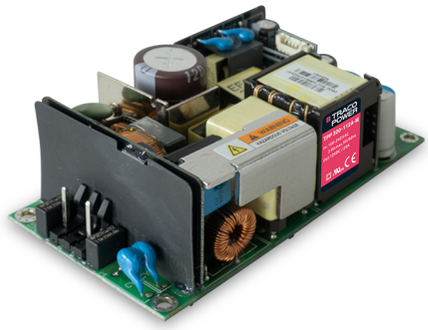
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TRACO POWER

AC/DC Medical Power Supply

TPP 300A-M Series, 300 Watt

- **High power-density: 300 Watt in 4”x2” package (open frame)**
- **I/O isolation 4000 VAC rated for 250 VAC working voltage**
- **Certification according to IEC/EN/ES 60601-1 3rd edition for 2 x MOPP**
- **Risk management process according to ISO 14971 incl. risk management file**
- **Acceptance criteria for electronic assemblies acc. to IPC-A-610 Level 3**
- **Peak power operation up to 360 Watt for 5s**
- **Operating temperature –40°C to 85°C**
- **Active power factor correction >0.9**
- **Operating up to 5000m altitude**
- **5-year product warranty**



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

The TPP 300 series is a set of AC/DC power supplies in an open frame package style. They feature a reinforced double I/O isolation (4000 VAC) system according to latest medical safety standards. The TPP series also has a low leakage current of <100 µA which makes the units suitable for BF (body floating) applications. The excellent efficiency of up to 93% allows a high power-density and compact design (4” x 2”). The operating temperature range is –40°C to +85°C with derating above 50°C. In natural convection operation these power supplies deliver 180 Watt going up to 300 Watt with forced air cooling. Additionally, they can deliver 360 Watt peak power for 5s. The EMC characteristic is dedicated for applications in industrial and medical fields. High reliability is provided by using high quality components and an excellent thermal management making the TPP 300 an ideal solution for industrial and medical devices and for demanding safety and space critical applications.

Models

Order Code	Output Power max.	Output Voltage nom. (adjustable)	Output Current max. (Forced air cooling)	Output Current max. (Natural convection)	Output Current peak	Efficiency typ.
TPP 300-112A-M	300 W	12 VDC (10.8 - 13.2 VDC)	25'000 mA	15'000 mA	30'000 mA	91 %
TPP 300-115A-M		15 VDC (13.5 - 16.5 VDC)	20'000 mA	12'000 mA	24'000 mA	92 %
TPP 300-124A-M		24 VDC (21.6 - 26.4 VDC)	12'500 mA	7'500 mA	15'000 mA	93 %
TPP 300-136A-M		36 VDC (32.4 - 39.6 VDC)	8'330 mA	5'000 mA	10'000 mA	93 %
TPP 300-148A-M		48 VDC (43.2 - 52.8 VDC)	6'250 mA	3'750 mA	7'500 mA	93 %
TPP 300-153A-M		53 VDC (47.7 - 58.3 VDC)	5'670 mA	3'400 mA	6'790 mA	93 %

Options

on demand (backorder with MOQ non stocking item)	- Optional model with 18 VDC / 16'667 mA - Optional model with 28 VDC / 10'710 mA

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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 (Designed for, no certification)
		Polarity:	+DC: L / –DC: N
Input Frequency		Operational Range:	47 - 440 Hz
		Certified:	50/60 Hz
Input Current	- Full Load & Vin = 230 VAC		1'600 mA max.
	- Full Load & Vin = 115 VAC		3'900 mA max.
Power Consumption	- No load & Vin = 230 VAC		400 mW max. (Ready to meet ErP directive)
	- No load & Vin = 115 VAC		400 mW max.
Input Inrush Current	- At 230 VAC		70 A max.
	- At 115 VAC		40 A max.
Power Factor	- At 230 VAC		0.9 min. (Active Power Factor Correction)
	- At 115 VAC		0.9 min. (Active Power Factor Correction)
Input Protection			T 5 A / 250 VAC (Internal Fuse in L & N)
Recommended Input Fuse			5'000 mA (slow blow) (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%)		0.5% max.
Boost Power			Output Current peak: See model table Peak power time: 5 s max. Peak power duty cycle: 20% max. Average operation power: 50% of full load (at natural convection)
Ripple and Noise (20 MHz Bandwidth)		12 VDC model:	150 mVp-p max. (w/ 1 µF X7R)
		15 VDC model:	180 mVp-p max. (w/ 1 µF X7R)
		18 VDC model:	210 mVp-p max. (w/ 1 µF X7R)
		24 VDC model:	270 mVp-p max. (w/ 1 µF X7R)
		28 VDC model:	310 mVp-p max. (w/ 1 µF X7R)
		36 VDC model:	390 mVp-p max. (w/ 1 µF X7R)
		48 VDC model:	510 mVp-p max. (w/ 1 µF X7R)
		53 VDC model:	540 mVp-p max. (w/ 1 µF X7R)
Capacitive Load		12 VDC model:	20'000 µF max.
		15 VDC model:	12'000 µF max.
		18 VDC model:	9'000 µF max.
		24 VDC model:	2'400 µF max.
		28 VDC model:	2'000 µF max.
		36 VDC model:	1'000 µF max.
		48 VDC model:	650 µF max.
		53 VDC model:	470 µF max.
Minimum Load			Not required
Temperature Coefficient			±0.02 %/K max.
Hold-up Time	- At 230 VAC		5 ms min.
	- At 115 VAC		5 ms min.
Start-up Time	- At 230 VAC		2'000 ms max.
	- At 115 VAC		2'000 ms max.
Short Circuit Protection			Continuous, Automatic recovery

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

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Output Current Limitation		135 - 165% of Iout max. 150% typ. of Iout max.
Overvoltage Protection		115 - 135% of Vout nom. (Latch off)
Transient Response	- Response Deviation	3% typ. / 10% 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 2 x MOPP (Means Of Patient Protection)
	- Certification Documents	www.tracopower.com/overview/tpp300a-m
Protection Class		Class I & II (Prepared): Reinforced Insulation
Pollution Degree		PD 2
Over Voltage Category		OVC II

EMC Specifications

EMI Emissions			EN 60601-1-2 edition 4 (Medical Devices)
	- Conducted Emissions		EN 55011 class B (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 A (internal filter) EN 55032 class A (internal filter) FCC Part 15 class A (internal filter) FCC Part 18 class A (internal filter)
	- Harmonic Current Emissions		EN 61000-3-2, class A
	- Voltage Fluctuations & Flicker		EN 61000-3-3
EMS Immunity			EN 55024 (IT Equipment) EN 55035 (Multimedia) 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
	- RF Electromagnetic Field		EN 61000-4-3, 20 V/m, perf. criteria A
	- EFT (Burst) / Surge		EN 61000-4-4, ±2 kV, perf. criteria A
		L to L:	EN 61000-4-5, ±1 kV, perf. criteria A
		L to PE:	EN 61000-4-5, ±2 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%, 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%, 250 periods, perf. criteria B

General Specifications

Relative Humidity		95% max. (non condensing)
Temperature Ranges	- Operating Temperature	–40°C to +85°C
	- Storage Temperature	–40°C to +85°C

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

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Power Derating	- High Temperature		Depending on model
	- Low Input Voltage		2 %/V below 100 VAC
		See application note:	www.tracopower.com/overview/tpp300a-m
Over Temperature Protection Switch Off	- Protection Mode		118°C min. / 125°C typ. / 132°C max. (Automatic recovery at 112°C typ.)
	- Measurement Point	See application note:	www.tracopower.com/overview/tpp300a-m (Internal Thermistor)
Cooling System	- Option 1		Forced air cooling (with external fan, 21 CFM)
	- Option 2		Natural convection (20 LFM)
Fan Power Source	- Characteristic		Variable fan speed (temperature regulated)
	- Output Voltage		12 VDC
	- Output Current		500 mA max.
Standby Power Source	- Output Voltage		5 VDC
	- Output Current		1000 mA max. (Fan Power Source and Standby Power Source total power must not exceed 8 W.)
Remote Control	- Voltage Controlled Remote		On: 3.0 to 12 VDC or open circuit Off: 0 to 1.2 VDC or short circuit Refers to '+Remote' and '-Remote' Pin
	- Off Idle Input Current		16 mA typ. / 25 mA max. (excl. Standby power source and Fan power source)
	- Remote Pin Input Current		-0.5 to 1.0 mA (Standby power source and Fan power source are always present)
Altitude During Operation			5'000 m max.
Switching Frequency			100 - 180 kHz (PWM) 140 kHz typ. (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		2'500 VAC
	- Output to Case or PE, 60 s		2'500 VAC
Creepage	- Input to Output		13.6 mm min.
	- Input to Case or PE		5 mm min.
	- Output to Case or PE		4.2 mm min.
Clearance	- Input to Output		9.7 mm min.
	- Input to Case or PE		5 mm min.
	- Output to Case or PE		4.2 mm min.
Isolation Resistance	- Input to Output, 500 VDC		100 MΩ min.
Isolation Capacitance	- Input to Output, 100 kHz, 1 V		1'250 pF typ. / 1'500 pF max.
Leakage Current (264 VAC / 60 Hz)	- Touch Current		100 µA max.
Reliability	- Calculated MTBF		1'056'000 h (MIL-HDBK-217F, ground benign)
Environment	- Vibration		IEC 60068-2-6 5 g, 3 axis, sine sweep, 3x30 min, 5-500 Hz
	- Mechanical Shock		IEC 60068-2-27 50 g, 3 axis, half sine, 11 ms
	- Thermal Shock		MIL-STD-810F
Housing Type			Open Frame
Mounting Type			Chassis Mount
Connection Type			Pin Connector
Weight			210 g

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Power OK Signal			Open collector output
	- Trigger Threshold	12 VDC model:	10 - 10.8 VDC
		15 VDC model:	12.5 - 13.5 VDC
		18 VDC model:	15.3 - 16.2 VDC
		24 VDC model:	20 - 21.6 VDC
		28 VDC model:	24 - 25.2 VDC
		36 VDC model:	31 - 32.4 VDC
		48 VDC model:	41.5 - 43.2 VDC
		53 VDC model:	46 - 47.7 VDC
	- Power OK		Low level
	- Power Off		High resistance (Refers to 'PG' and '-Vout' Pin)
	- Pin Specifications		50 VDC / 50 mA max.
Sense Function			10% max. of Vout nom. (If sense function is not used, sense pins should be connected to output pins.)
Environmental Compliance	- REACH Declaration		www.tracopower.com/info/reach-declaration.pdf REACH SVHC list compliant REACH Annex XVII compliant
	- RoHS Declaration		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.)

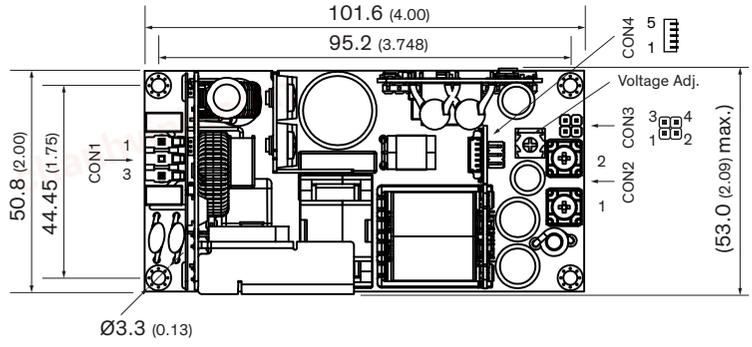
Supporting Documents

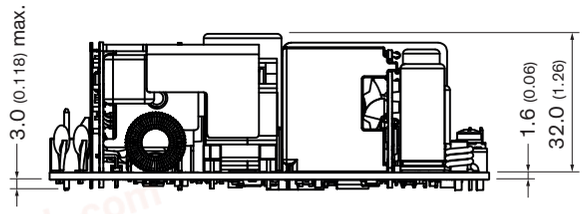
Overview Link (for additional Documents)	www.tracopower.com/overview/tpp300a-m

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Outline Dimensions





FRONT VIEW

All dimensions in mm (inch)

Tolerance: X.X ±0.5 (X.XX ±0.02)
X.XX ±0.25 (X.XXX ±0.01)

CON2 screw locked torque: max. 16.8 kgfcm / 1.65 Nm
wires 24 - 14 AWG

Input	
CON1	
Pin	Function
1	AC (L) / DC (+)
3	AC (N) / DC (–)

Output	
CON2	
Pin	Function
1	+ Vout
2	– Vout

Auxiliary	
CON3	
Pin	Function
1	+ Fan
2	– Fan
3	+ Sense
4	– Sense

Auxiliary	
CON4	
Pin	Function
1	+ Standby
2	– Standby
3	PG
4	– Remote
5	+ Remote

CON1: Molex Housing 09-50-8031
Molex Crimp Terminals 08500106 (2478), 08520112 (6838), 45570

CON2: KST Ring Terminal RVS2-3.7

CON3: Molex Housing 90143-0004
Molex Crimp Terminals 90119

CON4: Molex Housing 51021-0500
Molex Crimp Terminals 50058, 50078

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