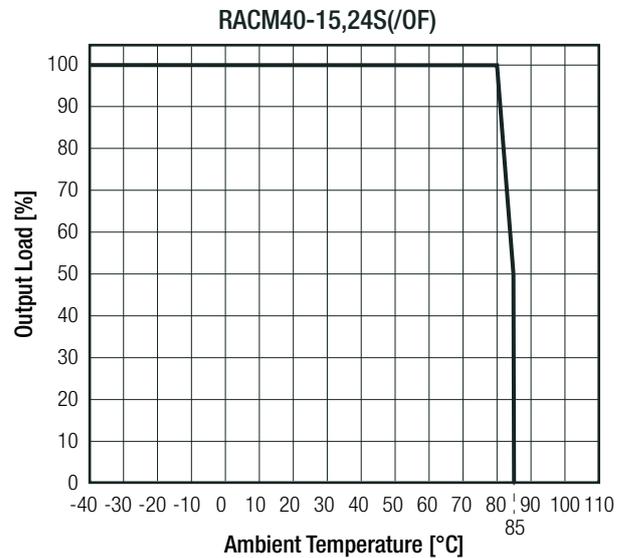
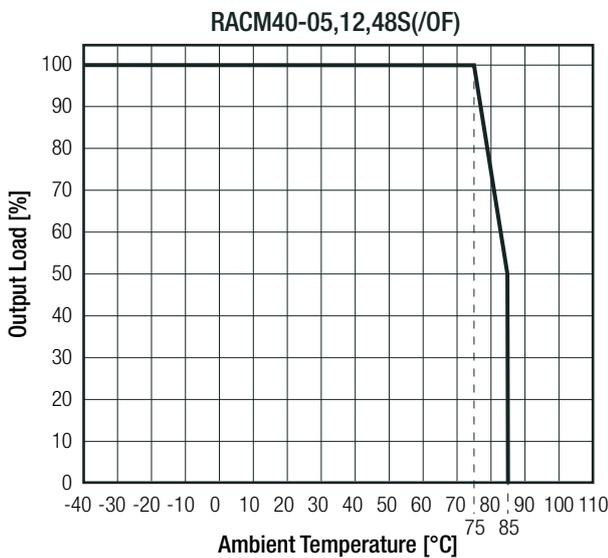
Note5: For repeat Hi-Pot testing, reduce the time and/or the test voltage

**Specifications** (measured at Ta= 25°C, 250VAC, full load and after warm-up)

| ENVIRONMENTAL               |  |                              |
|-----------------------------|--|------------------------------|
| Parameter                   | Condition                                    | Value                        |
| Operating Temperature Range | refer to derating graph                      | -40°C to +85°C               |
| Temperature Coefficient     |  | ±0.02%/K                     |
| Operating Altitude          |  | 5000m max.                   |
| Operating Humidity          | non-condensing                               | 5% to 95% RH                 |
| Pollution Degree            |  | PD2                          |
| Shock                       |  | according to IEC60068-2-27   |
| Vibration                   |  | according to IEC60068-2-6    |
| MTBF                        | according to MIL-HDBK-217F, full load, +25°C | 3010 x 10 <sup>3</sup> hours |

**Derating Graph**

(@ 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<br>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<br>EN60601-1:2006           |
| 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   |                      | CISPR11:2009 + A1:2010, Class B                                    |

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**Specifications** (measured at Ta= 25°C, 250VAC, 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   | 20V/m (80-2700MHz)<br>27V/m (385MHz)<br>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<br>L-GND= ±2kV                      | IEC61000-4-5:2014  |
| Immunity to conducted disturbances, induced by radio-frequency fields  | 20Vr.m.s   | IEC61000-4-6:2013  |
| Power Frequency Magnetic Field   | 50Hz, 30A/m  | IEC61000-4-8:2009  |
| Voltage Dips and Interruptions   | Dips: >95%; 30%;<br>Interruptions >95%                 | IEC61000-4-11:2004   |
| 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 9 kHz to 40 GHz |  | ANSI C63.4:2014  |
| FCC methods of measurement of radio noise emissions from industrial, scientific, and medical equipment                               |  | FCC OST/MP-5   |
| 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 ±15kV; Contact ±6kV                                | IEC61000-4-2:2008, Criteria A                                    |
| Radiated, radio-frequency, electromagnetic field immunity test   | 10V/m (80-1000MHz)<br>20V/m (80-1000MHz)               | IEC61000-4-3:2006 + A2:2010, Criteria A                          |
| Fast Transient and Burst Immunity  | AC Power Port: ±4kV                                    | IEC61000-4-4:2012, Criteria A                                    |
| Surge Immunity   | AC Port: L-N= ±2kV<br>L-PE= ±4kV                       | IEC61000-4-5:2014, Criteria A                                    |
| Immunity to conducted disturbances, induced by radio-frequency fields  | AC Power Port 10V, 20V                                 | IEC61000-4-6:2013, Criteria A                                    |
| Power Frequency Magnetic Field   | 50Hz/60Hz, 100A/m,<br>1000A/m                          | IEC61000-4-8:2009, Criteria A                                    |
| Voltage Dips and Interruptions   | Dips: >95%; 60%; 30%<br>Interruptions >95%             | IEC61000-4-11:2004, Criteria A<br>IEC61000-4-11:2004, Criteria B |
| Damped oscillatory wave immunity test  | AC Port: L-N= ±1kV<br>L/N-G= ±2.5kV                    | IEC61000-4-18:2006 + A1:2010, Criteria A                         |
| Limits of Voltage Fluctuations and Flicker   |  | EN61000-3-3:2013   |

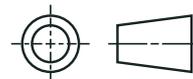
**DIMENSION and PHYSICAL CHARACTERISTICS**

| Parameter         | Type                       | Value                |
|-------------------|----------------------------|----------------------|
| Material          | enclosed case              | aluminum             |
|                   | PCB                        | FR4, (UL94V-0)       |
| Dimension (LxWxH) | enclosed case              | 91.4 x 60.5 x 33.3mm |
|                   | open frame                 | 76.2 x 50.8 x 26.5mm |
| Weight            | enclosed case              | 172g                 |
|                   | open frame + "-ST" version | 137g                 |

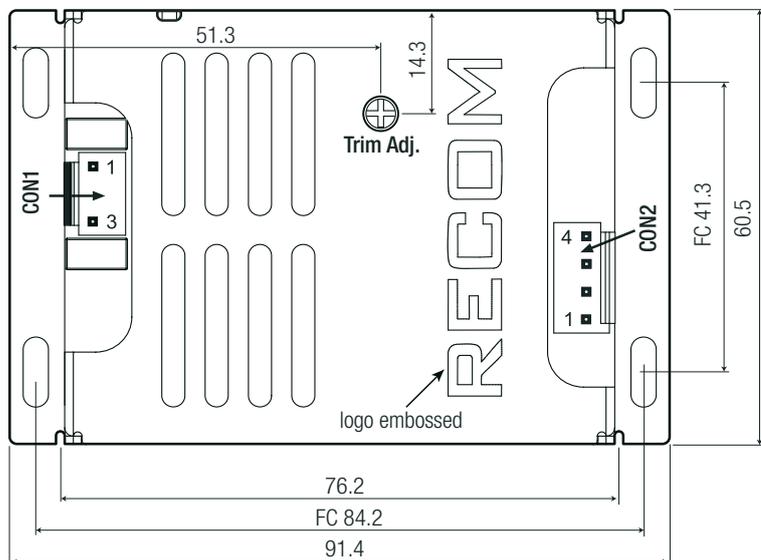
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**Specifications** (measured at Ta= 25°C, 250VAC, full load and after warm-up)

Dimension Drawing Enclosed Case (mm)



Top View



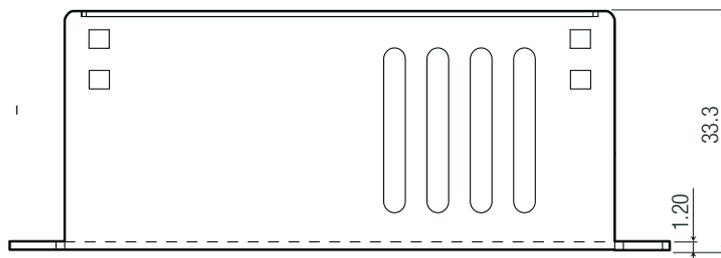
**AC Input Connector (CON1)**

| Pin#   | Terminal    | Mating Housing |
|--------|-------------|----------------|
| 1 AC/L | Molex KK156 | Molex KK156    |
| 3 AC/N | (SD-2478)   | (09508031)     |

**DC Output Connector (CON2)**

| Pin#   | Terminal    | Mating Housing |
|--------|-------------|----------------|
| 1,2 V- | Molex KK156 | Molex KK156    |
| 3,4 V+ | (SD-2478)   | (09508041)     |

Side View



Bottom View

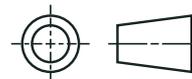
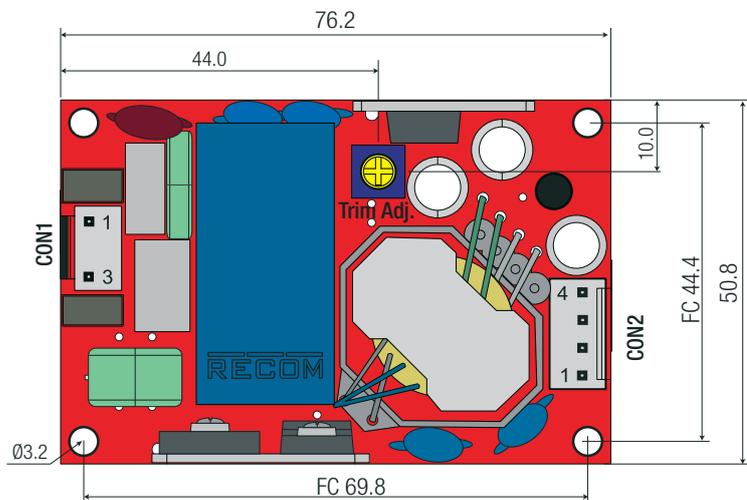


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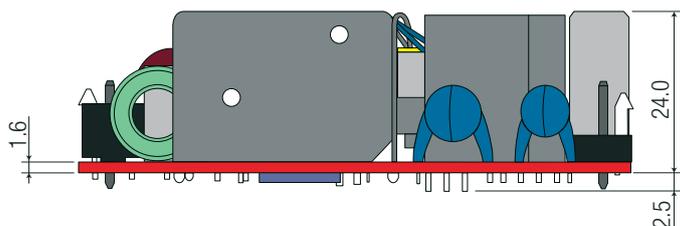
**Specifications** (measured at Ta= 25°C, 250VAC, full load and after warm-up)

**Dimension Drawing Open Frame (/OF) (mm)**

**Top View**



**Side View**



**AC Input Connector (CON1)**

| Pin#   | Terminal    | Mating Housing |
|--------|-------------|----------------|
| 1 AC/L | Molex KK156 | Molex KK156    |
| 3 AC/N | (SD-2478)   | (09508031)     |

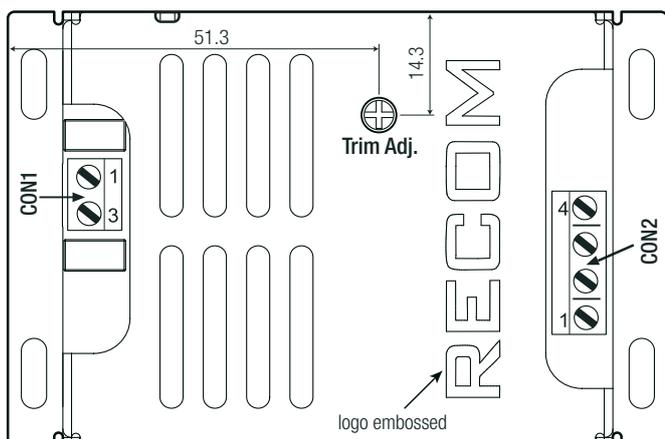
**DC Output Connector (CON2)**

| Pin#   | Terminal    | Mating Housing |
|--------|-------------|----------------|
| 1,2 V- | Molex KK156 | Molex KK156    |
| 3,4 V+ | (SD-2478)   | (09508041)     |

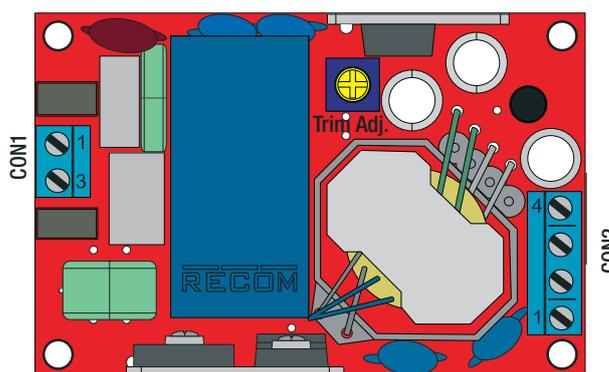
**Screw Terminal Connection “-ST”**

**Top View**

**Enclosed Version**



**Open Frame Version**



**Screw terminal information**

| #   | Function   | AWG   | Model    |
|-----|------------|-------|----------|
| 1   | VAC in (L) | 26-16 | ETB30    |
| 3   | VAC in (N) | 26-16 | (EK381V) |
| 1,2 | -Vout      | 26-16 | ETB30    |
| 3,4 | +Vout      | 26-16 | (EK381V) |

recommended tightening torque: 0.2Nm

**Specifications** (measured at Ta= 25°C, 250VAC, full load and after warm-up)**PACKAGING INFORMATION**

| Parameter                   | Type           |               | Value                 |
|-----------------------------|----------------|---------------|-----------------------|
| Packaging Dimension (LxWxH) | cardboard box  | enclosed case | 120.0 x 80.0 x 85.0mm |
|                             |                | open frame    | 111.0 x 94.0 x 51.0mm |
| Packaging Quantity          |                |               | 1pcs                  |
| Storage Temperature Range   |                |               | -40°C to +85°C        |
| Storage Humidity            | non-condensing |               | 5% to 95% RH          |

The product information and specifications may be subject to changes even without prior written notice. The product has been designed for various applications; its suitability lies in the responsibility of each customer. The products are not authorized for use in safety-critical applications without RECOM's explicit written consent. A safety-critical application is an application where a failure may reasonably be expected to endanger or cause loss of life, inflict bodily harm or damage property. The applicant 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.