TRACO POWER

DC/DC Railway Converter

TEQ 200WIR Series, 200 Watt

- **High power block with excellent thermal convection**
- **Operating temperature -40°C to +70°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 1591 VAC**
- **Under voltage lock-out circuit**
- **3-year product warranty**

UL 508 UL 62368-1 IEC 62368-1

The TEQ 200WIR 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 +70°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 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 200-4812WIR	19 - 75 VDC (48 VDC nom.)	12 VDC (9.6 - 13.2 VDC)	18'000 mA	89 %
TEQ 200-4815WIR		24 VDC (19.2 - 26.4 VDC)	9'000 mA	89 %
TEQ 200-4816WIR		28 VDC (22.4 - 30.8 VDC)	7'500 mA	90 %
TEQ 200-4818WIR		48 VDC (38.4 - 52.8 VDC)	4'500 mA	89 %
TEQ 200-7212WIR	43 - 160 VDC (110 VDC nom.)	12 VDC (9.6 - 13.2 VDC)	20'000 mA	88 %
TEQ 200-7215WIR		24 VDC (19.2 - 26.4 VDC)	10'000 mA	88 %
TEQ 200-7216WIR		28 VDC (22.4 - 30.8 VDC)	8'500 mA	89 %
TEQ 200-7218WIR		48 VDC (38.4 - 52.8 VDC)	5'000 mA	88 %

Options

TEQ-MK1	- Optional DIN-Rail Mounting Kit: www.tracopower.com/overview/teq-mk1

Input Specifications

Input Current	- At no load	48 Vin models:	23 mA typ.
		110 Vin models:	13 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:	15.5 VDC min. / 16.5 VDC typ. / 18 VDC max.
		110 Vin models:	33 VDC min. / 35.5 VDC typ. / 38 VDC max.
Recommended Input Fuse			(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% to +10% (By trim potentiometer) Output power must not exceed rated power!
Voltage Set Accuracy			±1% max.
Regulation	- Input Variation (Vmin - Vmax)		0.1% max.
	- Load Variation (0 - 100%)		0.1% max.
Ripple and Noise (20 MHz Bandwidth)		12 Vout models:	125 mVp-p max.
		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	- 48 Vin input	12 Vout models:	15'000 µF max.
		24 Vout models:	3'700 µF max.
		28 Vout models:	2'600 µF max.
		48 Vout models:	930 µF max.
	- 110 Vin input	12 Vout models:	16'600 µF max.
		24 Vout models:	4'100 µF max.
		28 Vout models:	3'000 µF max.
		48 Vout models:	1'000 µF max.
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			75 ms typ.
Short Circuit Protection			Continuous, Automatic recovery
Output Current Limitation			120 - 150% of Iout max.
Overvoltage Protection			115 - 130% of Vout nom.
Transient Response	- Response Time		200 µs typ. / 250 µs max. (25% Load Step)

Safety Specifications

Standards	- IT / Multimedia Equipment	EN 62368-1 IEC 62368-1 UL 62368-1
	- Industrial Control Equipment	UL 508
	- Railway Applications	EN 50155
	- Certification Documents	www.tracopower.com/teq200wir-safety-cert
Energy Source	- Output, acc. to 62368-1	ES1
Power Source	- Output, acc. to 62368-1	PS3
Pollution Degree		PD 2
Over Voltage Category		Not mains connected

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

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 61204-3 (Low Voltage Power Supplies)
			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
EMC / Environmental	- Certification Documents		www.tracopower.com/teq200wir-emc-cert

General Specifications

Relative Humidity			95% max. (non condensing)
Temperature Ranges	- Operating Temperature		−40°C to +90°C
	- Storage Temperature		−40°C to +105°C
Power Derating	- High Temperature		Depending on model
		See application note:	www.tracopower.com/teq200wir-cc
Over Temperature Protection Switch Off	- Protection Mode		105°C min. / 115°C typ. / 120°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		8 mA max.
	- Remote Pin Input Current		-0.5 to 1.0 mA
Altitude During Operation			2'000 m max.
Switching Frequency			225 - 275 kHz (PWM)
			250 kHz typ. (PWM)
Insulation System			Reinforced Insulation
Working Voltage (rated)			182 VAC
Isolation Test Voltage	- Input to Output, 60 s		2'250 VDC
	- Input to Case, 60 s		1'600 VDC
	- Output to Case, 60 s		1'600 VDC
Isolation Resistance	- Input to Output, 500 VDC		1'000 MΩ min.
Reliability	- Calculated MTBF		270'000 h (MIL-HDBK-217F at 55°C, ground benign)
Environment	- Vibration		MIL-STD-810F
			EN 61373
	- 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

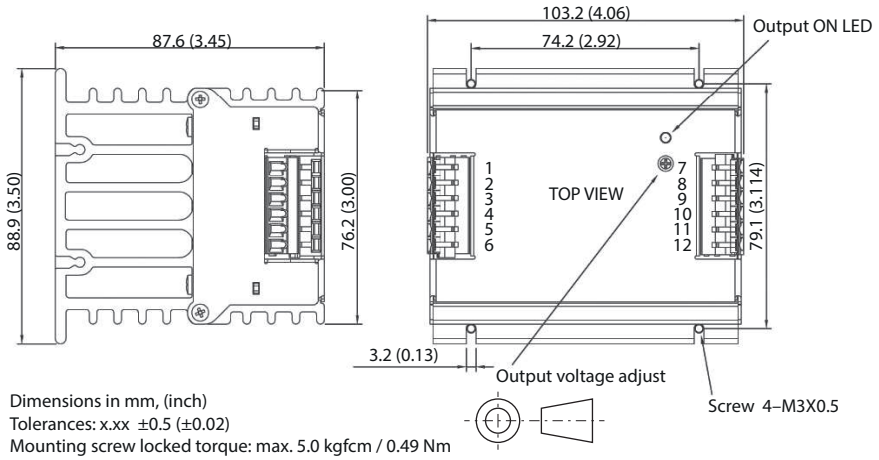
All specifications valid at nominal voltage, resistive full load and +25°C after warm-up time, unless otherwise stated.

Connection Type		Spring Clamps
Weight		800 g
Thermal Impedance	- Case to Ambient	1.45 K/W typ.
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	d0b65161-1e05-4385-ba69-4d0a932e4eaa

Additional Information

Supporting Documents	www.tracopower.com/overview/teq200wir
Frequently Asked Questions	www.tracopower.com/glossary-faq
Glossary	www.tracopower.com/info/glossary.pdf

Outline Dimensions



Dimensions in mm, (inch)
Tolerances: x.xx ±0.5 (±0.02)
Mounting screw locked torque: max. 5.0 kgfcm / 0.49 Nm

Terminal connection

Terminal	Pin Function	Recommended Wire
1,2	–Vin	12 AWG
3	NC	-
4	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

NC: No Connection

* Connect the sense line to the output, either at the module or at the load, ensuring correct 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).

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