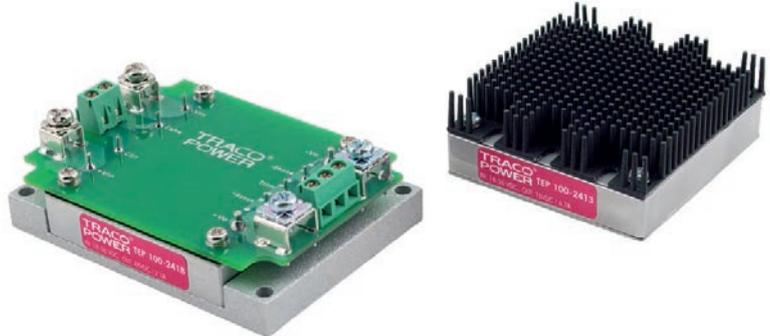


### Features

- ◆ 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
- ◆ 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 a 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:	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 / under voltage shut down	12 Vin models:	8.5 VDC / 7.5 VDC typ.
	24 Vin models:	17.5 VDC / 16 VDC typ.
	48 Vin models:	35.5 VDC / 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 µF, 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	<ul style="list-style-type: none"> <li>- Operating</li> <li>- Case temperature</li> <li>- Storage</li> </ul>	-40°C to +75°C +105°C max. -55°C to +125°C
Thermal impedance	<ul style="list-style-type: none"> <li>- without Heatsink</li> <li>- with Heatsink</li> </ul>	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 MTTF (MIL-HDBK-217F, @ +25°C, ground benign)		75'000 h
Isolation voltage (60sec.)	<ul style="list-style-type: none"> <li>- Input/Output</li> <li>- Input/Case</li> </ul>	2'250 VDC (basic insulation) 1'500 VDC
Isolation capacity	- 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	<a href="http://www.ul.com">www.ul.com</a> -> certifications -> File E188913
Remote On/Off	<ul style="list-style-type: none"> <li>- positive logic (standard)</li> <li>- negative logic (option -N)</li> <li>- Off idle current:</li> </ul>	<ul style="list-style-type: none"> <li>- On: 3 to 12 VDC or open circuit</li> <li>- Off: 0 to 1.2 VDC or short circuit pin 1 and 3</li> <li>- On: 0 to 1.2 VDC or short circuit pin 1 and 3</li> <li>- Off: 3 to 12 VDC or open circuit</li> <li>3 mA</li> </ul>
Environmental compliance	<ul style="list-style-type: none"> <li>- Reach</li> <li>- RoHS</li> </ul>	<a href="http://www.tracopower.com/products/tep100-reach.pdf">www.tracopower.com/products/tep100-reach.pdf</a> RoHS directive 2002/95/EC

**Application note:** [www.tracopower.com/products/tep100-application.pdf](http://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.

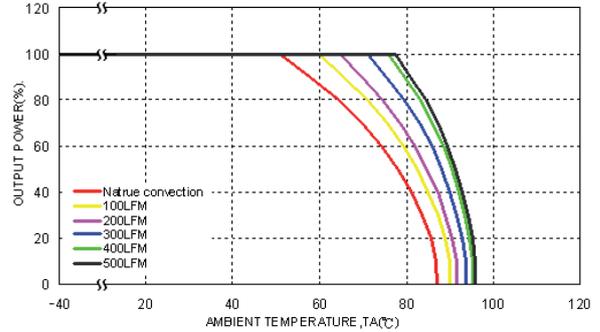
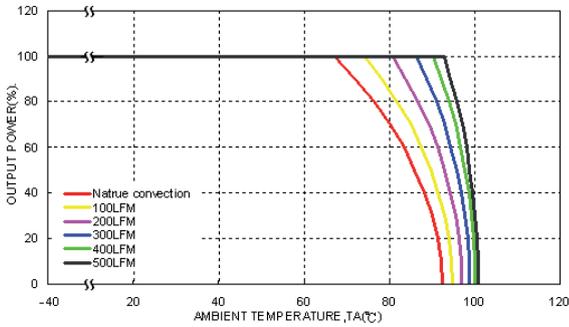
**Output Power Derating**

Models with heatsink

Models without heatsink

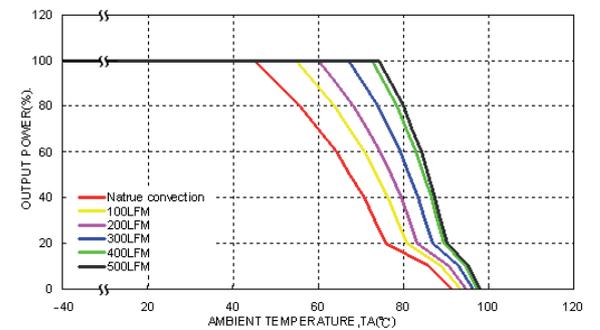
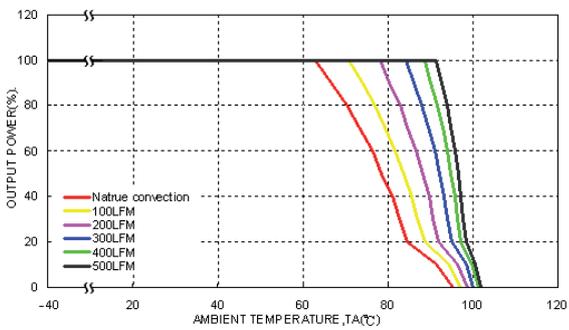
24 Vin models: Output 3.3–15 VDC

24 Vin models: Output 3.3–15 VDC



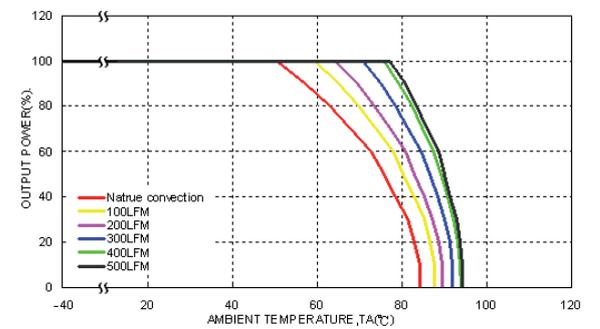
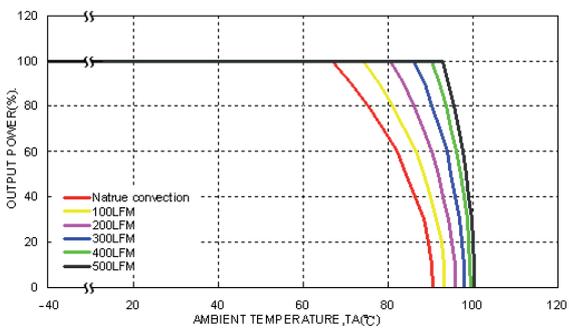
24 Vin models: Output 24–48 VDC

24 Vin models: Output 24–48 VDC



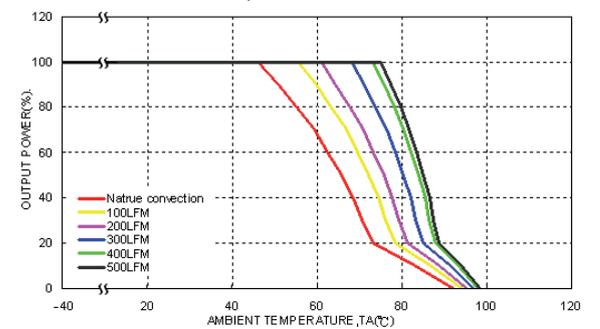
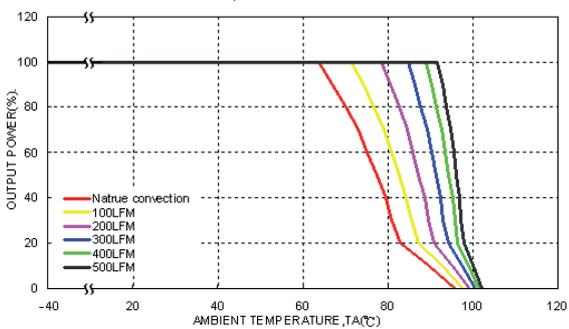
48 Vin models: Output 3.3–15 VDC

48 Vin models: Output 3.3–15 VDC



48 Vin models: Output 24–48 VDC

48 Vin models: Output 24–48 VDC

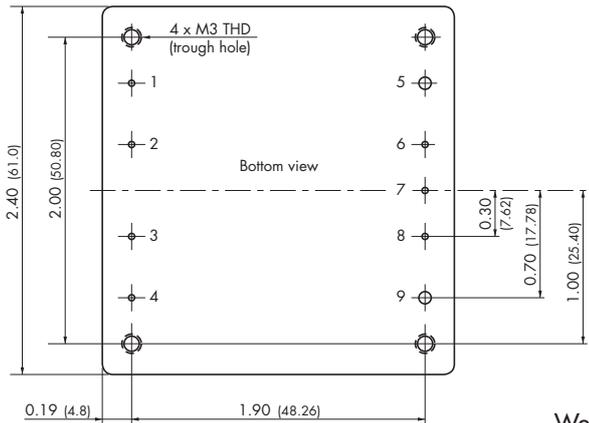


**Specifications**

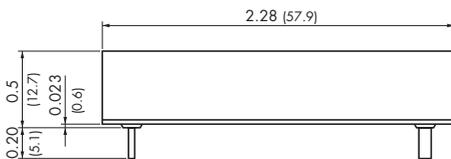
Casing material	metal
Potting material	silicon (UL94V-0 rated)
Base material	FR4
Vibration	acc. MIL-STD-810F

**Dimensions**

TEP 100 module

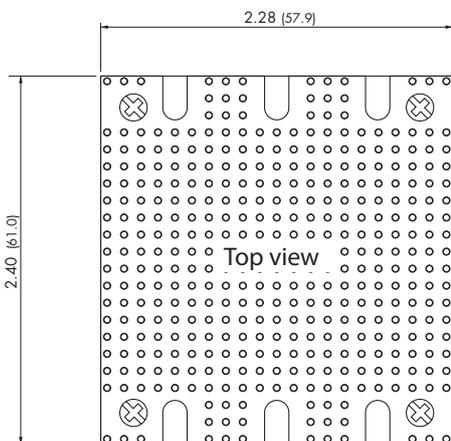
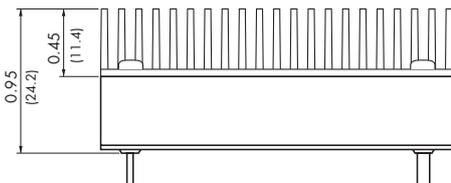


Weight: 97 g (3.42 oz)



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

**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)

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.

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

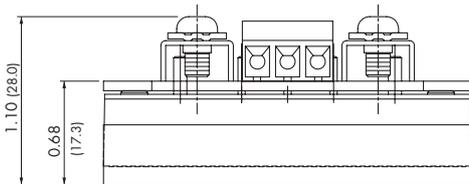
**Chassis Mount Adaptor**

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

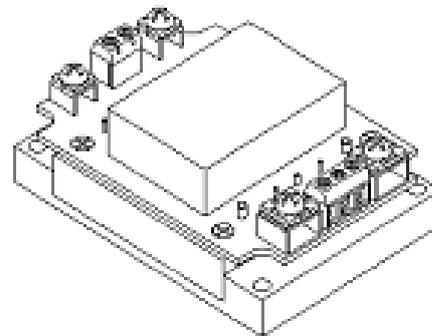
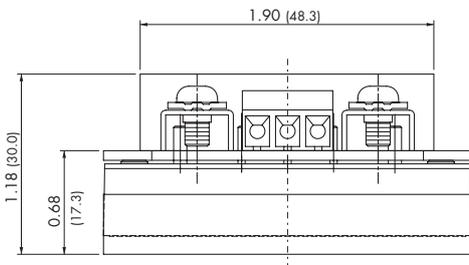
For easy chassis mounting the converter modules can be supplied with an adaptor consisting of a screw terminal connection board (soldered to converter pins) and a chassis mount adaptor.

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

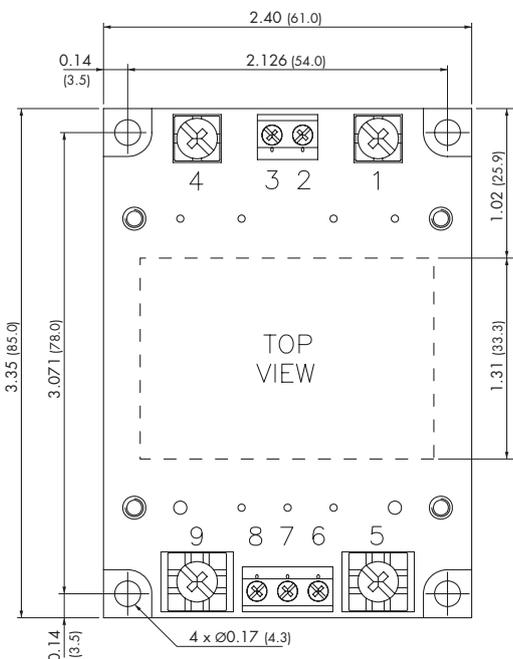
Suffix -CM: Chassis mount adaptor



Suffix -CMF: Chassis mount adaptor with EMI filter



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



Connection	
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.

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

Specifications can be changed any time without notice.