

TRACO POWER

2020 | 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

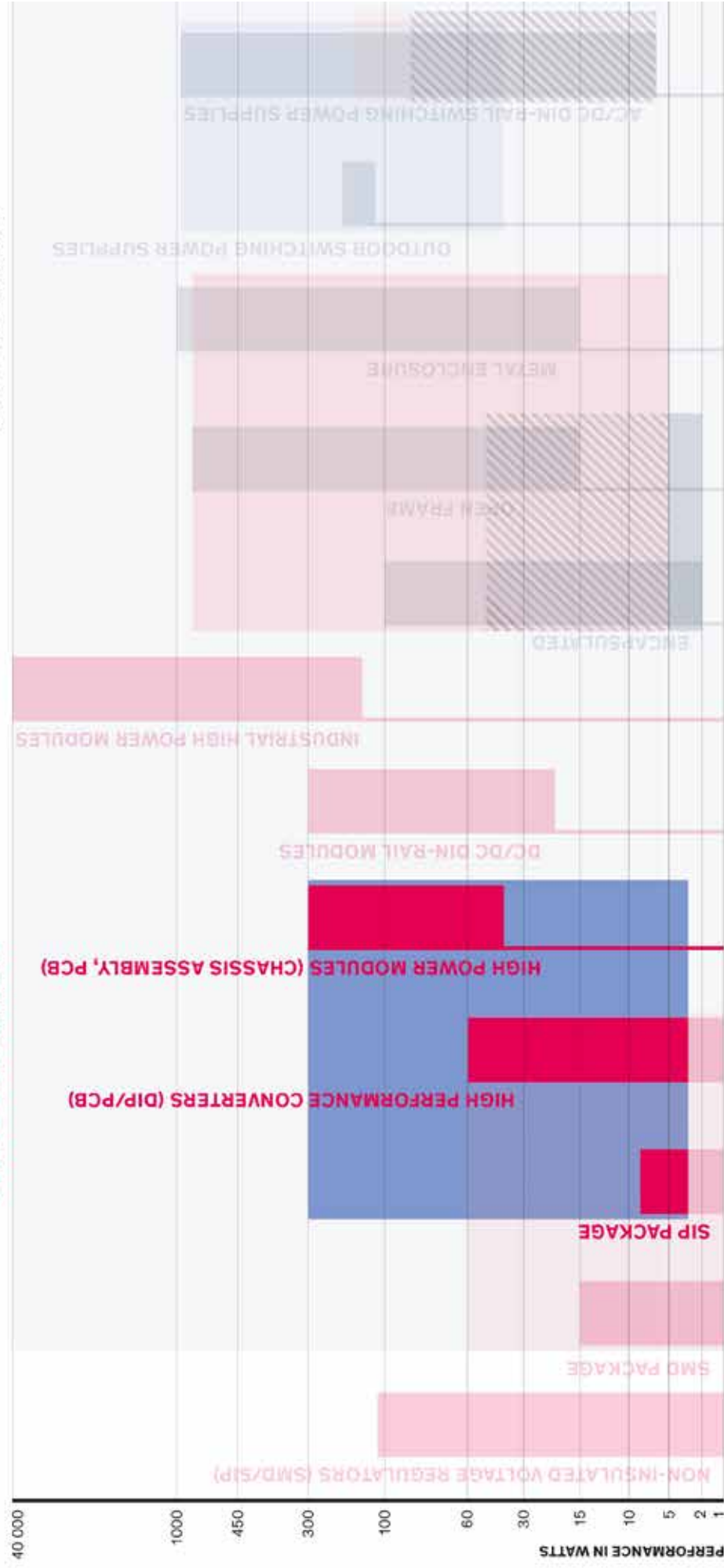
EN 61373 defines that DC/DC converters must provide continuous operation under these stresses:

- 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.

AC/DC & DIN RAIL

DC/DC CONVERTER



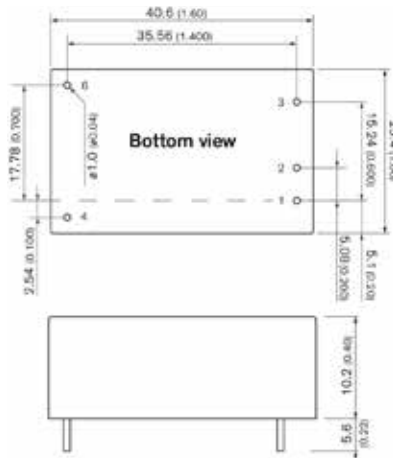
SPECIAL APPROVALS/TARGET MARKETS

- MEDICAL TECHNOLOGY
- INDUSTRY/ICT
- RAILWAY AND TRANSPORT
- HOUSEHOLD
- MARGINAL ENVIRONMENT/TATEX
- BUILDING TECHNOLOGY

Railway DC/DC Converters

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

TFI **NEW!** 0-300 Watt



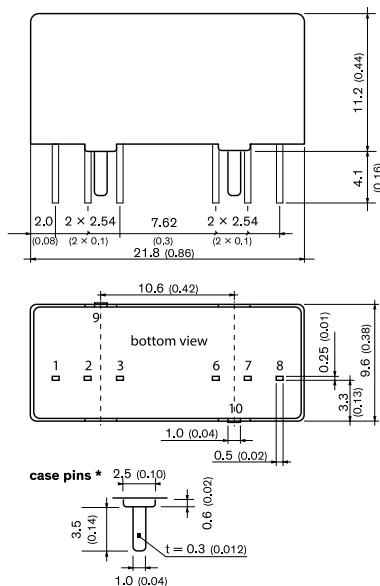
Pinout	
Pin	Function
1	+Vin
2	NC
3	- Vin
4	+Vout
6	- Vout

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

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

TMR 3WIR 3 Watt

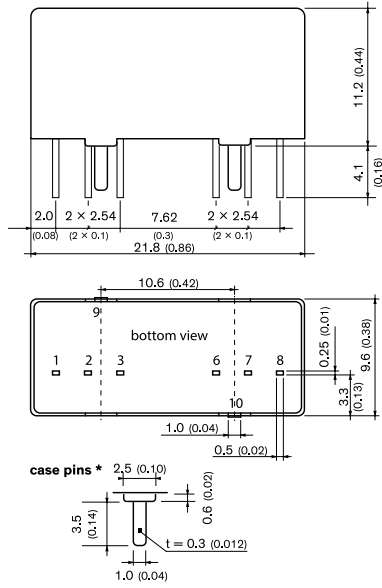


Pinout		
Pin	Single Output	Dual Output
1	-Vin (GND)	-Vin (GND)
2	+Vin (Vcc)	+Vin (Vcc)
3	Remote	Remote
6	+Vout	+Vout
7	-Vout	Common
8	NC	-Vout
9, 10	Case	Case

- 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

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
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
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 %

TMR 6WIR 6 Watt

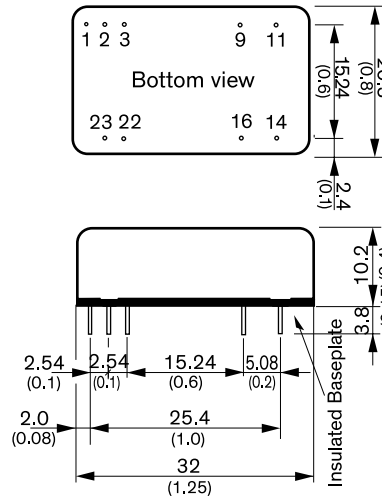


- Compact SIP-8 metal case
- EN 50155 railway approval
- Ultra wide 4:1 Input: 9–36, 18–75 and 43–160 VDC
- I/O-isolation 3'000 VDC
- Fully regulated outputs
- Operating temperature range –40°C to +80°C
- Short circuit protection and current limitation
- Remote On/Off
- 3-year product warranty

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 Vnom	Imax	Efficiency
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	81 %
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	80 %
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 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

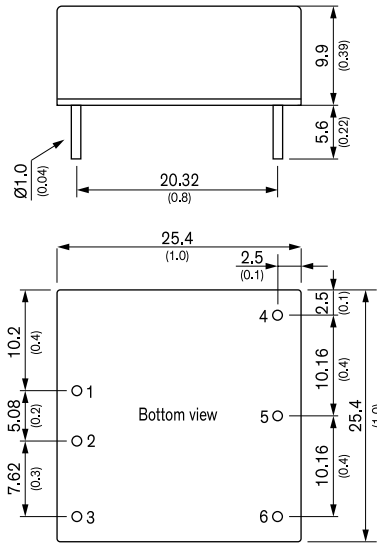
Pinout		
Pin	Single	Dual
1	Remote On/Off	Remote On/Off
2	–Vin (GND)	–Vin (GND)
3	–Vin (GND)	–Vin (GND)
9	ntc	Common
11	ntc	–Vout
14	+Vout	+Vout
16	–Vout	Common
22	+Vin (Vcc)	+Vin (Vcc)
23	+Vin (Vcc)	+Vin (Vcc)

Model	Input Voltage Range	Output Vnom	Imax	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
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
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

NEW!

10 Watt



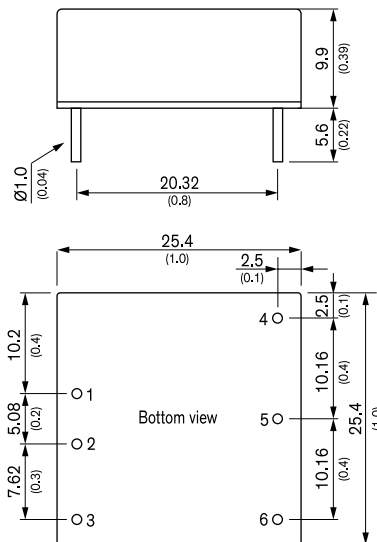
- Compact 1"x1"x0.4" standard package
- Ultra-wide 4:1 input voltage range 9–36, 18–75, 36–160 VDC
- EN 50155 and EN 61373 approval for railway applications
- Qualification for fire behaviour according to EN 45545-2
- I/O-isolation 3'000 VDC
- High efficiency up to 90%
- Operating temperature range -40°C to +90°C
- Under-voltage lock out circuit
- Adjustable output voltage & Remote On/Off'

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		Efficiency
		Vnom	I _{max}	
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
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
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 %

THN 15WIR

15 Watt

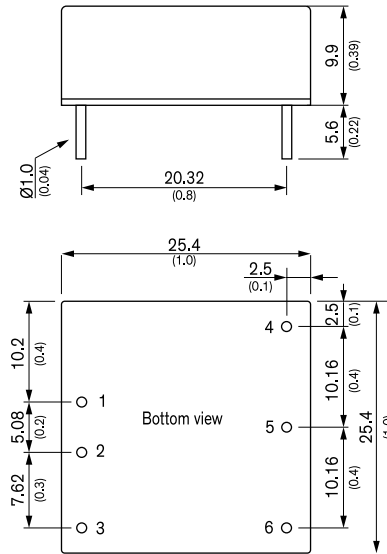


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- Ultra-wide 4:1 input voltage range 9–36, 18–75, 36–160 VDC
- EN 50155 and EN 61373 approval for railway applications
- Qualification for fire behaviour according to EN 45545-2
- I/O-isolation 3'000 VDC
- High efficiency up to 91%
- Operating temperature 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		Efficiency
		Vnom	I _{max}	
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 - under development** **20 Watt**

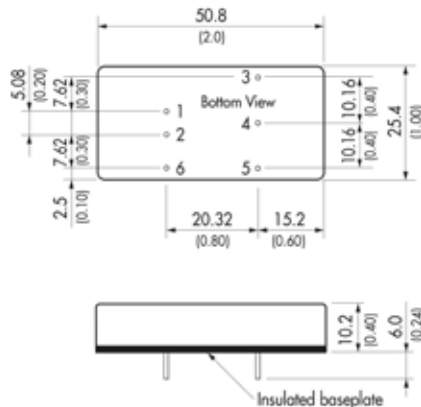


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- I/O-isolation 3'000 VDC
- High efficiency up to 91%
- Operating temperature range -40°C to +90°C
- Under-voltage lock out circuit
- Adjustable output voltage & Remote On/Off

Pinout / Conecction		
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**



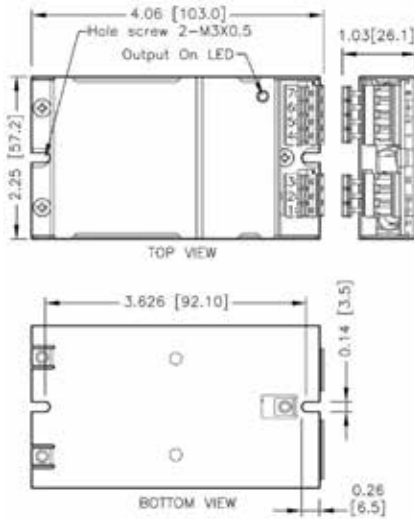
- 2" x 1" metal package
- Ultra wide 4:1 input voltage range 9–36, 18–75, 43–160 VDC
- EN 50155 approval for railway applications
- Thermal shock and vibration resistant according EN 61373
- Input filter meets EN 55032 class B without external components
- High efficiency up to 89%
- No minimum load 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 Vnom	I _{max}	Efficiency
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 %

TEQ 20WIR **20 Watt**

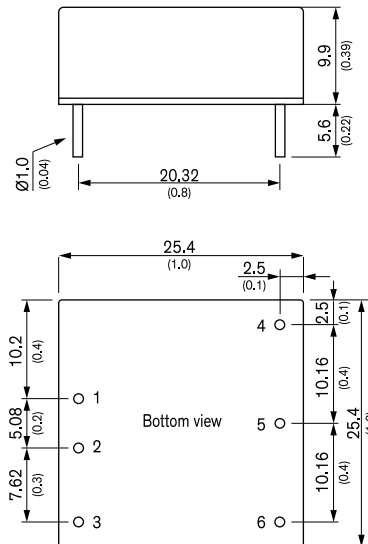


- High power block with excellent thermal convection
- Operating temperature -40°C to +93°
- Ultra wide 4:1 input voltage range
- EN 50155 approval for railway applications
- Excellent efficiency up to 88%
- Input filter meet EN 55032 class B
- I/O isolation up to 2250 VDC
- Under voltage lock-out circuit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

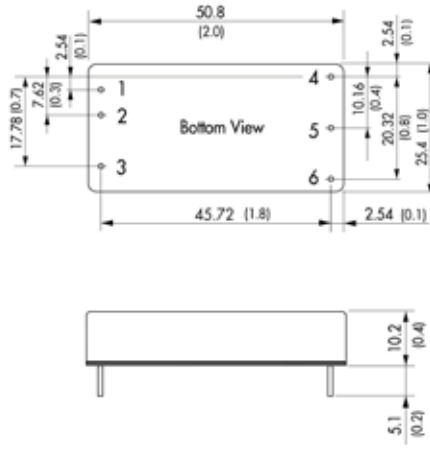


- Compact 1"x1"x0.4" standard package
- Ultra-wide 4:1 input voltage range 9–36, 18–75, 36–160 VDC
- EN 50155 and EN 61373 approval for railway applications
- Qualification for fire behaviour according to EN 45545-2
- I/O-isolation 3'000 VDC
- High efficiency up to 92%
- Operating temperature range -40°C 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

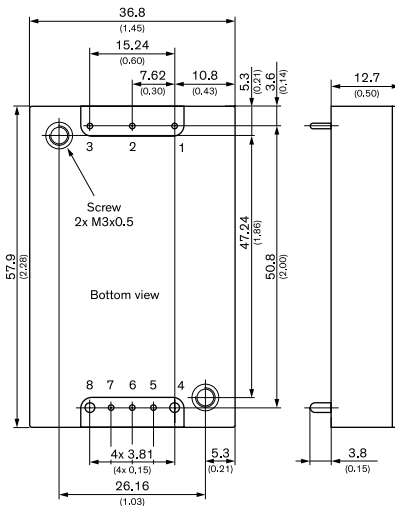
* For heat-sink option drawing see data sheet

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.

TEP 40UIR NEW - under development 40 Watt



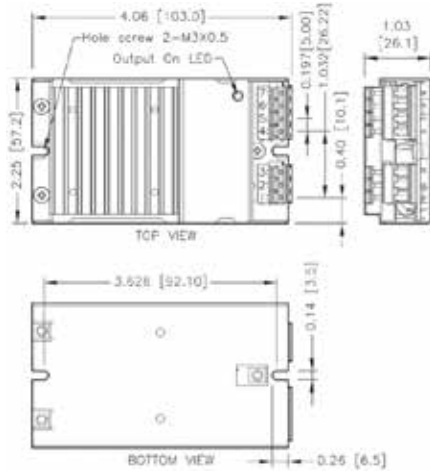
Pin (4, 8): 1.5 (0.06), Pin (other): 1.0 (0.04)

- Compact 2.3"x1.45"x0.5" 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

Model	Input Voltage Range	Output		Efficiency
		Vnom	I _{max}	
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 %

TEQ 40WIR **40 Watt**

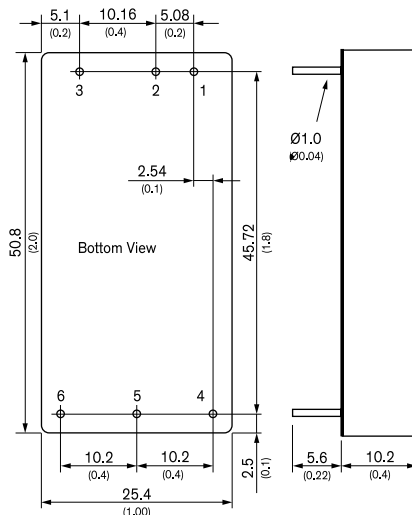


- High power block with excellent thermal convection
- Operating temperature -40°C to +92°
- Ultra wide 4:1 input voltage range
- EN 50155 approval for railway applications
- Excellent efficiency up to 91%
- Input filter meet EN 55032, class B
- I/O isolation up to 3000 VDC
- Under voltage lock-out circuit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

Model	Input Voltage Range	Output		Efficiency
		Vnom	I _{max}	
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		±15 VDC	1330 mA	89 %
TEQ 40-2425WIR	±24 VDC	830 mA	90 %	
TEQ 40-4811WIR	18 - 75 VDC (48 VDC nom.)	5 VDC	8000 mA	90 %
TEQ 40-4812WIR		12 VDC	3330 mA	91 %
TEQ 40-4813WIR		15 VDC	2670 mA	91 %
TEQ 40-4815WIR		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	43 - 160 VDC (110 VDC nom.)	5 VDC	8000 mA	88 %
TEQ 40-7212WIR		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 %	

TEN 60WIR NEW - under development **60 Watt**

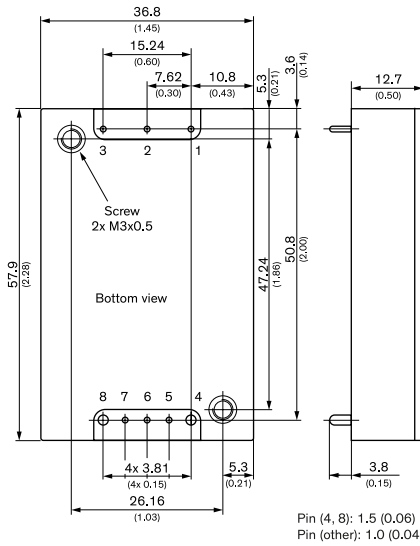


- Compact 2"x1" standard package
- Ultra-wide 4:1 input voltage range 9–36, 18–75, 36–160 VDC
- EN 50155 and EN 61373 approval for railway applications
- Qualification for fire behaviour according to EN 45545-2
- I/O-isolation 3'000 VDC
- High efficiency up to 91%
- Operating temperature range -40°C to +90°C
- Under-voltage lock out circuit
- Adjustable output voltage & Remote On/Off

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

Model	Input Voltage Range	Output		Efficiency
		Vnom	I _{max}	
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 %	

TEP 60UIR **NEW - under development** **60 Watt**

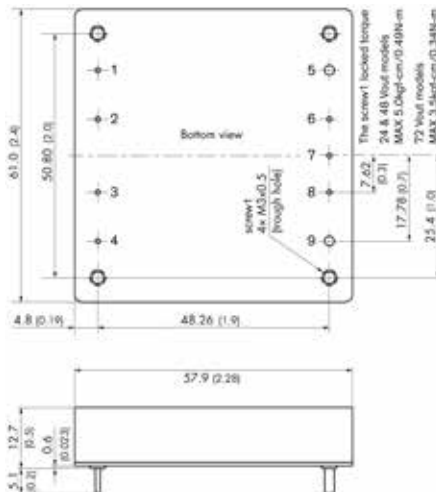


- Compact 2.3"x1.45"x0.5" standard package
- Ultra-wide 12:1 input voltage range 9-75, 14-160 VDC
- EN 50155 and EN 61373 approval for railway applications
- Qualification for fire behaviour according to EN 45545-2
- I/O-isolation 3'000 VAC
- High efficiency up to 92%
- Operating temperature range -40°C 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

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 %

TEP 75WI **75 Watt**



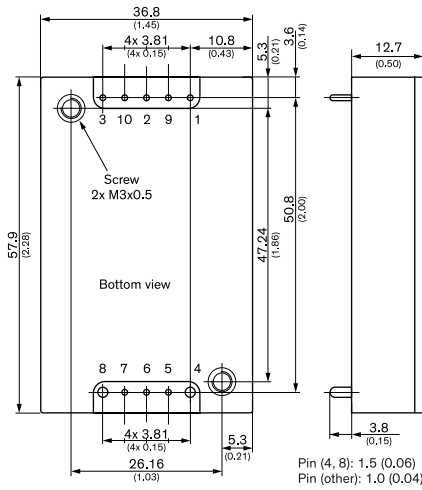
- Rugged, compact metal case
- Screw terminal adaptor available for easy connection
- EN 50155 approval for railway applications
- Ultra wide 4:1 input voltage range
- Full load operation up to +60°C with convection cooling
- Undervoltage lockout
- Reverse input voltage protection
- Input protection 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 Vnom	I _{max}	Efficiency
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**

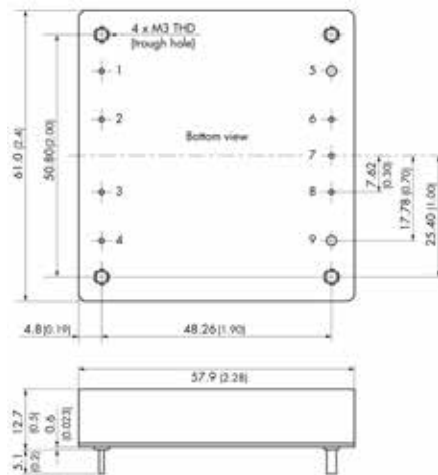


- Compact 2.3"x1.45"x0.5" standard package
- Ultra-wide 12:1 input voltage range 9–75, 14–160 VDC
- EN 50155 and EN 61373 approval for railway applications
- Qualification for fire behaviour according to EN 45545-2
- I/O-isolation 3'000 VAC
- High efficiency up to 92%
- Operating temperature range -40°C 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

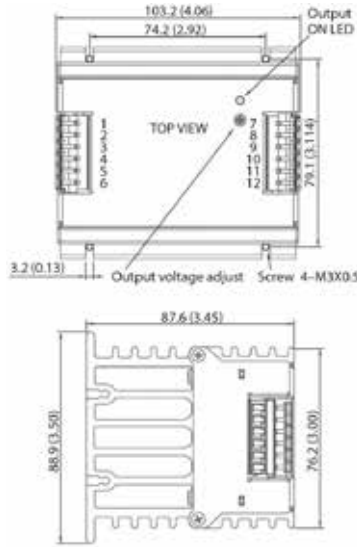
Pinout	
Pin	Function
1	-Vin (GND)
2	Case
3	Remote
4	+Vin (Vcc)
5	-Vout
6	-Sense
7	Trim
8	+Sense
9	+Vout

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

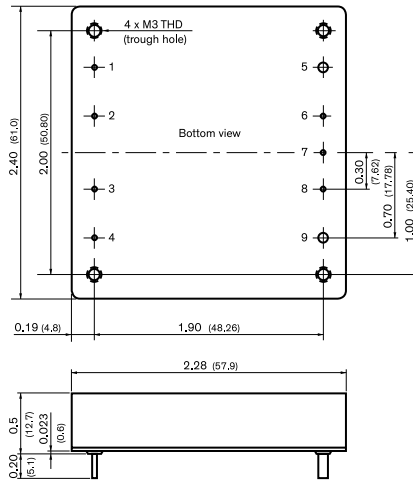


- Shielded metal case with screw terminals
- Ultra wide 4:1 input voltage ranges
- 9-36, 18-75, 43-160 VDC
- EN 50155 approval for railway applications
- Very high efficiency up to 89%
- Constant current output characteristic for battery load applications
- Optional with input filter to meet EN 55032 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 160WIR **160 Watt**

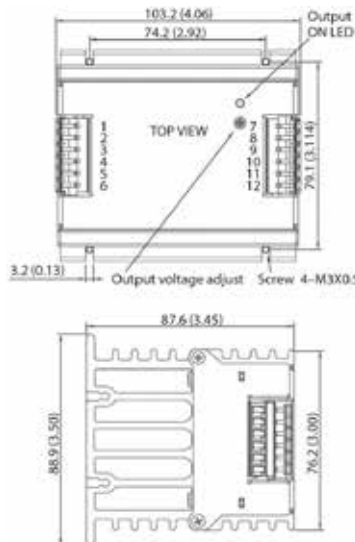


- Compact metal package
- Ultra wide 4:1 input voltage ranges 9–36, 18–75, 43–160 VDC
- EN 50155 approval for railway applications
- Very high efficiency up to 91%
- No minimum load
- Soft start
- Adjustable output voltage +10/-20%
- Sense line
- Remote On/Off input
- Under voltage lock-out circuit

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	18 - 75 VDC (48 VDC nom.)	48 VDC	3000 mA	90 %
TEP 160-4812WIR		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	43 - 160 VDC (110 VDC nom.)	28 VDC	5500 mA	91 %
TEP 160-4818WIR		48 VDC	3200 mA	91 %
TEP 160-7212WIR		12 VDC	15'000 mA	90 %
TEP 160-7213WIR		15 VDC	12'000 mA	90 %
TEP 160-7215WIR	43 - 160 VDC (110 VDC nom.)	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

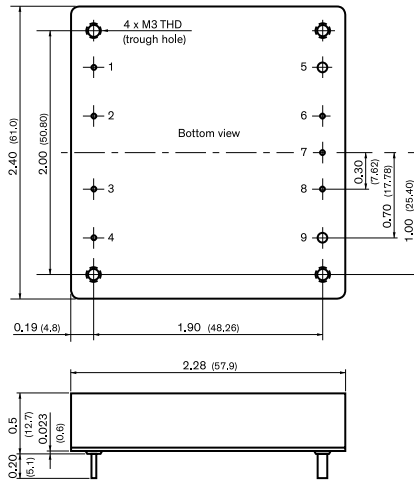
Pin Connection		
Terminal	Pin Function	Recommended Wire
1, 2	-Vin	12 AWG
3	NC	NC
4	On/Off Ctrl	14 - 18 AWG
5, 6	+Vin	12 AWG
7, 8	-Vout	12 AWG
9	-Sense*	14 - 18 AWG
10	+Sense*	14 - 18 AWG
11, 12	+Vout	12 AWG

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



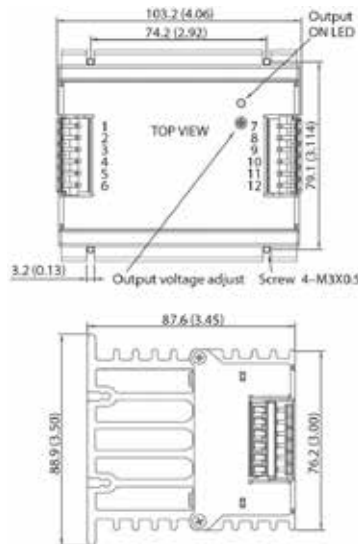
- Compact metal package
- Ultra wide 4:1 input voltage ranges 9–36, 18–75, 43–160 VDC
- EN 50155 approval for railway applications
- Very high efficiency up to 91%
- No minimum load
- Soft start
- Under voltage lock-out circuit
- Adjustable output voltage +10 / -20%
- Sense line

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	18 - 75 VDC (48 VDC nom.)	48 VDC	3700 mA	89 %
TEP 200-4812WIR		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	43 - 160 VDC (110 VDC nom.)	28 VDC	7500 mA	91 %
TEP 200-4818WIR		48 VDC	4500 mA	90 %
TEP 200-7212WIR		12 VDC	20'000 mA	89 %
TEP 200-7213WIR		15 VDC	16'000 mA	90 %
TEP 200-7215WIR	43 - 160 VDC (110 VDC nom.)	24 VDC	10'000 mA	89 %
TEP 200-7216WIR		28 VDC	8500 mA	90 %
TEP 200-7218WIR		48 VDC	5000 mA	89 %

TEQ 200WIR

200 Watt



- High power block with excellent thermal convection
- Operating temperature -40°C to +70°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

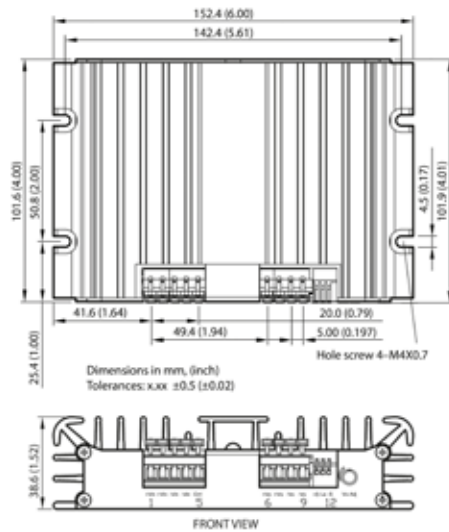
Pin Connection		
Terminal	Pin Function	Recommended Wire
1, 2	-Vin	12 AWG
3	NC	NC
4	Remote	14 - 18 AWG
5, 6	+Vin	12 AWG
7, 8	-Vout	12 AWG
9	-Sense*	14 - 18 AWG
10	+Sense*	14 - 18 AWG
11, 12	+Vout	12 AWG

Model	Input Voltage Range	Output		Efficiency typ.
		Vnom	I _{max}	
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°
- 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		Efficiency typ.
		Vnom	I _{max}	
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).

EXTERNAL DISPLAY



TEQ300WIR

CLIMATE CONTROL



THN15WIR

ON-BOARD COMMUNICATION



TEN20WIR

DOOR CONTROL



TMR3WIR

SWITCH/ SIGNAL CONTROL



TEP100WIR

SURGE PROTECTION



TFI150

BRAKE CONTROL



TEP75WI

Ruggedized Power Solutions DC/DC from 3–300 Watt

- EN 50155: Isolation and EMC immunity
- EN 45545-2: Fire protection
- EN 61373: Shock and vibration immunity
- Input voltage range: 2:1/4:1/12:1
- 3-years warranty

For more information, datasheet and certifications
please visit our website www.tracopower.com

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.

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