



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

BASIC CHARACTERISTICS					
Parameter	Condition		Min.	Typ.	Max.
Internal Input Filter					Pi type
Input Voltage Range <sup>(4, 5)</sup>	nom. Vin= 230VAC		85VAC 120VDC	230VAC	264VAC 370VDC
Input Current	115VAC 230VAC				450mA 400mA
Inrush Current	cold start at +25°C	115VAC 230VAC			20A 40A
No Load Power Consumption	230VAC			40mW	
ErP Lot 6 Standby Mode Conformity (Output Load Capability)	0.5W Input Power = 1.0W 2.0W				0.3W 0.7W 1.6W
Input Frequency Range	AC Input		47Hz		63Hz
Minimum Load <sup>(6)</sup>	single dual (required for regulation on both outputs)		0% 5%		
Power Factor	115VAC 230VAC		0.6 0.5		
Start-up Time				150ms	
Rise Time				40ms	
Hold-up Time	115VAC 230VAC			15ms 90ms	
Internal Operating Frequency					100kHz
Output Ripple and Noise <sup>(7)</sup>	20MHz BW			100mVp-p	

**Notes:**

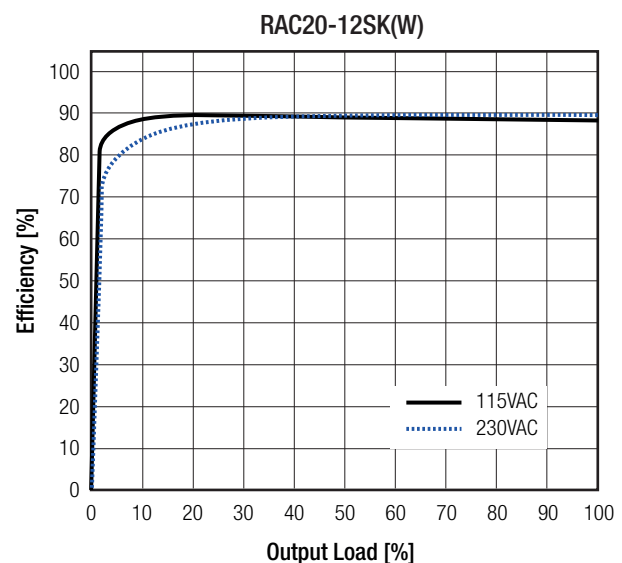
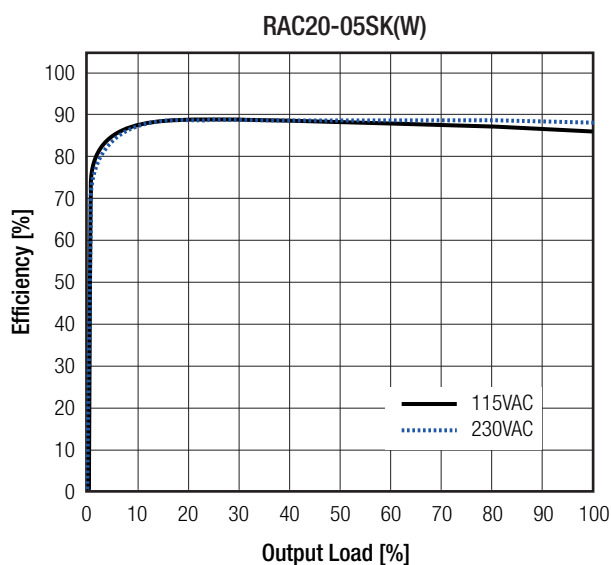
Note4: The products were submitted for safety files at AC-Input operation

Note5: Refer to line derating graph on page 5

Note6: Operation below 5% load will not harm the converter, but specifications may not be met

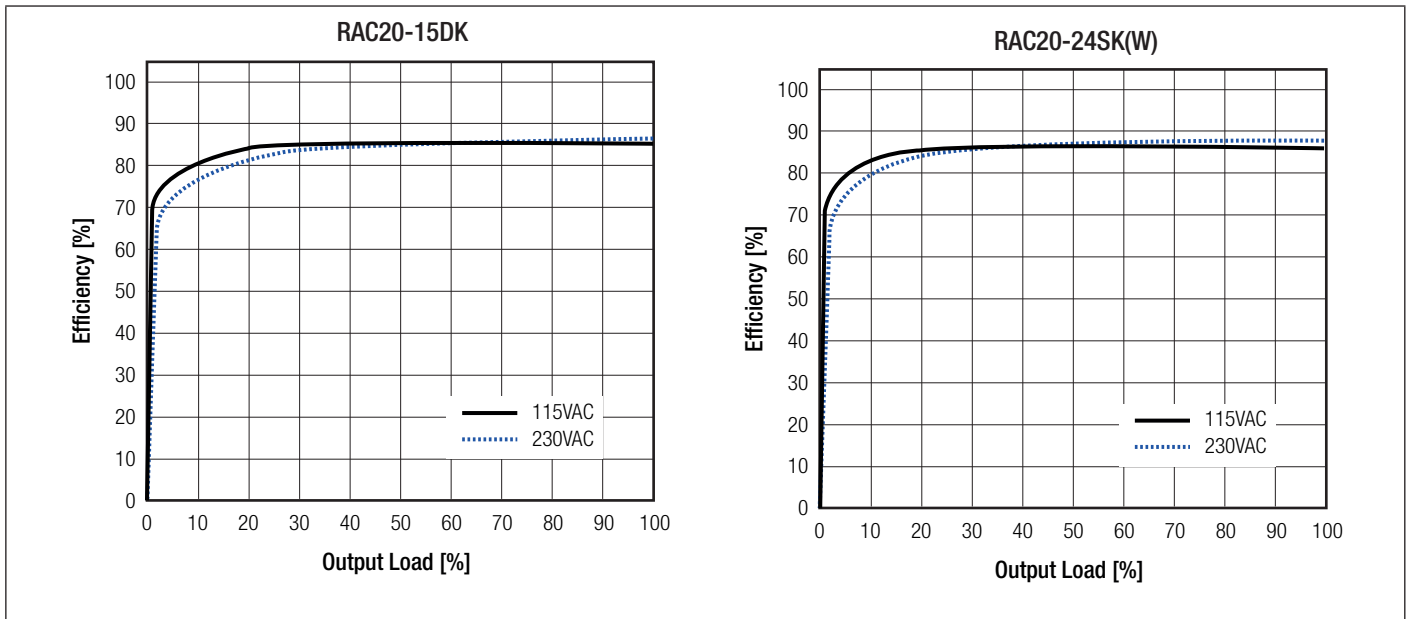
Note7: Measurements are made with a 1.0µF MLCC across output (low ESR)

**Efficiency vs. Load**



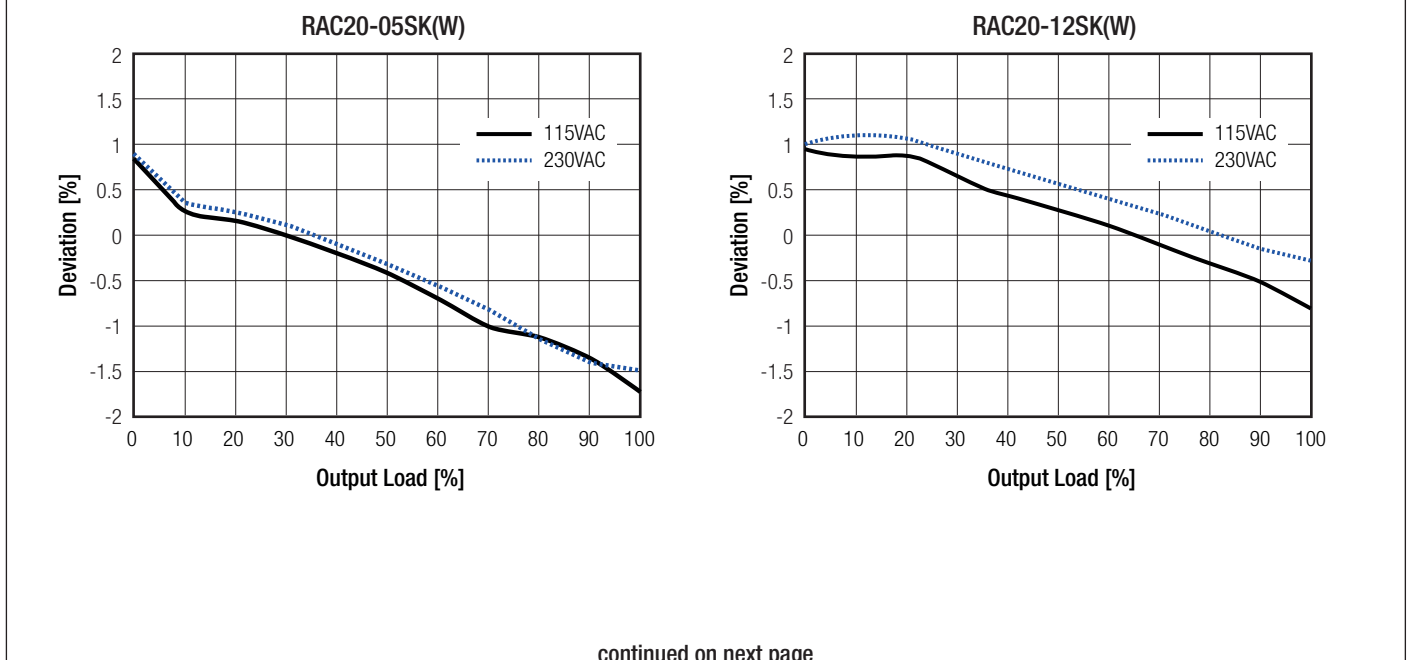
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Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)



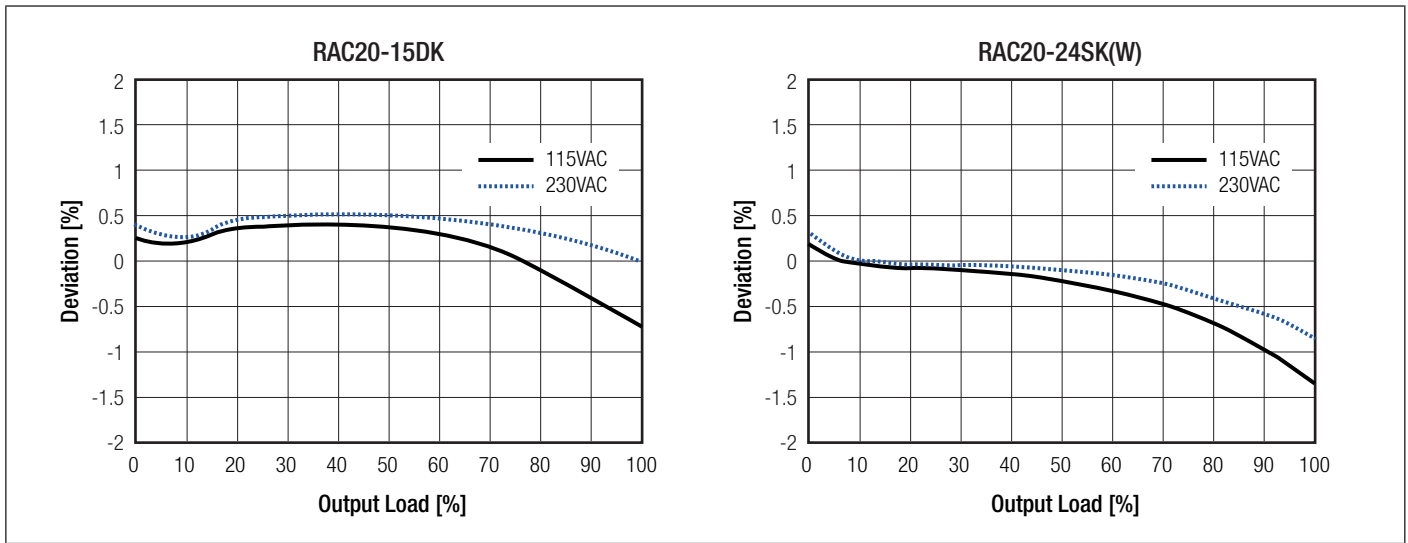
REGULATIONS		
Parameter	Condition	Value
Output Accuracy		±2.0% typ.
Line Regulation	low line to high line	±0.5% typ.
Load Regulation	10% to 100% load	±2.0% typ.
Cross Regulation <sup>(6)</sup>	dual output only	±5% max.
Transient Response	25% load step change recovery time	4.0% max. 500µs typ.

Deviation vs. Load



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



**PROTECTIONS**

Parameter	Type	Value
Input Fuse <sup>(8)</sup>	internal	T3.15A, slow blow type
Short Circuit Protection (SCP)	below 100mΩ	hiccup, auto recovery
Over Voltage Protection (OVP)		150% - 195%, latch off mode
Over Current Protection (OCP)		110% - 130%, hiccup mode
Over Voltage Category		OVCII
Class of Equipment		Class II
Isolation Voltage <sup>(9)</sup>	I/P to O/P	tested for 1 minute
Isolation Resistance		V <sub>iso</sub> = 500VDC
Isolation Capacitance		100pF max.
Insulation Grade		reinforced
Leakage Current		0.25mA max.

**Notes:**

- Note8: Refer to local safety regulations if input over-current protection is also required
- Note9: For repeat Hi-Pot testing, reduce the time and/or the test voltage

**ENVIRONMENTAL**

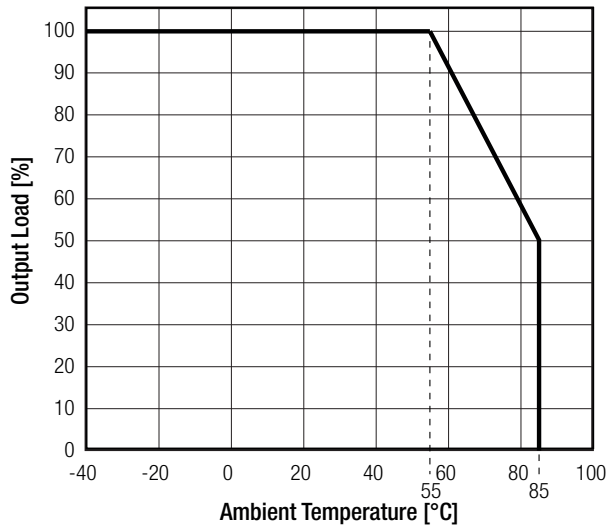
Parameter	Condition	Value
Operating Temperature Range	@ natural convection 0.1m/s	full load
		refer to derating graph
Maximum Case Temperature		-40°C to +55°C
Temperature Coefficient		-40°C to +85°C
Operating Altitude		+95°C
Operating Humidity	non-condensing	0.05%/K
IP Rating		3000m
Pollution Degree		20% - 90% RH max.
Vibration	according to MIL-STD-202G	10-500Hz, 2G 10min./1cycle, period 60min. along x,y,z axes
Design Lifetime	+25°C	130 x 10 <sup>3</sup> hours
	+55°C	16 x 10 <sup>3</sup> hours
MTBF	according to MIL-HDBK-217F, G.B.	+25°C
		+55°C
		>450 x 10 <sup>3</sup> hours
		>56 x 10 <sup>3</sup> hours

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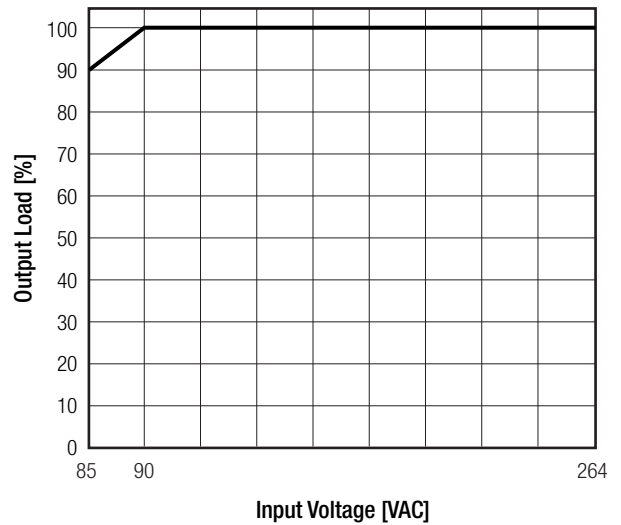
### Specifications (measured @ Ta= 25°C, nom. Vin, full load and after warm-up unless otherwise stated)

#### Derating Graph

(@ Chamber and natural convection 0.1 m/s)



#### Line Derating



### SAFETY AND CERTIFICATIONS

Certificate Type (Safety)	Report / File Number	Standard
Audio/Video, information and communication technology equipment - Safety requirements	E224736	UL62368-1, 2nd Edition, 2014 CAN/CSA C22.2 Nr. 62368-1-14, 2nd Ed. 2014
Audio/Video, information and communication technology equipment - Safety requirements (CB Scheme)	E491408-A6002-CB-1	IEC62368-1:2014 2nd Edition EN62368-1:2014 + A11:2017
Household and similar electrical appliances – Safety – Part 1: General requirements	pending	IEC60335-1:2010 + AMD2:2016 + COR1:2016 EN60335-1:2012 + A11:2014 + A13:2017
RoHS 2		RoHS-2011/65/EU

EMC Compliance	Condition	Standard / Criterion
Low voltage power supplies, d.c. output Part 3: Electromagnetic compatibility (EMC)		IEC/EN61204-3:2000, Class B
Electromagnetic compatibility of multimedia equipment - Emission requirements	without external filter	EN55032:2015, Class B
Electromagnetic compatibility of household appliances, electric tools and similar apparatus - Emission Requirements		EN55014-1:2006+A2:2011
Information technology equipment - Immunity characters - Limits and methods of measurement		EN55024:2010 + A1:2015
Electromagnetic compatibility of household appliances, electric tools and similar apparatus - Immunity Requirements		EN55014-2:2015
ESD Electrostatic discharge immunity test	Air: ±2, 4, 8kV, Contact: ±2, 4kV	EN61000-4-2:2009, Criteria B
Radiated, radio-frequency, electromagnetic field immunity test	10V/m, 3V/m, 1V/m	EN61000-4-3:2006 + A1:2008, Criteria A
Fast Transient and Burst Immunity	AC Power Port: ±2.0kV DC Output Port: ±2.0kV	EN61000-4-4:2012, Criteria B
Surge Immunity	AC Power Port: L-N ±1.0kV DC Output Port: ±0.5kV	EN61000-4-5:2014+A1:2017, Criteria B
Immunity to conducted disturbances, induced by radio-frequency fields	AC Power Port: 10V DC Output Port: 10V	EN61000-4-6:2014, Criteria A
Power Magnetic Field Immunity	50Hz, 30A/m	EN61000-4-8:2010, Criteria A
Voltage Dips and Interruptions	Voltage Dips 20%	EN61000-4-11:2004+A1:2017, Criteria C
	Voltage Dips 30%	EN61000-4-11:2004+A1:2017, Criteria C
	Voltage Dips 60%	EN61000-4-11:2004+A1:2017, Criteria C
	Voltage Dips 100%	EN61000-4-11:2004+A1:2017, Criteria B
	Voltage Interruptions > 95%	EN61000-4-11:2004+A1:2017, Criteria C

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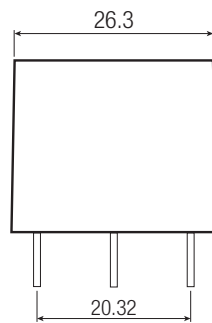
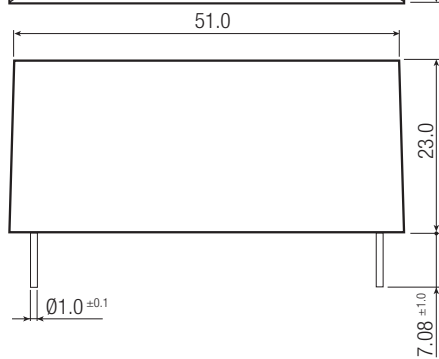
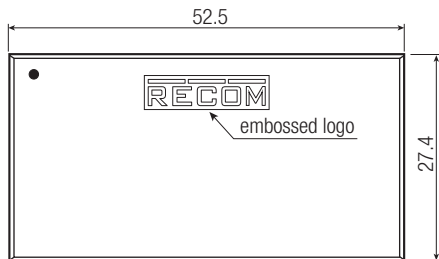
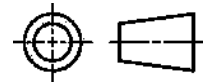
**SAFETY AND CERTIFICATIONS**

EMC Compliance	Condition	Standard / Criterion
Limits of Voltage Fluctuations & Flicker		EN61000-3-3:2013
Limitations on the amount of electromagnetic interference allowed from digital and electronic devices		FCC 47 CFR Part 15 Subpart B, Class B
American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz		ANSI C63.4-2014, Class B

**DIMENSION AND PHYSICAL CHARACTERISTICS**

Parameter	Type	Value
Material	case	black plastic, (UL94V-0)
	potting	silicone, (UL94V-0)
	PCB	FR4, (UL94V-0)
	baseplate	black plastic, (UL94V-0)
Dimension (LxWxH)		52.5 x 27.4 x 23.0mm
Weight	pin	60g typ.
	wired	65g typ.

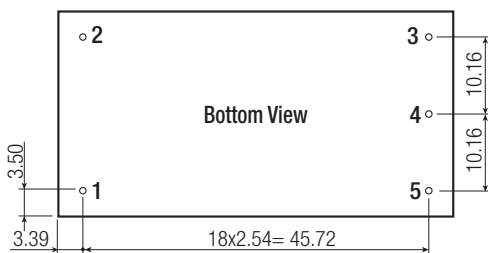
**Dimension Drawing (mm)**



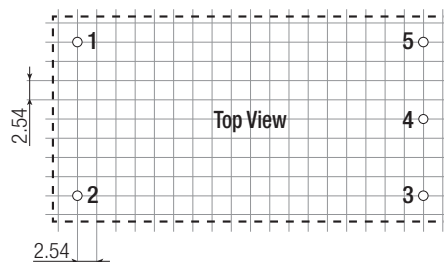
**Pinning information**

Pin #	Single	Dual
1	VAC in (N)	VAC in (N)
2	VAC in (L)	VAC in (L)
3	no pin	-Vout
4	-Vout	Com
5	+Vout	+Vout

Tolerance: xx.x=  $\pm 0.5$ mm  
xx.xx=  $\pm 0.25$ mm

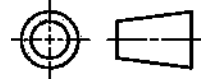


**Recommended Footprint Details**

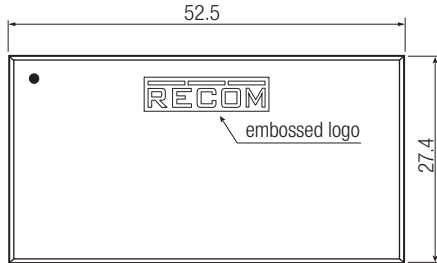


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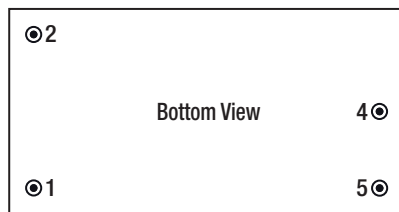
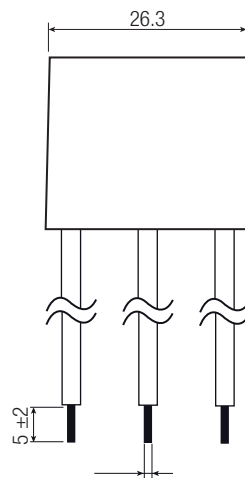
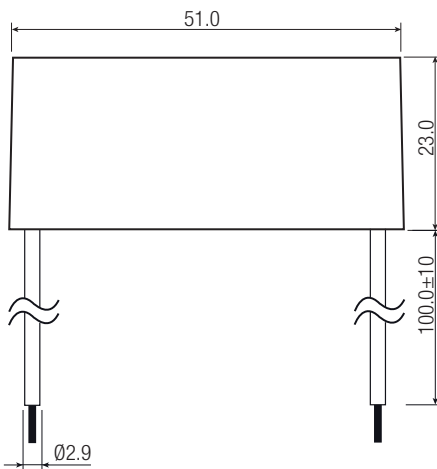
Dimension Drawing Single Wired (mm) 12-48Vout available from Dec/2018



**Wired information**

#	Function	Wire color	Type	AWG
1	VAC in (N)	blue	UL-1015	18
2	VAC in (L)	brown	UL-1015	18
4	-Vout	black	UL-1015	18
5	+Vout	red	UL-1015	18

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



**PACKAGING INFORMATION**

Parameter	Type		Value
	pin wired	tube tray	
Packaging Dimension (LxWxH)			490.0 x 56.0 x 40.0mm 488.0 x 202.0 x 47.0mm
Packaging Quantity		tube tray	15pcs 20pcs
Storage Temperature Range			-40°C to +85°C
Storage Humidity		non-condensing	20% to 90% RH max.

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