Technical Data Sheet

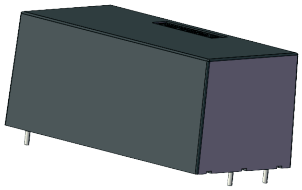
# RAC40S-K Series ◊ AC/DC Power Supply

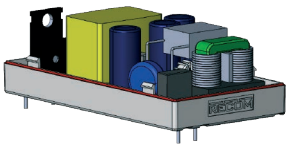
## 40W ◊ Input: 100-277VAC or 100-264VAC

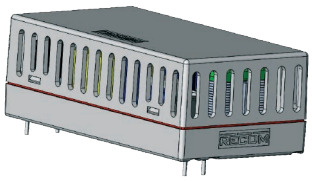
AC/DC Converter

## FEATURES

- Extended input range: 85–305 VAC
- 40 watts with a power density of 22W/in³
- OVC III versions for applications up to 3000 m altitude
- Operating altitude up to 5000 m
- 2” × 1” THT module with legacy P12+ pinout
- Ultra-low no-load power consumption (<75 mW)
- Versions with integrated EMI filter for grounded loads
- Certified to household and industrial safety standards



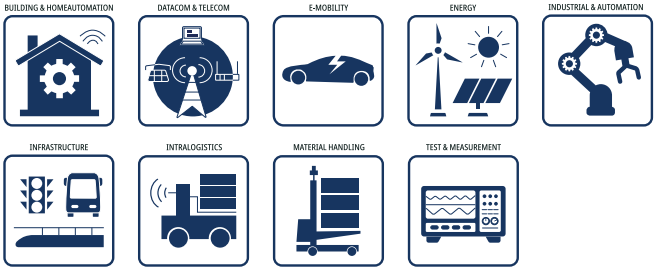







2” x 1” THT: 52.5 x 27.4 x 23.0mm (2.07 x 1.07 x 0.90 inch)
“/277/PCB/OF: 69.5 x 37.0 x 22.5mm (2.73 x 1.45 x 0.88 inch)
“/277/PCB/ENC: 69.5 x 37.0 x 24.0mm (2.73 x 1.45 x 0.94 inch)

## APPLICATIONS




## SAFETY & EMC

RoHS² compliant 10 from 10

Reach compliant

## DESCRIPTION

RAC40S-K sets a new benchmark in power density for low-power AC/DC power supplies. With efficiency levels exceeding 90% and power densities of up to 22 W/in³, it can reliably power loads of up to 40 Watts. Two solder-mount module options are available: a compact encapsulated 2” x 1” module featuring the industry-standard P12 pinout, and a slightly larger low-profile open-frame version. The open-frame module incorporates enhanced EMI filtering, providing comfortable compliance margins to EN55032 Class B limits, even with ground-referenced loads. International safety approvals for both household and industrial applications, combined with OVC II and OVC III ratings and operation at altitudes of up to 5000m, enable worldwide deployment. The series supports ambient temperatures from -40 °C to +90 °C. The 40 W RAC40S-K extends RECOM’s established 2” x 1” AC/DC product family with P12 pinout options, complementing the existing 10 W and 20 W models and providing maximum design flexibility across a wide range of applications.

## SELECTION GUIDE

| Part Number | Input Voltage Range (1) [VAC] | Output Voltage nom. [VDC] | Output Current nom. [A] | Efficiency typ. (2) [%] | Output Power continuous [W] |
|---|---|---|---|---|---|
| RAC40S-05SK (2) | 85-264 / 85-305 | 5 | 6 | 88 | 30 |
| RAC40S-12SK (2) | 85-264 / 85-305 | 12 | 3.33 | 91 | 40 |
| RAC40S-15SK (2) | 85-264 / 85-305 | 15 | 2.67 | 91 | 40 |
| RAC40S-24SK (2) | 85-264 / 85-305 | 24 | 1.67 | 90 | 40 |
| RAC40S-28SK (2) | 85-264 / 85-305 | 28 | 1.42 | 90 | 40 |
| RAC40S-48SK (2) | 85-264 / 85-305 | 48 | 0.83 | 89 | 40 |

Note1: without suffix: 240VAC_nom rated; with suffix “/277”: 277VAC_nom rated
Note2: Efficiency is tested at nominal input (230VAC) and full load at +25°C ambient

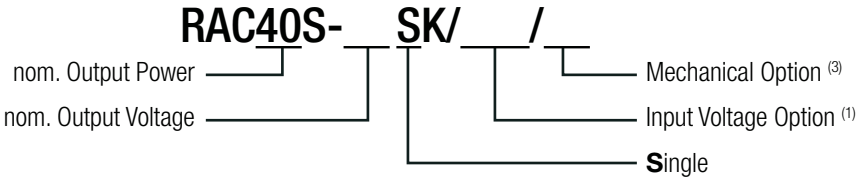
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# RAC40S-K Series ◊ AC/DC Power Supply

## 40W ◊ Input: 100-277VAC or 100-264VAC

RECOM
AC/DC Converter

## MODEL NUMBERING




Note3: without suffix= standard THT printmount version
"/PCB/OF"= open frame version with PCB mounting pins
"/PCB/ENC"= enclosed version with PCB mounting pins

Note4: RAC40S-xxSKA/277, variant without internal Y-caps : on request to meet EN55032 Class B

## ORDERING INFORMATION

| Model | nom. Output Voltage | 2" x 1" THT soldermount | 2" x 1" THT soldermount "SKA/277/ | "/277/PCB/OF" | "/277/PCB/ENC" |
|---|---|---|---|---|---|
| RAC40S-05SK | 5VDC | y | on request | coming soon | coming soon |
| RAC40S-12SK | 12VDC | y | on request | coming soon | coming soon |
| RAC40S-15SK | 15VDC | y | on request | coming soon | coming soon |
| RAC40S-24SK | 24VDC | y | on request | coming soon | coming soon |
| RAC40S-28SK | 28VDC | y | on request | coming soon | coming soon |
| RAC40S-48SK | 48VDC | y | on request | coming soon | coming soon |

y= standard portfolio; on request= on project base (MOQ applies)

## BASIC CHARACTERISTICS (measured @ $T_{AMB}$= 25°C, nom. $V_{IN}$, full load and after warm-up unless otherwise stated)

| Parameter | Condition | | Min. | Typ. | Max. |
|---|---|---|---|---|---|
| Nominal Input Voltage | 50/60Hz | standard version | 100VAC | | 240VAC |
| | | "/277" version | | | 277VAC |
| Operating Range (5) | 47-63Hz | standard version | 85VAC | | 264VAC |
| | | "/277" version | 85VAC | | 305VAC |
| Input Current | 120AC | | | 0.65A | 1A |
| | 230VAC | | | 0.4A | |
| | 277VAC | | | 0.365A | |
| Inrush Current | cold start at 25°C, 230VAC | | | | 45A |
| No Load Power Consumption | | | 40mW | | 75mW |
| Ecodesign Standby Mode Use (Available output power for stated input power) | $P_{IN}$= 0.3W | | 220mW | | |
| | $P_{IN}$= 0.5W | | 400mW | | |
| | $P_{IN}$= 0.7W | | 570mW | | |
| Input Frequency Range | | | 47Hz | | 63Hz |
| Minimum Load | | | 0% | | |
| Power Factor | 120AC | | 0.6 | | |
| | 230VAC | | 0.5 | | |
| | 277VAC | | 0.45 | | |

Note5: The products were submitted for safety files at AC-Input operation

Note6: Measurements are made with a 0.1µF MLCC & 10µF E-cap in parallel across output. (low ESR)
The test setup can have an impact on ripple noise values (placement of scope probe, capacitors, it's specifications, wires, PCB tracks, distances, etc.)

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# RAC40S-K Series ◊ AC/DC Power Supply

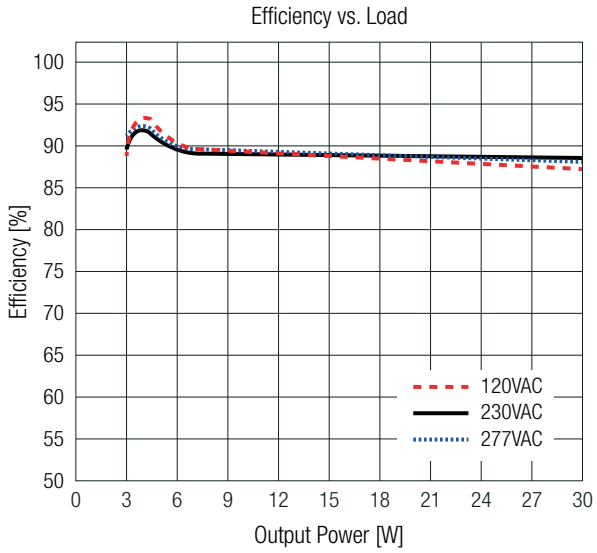
## 40W ◊ Input: 100-277VAC or 100-264VAC

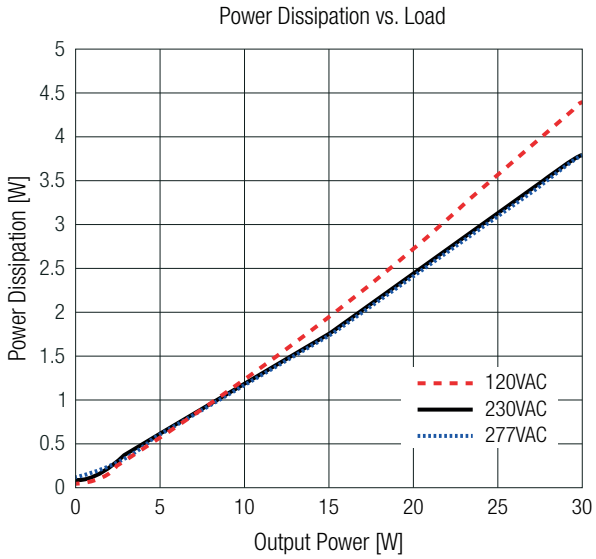
RECOM AC/DC Converter

**BASIC CHARACTERISTICS (measured @ $T_{AMB}$= 25°C, nom. $V_{IN}$, full load and after warm-up unless otherwise stated)**

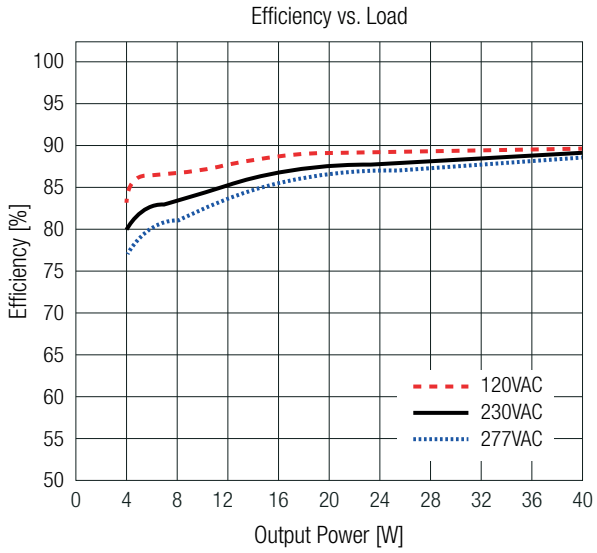
| Parameter | Condition | | Min. | Typ. | Max. |
|---|---|---|---|---|---|
| Start-up time | 120AC | | | 110ms | 150ms |
| | 230VAC | | | 60ms | |
| | 277VAC | | | 40ms | |
| Rise time | 230VAC | | | | 25ms |
| Hold-up time | 120VAC | | | 8ms | |
| | 230VAC | | | 30ms | |
| | 277VAC | | | 45ms | |
| Internal Operating Frequency | | | | | 145kHz |
| Output Ripple and Noise [6] | 20MHz BW | 5Vout | | | 120mVp-p |
| | | others | | | 1% of Vout |

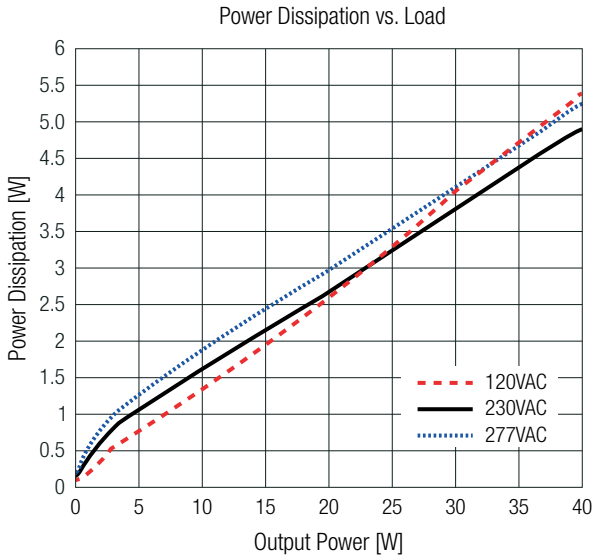
**5Vout**




**48Vout**



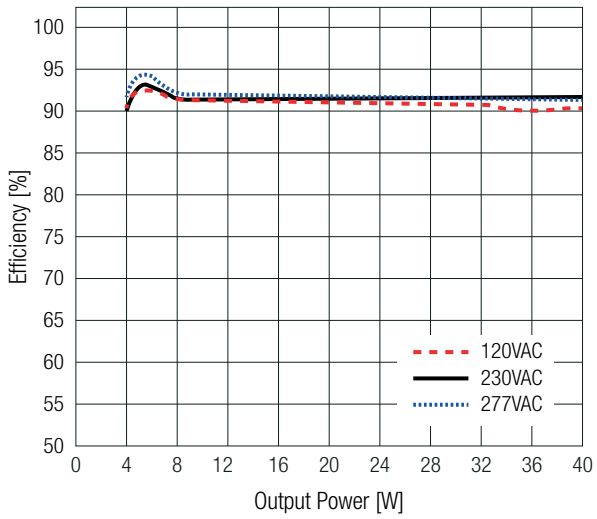




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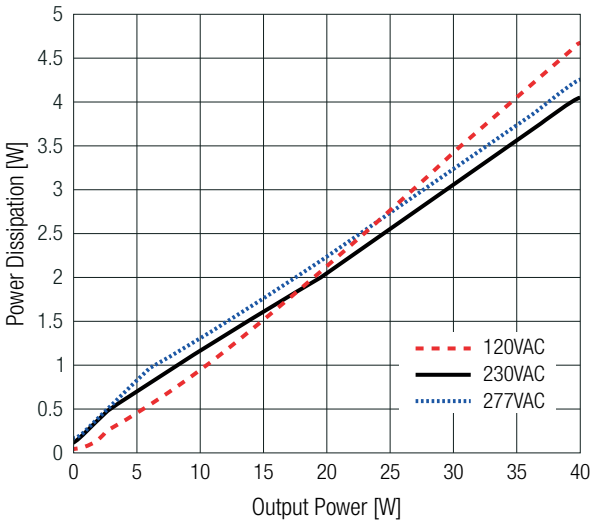
## BASIC CHARACTERISTICS (measured @ $T_{AMB}$= 25°C, nom. $V_{IN}$, full load and after warm-up unless otherwise stated)

**others**

Efficiency vs. Load




Power Dissipation vs. Load




## REGULATIONS (measured @ $T_{AMB}$= 25°C, nom. $V_{IN}$, full load and after warm-up unless otherwise stated)

| Parameter | Condition | Value |
|---|---|---|
| Output Accuracy | | ±3.0% max. |
| Line Regulation | low line to high line | ±1.0% max. |
| Load Regulation [7] | 10% to 100% load | 1.0% typ. |
| Transient Response | 10%-100%-10% load change steps | ±800mV max. |
| | recovery time | 3ms max. |

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

## PROTECTIONS (measured @ $T_{AMB}$= 25°C, nom. $V_{IN}$, full load and after warm-up unless otherwise stated)

| Parameter | Type | | Value |
|---|---|---|---|
| Internal Input Fuse | | | T3.15A , slow blow type |
| Short Circuit Protection (SCP) | | | hiccup, auto recovery |
| Over Voltage Protection (OVP) | 5Vout | | ≤10VDC |
| | 12 & 15Vout | | ≤25VDC |
| | 24 & 28Vout | | ≤35VDC |
| | 48Vout | | ≤63VDC |
| Over Current Protection (OCP) | 5Vout | | 110%-195%, hiccup, auto recovery |
| | 12Vout | | 140%-160%, hiccup, auto recovery |
| | 15Vout | | 180%-195%, hiccup, auto recovery |
| | 24 & 28Vout | | 160%-180%, hiccup, auto recovery |
| | 48Vout | | 130%-180%, hiccup, auto recovery |
| Isolation Voltage [8] | 1 minute | I/P to O/P | 4.2kVAC |
| Isolation Resistance | $V_{ISO}$ = 500VDC | | 1GΩ min. |
| Isolation Capacitance | I/P to O/P, 100kHz, 0.1V | | <1200pF max. |

Note8: For repeat Hi-Pot testing, reduce the time and/or the test voltage

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# RAC40S-K Series ◊ AC/DC Power Supply

## 40W ◊ Input: 100-277VAC or 100-264VAC

RECOM AC/DC Converter

**ENVIRONMENTAL (measured @ $T_{AMB}$= 25°C, nom. $V_{IN}$, full load and after warm-up unless otherwise stated)**

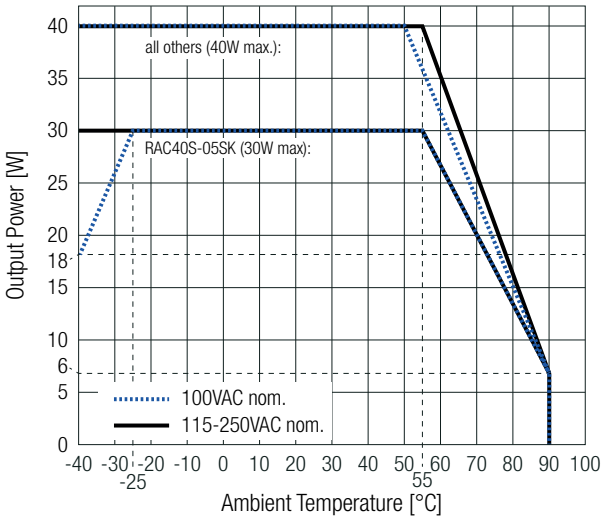
| Parameter | Condition | | | Value |
|---|---|---|---|---|
| Operating Ambient Temperature Range | @ natural convection (0.1m/s) | refer to **„Derating Graph“** | | -40°C to +90°C |
| Maximum Case Temperature | | | | +110°C |
| Temperature Coefficient | | | | 0.023%/K |
| Operating Humidity | non-condensing | | | 90% RH max. |
| Shock | according to IEC60068-2-6 & -64 | | | 5-500Hz, 2Grms, 15 min for each axis |
| MTBF | according to MIL-HDBK-217, G.B. | $T_{AMB}$= +25°C | 100VAC | 2000 x $10^3$ hours |
| | | | 230VAC | 2110 x $10^3$ hours |
| | | $T_{AMB}$= +40°C | 100VAC | 1170 x $10^3$ hours |
| | | | 230VAC | 1860 x $10^3$ hours |
| Design Lifetime | 5Vout @ 230VAC | $T_{AMB}$= +40°C | | 43 x $10^3$ hours |
| | | $T_{AMB}$= +50°C | | 24 x $10^3$ hours |
| | others @ 230VAC | $T_{AMB}$= +40°C | | 28 x $10^3$ hours |
| | | $T_{AMB}$= +50°C | | 16 x $10^3$ hours |

Note9: Recognized by safety agency for safe operation up to xxxxm. High altitude operation may impact the performance and lifetime.

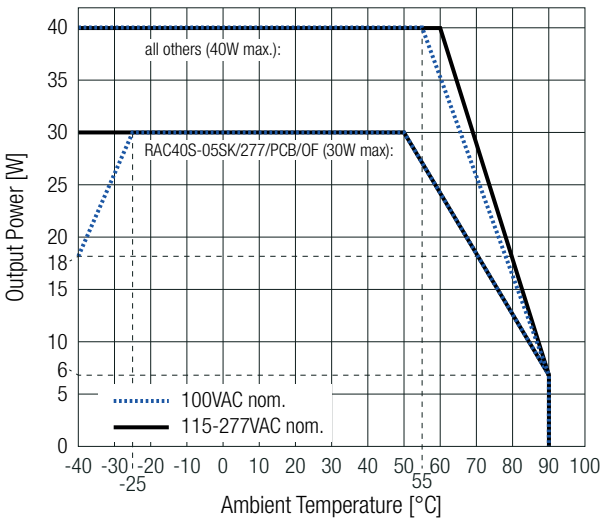
### Derating Graph

(@ Chamber and natural convection 0.1m/s)

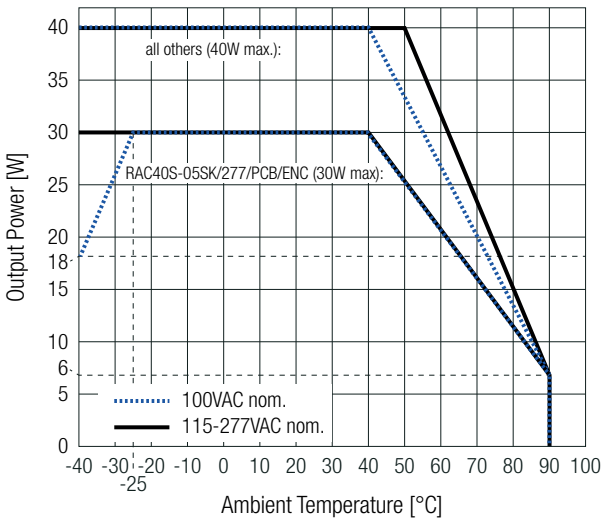
2” x 1” THT soldermount Models




“/277/PCB/OF” Version coming soon




“/277/PCB/OF” Version coming soon




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## SAFETY & CERTIFICATIONS

| Certificate Type (Safety) | Report Number | Standard |
|---|---|---|
| Audio/Video, information and communication technology equipment - Part1: Safety requirements 3rd Edition | pending | UL62368-1:2019 |
| | | CAN/CSA-C22.2 No. 62368-1-19 |
| Audio/Video, information and communication technology equipment - Part1: Safety requirements 3rd Edition | pending | IEC62368-1:2018 |
| | | EN IEC 62368-1:2020 |
| Household and similar electrical appliances – Safety – Part 1: General requirements | pending | EN/IEC60335-1:2023 + A11:2023 |
| | | IEC60335-1:2020 |
| Measurement methods for electromagnetic fields of household appliances and similar apparatus with regard to human exposure | pending | EN62333:2008 + AC:2008 |
| Safety of power transformers, power supplies, reactors and similar products for supply voltages up to 1100 V Part 2: Particular requirements | pending | IEC 61558-2-16:2021 |
| Safety of power transformers, power supplies, reactors and similar products for supply voltages up to 1100 V 3rd Edition | pending | IEC 61558-1:2017 |
| Safety of power transformers, power supplies, reactors and similar products for supply voltages up to 1100 V 3rd Edition | pending | EN IEC 61558-1:2019 |
| Safety of power transformers, power supplies, reactors and similar products for supply voltages up to 1100 V Part 2: Particular requirements | pending | EN IEC 61558-2-16:2025 |
| RoHS2 | | RoHS 2011/65/EU + AM2015/863 |

| EMC Compliance according to EN IEC61204-3 | Condition | Standard / Criterion |
|---|---|---|
| Low voltage power supplies, d.c. output Part 3: Electromagnetic compatibility (EMC) | | IEC/EN 61204-3:2018 |
| Limits of Harmonic Current Emissions | | EN IEC 61000-3-2:2019 |
| Limits of Voltage Fluctuations & Flicker | | EN61000-3-3:2013+A1:2019 |

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# RAC40S-K Series ◊ AC/DC Power Supply

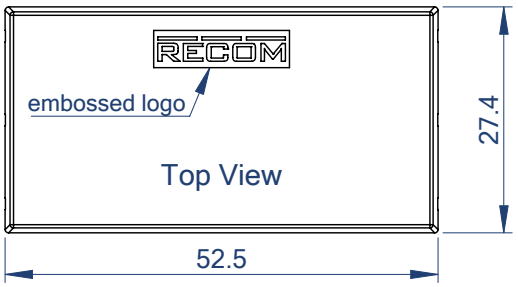
## 40W ◊ Input: 100-277VAC or 100-264VAC

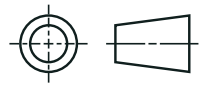
RECOM AC/DC Converter

## DIMENSION & PHYSICAL CHARACTERISTICS

| Parameter | Type | Value |
|---|---|---|
| Materials | case/ baseplate | black plastic, (UL94 V-0) |
| | potting | silicone, (UL94 V-0) |
| | PCB | FR4 |
| Dimension (LxWxH) | THT soldermount versions | 52.5 x 27.4 x 23.0mm<br>2.07 x 1.07 x 0.90 inch |
| | "/277/PCB/OF" | 69.5 x 37.0 x 22.5mm<br>2.73 x 1.45 x 0.88 inch |
| | "/277/PCB/ENC" | 69.5 x 37.0 x 24.0mm<br>2.73 x 1.45 x 0.94 inch |
| Weight | THT soldermount versions | 80.5g typ.<br>0.17 lbs |
| | "/277/PCB/OF" | 68.5g typ.<br>0.15 lbs |
| | "/277/PCB/ENC" | 75g typ.<br>0.16 lbs |

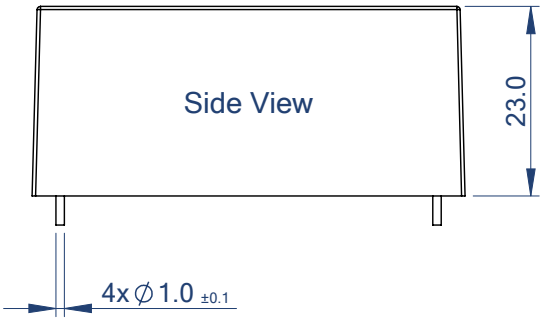
### Dimension Drawing 2" x 1" THT soldermount Version (mm)

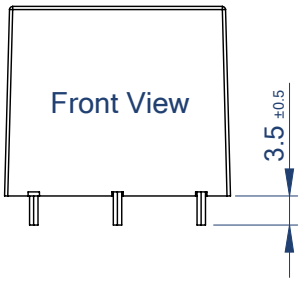


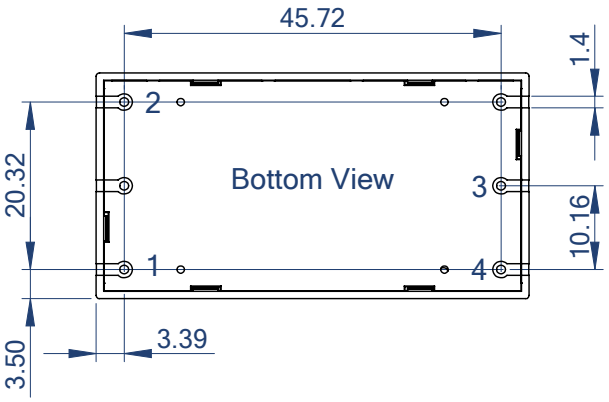



**Pinning information [P12+]**

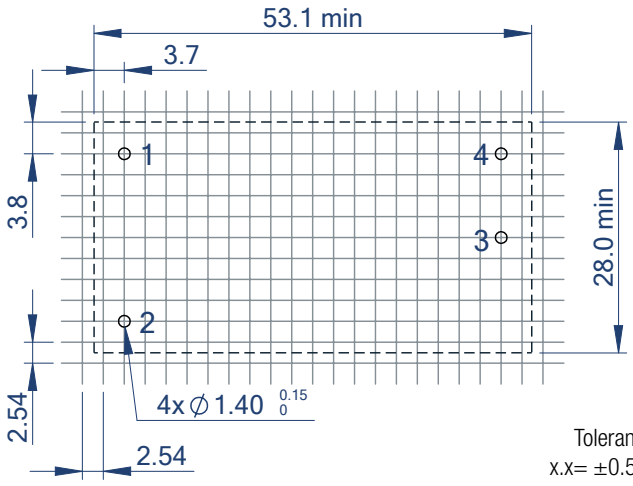
| Pin # | Single |
|---|---|
| 1 | VAC in (N) |
| 2 | VAC in (L) |
| 3 | -Vout |
| 4 | +Vout |




Recommended Footprint Detail




Tolerances:
x.x= ±0.5mm
x.xx= ±0.25mm

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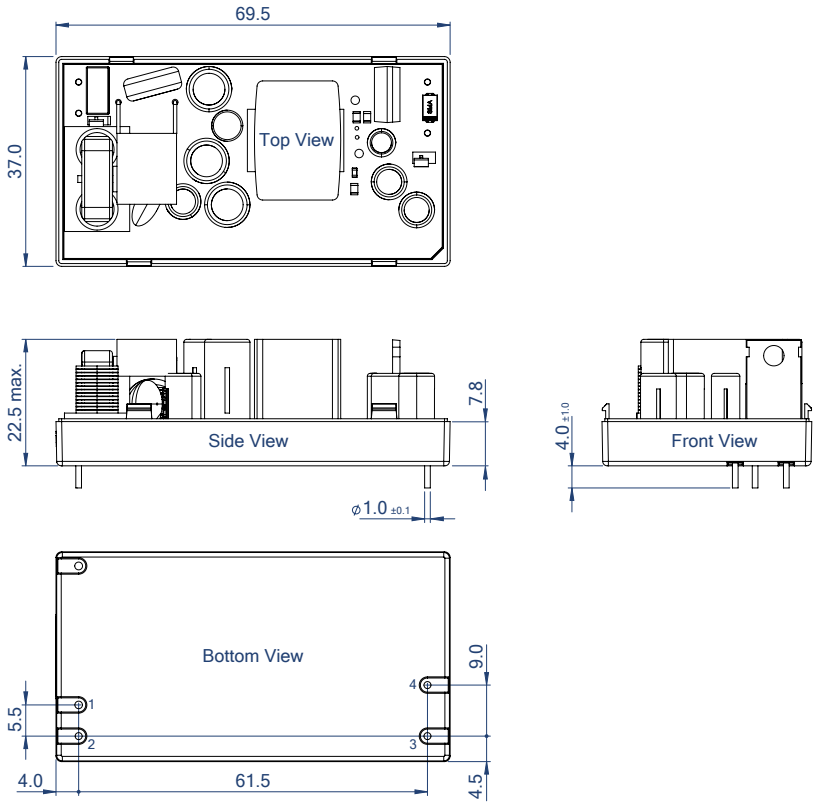
# RAC40S-K Series ◊ AC/DC Power Supply

## 40W ◊ Input: 100-277VAC or 100-264VAC

AC/DC Converter

## DIMENSION & PHYSICAL CHARACTERISTICS (COMING SOON)

### Dimension Drawing "/277/PCB/OF" Version (mm)

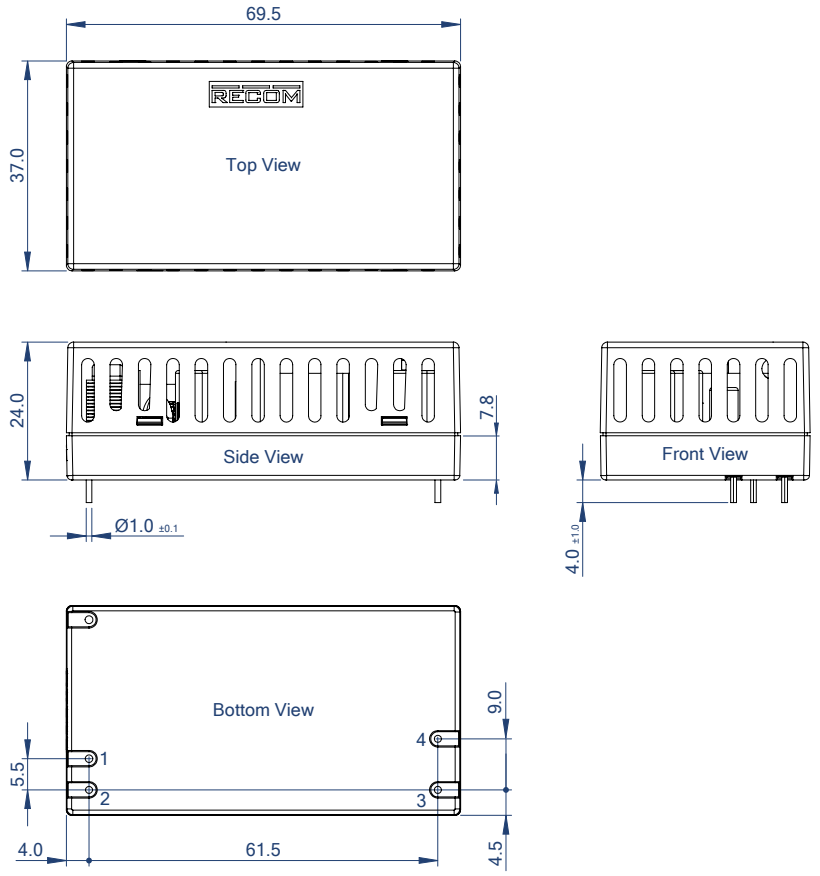



**Pinning information [P12+]**

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

Tolerances:
x.x= ±0.5mm
x.xx= ±0.25mm

### Dimension Drawing "/277/PCB/ENC" Version (mm)



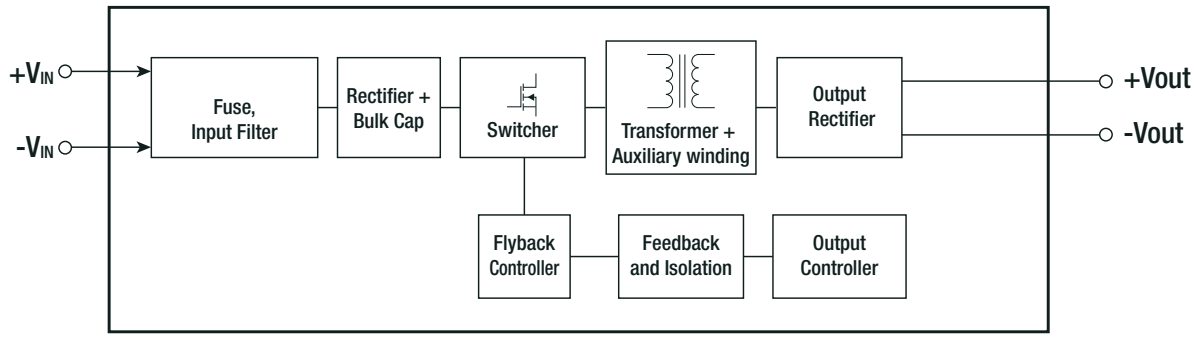

**Pinning information [P12+]**

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

Tolerances:
x.x= ±0.5mm
x.xx= ±0.25mm

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## BLOCK DIAGRAMM




## PACKAGING INFORMATION

| Parameter | Type | Value |
|---|---|---|
| Packaging Dimension (LxWxH) | cardboard box | 490.0 x 56.0 x 40.0 |
| Packaging Quantity | | 15pcs |
| Storage Temperature Range | | -40°C to +90°C |
| Storage Humidity | non-condensing | 95% 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.

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