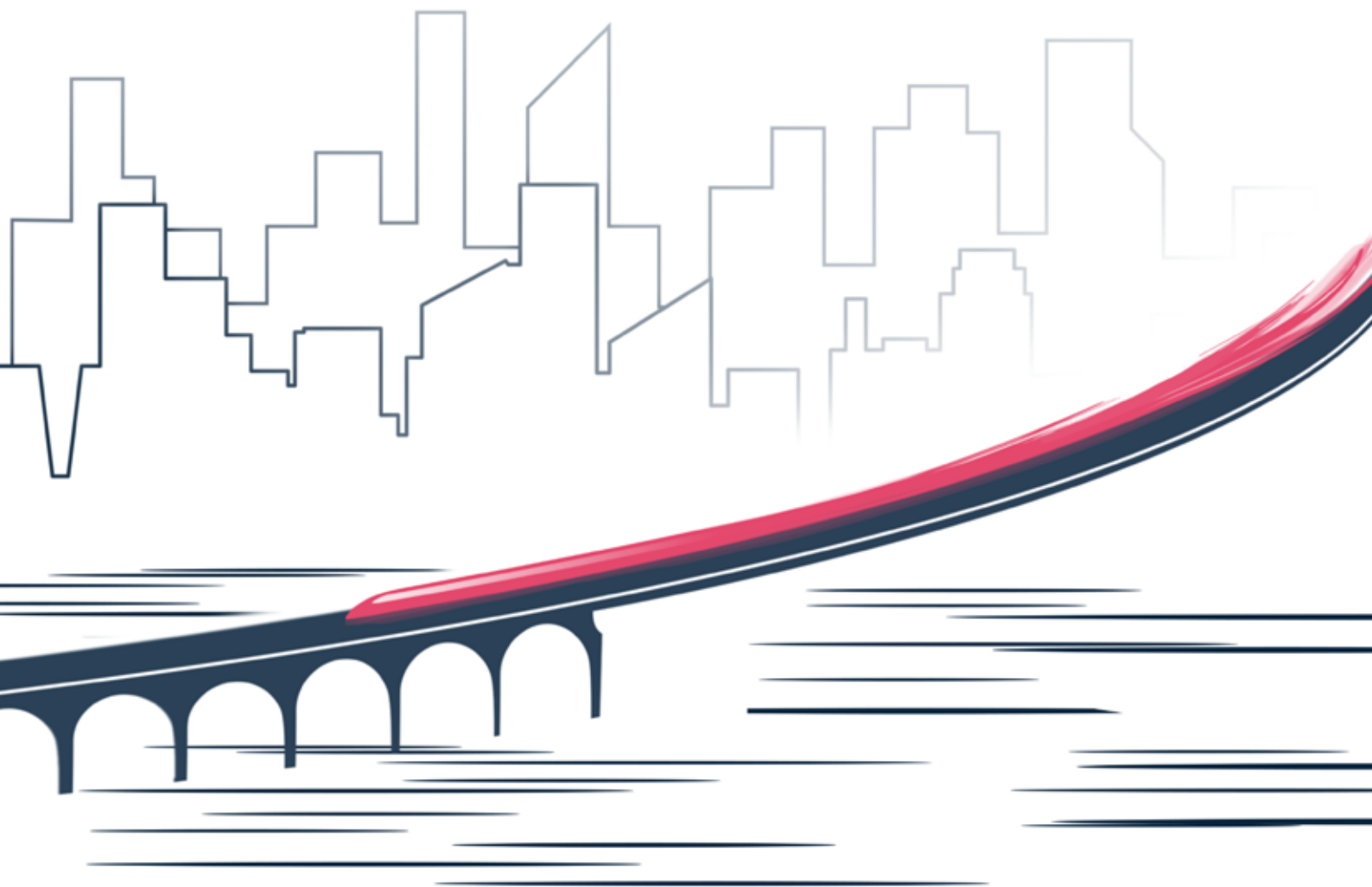




2019 | **Railway Power Solutions**
Ruggedized DC/DC Converters
Product Portfolio



Company Profile

TRACO Electronic AG is a Swiss company with headquarters based in Baar, Switzerland. As a leading power supply specialist with more than 35 years experience we are dedicated to the design and manufacturing of high quality DC/DC and AC/DC power conversion products.

TRACO markets its products worldwide under the registered trademark TRACO POWER. Our mission is to provide our customers with optimal power supply solutions in terms of performance, quality and cost for their individual application.

Ruggedized DC/DC Converters for Railway and Industrial Applications

DC/DC converters for railway and ruggedized industrial applications must withstand greater disruptive forces than most stationary applications and are subject to greater demands for operational safety, durability and thermal shock. European standards EN 50155 and EN 61373 were established to provide internationally recognized standards for these type of applications. These standards are now considered to be the defacto symbol of quality, indicating robustness, reliability and durability in the railway and transportation sectors and applications with extreme environments.

EN 50155 defines the minimum input requirements for DC/DC converters as follows:

Bus Voltage	Continuous input voltage range	Brownout 100 ms	Transient 1 sec	TRACO POWER railway DC/DC input ranges
24 VDC	16.8-30.0 V	14.4 V	33.6 V	Satisfied by 9~36 VDC input range products
37.5 VDC	26.2-47.0 V	22.5 V	52.5 V	Satisfied by 18~75 VDC input range products
48 VDC	33.6-60.0 V	28.8 V	67.2 V	Satisfied by 18~75 VDC input range products
72 VDC	50.4-90.0 V	43.2 V	100.8 V	Satisfied by 43~160 VDC input range products
96 VDC	67.2-120.0 V	57.6 V	134.4 V	Satisfied by 43~160 VDC input range products
110 VDC	77.0-137.5 V	66.0 V	154.0 V	Satisfied by 43~160 VDC input range products

EN 50155 sets these additional requirements:

- Galvanic isolation to protect electronic circuits
- Standards for immunity and susceptibility from conducted / radiated noise
- Relative humidity levels up to 95% relative for 30 consecutive days

EN 61373 defines that DC/DC converters must provide continuous operation under these stresses:

- Random vibration - frequency range of 5-150 Hz @ 5grms (5hrs per axis)
- Shock - peak acceleration of 5g/2g/1g (duration: 50ms/20ms/20ms.)

All TRACO POWER DC/DC converters classified as "Railway" are extremely robust and safety qualified to meet EN 50155 and EN 61373. They offer continuous operational input ranges that exceed EN 50155's defined ranges with galvanic isolation up to 2250 VDC (input to output / input to case). Our DC/DC modules are fully enclosed and encapsulated with additional filtration circuits to protect from radiated / conducted noise while providing ruggedized mechanical protection from shock, vibration, humidity and air particles such as dust and water. Additional qualification for the fire behaviour of components according to EN 45545-2 and overall temperature ranges from -40 to +85°C ambient ensure all our products are safe and of the highest quality for operation in extreme environments.

Railway Converters

NEW	TMR 3WIR Series 3 Watt in SIP-8 metal package	4
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TMR 3WIR Series

NEW

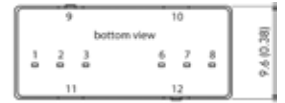
- Wide 4:1 input voltage ranges: 9-36, 18-75, 43-160 VDC
- Output voltages: 3.3, 5.0, 9.0, 12, 15, 24, ±5, ±12, ±15 VDC
- Operating temperature range -40°C to 90°C
- Derating 4.5 %/K above 78°C



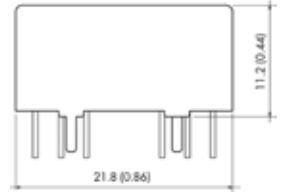
www.tracopower.com/overview/tmr3wir

3 Watt in SIP-8 metal package

- single output
- 1: -Vin
 - 2: +Vin
 - 3: On/Off
 - 6: +Vout
 - 7: -Vout
 - 8: NC



- dual output
- 1: -Vin
 - 2: +Vin
 - 3: On/Off
 - 6: +Vout
 - 7: Com.
 - 8: -Vout



TMR 6WIR Series

NEW

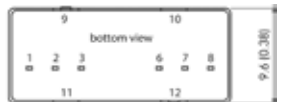
- Wide 4:1 input voltage ranges: 9-36, 18-75, 43-160 VDC
- Output voltages: 3.3, 5.0, 9.0, 12, 15, 24, ±5, ±12, ±15 VDC
- Operating temperature range -40°C to 80°C
- Derating 2.5 %/K above 60°C



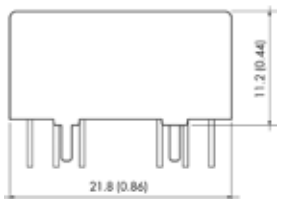
www.tracopower.com/overview/tmr6wir

6 Watt in SIP-8 metal package

- Single output
- 1: -Vin
 - 2: +Vin
 - 3: On/Off
 - 6: +Vout
 - 7: -Vout
 - 8: NC



- Dual output
- 1: -Vin
 - 2: +Vin
 - 3: On/Off
 - 6: +Vout
 - 7: Com.
 - 8: -Vout



TEN 8WI Series

- Wide 4:1 input voltage ranges: 9-36, 18-75, 43-160 VDC
- Output voltages: 3.3, 5.0, 12, 15, ±5, ±12, ±15 VDC



www.tracopower.com/overview/ten8wi

8 Watt in DIP-24 package

- Single output
- 1: On/Off
 - 2: -Vin
 - 3: -Vin
 - 9: nc
 - 11: nc
 - 14: +Vout
 - 16: -Vout
 - 22: +Vin
 - 23: +Vin



- Dual output
- 1: On/Off
 - 2: -Vin
 - 3: -Vin
 - 9: Com.
 - 11: -Vout
 - 14: +Vout
 - 16: Com.
 - 22: +Vin
 - 23: +Vin



THN 10WIR Series

NEW

- Wide 4:1 input voltage ranges:
9-36, 18-75, 36-160 VDC
- Output voltages:
3.3, 5.0, 12, 15, 24 adjust. $\pm 10\%$
 $\pm 5, \pm 12, \pm 15, \pm 24$ VDC
- Six side shielded metal casing
- Input filter to meet EN 55032 class A
- Very high efficiency up to 90%



www.tracopower.com/overview/thn10wir

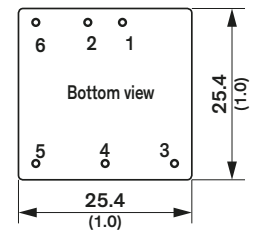
10 Watt in 1" x 1" package

single output

- 1: +Vin
- 2: -Vin
- 3: +Vout
- 4: Trim
- 5: -Vout
- 6: On/Off

dual output

- 1: +Vin
- 2: -Vin
- 3: +Vout
- 4: Com.
- 5: -Vout
- 6: On/Off



THN 15WIR Series

- Wide 4:1 input voltage ranges:
9-36, 18-75, 36-160 VDC
- Output voltages:
3.3, 5.0, 12, 15, 24 adjust. $\pm 10\%$
 $\pm 5, \pm 12, \pm 15, \pm 24$ VDC
- Six side shielded metal casing
- Input filter to meet EN 55032 class A
- Very high efficiency up to 91%



www.tracopower.com/overview/thn15wir

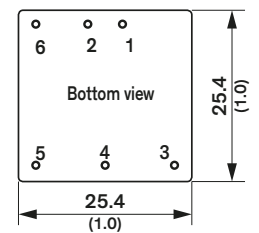
15 Watt in 1" x 1" package

single output

- 1: +Vin
- 2: -Vin
- 3: +Vout
- 4: Trim
- 5: -Vout
- 6: On/Off

dual output

- 1: +Vin
- 2: -Vin
- 3: +Vout
- 4: Com.
- 5: -Vout
- 6: On/Off



TEN 20WIR Series

- Wide 4:1 input voltage ranges:
9-36, 18-75, 43-160 VDC
- Output voltages:
3.3, 5.0, 12, 15 adjust. $\pm 10\%$
 $\pm 12, \pm 15$ VDC
- Six side shielded metal casing
- Input filter to meet EN 55032
class B for 9-36, 18-75 VDC input
class A for 40-160 VDC input
- Under voltage lock-out circuit



www.tracopower.com/overview/ten20wir

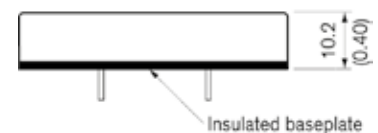
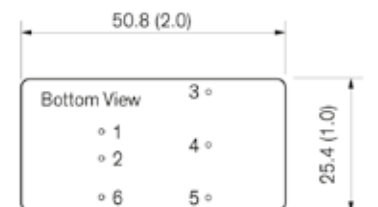
20 Watt in 2" x 1" package

single output

- 1: +Vin
- 2: -Vin
- 3: +Vout
- 4: Trim
- 5: -Vout
- 6: On/Off

dual output

- 1: +Vin
- 2: -Vin
- 3: +Vout
- 4: Com.
- 5: -Vout
- 6: On/Off

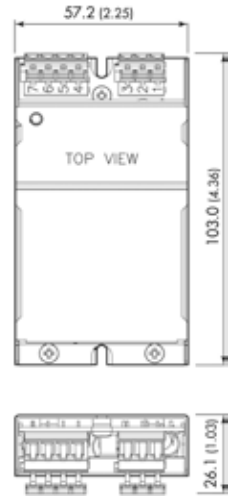


TEQ 20WIR Series

NEW dual output models

20 Watt in chassis mount package

- Wide 4:1 input voltage ranges: 9-36, 18-75, 43-160 VDC
- Output voltages: 5.0, 12, 15, 24, ±12, ±15 VDC
- Input filter to meet EN 55032 class B
- Voltage interruption class 2 without external components
- Under voltage lock-out circuit
- DC-Ok LED indicator
- Operating temperature range -40°C to 85°C at full load
- Optional DIN-rail mounting



www.tracopower.com/overview/teq20wir

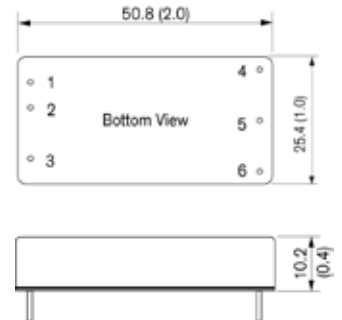
TEN 40WIR Series

40 Watt in 2" x 1" package

- Wide 4:1 input voltage ranges: 9-36, 18-75, 43-160 VDC
- Output voltages: 3.3, 5.0, 12, 15, 24 VDC adjust. ±10% ±12, ±15, ±24 VDC
- Six side shielded metal casing
- Very high efficiency up to 92%
- Under voltage lock-out circuit



- single output
- 1: +Vin
 - 2: -Vin
 - 3: On/Off
 - 4: +Vout
 - 5: -Vout
 - 6: Trim
- dual output
- 1: +Vin
 - 2: -Vin
 - 3: On/Off
 - 4: +Vout
 - 5: Com.
 - 6: -Vout



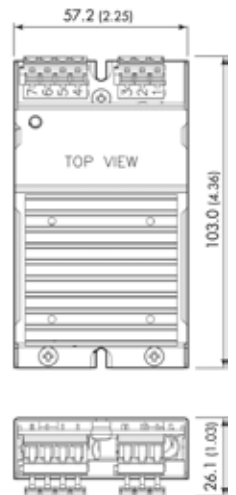
www.tracopower.com/overview/ten40wir

TEQ 40WIR Series

NEW dual output models

40 Watt in chassis mount package

- Wide 4:1 input voltage ranges: 9-36, 18-75, 43-160 VDC
- Output voltages: 5.0, 12, 15, 24, ±12, ±15, ±24 VDC
- Input filter to meet EN 55032 class B
- Voltage interruption class 2 without external components
- Under voltage lock-out circuit
- Very high efficiency up to 91%
- DC-Ok LED indicator
- Operating temperature range -40°C to 85°C at full load
- Optional DIN-rail mounting



www.tracopower.com/overview/teq40wir

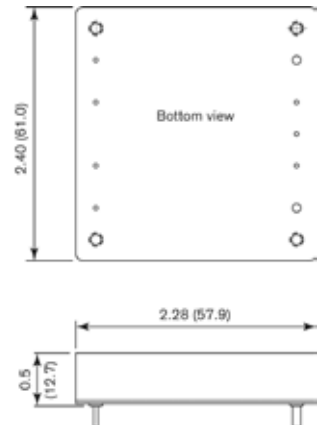
TEP 75WI Series

75 Watt in 2.4" x 2.3" package PCB or chassis mount

- Wide 4:1 input voltage ranges:
9-36, 18-75, 43-160 VDC
- Output voltages:
3.3, 5.0, 12, 15, 24, 48 VDC adjust. +10%/-20%
- Input filter to meet EN 55032 class B
- Under voltage lock-out circuit
- Very high efficiency up to 91%
- Options:
 - Chassis mount (see TEP 100WIR)
 - Mounted heat-sink (see TEP 160WIR)
 - Chassis mount with EMI filter (see TEP 200WIR)
 - DIN-rail mount



picture: standard PCB mount version

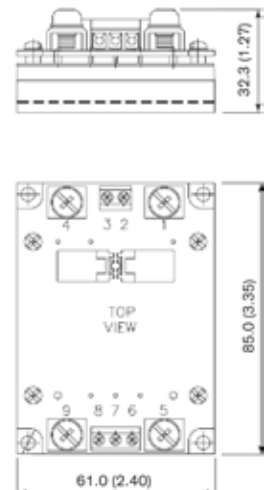


www.tracopower.com/overview/tep75wi

TEP 100WIR Series

100 Watt in 2.4" x 2.3" package PCB or chassis mount

- Wide 4:1 input voltage ranges:
8.5-36, 18-75, 43-160 VDC
- Output voltages:
3.3, 5.0, 12, 15, 24, 48 VDC adjust. +10%/-20%
- Under-voltage lock-out circuit
- Over-temperature protection (auto restart)
- Very high efficiency up to 91%
- Options:
 - Chassis mount (see picture)
 - Mounted heat-sink (see TEP 160WIR)
 - Chassis mount with EMI filter (see TEP 200WIR)
 - DIN-rail mount

picture: optional chassis mount version
standard PCB version see picture of TEP 75WI

www.tracopower.com/overview/tep100wir

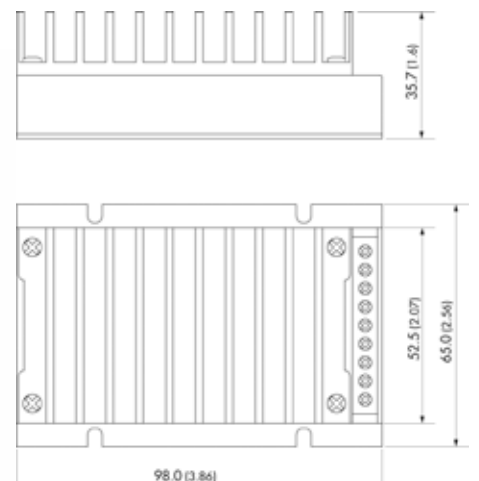
TEP 150WI Series

150 Watt in chassis mount package

- Wide 4:1 input voltage ranges:
9-36, 18-75, 43-160 VDC
- Output voltages:
12, 15, 24, 28, 48 VDC adjust. +20%
- Constant voltage up to 100% load then constant current (suitable for battery load applications)
- Under-voltage lock-out circuit
- Over-temperature protection (auto restart)
- Option:
Input filter to meet EN 55032 class B



www.tracopower.com/overview/tep150wi



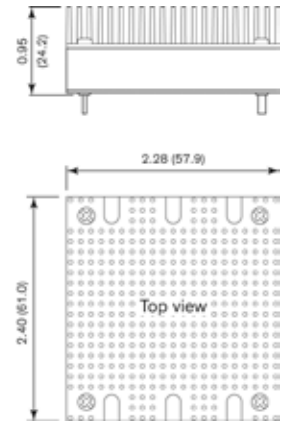
TEP 160WIR Series

160 Watt in 2.4" x 2.3" package PCB or chassis mount

- Wide 4:1 input voltage ranges:
8.5-36, 18-75, 43-160 VDC
- Output voltages:
3.3, 5, 12, 15, 24, 28, 48 VDC adjust. +10%/-20%
- Under voltage lock-out circuit
- Over-temperature protection (auto restart)
- Very high efficiency up to 91%
- Options:
 - Chassis mount (see TEP 100WIR)
 - Mounted heat-sink (see picture)
 - Chassis mount with EMI filter (see TEP 200WIR)
 - DIN-rail mount



picture: with optional mounted heat-sink
standard PCB version see picture of TEP 75WI



www.tracopower.com/overview/tep160wir

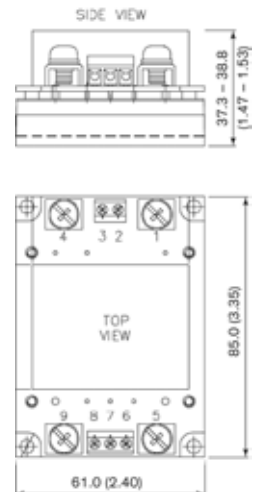
TEP 200WIR Series

200 Watt in chassis mount package

- Wide 4:1 input voltage ranges:
8.5-36, 18-75, 43-160 VDC
- Output voltages:
3.3, 5, 12, 15, 24, 28, 48 VDC adjust. +10%/-20%
- Input filter to meet EN 55032 class A
- Under-voltage lock-out circuit
- Over-temperature protection (auto restart)
- Very high efficiency up to 91%
- Options:
 - PCB mount (see TEP 75WIR)
 - PCB mount with heat-sink (see TEP 160WIR)
 - Chassis mount without EMI filter (see TEP 100WIR)
 - DIN-rail mount



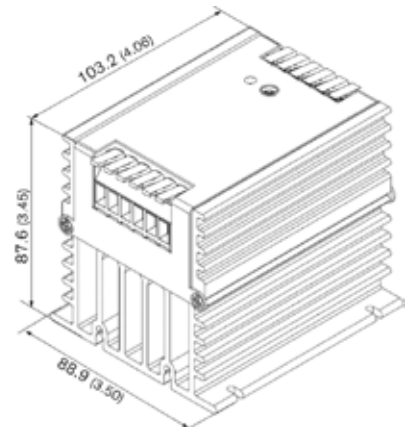
www.tracopower.com/overview/tep200wir



TEQ Series

100 - 200 Watt in chassis mount package

- Wide 4:1 input voltage ranges:
9-36, 18-75, 43-160 VDC
- Output voltages:
12, 24, 28, 48 VDC adjust. +10%/-20%
- Excellent thermal convection
- Input filter to meet EN 55032 class A
- Under-voltage lock-out circuit
- Soft start
- Over-temperature protection (auto restart)
- Very high efficiency up to 90%



www.tracopower.com/overview/teq

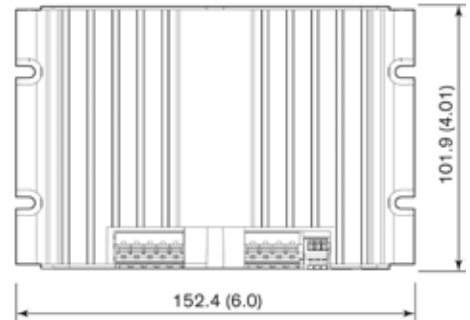
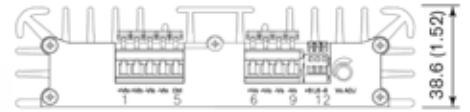
TEQ 300WIR Series

- Wide 4:1 input voltage ranges:
18-75, 43-160 VDC
- Output voltages:
12, 24, 28, 48 VDC adjust. +20%
- Constant voltage up to 100% load then
constant current mode up to 400 Watt
(suitable for battery load applications)
- Under-voltage lock-out circuit
- Sens lines
- Load share input for parallel operation
- Very high efficiency up to 91%
- Input filter to meet EN 55032 class A



www.tracopower.com/overview/teq300wir

300 Watt in chassis mount package



TRACO POWER – dedicated to design and production of high quality, state-of-the-art DC/DC & AC/DC power conversion products. Our mission is to provide optimal power supply solutions for specific applications with regard to performance, quality, cost and functionality.

TRACO POWER stocks an average of USD 15+ million in available finished goods inventory for immediate shipment through our distribution partners.

TRACO POWER offers extended product life-cycles, typically 10+ years, and our products are supported by a 3 or 5 year product warranty.

We understand our customers require a high quality solution as well as a diverse product offering, availability from stock, extended life-cycles and a strong commitment to quality in the form of extended warranty to support their business.

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