

Features

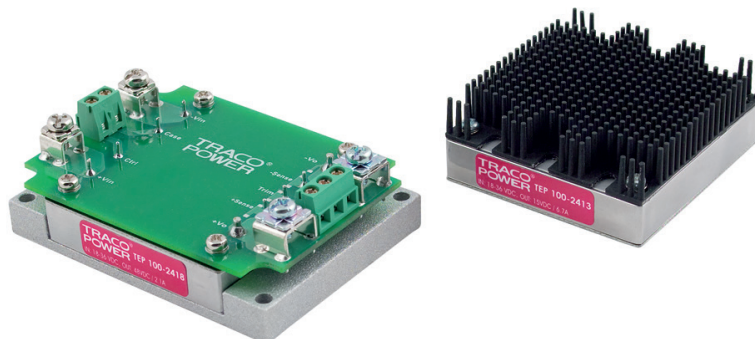
- ◆ Rugged, compact metal case
- ◆ Easy chassis mount
- ◆ Screw terminal adaptor available for easy connection
- ◆ Wide 2:1 input voltage range
- ◆ Full load operation up to 60°C with convection cooling
- ◆ Soft start
- ◆ Under voltage lock-out circuit
- ◆ Reverse input voltage protection
- ◆ Input protection filter
- ◆ 3-year product warranty

The TEP-100 Series is a family of isolated high performance dc-dc converter modules with ultra-wide 2:1 input voltage ranges which come in a rugged, sealed metal case.

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 pictured with chassis mount adaptor and optional heatsink)

Models

Order code*	Input voltage	Output voltage	Output current max.	Efficiency typ.
TEP 100-1210	9 – 18 VDC (12 VDC nominal)	3.3 VDC	25.0 A	90 %
TEP 100-1211		5.0 VDC	20.0 A	91 %
TEP 100-1212		12 VDC	8.4 A	91 %
TEP 100-1213		15 VDC	6.7 A	91 %
TEP 100-1215		24 VDC	4.2 A	90 %
TEP 100-1216		28 VDC	3.6 A	90 %
TEP 100-1218		48 VDC	2.1 A	90 %
TEP 100-2410	18 – 36 VDC (24 VDC nominal)	3.3 VDC	25.0 A	91 %
TEP 100-2411		5.0 VDC	20.0 A	93 %
TEP 100-2412		12 VDC	8.4 A	93 %
TEP 100-2413		15 VDC	6.7 A	93 %
TEP 100-2415		24 VDC	4.2 A	92 %
TEP 100-2416		28 VDC	3.6 A	92 %
TEP 100-2418		48 VDC	2.1 A	92 %
TEP 100-4810	36 – 75 VDC (48 VDC nominal)	3.3 VDC	25.0 A	91 %
TEP 100-4811		5.0 VDC	20.0 A	93 %
TEP 100-4812		12 VDC	8.4 A	93 %
TEP 100-4813		15 VDC	6.7 A	93 %
TEP 100-4815		24 VDC	4.2 A	92 %
TEP 100-4816		28 VDC	3.6 A	92 %
TEP 100-4818		48 VDC	2.1 A	92 %

* – add suffix **-CM**, **-CMF** for models with chassis mount adaptor, see last page.

– add suffix **-N** for negative remote control, see page 3 -> Remote On/Off

Input Specifications

Input current at no load	12 Vin; 3.3 – 15 VDC models:	210 mA typ.
	12 Vin; 24 – 48 VDC models:	100 mA typ.
	24 Vin; 3.3 – 15 VDC models:	185 mA typ.
	24 Vin; 24 – 48 VDC models:	85 mA typ.
	48 Vin; 3.3 – 15 VDC models:	90 mA typ.
	48 Vin; 24 – 48 VDC models:	40 mA typ.
Input current at full load	12 Vin models:	9.4 A typ.
	24 Vin models:	4.6 A typ.
	48 Vin models:	2.3 A typ.
Start-up voltage	12 Vin models:	8.5 VDC (or lower)
	24 Vin models:	17.5 VDC (or lower)
	48 Vin models:	35.5 VDC (or lower)
Under voltage shut down (lock-out circuit)	12 Vin models:	7.5 VDC typ.
	24 Vin models:	16 VDC typ.
	48 Vin models:	34 VDC typ.
Surge voltage (100 msec. max.)	12 Vin models:	36 V max.
	24 Vin models:	50 V max.
	48 Vin models:	100 V max.
Conducted noise	EN 55022 level A, FCC part 15, level A (chassis mount option –CFM required)	
ESD (electrostatic discharge)	EN 61000-4-2, air ± 8 kV, contact ± 6 kV, perf. criteria A	
Radiated immunity	EN 61000-4-3, 10 V/m, perf. criteria A	
Fast transient / Surge	EN 61000-4-4, ± 2 kV, perf. criteria A EN 61000-4-5, ± 1 kV perf. criteria A With external input capacitor e.g. Nippon chemi-con KY 200 μ F, 100 V, ESR 48 mOhm or with chassis mount option –CFM	
Conducted immunity	EN 61000-4-6, 10 Vrms, perf. criteria A	
Reverse voltage protection	parallel diode	
Recommended input fuse (slow blow)	12 Vin models:	15 A
	24 Vin models:	10 A
	48 Vin models:	5 A

Output Specifications

Voltage set accuracy	± 1 %	
Output voltage adjustment	+10 % / –20 % by external resistor see application note:	
Regulation	– Input variation Vin min. to Vin max.	0.2 % max.
	– Load variation (0 – 100 %) 3.3 – 15 VDC models:	0.3 % max.
	24 – 48 VDC models:	0.3 % max.
Temperature coefficient	± 0.02 %/K	
Minimum load	not required	
Remote sense	10 % max. of Vout nom. (including trim up value)	
Ripple and noise (20 MHz Bandwidth)	3.3 & 5 VDC models:	75 mVpk-pk max.
	12 & 15 VDC models:	100 mVpk-pk max.
	24 & 28 VDC models:	200 mVpk-pk max.
	48 VDC models:	300 mVpk-pk max.

Output Specifications

Start up time (nominal Vin and constant resistive load)	25 ms typ. (at power On or remote On)
Transient response (25% load step change)	200 µs typ.
Output current limitation	at 110 -140 % of Iout max.
Over voltage protection	at 115 -130 % of Vout nom.
Short circuit protection	indefinite, automatic recovery
Capacitive load	3.3 & 5 VDC models: 40'000 µF max. 12 VDC models: 7'000 µF max. 15 VDC models: 4'460 µF max. 24 VDC models: 1'750 µF max. 28 VDC models: 1'280 µF max. 48 VDC models: 430 µF max.

General Specifications

Temperature ranges	– Operating – Case temperature – Storage	–40°C to +75°C +105°C max. –55°C to +125°C
Thermal impedance	– without Heatsink – with Heatsink	6.7°C/W 4.7°C/W
Derating		See derating graphs page 4
Over temperature protection		at 115°C
Thermal shock		acc. MIL-STD-810F
Humidity (non condensing)		95 % rel H max.
Reliability, calculated MTBF (MIL-HDBK-217F, at +25°C, ground benign)		75'000 h
Isolation voltage (60sec.)	– Input/Output – Input/Case	2'250 VDC (basic insulation) 1'500 VDC
Isolation capacitance	– Input/Output	2500 pF max.
Isolation resistance	– Input/Output (500 VDC)	>1 GOhm min.
Switching frequency		300 kHz typ. (puls width modulation)
Safety standards		UL 60950-1 , IEC/EN 60950-1
Safety approvals	– UL/cUL	www.ul.com -> certifications -> File e188913
Remote On/Off	– positive logic (standard) – negative logic (option -N) – Off idle current:	– On: 3 to 12 VDC or open circuit – Off: 0 to 1.2 VDC or short circuit pin 1 and 3 – On: 0 to 1.2 VDC or short circuit pin 1 and 3 – Off: 3 to 12 VDC or open circuit 3 mA
Environmental compliance	– Reach – RoHS	www.tracopower.com/products/tep100-reach.pdf RoHS directive 2011/65/EU

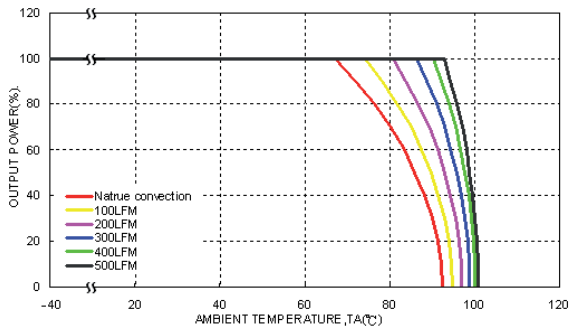
Application note: www.tracopower.com/products/tep100-application.pdf

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

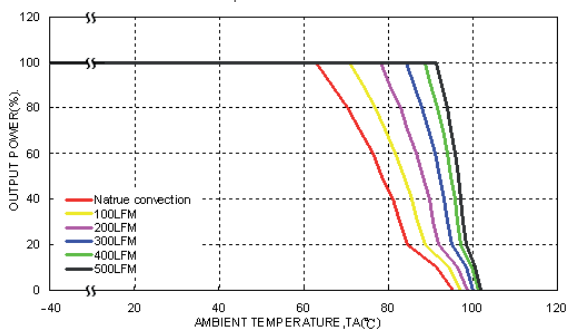
Output Power Derating

Models with heatsink

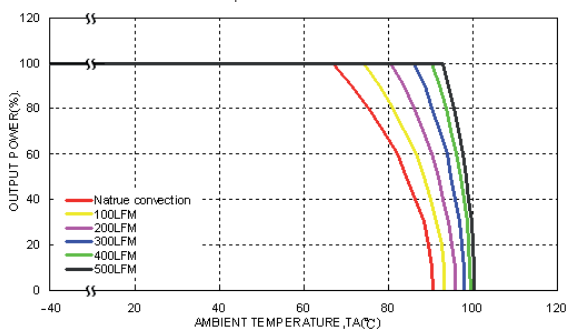
24 Vin models: Output 3.3–15 VDC



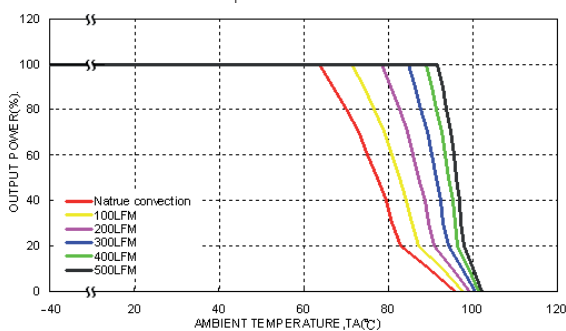
24 Vin models: Output 24–48 VDC



48 Vin models: Output 3.3–15 VDC

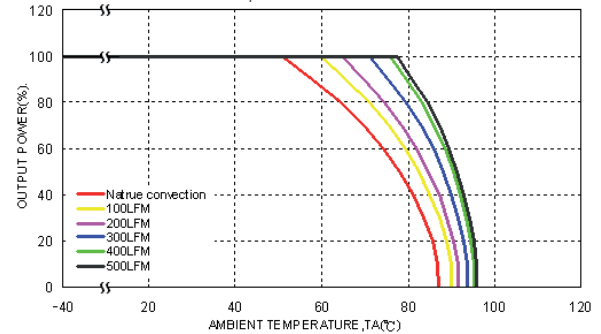


48 Vin models: Output 24–48 VDC

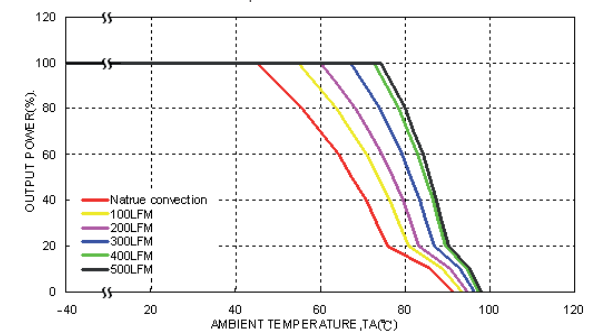


Models without heatsink

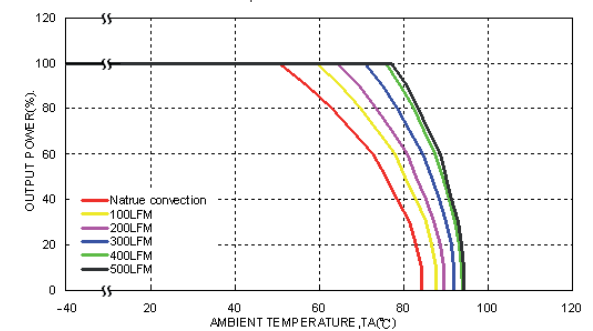
24 Vin models: Output 3.3–15 VDC



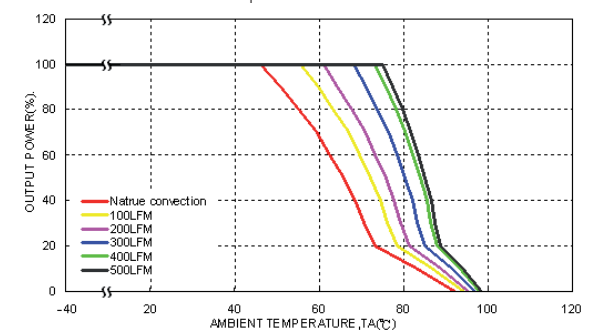
24 Vin models: Output 24–48 VDC



48 Vin models: Output 3.3–15 VDC



48 Vin models: Output 24–48 VDC

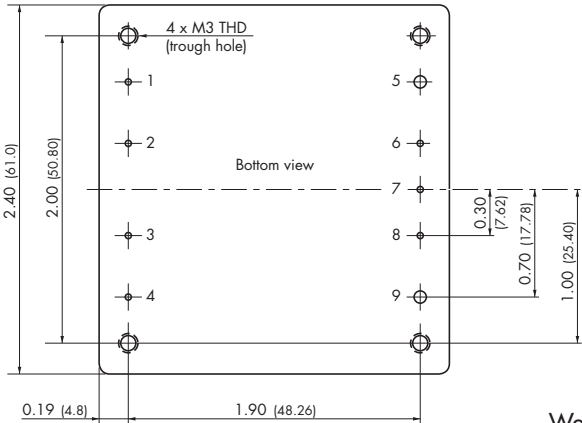


Specifications

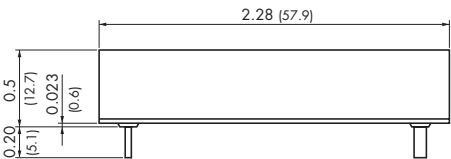
Casing material	metal
Potting material	silicone (UL94V-0 rated)
Base material	FR4
Vibration	acc. MIL-STD-810F

Dimensions

TEP 100 module



Weight: 97 g (3.42 oz)

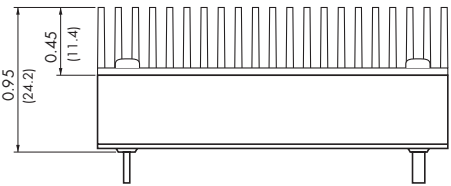


Pin diameter pin 5 & 9: 0.08 (2.0)
Pin diameter other pins: 0.04 (1.0)

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

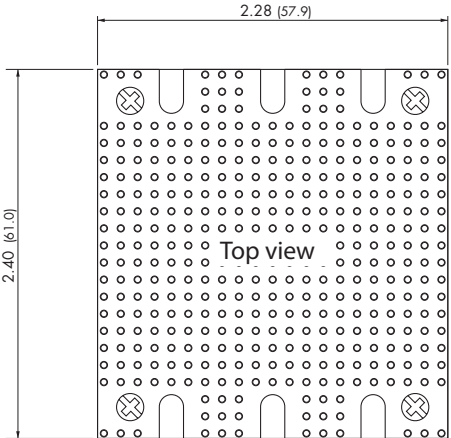
*Sense line to be connected to the output either at the module or at the load under regard of polarity.

TEP-HS1 Heatsink (pictured with heatsink mounted)



Order code: TEP-HS1
Includes heatsink with thermal pad and mounting screws
For to order modules with mounted heatsink ask factory.

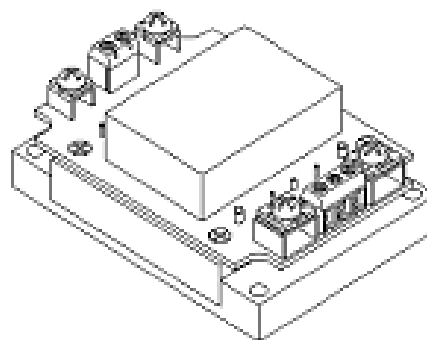
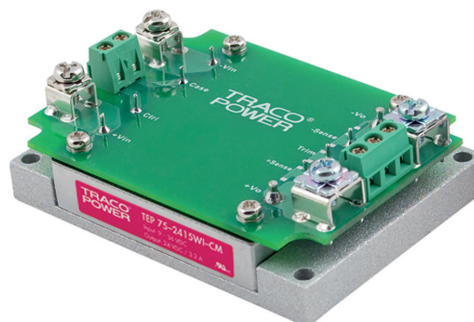
Weight: 135 g (4.76 oz)
(Heatsink + Converter)



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

TEP 100 module with chassis mount adaptor (suffix -CM or -CMF)

In addition this Chassis mount option is available with an EMI-filter(see EMI specification)



Top view of the PCB showing dimensions and component locations. The dimensions are as follows:

- Overall width: 2.40 [61.0]
- Overall height: 3.35 [85.0]
- Distance from top edge to top of component area: 0.14 [3.5]
- Distance from top edge to center of component area: 3.07 [78.0]
- Distance from top edge to center of component area (alternative): 2.126 [54.0]
- Distance from top edge to center of component area (alternative): 0.89 [22.2]
- Distance from top edge to center of component area (alternative): 1.60 [40.6]
- Distance from bottom edge to bottom of component area: 0.14 [3.5]
- Distance from bottom edge to center of component area: 3.07 [78.0]
- Distance from bottom edge to center of component area (alternative): 2.126 [54.0]
- Distance from bottom edge to center of component area (alternative): 0.89 [22.2]
- Distance from bottom edge to center of component area (alternative): 1.60 [40.6]

The component locations are indicated by circles with numbers 1 through 9. The locations are as follows:

- 1: Top right corner
- 2: Top center-right
- 3: Top center-left
- 4: Top left corner
- 5: Bottom right corner
- 6: Bottom center-right
- 7: Bottom center-left
- 8: Bottom center-left
- 9: Bottom left corner

The text "TOP VIEW" is centered in the diagram.

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

Connection	
Pin	
1	$-V_{in}$
2	Case
3	Remote On/Off
4	$+V_{in}$
5	$-V_{out}$
6	$-Sense^*$
7	Trim
8	$+Sense^*$
9	$+V_{out}$

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