TRACO POWER

DC/DC Railway Converter

TEP 75WICM Series, 75 Watt

- **Chassis mount with screw terminal block**
- **EN 50155 approval for railway applications**
- **Optional DIN-rail mounting kit**
- **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**

UL 62368-1 IEC 62368-1

The TEP 75WICM Series is a family of isolated high performance DC/DC converter modules. 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 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-CM	9 - 36 VDC (24 VDC nom.)	5 VDC	15'000 mA	88 %
TEP 75-2412WI-CM		12 VDC	6'300 mA	88 %
TEP 75-2413WI-CM		15 VDC	5'000 mA	88 %
TEP 75-2415WI-CM		24 VDC	3'200 mA	87 %
TEP 75-2416WI-CM		28 VDC	2'700 mA	87 %
TEP 75-2418WI-CM		48 VDC	1'600 mA	87 %
TEP 75-4811WI-CM	18 - 75 VDC (48 VDC nom.)	5 VDC	15'000 mA	90 %
TEP 75-4812WI-CM		12 VDC	6'300 mA	90 %
TEP 75-4813WI-CM		15 VDC	5'000 mA	89 %
TEP 75-4815WI-CM		24 VDC	3'200 mA	88 %
TEP 75-4816WI-CM		28 VDC	2'700 mA	88 %
TEP 75-4818WI-CM		48 VDC	1'600 mA	87 %
TEP 75-7211WI-CM	43 - 160 VDC (110 VDC nom.)	5 VDC	15'000 mA	91 %
TEP 75-7212WI-CM		12 VDC	6'300 mA	91 %
TEP 75-7213WI-CM		15 VDC	5'000 mA	91 %
TEP 75-7215WI-CM		24 VDC	3'200 mA	90 %
TEP 75-7216WI-CM		28 VDC	2'700 mA	90 %
TEP 75-7218WI-CM		48 VDC	1'600 mA	90 %

Options

TEP-MK1	- Optional DIN-Rail Mounting Kit: www.tracopower.com/products/tep-mk1.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 (external input fuse required)
Input Filter			Internal Pi-Type

Output Specifications

Output Voltage Adjustment			–20% to +10% (By external trim resistor)
		See application note:	www.tracopower.com/overview/tep75wicm
			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
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

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

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/tep75wicm

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/tep75wicm
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		–40°C to +105°C
Power Derating	- High Temperature	See application note:	www.tracopower.com/overview/tep75wicm
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.
Switching Frequency			270 - 330 kHz (PWM) 300 kHz typ. (PWM)
Insulation System			Reinforced Insulation (110 Vin models) Basic Insulation (other models)

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

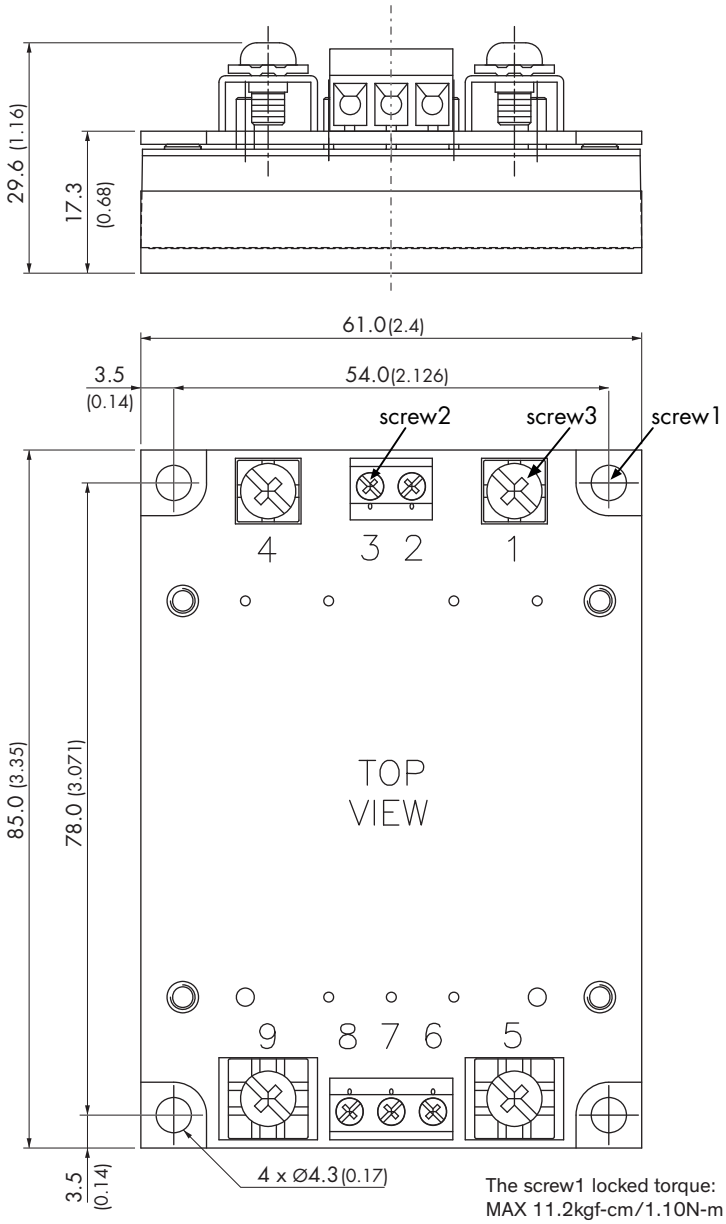
Working Voltage (rated)		157 VAC (110 Vin models) 125 VAC (other input models)
Isolation Test Voltage	- Input to Output, 60 s	3'000 VAC (110 Vin models) 3'000 VDC (other models)
	- Input to Case, 60 s	1'500 VAC (110 Vin models) 1'600 VDC (other models)
	- Output to Case, 60 s	1'500 VAC (110 Vin models) 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)
Connection Type		Screw Terminal
Weight		200 g
Thermal Impedance		6.7 K/W
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/tep75wicm

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

Outline Dimensions



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

Screw 3:
Type M4
Head diameter 6.88 (0.271)
Rated current: 15 A

The screw1 locked torque:
MAX 11.2kgf-cm/1.10N-m

The screw2 locked torque:
MAX 5.2kgf-cm/0.51N-m

The screw3 locked torque:
MAX 12kgf-cm/1.18N-m

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.