

## AC/DC Power Supply

## TPI 300-M Series, 300 Watt

- **High power-density: 300 Watt in 4.6"x2.44" package (encased)**
- **I/O isolation 3000 VAC rated for 250 VAC working voltage**
- **Certification according to IEC/EN/UL 62368-1**
- **Peak power operation up to 360 Watt for 5s**
- **Operating temperature -40°C to 80°C**
- **Active power factor correction >0.9**
- **Operating up to 5000m altitude**
- **High efficiency up to 93%**
- **Protection class II prepared**
- **3-year product warranty**



The TPI 300-M series is a set of AC/DC power supplies in an encased package style. They feature a reinforced double I/O isolation (3000 VAC) system according to latest industrial safety standards. The excellent efficiency of up to 93% allows a high power-density and compact design (4.6" x 2.44"). The operating temperature range is -40°C to +80°C with derating above 50°C. In natural convection operation these power supplies deliver 180 Watt going up to 300 Watt with forced air cooling. Additionally, they can deliver 360 Watt peak power for 5s. The EMC characteristic is dedicated for applications in industrial and medical fields. High reliability is provided by using high quality components and an excellent thermal management making the TPI 300-M an ideal solution for industrial and medical devices and for demanding safety and space critical applications.

| Models        |                   |                                  |                     |                     |                 |
|---------------|-------------------|----------------------------------|---------------------|---------------------|-----------------|
| Order Code    | Output Power max. | Output Voltage nom. (adjustable) | Output Current max. | Output Current peak | Efficiency typ. |
| TPI 300-112-M | 300 W             | 12 VDC (10.8 - 13.2 VDC)         | 25'000 mA           | 30'000 mA           | 91 %            |
| TPI 300-115-M |                   | 15 VDC (13.5 - 16.5 VDC)         | 20'000 mA           | 24'000 mA           | 92 %            |
| TPI 300-124-M |                   | 24 VDC (21.6 - 26.4 VDC)         | 12'500 mA           | 15'000 mA           | 93 %            |
| TPI 300-136-M |                   | 36 VDC (32.4 - 39.6 VDC)         | 8'330 mA            | 10'000 mA           | 93 %            |
| TPI 300-148-M |                   | 48 VDC (43.2 - 52.8 VDC)         | 6'250 mA            | 7'500 mA            | 93 %            |
| TPI 300-153-M |                   | 53 VDC (47.7 - 58.3 VDC)         | 5'670 mA            | 6'790 mA            | 93 %            |

| Options                                                    |                                                                                                                                              |
|------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| <b>on demand</b><br>(backorder with MOQ non stocking item) | <ul style="list-style-type: none"> <li>- Optional model with 18 VDC / 16'667 mA</li> <li>- Optional model with 28 VDC / 10'710 mA</li> </ul> |

## Input Specifications

|                        |                                  |                                                                                                                                                                |
|------------------------|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Input Voltage          | - AC Range                       | Operational Range: <b>85 - 264 VAC</b> (Full Range)                                                                                                            |
|                        | - DC Range                       | Rated Range: <b>100 - 240 VAC</b> (Full Range)<br>Operational Range: <b>120 - 370 VDC</b> (Designed for, no certification)<br>Polarity: <b>+DC: L / -DC: N</b> |
| Input Frequency        |                                  | <b>47 - 63 Hz</b>                                                                                                                                              |
| Input Current          | - Full Load & $V_{in} = 230$ VAC | <b>1'600 mA max.</b>                                                                                                                                           |
|                        | - Full Load & $V_{in} = 115$ VAC | <b>3'900 mA max.</b>                                                                                                                                           |
| Power Consumption      | - At no load                     | <b>3'000 mW typ.</b>                                                                                                                                           |
| Input Inrush Current   | - At 230 VAC                     | <b>70 A max.</b>                                                                                                                                               |
|                        | - At 115 VAC                     | <b>40 A max.</b>                                                                                                                                               |
| Power Factor           | - At 230 VAC                     | <b>0.9 min.</b> (Active Power Factor Correction)                                                                                                               |
|                        | - At 115 VAC                     | <b>0.9 min.</b> (Active Power Factor Correction)                                                                                                               |
| Input Protection       |                                  | <b>T 5 A / 250 VAC</b> (Internal Fuse in L & N)                                                                                                                |
| Recommended Input Fuse |                                  | <b>5'000 mA</b> (slow blow)<br>(The need of an external fuse has to be assessed in the final application.)                                                     |

## Output Specifications

|                                        |                                           |                                                                                                                                                                        |
|----------------------------------------|-------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Output Voltage Adjustment              |                                           | <b>±10%</b> (By trim potentiometer)<br>Output power must not exceed rated power!                                                                                       |
| Voltage Set Accuracy                   |                                           | <b>±1% max.</b>                                                                                                                                                        |
| Regulation                             | - Input Variation ( $V_{min} - V_{max}$ ) | <b>0.2% max.</b>                                                                                                                                                       |
|                                        | - Load Variation (0 - 100%)               | <b>0.5% max.</b>                                                                                                                                                       |
| Boost Power                            |                                           | Output Current peak: See model table<br>Peak power time: <b>5 s max.</b><br>Peak power duty cycle: <b>20% max.</b><br>Average operation power: <b>50% of full load</b> |
| Ripple and Noise<br>(20 MHz Bandwidth) | 12 VDC model:                             | <b>150 mVp-p max.</b> (w/ 1 $\mu$ F X7R)                                                                                                                               |
|                                        | 15 VDC model:                             | <b>180 mVp-p max.</b> (w/ 1 $\mu$ F X7R)                                                                                                                               |
|                                        | 18 VDC model:                             | <b>210 mVp-p max.</b> (w/ 1 $\mu$ F X7R)                                                                                                                               |
|                                        | 24 VDC model:                             | <b>270 mVp-p max.</b> (w/ 1 $\mu$ F X7R)                                                                                                                               |
|                                        | 28 VDC model:                             | <b>310 mVp-p max.</b> (w/ 1 $\mu$ F X7R)                                                                                                                               |
|                                        | 36 VDC model:                             | <b>390 mVp-p max.</b> (w/ 1 $\mu$ F X7R)                                                                                                                               |
|                                        | 48 VDC model:                             | <b>510 mVp-p max.</b> (w/ 1 $\mu$ F X7R)                                                                                                                               |
|                                        | 53 VDC model:                             | <b>540 mVp-p max.</b> (w/ 1 $\mu$ F X7R)                                                                                                                               |
| Capacitive Load                        | 12 VDC model:                             | <b>20'000 <math>\mu</math>F max.</b>                                                                                                                                   |
|                                        | 15 VDC model:                             | <b>12'000 <math>\mu</math>F max.</b>                                                                                                                                   |
|                                        | 18 VDC model:                             | <b>9'000 <math>\mu</math>F max.</b>                                                                                                                                    |
|                                        | 24 VDC model:                             | <b>2'400 <math>\mu</math>F max.</b>                                                                                                                                    |
|                                        | 28 VDC model:                             | <b>2'000 <math>\mu</math>F max.</b>                                                                                                                                    |
|                                        | 36 VDC model:                             | <b>1'000 <math>\mu</math>F max.</b>                                                                                                                                    |
|                                        | 48 VDC model:                             | <b>650 <math>\mu</math>F max.</b>                                                                                                                                      |
|                                        | 53 VDC model:                             | <b>470 <math>\mu</math>F max.</b>                                                                                                                                      |
| Minimum Load                           |                                           | <b>Not required</b>                                                                                                                                                    |
| Temperature Coefficient                |                                           | <b>±0.02 %/K max.</b>                                                                                                                                                  |
| Hold-up Time                           | - At 230 VAC                              | <b>5 ms min.</b>                                                                                                                                                       |
|                                        | - At 115 VAC                              | <b>5 ms min.</b>                                                                                                                                                       |
| Start-up Time                          | - At 230 VAC                              | <b>2'000 ms max.</b>                                                                                                                                                   |
|                                        | - At 115 VAC                              | <b>2'000 ms max.</b>                                                                                                                                                   |
| Short Circuit Protection               |                                           | <b>Continuous, Automatic recovery</b>                                                                                                                                  |
| Output Current Limitation              |                                           | <b>135 - 165% of <math>I_{out}</math> max.</b>                                                                                                                         |
|                                        |                                           | <b>150% typ. of <math>I_{out}</math> max.</b>                                                                                                                          |
| Overvoltage Protection                 |                                           | <b>115 - 135% of <math>V_{out}</math> nom.</b><br>(Latch off)                                                                                                          |

All specifications valid at nominal voltage, resistive full load and +25°C after warm-up time, unless otherwise stated.

|                    |                                         |                                                                                      |
|--------------------|-----------------------------------------|--------------------------------------------------------------------------------------|
| Transient Response | - Response Deviation<br>- Response Time | 3% typ. / 10% max. (50% to 75% Load Step)<br>600 $\mu$ s typ. (50% to 75% Load Step) |
|--------------------|-----------------------------------------|--------------------------------------------------------------------------------------|

## Safety Specifications

|                       |                                                              |                                                                                                                                           |
|-----------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| Safety Standards      | - IT / Multimedia Equipment<br><br>- Certification Documents | EN 62368-1<br>IEC 62368-1<br>UL 62368-1<br><a href="http://www.tracopower.com/overview/tpi300-m">www.tracopower.com/overview/tpi300-m</a> |
| Protection Class      |                                                              | Class I & II (Prepared): Reinforced Insulation                                                                                            |
| Pollution Degree      |                                                              | PD 2                                                                                                                                      |
| Over Voltage Category |                                                              | OVC II                                                                                                                                    |

## EMC Specifications

|               |                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EMI Emissions | - Conducted Emissions<br><br>- Radiated Emissions<br><br>- Harmonic Current Emissions<br>- Voltage Fluctuations & Flicker                                                        | EN 55032 class B (internal filter)<br>FCC Part 15 class B (internal filter)<br>EN 55032 class A (internal filter)<br>FCC Part 15 class A (internal filter)<br>EN 61000-3-2, class A<br>EN 61000-3-3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| EMS Immunity  | - Electrostatic Discharge<br><br>- RF Electromagnetic Field<br>- EFT (Burst) / Surge<br><br>- Conducted RF Disturbances<br>- PF Magnetic Field<br>- Voltage Dips & Interruptions | EN 55024 (IT Equipment)<br>EN 60601-1-2 edition 4 (Medical Devices)<br>Air: EN 61000-4-2, $\pm 15$ kV, perf. criteria A<br>Contact: EN 61000-4-2, $\pm 8$ kV, perf. criteria A<br>EN 61000-4-3, 20 V/m, perf. criteria A<br>EN 61000-4-4, $\pm 2$ kV, perf. criteria A<br>L to L: EN 61000-4-5, $\pm 1$ kV, perf. criteria A<br>L to PE: EN 61000-4-5, $\pm 2$ kV, perf. criteria A<br>EN 61000-4-6, 20 Vrms, perf. criteria A<br>Continuous: EN 61000-4-8, 30 A/m, perf. criteria A<br>230 VAC / 50 Hz: EN 61000-4-11<br>30%, 25 periods, perf. criteria A<br>>95%, 0.5 periods, perf. criteria A<br>>95%, 250 periods, perf. criteria B<br>115 VAC / 60 Hz: EN 61000-4-11<br>30%, 25 periods, perf. criteria A<br>>95%, 0.5 periods, perf. criteria A<br>>95%, 250 periods, perf. criteria B |

## General Specifications

|                                        |                                                          |                                                                                                                                                                                                                             |
|----------------------------------------|----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Relative Humidity                      |                                                          | 95% max. (non condensing)                                                                                                                                                                                                   |
| Temperature Ranges                     | - Operating Temperature<br>- Storage Temperature         | -40°C to +80°C<br>-40°C to +80°C                                                                                                                                                                                            |
| Power Derating                         | - High Temperature<br>- Low Input Voltage                | See application note: <a href="http://www.tracopower.com/overview/tpi300-m">www.tracopower.com/overview/tpi300-m</a><br>2 %/V below 100 VAC                                                                                 |
| Over Temperature Protection Switch Off | - Protection Mode<br><br>- Measurement Point             | 118°C min. / 125°C typ. / 132°C max.<br>(Automatic recovery at 112°C typ.)<br>See application note: <a href="http://www.tracopower.com/overview/tpi300-m">www.tracopower.com/overview/tpi300-m</a><br>(Internal Thermistor) |
| Cooling System                         |                                                          | Forced air cooling (with internal fan)                                                                                                                                                                                      |
| Fan Power Source                       | - Characteristic<br>- Output Voltage<br>- Output Current | Variable fan speed (temperature regulated)<br>12 VDC<br>500 mA max.                                                                                                                                                         |
| Standby Power Source                   | - Output Voltage<br>- Output Current                     | 5 VDC<br>1000 mA max.<br>(Fan Power Source and Standby Power Source total power must not exceed 8 W.)                                                                                                                       |

All specifications valid at nominal voltage, resistive full load and +25°C after warm-up time, unless otherwise stated.

|                                      |                              |                                                                                                                                                                                                                                                            |
|--------------------------------------|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Remote Control                       | - Voltage Controlled Remote  | On: 3.0 to 12 VDC or open circuit<br>Off: 0 to 1.2 VDC or short circuit<br>Refers to '+Remote' and '-Remote' Pin                                                                                                                                           |
|                                      | - Off Idle Input Current     | 16 mA typ. / 25 mA max. (excl. Standby power source and Fan power source)                                                                                                                                                                                  |
|                                      | - Remote Pin Input Current   | -0.5 to 1.0 mA<br>(Standby power source and Fan power source are always present)                                                                                                                                                                           |
|                                      |                              |                                                                                                                                                                                                                                                            |
| Altitude During Operation            |                              | 5'000 m max.                                                                                                                                                                                                                                               |
| Switching Frequency                  |                              | 100 - 180 kHz (PWM)<br>140 kHz typ. (PWM)                                                                                                                                                                                                                  |
| Insulation System                    |                              | Reinforced Insulation                                                                                                                                                                                                                                      |
| Working Voltage (rated)              |                              | 250 VAC                                                                                                                                                                                                                                                    |
| Isolation Test Voltage               | - Input to Output, 60 s      | 3'000 VAC                                                                                                                                                                                                                                                  |
|                                      | - Input to Case or PE, 60 s  | 2'000 VAC                                                                                                                                                                                                                                                  |
|                                      | - Output to Case or PE, 60 s | 2'000 VAC                                                                                                                                                                                                                                                  |
|                                      |                              |                                                                                                                                                                                                                                                            |
| Creepage                             | - Input to Output            | 13.6 mm min.                                                                                                                                                                                                                                               |
|                                      | - Input to Case or PE        | 5 mm min.                                                                                                                                                                                                                                                  |
|                                      | - Output to Case or PE       | 4.2 mm min.                                                                                                                                                                                                                                                |
|                                      |                              |                                                                                                                                                                                                                                                            |
| Clearance                            | - Input to Output            | 9.7 mm min.                                                                                                                                                                                                                                                |
|                                      | - Input to Case or PE        | 5 mm min.                                                                                                                                                                                                                                                  |
|                                      | - Output to Case or PE       | 4.2 mm min.                                                                                                                                                                                                                                                |
|                                      |                              |                                                                                                                                                                                                                                                            |
| Isolation Resistance                 |                              | 100 MΩ min.                                                                                                                                                                                                                                                |
| Isolation Capacitance                |                              | 1'250 pF typ. / 1'500 pF max.                                                                                                                                                                                                                              |
| Leakage Current<br>(264 VAC / 63 Hz) |                              | 300 μA max.                                                                                                                                                                                                                                                |
| Reliability                          |                              | 1'056'000 h (MIL-HDBK-217F, ground benign)                                                                                                                                                                                                                 |
| Environment                          | - Vibration                  | IEC 60068-2-6<br>5 g, 3 axis, sine sweep, 3x30 min, 5-500 Hz                                                                                                                                                                                               |
|                                      | - Mechanical Shock           | IEC 60068-2-27<br>50 g, 3 axis, half sine, 11 ms                                                                                                                                                                                                           |
|                                      | - Thermal Shock              | MIL-STD-810F                                                                                                                                                                                                                                               |
|                                      |                              |                                                                                                                                                                                                                                                            |
| Housing Material                     |                              | Aluminum                                                                                                                                                                                                                                                   |
| Housing Type                         |                              | Metal Case                                                                                                                                                                                                                                                 |
| Mounting Type                        |                              | Chassis Mount                                                                                                                                                                                                                                              |
| Connection Type                      |                              | Pin Connector                                                                                                                                                                                                                                              |
| Weight                               |                              | 318 g                                                                                                                                                                                                                                                      |
| Power OK Signal                      | Open collector output        |                                                                                                                                                                                                                                                            |
|                                      | - Trigger Threshold          | 12 VDC model: 10 - 10.8 VDC<br>15 VDC model: 12.5 - 13.5 VDC<br>18 VDC model: 15.3 - 16.2 VDC<br>24 VDC model: 20 - 21.6 VDC<br>28 VDC model: 24 - 25.2 VDC<br>36 VDC model: 31 - 32.4 VDC<br>48 VDC model: 41.5 - 43.2 VDC<br>53 VDC model: 46 - 47.7 VDC |
|                                      | - Power OK                   | Low level                                                                                                                                                                                                                                                  |
|                                      | - Power Off                  | High resistance<br>(Refers to 'PG' and '-Vout' Pin)                                                                                                                                                                                                        |
|                                      | - Pin Specifications         | 50 VDC / 50 mA max.                                                                                                                                                                                                                                        |
|                                      |                              |                                                                                                                                                                                                                                                            |
|                                      |                              |                                                                                                                                                                                                                                                            |
|                                      |                              |                                                                                                                                                                                                                                                            |
|                                      |                              |                                                                                                                                                                                                                                                            |
|                                      |                              |                                                                                                                                                                                                                                                            |
|                                      |                              |                                                                                                                                                                                                                                                            |
| Sense Function                       |                              | 10% max. of Vout nom.<br>(If sense function is not used, sense pins should be connected to output pins.)                                                                                                                                                   |

All specifications valid at nominal voltage, resistive full load and +25°C after warm-up time, unless otherwise stated.

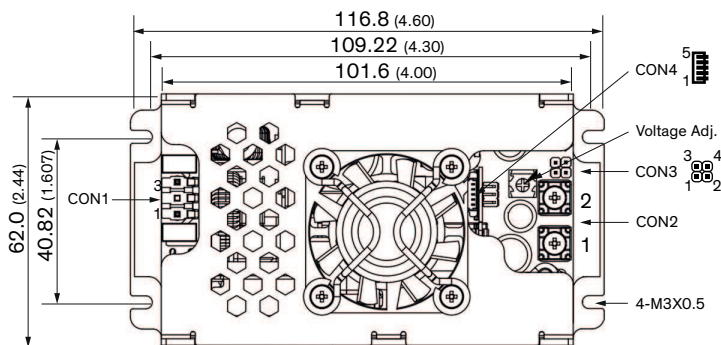
|                          |                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|--------------------------|---------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Environmental Compliance | - REACH Declaration | <a href="http://www.tracopower.com/info/reach-declaration.pdf">www.tracopower.com/info/reach-declaration.pdf</a><br>REACH SVHC list compliant<br>REACH Annex XVII compliant<br><a href="http://www.tracopower.com/info/rohs-declaration.pdf">www.tracopower.com/info/rohs-declaration.pdf</a><br>Exemptions: 7a, 7c-I<br>(RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule).<br>The SCIP number is provided on request.) |
|                          | - RoHS Declaration  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |

**Supporting Documents**

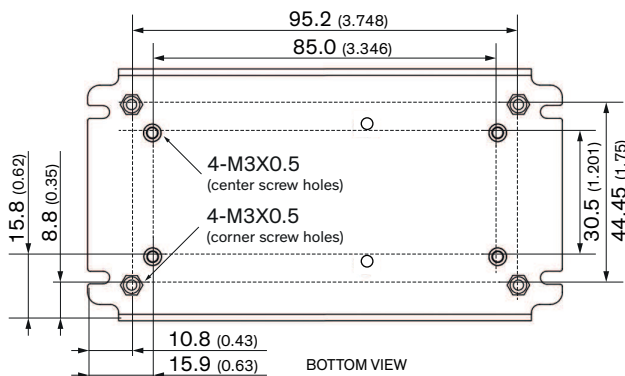
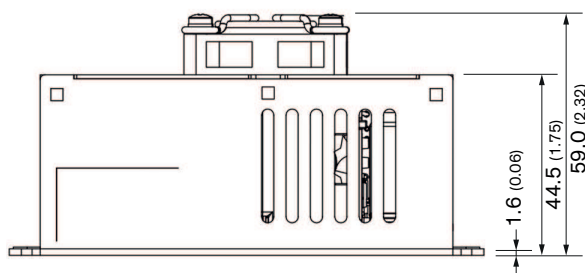
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|------------------------------------------|------------------------------------------------------------------------------------------------|
| Overview Link (for additional Documents) | <a href="http://www.tracopower.com/overview/tpi300-m">www.tracopower.com/overview/tpi300-m</a> |
|------------------------------------------|------------------------------------------------------------------------------------------------|

All specifications valid at nominal voltage, resistive full load and +25°C after warm-up time, unless otherwise stated.

## Outline Dimensions



TOP VIEW



BOTTOM VIEW

All dimensions in mm (inch)

Tolerance: X.X  $\pm 0.5$  ( $\pm$ X.XX 0.02)

X.XX  $\pm 0.25$  ( $\pm$ 0.01)

Max. screw penetration depth: 3.3 (0.130)

Setup screw locked torque: max. 2.5 kgfcm / 0.25 Nm

CON2 screw locked torque: max. 16.8 kgfcm / 1.65 Nm  
wires 24 - 14 AWG

| Input |                 |
|-------|-----------------|
| CON1  |                 |
| Pin   | Function        |
| 1     | AC (L) / DC (+) |
| 3     | AC (N) / DC (-) |

| Output |          |
|--------|----------|
| CON2   |          |
| Pin    | Function |
| 1      | + Vout   |
| 2      | - Vout   |

| Auxiliary |          |
|-----------|----------|
| CON3      |          |
| Pin       | Function |
| 1         | + Fan    |
| 2         | - Fan    |
| 3         | + Sense  |
| 4         | - Sense  |

| Auxiliary |           |
|-----------|-----------|
| CON4      |           |
| Pin       | Function  |
| 1         | + Standby |
| 2         | - Standby |
| 3         | PG        |
| 4         | - Remote  |
| 5         | + Remote  |

**CON1:** Molex Housing 09-50-8031  
Molex Crimp Terminals 08500106 (2478),  
08520112 (6838),  
45570

**CON2:** KST Ring Terminal RVS2-3.7

**CON3:** Molex Housing 90143-0004  
Molex Crimp Terminals 90119

**CON4:** Molex Housing 51021-0500  
Molex Crimp Terminals 50058, 50078