

- Fully encapsulated, dust resistant, and waterproof (IP68 certified)
- Operating temperature range -20° to +80°C
- Mountable in wall outlet boxes
- Safety approval IEC/EN 62368-1 and IEC/EN 60335-1
- 2xMOPP certified according to IEC/EN 60601-1 3rd edition
- Leakage current < 100 µA for body-floating (BF) applications
- I/O isolation 4000 VAC (reinforced)
- Short-circuit protection (SCP), overvoltage protection (OVP) and overtemperature protection (OTP)
- 5-year product warranty



The TMW 36P is a series of fully encapsulated AC/DC power supplies designed for medical, household, and industrial applications. All models come in compact, dust resistant, and waterproof IP68 housings, are IEC/EN 62368-1, IEC/EN 60335-1 and IEC/EN 60601-1 3rd edition compliant and are certified for 2xMOPP. Featuring a reinforced isolation, the TMW 36P power supplies are prepared for protection class II applications. Their wide operating temperature range from -20°C to +80°C makes them ideal candidates for demanding applications.

| Models      |                      |                        |                        |                    |
|-------------|----------------------|------------------------|------------------------|--------------------|
| Order Code  | Output Power<br>max. | Output Voltage<br>nom. | Output Current<br>max. | Efficiency<br>typ. |
| TMW 36-112P | 36 W                 | 12 VDC                 | 3'000 mA               | 87 %               |
| TMW 36-124P |                      | 24 VDC                 | 1'500 mA               | 88 %               |

## Input Specifications

|                        |                                                                                                                              |
|------------------------|------------------------------------------------------------------------------------------------------------------------------|
| Input Voltage          | Operational Range: 85 - 264 VAC (Full Range)<br>Rated Range: 100 - 240 VAC (Full Range)                                      |
| Input Frequency        | Operational Range: 47 - 63 Hz<br>Certified: 50/60 Hz                                                                         |
| Power Consumption      | - No load & $V_{in} = 230$ VAC<br>- No load & $V_{in} = 115$ VAC<br>200 mW max. (Ready to meet ErP directive)<br>200 mW max. |
| Input Inrush Current   | - At 230 VAC<br>- At 115 VAC<br>50 A max.<br>25 A max.                                                                       |
| Power Factor           | - At 230 VAC<br>- At 115 VAC<br>0.45 min.<br>0.55 min.                                                                       |
| Input Protection       | T 2 A (Internal Fuse)                                                                                                        |
| Recommended Input Fuse | (The need of an external fuse has to be assessed in the final application.)                                                  |

## Output Specifications

|                                        |                                                                                                                        |
|----------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| Voltage Set Accuracy                   | $\pm 2\%$ max.                                                                                                         |
| Regulation                             | - Input Variation ( $V_{min} - V_{max}$ )<br>- Load Variation (10 - 90%)<br>0.5% max.<br>1% max.                       |
| Ripple and Noise<br>(20 MHz Bandwidth) | 12 VDC model: 195 mVp-p max. (w/ 0.1 $\mu$ F / 50 V)<br>24 VDC model: 195 mVp-p max.                                   |
| Capacitive Load                        | 10'000 $\mu$ F max.                                                                                                    |
| Minimum Load                           | Not required                                                                                                           |
| Temperature Coefficient                | $\pm 2$ %/K max.                                                                                                       |
| Hold-up Time                           | - At 230 VAC<br>- At 115 VAC<br>40 ms min.<br>7 ms min.                                                                |
| Start-up Time                          | - At 230 VAC<br>- At 115 VAC<br>500 ms max.<br>500 ms max.                                                             |
| Start-up Overshoot Voltage             | 5% max.                                                                                                                |
| Short Circuit Protection               | Continuous, Automatic recovery                                                                                         |
| Output Current Limitation              | 105 - 150% of $I_{out}$ max.                                                                                           |
| Overvoltage Protection                 | 120 - 160% of $V_{out}$ nom.<br>130% typ. of $V_{out}$ nom.                                                            |
| Transient Response                     | - Response Deviation<br>- Response Time<br>5% max. (10% to 90% Load Step)<br>2'000 $\mu$ s max. (10% to 90% Load Step) |

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

## Safety Specifications

|                       |                             |                                                                                                                      |
|-----------------------|-----------------------------|----------------------------------------------------------------------------------------------------------------------|
| Standards             | - IT / Multimedia Equipment | EN 62368-1<br>IEC 62368-1<br>UL 62368-1                                                                              |
|                       | - Household                 | EN 60335-1<br>IEC 60335-1                                                                                            |
|                       | - Medical Equipment         | EN 60601-1<br>IEC 60601-1<br>ANSI/AAMI ES 60601-1<br>CSA-C22.2, No 60601-1<br>2 x MOPP (Means Of Patient Protection) |
|                       | - LED Modules Controlgear   | EN 61347-2-13                                                                                                        |
|                       | - Luminaires for Furniture  | VDE 0710-14                                                                                                          |
|                       | - Power Transformers        | EN 61558-1<br>IEC 61558-1<br>EN 61558-2-8<br>IEC 61558-2-8<br>EN 61558-2-16<br>IEC 61558-2-16                        |
|                       | - Certification Documents   | <a href="http://www.tracopower.com/overview/tmw36p">www.tracopower.com/overview/tmw36p</a>                           |
| Protection Class      |                             | Class I & II (Prepared): Reinforced Insulation                                                                       |
| Pollution Degree      |                             | PD 2                                                                                                                 |
| Over Voltage Category |                             | OVC II                                                                                                               |

## EMC Specifications

|                     |                                |                                                                                                                                                                                                                            |
|---------------------|--------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EMI (Emissions)     |                                | EN 61000-6-3 (Generic Residential)<br>EN 61204-3 (Low Voltage Power Supplies)                                                                                                                                              |
|                     | - Conducted Emissions          | EN 55011 class B (internal filter)<br>EN 55032 class B (internal filter)                                                                                                                                                   |
|                     | - Radiated Emissions           | EN 55011 class B (internal filter)<br>EN 55032 class B (internal filter)                                                                                                                                                   |
|                     | - Harmonic Current Emissions   | EN 61000-3-2, class A                                                                                                                                                                                                      |
| EMS (Immunity)      |                                | EN 61000-6-2 (Generic Industrial)<br>EN 60601-1-2 edition 4.1 (Medical Devices)                                                                                                                                            |
|                     | - RF Electromagnetic Field     | EN 61000-4-3, 10 V/m, perf. criteria A                                                                                                                                                                                     |
|                     | - EFT (Burst) / Surge          | EN 61000-4-4, $\pm 2$ kV, perf. criteria A                                                                                                                                                                                 |
|                     |                                | L to L: EN 61000-4-5, $\pm 1$ 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<br>20%, 250 periods, perf. criteria A<br>30%, 25 periods, perf. criteria A<br>60%, 10 periods, perf. criteria A<br>>95%, 5 periods, perf. criteria B<br>>95%, 250 periods, perf. criteria B |
|                     |                                | 115 VAC / 60 Hz: EN 61000-4-11<br>20%, 250 periods, perf. criteria A<br>30%, 25 periods, perf. criteria B<br>60%, 10 periods, perf. criteria B<br>>95%, 5 periods, perf. criteria B<br>>95%, 250 periods, perf. criteria B |
| EMC / Environmental | - Certification Documents      | <a href="http://www.tracopower.com/overview/tmw36p">www.tracopower.com/overview/tmw36p</a>                                                                                                                                 |

## General Specifications

|                    |                         |                |
|--------------------|-------------------------|----------------|
| Relative Humidity  |                         | 100% max.      |
| Temperature Ranges | - Operating Temperature | -20°C to +80°C |
|                    | - Storage Temperature   | -40°C to +90°C |

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

|                                         |                                 |                                                                                                                                                                                                                                                                    |
|-----------------------------------------|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Power Derating                          | - High Temperature              | 2 %/K above 50°C (at $V_{in} \geq 187$ VAC)<br>2 %/K above 40°C (at $V_{in} < 187$ VAC)                                                                                                                                                                            |
|                                         | - Low Input Voltage             | 2 %/V below 100 VAC                                                                                                                                                                                                                                                |
| Over Temperature Protection Switch Off  | - Protection Mode               | 85°C min. / 90°C typ. / 95°C max. (Automatic recovery)                                                                                                                                                                                                             |
|                                         | - Measurement Point             | Case                                                                                                                                                                                                                                                               |
| Cooling System                          |                                 | Natural convection (20 LFM)                                                                                                                                                                                                                                        |
| Altitude During Operation               |                                 | 5'000 m max. (4'000 m max. for IEC 61558-2-8)                                                                                                                                                                                                                      |
| Regulator Topology                      |                                 | Flyback Converter                                                                                                                                                                                                                                                  |
| Switching Frequency                     |                                 | 25 - 140 kHz (PWM QR)                                                                                                                                                                                                                                              |
| Insulation System                       |                                 | Reinforced Insulation                                                                                                                                                                                                                                              |
| Isolation Test Voltage                  | - Input to Output, 60 s         | 4'000 VAC                                                                                                                                                                                                                                                          |
|                                         | - Input to Output, 1 s          | 4'000 VAC                                                                                                                                                                                                                                                          |
| Creepage                                | - Input to Output               | 8 mm min.                                                                                                                                                                                                                                                          |
| Clearance                               | - Input to Output               | 8 mm min.                                                                                                                                                                                                                                                          |
| Isolation Resistance                    | - Input to Output, 500 VDC      | 100 MΩ min.                                                                                                                                                                                                                                                        |
| Isolation Capacitance                   | - Input to Output, 100 kHz, 1 V | 1'100 pF typ. / 1'300 pF max.                                                                                                                                                                                                                                      |
| Leakage Current<br>(at 240 VAC / 60 Hz) | - Touch Current                 | 100 μA max.                                                                                                                                                                                                                                                        |
| Distance Through Isolation              |                                 | 2 mm                                                                                                                                                                                                                                                               |
| Reliability                             | - Calculated MTBF               | 3'400'000 h (see application note) (IEC 61709)                                                                                                                                                                                                                     |
| Washing Process                         |                                 | Not allowed                                                                                                                                                                                                                                                        |
| Environment                             | - Vibration                     | IEC 60068-2-6<br>3 g, 3 axis, sine sweep, 10-55 Hz, 1 oct/min                                                                                                                                                                                                      |
|                                         | - Mechanical Shock              | IEC 60068-2-27<br>25 g, 3 axis, half sine, 11 ms                                                                                                                                                                                                                   |
|                                         |                                 |                                                                                                                                                                                                                                                                    |
| Case Ingress Protection                 |                                 | IP 68 (acc. IEC 60529)                                                                                                                                                                                                                                             |
| Housing Material                        |                                 | Plastic (UL 94 V-1 rated)                                                                                                                                                                                                                                          |
| Potting Material                        |                                 | Polyurethane (UL 94 V-2 rated)                                                                                                                                                                                                                                     |
| Pin Material                            |                                 | Brass (Alloy 360/385)                                                                                                                                                                                                                                              |
| Pin Surface Plating                     |                                 | Tin (200 - 300 μm), matte                                                                                                                                                                                                                                          |
| Housing Type                            |                                 | Plastic Case                                                                                                                                                                                                                                                       |
| Mounting Type                           |                                 | PCB Mount                                                                                                                                                                                                                                                          |
| Connection Type                         |                                 | THD (Through-Hole Device)                                                                                                                                                                                                                                          |
| Soldering Profile                       |                                 | Lead-Free Wave Soldering<br>260°C / 4 s max.                                                                                                                                                                                                                       |
| Weight                                  | - single output                 | 12 VDC model: 143 g                                                                                                                                                                                                                                                |
|                                         |                                 | 24 VDC model: 145 g                                                                                                                                                                                                                                                |
| Power Back Immunity                     |                                 | 12 VDC model: 15 V max.                                                                                                                                                                                                                                            |
|                                         |                                 | 24 VDC model: 30 V max.                                                                                                                                                                                                                                            |
| Environmental Compliance                | - REACH Declaration             | <a href="http://www.tracopower.com/info/reach-declaration.pdf">www.tracopower.com/info/reach-declaration.pdf</a><br>REACH SVHC list compliant<br>REACH Annex XVII compliant                                                                                        |
|                                         | - RoHS Declaration              | <a href="http://www.tracopower.com/info/rohs-declaration.pdf">www.tracopower.com/info/rohs-declaration.pdf</a><br>Exemptions: 7a, 7c-I<br>(RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule).) |
|                                         | - SCIP Reference Number         | e425dd0d-e647-4e75-91c8-1005009631d0                                                                                                                                                                                                                               |

## Supporting Documents

Overview Link (for additional Documents)

[www.tracopower.com/overview/tmw36p](http://www.tracopower.com/overview/tmw36p)

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

### Outline Dimensions

| Pinout |          |
|--------|----------|
| Pin    | Function |
| 1      | AC (N)   |
| 2      | AC (L)   |
| 3      | - Vout   |
| 4      | + Vout   |

