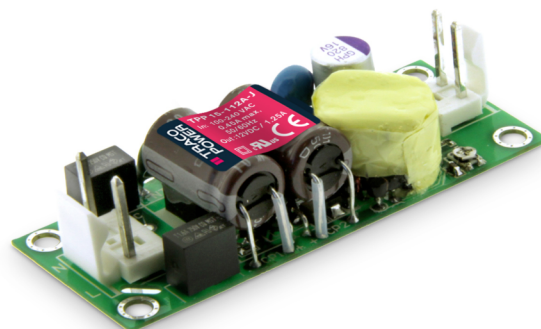


- High power density power supply (open frame)
- Certification according to IEC/EN/ES 60601-1 edition 3.2 for 2 x MOPP
- Low leakage current <100 µA rated for BF applications
- EMC compliance to IEC 60601-1-2 4th edition
- Risk management process according to ISO 14971 incl. risk management file
- Acceptance 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 <100 mW
- 5-year product warranty



ES 60601-1 IEC 60601-1
UL 62368-1 IEC 60335-1
IEC 62368-1

The TPP 15A-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 100µA what makes the units suitable for BF (body floating) applications. The excellent efficiency of up to 89% offers a high power density in the packaging format 1.0" x 2.6". 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 15-103A-J	13.2 W	3.3 VDC (2.97 - 3.63 VDC)	4'000 mA	84 %
TPP 15-105A-J	15 W	5 VDC (4.5 - 5.5 VDC)	3'000 mA	86 %
TPP 15-109A-J		9 VDC (8.1 - 9.9 VDC)	1'670 mA	86 %
TPP 15-112A-J		12 VDC (10.8 - 13.2 VDC)	1'250 mA	87 %
TPP 15-115A-J		15 VDC (13.5 - 16.5 VDC)	1'000 mA	87 %
TPP 15-124A-J		24 VDC (21.6 - 26.4 VDC)	625 mA	88 %
TPP 15-136A-J		36 VDC (32.4 - 39.6 VDC)	417 mA	88 %
TPP 15-148A-J		48 VDC (43.2 - 52.8 VDC)	313 mA	89 %

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 Certified Range: 120 - 370 VDC Polarity: +DC: L / -DC: N (When operating with DC input voltage an external fuse T 1.0 A / 400 VDC is needed. Allowed types: Littlefuse 477 series, Cooper Bussmann type S505H-1-R, Bel Fuse type OADK)
Input Frequency		Operational Range: 47 - 440 Hz Certified: 50/60 Hz
Power Consumption	- No load & $V_{in} = 230$ VAC - No load & $V_{in} = 115$ VAC	100 mW max. (Ready to meet ErP directive) 100 mW max.
Input Current	- Full load & $V_{in} = 230$ VAC - Full load & $V_{in} = 115$ VAC	300 mA max. 450 mA max.
Input Inrush Current	- At 230 VAC - At 115 VAC	40 A max. 25 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

Output Voltage Adjustment		±10% (By trim potentiometer) Output power must not exceed rated power!
Voltage Set Accuracy		±1% max.
Regulation	- Input Variation ($V_{min} - V_{max}$) - Load Variation (0 - 100%)	0.2% max. 0.7% max. (3.3 and 5 VDC model) 0.5% max. (other output models)
Ripple and Noise (20 MHz Bandwidth)	3.3 VDC model: 5 VDC model: 9 VDC model: 12 VDC model: 15 VDC model: 24 VDC model: 36 VDC model: 48 VDC model:	40 mVp-p typ. (w/ 10 μ F X5R) 40 mVp-p typ. (w/ 10 μ F X5R) 70 mVp-p typ. (w/ 10 μ F X5R) 70 mVp-p typ. (w/ 10 μ F X5R) 70 mVp-p typ. (w/ 10 μ F X5R) 100 mVp-p typ. (w/ 10 μ F X5R) 100 mVp-p typ. (w/ 10 μ F X5R) 140 mVp-p typ. (w/ 1 μ F X7R)
Capacitive Load	3.3 VDC model: 5 VDC model: 9 VDC model: 12 VDC model: 15 VDC model: 24 VDC model: 36 VDC model: 48 VDC model:	6'000 μF max. 4'000 μF max. 1'860 μF max. 1'200 μF max. 820 μF max. 470 μF max. 220 μF max. 150 μF max.
Minimum Load		Not required
Temperature Coefficient		±0.02 %/K max.
Hold-up Time	- At 115 VAC	8 ms min.
Start-up Time	- At 230 VAC	850 ms max.
Short Circuit Protection		Continuous, Automatic recovery
Output Current Limitation		120 - 200% of I_{out} max. 145% typ. of I_{out} max.
Overvoltage Protection		115 - 140% of V_{out} nom.
Transient Response	- Response Deviation - Response Time	8% max. (75% to 100% Load Step) 500 μs typ. (75% to 100% 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 2 x MOPP (Means Of Patient Protection)
	- Power Transformers	IEC 61558-1 IEC 61558-2-16
	- Certification Documents	www.tracopower.com/overview/tp15a-j
Protection Class	Class I & II (Prepared): Reinforced Insulation See application note: www.tracopower.com/info/protection-class.pdf	
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 55014-1 (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 55011 class B (internal filter) EN 55014-1 (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)
	- Harmonic Current Emissions	EN 61000-3-2, class A
	- Voltage Fluctuations & Flicker	EN 61000-3-3

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

EMS (Immunity)		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, ± 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 L to L: EN 61000-4-5, ± 1 kV, perf. criteria A EN 61000-4-6, 20 Vrms, perf. criteria A 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
- Electrostatic Discharge - RF Electromagnetic Field - EFT (Burst) / Surge - Conducted RF Disturbances - PF Magnetic Field - Voltage Dips & Interruptions		
EMC / Environmental	- Certification Documents	www.tracopower.com/overview/tpp15a-j

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	Depending on model
	- Low Input Voltage	4 %/V below 90 VAC
See application note:		www.tracopower.com/overview/tpp15a-j
Cooling System		Natural convection (20 LFM)
Altitude During Operation		5'000 m max.
Regulator Topology		Flyback Converter
Switching Frequency		90 - 110 kHz (PWM)
Insulation System		Reinforced Insulation
Working Voltage (rated)		250 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 Ω min.
Leakage Current (at 264 VAC)	- Touch Current	100 μ A max.
Reliability	- Calculated MTBF	3'100'000 h (MIL-HDBK-217F, ground benign)
Environment	- Vibration	IEC 60068-2-6
	- Mechanical Shock	IEC 60068-2-27
Housing Type		Open Frame
Mounting Type		Chassis Mount
Connection Type		Pin Connector
Weight		19 g

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

Environmental Compliance - REACH Declaration

www.tracopower.com/info/reach-declaration.pdf

- RoHS Declaration

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))

- SCIP Reference Number

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Additional Information

Supporting Documents

www.tracopower.com/overview/tpp15a-j

Frequently Asked Questions

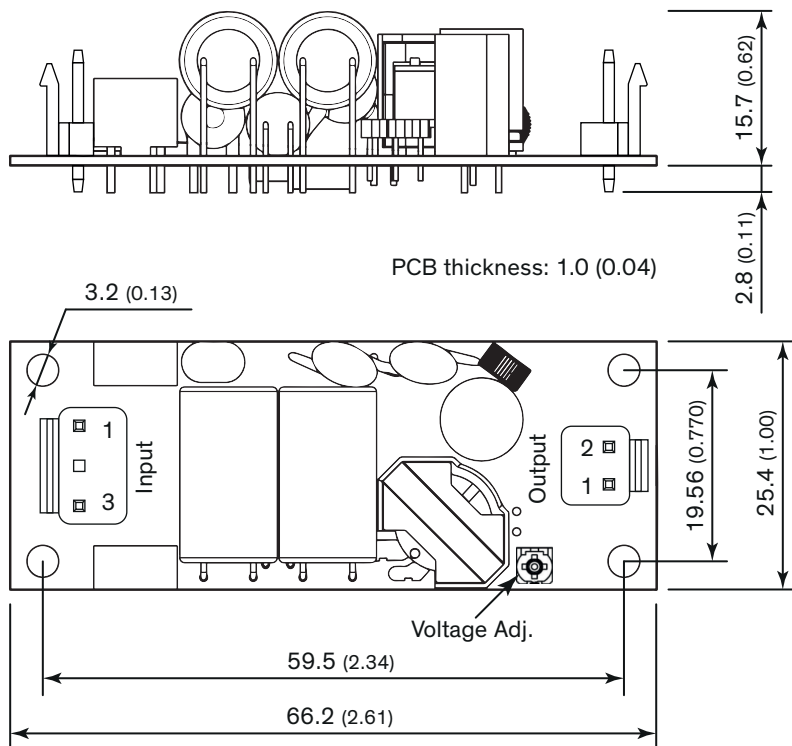
www.tracopower.com/glossary-faq

Glossary

www.tracopower.com/info/glossary.pdf

Outline Dimensions

12, 15, 24, 36, and 48 VDC models - without heatsink



Pin connectors

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

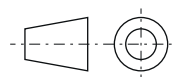
Input: JST series
mates with JST crimp terminal: SVH-21T-P1.1
and terminal housing: VHR-3N

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

Dimension in mm (inch)

Tolerances: x.x ±0.5 (x.xx ±0.02)

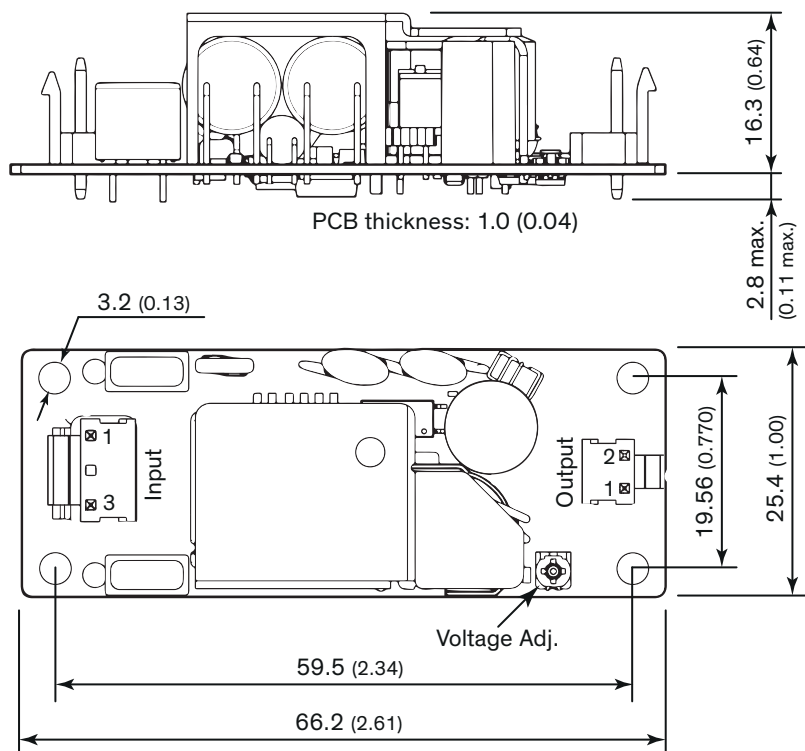
x.xx ±0.25 (x.xxx ±0.010)



Mounting screw locked torque: max. 0.33 Nm (3.4 kgfcm)

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

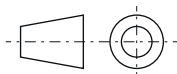
3.3, 5, and 9 VDC models - with heatsink



Dimension in mm (inch)

Tolerances: $x.x \pm 0.5$ ($x.xx \pm 0.02$)

$x.xx \pm 0.25$ ($x.xxx \pm 0.010$)



Mounting screw locked torque: max. 0.33 Nm (3.4 kgfcm)

Pin connectors

Input		Output	
Pin	Function	Pin	Function
1	Line	1	-Vout
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and terminal housing: VHR-2N