

### Features

- ◆ Fully encapsulated low profile plastic case
- ◆ Ultra wide 4:1 input voltage range
- ◆ Operating temperature range  
-40°C to +85°C
- ◆ I/O isolation 2500 VDC (functional)
- ◆ Excellent efficiency up to 92 %
- ◆ Input filter to meet EN 55022, class A
- ◆ Optional DIN-Rail mount adapter
- ◆ No minimum load required
- ◆ Input polarity protection
- ◆ Power good LED indicator
- ◆ Remote On/Off
- ◆ 3-year product warranty



The TMDC 60 Series is a range of encapsulated high performance DC/DC converter modules with ultra wide input voltage ranges. With a very high efficiency of up to 92% and the use of highest grade components these 60 W converters can be operated in an ambient temperature range of -40°C up to 70°C with full load and up to 85°C with 50% load reduction. The EMC immunity is aligned for industrial applications and DIN-rail mount adapters are available as option. Input polarity protection remote On/Off function and power good LED indicator makes this unit to a practical and reliable DC source for any application - Fit and forget!

### Models

Order code	Input voltage range	Output voltage	Output current max.	Efficiency
TMDC 60-2411	9 – 36 VDC (nominal 24 VDC)	5.1 VDC	12'000 mA	90 %
TMDC 60-2412		12 VDC	5'000 mA	91 %
TMDC 60-2415		24 VDC	2500 mA	91 %
TMDC 60-2418		48 VDC	1250 mA	91 %
TMDC 60-4811	18 – 75 VDC (nominal 48 VDC)	5.1 VDC	12'000 mA	91 %
TMDC 60-4812		12 VDC	5'000 mA	92 %
TMDC 60-4815		24 VDC	2500 mA	91 %
TMDC 60-4818		48 VDC	1250 mA	91 %

### Input Specifications

Input current at no load (nominal input voltage)	- 24 Vin	5.1 & 12 VDC models: 100 mA typ. 24 VDC models: 110 mA typ. 48 VDC models: 60 mA typ.
	- 48 Vin	5.1 VDC models: 40 mA typ. 12 & 24 VDC models: 60 mA typ. 48 VDC models: 50 mA typ.
Surge voltage (100 msec. max.)		24 Vin models: 50 V max. 48 Vin models: 100 V max.
Start up time		50 ms max.
Start-up voltage / under voltage lockout		24 Vin models: 9 VDC max./ 7.5 VDC typ.
		48 Vin models: 18 VDC max./ 16 VDC typ.
Conducted noise (input)		EN 55022 class A, FCC part 15 class A (without external components)
EMC immunity	- ESD (electrostatic discharge)	EN 55024 EN 61000-4-2, air $\pm 8$ kV, contact $\pm 4$ kV, perf. criteria A
	- Radiated immunity	EN 61000-4-3, 10 V/m, perf. criteria A
	- Fast transient / surge	EN 61000-4-4, $\pm 2$ kV, perf. criteria A
	- Conducted immunity	EN 61000-4-5, $\pm 2$ kV, perf. criteria A
	- Magnetic field immunity	EN 61000-4-6, 10 Vrms, perf. criteria A EN 61000-4-8, 30 A/m, perf. criteria A

### Output Specifications

Voltage set accuracy		$\pm 2.0$ % max.
Regulation	- Input variation Vin min. to Vin max.	1.5 % max.
	- Load variation 0 – 100 %	1.0 % max.
Minimum load		not required
Temperature coefficient		$\pm 0.02$ %/K
Ripple and noise (20 MHz Bandwidth)		5.1 VDC models: 100 mVpk-pk. typ.
		12 & 24 VDC models: 150 mVpk-pk typ.
		48 VDC models: 200 mVpk-pk. typ.
Transient response (alignment to 1% at load step change 75% to 100% )	- Recovery time	250 $\mu$ s typ.
	- Deviation	$\pm 5$ % max.
Over voltage protection		120 % of Vout (Zener diode clamp)
Output current limitation		at 150 % of Iout max.
Short circuit protection		hiccup mode, automatic recovery
Capacitive load		5.1 VDC models: 20'400 $\mu$ F max.
		12.0 VDC models: 3'540 $\mu$ F max.
		24.0 VDC models: 890 $\mu$ F max.
		48.0 VDC models: 220 $\mu$ F max.

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

### General Specifications

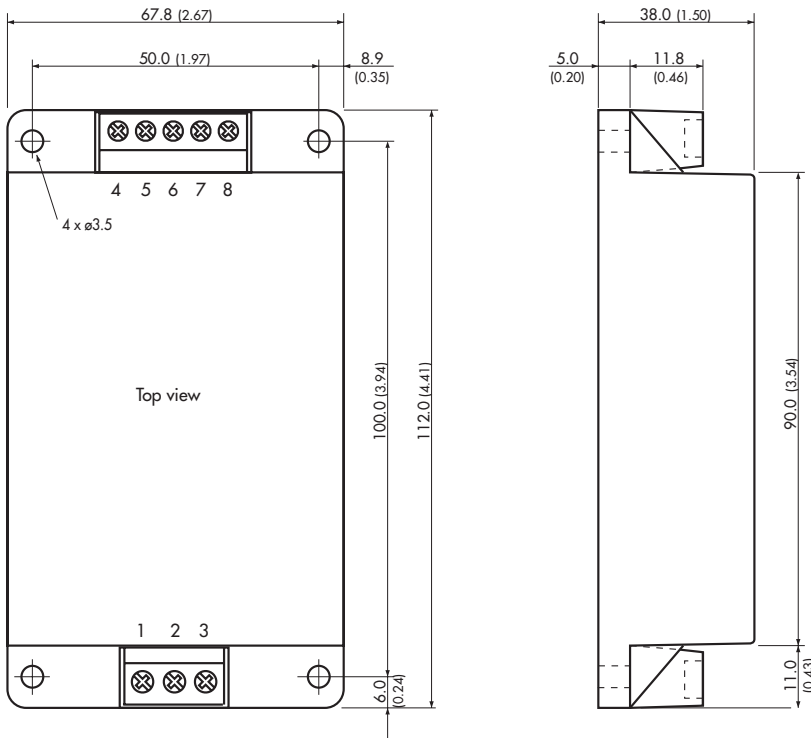
Temperature ranges	<ul style="list-style-type: none"> <li>- Operating ambient with natural convection (20 LFM)</li> <li>- IEC/EN/UL60950-1 approved ambient</li> <li>- Case temperature</li> <li>- Storage</li> </ul>	-40°C to +85°C (see load derating) +60°C max. (without derating) +95°C max. -50°C to +125°C
Load derating (with natural convection 20 LFM)		3.3 %/K above +70°C
Thermal impedance	- Natural convection 20 LFM	3.5 K/W
Humidity (non condensing)		95 % rel H max.
Reliability, calculated MTBF (MIL-HDBK-217F, at +25°C, ground benign)		242'029 h
Isolation voltage (60 sec.)	- Input/Output	2500 VDC
Isolation capacitance	- Input/Output	3000 pF max. (100 kHz, 1 V)
Isolation resistance	- Input/Output	>1000 Mohm (500 VDC)
Altitude during operation		2'000 m max.
Switching frequency		210 kHz typ.
Remote On/Off	<ul style="list-style-type: none"> <li>- On:</li> <li>- Off:</li> <li>- Off idle current:</li> </ul>	3.5 to 12 VDC to on terminal 1 or open circuit. 0 to +1.2 VDC on terminal 1 reference to -Vin 3 mA typ.
Safety standards	<ul style="list-style-type: none"> <li>- CB test report</li> <li>- UL test certificat</li> <li>- Certification documents</li> </ul>	UL/cUL 60950-1 2nd edition, IEC 60950-1:2005 (2nd edition)+Am1:2009 +Am2:2013, EN 60950-1:2006+A11:2009+A1: 2010+A12:2011+A2:2013 UL/cUL 60950-1 2nd edition, CSA C22.2 No. 60950-1-07, 2nd Ed. <a href="http://www.tracopower.com/overview/tmdc60">www.tracopower.com/overview/tmdc60</a>

### Physical Specifications

Casing material		plastic resin (UL 94V-0 rated)
Weight		300 g (10.57 oz)
Soldering temperature		max. 260°C / 10 sec. (1.5 mm from casing)
Environmental compliance	<ul style="list-style-type: none"> <li>- Reach declaration</li> <li>- RoHS</li> </ul>	<a href="http://www.tracopower.com/products/reach-declaration.pdf">www.tracopower.com/products/reach-declaration.pdf</a> directive 2011/65/EU

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**Outline Dimensions**

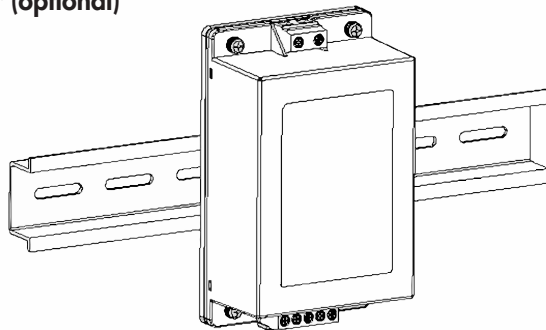


**Terminal connection**

Pin	Single
1	Remote On/Off
2	-Vin (GND)
3	+Vin (Vcc)
4	NC
5	+Vout
6	NC
7	-Vout
8	NC

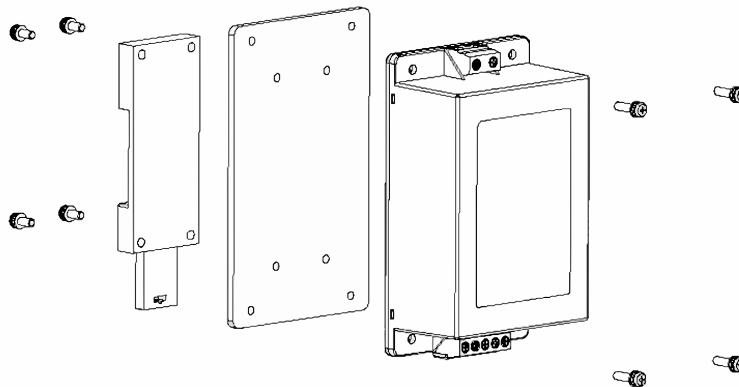
Dimensions in [mm], ( ) = Inch  
 Terminals: Wires 1.5mm<sup>2</sup> max.  
 Recommended tightening torque:  
 0.5 to 0.7 Nm (4.5 to 6.2 lb.in.)  
 Case tolerances: ±0.25 (±0.01)

**DIN-Rail mount adapter (optional)**



**Order code: TMP-MK2**

**Weight: 59 g (2.08 oz) without converter**



Specifications can be changed without notice! Make sure you are using the latest documentation, downloadable at [www.tracopower.com](http://www.tracopower.com)