



### Features

- ◆ Fully encapsulated low profile plastic casing in PCB- or 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 60950-1 and UL 508
- ◆ Ready to meet ErP directive <0.3W 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



### Also available with 40 and 60 Watt!

TMM 40 Series, 40 Watt:

[www.tracopower.com/products/tmm40.pdf](http://www.tracopower.com/products/tmm40.pdf)

TMM 60 Series, 60 Watt:

[www.tracopower.com/products/tmm60.pdf](http://www.tracopower.com/products/tmm60.pdf)

The TMM 24 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 while it goes up to 80°C with 50% 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.

### 24 Watt Models

Order code		Output power max.	Output 1	Output 2	Efficiency
PCB mount	Chassis mount				
TMM 24105	TMM 24105C	15 W	5.0 VDC / 3000 mA		76 %
TMM 24112	TMM 24112C	24 W	12 VDC / 2000 mA		82 %
TMM 24115	TMM 24115C		15 VDC / 1600 mA		82 %
TMM 24124	TMM 24124C		24 VDC / 1000 mA		82 %
TMM 24212	TMM 24212C		+12 VDC / 1000 mA	-12 VDC / 1000 mA	82 %
TMM 24215	TMM 24215C		+15 VDC / 800 mA	-15 VDC / 800 mA	82 %

### Input Specifications

Input voltage	<ul style="list-style-type: none"> <li>- nominal</li> <li>- AC range (universal input)</li> <li>- DC range</li> </ul>	100 – 240 VAC 85 – 264 VAC 120 – 370 VDC
Input frequency		47 – 440 Hz
Input current at full load (115 VAC / 230 VAC nominal input)	5.0 VDC model: other models:	285 mA / 170 mA typ. 425 mA / 255 mA typ
Leakage current		80 $\mu$ A typ.
No-load power consumption		<0.3 W
Internal fuse		T2A 250VAC (both life and neutral)

### Output Specifications

Voltage set accuracy		$\pm$ 2%
Minimum load		no minimum load required
Regulation	<ul style="list-style-type: none"> <li>- Input variation</li> <li>- Load variation (0-100%)</li> </ul>	0.5% typ. single output models: 0.5% typ. dual output models: 2.5% typ.
Temperature coefficient		0.02 %/°C
Ripple and noise (20 MHz bandwidth)	5.0 VDC model: other models:	<1.8% of Vout [Vp-p] max. <1.3% of Vout [Vp-p] max.
Current limitation		above 105 % of rated output current. hicup, auto recovery
Overvoltage protection by Zehner diode (main output only)		120 % of Vout typ.
Short circuit protection		continuous
Max. capacitive load	5.0 VDC model: 12 VDC model: 15 VDC model: 24 VDC model: $\pm$ 12 VDC model: $\pm$ 15 VDC model:	2200 $\mu$ F 1000 $\mu$ F 680 $\mu$ F 480 $\mu$ F 470 $\mu$ F (each output) 330 $\mu$ F (each output)

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

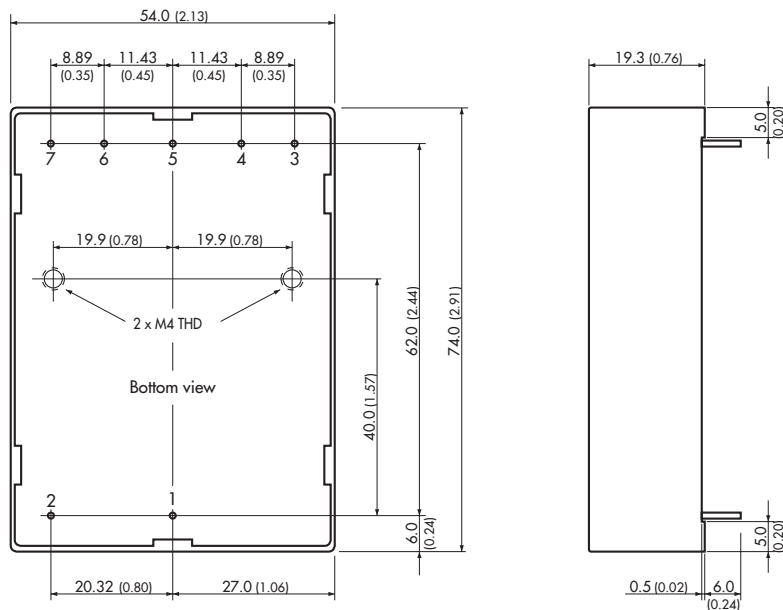
## General Specifications

Temperature ranges	<ul style="list-style-type: none"> <li>- Operating (natural convection cooling 20 LFM)</li> <li>- Power derating above +65°C</li> <li>- Storage (non operating)</li> </ul>	-40°C to +80°C 5.0 %/K -40°C to +95°C
Over temperature protection		shutdown: at 90°C automatic recovery: at approx 67°C
Humidity (non condensing)		95 % rel max.
Altitude during operation		5000 m
Switching frequency (pulse width modulation PWM)		132 kHz typ.
Hold-up time		115 VAC: 20 ms typ. 230 VAC: 80 ms typ.
Isolation voltage	- Input/Output	4'000 VAC
Isolation resistance	- at 500 VDC	1'000 MOhm
Reliability /calculated MTBF (MIL-HDBK-217F, at +25°C, ground benign)		>400'000 h
EMI / RFI conducted and radiated		EN 55022, class B, FCC part 15, level B EN 55011 class B
Electromagnets compatibility (EMC), immunity	<ul style="list-style-type: none"> <li>- Electrostatic discharge ESD</li> <li>- RF field immunity</li> <li>- Electrical fast transients/burst immunity</li> <li>- Surge</li> <li>- Conducted RF</li> <li>- Magnetic field immunity</li> </ul>	IEC / EN 61000-4-2, 8kV/4kV perf. criteria B IEC / EN 61000-4-3, 10V/m perf. criteria A IEC / EN 61000-4-4, ± 2kV perf. criteria B IEC / EN 61000-4-5, ± 1kV/± 2kV perf. criteria B IEC / EN 61000-4-6, 10 Vr.m.s perf. criteria B IEC / EN 61000-4-8, 30A/m perf. criteria A
Voltage dip and interruptions according to EN 61000-4-11 reference: 115 VAC / 60Hz		30%, 10ms perf. criteria B 60%, 100ms perf. criteria C 95%, 5000ms perf. criteria C
Protection class II		according IEC/EN 60536
Safety standards		UL 60950-1, IEC/EN 60950-1, IEC 60601-1 3rd edition, 2 x MOPP ANSI/AAMI ES 60601-1:2005(R)2012 UL 508 for chassis mount version
Safety approvals and certifications	<ul style="list-style-type: none"> <li>- UL online certification (ES60601-1:2005(R)2012)</li> <li>- UL certificate (UL 60950-1)</li> <li>- UL approval for UL 508 (chassis mount models only)</li> <li>- CB certificate (60601-1 3rd edition 2 x MOPP)</li> <li>- CB certificate (IEC/EN 60950-1)</li> </ul>	<a href="http://www.ul.com">www.ul.com</a> File e188913, copy: e188913qqhm2.pdf <a href="http://www.ul.com">www.ul.com</a> File e188913, copy: e188913qqgq2.pdf <a href="http://www.ul.com">www.ul.com</a> -> certifications -> File: e322109 <a href="http://www.tracopower.com/products/imm24-cb60601.pdf">www.tracopower.com/products/imm24-cb60601.pdf</a> <a href="http://www.tracopower.com/products/imm24-cb60950.pdf">www.tracopower.com/products/imm24-cb60950.pdf</a>
Casing material		plastic resin + fiberglass (UL 94V-0 rated)
Environmental compliance	<ul style="list-style-type: none"> <li>- Reach</li> <li>- RoHS</li> </ul>	<a href="http://www.tracopower.com/products/reach-declaration.pdf">www.tracopower.com/products/reach-declaration.pdf</a> RoHS directive 2011/65/EU

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**Outline Dimensions**

**TMM 24:**  
for PCB mount:



Pin diameter  $\varnothing$  1.0 mm (0.039)

**Weight: 137 g (4.83oz)**

**TMM 24C:**  
for chassis mount:



**Weight: 147 g (5.19oz)**

**Pinout / Connection**

Pin/con.	Single	Dual
1	AC (N)	AC (N)
2	AC (L)	AC(L)
3	No Pin / NC	No Pin / NC
4	-Vout	-Vout
5	No Pin / NC	Common
6	+Vout	+Vout
7	No Pin / NC	No Pin / NC

NC = not to connect

Dimensions in [mm], ( ) = Inches  
Tolerances = 0.5mm (0.02)

Specifications can be changed without notice! Make sure you are using the latest documentation, downloadable at [www.tracopower.com](http://www.tracopower.com)