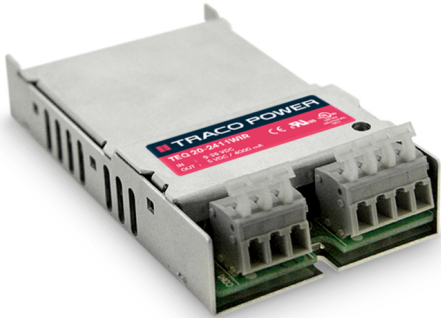


DC/DC Railway Converter

TEQ 20WIR Series, 20 Watt

- High power block with excellent thermal convection
- Operating temperature -40°C to +93°C
- Ultra wide 4:1 input voltage range
- EN 50155 approval for railway applications
- Excellent efficiency up to 88%
- Input filter meet EN 55022 class B
- I/O isolation up to 1591 VAC
- Under voltage lock-out circuit
- Protection against overvoltage, overtemperature and short circuit
- Output LED indicator



The TEQ 20WIR 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 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 heatsink construction allows an operating temperature up to +83°C with natural convection cooling without power derating and up to +93°C with power derating. Further features include under voltage lockout, over temperature protection and short circuit protection.

Models						
Order Code	Input Voltage Range	Output 1		Output 2		Efficiency typ.
		Vnom	I _{max}	Vnom	I _{max}	
TEQ 20-2411WIR	9 - 36 VDC (24 VDC nom.)	5 VDC	4'000 mA			87 %
TEQ 20-2412WIR		12 VDC	1'670 mA			88 %
TEQ 20-2413WIR		15 VDC	1'330 mA			87 %
TEQ 20-2415WIR		24 VDC	833 mA			87 %
TEQ 20-2422WIR		+12 VDC	833 mA	-12 VDC	833 mA	87 %
TEQ 20-2423WIR		+15 VDC	667 mA	-15 VDC	667 mA	88 %
TEQ 20-4811WIR	18 - 75 VDC (48 VDC nom.)	5 VDC	4'000 mA			87 %
TEQ 20-4812WIR		12 VDC	1'670 mA			88 %
TEQ 20-4813WIR		15 VDC	1'330 mA			88 %
TEQ 20-4815WIR		24 VDC	833 mA			87 %
TEQ 20-4822WIR		+12 VDC	833 mA	-12 VDC	833 mA	87 %
TEQ 20-4823WIR		+15 VDC	667 mA	-15 VDC	667 mA	88 %
TEQ 20-7211WIR	43 - 160 VDC (110 VDC nom.)	5 VDC	4'000 mA			86 %
TEQ 20-7212WIR		12 VDC	1'670 mA			87 %
TEQ 20-7213WIR		15 VDC	1'330 mA			87 %
TEQ 20-7215WIR		24 VDC	833 mA			87 %
TEQ 20-7222WIR		+12 VDC	833 mA	-12 VDC	833 mA	87 %
TEQ 20-7223WIR		+15 VDC	667 mA	-15 VDC	667 mA	88 %

Input Specifications

Input Current	- At no load	24 Vin models: 10 mA typ. 48 Vin models: 8 mA typ. 110 Vin models: 6 mA typ.
Surge Voltage		24 Vin models: 50 VDC max. (1 s max.) 48 Vin models: 100 VDC max. (1 s max.) 110 Vin models: 170 VDC max. (1 s max.)
Input Inrush Current		15 A typ.
Under Voltage Lockout		24 Vin models: 7 VDC min. / 8 VDC typ. / 8.8 VDC max. 48 Vin models: 15 VDC min. / 16 VDC typ. / 17.5 VDC max. 110 Vin models: 37 VDC min. / 40 VDC typ. / 42 VDC max.
Recommended Input Fuse		24 Vin models: 4'000 mA (slow blow) 48 Vin models: 2'000 mA (slow blow) 110 Vin models: 1'000 mA (slow blow) (The need of an external fuse has to be assessed in the final application.)
Reverse Voltage Protection		Parallel diode

Output Specifications

Voltage Set Accuracy		±1% max. (Single Output) +1% / -1.2% (Dual Output)
Regulation	- Input Variation (Vmin - Vmax) - Load Variation (0 - 100%) - Cross Regulation (25% / 100% asym. load)	single output models: 0.5% max. dual output models: 0.5% max. single output models: 1.5% max. (5 VDC models) 1% max. (other models) dual output models: 1% max. (Output 1) 1% max. (Output 2) dual output models: 5% max.
Ripple and Noise (20 MHz Bandwidth)	- single output - dual output	5 Vout models: 75 mVp-p max. 12 Vout models: 100 mVp-p max. 15 Vout models: 100 mVp-p max. 24 Vout models: 150 mVp-p max. 12 / -12 Vout models: 100 / 100 mVp-p max. 15 / -15 Vout models: 100 / 100 mVp-p max.
Capacitive Load	- single output - dual output	5 Vout models: 5'000 µF max. 12 Vout models: 850 µF max. 15 Vout models: 700 µF max. 24 Vout models: 250 µF max. 12 / -12 Vout models: 500 / 500 µF max. 15 / -15 Vout models: 350 / 350 µF max.
Minimum Load		Not required
Temperature Coefficient		±0.02 %/K max.
Hold-up Time		10 ms min. (acc. EN50155 class S2)
Start-up Time		100 ms typ.
Short Circuit Protection		Continuous, Automatic recovery
Output Current Limitation		150% typ. of Iout max.
Overvoltage Protection		125% typ. of Vout nom.
Transient Response	- Response Time	250 µs typ. (25% Load Step)

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

Safety Specifications

Safety 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	Designed for UL 508 (no certification) (single output models only)
	- Railway Applications	EN 50155
	- Certification Documents	www.tracopower.com/overview/teq20wir
Pollution Degree		PD 2

EMC Specifications

EMI Emissions	- Conducted Emissions	EN 50121-3-2 (EMC for Rolling Stock) EN 55032 class B (internal filter)
	- Radiated Emissions	EN 55032 class B (internal filter)
EMS Immunity		EN 50155 (Railway Applications) EN 50121-3-2 (EMC for Rolling Stock) EN 55024 (IT Equipment)
	- 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, ± 1 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

General Specifications

Relative Humidity		95% max. (non condensing)
Temperature Ranges	- Operating Temperature	-40°C to +93°C
	- Storage Temperature	-40°C to +105°C
Power Derating	- High Temperature	See application note: www.tracopower.com/overview/teq20wir
Cooling System		Natural convection (20 LFM)
Altitude During Operation		2'000 m max.
Switching Frequency		297 - 363 kHz (PWM)
		330 kHz typ. (PWM)
Insulation System		Functional Insulation
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 M Ω min.
Isolation Capacitance	- Input to Output, 100 kHz, 1 V	6'000 pF typ.
Reliability	- Calculated MTBF	1'600'000 h (MIL-HDBK-217F, ground benign)
Environment	- Vibration	MIL-STD-810F EN 61373
	- Mechanical Shock	MIL-STD-810F EN 61373
	- Thermal Shock	MIL-STD-810F EN 50155
Housing Material		Aluminum
Housing Type		Metal Case
Mounting Type		Chassis Mount
Connection Type		Spring Clamps
Weight		122 g

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

Status Indicator

Indicated by green LED

Environmental Compliance - REACH Declaration

www.tracopower.com/info/reach-declaration.pdf

REACH SVHC list compliant

REACH Annex XVII compliant

www.tracopower.com/info/rohs-declaration.pdf

- RoHS Declaration

Exemptions: 7a, 7c-I

(RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule).
The SCIP number is provided on request.)

- Flammability (EN 45545-2)

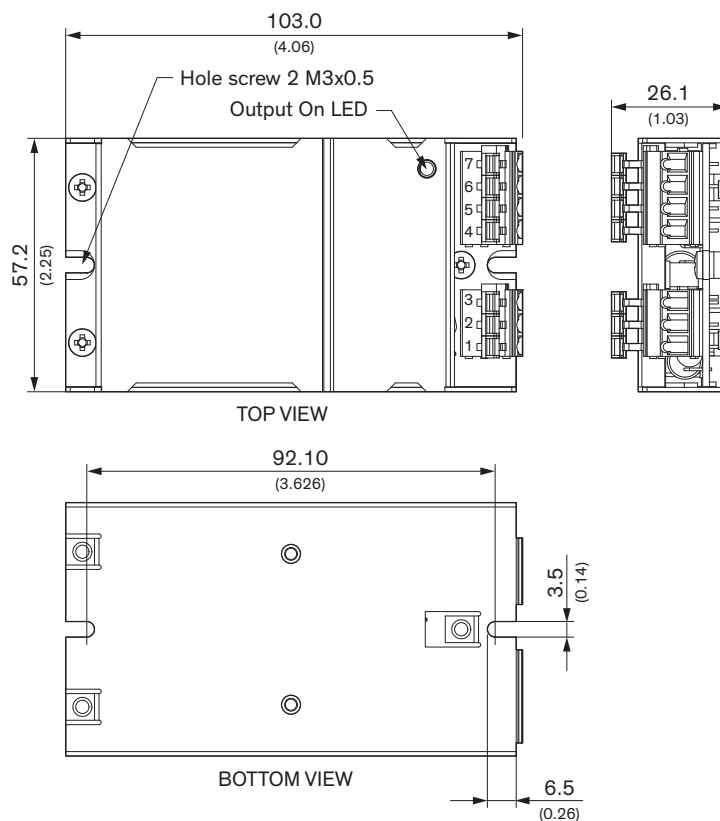
www.tracopower.com/info/en45545-declaration.pdf

Supporting Documents

Overview Link (for additional Documents)

www.tracopower.com/overview/teq20wir

Outline Dimensions



Dimensions in mm, () = inch
Tolerances: x.x ± 0.5 (± 0.02)
x.xx ± 0.25 (± 0.01)
Screw max. torque: 5.0 kgf - cm (0.49 Nm)
Spring terminals: 12 - 18 AWG

Pinout		
Pin	Single Output	Dual Output
1	+Vin	+Vin
2	-Vin (GND)	-Vin (GND)
3	NC	NC
4	NC	-Vout
5	-Vout	Common
6	+Vout	Common
7	NC	+Vout

NC: No Connection