

# Features

## Regulated Converter

- Household, medically and ITE certified
- Class II installations (without FG)
- IP68 waterproof encapsulation
- Long life components, rugged module
- Energy Efficiency Level VI
- Cable and connector modifications on request

### Description

The RACM30-ER/W series comprises reliable and highly efficient power conversion modules in a potted IP68 certified, waterproof encapsulation to fit into flush mount wall installations. All versions are covered by multiple certifications for household, medical and ITE safety standards as well. With a certified operation up to 5000m altitude and an ambient temperature range from -20°C up to +70°C, the compact modules are designed to power sanitary, healthcare, smart building, automation, and household applications. Since these modules do not require any external components, they are ready to connect and forget.

### Selection Guide

| Part Number                 | Input Voltage Range [VAC] | Output Voltage <sup>(1)</sup> [VDC] | Output Current [A] | Efficiency typ. <sup>(3)</sup> [%] |
|-----------------------------|---------------------------|-------------------------------------|--------------------|------------------------------------|
| RACM30-12SER <sup>(2)</sup> | 90-264                    | 12                                  | 2.5                | 88                                 |
| RACM30-24SER <sup>(2)</sup> | 90-264                    | 24                                  | 1.25               | 89.5                               |

#### Notes:

Note1: Other output voltages on request

Note2: Efficiency is tested at nominal input (115/230VAC) and full load at +25°C ambient

### Model Numbering



#### Notes:

Note3: Other connection types on request

**RECOM**  
AC/DC Converter

## RACM30-ER/W

30 Watt  
Wired  
Round Shape  
Single Output



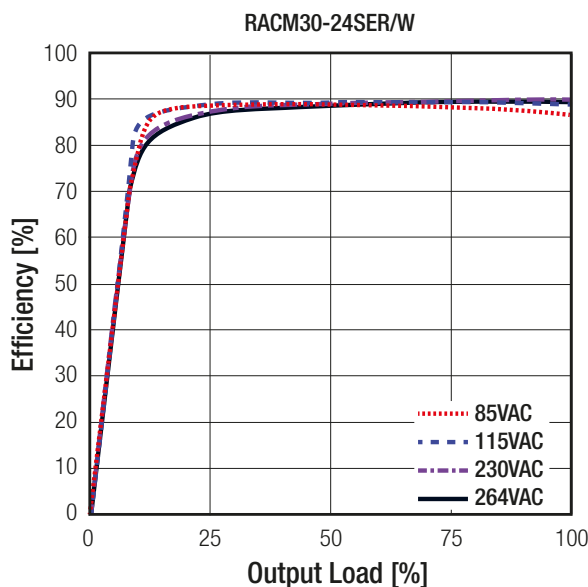
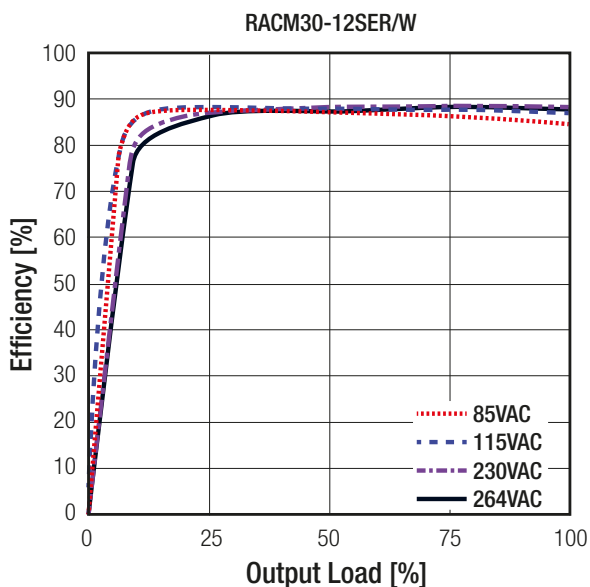
IEC/EN60950-1 certified  
UL60950-1 certified  
ANSI/AAMI ES60601-1 certified  
IEC/EN60601-1 certified  
IEC/EN60335-1 certified  
IEC/EN61558-1 certified  
IEC/EN61558-2-16 certified  
IEC/EN60601-1-2 certified  
EN55024/32 certified  
EN55014-1 (-2) certified  
IEC60529 certified

**Specifications** (measured @ Ta= 25°C, nom. Vin (115/230VAC), full load after warm-up unless otherwise stated)

### BASIC CHARACTERISTICS

| Parameter                    | Condition                | Min.    | Typ.          | Max.            |
|------------------------------|--------------------------|---------|---------------|-----------------|
| Internal Input Filter        |                          | Pi type |               |                 |
| Input Voltage Range          |                          | 90VAC   | 230VAC        | 264VAC          |
| Input Current                | 115VAC<br>230VAC         |         |               | 1000mA<br>290mA |
| Inrush Current               | 115VAC<br>230VAC         |         | 60A<br>95A    |                 |
| No load Power Consumption    |                          |         |               | 75mW            |
| Input Frequency Range        |                          | 47Hz    |               | 63Hz            |
| Minimum Load                 |                          | 0%      |               |                 |
| Power Factor                 |                          |         | 0.55          |                 |
| Start-up Time                | 115VAC<br>230VAC         |         | 75ms<br>150ms |                 |
| Rise Time                    | 115VAC / 230VAC          |         | 10ms          |                 |
| Hold-up Time                 | 115VAC<br>230VAC         |         | 15ms<br>55ms  |                 |
| Internal Operating Frequency | 100% load at nominal Vin |         | 100kHz        |                 |
| Output Ripple and Noise      |                          |         |               | 75mVp-p         |

### Efficiency vs. Load



### REGULATIONS

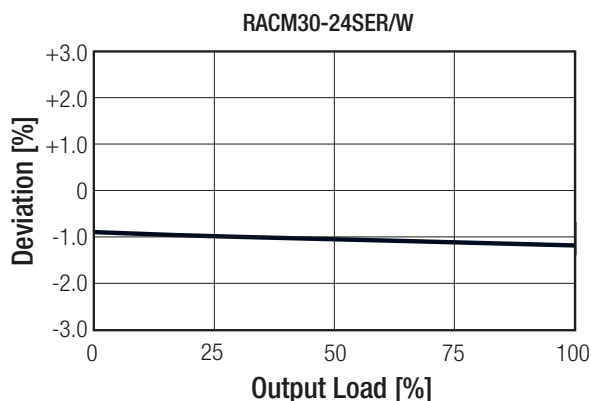
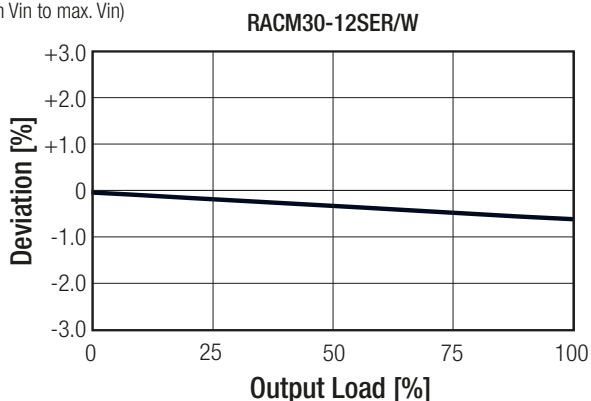
| Parameter          | Condition             | Value      |
|--------------------|-----------------------|------------|
| Output Accuracy    |                       | ±3.0% max. |
| Line Regulation    | low line to high line | ±1.0% max. |
| Load Regulation    | 0% to 100% load       | ±1.0% max. |
| Transient Response | 100% load step change | ±3.0% max. |

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**Specifications** (measured @ Ta= 25°C, nom. Vin (115/230VAC), full load after warm-up unless otherwise stated)

### Accuracy vs. Load

(@ min Vin to max. Vin)



### PROTECTIONS

| Parameter                         | Type                      |                     | Value                                                                                          |             |
|-----------------------------------|---------------------------|---------------------|------------------------------------------------------------------------------------------------|-------------|
| Input Fuse                        | internal (line & neutral) |                     | T2A, slow blow                                                                                 |             |
| Short Circuit Protection (SCP)    |                           |                     | continuous, auto recovery                                                                      |             |
| Over Voltage Protection (OVP)     | 12Vout<br>24Vout          |                     | 17VDC, Latch OFF<br>35VDC, Latch OFF                                                           |             |
| Over Voltage Category (OVC)       |                           |                     | OVCI                                                                                           |             |
| Over Current Protection (OCP)     | < 1 minute                | 90VAC<br>264VAC     | 140% of nominal output current, auto recovery<br>170% of nominal output current, auto recovery | Hiccup Mode |
| Over Temperature Protection (OTP) | 95°C ambient              |                     | thermal shutdown, auto recovery                                                                |             |
| Class of Equipment                |                           |                     | Class II                                                                                       |             |
| Isolation Voltage <sup>(3)</sup>  | I/P to O/P                | tested for 1 minute | 4.4kVAC                                                                                        |             |
| Insulation Grade                  |                           |                     | reinforced                                                                                     |             |
| Leakage Current                   |                           |                     | 100µA max.                                                                                     |             |
| Means of Protection               | 260VAC working voltage    |                     | 2MOPP                                                                                          |             |
| Medical Device Classification     |                           |                     | Type BF                                                                                        |             |

#### Notes:

Note3: For repeat Hi-Pot testing, reduce the time and/or the test voltage

### ENVIRONMENTAL

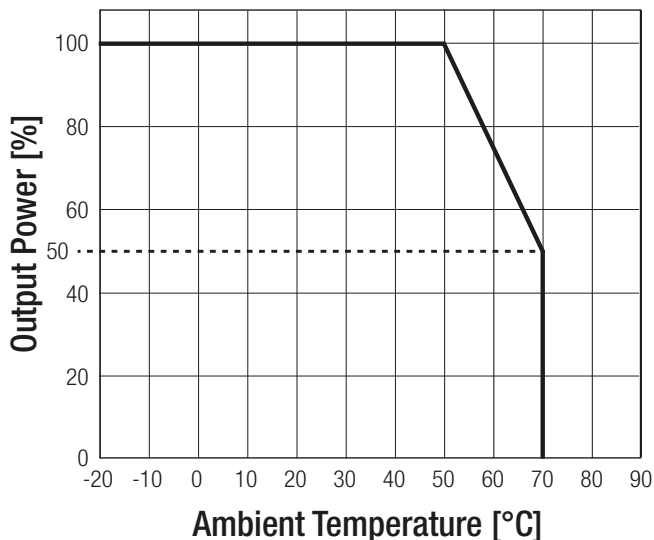
| Parameter                   | Condition                        |                                   | Value                                                      |
|-----------------------------|----------------------------------|-----------------------------------|------------------------------------------------------------|
| Operating Temperature Range | natural convection 0.1m/s        | without derating<br>with derating | -20°C to +50°C<br>-20°C to +70°C                           |
| Maximum Case Temperature    |                                  |                                   | +85°C                                                      |
| Operating Altitude          |                                  |                                   | 5000m                                                      |
| Operating Humidity          | non-condensing                   |                                   | 95% RH max.                                                |
| IP Rating                   |                                  |                                   | IP68                                                       |
| Pollution Degree            |                                  |                                   | PD2                                                        |
| MTBF                        | according to MIL-HDBK-217F, G.B. | +25°C<br>+50°C                    | 538 x 10 <sup>3</sup> hours<br>107 x 10 <sup>3</sup> hours |
| Design Lifetime             | E-Cap limitation                 |                                   | 130 x 10 <sup>3</sup> hours                                |

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**Specifications** (measured @ Ta= 25°C, nom. Vin (115/230VAC), full load after warm-up unless otherwise stated)

### Derating Graph

(@ Chamber and natural convection 0.1m/s)



### SAFETY AND CERTIFICATIONS

| Certificate Type (Safety)                                                                                                                                                                    | Report / File Number | Standard                                                                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|----------------------------------------------------------------------------|
| Information Technology Equipment, General Requirements for Safety (CB Scheme)                                                                                                                | T223-0255/17         | IEC60950-1:2005, 2nd Edition + Am2:2013<br>EN60950-1:2006 + A2:2013        |
| Information Technology Equipment, General Requirements for Safety                                                                                                                            | T223-0255/17         | UL60950-1, 2nd Edition:2014<br>CAN/CSA C22.2 No. 60950-1, 2nd Edition:2014 |
| Medical Electric Equipment, General Requirements for Safety and Essential Performance (CB Scheme)                                                                                            | T223-0254/17         | IEC60601-1:2005, AM1:2012<br>EN60601-1:2006 + A12:2014                     |
| Medical Electric Equipment, General Requirements for Safety and Essential Performance                                                                                                        | T223-0254/17         | CAN/CSA-C22.2 No. 60601-1:14, 3rd Edition 2014<br>ANSI/AAMI ES60601-1:2005 |
| Household and similar electrical appliances - Safety Part 1: General requirements (CB Scheme)                                                                                                | T211-0759/17         | IEC60335-1:2010, 5th Edition + A1:2013<br>EN60335-1:2012 + A11:2014        |
| Safety of power transformers, power supplies, reactors and similar products for supply voltages up to 1100V                                                                                  | T211-0760/17         | IEC61558-1:2005, 2nd Edition + A1:2009<br>EN61558-1:2005 + A1:2009         |
| Safety of transformers, reactors, power supply units and similar products for supply voltages up to 1100 V - Part 2-16: Particular requirements and tests for switch mode power supply units |                      | IEC61558-2-16:2009, 1st Edition + A1:2013<br>EN61558-2-16:2009 + A1:2013   |
| Degrees of protection provided by enclosures (IP Code)                                                                                                                                       | T211-0584/17         | IEC60529-1989,2nd-Edition+A1:1999+A2:2013                                  |
| EAC                                                                                                                                                                                          | RU-AT.49.09571       | TP TC 004/2011 TP TC 004/2011                                              |
| RoHs 2 (2+)                                                                                                                                                                                  |                      | RoHs 10/10, AM2015                                                         |

| EMC Compliance (Medical)                                                                     | Condition                                                                                                             | Standard / Criterion                                   |
|----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|
| Medical electrical equipment Part 1-2: Electromagnetic disturbances – Requirements and tests |                                                                                                                       | EN60601-1-2:2015                                       |
| ESD Electrostatic discharge immunity test                                                    | Air ±2, 4, 8, 15kV; Contact ±8kV                                                                                      | IEC61000-4-2:2008                                      |
| Radiated, radio-frequency, electromagnetic field immunity test                               | 10V/m (80 - 2700MHz)                                                                                                  | IEC61000-4-3:2006 + A2:2010                            |
| Radiated, radio-frequency, electromagnetic field immunity test (table 9)                     | 27V/m (385MHz), 28V/m (450MHz), 9V/m (710, 745, 780MHz), 28V/m 1720, 1845, 1970, 2450MHz), 9V/m (5240, 5500, 5785MHz) | IEC61000-4-3:2006 + A2:2010, Criteria A                |
|                                                                                              | 28V/m (800-960MHz)                                                                                                    | IEC61000-4-3:2006 + A2:2010, Criteria B <sup>(4)</sup> |
| Fast Transient and Burst Immunity                                                            | AC Power Port ±2.0kV<br>DC Output Port ±1.0kV                                                                         | IEC61000-4-4:2012                                      |
| Surge Immunity                                                                               | AC Power Port: L-N ±0.5, 1.0kV                                                                                        | IEC61000-4-5:2005                                      |

#### Notes:

Note4: Output voltage doesn't meet specified output accuracy

continued on next page

**Specifications** (measured @ Ta= 25°C, nom. Vin (115/230VAC), full load after warm-up unless otherwise stated)

| EMC Compliance (Medical)                                                                            | Condition                                     | Standard / Criterion                   |
|-----------------------------------------------------------------------------------------------------|-----------------------------------------------|----------------------------------------|
| Immunity to conducted disturbances, induced by radio-frequency fields                               | AC Power Port 6V<br>DC Output Port 6V         | IEC61000-4-6:2013                      |
| Power Magnetic Field Immunity                                                                       | 50Hz, 60Hz, 30A/m                             | IEC61000-4-8:2009                      |
| Voltage Dips and Interruptions                                                                      |                                               | IEC61000-4-11:2004                     |
| EMC Compliance (Household)                                                                          | Condition                                     | Standard / Criterion                   |
| Electromagnetic compatibility of multimedia equipment – Emission Requirements                       |                                               | EN55014-1:2006 + A1:2009 + A2:2011     |
| Information technology equipment - Immunity characteristics - Limits and methods of measurement     |                                               | EN55014-2:1997 + A1:2001 + A2:2008     |
| ESD Electrostatic discharge immunity test                                                           | Air ±8kV; Contact ±4kV                        | EN61000-4-2:1995 + A2:2001, Criteria A |
| Radiated, radio-frequency, electromagnetic field immunity test                                      | 3V/m (80 - 1000MHz)                           | EN61000-4-3:2006 + A1:2008, Criteria A |
| Fast Transient and Burst Immunity                                                                   | AC Power Port: ±1.0kV<br>DC Power Port ±0.5kV | EN61000-4-4:2004, Criteria A           |
| Surge Immunity                                                                                      | AC Power Port: L-N ±0.5, 1.0kV                | EN61000-4-5:2006, Criteria A           |
| Immunity to conducted disturbances, induced by radio-frequency fields                               | AC Power Port 3V<br>DC Power Port 3V          | EN61000-4-6:2007, Criteria A           |
| Voltage Dips and Interruptions                                                                      |                                               | EN61000-4-11:2004                      |
| EMC Compliance (Multimedia)                                                                         | Condition                                     | Standard / Criterion                   |
| Information technology equipment - Immunity characteristics - Limits and methods of measurement     |                                               | EN55024:2010                           |
| ESD Electrostatic discharge immunity test                                                           | Air ±2, 4, 8kV; Contact ±4kV                  | EN61000-4-2:2009, Criteria A           |
| Radiated, radio-frequency, electromagnetic field immunity test                                      | 3V/m (80 - 1000MHz)                           | EN61000-4-3:2006 + A2:2010, Criteria A |
| Fast Transient and Burst Immunity                                                                   | AC Power Port: ±1.0kV<br>DC Power Port ±0.5kV | EN61000-4-4:2004, Criteria A           |
| Surge Immunity                                                                                      | AC Power Port: L-N ±0.5, 1.0kV                | EN61000-4-5:2006, Criteria A           |
| Immunity to conducted disturbances, induced by radio-frequency fields                               | AC Power Port 3V<br>DC Power Port 3V          | EN61000-4-6:2009, Criteria A           |
| Power Magnetic Field Immunity                                                                       | 50Hz, 60Hz, 1A/m                              | EN61000-4-8:2010, Criteria A           |
| Voltage Dips and Interruptions                                                                      |                                               | EN61000-4-11:2004, Criteria A          |
| Limits of Voltage Fluctuations & Flicker                                                            |                                               | EN61000-3-3:2013                       |
| EMC Compliance (Generic Standards)                                                                  | Condition                                     | Standard / Criterion                   |
| Generic standards – Immunity standard for residential, commercial and light-industrial environments |                                               | EN61000-6-1:2007                       |
| Generic standards – Immunity standard for industrial environments                                   |                                               | EN61000-6-2:2005                       |
| Generic standards – Emission standard for residential, commercial and light-industrial environments |                                               | EN61000-6-3:2007 + A1:2011             |

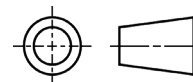
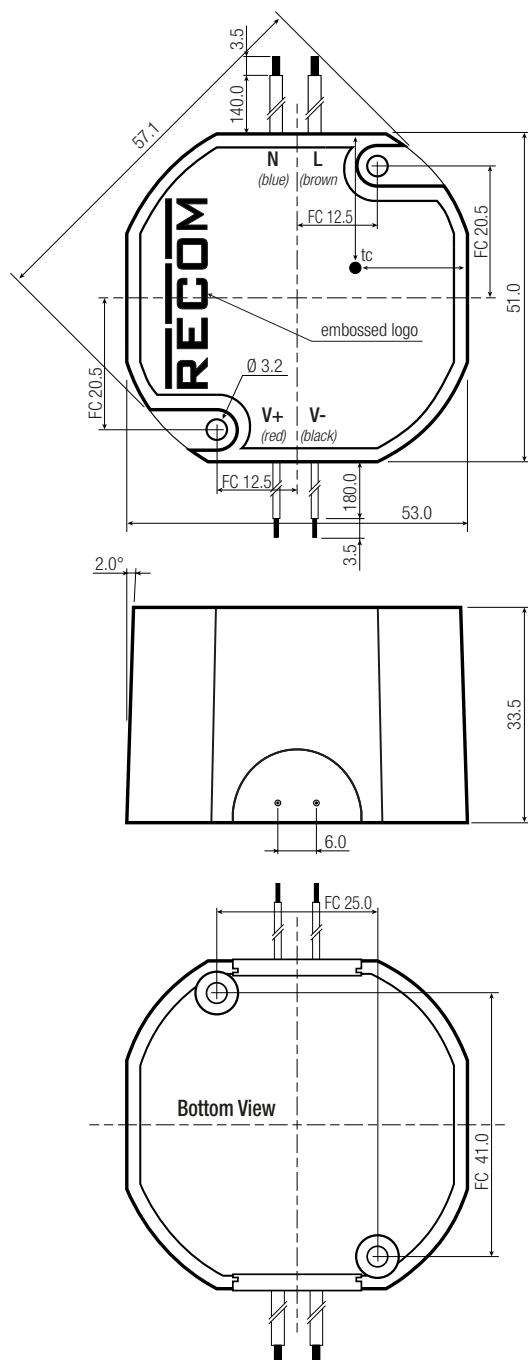
**DIMENSION AND PHYSICAL CHARACTERISTICS**

| Parameter                 | Type                   | Value                                                                                |
|---------------------------|------------------------|--------------------------------------------------------------------------------------|
| Material                  | Case<br>Potting<br>PCB | non-conductive black plastic, (UL94V-0)<br>polyurethane, (UL94V-0)<br>FR4, (UL94V-0) |
| Package Dimension (LxWxH) |                        | 53.0 x 378.0 x 33.5mm                                                                |
| Package Weight            |                        | 132g max.                                                                            |

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**Specifications** (measured @ Ta= 25°C, nom. Vin (115/230VAC), full load after warm-up unless otherwise stated)

Dimension Drawing (mm)



### Wired Connection

| # | Function   | Wire Color | Type           |
|---|------------|------------|----------------|
| 1 | VAC in (N) | white      | UL-1007, AWG20 |
| 2 | VAC in (L) | white      | UL-1007, AWG20 |
| 3 | V+         | red        | UL-1007, AWG22 |
| 4 | V-         | black      | UL-1007, AWG22 |

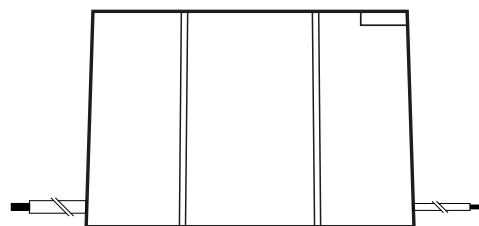
tc= case temperature measuring point

FC= fixing centers

Tolerance: xx.x= ±0.5mm

xx.xx= ±0.25mm

Max. tightening torque fixing screws: 0.3Nm



### PACKAGING INFORMATION

| Parameter                   | Type           | Value                   |
|-----------------------------|----------------|-------------------------|
| Packaging Dimension (LxWxH) | carton         | 310.0 x 220.0 x 100.0mm |
| Packaging Quantity          |                | 10pcs                   |
| Storage Temperature Range   |                | -30°C to +80°C          |
| Storage Humidity            | non-condensing | 95% RH max.             |

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