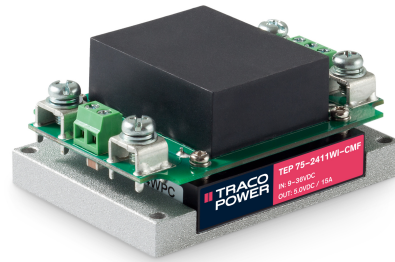


- Chassis mount with screw terminal block
- EN 50155 approval for railway applications
- Optional DIN-rail mounting kit
- Ultra wide 4:1 input voltage range
- Full load operation up to +60°C with convection cooling
- Undervoltage lockout
- Reverse input voltage protection
- Input protection filter
- 3-year product warranty



The TEP 75WICMF Series is a family of isolated high performance DC/DC converter modules with ultra-wide 4:1 input voltage ranges. They come in chassis mount version with screw terminal block. 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 trim, 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 Range            | Output Voltage nom. (adjustable) | Output Current max. | Efficiency typ. |
| TEP 75-2411WI-CMF | 9 - 36 VDC<br>(24 VDC nom.)    | 5 VDC (4.0 - 5.5 VDC)            | 15'000 mA           | 88 %            |
| TEP 75-2412WI-CMF |                                | 12 VDC (9.6 - 13.2 VDC)          | 6'300 mA            | 88 %            |
| TEP 75-2413WI-CMF |                                | 15 VDC (12.0 - 16.5 VDC)         | 5'000 mA            | 88 %            |
| TEP 75-2415WI-CMF |                                | 24 VDC (19.2 - 26.4 VDC)         | 3'200 mA            | 87 %            |
| TEP 75-2416WI-CMF |                                | 28 VDC (22.4 - 30.8 VDC)         | 2'700 mA            | 87 %            |
| TEP 75-2418WI-CMF |                                | 48 VDC (38.4 - 52.8 VDC)         | 1'600 mA            | 87 %            |
| TEP 75-4811WI-CMF | 18 - 75 VDC<br>(48 VDC nom.)   | 5 VDC (4.0 - 5.5 VDC)            | 15'000 mA           | 90 %            |
| TEP 75-4812WI-CMF |                                | 12 VDC (9.6 - 13.2 VDC)          | 6'300 mA            | 90 %            |
| TEP 75-4813WI-CMF |                                | 15 VDC (12.0 - 16.5 VDC)         | 5'000 mA            | 89 %            |
| TEP 75-4815WI-CMF |                                | 24 VDC (19.2 - 26.4 VDC)         | 3'200 mA            | 88 %            |
| TEP 75-4816WI-CMF |                                | 28 VDC (22.4 - 30.8 VDC)         | 2'700 mA            | 88 %            |
| TEP 75-4818WI-CMF |                                | 48 VDC (38.4 - 52.8 VDC)         | 1'600 mA            | 87 %            |
| TEP 75-7211WI-CMF | 43 - 160 VDC<br>(110 VDC nom.) | 5 VDC (4.0 - 5.5 VDC)            | 15'000 mA           | 91 %            |
| TEP 75-7212WI-CMF |                                | 12 VDC (9.6 - 13.2 VDC)          | 6'300 mA            | 91 %            |
| TEP 75-7213WI-CMF |                                | 15 VDC (12.0 - 16.5 VDC)         | 5'000 mA            | 91 %            |
| TEP 75-7215WI-CMF |                                | 24 VDC (19.2 - 26.4 VDC)         | 3'200 mA            | 90 %            |
| TEP 75-7216WI-CMF |                                | 28 VDC (22.4 - 30.8 VDC)         | 2'700 mA            | 90 %            |
| TEP 75-7218WI-CMF |                                | 48 VDC (38.4 - 52.8 VDC)         | 1'600 mA            | 90 %            |

### Options

|  |   |
|--|---|
| <b>TEP-MK1</b>   | - Optional DIN-Rail Mounting Kit: <a href="http://www.tracopower.com/products/tep-mk1.pdf">www.tracopower.com/products/tep-mk1.pdf</a>  |
| <b>on demand</b><br>(backorder with MOQ non stocking item) | - Optional model with 3.3 VDC / 20'000 mA Output and 9 - 36 VDC Input<br>- Optional model with 3.3 VDC / 20'000 mA Output and 18 - 75 VDC Input<br>- Optional model with 3.3 VDC / 20'000 mA Output and 43 - 160 VDC Input<br>- Optional models with inverse Remote On/Off function (passive = off) |

### Input Specifications

|                            |                |  |
|----------------------------|----------------|--|
| Input Current              | - At no load   | 110 Vin models: <b>10 mA typ.</b><br>24 Vin models: <b>85 mA typ.</b> (3.3 Vout model)<br><b>120 mA typ.</b> (5 Vout model)<br><b>185 mA typ.</b> (12 Vout model)<br><b>185 mA typ.</b> (15 Vout model)<br><b>85 mA typ.</b> (24 Vout model)<br><b>85 mA typ.</b> (28 Vout model)<br><b>85 mA typ.</b> (48 Vout model) |
|                            | - At full load | 48 Vin models: <b>60 mA typ.</b> (3.3 Vout model)<br><b>60 mA typ.</b> (5 Vout model)<br><b>90 mA typ.</b> (12 Vout model)<br><b>50 mA typ.</b> (15 Vout model)<br><b>50 mA typ.</b> (24 Vout model)<br><b>50 mA typ.</b> (28 Vout model)<br><b>50 mA typ.</b> (48 Vout model)   |
| Surge Voltage              |                | 24 Vin models: <b>50 VDC max.</b> (1 s max.)<br>48 Vin models: <b>100 VDC max.</b> (1 s max.)<br>110 Vin models: <b>185 VDC max.</b> (1 s max.)  |
| Under Voltage Lockout      |                | 24 Vin models: <b>7.3 VDC min. / 7.7 VDC typ. / 8.1 VDC max.</b><br>48 Vin models: <b>15.5 VDC min. / 16 VDC typ. / 16.3 VDC max.</b><br>110 Vin models: <b>33 VDC min. / 34.5 VDC typ. / 36 VDC max.</b>  |
| Recommended Input Fuse     |                | 24 Vin models: <b>15'000 mA</b> (fast acting)<br>48 Vin models: <b>8'000 mA</b> (fast acting)<br>110 Vin models: <b>3'150 mA</b> (slow blow)<br>(The need of an external fuse has to be assessed in the final application.)  |
| Reverse Voltage Protection |                | <b>Parallel diode</b> (external input fuse required)   |
| Input Filter               |                | <b>Internal Pi-Type</b>  |

### Output Specifications

|  |  |   |
|--|--|---|
| Output Voltage Adjustment              |  | -20% to +10% (By external trim resistor)<br>See application note: <a href="http://www.tracopower.com/overview/tep75wicmf">www.tracopower.com/overview/tep75wicmf</a><br>Output power must not exceed rated power!   |
| Voltage Set Accuracy                   |  | <b>±1% max.</b>   |
| Regulation                             | - Input Variation (Vmin - Vmax)<br>- Load Variation (0 - 100%) | <b>0.1% max.</b><br><b>0.1% max.</b>  |
| Ripple and Noise<br>(20 MHz Bandwidth) |  | 3.3 Vout models: <b>100 mVp-p max.</b> (w/ 4.7 µF)<br>5 Vout models: <b>100 mVp-p max.</b> (w/ 4.7 µF)<br>12 Vout models: <b>125 mVp-p max.</b> (w/ 4.7 µF)<br>15 Vout models: <b>125 mVp-p max.</b> (w/ 4.7 µF)<br>24 Vout models: <b>250 mVp-p max.</b> (w/ 4.7 µF)<br>28 Vout models: <b>250 mVp-p max.</b> (w/ 4.7 µF)<br>48 Vout models: <b>350 mVp-p max.</b> (w/ 2.2 µF) |

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

|                                    |   |
|------------------------------------|---|
| Capacitive Load                    | 3.3 Vout models: 60'600 µF max.<br>5 Vout models: 30'000 µF max.<br>12 Vout models: 5'250 µF max.<br>15 Vout models: 3'330 µF max.<br>24 Vout models: 1'330 µF max.<br>28 Vout models: 960 µF max.<br>48 Vout models: 330 µF max. |
| Minimum Load                       | Not required  |
| Temperature Coefficient            | ±0.02 %/K max.  |
| Start-up Time                      | 60 ms typ. (110 Vin models)<br>25 ms typ. (other models)  |
| Short Circuit Protection           | Continuous, Automatic recovery  |
| Output Current Limitation          | 150% typ. of Iout max.<br>(110 Vin models)<br>110 - 140% (other models)   |
| Overvoltage Protection             | 115 - 130% of Vout nom.   |
| Transient Response - Response Time | 200 µs typ. / 250 µs max. (25% Load Step)   |

### Safety Specifications

|                  |                             |  |
|------------------|-----------------------------|--|
| Safety Standards | - IT / Multimedia Equipment | EN 60950-1<br>EN 62368-1<br>IEC 60950-1<br>IEC 62368-1<br>UL 60950-1<br>UL 62368-1                 |
|                  | - Railway Applications      | EN 50155   |
|                  | - Certification Documents   | <a href="http://www.tracopower.com/overview/tep75wicmf">www.tracopower.com/overview/tep75wicmf</a> |

### EMC Specifications

|               |                             |  |
|---------------|-----------------------------|--|
| EMI Emissions | - Conducted Emissions       | EN 55011 class A (internal filter)<br>EN 55011 class B (with external filter)<br>EN 55032 class A (internal filter)<br>EN 55032 class B (with external filter)             |
|               | - Radiated Emissions        | EN 55011 class A (internal filter)<br>EN 55011 class B (with external filter)<br>EN 55032 class A (internal filter)<br>EN 55032 class B (with external filter)             |
|               |                             | External filter proposal: <a href="http://www.tracopower.com/overview/tep75wicmf">www.tracopower.com/overview/tep75wicmf</a>   |
| EMS Immunity  | - Electrostatic Discharge   | EN 50155 (Railway Applications)<br>EN 55024 (IT Equipment)   |
|               | - RF Electromagnetic Field  | Air: EN 61000-4-2, ±8 kV, perf. criteria A   |
|               | - EFT (Burst) / Surge       | Contact: EN 61000-4-2, ±6 kV, perf. criteria A<br>EN 61000-4-3, 20 V/m, perf. criteria A<br>EN 61000-4-4, ±2 kV, perf. criteria A<br>EN 61000-4-5, ±2 kV, perf. criteria A |
|               | - Conducted RF Disturbances | EN 61000-4-6, 10 Vrms, perf. criteria A  |
|               | - PF Magnetic Field         | Continuous: EN 61000-4-8, 100 A/m, perf. criteria A<br>1 s: EN 61000-4-8, 1000 A/m, perf. criteria A   |

### General Specifications

|                    |                         |  |
|--------------------|-------------------------|--|
| Relative Humidity  |                         | 95% max. (non condensing)  |
| Temperature Ranges | - Operating Temperature | -40°C to +75°C   |
|                    | - Case Temperature      | +105°C max.  |
|                    | - Storage Temperature   | -40°C to +105°C  |
| Power Derating     | - High Temperature      | Depending on model   |
|                    |                         | See application note: <a href="http://www.tracopower.com/overview/tep75wicmf">www.tracopower.com/overview/tep75wicmf</a> |

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

|  |  |   |
|--|--|---|
| Over Temperature Protection Switch Off | - Protection Mode<br>- Measurement Point   | 115°C typ. (Automatic recovery at 105°C typ.)<br>Base-Plate   |
| Cooling System                         |  | Natural convection (20 LFM)   |
| Sense Function                         |  | 10% max. of Vout nom.   |
| Remote Control                         | - Voltage Controlled Remote<br><br>- Off Idle Input Current                        | On: 3.0 to 12 VDC or open circuit<br>Off: 0 to 1.2 VDC or short circuit<br>Refers to 'Remote' and '-Vin' Pin<br>3 mA typ.<br>(Optional models with inverse logic available)   |
| Altitude During Operation              |  | 2'000 m max.  |
| Switching Frequency                    |  | 270 - 330 kHz (PWM)<br>300 kHz typ. (PWM)   |
| Insulation System                      |  | Reinforced Insulation (110 Vin models)<br>Basic Insulation (other models)   |
| Working Voltage (rated)                |  | 157 VAC (110 Vin models)<br>125 VAC (other input models)  |
| Isolation Test Voltage                 | - Input to Output, 60 s<br><br>- Input to Case, 60 s<br><br>- Output to Case, 60 s | 3'000 VAC (110 Vin models)<br>3'000 VDC (other models)<br>1'500 VAC (110 Vin models)<br>1'600 VDC (other models)<br>1'500 VAC (110 Vin models)<br>1'600 VDC (other models)  |
| Isolation Resistance                   | - Input to Output, 500 VDC   | 1'000 MΩ min.   |
| Isolation Capacitance                  | - Input to Output, 100 kHz, 1 V  | 2'500 pF max.   |
| Reliability                            | - Calculated MTBF  | 336'000 h (MIL-HDBK-217F, ground benign)  |
| Environment                            | - Vibration<br><br>- Mechanical Shock<br><br>- Thermal Shock                       | MIL-STD-810F<br>EN 61373<br>MIL-STD-810F<br>EN 61373<br>MIL-STD-810F<br>EN 50155  |
| Housing Material                       |  | Alu base-plate w. metal case (24 and 48 Vin models)<br>Alu base-plate w. plastic case (110 Vin models)  |
| Base Material                          |  | Non-conductive FR4 (UL 94 V-0 rated) (24 and 48 Vin models only)  |
| Potting Material                       |  | Silicone (UL 94 V-0 rated)  |
| Housing Type                           |  | Metal Case (24 and 48 Vin models)<br>Plastic Case (110 Vin models)  |
| Mounting Type                          |  | Chassis Mount   |
| Connection Type                        |  | Screw Terminal  |
| Weight                                 |  | 287 g   |
| Thermal Impedance                      | - Case to Ambient  | 6.7 K/W typ.  |
| Environmental Compliance               | - REACH Declaration<br><br>- RoHS Declaration<br><br>- Flammability (EN 45545-2)   | <a href="http://www.tracopower.com/info/reach-declaration.pdf">www.tracopower.com/info/reach-declaration.pdf</a><br>REACH SVHC list compliant<br>REACH Annex XVII compliant<br><a href="http://www.tracopower.com/info/rohs-declaration.pdf">www.tracopower.com/info/rohs-declaration.pdf</a><br>Exemptions: 7a, 7c-I<br>(RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule). The SCIP number is provided on request.)<br><a href="http://www.tracopower.com/info/en45545-declaration.pdf">www.tracopower.com/info/en45545-declaration.pdf</a> |

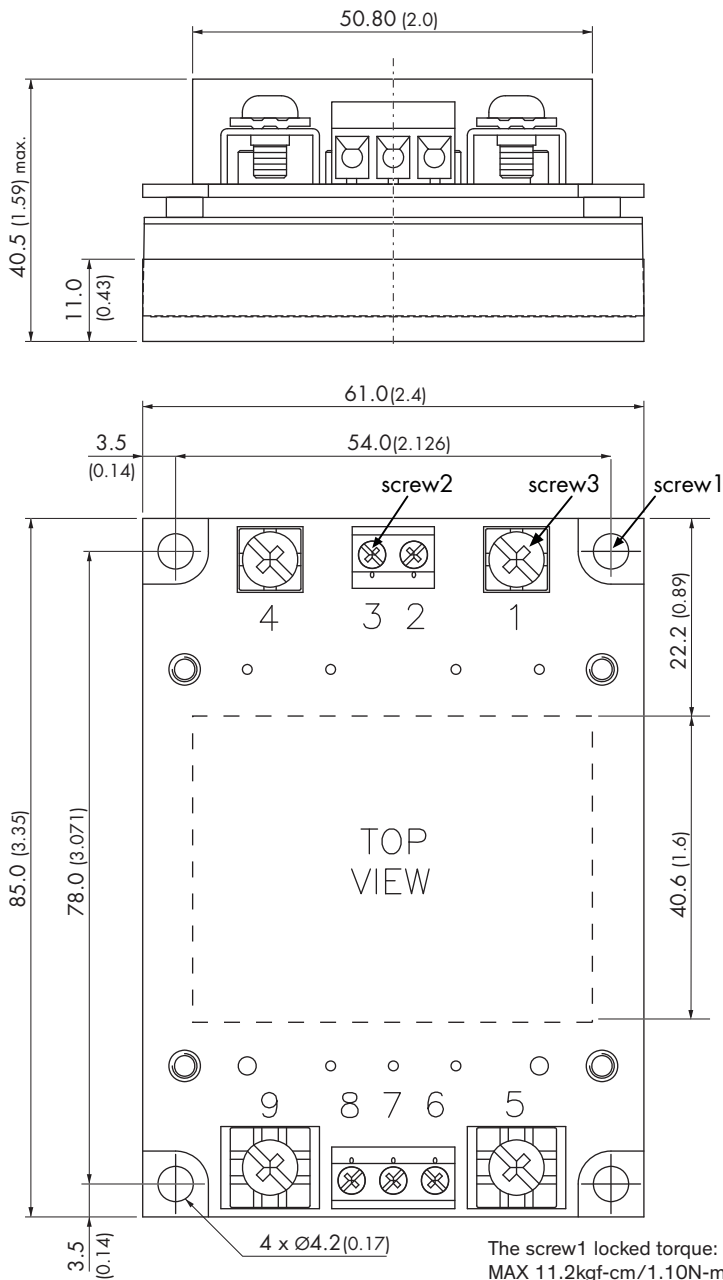
## Supporting Documents

Overview Link (for additional Documents)

[www.tracopower.com/overview/tep75wicmf](http://www.tracopower.com/overview/tep75wicmf)

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

### Outline Dimensions



Dimensions in mm (inch)  
Tolerances  $x.x \pm 0.5$  ( $x.xx \pm 0.02$ )  
 $x.xx \pm 0.25$  ( $x.xxx \pm 0.01$ )

Screw 3:  
Type M4  
Head diameter 6.88 (0.271)  
Rated current: 15 A

The screw1 locked torque:  
MAX 11.2kgf-cm/1.10N-m

The screw2 locked torque:  
MAX 5.2kgf-cm/0.51N-m

The screw3 locked torque:  
MAX 12kgf-cm/1.18N-m

### Pinout

| Pin | Function   |
|-----|------------|
| 1   | -Vin (GND) |
| 2   | NC         |
| 3   | Remote     |
| 4   | +Vin (Vcc) |
| 5   | -Vout      |
| 6   | -Sense*    |
| 7   | Trim       |
| 8   | +Sense*    |
| 9   | +Vout      |

NC: No Connection

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