

DC/DC Railway Converter

TER 75WIR Series, 75 Watt

- Wide 4:1 input range
- EN 50155 and EN 61373 certified
- EN 45545-2 fire behavior
- Encapsulated quarter-brick (2.3"x1.45"x0.5") package
- -40°C up to +85°C operating temperature without derating
- Up to 4'242 VDC I/O isolation
- Remote on/off and trim function
- Undervoltage lockout (UVLO), short-circuit protection (SCP), overvoltage protection (OVP) and overtemperature protection (OTP)
- 3-year product warranty



The TER 75WIR is a series of high-performance 75 Watt DC/DC converters with a wide 4:1 input voltage range. The TER 75WIR comes in a compact, fully encapsulated quarter-brick package for highest reliability. The converter features continuous short-circuit protection and automatic recovery from over-temperature events, guaranteeing safe and dependable operation. The TER 75WIR is EN 50155 certified for rolling stock applications, EN 61373 certified for mechanical shock and vibration, and EN 45545-2 certified for fire behavior. It comes with IEC/EN/UL 62368-1 safety approvals.

Models				
Order Code	Input Voltage Range	Output Voltage nom. (adjustable)	Output Current max. (Forced air cooling)	Efficiency typ.
TER 75-2410WIR	9 - 36 VDC (24 VDC nom.)	3.3 VDC (2.64 - 3.63 VDC)	20'000 mA	89 %
TER 75-2411WIR		5 VDC (4.0 - 5.5 VDC)	15'000 mA	90 %
TER 75-2412WIR		12 VDC (9.6 - 13.2 VDC)	6'300 mA	91 %
TER 75-2413WIR		15 VDC (12.0 - 16.5 VDC)	5'000 mA	92 %
TER 75-2415WIR		24 VDC (19.2 - 26.4 VDC)	3'200 mA	91 %
TER 75-2418WIR		48 VDC (38.4 - 52.8 VDC)	1'600 mA	90 %
TER 75-4810WIR	18 - 75 VDC (48 VDC nom.)	3.3 VDC (2.64 - 3.63 VDC)	20'000 mA	89 %
TER 75-4811WIR		5 VDC (4.0 - 5.5 VDC)	15'000 mA	90 %
TER 75-4812WIR		12 VDC (9.6 - 13.2 VDC)	6'300 mA	91 %
TER 75-4813WIR		15 VDC (12.0 - 16.5 VDC)	5'000 mA	91 %
TER 75-4815WIR		24 VDC (19.2 - 26.4 VDC)	3'200 mA	91 %
TER 75-4818WIR		48 VDC (38.4 - 52.8 VDC)	1'600 mA	90 %
TER 75-7210WIR	40 - 160 VDC (110 VDC nom.)	3.3 VDC (2.64 - 3.63 VDC)	20'000 mA	89 %
TER 75-7211WIR		5 VDC (4.0 - 5.5 VDC)	15'000 mA	90 %
TER 75-7212WIR		12 VDC (9.6 - 13.2 VDC)	6'300 mA	91 %
TER 75-7213WIR		15 VDC (12.0 - 16.5 VDC)	5'000 mA	91 %
TER 75-7215WIR		24 VDC (19.2 - 26.4 VDC)	3'200 mA	91 %
TER 75-7218WIR		48 VDC (38.4 - 52.8 VDC)	1'600 mA	90 %

Options

T4B-HS10	- Optional Heat Sink: www.tracopower.com/overview/t4b-hs10
TEP-HS2	- Optional Heat Sink: www.tracopower.com/overview/tep-hs2
TEP-HS4	- Optional Heat Sink: www.tracopower.com/overview/tep-hs4
on demand (backorder with MOQ non stocking item)	- Optional Heat Sink: www.tracopower.com/overview/t4b-hs11 - Optional model(s) with different ratings - Optional models with pre-assembled heatsink - Optional models with inverse Remote On/Off function (passive = off) - Optional models without threads

Input Specifications

Input Current	- At no load	24 Vin models: 35 mA typ. 48 Vin models: 15 mA typ. 110 Vin models: 8 mA typ.
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: 7.5 VDC min. / 8 VDC typ. / 8.8 VDC max. 48 Vin models: 15.5 VDC min. / 16.2 VDC typ. / 17.5 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% (except 54 Vout models) -20% to 0% (54 Vout models) (By external trim resistor) See application note: www.tracopower.com/ter75wir-adj/ Output power must not exceed rated power!
Voltage Set Accuracy		±1% max.
Regulation	- Input Variation (Vmin - Vmax) - Load Variation (0 - 100%)	0.1% max. 0.2% max. (3.3 & 5 Vout models) 0.1% max. (other models)
Ripple and Noise	- 20 MHz Bandwidth	100 mVp-p max. (3.3/5 Vout) (w/ 1µF/25V 47µF/20V) 75 mVp-p typ. (3.3/5 Vout) (w/ 1µF/25V 47µF/20V) 130 mVp-p max. (12/15 Vout) (w/ 22µF/25V) 90 mVp-p typ. (12/15 Vout) (w/ 22µF/25V) 265 mVp-p max. (24/28 Vout) (w/ 4.7µF/50V) 200 mVp-p typ. (24/28 Vout) (w/ 4.7µF/50V) 400 mVp-p max. (48/54 Vout) (w/ 4.7µF/100V) 290 mVp-p typ. (48/54 Vout) (w/ 4.7µF/100V)

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: 65'300 µF max. 5 Vout models: 30'000 µF max. 12 Vout models: 5'400 µF max. 15 Vout models: 3'330 µF max. 24 Vout models: 1'360 µF max. 28 Vout models: 960 µF max. 48 Vout models: 340 µF max. 54 Vout models: 240 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	70 ms typ. / 100 ms max.
Short Circuit Protection	Continuous, Automatic recovery
Output Current Limitation	125 - 170% of Iout max. 155% typ. of Iout max.
Overvoltage Protection	112 - 125% of Vout nom. (48 Vout models) 102 - 111 % of Vout nom. (54 Vout models) 115 - 130 % of Vout nom. (other models)
Transient Response	- Response Deviation: 5% typ. / 10% max. (25% Load Step) - Response Time: 250 µs typ. (25% Load Step)

Safety Specifications

Standards	- IT / Multimedia Equipment - Railway Applications - Certification Documents	EN 62368-1 IEC 62368-1 UL 62368-1 EN 50155 www.tracopower.com/ter75wir-safety-cert/
Pollution Degree		PD 2
Over Voltage Category		Not mains connected

EMC Specifications

EMI (Emissions)	- Conducted Emissions - Radiated Emissions	EN 50121-3-2 (EMC for Rolling Stock) EN 55032 class A (with external filter) EN 55032 class B (with external filter) EN 55032 class A (with external filter) EN 55032 class B (with external filter)
	External filter proposal:	www.tracopower.com/ter75wir-emc-filter/
EMS (Immunity)	- Electrostatic Discharge - RF Electromagnetic Field - EFT (Burst) / Surge - Conducted RF Disturbances - PF Magnetic Field	EN 50121-3-2 (EMC for Rolling Stock) EN 55035 (Multimedia) Air: EN 61000-4-2, ±8 kV, perf. criteria A 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 Ext. input component: 2x 330µF/100V/KY (24 & 48 Vin models) 2x 150µF/200V/KXJ (110 Vin models) Continuous: EN 61000-4-6, 10 Vrms, perf. criteria A 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)
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All specifications valid at nominal voltage, resistive full load and +25°C after warm-up time, unless otherwise stated.

Temperature Ranges	- Operating Temperature	-40°C to +75°C -40°C to +80°C (with heatsink TEP-HS2) -40°C to +80°C (with heatsink TEP-HS4) -40°C to +92°C (with heatsink T4B-HS10) -40°C to +95°C (with heatsink T4B-HS11) +105°C max. -55°C to +125°C
	- Case Temperature - Storage Temperature	
Power Derating	- High Temperature	Depending on model Depending on model (with heatsink TEP-HS2) Depending on model (with heatsink TEP-HS4) Depending on model (with heatsink T4B-HS10) Depending on model (with heatsink T4B-HS11)
		See application note: www.tracopower.com/ter75wir-cc/
Over Temperature Protection Switch Off	- Protection Mode - Measurement Point	108°C typ. (Automatic recovery at 103°C typ.) Base-Plate
Cooling System	- Option 1	Forced air cooling (with external fan, 400 LFM)
	- Option 2	Conduction Cooling (with a 450 x 450 x 3.0 mm aluminum plate)
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 15 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))
	- Off Idle Input Current - Remote Pin Input Current	
Altitude During Operation		5'000 m max.
Regulator Topology		Flyback Converter
Switching Frequency		145 - 245 kHz (PWM) 190 kHz typ. (PWM)
Insulation System		Reinforced Insulation (110 Vin models) Basic Insulation (other models)
Working Voltage (rated)		384 VAC
Isolation Test Voltage	- Input to Output, 60 s	4'242 VDC (110 Vin models) 2'121 VDC (other models)
	- Input to Case, 60 s	2'121 VDC (110 Vin models) 1'600 VDC (other models)
	- Output to Case, 60 s	2'121 VDC (110 Vin models) 1'600 VDC (other models)
Creepage		4.5 mm min.
Clearance		4.5 mm min.
Isolation Resistance		1'000 MΩ min.
Isolation Capacitance		1'470 pF max.
Distance Through Isolation		0.4 mm
Reliability		698'800 h (MIL-HDBK-217F, ground benign)
Washing Process		According to Cleaning Guideline www.tracopower.com/info/cleaning.pdf
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. plastic case

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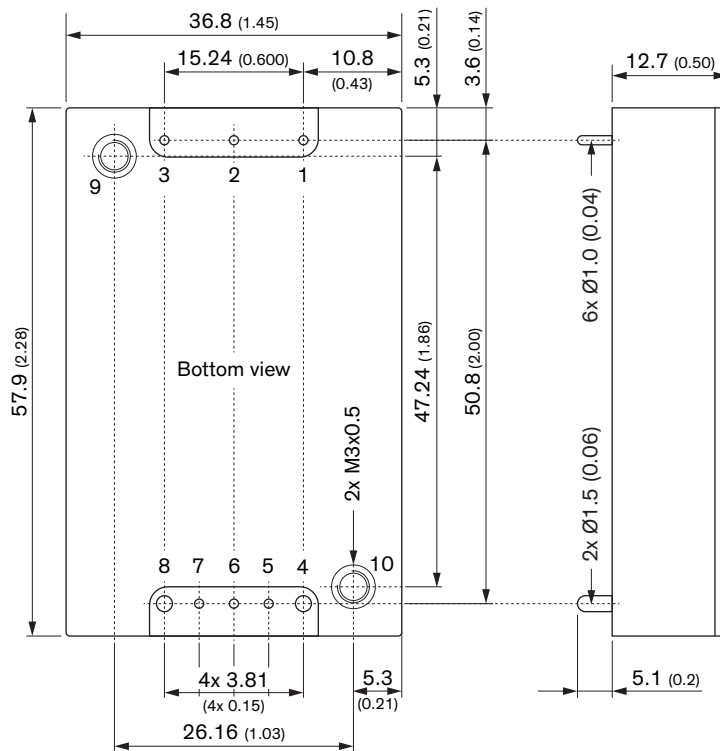
Base Material	Non-conductive FR4 (UL 94 V-0 rated)
Potting Material	Silicone (UL 94 V-0 rated)
Pin Material	Tinned Copper
Pin Foundation Plating	Nickel (3 - 5 µm)
Pin Surface Plating	Tin (5 - 7 µm), matte
Housing Type	Plastic Case
Mounting Type	PCB Mount
Connection Type	THD (Through-Hole Device)
Footprint Type	Quarter-Brick
Soldering Profile	Lead-Free Wave Soldering 260°C / 6 s max.
Weight	66.5 g
Thermal Impedance	- Case to Ambient 9.0 K/W typ. 7.1 K/W typ. (with heatsink TEP-HS2) 7.1 K/W typ. (with heatsink TEP-HS4) 4.2 K/W typ. (with heatsink T4B-HS10) 3.4 K/W typ. (with heatsink T4B-HS11)
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: 7(a), 7(c)-I (RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule).) - SCIP Reference Number 2b8dd361-d75b-4369-b814-211ac9641e05

Additional Information

Supporting Documents	www.tracopower.com/overview/ter75wir
Frequently Asked Questions	www.tracopower.com/glossary-faq
Glossary	www.tracopower.com/info/glossary.pdf
Service Portal	www.tracoserviceportal.com

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Outline Dimensions



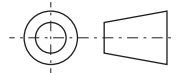
Dimensions in mm (inch)

Tolerances: x.x ± 0.5 (± 0.02)

x.xx ± 0.25 (± 0.01)

Pin diameter tolerances: ± 0.1 (± 0.004)

Mounting screw tightening torque: Max. 0.34 N·m (3.5 kgf·cm)



Pinout

1	Function
2	-Vin
3	Remote On/Off
4	+Vin
5	-Sense
6	Trim
7	+Sense
8	+Vout
9	Case
10	Case

Avoid routing PCB traces under the converter.