TRACO POWER

DC/DC Railway Converter

TEP 75WI Series, 75 Watt

- **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**
- **Reverse input voltage protection**
- **Input protection filter**
- **3-year product warranty**

c UL us CB Scheme

UL 62368-1 IEC 62368-1

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 an 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 and reverse input voltage protection make these converters also an interesting solution for battery operated systems.

Models

Order Code	Input Voltage Range	Output Voltage nom.	Output Current max.	Efficiency typ.
TEP 75-2411WI	9 - 36 VDC (24 VDC nom.)	5 VDC	15'000 mA	88 %
TEP 75-2412WI		12 VDC	6'300 mA	88 %
TEP 75-2413WI		15 VDC	5'000 mA	88 %
TEP 75-2415WI		24 VDC	3'200 mA	87 %
TEP 75-2416WI		28 VDC	2'700 mA	87 %
TEP 75-2418WI		48 VDC	1'600 mA	87 %
TEP 75-4811WI	18 - 75 VDC (48 VDC nom.)	5 VDC	15'000 mA	90 %
TEP 75-4812WI		12 VDC	6'300 mA	90 %
TEP 75-4813WI		15 VDC	5'000 mA	89 %
TEP 75-4815WI		24 VDC	3'200 mA	88 %
TEP 75-4816WI		28 VDC	2'700 mA	88 %
TEP 75-4818WI		48 VDC	1'600 mA	87 %
TEP 75-7211WI	43 - 160 VDC (110 VDC nom.)	5 VDC	15'000 mA	91 %
TEP 75-7212WI		12 VDC	6'300 mA	91 %
TEP 75-7213WI		15 VDC	5'000 mA	91 %
TEP 75-7215WI		24 VDC	3'200 mA	90 %
TEP 75-7216WI		28 VDC	2'700 mA	90 %
TEP 75-7218WI		48 VDC	1'600 mA	90 %

Options

Suffix -CM	- Chassis mount models without filter: www.tracopower.com/products/tep75wicm.pdf
Suffix -CMF	- Chassis mount models with filter to meet EN 55032 class A: www.tracopower.com/products/tep75wicmf.pdf
TEP-HS1	- Optional Heat Sink: www.tracopower.com/products/tep-hs1.pdf
on demand (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 - Inverse Remote On/Off function (passive = off)

Input Specifications

Input Current	- At no load	24 Vin models:	85 mA typ.
		48 Vin models:	60 mA typ.
		110 Vin models:	10 mA typ.
	- At full load	24 Vin models:	3'600 mA max.
		48 Vin models:	1'800 mA max.
		110 Vin models:	1'350 mA max.
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. / 7.7 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:	15'000 mA (fast acting)
		48 Vin models:	8'000 mA (fast acting)
		110 Vin models:	3'150 mA (slow blow)
			(The need of an external fuse has to be assessed in the final application.)
Reverse Voltage Protection			Parallel diode (24 Vin and 48 Vin models only) (external input fuse required)
Input Filter			Internal Pi-Type (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:	www.tracopower.com/overview/tep75wi
			Output power must not exceed rated power!
Voltage Set Accuracy			±1% max.
Regulation	- Input Variation (Vmin - Vmax)		0.1% max.
	- Load Variation (0 - 100%)		0.1% max.
Ripple and Noise (20 MHz Bandwidth)		3.3 Vout models:	100 mVp-p max. (w/ 4.7 µF)
		5 Vout models:	100 mVp-p max. (w/ 4.7 µF)
		12 Vout models:	125 mVp-p max. (w/ 4.7 µF)
		15 Vout models:	125 mVp-p max. (w/ 4.7 µF)
		24 Vout models:	250 mVp-p max. (w/ 4.7 µF)
		28 Vout models:	250 mVp-p max. (w/ 4.7 µF)
		48 Vout models:	350 mVp-p max. (w/ 2.2 µF)
Capacitive Load		3.3 Vout models:	60'600 µF max.
		5 Vout models:	30'000 µF max.
		12 Vout models:	5'250 µF max.
		15 Vout models:	3'330 µF max.
		24 Vout models:	1'330 µF max.
		28 Vout models:	960 µF max.
		48 Vout models:	330 µF max.
Minimum Load			Not required

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

Temperature Coefficient		±0.02 %/K max.
Start-up Time		60 ms typ. (110 Vin models) 25 ms typ. (other models)
Short Circuit Protection		Continuous, Automatic recovery
Output Current Limitation		150% typ. of Iout max. (110 Vin models) 110 - 140% (other models)
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
	- Railway Applications	EN 50155
	- Certification Documents	www.tracopower.com/overview/tep75wi

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:	www.tracopower.com/overview/tep75wi
EMS Immunity			EN 50155 (Railway Applications) EN 55024 (IT Equipment)
	- 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 KY 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		–40°C to +75°C
	- Case Temperature		+105°C max.
	- Storage Temperature		–55°C to +125°C
Power Derating	- High Temperature	See application note:	www.tracopower.com/overview/tep75wi
Over Temperature Protection Switch Off	- Protection Mode		115°C typ. (Automatic recovery at 105°C typ.)
	- Measurement Point		Base-Plate
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. (Optional models with inverse logic available)
Altitude During Operation			2'000 m max.

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Switching Frequency		270 - 330 kHz (PWM) 300 kHz typ. (PWM)
Insulation System		Reinforced Insulation (110 Vin models) Basic Insulation (other models)
Working Voltage (rated)		157 VAC (110 Vin models) 125 VAC (other input models)
Isolation Test Voltage	- Input to Output, 60 s	3'000 VAC (110 Vin models) 3'000 VDC (other models)
	- Input to Case, 60 s	1'500 VAC (110 Vin models) 1'600 VDC (other models)
	- Output to Case, 60 s	1'500 VAC (110 Vin models) 1'600 VDC (other models)
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	336'000 h (MIL-HDBK-217F, ground benign)
Environment	- Vibration	MIL-STD-810F EN 61373
	- Mechanical Shock	MIL-STD-810F EN 61373
	- Thermal Shock	MIL-STD-810F EN 50155
Housing Material		Alu base-plate w. plastic case (110 Vin models) Alu base-plate w. metal case (other models)
Base Material		Non-conductive FR4 (UL94 V-0 rated) (24 Vin & 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
Connection Type		THD (Through-Hole Device)
Weight		97 g
Thermal Impedance		6.7 K/W 4.7 K/W (with Heat Sink)
Environmental Compliance	- REACH Declaration	www.tracopower.com/info/reach-declaration.pdf REACH SVHC list compliant REACH Annex XVII compliant
	- RoHS Declaration	www.tracopower.com/info/rohs-declaration.pdf Exemptions: 7a, 7c-I
	- Flammability (EN 45545-2)	www.tracopower.com/info/en45545-declaration.pdf

Supporting Documents

Overview Link (for additional Documents)	www.tracopower.com/overview/tep75wi

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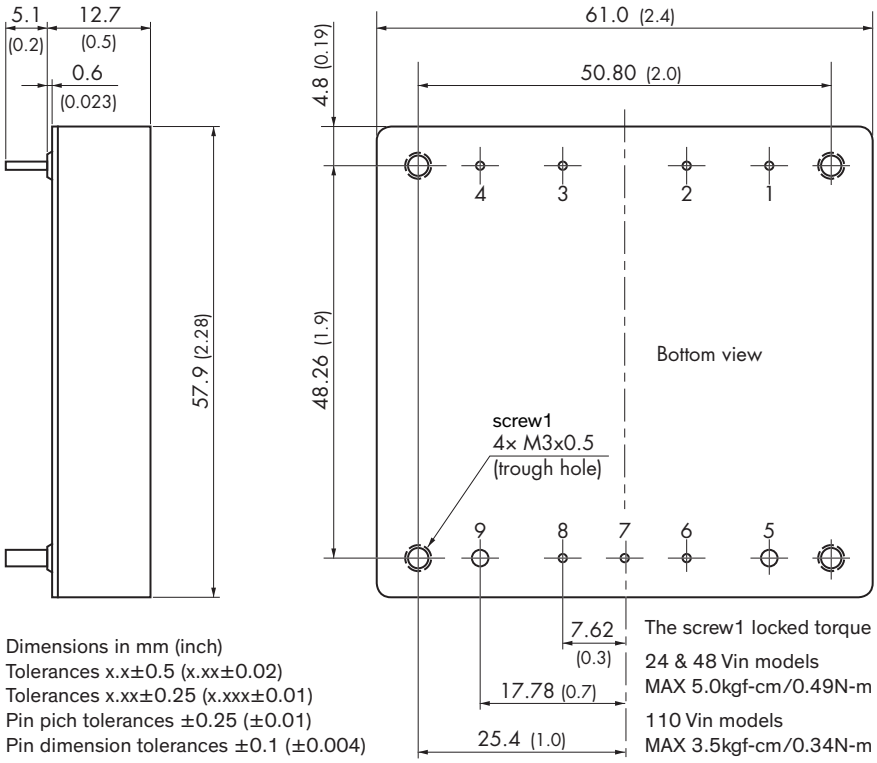
Outline Dimensions



The screw1 locked torque
24 & 48 Vin models
MAX 5.0kgf-cm/0.49N-m
110 Vin models
MAX 3.5kgf-cm/0.34N-m

Dimensions in mm (inch)
Tolerances x.x±0.5 (x.xx±0.02)
Tolerances x.xx±0.25 (x.xxx±0.01)
Pin pich tolerances ±0.25 (±0.01)
Pin dimension tolerances ±0.1 (±0.004)

Pin diamter pin 5 & 9: 2.0 (0.08)
Pin diameter other pins: 1.0 (0.04)

Pinout

Pin	Function
1	–Vin (GND)
2	Case
3	Remote
4	+Vin (Vcc)
5	–Vout
6	–Sense*
7	Trim
8	+Sense*
9	+Vout

*Sense line to be conneced to the output either at the module or at the load under regard of polarity.