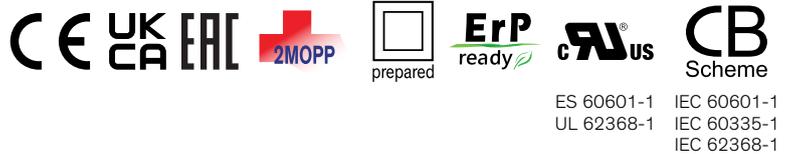


- High power density power supply (open frame)
- Certification according to IEC/EN/ES 60601-1 edition 3.2 for 2 x MOPP
- Low leakage current <75  $\mu$ A rated for BF applications
- EMC compliance to IEC 60601-1-2 4th edition
- Risk management process according to ISO 14971 incl. risk management file
- Acceptance criteria for electronic assemblies acc. to IPC-A-610 Level 3
- Protection class I and II
- Operating up to 5000 m altitude
- Ready to meet ErP directive, no load power consumption <60 mW
- 5-year product warranty



The TPP 30A-J AC/DC power supplies feature a reinforced double I/O isolation system according to medical safety standards IEC/EN/ES 60601-1 edition 3.2 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 92% offers a high power density in the packaging format 1.36" x 3.34". 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. (adjustable)	Output Current max.	Efficiency typ.
TPP 30-103A-J	20 W	3.3 VDC (2.97 - 3.63 VDC)	6'000 mA	84 %
TPP 30-105A-J	30 W	5 VDC (4.5 - 5.5 VDC)	6'000 mA	87 %
TPP 30-109A-J		9 VDC (8.1 - 9.9 VDC)	3'340 mA	88 %
TPP 30-112A-J		12 VDC (10.8 - 13.2 VDC)	2'500 mA	91 %
TPP 30-115A-J		15 VDC (13.5 - 16.5 VDC)	2'000 mA	91 %
TPP 30-124A-J		24 VDC (21.6 - 26.4 VDC)	1'250 mA	90 %
TPP 30-136A-J		36 VDC (32.4 - 39.6 VDC)	840 mA	90 %
TPP 30-148A-J		48 VDC (43.2 - 52.8 VDC)	630 mA	92 %

### Input Specifications

Input Voltage	- AC Range	Operational Range: <b>85 - 264 VAC</b> (Full Range) Rated Range: <b>100 - 240 VAC</b> (Full Range)
	- DC Range	Operational Range: <b>120 - 370 VDC</b> (Designed for, no certification) Polarity: <b>+DC: L / -DC: N</b>
Input Frequency		Operational Range: <b>47 - 440 Hz</b> Certified: <b>50/60 Hz</b>
Power Consumption	- No load & Vin = 230 VAC - No load & Vin = 115 VAC	<b>60 mW max.</b> (Ready to meet ErP directive) <b>60 mW max.</b>
Input Current	- Full load & Vin = 230 VAC - Full load & Vin = 115 VAC	<b>400 mA max.</b> <b>800 mA max.</b>
Input Inrush Current	- At 230 VAC - At 115 VAC	<b>40 A max.</b> <b>25 A max.</b>
Input Protection		<b>T 1.6 A / 250 VAC</b> (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		<b>±10%</b> (By trim potentiometer) Output power must not exceed rated power!
Voltage Set Accuracy		<b>±1% max.</b>
Regulation	- Input Variation (Vmin - Vmax) - Load Variation (0 - 100%)	<b>0.2% max.</b> <b>0.7% max.</b> (3.3 and 5 VDC model) <b>0.5% max.</b> (other output models)
Ripple and Noise (20 MHz Bandwidth)		3.3 VDC model: <b>50 mVp-p typ.</b> (w/ 10 µF X7R) 5 VDC model: <b>50 mVp-p typ.</b> (w/ 10 µF X7R) 9 VDC model: <b>50 mVp-p typ.</b> (w/ 10 µF X7R) 12 VDC model: <b>50 mVp-p typ.</b> (w/ 1 µF X7R) 15 VDC model: <b>50 mVp-p typ.</b> (w/ 1 µF X7R) 24 VDC model: <b>50 mVp-p typ.</b> (w/ 1 µF X7R) 36 VDC model: <b>50 mVp-p typ.</b> (w/ 1 µF X7R) 48 VDC model: <b>50 mVp-p typ.</b> (w/ 0.1 µF X7R)
Capacitive Load		3.3 VDC model: <b>10'000 µF max.</b> 5 VDC model: <b>12'000 µF max.</b> 9 VDC model: <b>3'720 µF max.</b> 12 VDC model: <b>2'085 µF max.</b> 15 VDC model: <b>1'350 µF max.</b> 24 VDC model: <b>520 µF max.</b> 36 VDC model: <b>235 µF max.</b> 48 VDC model: <b>130 µF max.</b>
Minimum Load		<b>Not required</b>
Temperature Coefficient		<b>±0.02 %/K max.</b>
Hold-up Time	- At 115 VAC	<b>16 ms min.</b>
Start-up Time	- At 230 VAC	<b>1'500 ms max.</b>
Short Circuit Protection		<b>Continuous, Automatic recovery</b>
Output Current Limitation		<b>110 - 170% of Iout max.</b> <b>140% typ. of Iout max.</b>
Overvoltage Protection		<b>125 - 140% of Vout nom.</b>
Transient Response	- Response Deviation - Response Time	<b>3% max.</b> (50% to 75% Load Step) <b>500 µs typ.</b> (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 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/tpp30a-j">www.tracopower.com/overview/tpp30a-j</a>
Protection Class	Class I & II (Prepared): Reinforced Insulation	
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 B (internal filter) EN 55014-1 (internal filter) EN 55032 class B (internal filter) FCC 47 Part 15 class B (internal filter) FCC 47 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 47 Part 15 class B (internal filter) FCC 47 Part 18 class B (internal filter)		
	- Harmonic Current Emissions	EN 61000-3-2, class A		
	- 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) EN 55014-2 (Household Appliances Tools) Air: EN 61000-4-2, $\pm 15$ kV, perf. criteria A Contact: EN 61000-4-2, $\pm 8$ kV, perf. criteria A		
	- RF Electromagnetic Field	EN 61000-4-3, 20 V/m, perf. criteria A		
	- EFT (Burst) / Surge	EN 61000-4-4, $\pm 2$ kV, perf. criteria A L to L: EN 61000-4-5, $\pm 1$ kV, perf. criteria A		
	- Conducted RF Disturbances	EN 61000-4-6, 20 Vrms, perf. criteria A		
	- PF Magnetic Field	Continuous: EN 61000-4-8, 30 A/m, perf. criteria A		
	- Voltage Dips & Interruptions	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		
		EMC / Environmental	- Certification Documents	<a href="http://www.tracopower.com/overview/tpp30a-j">www.tracopower.com/overview/tpp30a-j</a>

### General Specifications

Relative Humidity	95% max. (non condensing)
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All specifications valid at 230 VAC, resistive full load and +25°C after warm-up time, unless otherwise stated.

Temperature Ranges	- Operating Temperature - Storage Temperature	-40°C to +85°C -40°C to +85°C
Power Derating	- High Temperature - Low Input Voltage	Depending on model 4 %/V below 90 VAC
		See application note: <a href="http://www.tracopower.com/overview/tpp30a-j">www.tracopower.com/overview/tpp30a-j</a>
Cooling System		Natural convection (20 LFM)
Altitude During Operation		5'000 m max.
Regulator Topology		Flyback Converter
Switching Frequency		30 - 60 kHz (PWM)
Insulation System		Reinforced Insulation
Working Voltage (rated)		272 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 1'500 VAC 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 MΩ min.
Leakage Current (at 264 VAC)	- Touch Current	75 μA max.
Reliability	- Calculated MTBF	3'300'000 h (MIL-HDBK-217F, ground benign)
Environment	- Vibration - Mechanical Shock	IEC 60068-2-6 IEC 60068-2-27
Housing Type		Open Frame
Mounting Type		Chassis Mount
Connection Type		Pin Connector
Weight		60.5 g
Environmental Compliance	- REACH Declaration  - RoHS Declaration  - SCIP Reference Number	<a href="http://www.tracopower.com/info/reach-declaration.pdf">www.tracopower.com/info/reach-declaration.pdf</a> REACH SVHC list compliant REACH Annex XVII compliant <a href="http://www.tracopower.com/info/rohs-declaration.pdf">www.tracopower.com/info/rohs-declaration.pdf</a> Exemptions: 7a, 7c-l (RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule)) 82d4bc53-5b33-476c-88dc-17de303e6dcb

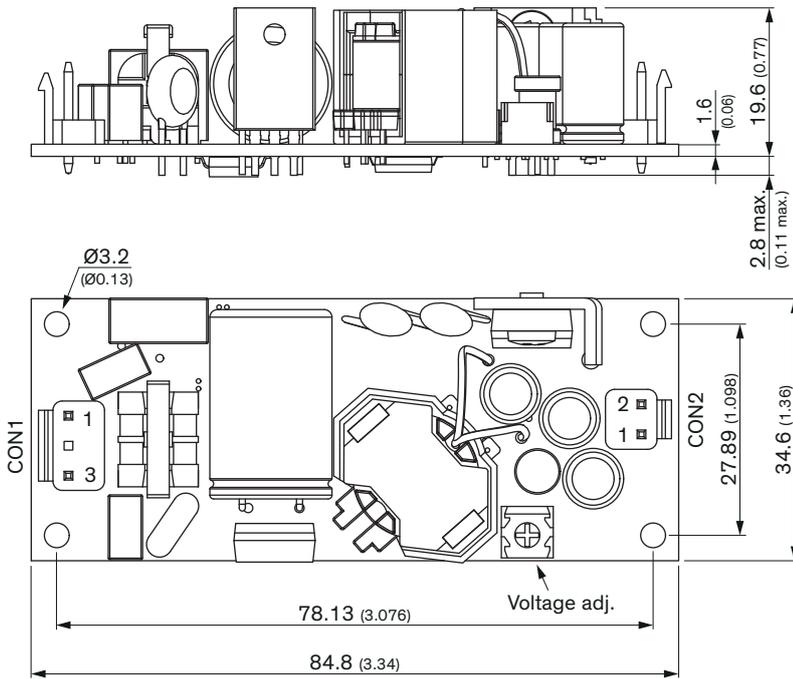
## Supporting Documents

Overview Link (for additional Documents)

[www.tracopower.com/overview/tpp30a-j](http://www.tracopower.com/overview/tpp30a-j)

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

### Outline Dimensions

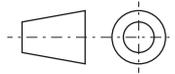


Dimensions in mm (inch)

Tolerances: x.x ±0.5 (x.xx ±0.02)

x.xx ±0.25 (x.xxx ±0.010)

Screw lock torque: Max. 0.49 Nm (5 kgfcm)



### Pin connectors

Input (CON1)		Output (CON2)	
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