DC/DC Converters

TEQ 200WIR Series, 180 to 240 Watt

CB Scheme cULus UL 60950-1

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: 72 Vin models:	23 mA typ. 13 mA typ.
Start-up voltage	48 Vin models: 72 Vin models:	18.0 VDC (or lower) 43.0 VDC (or lower)
Under voltage shut down (lock-out circuit)	48 Vin models: 72 Vin models:	15.8 VDC typ. 34.5 VDC typ
Surge voltage (100 msec. max.)	48 Vin models: 72 Vin models:	100 V max. 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: 72 Vin models:	5 A 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. – Load variation (0 – 100 %)	0.1 % max. 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: 24 & 28 VDC models: 48 VDC models:	125 mVpk-pk max. 250 mVpk-pk max. 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		www.ul.com -> 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		www.tracopower.com/products/teq160wir-reach.pdf
	– RoHS		RoHS directive 2002/95/EC

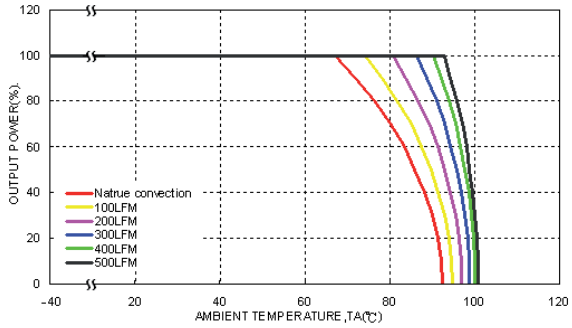
Application note: www.tracopower.com/products/teq200wir-application.pdf

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

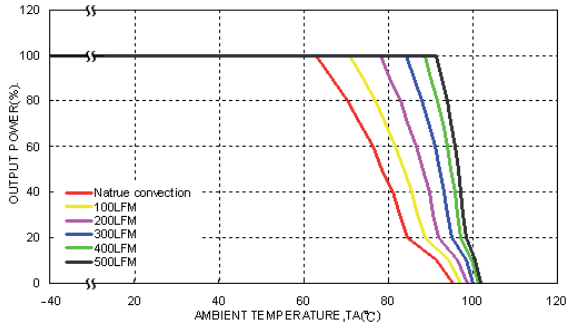
Output Power Derating

Models with heatsink

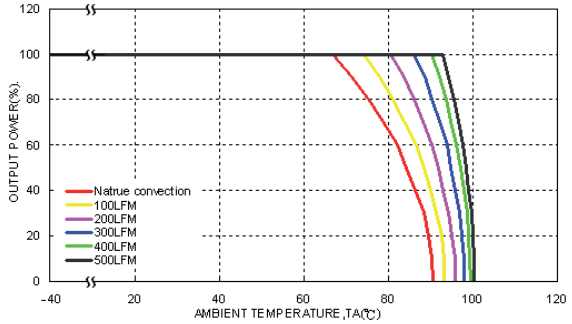
24 Vin models: Output 3.3–15 VDC



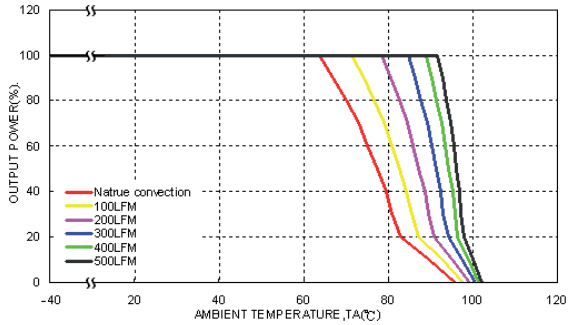
24 Vin models: Output 24–48 VDC



48 Vin models: Output 3.3–15 VDC

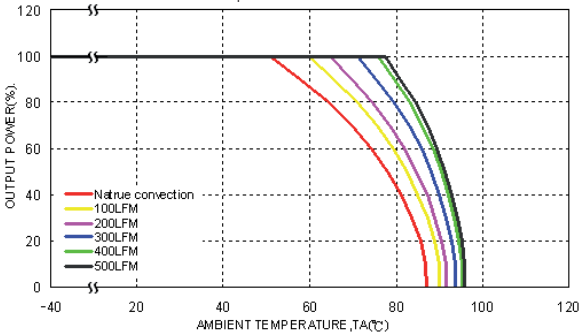


48 Vin models: Output 24–48 VDC

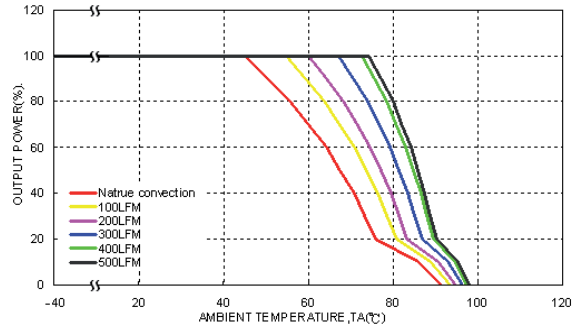


Models without heatsink

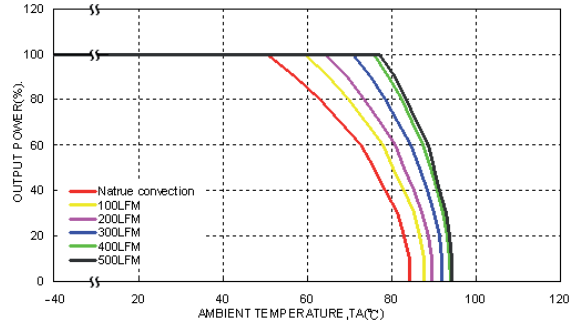
24 Vin models: Output 3.3–15 VDC



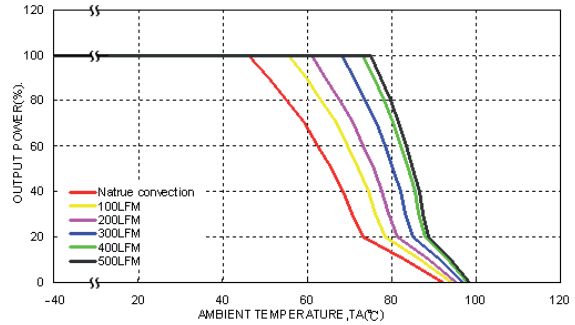
24 Vin models: Output 24–48 VDC



48 Vin models: Output 3.3–15 VDC



48 Vin models: Output 24–48 VDC

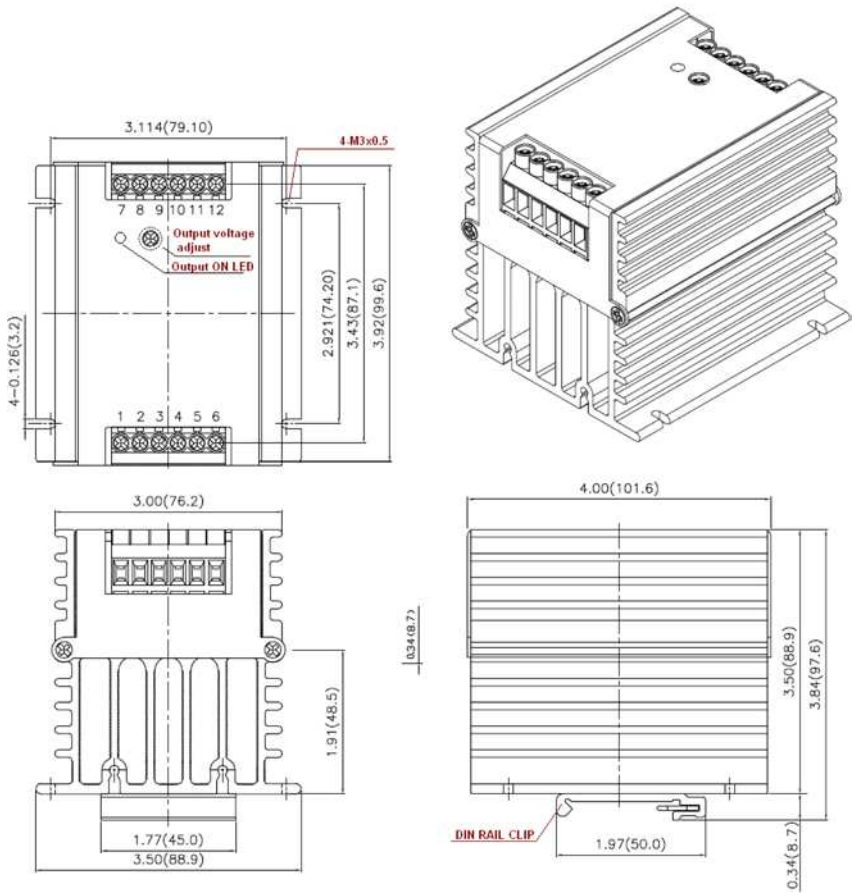


Specifications

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)