

# Product Portfolio 2017

## Railway / Ruggedized DC/DC Converters



## 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.

EN50155 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
24VDC	16.8-30.0V	14.4V	33.6V	Satisfied by 9~36 VDC input range products
37.5VDC	26.2-47.0V	22.5V	52.5V	Satisfied by 18~75 VDC input range products
48VDC	33.6-60.0V	28.8V	67.2V	Satisfied by 18~75 VDC input range products
72VDC	50.4-90.0V	43.2V	100.8V	Satisfied by 43~160 VDC input range products
96VDC	67.2-120.0V	57.6V	134.4V	Satisfied by 43~160 VDC input range products
110VDC	77.0-137.5V	66.0V	154.0V	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. The convection and conduction cooled package design of Traco Power railway DC/DC converters enable operation in extreme environments that can swing quickly from low to high temperatures ranging at least -40 to +85°C ambient. Additional qualification for the fire behaviour of components according to EN 45545-2 to ensure all our products are safe and of the highest quality for operation in extreme environments.

**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,  
 $\pm 5$ ,  $\pm 12$ ,  $\pm 15$  VDC

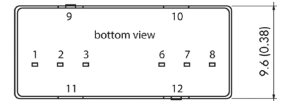


[www.tracopower.com/overview/tmr3wir](http://www.tracopower.com/overview/tmr3wir)

**3 Watt in SIP-8 metal package**

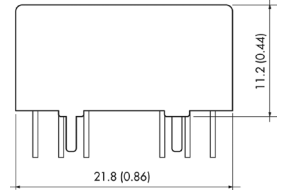
single output

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

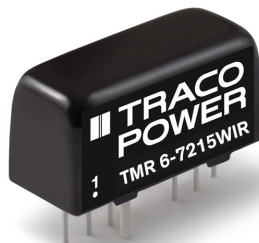


dual output

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

**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,  
 $\pm 5$ ,  $\pm 12$ ,  $\pm 15$  VDC

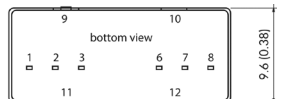


[www.tracopower.com/overview/tmr6wir](http://www.tracopower.com/overview/tmr6wir)

**6 Watt in SIP-8 metal package**

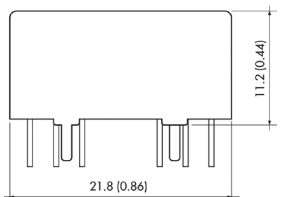
Single output

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

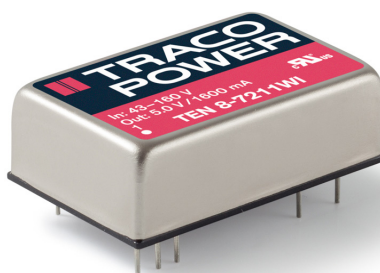


Dual output

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

**TEN 8WI Series**

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

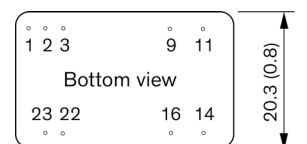


[www.tracopower.com/overview/ten8wi](http://www.tracopower.com/overview/ten8wi)

**8 Watt in DIP-24 package**

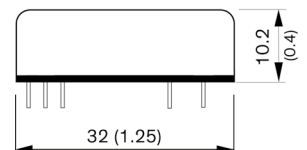
Single output

- 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 15WIR Series

**NEW**

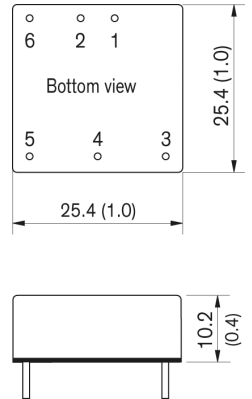
### 15 Watt in 1" x 1" package

- Wide 4:1 input voltage ranges:  
9-36, 18-75, 40-160 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 EN55022 class A
- Very high efficiency up to 91%



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/thn15wir](http://www.tracopower.com/overview/thn15wir)

## TEN 20WIR Series

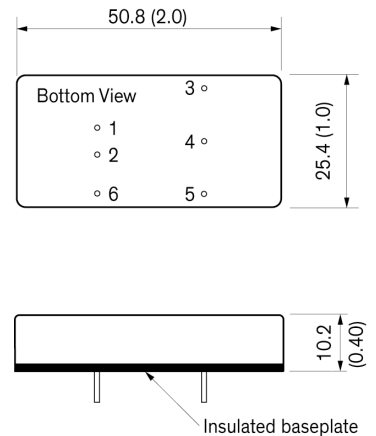
### 20 Watt in 2" x 1" package

- Wide 4:1 input voltage ranges:  
9-36, 18-75, 43-160 VDC
- Output voltages:  
3.3, 5.0, 12, 15 adjust.  $\pm 10\%$   
 $\pm 12, \pm 15$  VDC
- Six side shielded metal casing
- Input filter to meet EN55022 class B for 9-36, 18-75 VDC input  
class A for 40-160 VDC input
- 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



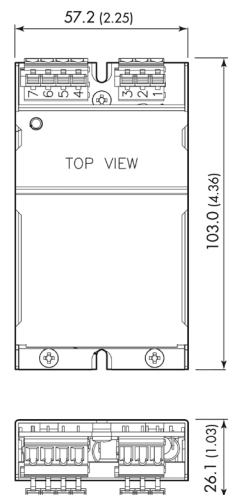
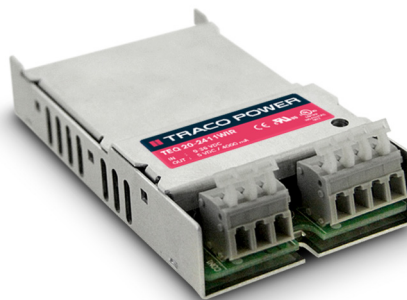
[www.tracopower.com/overview/ten20wir](http://www.tracopower.com/overview/ten20wir)

## TEQ 20WIR Series

**NEW**

### 20 Watt in chassis mount package

- Wide 4:1 input voltage ranges:  
9-36, 18-75, 43-160 VDC
- Output voltages:  
3.3, 5.0, 12, 15, 24 adjust.  $\pm 10\%$   
 $\pm 12, \pm 15$  VDC
- Input filter to meet EN55022 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](http://www.tracopower.com/overview/teq20wir)

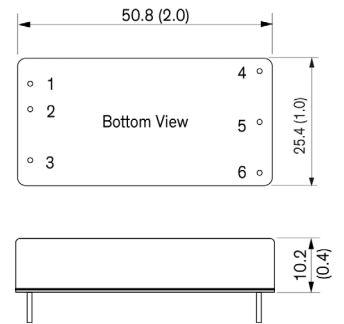
## TEN 40WIR Series

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



## 40 Watt in 2" x 1" package

- 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

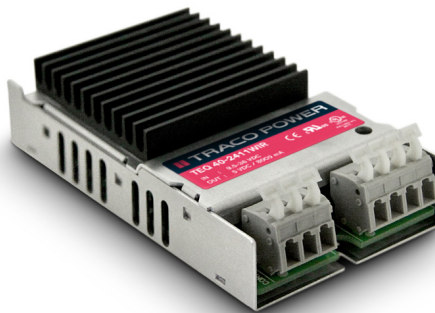


[www.tracopower.com/overview/ten40wir](http://www.tracopower.com/overview/ten40wir)

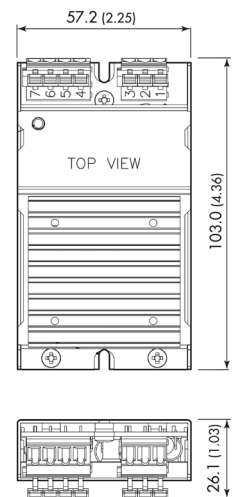
## TEQ 40WIR Series

**NEW**

- Wide 4:1 input voltage ranges: 9-36, 18-75, 43-160 VDC
- Output voltages: 5.0, 12, 15, 24 adjust.  $\pm 10\%$
- Input filter to meet EN55022 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



## 40 Watt in chassis mount package

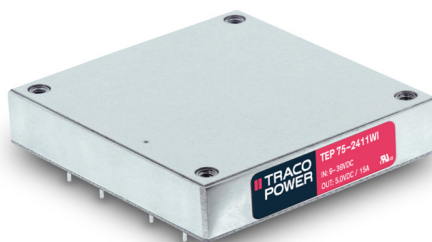


[www.tracopower.com/overview/teq40wir](http://www.tracopower.com/overview/teq40wir)

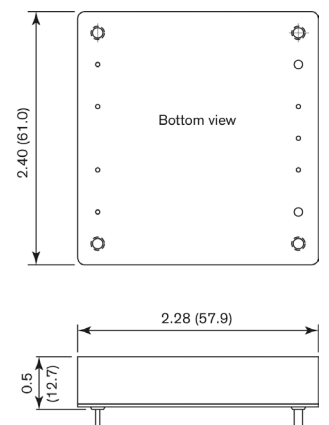
## TEP 75WI Series

## 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: 5.0, 12, 15, 24, 48 VDC adjust. +10%/-20%
- Input filter to meet EN55022 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

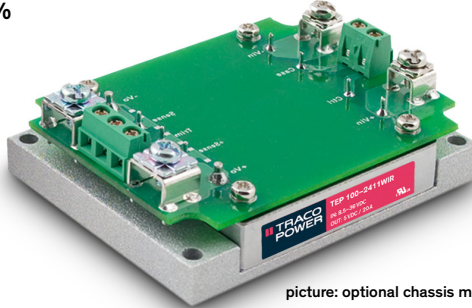


[www.tracopower.com/overview/teq75wi](http://www.tracopower.com/overview/teq75wi)

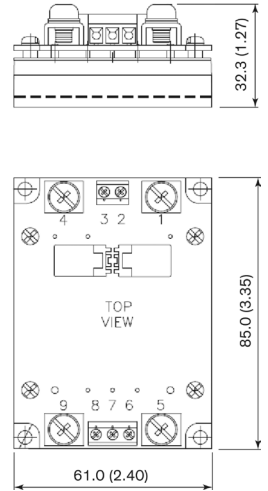
## TEP 100WIR

## 100 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:  
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](http://www.tracopower.com/overview/tep100wir)

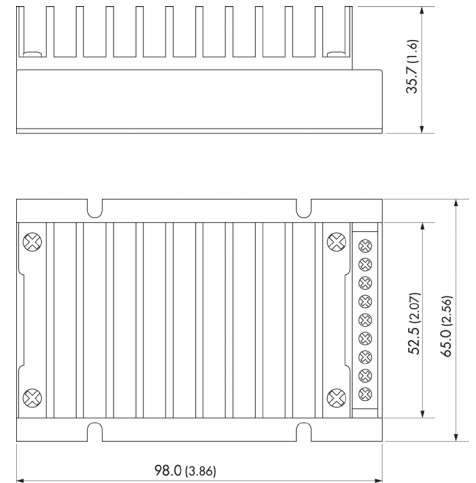
## TEP 150WI Series

## 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 EN55022 class B



[www.tracopower.com/overview/tep150wi](http://www.tracopower.com/overview/tep150wi)



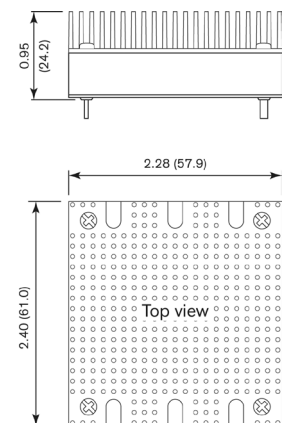
## TEP 160WIR

## 160 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:  
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

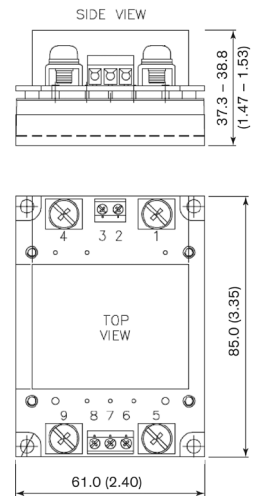


[www.tracopower.com/overview/tep160wir](http://www.tracopower.com/overview/tep160wir)

## TEP 200WIR Series

## 200 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. +10%/-20%
- Input filter to meet EN55022 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

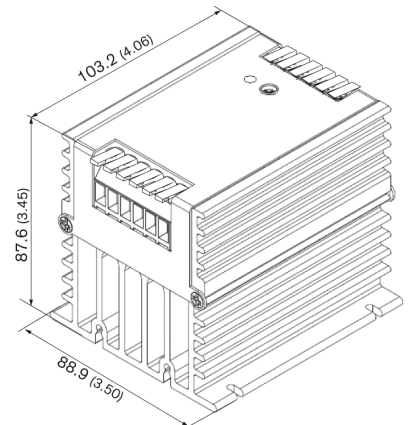


[www.tracopower.com/overview/tep200wir](http://www.tracopower.com/overview/tep200wir)

## 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 EN55022 class A
- Under-voltage lock-out circuit
- Soft start
- Over-temperature protection (auto restart)
- Very high efficiency up to 90%



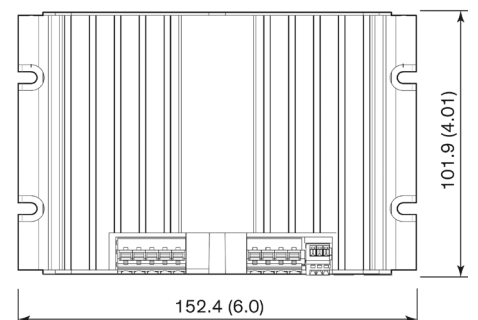
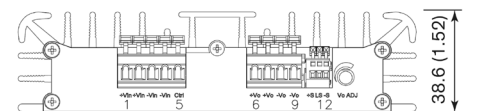
[www.tracopower.com/overview/teq](http://www.tracopower.com/overview/teq)

## TEQ 300WIR Series

NEW

## 300 Watt in chassis mount package

- Wide 4:1 input voltage ranges:  
18-75, 43-160 VDC
- Output voltages:  
12, 15, 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 EN55022 class A



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

**TRACO POWER – dedicated to design and production of high quality, state-of-the-art AC/DC & DC/DC power conversion products for Industrial, Medical & Railway applications. 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 13+ 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.**

**International Office**

Traco Electronic AG  
Sihlbruggstrasse 111  
6340 Baar  
Switzerland

P +41 43 311 45 11  
F +41 43 311 45 45  
info@traco.ch

**German Office**

Traco Electronic GmbH  
Oskar-Messter-Str. 20a  
85737 Ismaning/München  
Germany

P +49 89 96 11 82-0  
F +49 89 96 11 82-20  
info@traco-electronic.de

**North America Office**

Traco Power North America, Inc.  
2025 Gateway Place #330  
San Jose, CA 95110  
USA

P +1 (408) 916-4570  
F +1 (408) 916-4571  
salesusa@tracopower.com

**Design & Development**

Traco Power Solutions Ltd.  
Whitemill Industrial Estate  
Whitemill Road, Wexford  
Y35 YH66, Ireland

P +353 53 9167 700  
F +353 53 9167 701  
info@tracopower-solutions.com