DC/DC Converters

TEQ 100WIR Series, 100 Watt

Features

- 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 55032, class A
- I/O isolation 2250 VDC
- Under voltage lock-out circuit
- Soft start
- Input protection filter

CB Scheme c UL us UL 508 c TÜV us UL 60950-1

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	Output voltage	Output current max.	Efficiency typ.
TEQ 100-2412WIR	**10 – 36 VDC** (24 VDC nominal)	12 VDC (9.6 – 13.2)	8.4 A	90 %
TEQ 100-2415WIR		24 VDC (19.2 – 26.4)	4.2 A	90 %
TEQ 100-2416WIR		28 VDC (22.4 – 30.8)	3.6 A	90 %
TEQ 100-2418WIR		48 VDC (38.4 – 52.8)	2.1 A	90 %
TEQ 100-4812WIR	**19 – 75 VDC** (48 VDC nominal)	12 VDC (9.6 – 13.2)	8.4 A	90 %
TEQ 100-4815WIR		24 VDC (19.2 – 26.4)	4.2 A	90 %
TEQ 100-4816WIR		28 VDC (22.4 – 30.8)	3.6 A	90 %
TEQ 100-4818WIR		48 VDC (38.4 – 52.8)	2.1 A	90 %
TEQ 100-7212WIR	**43 – 160 VDC** (110 VDC nominal)	12 VDC (9.6 – 13.2)	8.4 A	89 %
TEQ 100-7215WIR		24 VDC (19.2 – 26.4)	4.2 A	90 %
TEQ 100-7216WIR		28 VDC (22.4 – 30.8)	3.6 A	90 %
TEQ 100-7218WIR		48 VDC (38.4 – 52.8)	2.1 A	90 %

Input Specifications

Input current at no load		24 Vin models:	25 mA typ.
		48 Vin models:	20 mA typ.
		110 Vin models:	10 mA typ.
Start-up voltage		24 Vin models:	10.0 VDC (or lower)
		48 Vin models:	19.0 VDC (or lower)
		110 Vin models:	43.0 VDC (or lower)
Under voltage shut down (lock-out circuit)		24 Vin models:	8.0 VDC (or lower)
		48 Vin models:	17.0 VDC (or lower)
		110 Vin models:	37.5 VDC (or lower)
Surge voltage (1 sec. max.)		24 Vin models:	50 V 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
Reverse voltage protection			parallel diode

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.

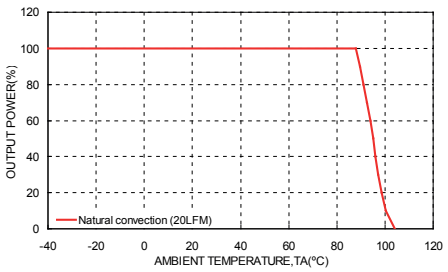
Output Specifications (continued)

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	12 VDC models:	7'000 µF max.
	24 VDC models:	1'750 µF max.
	28 VDC models:	1'280 µF max.
	48 VDC models:	430 µF max.

General Specifications

Temperature ranges	– Operating		–40°C to +105°C (up to +85°C w/o derating)
	– Storage		–40°C to +105°C
Thermal impedance			1.45°C/W
Derating			See derating graph below
Over temperature protection			at 110°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)			> 711'000 h
Isolation voltage (60sec.)	– Input/Output		2'250 VDC (basic insulation)
	– Input/Case		1'600 VDC
Isolation resistance	– Input/Output (500 VDC)		>1 GOhm min.
Switching frequency		24 & 48 Vin models:	250 kHz typ. (puls width modulation)
		110 Vin models:	300 kHz typ. (puls width modulation)
Safety standards	– CB test certificate		IEC/EN 60950-1 (ed. 2), EN 60950-1:2006/ A11:2009/A1:2010/A12:2011/A2:2013
	– CSA certificate of compliance		UL 508, CSA C22.2 No. 107.1-01
	– UL online certification E188913, QQGQ2		UL 60950-1 2nd ed. +Am1
	– Railway immunity		EN50155
	– Certification documents		www.tracopower.com/overview/teq100wir
Remote On/Off	– positive logic (standard)	– On:	3 to 12 VDC or open circuit
		– Off:	0 to 1.2 VDC or short circuit terminal 1 and 4
	– negative logic (option -N)	– On:	0 to 1.2 VDC or short circuit terminal 1 and 4
		– Off:	3 to 12 VDC or open circuit
	– Off idle current:		3 mA
Environmental compliance	– Reach document		www.tracopower.com/info/reach-declaration.pdf
	– RoHS		RoHS directive 2011/65/EU
	– Flammability identified acc. EN 45545-2		www.tracopower.com/info/en45545-declaration.pdf

Temperature derating



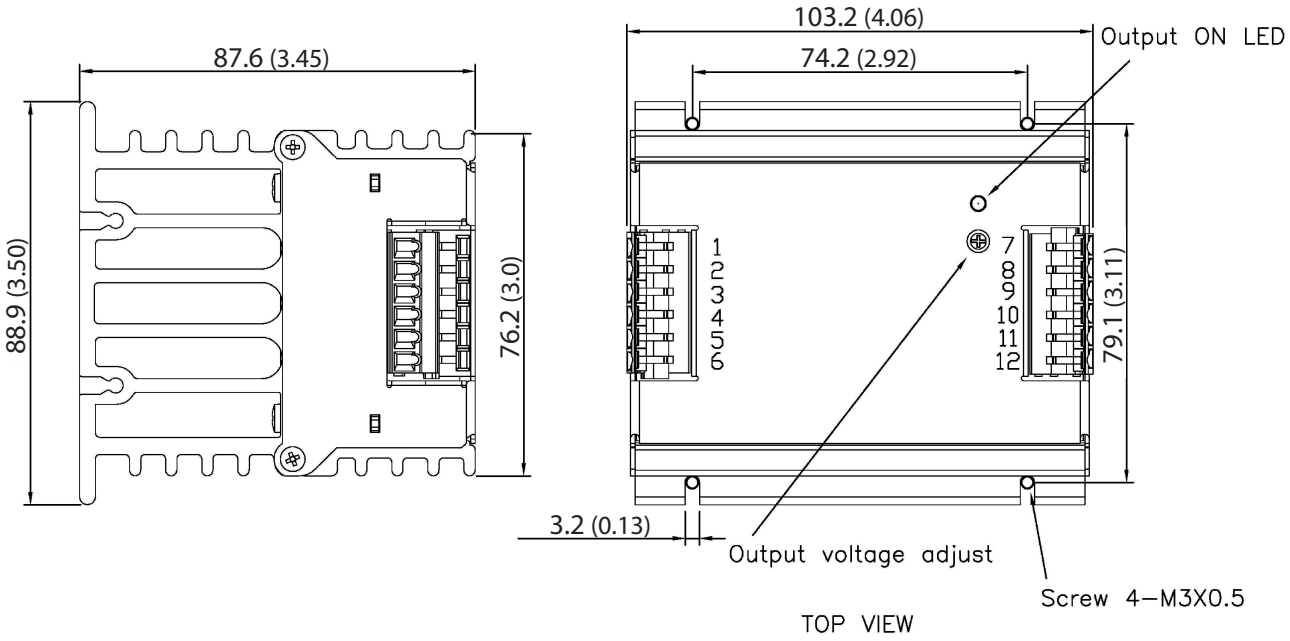
All specifications valid at nominal input voltage, full load and +25°C after warm-up time unless otherwise stated.

Physical Specifications

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

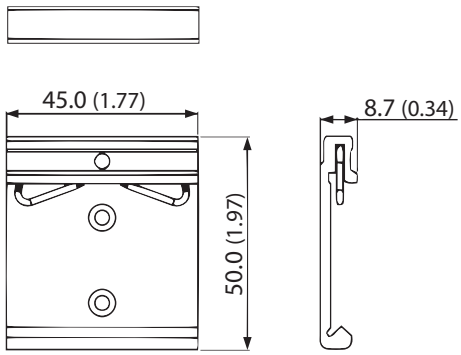
Dimensions

TEQ 100WIR 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

DIN-Rail clip: **Order code: TEQ-MK1**



* 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 (Iout max + Current limitation).