

- Fully encapsulated, dust resistant, and waterproof (IP68 certified)
- Operating temperature range -20° to $+80^{\circ}\text{C}$
- 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 $< 100 \mu\text{A}$ 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



ES 60601-1 IEC 60601-1
UL 62368-1 IEC 60335-1
IEC 62368-1

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 $+80^{\circ}\text{C}$ makes them ideal candidates for demanding applications.

Models				
Order Code	Output Power max.	Output Voltage nom.	Output Current max.	Efficiency typ.
TMW 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) Rated Range: 100 - 240 VAC (Full Range)
Input Frequency		Operational Range: 47 - 63 Hz Certified: 50/60 Hz
Power Consumption	- No load & $V_{in} = 230$ VAC	200 mW max. (Ready to meet ErP directive)
	- No load & $V_{in} = 115$ VAC	200 mW max.
Input Inrush Current	- At 230 VAC	50 A max.
	- At 115 VAC	25 A max.
Power Factor	- At 230 VAC	0.45 min.
	- At 115 VAC	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		±2% max.
Regulation	- Input Variation ($V_{min} - V_{max}$)	0.5% max.
	- Load Variation (10 - 90%)	1% max.
Ripple and Noise (20 MHz Bandwidth)	12 VDC model:	195 mVp-p max. (w/ 0.1 μ F / 50 V)
	24 VDC model:	195 mVp-p max.
Capacitive Load		10'000 μ F max.
Minimum Load		Not required
Temperature Coefficient		±2 %/K max.
Hold-up Time	- At 230 VAC	40 ms min.
	- At 115 VAC	7 ms min.
Start-up Time	- At 230 VAC	500 ms max.
	- At 115 VAC	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.
		130% typ. of V_{out} nom.
Transient Response	- Response Deviation	5% max. (10% to 90% Load Step)
	- Response Time	2'000 μ 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 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 - Luminaires for Furniture - Power Transformers	EN 61347-2-13 VDE 0710-14 EN 61558-1 IEC 61558-1 EN 61558-2-8 IEC 61558-2-8 EN 61558-2-16 IEC 61558-2-16
	- Certification Documents	www.tracopower.com/overview/tmw36p
Protection Class	Class I & II (Prepared): Reinforced Insulation	
	See application note: www.tracopower.com/info/protection-class.pdf	
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 A (internal filter) EN 55011 class B (internal filter) EN 55032 class A (internal filter) EN 55032 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)
	- Harmonic Current Emissions	EN 61000-3-2, class A
EMS (Immunity)	- RF Electromagnetic Field - EFT (Burst) / Surge	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 EN 61000-4-4, ± 2 kV, perf. criteria A
	- Conducted RF Disturbances - PF Magnetic Field - Voltage Dips & Interruptions	L to L: EN 61000-4-5, ± 1 kV, perf. criteria A EN 61000-4-6, 10 Vrms, perf. criteria A Continuous: EN 61000-4-8, 30 A/m, perf. criteria A 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 >95%, 250 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	www.tracopower.com/overview/tmw36p

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General Specifications		
Relative Humidity		100% max.
Temperature Ranges	- Operating Temperature	-20°C to +80°C
	- Storage Temperature	-40°C to +90°C
Power Derating	- High Temperature	2 %/K above 50°C (at $V_{in} \geq 187$ VAC)
		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 (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 3 g, 3 axis, sine sweep, 10-55 Hz, 1 oct/min
	- Mechanical Shock	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)
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 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	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: 7(a), 7(c)-I (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

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Additional Information

Supporting Documents

www.tracopower.com/overview/tmw36p

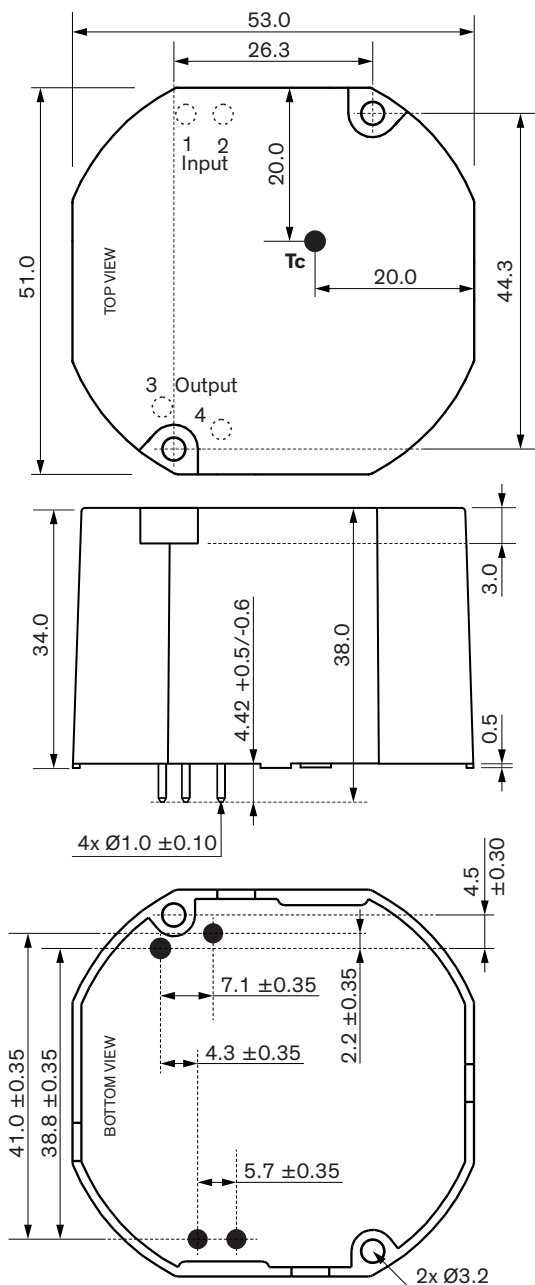
Frequently Asked Questions

www.tracopower.com/glossary-faq

Glossary

www.tracopower.com/info/glossary.pdf

Outline Dimensions



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

Thru-holes must not be used for fixation.

All dimensions in mm
Tolerances acc. to ISO 2768-1, class m
unless stated otherwise

