Technical Data Sheet

RAC15-K/WI Series ◊ AC/DC Power Supply

15W ◊ Input: 18V-264VAC and 18V-375VDC

AC/DC Converter

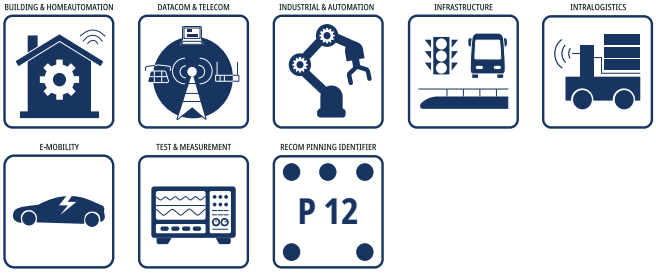
FEATURES

- Ultra low Input: AC: 18-264V or DC: 18-375V
- 1.5”x2” compact size; standard pinning [P12]
- Print mount or flying wire connections
- OVC III to 3000m or OVC II to 5000m altitude
- Operating temperature ratings from -40° to 85°C
- UL industry and IEC household
- EMI EN55032 “B” filter inside
- No load power consumption typ.: 30mW
- 3 year warranty



52.5 x 40.0 x 25.5mm (2.06 x 1.57 x 1.0 inch)

APPLICATIONS



SAFETY & EMC

E314885

HOUSEHOLD CERTIFIED EN-60335-1

RoHS² compliant 10 from 10

Reach compliant

DESCRIPTION

The RAC15-K/WI power conversion series with extended wide input to ultra-low mains voltages converts inputs ranging from 24 to 240VAC nominal or 18 to 375VDC into regulated outputs from 5 to 54 VDC. The sealed modules in a compact size of 1.5 x 2 inches with the industry standard pinning “P12” enable integration via solder mounting or via flexible cable connections. Certified for operation at altitudes up to 3000m under OVC III or up to 5000m under OVC II requirements, the power supplies meet strict safety standards according to UL and IEC certifications of industrial and household standards. In addition, the integrated EMI EN55032 “B” filter ensures minimal electromagnetic interference for compliant integration in a wide variety of applications. Together with the mechanically identical RAC15-K/480 series Recom´s range of 1.5”x2” modules opens up an entire accessible conversion range from 24VAC to 480VAC with just two items of the same form factor.

SELECTION GUIDE

Part Number	Input Voltage Range [VAC]	Input Voltage Range [VDC]	Output Voltage nom. [VDC]	Output Current rated [mA]	Efficiency (1) typ. [%]	Output Power continuous (2) [W]
RAC15-05SK/WI (2)	18-264	18-375	5	3000	82	15
RAC15-12SK/WI (2)	18-264	18-375	12	1250	83	15
RAC15-15SK/WI (2)	18-264	18-375	15	1000	83	15
RAC15-24SK/WI (2)	18-264	18-375	24	625	84	15
RAC15-54SK/WI (2)	18-264	18-375	54	278	80	15

Note1: Efficiency is tested at 230VAC and full load at +25°C ambient

Note2: Refer to **„Derating Graph“**

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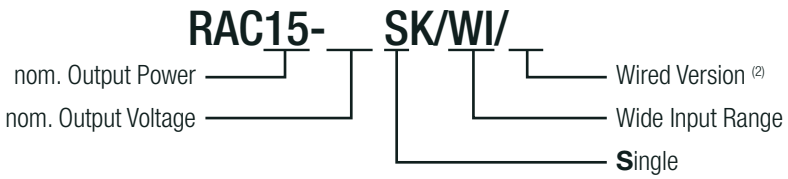
15W ◊ Input: 18V-264VAC and 18V-375VDC

RECOM AC/DC Converter

MODEL NUMBERING



Note2: add suffix "/W" for wired version
without suffix standard THT version

ACCESSIBLE PART (ONLY VALID FOR THT VERSION)

Part Number	Description	Datasheet Link
RAC-ADAPT-ST-1	adapter board with screw terminals for easy connection	RAC-ADAPT-ST-1.pdf

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		24VAC		240VAC
Operating Range (4)	47-63Hz		18VAC		264VAC
	DC operation	5Vout, 12Vout, 15Vout	18VDC		375VDC
		24Vout	20VDC		
		54Vout	21.6VDC		
Input Current	48VAC			600mA	
	115VAC			280mA	450mA
	230VAC			180mA	450mA
Inrush Current	cold start at 25°C	100VAC			40A
		230VAC			65A
No Load Power Consumption				30mW	100mW
Ecodesign Standby Mode Use (Available output power for stated input power)	100/230VAC	P_{IN}= 0.5W	0.32W		
		P_{IN}= 1.0W	0.7W		
		P_{IN}= 2.0W	1.48W		
Input Frequency Range	AC operation		47Hz		63Hz
Minimum Load			0%		
Power Factor	100VAC		0.5		
	230VAC		0.45		
Start-up time	48/100/230VAC				120ms
Rise time	48/100/230VAC				25ms
Hold-up time	230VAC		120ms	150ms	
Internal Operating Frequency					75kHz
Output Ripple and Noise (5)	20MHz BW				1% of Vout

Note4: The products were submitted to all safety files at AC (21.6V-264VAC), and DC according to 32368, 61558 (24-375VDC) operation.

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.)

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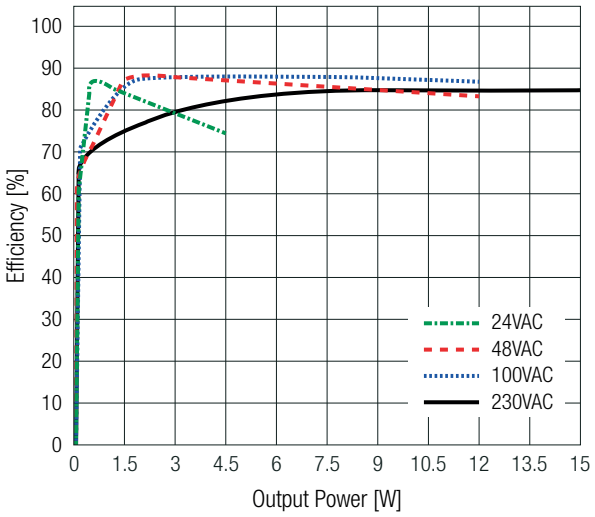
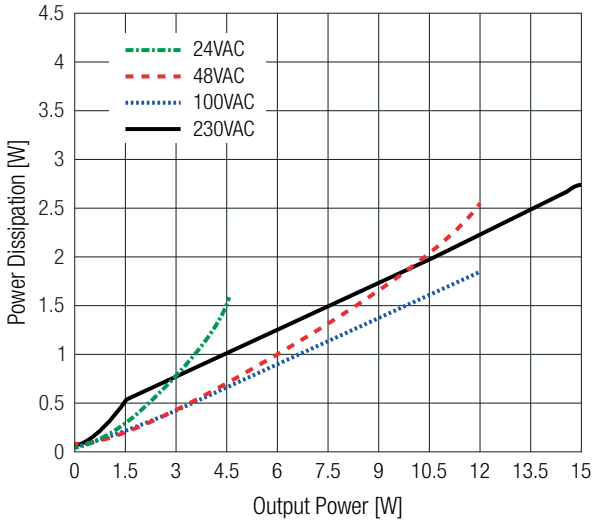
BASIC CHARACTERISTICS (measured @ T_{AMB}= 25°C, nom. V_{IN}, full load and after warm-up unless otherwise stated)

RAC15-05SK/WI

Efficiency vs. Output Power

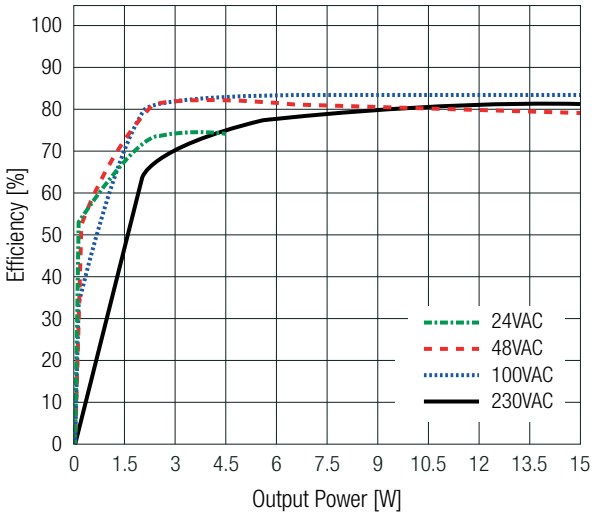


Power Dissipation vs. Output Power

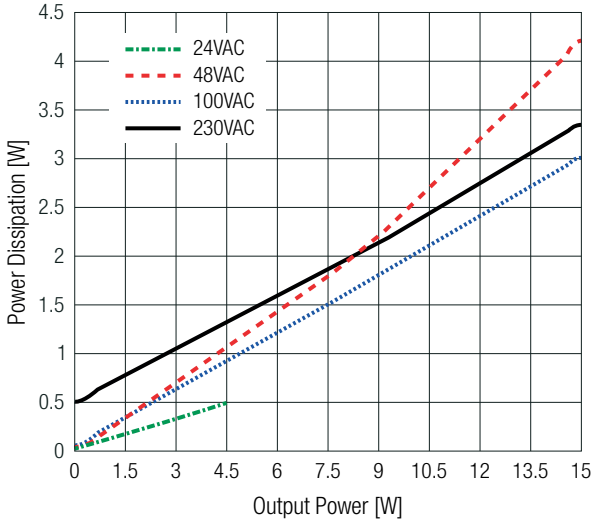


RAC15-12SK/WI

Efficiency vs. Output Power

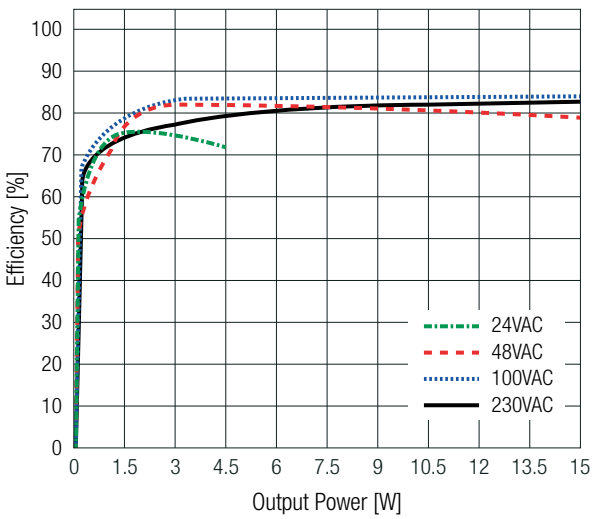


Power Dissipation vs. Output Power

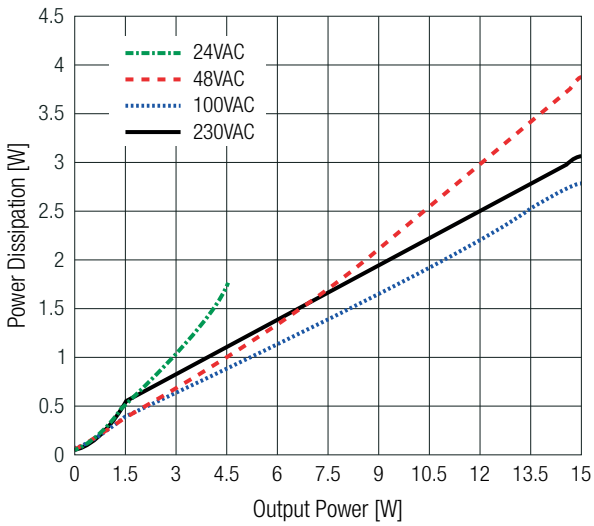


RAC15-15SK/WI

Efficiency vs. Output Power



Power Dissipation vs. Output Power



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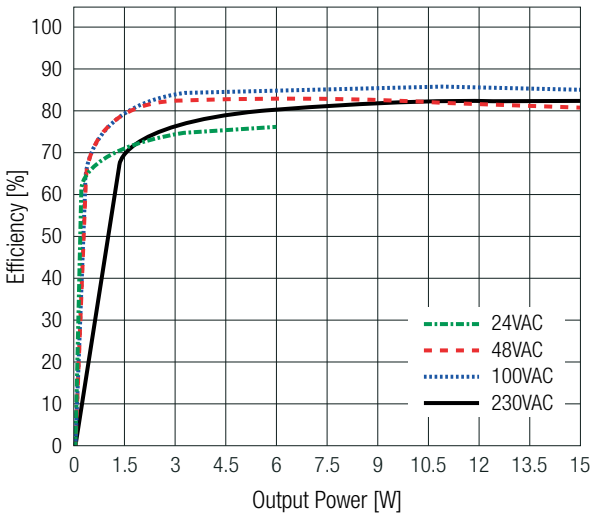
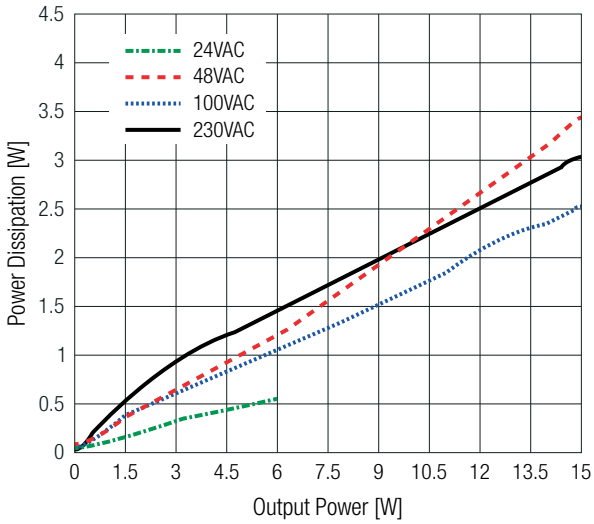
BASIC CHARACTERISTICS (measured @ T_{AMB}= 25°C, nom. V_{IN}, full load and after warm-up unless otherwise stated)

RAC15-24SK/WI

Efficiency vs. Output Power

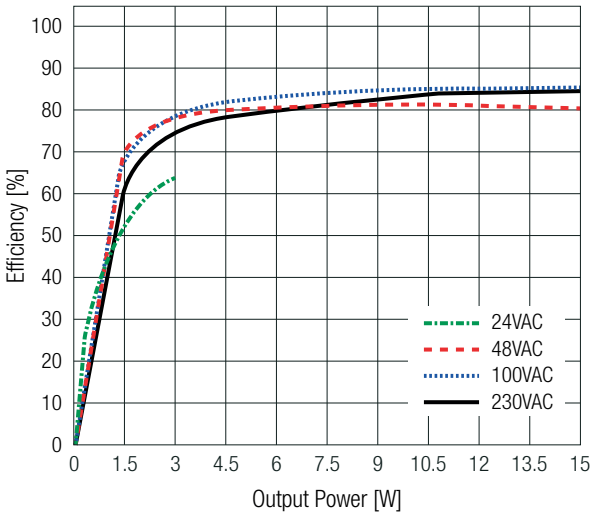


Power Dissipation vs. Output Power

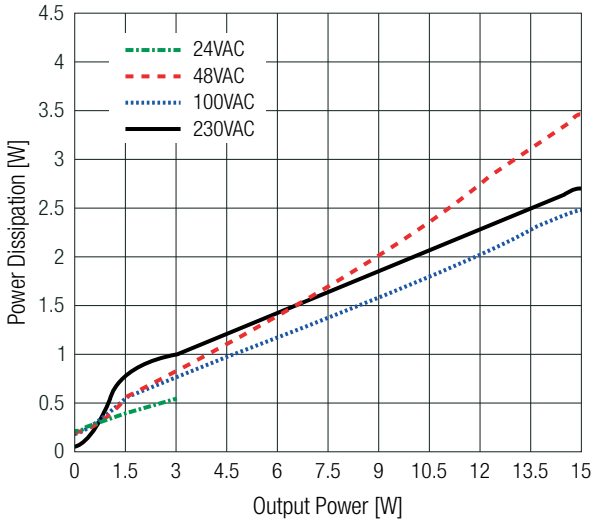


RAC15-54SK/WI

Efficiency vs. Output Power



Power Dissipation vs. Output Power



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% typ. / ±3.0% max.
Line Regulation	low line to high line, full load		±0.5% typ. / ±1.0% max.
Load Regulation [7]	10% to 100% load		1.0% typ. / 2.0% max.
Transient Response	25% load step change	others	0.5V max.
		54Vout	1.5V max.
	recovery time	others	3ms max.
		54Vout	6ms max.

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

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

Parameter	Type		Value
Internal Input Fuse [8]			T3.15A slow blow type
Limited Power Source (LPS)			yes (62368-1)
Short Circuit Protection (SCP)	below 100mΩ		hiccup mode
Over Voltage Protection (OVP)			110%-150%, hiccup mode
Over Voltage Category (OVC)	62368-1, 60335-1, 61558 with AC only		OVC III (3000m)
	61558 with DC only		OVC III (2000m)
	62368-1, 60335-1, 61558		OVC II (5000m)
Over Current Protection (OCP)			<150%, hiccup mode
Class of Equipment			Class II
Isolation Voltage [9]	I/P to O/P	1 minute	4kVAC
			6kVDC
Isolation Resistance			1GΩ min.
Isolation Capacitance			100pF max.
Insulation Grade			reinforced

Note8: For system integration with DC operation, consider a suitable DC fuse in front of the input.
Note9: For repeat Hi-Pot testing, reduce the time and/or the test voltage.

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				+110°C
Temperature Coefficient				0.03%/K
Operating Altitude [10]	62368-1, 60335-1, 61558 with AC only			3000m (OVC III)
	61558 with DC only			2000m (OVC III)
	62368-1, 60335-1, 61558			5000m (OVC II)
Operating Humidity	non-condensing			90% RH max.
Pollution Degree				PD2
MTBF	others	100VAC	T_{AMB}= +25°C	660 x 10³ hours
			T_{AMB}= +40°C	500 x 10³ hours
		230VAC	T_{AMB}= +25°C	670 x 10³ hours
			T_{AMB}= +40°C	560 x 10³ hours
	54Vout	100/230VAC	T_{AMB}= +25°C	330 x 10³ hours
			T_{AMB}= +40°C	300 x 10³ hours
Design Lifetime	230VAC/50Hz and full load	T_{AMB}= +50°C		30 x 10³ hours

Note10: 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.

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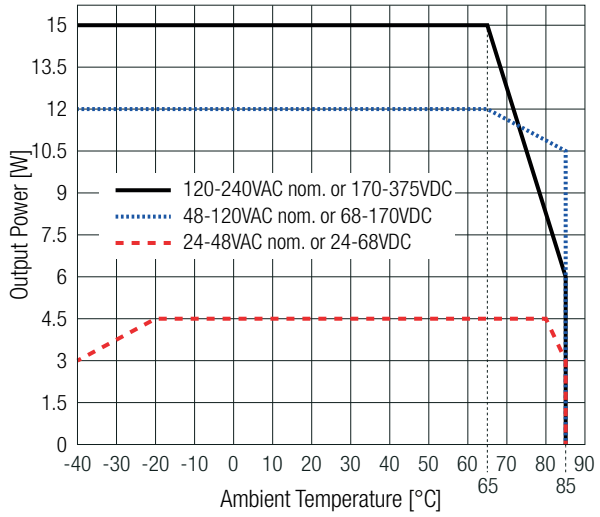
ENVIRONMENTAL (measured @ T_{AMB}= 25°C, nom. V_{IN}, full load and after warm-up unless otherwise stated)

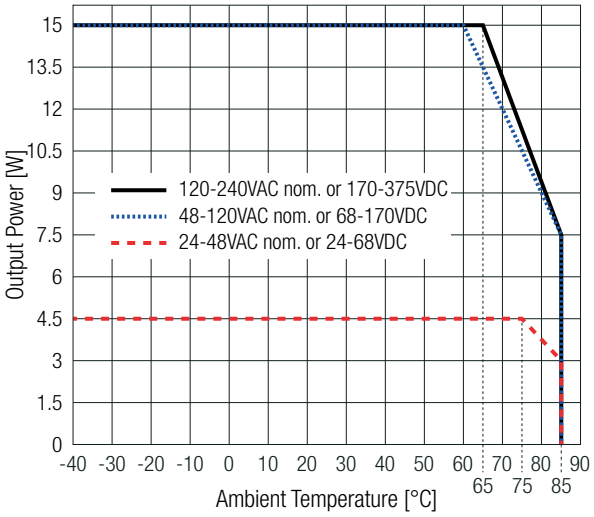
Derating Graph

(@ Chamber and natural convection 0.1m/s)

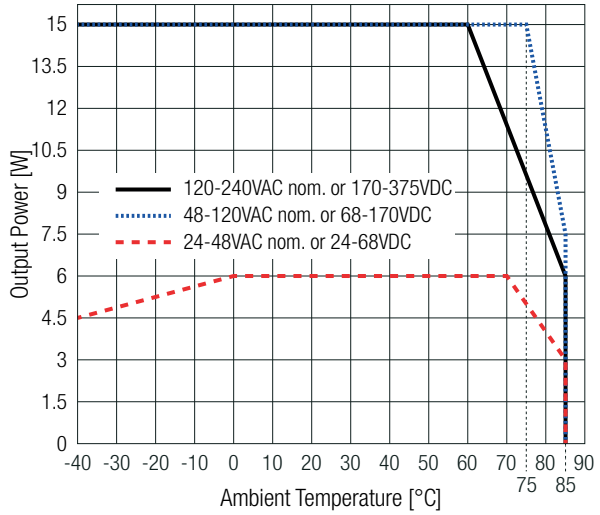
RAC15-05SK/WI



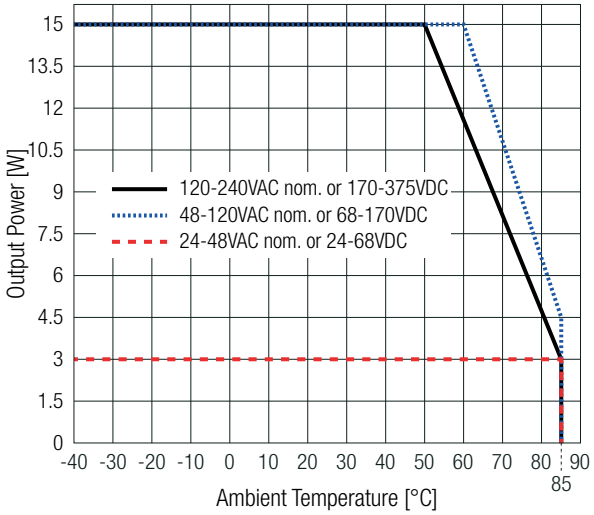
RAC15-12SK/WI
RAC15-15SK/WI



RAC15-24SK/WI



RAC15-54SK/WI



SAFETY & CERTIFICATIONS

Certificate Type (Safety)	Report Number	Standard
Audio/Video, information and communication technology equipment - Part1: Safety requirements 3rd Edition	E491408-A6036-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	240619010	IEC62368-1:2018 3rd Edition
		EN IEC 62368-1:2020+A11:2020
Household and similar electrical appliances – Safety – Part 1: General requirements	64.110.24.03275.01	IEC60335-1:2010 5th Edition
		EN 60335-1:2012+A16:2023
Measurement methods for electromagnetic fields of household appliances and similar apparatus with regard to human exposure		EN62233:2008
Safety of power transformers, power supplies, reactors and similar products for supply voltages up to 1100 V 3rd Edition	085-240327401-000	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
RoHS2		RoHS-2011/65/EU + AM-2015/863

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SAFETY & CERTIFICATIONS

EMC Compliance according to EN55032	Condition	Standard
Electromagnetic compatibility of multimedia equipment – Emission Requirements		EN55032:2015+A11:2020
Limitations on the amount of electromagnetic interference allowed from digital and electronic devices		FCC 47 CFR Part 15 Subpart B, Class B

EMC Compliance according to EN61204-3	Condition		Standard
Low voltage power supplies, d.c. output Part 3: Electromagnetic compatibility (EMC)			EN IEC 61204-3:2018, Class B
ESD Electrostatic discharge immunity test	Air: ±2, 4, 8kV Contact: ±4kV		IEC61000-4-2:2008, Criteria A EN61000-4-2:2009, Criteria A
Radiated, radio-frequency, electromagnetic field immunity test	10V/m (80-6000MHz) 3V/m (1.4-2GHz) 1V/m (2.0-2.7GHz)		IEC/EN61000-4-3:2006 + A2:2010, Criteria A
Fast Transient and Burst Immunity	L, N, L & N: ±2kV	12/24Vout	IEC/EN61000-4-4:2012, Criteria A
		others	IEC/EN61000-4-4:2012, Criteria B
Surge Immunity	AC Port: L-N: ±0.5, 1kV		IEC/EN61000-4-5:2014 + A1:2017, Criteria A
	AC Port: L-PE, N-PE: ±1, 2kV		IEC/EN61000-4-5:2014 + A1:2017, Criteria A
Immunity to conducted disturbances, induced by radio-frequency fields	AC Port: 10V (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, Criteria A EN61000-4-8:2010, Criteria A
Voltage Dips	100% (0.5P, 1P) 60%, 30%, 20%		IEC/EN61000-4-11:2004 + A1:2017, Criteria A
Voltage Interruptions	100%		IEC/EN61000-4-11:2004 + A1:2017, Criteria B
Limits of Voltage Fluctuations & Flicker			EN61000-3-3:2013

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)	THT Version	52.5 x 40.0 x 25.5mm 2.6 x 1.6 x 1.0 inch
	Wired Version	52.5 x 40.0 x 25.5mm 2.6 x 1.6 x 1.0 inch
Weight	THT Version	91g typ. 0.20 lbs
	Wired Version	96g typ. 0.21 lbs

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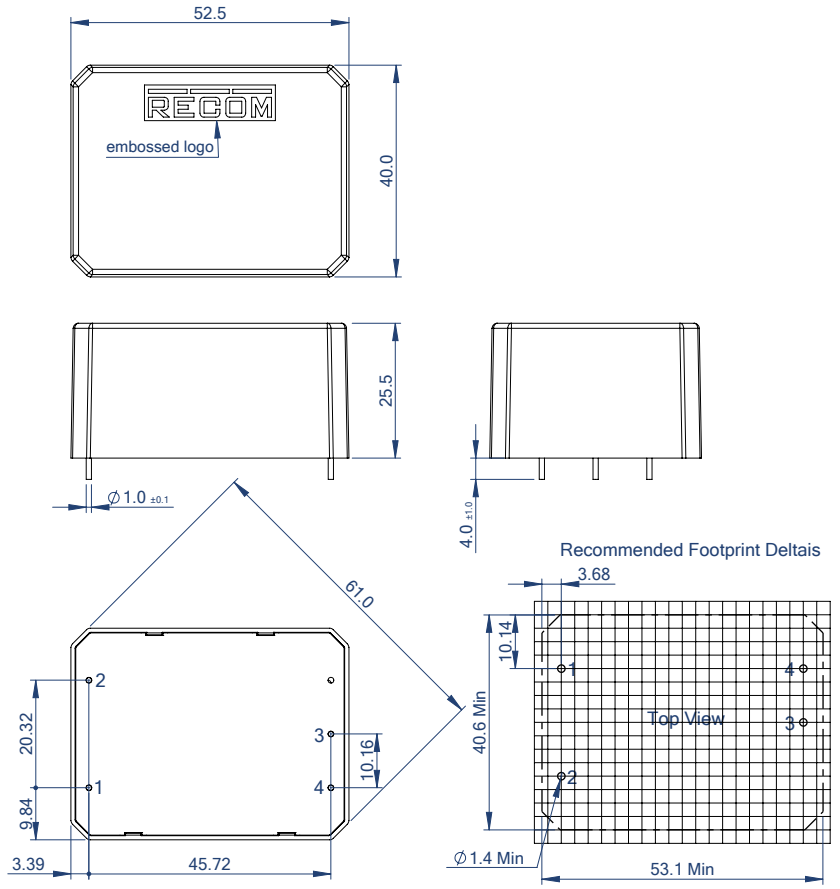
DIMENSION & PHYSICAL CHARACTERISTICS

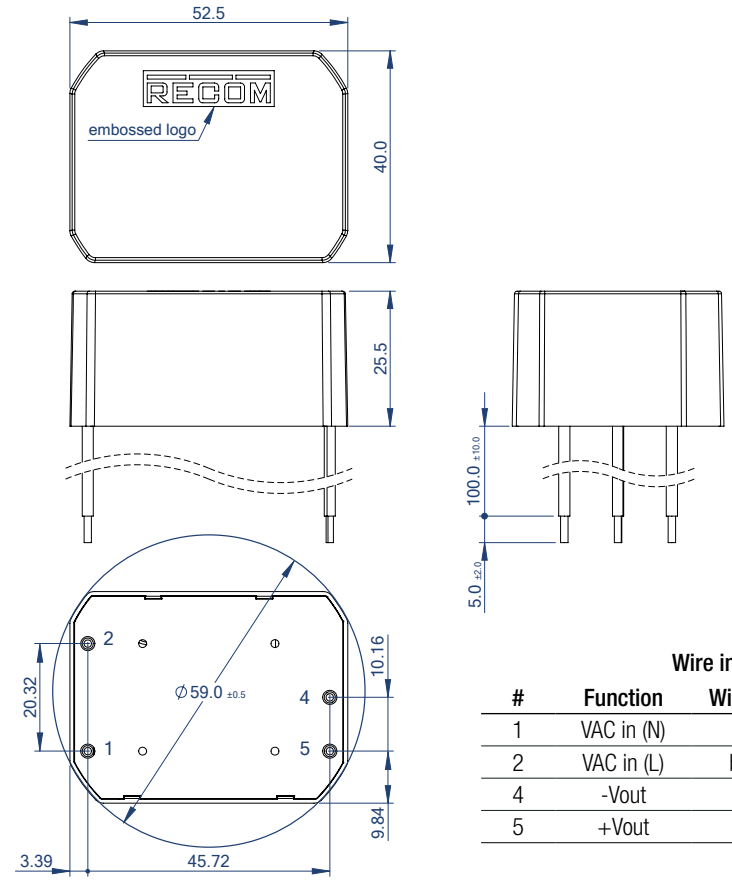
Dimension Drawing "/THT" version (mm)



Pinning information [P12]

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

Dimension Drawing "/W" version (mm)



Wire information

#	Function	Wire color	Type	AWG
1	VAC in (N)	blue	UL-3266	18
2	VAC in (L)	brown	UL-3266	18
4	-Vout	black	UL-3266	18
5	+Vout	red	UL-3266	18

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

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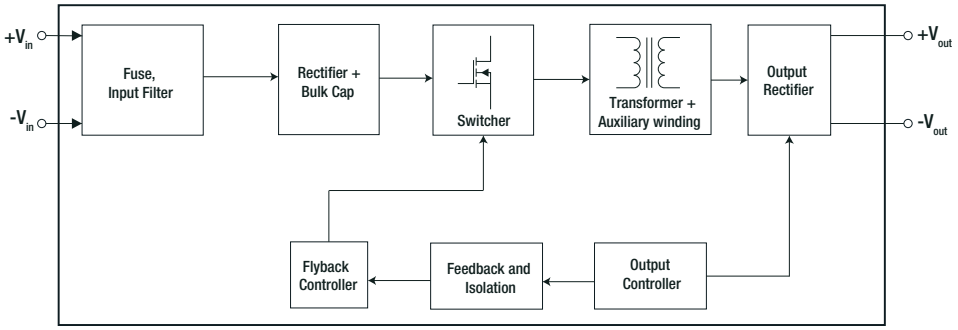
BLOCK DIAGRAM



PACKAGING INFORMATION

Parameter	Type		Value
Packaging Dimension (LxWxH)	tube	THT Version	490.0 x 56.0 x 40.0mm
	tray	Wired Version	435.0 x 370.0 x 64.0mm
Packaging Quantity	tube		11pcs
	tray		24pcs
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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