The TEQ 160WIR 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. A very high efficiency and the overall heatsink construction allows an operating temperature up to +75°C with natural convection cooling without power derating and up to +90°C with 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

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>TEQ 160-4812WIR</td>
<td>19 - 75 VDC (48 VDC nom.)</td>
<td>12 VDC (9.6 - 13.2 VDC)</td>
<td>13'000 mA</td>
<td>90 %</td>
</tr>
<tr>
<td>TEQ 160-4815WIR</td>
<td>24 VDC (19.2 - 26.4 VDC)</td>
<td>6'500 mA</td>
<td>90 %</td>
<td></td>
</tr>
<tr>
<td>TEQ 160-4816WIR</td>
<td>28 VDC (22.4 - 30.8 VDC)</td>
<td>5'500 mA</td>
<td>90 %</td>
<td></td>
</tr>
<tr>
<td>TEQ 160-4818WIR</td>
<td>48 VDC (38.4 - 52.8 VDC)</td>
<td>3'200 mA</td>
<td>90 %</td>
<td></td>
</tr>
<tr>
<td>TEQ 160-7212WIR</td>
<td>43 - 160 VDC (110 VDC nom.)</td>
<td>12 VDC (9.6 - 13.2 VDC)</td>
<td>15'000 mA</td>
<td>89 %</td>
</tr>
<tr>
<td>TEQ 160-7215WIR</td>
<td>24 VDC (19.2 - 26.4 VDC)</td>
<td>7'500 mA</td>
<td>89 %</td>
<td></td>
</tr>
<tr>
<td>TEQ 160-7216WIR</td>
<td>28 VDC (22.4 - 30.8 VDC)</td>
<td>6'500 mA</td>
<td>89 %</td>
<td></td>
</tr>
<tr>
<td>TEQ 160-7218WIR</td>
<td>48 VDC (38.4 - 52.8 VDC)</td>
<td>3'800 mA</td>
<td>89 %</td>
<td></td>
</tr>
</tbody>
</table>

### Options

### Input Specifications

<table>
<thead>
<tr>
<th>Description</th>
<th>110 Vin models</th>
<th>48 Vin models</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Current</td>
<td>10 mA typ.</td>
<td>20 mA typ. (24 Vout)</td>
</tr>
<tr>
<td>Surge Voltage</td>
<td>100 VDC max. (1 s max)</td>
<td>185 VDC max. (1 s max)</td>
</tr>
<tr>
<td>Under Voltage Lockout</td>
<td>200 VDC min. / 165 VDC typ. / 18 VDC max.</td>
<td>33 VDC min. / 355 VDC typ. / 38 VDC max.</td>
</tr>
</tbody>
</table>

### Recommended Input Fuse

(The need of an external fuse has to be assessed in the final application)

| Description                  | Internal Common Mode Choke + Pi-Type |

### Output Specifications

<table>
<thead>
<tr>
<th>Description</th>
<th>–20% to +10% (By trim potentiometer)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage Set Accuracy</td>
<td>±1% max.</td>
</tr>
<tr>
<td>Regulation</td>
<td>0.1% max.</td>
</tr>
<tr>
<td>Ripple and Noise</td>
<td>0.1% max.</td>
</tr>
<tr>
<td>Capacitive Load</td>
<td></td>
</tr>
<tr>
<td>- 48 Vin input</td>
<td>10/800 µF max.</td>
</tr>
<tr>
<td>- 110 Vin input</td>
<td>2/700 µF max.</td>
</tr>
<tr>
<td>Minimum Load</td>
<td>Not required</td>
</tr>
<tr>
<td>Temperature Coefficient</td>
<td>±0.02 %/K max.</td>
</tr>
<tr>
<td>Hold-up Time</td>
<td>10 ms min.</td>
</tr>
<tr>
<td>Start-up Time</td>
<td>75 ms typ.</td>
</tr>
<tr>
<td>Short Circuit Protection</td>
<td>Continuous, Automatic recovery</td>
</tr>
<tr>
<td>Overvoltage Protection</td>
<td>115 - 130% of Vout nom.</td>
</tr>
<tr>
<td>Transient Response</td>
<td>200 µs typ. / 250 µs max. (25% Load Step)</td>
</tr>
</tbody>
</table>

### Safety Specifications

<table>
<thead>
<tr>
<th>Description</th>
<th>EN 62368-1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standards</td>
<td>IEC 62368-1</td>
</tr>
<tr>
<td>- IT / Multimedia Equipment</td>
<td>UL 62368-1</td>
</tr>
<tr>
<td>- Industrial Control Equipment</td>
<td>UL 508</td>
</tr>
<tr>
<td>- Railway Applications</td>
<td>CSA-C22.2, No. 107.1</td>
</tr>
<tr>
<td>- Certification Documents</td>
<td>EN 50155</td>
</tr>
<tr>
<td>Pollution Degree</td>
<td>PD 2</td>
</tr>
</tbody>
</table>

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

**EMI Emissions**
- Conducted Emissions
  - EN 50121-3-2 (EMC for Rolling Stock)
  - EN 55011 class A (internal filter)
  - EN 55032 class A (internal filter)
- Radiated Emissions
  - EN 50121-3-2 (EMC for Rolling Stock)
  - EN 55011 class A (internal filter)
  - EN 55032 class A (internal filter)

**EMS Immunity**
- Electrostatic Discharge
  - Air: EN 61000-4-2, ±8 kV, perf. criteria A
  - Contact: EN 61000-4-2, ±6 kV, perf. criteria A
- RF Electromagnetic Field
  - EN 61000-4-3, 20 V/m, perf. criteria A
- EFT (Burst) / Surge
  - EN 61000-4-4, ±2 kV, perf. criteria A
  - EN 61000-4-5, ±1 kV, perf. criteria A
  - EN 61000-4-5, ±2 kV, perf. criteria A
- Conducted RF Disturbances
  - EN 61000-4-6, 10 Vrms, perf. criteria A
- PF Magnetic Field
  - EN 61000-4-8, 100 A/m, perf. criteria A

### General Specifications

**Relative Humidity**
- 95% max. (non-condensing)

**Temperature Ranges**
- Operating Temperature: -40°C to +90°C
- Storage Temperature: -40°C to +105°C

**Power Derating**
- High Temperature: Depends on model
  - See application note: [www.tracopower.com/overview/teq160wir](http://www.tracopower.com/overview/teq160wir)

**Over Temperature Protection Switch Off**
- Protection Mode: 105°C min. / 115°C typ. / 120°C max. (Automatic recovery)

**Cooling System**
- Natural convection (20 LFM)

**Sense Function**
- 10% max. of Vout nom.

**Remote Control**
- Voltage Controlled Remote
  - On: 3.0 to 12 VDC or open circuit
  - Off: 0 to 1.2 VDC or short circuit
  - Refers to 'Remote' and '-Vin' Pin
- Off Idle Input Current
  - Remote Pin Input Current
  - 8 mA max.
  - -0.5 to 1.0 mA

**Altitude During Operation**
- 2'000 m max.

**Switching Frequency**
- 225 - 275 kHz (PWM)
- 250 kHz typ. (PWM)

**Insulation System**
- Reinforced Insulation

**Working Voltage (rated)**
- 182 VAC

**Isolation Test Voltage**
- Input to Output, 60 s
  - 2'250 VDC
- Input to Case, 60 s
  - 1'600 VDC
- Output to Case, 60 s
  - 1'600 VDC

**Isolation Resistance**
- Input to Output, 500 VDC
  - 1'000 MΩ min.

**Reliability**
- Calculated MTBF
  - 400'000 h (MIL-HDBK-217F at 55°C, ground benign)

**Environment**
- Vibration
  - MIL-STD-810F
  - EN 61373
- Mechanical Shock
  - MIL-STD-810F
  - EN 61373
- Thermal Shock
  - MIL-STD-810F
  - EN 45545-2

**Housing Material**
- Aluminum

**Potting Material**
- Silicone (UL 94 V-0 rated)

**Housing Type**
- Metal Case

**Mounting Type**
- Chassis Mount

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All specifications valid at nominal voltage, resistive full load and +25°C after warm-up time, unless otherwise stated.
Connection Type  | Spring Clamps
---|---
Weight  | 800 g
Thermal Impedance - Case to Ambient  | 1.45 K/W typ.
Environmental Compliance - REACH Declaration  | www.tracopower.com/info/reach-declaration.pdf
- RoHS Declaration  | www.tracopower.com/info/rohs-declaration.pdf
Exemptions: 7a, 7c-I
(RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule)).
- SCIP Reference Number  | 2f38252-a003-4575-ab82-5cf26842ecfe

Supporting Documents
Overview Link (for additional Documents)  | www.tracopower.com/overview/teq160wir

Outline Dimensions

<table>
<thead>
<tr>
<th>Terminal</th>
<th>Pin Function</th>
<th>Recommended Wire</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 2</td>
<td>–Vin</td>
<td>12 AWG</td>
</tr>
<tr>
<td>3</td>
<td>NC</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>On/Off Ctrl</td>
<td>14 - 18 AWG</td>
</tr>
<tr>
<td>5, 6</td>
<td>+Vin</td>
<td>12 AWG</td>
</tr>
<tr>
<td>7, 8</td>
<td>–Vout</td>
<td>12 AWG</td>
</tr>
<tr>
<td>9</td>
<td>–Sense*</td>
<td>14 - 18 AWG</td>
</tr>
<tr>
<td>10</td>
<td>+Sense*</td>
<td>14 - 18 AWG</td>
</tr>
<tr>
<td>11, 12</td>
<td>+Vout</td>
<td>12 AWG</td>
</tr>
</tbody>
</table>

NC: Not connected

*Sense line to be connected to the output either at the module or at the load under regard of polarity.
- The current rating of the terminal block is 15 A/pole.
- Using 2 poles in parallel if the peak output current can exceed 15 A.
- Wire size shall be selected to withstand the peak output current (Iout max + Current limitation).

Dimensions in mm, (inch)
Tolerances: ±0.5 (±0.02)
Mounting screw locked torque: max. 5.0 kgfcm / 0.49 Nm

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