TRACO POWER

DC/DC Railway Converter

TEQ 300WIR Series, 300 Watt

- **High power block with excellent thermal convection**
- **Operating temperature -40°C to +80°C**
- **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**
- **Under voltage lock-out circuit**
- **3-year product warranty**

UL 508 UL 62368-1 IEC 62368-1

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 makes these converters also an interesting solution for battery operated systems.

Models

Order Code	Input Voltage Range	Output Voltage nom. (adjustable)	Output Current max.	Efficiency typ.
TEQ 300-4812WIR	18 - 75 VDC (48 VDC nom.)	12 VDC (9.6 - 14.4 VDC)	25'000 mA	89 %
TEQ 300-4815WIR		24 VDC (19.2 - 28.8 VDC)	12'500 mA	92 %
TEQ 300-4816WIR		28 VDC (22.4 - 33.6 VDC)	10'800 mA	91 %
TEQ 300-4818WIR		48 VDC (38.4 - 57.6 VDC)	6'300 mA	92 %
TEQ 300-7212WIR	43 - 160 VDC (110 VDC nom.)	12 VDC (9.6 - 14.4 VDC)	25'000 mA	89 %
TEQ 300-7215WIR		24 VDC (19.2 - 28.8 VDC)	12'500 mA	91 %
TEQ 300-7216WIR		28 VDC (22.4 - 33.6 VDC)	10'800 mA	91 %
TEQ 300-7218WIR		48 VDC (38.4 - 57.6 VDC)	6'300 mA	92 %

Options

TEQ-MK2	- Optional DIN-Rail Mounting Kit: www.tracopower.com/overview/teq-mk2

Note - A continuous 400 watts operation is possible with restrictions. See: www.tracopower.com/info/teq300wir_400w-mode.pdf

Input Specifications

Input Current	- At no load	48 Vin models:	30 mA typ.
		110 Vin models:	20 mA typ.
Surge Voltage		48 Vin models:	100 VDC max. (1 s max.)
		110 Vin models:	185 VDC max. (1 s max.)
Under Voltage Lockout		48 Vin models:	15.6 VDC min. / 16 VDC typ. / 16.8 VDC max.
		110 Vin models:	33 VDC min. / 34.5 VDC typ. / 36 VDC max.
Recommended Input Fuse		48 Vin models:	25'000 mA (fast acting)
		110 Vin models:	12'000 mA (fast acting)
			(The need of an external fuse has to be assessed in the final application.)
Input Filter			Internal Common Mode Choke + Pi-Type

Output Specifications

Output Voltage Adjustment			±20% (By trim potentiometer)
			Output power must not exceed rated power!
Voltage Set Accuracy			±1% max.
Regulation	- Input Variation (Vmin - Vmax)		0.2% max.
	- Load Variation (0 - 100%)		0.5% max.
Ripple and Noise		12 Vout models:	125 mVp-p max.
(20 MHz Bandwidth)		24 Vout models:	250 mVp-p max.
		28 Vout models:	250 mVp-p max.
		48 Vout models:	350 mVp-p max.
		12 Vout models:	100 mVp-p typ.
		24 Vout models:	200 mVp-p typ.
		28 Vout models:	200 mVp-p typ.
		48 Vout models:	300 mVp-p typ.
Capacitive Load			Infinite
Minimum Load			Not required
Temperature Coefficient			±0.02 %/K max.
Hold-up Time			10 ms min. (acc. to EN 50155 Class S2, see application note for ext. capacitor calculation: www.tracopower.com/info/holdup_en50155.pdf)
Start-up Time			140 ms typ.
Short Circuit Protection			Automatic recovery
Overload Protection			Constant Current Mode
Output Current Limitation			105 - 115% of Iout max.
Overvoltage Protection			125 - 140% of Vout nom.
Transient Response	- Response Time		250 µs typ. (25% Load Step)
Load Share Function		See application note:	www.tracopower.com/teq300wir-loadshare
Load Share Accuracy			10%

Safety Specifications

Standards	- IT / Multimedia Equipment	EN 60950-1
		EN 62368-1
		IEC 60950-1
		IEC 62368-1
		UL 60950-1
		UL 62368-1
	- Industrial Control Equipment	UL 508
	- Railway Applications	EN 50155
	- Certification Documents	www.tracopower.com/teq300wir-safety-cert
Energy Source	- Output, acc. to 62368-1	ES1
Power Source	- Output, acc. to 62368-1	PS3

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

Pollution Degree			PD 2
Over Voltage Category			Not mains connected

EMC Specifications

EMI (Emissions)			EN 50121-3-2 (EMC for Rolling Stock)
	- Conducted Emissions		EN 55011 class A (internal filter)
			EN 55032 class A (internal filter)
	- Radiated Emissions		EN 55011 class A (internal filter)
			EN 55032 class A (internal filter)
EMS (Immunity)			EN 50121-3-2 (EMC for Rolling Stock)
			EN 55024 (IT Equipment)
			EN 55035 (Multimedia)
	- Electrostatic Discharge	Air:	EN 61000-4-2, ±8 kV, perf. criteria A
		Contact:	EN 61000-4-2, ±6 kV, perf. criteria A
	- RF Electromagnetic Field		EN 61000-4-3, 20 V/m, perf. criteria A
	- EFT (Burst) / Surge		EN 61000-4-4, ±2 kV, perf. criteria A
			EN 61000-4-5, ±2 kV, perf. criteria A
	- Conducted RF Disturbances		EN 61000-4-6, 10 Vrms, perf. criteria A
	- PF Magnetic Field	Continuous:	EN 61000-4-8, 100 A/m, perf. criteria A
		1 s:	EN 61000-4-8, 1000 A/m, perf. criteria A
EMC / Environmental	- Certification Documents		www.tracopower.com/teq300wir-emc-cert

General Specifications

Relative Humidity			95% max. (non condensing)
Temperature Ranges	- Operating Temperature		–40°C to +80°C
	- Approved Ambient Temp.	62368-1:	+55°C max. (stand-alone)
		62368-1:	+60°C max. (on 19"x5.25"x0.063" FE base plate)
	- Case Temperature		+105°C max.
	- Storage Temperature		–40°C to +105°C
Power Derating	- High Temperature		Depending on model
		See application note:	www.tracopower.com/teq300wir-cc
Over Temperature Protection Switch Off	- Protection Mode		100°C min. / 105°C typ. / 115°C max. (Automatic recovery)
Cooling System			Natural convection (20 LFM)
Sense Function			10% max. of Vout nom.
Remote Control	- Voltage Controlled Remote (passive = on)		On: 3.0 to 12 VDC or open circuit Off: 0 to 1.2 VDC or short circuit Refers to 'Remote' and '-Vin' Pin
	- Off Idle Input Current		10 mA max.
	- Remote Pin Input Current		-0.5 to 1.0 mA
Altitude During Operation			5'000 m max.
Switching Frequency			225 kHz typ. (PWM) (±10%, 48 VDC models) 200 kHz typ. (PWM) (±20%, 110 VDC model)
Insulation System			Reinforced Insulation
Working Voltage (rated)			236 VAC
Isolation Test Voltage	- Input to Output, 60 s		3'000 VAC
	- Input to Case, 60 s		1'500 VAC
	- Output to Case, 60 s		1'500 VAC
Isolation Resistance	- Input to Output, 500 VDC		1'000 MΩ min.
Isolation Capacitance	- Input to Output, 100 kHz, 1 V		14'000 pF typ.
Reliability	- Calculated MTBF		149'000 h (MIL-HDBK-217F, ground benign)

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

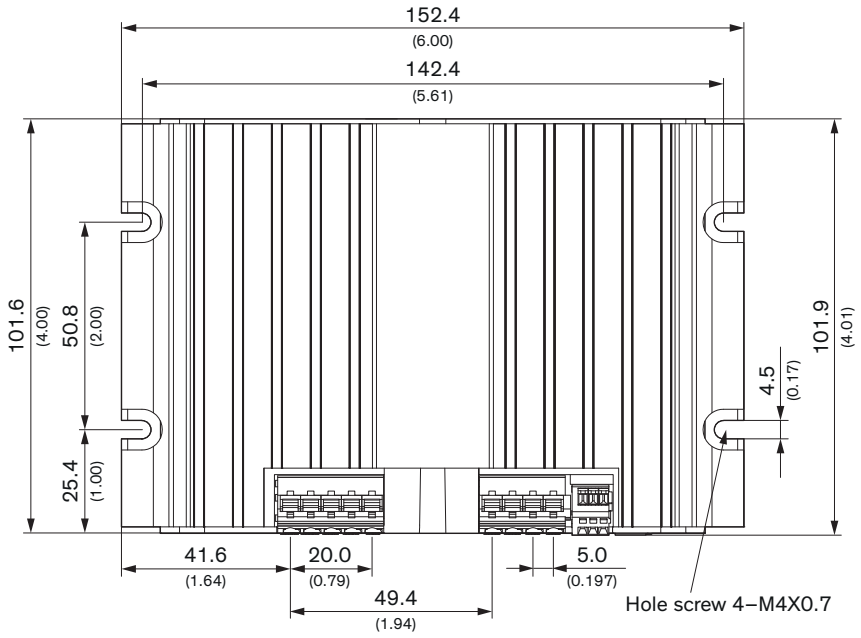
Environment	- Vibration	MIL-STD-810F EN 61373 7.6 g, 3 axis, 60 min, 20-2000 Hz
	- Mechanical Shock	MIL-STD-810F EN 61373
	- Thermal Shock	MIL-STD-810F
	- Flammability	EN 45545-2 www.tracopower.com/info/en45545-declaration.pdf
Housing Material		Aluminum
Potting Material		Silicone (UL 94 V-0 rated)
Housing Type		Metal Case
Mounting Type		Chassis Mount
Connection Type		Spring Clamps
Weight		900 g
Thermal Impedance	- Case to Ambient	1.2 K/W typ. 1.1 K/W typ. (mounted on 19" x 5.25" x " 0.063" iron base plate)
Environmental Compliance	- REACH Declaration	www.tracopower.com/info/reach-declaration.pdf REACH SVHC list compliant REACH Annex XVII compliant
	- RoHS Declaration	www.tracopower.com/info/rohs-declaration.pdf Exemptions: 7(a), 7(c)-I (RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule).)
	- SCIP Reference Number	3dd2ff88-997b-4312-9ffc-426dca266dd2

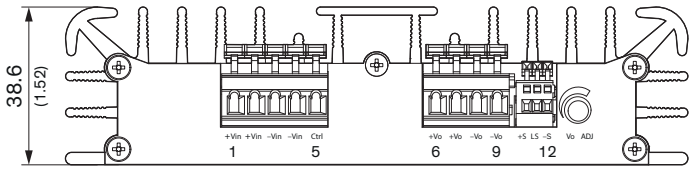
Additional Information

Supporting Documents	www.tracopower.com/overview/teq300wir
Frequently Asked Questions	www.tracopower.com/glossary-faq
Glossary	www.tracopower.com/info/glossary.pdf

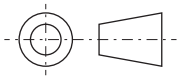
All specifications valid at nominal voltage, resistive full load and +25°C after warm-up time, unless otherwise stated.

Outline Dimensions





FRONT VIEW



Dimensions in mm, (inch)
Tolerances: x.xx ±0.5 (±0.02)
Mounting screw locked torque: max. 14 kgfcm / 1.37 Nm

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 - 16 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

* Connect the sense line to the output, either at the module or at the load, ensuring correct polarity.
** Wire size shall be selected to withstand the peak current (Iout max. + Current limitation).
- 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).

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