



# TRE36 SERIES 36 WATT AC-DC I.T.E SWITCHING ADAPTER

## Features

- Universal Input Range 90~264Vac
- High Efficiency up to 89%
- Class II
- No Load Power Consumption < 75mW
- Approved IEC/EN/UL 62368-1
- Meets EN55032 Class B and CISPR/FCC Class B
- 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
TRE36A050	5 V	5 A	±2%	100 mV	±1%	±6%	83%
TRE36A090	9 V	3.3 A	±2%	120 mV	±1%	±4%	87%
TRE36A120	12 V	2.5 A	±2%	120 mV	±1%	±2%	88%
TRE36A135	13.5 V	2.4 A	±2%	130 mV	±1%	±2%	89%
TRE36A150	15 V	2.4 A	±2%	150 mV	±1%	±2%	88%
TRE36A180	18 V	2 A	±2%	180 mV	±1%	±2%	88%
TRE36A240	24 V	1.5 A	±2%	240 mV	±1%	±2%	88%
TRE36A360	36 V	1 A	±2%	360 mV	±1%	±2%	89%
TRE36A480	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<sub>ac</sub> to 240V<sub>ac</sub> 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<sub>ac</sub> and 75% full load at 25°C.

## PART NUMBER

Series	Output Voltage	DC Plug Type	Cable Type	Cable Length
TRE36A	XXX	-XX	X	XX
36W I.T.E Adapter	050 : 5V	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
	090 : 9V			
	120 : 12V			
	135 : 13.5V			
	150 : 15V			
	180 : 18V			
	240 : 24V			
	360 : 36V			
480 : 48V	<a href="#">See page 7 for restrictions</a>			

Part Number Example:

**TRE36A120-01G03**, 12V<sub>ac</sub> Output, DC Jack Type, Cable Length 1800mm



## 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	90		264	V <sub>ac</sub>
					370	V <sub>dc</sub>
Operating 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 <sub>ac</sub>
Input Frequency Range		All	47		63	Hz
Maximum Input Current	100% Full load, V <sub>in</sub> =100V <sub>ac</sub>	All			0.9	A
Leakage Current		All			250	uA
Inrush Current	V <sub>in</sub> =240V <sub>ac</sub> , Cold start at 25°C	All			100	A

### OUTPUT CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Output Voltage Set Point	V <sub>in</sub> =115V <sub>ac</sub> and 230V <sub>ac</sub> , I <sub>o</sub> =60% Full load T <sub>c</sub> =25°C	TRE36A050	4.9	5	5.1	V <sub>dc</sub>
		TRE36A090	8.82	9	9.18	
		TRE36A120	11.76	12	12.24	
		TRE36A135	13.23	13.5	13.77	
		TRE36A150	14.7	15	15.3	
		TRE36A180	17.64	18	18.36	
		TRE36A240	23.52	24	24.48	
		TRE36A480	47.04	48	48.96	
Operating Output Current Range	V <sub>in</sub> =115V <sub>ac</sub> and 230V <sub>ac</sub> , T <sub>c</sub> =25°C	TRE36A050			5	A
		TRE36A090			3.3	
		TRE36A120			2.5	
		TRE36A135			2.4	
		TRE36A150			2.4	
		TRE36A180			2	
		TRE36A240			1.5	
		TRE36A480			0.75	
Holdup Time	V <sub>in</sub> =115V <sub>ac</sub>	All		10		ms
Output Voltage Regulation						
Load Regulation	60%±40% Full load change	TRE36A050			±6	%
		TRE36A090			±4	
		TRE36A120			±2	
		TRE36A135			±2	
		TRE36A150			±2	
		TRE36A180			±2	
		TRE36A240			±2	
		TRE36A480			±2	
Line Regulation	V <sub>in</sub> =100V <sub>ac</sub> to 240V <sub>ac</sub>	All			±1.0	%



# TRE36 Series

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Over Voltage Protection	IC component to clamp (auto recovery)	TRE36A050			7.44	V <sub>dc</sub>
		TRE36A090			13.6	
		TRE36A120			15.9	
		TRE36A135			16.5	
		TRE36A150			21.5	
		TRE36A180			24.8	
		TRE36A240			31.5	
		TRE36A360			45.2	
		TRE36A480			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°C	TRE36A050			100	mV
		TRE36A090			120	
		TRE36A120			120	
		TRE36A135			130	
		TRE36A150			150	
		TRE36A180			180	
		TRE36A240			240	
		TRE36A360			360	
		TRE36A480			480	
Load Capacitance	1. V <sub>in</sub> =115V <sub>ac</sub> and 230V <sub>ac</sub> 2. Output is max. load 3. Ambient temperature=25°C	TRE36A050			5000	uF
		TRE36A090			3300	
		TRE36A120			2500	
		TRE36A135			2400	
		TRE36A150			2400	
		TRE36A180			2000	
		TRE36A240			1500	
		TRE36A360			1000	
		TRE36A480			750	
Efficiency	1. V <sub>in</sub> =230V <sub>ac</sub> 2. Output is 75% full load 3. Ambient temperature=25°C	TRE36A050		83		%
		TRE36A090		87		
		TRE36A120		88		
		TRE36A135		89		
		TRE36A150		88		
		TRE36A180		88		
		TRE36A240		88		
		TRE36A360		89		
		TRE36A480		89		

## ISOLATION CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Input to Output	1 minute	All			4000	V <sub>ac</sub>
Isolation Resistance	Input to output	All	100			MΩ

## FEATURE CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Switching Frequency	P <sub>out</sub> =max. rated power	All		65		kHz



# TRE36 Series

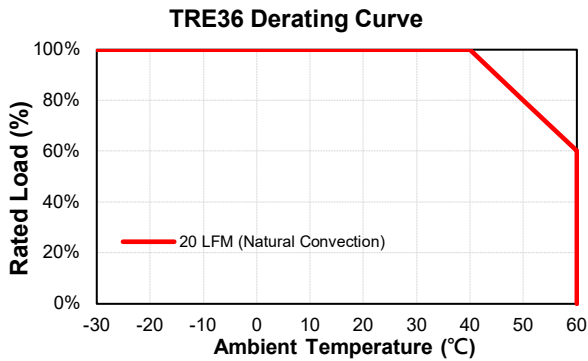
## GENERAL SPECIFICATIONS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
MTBF	$I_0=100\%$ ; $T_a=25^\circ\text{C}$ per MIL-HDBK-217F	All	400			k hours
Humidity	Non-condensing	All			93	% RH
Shock	Meet MIL-STD-810F Table 516.5, Table 516.5-1 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)			
<b>Safety</b>	Class II, IEC/EN/UL 62368-1					Ed.3.0
<b>EMC Emission</b>	EN 55032:2015+A1:2020, EN 55032:2015+A11:2020, CISPR PUB. 22, FCC Part 15 Subpart B, EN 61000-6-3:2021, EN 61000-6-4:2019, EN 61000-3-2:2019+A1:2021, EN 61000-3-3:2013+A2:2021					Class B
Conducted Disturbance	EN 55032:2015+A1:2020, EN 55032:2015+A11:2020, CISPR PUB. 22, FCC Part 15 Subpart B, EN 61000-6-3:2021, EN 61000-6-4:2019					Class B
Radiated Disturbance	EN 55032:2015+A1:2020, EN 55032:2015+A11:2020, CISPR PUB. 22, FCC Part 15 Subpart B, EN 61000-6-3:2021, EN 61000-6-4:2019					Class B
Harmonic Current Emissions	EN 61000-3-2:2019+A1:2021					
Voltage Fluctuations & Flicker	EN 61000-3-3:2013+A2:2021					
<b>EMC Immunity</b>	EN 55035:2017+A11:2020, EN 61000-6-1:2019, EN 61000-6-2:2019、IEC 61000-4-2, 3, 4, 5, 6, 11					
Electrostatic Discharge (ESD)	IEC 61000-4-2:2008、Air Discharge: $\pm 8\text{kV}$ , Contact Discharge: $\pm 4\text{kV}$					Criteria A
Radio-Frequency, Continuous Radiated Disturbance	IEC 61000-4-3:2020					Criteria A
Electrical Fast Transient (EFT)	IEC 61000-4-4:2012, $\pm 1\text{kV}$ , $\pm 2\text{kV}$					Criteria A
Surge	IEC 61000-4-5:2014+A1:2017, L-N: $\pm 0.5\text{kV}$ , $\pm 1\text{kV}$					Criteria A
Conducted Disturbances, Induced by RF Fields	IEC 61000-4-6:2013+COR1:2015					Criteria A
Voltage Dips	IEC 61000-4-11:2020, Dip: 30% Reduction, Dip >95% Reduction					Criteria A
Voltage Interruptions	IEC 61000-4-11:2020, >95% Reduction					Criteria B
Application Note Link						<a href="#">TRE36 Series App Notes</a>

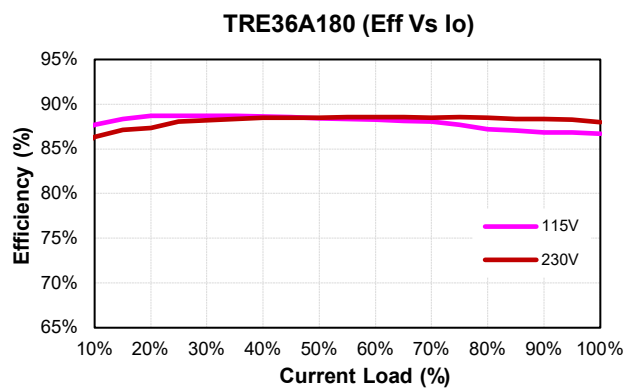
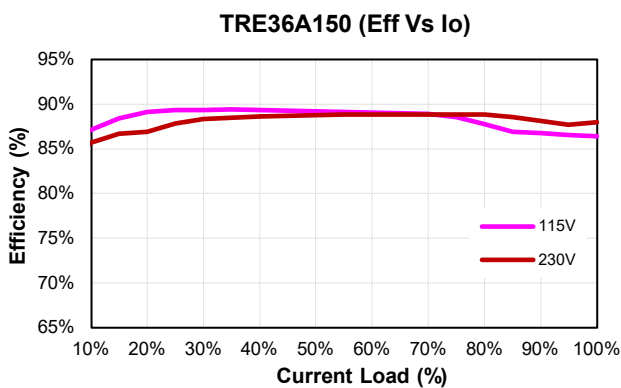
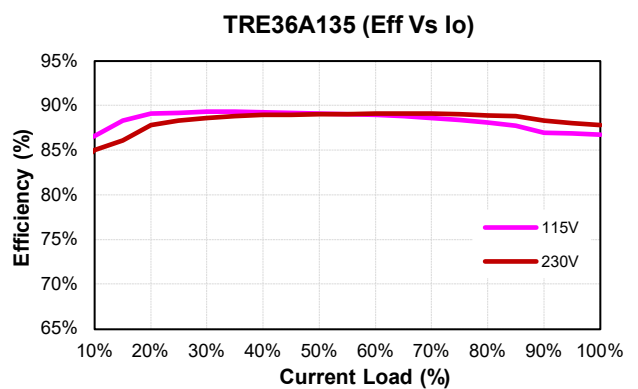
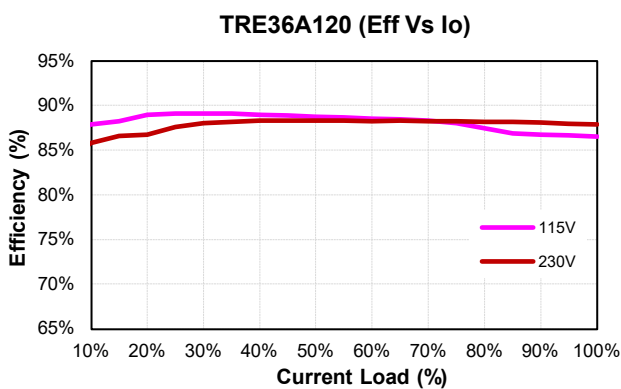
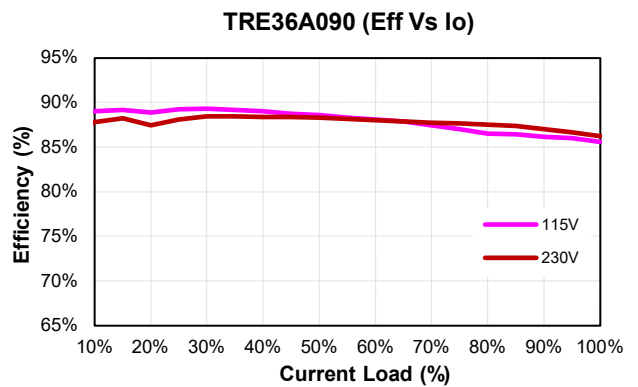
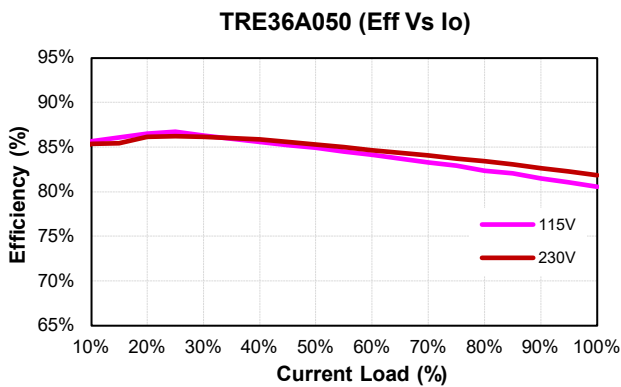


## CHARACTERISTIC CURVE

### Power Derating Curve



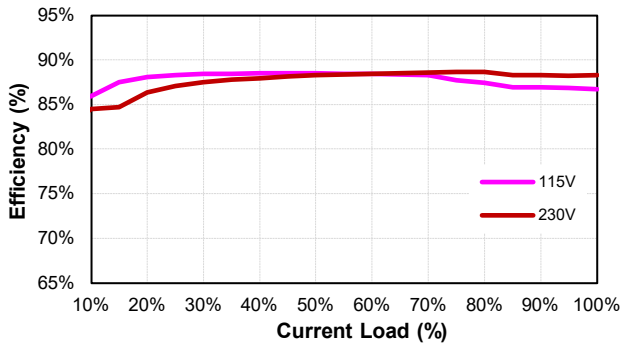
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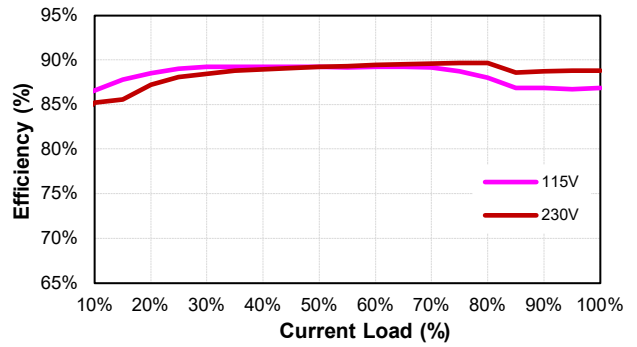


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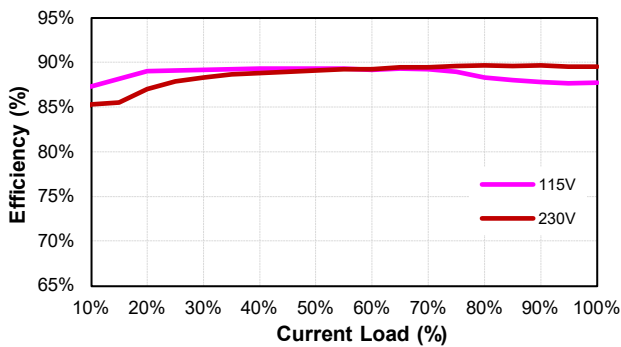
TRE36A240 (Eff Vs Io)



TRE36A360 (Eff Vs Io)

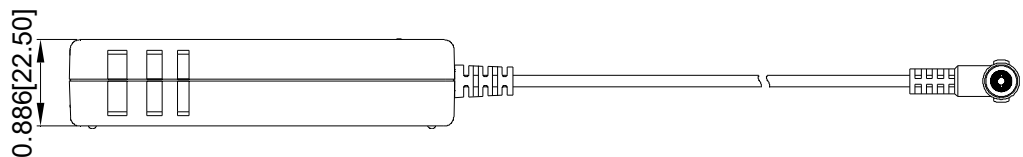
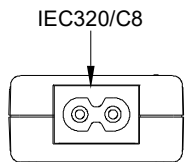
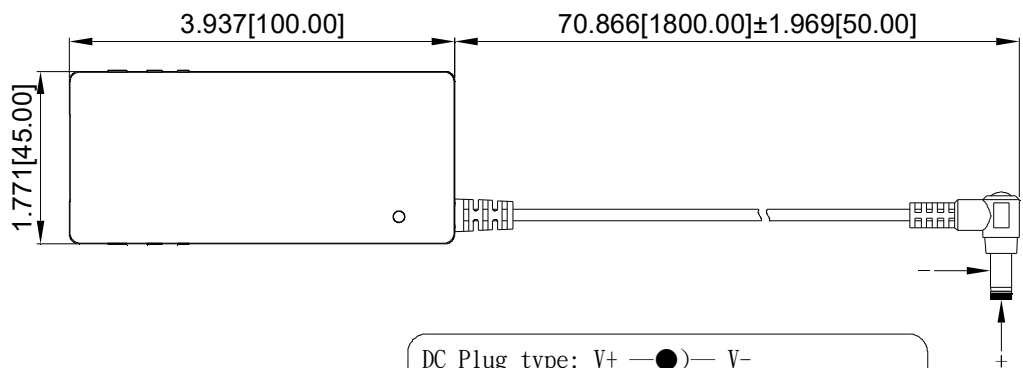


TRE36A480 (Eff Vs Io)



## MECHANICAL SPECIFICATION

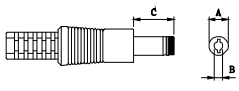
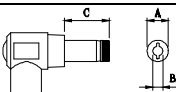
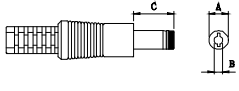
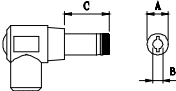
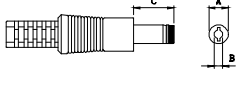
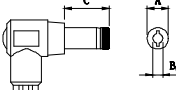
All Dimensions are in inches[mm]  
 Tolerance: Inches: X.XXX±0.02  
 Millimeters: X.XX±0.5





# TRE36 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/TRE36-cable--DC-Plug.pdf>

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