

- Shielded metal case with screw terminals
- Ultra wide 4:1 input voltage ranges 9–36, 18–75, 43–160 VDC
- EN 50155 approval for railway applications
- Very high efficiency up to 89%
- Constant current output characteristic for battery load applications
- Optional with input filter to meet EN 55032 class B
- Wide Operating temperature range: –40°C to +75°C
- Under voltage lock-out, overtemperature & reverse input protection
- Easy chassis and wall mounting
- 3-year product warranty



The modules have originally been designed for harsh industrial environment. High EMC immunity against surge, burst, radiated and conducted disturbances and the shock/ vibration and thermal shock resistance make them very popular for stringent requirements. With the extended input voltage ranges that cover the nominal 24, 36, 72 and 110 VDC with $\pm 40\%$ tolerance and the approval in accordance to EN 50155 standard they now also offer a reliable solution for mobile and stationary railway applications. At 100% load the current characteristics goes from constant voltage to constant current what makes the units also suitable for battery charger applications. With protection against over-temperature, overload, short-circuit, reverse input, overvoltage and input under-voltage lock-out they are hard to destroy.

Models				
Order Code	Input Voltage Range	Output Voltage nom. (adjustable)	Output Current max.	Efficiency typ.
TEP 150-2412WI	9 - 36 VDC (24 VDC nom.)	12 VDC (12.0 - 14.4 VDC)	12'500 mA	86 %
TEP 150-2413WI		15 VDC (15.0 - 18.0 VDC)	10'000 mA	86 %
TEP 150-2415WI		24 VDC (24.0 - 28.8 VDC)	6'300 mA	87 %
TEP 150-2416WI		28 VDC (28.0 - 33.6 VDC)	5'400 mA	87 %
TEP 150-2418WI		48 VDC (48.0 - 57.6 VDC)	3'200 mA	86 %
TEP 150-4812WI	18 - 75 VDC (48 VDC nom.)	12 VDC (12.0 - 14.4 VDC)	12'500 mA	88 %
TEP 150-4813WI		15 VDC (15.0 - 18.0 VDC)	10'000 mA	89 %
TEP 150-4815WI		24 VDC (24.0 - 28.8 VDC)	6'300 mA	89 %
TEP 150-4816WI		28 VDC (28.0 - 33.6 VDC)	5'400 mA	89 %
TEP 150-4818WI		48 VDC (48.0 - 57.6 VDC)	3'200 mA	88 %
TEP 150-7212WI	43 - 160 VDC (110 VDC nom.)	12 VDC (12.0 - 14.4 VDC)	12'500 mA	88 %
TEP 150-7213WI		15 VDC (15.0 - 18.0 VDC)	10'000 mA	89 %
TEP 150-7215WI		24 VDC (24.0 - 28.8 VDC)	6'300 mA	89 %
TEP 150-7216WI		28 VDC (28.0 - 33.6 VDC)	5'400 mA	89 %
TEP 150-7218WI		48 VDC (48.0 - 57.6 VDC)	3'200 mA	88 %

Options

Suffix -F	- Optional models with input filter to meet EN 55032 class B: www.tracopower.com/products/tep150wi-f.pdf
on demand (backorder with MOQ non stocking item)	- Optional models with inverse remote on/off function (passiv = off)

Input Specifications

Input Current	- At no load	24 Vin models: 100 mA typ. 48 Vin models: 65 mA typ. 110 Vin models: 30 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: 7.9 - 8.5 VDC 48 Vin models: 15.6 - 16.8 VDC 110 Vin models: 33 - 36 VDC
Recommended Input Fuse		24 Vin models: 30'000 mA (slow blow) 48 Vin models: 15'000 mA (slow blow) 110 Vin models: 7'000 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		0% to +20% (By external trim resistor) See application note: www.tracopower.com/overview/tep150wi Output power must not exceed rated power!
Voltage Set Accuracy		±1% max.
Regulation	- Input Variation (Vmin - Vmax) - Load Variation (0 - 100%)	0.2% max. 0.4% max.
Ripple and Noise (20 MHz Bandwidth)		12 Vout models: 100 mVp-p max. 15 Vout models: 100 mVp-p max. 24 Vout models: 200 mVp-p max. 28 Vout models: 200 mVp-p max. 48 Vout models: 300 mVp-p max.
Capacitive Load		12 Vout models: 40'000 µF max. 15 Vout models: 26'000 µF max. 24 Vout models: 10'000 µF max. 28 Vout models: 7'600 µF max. 48 Vout models: 2'600 µF max.
Minimum Load		Not required
Temperature Coefficient		±0.02 %/K max.
Start-up Time		35 ms typ.
Short Circuit Protection		Continuous, Automatic recovery
Overload Protection		Constant Current Mode
Output Current Limitation		105 - 120% of Iout max.
Overvoltage Protection		125 - 140% of Vout nom.
Transient Response	- Response Time	200 µs typ. (25% Load Step)

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

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 EN 50155 www.tracopower.com/overview/tep150wi
	- Railway Applications - Certification Documents	
Pollution Degree		PD 2
Over Voltage Category		OVC I

EMC Specifications

EMI Emissions	- Conducted Emissions	EN 50121-3-2 (EMC for Rolling Stock) EN 55032 class A (internal filter) FCC Part 15 class A (internal filter)
	- Radiated Emissions	EN 55032 class A (internal filter) FCC Part 15 class A (internal filter)
EMS Immunity	- Electrostatic Discharge	EN 50155 (Railway Applications) EN 50121-3-2 (EMC for Rolling Stock) Air: EN 61000-4-2, ± 8 kV, perf. criteria A Contact: EN 61000-4-2, ± 6 kV, perf. criteria A EN 61000-4-3, 10 V/m, perf. criteria A EN 61000-4-4, ± 2 kV, perf. criteria A EN 61000-4-5, ± 1 kV, perf. criteria A
	- RF Electromagnetic Field - EFT (Burst) / Surge	Ext. input component: 24 Vin models: KY 470 μ F, ESR 45 mOhm 48 Vin models: KY 220 μ F, ESR 48 mOhm 110 Vin models: KXJ 150 μ F 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
	- Conducted RF Disturbances - PF Magnetic Field	

General Specifications

Relative Humidity		95% max. (non condensing)
Temperature Ranges	- Operating Temperature	-40°C to +75°C
	- Case Temperature	+100°C max.
	- Storage Temperature	-55°C to +125°C (Mount on conducting surface to optimize thermal coupling)
Power Derating	- High Temperature	See application note: www.tracopower.com/overview/tep150wi
Over Temperature Protection Switch Off	- Protection Mode	110°C typ. (Automatic recovery)
Cooling System		Natural convection (20 LFM)
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 3.5 mA typ. (Optional models with inverse logic (passiv = off) available)
	- Off Idle Input Current	
Altitude During Operation		5'000 m max.
Switching Frequency		203 - 330 kHz (PWM)
Insulation System		Functional Insulation
Isolation Test Voltage	- Input to Output, 60 s	2'250 VDC
	- Input to Case, 60 s	1'600 VDC
	- Output to Case, 60 s	1'600 VDC
Isolation Resistance	- Input to Output, 500 VDC	1'000 M Ω min.

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Isolation Capacitance	- Input to Output, 100 kHz, 1 V	3'500 pF max.
Reliability	- Calculated MTBF	495'000 h (MIL-HDBK-217F, ground benign)
Environment	- Vibration	MIL-STD-810F EN 61373 7.7 g, 3 axis, random waveform, 60 min
	- Mechanical Shock	MIL-STD-810F EN 61373 50 g, 3 axis, 11 ms
	- Thermal Shock	MIL-STD-810F EN 50155
Case Ingress Protection		IP 55 (acc. IEC 60529)
Housing Material		Aluminum
Potting Material		Silicone (UL 94 V-0 rated)
Housing Type		Metal Case
Mounting Type		Chassis Mount
Connection Type		Screw Terminal
Weight		300 g
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 (Q5A rule). The SCIP number is provided on request.)
	- Flammability (EN 45545-2)	www.tracopower.com/info/en45545-declaration.pdf

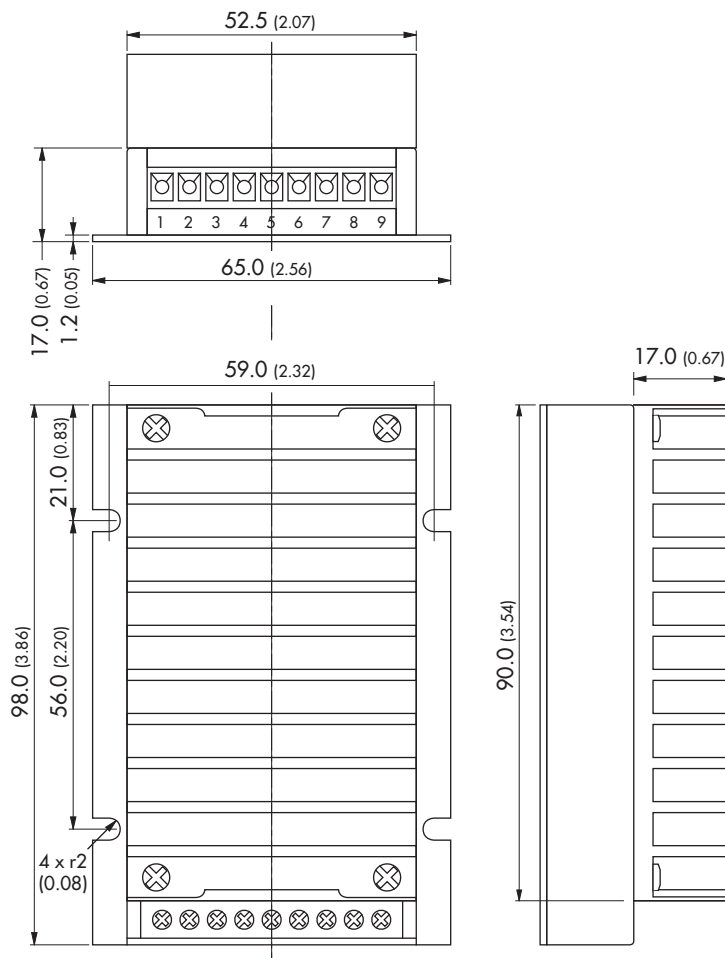
Supporting Documents

Overview Link (for additional Documents)

www.tracopower.com/overview/tep150wi

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

Outline Dimensions



Pinout		
Pin	Function	recommended wire
1	+ Vin	14 – 16 AWG
2	+ Vin	14 – 16 AWG
3	– Vin	14 – 16 AWG
4	– Vin	14 – 16 AWG
5	Remote	14 – 24 AWG
6	+ Vout	14 – 16 AWG
7	– Vout	14 – 16 AWG
8	Trim	14 – 24 AWG
9	Trim	14 – 24 AWG