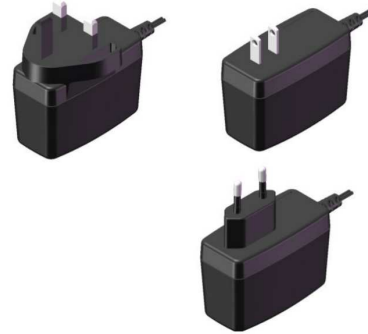




TRE25 SERIES 25 WATT I.T.E SWITCH ADAPTER

Features

- Universal Input Range 90~264Vac
- High Efficiency up to 88%
- Class II
- No Load Input Power Consumption < 75mW
- Approval IEC/EN/UL 62368-1
- Approval EN55032 and CISPR/FCC Class B
- Operating Altitude 3000m
- Continuous Short Circuit Protection
- Over Voltage Protection
- Meets CoC Tier 2 and DOE Level VI



MODEL NUMBER	OUTPUT VOLTAGE	OUTPUT CURRENT	RIPPLE & NOISE NOTE1	VOLTAGE ACCURACY NOTE2	LINE REGULATION NOTE3	LOAD REGULATION NOTE4	%EFF. (Typ.) NOTE5
TRE25050	5 V	4.0 A	50 mV	±2%	±1%	±6%	80%
TRE25090	9 V	2.5 A	90 mV	±2%	±1%	±5%	87%
TRE25120	12 V	2.1 A	120 mV	±2%	±1%	±5%	87%
TRE25150	15 V	1.67 A	150 mV	±2%	±1%	±3%	88%
TRE25180	18 V	1.4 A	180 mV	±2%	±1%	±2%	88%
TRE25240	24 V	1.05 A	240 mV	±2%	±1%	±2%	88%

Note:

1. Add a 0.1uF ceramic capacitor and a 10uF E.L. capacitor to output for ripple & noise measuring @20MHz BW.
2. Voltage accuracy is set at 60% full load.
3. Line regulation is measured from 100V_{ac} to 240V_{ac} with full load.
4. Load regulation measured from 60% to 100% full load and from 60% to 20% full load (60%±40% full load).
5. Typical efficiency at 230V_{ac} and 75% full load at 25°C.

PART NUMBER

Series	Output Voltage	DC Plug Type	Cable Type	Cable Length
TRE25	XXX	-XX	X	XX
25W I.T.E Adapter	A : USA 2 Pin E : Europe 2 Pin U : British 3 Pin 050 : 5V 090 : 9V 120 : 12V 150 : 15V 180 : 18V 240 : 24V	See Page 6	G : UL1571 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

Part Number Example:

TRE25120-01E02, 25W, 12V_{dc} Output, DC Jack Type, Cable Length 1220mm



TRE25 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		All	90 120		264 370	V _{ac} V _{dc}
Operating Temperature	See Derating Curve	All	-20		60	°C
Storage Temperature		All	-20		85	°C
Input/Output Isolation Voltage	1 minute	All			3000	V _{ac}
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% Load, V _{in} =100V _{ac}	All			0.7	A
Leakage Current		All			250	uA
Under Voltage Protection		All	60	68	75	V _{ac}
Inrush Current	V _{in} =240V _{ac} , Cold start at 25°C	All			60	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	TRE25050 TRE25090 TRE25120 TRE25150 TRE25180 TRE25240	4.9 8.82 11.76 14.7 17.64 23.52	5 9 12 15 18 24	5.1 9.18 12.24 15.3 18.36 24.48	V _{dc}
Operating Output Current Range	V _{in} =115V _{ac} and 230V _{ac} , T _c =25°C	TRE25050 TRE25090 TRE25120 TRE25150 TRE25180 TRE25240	0 0 0 0 0 0		4 2.5 2.1 1.67 1.4 1.05	A
Holdup Time	V _{in} =115V _{ac}	All		10		ms
Output Voltage Regulation						
Load Regulation	60%±40% Full load change	TRE25050 TRE25090 TRE25120 TRE25150 TRE25180 TRE25240			±6.0 ±5.0 ±5.0 ±3.0 ±2.0 ±2.0	%
Line Regulation	V _{in} =High line to low line, full load	All			±1.0	%
Over Voltage Protection	IC Component to clamp (auto recovery)	TRE25050 TRE25090 TRE25120 TRE25150 TRE25180 TRE25240		7.44 13.6 16.2 18.9 23.5 28.8		V _{dc}
Over Current Protection	Auto recovery	All	110		140	%
Short Circuit Protection	Auto recovery	All				



TRE25 Series

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°C	TRE25050			50	mV
		TRE25090			90	
		TRE25120			120	
		TRE25150			150	
		TRE25180			180	
		TRE25240			240	
Load Capacitance	1. $V_{in}=115V_{ac}$ and $230V_{ac}$ 2. Output is max. load 3. Ambient temperature=25°C	TRE25050			4000	uF
		TRE25090			2500	
		TRE25120			2100	
		TRE25150			1670	
		TRE25180			1400	
		TRE25240			1050	
Efficiency	1. $V_{in}=230V_{ac}$ 2. Output is 75% full load 3. Ambient temperature=25°C	TRE25050		80		%
		TRE25090		87		
		TRE25120		87		
		TRE25150		88		
		TRE25180		88		
		TRE25240		88		

ISOLATION CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Input to Output	1 minute (without dielectric breakdown)	All			3000	V_{ac}
Isolation Resistance	Input to output	All	100			MΩ

FEATURE CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typ.	Max.	Units
Switching Frequency		All		65		kHz

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	300			k hours
Humidity	Non-condensing	All			93	% RH
Shock	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	MIL-STD-810F Table 514.5C-VIII, 15~2000Hz, X、Y、Z axis, 1 hour(each axis),. total 3 hours.	All		4		g
Weight		All		140		grams
Dimension		All	2.795x1.906x1.299 inches (71.00x48.40x33.00 mm)			
Safety	Class II, IEC 62368-1:2014, EN 62368-1:2014/A11:2017, UL 62368-1, 2nd Edition					Ed. 2.0
EMC Emission	EN55032:2015+AC:2016, EN61000-3-2:2014, EN6100-3-3:2013, FCC CFR 47 Part 15					
Conducted Disturbance	EN55032:2015+AC:2016					Class B
Radiated Disturbance	EN55032:2015+AC:2016					Class B
Harmonic Current Emissions	EN 61000-3-2: 2014					Class A
Voltage Fluctuations & Flicker	EN 61000-3-3: 2013					Criterion A
EMC Immunity	EN 55024:2010+A1:2015, EN 61204-3, EN 61000-6-1,3, EN 61000-3-2:2014, EN 61000-3-3:2013					Criterion A
Electrostatic Discharge (ESD)	IEC 61000-4-2:2008, Air Discharge: $\pm 8\text{kV}$ Contact Discharge: $\pm 4\text{kV}$					Criterion A
Radio-Frequency, Continuous Radiated Disturbance	IEC 61000-4-3:2006+A1:2007+A2:2010					Criterion A



TRE25 Series

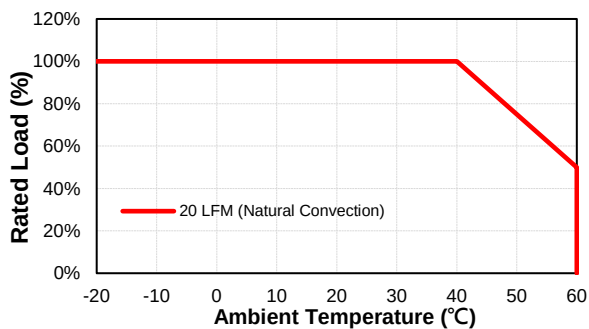
GENERAL SPECIFICATIONS

Electrical Fast Transient (EFT)	IEC 61000-4-4:2012, $\pm 1\text{kV}$	Criterion A
Surge	IEC 61000-4-5 2014+A1:2017, L-N $\pm 0.5\text{kV}$, $\pm 1\text{kV}$	Criterion A
Conducted Disturbances, Induced by RF Fields	IEC 61000-4-6:2013	Criterion A
Power Frequency Magnetic Field	IEC 61000-4-8:2009	Criterion A
Voltage Dips	IEC 61000-4-11:2004+A1:2017, Dips:30% reduction, Dips: >95% Reduction	Criterion A
Voltage Interruptions	IEC 61000-4-11:2004+A1:2017,>95% Reduction	Criterion B
Application Note Link	TRE25 Series App Notes	

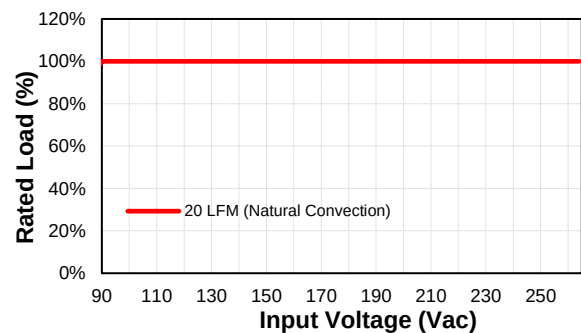
CHARACTERISTIC CURVE

Power Derating Curve

TRE25 Derating Curve

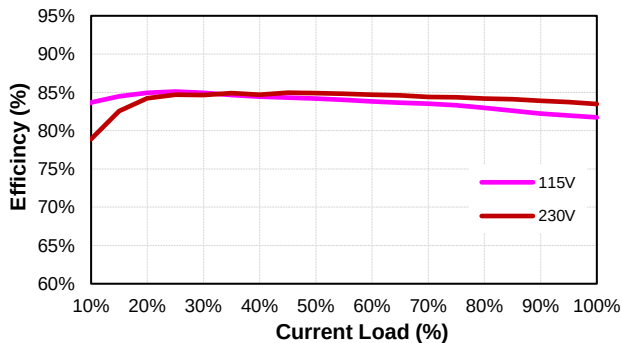


TRE25 Input Voltage Derating Curve

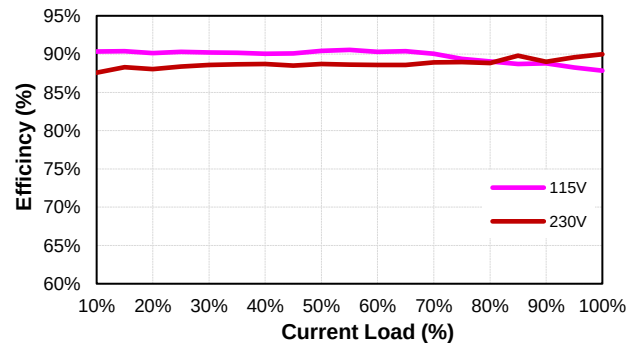


Performance Data

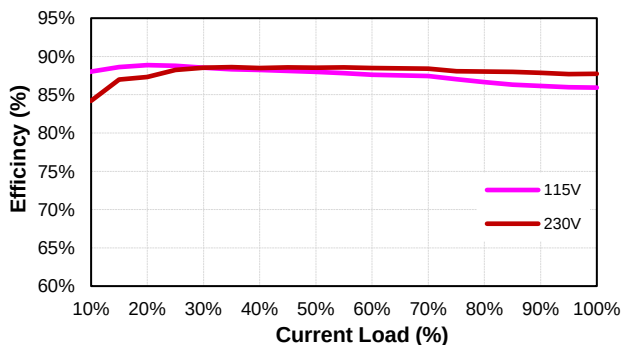
TRE25050 (Eff Vs Io)



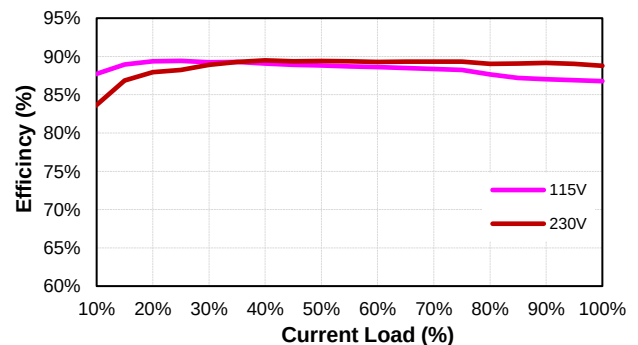
TRE25090 (Eff Vs Io)



TRE25120 (Eff Vs Io)



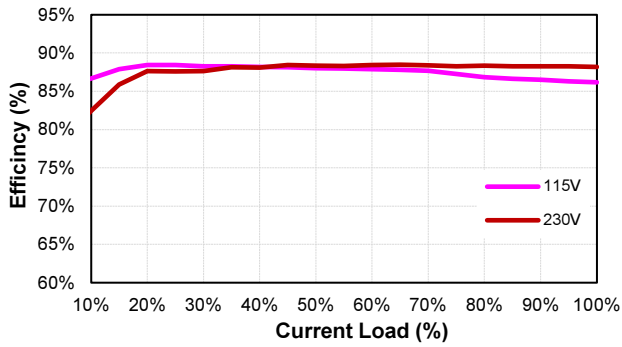
TRE25150 (Eff Vs Io)



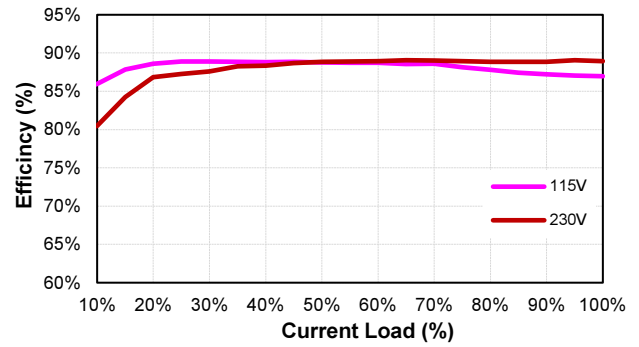


TRE25 Series

TRE25180 (Eff Vs Io)

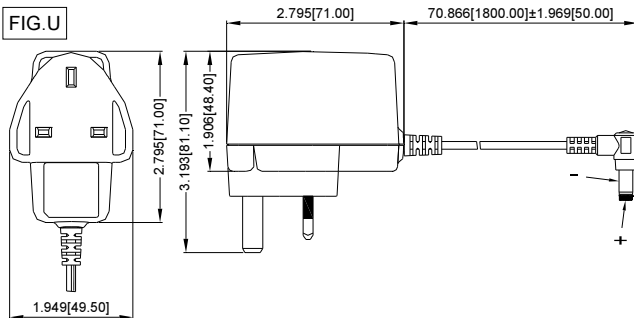
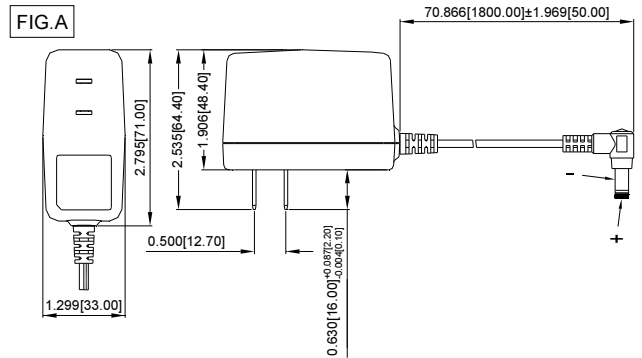
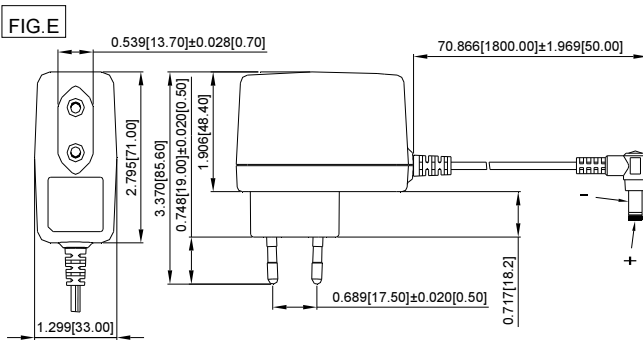


TRE25240 (Eff Vs Io)



MECHANICAL SPECIFICATION

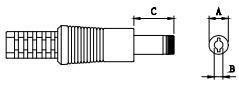
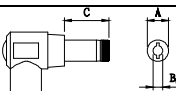
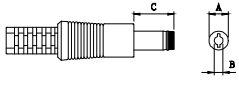
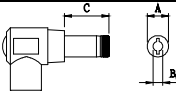
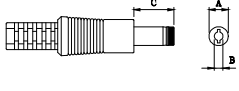
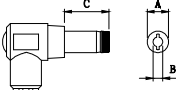
All Dimensions are in inches[mm]
Tolerance: Inches: X.XXX±0.02
Millimeters: X.XX±0.5





TRE25 Series

STANDARD OUTPUT DC 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- + ● -	11G03	Φ5.5	Φ2.1	12	UL1571	1800mm without Core	20AWG for 12V,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- + ● -	11G03	Φ5.5	Φ2.1	12	UL1571	1800mm without Core	18AWG for 9V
	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- + ● -	11G02	Φ5.5	Φ2.1	12	UL1571	1220mm without Core	16AWG for 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			

✕ Other DC Plug Type please refer to the link: <https://www.cincon.com/productdownload/TRE25-cable-DC-plug.pdf>

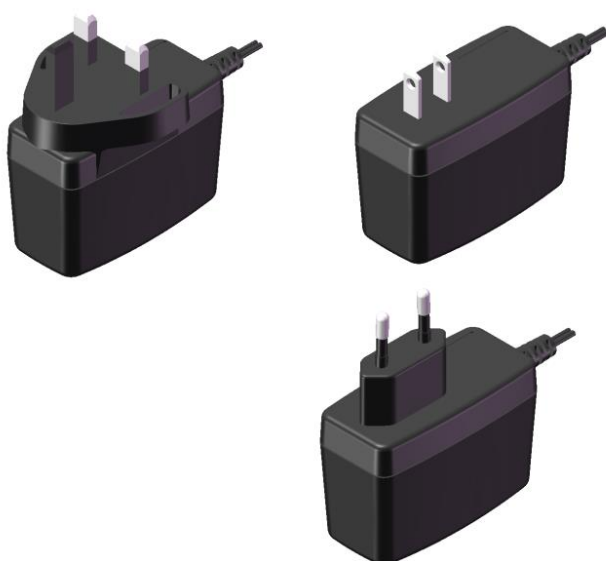
CINCON Electronics Co. Ltd.
 Add: 14F, No. 306, Sec.4, Hsin Yi Rd., Taipei, Taiwan
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 Web: www.cincon.com



TRE25 VI Series

Application Note V11 September 2019

AC-DC Switching ADAPTER TRE25 VI Series APPLICATION NOTE



Approved By:

Department	Approved By	Checked By	Written By
Research and Development Department	Enoch	Calvin/Jeter	Joyce
		Ovid	
Quality Assurance Department	Ryan	Benny	



TRE25 VI Series

Application Note V11 September 2019

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TRE25 VI Series

Application Note V11 September 2019

1. Introduction

This application note describes the features and functions of Cincon's TRE25 VI series of adapter, switching AC-DC power. These are highly efficient, reliable, compact, high power density, single output AC/DC power. The power is fully protected against short circuit and over-voltage conditions. Cincon's world class automated manufacturing methods, together with an extensive testing and qualification program, ensure that the TRE25 VI series power is extremely reliable. is extremely reliable.

- Universal Input: 90~264Vac
- EMI Meets EN55032 Class "B" and CISPR/FCC Class B
- Continuous Short Circuit Protection
- Over Voltage Protection
- No Load Power Consumption<75mW
- Approved IEC/EN/UL62368-1
- Meet CoC V5 Tier 2 & DoE Level VI

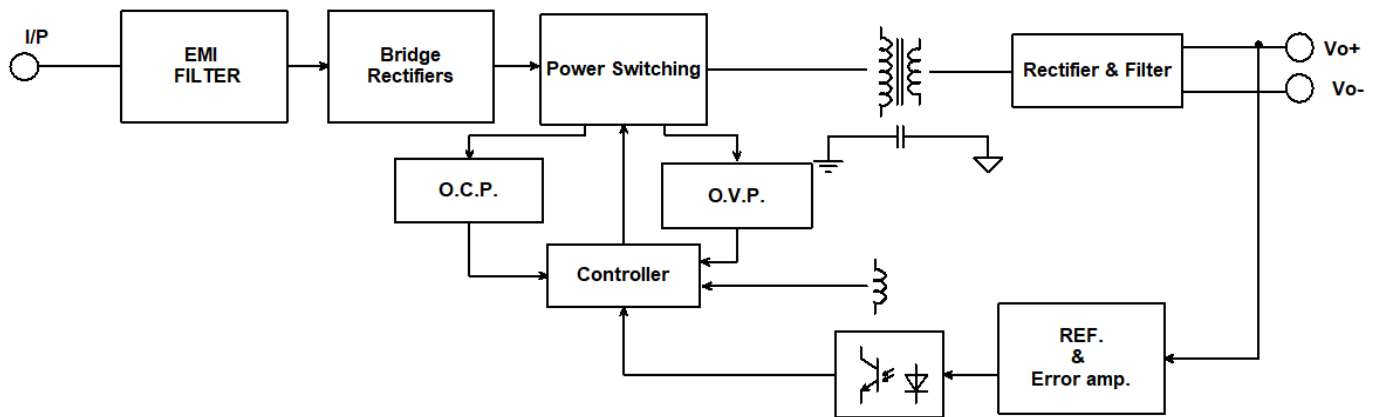
(Output Cable Length $\leq$ 1800mm)

(TRE25050: Output Cable Length $\leq$ 1220mm)

2. TRE25 VI Series Features

- Miniature Size

3. Electrical Block Diagram





TRE25 VI Series

Application Note V11 September 2019

4. 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.	Typical	Max.	Units
Input Voltage (Continuous)		All	90		264	Vac
			120		370	Vdc
Operating Temperature	See derating curve	All	-20		+60	°C
Storage Temperature		All	-20		+85	°C
Input/Output Isolation Voltage		All			3000	Vac
Altitude		All			3000	m

INPUT CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typical	Max.	Units
Operating Voltage Range		All	100		240	Vac
Input Frequency Range		All	47		63	Hz
Input Current	100% Load, Vin=100Vac	All			0.7	A
Leakage Current		All			250	uA
Inrush Current	Vin=240Vac, cold start at 25°C	All			60	A

OUTPUT CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typical	Max.	Units
Output Voltage Set Point	Voltage setpoint at 60% full load. Tc=25°C	TRE25050	4.9	5	5.1	Vdc
		TRE25090	8.82	9	9.18	
		TRE25120	11.76	12	12.24	
		TRE25150	14.7	15	15.3	
		TRE25180	17.64	18	18.36	
		TRE25240	23.52	24	24.48	
Operating Output Current Range		TRE25050			4	A
		TRE25090			2.5	
		TRE25120			2.1	
		TRE25150			1.67	
		TRE25180			1.4	
		TRE25240			1.05	
Holdup Time	Vin=115Vac	All		10		ms
Output Voltage Regulation						
Load Regulation	from 60% to full load and from 60% to 20% load	TRE25050			±6	%
		TRE25090			±5	
		TRE25120			±5	
		TRE25150			±3	
		TRE25180			±2	
		TRE25240			±2	



TRE25 VI Series

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OUTPUT CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typical	Max.	Units
Line Regulation	Vin=high line to low line, full load	All			±1	%
Over Voltage Protection		TRE25050 TRE25090 TRE25120 TRE25150 TRE25180 TRE25240			7.44 13.6 16.2 18.9 23.5 28.8	Vdc
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	TRE25050 TRE25090 TRE25120 TRE25150 TRE25180 TRE25240			50 90 120 150 180 240	mVp-p
Load Capacitance	1. Ambient temperature=25°C 2. Input voltage is 115VAC and 230VAC 3. Output is max. load	TRE25050 TRE25090 TRE25120 TRE25150 TRE25180 TRE25240			4000 2500 2100 1670 1400 1050	uF
Average Efficiency	Average Efficiency measured at 25%,50%,75%,100% load and input voltage is 115Vac/230Vac.	TRE25050 TRE25090 TRE25120 TRE25150 TRE25180 TRE25240	83.7 86.52 87.0 87.0 87.0 87.0			%

ISOLATION CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typical	Max.	Units
Input to Output	1 minute (without dielectric breakdown)	All			3000	Vac
Isolation Resistance		All	100			MΩ

FEATURE CHARACTERISTICS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typical	Max.	Units
Switching Frequency		All		65		KHz



TRE25 VI Series

Application Note V11 September 2019

GENERAL SPECIFICATIONS

PARAMETER	NOTES and CONDITIONS	Device	Min.	Typical	Max.	Units
MTBF	Vin=115Vac, Io=100%; Ta=25°C per MIL-HDBK-217F	All	300			K hours
Weight		All		140		g
Safety	Class II, IEC/EN/UL 62368-1/60950-1					
EMC Emission	EN 55032: 2010/AC: 2011 Class B, EN55032:2015+AC:2016 FCC CFR Title 47 Part 15 Subpart B: 2015 Class B					
EMC Immunity	EN 61204-3, EN 61000-6-3, EN 61000-3-2, EN 61000-3-3, EN 55024, EN 61000-6-1					
Conducted Emission	EN 55032, EN 61000-6-3, EN 61204-3					
Radiated Emission	EN 55032, EN 61000-6-3, EN 61204-3					
Power Harmonics	EN 61000-3-2: 2014					
Voltage Fluctuation and Flicker	EN 61000-3-3: 2013					
Electrostatic Discharge (ESD)	IEC 61000-4-2 Ed. 2.0: 2008					
Radiated Susceptibility	IEC 61000-4-3 Ed. 3.2: 2010					
Electrical Fast Transient/Burst	IEC 61000-4-4 Ed. 3.0: 2012					
Surge	IEC 61000-4-5 Ed. 3.0: 2014					
Conducted Susceptibility	IEC 61000-4-6 Ed. 4.0: 2013					
Power Frequency Magnetic Field	IEC 61000-4-8 Ed. 2.0: 2009					
Voltage Dips and Interruption	IEC 61000-4-11 Ed. 2.0: 2004					



TRE25 VI Series

Application Note V11 September 2019

5. Main Features and Functions

5.1 Operating Temperature Range

The highly efficient design of Cincon's TRE25 VI series power has resulted in their ability to operate within ambient temperature environments from -20°C to 40°C. Due consideration must be given to the de-rating curves when ascertaining the maximum power that can be drawn from the power. The maximum power which can be drawn is influenced by a number of factors, such as:

- Input voltage range
- Permissible Output load (per derating curve)
- Effective heat sinks

5.2 Over Current Protection

All different voltage models have a full continuous short-circuit protection. The unit will auto recover once the short circuit is removed. To provide protection in a fault condition, the unit is equipped with internal over-current protection. The unit operates normally once the fault condition is removed. The power module will supply up to 140-170% of rated current. In the event of an over current converter will go into a hiccup mode protection

6. EMC & Safety

■ Emission and Immunity

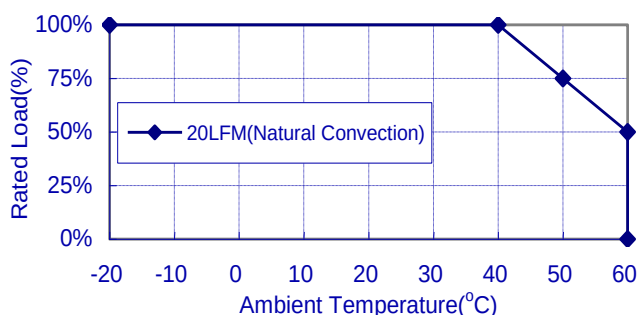
EN55032 Class B, FCC Part 15 Class B
EN61000-6-3, EN61000-3-2, EN61000-3-3
EN55024, EN61204-3, EN61000-6-1

■ Safety

Class II, IEC/EN/UL 62368-1/60950-1

7. Applications

7.1 Power De-Rating Curve



7.2 Test Set-Up

The basic test set-up to measure parameters such as efficiency and load regulation is shown in Figure 1. When testing the Cincon's TRE25 VI series under any transient conditions, please ensure that the transient response of the source is sufficient to power the equipment under test. We can calculate the

- Efficiency
- Load regulation and line regulation.

The value of efficiency is defined as:

$$\eta = \frac{V_o \times I_o}{P_{in}} \times 100\%$$

Where:

V_o is output voltage

I_o is output current

P_{in} is input power

The value of load regulation is defined as:

$$\text{Load reg.} = \frac{V_{FL} - V_{NL}}{V_{NL}} \times 100\%$$

Where:

V_{FL} is the output voltage at full load

V_{NL} is the output voltage at 10% load

The value of line regulation is defined as:

$$\text{Line reg.} = \frac{V_{HL} - V_{LL}}{V_{LL}} \times 100\%$$

Where:

V_{HL} is the output voltage of maximum input voltage at full load.

V_{LL} is the output voltage of minimum input voltage at full load.

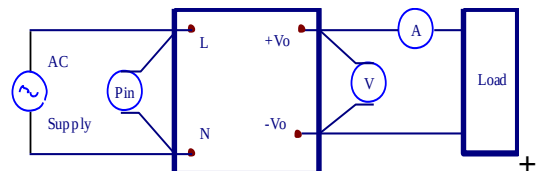


Figure 1 TRE25 VI Series Test Setup



TRE25 VI Series

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7.3 Output Ripple and Noise Measurement

The test set-up for noise and ripple measurements is shown in Figure 2. Measured method:
Add a 0.1 uF ceramic capacitor and a 10 uF electrolytic capacitor to output at 20 MHz Band Width.

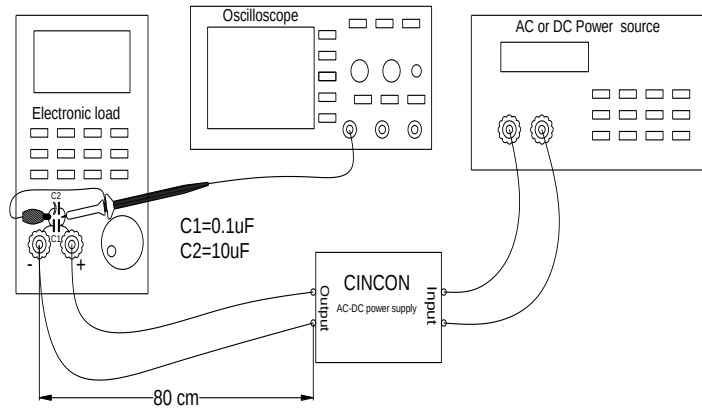
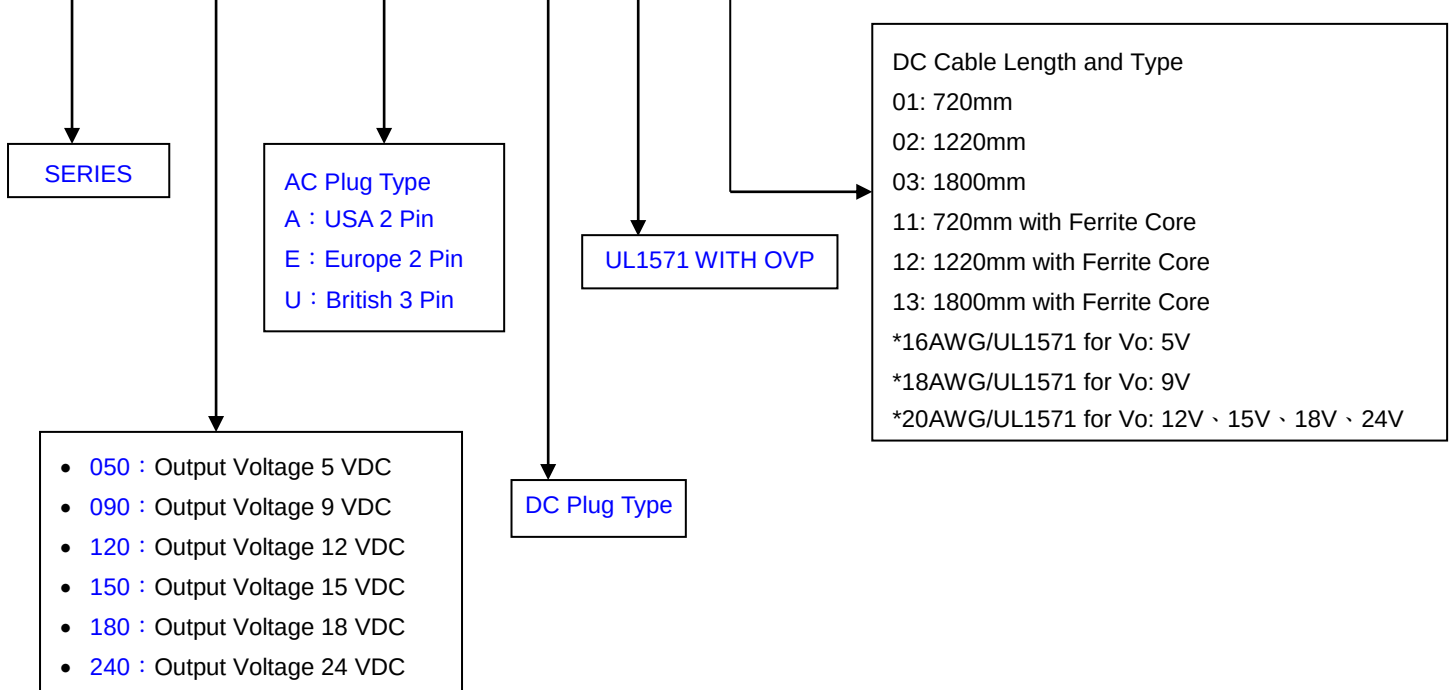


Figure 2 Output Voltage Ripple and Noise Measurement Set-Up

8. Part Number

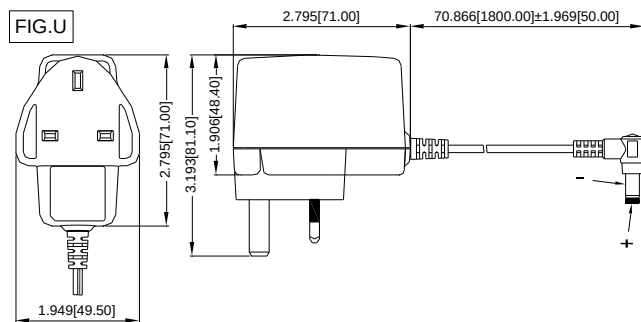
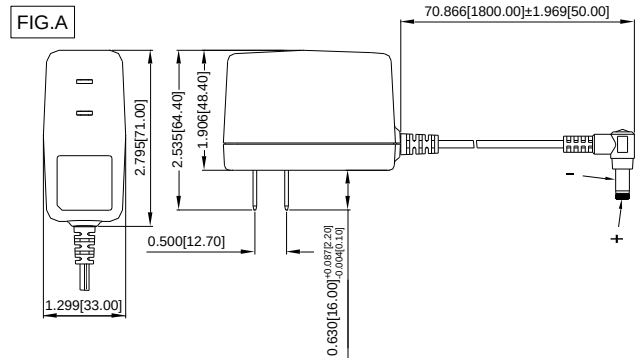
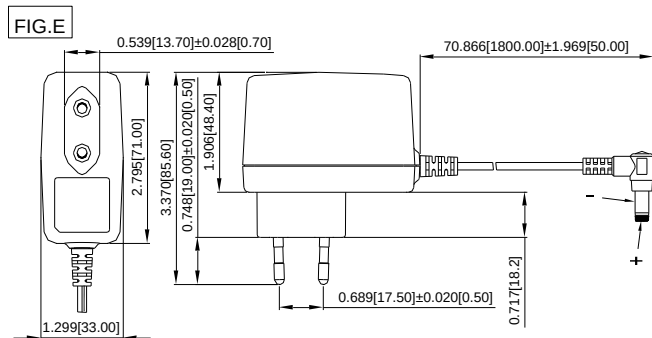
TRE25 XXX - X - XX G XX



9. TRE25 Series Mechanical Outline Diagrams

9.1. Mechanical Outline Diagrams

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



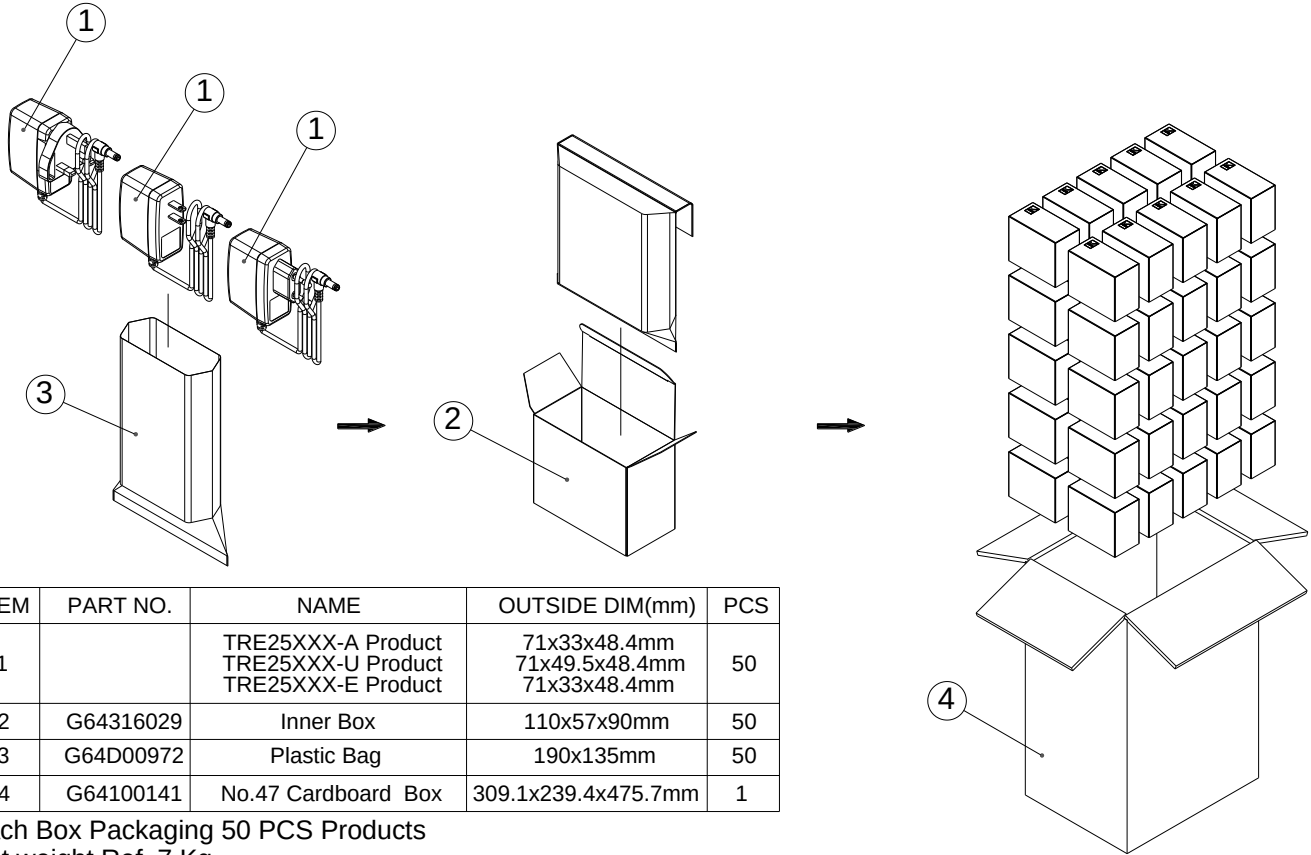


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9.2. Packing Information

The packing information for TRE25 series is showing as follows:



Each Box Packaging 50 PCS Products

Net weight Ref. 7 Kg

Gross weight Ref. 8 Kg

TRE25XXX-A/U/E 50pcs a box, including the total weight of package material about 8Kg

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