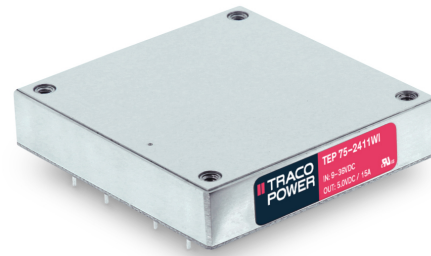


- Rugged, compact metal case
- Screw terminal adaptor available for easy connection
- EN 50155 approval for railway applications
- Ultra wide 4:1 input voltage range
- Full load operation up to +60°C with convection cooling
- Undervoltage lockout
- Input protection filter
- 3-year product warranty



The TEP-75WI 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 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 makes 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 75-2411WI	9 - 36 VDC (24 VDC nom.)	5 VDC (4.0 - 5.5 VDC)	15'000 mA	88 %
TEP 75-2412WI		12 VDC (9.6 - 13.2 VDC)	6'300 mA	88 %
TEP 75-2413WI		15 VDC (12.0 - 16.5 VDC)	5'000 mA	88 %
TEP 75-2415WI		24 VDC (19.2 - 26.4 VDC)	3'200 mA	87 %
TEP 75-2416WI		28 VDC (22.4 - 30.8 VDC)	2'700 mA	87 %
TEP 75-2418WI		48 VDC (38.4 - 52.8 VDC)	1'600 mA	87 %
TEP 75-4811WI	18 - 75 VDC (48 VDC nom.)	5 VDC (4.0 - 5.5 VDC)	15'000 mA	90 %
TEP 75-4812WI		12 VDC (9.6 - 13.2 VDC)	6'300 mA	90 %
TEP 75-4813WI		15 VDC (12.0 - 16.5 VDC)	5'000 mA	89 %
TEP 75-4815WI		24 VDC (19.2 - 26.4 VDC)	3'200 mA	88 %
TEP 75-4816WI		28 VDC (22.4 - 30.8 VDC)	2'700 mA	88 %
TEP 75-4818WI		48 VDC (38.4 - 52.8 VDC)	1'600 mA	87 %
TEP 75-7211WI	43 - 160 VDC (110 VDC nom.)	5 VDC (4.0 - 5.5 VDC)	15'000 mA	91 %
TEP 75-7212WI		12 VDC (9.6 - 13.2 VDC)	6'300 mA	91 %
TEP 75-7213WI		15 VDC (12.0 - 16.5 VDC)	5'000 mA	91 %
TEP 75-7215WI		24 VDC (19.2 - 26.4 VDC)	3'200 mA	90 %
TEP 75-7216WI		28 VDC (22.4 - 30.8 VDC)	2'700 mA	90 %
TEP 75-7218WI		48 VDC (38.4 - 52.8 VDC)	1'600 mA	90 %

Options	
<b>Suffix -CM</b>	- Chassis mount models w/o filter: <a href="http://www.tracopower.com/overview/tep75wicm">www.tracopower.com/overview/tep75wicm</a>
<b>Suffix -CMF</b>	- Chassis mount models w/ filter to meet EN 55032 class A: <a href="http://www.tracopower.com/overview/tep75wicmf">www.tracopower.com/overview/tep75wicmf</a>
<b>TEP-HS1</b>	- Optional Heat Sink: <a href="http://www.tracopower.com/overview/tep-hs1">www.tracopower.com/overview/tep-hs1</a>
<b>on demand</b> (backorder with MOQ non stocking item)	- Optional model with 3.3 VDC / 20'000 mA Output and 9 - 36 VDC Input - Optional model with 3.3 VDC / 20'000 mA Output and 18 - 75 VDC Input - Optional model with 3.3 VDC / 20'000 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: <b>10 mA typ.</b> 24 Vin models: <b>85 mA typ.</b> (3.3 Vout model) <b>120 mA typ.</b> (5 Vout model) <b>185 mA typ.</b> (12 Vout model) <b>185 mA typ.</b> (15 Vout model) <b>85 mA typ.</b> (24 Vout model) <b>85 mA typ.</b> (28 Vout model) <b>85 mA typ.</b> (48 Vout model)
	- At full load	48 Vin models: <b>60 mA typ.</b> (3.3 Vout model) <b>60 mA typ.</b> (5 Vout model) <b>90 mA typ.</b> (12 Vout model) <b>50 mA typ.</b> (15 Vout model) <b>50 mA typ.</b> (24 Vout model) <b>50 mA typ.</b> (28 Vout model) <b>50 mA typ.</b> (48 Vout model) 24 Vin models: <b>3'600 mA max.</b> 48 Vin models: <b>1'800 mA max.</b> 110 Vin models: <b>1'350 mA max.</b>
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. / 7.7 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>15'000 mA</b> (fast acting) 48 Vin models: <b>8'000 mA</b> (fast acting) 110 Vin models: <b>3'150 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> (For 24 Vin models an input capacitor 4.7 µF X7R or 68 µF Nippon chemi-con KY is recommended for a reliable supply.)

### Output Specifications

Output Voltage Adjustment		-20% to +10% (By external trim resistor) See application note: <a href="http://www.tracopower.com/overview/tep75wi">www.tracopower.com/overview/tep75wi</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>

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

Ripple and Noise (20 MHz Bandwidth)	3.3 Vout models: <b>100 mVp-p max.</b> (w/ 4.7 $\mu$ F) 5 Vout models: <b>100 mVp-p max.</b> (w/ 4.7 $\mu$ F) 12 Vout models: <b>125 mVp-p max.</b> (w/ 4.7 $\mu$ F) 15 Vout models: <b>125 mVp-p max.</b> (w/ 4.7 $\mu$ F) 24 Vout models: <b>250 mVp-p max.</b> (w/ 4.7 $\mu$ F) 28 Vout models: <b>250 mVp-p max.</b> (w/ 4.7 $\mu$ F) 48 Vout models: <b>350 mVp-p max.</b> (w/ 2.2 $\mu$ F)
Capacitive Load	3.3 Vout models: <b>60'600 <math>\mu</math>F max.</b> 5 Vout models: <b>30'000 <math>\mu</math>F max.</b> 12 Vout models: <b>5'250 <math>\mu</math>F max.</b> 15 Vout models: <b>3'330 <math>\mu</math>F max.</b> 24 Vout models: <b>1'330 <math>\mu</math>F max.</b> 28 Vout models: <b>960 <math>\mu</math>F max.</b> 48 Vout models: <b>330 <math>\mu</math>F max.</b>
Minimum Load	<b>Not required</b>
Temperature Coefficient	<b><math>\pm 0.02</math> %/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>60 ms typ.</b> (110 Vin models) <b>25 ms typ.</b> (other models)
Short Circuit Protection	<b>Continuous, Automatic recovery</b>
Output Current Limitation	<b>150% typ. of Iout max.</b> (110 Vin models) <b>110 - 140%</b> (other models)
Overvoltage Protection	<b>115 - 130% of Vout nom.</b>
Transient Response - Response Time	<b>200 <math>\mu</math>s typ. / 250 <math>\mu</math>s max.</b> (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/tep75wi">www.tracopower.com/overview/tep75wi</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/tep75wi">www.tracopower.com/overview/tep75wi</a>

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

EMS Immunity	<ul style="list-style-type: none"> <li>- Electrostatic Discharge</li> <li>- RF Electromagnetic Field</li> <li>- EFT (Burst) / Surge</li> <li>- Conducted RF Disturbances</li> <li>- PF Magnetic Field</li> </ul>	<p>EN 50121-3-2 (EMC for Rolling Stock)  EN 55024 (IT Equipment)  EN 55035 (Multimedia)</p> <p>Air: EN 61000-4-2, <math>\pm 8</math> kV, perf. criteria A  Contact: EN 61000-4-2, <math>\pm 6</math> kV, perf. criteria A  EN 61000-4-3, 20 V/m, perf. criteria A  EN 61000-4-4, <math>\pm 2</math> kV, perf. criteria A  EN 61000-4-5, <math>\pm 2</math> kV, perf. criteria A</p> <p>Ext. input component: 24 &amp; 48 Vin models: 2 x KY 220 <math>\mu</math>F  110 Vin models: 2 x KY 150 <math>\mu</math>F  EN 61000-4-6, 10 Vrms, perf. criteria A</p> <p>Continuous: EN 61000-4-8, 100 A/m, perf. criteria A  1 s: EN 61000-4-8, 1000 A/m, perf. criteria A</p>
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## General Specifications

Relative Humidity		95% max. (non condensing)
Temperature Ranges	<ul style="list-style-type: none"> <li>- Operating Temperature</li> <li>- Case Temperature</li> <li>- Storage Temperature</li> </ul>	<p>-40°C to +75°C</p> <p>+105°C max.</p> <p>-55°C to +125°C</p>
Power Derating	<ul style="list-style-type: none"> <li>- High Temperature</li> </ul>	<p>Depending on model</p> <p>See application note: <a href="http://www.tracopower.com/overview/tep75wi">www.tracopower.com/overview/tep75wi</a></p>
Over Temperature Protection Switch Off	<ul style="list-style-type: none"> <li>- Protection Mode</li> <li>- Measurement Point</li> </ul>	<p>115°C typ. (Automatic recovery at 105°C typ.)</p> <p>Base-Plate</p>
Cooling System		Natural convection (20 LFM)
Sense Function		<p>10% max. of Vout nom.</p> <p>(If sense function is not used, sense pins must be connected to corresponding polarity output pins.)</p>
Remote Control	<ul style="list-style-type: none"> <li>- Voltage Controlled Remote (passive = on)</li> <li>- Off Idle Input Current</li> </ul>	<p>On: 3.0 to 12 VDC or open circuit</p> <p>Off: 0 to 1.2 VDC or short circuit</p> <p>Refers to 'Remote' and '-Vin' Pin</p> <p>3 mA typ.</p> <p>(Optional models with inverse Remote On/Off function (passive = off))</p>
Altitude During Operation		<p>2'000 m max. (for basic insulation)</p> <p>5'000 m max. (for functional insulation)</p>
Switching Frequency		<p>270 - 330 kHz (PWM)</p> <p>300 kHz typ. (PWM)</p>
Insulation System		<p>Reinforced Insulation (110 Vin models)</p> <p>Basic Insulation (other models)</p>
Working Voltage (rated)		<p>157 VAC (110 Vin models)</p> <p>125 VAC (other input 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 (110 Vin models)</p> <p>3'000 VDC (other models)</p> <p>1'500 VAC (110 Vin models)</p> <p>1'600 VDC (other models)</p> <p>1'500 VAC (110 Vin models)</p> <p>1'600 VDC (other models)</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	336'000 h (MIL-HDBK-217F, ground benign)
Washing Process		<p>According to Cleaning Guideline</p> <p><a href="http://www.tracopower.com/info/cleaning.pdf">www.tracopower.com/info/cleaning.pdf</a></p>

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

Environment	- Vibration  - Mechanical Shock  - Thermal Shock - Flammability	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>
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)
Pin Material		Copper
Pin Foundation Plating		Nickel (2 - 3 µm)
Pin Surface Plating		Tin (3 - 5 µm), matte
Housing Type		Metal Case (24 and 48 Vin models) Plastic Case (110 Vin models)
Mounting Type		PCB Mount
Connection Type		THD (Through-Hole Device)
Footprint Type		Half-Brick
Soldering Profile		Lead-Free Wave Soldering 260°C / 6 s max.
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  - SCIP Reference Number	<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.)) b8b2d372-1660-418f-8c53-9823dfbc0f73

## Supporting Documents

Overview Link (for additional Documents)

[www.tracopower.com/overview/tep75wi](http://www.tracopower.com/overview/tep75wi)

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

