

### Features

- ◆ High power block with excellent thermal convection
- ◆ Operating temperature -40°C to +55° 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 insulation 2250 VDC
- ◆ Under voltage lock-out circuit
- ◆ Soft start
- ◆ Input protection filter



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 +105°C with natural convection cooling without 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	Output voltage	Output current max.	Efficiency typ.
TEQ 200-4812WIR	18 – 75 VDC (48 VDC nominal)	12 VDC	18 A	89 %
TEQ 200-4815WIR		24 VDC	9.0 A	89 %
TEQ 200-4816WIR		28 VDC	7.5 A	90 %
TEQ 200-4818WIR		48 VDC	4.5 A	89 %
TEQ 200-7212WIR	43 – 160 VDC (72 VDC nominal)	12 VDC	20 A	88 %
TEQ 200-7215WIR		24 VDC	10 A	88 %
TEQ 200-7216WIR		28 VDC	8.5 A	89 %
TEQ 200-7218WIR		48 VDC	5.0 A	88 %

\* – add suffix **-N** for negative remote control, see page 3 -> Remote On/Off

### Input Specifications

Input current at no load	48 Vin models: 23 mA typ. 72 Vin models: 13 mA typ.
Start-up voltage	48 Vin models: 18.0 VDC (or lower) 72 Vin models: 43.0 VDC (or lower)
Under voltage shut down (lock-out circuit)	48 Vin models: 15.8 VDC typ. 72 Vin models: 34.5 VDC typ
Surge voltage (100 msec. max.)	48 Vin models: 100 V max. 72 Vin models: 185 V max.
Conducted noise	EN 55022 class A, FCC part 15, level A (chassis mount option –CFM required)
ESD (electrostatic discharge)	EN 61000-4-2, air ±8 kV, contact ±6 kV, perf. criteria A
Radiated immunity	EN 61000-4-3, 10 V/m, perf. criteria A
Fast transient / Surge	EN 61000-4-4, ±2 kV, perf. criteria A EN 61000-4-5, ±1 kV perf. criteria A With external input capacitor e.g. Nippon chemi-con KY 200 µF, 100 V, ESR 48 mOhm or with chassis mount option –CFM
Conducted immunity	EN 61000-4-6, 10 Vrms, perf. criteria A
Reverse voltage protection	parallel diode
Recommended input fuse (slow blow)	48 Vin models: 5 A 72 Vin models: 2.5 A

### Output Specifications

Voltage set accuracy	±1 %
Output voltage adjustment	+10 % / –20 % by external resistor see application note:
Regulation	– Input variation Vin min. to Vin max. 0.1 % max. – Load variation (0 – 100 %) 0.1 % max.
Temperature coefficient	±0.02 %/K
Minimum load	not required
Remote sense	10 % max. of Vout nom. (including trim up value)
Ripple and noise (20 MHz Bandwidth)	12 VDC models: 125 mVpk-pk max. 24 & 28 VDC models: 250 mVpk-pk max. 48 VDC models: 350 mVpk-pk max.

### Output Specifications

Start up time (nominal Vin and constant resistive load)	75 ms typ. (at power On or remote On)	
Transient response (25% load step change)	200 µs typ.	
Output current limitation	at 120 -150 % of Iout max.	
Over voltage protection	at 115 -130 % of Vout nom.	
Short circuit protection	indefinite, automatic recovery	
Capacitive load	- 48 Vin models	12 VDC models: 15'000 µF max. 24 VDC models: 3'700 µF max. 28 VDC models: 2'600 µF max. 48 VDC models: 930 µF max.
	- 72 Vin models	12 VDC models: 16'600 µF max. 24 VDC models: 4'100 µF max. 28 VDC models: 3'000 µF max. 48 VDC models: 1'000 µF max.

### General Specifications

Temperature ranges	- Operating	-40°C to +105°C (up to +55°C w/o derating)
	- Storage	-55°C to +105°C
Thermal impedance	1.45°C/W	
Derating	See derating graphs page 4 -> TBD	
Over temperature protection	at 120°C	
Thermal shock	acc. MIL-STD-810F	
Humidity (non condensing)	95 % rel H max.	
Reliability, calculated MTBF (MIL-HDBK-217F, at +25°C, ground benign)	xxx h ->TBD	
Isolation voltage (60sec.)	- Input/Output	2'250 VDC (basic insulation)
	- Input/Case	1'600 VDC
Isolation capacitance	- Input/Output	2500 pF max. -> TBD
Isolation resistance	- Input/Output (500 VDC)	>1 GOhm min.
Switching frequency	250 kHz typ. (puls width modulation)	
Safety standards	UL 60950-1 , IEC/EN 60950-1	
Safety approvals	- UL/cUL	<a href="http://www.ul.com">www.ul.com</a> -> certifications -> File e188913
Remote On/Off	- positive logic (standard)	- On: 3 to 12 VDC or open circuit - Off: 0 to 1.2 VDC or short circuit pin 1 and 3
	- negative logic (option -N)	- On: 0 to 1.2 VDC or short circuit pin 1 and 3 - Off: 3 to 12 VDC or open circuit
	- Off idle current:	3 mA
Environmental compliance	- Reach	<a href="http://www.tracopower.com/products/teq160wir-reach.pdf">www.tracopower.com/products/teq160wir-reach.pdf</a>
	- RoHS	RoHS directive 2002/95/EC

**Application note:** [www.tracopower.com/products/teq200wir-application.pdf](http://www.tracopower.com/products/teq200wir-application.pdf)

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

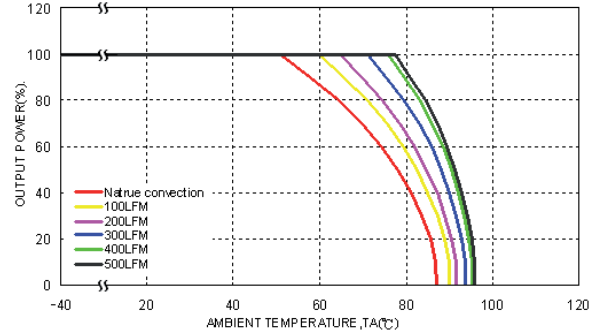
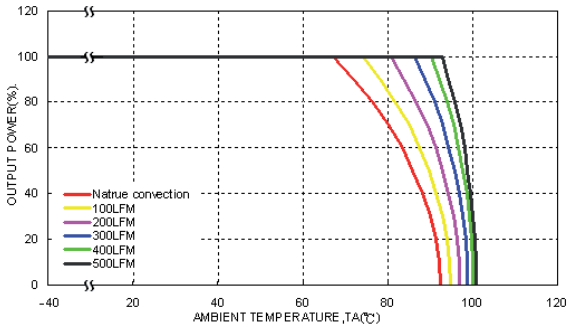
**Output Power Derating**

Models with heatsink

Models without heatsink

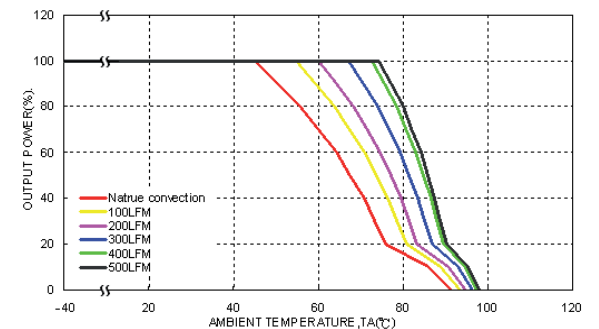
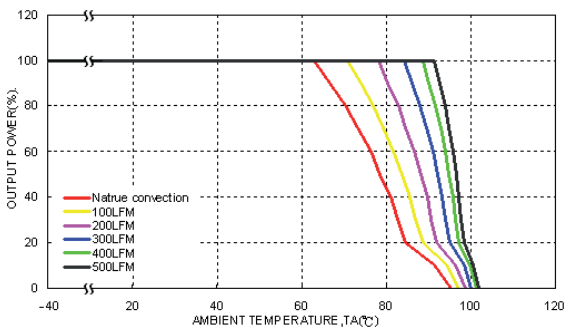
24 Vin models: Output 3.3–15 VDC

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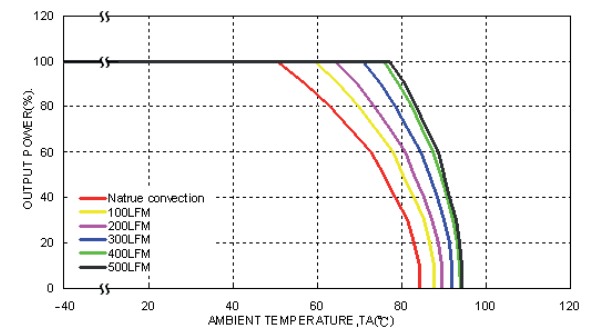
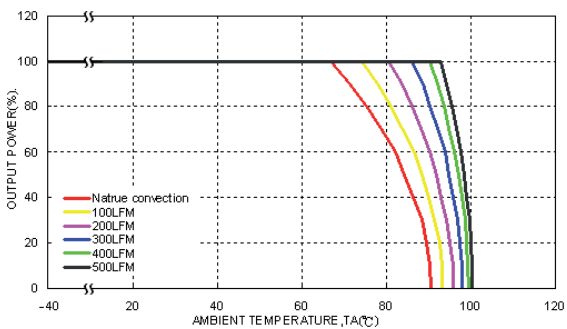
24 Vin models: Output 24–48 VDC

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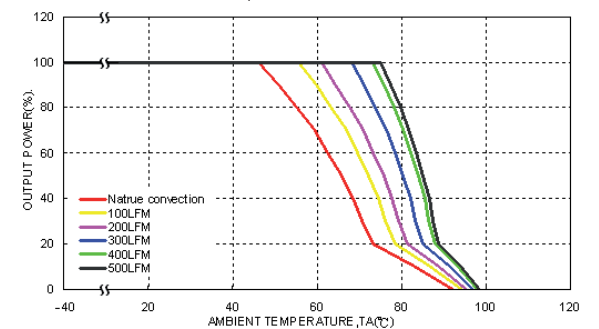
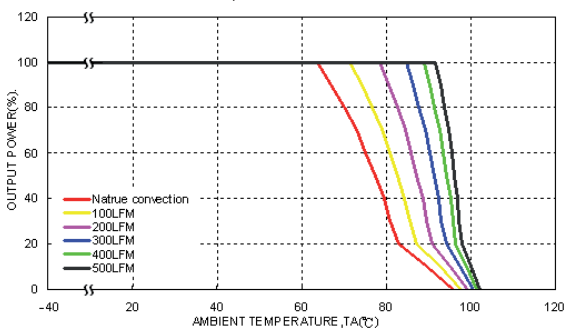
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48 Vin models: Output 24–48 VDC

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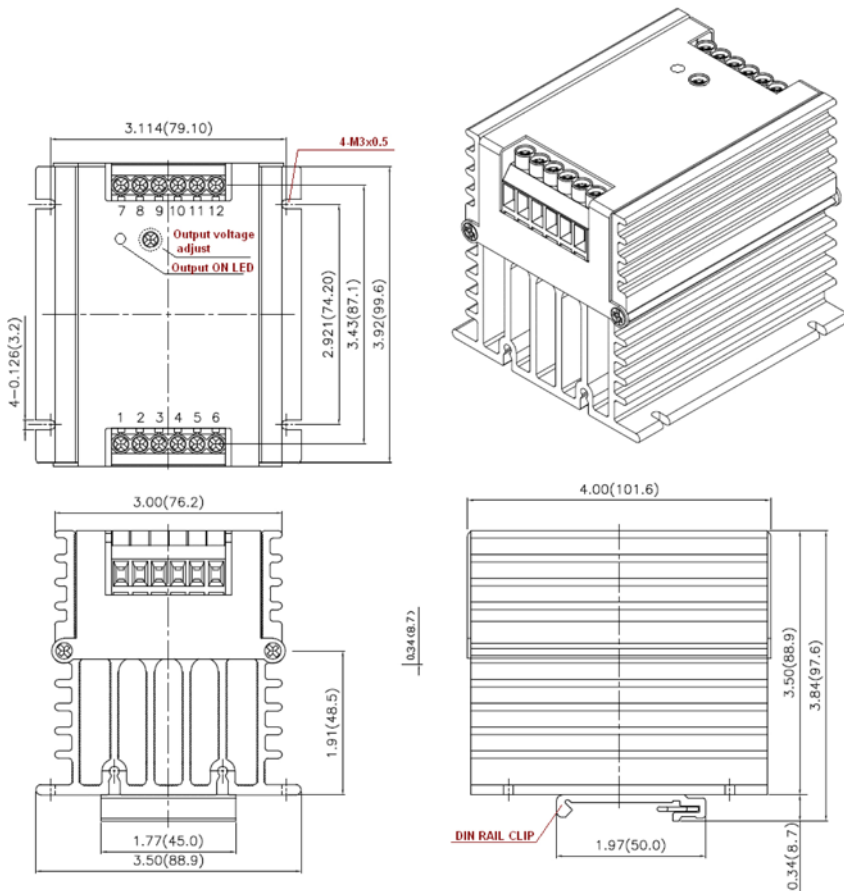


**Specifications**

Casing material	aluminium
Potting material	silicon (UL94V-0 rated)
Base material	FR4
Vibration	acc. MIL-STD-810F

**Dimensions**

TEQ 200WIR module



Connection	
Terminal	
1	- Vin
2	- Vin
3	NC
4	Remote On/Off
5	+ Vin
6	+ Vin
7	- Vout
8	- Vout
9	- Sense*
10	+ Sense*
11	+ Vout
12	+ Vout

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

Weight: 800 g (28.22 oz)

Specifications can be changed without notice! Make sure you are using the latest documentation, downloadable at [www.tracopower.com](http://www.tracopower.com)