

- High power block with excellent thermal convection
- Operating temperature -40°C to +85°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 55022, class A
- I/O isolation 1591 VAC
- Under voltage lock-out circuit
- Soft start



The TEQ 100WIR 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 +85°C with natural convection cooling without power derating and up to +95°C with power derating. Further features include output voltage trimming, Remote On/Off and under voltage lockout. The ultra 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 100-2412WIR	10 - 36 VDC (24 VDC nom.)	12 VDC	8'400 mA	90 %
TEQ 100-2415WIR		24 VDC	4'200 mA	90 %
TEQ 100-2416WIR		28 VDC	3'600 mA	90 %
TEQ 100-2418WIR		48 VDC	2'100 mA	90 %
TEQ 100-4812WIR	19 - 75 VDC (48 VDC nom.)	12 VDC	8'400 mA	90 %
TEQ 100-4815WIR		24 VDC	4'200 mA	90 %
TEQ 100-4816WIR		28 VDC	3'600 mA	90 %
TEQ 100-4818WIR		48 VDC	2'100 mA	90 %
TEQ 100-7212WIR	43 - 160 VDC (110 VDC nom.)	12 VDC	8'400 mA	89 %
TEQ 100-7215WIR		24 VDC	4'200 mA	90 %
TEQ 100-7216WIR		28 VDC	3'600 mA	90 %
TEQ 100-7218WIR		48 VDC	2'100 mA	90 %

### Options

TEQ-MK1	- Optional DIN-Rail Clip: <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	24 Vin models: <b>25 mA typ.</b> 48 Vin models: <b>20 mA typ.</b> 110 Vin models: <b>10 mA typ.</b>
Surge Voltage		24 Vin models: <b>50 VDC max.</b> (1 s max.) 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		24 Vin models: <b>7.3 - 8 VDC</b> 48 Vin models: <b>15.8 - 17 VDC</b> 110 Vin models: <b>34.5 - 37.5 VDC</b>
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>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> 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>
Capacitive Load		12 Vout models: <b>7'000 µF max.</b> 24 Vout models: <b>1'750 µF max.</b> 28 Vout models: <b>1'280 µF max.</b> 48 Vout models: <b>430 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> (150% typ. for 110 VDC models)
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	<b>IEC 60950-1</b> <b>EN 60950-1</b> <b>UL 60950-1</b> <b>UL 508</b> <b>EN 50155</b> <a href="http://www.tracopower.com/overview/teq100wir">www.tracopower.com/overview/teq100wir</a>
Pollution Degree		<b>PD 2</b>

### EMC Specifications

EMI Emissions	- Conducted Emissions  - Radiated Emissions	<b>EN 50121-3-2</b> (EMC for Rolling Stock) <b>EN 55011 class A</b> (internal filter) <b>EN 55032 class A</b> (internal filter) <b>EN 55011 class A</b> (internal filter) <b>EN 55032 class A</b> (internal filter)
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All specifications valid at nominal voltage, full load and +25°C after warm-up time unless otherwise stated.

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
	- RF Electromagnetic Field	Contact: EN 61000-4-2, $\pm 6$ kV, perf. criteria A
	- EFT (Burst)	EN 61000-4-3, 20 V/m, perf. criteria A
	- Surge	EN 61000-4-4, $\pm 2$ kV, perf. criteria A
	- Conducted RF Disturbances	EN 61000-4-5, $\pm 1$ kV, perf. criteria A
	- PF Magnetic Field	EN 61000-4-6, 10 Vrms, perf. criteria A
		Continuous: EN 61000-4-8, 100 A/m, perf. criteria A

## General Specifications

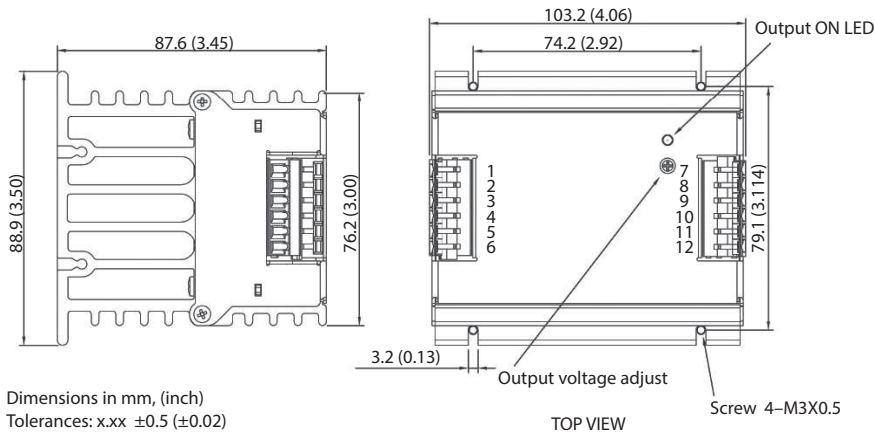
Relative Humidity		95% max. (non condensing)
Temperature Ranges	- Operating Temperature	-40°C to +95°C
	- Storage Temperature	-40°C to +105°C
Power Derating	- High Temperature	See application note: <a href="http://www.tracopower.com/overview/teq100wir">www.tracopower.com/overview/teq100wir</a>
Over Temperature Protection Switch Off		105°C min. / 110°C typ. / 120°C max. (Automatic recovery)
Cooling System		Natural convection (20 LFM)
Sense Function		10% max. of $V_{out}$ nom.
Remote Control	- Voltage Controlled Remote	On: 3.0 to 12 VDC or open circuit
	- Off Idle Input Current	Off: 0 to 1.2 VDC or short circuit
	- Remote Pin Input Current	7 mA max.
		-0.5 to 1.0 mA
Altitude During Operation		2'000 m max.
Switching Frequency		300 kHz typ. (PWM) ( $\pm 10\%$ , 110 VDC models) 250 kHz typ. (PWM) ( $\pm 10\%$ , other outp. models)
Insulation System		Reinforced Insulation
Isolation Test Voltage	- Input to Output, 60 s	1'591 VAC
	- Input to Case, 60 s	1'131 VAC
	- Output to Case, 60 s	1'131 VAC
Isolation Resistance	- Input to Output, 500 VDC	1'000 MOhm min.
Reliability	- Calculated MTBF	711'000 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
Housing Material		Aluminium
Potting Material		Silicone (UL 94 V-0 rated)
Connection Type		Clip
Weight		800 g
Thermal Impedance		1.45 K/W
Environmental Compliance	- Reach	<a href="http://www.tracopower.com/info/reach-declaration.pdf">www.tracopower.com/info/reach-declaration.pdf</a>
	- RoHS	<a href="http://www.tracopower.com/info/rohs-declaration.pdf">www.tracopower.com/info/rohs-declaration.pdf</a>
	- Flammability (EN 45545-2)	<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)	<a href="http://www.tracopower.com/overview/teq100wir">www.tracopower.com/overview/teq100wir</a>
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### Outline Dimensions



Terminal connection		
Terminal	Pin Function	Recommended Wire
1,2	-Vin	12 AWG
3	NC	NC
4	On/Off Ctrl	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 max</sub> + Current limitation).