

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

BASIC CHARACTERISTICS

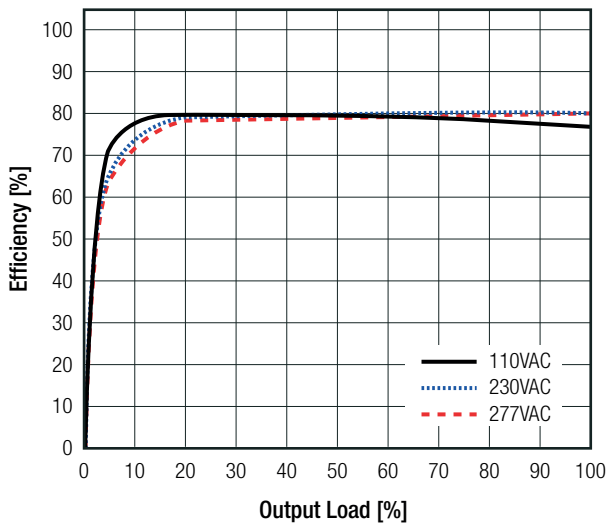
| Parameter | Condition | Min. | Typ. | Max. |
|--|----------------------------|-----------------|----------------------|------------------------|
| Input Frequency Range | AC Input | 47Hz | | 63Hz |
| Minimum Load | | 0% | | |
| Power Factor | 115VAC 230VAC 277VAC | | 0.6 0.5 0.45 | |
| Start-up Time | | | | 150ms |
| Rise Time | | | | 25ms |
| Hold-up Time | 115VAC 230VAC 277VAC | 25ms | 10ms 40ms 60ms | |
| Internal Operating Frequency | 100% load at nominal Vin | | 120kHz | |
| Output Ripple and Noise ⁽⁴⁾ | 20MHz BW | 5Vout others | | 150mVp-p 1% of Vout |

Notes:

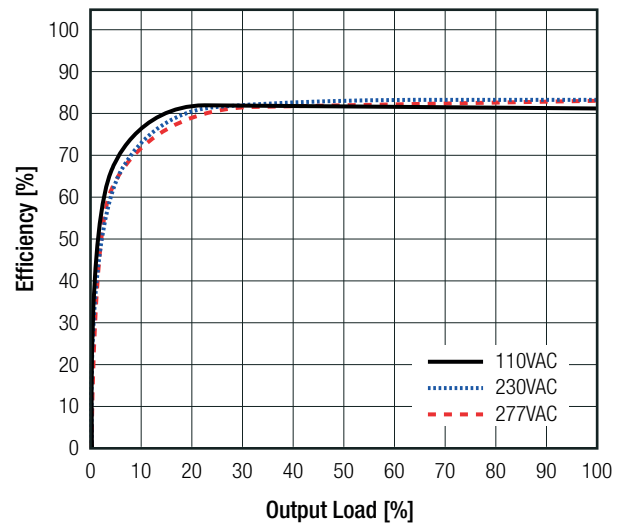
Note4: Measurements are made with a 0.1µF MLCC & 10µF E-cap in parallel across output. (low ESR)

Efficiency vs. Load

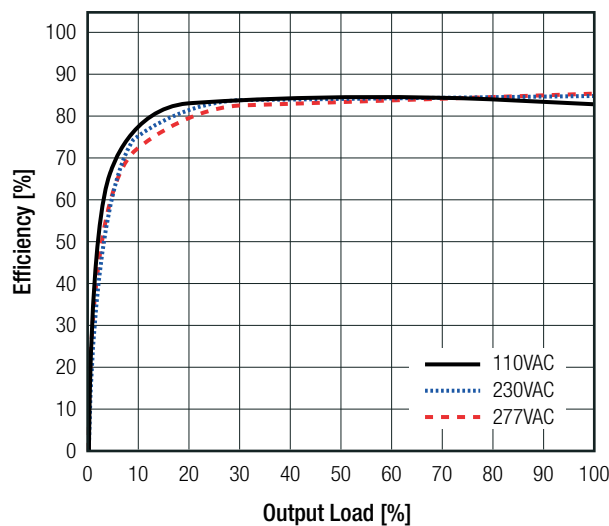
RAC20E-05SK/277



RAC20E-12SK/277



RAC20E-24SK/277



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

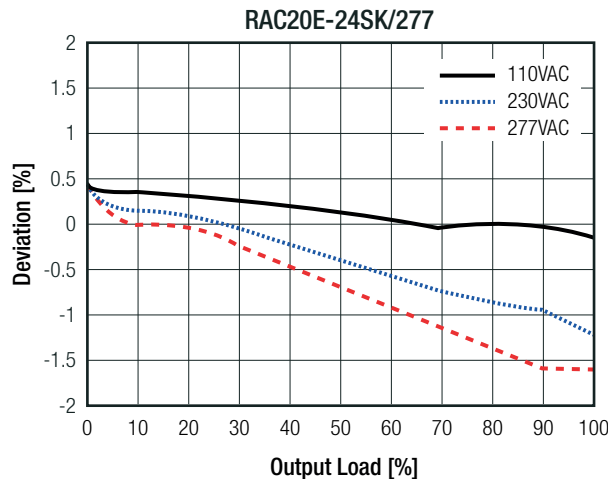
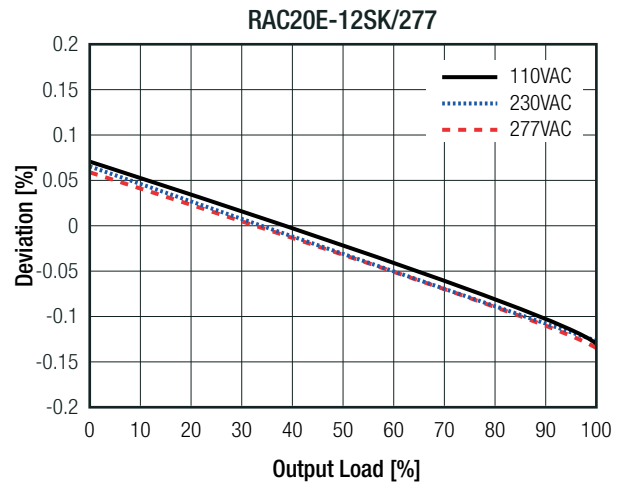
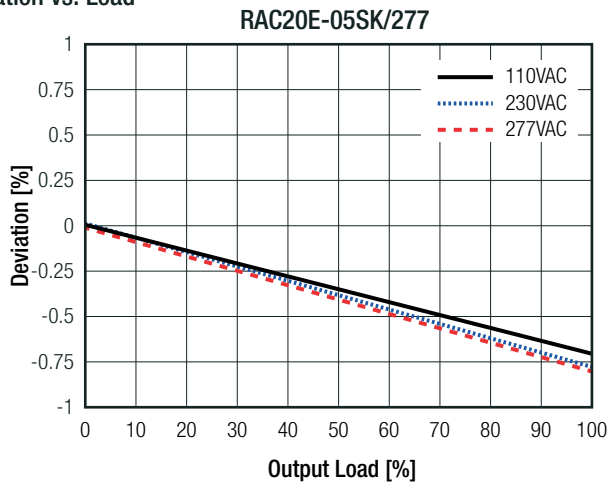
REGULATIONS

| Parameter | Condition | Value |
|--------------------------------|---------------------------------------|-------------------------|
| Output Accuracy | | ±2.0% typ. |
| Line Regulation | low line to high line, full load | ±0.5% typ. |
| Load Regulation ⁽⁵⁾ | 10% to 100% load | 1.0% typ. |
| Transient Response | 25% load step change recovery time | 3.0% max. 500µs max. |

Notes:

Note5: Operation below 10% load will not harm the converter, but specifications may not be met

Deviation vs. Load



PROTECTIONS

| Parameter | Type | Value |
|----------------------------------|---|--|
| Input Fuse | internal | slow blow |
| Short Circuit Protection (SCP) | | hiccup mode, automatic restart |
| Over Voltage Protection (OVP) | | 105% - 120%, clamping, automatic restart |
| Over Load Protection (OLP) | | 150% - 195%, hiccup mode |
| Over Voltage Category (OVC) | according to 62368-1 according to 61558-2-16 | OVCII (5000m) OVCIII (2000m) |
| Isolation Voltage ⁽⁶⁾ | I/P to O/P | 1 minute 4kVAC |

Notes:

Note6: For repeat Hi-Pot testing, reduce the time and/or the test voltage

continued on next page

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

PROTECTIONS

| Parameter | Condition | | Value |
|-----------------------|------------|---------------------------|-------------|
| Isolation Resistance | I/P to O/P | V _{iso} = 500VDC | 1GΩ min. |
| Isolation Capacitance | | 100kHz/0.1VDC | 100pF max. |
| Leakage Current | @ 277VAC | | 0.25mA max. |
| Insulation Grade | | | reinforced |

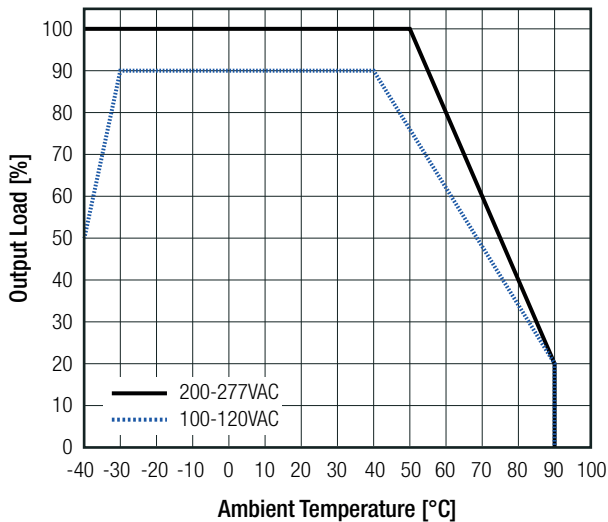
ENVIRONMENTAL

| Parameter | Condition | | Value |
|-----------------------------|----------------------------------|----------------------------------|---|
| Operating Temperature Range | @ natural convection 0.1m/s | refer to "Derating Graph" | -40°C to +90°C |
| Maximum Case Temperature | | | +95°C |
| Temperature Coefficient | | | ±0.02%/K |
| Operating Altitude | | | 5000m (OVCI) 2000m (OVCIII) |
| Operating Humidity | non-condensing | | 20% - 90% RH max. |
| Pollution Degree | | | PD2 |
| Vibration | | | 10-500Hz, 2G 10min./1cycle, period 60min. each along x,y,z axes |
| MTBF | according to MIL-HDBK-217F, G.B. | +25°C +40°C | 830 x 10 ³ hours 700 x 10 ³ hours |
| Design Lifetime | 230VAC/60Hz and full load | T _{AMB} = +40°C | 5Vout: 34 x 10 ³ hours 12Vout: 44 x 10 ³ hours 24Vout: 53 x 10 ³ hours |
| | | T _{AMB} = +25°C | 5Vout: 89 x 10 ³ hours 12Vout: 115 x 10 ³ hours 24Vout: 132 x 10 ³ hours |

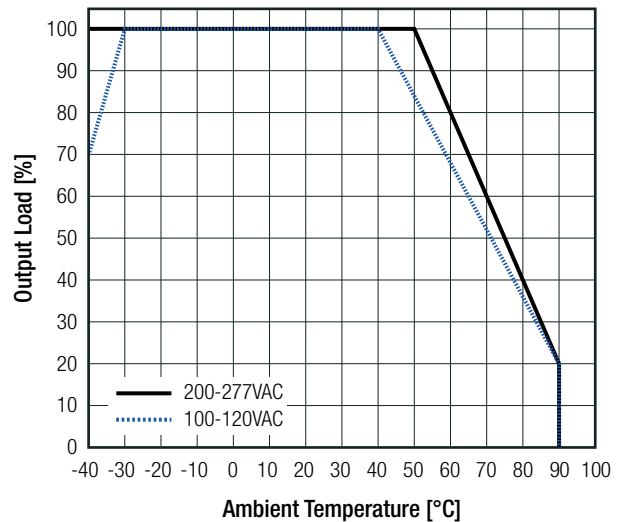
Derating Graph

(@ Chamber and natural convection 0.1m/s)

RAC20E-05SK/277



RAC20E-12SK/277

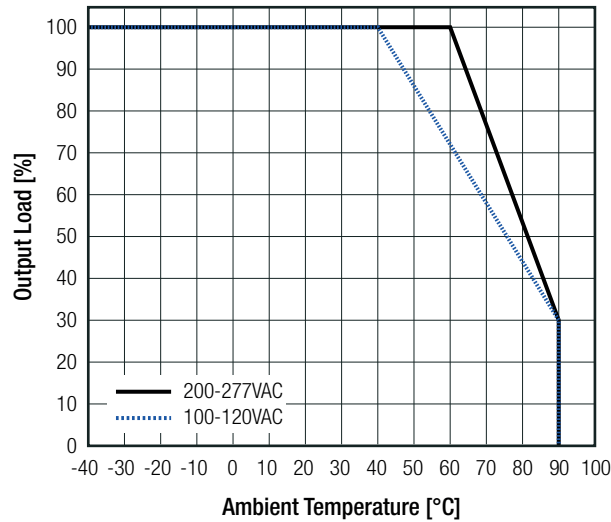


Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

Derating Graph ⁽⁷⁾

(@ Chamber and natural convection 0.1m/s)

RAC20E-24SK/277



SAFETY AND CERTIFICATIONS

| Certificate Type (Safety) | Report / File Number | Standard |
|--|----------------------|--|
| Audio/Video, information and communication technology equipment - Safety requirements | E491408-A6018-UL | UL62368-1 3rd Edition CAN/CSA-C22.2 No. 62368-1 3rd Edition |
| Audio/Video, information and communication technology equipment - Safety requirements (CB) | 210615003 | IEC62368-1:2014 2nd Edition |
| Audio/Video, information and communication technology equipment - Safety requirements (LVD) | | EN62368-1:2014 + A11:2017 |
| Audio/Video, information and communication technology equipment - Safety requirements | 210615002 | IEC62368-1:2018 3rd Edition |
| Audio/Video, information and communication technology equipment - Safety requirements | | EN IEC 62368-1:2020 + A11:2020 |
| Safety of power transformers, power supplies, reactors and similar products for supply voltages up to 1100 V (CB Scheme) | pending | IEC61558-1:2005 2nd Edition + A1:2009 |
| Safety of power transformers, power supplies, reactors and similar products for supply voltages up to 1100 V | | EN61558-1:2005 + A1:2009 |
| Safety of power transformers, power supplies, reactors and similar products for supply voltages up to 1100 V Part 2: Particular requirements (CB Scheme) | pending | IEC61558-2-16:2009 1st Edition + A1:2013 |
| Safety of power transformers, power supplies, reactors and similar products for supply voltages up to 1100 V Part 2: Particular requirements | | EN61558-2-16:2009 + A1:2013 |
| RoHS2 | | RoHS-2011/65/EU + AM-2015/863 |

| EMC Compliance | Condition | Standard / Criterion |
|---|---|--|
| ESD Electrostatic discharge immunity test | Air ±2kV, 4kV, 8kV Contact ±4kV | IEC61000-4-2:2008, Criteria A EN61000-4-2:2009, Criteria A |
| Radiated, radio-frequency, electromagnetic field immunity test | 10V/m (8MHz-1GHz) 3V/m (1.4GHz-2GHz) 1V/m (2GHz-2.7GHz) | IEC61000-4-3:2006+A2:2010, Criteria A IEC61000-4-3:2006+A2:2010, Criteria A |
| Fast Transient and Burst Immunity | AC Port: ±2.0kV | IEC/EN61000-4-4:2012, Criteria A |
| Surge Immunity | AC Port: ±1.0kV | IEC/EN61000-4-5:2014, Criteria A |
| Immunity to conducted disturbances, induced by radio-frequency fields | AC Port: 10Vrms (0.15-80MHz) | IEC61000-4-6:2013, Criteria A EN61000-4-6:2014, Criteria A |
| Power Magnetic Field Immunity | 30A/m | IEC61000-4-8:2009 / EN61000-4-8:2010, Criteria A |

continued on next page

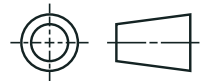
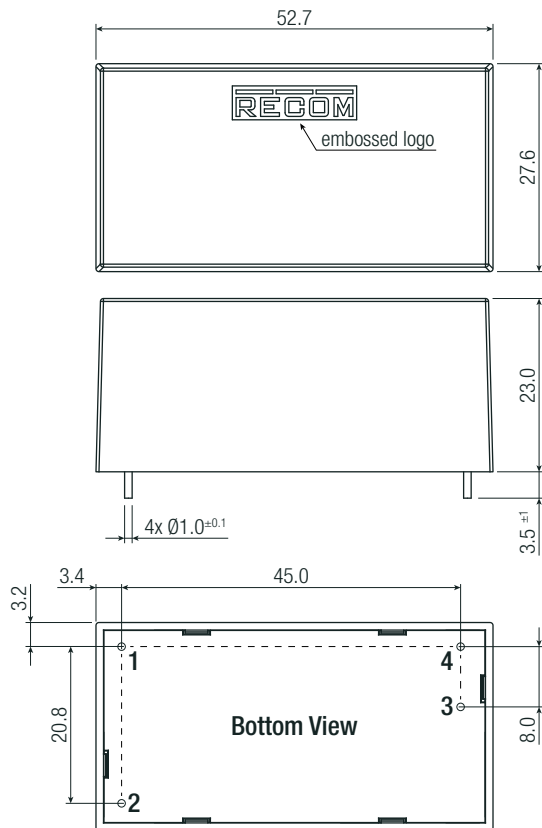
Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

| EMC Compliance | Condition | Standard / Criterion |
|---|---------------------------|---------------------------------------|
| Voltage Dips and Interruptions | Voltage Dip 100% (0.5P) | IEC/EN61000-4-11:2004, Criteria A |
| | Voltage Dip 100% (1.0P) | IEC/EN61000-4-11:2004, Criteria A |
| | Voltage Dip 30% | IEC/EN61000-4-11:2004, Criteria A |
| | Voltage Dip 20% | IEC/EN61000-4-11:2004, Criteria A |
| | Voltage Interruption 100% | IEC/EN61000-4-11:2004, Criteria B |
| Limits of Harmonic Current Emissions | | EN61000-3-2:2014 |
| Limits of Voltage Fluctuations & Flicker | | EN61000-3-3:2013 |
| Low voltage power supplies, d.c. output Part 3: Electromagnetic compatibility (EMC) | | EN IEC 61204-3:2018, Class B |
| Limitations on the amount of electromagnetic interference allowed from digital and electronic devices | | FCC 47 CFR Part 15 Subpart B, Class B |

DIMENSION AND PHYSICAL CHARACTERISTICS

| Parameter | Type | Value |
|-------------------|----------------------------------|--|
| Material | case/baseplate potting PCB | black plastic, (UL94 V-0) silicone, (UL94 V-0) FR4, (UL94 V-0) |
| Dimension (LxWxH) | | 52.7 x 27.6 x 23.0mm |
| Weight | | 60g typ. |

Dimension Drawing (mm)

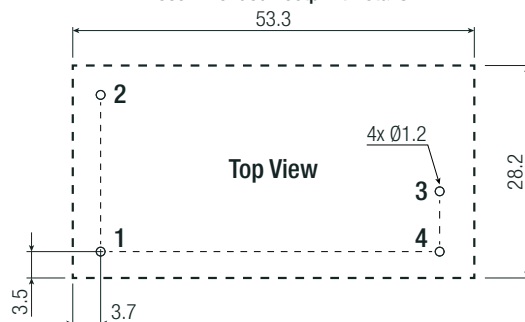


Pinning Information

| Pin # | Function |
|-------|------------|
| 1 | VAC in (N) |
| 2 | VAC in (L) |
| 3 | +Vout |
| 4 | -Vout |

Tolerance: x.x= ±0.5mm
x.xx= ±0.25mm

Recommended Footprint Details



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

PACKAGING INFORMATION

| Parameter | Type | Value |
|-----------------------------|----------------|-----------------------|
| Packaging Dimension (LxWxH) | tube | 490.0 x 56.0 x 40.0mm |
| Packaging Quantity | | 15pcs |
| Storage Temperature Range | | -40°C to +85°C |
| Storage Humidity | non-condensing | 20% to 90% RH max. |

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.