TR15RAM SERIES
15 WATT AC-DC MEDICAL INTERCHANGEABLE PLUG ADAPTER

Features

- Universal Input Range 90~264V_{ac}
- High Efficiency up to 82%
- Interchangeable AC Plugs
- Class II
- Approval IEC/EN/UL 60601-1 Ed 3.2
- Approval EN 55011, FCC 47 CFR Part 15 Class B
- Operating Altitude 3000m
- Over Voltage Protection
- Continuous Short Circuit Protection
- Meet ErP Level V



AC Plug Sold Separately

E252331

MODEL NUMBER	OUTPUT VOLTAGE	OUTPUT CURRENT	VOLTAGE ACCURACY NOTE1	RIPPLE& NOISE NOTE2	LINE REGULATION NOTE3	LOAD REGULATION NOTE4	%EFF. (Typ.) NOTE5
TR15RAM050	5 V	2 A	±3%	50 mV	±1%	±4%	75%
TR15RAM120	12 V	1.1 A	±2%	120 mV	±1%	±2%	81%
TR15RAM150	15 V	1 A	±2%	150 mV	±1%	±2%	82%
TR15RAM240	24 V	0.625 A	±2%	240 mV	±1%	±2%	80%

Note:

1. Voltage accuracy is set at 60% full load.
2. Add a 0.1uF ceramic capacitor and a 10uF E.L. capacitor to output for ripple & noise measuring @20MHz BW.
3. Line regulation is measured from 100V_{ac} to 240V_{ac} with 100% full load.
4. Load regulation is measured from 60% to 100% full load and from 60% to 20% full load (60%±40% full load).
5. Typical efficiency at 230 V_{ac} and 75% full load at 25℃.

PART NUMBER

Series	Output Voltage	AC Plug Type	DC Plug Type	Cable Type	Cable Length	Case Color
TR15RAM	XXX	-XXXX	-XX	X	XX	-XX-BK
15W Medical Adapter	050：5V 120：12V 150：15V 240：24V	Blank：Sold Separately ASUE：Include 4 Type AC Plug	See Page 6	E：UL1185 with OVP	01：720mm 02：1220mm 03：1800mm 11：720mm with Ferrite Core 12：1220mm with Ferrite Core 13：1800mm with Ferrite Core See page 6 for restrictions	BE-BK：Blue-Black GY-BK：Gray-Black PE-BK：Purple-Black OR-BK：Orange-Black

Part Number Example:

TR15RAM050-01E03-GY-BK: 5V_{dc} Output, DC Jack Type, Cable Length 1800mm, Case Color Gray-Black

TR15RAM050-ASUE-01E03-GY-BK: 5V_{dc} Output, Include 4 Type AC Plug, DC Jack Type, Cable Length 1800mm, Case Color Gray-Black

TECHNICAL SPECIFICATIONS

(All specifications are typical at nominal input, full load at 25℃ unless otherwise noted.)

ABSOLUTE MAXIMUM RATINGS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Input Voltage		All	90 120		264 370	V_{ac} V_{dc}
Operating Case Temperature	**See derating curve**	All	0		70	℃
Storage Temperature		All	-20		85	℃
Operating Altitude		All			3000	m

INPUT CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Operating Voltage Range		All	100		240	V_{ac}
Input Frequency Range		All	47		63	Hz
Maximum Input Current	100% Full load, V_{in}=100V_{ac}	All			0.4	A
Leakage Current		All			100	uA
Inrush Current	V_{in}=240V_{ac}, Cold start at 25℃	All			50	A

OUTPUT CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Output Voltage Set Point	V_{in}=115V_{ac} and 230V_{ac}, I_o=60% Full load T_c=25℃	TR15RAM050 TR15RAM120 TR15RAM150 TR15RAM240	4.85 11.76 14.7 23.52	5 12 15 24	5.15 12.24 15.3 24.48	V_{dc}
Operating Output Current Range	V_{in}=115V_{ac} and 230V_{ac},T_c=25℃	TR15RAM050 TR15RAM120 TR15RAM150 TR15RAM240			2 1.1 1 0.625	A
Holdup Time	V_{in}=115V_{ac}	All		10		ms
Output Voltage Regulation						
Load Regulation	60%±40% Full load change	TR15RAM050 TR15RAM120 TR15RAM150 TR15RAM240			±4.0 ±2.0 ±2.0 ±2.0	%
Line Regulation	V_{in}=100V_{ac} to 240V_{ac}	All			±1.0	%
Over Voltage Protection	TVS Component to clamp	TR15RAM050 TR15RAM120 TR15RAM150 TR15RAM240			7.14 15.8 18.9 31.5	V_{dc}
Over Current Protection	Auto recovery	All	110		180	%
Short Circuit Protection	Auto recovery	All				
Output Ripple and Noise	1. Add a 0.1uF ceramic capacitor and a 10uF aluminum electrolytic capacitor to output 2. Oscilloscope is 20MHz band width 3. Ambient temperature=25℃	TR15RAM050 TR15RAM120 TR15RAM150 TR15RAM240			50 120 150 240	mV
Load Capacitance	1. V_{in}=115V_{ac} and 230V_{ac} 2. Output is max. load 3. Ambient temperature=25℃	TR15RAM050 TR15RAM120 TR15RAM150 TR15RAM240			2000 1100 1000 610	uF

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Efficiency	1. V_{in}=230V_{ac} 2. Output is 75% full load 3. Ambient temperature=25℃	TR15RAM050 TR15RAM120 TR15RAM150 TR15RAM240		75 81 82 80		%

ISOLATION CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Input to Output	1 Minute	All			4000	V_{ac}
Isolation Resistance	Input to output	All	100			MΩ

FEATURE CHARACTERISTICS

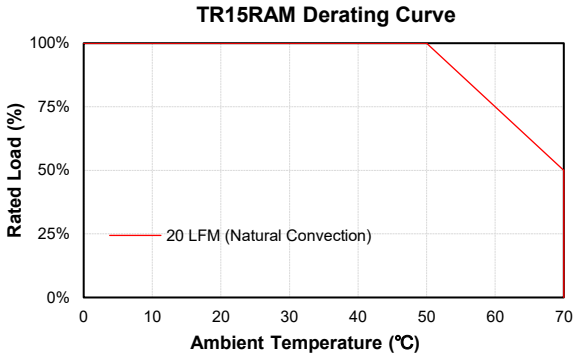
PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Switching Frequency	P_{out}=max. rated power	All		95		kHz

GENERAL SPECIFICATIONS

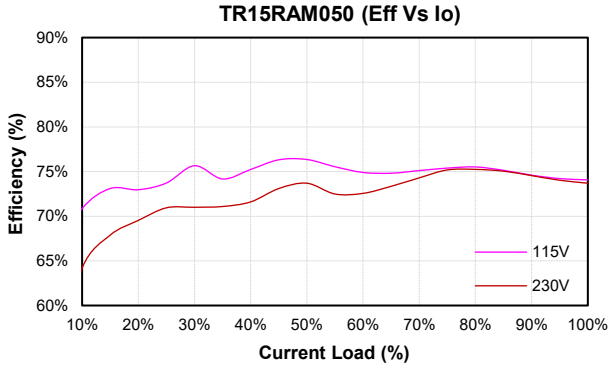
PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
MTBF	I_o=100%; T_a=25℃ per MIL-HDBK-217F	All	200			K hours
Humidity	Non-condensing	All			93	% RH
Shock	Meet MIL-STD-810F Table 516.5,table 516.5-I 10ms, each axis 3 times(±X、±Y、±Z axis)	All		75		g
Vibration	Meet MIL-STD-810F Table 514.5C-VIII,15~2000Hz, X、Y、Z axis, 1 hour (each axis), total 3 hrs.	All		4		g
Weight		All		130		g
Dimensions		All	3.173x1.885x1.704 inches (80.60x47.90x43.30 mm)			
Safety	Class II, IEC 60601-1 EN 60601-1, ANSI/AAMI ES 60601-1					Ed.3.2
EMC Emission	EN 55011:2016+A11, Class B EN 61000-3-2, FCC 47 CFR Part 15, ICES-003 Issue 7					
Conducted Disturbance	EN 55011, CISPR 11, FCC 47 CFR Part 15, ICES-003 Issue 7					Class B
Radiated Disturbance	EN 55011, CISPR 11, FCC 47 CFR Part 15, ICES-003 Issue 7					Class B
Harmonic Current Emissions	EN 61000-3-2					Class A
Voltage Fluctuations & Flicker	EN 61000-3-3					
EMC Immunity	EN 60601-1-2, IEC 61000-4-2, 3, 4, 5, 6, 8, 11					Ed.4.1
Electrostatic Discharge (ESD)	IEC 61000-4-2 Level 4, Air discharge: ±15kV, Level 4 Contact discharge: ±8kV					Criteria A
Radio-Frequency, Continuous Radiated Disturbance	IEC 61000-4-3 Level 2					Criteria A
Electrical Fast Transient (EFT)	IEC 61000-4-4 Level 3, ±0.5kV, ±1kV, ±2kV					Criteria A
Surge	IEC 61000-4-5 Level 3, L-N: ±0.5kV, ±1kV					Criteria A
Conducted Disturbances, Induced by RF Fields	IEC 61000-4-6 Level 2					Criteria A
Power Frequency Magnetic Field	IEC 61000-4-8 Level 2					Criteria A
Voltage Dips	IEC 61000-4-11, Dips: 30% reduction, Dips: >95% reduction					Criteria A
Voltage Interruptions	IEC 61000-4-11, >95% Reduction					Criteria B
Application Note Link	TR15RAM Series App Notes					

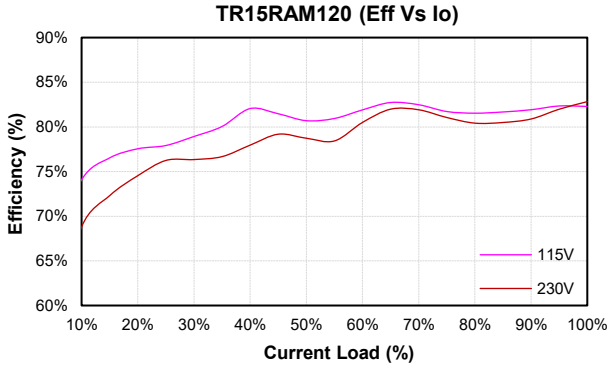
CHARACTERISTIC CURVE

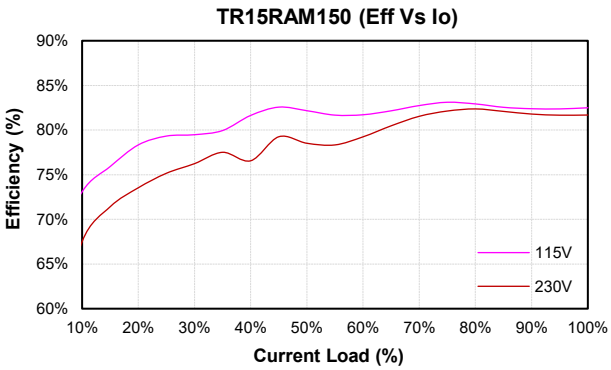
Power Derating Curve

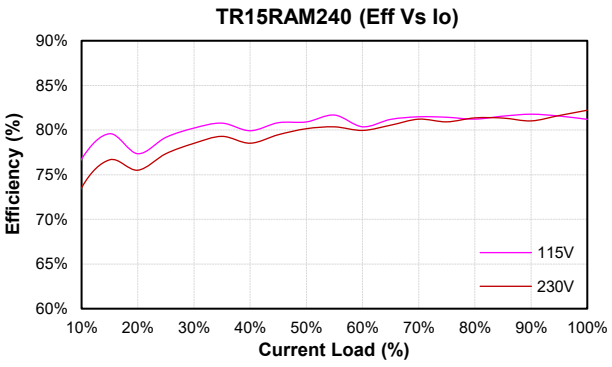


Performance Data







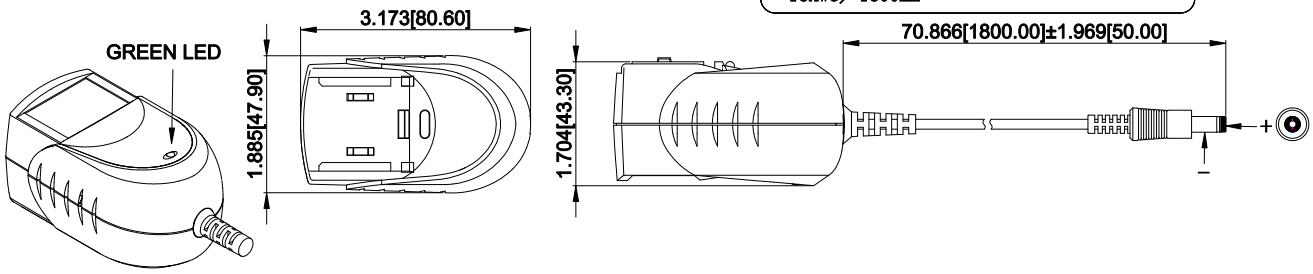


MECHANICAL SPECIFICATION

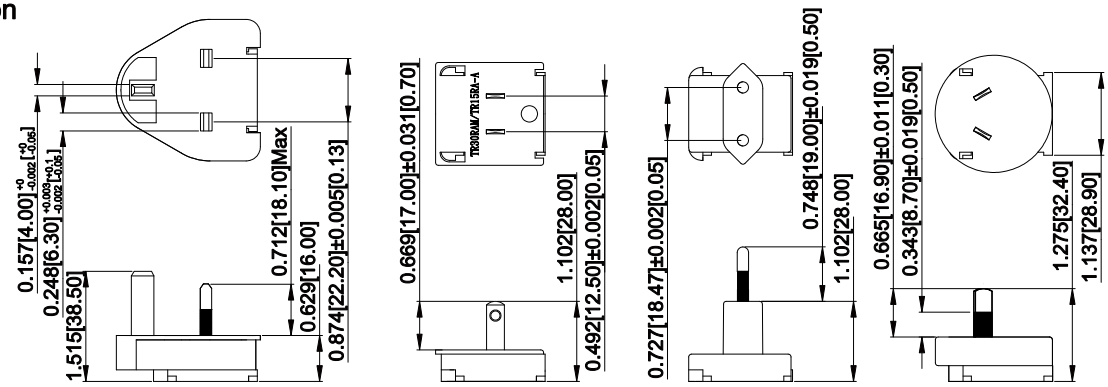
UNIT:inches[mm]

All Dimensions are in inches[mm]
Tolerance:Inches:X.XXX±0.02
Millimeters:X.XX±0.5

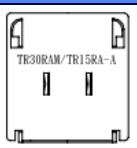
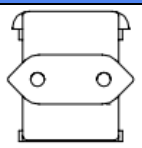
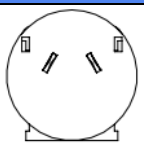
DC Plug type: V+ —●)— V-
DC Plug :Straight(φ5.5／φ2.1) L12mm
18AWG／1800mm



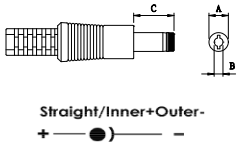
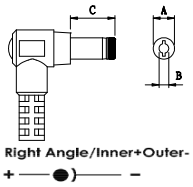
Option



INTERCHANGEABLE AC PLUG SPECIFICALLY for TR15RAM (SOLD SEPARATELY)

TYPE				
	U.K type (U)	American type (A)	European type (E)	Australian type (S)
ORDER NO.	AC PLUG RA-U	AC PLUG RA-A	AC PLUG RA-E	AC PLUG RA-S

STANDARD OUTPUT PLUG

DC Plug Type	Cable Number-XXXXX	A OD (mm)	B ID (mm)	C L (mm)	Cable Type	Cable Length	Cable AWG
	11E03	Φ5.5	Φ2.1	12	UL1185	1800mm without Core	18AWG for V_o: 5V, 12V, 15V, 24V
	12E03	Φ5.5	Φ2.5	12			
	23E03	Φ5.5	Φ2.1	9.5			
	26E03	Φ5.5	Φ2.5	9.5			
	01E03	Φ5.5	Φ2.1	12			
	02E03	Φ5.5	Φ2.5	12			
	21E03	Φ5.5	Φ2.5	9.5			
	24E03	Φ5.5	Φ2.1	9.5			

※Other DC Plug Type please refer to the link: https://www.cincon.com/productdownload/TR15RAM-cable-DC-Plug.pdf

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