



2021 | **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 40 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.

Note: All dimension drawings in mm (inch)



DC/DC converters 3-300 Watt 4:1 | 12:1

Features

- EN50155 Railway Approvals
- Extended Temperature range: -40 °C to +85 °C
- Ruggedized designs, EN61373 compliant for shock & vibration
- Ultra wide input voltage range: 9 - 36, 18 - 75, 43 - 160, 14 - 160 VDC
- Suitable for Applications in Harsh environment

- RIA 12 Surge Filters
- 3-year warranty

Standards and Directives

- IIEC/EN/UL 62368-1
- EN 45545-2
- RIA 12, NF F 01-510

Railway DC/DC Converters

SIP



3 - 6 W

DIP



8 - 200 W

Chassis assembly



20 - 300 W

Surge Filter

DIP, 1.6 x 1



1 - 300 W

3 100 200 300
PERFORMANCE IN WATTS



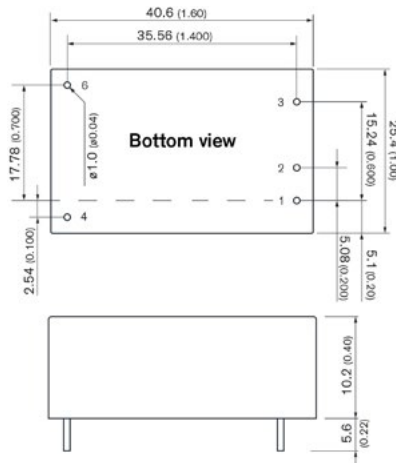
Railway DC/DC Converters

| | | | | |
|------------|--|------------------------------|------------|----|
| TFI | 1.6" x 1.0 or DIP-24 package, RIA 12 surge filter, encapsulated | NEW | 0–300 Watt | 5 |
| TMR 3WIR | SIP-8 package, 4:1 input, encapsulated, 3000 VDC I/O-isolation | | 3 Watt | 5 |
| TEN 3WIRH | DIP-24 package, 4:1 input, regulated, 3000 VAC isolation (reinforced), railway | NEW under development | 3 Watt | 6 |
| TMR 6WIR | SIP-8 package, 4:1 input, encapsulated, 3000 VDC I/O-isolation | | 6 Watt | 6 |
| TEN 6WIRH | DIP-24 package, 4:1 input, regulated, 3000 VAC isolation (reinforced), railway | NEW under development | 6 Watt | 7 |
| TEN 8WI | DIP-24 package, 4:1 input, encapsulated, 1500 VDC I/O-isolation | | 8 Watt | 7 |
| THN 10WIR | 1" x 1" package, 4:1 input, encapsulated, 3000 VDC I/O-isolation | | 10 Watt | 8 |
| TEN 10WIRH | DIP-24 package, 4:1 input, regulated, 3000 VAC isolation (reinforced), railway | NEW under development | 10 Watt | 8 |
| THN 15WIR | 1" x 1" package, 4:1 input, encapsulated, 3000 VDC I/O-isolation | | 15 Watt | 9 |
| THN 20WIR | 1" x 1" package, 4:1 input, encapsulated, 3000 VDC I/O-isolation | NEW | 20 Watt | 9 |
| TEN 20WIR | 2" x 1" package, 4:1 input, encapsulated, 2250 VDC I/O-isolation | | 20 Watt | 10 |
| TEN 20WIRH | 1.6" x 1" package, 4:1 input, regulated, 3000 VAC isolation (reinforced), railway | NEW under development | 20 Watt | 10 |
| TEQ 20WIR | 4.1" x 2.3" package, 4:1 input, encased, chassis mount, 2250 VDC I/O-isolation | | 20 Watt | 11 |
| THN 30WIR | 1" x 1" package, 4:1 input, encapsulated, 3000 VDC I/O-isolation | NEW under development | 30 Watt | 11 |
| TEN 40WIR | 2" x 1" package, 4:1 input, encapsulated, 2250 VDC I/O-isolation | | 40 Watt | 12 |
| TEN 40WIRH | 2" x 1" package, 4:1 input, regulated, 3000 VAC isolation (reinforced), railway | NEW under development | 40 Watt | 12 |
| TEP 40UIR | 2.3" x 1.45" package (1/4 brick), 12:1 input, encapsulated, 3000 VDC I/O-isolation | NEW | 40 Watt | 13 |
| TEQ 40WIR | 4.1" x 2.3" package, 4:1 input, encased, chassis mount, 2250 VDC I/O-isolation | | 40 Watt | 13 |
| TEN 60WIR | 2" x 1" package, 4:1 input, encapsulated, 3000 VDC I/O-isolation | NEW | 60 Watt | 14 |
| TEP 60UIR | 2.3" x 1.45" package (1/4 brick), 12:1 input, encapsulated, 3000 VDC I/O-isolation | NEW | 60 Watt | 14 |
| TEP 75WI | 2.4" x 2.3" package (1/2 brick), 4:1 input, encapsulated, 3000 VDC I/O-isolation | | 75 Watt | 15 |
| TEP 100UIR | 2.3" x 1.45" package (1/4 brick), 12:1 input, encapsulated, 3000 VDC I/O-isolation | NEW under development | 100 Watt | 15 |
| TEP 100WIR | 2.4" x 2.3" package (1/2 brick), 4:1 input, encapsulated, 3000 VDC I/O-isolation | | 100 Watt | 16 |
| TEQ 100WIR | 4" x 3" x 3.5 package, 4:1 input, ruggedized, chassis mount 3000 VDC I/O-isolation | | 100 Watt | 16 |
| TEP 150WI | 3.9" x 2.1" package, 4:1 input, ruggedized, chassis mount, CC function, 3000 VDC I/O-isolation | | 150 Watt | 17 |
| TEP 150UIR | 1/2-Brick package, 10:1 input, 3000 VAC isolation, railway, PCB mount | NEW under development | 150 Watt | 17 |
| TEP 160WIR | 2.4" x 2.3" package (1/2 brick), 4:1 input, encapsulated, 3000 VDC I/O-isolation | | 160 Watt | 18 |
| TEQ 160WIR | 4" x 3" x 3.5 package, 4:1 input, ruggedized, chassis mount 3000 VDC I/O-isolation | | 160 Watt | 18 |
| TEP 200WIR | 2.4" x 2.3" package (1/2 brick), 4:1 input, encapsulated, 3000 VDC I/O-isolation | | 200 Watt | 19 |
| TEP 200UIR | 1/2-Brick package, 10:1 input, 3000 VAC isolation, railway, PCB mount | NEW under development | 200 Watt | 19 |
| TEQ 200WIR | 4" x 3" x 3.5 package, 4:1 input, ruggedized, chassis mount 3000 VDC I/O-isolation | | 200 Watt | 20 |
| TEQ 300WIR | 6" x 4" x 1.5 package, 4:1 input, ruggedized, chassis mount, CC function, 3000 VDC I/O-isolation | | 300 Watt | 20 |

TFI

NEW!

0–300 Watt



| Model | Input voltage | Power max. |
|---------|---------------|------------|
| TFI 20 | 43–160 VDC | 20 W |
| TFI 150 | 43–160 VDC | 150 W |
| TFI 300 | 43–160 VDC | 300 W |

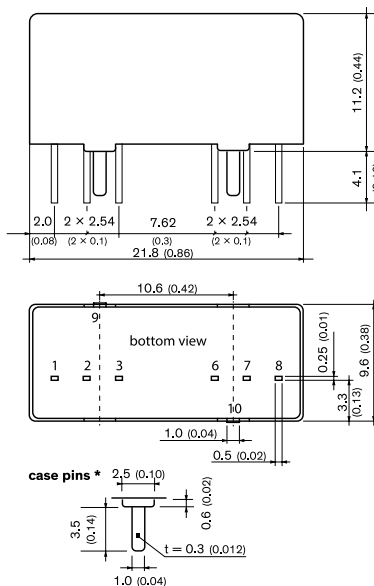
- Clamps over voltage transients (up to 385 VDC) at 168 VDC
- Universal use: Can be used with any DC/DC converter
- Complies with RIA12, NF F 01-510 Surge susceptibilities
- Wide input voltage range: 43–160 VDC
- Brownout voltage 36 VDC min.
- Operating temperature range –40 to +95°C
- 3-year product warranty

| Pinout | |
|--------|----------|
| Pin | Function |
| 1 | +Vin |
| 2 | NC |
| 3 | – Vin |
| 4 | +Vout |
| 6 | – Vout |

Note:
Dimension drawing and pinout is only for TFI 150 and TFI 300.
TFI 20 comes in a DIP-24 package

TMR 3WIR

3 Watt

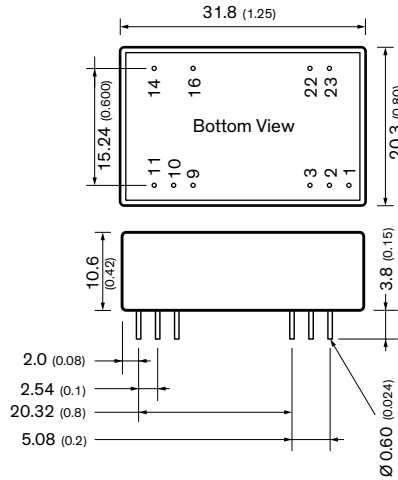


- Compact SIP-8 metal case
- EN 50155 railway approval
- Ultra wide 4:1 Input: 9–36, 18–75 and 43–160 VDC
- I/O-isolation 3'000 VDC
- Fully regulated outputs
- Operating temperature range –40°C to +90°C
- Short circuit protection and current limitation
- Remote On/Off
- 3-year product warranty

| Pinout | | |
|--------|---------------|-------------|
| Pin | Single Output | Dual Output |
| 1 | –Vin (GND) | –Vin (GND) |
| 2 | +Vin (Vcc) | +Vin (Vcc) |
| 3 | Remote | Remote |
| 6 | +Vout | +Vout |
| 7 | –Vout | Common |
| 8 | NC | –Vout |
| 9, 10 | Case | Case |

| Model | Input Voltage Range | Output | | Efficiency |
|---------------|--------------------------------|---------|------------------|------------|
| | | Vnom | I _{max} | |
| TMR 3-2410WIR | 9 – 36 VDC (24 VDC nom.) | 3.3 VDC | 700 mA | 76% |
| TMR 3-2411WIR | | 5 VDC | 600 mA | 81% |
| TMR 3-2419WIR | | 9VDC | 333 mA | 81% |
| TMR 3-2412WIR | | 12 VDC | 250 mA | 83% |
| TMR 3-2413WIR | | 15 VDC | 200 mA | 83% |
| TMR 3-2415WIR | | 24 VDC | 125 mA | 82% |
| TMR 3-2421WIR | | ±5 VDC | 300 mA | 80% |
| TMR 3-2422WIR | | ±12 VDC | 125 mA | 82% |
| TMR 3-2423WIR | ±15 VDC | 100 mA | 82% | |
| TMR 3-4810WIR | 18 – 75 VDC (48 VDC nom.) | 3.3 VDC | 700 mA | 75% |
| TMR 3-4811WIR | | 5 VDC | 600 mA | 81% |
| TMR 3-4819WIR | | 9VDC | 333 mA | 81% |
| TMR 3-4812WIR | | 12 VDC | 250 mA | 82% |
| TMR 3-4813WIR | | 15 VDC | 200 mA | 82% |
| TMR 3-4815WIR | | 24 VDC | 125 mA | 82% |
| TMR 3-4821WIR | | ±5 VDC | 300 mA | 80% |
| TMR 3-4822WIR | | ±12 VDC | 125 mA | 82% |
| TMR 3-4823WIR | ±15 VDC | 100 mA | 82% | |
| TMR 3-7210WIR | 43 – 160 VDC (110 VDC nom.) | 3.3 VDC | 700 mA | 76% |
| TMR 3-7211WIR | | 5 VDC | 600 mA | 80% |
| TMR 3-7219WIR | | 9VDC | 333 mA | 81% |
| TMR 3-7212WIR | | 12 VDC | 250 mA | 82% |
| TMR 3-7213WIR | | 15 VDC | 200 mA | 83% |
| TMR 3-7215WIR | | 24 VDC | 125 mA | 83% |
| TMR 3-7221WIR | | ±5 VDC | 300 mA | 80% |
| TMR 3-7222WIR | | ±12 VDC | 125 mA | 83% |
| TMR 3-7223WIR | ±15 VDC | 100 mA | 81% | |

TEN 3WIRH **NEW – under development** 3 Watt

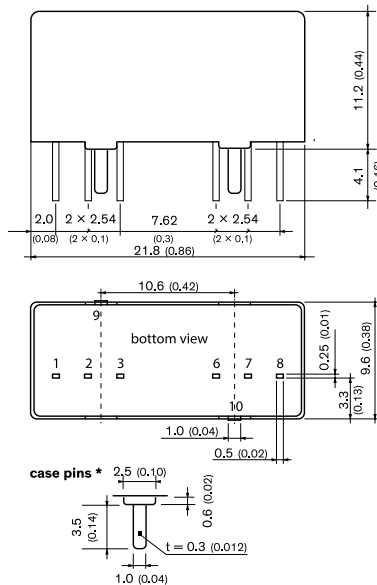


- Industrial standard DIP-24 package
- 3000 VAC reinforced I/O-isolation
- Wide 4:1 input voltage range: 36 – 160 VDC
- EN 50155 approval for railway applications
- Thermal shock and vibration resistant according EN 61373
- High efficiency up to 85%
- Operating temperature range -40°C to +85°C
- Under voltage lock-out circuit
- Remote On/Off and Trim function
- 3-year product warranty

| Pinout | | |
|--------|---------------|---------------|
| Pin | Single | Dual |
| 1 | Ctrl | Ctrl |
| 2 | -Vin | -Vin |
| 3 | -Vin | -Vin |
| 9 | NC | Common |
| 10 | Trim (option) | Trim (option) |
| 11 | NC | -Vout |
| 14 | +Vout | +Vout |
| 16 | -Vout | Common |
| 22 | +Vin | +Vin |
| 23 | +Vin | +Vin |

| Model | Input Voltage Range | Output | | Efficiency |
|-----------------|---------------------|---------|------------------|------------|
| | | Vnom | I _{max} | |
| TEN 3-11010WIRH | 36 – 160 VDC | 3.3 VDC | 1000 mA | 80% |
| TEN 3-11011WIRH | | 5 VDC | 600 mA | 81% |
| TEN 3-11012WIRH | | 12 VDC | 250 mA | 85% |
| TEN 3-11013WIRH | | 15 VDC | 200 mA | 85% |
| TEN 3-11015WIRH | | 24 VDC | 125 mA | 85% |
| TEN 3-11021WIRH | | ±5 VDC | ±300 mA | 80% |
| TEN 3-11022WIRH | | ±12 VDC | ±125 mA | 85% |
| TEN 3-11023WIRH | | ±15 VDC | ±100 mA | 85% |

TMR 6WIR 6 Watt

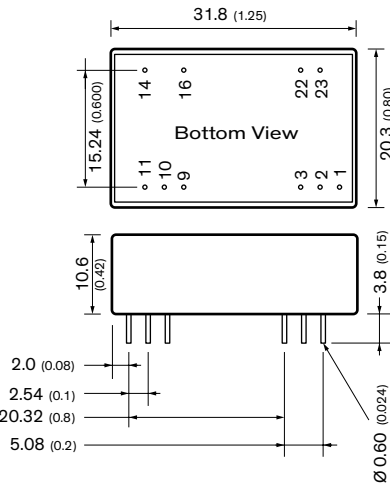


- Compact SIP-8 metal case
- EN 50155 railway approval
- Ultra wide 4:1 Input: 9–36, 18–75 and 43–160 VDC
- I/O-isolation 3'000 VDC
- Fully regulated outputs
- Operating temperature range -40°C to +80°C
- Short circuit protection and current limitation
- Remote On/Off
- 3-year product warranty

| Pinout | | |
|--------|---------------|-------------|
| Pin | Single Output | Dual Output |
| 1 | -Vin (GND) | -Vin (GND) |
| 2 | +Vin (Vcc) | +Vin (Vcc) |
| 3 | Remote | Remote |
| 6 | +Vout | +Vout |
| 7 | -Vout | Common |
| 8 | NC | -Vout |
| 9, 10 | Case | Case |

| Model | Input Voltage Range | Output | | Efficiency |
|---------------|-----------------------------|---------------------------|------------------|------------|
| | | Vnom | I _{max} | |
| TMR 6-2410WIR | 9 – 36 VDC (24 VDC nom.) | 3.3 VDC | 1500 mA | 81% |
| TMR 6-2411WIR | | 5 VDC | 1200 mA | 84% |
| TMR 6-2419WIR | | 9VDC | 666 mA | 86% |
| TMR 6-2412WIR | | 12 VDC | 500 mA | 87% |
| TMR 6-2413WIR | | 15 VDC | 400 mA | 88% |
| TMR 6-2415WIR | | 24 VDC | 250 mA | 87% |
| TMR 6-2421WIR | | ±5 VDC | 600 mA | 84% |
| TMR 6-2422WIR | | ±12 VDC | 250 mA | 87% |
| TMR 6-2423WIR | | ±15 VDC | 200 mA | 87% |
| TMR 6-4810WIR | | 18 – 75 VDC (48 VDC nom.) | 3.3 VDC | 1500 mA |
| TMR 6-4811WIR | 5 VDC | | 1200 mA | 84% |
| TMR 6-4819WIR | 9VDC | | 666 mA | 85% |
| TMR 6-4812WIR | 12 VDC | | 500 mA | 87% |
| TMR 6-4813WIR | 15 VDC | | 400 mA | 87% |
| TMR 6-4815WIR | 24 VDC | | 250 mA | 87% |
| TMR 6-4821WIR | ±5 VDC | | 600 mA | 84% |
| TMR 6-4822WIR | ±12 VDC | | 250 mA | 87% |
| TMR 6-4823WIR | ±15 VDC | | 200 mA | 87% |
| TMR 6-7210WIR | 43 – 160 VDC (110 VDC nom.) | | 3.3 VDC | 1500 mA |
| TMR 6-7211WIR | | 5 VDC | 1200 mA | 83% |
| TMR 6-7219WIR | | 9VDC | 666 mA | 85% |
| TMR 6-7212WIR | | 12 VDC | 500 mA | 86% |
| TMR 6-7213WIR | | 15 VDC | 400 mA | 86% |
| TMR 6-7215WIR | | 24 VDC | 250 mA | 86% |
| TMR 6-7221WIR | | ±5 VDC | 600 mA | 83% |
| TMR 6-7222WIR | | ±12 VDC | 250 mA | 86% |
| TMR 6-7223WIR | | ±15 VDC | 200 mA | 86% |

TEN 6WIRH **NEW – under development** **8 Watt**

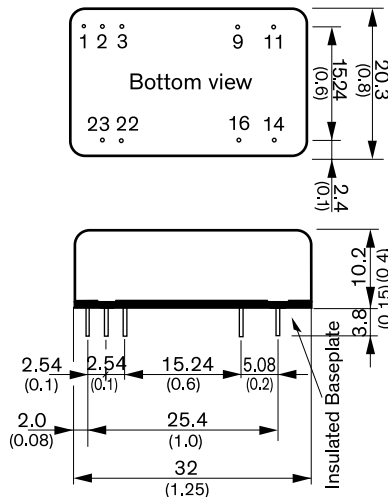


- Industrial standard DIP-24 package
- 3000 VAC reinforced I/O-isolation
- Wide 4:1 input voltage range: 36 – 160 VDC
- EN 50155 approval for railway applications
- Thermal shock and vibration resistant according EN 61373
- High efficiency up to 86%
- Operating temperature range -40°C to +85°C
- Under voltage lock-out circuit
- Remote On/Off and Trim function
- 3-year product warranty

| Pinout | | |
|--------|---------------|---------------|
| Pin | Single | Dual |
| 1 | Ctrl | Ctrl |
| 2 | -Vin | -Vin |
| 3 | -Vin | -Vin |
| 9 | NC | Common |
| 10 | Trim (option) | Trim (option) |
| 11 | NC | -Vout |
| 14 | + Vout | + Vout |
| 16 | -Vout | Common |
| 22 | + Vin | + Vin |
| 23 | + Vin | + Vin |

| Model | Input Voltage Range | Output Vnom | I _{max} | Efficiency |
|-----------------|---------------------|-------------|------------------|------------|
| TEN 6-11010WIRH | 36 – 160 VDC | 3.3 VDC | 1800 mA | 83% |
| TEN 6-11011WIRH | | 5 VDC | 1200 mA | 84% |
| TEN 6-11012WIRH | | 12 VDC | 500 mA | 85% |
| TEN 6-11013WIRH | | 15 VDC | 400 mA | 85% |
| TEN 6-11015WIRH | | 24 VDC | 250 mA | 86% |
| TEN 6-11021WIRH | | ±5 VDC | ±600 mA | 82% |
| TEN 6-11022WIRH | | ±12 VDC | ±250 mA | 85% |
| TEN 6-11023WIRH | | ±15 VDC | ±200 mA | 85% |

TEN 8WI **8 Watt**



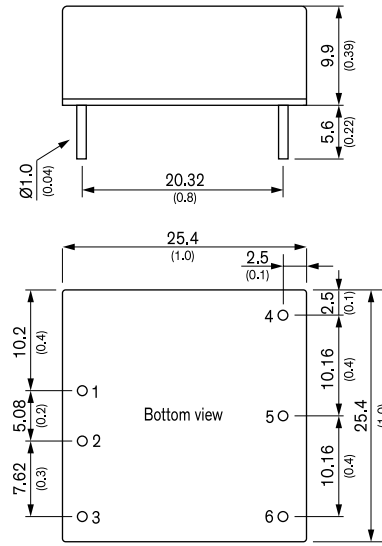
- DIP-24 metal package
- Ultra wide 4:1 input voltage range 9–36, 18–75, 43–160 VDC
- EN 50155 approval for railway applications
- Thermal shock and vibration resistant according EN 61373
- High efficiency up to 88%
- No minimum load required
- Operating temperature range -40°C to +85°C
- Remote On/Off
- Under voltage lock-out circuit
- Shielded metal case with insulated base plate
- Lead free design, RoHS compliant
- 3-year product warranty

| Pinout | | |
|--------|---------------|---------------|
| Pin | Single | Dual |
| 1 | Remote On/Off | Remote On/Off |
| 2 | -Vin (GND) | -Vin (GND) |
| 3 | -Vin (GND) | -Vin (GND) |
| 9 | ntc | Common |
| 11 | ntc | -Vout |
| 14 | +Vout | +Vout |
| 16 | -Vout | Common |
| 22 | +Vin (Vcc) | +Vin (Vcc) |
| 23 | +Vin (Vcc) | +Vin (Vcc) |

| Model | Input Voltage Range | Output Vnom | I _{max} | Efficiency |
|--------------|--------------------------------|-------------|------------------|------------|
| TEN 8-2410WI | 9 – 36 VDC (24 VDC nom.) | 3.3 VDC | 2400 mA | 85% |
| TEN 8-2411WI | | 5 VDC | 1600 mA | 87% |
| TEN 8-2412WI | | 12 VDC | 666 mA | 86% |
| TEN 8-2413WI | | 15 VDC | 533 mA | 86% |
| TEN 8-2421WI | | ±5 VDC | ±800 mA | 84% |
| TEN 8-2422WI | ±12 VDC | ±333 mA | 86% | |
| TEN 8-2423WI | ±15 VDC | ±267 mA | 86% | |
| TEN 8-4810WI | 18 – 75 VDC (48 VDC nom.) | 3.3 VDC | 2400 mA | 85% |
| TEN 8-4811WI | | 5 VDC | 1600 mA | 87% |
| TEN 8-4812WI | | 12 VDC | 666 mA | 87% |
| TEN 8-4813WI | | 15 VDC | 533 mA | 88% |
| TEN 8-4821WI | | ±5 VDC | ±800 mA | 84% |
| TEN 8-4822WI | ±12 VDC | ±333 mA | 87% | |
| TEN 8-4823WI | ±15 VDC | ±267 mA | 87% | |
| TEN 8-7210WI | 43 – 160 VDC (110 VDC nom.) | 3.3 VDC | 2400 mA | 84% |
| TEN 8-7211WI | | 5 VDC | 1600 mA | 85% |
| TEN 8-7212WI | | 12 VDC | 666 mA | 86% |
| TEN 8-7213WI | | 15 VDC | 533 mA | 86% |
| TEN 8-7221WI | | ±5 VDC | ±800 mA | 82% |
| TEN 8-7222WI | ±12 VDC | ±333 mA | 85% | |
| TEN 8-7223WI | ±15 VDC | ±267 mA | 85% | |

THN 10WIR

10 Watt



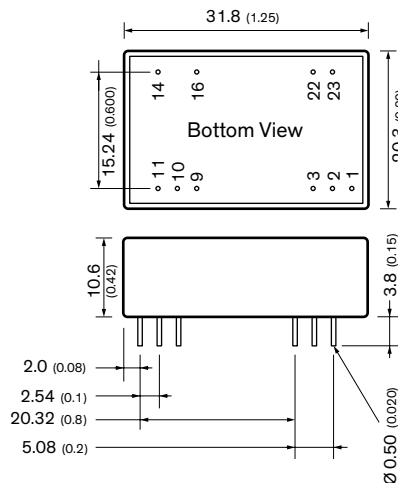
- Compact 1" x 1" x 0.4" standard package
- Ultra-wide 4:1 input voltage range 9–36, 18–75, 36–160 VDC
- EN 50155 and EN 61373 approval for railway applications
- Qualification for fire behaviour according to EN 45545-2
- I/O-isolation 3'000 VDC
- High efficiency up to 90%
- Operating temperature range –40°C to +90°C
- Under-voltage lock out circuit
- Adjustable output voltage & Remote On/Off

| Model | Input Voltage Range | Output Vnom | Imax | Efficiency |
|----------------|--------------------------------|-------------|----------|------------|
| THN 10-2410WIR | 9 – 36 VDC (24 VDC nom.) | 3.3 VDC | 3000 mA | 87% |
| THN 10-2411WIR | | 5 VDC | 2000 mA | 89% |
| THN 10-2412WIR | | 12 VDC | 830 mA | 89% |
| THN 10-2413WIR | | 15 VDC | 670 mA | 90% |
| THN 10-2415WIR | | 24 VDC | 420 mA | 90% |
| THN 10-2421WIR | | ±5 VDC | ±1000 mA | 86% |
| THN 10-2422WIR | | ±12 VDC | ±416 mA | 89% |
| THN 10-2423WIR | ±15 VDC | ±333 mA | 89% | |
| THN 10-2425WIR | ±24 VDC | ±210 mA | 90% | |
| THN 10-4810WIR | 18 – 75 VDC (48 VDC nom.) | 3.3 VDC | 3000 mA | 87% |
| THN 10-4811WIR | | 5 VDC | 2000 mA | 89% |
| THN 10-4812WIR | | 12 VDC | 830 mA | 89% |
| THN 10-4813WIR | | 15 VDC | 670 mA | 90% |
| THN 10-4815WIR | | 24 VDC | 420 mA | 90% |
| THN 10-4821WIR | | ±5 VDC | ±1000 mA | 86% |
| THN 10-4822WIR | | ±12 VDC | ±416 mA | 89% |
| THN 10-4823WIR | ±15 VDC | ±333 mA | 89% | |
| THN 10-4825WIR | ±24 VDC | ±210 mA | 90% | |
| THN 10-7210WIR | 36 – 160 VDC (110 VDC nom.) | 3.3 VDC | 3000 mA | 87% |
| THN 10-7211WIR | | 5 VDC | 2000 mA | 88% |
| THN 10-7212WIR | | 12 VDC | 830 mA | 89% |
| THN 10-7213WIR | | 15 VDC | 670 mA | 89% |
| THN 10-7215WIR | | 24 VDC | 420 mA | 89% |
| THN 10-7221WIR | | ±5 VDC | ±1000 mA | 85% |
| THN 10-7222WIR | | ±12 VDC | ±416 mA | 89% |
| THN 10-7223WIR | ±15 VDC | ±333 mA | 89% | |
| THN 10-7225WIR | ±24 VDC | ±210 mA | 89% | |

| Pinout / Conecction | | |
|---------------------|--------|--------|
| Pin | Single | Dual |
| 1 | +Vin | +Vin |
| 2 | -Vin | -Vin |
| 3 | Ctrl | Ctrl |
| 4 | +Vout | +Vout |
| 5 | Trim | Common |
| 6 | -Vout | -Vout |

TEN 10WIRH **NEW – under development**

10 Watt

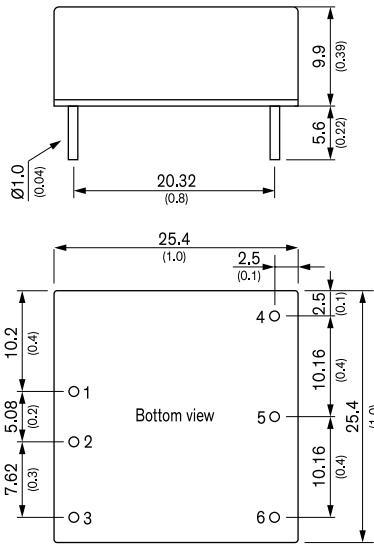


- Industrial standard DIP-24 package
- 3000 VAC reinforced I/O-isolation
- Wide 4:1 input voltage range: 36 – 160 VDC
- EN 50155 approval for railway applications
- Thermal shock and vibration resistant according EN 61373
- High efficiency up to 88%
- Operating temperature range –40°C to +85°C
- Under voltage lock-out circuit
- Remote On/Off and Trim function
- 3-year product warranty

| Model | Input Voltage Range | Output Vnom | Imax | Efficiency |
|------------------|---------------------|-------------|----------|------------|
| TEN 10-11010WIRH | 36 – 160 VDC | 3.3 VDC | 2500 mA | 85% |
| TEN 10-11011WIRH | | 5 VDC | 2000 mA | 86.5% |
| TEN 10-11012WIRH | | 12 VDC | 830 mA | 87.5% |
| TEN 10-11013WIRH | | 15 VDC | 670 mA | 88% |
| TEN 10-11015WIRH | | 24 VDC | 416 mA | 87.5% |
| TEN 10-11021WIRH | | ±5 VDC | ±1000 mA | 84% |
| TEN 10-11022WIRH | | ±12 VDC | ±416 mA | 87% |
| TEN 10-11023WIRH | ±15 VDC | ±333 mA | 87% | |

| Pinout | | |
|--------|---------------|---------------|
| Pin | Single | Dual |
| 1 | Ctrl | Ctrl |
| 2 | - Vin | - Vin |
| 3 | - Vin | - Vin |
| 9 | NC | Common |
| 10 | Trim (option) | Trim (option) |
| 11 | NC | - Vout |
| 14 | + Vout | + Vout |
| 16 | - Vout | Common |
| 22 | + Vin | + Vin |
| 23 | + Vin | + Vin |

THN 15WIR **15 Watt**

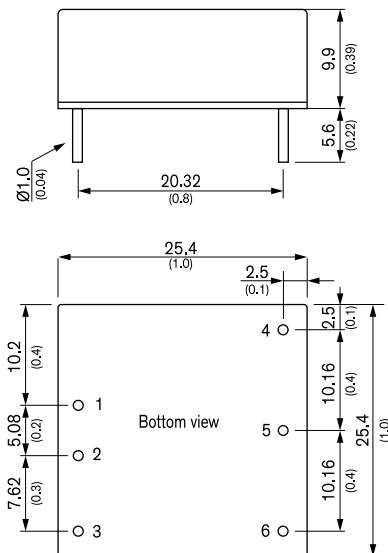


- Compact 1" x 1" x 0.4" standard package
- Ultra-wide 4:1 input voltage range 9–36, 18–75, 36–160 VDC
- EN 50155 and EN 61373 approval for railway applications
- Qualification for fire behaviour according to EN 45545-2
- I/O-isolation 3'000 VDC
- High efficiency up to 91%
- Operating temperature range -40°C to +90°C
- Under-voltage lock out circuit
- Adjustable output voltage & Remote On/Off

| Pinout / Conection | | |
|--------------------|--------|--------|
| Pin | Single | Dual |
| 1 | +Vin | +Vin |
| 2 | -Vin | -Vin |
| 3 | +Vout | +Vout |
| 4 | Trim | Common |
| 5 | -Vout | -Vout |
| 6 | On/Off | On/Off |

| Model | Input Voltage Range | Output Vnom | I _{max} | Efficiency |
|----------------|--------------------------------|------------------------------|------------------|------------|
| THN 15-2410WIR | 9 – 36 VDC (24 VDC nom.) | 3.3 VDC | 4500 mA | 88% |
| THN 15-2411WIR | | 5 VDC | 3000 mA | 89% |
| THN 15-2412WIR | | 12 VDC | 1300 mA | 89% |
| THN 15-2413WIR | | 15 VDC | 1000 mA | 89% |
| THN 15-2415WIR | | 24 VDC | 625 mA | 90% |
| THN 15-2421WIR | | ±5 VDC | ±1500 mA | 86% |
| THN 15-2422WIR | | ±12 VDC | ±625 mA | 89% |
| THN 15-2423WIR | | ±15 VDC | ±500 mA | 89% |
| THN 15-2425WIR | | ±24 VDC | ±315 mA | 91% |
| THN 15-4810WIR | | 18 – 75 VDC (48 VDC nom.) | 3.3 VDC | 4500 mA |
| THN 15-4811WIR | 5 VDC | | 3000 mA | 89% |
| THN 15-4812WIR | 12 VDC | | 1300 mA | 89% |
| THN 15-4813WIR | 15 VDC | | 1000 mA | 89% |
| THN 15-4815WIR | 24 VDC | | 625 mA | 91% |
| THN 15-4821WIR | ±5 VDC | | ±1500 mA | 86% |
| THN 15-4822WIR | ±12 VDC | | ±625 mA | 90% |
| THN 15-4823WIR | ±15 VDC | | ±500 mA | 89% |
| THN 15-4825WIR | ±24 VDC | | ±315 mA | 90% |
| THN 15-7210WIR | 36 – 160 VDC (110 VDC nom.) | | 3.3 VDC | 4500 mA |
| THN 15-7211WIR | | 5 VDC | 3000 mA | 89% |
| THN 15-7212WIR | | 12 VDC | 1300 mA | 89% |
| THN 15-7213WIR | | 15 VDC | 1000 mA | 89% |
| THN 15-7215WIR | | 24 VDC | 625 mA | 90% |
| THN 15-7221WIR | | ±5 VDC | ±1500 mA | 85% |
| THN 15-7222WIR | | ±12 VDC | ±625 mA | 89% |
| THN 15-7223WIR | | ±15 VDC | ±500 mA | 89% |
| THN 15-7225WIR | | ±24 VDC | ±315 mA | 90% |

THN 20WIR **NEW!** **20 Watt**



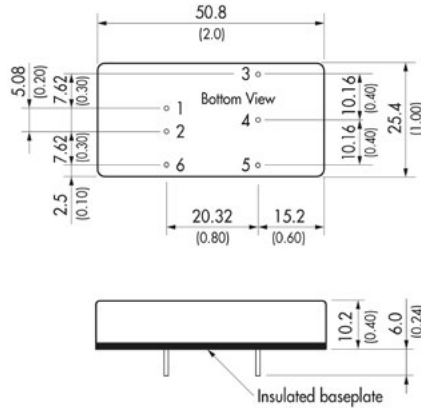
- Compact 1" x 1" x 0.4" standard package
- Ultra-wide 4:1 input voltage range 9–36, 18–75, 36–160 VDC
- EN 50155 and EN 61373 approval for railway applications
- Qualification for fire behaviour according to EN 45545-2
- I/O-isolation 3'000 VDC
- High efficiency up to 91%
- Operating temperature range -40°C to +90°C
- Under-voltage lock out circuit
- Adjustable output voltage & Remote On/Off

| Pinout / Conection | | |
|--------------------|--------|--------|
| Pin | Single | Dual |
| 1 | +Vin | +Vin |
| 2 | -Vin | -Vin |
| 3 | Ctrl | Ctrl |
| 4 | +Vout | +Vout |
| 5 | Trim | Common |
| 6 | -Vout | -Vout |

| Model | Input Voltage Range | Output Vnom | I _{max} | Efficiency | |
|----------------|--------------------------------|------------------------------|------------------|------------|-----|
| THN 20-2410WIR | 9 – 36 VDC (24 VDC nom.) | 3.3 VDC | 5500 mA | 88% | |
| THN 20-2411WIR | | 5 VDC | 4000 mA | 89% | |
| THN 20-2412WIR | | 12 VDC | 1670 mA | 89% | |
| THN 20-2413WIR | | 15 VDC | 1330 mA | 89% | |
| THN 20-2415WIR | | 24 VDC | 833 mA | 91% | |
| THN 20-2422WIR | | ±12 VDC | ±833 mA | 89% | |
| THN 20-2423WIR | | ±15 VDC | ±667 mA | 90% | |
| THN 20-2425WIR | | ±24 VDC | ±417 mA | 91% | |
| THN 20-4810WIR | | 18 – 75 VDC (48 VDC nom.) | 3.3 VDC | 5500 mA | 89% |
| THN 20-4811WIR | | | 5 VDC | 4000 mA | 90% |
| THN 20-4812WIR | 12 VDC | | 1670 mA | 89% | |
| THN 20-4813WIR | 15 VDC | | 1330 mA | 90% | |
| THN 20-4815WIR | 24 VDC | | 833 mA | 91% | |
| THN 20-4822WIR | ±12 VDC | | ±833 mA | 89% | |
| THN 20-4823WIR | ±15 VDC | | ±667 mA | 90% | |
| THN 20-4825WIR | ±24 VDC | | ±417 mA | 91% | |
| THN 20-7210WIR | 36 – 160 VDC (110 VDC nom.) | | 3.3 VDC | 5500 mA | 89% |
| THN 20-7211WIR | | | 5 VDC | 4000 mA | 90% |
| THN 20-7212WIR | | 12 VDC | 1670 mA | 90% | |
| THN 20-7213WIR | | 15 VDC | 1330 mA | 90% | |
| THN 20-7215WIR | | 24 VDC | 833 mA | 91% | |
| THN 20-7222WIR | | ±12 VDC | ±833 mA | 90% | |
| THN 20-7223WIR | | ±15 VDC | ±667 mA | 90% | |
| THN 20-7225WIR | | ±24 VDC | ±417 mA | 91% | |

TEN 20WIR

20 Watt



- 2" x 1" metal package
- Ultra wide 4:1 input voltage range 9–36, 18–75, 43–160 VDC
- EN 50155 approval for railway applications
- Thermal shock and vibration resistant according EN 61373
- Input filter meets EN 55032 class B without external components
- High efficiency up to 89%
- No minimum load required
- Operating temperature range –40°C to +85°C
- Under voltage lock-out circuit
- Remote On/Off
- Output voltage adjustable
- Lead free design, RoHS compliant
- 3-year product warranty

* For heat-sink option drawing see data sheet

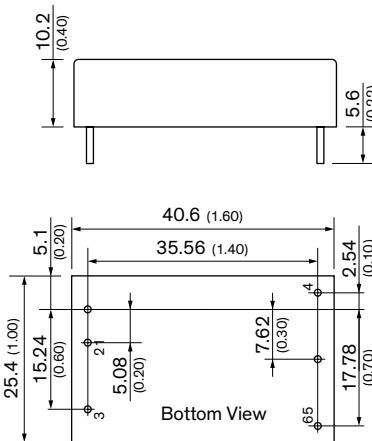
| Pinout / Conecction | | |
|---------------------|---------------|---------------|
| Pin | Single | Dual |
| 1 | +Vin (Vcc) | +Vin (Vcc) |
| 2 | –Vin (GND) | –Vin (GND) |
| 3 | +Vout | +Vout |
| 4 | Trim | Common |
| 5 | –Vout | –Vout |
| 6 | Remote On/Off | Remote On/Off |

| Model | Input Voltage Range | Output | | Efficiency |
|----------------|--------------------------------|---------|------------------|------------|
| | | Vnom | I _{max} | |
| TEN 20-2410WIR | 9 – 36 VDC (24 VDC nom.) | 3.3 VDC | 4500 mA | 85% |
| TEN 20-2411WIR | | 5 VDC | 4000 mA | 88% |
| TEN 20-2412WIR | | 12 VDC | 1670 mA | 89% |
| TEN 20-2413WIR | | 15 VDC | 1330 mA | 88% |
| TEN 20-2422WIR | | ±12 VDC | ±833 mA | 88% |
| TEN 20-2423WIR | ±15 VDC | ±667 mA | 99% | |
| TEN 20-4810WIR | 18 – 75 VDC (48 VDC nom.) | 3.3 VDC | 4500 mA | 85% |
| TEN 20-4811WIR | | 5 VDC | 4000 mA | 88% |
| TEN 20-4812WIR | | 12 VDC | 1670 mA | 89% |
| TEN 20-4813WIR | | 15 VDC | 1330 mA | 89% |
| TEN 20-4822WIR | | ±12 VDC | ±833 mA | 88% |
| TEN 20-4823WIR | ±15 VDC | ±667 mA | 89% | |
| TEN 20-7210WIR | 43 – 160 VDC (110 VDC nom.) | 3.3 VDC | 4500 mA | 85% |
| TEN 20-7211WIR | | 5 VDC | 4000 mA | 87% |
| TEN 20-7212WIR | | 12 VDC | 1670 mA | 88% |
| TEN 20-7213WIR | | 15 VDC | 1330 mA | 88% |
| TEN 20-7222WIR | | ±12 VDC | ±833 mA | 88% |
| TEN 20-7223WIR | ±15 VDC | ±667 mA | 89% | |

TEN 20WIRH

NEW – under development

20 Watt

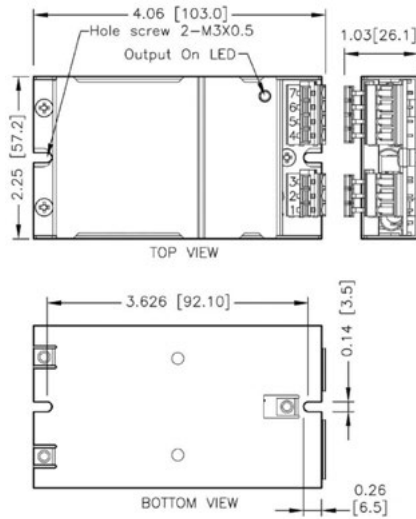


- Compact 1.6" x 1" plastic package
- 3000 VAC reinforced I/O-isolation
- Wide 4:1 input voltage range: 36 – 160 VDC
- EN 50155 approval for railway applications
- Thermal shock and vibration resistant according EN 61373
- High efficiency up to 89%
- Operating temperature range –40°C to +85°C
- Under voltage lock-out circuit
- Remote On/Off and Trim function
- 3-year product warranty

| Pinout / Conecction | | |
|---------------------|--------|-------|
| Pin | Single | Dual |
| 1 | +Vin | +Vin |
| 2 | –Vin | –Vin |
| 3 | Ctrl | Ctrl |
| 4 | +Vout | +Vout |
| 5 | –Vout | –Vout |
| 6 | Trim | –Vout |

| Model | Input Voltage Range | Output | | Efficiency |
|------------------|---------------------|---------|------------------|------------|
| | | Vnom | I _{max} | |
| TEN 20-11011WIRH | 36 – 160 VDC | 5.1 VDC | 4000 mA | 89% |
| TEN 20-11012WIRH | | 12 VDC | 1670 mA | 88.5% |
| TEN 20-11013WIRH | | 15 VDC | 1330 mA | 89% |
| TEN 20-11015WIRH | | 24 VDC | 833 mA | 88.5% |
| TEN 20-11021WIRH | | ±5 VDC | ±2000 mA | 86% |
| TEN 20-11022WIRH | | ±12 VDC | ±833 mA | 88.5% |
| TEN 20-11023WIRH | | ±15 VDC | ±667 mA | 89% |

TEQ 20WIR **20 Watt**

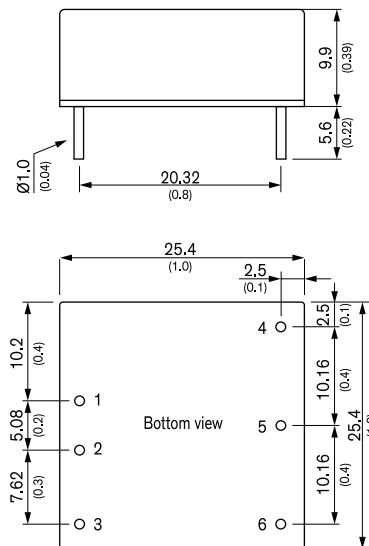


- High power block with excellent thermal convection
- Operating temperature -40°C to +93°
- Ultra wide 4:1 input voltage range
- EN 50155 approval for railway applications
- Excellent efficiency up to 88%
- Input filter meet EN 55032 class B
- I/O isolation up to 2250 VDC
- Under voltage lock-out circuit
- Protection against overvoltage, overtemperature and short circuit
- Output LED indicator

| Pinout | | |
|--------|------------|------------|
| Pin | Single | Dual |
| 1 | +Vin | +Vin |
| 2 | -Vin (GND) | -Vin (GND) |
| 3 | NC | NC |
| 4 | NC | -Vout |
| 5 | -Vout | Common |
| 6 | +Vout | Common |
| 7 | NC | +Vout |

| Model | Input Voltage Range | Output | | Efficiency |
|----------------|--------------------------------|---------|------------------|------------|
| | | Vnom | I _{max} | |
| TEQ 20-2411WIR | 9 – 36 VDC (24 VDC nom.) | 5 VDC | 4000 mA | 87% |
| TEQ 20-2412WIR | | 12 VDC | 1670 mA | 88% |
| TEQ 20-2413WIR | | 15 VDC | 1330 mA | 87% |
| TEQ 20-2415WIR | | 24 VDC | 833 mA | 87% |
| TEQ 20-2422WIR | | ±12 VDC | 833 mA | 87% |
| TEQ 20-2423WIR | ±15 VDC | 667 mA | 88% | |
| TEQ 20-4811WIR | 18 – 75 VDC (48 VDC nom.) | 5 VDC | 4500 mA | 87% |
| TEQ 20-4812WIR | | 12 VDC | 1670 mA | 88% |
| TEQ 20-4813WIR | | 15 VDC | 1330 mA | 88% |
| TEQ 20-4815WIR | | 24 VDC | 833 mA | 87% |
| TEQ 20-4822WIR | | ±12 VDC | 833 mA | 87% |
| TEQ 20-4823WIR | ±15 VDC | 667 mA | 88% | |
| TEQ 20-7211WIR | 43 – 160 VDC (110 VDC nom.) | 5 VDC | 4500 mA | 86% |
| TEQ 20-7212WIR | | 12 VDC | 1670 mA | 87% |
| TEQ 20-7213WIR | | 15 VDC | 1330 mA | 87% |
| TEQ 20-7215WIR | | 24 VDC | 833 mA | 87% |
| TEQ 20-7222WIR | | ±12 VDC | 833 mA | 87% |
| TEQ 20-7223WIR | ±15 VDC | 667 mA | 88% | |

THN 30WIR **NEW – under development** **30 Watt**

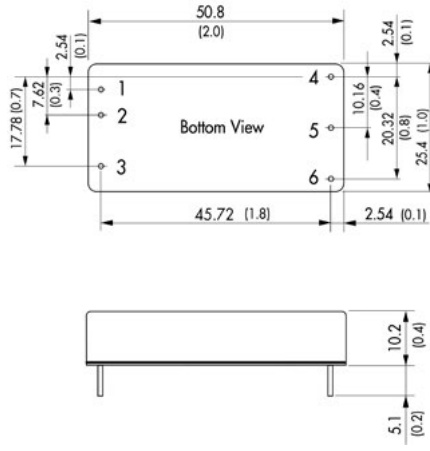


- Compact 1" x 1" x 0.4" standard package
- Ultra-wide 4:1 input voltage range 9–36, 18–75, 36–160 VDC
- EN 50155 and EN 61373 approval for railway applications
- Qualification for fire behaviour according to EN 45545-2
- I/O-isolation 3'000 VDC
- High efficiency up to 92%
- Operating temperature range -40°C to +90°C
- Under-voltage lock out circuit
- Adjustable output voltage & Remote On/Off

| Pinout / Connection | | |
|---------------------|--------|--------|
| Pin | Single | Dual |
| 1 | +Vin | +Vin |
| 2 | -Vin | -Vin |
| 3 | Ctrl | Ctrl |
| 4 | +Vout | +Vout |
| 5 | Trim | Common |
| 6 | -Vout | -Vout |

| Model | Input Voltage Range | Output | | Efficiency |
|----------------|--------------------------------|----------|------------------|------------|
| | | Vnom | I _{max} | |
| THN 30-2410WIR | 9 – 36 VDC (24 VDC nom.) | 3.3 VDC | 7000 mA | 88% |
| THN 30-2411WIR | | 5 VDC | 6000 mA | 89% |
| THN 30-2412WIR | | 12 VDC | 2500 mA | 89% |
| THN 30-2413WIR | | 15 VDC | 2000 mA | 89% |
| THN 30-2415WIR | | 24 VDC | 1250 mA | 90% |
| THN 30-2422WIR | ±12 VDC | ±1250 mA | 89% | |
| THN 30-2423WIR | ±15 VDC | ±1000 mA | 91% | |
| THN 30-2425WIR | ±24 VDC | ±625 mA | 91% | |
| THN 30-4810WIR | 18 – 75 VDC (48 VDC nom.) | 3.3 VDC | 7000 mA | 88% |
| THN 30-4811WIR | | 5 VDC | 6000 mA | 90% |
| THN 30-4812WIR | | 12 VDC | 2500 mA | 90% |
| THN 30-4813WIR | | 15 VDC | 2000 mA | 91% |
| THN 30-4815WIR | | 24 VDC | 1250 mA | 92% |
| THN 30-4822WIR | ±12 VDC | ±1250 mA | 91% | |
| THN 30-4823WIR | ±15 VDC | ±1000 mA | 91% | |
| THN 30-4825WIR | ±24 VDC | ±625 mA | 92% | |
| THN 30-7210WIR | 36 – 160 VDC (110 VDC nom.) | 3.3 VDC | 7000 mA | 88% |
| THN 30-7211WIR | | 5 VDC | 6000 mA | 90% |
| THN 30-7212WIR | | 12 VDC | 2500 mA | 90% |
| THN 30-7213WIR | | 15 VDC | 2000 mA | 90% |
| THN 30-7215WIR | | 24 VDC | 1250 mA | 91% |
| THN 30-7222WIR | ±12 VDC | ±1250 mA | 90% | |
| THN 30-7223WIR | ±15 VDC | ±1000 mA | 90% | |
| THN 30-7225WIR | ±24 VDC | ±625 mA | 91% | |

TEN 40 WIR **40 Watt**



- 2" x 1" metal package
- Ultra wide 4:1 input voltage range 9–36, 18–75, 43–160 VDC
- EN 50155 approval for railway applications
- Thermal shock and vibration resistant according EN 61373
- High efficiency up to 92%
- No minimum load required
- Operating temperature range –40°C to +85°C
- Under voltage lock-out circuit
- Remote On/Off
- Output voltage adjustable
- Lead free design, RoHS compliant
- 3-year product warranty

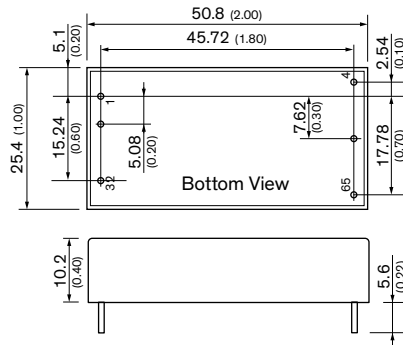
* For heat-sink option drawing see data sheet

| Pinout | | |
|--------|---------------|---------------|
| Pin | Single | Dual |
| 1 | +Vin (Vcc) | +Vin (Vcc) |
| 2 | –Vin (GND) | –Vin (GND) |
| 3 | Remote On/Off | Remote On/Off |
| 4 | +Vout | +Vout |
| 5 | –Vout | Common |
| 6 | trim | –Vout |

| Model | Input Voltage Range | Output | | Efficiency |
|----------------|--------------------------------|----------|------------------|------------|
| | | Vnom | I _{max} | |
| TEN 40-2410WIR | 9 – 36 VDC (24 VDC nom.) | 3.3 VDC | 10'000 mA | 90% |
| TEN 40-2411WIR | | 5 VDC | 8000 mA | 91% |
| TEN 40-2412WIR | | 12 VDC | 3333 mA | 92% |
| TEN 40-2413WIR | | 15 VDC | 2666 mA | 92% |
| TEN 40-2415WIR | | 24 VDC | 1666 mA | 91% |
| TEN 40-2422WIR | | ± 12 VDC | ±1666 mA | 90% |
| TEN 40-2423WIR | ± 15 VDC | ±1333 mA | 90% | |
| TEN 40-2425WIR | ±24 (48*) VDC | ±833 mA | 91% | |
| TEN 40-4810WIR | 18 – 75 VDC (48 VDC nom.) | 3.3 VDC | 10'000 mA | 90% |
| TEN 40-4811WIR | | 5 VDC | 8000 mA | 91% |
| TEN 40-4812WIR | | 12 VDC | 3333 mA | 92% |
| TEN 40-4813WIR | | 15 VDC | 2666 mA | 92% |
| TEN 40-4815WIR | | 24 VDC | 1666 mA | 91% |
| TEN 40-4822WIR | | ± 12 VDC | ±1666 mA | 90% |
| TEN 40-4823WIR | ± 15 VDC | ±1333 mA | 90% | |
| TEN 40-4825WIR | ±24 (48*) VDC | ±833 mA | 91% | |
| TEN 40-7210WIR | 43 – 160 VDC (110 VDC nom.) | 3.3 VDC | 10'000 mA | 88% |
| TEN 40-7211WIR | | 5 VDC | 8000 mA | 89% |
| TEN 40-7212WIR | | 12 VDC | 3333 mA | 90% |
| TEN 40-7213WIR | | 15 VDC | 2666 mA | 91% |
| TEN 40-7215WIR | | 24 VDC | 1666 mA | 90% |
| TEN 40-7222WIR | | ± 12 VDC | ±1666 mA | 89% |
| TEN 40-7223WIR | ± 15 VDC | ±1333 mA | 89% | |
| TEN 40-7225WIR | ±24 (48*) VDC | ±833 mA | 91% | |

*The outputs can also be used in serial circuit for single 48 VDC operation. Free-wheeling diodes are not necessary but recommended for increased performance for start-up with inductive/capacitive load and at dynamic load operation.

TEN 40WIRH **NEW – under development** **40 Watt**



- Compact 2" x 1" plastic package
- 3000 VAC reinforced I/O-isolation
- Wide 4:1 input voltage range: 36 – 160 VDC
- EN 50155 approval for railway applications
- Thermal shock and vibration resistant according EN 61373
- High efficiency up to 90%
- Operating temperature range –40°C to +85°C
- Under voltage lock-out circuit
- Remote On/Off and Trim function
- 3-year product warranty

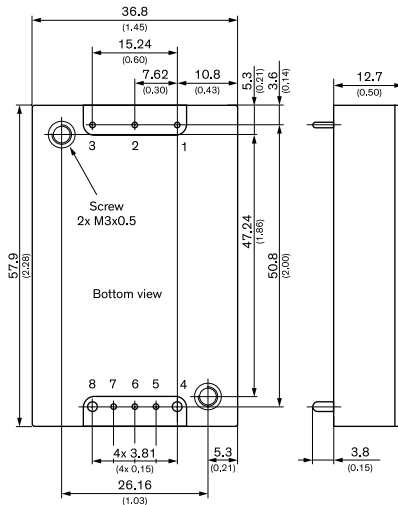
| Pinout | | |
|--------|--------|-------|
| Pin | Single | Dual |
| 1 | +Vin | +Vin |
| 2 | –Vin | –Vin |
| 3 | Ctrl | Ctrl |
| 4 | +Vout | +Vout |
| 5 | –Vout | –Vout |
| 6 | Trim | –Vout |

| Model | Input Voltage Range | Output | | Efficiency |
|------------------|---------------------|---------|------------------|------------|
| | | Vnom | I _{max} | |
| TEN 40-11011WIRH | 36 – 160 VDC | 5.1 VDC | 8000 mA | 88% |
| TEN 40-11012WIRH | | 12 VDC | 3333 mA | 89% |
| TEN 40-11013WIRH | | 15 VDC | 2666 mA | 90% |
| TEN 40-11015WIRH | | 24 VDC | 1666 mA | 88.5% |
| TEN 40-11022WIRH | | ±12 VDC | ±1666 mA | 88% |
| TEN 40-11023WIRH | | ±15 VDC | ±1333 mA | 89% |

TEP 40UIR

NEW!

40 Watt



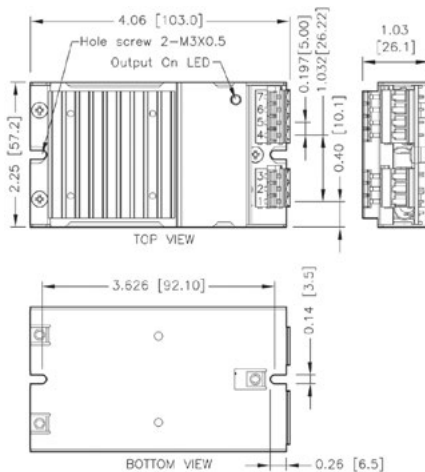
| Model | Input Voltage Range | Output Vnom | Imax | Efficiency |
|----------------|---------------------|-------------|--------|------------|
| TEP 40-3611UIR | 9 – 75 VDC | 5VDC | 8 A | 89% |
| TEP 40-3612UIR | | 12 VDC | 3.33 A | 91% |
| TEP 40-3613UIR | | 15 VDC | 2.67 A | 90% |
| TEP 40-3615UIR | | 24 VDC | 1.67 A | 90% |
| TEP 40-3618UIR | | 48 VDC | 0.83 A | 92% |
| TEP 40-7211UIR | 14 – 160 VDC | 5 VDC | 8 A | 89% |
| TEP 40-7212UIR | | 12 VDC | 3.33 A | 90% |
| TEP 40-7213UIR | | 15 VDC | 2.67 A | 90% |
| TEP 40-7215UIR | | 24 VDC | 1.67 A | 90% |
| TEP 40-7218UIR | | 48 VDC | 0.83 A | 90% |

- Compact 2.3" x 1.45" x 0.5" standard package
- Ultra-wide 12:1 input voltage range 9–75, 14–160 VDC
- EN 50155 and EN 61373 approval for railway applications
- Qualification for fire behaviour according to EN 45545-2
- I/O-isolation 3'000 VAC
- High efficiency up to 92%
- Operating temperature range –40°C to +85°C
- Under-voltage lock out circuit
- Adjustable output voltage & Remote On/Off

| Pin Connection | | |
|----------------|----------|-----------|
| Pin | Function | Diameter |
| 1 | –Vin | 0.04 Inch |
| 2 | Ctrl | 0.04 Inch |
| 3 | +Vin | 0.04 Inch |
| 4 | –Vout | 0.06 Inch |
| 5 | –Sense | 0.04 Inch |
| 6 | Trim | 0.04 Inch |
| 7 | +Sense | 0.04 Inch |
| 8 | +Vout | 0.06 Inch |

TEQ 40WIR

40 Watt

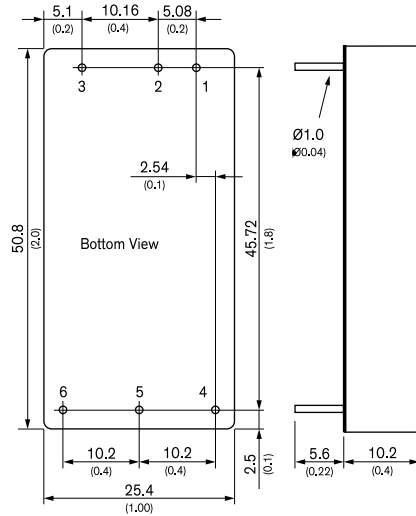
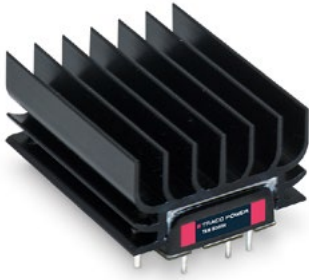


| Model | Input Voltage Range | Output Vnom | Imax | Efficiency |
|----------------|--------------------------------|-------------|---------|------------|
| TEQ 40-2411WIR | 9 – 36 VDC (24 VDC nom.) | 5 VDC | 8000 mA | 90% |
| TEQ 40-2412WIR | | 12 VDC | 3330 mA | 91% |
| TEQ 40-2413WIR | | 15 VDC | 2670 mA | 91% |
| TEQ 40-2415WIR | | 24 VDC | 1670 mA | 90% |
| TEQ 40-2422WIR | | ±12 VDC | 1670 mA | 89% |
| TEQ 40-2423WIR | 18 – 75 VDC (48 VDC nom.) | ±15 VDC | 1330 mA | 89% |
| TEQ 40-2425WIR | | ±24 VDC | 830 mA | 90% |
| TEQ 40-4811WIR | | 5 VDC | 8000 mA | 90% |
| TEQ 40-4812WIR | | 12 VDC | 3330 mA | 91% |
| TEQ 40-4813WIR | | 15 VDC | 2670 mA | 91% |
| TEQ 40-4815WIR | 43 – 160 VDC (110 VDC nom.) | 24 VDC | 1670 mA | 90% |
| TEQ 40-4822WIR | | ±12 VDC | 1670 mA | 89% |
| TEQ 40-4823WIR | | ±15 VDC | 1330 mA | 89% |
| TEQ 40-4825WIR | | ±24 VDC | 830 mA | 90% |
| TEQ 40-7211WIR | | 5 VDC | 8000 mA | 88% |
| TEQ 40-7212WIR | 43 – 160 VDC (110 VDC nom.) | 12 VDC | 3330 mA | 90% |
| TEQ 40-7213WIR | | 15 VDC | 2670 mA | 90% |
| TEQ 40-7215WIR | | 24 VDC | 1670 mA | 89% |
| TEQ 40-7222WIR | | ±12 VDC | 1670 mA | 88% |
| TEQ 40-7223WIR | | ±15 VDC | 1330 mA | 88% |
| TEQ 40-7225WIR | ±24 VDC | 830 mA | 90% | |

- High power block with excellent thermal convection
- Operating temperature –40°C to +92°
- Ultra wide 4:1 input voltage range
- EN 50155 approval for railway applications
- Excellent efficiency up to 91%
- Input filter meet EN 55032, class B
- I/O isolation up to 3000 VDC
- Under voltage lock-out circuit
- Protection against overvoltage, overtemperature and short circuit
- Output LED indicator

| 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 |

TEN 60WIR **NEW!** 60 Watt

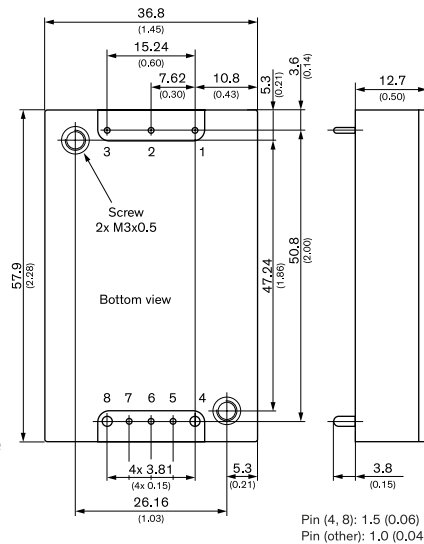


- Compact 2" x 1" standard package
- Ultra-wide 4:1 input voltage range 9–36, 18–75, 36–160 VDC
- EN 50155 and EN 61373 approval for railway applications
- Qualification for fire behaviour according to EN 45545-2
- I/O-isolation 3'000 VDC
- High efficiency up to 91%
- Operating temperature range -40°C to +90°C
- Under-voltage lock out circuit
- Adjustable output voltage & Remote On/Off

| Model | Input Voltage Range | Output Vnom | I _{max} | Efficiency |
|----------------|---------------------|-------------|------------------|------------|
| TEN 60-2411WIR | 9 – 36 VDC | 5 VDC | 12 A | 91% |
| TEN 60-2412WIR | | 12 VDC | 5 A | 93% |
| TEN 60-2413WIR | | 15 VDC | 4 A | 93% |
| TEN 60-2415WIR | | 24 VDC | 2.5 A | 90.5% |
| TEN 60-2418WIR | | 48 VDC | 1.25 A | 91.5% |
| TEN 60-2422WIR | | ±12 VDC | ±2.5 A | 90.5% |
| TEN 60-2423WIR | ±15 VDC | ±2 A | 90.5% | |
| TEN 60-2425WIR | ±24 VDC | ±1.25 A | 91.5% | |
| TEN 60-4811WIR | 18 – 75 VDC | 5 VDC | 12 A | 91.5% |
| TEN 60-4812WIR | | 12 VDC | 5 A | 92.5% |
| TEN 60-4813WIR | | 15 VDC | 4 A | 94% |
| TEN 60-4815WIR | | 24 VDC | 2.5 A | 91.5% |
| TEN 60-4818WIR | | 48 VDC | 1.25 A | 92% |
| TEN 60-4822WIR | | ±12 VDC | ±2.5 A | 91.5% |
| TEN 60-4823WIR | ±15 VDC | ±2 A | 91.5% | |
| TEN 60-4825WIR | ±24 VDC | ±1.25 A | 92% | |
| TEN 60-7211WIR | 36 – 160 VDC | 5 VDC | 12 A | 91% |
| TEN 60-7212WIR | | 12 VDC | 5 A | 92% |
| TEN 60-7213WIR | | 15 VDC | 4 A | 92% |
| TEN 60-7215WIR | | 24 VDC | 2.5 A | 90.5% |
| TEN 60-7218WIR | | 48 VDC | 1.25 A | 91% |
| TEN 60-7222WIR | | ±12 VDC | ±2.5 A | 90.5% |
| TEN 60-7223WIR | ±15 VDC | ±2 A | 90.5% | |
| TEN 60-7225WIR | ±24 VDC | ±1.25 A | 91% | |

| Pinout | | |
|--------|--------|--------|
| Pin | Single | Dual |
| 1 | +Vin | +Vin |
| 2 | -Vin | -Vin |
| 3 | Ctrl | Ctrl |
| 4 | +Vout | +Vout |
| 5 | -Vout | Common |
| 6 | Trim | -Vout |

TEP 60UIR **NEW!** 60 Watt

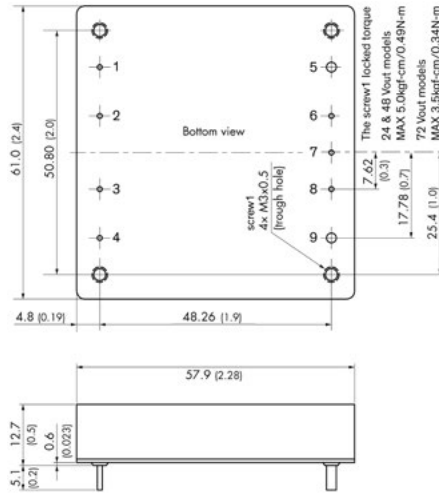


- Compact 2.3" x 1.45" x 0.5" standard package
- Ultra-wide 12:1 input voltage range 9–75, 14–160 VDC
- EN 50155 and EN 61373 approval for railway applications
- Qualification for fire behaviour according to EN 45545-2
- I/O-isolation 3'000 VAC
- High efficiency up to 92%
- Operating temperature range -40°C to +85°C
- Under-voltage lockout circuit
- Adjustable output voltage & Remote On/Off

| Model | Input Voltage Range | Output Vnom | I _{max} | Efficiency |
|----------------|---------------------|-------------|------------------|------------|
| TEP 60-3611UIR | 9 – 75 VDC | 5VDC | 12 A | 89% |
| TEP 60-3612UIR | | 12 VDC | 5 A | 89% |
| TEP 60-3613UIR | | 15 VDC | 4 A | 89% |
| TEP 60-3615UIR | | 24 VDC | 2.5 A | 90% |
| TEP 60-3618UIR | 48 VDC | 1.25 A | 92% | |
| TEP 60-7211UIR | 14 – 160 VDC | 5 VDC | 12 A | 89% |
| TEP 60-7212UIR | | 12 VDC | 5 A | 89% |
| TEP 60-7213UIR | | 15 VDC | 4 A | 89% |
| TEP 60-7215UIR | | 24 VDC | 2.5 A | 90% |
| TEP 60-7218UIR | 48 VDC | 1.25 A | 90% | |

| Pin Connection | | |
|----------------|----------|-----------|
| Pin | Function | Diameter |
| 1 | -Vin | 0.04 Inch |
| 2 | Ctrl | 0.04 Inch |
| 3 | +Vin | 0.04 Inch |
| 4 | -Vout | 0.06 Inch |
| 5 | -Sense | 0.04 Inch |
| 6 | Trim | 0.04 Inch |
| 7 | +Sense | 0.04 Inch |
| 8 | +Vout | 0.06 Inch |

TEP 75WI **75 Watt**



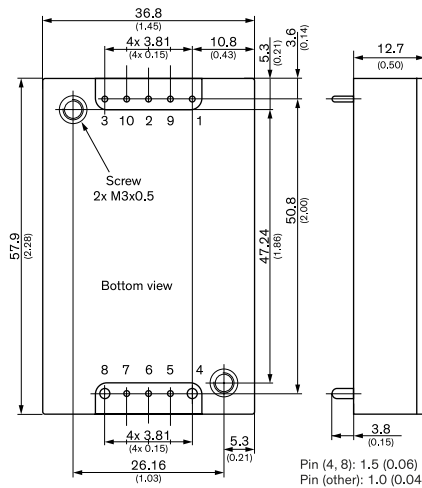
- Rugged, compact metal case
- Screw terminal adaptor available for easy connection
- EN 50155 approval for railway applications
- Ultra wide 4:1 input voltage range
- Full load operation up to +60°C with convection cooling
- Undervoltage lockout
- Reverse input voltage protection
- Input protection filter
- 3-year product warranty

| Pinout | |
|--------|------------|
| Pin | Function |
| 1 | -Vin (GND) |
| 2 | Case |
| 3 | Remote |
| 4 | +Vin (Vcc) |
| 5 | -Vout |
| 6 | -Sense* |
| 7 | Trim |
| 8 | +Sense* |
| 9 | +Vout |

| Model | Input Voltage Range | Output | | Efficiency |
|---------------|--------------------------------|---------|------------------|------------|
| | | Vnom | I _{max} | |
| TEP 75-2411WI | 9 – 36 VDC (24 VDC nom.) | 5 VDC | 15'000 mA | 88% |
| TEP 75-2412WI | | 12 VDC | 6300 mA | 88% |
| TEP 75-2413WI | | 15 VDC | 5000 mA | 88% |
| TEP 75-2415WI | | 24 VDC | 3200 mA | 87% |
| TEP 75-2416WI | | 28 VDC | 2700 mA | 87% |
| TEP 75-2418WI | 48 VDC | 1600 mA | 87% | |
| TEP 75-4811WI | 18 – 75 VDC (48 VDC nom.) | 5 VDC | 15'000 mA | 90% |
| TEP 75-4812WI | | 12 VDC | 6300 mA | 90% |
| TEP 75-4813WI | | 15 VDC | 5000 mA | 89% |
| TEP 75-4815WI | | 24 VDC | 3200 mA | 88% |
| TEP 75-4816WI | | 28 VDC | 2700 mA | 88% |
| TEP 75-4818WI | 48 VDC | 1600 mA | 87% | |
| TEP 75-7211WI | 43 – 160 VDC (110 VDC nom.) | 5 VDC | 15'000 mA | 91% |
| TEP 75-7212WI | | 12 VDC | 6300 mA | 91% |
| TEP 75-7213WI | | 15 VDC | 5000 mA | 91% |
| TEP 75-7215WI | | 24 VDC | 3200 mA | 90% |
| TEP 75-7216WI | | 28 VDC | 2700 mA | 90% |
| TEP 75-7218WI | 48 VDC | 1600 mA | 90% | |

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

TEP 100UIR NEW – under development **100 Watt**



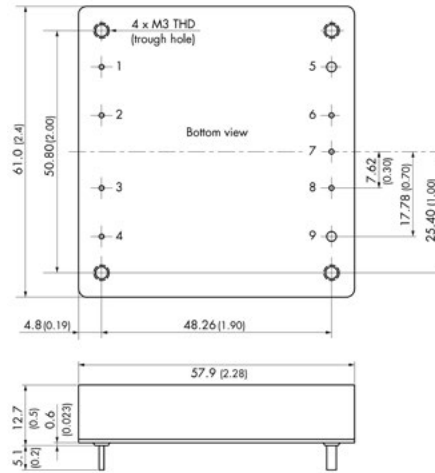
- Compact 2.3" x 1.45" x 0.5" standard package
- Ultra-wide 12:1 input voltage range 9–75, 14–160 VDC
- EN 50155 and EN 61373 approval for railway applications
- Qualification for fire behaviour according to EN 45545-2
- I/O-isolation 3'000 VAC
- High efficiency up to 92%
- Operating temperature range -40°C to +85°C
- Under-voltage lockout circuit
- Adjustable output voltage & Remote On/Off

| Pin Connection | | |
|----------------|---------------|-----------|
| Pin | Function | Diameter |
| 1 | -Vin | 0.04 Inch |
| 2 | Ctrl | 0.04 Inch |
| 3 | +Vin | 0.04 Inch |
| 4 | -Vout | 0.06 Inch |
| 5 | -Sense | 0.04 Inch |
| 6 | Trim | 0.04 Inch |
| 7 | +Sense | 0.04 Inch |
| 8 | +Vout | 0.06 Inch |
| 9 | Bus (option) | 0.04 Inch |
| 10 | UVLO (option) | 0.04 Inch |

| Model | Input Voltage Range | Output | | Efficiency |
|-----------------|---------------------|--------|------------------|------------|
| | | Vnom | I _{max} | |
| TEP 100-3611UIR | 9 – 75 VDC | 5VDC | 20 A | 87% |
| TEP 100-3612UIR | | 12 VDC | 8.35 A | 88% |
| TEP 100-3613UIR | | 15 VDC | 6.7 A | 88% |
| TEP 100-3615UIR | | 24 VDC | 4.2 A | 88% |
| TEP 100-3618UIR | | 48 VDC | 2.1 A | 89% |
| TEP 100-7211UIR | 14 – 160 VDC | 5 VDC | 20 A | 87% |
| TEP 100-7212UIR | | 12 VDC | 8.35 A | 88% |
| TEP 100-7213UIR | | 15 VDC | 6.7 A | 88% |
| TEP 100-7215UIR | | 24 VDC | 4.2 A | 88% |
| TEP 100-7218UIR | | 48 VDC | 2.1 A | 89% |

TEP 100WIR

100 Watt



- Compact metal package
- Ultra wide 4:1 input voltage ranges 9–36, 18–75, 43–160 VDC
- EN 50155 approval for railway applications
- Very high efficiency up to 93%
- No minimum load
- Soft start
- Adjustable output voltage +10/–20%
- Sense line
- Remote On/Off input
- Under voltage lock-out circuit

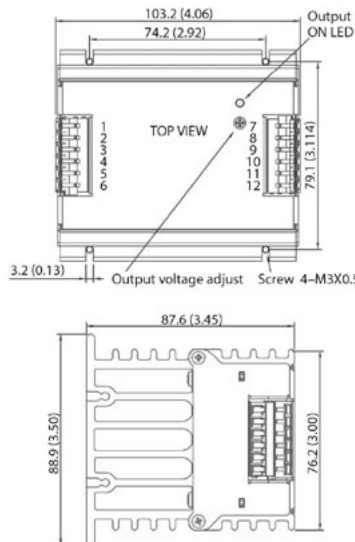
| Pinout | |
|--------|------------|
| Pin | Function |
| 1 | –Vin (GND) |
| 2 | Case |
| 3 | Remote |
| 4 | +Vin (Vcc) |
| 5 | –Vout |
| 6 | –Sense |
| 7 | Trim |
| 8 | +Sense |
| 9 | +Vout |

| Model | Input Voltage Range | Output | | Efficiency |
|-----------------|--------------------------------|---------|------------------|------------|
| | | Vnom | I _{max} | |
| TEP 100-2411WIR | 9 – 36 VDC (24 VDC nom.) | 5 VDC | 20'000 mA | 93% |
| TEP 100-2412WIR | | 12 VDC | 8400 mA | 90% |
| TEP 100-2415WIR | | 24 VDC | 4200 mA | 90% |
| TEP 100-2416WIR | | 28 VDC | 3600 mA | 90% |
| TEP 100-2418WIR | 48 VDC | 2100 mA | 90% | |
| TEP 100-4812WIR | 18 – 75 VDC (48 VDC nom.) | 12 VDC | 8400 mA | 90% |
| TEP 100-4815WIR | | 24 VDC | 4200 mA | 90% |
| TEP 100-4816WIR | | 28 VDC | 3600 mA | 92% |
| TEP 100-4818WIR | | 48 VDC | 2100 mA | 91% |
| TEP 100-7212WIR | 43 – 160 VDC (110 VDC nom.) | 12 VDC | 8400 mA | 90% |
| TEP 100-7215WIR | | 24 VDC | 4200 mA | 90% |
| TEP 100-7216WIR | | 28 VDC | 3600 mA | 90% |
| TEP 100-7218WIR | | 48 VDC | 2100 mA | 91% |

The screw 1 locked torque (24 and 48Vout models): MAX 5.0kgf-cm/0.49N-m

TEQ 100WIR

100 Watt



- High power block with excellent thermal convection
- Operating temperature –40°C to +85°C without derating
- Increased shock & vibration resistance
- Ultra wide 4:1 input voltage range
- EN 50155 approval for railway applications
- Excellent efficiency up to 90%
- Input filter meet EN 55032, class A
- I/O isolation 1591 VAC
- Under voltage lock-out circuit
- Soft start

| Pin Connection | | |
|----------------|--------------|------------------|
| Terminal | Pin Function | Recommended Wire |
| 1, 2 | –Vin | 12 AWG |
| 3 | NC | NC |
| 4 | On/Off Ctrl | 14 – 18 AWG |
| 5, 6 | +Vin | 12 AWG |
| 7, 8 | –Vout | 12 AWG |
| 9 | –Sense* | 14 – 18 AWG |
| 10 | +Sense* | 14 – 18 AWG |
| 11, 12 | +Vout | 12 AWG |

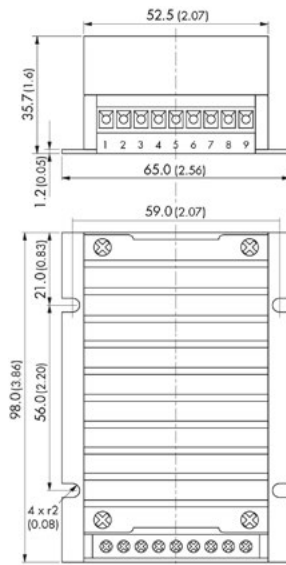
| Model | Input Voltage Range | Output | | Efficiency typ. |
|-----------------|--------------------------------|--------|------------------|-----------------|
| | | Vnom | I _{max} | |
| TEQ 100-2412WIR | 10 – 36 VDC (24 VDC nom.) | 12 VDC | 8400 mA | 90% |
| TEQ 100-2415WIR | | 24 VDC | 4200 mA | 90% |
| TEQ 100-2416WIR | | 28 VDC | 3600 mA | 90% |
| TEQ 100-2418WIR | | 48 VDC | 2100 mA | 90% |
| TEQ 100-4812WIR | 19 – 75 VDC (48 VDC nom.) | 12 VDC | 8400 mA | 90% |
| TEQ 100-4815WIR | | 24 VDC | 4200 mA | 90% |
| TEQ 100-4816WIR | | 28 VDC | 3600 mA | 90% |
| TEQ 100-4818WIR | | 48 VDC | 2100 mA | 90% |
| TEQ 100-7212WIR | 43 – 160 VDC (110 VDC nom.) | 12 VDC | 8400 mA | 89% |
| TEQ 100-7215WIR | | 24 VDC | 4200 mA | 90% |
| TEQ 100-7216WIR | | 28 VDC | 3600 mA | 90% |
| TEQ 100-7218WIR | | 48 VDC | 2100 mA | 90% |

* Sense line to be connected to the output either at the module or at the load under regard of polarity.
 • The current rating of the terminal block is 15 A/pole.
 • Using 2 poles in parallel if the peak output current can exceed 15 A.
 • Wire size shall be selected to withstand the peak output current (I_{out max} + Current limitation).

TEP 150WI **150 Watt**



- Shielded metal case with screw terminals
- Ultra wide 4:1 input voltage ranges
- 9–36, 18–75, 43–160 VDC
- EN 50155 approval for railway applications
- Very high efficiency up to 89%
- Constant current output characteristic for battery load applications
- Optional with input filter to meet EN 55032 class B
- Wide Operating temperature range: –40°C to +75°C
- Under voltage lock-out, overtemperature & reverse input protection
- Easy chassis and wall mounting
- 3-year product warranty



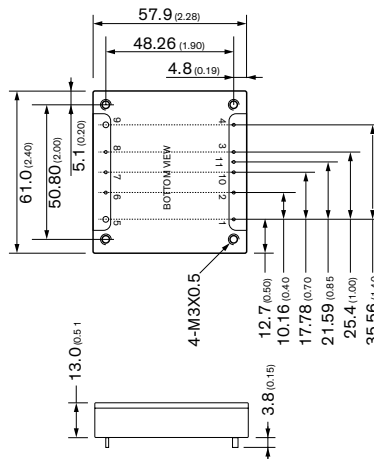
| Pinout | | |
|--------|----------|------------------|
| Pin | Function | Recommended Wire |
| 1 | + Vin | 14 – 16 AWG |
| 2 | + Vin | 14 – 16 AWG |
| 3 | – Vin | 14 – 16 AWG |
| 4 | – Vin | 14 – 16 AWG |
| 5 | Remote | 14 – 24 AWG |
| 6 | + Vout | 14 – 16 AWG |
| 7 | – Vout | 14 – 16 AWG |
| 8 | Trim | 14 – 24 AWG |
| 9 | Trim | 14 – 24 AWG |

| Model | Input Voltage Range | Output | | Efficiency |
|----------------|--------------------------------|---------|------------------|------------|
| | | Vnom | I _{max} | |
| TEP 150-2412WI | 9 – 36 VDC (24 VDC nom.) | 12 VDC | 12'500 mA | 86% |
| TEP 150-2413WI | | 15 VDC | 10'000 mA | 86% |
| TEP 150-2415WI | | 24 VDC | 6300 mA | 87% |
| TEP 150-2416WI | | 28 VDC | 5400 mA | 87% |
| TEP 150-2418WI | 48 VDC | 3200 mA | 86% | |
| TEP 150-4812WI | 18 – 75 VDC (48 VDC nom.) | 12 VDC | 12'500 mA | 88% |
| TEP 150-4813WI | | 15 VDC | 10'000 mA | 89% |
| TEP 150-4815WI | | 24 VDC | 6300 mA | 89% |
| TEP 150-4816WI | | 28 VDC | 5400 mA | 89% |
| TEP 150-4818WI | 48 VDC | 3200 mA | 88% | |
| TEP 150-7212WI | 43 – 160 VDC (110 VDC nom.) | 12 VDC | 12'500 mA | 88% |
| TEP 150-7213WI | | 15 VDC | 10'000 mA | 89% |
| TEP 150-7215WI | | 24 VDC | 6300 mA | 89% |
| TEP 150-7216WI | | 28 VDC | 5400 mA | 89% |
| TEP 150-7218WI | 48 VDC | 3200 mA | 88% | |

TEP 150UIR **NEW – under development** **150 Watt**



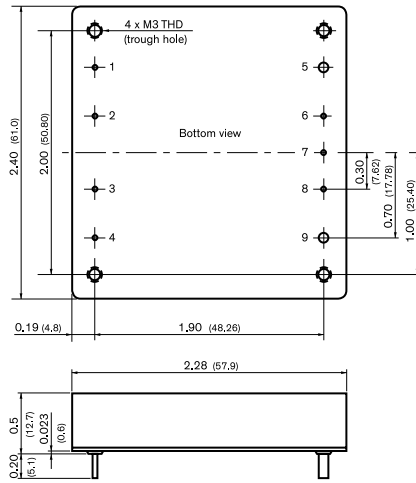
- Ultra-wide 10:1 input voltage range 16 – 160 VDC
- Compact 2.4" x 2.28" x 0.5" standard package (half brick)
- Bus pin to easily extend hold-up time
- EN 50155 and EN 61373 approval for railway applications
- Qualification for fire behavior according to EN 45545-2
- Operating temperature range –40°C to +75°C
- I/O-isolation 3'000 VAC
- High efficiency up to 93%
- Adjustable output voltage, Remote On/Off and adjustable under voltage lockout
- 3-year product warranty



| Pinout | | |
|--------|-----------|-----------|
| Pin | Single | Dual |
| 1 | –Vin | –Vin |
| 2 | BUS | BUS |
| 3 | Ctrl | UVLO |
| 4 | +Vin | +Vin |
| 5 | –Vout | –Vout |
| 6 | –Sense | –Sense |
| 7 | Trim | Trim |
| 8 | +Sense | +Sense |
| 9 | +Vout | +Vout |
| 10 | UVLO | Ctrl |
| 11 | Pulse Out | Pulse Out |

| Model | Input Voltage Range | Output | | Efficiency |
|-----------------|---------------------|--------|------------------|------------|
| | | Vnom | I _{max} | |
| TEP 150-7211UIR | 16 – 160 VDC | 5 VDC | 30'000 mA | 90.5% |
| TEP 150-7212UIR | | 12 VDC | 12'500 mA | 92.5% |
| TEP 150-7213UIR | | 15 VDC | 10'000 mA | 91.5% |
| TEP 150-7215UIR | | 24 VDC | 6300 mA | 89.5% |
| TEP 150-7218UIR | | 48 VDC | 3200 mA | 92% |

TEP 160WIR **160 Watt**

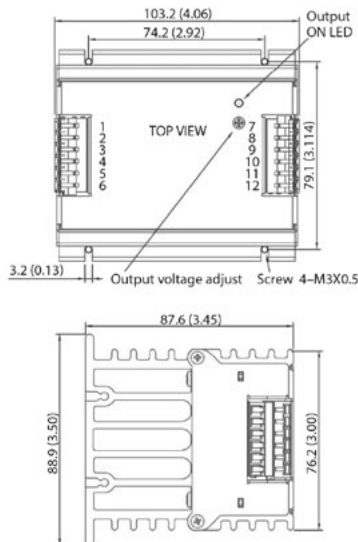


- Compact metal package
- Ultra wide 4:1 input voltage ranges 9–36, 18–75, 43–160 VDC
- EN 50155 approval for railway applications
- Very high efficiency up to 91%
- No minimum load
- Soft start
- Adjustable output voltage +10/-20%
- Sense line
- Remote On/Off input
- Under voltage lock-out circuit

| Pinout | | |
|--------|------------|--------------|
| Pin | Function | Pin Diameter |
| 1 | -Vin (GND) | 1 mm |
| 2 | Case | 1 mm |
| 3 | Remote | 1 mm |
| 4 | +Vin (Vcc) | 1 mm |
| 5 | -Vout | 2 mm |
| 6 | -Sense | 1 mm |
| 7 | Trim | 1 mm |
| 8 | +Sense | 1 mm |
| 9 | +Vout | 2 mm |

| Model | Input Voltage Range | Output | | Efficiency |
|-----------------|--------------------------------|---------|------------------|------------|
| | | Vnom | I _{max} | |
| TEP 160-2412WIR | 9 – 36 VDC (24 VDC nom.) | 12 VDC | 12'000 mA | 90% |
| TEP 160-2413WIR | | 15 VDC | 9500 mA | 91% |
| TEP 160-2415WIR | | 24 VDC | 6000 mA | 90% |
| TEP 160-2416WIR | | 28 VDC | 5000 mA | 90% |
| TEP 160-2418WIR | 48 VDC | 3000 mA | 90% | |
| TEP 160-4812WIR | 18 – 75 VDC (48 VDC nom.) | 12 VDC | 13'000 mA | 91% |
| TEP 160-4813WIR | | 15 VDC | 10'000 mA | 91% |
| TEP 160-4815WIR | | 24 VDC | 6500 mA | 91% |
| TEP 160-4816WIR | | 28 VDC | 5500 mA | 91% |
| TEP 160-4818WIR | 48 VDC | 3200 mA | 91% | |
| TEP 160-7212WIR | 43 – 160 VDC (110 VDC nom.) | 12 VDC | 15'000 mA | 90% |
| TEP 160-7213WIR | | 15 VDC | 12'000 mA | 90% |
| TEP 160-7215WIR | | 24 VDC | 7500 mA | 90% |
| TEP 160-7216WIR | | 28 VDC | 6500 mA | 90% |
| TEP 160-7218WIR | 48 VDC | 3800 mA | 90% | |

TEQ 160WIR **160 Watt**



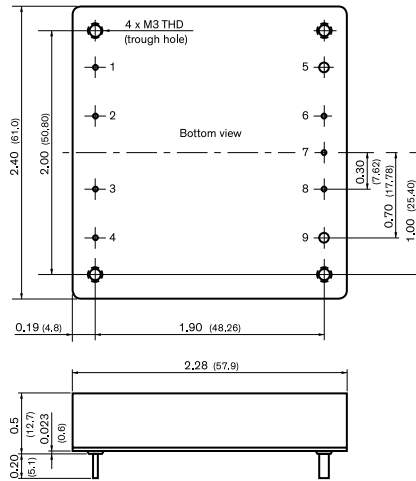
- High power block with excellent thermal convection
- Operating temperature -40°C to +75°C without derating
- Increased shock & vibration resistance
- Ultra wide 4:1 input voltage range
- EN 50155 approval for railway applications
- Excellent efficiency up to 90%
- Input filter meet EN 55032, class A
- I/O insulation 1591 VAC
- Under voltage lock-out circuit
- Soft start

| Pin Connection | | |
|----------------|--------------|------------------|
| Terminal | Pin Function | Recommended Wire |
| 1, 2 | -Vin | 12 AWG |
| 3 | NC | NC |
| 4 | On/Off Ctrl | 14 – 18 AWG |
| 5, 6 | +Vin | 12 AWG |
| 7, 8 | -Vout | 12 AWG |
| 9 | -Sense* | 14 – 18 AWG |
| 10 | +Sense* | 14 – 18 AWG |
| 11, 12 | +Vout | 12 AWG |

| Model | Input Voltage Range | Output | | Efficiency typ. |
|-----------------|--------------------------------|--------|------------------|-----------------|
| | | Vnom | I _{max} | |
| TEQ 160-4812WIR | 19 – 75 VDC (48 VDC nom.) | 12 VDC | 13'000 mA | 90% |
| TEQ 160-4815WIR | | 24 VDC | 6500 mA | 90% |
| TEQ 160-4816WIR | | 28 VDC | 5500 mA | 90% |
| TEQ 160-4818WIR | | 48 VDC | 3200 mA | 90% |
| TEQ 160-7212WIR | 43 – 160 VDC (110 VDC nom.) | 12 VDC | 15'000 mA | 89% |
| TEQ 160-7215WIR | | 24 VDC | 7500 mA | 89% |
| TEQ 160-7216WIR | | 28 VDC | 6500 mA | 89% |
| TEQ 160-7218WIR | | 48 VDC | 3800 mA | 89% |

* Sense line to be connected to the output either at the module or at the load under regard of polarity.
 • The current rating of the terminal block is 15 A/pole.
 • Using 2 poles in parallel if the peak output current can exceed 15 A.
 • Wire size shall be selected to withstand the peak output current (I_{out max} + Current limitation).

TEP 200WIR **200 Watt**

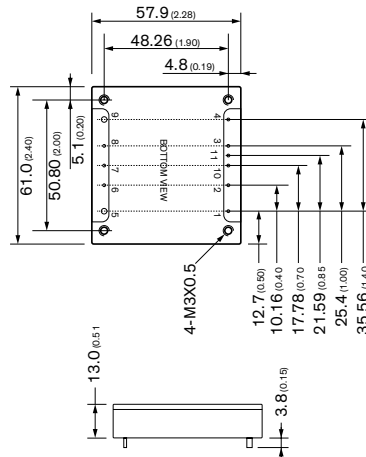


- Compact metal package
- Ultra wide 4:1 input voltage ranges 9–36, 18–75, 43–160 VDC
- EN 50155 approval for railway applications
- Very high efficiency up to 91%
- No minimum load
- Soft start
- Under voltage lock-out circuit
- Adjustable output voltage +10 / -20%
- Sense line

| Pinout | |
|--------|------------|
| Pin | Function |
| 1 | -Vin (GND) |
| 2 | NC |
| 3 | Remote |
| 4 | +Vin (Vcc) |
| 5 | -Vout |
| 6 | -Sense |
| 7 | Trim |
| 8 | +Sense |
| 9 | +Vout |

| Model | Input Voltage Range | Output | | Efficiency |
|-----------------|--------------------------------|--------|------------------|------------|
| | | Vnom | I _{max} | |
| TEP 200-2412WIR | 9 – 36 VDC (24 VDC nom.) | 12 VDC | 15'000 mA | 89% |
| TEP 200-2413WIR | | 15 VDC | 12'000 mA | 90% |
| TEP 200-2415WIR | | 24 VDC | 7500 mA | 90% |
| TEP 200-2416WIR | | 28 VDC | 6500 mA | 90% |
| TEP 200-2418WIR | | 48 VDC | 3700 mA | 89% |
| TEP 200-4812WIR | 18 – 75 VDC (48 VDC nom.) | 12 VDC | 18'000 mA | 90% |
| TEP 200-4813WIR | | 15 VDC | 14'000 mA | 91% |
| TEP 200-4815WIR | | 24 VDC | 9000 mA | 90% |
| TEP 200-4816WIR | | 28 VDC | 7500 mA | 91% |
| TEP 200-4818WIR | | 48 VDC | 4500 mA | 90% |
| TEP 200-7212WIR | 43 – 160 VDC (110 VDC nom.) | 12 VDC | 20'000 mA | 89% |
| TEP 200-7213WIR | | 15 VDC | 16'000 mA | 90% |
| TEP 200-7215WIR | | 24 VDC | 10'000 mA | 89% |
| TEP 200-7216WIR | | 28 VDC | 8500 mA | 90% |
| TEP 200-7218WIR | | 48 VDC | 5000 mA | 89% |

TEP 200UIR **NEW – under development** **200 Watt**

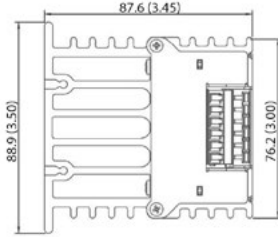
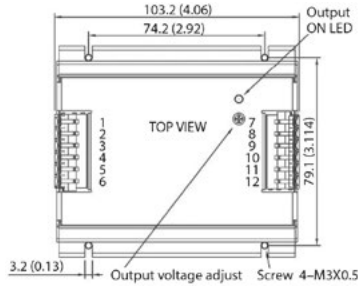


- Ultra-wide 10:1 input voltage range 16 – 160 VDC
- Compact 2.4" x 2.28" x 0.5" standard package (half brick)
- Bus pin to easily extend hold-up time
- EN 50155 and EN 61373 approval for railway applications
- Qualification for fire behavior according to EN 45545-2
- Operating temperature range -40°C to +70°C
- I/O-isolation 3'000 VAC
- High efficiency up to 92%
- Adjustable output voltage, Remote On/Off and adjustable under voltage lockout
- 3-year product warranty

| Pinout | | |
|--------|-----------|-----------|
| Pin | A-Type | B-Type |
| 1 | -Vin | -Vin |
| 2 | BUS | BUS |
| 3 | Ctrl | UVLO |
| 4 | +Vin | +Vin |
| 5 | -Vout | -Vout |
| 6 | -Sense | -Sense |
| 7 | Trim | Trim |
| 8 | +Sense | +Sense |
| 9 | +Vout | +Vout |
| 10 | UVLO | Ctrl |
| 11 | Pulse Out | Pulse Out |

| Model | Input Voltage Range | Output | | Efficiency |
|-----------------|---------------------|--------|------------------|------------|
| | | Vnom | I _{max} | |
| TEP 200-7211UIR | 16 – 160 VDC | 5 VDC | 40'000 mA | 90% |
| TEP 200-7212UIR | | 12 VDC | 16'800 mA | 92% |
| TEP 200-7213UIR | | 15 VDC | 13'400 mA | 91% |
| TEP 200-7215UIR | | 24 VDC | 8400 mA | 90% |
| TEP 200-7218UIR | | 48 VDC | 4200 mA | 92% |

TEQ 200WIR **200 Watt**



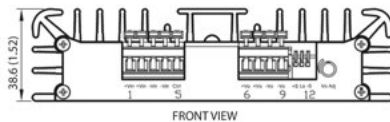
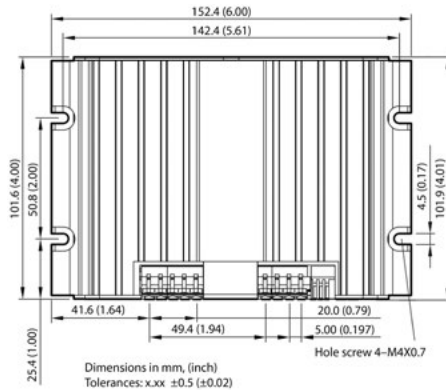
- High power block with excellent thermal convection
- Operating temperature -40°C to $+70^{\circ}\text{C}$ without derating
- Increased shock & vibration resistance
- Ultra wide 4:1 input voltage range
- EN 50155 approval for railway applications
- Excellent efficiency up to 90%
- Input filter meet EN 55032, class A
- I/O insulation 1591 VAC
- Under voltage lock-out circuit
- Soft start

| Pin Connection | | |
|----------------|--------------|------------------|
| Terminal | Pin Function | Recommended Wire |
| 1, 2 | -Vin | 12 AWG |
| 3 | NC | NC |
| 4 | Remote | 14 – 18 AWG |
| 5, 6 | +Vin | 12 AWG |
| 7, 8 | -Vout | 12 AWG |
| 9 | -Sense* | 14 – 18 AWG |
| 10 | +Sense* | 14 – 18 AWG |
| 11, 12 | +Vout | 12 AWG |

| Model | Input Voltage Range | Output Vnom | I _{max} | Efficiency typ. |
|-----------------|--------------------------------|-------------|------------------|-----------------|
| TEQ 200-4812WIR | 19 – 75 VDC (48 VDC nom.) | 12 VDC | 18'000 mA | 89% |
| TEQ 200-4815WIR | | 24 VDC | 9000 mA | 89% |
| TEQ 200-4816WIR | | 28 VDC | 7500 mA | 90% |
| TEQ 200-4818WIR | 48 VDC | 4500 mA | 89% | |
| TEQ 200-7212WIR | 43 – 160 VDC (110 VDC nom.) | 12 VDC | 20'000 mA | 88% |
| TEQ 200-7215WIR | | 24 VDC | 10'000 mA | 88% |
| TEQ 200-7216WIR | | 28 VDC | 8500 mA | 89% |
| TEQ 200-7218WIR | 48 VDC | 5000 mA | 88% | |

* Sense line to be connected to the output either at the module or at the load under regard of polarity.
 • The current rating of the terminal block is 15 A/pole.
 • Using 2 poles in parallel if the peak output current can exceed 15 A.
 • Wire size shall be selected to withstand the peak output current (I_{out max} + Current limitation).

TEQ 300WIR **300 Watt**



- High power block with excellent thermal convection
- Operating temperature -40°C to $+80^{\circ}\text{C}$
- 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 55032, class A
- Under voltage lock-out circuit

| Pin 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 |

| Model | Input Voltage Range | Output Vnom | I _{max} | Efficiency typ. |
|-----------------|--------------------------------|-------------|------------------|-----------------|
| TEQ 300-4812WIR | 19 – 75 VDC (48 VDC nom.) | 12 VDC | 25'000 mA | 89% |
| TEQ 300-4815WIR | | 24 VDC | 12'500 mA | 92% |
| TEQ 300-4816WIR | | 28 VDC | 10'800 mA | 91% |
| TEQ 300-4818WIR | 48 VDC | 6300 mA | 92% | |
| TEQ 300-7212WIR | 43 – 160 VDC (110 VDC nom.) | 12 VDC | 25'000 mA | 89% |
| TEQ 300-7215WIR | | 24 VDC | 12'500 mA | 91% |
| TEQ 300-7216WIR | | 28 VDC | 10'800 mA | 91% |
| TEQ 300-7218WIR | 48 VDC | 6300 mA | 92% | |

* 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_{out max} + Current limitation).

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 25+ 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@tracopower.com

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@tracopower.de

French Office

Traco Power France
17, rue de la Vanne
92120 Montrouge
France

M +33 (0)6 72 11 52 21
info@tracopower.fr

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.ie