DC/DC Converters

TEP 200WIR Series, 180 – 240 Watt

Features

- Chassis mount with screw terminal block
- Including EMI filter to meet EN 55022, class A
- Ultra wide 4:1 input voltage ranges 8.5–36, 16.5–75, 43–160 VDC
- EN 50155 approval for railway applications
- Very high efficiency up to 91%
- No minimum load
- Soft start
- Under voltage lock-out circuit
- Ajustable output voltage +10/-20%
- Sense line
- Remote On/Off input
- Reverse input voltage protection
- Over temperature protection
- 3-year product warranty

The TEP 200WIR Series is a family of isolated high performance dc-dc converter modules with ultra-wide 4:1 input voltage ranges. They come in chassis mount version with screw terminal block and with integrated EMI input filter to meet EN 55022 class A. A very high efficiency allows full power operation at 25°C with only 100 LFM air flow couling and operation at 60°C with only 40% power derating.

The very wide input voltage range and reverse input voltage protection make these converters interesting solution for battery operated systems. Typical applications are in telecom/datacom, industry control and railway systems for on board power distribution.

Standard Models

Order code	Input voltage	Output voltage	Output current max.	Efficiency typ.
TEP 200–2412WIRCMF	8.5 – 36 VDC (24 VDC nominal)	12 VDC	15 A	89 %
TEP 200–2413WIRCMF		15 VDC	12 A	90 %
TEP 200–2415WIRCMF		24 VDC	7.5 A	90 %
TEP 200–2416WIRCMF		28 VDC	6.5 A	90 %
TEP 200–2418WIRCMF		48 VDC	3.7 A	89 %
TEP 200–4812WIRCMF	16.5 – 75 VDC (48 VDC nominal)	12 VDC	18 A	90 %
TEP 200–4813WIRCMF		15 VDC	14 A	91 %
TEP 200–4815WIRCMF		24 VDC	9 A	90 %
TEP 200–4816WIRCMF		28 VDC	7.5 A	91 %
TEP 200–4818WIRCMF		48 VDC	4.5 A	90 %
TEP 200–7212WIRCMF	43 – 160 VDC (110 VDC nominal)	12 VDC	20 A	89 %
TEP 200–7213WIRCMF		15 VDC	16 A	90 %
TEP 200–7215WIRCMF		24 VDC	10 A	89 %
TEP 200–7216WIRCMF		28 VDC	8.5 A	90 %
TEP 200–7218WIRCMF		48 VDC	5 A	89 %

Options

TEP-MK1	Din-rail mounting kit (incl. mounting screws)
on demand	Models with 3.3 VDC or 5.0 VDC output
	Models with 53 VDC output (input voltage range 33 - 75 VDC)
	Models with 2:1 input voltage ranges: 8.5-22, 16.5-36, 33-75 VDC (only to optimize cost at high volumes)
	Models for PCB mount (EMI Filter not included), optional heatsink and chokes for external filter
	Negative (passive = Off) Remote On/Off function (standard is passive = On)

Input Specifications

Input current at no load (nominal input voltage)	24 V, 12 & 15 VDC models:	30 mA typ.
	24 V, 24 VDC model:	35 mA typ.
	24 V, 28 VDC model:	40 mA typ.
	24 V, 48 VDC model:	45 mA typ.
	48 V, 28 & 48 VDC models:	25 mA typ.
	48 V, other models:	20 mA typ.
	110 V, 28 & 48 VDC models:	15 mA typ.
	110 V, other models:	10 mA typ.
Start-up voltage	24 V models:	9.0 VDC max.
	48 V models:	18 VDC max.
	110 V models:	43 VDC max.
Under voltage shut down (lock-out circuit)	24 V models:	7.3 – 8.1 VDC
	48 V models:	15.5 – 16.3 VDC
	110 V models:	33.0 – 36.0 VDC
Surge voltage (1 sec. max.)	24 V models:	50 VDC
	48 V models:	100 VDC
	110 V models:	185 VDC
Conducted noise		EN 55022 class A without external components
EMC immunity		EN 50121-3-2
– ESD (electrostatic discharge)		EN 61000-4-2, air ±8 kV, contact ±6 kV, perf. criteria A
– Radiated immunity		EN 61000-4-3, 20 V/m, perf. criteria A
– Fast transient / surge (with external input capacitor)		EN 61000-4-4, ±2 kV, perf. criteria A EN 61000-4-5, ±2 kV perf. criteria A,
	24 / 48V models:	chemi-con KY 200 µF, 100 V, ESR 48 mOhm
	110 V models:	ruby-con BXF 100 µF, 250 V
– Conducted immunity		EN 61000-4-6, 10 Vrms, perf. criteria A
Reverse voltage protection		parallel diode
Recommended input fuse (slow blow)	24 V models:	20 A
	48 / 110 V models:	10 A

Output Specifications

Voltage set accuracy (at full load, nominal input)		±1 %
Output voltage adjustment		+10 % / –20 % by external resistor see application note
Regulation	– Input variation Vin min. to Vin max.	0.1 % max.
	– Load variation (0 – 100 %) 12 / 15 VDC models:	0.25 % max.
	24 – 48 VDC models:	0.2 % max.
Temperature coefficient		±0.02 %/K
Minimum load		not required
Remote sense		10 % max. of Vout nom. (trim up value to subtract)
Ripple and noise (20 MHz Bandwidth)	12 / 15 VDC models:	100 mVp-p typ.
	24 / 28 VDC models:	200 mVp-p typ.
	48 VDC models:	300 mVp-p typ.
Start up time (nominal Vin and constant resistive load)		75 ms typ. (at power On or remote On/Off)
Transient response (25 % load step change)		200 µs typ., 250 µs max.
Output current limitation		at 120 – 150 % of Iout max.
Over voltage protection		at 115 – 130 % of Vout nom.
Short circuit protection		indefinite, automatic recovery.

Max. capacitive load [µF]	12 VDC	15 VDC	24 VDC	28 VDC	48 VDC
24 VDC Input models	12'500	8'000	3'100	2'300	770
48 VDC Input models	15'000	9'300	3'700	2'600	930
110 VDC Input models	16'600	10'600	4'100	3'000	1'000

General Specifications

Temperature ranges	– Operating (ambient) – Case temperature – Storage		–40°C to +75°C +115°C max. –40°C to +105°C
Derating (convection cooling) Guideline values:			depending on installation! approx. 1.2 %/K above +25°C please refer to application note for temperature measure point that should not exceed 115°C.
Over temperature protection			at +120°C
Thermal shock, mechanical shock & vibration – Test conditions			EN 61373, MIL-STD-810F www.tracopower.com/products/mil810.pdf
Humidity (non condensing)			95 % rel H max.
Reliability, calculated MTBF (MIL-HDBK-217F, at +70°C, ground benign)			300'000 h
Isolation voltage (60sec.)	– Input/Output – Input/Case		2'250 VDC (basic insulation) 1'600 VDC
Isolation capacitance	– Input/Output		2500 pF max.
Isolation resistance	– Input/Output (500 VDC)		>1 GOhm min.
Switching frequency			250 kHz typ. (puls width modulation)
Safety standards			EN 50155, UL 60950-1, IEC/EN 60950-1
Safety approvals	– UL/cUL (entry pending) – Railway		www.ul.com -> certifications -> File e188913 www.tracopower.com/products/tep-coc.pdf
Remote On/Off	– positive logic (standard) – negative logic (option) – Off idle current:	– On: – Off: – On: – Off:	3 to 12 VDC or open circuit 0 to 1.2 VDC or short circuit pin 1 and 3 0 to 1.2 VDC or short circuit pin 1 and 3 3 to 12 VDC or open circuit 3 mA
Environmental compliance	– Reach – RoHS		www.tracopower.com/products/reach-declaration.pdf RoHS directive 2011/65/EU

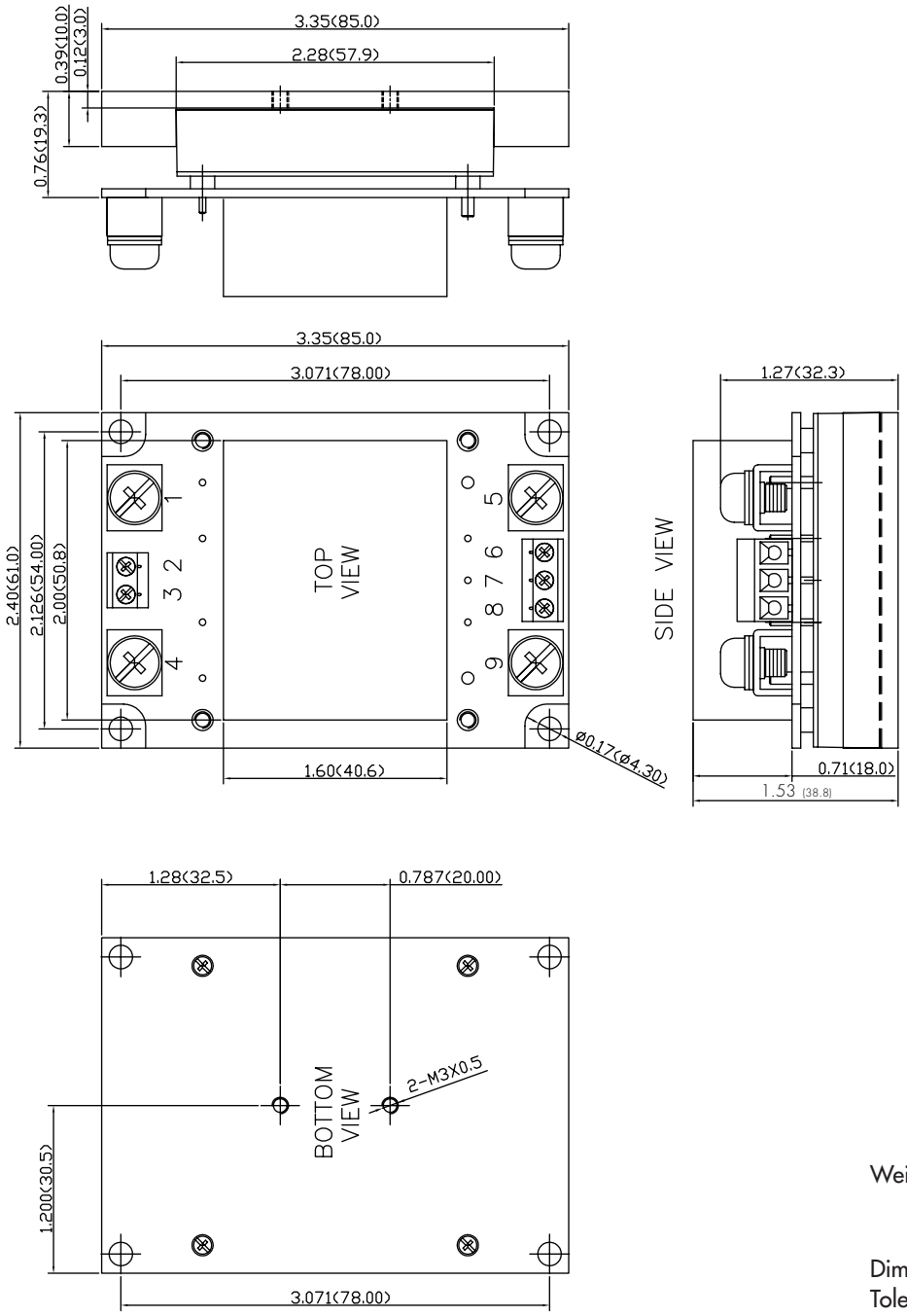
Application note: www.tracopower.com/products/tep200wir-application.pdf

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

General Specifications

Casing material	24 Vin & 48 Vin models: 110 Vin models:	metal Aluminium base-plate with plastic casing
Potting material		silicone (UL94V-0 rated)
Base material		FR4

Dimensions



Pin-Out	
Pin	
1	– Vin
2	Case
3	Remote On/Off
4	+ Vin
5	– Vout
6	– Sense*
7	Trim
8	+ Sense*
9	+ Vout

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

Weight: 287 g (10.12oz)

Dimensions in Inch, () = mm
Tolerances ±0.02 (±0.5)
Pin pich tolerances ±0.01 (±0.25)
Mounting hole pich tolerances ±0.01 (±0.25)

Options

TEP-MK1 DIN-rail clip for chassis mount models