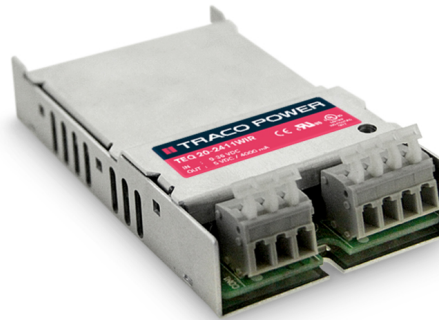


- High power block with excellent thermal convection
- Operating temperature -40°C to +93°C
- Ultra wide 4:1 input voltage range
- EN 50155 approval for railway applications
- Excellent efficiency up to 88%
- Input filter meet EN 55022 class B
- I/O isolation up to 1591 VAC
- Under voltage lock-out circuit
- 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)
	- Radiated Emissions	EN 55032 class B (internal filter) 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	Depending on model
		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

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

Weight	122 g
Status Indicator	Indicated by green LED
Environmental Compliance	- REACH Declaration - RoHS Declaration - Flammability (EN 45545-2)

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

REACH SVHC list compliant

REACH Annex XVII compliant

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

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.)

The SCIP number is provided on request.)

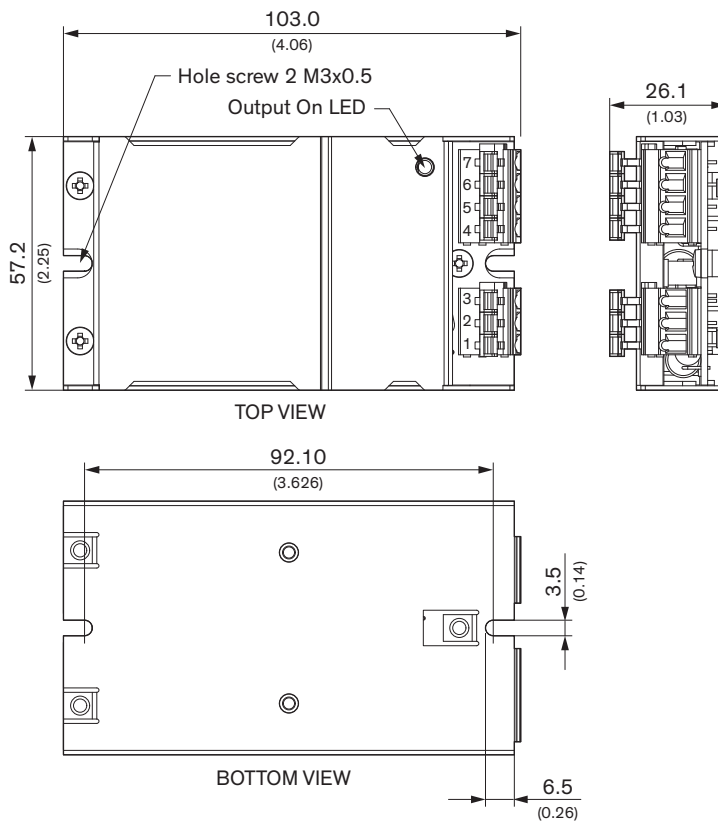
www.tracopower.com/info/en45545-declaration.pdf

Supporting Documents

[Overview Link](#) (for additional Documents)

www.tracopower.com/overview/teq20wir

Outline Dimensions



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

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