

- Encased 150 W power supply with screw connection 2.44" x 4.6" package
- Certification according to IEC/EN/ES 60601-1 3rd edition for 2 x MOPP
- Low leakage current <100 µA rated for BF applications
- Risk management process according to ISO 14971 incl. risk management file
- Acceptance criteria for electronic assemblies acc. to IPC-A-610 Level 3
- Active power factor correction >0.95
- Protection class I and II prepared
- Operating up to 5000 m altitude
- Ready to meet ErP directive, <0.3 W no load power consumption
- 5-year product warranty



The TPP 150 series of 150 Watt AC/DC encased power supplies feature a reinforced double I/O isolation system according to latest medical safety standards (60601-1 3rd edition, 2 x MOPP). The earth leakage current is below 100 µA which makes the units suitable for BF (body floating) applications. The excellent efficiency of up to 92% allows a high power density for the standard 2.44" x 4.6" packaging format. The full load operating temperature range is -25°C to +70°C while it goes up to 80°C with 40% load derating. The EMC characteristic is dedicated for applications in industrial and domestic medical fields. High reliability is provided by the use of industrial quality grade components and an excellent thermal management. It makes the products an ideal solution for medical devices and for demanding safety and space critical applications.

Models				
Order Code	Output Power max.	Output Voltage nom. (adjustable)	Output Current max.	Efficiency typ.
TPP 150-112	150 W	12 VDC (10.8 - 13.2 VDC)	12'500 mA	91 %
TPP 150-115		15 VDC (13.5 - 16.5 VDC)	10'000 mA	92 %
TPP 150-124		24 VDC (21.6 - 26.4 VDC)	6'250 mA	92 %
TPP 150-128		28 VDC (25.2 - 30.8 VDC)	5'360 mA	92 %
TPP 150-136		36 VDC (32.4 - 39.6 VDC)	4'170 mA	92 %
TPP 150-148		48 VDC (43.2 - 52.8 VDC)	3'130 mA	92 %

### Input Specifications

Input Voltage	- AC Range	85 - 264 VAC (Full Range)
	- DC Range	120 - 370 VDC (designed for, no certification)
Input Frequency		47 - 63 Hz
Input Current	- Full Load & Vin = 230 VAC	800 mA max.
	- Full Load & Vin = 115 VAC	1'700 mA max.
Power Consumption	- at no Load	1'000 mW max.
Input Inrush Current	- at 230 VAC	60 A max.
Power Factor	- at 230 VAC	0.95 min. (Active Power Factor Correction)
	- at 115 VAC	0.95 min. (Active Power Factor Correction)
Input Protection		T 3.15 A / 250 VAC (Internal Fuse in L & N)

### Output Specifications

Output Voltage Adjustment		±10% (By trim potentiometer) Output power must not exceed rated power!
Voltage Set Accuracy		±1% max.
Regulation	- Input Variation (Vmin - Vmax)	0.2% max.
	- Load Variation (0 - 100%)	0.5% max.
Ripple and Noise (20 MHz Bandwidth)	12 VDC model:	120 mVp-p typ. (with 1 µF X7R)
	15 VDC model:	150 mVp-p typ. (with 1 µF X7R)
	24 VDC model:	220 mVp-p typ. (with 1 µF X7R)
	28 VDC model:	220 mVp-p typ. (with 1 µF X7R)
	36 VDC model:	250 mVp-p typ. (with 1 µF X7R)
	48 VDC model:	250 mVp-p typ. (with 0.1 µF X7R)
Capacitive Load	12 VDC model:	10'400 µF max.
	15 VDC model:	6'600 µF max.
	24 VDC model:	2'600 µF max.
	28 VDC model:	1'900 µF max.
	36 VDC model:	1'150 µF max.
	48 VDC model:	650 µF max.
Minimum Load		not required
Temperature Coefficient		±0.02 %/K max.
Hold-up Time	- at 230 VAC	16 ms min.
	- at 115 VAC	16 ms min.
Start-up Time	- at 230 VAC	1'000 ms max.
	- at 115 VAC	1'000 ms max.
Output Current Limitation		115 - 150% of Iout max.
Short Circuit Protection		Continuous, automatic recovery
Overvoltage Protection		115 - 135% of Vout nom.
Transient Response	- Response Deviation	3% max. (50% to 75% Load Step)
	- Response Time	500 µs typ. (50% to 75% Load Step)

### Safety Specifications

Safety Standards	- IT / Multimedia Equipment	UL 60950-1
	- Medical Equipment	EN 60601-1 IEC 60601-1 ANSI/AAMI ES 60601-1
		2 x MOPP (Means Of Patient Protection)
	- Certification Documents	<a href="http://www.tracopower.com/overview/tp150">www.tracopower.com/overview/tp150</a>
Protection Class		Class I Prepared: Connection to PE Class II Prepared: Reinforced Insulation
Pollution Degree		PD 2: Office or Laboratory Environments
Over Voltage Category		OVC II

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

## EMC Specifications

<b>EMC Emissions</b>		EN 60601-1-2 edition 4 (Medical Devices)
- Conducted Emissions		EN 55011 class B (internal filter) EN 55032 class B (internal filter) FCC Part 15, class B FCC Part 18, class B
- Radiated Emissions		EN 55011 class A (internal filter) EN 55032 class A (internal filter) FCC Part 15, class A FCC Part 18, class A
- Harmonic Current Emissions		EN 61000-3-2, class A EN 61000-3-2, class D
- Voltage Fluctuations & Flicker		EN 61000-3-3
<b>EMC Immunity</b>		EN 55024 (IT Equipment)
- Electrostatic Discharge		EN 60601-1-2 edition 4 (Medical Devices)
- RF Electromagnetic Field	Air:	EN 61000-4-2, $\pm 15$ kV, perf. criteria A
- EFT (Burst)	Contact:	EN 61000-4-2, $\pm 8$ kV, perf. criteria A EN 61000-4-3, 20 V/m, perf. criteria A EN 61000-4-4, $\pm 2$ kV, perf. criteria A
- Surge	L to L:	EN 61000-4-5, $\pm 1$ kV, perf. criteria A
- Conducted RF Disturbances	L to PE:	EN 61000-4-5, $\pm 2$ kV, perf. criteria A EN 61000-4-6, 20 Vrms, perf. criteria A EN 61000-4-8, 10 A/m, perf. criteria A
- PF Magnetic Field	230 VAC / 50 Hz:	EN 61000-4-11
- Voltage Dips & Interruptions		30%, 25 periods, perf. criteria A 60%, 5 periods, perf. criteria A >95%, 0.5 periods, perf. criteria A >95%, 250 periods, perf. criteria B

## General Specifications

Relative Humidity		95% max. (non condensing)
Temperature Ranges	- Operating Temperature	-25°C to +80°C
	- Storage Temperature	-40°C to +75°C
Power Derating	- High Temperature	see application note <a href="http://www.tracopower.com/overview/tpp150">www.tracopower.com/overview/tpp150</a>
	- Low Input Voltage	1.33 %/V below 100 VAC
Cooling System		Forced air cooling (with internal fan)
Fan Power Source	- Characteristic	Variable fan speed (temperature regulated)
	- Output Voltage	12 VDC
	- Output Current	500 mA max.
Altitude During Operation		5'000 m max.
Switching Frequency		45 - 75 kHz (PWM QR)
Insulation System		Reinforced Insulation
Working Voltage (rated)		250 VAC
Isolation Test Voltage	- Input to Output, 60 s	5'657 VDC
	- Input to Case or PE, 60 s	2'828 VDC
	- Output to Case or PE, 60 s	2'828 VDC
Isolation Resistance	- Input to Output, 500 VDC	100 MOhm min.
Leakage Current (264 VAC)	- Touch Current	100 $\mu$ A max.
Reliability	- Calculated MTBF	786'000 h (MIL-HDBK-217F, ground benign)
Environment	- Vibration	IEC 60068-2-6
	- Mechanical Shock	IEC 60068-2-27
Housing Material		Aluminum alloy, black anodized Coating
Connection Type		Screw Terminal
Weight		273 g

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

Environmental Compliance - Reach  
- RoHS

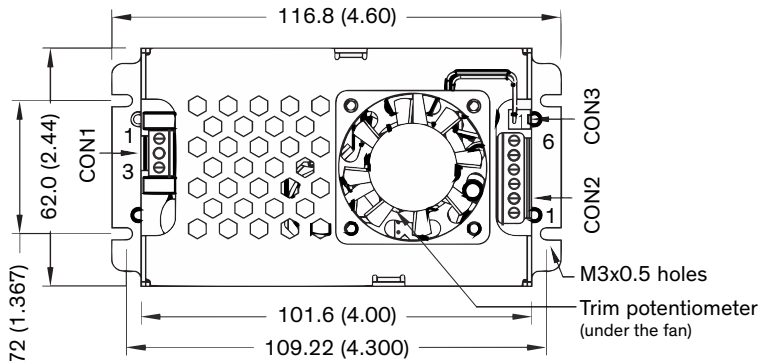
[www.tracopower.com/info/reach-declaration.pdf](http://www.tracopower.com/info/reach-declaration.pdf)  
[www.tracopower.com/info/rohs-declaration.pdf](http://www.tracopower.com/info/rohs-declaration.pdf)

### Supporting Documents

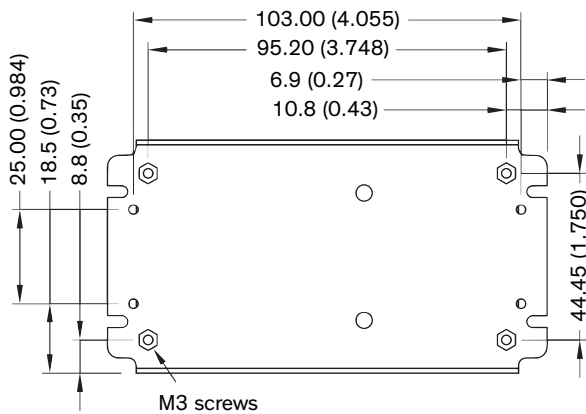
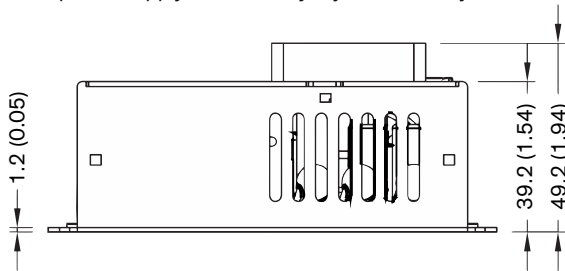
[Overview Link](#) (for additional Documents)

[www.tracopower.com/overview/tp150](http://www.tracopower.com/overview/tp150)

### Outline Dimensions



The fan's durability is lower compared to the power supply and has only 2 years warranty.



Dimension in mm, ( ) = inch  
Tolerances: x.x ±0.50 (±0.02)  
x.xx ±0.25 (±0.01)

Each one of the 4 screw holes can be used as a PE connection for CLASS I application.

Screw Terminal		Molex		Fan (CON3)	
Input (CON1)	Output (CON2)	Pin*	Function	Pin	Function
Pin 1	Function Line	1-3	-Vout	1	-Fan
Pin 3	Function Neutral	4-6	+Vout	2	+Fan

\*Terminal rated for 7 A max.  
(at higher current connection has to be split)

**CON1:** Screw Terminal

**CON2:** Screw Terminal

**CON3:** Molex series  
mates with Molex crimp terminals: 2759  
and Molex housing: 22-01-1022