



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
- Approval IP21
- 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



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°C.

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



TR36M Series

TECHNICAL SPECIFICATIONS

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

ABSOLUTE MAXIMUM RATINGS

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



TR36M Series

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Over Voltage Protection	IC component to clamp (auto recovery)	TR36M050 TR36M090 TR36M120 TR36M135 TR36M150 TR36M180 TR36M240 TR36M360 TR36M480			7.44 13.6 15.9 16.5 21.5 24.8 31.5 45.2 59.6	V _{dc}
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°C	TR36M050 TR36M090 TR36M120 TR36M135 TR36M150 TR36M180 TR36M240 TR36M360 TR36M480			100 120 120 130 150 180 240 360 480	mV
Load Capacitance	1. V _{in} =115V _{ac} and 230V _{ac} 2. Output is max. load 3. Ambient temperature=25°C	TR36M050 TR36M090 TR36M120 TR36M135 TR36M150 TR36M180 TR36M240 TR36M360 TR36M480			5000 3300 2500 2400 2400 2000 1500 1000 750	uF
Efficiency	1. V _{in} =230V _{ac} 2. Output is 75% full load 3. Ambient temperature=25°C	TR36M050 TR36M090 TR36M120 TR36M135 TR36M150 TR36M180 TR36M240 TR36M360 TR36M480		83 87 88 89 88 88 88 89 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	P _{out} =max. rated power	All		65		kHz



TR36M Series

GENERAL SPECIFICATIONS

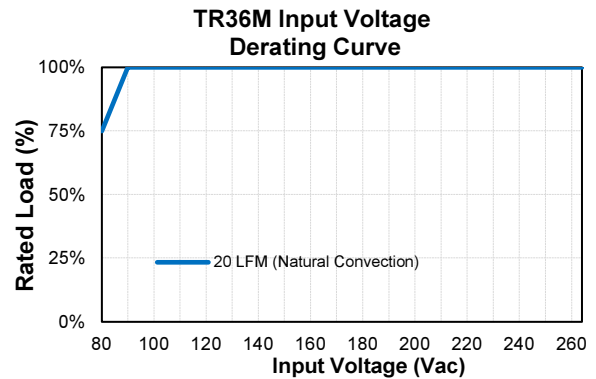
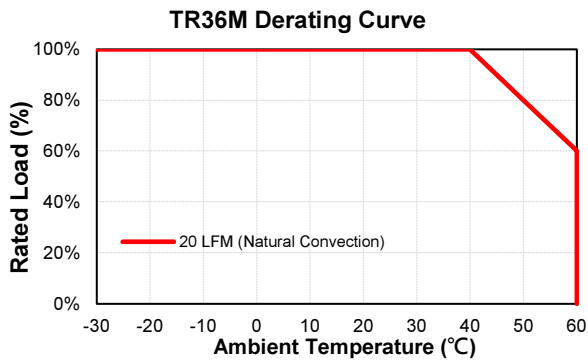
PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
MTBF	$I_o=100\%$; $T_a=25^{\circ}\text{C}$ per MIL-HDBK-217F	All	750			k hours
Humidity	Non-condensing	All			93	% RH
Shock	Meet MIL-STD-810F Table 516.5, Table 516.5-I 10ms, each axis 3 times ($\pm X$ 、 $\pm Y$ 、 $\pm Z$ axis)	All		75		g
Vibration	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: $\pm 15\text{kV}$, Contact Discharge: $\pm 8\text{kV}$					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			



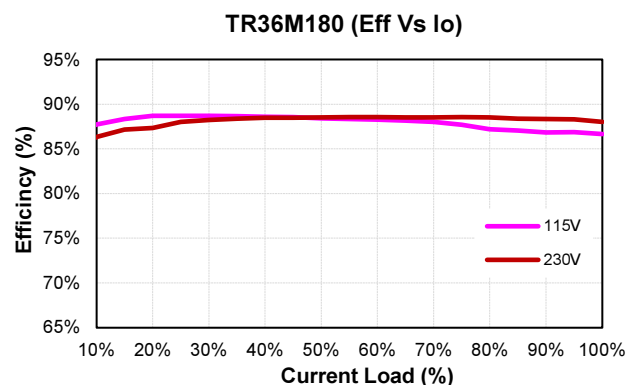
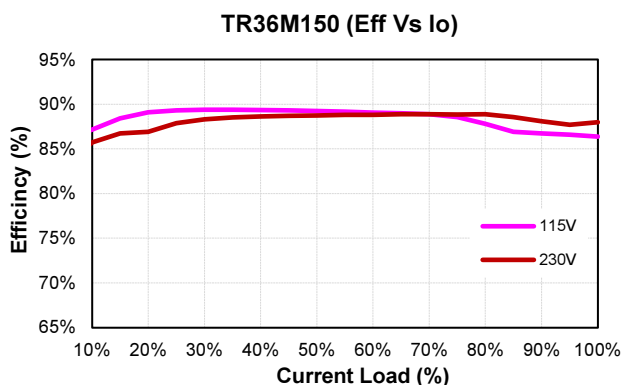
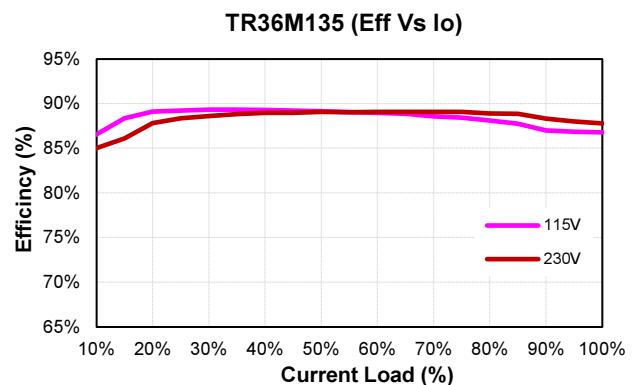
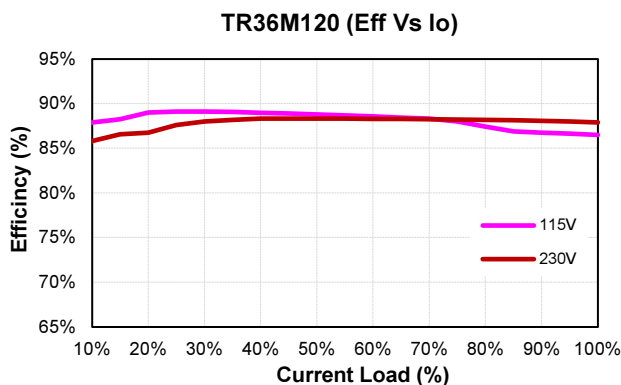
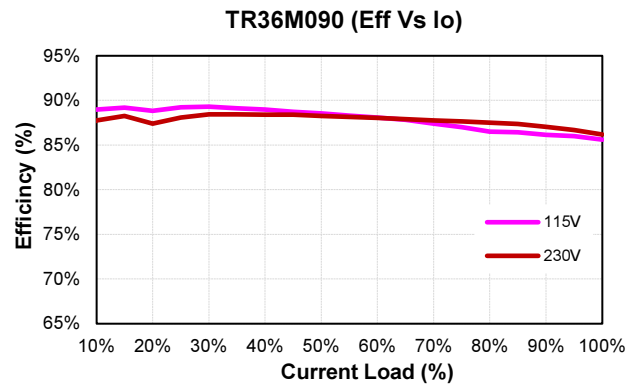
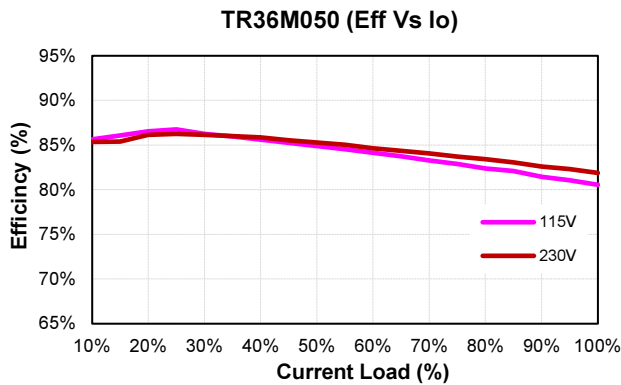
TR36M Series

CHARACTERISTIC CURVE

Power Derating Curve



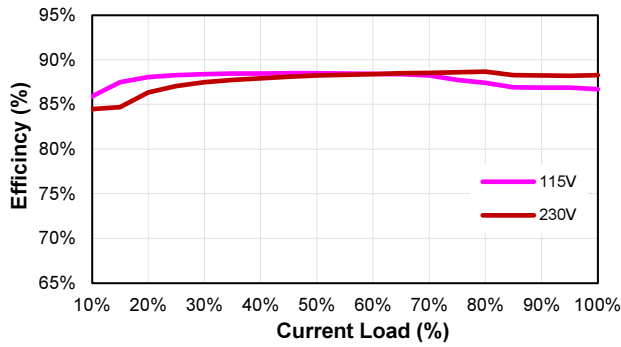
Performance Data



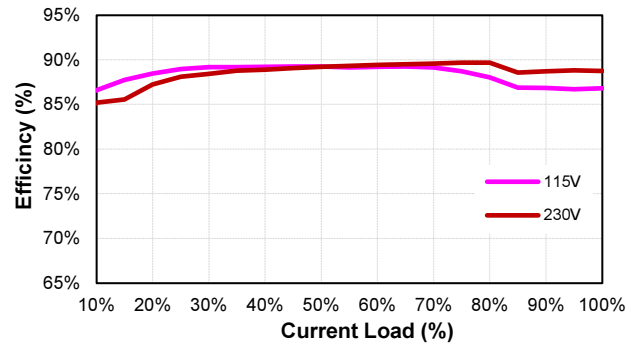


TR36M Series

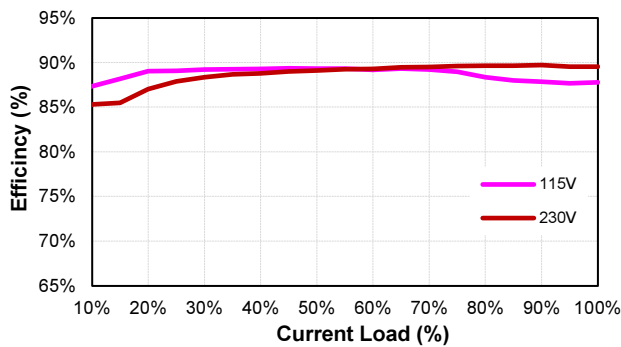
TR36M240 (Eff Vs Io)



TR36M360 (Eff Vs Io)

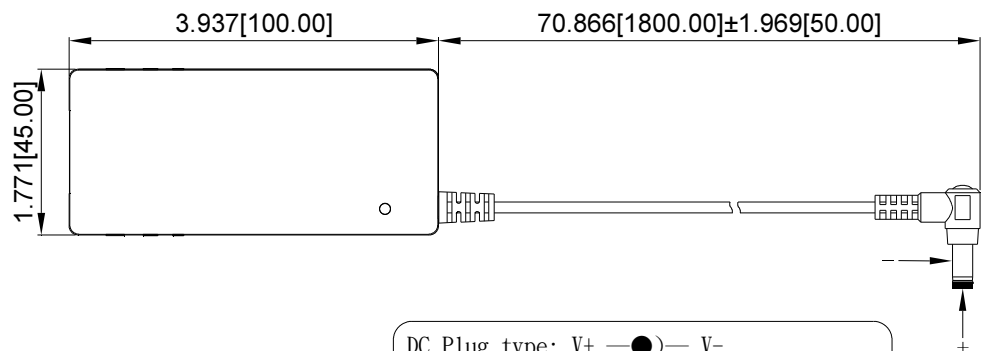


TR36M480 (Eff Vs Io)

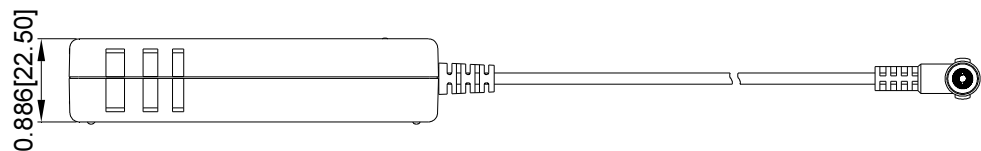
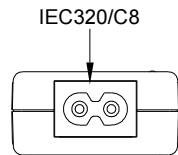


MECHANICAL SPECIFICATION

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



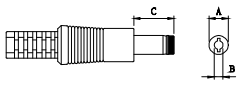
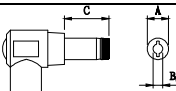
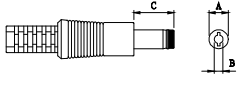
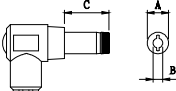
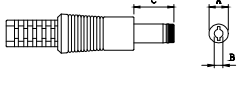
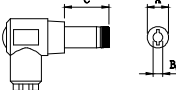
DC Plug type: V+ —●— V-
DC Plug :Right Angle(φ5.5/φ2.1)L12mm
20AWG/1800mm





TR36M Series

STANDARD OUTPUT PLUG

DC Plug Type	Cable Number-XXXXX	A	B	C	Cable Type	Cable Length	Cable AWG
		OD (mm)	ID (mm)	L (mm)			
 Straight/Inner+Outer- + ● -	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			
 Right Angle/Inner+Outer- + ● -	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			
 Straight/Inner+Outer- + ● -	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			
 Right Angle/Inner+Outer- + ● -	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			
 Straight/Inner+Outer- + ● -	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			
 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/TR36M-cable--DC-Plug.pdf>

CINCON Electronics Co. Ltd.
 Add: 14F, No. 306, Sec.4, Hsin Yi Rd., Taipei, Taiwan
 Tel: 886-2-27086210
 Fax: 886-2-27029852
 E-mail: sales@cincon.com.tw
 Web: www.cincon.com