

- High power block with excellent thermal convection
- Operating temperature -40°C to +70°C without derating
- Increased shock & vibration resistance
- Ultra wide 4:1 input voltage range
- EN 50155 approval for railway applications
- Excellent efficiency up to 90%
- Input filter meet EN 55032, class A
- I/O insulation 1591 VAC
- Under voltage lock-out circuit
- Soft start



The TEQ 200WIR 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 +70°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

Order Code	Input Voltage Range	Output Voltage nom.	Output Current max.	Efficiency typ.
TEQ 200-4812WIR	19 - 75 VDC (48 VDC nom.)	12 VDC	18'000 mA	89 %
TEQ 200-4815WIR		24 VDC	9'000 mA	89 %
TEQ 200-4816WIR		28 VDC	7'500 mA	90 %
TEQ 200-4818WIR		48 VDC	4'500 mA	89 %
TEQ 200-7212WIR	43 - 160 VDC (110 VDC nom.)	12 VDC	20'000 mA	88 %
TEQ 200-7215WIR		24 VDC	10'000 mA	88 %
TEQ 200-7216WIR		28 VDC	8'500 mA	89 %
TEQ 200-7218WIR		48 VDC	5'000 mA	88 %

### Options

TEQ-MK1	- Optional DIN-Rail Mounting Kit: <a href="http://www.tracopower.com/products/teq-mk1.pdf">www.tracopower.com/products/teq-mk1.pdf</a>
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### Input Specifications

Input Current	- At no load	48 Vin models: <b>23 mA typ.</b> 110 Vin models: <b>13 mA typ.</b>
Surge Voltage		48 Vin models: <b>100 VDC max.</b> (1 s max.) 110 Vin models: <b>185 VDC max.</b> (1 s max.)
Under Voltage Lockout		48 Vin models: <b>15.8 - 17 VDC</b> 110 Vin models: <b>34.5 - 37.5 VDC</b>
Recommended Input Fuse		(The need of an external fuse has to be assessed in the final application.)
Input Filter		<b>Internal Common Mode Choke + Pi-Type</b>

### Output Specifications

Output Voltage Adjustment		<b>-20% to +10%</b> (By trim potentiometer) Output power must not exceed rated power!
Voltage Set Accuracy		<b>±1% max.</b>
Regulation	- Input Variation (Vmin - Vmax) - Load Variation (0 - 100%)	<b>0.1% max.</b> <b>0.1% max.</b>
Ripple and Noise (20 MHz Bandwidth)		12 Vout models: <b>100 mVp-p typ.</b> 24 Vout models: <b>200 mVp-p typ.</b> 28 Vout models: <b>200 mVp-p typ.</b> 48 Vout models: <b>300 mVp-p typ.</b> 12 Vout models: <b>125 mVp-p max.</b> 24 Vout models: <b>250 mVp-p max.</b> 28 Vout models: <b>250 mVp-p max.</b> 48 Vout models: <b>350 mVp-p max.</b>
Capacitive Load	- 48 Vin input  - 110 Vin input	12 Vout models: <b>15'000 µF max.</b> 24 Vout models: <b>3'700 µF max.</b> 28 Vout models: <b>2'600 µF max.</b> 48 Vout models: <b>930 µF max.</b> 12 Vout models: <b>16'600 µF max.</b> 24 Vout models: <b>4'100 µF max.</b> 28 Vout models: <b>3'000 µF max.</b> 48 Vout models: <b>1'000 µF max.</b>
Minimum Load		<b>Not required</b>
Temperature Coefficient		<b>±0.02 %/K max.</b>
Start-up Time		<b>75 ms typ.</b>
Short Circuit Protection		<b>Continuous, Automatic recovery</b>
Output Current Limitation		<b>120 - 150% of Iout max.</b>
Overvoltage Protection		<b>115 - 130% of Vout nom.</b>
Transient Response	- Response Time	<b>200 µs typ. / 250 µs max.</b> (25% Load Step)

### Safety Specifications

Safety Standards	- IT / Multimedia Equipment  - Industrial Control Equipment - Railway Applications - Certification Documents	EN 62368-1 IEC 62368-1 UL 62368-1 UL 508 EN 50155 <a href="http://www.tracopower.com/overview/teq200wir">www.tracopower.com/overview/teq200wir</a>
Pollution Degree		<b>PD 2</b>
Over Voltage Category		<b>OVC II</b>

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

### EMC Specifications

EMI Emissions		EN 50121-3-2 (EMC for Rolling Stock) EN 55011 class A (internal filter) EN 55032 class A (internal filter)
- Conducted Emissions		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		EN 50155 (Railway Applications) EN 50121-3-2 (EMC for Rolling Stock) EN 55024 (IT Equipment) EN 61204-3 (Low Voltage Power Supplies)
- Electrostatic Discharge	Air:	EN 61000-4-2, $\pm 8$ kV, perf. criteria A
	Contact:	EN 61000-4-2, $\pm 6$ kV, perf. criteria A EN 61000-4-3, 20 V/m, perf. criteria A EN 61000-4-4, $\pm 2$ kV, perf. criteria A EN 61000-4-5, $\pm 2$ kV, perf. criteria A EN 61000-4-6, 10 Vrms, perf. criteria A
- RF Electromagnetic Field		EN 61000-4-8, 100 A/m, perf. criteria A
- EFT (Burst) / Surge		
- Conducted RF Disturbances		
- 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 - Storage Temperature	-40°C to +90°C -40°C to +105°C
Power Derating	- High Temperature	See application note: <a href="http://www.tracopower.com/overview/teq200wir">www.tracopower.com/overview/teq200wir</a>
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  - Off Idle Input Current - Remote Pin Input Current	On: 3.0 to 12 VDC or open circuit Off: 0 to 1.2 VDC or short circuit Refers to 'Remote' and '-Vin' Pin 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 - Input to Case, 60 s - Output to Case, 60 s	2'250 VDC 1'600 VDC 1'600 VDC
Isolation Resistance	- Input to Output, 500 VDC	1'000 M $\Omega$ min.
Reliability	- Calculated MTBF	270'000 h (MIL-HDBK-217F at 55°C, ground benign)
Environment	- Vibration  - Mechanical Shock  - Thermal Shock	MIL-STD-810F EN 61373 MIL-STD-810F EN 61373 MIL-STD-810F EN 50155
Housing Material		Aluminium
Potting Material		Silicone (UL 94 V-0 rated)
Connection Type		Clip
Weight		800 g
Thermal Impedance		1.45 K/W

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

Environmental Compliance - Reach  
 - RoHS  
 - Flammability (EN 45545-2)

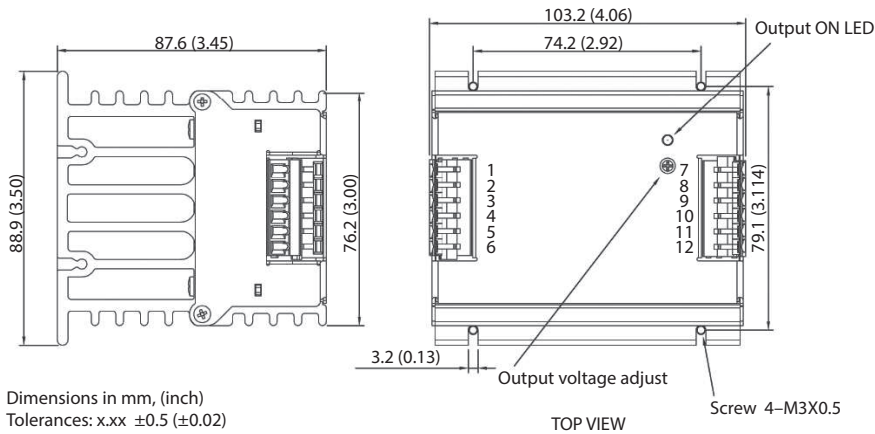
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### Supporting Documents

Overview Link (for additional Documents)

[www.tracopower.com/overview/teq200wir](http://www.tracopower.com/overview/teq200wir)

### Outline Dimensions



Terminal connection		
Terminal	Pin Function	Recommended Wire
1,2	-Vin	12 AWG
3	NC	NC
4	Remote	14 - 18 AWG
5, 6	+Vin	12 AWG
7, 8	-Vout	12 AWG
9	-Sense*	14 - 18 AWG
10	+Sense*	14 - 18 AWG
11, 12	+Vout	12 AWG

NC: No Connection

- \* 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 (I<sub>out</sub> max + Current limitation).

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