TR30RAM SERIES
30 WATT AC-DC MEDICAL INTERCHANGEABLE PLUG ADAPTER

Features

- Universal Input Range 90~264Vac
- High Efficiency up to 87%
- Interchangeable AC Plugs
- Leakage Current < 100uA
- Class II
- No Load Power Consumption < 0.3W
- Approval IEC/EN/UL 60601-1 2 MOPP
- Approval EN 55011, FCC 47 CFR Part 18 Class B
- Operating Altitude 3000m
- Over Voltage Protection
- Continuous Short Circuit Protection
- Meets CoC Tier 2 & DoE 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
TR30RAM050	5V	4.0A	±2%	50mV	±1%	±6%	80%
TR30RAM090	9V	3.0A	±2%	90mV	±1%	±3%	85%
TR30RAM120	12V	2.5A	±2%	120mV	±1%	±2%	85%
TR30RAM150	15V	2.0A	±2%	150mV	±1%	±2%	85%
TR30RAM180	18V	1.67A	±2%	180mV	±1%	±2%	86%
TR30RAM240	24V	1.25A	±2%	240mV	±1%	±2%	87%

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
TR30RAM	XXX	-XXXX	-XX	X	XX	-XX-BK
30W Medical Adapter	050 :5V 090 :9V 120 :12V 150 :15V 180 :18V 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	Blank: Blue-Black GY-BK: Gray-Black RD-BK: Red-Black

Part Number Example:

TR30RAM120-11E13-GY-BK, 12V_{dc} Output, DC Jack Type, Cable Length 1800mm with Ferrite Core, Case Color Gray-Black

TR30RAM120-ASUE-11E03, 12V_{dc} Output, Include 4 Type AC Plug, DC Jack Type, Cable Length 1800mm, Case Color Blue-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	Safety approvals only to the AC input	All	90 120		264 370	V_{ac} V_{dc}
Operating Case Temperature	See Derating Curve	All	0		60	℃
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			0.8	A
Leakage Current		All			100	uA
Inrush Current	V_{in}=240V_{ac}, Cold start at 25℃	All		100		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℃	TR30RAM050 TR30RAM090 TR30RAM120 TR30RAM150 TR30RAM180 TR30RAM240	4.90 8.82 11.76 14.70 17.64 23.52	5 9 12 15 18 24	5.10 9.18 12.24 15.30 18.36 24.48	V_{dc}
Operating Output Current Range	V_{in}=115V_{ac} and 230V_{ac},T_c=25℃	TR30RAM050 TR30RAM090 TR30RAM120 TR30RAM150 TR30RAM180 TR30RAM240			4.0 3.0 2.5 2.0 1.67 1.25	A
Holdup Time	V_{in}=115V_{ac}	All		10		ms
Output Voltage Regulation						
Load Regulation	60%±40% Full load change	TR30RAM050 TR30RAM090 TR30RAM120 TR30RAM150 TR30RAM180 TR30RAM240			±6 ±3 ±2 ±2 ±2 ±2	%
Line Regulation	V_{in}=100V_{ac} to 240V_{ac}	All			±1	%
Over Voltage Protection	TVS Component to clamp	TR30RAM050 TR30RAM090 TR30RAM120 TR30RAM150 TR30RAM180 TR30RAM240		7.44 12.10 16.20 19.50 23.10 32.00		V_{dc}
Over Current Protection	Auto recovery	All	110		160	%
Short Circuit Protection	Auto recovery	All				

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
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℃	TR30RAM050			50	mV
		TR30RAM090			90	
		TR30RAM120			120	
		TR30RAM150			150	
		TR30RAM180			180	
		TR30RAM240			240	
Load Capacitance	1. V_{in}=115V_{ac} and 230V_{ac} 2. Output is max. load 3. Ambient temperature=25℃	TR30RAM050			4000	uF
		TR30RAM090			3000	
		TR30RAM120			2500	
		TR30RAM150			2000	
		TR30RAM180			1670	
		TR30RAM240			1250	
Efficiency	1. V_{in}=230V_{ac} 2. Output is 75% full load 3. Ambient temperature=25℃	TR30RAM050		80		%
		TR30RAM090		85		
		TR30RAM120		85		
		TR30RAM150		85		
		TR30RAM180		86		
		TR30RAM240		87		

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		65		kHz

GENERAL SPECIFICATIONS

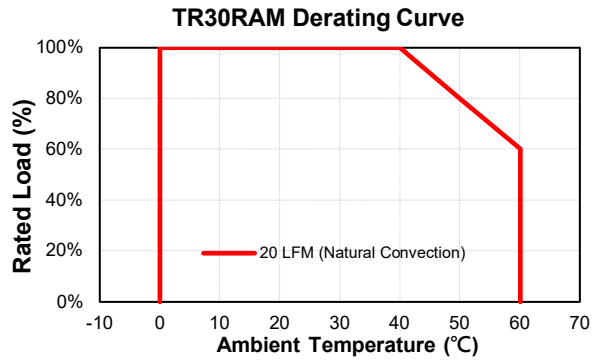
PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
MTBF	I_o=100%; T_a=25℃ per MIL-HDBK-217F	All	300			k hours
Humidity	Non-condensing	All			93	% RH
Shock	Meet MIL-STD-810F Table 516.5,Table 516.5-I 10ms, each axis 3 times(±X、±Y、±Z axis)	All		75		g
Vibration	Meet MIL-STD-810F Table 514.5C-VIII,15~2000Hz, X、Y、Z axis, 1 hour (each axis),. Total 3 hrs.	All		4		g
Weight		All		220		g
Dimensions		All	4.278x2.440x1.445 inches (108.67x61.98x36.70 mm)			
Safety	Class II, IEC 60601-1:2005+AMD1:2012+AMD2:2020 EN 60601-1:2006+A11:2011+A1:2013+A12:2014+A2:2021 ANSI/AAMI ES 60601-1:2005 & A1:2012 & A2:2021					Ed.3.2
EMC Emission	EN 55011:2016+A11:2020, CISPR 11:2015+A1:2016+A2:2019, Class B EN 61000-3-2:2019, EN 61003-3:2013+A1:2019, FCC 47 CFR Part 18, ICES-003 Issue7					
Conducted Disturbance	EN 55011:2016+A11:2020, CISPR 11:2015+A1:2016+A2:2019, FCC 47 CFR Part 18, ICES-003 Issue7					Class B
Radiated Disturbance	EN 55011:2016+A11:2020, CISPR 11:2015+A1:2016+A2:2019, FCC 47 CFR Part 18, ICES-003 Issue7					Class B
Harmonic Current Emissions	EN 61000-3-2:2019					Class A
Voltage Fluctuations & Flicker	EN 61000-3-3:2013+A1:2019					
EMC Immunity	EN 60601-1-2:2015+A1:2021, IEC 61000-4-2, 3, 4, 5, 6, 8, 11					Ed.4.1
Electrostatic Discharge (ESD)	IEC 61000-4-2:2008, Air Discharge: ±15kV Contact, Discharge: ±8kV					Criteria A
Radio-Frequency, Continuous Radiated Disturbance	IEC 61000-4-3:2020					Criteria A

GENERAL SPECIFICATIONS

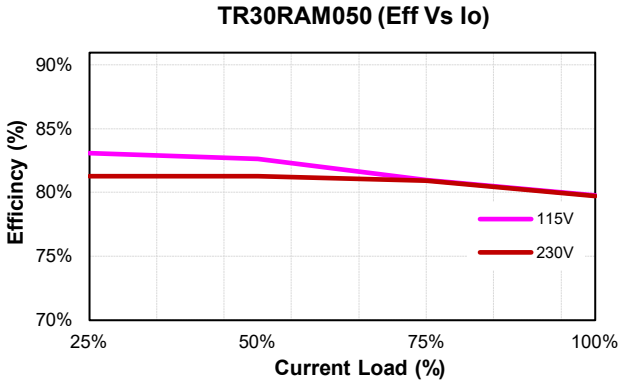
Electrical Fast Transient (EFT)	IEC 61000-4-4:2012, ±0.5kV, ±1kV, ±2kV	Criteria A
Surge	IEC 61000-4-5:2014+A1:2017, L-N: ±0.5kV, ±1kV	Criteria A
Conducted disturbances, induced by RF fields	IEC 61000-4-6:2013	Criteria A
Power frequency magnetic field	IEC 61000-4-8:2009	Criteria A
Voltage dips	IEC 61000-4-11:2020, Dips: 30% Reduction, Dips: >95% Reduction	Criteria A
Voltage interruptions	IEC 61000-4-11:2020, >95% reduction	Criteria B
Application Note Link	TR30RAM Series App Notes	

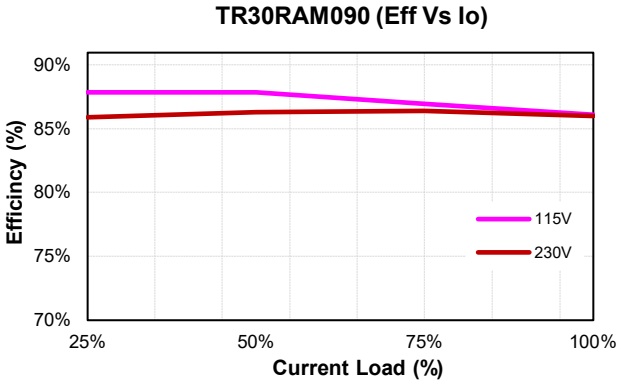
CHARACTERISTIC CURVE

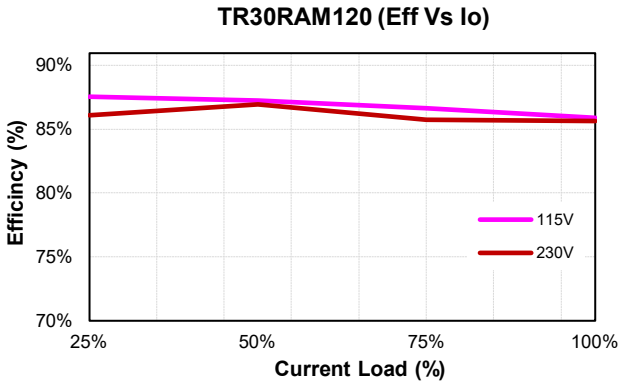
Power Derating Curve

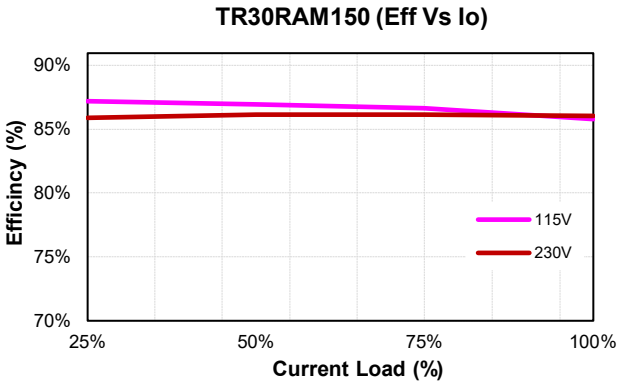


Performance Data

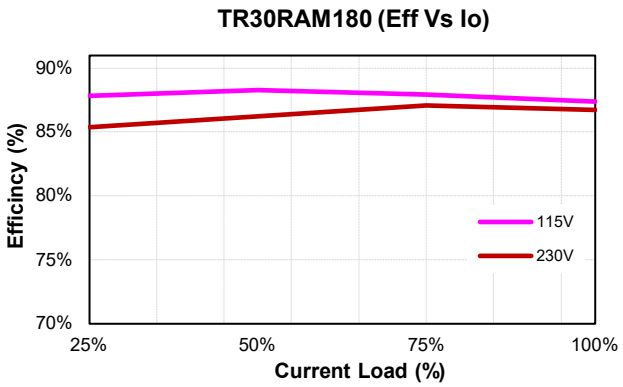


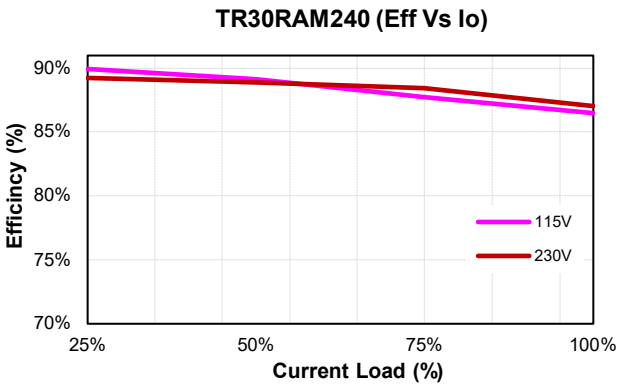






TR30RAM Series

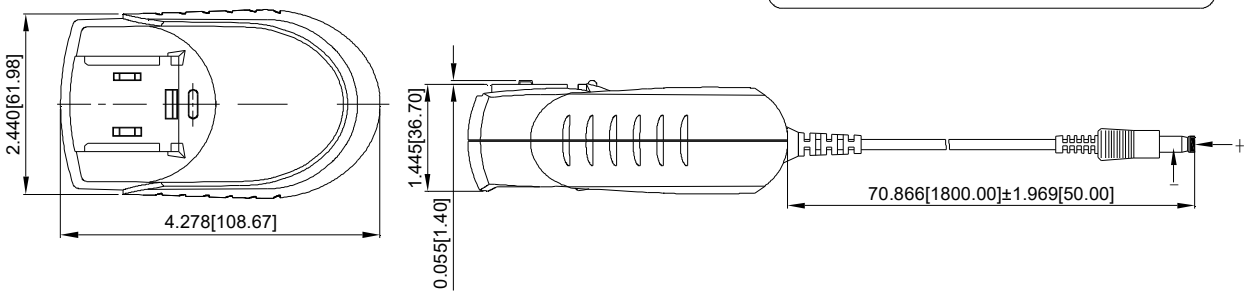


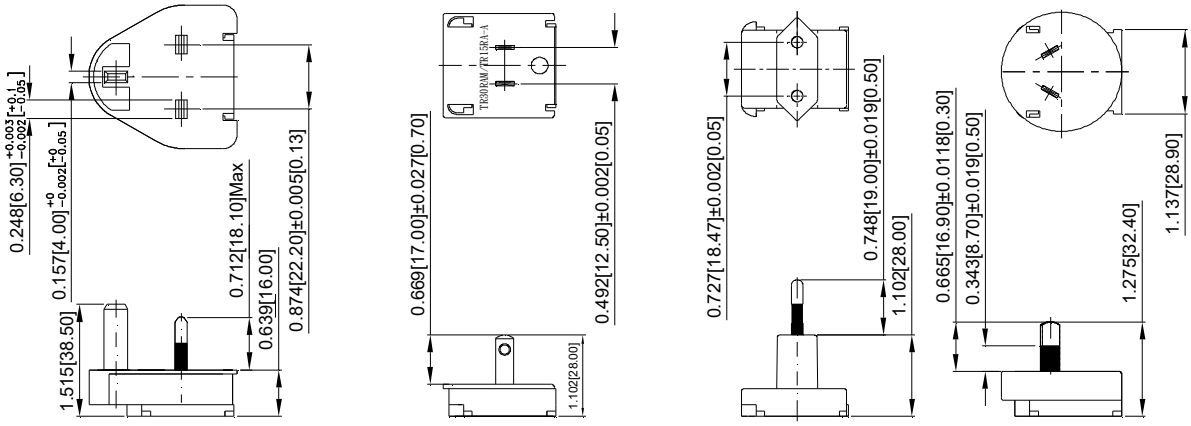


MECHANICAL SPECIFICATION

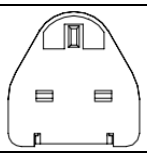
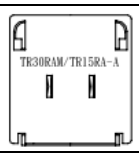
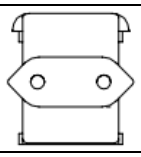
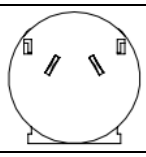
All Dimensions are in inches(mm)
Tolerance:Inches:X.XXX±0.02
Millimeters:X.XX±0.5

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

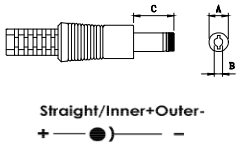
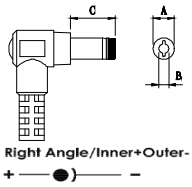




INTERCHANGEABLE AC PLUG SPECIFICALLY for TR30RAM (SOLD SEPARATELY)

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	16AWG for Vo: 5V, 9V 18AWG for Vo: 12V, 15V, 18V, 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/TR30RAM-cable-DC-Plug.pdf

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