TRACO POWER

AC/DC Power Supply

TMM 24C Series, 24 Watt

- **Fully encapsulated low profile plastic casing in chassis mount 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 and UL 508**
- **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**

2MOPP prepared

UL 508 | ES 60601-1 UL 62368-1 | IEC 60601-1 IEC 62368-1

The TMM 24C Series of fully encapsulated 24 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 +65°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 Vnom	Output 1 Imax	Output 2 Vnom	Output 2 Imax	Efficiency typ.
TMM 24105C	15 W	5 VDC	3'000 mA			77 %
TMM 24112C		12 VDC	2'000 mA			83 %
TMM 24115C		15 VDC	1'600 mA			82 %
TMM 24124C	24 W	24 VDC	1'000 mA			85 %
TMM 24212C		+12 VDC	1'000 mA	−12 VDC	1'000 mA	84 %
TMM 24215C		+15 VDC	800 mA	−15 VDC	800 mA	84 %

Options

TMP-MK1	- Optional DIN-Rail Mounting Kit: www.tracopower.com/overview/tmp-mk1

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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:	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:	170 mA max.
		12 VDC model:	255 mA max.
		15 VDC model:	255 mA max.
		24 VDC model:	250 mA max.
		dual output models:	250 mA max.
	- Full load & Vin = 115 VAC	5 VDC model:	285 mA max.
		12 VDC model:	420 mA max.
		15 VDC model:	425 mA max.
		24 VDC model:	410 mA max.
		dual output models:	415 mA max.
Input Inrush Current	- At 230 VAC		40 A max.
	- At 115 VAC		20 A max.
Input Protection			T 2 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

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:	3% max. (Output 1)
			3% 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:	2'200 µF max.
		12 VDC model:	1'000 µF max.
		15 VDC model:	680 µF max.
		24 VDC model:	470 µF max.
	- dual output	12 / -12 VDC model:	470 / 470 µF max.
		15 / -15 VDC model:	330 / 330 µF max.
Minimum Load			Not required
Temperature Coefficient			±0.02 %/K max.
Hold-up Time	- At 230 VAC		50 ms min.
	- At 115 VAC		10 ms min.
Start-up Overshoot Voltage			5% max.
Short Circuit Protection			Continuous, Automatic recovery

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

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Output Current Limitation		105% min. of Iout max.
Overvoltage Protection		120% typ. of Vout nom. (By Zener diode)

Safety Specifications

Standards	- IT / Multimedia Equipment		EN 60950-1
			EN 62368-1
			IEC 60950-1
			IEC 62368-1
			UL 60950-1
			UL 62368-1
	- Industrial Control Equipment		UL 508
	- Medical Equipment		EN 60601-1
			IEC 60601-1
			ANSI/AAMI ES 60601-1
			CSA-C22.2, No 60601-1
			2 x MOPP (Means Of Patient Protection)
	- Certification Documents		www.tracopower.com/tmm24c-safety-cert
Protection Class			Class I & II (Prepared): Reinforced Insulation
		See application note:	www.tracopower.com/info/protection-class.pdf
Energy Source	- Output, acc. to 62368-1		ES1
Power Source	- Output, acc. to 62368-1		PS3
Pollution Degree			PD 2
Over Voltage Category			OVC II

EMC Specifications

EMI (Emissions)			EN 61000-6-3 (Generic Residential)
			EN 61000-6-4 (Generic Industrial)
	- Conducted 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)
	- 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)
EMS (Immunity)			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)
	- 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, 10 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, ±1 kV, perf. criteria A
	- Conducted RF Disturbances		EN 61000-4-6, 10 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
EMC / Environmental	- Certification Documents		www.tracopower.com/tmm24c-emc-cert

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

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General Specifications

Relative Humidity		95% max. (non condensing)
Temperature Ranges	- Operating Temperature	–40°C to +80°C
	- Storage Temperature	–40°C to +95°C
Power Derating	- High Temperature	5.0 %/K above 65°C
	See application note:	www.tracopower.com/tmm24c-cc
Over Temperature Protection Switch Off	- Protection Mode	142°C typ. (Automatic recovery at 67°C typ.)
	- Measurement Point	Internal IC temperature
Cooling System		Natural convection (20 LFM)
Altitude During Operation		5'000 m max.
Switching Frequency		132 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 MΩ min.
Leakage Current	- Touch Current	100 µA max.
Reliability	- Calculated MTBF	400'000 h (MIL-HDBK-217F, ground benign)
Housing Material		Plastic resin (UL 94 V-0 rated)
Potting Material		Silicone (UL 94 V-0 rated)
Housing Type		Plastic Case
Mounting Type		Chassis Mount
Connection Type		Screw Terminal
Weight		147 g
Status Indicator		Indicated by green LED
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: 6(c), 7(a) (RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule).)
	- SCIP Reference Number	7da9e177-824c-479c-b20d-87383ae4c6b6

Additional Information

Supporting Documents	www.tracopower.com/overview/tmm24c
Frequently Asked Questions	www.tracopower.com/glossary-faq
Glossary	www.tracopower.com/info/glossary.pdf

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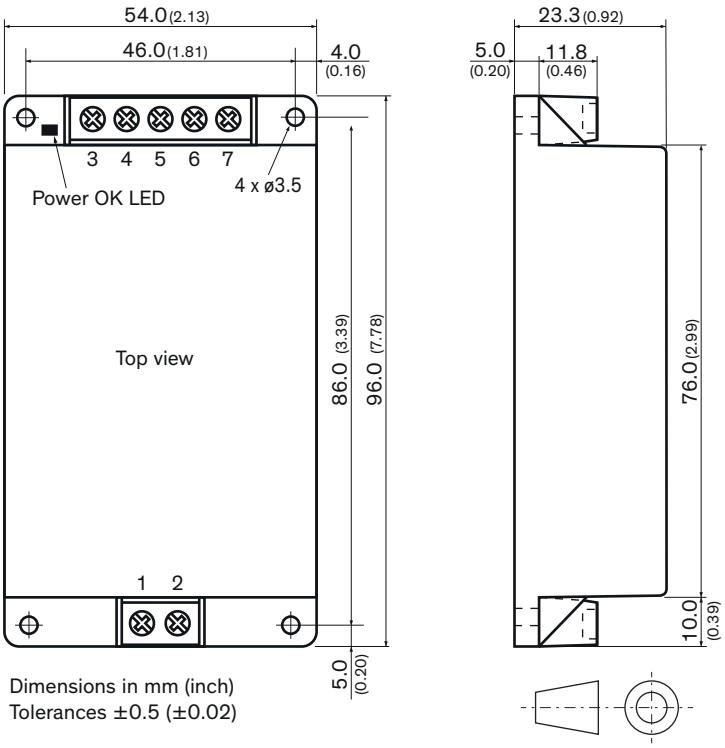
Outline Dimensions



Dimensions in mm (inch)
Tolerances ±0.5 (±0.02)

Mounting screw tightening torque: Max. 0.5 Nm (5.1 kgfcm)
Terminal screw tightening torque: Max. 0.5 Nm (5.1 kgfcm)

Pinout		
Pin	**Single Output**	**Dual Output**
1	AC (N)	AC (N)
2	AC (L)	AC (L)
3	NC	NC
4	–Vout	–Vout
5	NC	Common
6	+Vout	+Vout
7	NC	NC

NC: Not connected

Wire dimension: 1.5 mm² (16 AWG) max.

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