AC/DC Power Supply  TMM 40 Series, 40 Watt

- 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 and commercial environment.

<table>
<thead>
<tr>
<th>Models</th>
<th>Order Code</th>
<th>Output Power</th>
<th>Output 1</th>
<th>Efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Order Code</td>
<td>Output Power</td>
<td>Output 1</td>
<td>Efficiency</td>
</tr>
<tr>
<td>TMM 40105</td>
<td>40 W</td>
<td>5 VDC</td>
<td>8'000 mA</td>
<td>81 %</td>
</tr>
<tr>
<td>TMM 40112</td>
<td>12 VDC</td>
<td>3'330 mA</td>
<td>84 %</td>
<td></td>
</tr>
<tr>
<td>TMM 40115</td>
<td>15 VDC</td>
<td>2'660 mA</td>
<td>85 %</td>
<td></td>
</tr>
<tr>
<td>TMM 40124</td>
<td>24 VDC</td>
<td>1'660 mA</td>
<td>84 %</td>
<td></td>
</tr>
<tr>
<td>TMM 40212</td>
<td>+12 VDC</td>
<td>1'660 mA</td>
<td>–12 VDC</td>
<td>84 %</td>
</tr>
<tr>
<td>TMM 40215</td>
<td>+15 VDC</td>
<td>1'330 mA</td>
<td>–15 VDC</td>
<td>85 %</td>
</tr>
</tbody>
</table>

www.tracopower.com September 20, 2023
Input Specifications

<table>
<thead>
<tr>
<th>Input Voltage</th>
<th>AC Range</th>
<th>DC Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>operational range</td>
<td>85 - 264 VAC (Full Range)</td>
<td>120 - 370 VDC (Designed for, no certification)</td>
</tr>
<tr>
<td>rated range</td>
<td>100 - 240 VAC (Full Range)</td>
<td></td>
</tr>
<tr>
<td>Polarity</td>
<td>irrelevant</td>
<td></td>
</tr>
</tbody>
</table>

Operational Range: 47 - 440 Hz
Certified: 50/60 Hz

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.
  - 15 / -15 VDC model: 410 mA max.

- Full Load & Vin = 115 VAC
  - 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.

Power Consumption

- No load & Vin = 230 VAC: 750 mW max.
- No load & Vin = 115 VAC: 300 mW 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

<table>
<thead>
<tr>
<th>Voltage Set Accuracy</th>
<th>±2% max.</th>
</tr>
</thead>
</table>

Regulation

- Input Variation (Vin - 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)
  - dual output models: 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.
- 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.

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

### Output Current Limitation
105% min. of Iout max.

### Overvoltage Protection
120% typ. of Vout nom. (By Zener diode)

### Safety Specifications

<table>
<thead>
<tr>
<th>Safety Standards</th>
<th>Standards Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>- IT / Multimedia Equipment</td>
<td>EN 60950-1, EN 62368-1, IEC 60950-1, IEC 62368-1, UL 60950-1, UL 62368-1</td>
</tr>
<tr>
<td>- Industrial Control Equipment</td>
<td>UL 508</td>
</tr>
<tr>
<td>- Medical Equipment</td>
<td>EN 60601-1, IEC 60601-1, ANSI/AAMI ES 60601-1, CSA-C22.2, No 60601-1</td>
</tr>
<tr>
<td>- Certification Documents</td>
<td>2 x MOPP (Means Of Patient Protection)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Protection Class</th>
<th>Class I &amp; II (Prepared: Reinforced Insulation)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Over Voltage Category</td>
<td>OVC II</td>
</tr>
</tbody>
</table>

### EMC Specifications

<table>
<thead>
<tr>
<th>EMI Emissions</th>
<th>Standards Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Conducted Emissions</td>
<td>EN 61000-6-3 (Generic Residential), EN 61000-6-4 (Generic Industrial)</td>
</tr>
<tr>
<td>- Radiated Emissions</td>
<td>EN 55011 class B (internal filter), EN 55032 class B (internal filter), FCC Part 15 class B (internal filter)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EMS Immunity</th>
<th>Standards Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Electrostatic Discharge</td>
<td>EN 61000-4-2, ±15 kV, perf. criteria A</td>
</tr>
<tr>
<td>Contact:</td>
<td>EN 61000-4-2, ±8 kV, perf. criteria A</td>
</tr>
<tr>
<td>- RF Electromagnetic Field</td>
<td>EN 61000-4-3, 10 V/m, perf. criteria A</td>
</tr>
<tr>
<td>- EFT (Burst) / Surge</td>
<td>EN 61000-4-4, ±2 kV, perf. criteria A</td>
</tr>
<tr>
<td>L to L:</td>
<td>EN 61000-4-5, ±1 kV, perf. criteria A</td>
</tr>
<tr>
<td>- Conducted RF Disturbances</td>
<td>EN 61000-4-6, 10 Vrms, perf. criteria A</td>
</tr>
<tr>
<td>Continuous:</td>
<td>EN 61000-4-8, 30 A/m, perf. criteria A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>General Specifications</th>
<th>Standards Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relative Humidity</td>
<td>95% max. (non condensing)</td>
</tr>
<tr>
<td>Temperature Ranges</td>
<td>- Operating Temperature: -40°C to +80°C</td>
</tr>
<tr>
<td></td>
<td>- Storage Temperature: -40°C to +95°C</td>
</tr>
</tbody>
</table>

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

3.75 %/K above 60°C

See application note: [www.tracopower.com/overview/tmm40](http://www.tracopower.com/overview/tmm40)

## Over Temperature Protection Switch Off
- **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 MΩ min.

## Leakage Current
- Touch Current
- 100 µA 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 µm)

## Pin Surface Plating
Tin (3 - 5 µm), 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

## Environmental Compliance
- **REACH Declaration**
  [www.tracopower.com/info/reach-declaration.pdf](http://www.tracopower.com/info/reach-declaration.pdf)
- **RoHS Declaration**
- **SCIP Reference Number**
  fadb5307-b3f5-476e-a12d-7e37a33a0fc8

## Supporting Documents
- **Overview Link** (for additional Documents)
  [www.tracopower.com/overview/tmm40](http://www.tracopower.com/overview/tmm40)

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

Dimensions in mm (inch)
Tolerances ±0.5 (±0.02)
Pin Ø 1.0 ±0.1 (0.04 ±0.004)
Pin pitch tolerances ±0.25 (±0.01)

Pinout

<table>
<thead>
<tr>
<th>Pin</th>
<th>Single Output</th>
<th>Dual Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>AC (N)</td>
<td>AC (N)</td>
</tr>
<tr>
<td>2</td>
<td>AC (L)</td>
<td>AC (L)</td>
</tr>
<tr>
<td>3</td>
<td>+Vout</td>
<td>+Vout</td>
</tr>
<tr>
<td>5</td>
<td>–Vout</td>
<td>Common</td>
</tr>
<tr>
<td>7</td>
<td>NC</td>
<td>–Vout</td>
</tr>
</tbody>
</table>

NC: Not connected