TR36M SERIES
36 WATT AC-DC MEDICAL SWITCHING ADAPTER

Features

- Universal Input Range 80~264Vac
- High Efficiency up to 89%
- Class II
- No Load Power Consumption < 75mW
- Approval IEC/EN/UL 60601-1 2 MOPP
- Approval EN60601-1-11 for Home Healthcare Applications
- Approved EN55011, FCC CFR47 Part15 Class B
- Meets IEC/EN 60335-1
- Operating Altitude 5000m
- Over Voltage Protection
- Continuous Short Circuit Protection
- Meets CoC Tier 2 & DoE Level VI



E252331

MODEL NUMBER	OUTPUT VOLTAGE	OUTPUT CURRENT	VOLTAGE ACCURACY NOTE1	RIPPLE& NOISE NOTE2	LINE REGULATION NOTE3	LOAD REGULATION NOTE4	%EFF. (Typ.) NOTE5
TR36M050	5 V	5 A	±2%	100 mV	±1%	±6%	83%
TR36M090	9 V	3.3 A	±2%	120 mV	±1%	±4%	87%
TR36M120	12 V	2.5 A	±2%	120 mV	±1%	±2%	88%
TR36M135	13.5 V	2.4 A	±2%	130 mV	±1%	±2%	89%
TR36M150	15 V	2.4 A	±2%	150 mV	±1%	±2%	88%
TR36M180	18 V	2 A	±2%	180 mV	±1%	±2%	88%
TR36M240	24 V	1.5 A	±2%	240 mV	±1%	±2%	88%
TR36M360	36 V	1 A	±2%	360 mV	±1%	±2%	89%
TR36M480	48 V	0.75 A	±2%	480 mV	±1%	±2%	89%

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	DC Plug Type	Cable Type	Cable Length
TR36M	XXX	-XX	X	XX
36W Medical Adapter	050：5V 090：9V 120：12V 135：13.5V 150：15V 180：18V 240：24V 360：36V 480：48V	See Page 7	G：UL1571 with OVP 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 7 for restrictions

Part Number Example:

TR36M120-01G03, 12V_{dc} Output, DC Jack Type, Cable Length 1800mm

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	See Derating Curve	All	80 120		264 370	V_{ac} V_{dc}
Operating Case Temperature	See Derating Curve	All	-30		60	℃
Storage Temperature		All	-30		85	℃
Operating Altitude		All			5000	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			0.9	A
Leakage Current		All			80	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℃	TR36M050 TR36M090 TR36M120 TR36M135 TR36M150 TR36M180 TR36M240 TR36M360 TR36M480	4.9 8.82 11.76 13.23 14.7 17.64 23.52 35.28 47.04	5 9 12 13.5 15 18 24 36 48	5.1 9.18 12.24 13.77 15.3 18.36 24.48 36.72 48.96	V_{dc}
Operating Output Current Range	V_{in}=115V_{ac} and 230V_{ac}, T_c=25℃	TR36M050 TR36M090 TR36M120 TR36M135 TR36M150 TR36M180 TR36M240 TR36M360 TR36M480			5 3.3 2.5 2.4 2.4 2 1.5 1 0.75	A
Holdup Time	V_{in}=115V_{ac}	All		10		ms
Output Voltage Regulation						
Load Regulation	60%±40% Full load change	TR36M050 TR36M090 TR36M120 TR36M135 TR36M150 TR36M180 TR36M240 TR36M360 TR36M480			±6 ±4 ±2 ±2 ±2 ±2 ±2 ±2 ±2	%
Line Regulation	V_{in}=100V_{ac} to 240V_{ac}	All			±1.0	%

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Over Voltage Protection	IC component to clamp (auto recovery)	TR36M050			7.44	V_{dc}
		TR36M090			13.6	
		TR36M120			15.9	
		TR36M135			16.5	
		TR36M150			21.5	
		TR36M180			24.8	
		TR36M240			31.5	
		TR36M360			45.2	
		TR36M480			59.6	
Over Current Protection	Auto recovery	All	110		160	%
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℃	TR36M050			100	mV
		TR36M090			120	
		TR36M120			120	
		TR36M135			130	
		TR36M150			150	
		TR36M180			180	
		TR36M240			240	
		TR36M360			360	
		TR36M480			480	
Load Capacitance	1. V_{in}=115V_{ac} and 230V_{ac} 2. Output is max. load 3. Ambient temperature=25℃	TR36M050			5000	uF
		TR36M090			3300	
		TR36M120			2500	
		TR36M135			2400	
		TR36M150			2400	
		TR36M180			2000	
		TR36M240			1500	
		TR36M360			1000	
		TR36M480			750	
Efficiency	1. V_{in}=230V_{ac} 2. Output is 75% full load 3. Ambient temperature=25℃	TR36M050		83		%
		TR36M090		87		
		TR36M120		88		
		TR36M135		89		
		TR36M150		88		
		TR36M180		88		
		TR36M240		88		
		TR36M360		89		
		TR36M480		89		

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

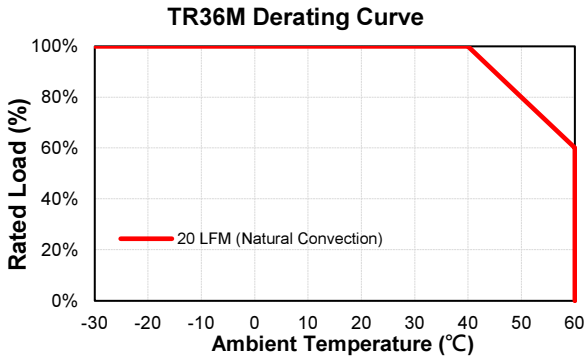
PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Switching Frequency	Pout=max. rated power	All		65		kHz

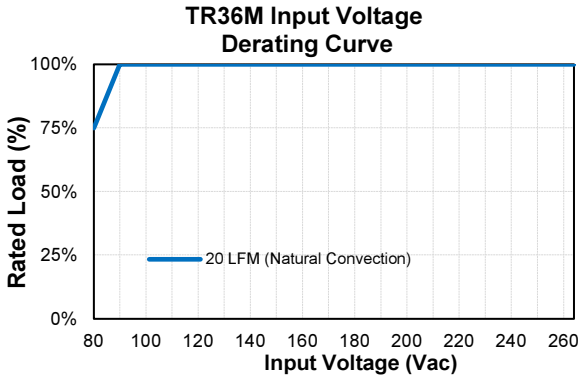
GENERAL SPECIFICATIONS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
MTBF	I_o=100%; T_a=25℃ per MIL-HDBK-217F	All	750			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		150		g
Dimensions		All	3.937x1.771x0.886 inches (100.00x45.00x22.50 mm)			
Safety	Class II, IEC 60601-1, EN 60601-1-11, EN 60601-1, ANSI/AAMI ES 60601-1					Ed.3.1
EMC Emission	EN 55011:2016+A1:2017 Class B, EN 61000-3-2:2014, EN 6100-3-3:2013 CISPR PUB. 22, FCC Part 15 Subpart B					
Conducted Disturbance	EN 55011:2016+A1:2017, FCC Part 15 Subpart B					Class B
Radiated Disturbance	EN 55011:2016+A1:2017, FCC Part 15 Subpart B					Class B
Power Harmonics	EN 61000-3-2: 2014					
Voltage Fluctuations	EN 61000-3-3: 2013					
EMC Immunity	EN 60601-1-2:2015, IEC 61000-4-2, 3, 4, 5, 6, 8, 11					
Electrostatic Discharge (ESD)	IEC 61000-4-2:2008, Air Discharge: ±15kV, Contact Discharge: ±8kV					Criteria A
Radio-Frequency, Continuous Radiated Disturbance	IEC 61000-4-3:2006+A1:2007+A2:2010					Criteria A
Electrical Fast Transient (EFT)	IEC 61000-4-4:2012					Criteria A
Surge	IEC 61000-4-5:2014+A1:2017					Criteria A
Conducted disturbances, induced by RF fields	IEC 61000-4-6:2013					Criteria A
Voltage dips	IEC 61000-4-11:2004+A1:2017, Dips: 30% Reduction, Dips: >95% Reduction					Criteria A
Voltage interruptions	IEC 61000-4-11:2004+A1:2017, >95% reduction					Criteria B
Application Note Link	TR36M Series App Notes					

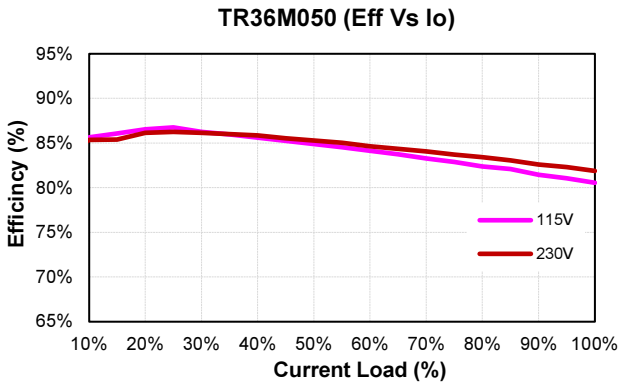
CHARACTERISTIC CURVE

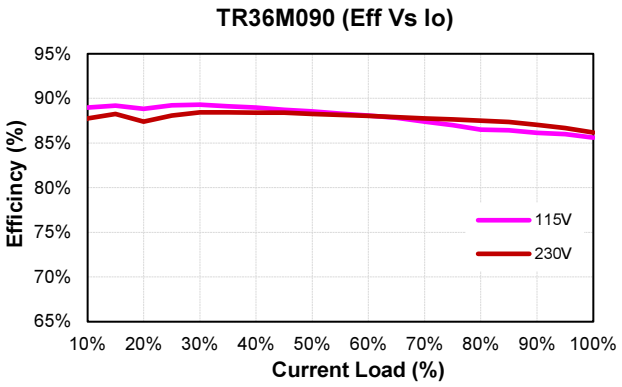
Power Derating Curve

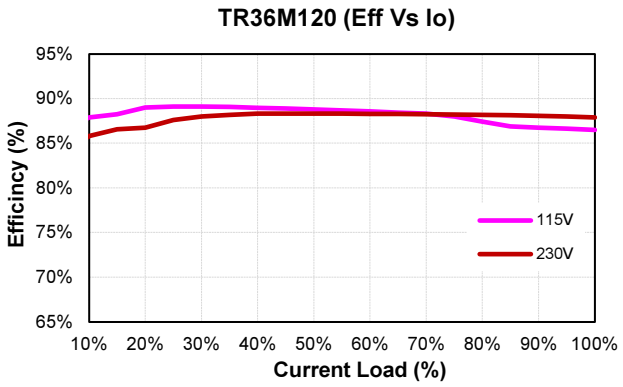


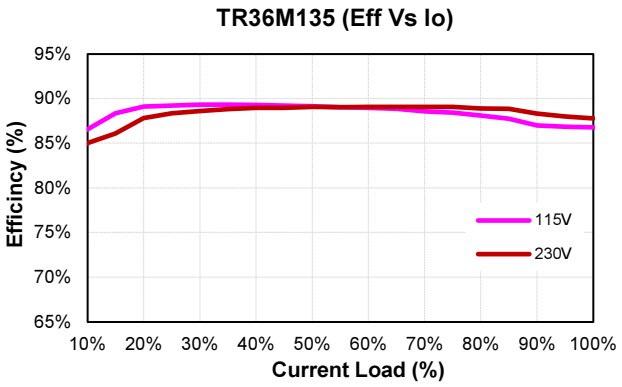


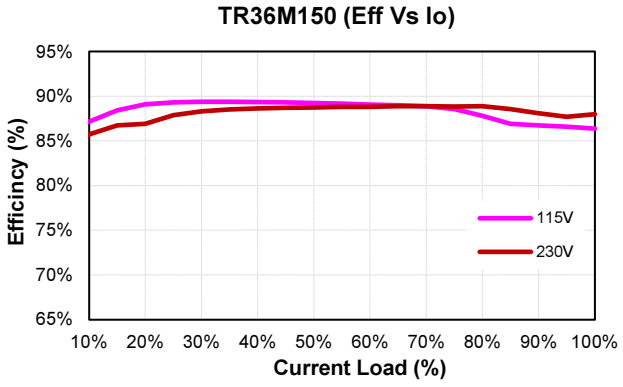
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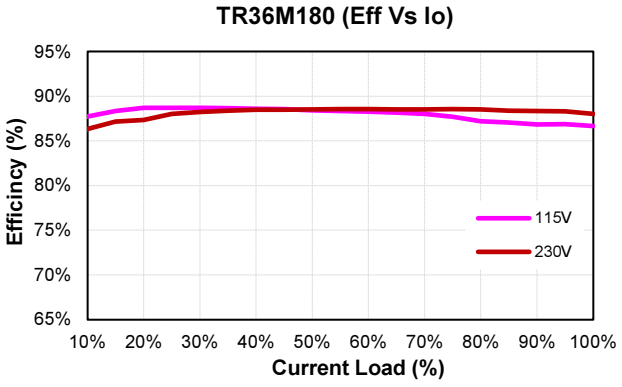


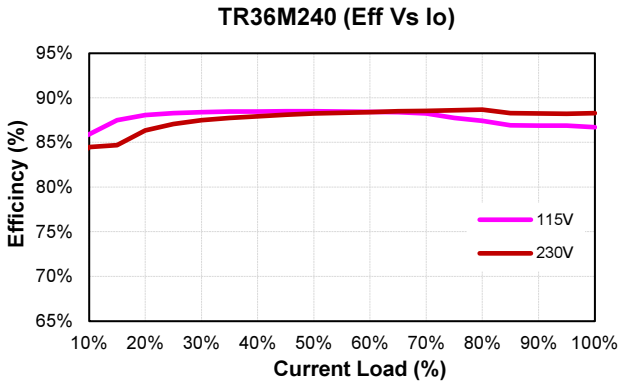


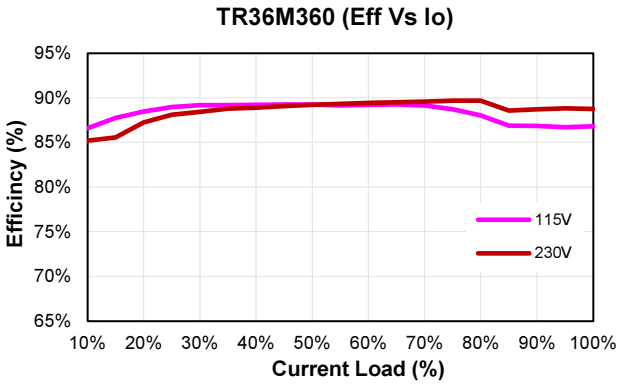


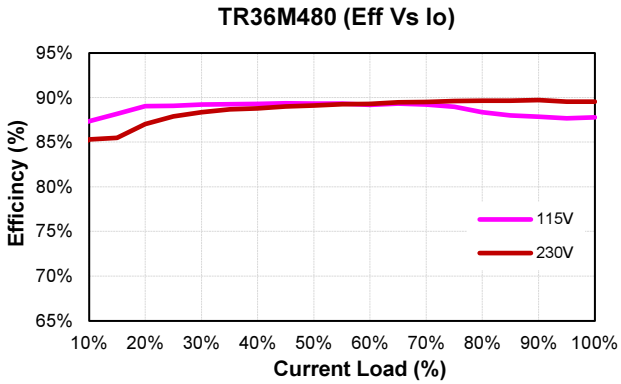






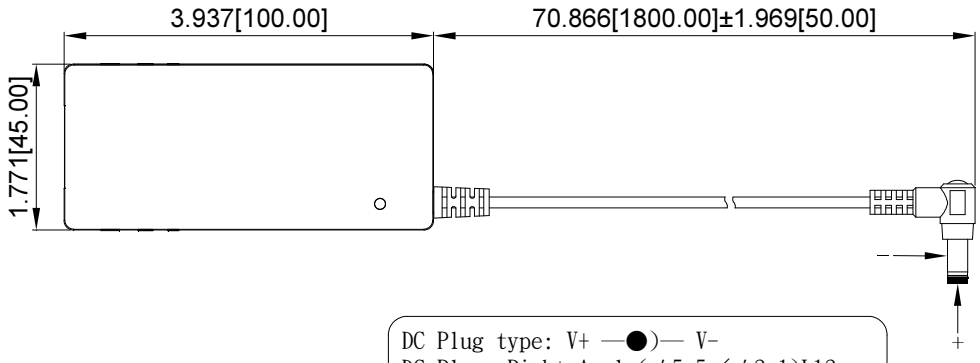




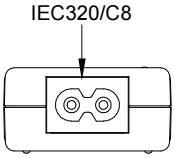


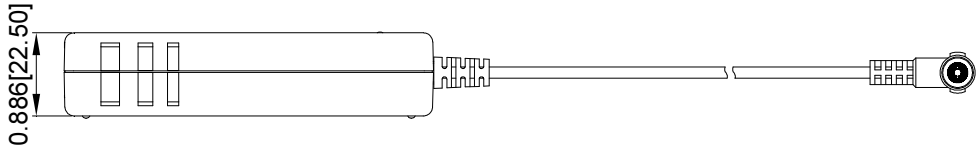
MECHANICAL SPECIFICATION

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

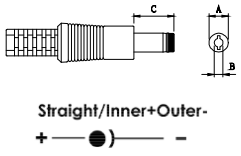
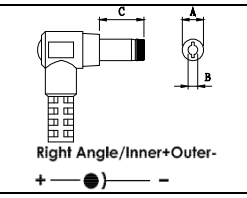
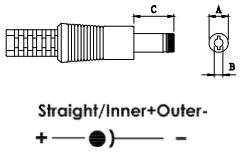
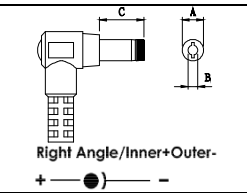
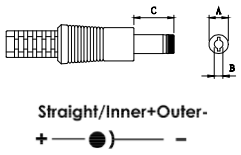
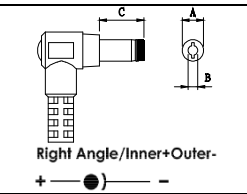


DC Plug type: V+ —●)— V-
DC Plug :Right Angle(φ5.5／φ2.1)L12mm
20AWG／1800mm





STANDARD OUTPUT PLUG

DC Plug Type	Cable Number-XXXXX	A OD (mm)	B ID (mm)	C L (mm)	Cable Type	Cable Length	Cable AWG
	11G02	Φ5.5	Φ2.1	12	UL1571	1220mm without Core	16AWG for Vo: 5V
	12G02	Φ5.5	Φ2.5	12			
	23G02	Φ5.5	Φ2.1	9.5			
	26G02	Φ5.5	Φ2.5	9.5			
	01G02	Φ5.5	Φ2.1	12			
	02G02	Φ5.5	Φ2.5	12			
	21G02	Φ5.5	Φ2.5	9.5			
	24G02	Φ5.5	Φ2.1	9.5			
	11G03	Φ5.5	Φ2.1	12	UL1571	1800mm without Core	18AWG for Vo: 9V, 12V, 13.5V 20AWG for Vo: 15V, 18V, 24V
	12G03	Φ5.5	Φ2.5	12			
	23G03	Φ5.5	Φ2.1	9.5			
	26G03	Φ5.5	Φ2.5	9.5			
	01G03	Φ5.5	Φ2.1	12			
	02G03	Φ5.5	Φ2.5	12			
	21G03	Φ5.5	Φ2.5	9.5			
	24G03	Φ5.5	Φ2.1	9.5			
	11E03	Φ5.5	Φ2.1	12	UL1185	1800mm without Core	20AWG for Vo: 36V, 48V
	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/TR36M-cable--DC-Plug.pdf

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