TR15RAM SERIES
15 WATT AC-DC MEDICAL INTERCHANGEABLE PLUG ADAPTER

Features

- Universal Input Range 90~264Vac
- 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

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 RD-BK：Red-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

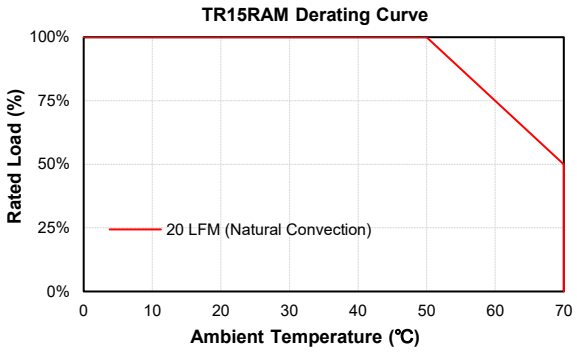
PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Switching Frequency	P_{out}=max. rated power	All		95		kHz

GENERAL SPECIFICATIONS

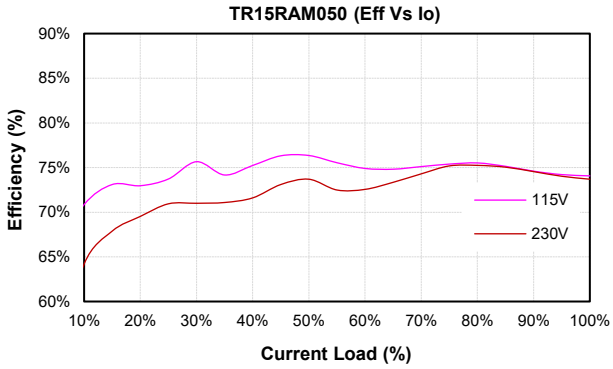
PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
MTBF	I_o=100%; T_a=25℃ per MIL-HDBK-217F	All	200			k hours
Humidity	Non-condensing	All			93	% RH
Shock	Meet MIL-STD-810F Table 516.5,Table 516.5-I 10ms, each axis 3 times(±X、±Y、±Z axis)	All		75		g
Vibration	Meet MIL-STD-810F Table 514.5C-VIII,15~2000Hz, 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					

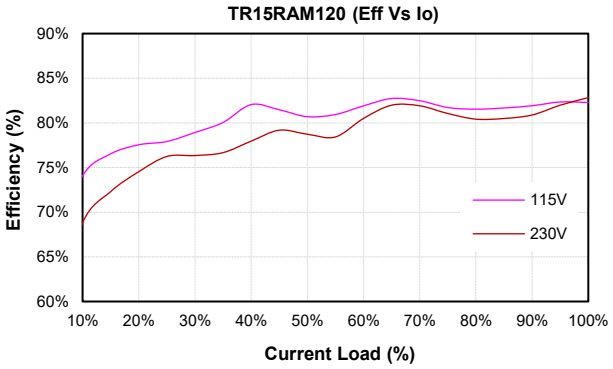
CHARACTERISTIC CURVE

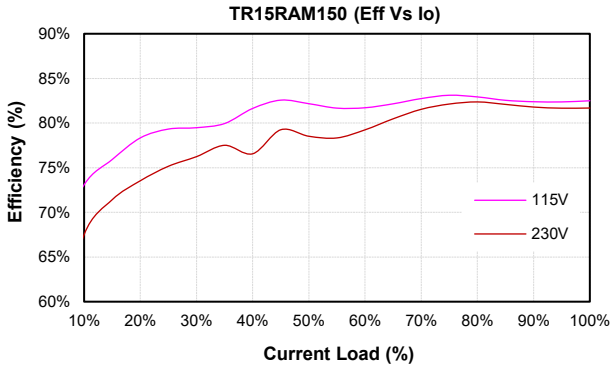
Power Derating Curve

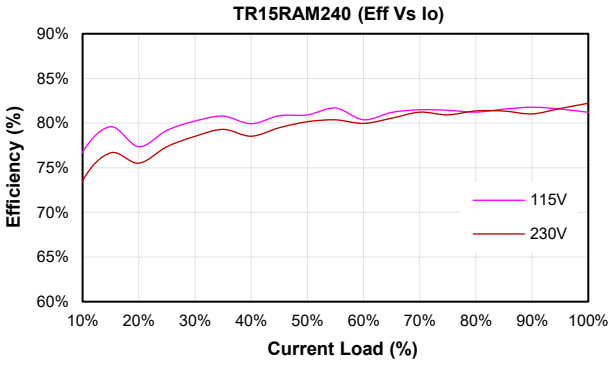


Performance Data







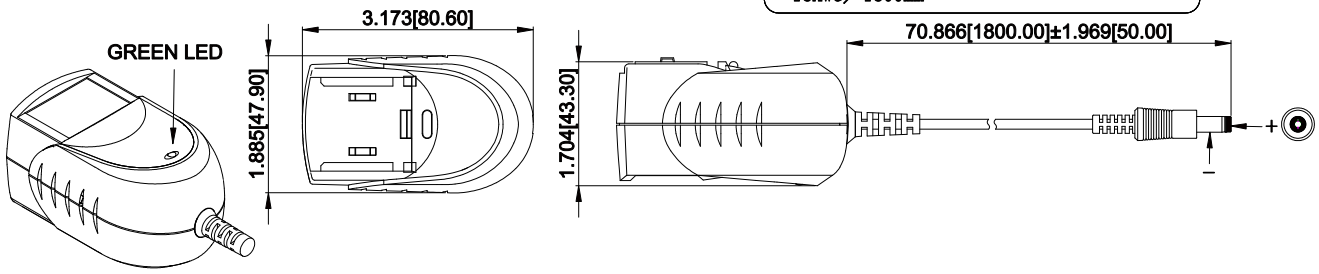


MECHANICAL SPECIFICATION

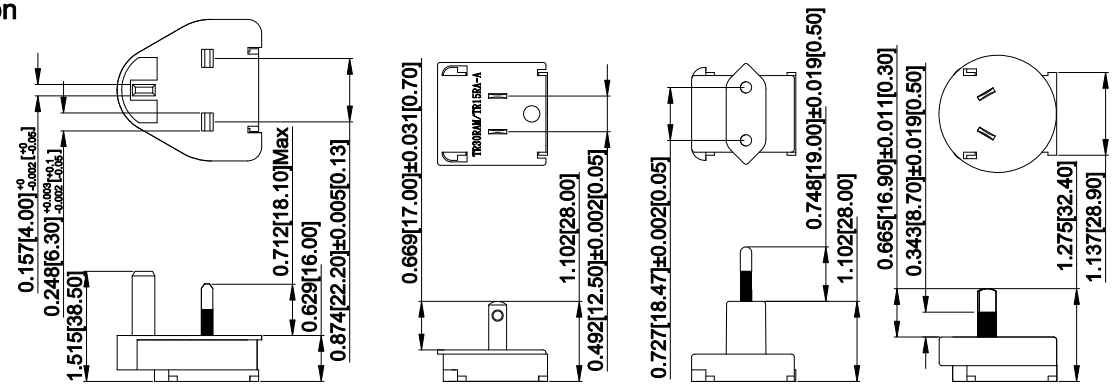
UNIT:inches[mm]

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

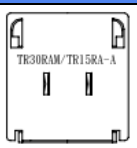
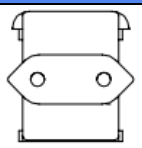
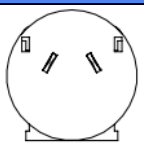
DC Plug type: V+ —●)— V-
DC Plug :Straight(φ5.5／φ2.1) L12mm
18AWG／1800mm



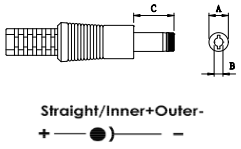
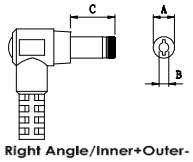
Option



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
 Straight/Inner+Outer-	11E03	Φ5.5	Φ2.1	12	UL1185	1800mm without Core	18AWG for Vo: 5V, 12V, 15V, 24V
	12E03	Φ5.5	Φ2.5	12			
	23E03	Φ5.5	Φ2.1	9.5			
	26E03	Φ5.5	Φ2.5	9.5			
 Right Angle/Inner+Outer-	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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