

- Rugged, compact metal case
- Screw terminal adaptor available for easy connection
- Wide 2:1 input voltage range
- Full load operation up to 60°C with convection cooling
- Soft start
- Under voltage lock-out circuit
- Reverse input voltage protection
- Input protection filter
- 3-year product warranty



The TEP 100 Series is a family of isolated high performance DC/DC converter modules with ultra-wide 2:1 input voltage ranges which come in a rugged, sealed metal case. These converters are suitable for a wide range of applications. For easy connection there is also a unique adaptor available with screw terminals. A very high efficiency allows an operating temperature up to +60°C with natural convection cooling without power derating. Further features include output voltage trimming, Remote On/Off and under voltage lockout. The very wide input voltage range make these converters also an interesting solution for battery operated systems.

Models				
Order Code	Input Voltage Range	Output Voltage nom. (adjustable)	Output Current max.	Efficiency typ.
TEP 100-1210	9 - 18 VDC (12 VDC nom.)	3.3 VDC (2.64 - 3.63 VDC)	25'000 mA	90 %
TEP 100-1211		5 VDC (4.0 - 5.5 VDC)	20'000 mA	91 %
TEP 100-1212		12 VDC (9.6 - 13.2 VDC)	8'400 mA	91 %
TEP 100-1213		15 VDC (12.0 - 16.5 VDC)	6'700 mA	91 %
TEP 100-1215		24 VDC (19.2 - 26.4 VDC)	4'200 mA	90 %
TEP 100-1216		28 VDC (22.4 - 30.8 VDC)	3'600 mA	90 %
TEP 100-1218		48 VDC (38.4 - 52.8 VDC)	2'100 mA	90 %
TEP 100-2410	18 - 36 VDC (24 VDC nom.)	3.3 VDC (2.64 - 3.63 VDC)	25'000 mA	91 %
TEP 100-2411		5 VDC (4.0 - 5.5 VDC)	20'000 mA	93 %
TEP 100-2412		12 VDC (9.6 - 13.2 VDC)	8'400 mA	93 %
TEP 100-2413		15 VDC (12.0 - 16.5 VDC)	6'700 mA	93 %
TEP 100-2415		24 VDC (19.2 - 26.4 VDC)	4'200 mA	92 %
TEP 100-2416		28 VDC (22.4 - 30.8 VDC)	3'600 mA	92 %
TEP 100-2418		48 VDC (38.4 - 52.8 VDC)	2'100 mA	92 %
TEP 100-4810	36 - 75 VDC (48 VDC nom.)	3.3 VDC (2.64 - 3.63 VDC)	25'000 mA	91 %
TEP 100-4811		5 VDC (4.0 - 5.5 VDC)	20'000 mA	93 %
TEP 100-4812		12 VDC (9.6 - 13.2 VDC)	8'400 mA	93 %
TEP 100-4813		15 VDC (12.0 - 16.5 VDC)	6'700 mA	93 %
TEP 100-4815		24 VDC (19.2 - 26.4 VDC)	4'200 mA	92 %
TEP 100-4816		28 VDC (22.4 - 30.8 VDC)	3'600 mA	92 %
TEP 100-4818		48 VDC (38.4 - 52.8 VDC)	2'100 mA	92 %

Options	
<b>Suffix -CM</b>	- Chassis mount models without filter: <a href="http://www.tracopower.com/products/tep100cm.pdf">www.tracopower.com/products/tep100cm.pdf</a>
<b>Suffix -CMF</b>	- Chassis mount models with filter to meet EN 55032 class A: <a href="http://www.tracopower.com/products/tep100cmf.pdf">www.tracopower.com/products/tep100cmf.pdf</a>
<b>TEP-HS1</b>	- Optional Heat Sink: <a href="http://www.tracopower.com/products/tep-hs1.pdf">www.tracopower.com/products/tep-hs1.pdf</a>
<b>on demand</b> (backorder with MOQ non stocking item)	- Optional models with inverse Remote On/Off function (passive = off)

Input Specifications		
Input Current	- At no load	12 Vin models: <b>130 mA typ.</b> 24 Vin models: <b>120 mA typ.</b> 48 Vin models: <b>70 mA typ.</b>
	- At full load	12 Vin models: <b>9'400 mA max.</b> 24 Vin models: <b>4'600 mA max.</b> 48 Vin models: <b>2'300 mA max.</b>
Surge Voltage		12 Vin models: <b>36 VDC max.</b> (1 s max.) 24 Vin models: <b>50 VDC max.</b> (1 s max.) 48 Vin models: <b>100 VDC max.</b> (1 s max.)
Under Voltage Lockout		12 Vin models: <b>7.5 VDC typ.</b> 24 Vin models: <b>16 VDC typ.</b> 48 Vin models: <b>34 VDC typ.</b>
Recommended Input Fuse		12 Vin models: <b>20'000 mA</b> (fast acting) 24 Vin models: <b>10'000 mA</b> (fast acting) 48 Vin models: <b>5'000 mA</b> (slow blow) (The need of an external fuse has to be assessed in the final application.)
Reverse Voltage Protection		<b>Parallel diode</b> (external input fuse required)
Input Filter		<b>Internal Pi-Type</b>

Output Specifications		
Output Voltage Adjustment		-20% to +10% (By external trim resistor) See application note: <a href="http://www.tracopower.com/overview/tep100">www.tracopower.com/overview/tep100</a> Output power must not exceed rated power!
Voltage Set Accuracy		<b>±1% max.</b>
Regulation	- Input Variation (Vmin - Vmax) - Load Variation (0 - 100%)	<b>0.1% max.</b> <b>0.1% max.</b>
Ripple and Noise (20 MHz Bandwidth)		3.3 Vout models: <b>75 mVp-p max.</b> (w/ 4.7 µF X7R) 5 Vout models: <b>75 mVp-p max.</b> (w/ 4.7 µF X7R) 12 Vout models: <b>100 mVp-p max.</b> (w/ 4.7 µF X7R) 15 Vout models: <b>100 mVp-p max.</b> (w/ 4.7 µF X7R) 24 Vout models: <b>200 mVp-p max.</b> (w/ 4.7 µF X7R) 28 Vout models: <b>200 mVp-p max.</b> (w/ 4.7 µF X7R) 48 Vout models: <b>300 mVp-p max.</b> (w/ 2.2 µF X7R)
Capacitive Load		3.3 Vout models: <b>75'700 µF max.</b> 5 Vout models: <b>40'000 µF max.</b> 12 Vout models: <b>7'000 µF max.</b> 15 Vout models: <b>4'460 µF max.</b> 24 Vout models: <b>1'750 µF max.</b> 28 Vout models: <b>1'280 µF max.</b> 48 Vout models: <b>430 µF max.</b>
Minimum Load		<b>Not required</b>
Temperature Coefficient		<b>±0.02 %/K max.</b>
Start-up Time		<b>25 ms typ.</b>
Short Circuit Protection		<b>Continuous, Automatic recovery</b>
Output Current Limitation		<b>110 - 140% of Iout max.</b>

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

Overvoltage Protection		115 - 130% of Vout nom.
Transient Response	- Response Time	200 µs typ. / 250 µs max. (25% Load Step)

### Safety Specifications

Safety Standards	- IT / Multimedia Equipment	EN 60950-1 EN 62368-1 IEC 60950-1 IEC 62368-1 UL 60950-1 UL 62368-1
	- Certification Documents	<a href="http://www.tracopower.com/overview/tep100">www.tracopower.com/overview/tep100</a>

### EMC Specifications

EMI Emissions	- Conducted Emissions	EN 55011 class B (with external filter) EN 55032 class B (with external filter)
	- Radiated Emissions	EN 55011 class B (with external filter) EN 55032 class B (with external filter)
		External filter proposal: <a href="http://www.tracopower.com/overview/tep100">www.tracopower.com/overview/tep100</a>
EMS Immunity		EN 55024 (IT Equipment) EN 55035 (Multimedia)
	- Electrostatic Discharge	Air: EN 61000-4-2, ±8 kV, perf. criteria A Contact: EN 61000-4-2, ±6 kV, perf. criteria A
	- RF Electromagnetic Field	EN 61000-4-3, 10 V/m, perf. criteria A
	- EFT (Burst) / Surge	EN 61000-4-4, ±2 kV, perf. criteria A EN 61000-4-5, ±2 kV, perf. criteria A
	- Conducted RF Disturbances	Ext. input component: 2 x KY 220 µF EN 61000-4-6, 10 Vrms, perf. criteria A
	- PF Magnetic Field	Continuous: EN 61000-4-8, 100 A/m, perf. criteria A 1 s: EN 61000-4-8, 1000 A/m, perf. criteria A

### General Specifications

Relative Humidity		95% max. (non condensing)
Temperature Ranges	- Operating Temperature	-40°C to +75°C
	- Case Temperature	+105°C max.
	- Storage Temperature	-55°C to +125°C
Power Derating	- High Temperature	Depending on model
		See application note: <a href="http://www.tracopower.com/overview/tep100">www.tracopower.com/overview/tep100</a>
Over Temperature Protection Switch Off	- Protection Mode - Measurement Point	115°C typ. (Automatic recovery at 105°C typ.) See application note: <a href="http://www.tracopower.com/overview/tep100">www.tracopower.com/overview/tep100</a>
Cooling System		Natural convection (20 LFM)
Sense Function		10% max. of Vout nom.
Remote Control	- Voltage Controlled Remote	On: 3.0 to 12 VDC or open circuit Off: 0 to 1.2 VDC or short circuit Refers to 'Remote' and '-Vin' Pin
	- Off Idle Input Current	3 mA typ.
	- Remote Pin Input Current	-0.5 to 1.0 mA (Optional models with inverse logic available)
Altitude During Operation		2'000 m max. (for basic insulation)
		5'000 m max. (for functional insulation)
Switching Frequency		270 - 330 kHz (PWM)
		300 kHz typ. (PWM)
Insulation System		Basic Insulation
Isolation Test Voltage	- Input to Output, 60 s	3'000 VDC
	- Input to Case, 60 s	1'600 VDC
	- Output to Case, 60 s	1'600 VDC
Isolation Resistance	- Input to Output, 500 VDC	1'000 MΩ min.

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Isolation Capacitance	- Input to Output, 100 kHz, 1 V	2'500 pF max.
Reliability	- Calculated MTBF	331'000 h (MIL-HDBK-217F, ground benign)
Washing Process		According to Cleaning Guideline <a href="http://www.tracopower.com/info/cleaning.pdf">www.tracopower.com/info/cleaning.pdf</a>
Environment	- Vibration - Thermal Shock	MIL-STD-810F MIL-STD-810F
Housing Material		Metal
Base Material		Non-conductive FR4 (UL 94 V-0 rated)
Potting Material		Silicone (UL 94 V-0 rated)
Pin Material		Copper
Pin Foundation Plating		Nickel (2 - 3 µm)
Pin Surface Plating		Tin (3 - 5 µm), matte
Housing Type		Metal Case
Mounting Type		PCB Mount
Connection Type		THD (Through-Hole Device)
Footprint Type		Half-Brick
Weight		97 g
Thermal Impedance	- Case to Ambient	6.7 K/W typ. 4.7 K/W typ. (with Heat Sink)
Environmental Compliance	- REACH Declaration  - RoHS Declaration	<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). The SCIP number is provided on request.)

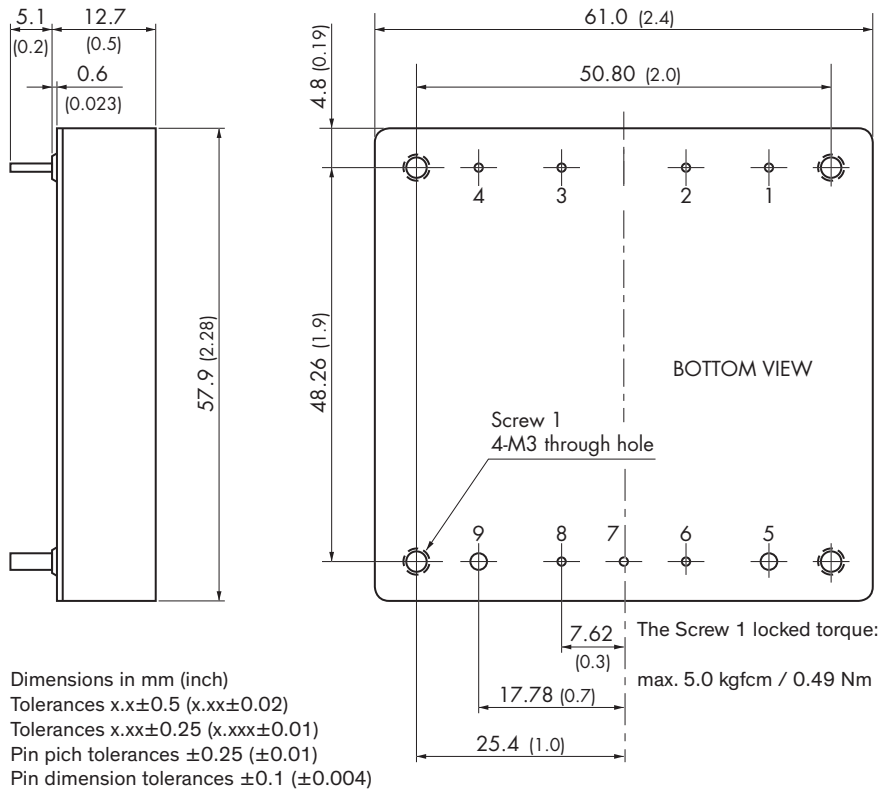
## Supporting Documents

Overview Link (for additional Documents)

[www.tracopower.com/overview/tep100](http://www.tracopower.com/overview/tep100)

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

### Outline Dimensions



### Pinout

Pin	Single	Pin Diameter
1	-Vin (GND)	1.0 mm (0.04 inch)
2	Case	1.0 mm (0.04 inch)
3	Remote On/Off	1.0 mm (0.04 inch)
4	+Vin (Vcc)	1.0 mm (0.04 inch)
5	-Vout	2.0 mm (0.08 inch)
6	-Sense	1.0 mm (0.04 inch)
7	Trim	1.0 mm (0.04 inch)
8	+Sense	1.0 mm (0.04 inch)
9	+Vout	2.0 mm (0.08 inch)