

Features

Regulated Converters

- 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



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. (%) | Max. Capacitive Load (µF) |
|------------------|---------------------------|----------------------|---------------------|---------------------|---------------------------|
| RAC03-3.3SER/277 | 85-305 | 3.3 | 900 | 68 | 22000 |
| RAC03-05SER/277 | 85-305 | 5 | 600 | 70 | 7500 |
| RAC03-12SER/277 | 85-305 | 12 | 250 | 74 | 1000 |
| RAC03-24SER/277 | 85-305 | 24 | 125 | 76 | 200 |

Model Numbering



Notes:

Note1: add suffix "-TRAY" for Tray packaging, without suffix standard cardboard box packaging.

Examples:

e.g. RAC03-05SER/277-TRAY, Single Output, 5Vout and Tray Packaging

Specifications (measured at TA= 25°C, nominal input voltage (115/230VAC), full load and after warm-up)

| BASIC CHARACTERISTICS | | | | |
|---------------------------|--|-----------------|--------------|---------------------|
| Parameter | Condition | Min. | Typ. | Max. |
| Input Voltage Range | | 85VAC 120VDC | | 305VAC 430VDC |
| Input Current | full load, 115VAC full load, 230VAC | | 70mA 45mA | |
| Inrush Current | cold start at 25°C, 115VAC cold start at 25°C, 230VAC | | | 15A 30A |
| No load Power Consumption | 85-305VAC, 47-440Hz | | | 40mW |
| Input Frequency Range | AC Input | 47Hz | | 440Hz |
| Hold-up time | 115VAC | 18ms | | |
| Operating Frequency Range | 100% load at nominal Vin | | 55kHz | |
| Efficiency | | | | see Selection Guide |
| Minimum Load | | | 10% | |

continued on next page



Refer to Applications Notes

Specifications (measured at $T_A = 25^\circ\text{C}$, nominal input voltage (115/230VAC), full load and after warm-up)

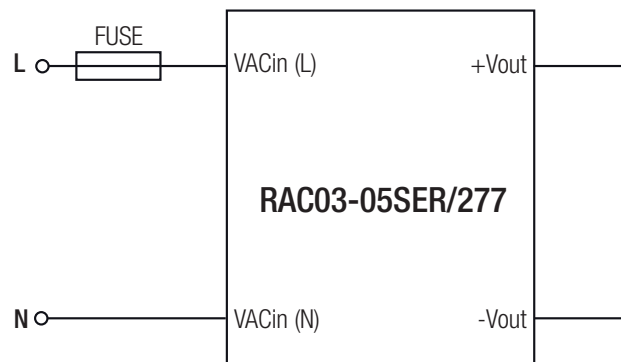
| | | |
|--|-----------------------|----------------------|
| Output Ripple and Noise ⁽¹⁾ | 3.3Vout all others | 250mVp-p 200mVp-p |
| <p>Notes: Note1: Ripple and Noise is the maximum peak-to-peak voltage value measured at the output with a 20MHz bandwidth, at rated line voltage at full load. And with a 47μF low-ESR electrolytic capacitor in parallel with a 0.1μF ceramic capacitor across output.</p> | | |

| REGULATIONS | | |
|---|----------------------------------|-----------------------------------|
| Parameter | Condition | Value |
| Output Voltage Tolerance ⁽²⁾ | 3.3Vout | $\pm 4\%$ typ. / $\pm 8\%$ max. |
| | 5Vout | $\pm 3.5\%$ typ. / $\pm 5\%$ max. |
| | 12, 24Vout | $\pm 3\%$ typ. / $\pm 4\%$ max. |
| Line Voltage Regulation | low line to high line, full load | $\pm 0.7\%$ typ. / $\pm 1\%$ max. |
| Load Voltage Regulation | 3.3Vout 10% to 100% load | $\pm 5.5\%$ typ. / $\pm 9\%$ max. |
| | 5Vout 10% to 100% load | $\pm 5\%$ typ. / $\pm 7.5\%$ max. |
| | 12, 24Vout 10% to 100% load | $\pm 4\%$ typ. / $\pm 5.5\%$ max. |
| <p>Notes: Note2: Includes initial voltage accuracy, thermal drift, line regulation and load regulation at rated input voltage and load conditions.</p> | | |

| 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% |
| Isolation Voltage | | 3kVAC / 1 Minute |
| Isolation Resistance | | 1G Ω min. |
| Leakage Current | 85-305VAC, 47-440Hz | 10 μA max. |

Notes:

Note3: An input fuse must be always used. Recommended fuse: T1A slow blow type.



Specifications (measured at $T_A=25^{\circ}\text{C}$, nominal input voltage (115/230VAC), full load and after warm-up)

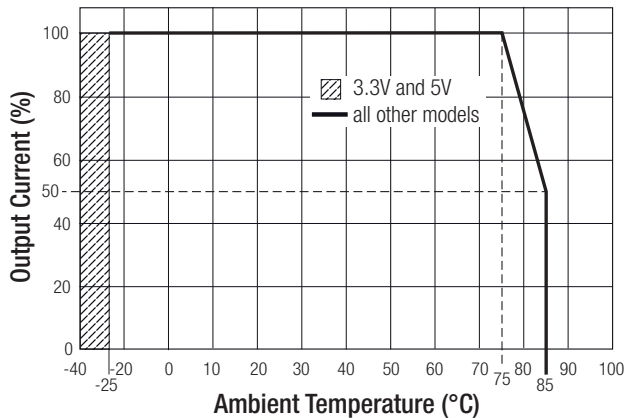
| ENVIRONMENTAL | | |
|-----------------------------|-----------------------------------|------------------------------|
| Parameter | Condition | Value |
| Operating Temperature Range | 230VAC, with derating (see graph) | -40°C to +85°C |
| Maximum Case Temperature | | 105°C |
| Thermal Impedance | | 9.5°C / W typ. |
| Humidity | non-condensing | 5% - 95%, RH max. |
| MTBF ⁽³⁾ | MIL-HDBK-217F, 115VAC, +25°C | 3554 x 10 ³ hours |
| | MIL-HDBK-217F, 230VAC, +25°C | 3219 x 10 ³ hours |

Notes:

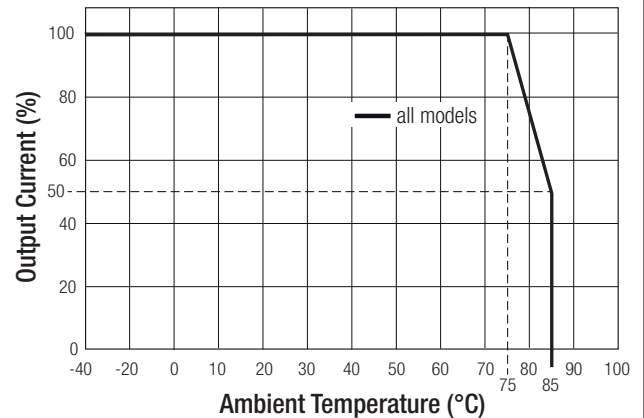
Note3: MTBF is referring RAC03-05SER/277

Derating Graph

@ 85-140VAC



@ 140-305VAC



SAFETY AND CERTIFICATIONS

| Certificate Type | Report / File Number | Standard |
|-----------------------|----------------------|---|
| EN General Safety | SPCLVD1208051 | EN-60950-1, 2nd Edition |
| UL General Safety | E224736-X1-A24 | UL-60950-1, 2nd Edition, 2014 |
| Canada General Safety | E224736-X1-A24 | CAN/CSA C22.2 No. 60950-1-07, 2nd Edition, 2014 |

| Certificate Type (Environmental) | Condition / Report or File Number | Standard / Criterion |
|-----------------------------------|---------------------------------------|-----------------------------|
| ESD | Air ±5kV, Contact ±4kV | EN61000-4-2, Criteria B |
| Radiated Immunity | 3V/m | EN61000-4-3, Criteria A |
| Fast Transient | AC Power Port: ±1kV | EN61000-4-4, Criteria B |
| Surge | AC Power Port: line to line: ±1kV | EN61000-4-5, Criteria B |
| Conducted Immunity | AC Power Port: 3V/m | EN61000-4-6, Criteria A |
| PMF | 1 A/m | EN61000-4-8, Criteria A |
| Voltage Dips & Voltage Variations | Voltage Dips: >95% reduction | EN61000-4-11, Criteria B |
| | 30% reduction | EN61000-4-11, Criteria C |
| | Voltage Interruptions: >95% reduction | EN61000-4-11, Criteria C |
| Voltage | | EN-61000-3-3 |
| EMI Standard | Report: 1502CE17 | EN55022, Class B EN55024 |
| Over Voltage Category | | OVC II |

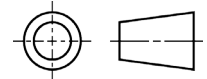
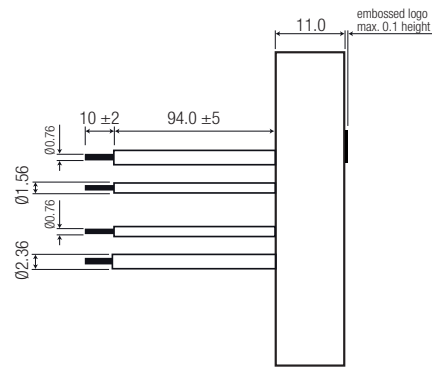
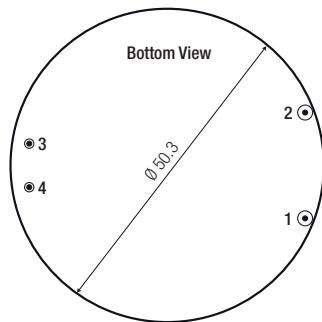
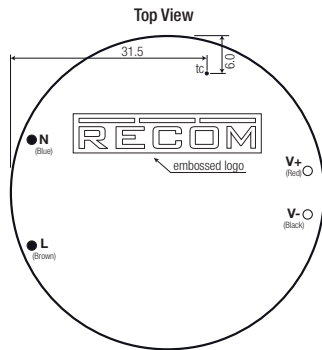
Specifications (measured at $T_A = 25^\circ\text{C}$, nominal input voltage (115/230VAC), full load and after warm-up)

| DIMENSION and PHYSICAL CHARACTERISTICS | | |
|--|------|------------------------|
| Parameter | Type | Value |
| Case Material | | UL94V-0, black plastic |
| Potting Material | | UL94V-0, Epoxy |
| Package Dimension (LxWxH) | | 50.3 x 50.3 x 11.0mm |
| Package Weight | | 41g typ. |

| Wired Connections | | | | |
|-------------------|----------------|------------------|------------|--|
| Wired Color | Type | Wire Composition | Function | |
| 1, brown | UL-1015, AWG22 | 17/0.16 | VAC in (L) | |
| 2, blue | UL-1015, AWG22 | 17/0.16 | VAC in (N) | |
| 3, red | UL-1430, AWG22 | 17/0.16 | +Vout | |
| 4, black | UL-1430, AWG22 | 17/0.16 | -Vout | |

Tolerance: xx.x= ±0.5mm
xx.xx= ±0.35mm

Dimension Drawing (mm)



| PACKAGING INFORMATION | | |
|-----------------------------|---------------|-------------------|
| Parameter | Type | Value |
| Packaging Dimension (LxWxH) | Cardboard box | 195 x 170 x 140mm |
| Packaging Quantity | | 12 pcs |
| Storage Temperature Range | | -40°C to +85°C |