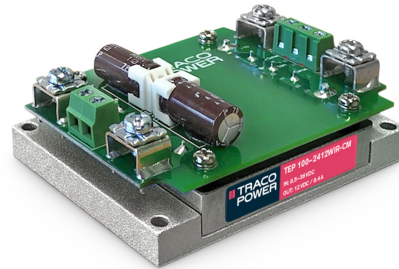


- Chassis mount with screw terminal block
- Ultra wide 4:1 input voltage ranges 9–36, 18–75, 43–160 VDC
- EN 50155 approval for railway applications
- Very high efficiency up to 93%
- No minimum load
- Soft start
- Adjustable output voltage +10/-20%
- Sense line
- Remote On/Off input
- Under voltage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



The TEP 100WIR Series is a family of isolated high performance DC/DC converter modules with ultra-wide 4:1 input voltage ranges which come in a rugged, sealed industry standard half brick package. A very high efficiency allows full power operation without forced air cooling at 60°C This temperature can be increased to 70°C with optional mounted heatsink or up to 85°C when mounted on an iron base plate. 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: <a href="http://www.tracopower.com/overview/tep-mk1">www.tracopower.com/overview/tep-mk1</a>
<p><b>on demand</b> (backorder with MOQ non stocking item)</p>	<ul style="list-style-type: none"> <li>- Optional model with 3.3 VDC and 25'000 mA Output, and 9 - 36 VDC Input</li> <li>- Optional model with 5 VDC and 20'000 mA Output, and 9 - 36 VDC Input</li> <li>- Optional model with 12 VDC and 8'400 mA Output, and 9 - 36 VDC Input</li> <li>- Optional model with 15 VDC and 6'700 mA Output, and 9 - 36 VDC Input</li> <li>- Optional model with 24 VDC and 4'200 mA Output, and 9 - 36 VDC Input</li> <li>- Optional model with 28 VDC and 3'600 mA Output, and 9 - 36 VDC Input</li> <li>- Optional model with 48 VDC and 2'100 mA Output, and 9 - 36 VDC Input</li> <li>- Optional model with 3.3 VDC and 25'000 mA Output, and 18 - 75 VDC Input</li> <li>- Optional model with 5 VDC and 20'000 mA Output, and 18 - 75 VDC Input</li> <li>- Optional model with 12 VDC and 8'400 mA Output, and 18 - 75 VDC Input</li> <li>- Optional model with 15 VDC and 6'700 mA Output, and 18 - 75 VDC Input</li> <li>- Optional model with 24 VDC and 4'200 mA Output, and 18 - 75 VDC Input</li> <li>- Optional model with 28 VDC and 3'600 mA Output, and 18 - 75 VDC Input</li> <li>- Optional model with 48 VDC and 2'100 mA Output, and 18 - 75 VDC Input</li> <li>- Optional model with 3.3 VDC and 25'000 mA Output, and 43 - 160 VDC Input</li> <li>- Optional model with 5 VDC and 20'000 mA Output, and 43 - 160 VDC Input</li> <li>- Optional model with 12 VDC and 8'400 mA Output, and 43 - 160 VDC Input</li> <li>- Optional model with 15 VDC and 6'700 mA Output, and 43 - 160 VDC Input</li> <li>- Optional model with 24 VDC and 4'200 mA Output, and 43 - 160 VDC Input</li> <li>- Optional model with 28 VDC and 3'600 mA Output, and 43 - 160 VDC Input</li> <li>- Optional model with 48 VDC and 2'100 mA Output, and 43 - 160 VDC Input</li> <li>- Optional models with inverse Remote On/Off function (passive = off)</li> </ul>

## Input Specifications

Input Current	- At no load	110 Vin models: <b>10 mA typ.</b> 24 Vin models: <b>20 mA typ.</b> (3.3 Vout model) <b>25 mA typ.</b> (5 Vout model) <b>25 mA typ.</b> (12 Vout model) <b>25 mA typ.</b> (15 Vout model) <b>25 mA typ.</b> (24 Vout model) <b>25 mA typ.</b> (28 Vout model) <b>35 mA typ.</b> (48 Vout model) 48 Vin models: <b>15 mA typ.</b> (3.3 Vout model) <b>15 mA typ.</b> (5 Vout model) <b>20 mA typ.</b> (12 Vout model) <b>20 mA typ.</b> (15 Vout model) <b>20 mA typ.</b> (24 Vout model) <b>20 mA typ.</b> (28 Vout model) <b>25 mA typ.</b> (48 Vout model)
Surge Voltage		24 Vin models: <b>50 VDC max.</b> (1 s max.) 48 Vin models: <b>100 VDC max.</b> (1 s max.) 110 Vin models: <b>185 VDC max.</b> (1 s max.)
Under Voltage Lockout		24 Vin models: <b>7.3 VDC min. / 7.5 VDC typ. / 8.1 VDC max.</b> 48 Vin models: <b>15.5 VDC min. / 16 VDC typ. / 16.3 VDC max.</b> 110 Vin models: <b>33 VDC min. / 34.5 VDC typ. / 36 VDC max.</b>
Recommended Input Fuse		24 Vin models: <b>20'000 mA</b> (fast acting) 48 Vin models: <b>12'000 mA</b> (fast acting) 110 Vin models: <b>5'000 mA</b> (slow blow) (The need of an external fuse has to be assessed in the final application.)
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/tep100wircm">www.tracopower.com/overview/tep100wircm</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/ 1 µF X7R    22 µF poscap) 5 Vout models: <b>75 mVp-p max.</b> (w/ 1 µF X7R    22 µF poscap) 12 Vout models: <b>100 mVp-p max.</b> (w/ 1 µF X7R    22 µF poscap) 15 Vout models: <b>100 mVp-p max.</b> (w/ 1 µF X7R    22 µF poscap) 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>
Hold-up Time		<b>10 ms min.</b> (acc. to EN 50155 Class S2, see application note for ext. capacitor calculation: <a href="http://www.tracopower.com/info/holdup_en50155.pdf">www.tracopower.com/info/holdup_en50155.pdf</a> )
Start-up Time		<b>75 ms typ.</b>

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 I <sub>out</sub> max. (110 V <sub>in</sub> models) 120 - 150% (other models)
Overvoltage Protection	115 - 130% of V <sub>out</sub> 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	<a href="http://www.tracopower.com/overview/tep100wircm">www.tracopower.com/overview/tep100wircm</a>

### EMC Specifications

EMI (Emissions)	- Conducted Emissions	EN 50121-3-2 (EMC for Rolling Stock) 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/tep100wircm">www.tracopower.com/overview/tep100wircm</a>
EMS (Immunity)	- Electrostatic Discharge	EN 50121-3-2 (EMC for Rolling Stock) EN 55024 (IT Equipment) EN 55035 (Multimedia)
	- RF Electromagnetic Field	Air: EN 61000-4-2, ±8 kV, perf. criteria A
	- EFT (Burst) / Surge	Contact: EN 61000-4-2, ±6 kV, perf. criteria A EN 61000-4-3, 20 V/m, perf. criteria A EN 61000-4-4, ±2 kV, perf. criteria A EN 61000-4-5, ±2 kV, perf. criteria A
	- Conducted RF Disturbances	Ext. input component: 24 V <sub>in</sub> models: 2 x KY 220 μF 48 V <sub>in</sub> models: 2 x KY 220 μF 110 V <sub>in</sub> models: 2 x KXJ 150 μF
	- PF Magnetic Field	Continuous: EN 61000-4-6, 10 Vrms, perf. criteria A 1 s: EN 61000-4-8, 100 A/m, perf. criteria A EN 61000-4-8, 1000 A/m, perf. criteria A
EMC / Environmental	- Certification Documents	<a href="http://www.tracopower.com/overview/tep100wircm">www.tracopower.com/overview/tep100wircm</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: <a href="http://www.tracopower.com/overview/tep100wircm">www.tracopower.com/overview/tep100wircm</a>
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 V <sub>out</sub> 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"> <li>- Voltage Controlled Remote (passive = on)</li> <li>- Off Idle Input Current</li> <li>- Remote Pin Input Current</li> </ul>	<p>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))</p>
Altitude During Operation		<p>2'000 m max. (for reinforced insulation)  5'000 m max. (for functional insulation)</p>
Switching Frequency		<p>300 kHz typ. (PWM) (<math>\pm 10\%</math>, 110 Vin models)  250 kHz typ. (PWM) (<math>\pm 10\%</math>, other models)</p>
Insulation System		<b>Reinforced Insulation</b>
Working Voltage (rated)		<p>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)</p>
Isolation Test Voltage	<ul style="list-style-type: none"> <li>- Input to Output, 60 s</li> <li>- Input to Case, 60 s</li> <li>- Output to Case, 60 s</li> </ul>	<p>3'000 VAC  1'500 VAC  1'500 VAC</p>
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	409'000 h (MIL-HDBK-217F, ground benign)
Environment	<ul style="list-style-type: none"> <li>- Vibration</li> <li>- Mechanical Shock</li> <li>- Thermal Shock</li> <li>- Flammability</li> </ul>	<p>MIL-STD-810F  EN 61373  MIL-STD-810F  EN 61373  MIL-STD-810F  EN 45545-2  <a href="http://www.tracopower.com/info/en45545-declaration.pdf">www.tracopower.com/info/en45545-declaration.pdf</a></p>
Housing Material		<p>Alu base-plate w. metal case (24 and 48 Vin models)  Alu base-plate w. plastic case (110 Vin models)</p>
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		<p>Metal Case (24 and 48 Vin models)  Plastic Case (110 Vin models)</p>
Mounting Type		Chassis Mount
Connection Type		Screw Terminal
Weight		235 g
Thermal Impedance	- Case to Ambient	6.7 K/W typ.
Environmental Compliance	<ul style="list-style-type: none"> <li>- REACH Declaration</li> <li>- RoHS Declaration</li> <li>- SCIP Reference Number</li> </ul>	<p><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.)  e467ae10-310c-4737-9941-0ad3db466a7d</p>

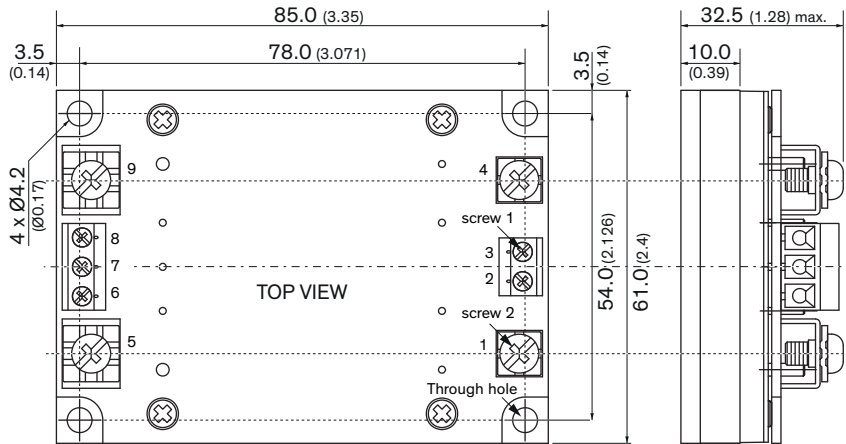
## Supporting Documents

Overview Link (for additional Documents)

[www.tracopower.com/overview/tep100wircm](http://www.tracopower.com/overview/tep100wircm)

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

**Outline Dimensions**



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 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

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

NC: Not connected

Wire gauge range:

AWG 14 - 26