

## DC/DC Converter

## TEQ 300WIR Series, 300 Watt

- High power block with excellent thermal convection
- Operating temperature -40°C to +80°
- Increased shock & vibration resistance
- Ultra wide 4:1 input voltage range
- EN 50155 approval for railway applications
- Excellent efficiency up to 92%
- Constant current output characteristic for battery load applications
- Power sharing (up to 3 pcs in parallel)
- Input filter meet EN 55022, class A
- I/O isolation 3000 VDC
- Infinite capacitive load
- Under voltage lock-out circuit
- Soft start
- Input protection filter



The TEQ-300WIR 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 +55°C with natural convection cooling without power derating and up to +80°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 300-4812WIR	<b>18 - 75 VDC*</b> (nominal 48 VDC)	12 VDC	25 A	89 %
TEQ 300-4815WIR		24 VDC	12.5 A	92 %
TEQ 300-4816WIR		28 VDC	10.8 A	91 %
TEQ 300-4818WIR		48 VDC	6.3 A	92 %
TEQ 300-7212WIR	<b>43 - 160 VDC</b> (nominal 110 VDC)	12 VDC	25 A	89 %
TEQ 300-7215WIR		24 VDC	12.5 A	91 %
TEQ 300-7216WIR		28 VDC	10.8 A	91 %
TEQ 300-7218WIR		48 VDC	6.3 A	92 %

\* below 24 Vin a derating of 3.3%/V has to be applied (see page 3)

## Input Specifications

Input current no load	48 Vin models: 30 mA typ. 110 Vin models: 25 mA typ.
Surge voltage (1 sec. max.)	48 Vin models: 100 V max. 110 Vin models: 185 V max.
Start-up voltage	48 Vin models: 18 VDC (or lower) 110 Vin models: 43 VDC (or lower)
Under voltage shut down	48 Vin models: 16.8 VDC (or lower) 110 Vin models: 36.0 VDC (or lower)
Conducted noise	EN55022, EN55011 class A (internal filter)
ESD (electrostatic discharge)	EN 61000-4-2, air $\pm 8$ kV, contact $\pm 6$ kV, perf. criteria A
Radiated immunity	EN 61000-4-3, 20 V/m, perf. criteria A
Fast transient / surge (without external input capacitor)	EN 61000-4-4, $\pm 2$ kV, perf. criteria A EN 55024: EN 61000-4-5, $\pm 1$ kV perf. criteria A EN 50155: EN 61000-4-5, $\pm 2$ kV perf. criteria A
Conducted immunity	EN 61000-4-6, 10 Vrms, perf. criteria A
Power frequency magnetic field	EN 61000-4-8, 100 A/m, perf. criteria A

## Output Specifications

Voltage adjustability	$\pm 20$ %
Output power	– rated output power 300W – max. output power up to 400W (depending on temperature and duty cycle)
Regulation	– Input variation 0.2 % max. – Load variation 0 – 100 % 0.5 % max.
Temperature coefficient	$\pm 0.02$ %/K typ.
Start up time (constant resistive load)	140 ms
Minimum load	not required
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.
Transient response (25% load step change)	250 $\mu$ s typ.
Over voltage protection	at 125 - 140 % of Vout nom. (Latch mode)
Over current protection (constant current mode)	at 105 - 120 % of rated Iout max.
Short circuit protection	continuous, automatic recovery
Capacitive load	infinite
Load share accuracy	10 %

## General Specifications

Temperature ranges	– Operating (natural convection 20LFM, 0,1m/s) –40°C to +80°C – Storage temperature –40°C to +105°C
Thermal impedance (natural convection 20LFM, 0,1m/s)	1.1 K/W
Derating	2.2 %/K above 55°C
Over temperature protection	at 105°C typ.
Mechanical shock	acc. EN61373, MIL-STD-810F
Thermal shock	acc. MIL-STD-810F
Vibration	20 - 2000Hz, 7.6grms, 3 axes (total 3 hours)
Humidity (non condensing)	5 - 95 % rel H max.

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

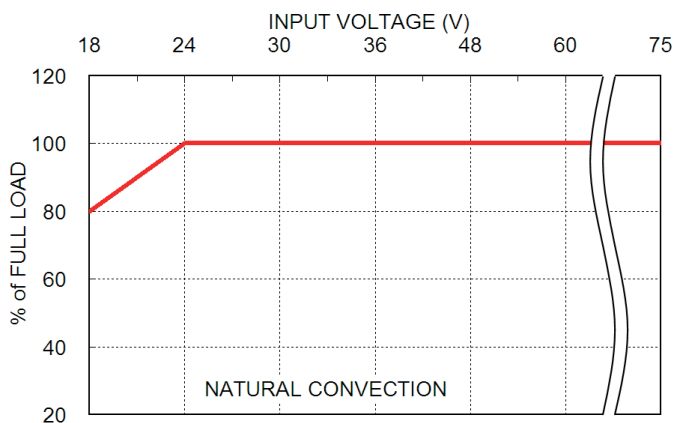
### General Specifications

Isolation voltage (60 sec)	– Input/Case – Input/Output	1'500 VDC 3'000 VDC
Isolation capacitance (input/output)		14'000 pF typ.
Isolation resistance (input/output)		>1 Gohm
Reliability, calculated MTBF (MIL-HDBK-217F at +25°C, ground benign)		195'100 h
Altitude during operation		4000 m
Switching frequency	48 Vin models: 110 Vin models:	225 kHz typ. (PWM) 200 kHz typ. (PWM)
Safety standards & approvals	– CB test certificate – UL online certification E188913, OQGO2 – CSA certificate of compliance – Railway immunity – Flamability identified acc. – Certification documents (pending)	IEC/EN 62368-1, IEC/EN 60950-1 UL 60950-1 UL 508 EN 50155 EN 45545-2 <a href="http://www.tracopower.com/overview/teq300wir">www.tracopower.com/overview/teq300wir</a>
Remote Sense		10% of Vout nom.
Remote On/Off	– positive logic  – Off idle current:	On: 3 to 12 VDC or open circuit Off: 0 to 1.2 VDC or short circuit 3 & 4 with 5 4 mA
Environmental compliance	– Reach – RoHS	<a href="http://www.tracopower.com/products/reach-declaration.pdf">www.tracopower.com/products/reach-declaration.pdf</a> RoHS directive 2011/65/EU

### Physical Specifications

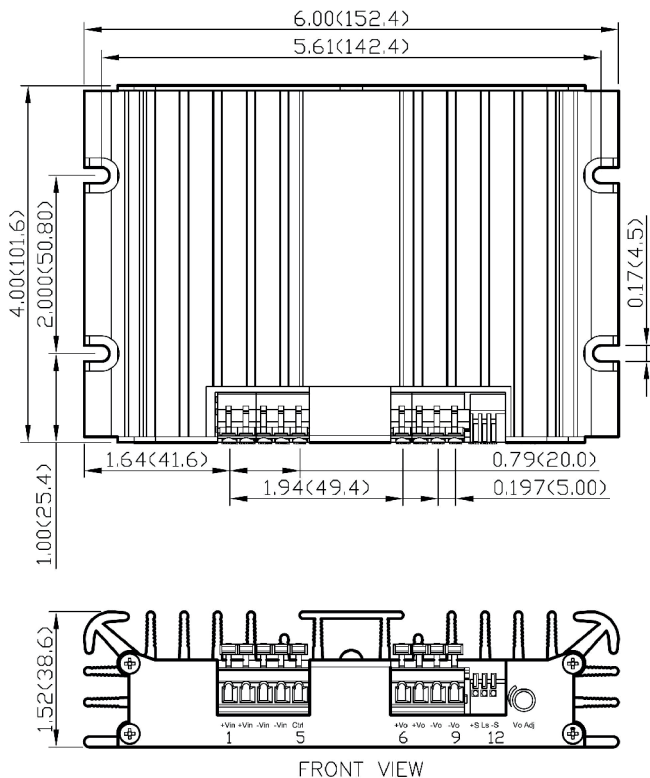
Casing material	aluminium
Potting material	silicone (UL94 V-0 rated)
Package weight	900g (31.74oz)

#### Load derating at low input voltage (48 Vin models):



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

### Outline Dimensions



### Terminal connection

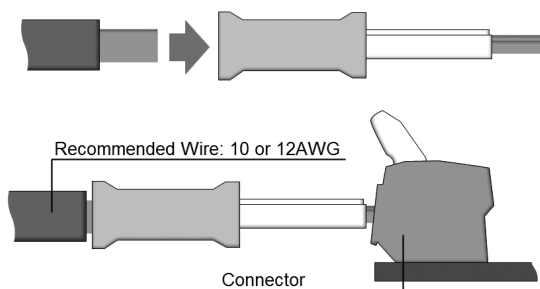
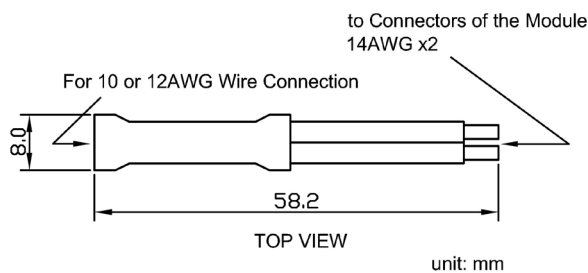
Terminal	Pin Function	Recommended Wire
1, 2	+Vin	12–16 AWG
3, 4	-Vin (GND)	12–16 AWG
5	On/Off Ctrl	12–28 AWG
6, 7	+Vout	12–16 AWG
8, 9	-Vout	12–16 AWG
10	+Sense*	20–28 AWG
11	LS (Loadshare)	20–28 AWG
12	-Sense*	20–28 AWG

\* Sense line to be connected to the output either at the module or at the load under regard of polarity.  
 – Wire size shall be selected to withstand the peak current (I<sub>out</sub> max. + Current limitation)

Dimensions in [mm], ( ) = Inch  
 Tolerances: x.xx ±0.5 (±0.02)

### Current Line Splitter

each 48 Vin module has 2 bypacked splitters included



The current rating of the terminal block is 15 A/pole. It's recommended to use 2 poles in parallel if the peak output current can exceed 15 A.

Table for Input voltage vs. Input terminal specifications:

Output power	Input voltage	Input terminal
300 W CV mode	≥ 23 Vin	1 pole
	< 23 Vin	2 poles
400 W CC mode	≥ 32 Vin	1 pole
	< 32 Vin	2 poles