

- 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



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: <a href="http://www.tracopower.com/products/teq-mk2.pdf">www.tracopower.com/products/teq-mk2.pdf</a>
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Note - Max. Power up to 400 W (depending on temperature and duty cycle)

## Input Specifications

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

## Output Specifications

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

## Safety Specifications

Safety Standards	- IT / Multimedia Equipment  - Industrial Control Equipment - Railway Applications - Certification Documents	EN 60950-1 EN 62368-1 IEC 60950-1 IEC 62368-1 UL 60950-1 UL 62368-1 UL 508 EN 50155 <a href="http://www.tracopower.com/overview/teq300wir">www.tracopower.com/overview/teq300wir</a>
Pollution Degree		<b>PD 2</b>
Over Voltage Category		<b>OVC II</b>

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

## EMC Specifications

<b>EMI Emissions</b>		EN 50121-4 (Railway Application Signalling)
- 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)
<b>EMS Immunity</b>		EN 50155 (Railway Applications)
		EN 50121-3-2 (EMC for Rolling Stock)
		EN 55024 (IT Equipment)
		EN 55035 (Multimedia)
- Electrostatic Discharge	Air:	EN 61000-4-2, $\pm 8$ kV, perf. criteria A
	Contact:	EN 61000-4-2, $\pm 6$ kV, perf. criteria A
- RF Electromagnetic Field		EN 61000-4-3, 20 V/m, perf. criteria A
- EFT (Burst) / Surge		EN 61000-4-4, $\pm 2$ kV, perf. criteria A
		EN 61000-4-5, $\pm 1$ kV, perf. criteria A
		EN 61000-4-5, $\pm 2$ 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

## General Specifications

<b>Relative Humidity</b>		95% max. (non condensing)
<b>Temperature Ranges</b>	- Operating Temperature	-40°C to +80°C
	- Approved Ambient Temp.	+55°C max. (stand-alone)
		+60°C max. (on 19"x5.25"x0.063" FE base plate)
		(for compliance with 62368-1)
	- Case Temperature	+105°C max.
	- Storage Temperature	-40°C to +105°C
<b>Power Derating</b>	- High Temperature	Depending on model
		See application note: <a href="http://www.tracopower.com/overview/teq300wir">www.tracopower.com/overview/teq300wir</a>
<b>Over Temperature Protection Switch Off</b>	- Protection Mode	100°C min. / 105°C typ. / 115°C max. (Automatic recovery)
<b>Cooling System</b>		Natural convection (20 LFM)
<b>Sense Function</b>		10% max. of $V_{out}$ nom.
<b>Remote Control</b>	- Voltage Controlled Remote	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
<b>Altitude During Operation</b>		5'000 m max.
<b>Switching Frequency</b>		225 kHz typ. (PWM) ( $\pm 10\%$ , 48 VDC models)
		200 kHz typ. (PWM) ( $\pm 20\%$ , 110 VDC model)
<b>Insulation System</b>		Reinforced Insulation
<b>Working Voltage (rated)</b>		236 VAC
<b>Isolation Test Voltage</b>	- Input to Output, 60 s	3'000 VAC
	- Input to Case, 60 s	1'500 VAC
	- Output to Case, 60 s	1'500 VAC
<b>Isolation Resistance</b>	- Input to Output, 500 VDC	1'000 M $\Omega$ min.
<b>Isolation Capacitance</b>	- Input to Output, 100 kHz, 1 V	14'000 pF typ.
<b>Reliability</b>	- Calculated MTBF	149'000 h (MIL-HDBK-217F, ground benign)
<b>Environment</b>	- 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
		EN 50155
<b>Housing Material</b>		Aluminum

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

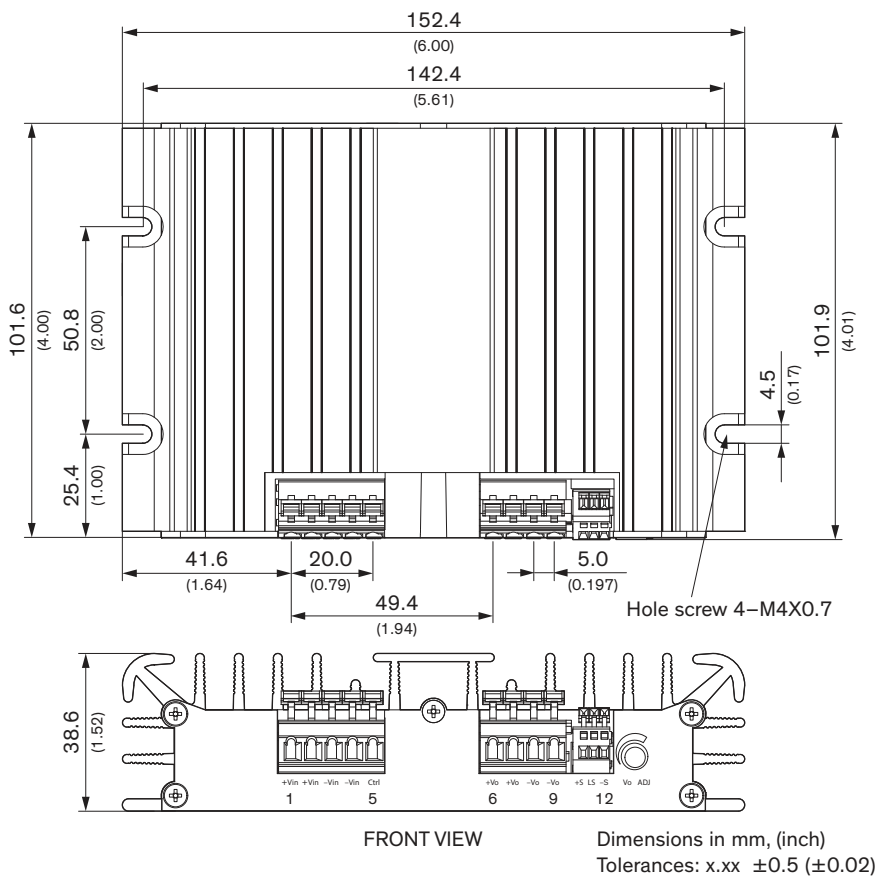
Potting Material	Silicone (UL 94 V-0 rated)
Housing Type	Metal Case
Mounting Type	Chassis Mount
Connection Type	Spring Clamps
Weight	900 g
Thermal Impedance	- Case to Ambient 1.2 K/W typ. (stand-alone) 1.1 K/W typ. (mounted on 19" x 5.25" x " 0.063" iron base plate)
Environmental Compliance	- REACH Declaration <a href="http://www.tracopower.com/info/reach-declaration.pdf">www.tracopower.com/info/reach-declaration.pdf</a> REACH SVHC list compliant REACH Annex XVII compliant - RoHS Declaration <a href="http://www.tracopower.com/info/rohs-declaration.pdf">www.tracopower.com/info/rohs-declaration.pdf</a> Exemptions: 7a, 7c-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 - Flammability (EN 45545-2) <a href="http://www.tracopower.com/info/en45545-declaration.pdf">www.tracopower.com/info/en45545-declaration.pdf</a>

### Supporting Documents

Overview Link (for additional Documents)

[www.tracopower.com/overview/teq300wir](http://www.tracopower.com/overview/teq300wir)

### Outline Dimensions



#### 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

\* Sense line to be connected to the output either at the module or at the load under regard of polarity.

\*\* Wire size shall be selected to withstand the peak current (I<sub>out</sub> max. + Current limitation).