**DC/DC Converter**

- High power block with excellent thermal convection
- Operating temperature -40°C to +80°C
- Increased shock & vibration resistance
- Ultra wide 4:1 input voltage range
- EN 50155 approval for railway applications
- Excellent efficiency up to 92%
- Constant current output characteristic for battery load applications
- Power sharing (up to 3 pcs in parallel)
- Input filter meet EN 55022, class A
- Under voltage lock-out circuit

The TEQ 300WIR 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 +55°C with natural convection cooling without power derating and up to +80°C with power derating. Further features include output voltage trimming, Remote On/Off and under voltage lockout. The ultra wide input voltage range makes these converters also an interesting solution for battery operated systems.

### Models

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
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</thead>
<tbody>
<tr>
<td>TEQ 300-4812WIR</td>
<td>18 - 75 VDC</td>
<td>12 VDC</td>
<td>25'000 mA</td>
<td>89 %</td>
</tr>
<tr>
<td>TEQ 300-4815WIR</td>
<td>24 VDC</td>
<td>12'500 mA</td>
<td>92 %</td>
<td></td>
</tr>
<tr>
<td>TEQ 300-4816WIR</td>
<td>28 VDC</td>
<td>10'800 mA</td>
<td>91 %</td>
<td></td>
</tr>
<tr>
<td>TEQ 300-4818WIR</td>
<td>48 VDC</td>
<td>6'300 mA</td>
<td>92 %</td>
<td></td>
</tr>
<tr>
<td>TEQ 300-7212WIR</td>
<td>43 - 160 VDC (110 VDC nom.)</td>
<td>12 VDC</td>
<td>25'000 mA</td>
<td>89 %</td>
</tr>
<tr>
<td>TEQ 300-7215WIR</td>
<td>24 VDC</td>
<td>12'500 mA</td>
<td>91 %</td>
<td></td>
</tr>
<tr>
<td>TEQ 300-7216WIR</td>
<td>28 VDC</td>
<td>10'800 mA</td>
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<td>TEQ 300-7218WIR</td>
<td>48 VDC</td>
<td>6'300 mA</td>
<td>92 %</td>
<td></td>
</tr>
</tbody>
</table>

### Options


**Note** - Max. Power up to 400 W (depending on temperature and duty cycle)
### Input Specifications

<table>
<thead>
<tr>
<th>Parameter</th>
<th>48 V Vin models</th>
<th>110 V Vin models</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Current - At no load</td>
<td>30 mA typ.</td>
<td>20 mA typ.</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>15.6 VDC min. / 16 VDC typ. / 16.8 VDC max.</td>
<td>33 VDC min. / 34.5 VDC typ. / 36 VDC max.</td>
</tr>
<tr>
<td>Recommended Input Fuse</td>
<td>25'000 mA (fast acting)</td>
<td>12'000 mA (fast acting)</td>
</tr>
<tr>
<td>Input Filter</td>
<td>Internal Common Mode Choke + Pi-Type</td>
<td></td>
</tr>
</tbody>
</table>

### Output Specifications

<table>
<thead>
<tr>
<th>Parameter</th>
<th>12 Vout models</th>
<th>24 Vout models</th>
<th>28 Vout models</th>
<th>48 Vout models</th>
<th>12 Vout models</th>
<th>24 Vout models</th>
<th>28 Vout models</th>
<th>48 Vout models</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output Voltage Adjustment</td>
<td>±20% (by trim potentiometer)</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Voltage Set Accuracy</td>
<td>±1% max.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Regulation</td>
<td>- Input Variation (Vmin - Vmax)</td>
<td>0.2% max.</td>
<td></td>
<td></td>
<td>0.5% max.</td>
<td></td>
<td></td>
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<tr>
<td>- Load Variation (0 - 100%)</td>
<td>100 mVp-p typ.</td>
<td>200 mVp-p typ.</td>
<td>200 mVp-p typ.</td>
<td>300 mVp-p typ.</td>
<td>125 mVp-p max.</td>
<td>250 mVp-p max.</td>
<td>250 mVp-p max.</td>
<td>350 mVp-p max.</td>
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<tr>
<td>Capacitive Load</td>
<td>Infinite</td>
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<td></td>
<td></td>
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<tr>
<td>Minimum Load</td>
<td>Not required</td>
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<td></td>
<td></td>
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<tr>
<td>Temperature Coefficient</td>
<td>±0.02 %/K max.</td>
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<td></td>
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<tr>
<td>Start-up Time</td>
<td>140 ms typ.</td>
<td></td>
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<tr>
<td>Short Circuit Protection</td>
<td>Automatic recovery</td>
<td></td>
<td></td>
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<tr>
<td>Overload Protection</td>
<td>Constant Current Mode</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Output Current Limitation</td>
<td>105 - 115% of Iout max.</td>
<td></td>
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<tr>
<td>Overvoltage Protection</td>
<td>- Response Time</td>
<td>125 - 140% of Vout nom.</td>
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<tr>
<td>Transient Response</td>
<td>250 µs typ. (25% Load Step)</td>
<td></td>
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<tr>
<td>Load Share Function</td>
<td>- Refer to application note</td>
<td><a href="http://www.tracopower.com/overview/teq300wir">www.tracopower.com/overview/teq300wir</a></td>
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<tr>
<td>Load Share Accuracy</td>
<td>10%</td>
<td></td>
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### Safety Specifications

<table>
<thead>
<tr>
<th>Safety Standards</th>
<th>EN 60950-1</th>
<th>EN 62368-1</th>
<th>IEC 60950-1</th>
<th>IEC 62368-1</th>
<th>UL 60950-1</th>
<th>UL 62368-1</th>
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<tbody>
<tr>
<td>- IT / Multimedia Equipment</td>
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<tr>
<td>- Industrial Control Equipment</td>
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<tr>
<td>- Railway Applications</td>
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<td>- Certification Documents</td>
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<td>Pollution Degree</td>
<td>PD 2</td>
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<tr>
<td>Over Voltage Category</td>
<td>OVC II</td>
<td></td>
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</tr>
</tbody>
</table>

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

**EMI Emissions**
- Conducted Emissions
  - EN 50121-4 (Railway Application Signalling)
  - EN 55011 class A (internal filter)
  - EN 55032 class A (internal filter)
- Radiated Emissions
  - EN 50515 (Railway Applications)
  - EN 50121-3-2 (EMC for Rolling Stock)
  - EN 55024 (IT Equipment)
  - Conducted Emissions EN 55011 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
  - EN 61000-4-4, ±2 kV, perf. criteria A
  - EN 61000-4-5, ±1 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

## General Specifications

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

**Temperature Ranges**
- Operating Temperature
  - −40°C to +80°C
- Case Temperature
  - +105°C max.
- Storage Temperature
  - −40°C to +105°C

**Power Derating**
- High Temperature
  - See application note: www.tracopower.com/overview/teq300wir

**Over Temperature Protection Switch Off**
- Protection Mode
  - 100°C min. / 105°C typ. / 115°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
  - 10 mA max.
- Remote Pin Input Current
  - −0.5 to 1.0 mA

**Altitude During Operation**
5'000 m max.

**Switching Frequency**
- 225 kHz typ. (PWM) (±10%, 48 VDC models)
- 200 kHz typ. (PWM) (±20%, 110 VDC model)

**Insulation System**
Reinforced Insulation

**Working Voltage (rated)**
236 VAC

**Isolation Test Voltage**
- Input to Output, 60 s
  - 3'000 VAC
- Input to Case, 60 s
  - 1'500 VAC
- Output to Case, 60 s
  - 1'500 VAC

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

**Isolation Capacitance**
- Input to Output, 100 kHz, 1 V
  - 14'000 pF typ.

**Reliability**
- Calculated MTBF
  - 149'000 h (MIL-HDBK-217F, ground benign)

**Environment**
- Vibration
  - MIL-STD-810F
  - 7.6 g, 3 axis, 60 min, 20-2000 Hz
  - EN 61373
- Mechanical Shock
  - MIL-STD-810F
  - EN 61373
- Thermal Shock
  - MIL-STD-810F
  - EN 50155

**Housing Material**
Aluminium

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

**Connection Type**
Clip

**Weight**
800 g

All specifications valid at nominal voltage, full load and +25°C after warm-up time unless otherwise stated.
**TEQ 300WIR Series, 300 Watt**

**Thermal Impedance**
1.1 K/W (Mounted on 19" x 5.25" x 0.063" iron base plate)

**Environmental Compliance**
- REACH Declaration
  - www.tracopower.com/info/reach-declaration.pdf
  - REACH SVHC list compliant
  - REACH Annex XVII compliant
  - www.tracopower.com/info/rohs-declaration.pdf
  - RoHS Declaration
  - Exemptions: '7a, '7c-1

**Supporting Documents**
Overview Link (for additional Documents)
www.tracopower.com/overview/teq300wir

**Outline Dimensions**

```
Terminal connection

<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 - 16 AWG</td>
</tr>
<tr>
<td>3, 4</td>
<td>-Vin (GND)</td>
<td>12 - 16 AWG</td>
</tr>
<tr>
<td>5</td>
<td>On/Off Ctrl</td>
<td>12 - 16 AWG</td>
</tr>
<tr>
<td>6, 7</td>
<td>+ Vout**</td>
<td>12 - 16 AWG</td>
</tr>
<tr>
<td>8, 9</td>
<td>- Vout**</td>
<td>12 - 16 AWG</td>
</tr>
<tr>
<td>10</td>
<td>+Sense*</td>
<td>20 - 28 AWG</td>
</tr>
<tr>
<td>11</td>
<td>LS (Loadshare)</td>
<td>20 - 28 AWG</td>
</tr>
<tr>
<td>12</td>
<td>-Sense*</td>
<td>20 - 28 AWG</td>
</tr>
</tbody>
</table>

* Sense line to be connected to the output either at the module or at the load under regard of polarity.
** Wire size shall be selected to withstand the peak current (Iout max. + Current limitation).
```

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