

Features

Regulated Converter

- 40mW max. no load power consumption
- High efficiency up to 76%
- Isolated output 3kVAC / 1 min
- SCP, OVP protection
- Wide operating temperature range: -40°C to +85°C
- Universal input 85-305VAC



RAC03-SER/277

3 Watt Single Output



UL60950-1 certified
 CAN/CSA-22.2 No. 60950 certified
 EN60335-1 certified
 IEC/EN60950-1 certified
 CB Report
 EN55032 certified
 EN55024 certified
 EN55014 certified

Description

The modules of the RAC03-SER/277 series are regulated AC/DC converters with 3kVAC isolation and a round, flat shape. This series has been designed to offer low stand-by consumption and an ultra-wide input voltage range. Uses include a variety of applications in building automation, security systems and communication systems.

Selection Guide

| Part Number | Input Voltage Range [VAC] | Output Voltage [VDC] | Output Current [mA] | Efficiency typ ⁽¹⁾ [%] | Max. Capacitive Load ⁽²⁾ [µF] |
|------------------|---------------------------|----------------------|---------------------|-----------------------------------|--|
| RAC03-3.3SER/277 | 100-277 | 3.3 | 900 | 68 | 22000 |
| RAC03-05SER/277 | 100-277 | 5 | 600 | 70 | 7500 |
| RAC03-12SER/277 | 100-277 | 12 | 250 | 74 | 1000 |
| RAC03-24SER/277 | 100-277 | 24 | 125 | 76 | 200 |

Notes:

Note1: Efficiency is tested at nominal input and full load at +25°C ambient

Note2: Max Cap Load is tested at nominal input and full resistive load

Model Numbering



Notes:

Note3: add suffix "-TRAY" for Tray packaging, without suffix standard cardboard box packaging

Ordering Examples:

| | | | | |
|----------------------|--------|--------|---------------|----------------|
| RAC03-05SER/277 | 3 Watt | 5Vout | Single Output | cardboard box |
| RAC03-12SER/277 | 3 Watt | 12Vout | Single Output | cardboard box |
| RAC03-05SER/277-TRAY | 3 Watt | 5Vout | Single Output | tray packaging |

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

BASIC CHARACTERISTICS

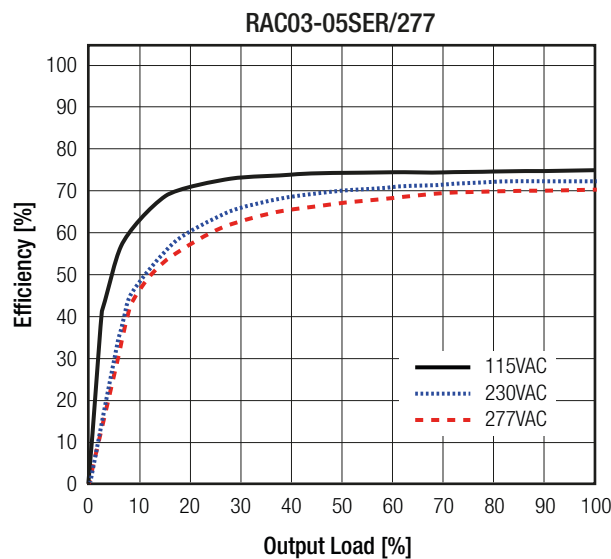
| Parameter | Condition | Min. | Typ. | Max. |
|--|--------------------------|------------------|----------------------|------------------|
| Input Voltage Range ⁽⁴⁾ | nom. Vin= 230VAC | 85VAC 120VDC | 277VAC | 305VAC 430VDC |
| Input Current | 115VAC 230VAC | | 70mA 45mA | |
| Inrush Current | cold start at +25°C | 115VAC 230VAC | | 15A 30A |
| No load Power Consumption | 85-305VAC/ 47-440Hz | | | 40mW |
| Input Frequency Range | AC Input | 47Hz | | 440Hz |
| Minimum Load ⁽⁷⁾ | | | 10% | |
| Hold-up Time | 115VAC | 18ms | | |
| Internal Operating Frequency | 100% load at nominal Vin | | 55kHz | |
| Output Ripple and Noise ⁽⁵⁾ | 3.3Vout all others | | 250mVp-p 200mVp-p | |

Notes:

Note4: No line derating required

Note5: Ripple and Noise is the maximum peak-to-peak voltage value measured at the output with a 20MHz bandwidth, at rated line voltage at full load. And with a 47µF low-ESR electrolytic capacitor in parallel with a 0.1µF ceramic capacitor across output

Efficiency vs. Load



REGULATIONS

| Parameter | Condition | Value |
|---|----------------------------------|-------------------------|
| Output Voltage Tolerance ⁽⁶⁾ | 3.3Vout | ±4.0% typ. / ±8.0% max. |
| | 5Vout | ±3.5% typ. / ±5.0% max. |
| | 12, 24Vout | ±3.0% typ. / ±4.0% max. |
| Line Regulation | low line to high line, full load | ±0.7% typ. / ±1.0% max. |
| Load Regulation ⁽⁷⁾ | 3.3Vout | 5.5% typ. / 9.0% max. |
| | 5Vout | 5.0% typ. / 7.5% max. |
| | 12, 24Vout | 4.0% typ. / 5.5% max. |

Notes:

Note6: Includes initial voltage accuracy, thermal drift, line regulation and load regulation at rated input voltage and load conditions

Note7: Operation below 10% load will not harm the converter, but specifications may not be met

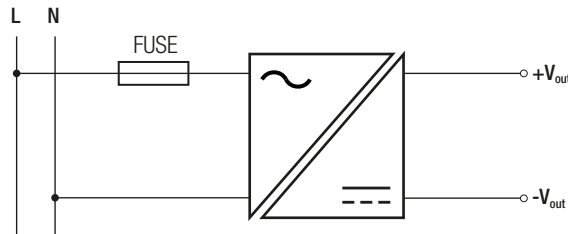
Specifications (measured @ Ta= 25°C, nom. Vin (115/230VAC), full load and after warm-up unless otherwise stated)

PROTECTIONS

| Parameter | Type | | Value |
|--------------------------------|---------------------|---------------------|--------------------------------|
| Short Circuit Protection (SCP) | | | continuous, automatic recovery |
| Over Voltage Protection (OVP) | zener diode clamp | | 105% - 150% |
| Over Current Limit | | | 120% - 190% |
| Over Voltage Category | | | OVCII |
| Isolation Voltage | I/P to O/P | tested for 1 minute | 3kVAC |
| Isolation Resistance | | | 1GΩ min. |
| Leakage Current | 85-305VAC, 47-440Hz | | 10μA max. |

Notes:

Note8: Refer to local wiring regulations if input over-current protection is also required. Recommended fuse: slow blow type



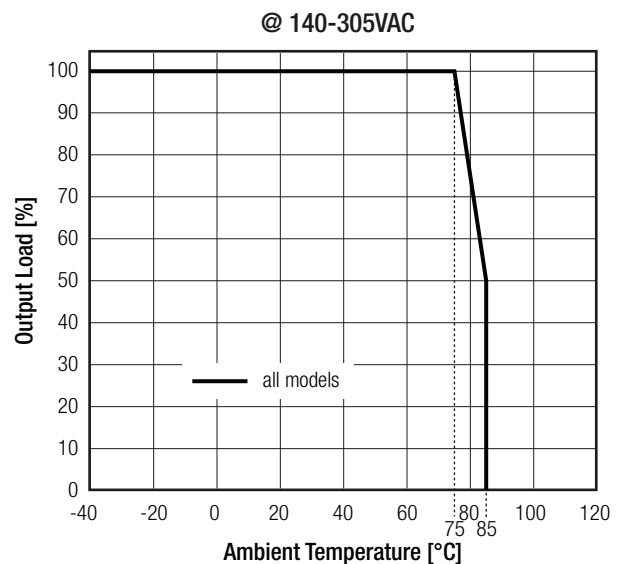
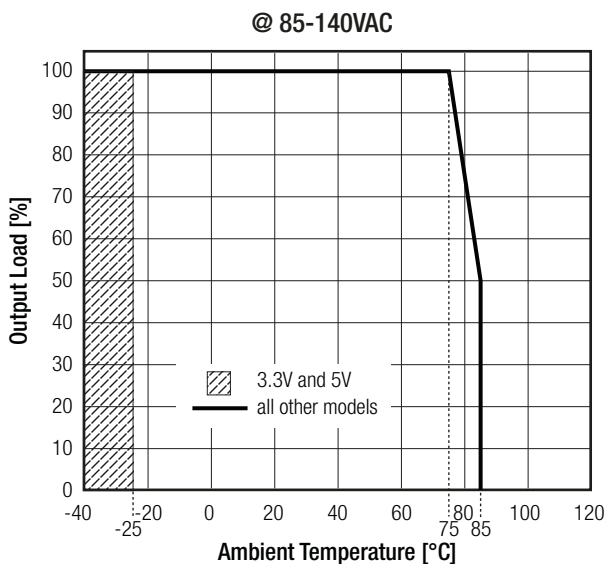
ENVIRONMENTAL

| Parameter | Condition | | Value |
|--|----------------------------------|-------|------------------------------|
| Operating Temperature Range ⁽⁹⁾ | full load | | -40°C to +75°C |
| | refer to derating graph | | -40°C to +85°C |
| Maximum Case Temperature | | | +105°C |
| Thermal Impedance | | | 9.5K/W typ. |
| Operating Humidity | non-condensing | | 5% - 95% RH max. |
| MTBF | according to MIL-HDBK-217F, G.B. | +25°C | 3554 x 10 ³ hours |
| | | | 3219 x 10 ³ hours |

Notes:

Note9: At low input voltage (85-140VAC) and temperature below -25°C the RAC03-3.3SER/277 and RAC03-05SER/277, will not start

Derating Graph



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

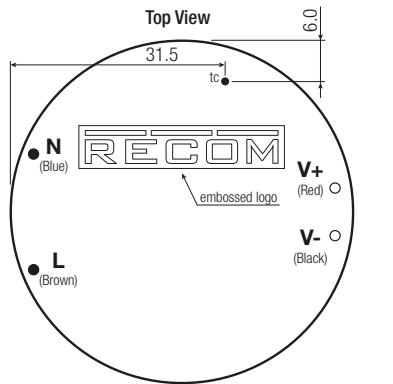
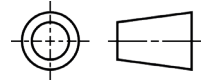
| SAFETY AND CERTIFICATIONS | | |
|--|--|--|
| Certificate Type (Safety) | Report / File Number | Standard |
| Information Technology Equipment, General Requirements for Safety (CB Scheme) | L0339L26-CB-1-B4 | IEC60950-1:2005 2nd Edition + A2:2013 EN60950-1:2006 + A2:2013 |
| Information Technology Equipment, General Requirements for Safety | E224736-A24-UL | UL No. 60950-1, 2nd Edition, 2014 CAN/CSA-C22.2 No. 60950-1-07, 2nd Edition, 2014 |
| Household and similar electrical appliances, General requirements | L0339L26-B2-L | EN60335-1:2012+A11:2014 |
| EAC Safety of Low Voltage Equipment | RU-AT.37.02367 | TP TC 004/2011 |
| RoHS2+ | | RoHS-2011/65/EU + AM-2015/863 |
| EMC Compliance (Industrial) | | |
| | Condition | Standard / Criterion |
| Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement | | EN55032:2015, Class B |
| Information technology equipment - Immunity characteristics - Limits and methods of measurement | | EN55024:2010 |
| ESD Electrostatic discharge immunity test | ±8kV air, ±4kV contact | EN61000-4-2:2009, Criteria B |
| Radiated, radio-frequency, electromagnetic field immunity test | 3V/m | EN61000-4-3:2006 + A2:2010, Criteria A |
| Fast Transient and Burst Immunity | AC Power Port: ±1kV | EN61000-4-4:2012, Criteria A |
| Power Magnetic Field Immunity | 50Hz, 1A/m | EN61000-4-8:2010, Criteria A |
| Voltage Dips and Interruption | Voltage Dips: >95% reduction >30% reduction Interruption: >95% | EN61000-4-11:2004, Criteria A EN61000-4-11:2004, Criteria A EN61000-4-11:2004, Criteria B |
| Limits of Voltage Fluctuations & Flicker | | EN61000-3-3:2013 |
| EMC Compliance (Household) | | |
| | Condition | Standard / Criterion |
| Electromagnetic compatibility of multimedia equipment – Emission Requirements | | EN55014-1:2006+A2:2011 |
| Information technology equipment - Immunity characteristics - Limits and methods of measurement | | EN55014-2:2015 |
| ESD Electrostatic discharge immunity test | ±8kV Air, ±4kV Contact | IEC61000-4-2:2008, Criteria A |
| Radiated, radio-frequency, electromagnetic field immunity test | 3V/m | IEC61000-4-3:2006 + A2:2010, Criteria A |
| Fast Transient and Burst Immunity | AC Power Port +/-1.0kV DC Output +/-0.5kV | IEC61000-4-4:2012, Criteria A |
| Surge Immunity | AC Power Port L-N +/-2kV DC Output L-N +/-1kV | IEC61000-4-5:2014, Criteria B |
| Immunity to conducted disturbances, induced by radio-frequency fields | AC Power Port 3V, DC Output 3V | IEC61000-4-6:2013, Criteria A |
| Voltage Dips and Interruption | Voltage Dips: >95% reduction >30% reduction Interruption: >95% | IEC61000-4-11:2004, Criteria B IEC61000-4-11:2004, Criteria C IEC61000-4-11:2004, Criteria C |
| Limits of Harmonic Current Emissions | | EN61000-3-2:2014 |
| Limits of Voltage Fluctuations & Flicker | | EN61000-3-3:2013 |

| DIMENSION AND PHYSICAL CHARACTERISTICS | | |
|---|-----------------|--|
| Parameter | Type | Value |
| Material | case potting | black plastic, (UL94V-0) epoxy, (UL94V-0) |
| Dimension (LxWxH) | | 50.3 x 50.3 x 11.0mm |
| Weight | | 41g typ. |

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

Dimension Drawing (mm)



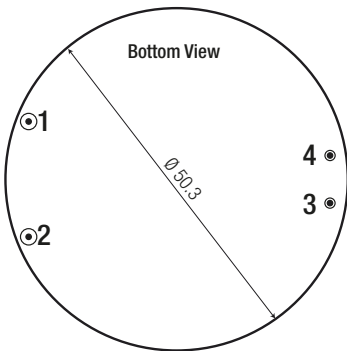
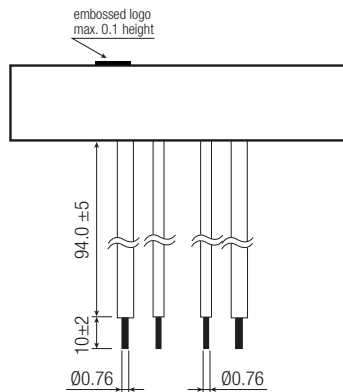
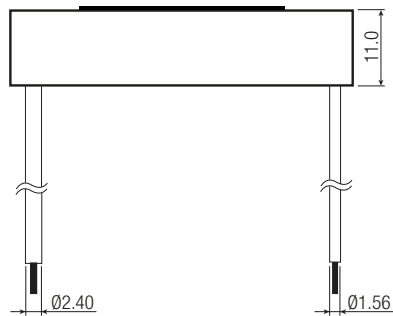
Wired information

| # | Function | Wire color | Type | AWG |
|---|------------|------------|---------|-----|
| 1 | VAC in (L) | brown | UL-1015 | 22 |
| 2 | VAC in (N) | blue | UL-1015 | 22 |
| 3 | +Vout | red | UL-1430 | 22 |
| 4 | -Vout | black | UL-1430 | 22 |

tc= case temperature measuring point

Tolerance: xx.x= ±0.5mm

xx.xx= ±0.35mm



PACKAGING INFORMATION

| Parameter | Type | Value |
|-----------------------------|---------------|-------------------------|
| Packaging Dimension (LxWxH) | cardboard box | 195.0 x 170.0 x 140.0mm |
| | tray | 462.0 x 292.0 x 49.0mm |
| Packaging Quantity | cardboard box | 12pcs |
| | tray | 72pcs |
| Storage Temperature Range | | -40°C to +85°C |

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