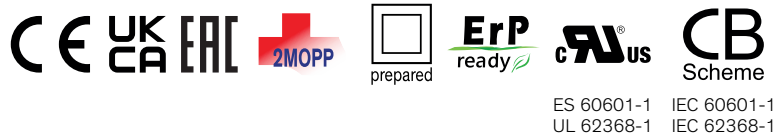
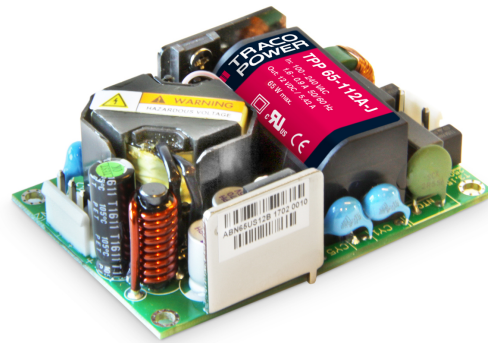


- Open frame power supply with pin connection
- Certification according to IEC/EN/ES 60601-1 3rd edition for 2 x MOPP
- Low leakage current <75 µA rated for BF applications
- Risk management process according to ISO 14971 incl. risk management file
- Acceptance criteria for electronic assemblies acc.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



The TPP 65A Series of 65 Watt AC/DC power supplies feature a reinforced double I/O isolation system according to latest medical safety standards (60601-1 3rd edition, 2 x MOPP). The leakage current is below 75 µA 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°C to +60°C while it goes up to 85°C with 50% load derating. The EMC characteristic is dedicated for applications in industrial and domestic 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.	Efficiency typ.
TPP 65-105A-J	50 W	5 VDC (4.5 - 5.5 VDC)	10'000 mA	90 %
TPP 65-112A-J	65 W	12 VDC (10.8 - 13.2 VDC)	5'420 mA	93 %
TPP 65-124A-J		24 VDC (21.6 - 26.4 VDC)	2'710 mA	94 %
TPP 65-148A-J		48 VDC (43.2 - 52.8 VDC)	1'360 mA	93 %

Note - Other output models are available on request.

### 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	950 mA max.
	- Full Load & Vin = 115 VAC	1'650 mA max.
Power Consumption	- At no load	150 mW max. (Ready to meet ErP directive)
Input Inrush Current	- At 230 VAC	60 A max.
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%)	0.7% max. (5 VDC model) 0.5% max. (other output models)
Ripple and Noise (20 MHz Bandwidth)	5 VDC model:	75 mVp-p typ. (w/ 10 µF X7R)
	12 VDC model:	75 mVp-p typ. (w/ 10 µF X7R)
	24 VDC model:	75 mVp-p typ. (w/ 1 µF X7R)
	48 VDC model:	150 mVp-p typ. (w/ 0.1 µF X7R)
Capacitive Load	5 VDC model:	20'000 µF max.
	12 VDC model:	4'520 µF max.
	24 VDC model:	1'130 µF max.
	48 VDC model:	285 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	1'000 ms max.
Short Circuit Protection		Continuous, Automatic recovery
Output Current Limitation		120 - 160% of Iout max.
		145% typ. of Iout max.
Overvoltage Protection		125 - 140% of Vout nom.
Transient Response	- Response Deviation	3% max. (50% to 75% Load Step)
	- Response Time	600 µs typ. (50% to 75% Load Step)

### Safety Specifications

Safety 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/tpp65a">www.tracopower.com/overview/tpp65a</a>
Protection Class		Class I & II (Prepared): Reinforced Insulation
Pollution Degree		PD 2
Over Voltage Category		OVC II

All specifications valid at nominal voltage, 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 Part 18 class B (internal filter)
- Radiated Emissions		EN 55011 class B (internal filter) EN 55032 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 60601-1-2 edition 4 (Medical Devices)
- Electrostatic Discharge	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 >95%, 0.5 periods, perf. criteria A >95%, 1 period, perf. criteria A >95%, 250 periods, perf. criteria B
	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

## General Specifications

<b>Relative Humidity</b>		95% max. (non condensing)
<b>Temperature Ranges</b>	- Operating Temperature	-40°C to +85°C
	- Storage Temperature	-40°C to +85°C
<b>Power Derating</b>	- High Temperature	See application note: <a href="http://www.tracopower.com/overview/tpp65a">www.tracopower.com/overview/tpp65a</a>
	- Low Input Voltage	4 %/V below 90 VAC
<b>Cooling System</b>		Natural convection (20 LFM)
<b>Altitude During Operation</b>		5'000 m max.
<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>	- Input to Output, 60 s	4'000 VAC
	- Input to Case or PE, 60 s	2'500 VAC
	- Output to Case or PE, 60 s	2'500 VAC
<b>Creepage</b>	- Input to Output	8 mm min.
<b>Clearance</b>	- Input to Output	8 mm min.
<b>Isolation Resistance</b>	- Input to Output, 500 VDC	100 M $\Omega$ min.
<b>Leakage Current (at 264 VAC)</b>	- Touch Current	75 $\mu$ A max.
<b>Reliability</b>	- Calculated MTBF	1'500'000 h (MIL-HDBK-217F, ground benign)
<b>Environment</b>	- Vibration	IEC 60068-2-6
	- Mechanical Shock	IEC 60068-2-27
<b>Housing Type</b>		Open Frame
<b>Mounting Type</b>		Chassis Mount
<b>Connection Type</b>		Pin Connector
<b>Weight</b>		117 g

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

Environmental Compliance - REACH Declaration

- RoHS Declaration

[www.tracopower.com/info/reach-declaration.pdf](http://www.tracopower.com/info/reach-declaration.pdf)

REACH SVHC list compliant

REACH Annex XVII compliant

[www.tracopower.com/info/rohs-declaration.pdf](http://www.tracopower.com/info/rohs-declaration.pdf)

Exemptions: 7a, 7c-I

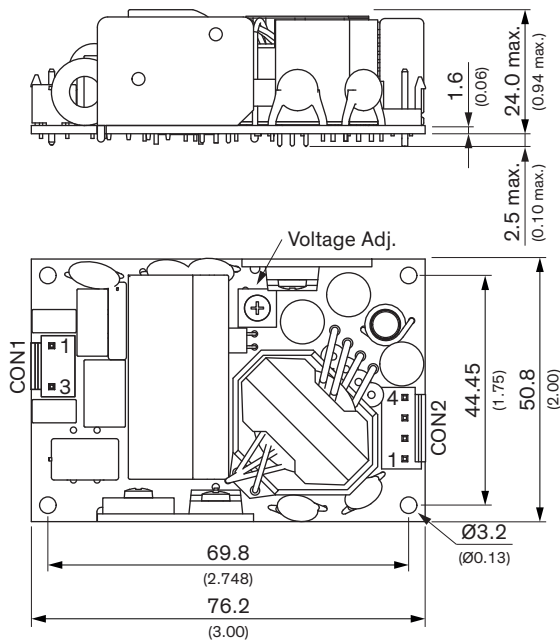
(RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule). The SCIP number is provided on request.)

### Supporting Documents

Overview Link (for additional Documents)

[www.tracopower.com/overview/tpp65a](http://www.tracopower.com/overview/tpp65a)

### Outline Dimensions



Dimensions in mm (inch)  
 Tolerances: x.x ±0.5 (±0.02)  
 x.xx ±0.25 (±0.01)  
 Screw lock torque: Max. 0.49 N·m (5 kgf·cm)

### Pin connectors

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

\*Terminal rated for 10 A max.  
 (at higher current connection has to be split)

**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-4N

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