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

Options

TEP-MK1	- Optional DIN-Rail Mounting Kit: www.tracopower.com/overview/tep-mk1
on demand (backorder with MOQ non stocking item)	- Optional model with 3.3 VDC and 20'000 mA Output, and 9 - 36 VDC Input - Optional model with 3.3 VDC and 20'000 mA Output, and 18 - 75 VDC Input - Optional model with 3.3 VDC and 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:	**10 mA typ.**
		24 Vin models:	**85 mA typ.** (3.3 Vout model)
			120 mA typ. (5 Vout model)
			185 mA typ. (12 Vout model)
			185 mA typ. (15 Vout model)
			85 mA typ. (24 Vout model)
			85 mA typ. (28 Vout model)
			85 mA typ. (48 Vout model)
		48 Vin models:	**60 mA typ.** (3.3 Vout model)
			60 mA typ. (5 Vout model)
			90 mA typ. (12 Vout model)
			50 mA typ. (15 Vout model)
			50 mA typ. (24 Vout model)
			50 mA typ. (28 Vout model)
			50 mA typ. (48 Vout model)
	- 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.)
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)

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

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.
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			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

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)			EN 50121-3-2 (EMC for Rolling Stock)
	- 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 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 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
EMC / Environmental	- Certification Documents		www.tracopower.com/overview/tep75wicm

General Specifications

Relative Humidity	95% max. (non condensing)

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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	Depending on model
	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. (If sense function is not used, sense pins must be connected to corresponding polarity output pins.)
Remote Control	- Voltage Controlled Remote (passive = on)	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 Remote On/Off function (passive = off))
Altitude During Operation		2'000 m max. (for basic insulation) 5'000 m max. (for functional insulation)
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
	- Flammability	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		200 g
Thermal Impedance	- Case to Ambient	6.7 K/W typ.

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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 (RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule).)
	- SCIP Reference Number	02739881-c3ea-4176-94ae-6781f5b16688

Supporting Documents

Overview Link (for additional Documents)	www.tracopower.com/overview/tep75wicm

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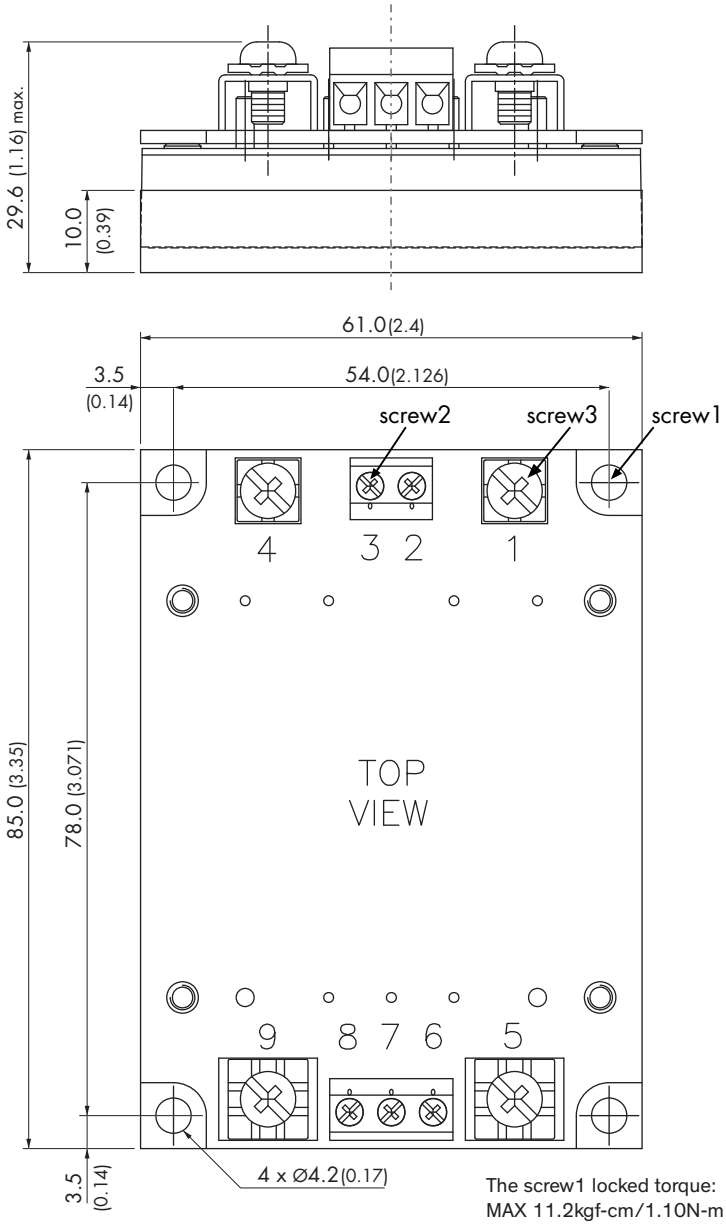
Outline Dimensions



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.

Wire gauge range: AWG 14 - 26