

Features

- ◆ High power block with excellent thermal convection
- ◆ Operating temperature -40°C to +70° 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-160WIR 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 160-4812WIR	18 – 75 VDC (48 VDC nominal)	12 VDC	13 A	90 %
TEQ 160-4815WIR		24 VDC	6.5 A	90 %
TEQ 160-4816WIR		28 VDC	5.5 A	90 %
TEQ 160-4818WIR		48 VDC	3.2 A	90 %
TEQ 160-7212WIR	43 – 160 VDC (72 VDC nominal)	12 VDC	15A	89 %
TEQ 160-7215WIR		24 VDC	7.5 A	89 %
TEQ 160-7216WIR		28 VDC	6.5 A	89 %
TEQ 160-7218WIR		48 VDC	3.8 A	89 %

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

Input Specifications

Input current at no load	48 Vin models: 20 mA typ. 72 Vin models: 10 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 μ F, 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: 10'800 µF max. 24 VDC models: 2'700 µF max. 28 VDC models: 1'900 µF max. 48 VDC models: 660 µF max.
	- 72 Vin models	12 VDC models: 12'500 µF max. 24 VDC models: 3'100 µF max. 28 VDC models: 2'300 µF max. 48 VDC models: 790 µF max.

General Specifications

Temperature ranges	- Operating - Storage	-40°C to +105°C (up to +70°C w/o derating) -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

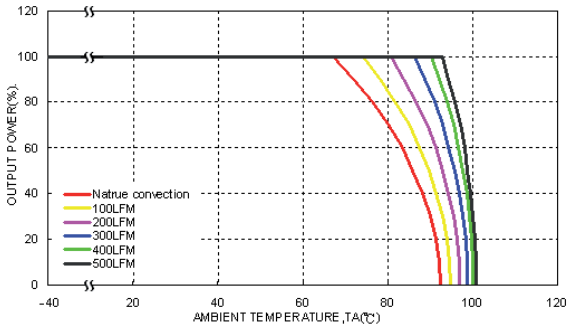
Application note: www.tracopower.com/products/teq160wir-application.pdf pending

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

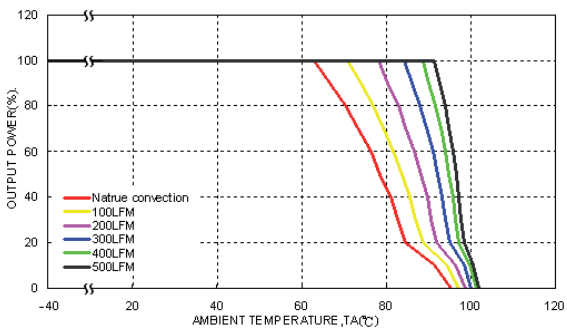
Output Power Derating

Models with heatsink

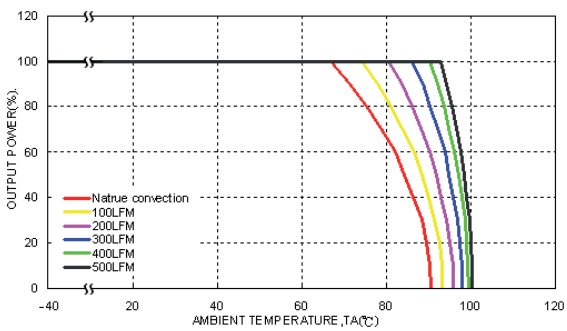
24 Vin models: Output 3.3–15 VDC



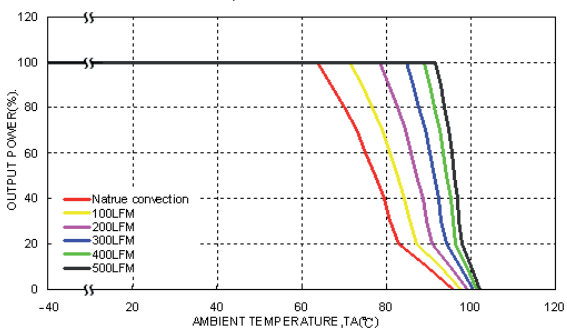
24 Vin models: Output 24–48 VDC



48 Vin models: Output 3.3–15 VDC

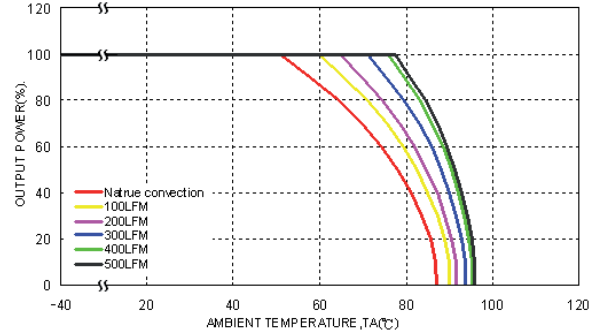


48 Vin models: Output 24–48 VDC

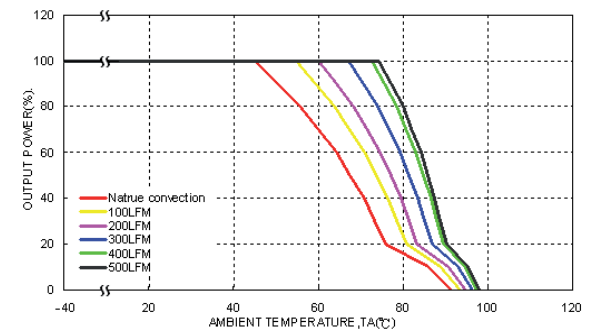


Models without heatsink

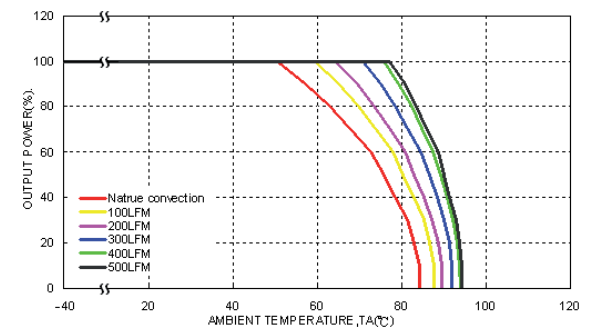
24 Vin models: Output 3.3–15 VDC



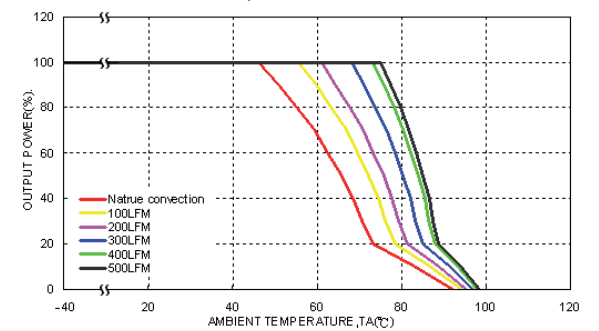
24 Vin models: Output 24–48 VDC



48 Vin models: Output 3.3–15 VDC



48 Vin models: Output 24–48 VDC

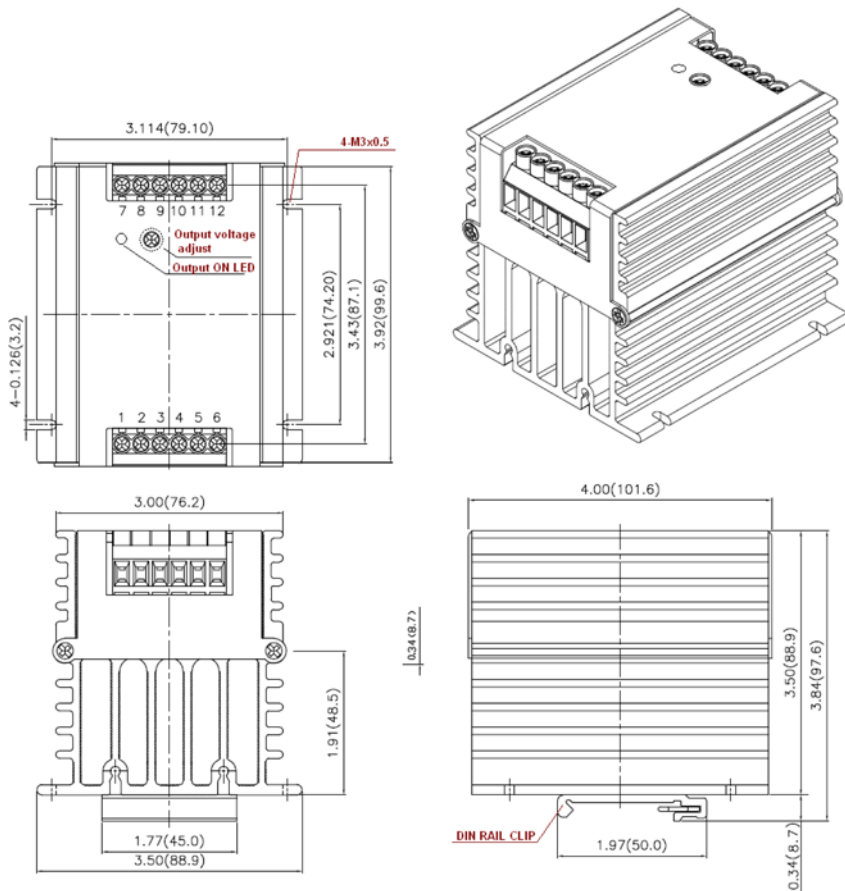


Specifications

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

Dimensions

TEQ 160WIR module



Weight: 800 g (28.22 oz)

Connection

Terminal	Connection
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.