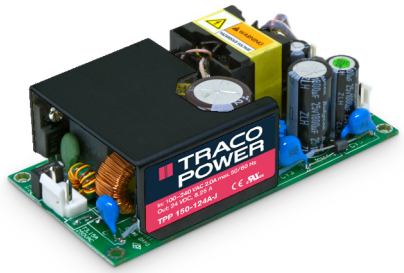
TRACO POWER

AC/DC Medical Power Supply

TPP 150A-J Series, 150 Watt

- **Open frame 150 W power supply with JST connection in 2.0” x 4.0” 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**



2MOPP prepared ErP ready c UL us CB Scheme

ES 60601-1 IEC 60601-1
UL 60950-1

The TPP 150A-J series of 150 Watt AC/DC open frame 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 2.0” x 4.0” packaging format. The full load operating temperature range is –25°C to +55°C while it goes up to 80°C with 50% load derating. The EMC characteristic is dedicated for applications in industrial and 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. (Forced air cooling)	Output Current max. (Natural convection)	Efficiency typ.
TPP 150-112A-J	150 W	12 VDC (10.8 - 13.2 VDC)	12'500 mA	8'340 mA	91 %
TPP 150-115A-J		15 VDC (13.5 - 16.5 VDC)	10'000 mA	7'340 mA	92 %
TPP 150-124A-J		24 VDC (21.6 - 26.4 VDC)	6'250 mA	4'590 mA	92 %
TPP 150-128A-J		28 VDC (25.2 - 30.8 VDC)	5'360 mA	3'930 mA	92 %
TPP 150-136A-J		36 VDC (32.4 - 39.6 VDC)	4'170 mA	3'060 mA	92 %
TPP 150-148A-J		48 VDC (43.2 - 52.8 VDC)	3'130 mA	2'090 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	300 mW max. (Ready to meet ErP directive)
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)
Recommended Input Fuse		(The need of an external fuse has to be assessed in the final application.)

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. (w/ 1 µF X7R)
		15 VDC model:	150 mVp-p typ. (w/ 1 µF X7R)
		24 VDC model:	220 mVp-p typ. (w/ 1 µF X7R)
		28 VDC model:	220 mVp-p typ. (w/ 1 µF X7R)
		36 VDC model:	250 mVp-p typ. (w/ 1 µF X7R)
		48 VDC model:	250 mVp-p typ. (w/ 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.
Short Circuit Protection			Continuous, Automatic recovery
Output Current Limitation			115 - 150% of Iout max.
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	www.tracopower.com/overview/tpp150a-j
Protection Class		Class I (Prepared): Connection to PE Class II (Prepared): Reinforced Insulation
Pollution Degree		PD 2
Over Voltage Category		OVC II

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

EMC Specifications

EMI Emissions			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 (internal filter)
			FCC Part 18 class B (internal filter)
	- Radiated Emissions		EN 55011 class A (internal filter)
			EN 55032 class A (internal filter)
			FCC Part 15 class A (internal filter)
			FCC Part 18 class A (internal filter)
	- Harmonic Current Emissions		EN 61000-3-2, class A
			EN 61000-3-2, class D
	- Voltage Fluctuations & Flicker		EN 61000-3-3
EMS Immunity			EN 55024 (IT Equipment)
			EN 60601-1-2 edition 4 (Medical Devices)
	- Electrostatic Discharge	Air:	EN 61000-4-2, ±15 kV, perf. criteria A
		Contact:	EN 61000-4-2, ±8 kV, perf. criteria A
	- RF Electromagnetic Field		EN 61000-4-3, 20 V/m, perf. criteria A
	- EFT (Burst) / Surge		EN 61000-4-4, ±2 kV, perf. criteria A
		L to L:	EN 61000-4-5, ±1 kV, perf. criteria A
		L to PE:	EN 61000-4-5, ±2 kV, perf. criteria A
	- Conducted RF Disturbances		EN 61000-4-6, 20 Vrms, perf. criteria A
	- PF Magnetic Field	Continuous:	EN 61000-4-8, 10 A/m, perf. criteria A
	- Voltage Dips & Interruptions	230 VAC / 50 Hz:	EN 61000-4-11
			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 +85°C
	- Storage Temperature		−40°C to +85°C
Power Derating	- High Temperature	See application note:	www.tracopower.com/overview/tpp150a-j
	- Low Input Voltage		1.33 %/V below 100 VAC
Cooling System	- Option 1		Forced air cooling (with external fan, 10 CFM)
	- Option 2		Natural convection (20 LFM)
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		4'000 VAC
	- Input to Case or PE, 60 s		2'000 VAC
	- Output to Case or PE, 60 s		2'000 VAC
Isolation Resistance	- Input to Output, 500 VDC		100 MΩ min.
Leakage Current (at 264 VAC)	- Touch Current		100 µA max.
Reliability	- Calculated MTBF		786'000 h (MIL-HDBK-217F, ground benign)
Environment	- Vibration		IEC 60068-2-6
	- Mechanical Shock		IEC 60068-2-27
Connection Type			JST
Weight			187 g

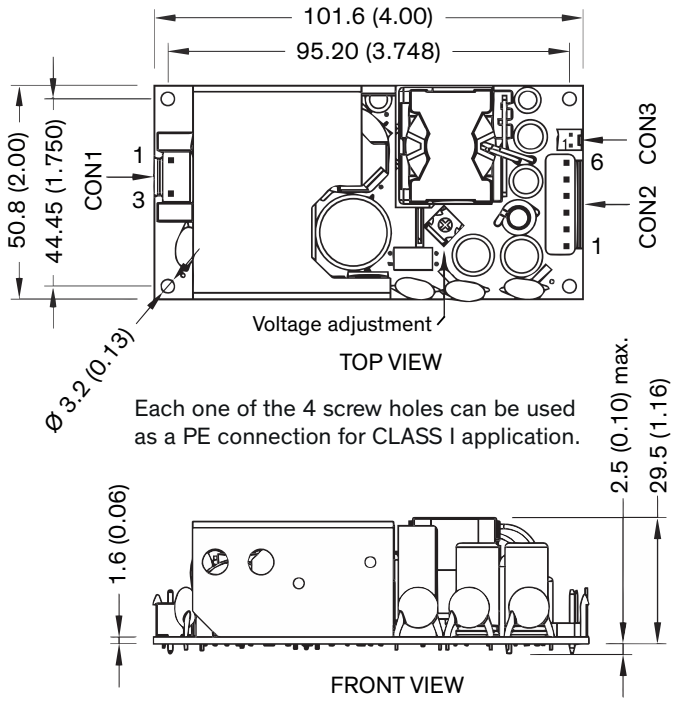
All specifications valid at nominal voltage, full load and +25°C after warm-up time unless otherwise stated.

Environmental Compliance	- Reach	www.tracopower.com/info/reach-declaration.pdf
	- RoHS	www.tracopower.com/info/rohs-declaration.pdf

Supporting Documents

Overview Link (for additional Documents)	www.tracopower.com/overview/tpp150a-j

Outline Dimensions



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

Pin connectors

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

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

CON1: JST series
mates with JST crimp terminal: SVH-21T-P1.1
and terminal housing: VHR-3N

CON2: JST series
mates with JST crimp terminal: SVH-21T-P1.1
and terminal housing: VHR-6N

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

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