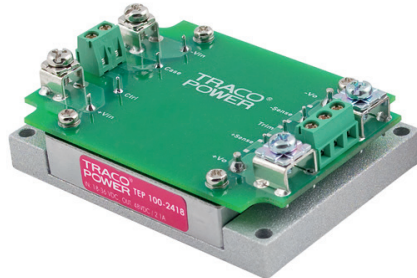


Features

- ◆ 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



(Models pictured with chassis mount adaptor and optional heatsink)

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

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: 160 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)
EMC immunity	EN 50121-3-2 EN 61000-4-2, air ±8 kV, contact ±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, ±2 kV perf. criteria A Nippon chemi-con KY 200 µF, 100 V, ESR 48 Ohm or with chassis mount option –CFM EN 61000-4-6, 10 Vrms, perf. criteria A
	– ESD (electrostatic discharge)
	– Radiated immunity
	– Fast transient / surge (with external input capacitor)
	– Conducted immunity
Reverse voltage protection	parallel diode

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	<ul style="list-style-type: none"> - Operating - Case temperature - Storage 	-40°C to +75°C +105°C max. -55°C to +125°C
Thermal impedance	<ul style="list-style-type: none"> - 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 +70°C, ground benign)		331'000 h
Isolation voltage (60sec.)	<ul style="list-style-type: none"> - 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		300 kHz typ. (puls width modulation)
Safety approvals	<ul style="list-style-type: none"> - Certification documents 	UL 60950-1 , IEC/EN 60950-1 www.tracopower.com/overview/tep100
Remote On/Off	<ul style="list-style-type: none"> - positive logic (standard) - negative logic (option -N) - Off idle current: 	<ul style="list-style-type: none"> - 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	<ul style="list-style-type: none"> - Reach - RoHS 	www.tracopower.com/products/reach-declaration.pdf RoHS directive 2011/65/EU

Application note: www.tracopower.com/overview/tep100

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

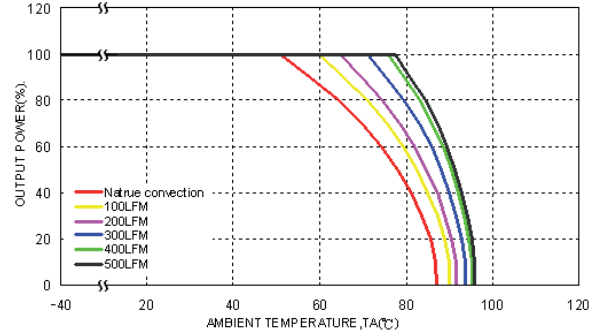
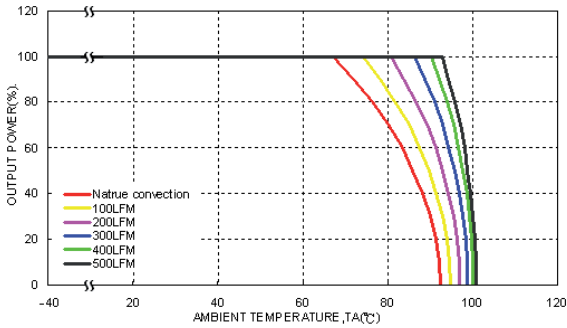
Output Power Derating

Models with heatsink

Models without heatsink

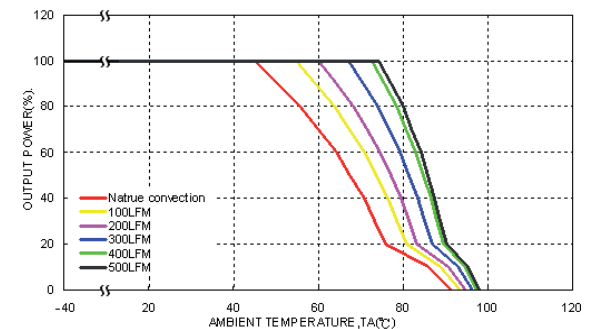
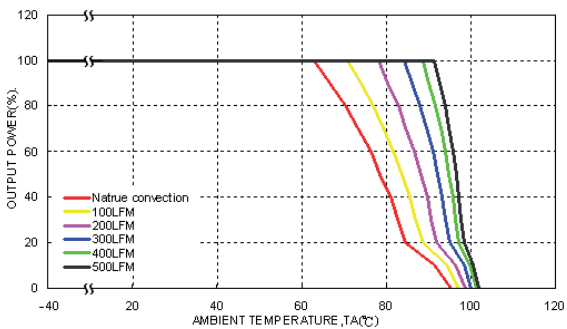
24 Vin models: Output 3.3–15 VDC

24 Vin models: Output 3.3–15 VDC



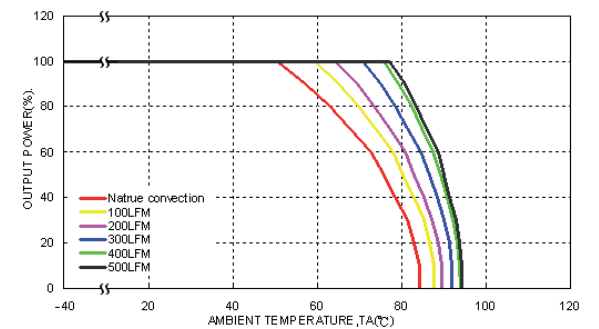
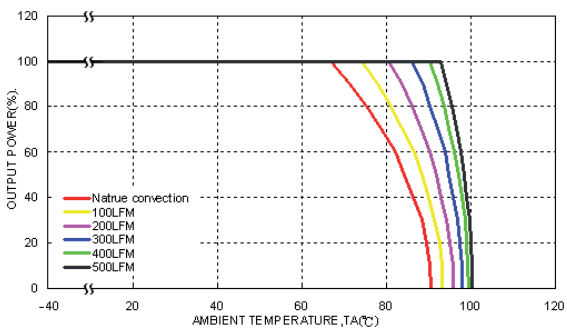
24 Vin models: Output 24–48 VDC

24 Vin models: Output 24–48 VDC



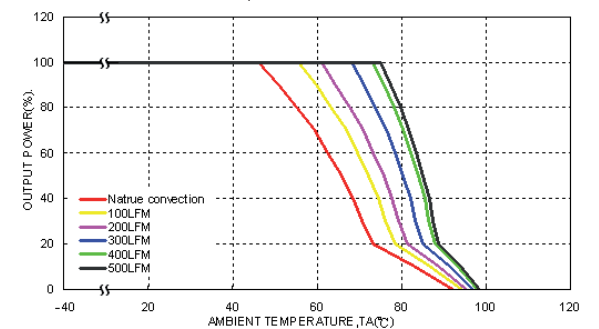
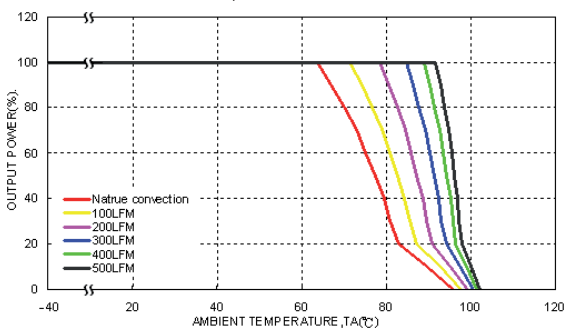
48 Vin models: Output 3.3–15 VDC

48 Vin models: Output 3.3–15 VDC



48 Vin models: Output 24–48 VDC

48 Vin models: Output 24–48 VDC

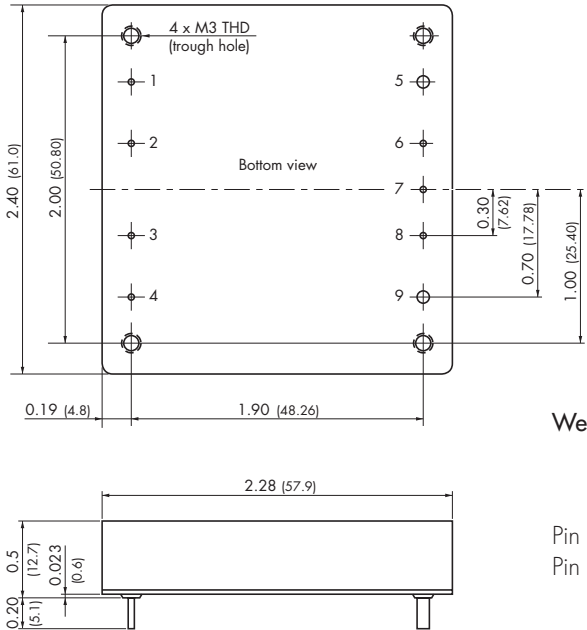


Specifications

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

Dimensions

TEP 100 module



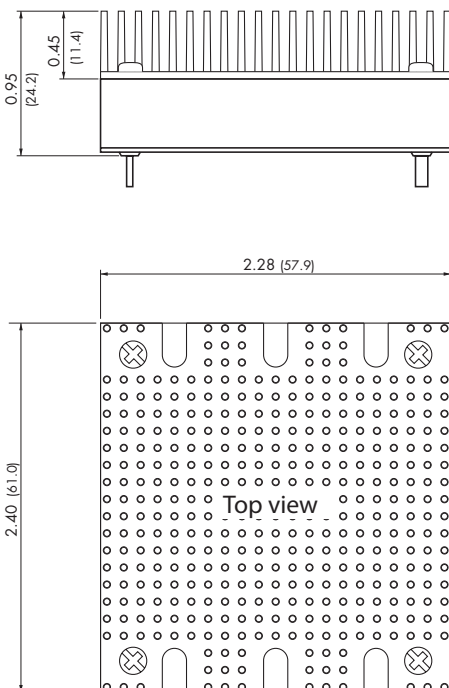
Weight: 97 g (3.42 oz)

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 (4.76oz)
(Heatsink + Converter)

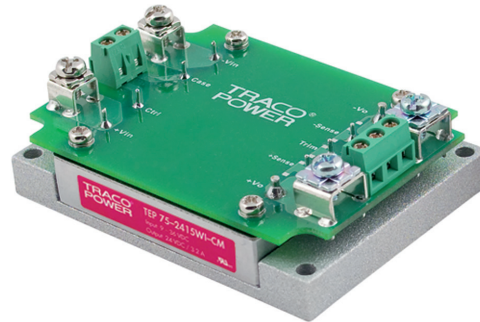
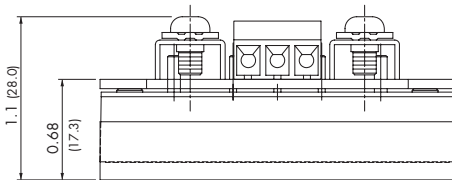
Dimensions in Inch, () = mm
Tolerances: ± 0.02 (± 0.5)
Pin pitch tolerances: ± 0.01 (± 0.25)
Mounting hole pitch tolerances: ± 0.01 (± 0.25)

Chassis Mount Adaptor

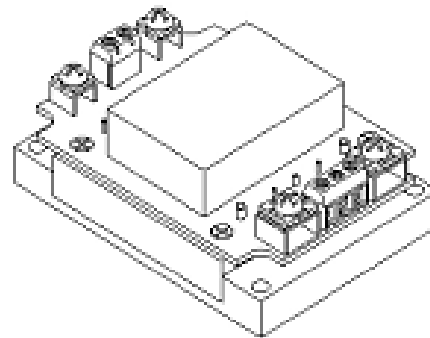
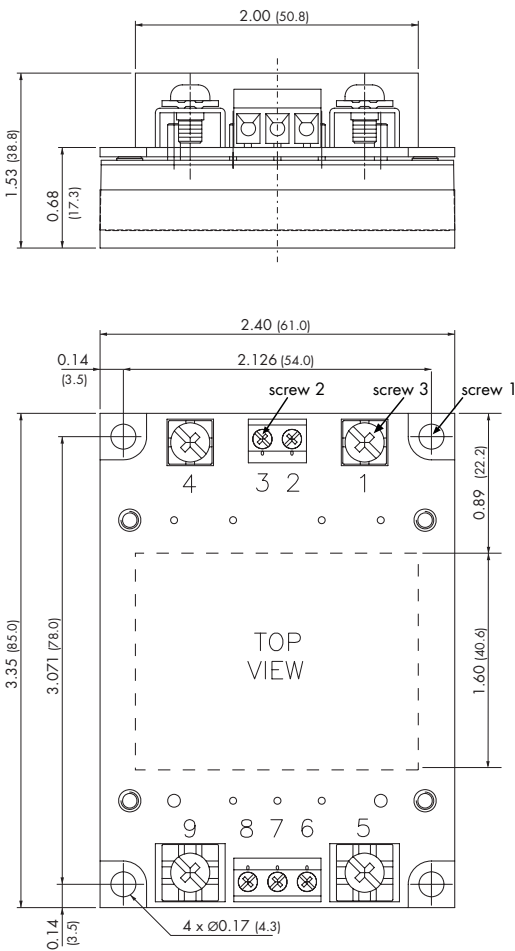
TEP 100 module with chassis mount adaptor (suffix -CM or -CMF)

For easy chassis mounting the converter modules can be supplied with an adaptor option consisting of a screw terminal connection board (soldered to converter pins) and a chassis mount adaptor. In addition this Chassis mount option is available with an EMI-filter (see EMI specification)

Suffix -CM: Chassis mount adaptor



Suffix -CMF: Chassis mount adaptor with EMI filter



Please note that adaptors cannot be ordered as separate items but are factory assembled.

Weight: -CM 200 g (7.05oz)
Weight: -CMF 287 g (10.12oz)

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

Connection

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

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

Specifications can be changed without notice! Make sure you are using the latest documentation, downloadable at www.tracopower.com