

- 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 55032 class B
- I/O isolation up to 1591 VAC
- Under voltage lock-out circuit
- Protection against overvoltage, overtemperature and short circuit
- Output LED indicator
- 3-year product warranty



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.)
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.
Input Protection		T 6.3 A / 250 VAC (Internal Fuse in +Vin, 24 Vin models) T 3.15 A / 250 VAC (Internal Fuse in +Vin, 48 & 110 Vin models)
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, without external components)
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

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/teq20wir-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

EMC Specifications

EMI (Emissions)	- Conducted Emissions	EN 50121-3-2 (EMC for Rolling Stock) EN 55032 class A (internal filter) EN 55032 class B (internal filter)
	- Radiated Emissions	EN 55032 class A (internal filter) EN 55032 class B (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, ± 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
EMC / Environmental	- Certification Documents	www.tracopower.com/teq20wir-emc-cert

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	Depending on model
	See application note:	www.tracopower.com/teq20wir-cc
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)

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

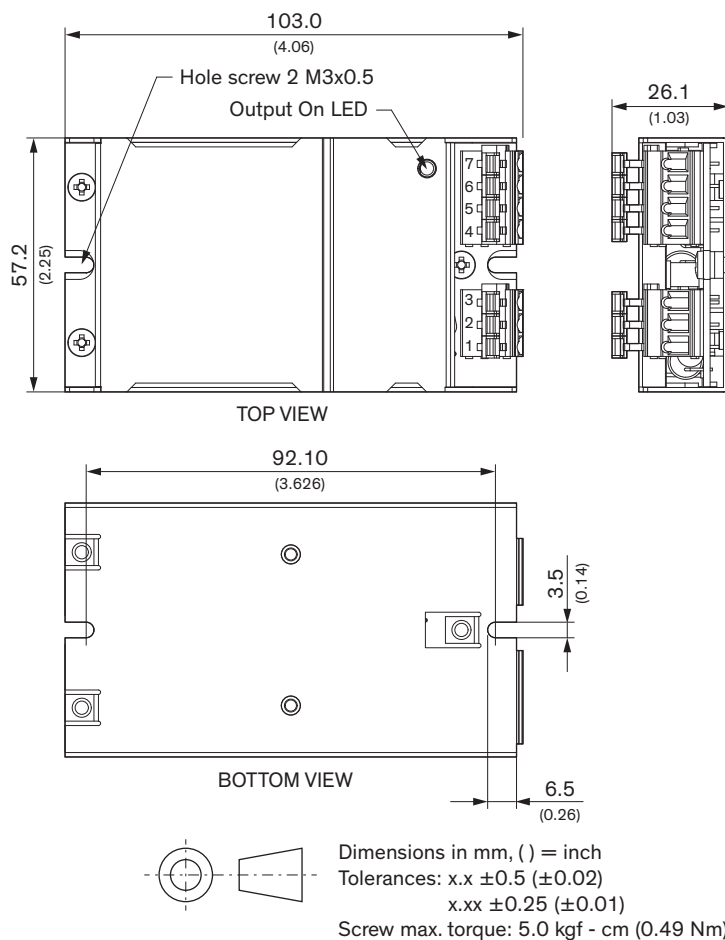
Environment	- Vibration	MIL-STD-810F EN 61373
	- Mechanical Shock	MIL-STD-810F EN 61373
	- Thermal Shock	MIL-STD-810F
	- Flammability	EN 45545-2 www.tracopower.com/info/en45545-declaration.pdf
Housing Material		Aluminum
Housing Type		Metal Case
Mounting Type		Chassis Mount
Connection Type		Spring Clamps
Weight		122 g
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
	- 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	3ad2da4c-14d8-4a79-a38b-1b0447f15324

Additional Information

Supporting Documents	www.tracopower.com/overview/teq20wir
Frequently Asked Questions	www.tracopower.com/glossary-faq
Glossary	www.tracopower.com/info/glossary.pdf
Service Portal	www.tracoserviceportal.com

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Outline Dimensions



Terminal connection

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: Not connected

Wire dimension: AWG 12 max.

Note: The size of the wires has to be assessed in the final application.