

- Open frame 150 W power supply with JST connection in 2.0" x 4.0" package
- Certification according to IEC/EN/ES 60601-1 edition 3.2 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



ES 60601-1 IEC 60601-1
UL 62368-1 IEC 62368-1

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 edition 3.2, 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	Operational Range: 85 - 264 VAC (Full Range) Rated Range: 100 - 240 VAC (Full Range)
	- DC Range	Operational Range: 120 - 370 VDC (Designed for, no certification) Polarity: +DC: L / -DC: N
Input Frequency		Operational Range: 47 - 440 Hz Certified: 50/60 Hz
Power Consumption	- No load & Vin = 230 VAC	300 mW max. (Ready to meet ErP directive)
	- No load & Vin = 115 VAC	300 mW max.
Input Current	- Full load & Vin = 230 VAC	800 mA max.
	- Full load & Vin = 115 VAC	1'700 mA max.
Input Inrush Current	- At 230 VAC	60 A max.
	- At 115 VAC	35 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 μ F X7R)
	15 VDC model:	150 mVp-p typ. (w/ 1 μ F X7R)
	24 VDC model:	220 mVp-p typ. (w/ 1 μ F X7R)
	28 VDC model:	220 mVp-p typ. (w/ 1 μ F X7R)
	36 VDC model:	250 mVp-p typ. (w/ 1 μ F X7R)
	48 VDC model:	250 mVp-p typ. (w/ 0.1 μ F 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)

All specifications valid at 230 VAC, resistive full load and +25°C after warm-up time, unless otherwise stated.

Safety Specifications

Standards	- IT / Multimedia Equipment	EN 62368-1 IEC 62368-1 UL 60950-1 UL 62368-1
	- 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/tpp150a-j-safety-cert
	Protection Class	Class I & II (Prepared): Reinforced Insulation
See application note: www.tracopower.com/info/protection-class.pdf		
Energy Source	- Output, acc. to 62368-1	ES1
Power Source	- Output, acc. to 62368-1	PS3
Pollution Degree		PD 2
Over Voltage Category		OVC II

EMC Specifications

EMI (Emissions)	- Conducted Emissions	EN 60601-1-2 edition 4 (Medical Devices) EN 55011 class A (internal filter) EN 55011 class B (internal filter) EN 55032 class A (internal filter) EN 55032 class B (internal filter) FCC 47 Part 15 class A (internal filter) FCC 47 Part 15 class B (internal filter) FCC 47 Part 18 class A (internal filter) FCC 47 Part 18 class B (internal filter)
	- Radiated Emissions	EN 55011 class A (internal filter) EN 55032 class A (internal filter) FCC 47 Part 15 class A (internal filter) FCC 47 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)	- Electrostatic Discharge	EN 60601-1-2 edition 4 (Medical Devices) EN 55024 (IT Equipment) EN 55035 (Multimedia)
	- RF Electromagnetic Field	Air: EN 61000-4-2, ± 15 kV, perf. criteria A
	- EFT (Burst) / Surge	Contact: EN 61000-4-2, ± 8 kV, perf. criteria A EN 61000-4-3, 20 V/m, perf. criteria A EN 61000-4-4, ± 2 kV, perf. criteria A
	- Conducted RF Disturbances	L to L: EN 61000-4-5, ± 1 kV, perf. criteria A 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
EMC / Environmental	- Certification Documents	www.tracopower.com/tpp150a-j-emc-cert

General Specifications

Relative Humidity		95% max. (non condensing)
Temperature Ranges	- Operating Temperature	-25°C to +85°C
	- Storage Temperature	-40°C to +85°C

All specifications valid at 230 VAC, resistive full load and +25°C after warm-up time, unless otherwise stated.

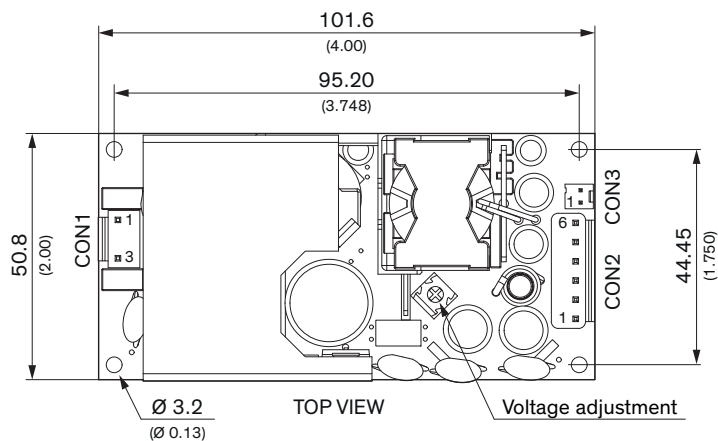
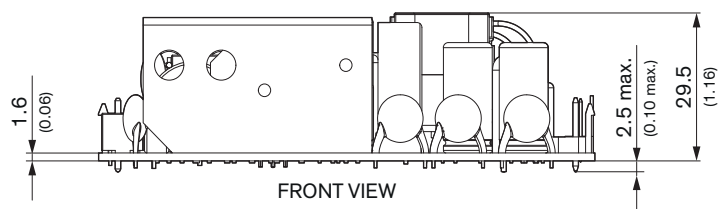
Power Derating	- High Temperature - Low Input Voltage	Depending on model 1.33 %/V below 100 VAC See application note: www.tracopower.com/tpp150a-j-cc
Cooling System	- Option 1 - Option 2	Forced air cooling (with external fan, 10 CFM) Natural convection (20 LFM)
Fan Power Source	- Characteristic - Output Voltage - Output Current	Variable fan speed (temperature regulated) 12 VDC 500 mA max.
Altitude During Operation		5'000 m max.
Regulator Topology		Flyback Converter
Switching Frequency		45 - 75 kHz (PWM QR)
Insulation System		Reinforced Insulation
Working Voltage (rated)		250 VAC
Isolation Test Voltage	- Input to Output, 60 s - Input to Case or PE, 60 s - Output to Case or PE, 60 s	4'000 VAC 2'000 VAC 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 - Mechanical Shock	IEC 60068-2-6 5 g, 3 axis, sine sweep, 10-500 Hz, 1 oct/min IEC 60068-2-27 50 g, 3 axis, half sine, 11 ms
Housing Type		Open Frame
Mounting Type		Chassis Mount
Connection Type		Pin Connector
Weight		187 g
Environmental Compliance	- REACH Declaration - RoHS Declaration - SCIP Reference Number	www.tracopower.com/info/reach-declaration.pdf REACH SVHC list compliant REACH Annex XVII compliant www.tracopower.com/info/rohs-declaration.pdf Exemptions: 7(a), 7(c)-I (RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule).) e0777432-36e5-453e-b34f-5037ee652740

Additional Information

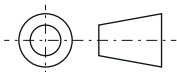
Supporting Documents	www.tracopower.com/overview/tpp150a-j
Frequently Asked Questions	www.tracopower.com/glossary-faq
Glossary	www.tracopower.com/info/glossary.pdf

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Outline Dimensions



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



Mounting screw locked torque: max. 5 kgfcm / 0.49 Nm

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