



TR100M SERIES 100 WATT MEDICAL SWITCH ADAPTER

Features

- Universal Input Range 90~264Vac
- High Efficiency up to 89%
- Class II
- No Load Input Power Consumption < 300mW
- Approval IEC/EN/UL 60601-1 2 MOPP
- Approval EN55011 and CISPR/FCC Class B
- Operating Altitude 3000m
- Continuous Short Circuit Protection
- Over Voltage Protection



| MODEL NUMBER | OUTPUT VOLTAGE | OUTPUT CURRENT | RIPPLE & NOISE NOTE1 | VOLTAGE ACCURACY NOTE2 | LINE REGULATION NOTE3 | LOAD REGULATION NOTE4 | %EFF. (Typ.) NOTE5 |
|--------------|----------------|----------------|----------------------|------------------------|-----------------------|-----------------------|--------------------|
| TR100M120 | 12 V | 8.34 A | 120mV | ±2% | ±1% | ±4% | 88% |
| TR100M150 | 15 V | 6.67 A | 150mV | ±2% | ±1% | ±3% | 88% |
| TR100M180 | 18 V | 5.56 A | 180mV | ±2% | ±1% | ±2% | 88% |
| TR100M190 | 19 V | 5.27 A | 190mV | ±2% | ±1% | ±2% | 88% |
| TR100M200 | 20 V | 5.0 A | 200mV | ±2% | ±1% | ±2% | 88% |
| TR100M240 | 24 V | 4.17 A | 240mV | ±2% | ±1% | ±2% | 88% |
| TR100M480 | 48 V | 2.1 A | 480mV | ±2% | ±1% | ±2% | 89% |

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 |
|----------------------|---|--------------|---------------------|---|
| TR100M | XXX | -XX | E | XX |
| 100W Medical Adapter | 120 : 12V 150 : 15V 180 : 18V 190 : 19V 200 : 20V 240 : 24V 480 : 48V | See Page 6 | E : UL1185 with OVP | 11 : 720mm with Ferrite Core 12 : 1220mm with Ferrite Core 13 : 1800mm with Ferrite Core See page 6 for restrictions |

Part Number Example:

TR100M120-11E36, 100W, Class II, 12V_{dc} Output, DC Jack Type, Cable Length 1500mm with Ferrite Core



TR100M 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 | | 264 | V _{ac} |
| | | | 120 | | 370 | V _{dc} |
| Operating Temperature | See Derating Curve | All | -20 | | 70 | °C |
| Storage Temperature | | All | -20 | | 85 | °C |
| Input/Output Isolation Voltage | 1 minute | All | | | 4800 | 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 | | | 1.5 | A |
| Leakage Current (Touch) | | All | | | 100 | uA |
| Under Voltage Protection | | All | 65 | | 70 | V _{ac} |
| Power Factor | 230V _{ac} /50Hz @ Full load | All | 0.9 | | | |
| 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 | TR100M120 | 11.76 | 12 | 12.24 | V _{dc} |
| | | TR100M150 | 14.7 | 15 | 15.3 | |
| | | TR100M180 | 17.64 | 18 | 18.36 | |
| | | TR100M190 | 18.62 | 19 | 19.38 | |
| | | TR100M200 | 19.6 | 20 | 20.4 | |
| | | TR100M240 | 23.52 | 24 | 24.48 | |
| | | TR100M480 | 47.04 | 48 | 48.96 | |
| Operating Output Current Range | V _{in} =115V _{ac} and 230V _{ac} , T _c =25°C | TR100M120 | 0 | | 8.34 | A |
| | | TR100M150 | 0 | | 6.67 | |
| | | TR100M180 | 0 | | 5.56 | |
| | | TR100M190 | 0 | | 5.27 | |
| | | TR100M200 | 0 | | 5 | |
| | | TR100M240 | 0 | | 4.17 | |
| | | TR100M480 | 0 | | 2.1 | |
| Holdup Time | V _{in} =115V _{ac} | All | | 16 | | ms |
| Output Voltage Regulation | | | | | | |
| Load Regulation | 60%±40% Full load change | TR100M120 | | | ±4.0 | % |
| | | TR100M150 | | | ±3.0 | |
| | | TR100M180 | | | ±2.0 | |
| | | TR100M190 | | | ±2.0 | |
| | | TR100M200 | | | ±2.0 | |
| | | TR100M240 | | | ±2.0 | |
| | | TR100M480 | | | ±2.0 | |
| Line Regulation | V _{in} =High line to low line, full load | All | | | ±1.0 | % |



TR100M Series

| PARAMETER | NOTES and CONDITIONS | Device | Min. | Typ. | Max. | Units |
|--------------------------|---|-----------|------|------|------|-----------------|
| Over Voltage Protection | TVS Component to clamp | TR100M120 | 14.3 | | 15.8 | V _{dc} |
| | | TR100M150 | 17.1 | | 19.3 | |
| | | TR100M180 | 20.9 | | 23.1 | |
| | | TR100M190 | 20.9 | | 23.1 | |
| | | TR100M200 | 22.8 | | 25.2 | |
| | | TR100M240 | 28.5 | | 31.9 | |
| | | TR100M480 | 53.2 | | 59.2 | |
| Over Current Protection | Auto recovery | All | 160 | | 180 | % |
| 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 | TR100M120 | | | 120 | mV |
| | | TR100M150 | | | 150 | |
| | | TR100M180 | | | 180 | |
| | | TR100M190 | | | 190 | |
| | | TR100M200 | | | 200 | |
| | | TR100M240 | | | 240 | |
| | | TR100M480 | | | 480 | |
| Load Capacitance | 1. V _{in} =115V _{ac} and 230V _{ac} 2. Output is max. load 3. Ambient temperature=25°C | TR100M120 | | | 8400 | uF |
| | | TR100M150 | | | 6600 | |
| | | TR100M180 | | | 5800 | |
| | | TR100M190 | | | 5200 | |
| | | TR100M200 | | | 5100 | |
| | | TR100M240 | | | 4200 | |
| | | TR100M480 | | | 2040 | |
| Efficiency | 1. V _{in} =230V _{ac} 2. Output is 75% full load 3. Ambient temperature=25°C | TR100M120 | | 88 | | % |
| | | TR100M150 | | 88 | | |
| | | TR100M180 | | 88 | | |
| | | TR100M190 | | 88 | | |
| | | TR100M200 | | 88 | | |
| | | TR100M240 | | 88 | | |
| | | TR100M480 | | 89 | | |

ISOLATION CHARACTERISTICS

| PARAMETER | NOTES and CONDITIONS | Device | Min. | Typ. | Max. | Units |
|----------------------|---|--------|------|------|------|-----------------|
| Input to Output | 1 minute (without dielectric breakdown) | All | | | 4800 | V _{ac} |
| Isolation Resistance | Input to output | All | 100 | | | MΩ |

FEATURE CHARACTERISTICS

| PARAMETER | NOTES and CONDITIONS | Device | Min. | Typ. | Max. | Units |
|---------------------|----------------------|--------|------|------|------|-------|
| Switching Frequency | | All | | 70 | | kHz |

GENERAL SPECIFICATIONS

| PARAMETER | NOTES and CONDITIONS | Device | Min. | Typ. | Max. | Units |
|-----------|---|--------|---|------|------|---------|
| MTBF | I _o =100%; T _a =25 °C per MIL-HDBK-217F | All | 150 | | | k hours |
| Humidity | Non-condensing | All | | | 93 | % RH |
| Shock | MIL-STD-810F Table 516.5, TABLE 516.5-I 10ms, each axis 3 times(±X、±Y、±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 | | 485 | | grams |
| Dimension | | All | 5.591x2.283x1.457 inches (142.00x58.00x37.00 mm) | | | |



TR100M Series

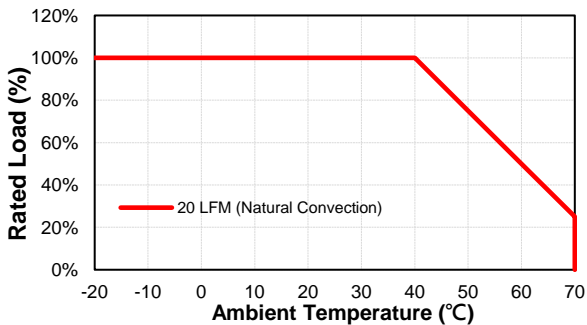
GENERAL SPECIFICATIONS

| | | |
|--|--|-------------|
| Safety | Class II IEC 60601-1:2005 (Third Edition) + CORR. 1:2006 + CORR. 2:2007 + A1:2012 EN 60601-1:2006;A11+A1+A12 ANSI/AAMI ES60601-1 (2005 + C1:09 + A2:10) | Ed 3.1 |
| EMC Emission | EN55011:2009+A1:2010, EN61000-3-2:2014, EN6100-3-3:2013, FCC CFR 47 Part 18 | |
| Conducted Disturbance | EN55011:2009+A1:2010, FCC CFR 47 Part 18 | Class B |
| Radiated Disturbance | EN55011:2009+A1:2010, FCC CFR 47 Part 18 | Class B |
| Harmonic Current Emissions | EN 61000-3-2:2014 | Class A |
| Voltage Fluctuations & Flicker | EN 61000-3-3:2013 | Criterion A |
| EMC Immunity | EN60601-1-2:2015, IEC61000-4-2,3,4,5,6,8,11 | |
| Electrostatic Discharge (ESD) | IEC 61000-4-2:2008 Air Discharge: $\pm 15\text{kV}$ Contact Discharge: $\pm 8\text{kV}$ | Criterion A |
| Radio-Frequency, Continuous Radiated Disturbance | IEC 61000-4-3:2010 | Criterion A |
| Electrical Fast Transient (EFT) | IEC61000-4-4:2012, $\pm 0.5\text{kV}$, $\pm 1\text{kV}$, $\pm 2\text{kV}$ | Criterion A |
| Surge | IEC61000-4-5:2014, 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, Dips:30% reduction, Dips: >95% Reduction, Criteria A | Criterion A |
| Voltage Interruptions | IEC 61000-4-11:2004, >95% Reduction | Criterion B |
| Application Note Link | TR100M Series App Notes | |

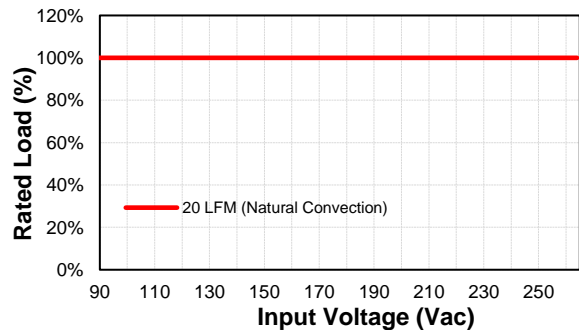
CHARACTERISTIC CURVE

Power Derating Curve

TR100M Derating Curve

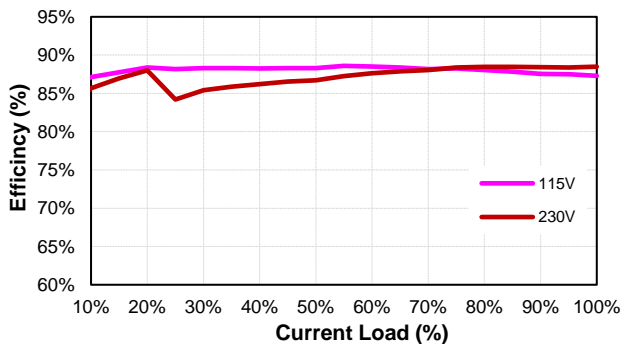


TR100M Input Voltage Derating Curve

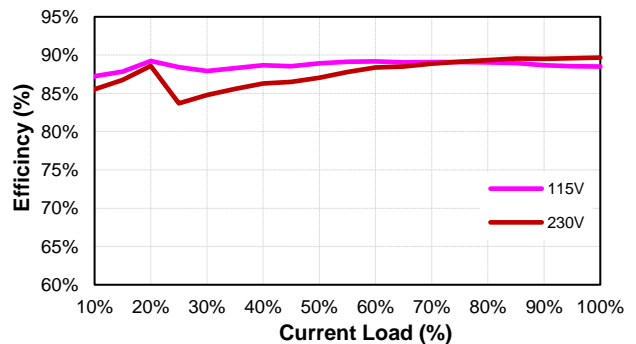


Performance Data

TR100M120 (Eff Vs Io)



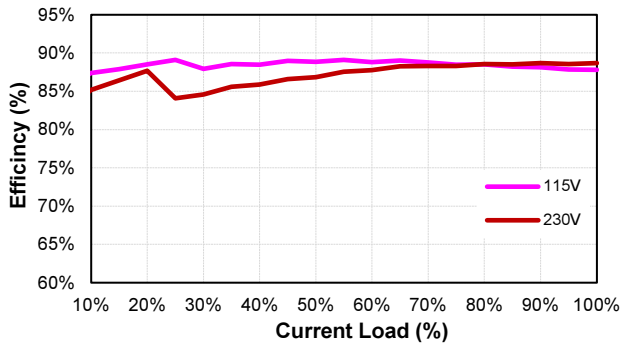
TR100M150 (Eff Vs Io)



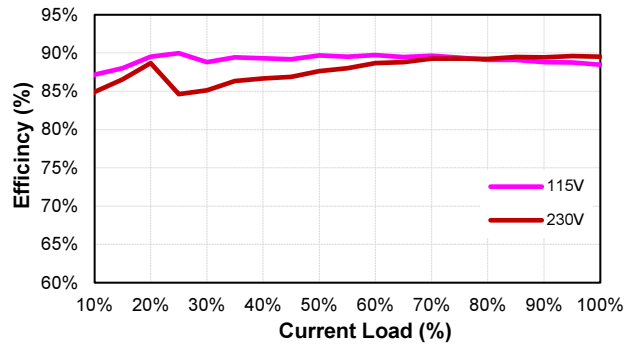


TR100M Series

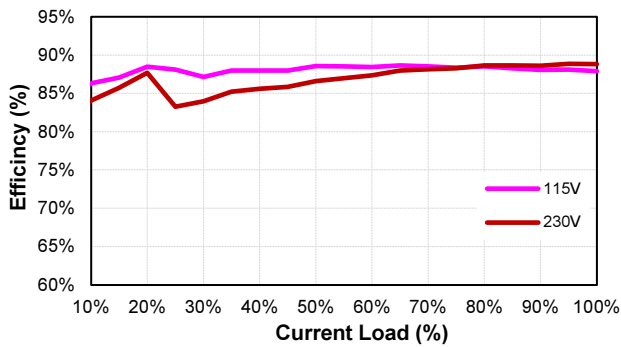
TR100M180 (Eff Vs Io)



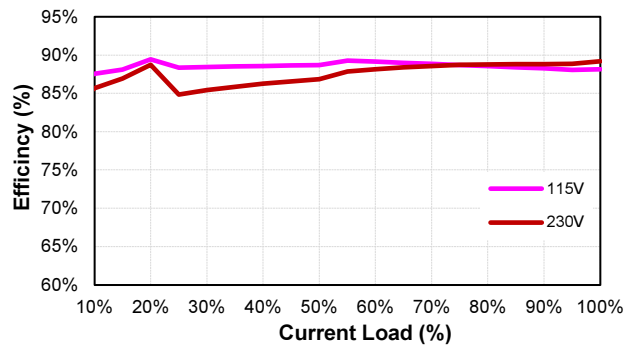
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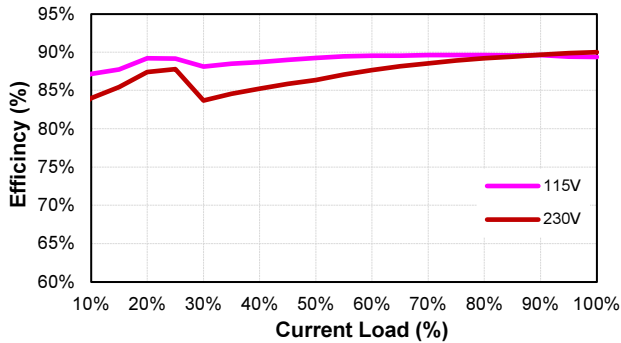
TR100M200 (Eff Vs Io)



TR100M240 (Eff Vs Io)



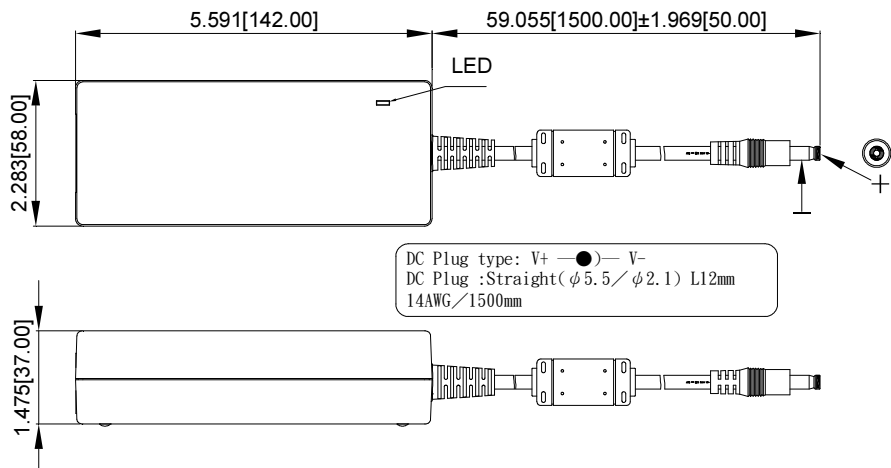
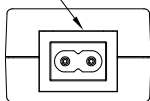
TR100M480 (Eff Vs Io)



MECHANICAL SPECIFICATION

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

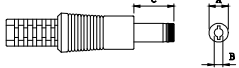
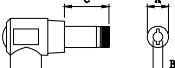
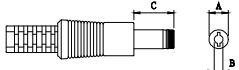
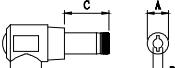
IEC320/C8





TR100M 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- + ● - | 11E36 | Φ5.5 | Φ2.1 | 12 | UL1185 | 1500mm with Ferrite Core | 14AWG for Vo: 12V, 15V |
| | 12E36 | Φ5.5 | Φ2.5 | 12 | | | |
| | 23E36 | Φ5.5 | Φ2.1 | 9.5 | | | |
| | 26E36 | Φ5.5 | Φ2.5 | 9.5 | | | |
|  Right Angle/Inner+Outer- + ●) - | 01E36 | Φ5.5 | Φ2.1 | 12 | | | |
| | 02E36 | Φ5.5 | Φ2.5 | 12 | | | |
| | 21E36 | Φ5.5 | Φ2.5 | 9.5 | | | |
| | 24E36 | Φ5.5 | Φ2.1 | 9.5 | | | |
|  Straight/Inner+Outer- + ● - | 11E13 | Φ5.5 | Φ2.1 | 12 | UL1185 | 1800mm with Ferrite Core | 16AWG for Vo: 18V, 19V, 20V, 24V, 48V |
| | 12E13 | Φ5.5 | Φ2.5 | 12 | | | |
| | 23E13 | Φ5.5 | Φ2.1 | 9.5 | | | |
| | 26E13 | Φ5.5 | Φ2.5 | 9.5 | | | |
|  Right Angle/Inner+Outer- + ●) - | 01E13 | Φ5.5 | Φ2.1 | 12 | | | |
| | 02E13 | Φ5.5 | Φ2.5 | 12 | | | |
| | 21E13 | Φ5.5 | Φ2.5 | 9.5 | | | |
| | 24E13 | Φ5.5 | Φ2.1 | 9.5 | | | |

※Other DC Plug Type please refer to the link: <https://www.cincon.com/productdownload/TR100M-cable-DC-plug.pdf>

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