

AC/DC Power Supply

TMM 40 Series, 40 Watt

Not recommended for new designs

- Fully encapsulated low profile plastic casing in PCB version
- 2 x MOPP Medical safety according to AAMI/ANSI ES 60601-1:2005(R) and IEC/EN 60601-1 3rd edition
- IT and industrial safety according to IEC/EN/UL 62368-1
- Ready to meet ErP directive <0.3 W no load power consumption
- -40°C start-up temperature
- Safety class II prepared
- Protection against over-temperature, overload and short circuit
- 3-year product warranty



The TMM 40 Series of fully encapsulated 40 Watt AC/DC power supply modules feature a reinforced/double I/O isolation system according to latest medical safety standards 60601-3 3rd edition for 2 x MOPP (Means Of Patient Protection).

The high efficiency and the use of highest grade components make the units suitable for an operating temperature range of -40°C to +60°C without load derating. EMI/EMC characteristics and the safety approval package qualify these modules not only for medical devices but also for demanding applications in transportation systems and for equipment in industrial an commercial environment.

Models

Order Code	Output Power	Output 1		Output 2		Efficiency typ.
		Vnom	I _{max}	Vnom	I _{max}	
TMM 40105 *	40 W	5 VDC	8'000 mA			81 %
TMM 40112 *		12 VDC	3'330 mA			84 %
TMM 40115 *		15 VDC	2'660 mA			85 %
TMM 40124 *		24 VDC	1'660 mA			84 %
TMM 40212 *		+12 VDC	1'660 mA	-12 VDC	1'660 mA	84 %
TMM 40215 *		+15 VDC	1'330 mA	-15 VDC	1'330 mA	85 %

Note * Not recommended for new designs

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: irrelevant
Input Frequency		Operational Range: 47 - 440 Hz Certified: 50/60 Hz
Power Consumption	- No load & Vin = 230 VAC	750 mW max.
	- No load & Vin = 115 VAC	300 mW max.
Input Current	- Full load & Vin = 230 VAC	5 VDC model: 430 mA max.
		12 VDC model: 415 mA max.
		15 VDC model: 410 mA max.
		24 VDC model: 415 mA max.
		12 / -12 VDC model: 415 mA max.
	- Full load & Vin = 115 VAC	15 / -15 VDC model: 410 mA max.
		5 VDC model: 720 mA max.
		12 VDC model: 690 mA max.
		15 VDC model: 680 mA max.
		24 VDC model: 690 mA max.
12 / -12 VDC model: 690 mA max.		
15 / -15 VDC model: 680 mA max.		
Input Inrush Current	- At 230 VAC	60 A max.
	- At 115 VAC	30 A max.
Input Protection		T 2 A / 250 VAC (Internal Fuse in L & N)
Recommended Input Fuse		3'000 mA (slow blow) (The need of an external fuse has to be assessed in the final application.)

Output Specifications

Voltage Set Accuracy		±2% max.
Regulation	- Input Variation (Vmin - Vmax)	single output models: 0.5% max.
		dual output models: 0.5% max.
	- Load Variation (0 - 100%)	single output models: 1% max.
		dual output models: 2% max. (Output 1) 2% max. (Output 2)
Ripple and Noise (20 MHz Bandwidth)	- single output	5 VDC model: 90 mVp-p max.
		12 VDC model: 155 mVp-p max.
		15 VDC model: 195 mVp-p max.
		24 VDC model: 310 mVp-p max.
	- dual output	12 / -12 VDC model: 155 / 155 mVp-p max.
	15 / -15 VDC model: 195 / 195 mVp-p max.	
	- single output	5 VDC model: 80 mVp-p typ.
		12 VDC model: 120 mVp-p typ.
		15 VDC model: 150 mVp-p typ.
		24 VDC model: 240 mVp-p typ.
- dual output	12 / -12 VDC model: 120 / 120 mVp-p typ.	
15 / -15 VDC model: 150 / 150 mVp-p typ.		
Capacitive Load	- single output	5 VDC model: 8'000 µF max.
		12 VDC model: 3'900 µF max.
		15 VDC model: 3'900 µF max.
		24 VDC model: 680 µF max.
	- dual output	12 / -12 VDC model: 1'500 / 1'500 µF max.
		15 / -15 VDC model: 1'000 / 1'000 µF max.
Minimum Load		Not required
Temperature Coefficient		±0.02 %/K max.

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

Hold-up Time	- At 230 VAC - At 115 VAC	50 ms min. 10 ms min.
Start-up Overshoot Voltage		5% max.
Short Circuit Protection		Continuous, Automatic recovery
Output Current Limitation		105% min. of I _{out} max.
Overvoltage Protection		120% typ. of V _{out} nom. (By Zener diode)

Safety Specifications

Standards	- IT / Multimedia Equipment - Industrial Control Equipment - Medical Equipment - Certification Documents	EN 60950-1 EN 62368-1 IEC 60950-1 IEC 62368-1 UL 60950-1 UL 62368-1 UL 508 EN 60601-1 IEC 60601-1 ANSI/AAMI ES 60601-1 CSA-C22.2, No 60601-1 2 x MOPP (Means Of Patient Protection) www.tracopower.com/overview/tmm40
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 61000-6-3 (Generic Residential) EN 61000-6-4 (Generic Industrial) EN 55011 class A (internal filter) EN 55011 class B (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)
	- Radiated Emissions	EN 55011 class A (internal filter) EN 55011 class B (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)

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

EMS (Immunity)	<ul style="list-style-type: none"> - Electrostatic Discharge - RF Electromagnetic Field - EFT (Burst) / Surge - Conducted RF Disturbances - PF Magnetic Field - Voltage Dips & Interruptions 	EN 61000-6-1 (Generic Residential) EN 61000-6-2 (Generic Industrial) EN 60601-1-2 edition 4 (Medical Devices) EN 55024 (IT Equipment) EN 55035 (Multimedia) Air: EN 61000-4-2, ± 15 kV, perf. criteria A Contact: EN 61000-4-2, ± 8 kV, perf. criteria A EN 61000-4-3, 10 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, 10 V _{rms} , 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 >95%, 0.5 periods, perf. criteria A >95%, 1 period, perf. criteria A >95%, 250 periods, perf. criteria B
EMC / Environmental	- Certification Documents	www.tracopower.com/overview/tmm40

General Specifications

Relative Humidity		95% max. (non condensing)
Temperature Ranges	<ul style="list-style-type: none"> - Operating Temperature - Storage Temperature 	-40°C to +80°C -40°C to +95°C
Power Derating	- High Temperature	3.75 %/K above 60°C
		See application note: www.tracopower.com/overview/tmm40
Over Temperature Protection Switch Off	<ul style="list-style-type: none"> - Protection Mode - Measurement Point 	142°C typ. (Automatic recovery at 67°C typ.) Internal IC temperature
Cooling System		Natural convection (20 LFM)
Altitude During Operation		5'000 m max.
Switching Frequency		130 kHz typ. (PWM)
Insulation System		Reinforced Insulation
Working Voltage (rated)		240 VAC
Isolation Test Voltage	- Input to Output, 60 s	4'000 VAC
Isolation Resistance	- Input to Output, 500 VDC	1'000 M Ω min.
Leakage Current	- Touch Current	100 μ A max.
Reliability	- Calculated MTBF	200'000 h (MIL-HDBK-217F, ground benign)
Washing Process		Not allowed
Housing Material		Plastic resin (UL 94 V-0 rated)
Potting Material		Silicone (UL 94 V-0 rated)
Pin Material		Copper Alloy (C6801)
Pin Foundation Plating		Nickel (2 - 4 μ m)
Pin Surface Plating		Tin (3 - 5 μ m), matte
Housing Type		Plastic Case
Mounting Type		PCB Mount
Connection Type		THD (Through-Hole Device)
Soldering Profile		Lead-Free Wave Soldering 260°C / 10 s max.
Weight		310 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)

(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/tmm40

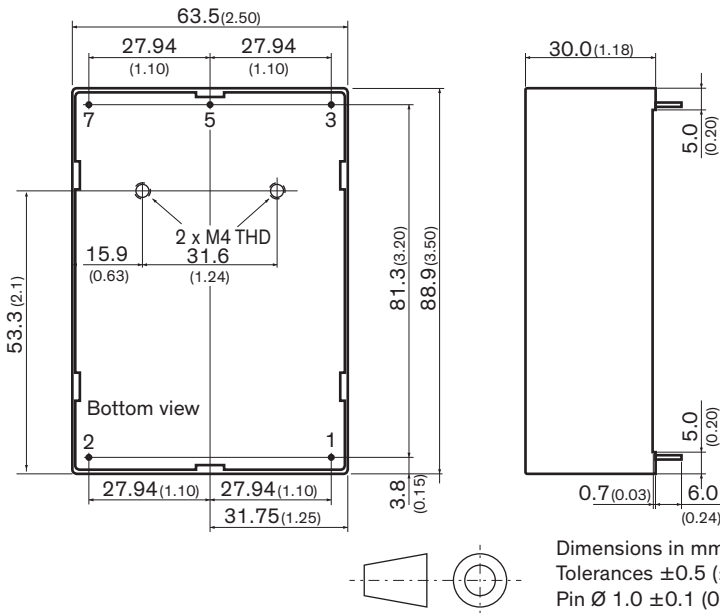
Frequently Asked Questions

www.tracopower.com/glossary-faq

Glossary

www.tracopower.com/info/glossary.pdf

Outline Dimensions



Pinout

Pin	Single Output	Dual Output
1	AC (N)	AC (N)
2	AC (L)	AC (L)
3	+Vout	+Vout
5	-Vout	Common
7	NC	-Vout

NC: Not connected