Technical Data Sheet

RAC20NE-12SK/277/EVSE ◊ AC/DC Power Supply

20W ◊ Input: 100V-277VAC

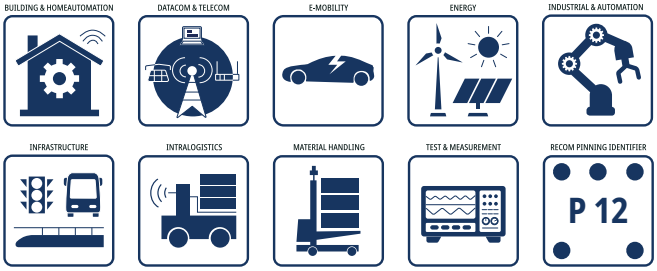
AC/DC Converter

FEATURES

- 85-305VAC wide input range
- Full load ratings to 60°C
- O/P either floating or coupled with GND, FE or PE
- Surge immunity 2kVAC: L-N &; 4kV: L; N - Earth
- OVC III over voltage category up to 5000m
- OCP: hiccup auto recovery
- Boost power 23W
- High efficiency
- 3 year warranty

LxWxH: 52.5 x 27.4 x 23.0mm (2.07 x 1.07 x 0.9 inch)
60g (0.13lbs)

APPLICATIONS



SAFETY & EMC

RoHS² compliant 10 from 10 | Reach compliant | CE | cULus E224736 | IECEE CB SCHEME | HOUSEHOLD CERTIFIED EN-60335-1

SELECTION GUIDE (CONSTANT VOLTAGE OPERATION)

Part Number	Input Voltage Range [VAC]	Output Voltage [VDC]	Output Current nom. [mA]	Boost Current max. (1) [mA]	Efficiency (2) typ. [%]	Output Power continuous [W]
RAC20NE-12SK/277/EVSE	85-305	12	1667	1916	87	20

Note1: Refer to **„Boost Power Duty Cycle“**

Note2: Efficiency is tested at 230VAC and full load at +25°C ambient.

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RECOM AC/DC Converter

Model Numbering

RAC20NE-12 SK/277/EVSE

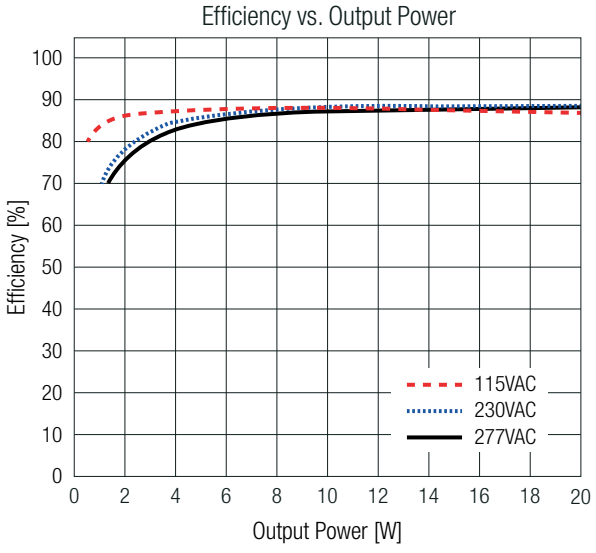
- 20 — nom. Output Power
- 12 — Output Voltage
- SK — **S**ingle
- /277/EVSE — custom specific suffix

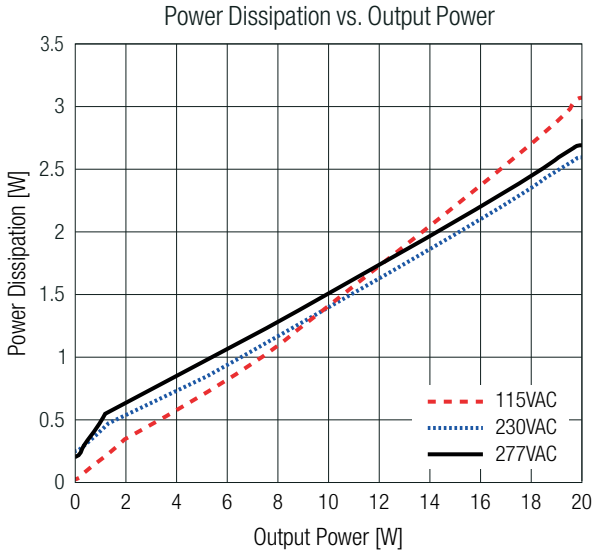
BASIC CHARACTERISTICS (measured @ T_{AMB}= 25°C, nom. V_{IN}, full load and after warm-up unless otherwise stated)

Parameter	Condition		Min.	Typ.	Max.
Nominal Input Voltage	50/60Hz		100VAC		277VAC
Operating Range [4]	47-63Hz		85VAC		305VAC
	DC		120VDC		430VDC
Input Current	115VAC			350mA	450mA
	230VAC			250mA	450mA
	277VAC			200mA	450mA
Inrush Current	cold start at 25°C	115VAC			20A
		230VAC			40A
		277VAC			50A
No Load Power Consumption	115/230/277VAC			50mW	100mW
Ecodesign Standby Mode Use (Available output power for stated input power)	P_{IN}= 0.5W		0.34W		
	P_{IN}= 1.0W		0.74W		
	P_{IN}= 2.0W		1.6W		
Input Frequency Range	AC Input		47Hz		63Hz
Minimum Load			0%		
Power Factor	115VAC			0.6	
	230VAC			0.5	
	277VAC			0.4	
Start-up time					150ms
Rise time			40ms		
Hold-up time	230VAC		30ms		
	277VAC		50ms		
Internal Operating Frequency					150kHz
Output Ripple and Noise [5]	20MHz BW				1% Vout

Note4: The products were submitted to all safety files at AC-operation. (90-305VAC)

Note5: 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.)





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

Parameter	Condition	Value
Output Accuracy		±2.0% max.
Line Regulation	low line to high line, full load	±1.0% max.
Load Regulation (6)	10% to 100% load	2.0% max.
Transient Response	25% load step change	4.0% max.
Recovery Time		500µs max.

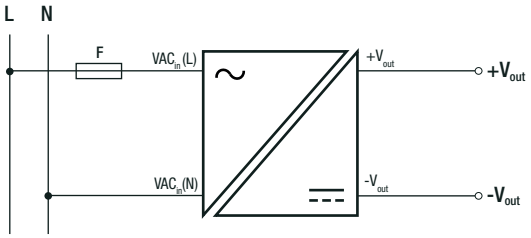
Note6: Operation below 10% load will not harm the converter, but specifications may not be met

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

Parameter	Type			Value
Input Fuse (7)				no internal fuse
Short Circuit Protection (SCP)				hiccup mode; auto recovery
Over Current Protection (OCP)				120% - 150%, hiccup mode
Over Voltage Protection (OVP)				120% - 250%, latch off mode
Over Voltage Category (OVC)				OVC III (5000m)
Class of Equipment				Class II
Isolation Voltage	I/P to O/P	1 minute	according to 61558	4.2kVAC
			according to 62368-1	6kVDC
Insulation Grade	I/P to O/P			reinforced

Note7: Refer to local safety regulations if input over-current protection is also required

Protection Circuit



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

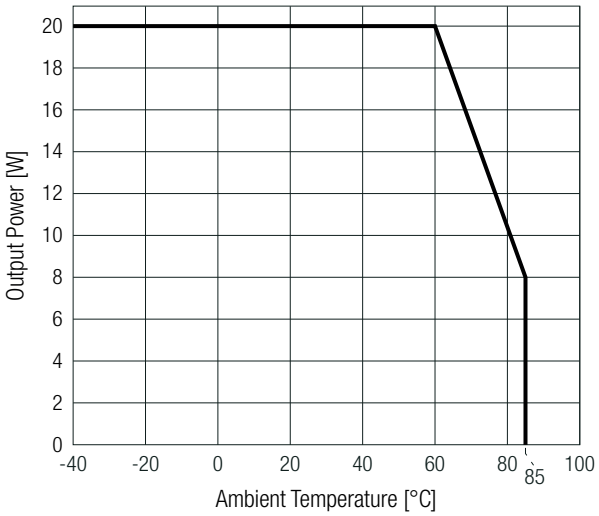
Parameter	Condition		Value
Operating Ambient Temperature Range	@ natural convection (0.1m/s)	refer to **„Derating Graph“**	-40°C to +85°C
Maximum Case Temperature			+95°C
Temperature Coefficient			±0.05%/K
Operating Altitude (8)	“/277” and “/277/CC”		5000m (OVC III)
Operating Humidity			95% RH max.
Pollution Degree			PD2
MTBF	according to MIL-HDBK-217, G.B.	T_{AMB}= +25°C	1190 x 10^3 hours
Design Lifetime	full load	T_{AMB}= +25°C	130 x 10^3 hours

Note8: Recognized by safety agency for safe operation up to 5000m. High altitude operation may impact the performance and lifetime. Please contact RECOM tech support for advice

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

Derating Graph

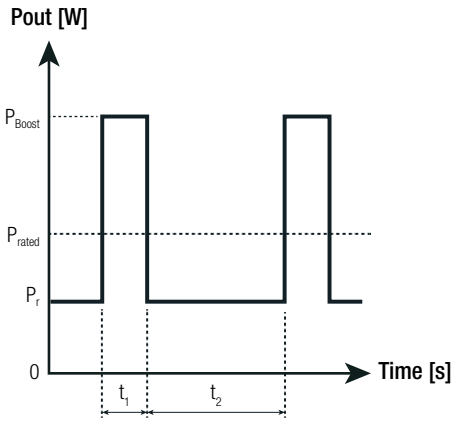
(@ Chamber and natural convection 0.1m/s)



BOOST POWER DUTY CYCLE

P_{rated} = refer to **„Derating Graph“** [W]
P_{Boost} = Boost power (<23W) [W]
P_r = recovery output power [W]
t_1 = Boost time set (20s max.) [s]
t_2 = recovery time (min. 2 x t_1) [s]

$$P_r = \frac{P_{rated} \times (t_1 + t_2) - (P_{Boost} \times t_1)}{t_2}$$



Practical Example (RAC20NE-12SK/277/EVSE):

Take the RAC20NE-12SK/277/EVSE at 230VAC input Voltage and full load at T_{AMB}= 80°C ,with natural convection.

P_{rated} = 10W
P_{Boost} = 23W
t_1 = 20s
t_2 = 50s

$$P_r = \frac{10W \times (20s + 50s) - (23W \times 20s)}{50s} = \underline{4.8W}$$

Note9: For increased peak power values for 300ms of up to 27W at 90VAC and 33W at 200VAC and more please consult tech support.

SAFETY & CERTIFICATIONS

Certificate Type (Safety)	Report Number	Standard
Audio/Video, information and communication technology equipment - Part1: Safety requirements 3rd Edition	E491408-A6034-UL	UL62368-1:2019 3rd Edition
		CAN/CSA-C22.2 No. 62368-1-19 3rd Edition
Audio/Video, information and communication technology equipment - Part1: Safety requirements 3rd Edition	240408022	IEC62368-1:2018 3rd Edition
		EN IEC 62368-1:2020+A11:2020
Audio/Video, information and communication technology equipment - Part1: Safety requirements 3rd Edition	085-240223001-000	IEC62368-1:2018 3rd Edition
		EN IEC 62368-1:2020+A11:2020
Audio/Video, information and communication technology equipment - Part1: Safety requirements 3rd Edition	085-240223401-000	IEC62368-1:2018 3rd Edition
		EN IEC 62368-1:2020+A11:2020
Household and similar electrical appliances – Safety – Part 1: General requirements	64.110.24.02233.01	IEC60335-1:2010 + C1:2016 5th Edition
		EN60335-1:2012 + A15:2021
Measurement methods for electromagnetic fields of household appliances and similar apparatus with regard to human exposure	64.110.24.02233.01	EN62233:2008
Safety of power transformers, power supplies, reactors and similar products for supply voltages up to 1100 V 3rd Edition	085-240223101-000	IEC61558-1:2017 3rd Edition
		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		IEC61558-2-16:2009+A1:2013 1st Edition
		EN61558-2-16:2009+A1:2013
Lamp controlgear Part 1: General and safety requirements	085-240223201-000	IEC61347-1:2015+A1:2017 3rd Edition
		EN61347-1:2015+A1:2021
Lamp controlgear Part 2-13: Particular requirements for d.c. or a.c. supplied electronic controlgear for LED modules		IEC61347-2-13:2014+A1:2016 2nd Edition
		EN61347-2-13:2014+A1:2017

EMC Compliance according to EN IEC61204-3	Condition	Standard / Criterion
Low voltage power supplies, d.c. output Part 3: Electromagnetic compatibility (EMC)		EN IEC 61204-3:2018
ESD Electrostatic discharge immunity test	Air: ±2, 4, 8kV Contact: ±6kV	IEC61000-4-2:2008, Criteria A EN61000-4-2:2009, Criteria A
Radiated, radio-frequency, electromagnetic field immunity test	10V/m (80-1000MHz), 3V/m (1400-2000MHz), 1V/m (2000-2700MHz)	IEC/EN61000-4-3:2006 + A2:2010 Criteria A
Fast Transient and Burst Immunity	L, N, L-N ±2kV	IEC/EN61000-4-4:2012, Criteria A
	L, N, L-N ±4kV	IEC/EN61000-4-4:2012, Criteria B
Surge Immunity	L-N: 0.5, 1kV	IEC/EN61000-4-5:2014 + A1:2017, Criteria A
	L-N: 2kV	IEC/EN61000-4-5:2014 + A1:2017, Criteria B
	L-PE, N-PE: 1, 2kV	IEC/EN61000-4-5:2014 + A1:2017, Criteria A
	L-PE: 4kV; O/P connected to GND	IEC/EN61000-4-5:2014 + A1:2017, Criteria B
	N-PE: 4kV; O/P connected to GND	IEC/EN61000-4-5:2014 + A1:2017, Criteria A
Immunity to conducted disturbances, induced by radio-frequency fields	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
Voltage Dips and Interruptions	Dips: 100% (0.5P, 1.0P), 60%, 30%, 20%	IEC/EN61000-4-11:2004+A1:2017, Criteria A
	Interruption: 100%	IEC/EN61000-4-11:2004+A1:2017, Criteria B
Limits of Voltage Fluctuations & Flicker		EN61000-3-3:2013+A1:2019

EMC Compliance according to EN55032	Condition	Standard / Criterion
Electromagnetic compatibility of multimedia equipment – Emission Requirements	O/P either floating or earth coupled (FE; PE or GND)	EN55032:2015+A11:2020, Criteria B

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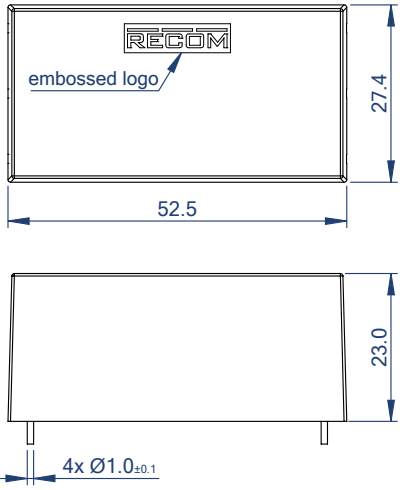
20W ◊ Input: 100V-277VAC

RECOM AC/DC Converter

DIMENSION & PHYSICAL CHARACTERISTICS

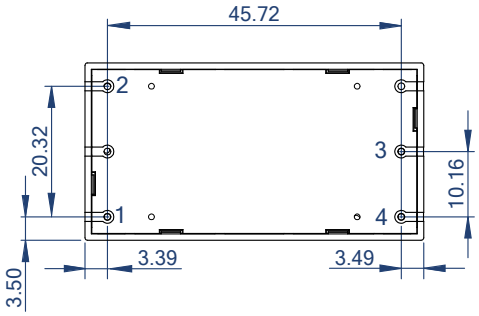
Parameter	Type	Value
Materials	case/baseplate	plastic, (UL94 V-0)
	potting	silicone, (UL94 V-0)
	PCB	FR4, (UL94 V-0)
Dimension (LxWxH)		52.5 x 27.4 x 23.0mm 2.07 x 1.07 x 0.9 inch
Weight		60g typ. 0.13 lbs

Dimension Drawing (mm)

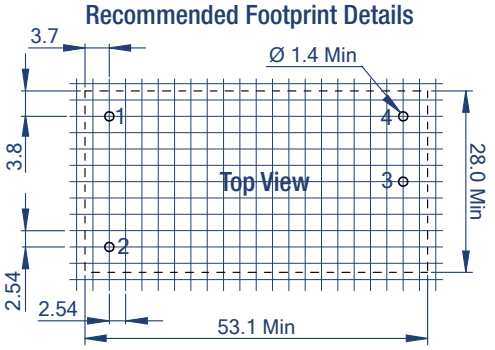


Pinning information [P12]

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

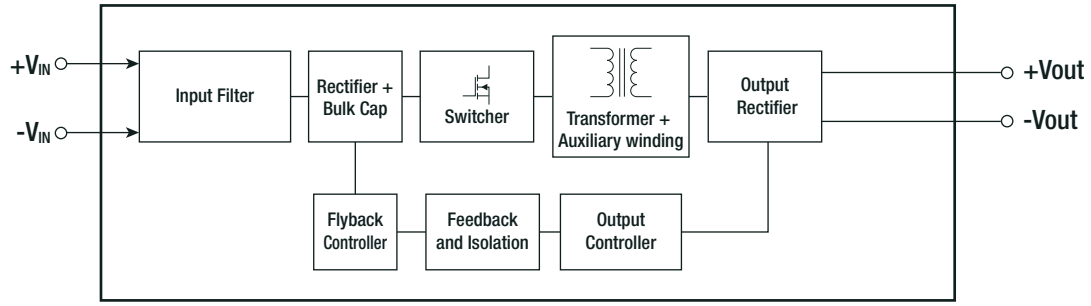


Recommended Footprint Details



Tolerance: xx.x= ±0.5mm
xx.xx= ±0.25mm

BLOCK DIAGRAMM



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 +90°C
Storage Humidity		95% RH max.