

Features

- ◆ High power block with excellent thermal convection
- ◆ Operating temperature -40°C to +75°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 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 +75°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	Output voltage	Output current max.	Efficiency typ.
TEQ 160-4812WIR	19 – 75 VDC (48 VDC nominal)	12 VDC (9.6 – 13.2)	13 A	90 %
TEQ 160-4815WIR		24 VDC (19.2 – 26.4)	6.5 A	90 %
TEQ 160-4816WIR		28 VDC (22.4 – 30.8)	5.5 A	90 %
TEQ 160-4818WIR		48 VDC (38.4 – 52.8)	3.2 A	90 %
TEQ 160-7212WIR	43 – 160 VDC (110 VDC nominal)	12 VDC (9.6 – 13.2)	15 A	89 %
TEQ 160-7215WIR		24 VDC (19.2 – 26.4)	7.5 A	89 %
TEQ 160-7216WIR		28 VDC (22.4 – 30.8)	6.5 A	89 %
TEQ 160-7218WIR		48 VDC (38.4 – 52.8)	3.8 A	89 %

Input Specifications

Input current at no load	48 Vin models: 20 mA typ. 110 Vin models: 10 mA typ.
Start-up voltage	48 Vin models: 19.0 VDC (or lower) 110 Vin models: 43.0 VDC (or lower)
Under voltage shut down (lock-out circuit)	48 Vin models: 17.0 VDC (or lower) 110 Vin models: 37.5 VDC (or lower)
Surge voltage (1 s max.)	48 Vin models: 100 V max. 110 Vin models: 185 V max.
Conducted noise	EN 55032 class A
EMC immunity	EN 50121-3-2
– ESD (electrostatic discharge)	EN 61000-4-2, air ± 8 kV, contact ± 6 kV, perf. criteria A
– Radiated immunity	EN 61000-4-3, 20 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
	EN 61000-4-5, ± 2 kV, perf. criteria A
– Conducted immunity	EN 61000-4-6, 10 Vrms, perf. criteria A
– Railway immunity	EN 50155

Output Specifications

Voltage set accuracy	± 1 %
Output voltage adjustment	+10 % / -20 %
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	up to Vout nom. +10%
Ripple and noise (20 MHz Bandwidth)	12 VDC models: 125 mVp-p max. 24 & 28 VDC models: 250 mVp-p max. 48 VDC models: 350 mVp-p max.

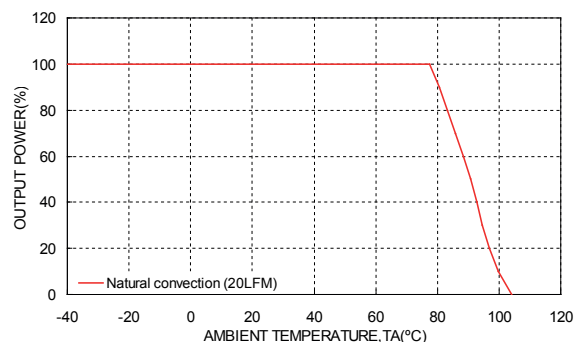
Output Specifications

Start up time (nominal Vin and constant resistive load)	75 ms typ. (at power On or remote On)
Transient response (25% load step change)	250 µs max.
Output current limitation	at 120 -150 % of Iout max.
Over voltage protection	at 115 -130 % of Vout nom.
Short circuit protection	hiccup, automatic recovery
Capacitive load (48Vin / 110Vin)	12 VDC models: 10'800 / 12'500 µF max. 24 VDC models: 2'700 / 3'100 µF max. 28 VDC models: 1'900 / 2'300 µF max. 48 VDC models: 660 / 790 µF max.

General Specifications

Temperature ranges	– Operating – Storage	–40°C to +105°C (up to +75°C w/o derating) –40°C to +105°C
Thermal impedance		1.45 K/W
Derating		See derating graph below
Over temperature protection		at 115°C typ.
Thermal shock		acc. MIL-STD-810F
Shock & Vibration		acc. EN61373, MIL-STD-810F
Humidity (non condensing)		5% to 95 % rel H max.
Reliability, calculated MTBF (MIL-HDBK-217F, at +25°C, ground benign)		>400'000 h
Isolation voltage (60 s)	– Input/Output – Input/Case	2'250 VDC (basic insulation) 1'600 VDC
Isolation resistance	– Input/Output (500 VDC)	>1 GOhm min.
Switching frequency		250 kHz typ. (puls width modulation)
Safety standards	– CB test certificate – CSA certificate of compliance – UL online certification E188913, QGGQ2 – Railway immunity – Certification documents	IEC/EN 60950-1 (ed. 2), EN 60950-1:2006/ A11:2009/A1:2010/A12:2011/A2:2013 UL 508, CSA C22.2 No. 107.1-01 UL 60950-1 2nd ed. +Am1 EN50155 www.tracopower.com/overview/teq160wir
Remote On/Off	– positive logic (standard) – Off idle current:	– On: 3 to 12 VDC or open circuit – Off: 0 to 1.2 VDC or short circuit terminal 1 and 4 3 mA
Environmental compliance	– Reach document – RoHS – Flammability identified acc. EN 45545-2	www.tracopower.com/info/reach-declaration.pdf RoHS directive 2011/65/EU www.tracopower.com/info/en45545-declaration.pdf

Temperature derating



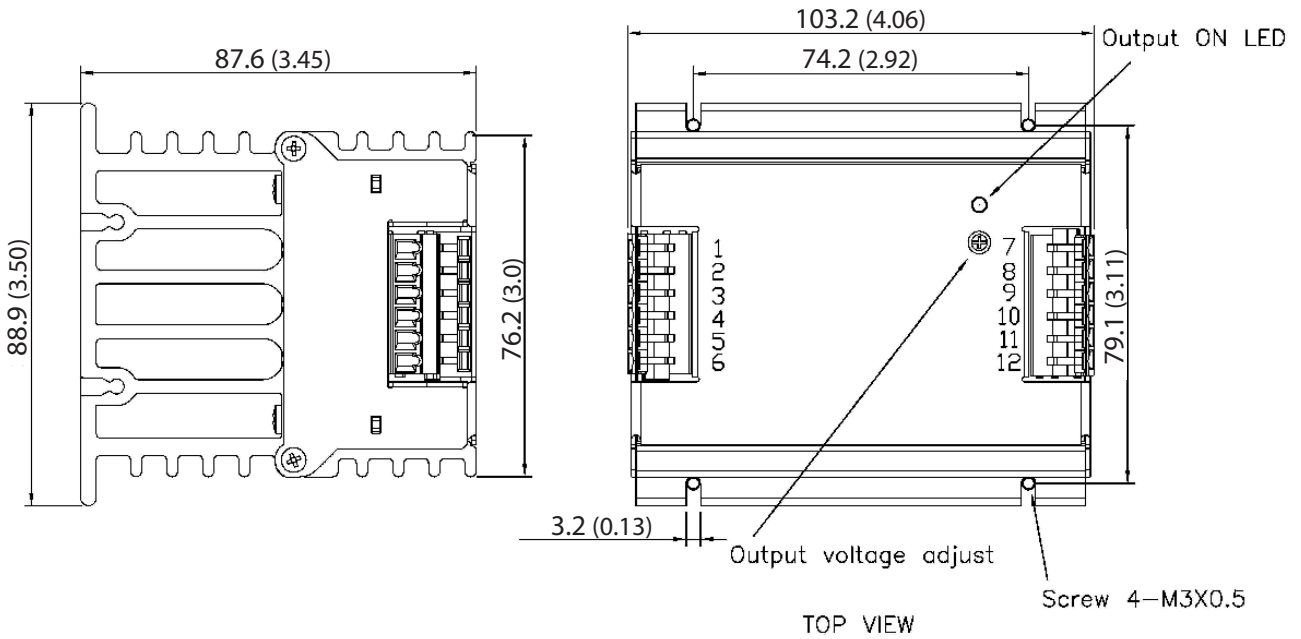
All specifications valid at nominal input voltage, full load and +25°C after warm-up time unless otherwise stated.

Physical Specifications

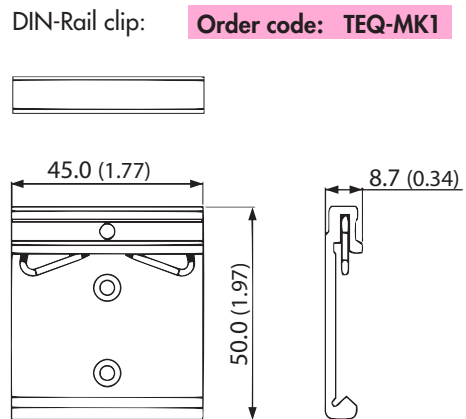
Casing material	aluminium
Potting material	silicone (UL94V-0 rated)
Weight	800 g (28.22oz)

Dimensions

TEQ 160WIR module:



Connection		
Terminal	Pin Function	Recommended wire
1,2	- Vin	12 AWG
3	NC	NA
4	Ctrl (Remote On/Off)	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



- * 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_{out max} + Current limitation).

Specifications can be changed without notice! Make sure you are using the latest documentation, downloadable at www.tracopower.com