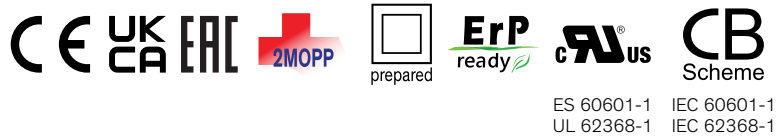
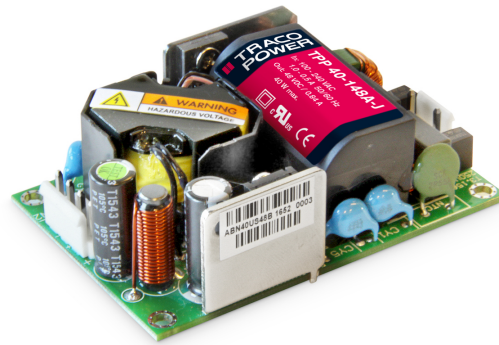


- Open frame power supply with pin connector
- Certification according to IEC/EN/ES 60601-1 edition 3.2 for 2 x MOPP
- Low leakage current <75  $\mu$ A rated for BF applications
- Risk management process according to ISO 14971 incl. risk management file
- Acceptance criteria for electronic assemblies acc. to IPC-A-610 Level 3
- EMC compliance to IEC 60601-1-2 ed. 4
- Protection class I and II prepared
- Operating up to 5000 m altitude
- Ready to meet ErP directive, <0.15 W no load power consumption
- 5-year product warranty



The TPP 40A Series of 40 Watt AC/DC power supplies feature a reinforced double I/O isolation system according to latest medical safety standards IEC/EN/ES 60601-1 edition 3.2 for 2 x MOPP up to 5000 m altitude. The leakage current is below 75  $\mu$ A what 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 3.0" packaging format. The full load operating temperature range is  $-40^{\circ}\text{C}$  to  $+70^{\circ}\text{C}$  while it goes up to  $85^{\circ}\text{C}$  with 50% load derating. The EMC characteristic complies to IEC 60601-1-2 ed.4 and is dedicated for applications in industrial and domestic fields. High reliability is provided by 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 40-105A-J	40 W	5 VDC (4.5 - 5.5 VDC)	8'000 mA	90 %
TPP 40-112A-J		12 VDC (10.8 - 13.2 VDC)	3'340 mA	92 %
TPP 40-124A-J		24 VDC (21.6 - 26.4 VDC)	1'670 mA	92 %
TPP 40-148A-J		48 VDC (43.2 - 52.8 VDC)	840 mA	93 %

Note - Other output models are available on request.

### 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>150 mW max.</b> (Ready to meet ErP directive) <b>150 mW max.</b>
Input Current	- Full load & Vin = 230 VAC - Full load & Vin = 115 VAC	<b>500 mA max.</b> <b>1'000 mA max.</b>
Input Inrush Current	- At 230 VAC - At 115 VAC	<b>60 A max.</b> <b>35 A max.</b>
Input Protection		<b>T 3.15 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> (5 VDC model) <b>0.5% max.</b> (other output models)
Ripple and Noise (20 MHz Bandwidth)		5 VDC model: <b>75 mVp-p typ.</b> (w/ 10 µF X7R) 12 VDC model: <b>75 mVp-p typ.</b> (w/ 10 µF X7R) 24 VDC model: <b>75 mVp-p typ.</b> (w/ 1 µF X7R) 48 VDC model: <b>150 mVp-p typ.</b> (w/ 0.1 µF X7R)
Capacitive Load		5 VDC model: <b>16'000 µF max.</b> 12 VDC model: <b>2'785 µF max.</b> 24 VDC model: <b>700 µF max.</b> 48 VDC model: <b>175 µF max.</b>
Minimum Load		Not required
Temperature Coefficient		<b>±0.02 %/K max.</b>
Hold-up Time	- At 115 VAC	<b>25 ms min.</b>
Start-up Time	- At 230 VAC	<b>1'000 ms max.</b>
Short Circuit Protection		Continuous, Automatic recovery
Output Current Limitation		<b>115 - 180% of Iout max.</b> <b>145% 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>600 µs typ.</b> (50% to 75% Load Step)

### Safety Specifications

Standards	- IT / Multimedia Equipment	EN 62368-1 IEC 62368-1 UL 62368-1
	- Medical Equipment	EN 60601-1 IEC 60601-1 ANSI/AAMI ES 60601-1
	- Certification Documents	2 x MOPP (Means Of Patient Protection) <a href="http://www.tracopower.com/overview/tpp40a">www.tracopower.com/overview/tpp40a</a>
Protection Class		<b>Class I &amp; II (Prepared): Reinforced Insulation</b>
Pollution Degree		<b>PD 2</b>
Over Voltage Category		<b>OVC II</b>

All specifications valid at 230 VAC, resistive 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 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 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
<b>EMS (Immunity)</b>		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 EN 61000-4-3, 20 V/m, perf. criteria A EN 61000-4-4, ±2 kV, perf. criteria A
- RF Electromagnetic Field	L to L:	EN 61000-4-5, ±1 kV, perf. criteria A EN 61000-4-6, 20 Vrms, perf. criteria A
- EFT (Burst) / Surge	Continuous:	EN 61000-4-8, 30 A/m, perf. criteria A
- Conducted RF Disturbances	230 VAC / 50 Hz:	EN 61000-4-11 30%, 25 periods, perf. criteria A >95%, 0.5 periods, perf. criteria A >95%, 1 period, perf. criteria A >95%, 250 periods, perf. criteria B
- PF Magnetic Field	115 VAC / 60 Hz:	EN 61000-4-11 30%, 25 periods, perf. criteria A >95%, 0.5 periods, perf. criteria A >95%, 1 period, perf. criteria A >95%, 250 periods, perf. criteria B
- Voltage Dips & Interruptions		
<b>EMC / Environmental</b>		- Certification Documents <a href="http://www.tracopower.com/overview/tpp40a">www.tracopower.com/overview/tpp40a</a>

## General Specifications

<b>Relative Humidity</b>		95% max. (non condensing)
<b>Temperature Ranges</b>		-40°C to +85°C
- Operating Temperature		-40°C to +85°C
- Storage Temperature		-40°C to +85°C
<b>Power Derating</b>		Depending on model
- High Temperature		Depending on model
- Low Input Voltage		See application note: <a href="http://www.tracopower.com/overview/tpp40a">www.tracopower.com/overview/tpp40a</a>
<b>Cooling System</b>		Natural convection (20 LFM)
<b>Altitude During Operation</b>		5'000 m max.
<b>Regulator Topology</b>		Flyback Converter
<b>Switching Frequency</b>		50 - 140 kHz (PWM)
<b>Insulation System</b>		Reinforced Insulation
<b>Working Voltage (rated)</b>		258 VAC
<b>Isolation Test Voltage</b>		4'000 VAC
- Input to Output, 60 s		2'500 VAC
- Input to Case or PE, 60 s		2'500 VAC
- Output to Case or PE, 60 s		2'500 VAC
<b>Creepage</b>		8 mm min.
<b>Clearance</b>		8 mm min.
<b>Isolation Resistance</b>		100 MΩ min.
<b>Leakage Current (at 264 VAC)</b>		75 µA max.
<b>Reliability</b>		3'000'000 h (MIL-HDBK-217F, ground benign)
- Calculated MTBF		

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

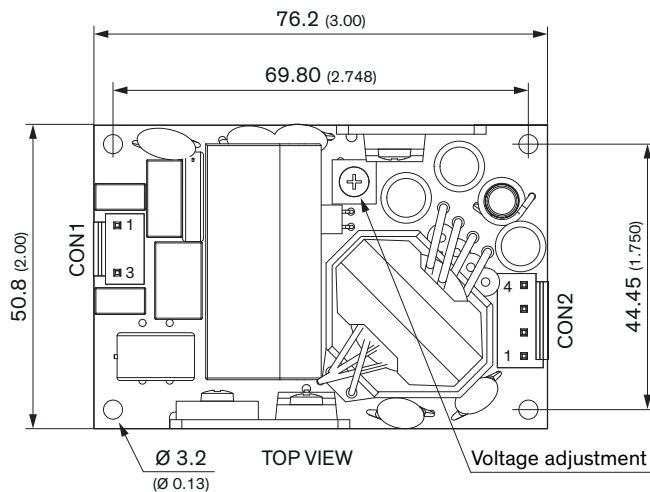
Environment	- Vibration - Mechanical Shock	IEC 60068-2-6 5 g, 3 axis, sine sweep, 5-500 Hz, 1 oct/min IEC 60068-2-27 50 g, 3 axis, half sine, 11 ms
Housing Type		Open Frame
Mounting Type		Chassis Mount
Connection Type		Pin Connector
Weight		114 g
Environmental Compliance	- REACH Declaration  - RoHS Declaration  - 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-I (RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule)) 7b231a3f-8806-4ef9-b158-ee13c938f824

### Supporting Documents

Overview Link (for additional Documents)

[www.tracopower.com/overview/tpp40a](http://www.tracopower.com/overview/tpp40a)

### Outline Dimensions



Pin connectors			
Input (CON1)		Output (CON2)	
Pin	Function	Pin*	Function
1	Line	1,2	-Vout
3	Neutral	3,4	+Vout

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

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

**CON2:** JST series  
mates with JST crimp terminal: BVH-21T-P1.1  
and terminal housing: VHR-4N

Dimensions in mm (inch)  
Outside dimension tolerance:  $x.x \pm 0.5$  ( $x.xx \pm 0.02$ )  
Hole spacing tolerance:  $x.xx \pm 0.25$  ( $x.xxx \pm 0.01$ )

Mounting screw locked torque: max. 0.33 Nm / 3.4 kgfcm