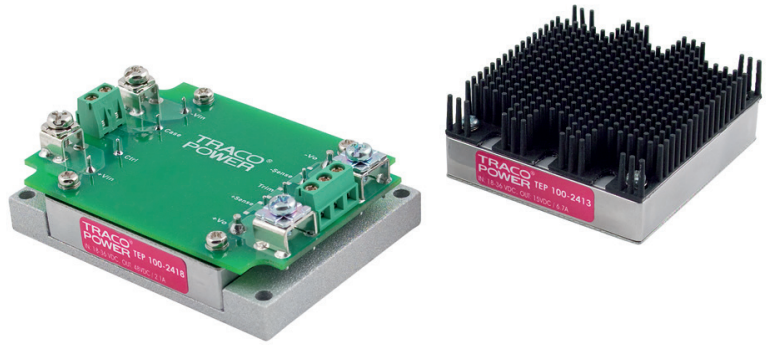


### Features

- ◆ Rugged, compact metal case
- ◆ Screw terminal adaptor available for easy connection
- ◆ EN 50155 approval for railway applications
- ◆ Optional DIN-rail mounting kit
- ◆ Ultra wide 4:1 input voltage range
- ◆ Full load operation up to +60°C with convection cooling
- ◆ Undervoltage lockout
- ◆ Reverse input voltage protection
- ◆ Input protection filter
- ◆ 3-year product warranty



(Models pictured with chassis mount adaptor / optional heatsink)

The TEP-75WI Series is a family of isolated high performance DC/DC converter modules with ultra-wide 4:1 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 75-2411WI | 9 – 36 VDC<br>(24 VDC nominal)   | 5.0 VDC        | 15.0 A              | 88 %            |
| TEP 75-2412WI |  | 12 VDC         | 6.3 A               | 88 %            |
| TEP 75-2413WI |  | 15 VDC         | 5.0 A               | 88 %            |
| TEP 75-2415WI |  | 24 VDC         | 3.2 A               | 87 %            |
| TEP 75-2416WI |  | 28 VDC         | 2.7 A               | 87 %            |
| TEP 75-2418WI |  | 48 VDC         | 1.6 A               | 87 %            |
| TEP 75-4811WI | 18 – 75 VDC<br>(48 VDC nominal)  | 5.0 VDC        | 15 A                | 90 %            |
| TEP 75-4812WI |  | 12 VDC         | 6.3 A               | 90 %            |
| TEP 75-4813WI |  | 15 VDC         | 5.0 A               | 89 %            |
| TEP 75-4815WI |  | 24 VDC         | 3.2 A               | 88 %            |
| TEP 75-4816WI |  | 28 VDC         | 2.7 A               | 88 %            |
| TEP 75-4818WI |  | 48 VDC         | 1.6 A               | 87 %            |
| TEP 75-7211WI | 43 – 160 VDC<br>(110 VDC nominal)  | 5.0 VDC        | 15 A                | 91 %            |
| TEP 75-7212WI |  | 12 VDC         | 6.3 A               | 91 %            |
| TEP 75-7213WI |  | 15 VDC         | 5.0 A               | 91 %            |
| TEP 75-7215WI |  | 24 VDC         | 3.2 A               | 90 %            |
| TEP 75-7216WI |  | 28 VDC         | 2.7 A               | 90 %            |
| TEP 75-7218WI |  | 48 VDC         | 1.6 A               | 90 %            |
| on demand     | Models with 3.3 VDC / ~ 20 A<br>Negative (passive = Off) Remote On/Off function (standard is passive = On) |                |                     |                 |

### Options

|                    |  |
|--------------------|--|
| suffix <b>-CM</b>  | Chassis mount models with screw terminal block, see page 5   |
| suffix <b>-CMF</b> | Chassis mount models with screw terminal block and input filter to meet EN 55032 class A, see page 5 |
| <b>TEP-HS1</b>     | Heat-sink for standard version (incl. mounting screws and thermal pad), see page 4                   |
| <b>TEP-MK1</b>     | Din-rail mounting kit for chassis mount models (incl. mounting screws), see page 6                   |
| <b>TCK-xxx</b>     | Common mode chokes for filter proposals to meet EN55032 class A/B, see application note              |

### Input Specifications

|  |  |
|--|--|
| Input current at no load                 | 24 Vin; 5 – 15 VDC models: <b>185 mA typ.</b><br>24 Vin; 24 – 48 VDC models: <b>85 mA typ.</b><br>48 Vin; 5 & 12 VDC models: <b>85 mA typ.</b><br>48 Vin; 15 – 48 VDC models: <b>50 mA typ.</b><br>110 Vin; 5 – 48 VDC models: <b>10 mA typ.</b>   |
| Input current at full load               | 24 Vin models: <b>3600 mA typ.</b> (see Note 1)<br>48 Vin models: <b>1800 mA typ.</b><br>110 Vin models: <b>1350 mA typ.</b>   |
| Start-up voltage / under voltage lockout | 24 Vin models: <b>9 VDC / 7.5 VDC (or lower)</b><br>48 Vin models: <b>18 VDC / 16 VDC (or lower)</b><br>110 Vin models: <b>43 VDC / 36 VDC (or lower)</b>  |
| Surge voltage (100 msec. max.)           | 24 Vin models: <b>50 V max.</b><br>48 Vin models: <b>100 V max.</b><br>110 Vin models: <b>185 V max.</b>   |
| Conducted noise                          | – with option <b>-CMF</b><br>– for PCB mount version<br><b>EN 55032 class A, FCC part 15, level A</b><br>See application note for to meet EN 55032 class A or B  |
| EMC immunity                             | – ESD (electrostatic discharge)<br>– Radiated immunity<br>– Fast transient / surge (with external input capacitor)<br><b>EN 50121-3-2</b><br><b>EN 61000-4-2, air ±8 kV, contact ±6 kV, perf. criteria A</b><br><b>EN 61000-4-3, 20 V/m, perf. criteria A</b><br><b>EN 61000-4-4, ±2 kV, perf. criteria A</b><br><b>EN 61000-4-5, ±2 kV perf. criteria A, EN55024/EN51055</b><br>24 & 48 Vin models: Nippon chemi-con KY 220 µF/100V, ESR 48 mOhm<br>110 Vin models: Ruby-con BXF series, 150µF/200V<br>CMF option models: capacitor included<br>– Conducted immunity<br>– PF Magnetic Field<br><b>EN 61000-4-6, 10 Vrms, perf. criteria A</b><br><b>EN 61000-4-8, 100 A/m, perf. criteria A</b> |
| Reverse voltage protection               | <b>parallel diode (external input fuse required)</b>   |

### Output Specifications

|                           |  |
|---------------------------|--|
| Voltage set accuracy      | <b>±1 %</b>  |
| Output voltage adjustment | <b>+10 % / -20 % by external resistor</b><br>see application note:   |
| Regulation                | – Input variation Vin min. to Vin max. <b>0.1 % max.</b><br>– Load variation (0 – 100 %) 5 – 15 VDC models: <b>0.1 % max.</b><br>24 – 48 VDC models: <b>0.1 % max.</b> |
| Temperature coefficient   | <b>±0.02 %/K</b>   |
| Minimum load              | <b>not required</b>  |

#### Note 1:

For 24 VDC input voltage models an input capacitor 4.7µF/50V X7R MLCC or 68µF/100V, 110mOhm Nippon chemi-con KY series is recommended for a reliable supply of the pulse current. Capacitor is already include with chassis mount option **-CM** and **-CMF**

## Output Specifications

|   |   |   |
|---|---|---|
| Remote sense  |   | 10 % max. of Vout nom.<br>(trim up value to subtract)   |
| Ripple and noise (20 MHz Bandwidth)                     | 5 VDC models:<br>12 & 15 VDC models:<br>24 & 28 VDC models:<br>48 VDC models:                           | 100 mVp-p max.<br>125 mVp-p max.<br>250 mVp-p max.<br>350 mVp-p max.                            |
| Start up time (nominal Vin and constant resistive load) | 110 VDC input:<br>Others:   | 60 ms typ. (at power On or remote On)<br>25 ms typ. (at power On or remote On)                  |
| Transient response (25 % load step change)              |   | 200 µs typ.   |
| Output current limitation                               | 110 VDC input:<br>Others:   | at 150 % of Iout max.<br>at 110 – 140 % of Iout max.  |
| Over voltage protection                                 |   | at 115 – 130 % of Vout nom.   |
| Short circuit protection                                |   | continuous, automatic recovery.   |
| Capacitive load   | 5 VDC models:<br>12 VDC models:<br>15 VDC models:<br>24 VDC models:<br>28 VDC models:<br>48 VDC models: | 30'000 µF max.<br>5'250 µF max.<br>3'330 µF max.<br>1'330 µF max.<br>960 µF max.<br>330 µF max. |

## General Specifications

|   |   |   |
|---|---|---|
| Temperature ranges  | – Operating<br>– Case temperature<br>– Storage  | –40°C to +75°C (with derating)<br>+105°C max.<br>–55°C to +125°C  |
| Thermal impedance   | – without Heatsink<br>– with Heatsink   | 6.7 K/W<br>4.7 K/W  |
| Over temperature protection   |   | at +115°C   |
| Thermal shock, mechanical shock & vibration                           | – Test conditions   | EN 61373:1999, MIL-STD-810F<br><a href="http://www.tracopower.com/products/mil810.pdf">www.tracopower.com/products/mil810.pdf</a>   |
| Humidity (non condensing)   |   | 5 – 95 % rel H max.   |
| Reliability, calculated MTBF (MIL-HDBK-217F, at +70°C, ground benign) |   | 336'000 h   |
| Isolation voltage (60sec.)  | – Input/Output<br>– Input/Case  | 2'250 VDC (basic insulation)<br>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 standards  | – UL online certification E188913, QQGG2<br><br>– Railway immunity<br>– Cold / dry heat / damp heat cyclic<br>– Certification documents | UL 60950-1 2nd edition + AM1<br>EN 60950-1:2006 + A11:2009-03<br>IEC 60950-1(2nd edition)<br>EN 50155:2007<br>EN 60068-2-1, EN 60068-2-2, EN 60068-2-30<br><a href="http://www.tracopower.com/overview/tep75wi">www.tracopower.com/overview/tep75wi</a>               |
| Remote On/Off   | – Positive logic (standard)<br><br>– Negative logic (optional on demand)<br><br>– Off idle current:                                     | – On: 3 to 12 VDC or open circuit<br>– Off: 0 to 1.2 VDC or short circuit pin 1 and 3<br>– On: 0 to 1.2 VDC or short circuit pin 1 and 3<br>– Off: 3 to 12 VDC or open circuit<br>3 mA  |
| Environmental compliance  | – Reach<br>– RoHS<br>– Flamability identified acc. EN 45545-2   | <a href="http://www.tracopower.com/info/reach-declaration.pdf">www.tracopower.com/info/reach-declaration.pdf</a><br>RoHS directive 2011/65/EU<br><a href="http://www.tracopower.com/info/en45545-declaration.pdf">www.tracopower.com/info/en45545-declaration.pdf</a> |

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

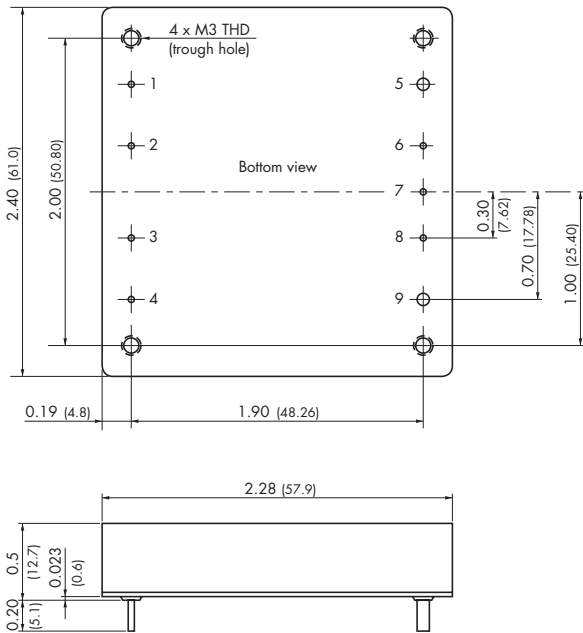
**General Specifications**

|                  |   |
|------------------|---|
| Casing material  | 24 & 48 VDC input: metal<br>110 VDC input: aluminium base-plate with plastic casing |
| Potting material | silicone (UL94V-0 rated)  |
| Base material    | 24 & 48 VDC input: FR4  |

**Supporting documents:** [www.tracopower.com/overview/tep75wi](http://www.tracopower.com/overview/tep75wi)

**Dimensions**

TEP 75 module



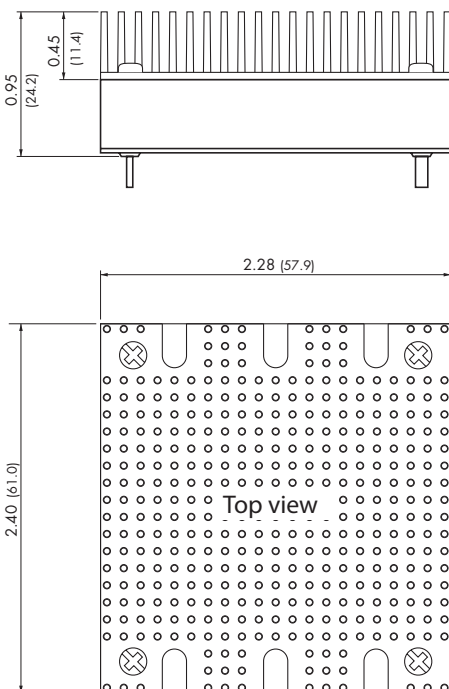
Weight: 97 g (3.42oz)

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.

**Option Heatsink**



Order code: **TEP-HS1**

Includes heatsink with thermal pad and mounting screws  
To order modules with mounted heatsink ask factory.

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

Dimensions in Inch, ( ) = mm  
Tolerances  $\pm 0.02$  ( $\pm 0.5$ )  
Pin pitch tolerances  $\pm 0.01$  ( $\pm 0.25$ )  
Mounting hole pitch tolerances  $\pm 0.01$  ( $\pm 0.25$ )

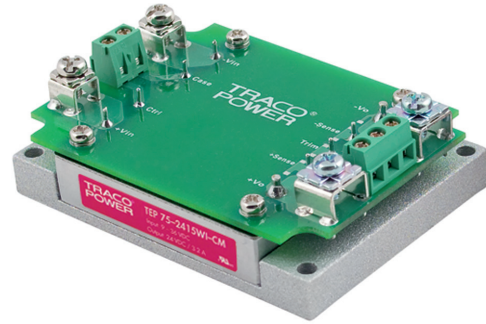
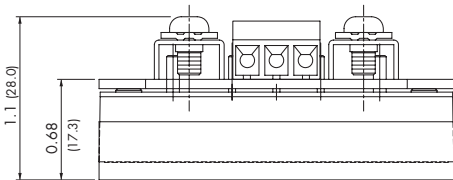
**Option Chassis Mount**

TEP 75 module with chassis mount adaptor (suffix -CM or -CMF)

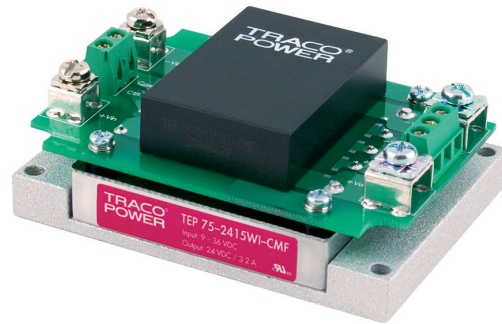
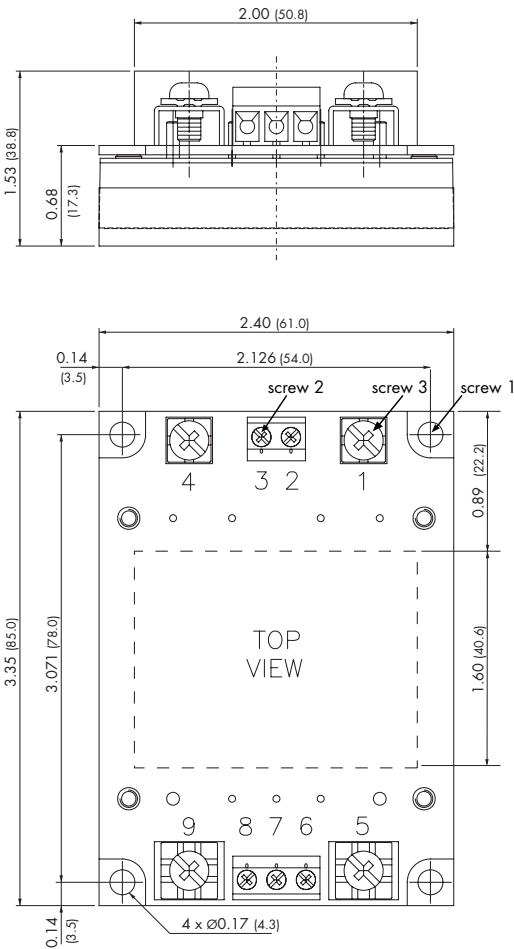
For easy chassis mounting the converter modules can be supplied with an adaptor option consisting of a screw terminal connection board (soldered to converter pins) and a chassis mount adaptor.

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.

| Connection |               |
|------------|---------------|
| Pin        |               |
| 1          | -Vin          |
| 2          | NC            |
| 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: -CM 200 g (7.05oz)  
Weight: -CMF 287 g (10.12oz)

Dimensions in Inch, ( ) = mm

Tolerances  $\pm 0.02$  ( $\pm 0.5$ )

Mounting hole pitch tolerances  $\pm 0.01$  ( $\pm 0.25$ )

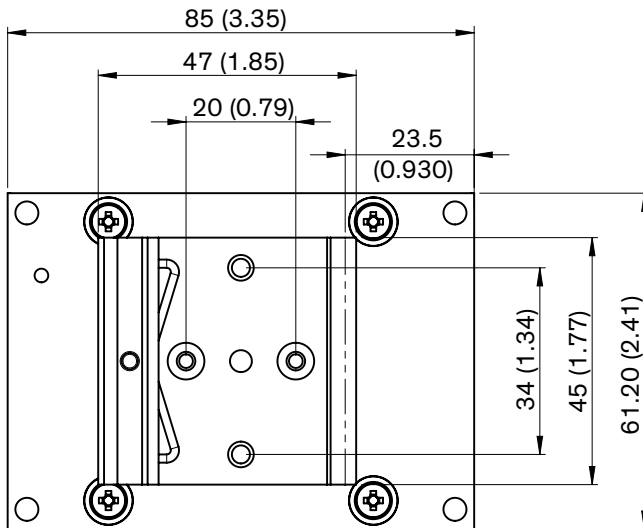
The screw 1 locked torque: MAX 11.2kgf-cm/1.10N-m

The screw 2 locked torque: MAX 5.2kgf-cm/0.51N-m

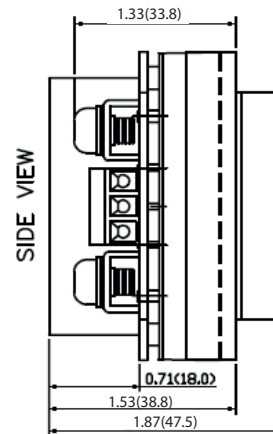
The screw 3 locked torque: MAX 12kgf-cm/1.18N-m

**Option DIN-Rail Clip**

TEP-MK1 DIN-rail clip for chassis mount models



DIN RAIL CLIPPER  
Countersink Head screw  
M3X0.5 Length: 4mm



Order code: **TEP-MK1**

Includes DIN-rail clip and mounting screws.

To order modules with mounted DIN-rail clip ask factory.