

- Chassis mount with screw terminal block
- 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
- Optional DIN-rail mounting kit
- 3-year product warranty



The TEP-100 Series is a family of isolated high performance DCDC converter modules with ultra-wide 2:1 input voltage ranges. They come in chassis mount version with screw terminal block. These converters are suitable for a wide range of applications, but the product is designed particularly also for industrial applications where often no PCB mounting is possible but the module has to be mounted on a chassis. Four threaded M3 inserts in the module makes chassis mount or attachment of a heatsink for optimal thermal management very simple. 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 trim, 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-CM	9 - 18 VDC (12 VDC nom.)	3.3 VDC (2.64 - 3.63 VDC)	25'000 mA	90 %
TEP 100-1211-CM		5 VDC (4.0 - 5.5 VDC)	20'000 mA	91 %
TEP 100-1212-CM		12 VDC (9.6 - 13.2 VDC)	8'400 mA	91 %
TEP 100-1213-CM		15 VDC (12.0 - 16.5 VDC)	6'700 mA	91 %
TEP 100-1215-CM		24 VDC (19.2 - 26.4 VDC)	4'200 mA	90 %
TEP 100-1216-CM		28 VDC (22.4 - 30.8 VDC)	3'600 mA	90 %
TEP 100-1218-CM		48 VDC (38.4 - 52.8 VDC)	2'100 mA	90 %
TEP 100-2410-CM	18 - 36 VDC (24 VDC nom.)	3.3 VDC (2.64 - 3.63 VDC)	25'000 mA	91 %
TEP 100-2411-CM		5 VDC (4.0 - 5.5 VDC)	20'000 mA	93 %
TEP 100-2412-CM		12 VDC (9.6 - 13.2 VDC)	8'400 mA	93 %
TEP 100-2413-CM		15 VDC (12.0 - 16.5 VDC)	6'700 mA	93 %
TEP 100-2415-CM		24 VDC (19.2 - 26.4 VDC)	4'200 mA	92 %
TEP 100-2416-CM		28 VDC (22.4 - 30.8 VDC)	3'600 mA	92 %
TEP 100-2418-CM		48 VDC (38.4 - 52.8 VDC)	2'100 mA	92 %
TEP 100-4810-CM	36 - 75 VDC (48 VDC nom.)	3.3 VDC (2.64 - 3.63 VDC)	25'000 mA	91 %
TEP 100-4811-CM		5 VDC (4.0 - 5.5 VDC)	20'000 mA	93 %
TEP 100-4812-CM		12 VDC (9.6 - 13.2 VDC)	8'400 mA	93 %
TEP 100-4813-CM		15 VDC (12.0 - 16.5 VDC)	6'700 mA	93 %
TEP 100-4815-CM		24 VDC (19.2 - 26.4 VDC)	4'200 mA	92 %
TEP 100-4816-CM		28 VDC (22.4 - 30.8 VDC)	3'600 mA	92 %
TEP 100-4818-CM		48 VDC (38.4 - 52.8 VDC)	2'100 mA	92 %

Options	
<b>TEP-MK1</b>	- Optional DIN-Rail Mounting Kit: <a href="http://www.tracopower.com/products/tep-mk1.pdf">www.tracopower.com/products/tep-mk1.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/tep100cm">www.tracopower.com/overview/tep100cm</a> Output power must not exceed rated power!
Voltage Set Accuracy	<b>±1% max.</b>
Regulation	- Input Variation (Vmin - Vmax) <b>0.1% max.</b> - Load Variation (0 - 100%) <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>
Overvoltage Protection	<b>115 - 130% of Vout nom.</b>
Transient Response	- Response Time <b>200 µs typ. / 250 µs max.</b> (25% Load Step)

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

## 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/tep100cm">www.tracopower.com/overview/tep100cm</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/tep100cm">www.tracopower.com/overview/tep100cm</a>
EMS Immunity		EN 55024 (IT Equipment) EN 55035 (Multimedia)
	- Electrostatic Discharge	Air: EN 61000-4-2, $\pm 8$ kV, perf. criteria A Contact: EN 61000-4-2, $\pm 6$ kV, perf. criteria A
	- RF Electromagnetic Field	EN 61000-4-3, 10 V/m, perf. criteria A
	- EFT (Burst) / Surge	EN 61000-4-4, $\pm 2$ kV, perf. criteria A EN 61000-4-5, $\pm 2$ kV, perf. criteria A
	- Conducted RF Disturbances	Ext. input component: 2 x KY 220 $\mu$ F 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	-40°C to +105°C
Power Derating	- High Temperature	Depending on model
		See application note: <a href="http://www.tracopower.com/overview/tep100cm">www.tracopower.com/overview/tep100cm</a>
Over Temperature Protection Switch Off	- Protection Mode	115°C typ. (Automatic recovery at 105°C typ.)
	- Measurement Point	See application note: <a href="http://www.tracopower.com/overview/tep100cm">www.tracopower.com/overview/tep100cm</a>
Cooling System		Natural convection (20 LFM)
Sense Function		10% max. of $V_{out}$ 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 M $\Omega$ min.
Isolation Capacitance	- Input to Output, 100 kHz, 1 V	2'500 pF max.
Reliability	- Calculated MTBF	331'000 h (MIL-HDBK-217F, ground benign)

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

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)
Housing Type		Metal Case
Mounting Type		Chassis Mount
Connection Type		Screw Terminal
Weight		200 g
Thermal Impedance	- Case to Ambient	6.7 K/W typ.
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> <b>Exemptions: 7a, 7c-I</b> (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.)

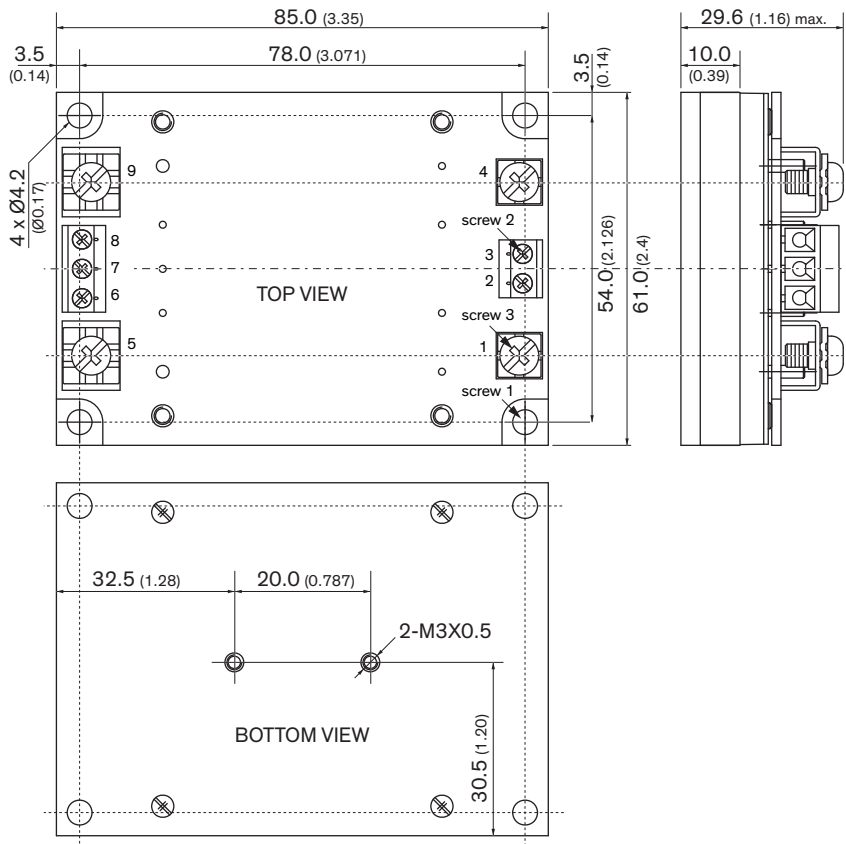
## Supporting Documents

Overview Link (for additional Documents)

[www.tracopower.com/overview/tep100cm](http://www.tracopower.com/overview/tep100cm)

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

### Outline Dimensions



Pinout	
Pin	Single
1	-Vin (GND)
2	Case
3	Remote On/Off
4	+Vin (Vcc)
5	-Vout
6	-Sense
7	Trim
8	+Sense
9	+Vout

Dimensions in mm (inch)

Tolerances  $x.x \pm 0.5$  ( $x.xx \pm 0.02$ )

$x.xx \pm 0.25$  ( $x.xxx \pm 0.01$ )

Mounting hole pitch tolerances  $\pm 0.25$  ( $\pm 0.01$ )

Screw 3:

Type M4

Head diameter 6.88 (0.271)

Rated current: 15 A

The screw 1 locked torque: max. 11.2 kgfcm / 1.1 Nm

The screw 2 locked torque: max. 5.2 kgfcm / 0.51 Nm

The screw 3 locked torque: max. 12.0 kgfcm / 1.18 Nm