

- Fully encapsulated, dust resistant, and waterproof (IP68 certified)
- Operating temperature range  $-20^{\circ}$  to  $+80^{\circ}\text{C}$
- Mountable in wall outlet boxes, with flying leads
- Screw mountable on wood and inside furniture
- Safety approval IEC/EN 62368-1 and IEC/EN 60335-1
- 2xMOPP certified according to IEC/EN 60601-1 3rd edition
- Leakage current  $< 100 \mu\text{A}$  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 24 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 24 power supplies are prepared for protection class II applications. Their wide operating temperature range from  $-20^{\circ}\text{C}$  to  $+80^{\circ}\text{C}$  makes them ideal candidates for demanding applications.

### Models

Order Code	Output Power max.	Output Voltage nom.	Output Current max.	Efficiency typ.
TMW 24-105	20.4 W	5.1 VDC	4'000 mA	85 %
TMW 24-112	24 W	12 VDC	2'000 mA	88 %
TMW 24-124		24 VDC	1'000 mA	89 %

## Input Specifications

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

## Output Specifications

Voltage Set Accuracy		<b>±2% max.</b>
Regulation	- Input Variation (Vmin - Vmax) - Load Variation (10 - 90%)	<b>0.5% max.</b> <b>1% max.</b> (12 Vout and 24 Vout model) <b>2% max.</b> (5 Vout model)
Ripple and Noise (20 MHz Bandwidth)		<b>140 mVp-p max.</b>
Capacitive Load		<b>10'000 µF max.</b>
Minimum Load		<b>Not required</b>
Temperature Coefficient		<b>±2 %/K max.</b>
Hold-up Time	- At 230 VAC - At 115 VAC	<b>40 ms min.</b> <b>7 ms min.</b>
Start-up Time	- At 230 VAC - At 115 VAC	<b>500 ms max.</b> <b>500 ms max.</b>
Start-up Overshoot Voltage		<b>5% max.</b>
Short Circuit Protection		<b>Continuous, Automatic recovery</b>
Output Current Limitation		<b>105 - 150% of Iout max.</b>
Oversvoltage Protection		<b>120 - 160% of Vout nom.</b> <b>130% typ. of Vout nom.</b>
Transient Response	- Response Deviation - Response Time	<b>5% max.</b> (10% to 90% Load Step) <b>2'000 µs max.</b> (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 IEC 62368-1 UL 62368-1
	- Household	EN 60335-1 IEC 60335-1
	- 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)
	- LED Modules Controlgear	EN 61347-2-13
	- Luminaires for Furniture	VDE 0710-14
	- Power Transformers	EN 61558-1 IEC 61558-1 EN 61558-2-8 IEC 61558-2-8 EN 61558-2-16 IEC 61558-2-16
	- Certification Documents	<a href="http://www.tracopower.com/overview/tmw24">www.tracopower.com/overview/tmw24</a>
Protection Class		Class I & II (Prepared): Reinforced Insulation
Pollution Degree		PD 2
Over Voltage Category		OVC II

### EMC Specifications

EMI (Emissions)	- Conducted Emissions	EN 61000-6-3 (Generic Residential) EN 61204-3 (Low Voltage Power Supplies) EN 55011 class B (internal filter) EN 55032 class B (internal filter)
	- Radiated Emissions	EN 55011 class B (internal filter) EN 55032 class B (internal filter)
	- Harmonic Current Emissions	EN 61000-3-2, class A
EMS (Immunity)	- RF Electromagnetic Field	EN 61000-6-2 (Generic Industrial) EN 60601-1-2 edition 4.1 (Medical Devices) 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 20%, 250 periods, perf. criteria A 30%, 25 periods, perf. criteria A 60%, 10 periods, perf. criteria A >95%, 5 periods, perf. criteria B 115 VAC / 60 Hz: EN 61000-4-11 20%, 250 periods, perf. criteria A 30%, 25 periods, perf. criteria B 60%, 10 periods, perf. criteria B >95%, 5 periods, perf. criteria B >95%, 250 periods, perf. criteria B
EMC / Environmental	- Certification Documents	<a href="http://www.tracopower.com/overview/tmw24">www.tracopower.com/overview/tmw24</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 - Low Input Voltage	2 %/K above 50°C 2 %/V below 100 VAC
Over Temperature Protection Switch Off	- Protection Mode - Measurement Point	85°C min. / 90°C typ. / 95°C max. (Automatic recovery) 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 - Input to Output, 1 s	4'000 VAC 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 (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)
Environment	- Vibration - Mechanical Shock	IEC 60068-2-6 3 g, 3 axis, sine sweep, 10-55 Hz, 1 oct/min IEC 60068-2-27 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)
Housing Type		Plastic Case
Mounting Type		Chassis Mount
Connection Type		Flying Leads
Weight		131 g
Power Back Immunity	5.1 VDC model: 12 VDC model: 24 VDC model:	6.4 V max. 15 V max. 30 V max.
Environmental Compliance	- REACH Declaration  - RoHS Declaration  - SCIP Reference Number	<a href="http://www.tracopower.com/info/reach-declaration.pdf">www.tracopower.com/info/reach-declaration.pdf</a> REACH SVHC list compliant REACH Annex XVII compliant <a href="http://www.tracopower.com/info/rohs-declaration.pdf">www.tracopower.com/info/rohs-declaration.pdf</a> Exemptions: 7a, 7c-I (RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule.)) d74cdb40-a5ec-4615-94fa-4e45df94bd0c

## Supporting Documents

Overview Link (for additional Documents)

[www.tracopower.com/overview/tmw24](http://www.tracopower.com/overview/tmw24)

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