

- High power density power supply (encapsulated)
- Certification according to IEC/EN/ES 60601-1 3rd edition for 2 x MOPP
- Low leakage current <75  $\mu$ A rated for BF applications
- EMC compliance to IEC 60601-1-2 4th edition
- Risk management process according to ISO 14971 incl. risk management file
- Acceptance criteria for electronic assemblies acc. to IPC-A-610 Level 3
- Protection class II
- Operating up to 5000 m altitude
- Ready to meet ErP directive, no load power consumption <60 mW
- 5-year product warranty



The TPP 30-J AC/DC power supplies feature a reinforced double I/O isolation system according to medical safety standards IEC/EN/ES 60601-1 3rd edition for 2 x MOPP approved for an operating altitude of 5000 m. The earth leakage current is below 75  $\mu$ A what makes the units suitable for BF (body floating) applications. The excellent efficiency of up to 91.5% offers a high power density in the packaging format 1.5" x 3.95". The full load operating temperature range covers -40°C to +60°C while it goes up to 85°C with 50% load derating. The units operate in compliance to the medical EMC emission and immunity levels according to latest standard IEC 60601-1-2 4th edition.

### Models

Order Code	Output Power max.	Output Voltage nom.	Output Current max.	Efficiency typ.
TPP 30-103-J	20 W	3.3 VDC	6'000 mA	84 %
TPP 30-105-J	30 W	5 VDC	6'000 mA	87 %
TPP 30-109-J		9 VDC	3'340 mA	88 %
TPP 30-112-J		12 VDC	2'500 mA	91 %
TPP 30-115-J		15 VDC	2'000 mA	91 %
TPP 30-124-J		24 VDC	1'250 mA	90 %
TPP 30-136-J		36 VDC	840 mA	90 %
TPP 30-148-J		48 VDC	630 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	400 mA max.
	- Full Load & Vin = 115 VAC	800 mA max.
Power Consumption	- At no load	60 mW max. (Ready to meet ErP directive)
Input Inrush Current	- At 230 VAC	40 A max.
Input Protection		T 1.6 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

Voltage Set Accuracy		±1% max.
Regulation	- Input Variation (Vmin - Vmax)	0.2% max.
	- Load Variation (0 - 100%)	0.7% max. (3.3 and 5 VDC model) 0.5% max. (other output models)
Ripple and Noise (20 MHz Bandwidth)		50 mVp-p typ. (w/ 10 µF X7R)
Capacitive Load	3.3 VDC model:	10'000 µF max.
	5 VDC model:	12'000 µF max.
	9 VDC model:	3'720 µF max.
	12 VDC model:	2'085 µF max.
	15 VDC model:	1'350 µF max.
	24 VDC model:	520 µF max.
	36 VDC model:	235 µF max.
48 VDC model:	130 µF max.	
Minimum Load		Not required
Temperature Coefficient		±0.02 %/K max.
Hold-up Time	- At 115 VAC	16 ms min.
Start-up Time	- At 230 VAC	1'500 ms max.
Short Circuit Protection		Continuous, Automatic recovery
Output Current Limitation		110 - 170% of Iout max.
		140% typ. of Iout max.
Overvoltage Protection		125 - 140% 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	EN 62368-1 IEC 62368-1 UL 62368-1
	- Household	EN 60335-1 IEC 60335-1
	- Medical Equipment	EN 60601-1 IEC 60601-1 ANSI/AAMI ES 60601-1
	- Power Transformers	2 x MOPP (Means Of Patient Protection) IEC 61558-1 IEC 61558-2-16
	- Certification Documents	<a href="http://www.tracopower.com/overview/tpp30-j">www.tracopower.com/overview/tpp30-j</a>
	Protection Class	
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

<b>EMI Emissions</b>		EN 60601-1-2 edition 4 (Medical Devices)
- Conducted Emissions		EN 55011 class B (internal filter) EN 55014-1 (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 B (internal filter) EN 55014-1 (internal filter) EN 55032 class B (internal filter) FCC Part 15 class B (internal filter) FCC Part 18 class B (internal filter)
- Harmonic Current Emissions		EN 61000-3-2, class A
- Voltage Fluctuations & Flicker		EN 61000-3-3
<b>EMS Immunity</b>		EN 55024 (IT Equipment)
- Electrostatic Discharge		EN 60601-1-2 edition 4 (Medical Devices) EN 55014-2 (Household Appliances Tools)
- RF Electromagnetic Field		Air: EN 61000-4-2, $\pm 15$ kV, perf. criteria A
- EFT (Burst) / Surge		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
- Conducted RF Disturbances		L to L: EN 61000-4-5, $\pm 1$ kV, perf. criteria A
- PF Magnetic Field		EN 61000-4-6, 20 Vrms, perf. criteria A
- Voltage Dips & Interruptions		Continuous: EN 61000-4-8, 30 A/m, perf. criteria A 230 VAC / 50 Hz: EN 61000-4-11 30%, 25 periods, perf. criteria A 60%, 1 period, perf. criteria A >95%, 1 period, perf. criteria A >95%, 250 periods, perf. criteria A
		115 VAC / 60 Hz: EN 61000-4-11 30%, 25 periods, perf. criteria A 60%, 1 period, perf. criteria A >95%, 1 period, perf. criteria A >95%, 250 periods, perf. criteria A

## General Specifications

Relative Humidity		95% max. (non condensing)
Temperature Ranges	- Operating Temperature	-40°C to +85°C
	- Storage Temperature	-40°C to +85°C
Power Derating	- High Temperature	See application note: <a href="http://www.tracopower.com/overview/tpp30-j">www.tracopower.com/overview/tpp30-j</a>
	- Low Input Voltage	4 %/V below 90 VAC
Cooling System		Natural convection (20 LFM)
Altitude During Operation		5'000 m max.
Switching Frequency		30 - 60 kHz (PWM)
Insulation System		Reinforced Insulation
Working Voltage (rated)		272 VAC
Isolation Test Voltage	- Input to Output, 60 s	4'000 VAC
	- Input to Case or PE, 60 s	1'500 VAC
	- Output to Case or PE, 60 s	1'500 VAC
Creepage	- Input to Output	8 mm min.
Clearance	- Input to Output	8 mm min.
Isolation Resistance	- Input to Output, 500 VDC	100 M $\Omega$ min.
Leakage Current (at 264 VAC)	- Touch Current	75 $\mu$ A max.
Reliability	- Calculated MTBF	3'300'000 h (MIL-HDBK-217F, ground benign)
Environment	- Vibration	IEC 60068-2-6
	- Mechanical Shock	IEC 60068-2-27

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

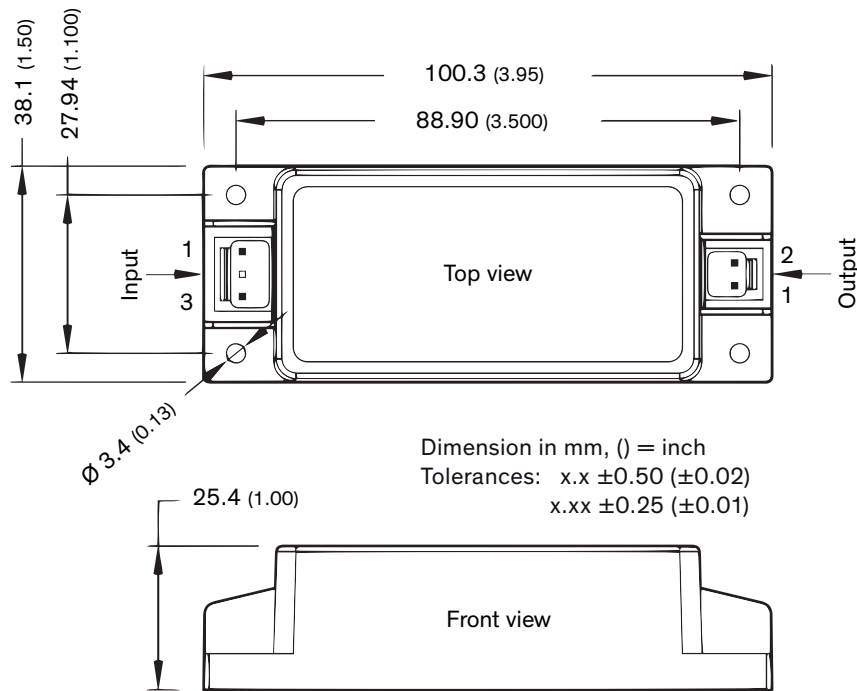
Connection Type	JST
Weight	119 g
Environmental Compliance	- Reach - RoHS
	<a href="http://www.tracopower.com/info/reach-declaration.pdf">www.tracopower.com/info/reach-declaration.pdf</a> <a href="http://www.tracopower.com/info/rohs-declaration.pdf">www.tracopower.com/info/rohs-declaration.pdf</a>

### Supporting Documents

Overview Link (for additional Documents)

[www.tracopower.com/overview/tpp30-j](http://www.tracopower.com/overview/tpp30-j)

### Outline Dimensions



#### Pin connectors

Input		Output	
Pin	Function	Pin	Function
1	Line	1	+Vout
3	Neutral	2	-Vout

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

**Output:** JST series  
 mates with JST crimp terminal: SVH-21T-P1.1  
 and terminal housing: VHR-2N