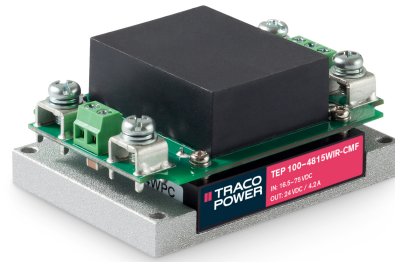


DC/DC Railway Converter

TEP 100WIRCMF Series, 100 Watt

- Chassis mount with screw terminal block
- Ultra wide 4:1 input voltage ranges 9–36, 18–75, 43–160 VDC
- EN 50155 approval for railway applications
- Very high efficiency up to 93%
- No minimum load
- Soft start
- Adjustable output voltage +10/-20%
- Sense line
- Remote On/Off input
- Under voltage lock-out circuit
- 3-year product warranty



The TEP 100WIRCMF Series is a family of isolated high performance DC/DC converter modules with ultra-wide 4:1 input voltage ranges. They come in chassis mount version with screw terminal block. A very high efficiency allows full power operation without forced air cooling at 60°C. The very wide input voltage range make these converters interesting solution for battery operated systems. Typical applications are in telecom/datacom, industry control and railway systems for on board power distribution.

Options

TEP-MK1	- Optional DIN-Rail Mounting Kit: www.tracopower.com/products/tep-mk1.pdf
<p>on demand (backorder with MOQ non stocking item)</p>	<ul style="list-style-type: none"> - Optional model with 3.3 VDC / 25'000 mA Output and 9 - 36 VDC Input - Optional model with 5 VDC / 20'000 mA Output and 9 - 36 VDC Input - Optional model with 12 VDC / 8'400 mA Output and 9 - 36 VDC Input - Optional model with 15 VDC / 6'700 mA Output and 9 - 36 VDC Input - Optional model with 24 VDC / 4'200 mA Output and 9 - 36 VDC Input - Optional model with 28 VDC / 3'600 mA Output and 9 - 36 VDC Input - Optional model with 48 VDC / 2'100 mA Output and 9 - 36 VDC Input - Optional model with 3.3 VDC / 25'000 mA Output and 18 - 75 VDC Input - Optional model with 5 VDC / 20'000 mA Output and 18 - 75 VDC Input - Optional model with 12 VDC / 8'400 mA Output and 18 - 75 VDC Input - Optional model with 15 VDC / 6'700 mA Output and 18 - 75 VDC Input - Optional model with 24 VDC / 4'200 mA Output and 18 - 75 VDC Input - Optional model with 28 VDC / 3'600 mA Output and 18 - 75 VDC Input - Optional model with 48 VDC / 2'100 mA Output and 18 - 75 VDC Input - Optional model with 3.3 VDC / 25'000 mA Output and 43 - 160 VDC Input - Optional model with 5 VDC / 20'000 mA Output and 43 - 160 VDC Input - Optional model with 12 VDC / 8'400 mA Output and 43 - 160 VDC Input - Optional model with 15 VDC / 6'700 mA Output and 43 - 160 VDC Input - Optional model with 24 VDC / 4'200 mA Output and 43 - 160 VDC Input - Optional model with 28 VDC / 3'600 mA Output and 43 - 160 VDC Input - Optional model with 48 VDC / 2'100 mA Output and 43 - 160 VDC Input - Optional models with inverse Remote On/Off function (passive = off)

Input Specifications

Input Current	- At no load	110 Vin models: 10 mA typ. 24 Vin models: 20 mA typ. (3.3 Vout model) 25 mA typ. (5 Vout model) 25 mA typ. (12 Vout model) 25 mA typ. (15 Vout model) 25 mA typ. (24 Vout model) 25 mA typ. (28 Vout model) 35 mA typ. (48 Vout model) 48 Vin models: 15 mA typ. (3.3 Vout model) 15 mA typ. (5 Vout model) 20 mA typ. (12 Vout model) 20 mA typ. (15 Vout model) 20 mA typ. (24 Vout model) 20 mA typ. (28 Vout model) 25 mA typ. (48 Vout model)
Surge Voltage		24 Vin models: 50 VDC max. (1 s max.) 48 Vin models: 100 VDC max. (1 s max.) 110 Vin models: 185 VDC max. (1 s max.)
Under Voltage Lockout		24 Vin models: 7.3 VDC min. / 7.5 VDC typ. / 8.1 VDC max. 48 Vin models: 15.5 VDC min. / 16 VDC typ. / 16.3 VDC max. 110 Vin models: 33 VDC min. / 34.5 VDC typ. / 36 VDC max.
Recommended Input Fuse		24 Vin models: 20'000 mA (fast acting) 48 Vin models: 12'000 mA (fast acting) 110 Vin models: 5'000 mA (slow blow) (The need of an external fuse has to be assessed in the final application.)
Input Filter		Internal Pi-Type

Output Specifications

Output Voltage Adjustment		-20% to +10% (By external trim resistor) See application note: www.tracopower.com/overview/tep100wircmf Output power must not exceed rated power!
Voltage Set Accuracy		±1% max.
Regulation	- Input Variation (Vmin - Vmax) - Load Variation (0 - 100%)	0.1% max. 0.1% max.
Ripple and Noise (20 MHz Bandwidth)		3.3 Vout models: 75 mVp-p max. (w/ 1 µF X7R 22 µF poscap) 5 Vout models: 75 mVp-p max. (w/ 1 µF X7R 22 µF poscap) 12 Vout models: 100 mVp-p max. (w/ 1 µF X7R 22 µF poscap) 15 Vout models: 100 mVp-p max. (w/ 1 µF X7R 22 µF poscap) 24 Vout models: 200 mVp-p max. (w/ 4.7 µF X7R) 28 Vout models: 200 mVp-p max. (w/ 4.7 µF X7R) 48 Vout models: 300 mVp-p max. (w/ 2.2 µF X7R)
Capacitive Load		3.3 Vout models: 75'700 µF max. 5 Vout models: 40'000 µF max. 12 Vout models: 7'000 µF max. 15 Vout models: 4'460 µF max. 24 Vout models: 1'750 µF max. 28 Vout models: 1'280 µF max. 48 Vout models: 430 µF max.
Minimum Load		Not required
Temperature Coefficient		±0.02 %/K max.
Hold-up Time		10 ms min. (acc. to EN 50155 Class S2, see application note for ext. capacitor calculation: www.tracopower.com/info/holdup_en50155.pdf)
Start-up Time		75 ms typ.

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

Short Circuit Protection		Continuous, Automatic recovery
Output Current Limitation		150% typ. of Iout max. (110 Vin models) 120 - 150% (other models)
Overvoltage Protection		115 - 130% of Vout nom.
Transient Response	- Response Time	200 µs typ. / 250 µs max. (25% Load Step)

Safety Specifications

Standards	- IT / Multimedia Equipment	EN 60950-1 EN 62368-1 IEC 60950-1 IEC 62368-1 UL 60950-1 UL 62368-1
	- Railway Applications	EN 50155
	- Certification Documents	www.tracopower.com/overview/tep100wircmf

EMC Specifications

EMI Emissions	- Conducted Emissions	EN 50121-3-2 (EMC for Rolling Stock) EN 55011 class A (internal filter) EN 55032 class A (internal filter)
	- Radiated Emissions	EN 55011 class A (internal filter) EN 55032 class A (internal filter)
EMS Immunity		EN 50121-3-2 (EMC for Rolling Stock) 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, 20 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
		Ext. input component: 24 & 48 Vin models: 2 x KY 220 µF 110 Vin models: 2 x KXJ 150 µF
	- Conducted RF Disturbances	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 - Case Temperature - Storage Temperature	-40°C to +75°C +105°C max. -40°C to +105°C
Power Derating	- High Temperature	Depending on model
		See application note: www.tracopower.com/overview/tep100wircmf
Over Temperature Protection Switch Off	- Protection Mode - Measurement Point	115°C typ. (Automatic recovery at 105°C typ.) Base-Plate
Cooling System		Natural convection (20 LFM)
Sense Function		10% max. of Vout nom. (If sense function is not used, sense pins must be connected to corresponding polarity output pins.)

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

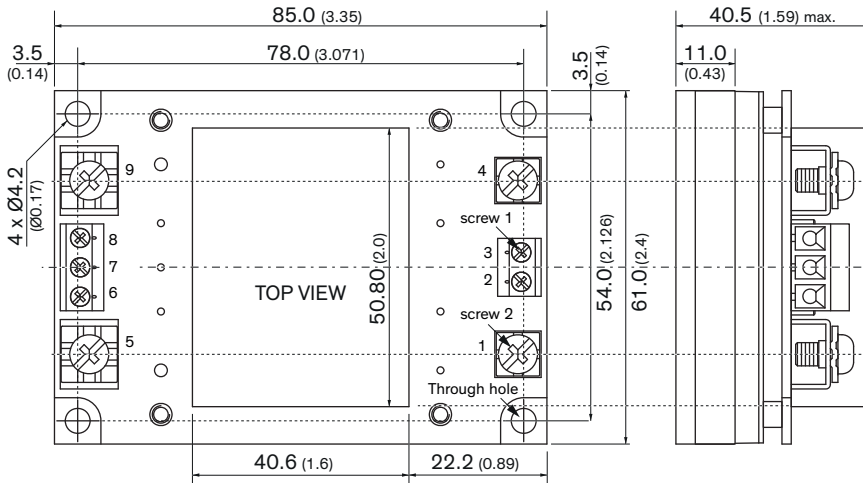
Remote Control	<ul style="list-style-type: none"> - Voltage Controlled Remote (passive = on) - Off Idle Input Current - Remote Pin Input Current 	On: 3.0 to 12 VDC or open circuit Off: 0 to 1.2 VDC or short circuit Refers to 'Remote' and '-Vin' Pin 3 mA typ. -0.5 to 1.0 mA (Optional models with inverse Remote On/Off function (passive = off))
Altitude During Operation		2'000 m max. (for reinforced insulation) 5'000 m max. (for functional insulation)
Switching Frequency		300 kHz typ. (PWM) ($\pm 10\%$, 110 Vin models) 250 kHz typ. (PWM) ($\pm 10\%$, other models)
Insulation System		Reinforced Insulation
Working Voltage (rated)		177 VAC (110 Vin models) 145 VAC (24 and 48 Vin, 3.3 and 5 Vout models) 185 VAC (24 and 48 Vin, 48 Vout models) 172 VAC (24 and 48 Vin, other output models)
Isolation Test Voltage	<ul style="list-style-type: none"> - Input to Output, 60 s - Input to Case, 60 s - Output to Case, 60 s 	3'000 VAC 1'500 VAC 1'500 VAC
Isolation Resistance	- Input to Output, 500 VDC	1'000 MΩ min.
Isolation Capacitance	- Input to Output, 100 kHz, 1 V	2'500 pF max.
Reliability	- Calculated MTBF	409'000 h (MIL-HDBK-217F, ground benign)
Environment	<ul style="list-style-type: none"> - Vibration - Mechanical Shock - Thermal Shock - Flammability 	MIL-STD-810F EN 61373 MIL-STD-810F EN 61373 MIL-STD-810F EN 45545-2 www.tracopower.com/info/en45545-declaration.pdf
Housing Material		Alu base-plate w. metal case (24 and 48 Vin models) Alu base-plate w. plastic case (110 Vin models)
Base Material		Non-conductive FR4 (UL 94 V-0 rated) (24 and 48 Vin models only)
Potting Material		Silicone (UL 94 V-0 rated)
Housing Type		Metal Case (24 and 48 Vin models) Plastic Case (110 Vin models)
Mounting Type		Chassis Mount
Connection Type		Screw Terminal
Weight		287 g
Thermal Impedance	- Case to Ambient	6.7 K/W typ.
Environmental Compliance	<ul style="list-style-type: none"> - REACH Declaration - RoHS Declaration - SCIP Reference Number 	www.tracopower.com/info/reach-declaration.pdf REACH SVHC list compliant REACH Annex XVII compliant www.tracopower.com/info/rohs-declaration.pdf Exemptions: 7a, 7c-I (RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule.)) 54b7eea6-7f47-43d5-8690-a22fd8fc17c0

Supporting Documents

Overview Link (for additional Documents) www.tracopower.com/overview/tep100wircmf

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

Wire gauge range:
AWG 14 - 26

Dimensions in mm (inch)
Tolerances x.x ±0.5 (x.xx ±0.02)
x.xx ±0.25 (x.xxx ±0.01)
Mounting hole pitch tolerances ±0.25 (±0.01)

Screw 2:
Type M4
Head diameter 6.88 (0.271)
Rated current: 15 A

The screw 1 locked torque: max. 5.2 kgfcm / 0.51 Nm
The screw 2 locked torque: max. 12.0 kgfcm / 1.18 Nm

Mounting screw locked torque: max. 11.2 kgfcm / 1.10 Nm