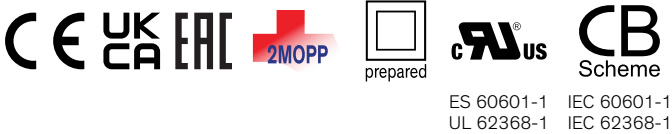


AC/DC Medical Power Supply

TPP 300-M Series, 300 Watt

- **High power-density: 300 Watt in 4.6"x2.44" package (encased)**
- **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 80°C**
- **Active power factor correction >0.9**
- **Operating up to 5000m altitude**
- **5-year product warranty**



The TPP 300-M series is a set of AC/DC power supplies in an encased package style. They feature a reinforced double I/O isolation (4000 VAC) system according to latest medical safety standards. The TPP 300-M 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 (4.6" x 2.44"). The operating temperature range is -40°C to +80°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-M 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.	Output Current peak	Efficiency typ.
TPP 300-112-M	300 W	12 VDC (10.8 - 13.2 VDC)	25'000 mA	30'000 mA	91 %
TPP 300-115-M		15 VDC (13.5 - 16.5 VDC)	20'000 mA	24'000 mA	92 %
TPP 300-124-M		24 VDC (21.6 - 26.4 VDC)	12'500 mA	15'000 mA	93 %
TPP 300-136-M		36 VDC (32.4 - 39.6 VDC)	8'330 mA	10'000 mA	93 %
TPP 300-148-M		48 VDC (43.2 - 52.8 VDC)	6'250 mA	7'500 mA	93 %
TPP 300-153-M		53 VDC (47.7 - 58.3 VDC)	5'670 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

Input Specifications

Input Voltage	- AC Range	Operational Range: 85 - 264 VAC (Full Range)
	- DC Range	Rated Range: 100 - 240 VAC (Full Range) Operational Range: 120 - 370 VDC (Designed for, no certification) Polarity: +DC: L / -DC: N
Input Frequency		47 - 63 Hz
Input Current	- Full Load & Vin = 230 VAC	1'600 mA max.
	- Full Load & Vin = 115 VAC	3'900 mA max.
Power Consumption	- At no load	3'000 mW typ.
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
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
Output Current Limitation		135 - 165% of Iout max.
		150% typ. of Iout max.
Overvoltage Protection		115 - 135% of Vout nom. (Latch off)

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

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/tpp300-m
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 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	- Electrostatic Discharge	EN 55024 (IT Equipment) EN 60601-1-2 edition 4 (Medical Devices) 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 +80°C
	- Storage Temperature	-40°C to +80°C
Power Derating	- High Temperature - Low Input Voltage	See application note: www.tracopower.com/overview/tpp300-m 2 %/V below 100 VAC
Over Temperature	- Protection Mode	118°C min. / 125°C typ. / 132°C max. (Automatic recovery at 112°C typ.)
Protection Switch Off	- Measurement Point	See application note: www.tracopower.com/overview/tpp300-m (Internal Thermistor)

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

Cooling System		Forced air cooling (with internal fan)
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 Material		Aluminum
Housing Type		Metal Case
Mounting Type		Chassis Mount
Connection Type		Pin Connector
Weight		318 g

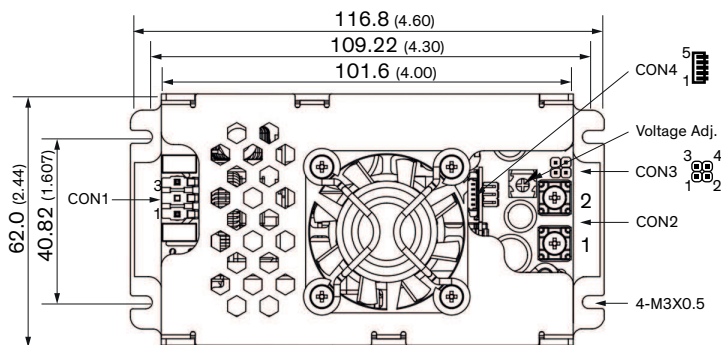
All specifications valid at nominal voltage, resistive full load and +25°C after warm-up time, unless otherwise stated.

Power OK Signal	- 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	Open collector output
	- Power OK		Low level
	- Power Off		High resistance
	- Pin Specifications		(Refers to 'PG' and '-Vout' Pin) 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.)

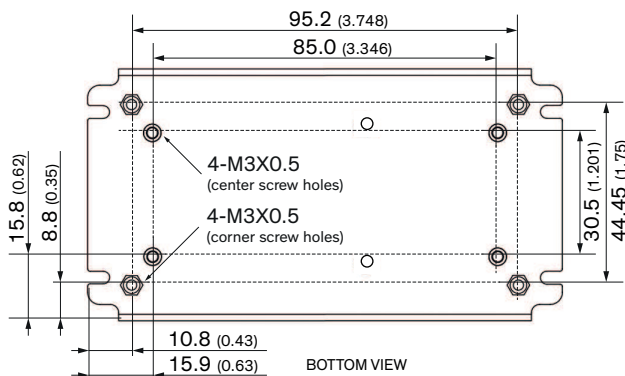
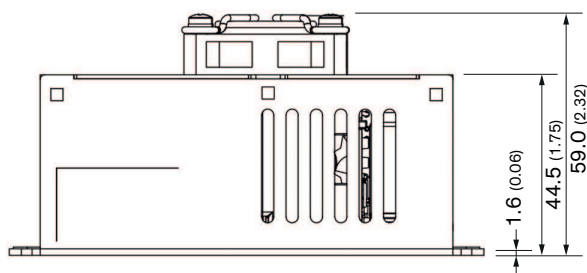
Supporting Documents	
Overview Link (for additional Documents)	www.tracopower.com/overview/tpp300-m

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

Outline Dimensions



TOP VIEW



BOTTOM VIEW

All dimensions in mm (inch)

Tolerance: X.X ± 0.5 ($\pm$ X.XX 0.02)

X.XX ± 0.25 ($\pm$ 0.01)

Max. screw penetration depth: 3.3 (0.130)

Setup screw locked torque: max. 2.5 kgfcm / 0.25 Nm

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