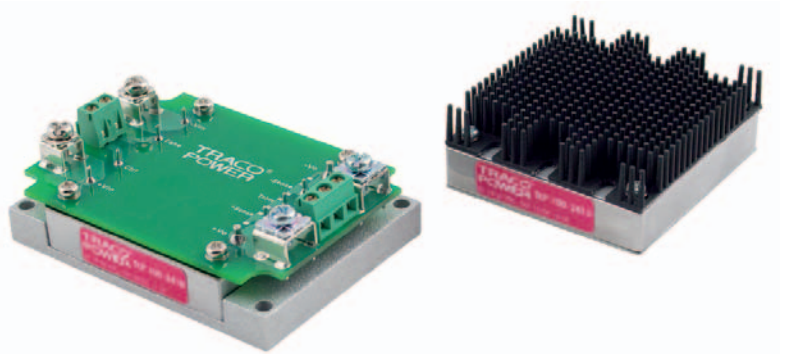


Features

- ◆ 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 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 | 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 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 | – 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 2002/95/EC |

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.

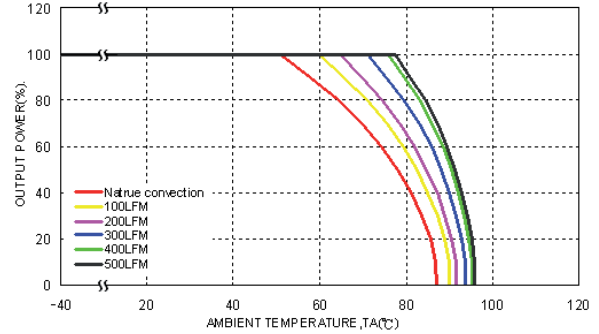
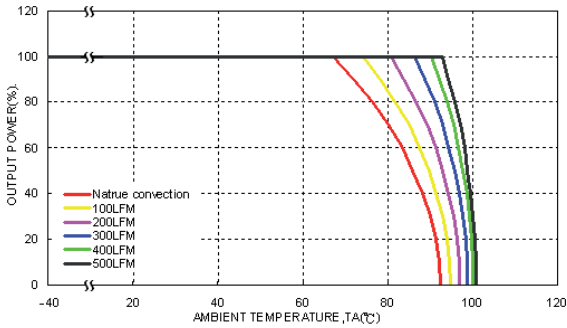
Output Power Derating

Models with heatsink

Models without heatsink

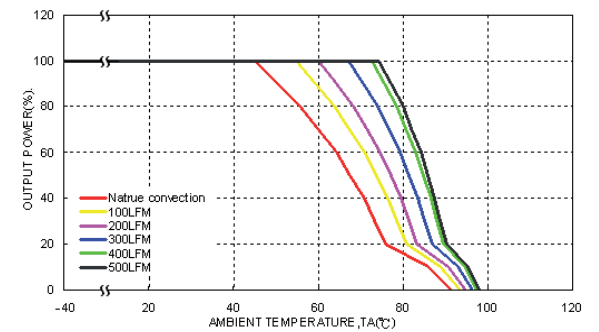
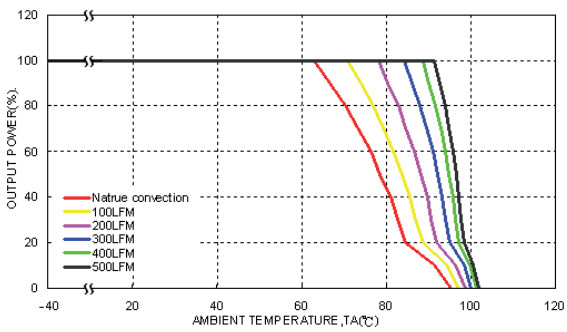
24 Vin models: Output 3.3–15 VDC

24 Vin models: Output 3.3–15 VDC



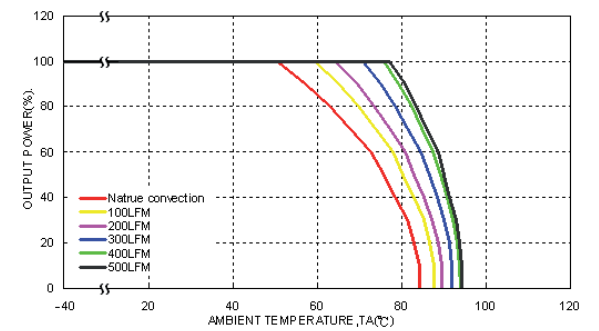
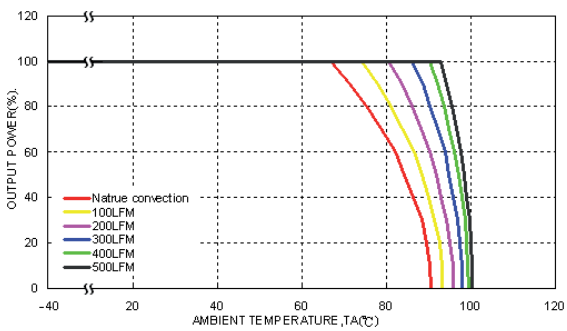
24 Vin models: Output 24–48 VDC

24 Vin models: Output 24–48 VDC



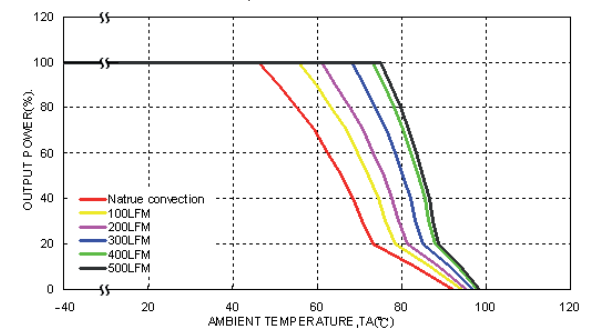
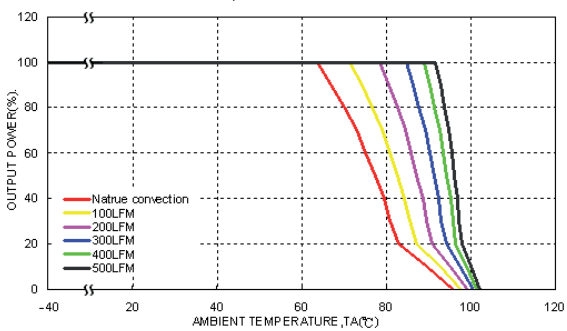
48 Vin models: Output 3.3–15 VDC

48 Vin models: Output 3.3–15 VDC



48 Vin models: Output 24–48 VDC

48 Vin models: Output 24–48 VDC

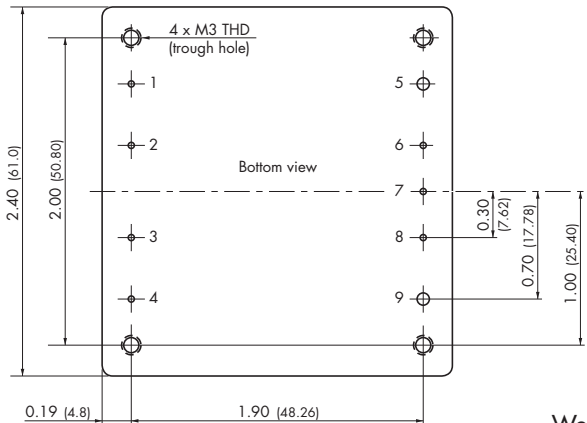


Specifications

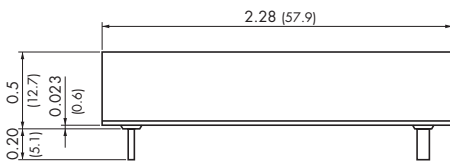
| | |
|------------------|-------------------------|
| Casing material | metal |
| Potting material | silicon (UL94V-0 rated) |
| Base material | FR4 |
| Vibration | acc. MIL-STD-810F |

Dimensions

TEP 100 module

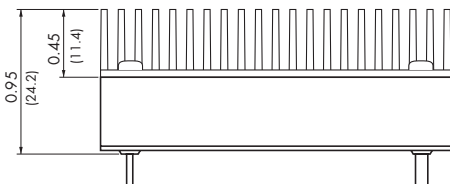


Weight: 97 g (3.42 oz)



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

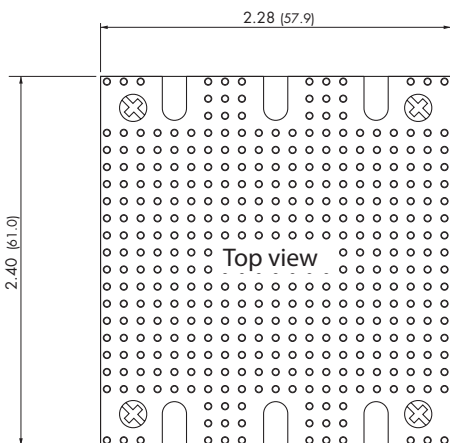
TEP-HS1 Heatsink (pictured with heatsink mounted)



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.

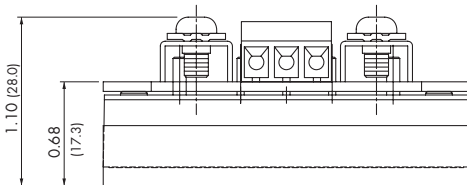
Dimensions in Inch, () = mm
Tolerances: ±0.02 (±0.5)
Pin pitch tolerances: ±0.01 (±0.25)
Mounting hole pitch tolerances: ±0.01 (±0.25)

Chassis Mount Adaptor

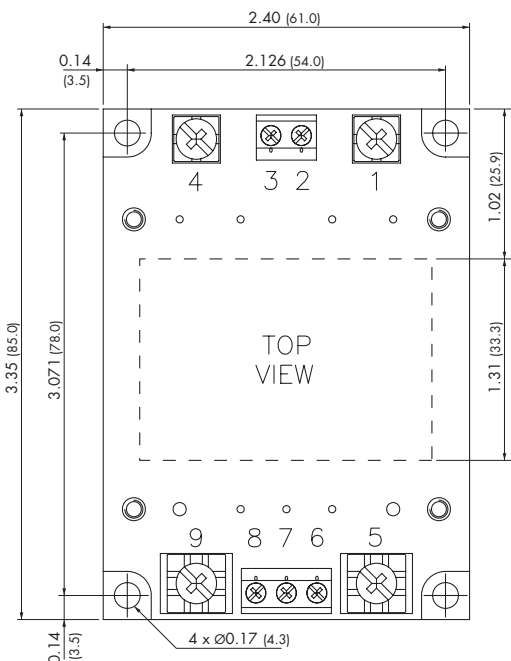
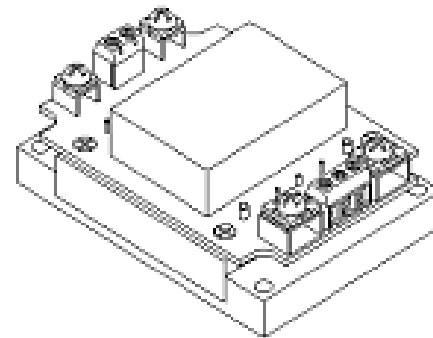
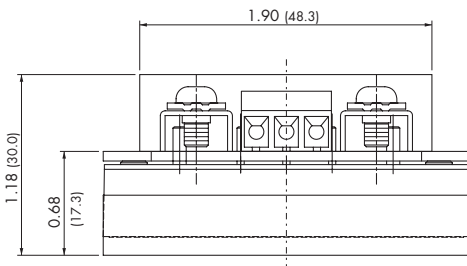
TEP 100 module with chassis mount adaptor (suffix -CM or -CMF)

For easy chassis mounting the converter modules can be supplied with an adaptor 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 196 g (6.91 oz)
Weight: -CMF 238 g (8.39 oz)

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

Connection

| Pin | Connection |
|-----|---------------|
| 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 any time without notice.