

- Fully encapsulated low profile plastic case
- Ultra wide 4:1 input voltage range
- Operating temperature range  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$
- I/O isolation 2500 VDC
- Excellent efficiency up to 92 %
- Input filter to meet EN 55022, class A
- Optional DIN-Rail mount adapter
- Power good LED indicator
- Remote on/off function
- 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  $-40^{\circ}\text{C}$  up to  $70^{\circ}\text{C}$  with full load and up to  $85^{\circ}\text{C}$  with 50% load reduction. The EMC immunity is aligned for industrial applications and DIN-rail mount adapters are available as option. Remote On/Off function and power good LED indicator makes this unit a practical and reliable DC source for any application - Fit and forget!

### Models

Order Code	Input Voltage Range	Output Voltage nom.	Output Current max.	Efficiency typ.
TMDC 60-2411	9 - 36 VDC (24 VDC nom.)	5.1 VDC	12'000 mA	90 %
TMDC 60-2412		12 VDC	5'000 mA	91 %
TMDC 60-2415		24 VDC	2'500 mA	91 %
TMDC 60-2418		48 VDC	1'250 mA	91 %
TMDC 60-4811	18 - 75 VDC (48 VDC nom.)	5.1 VDC	12'000 mA	91 %
TMDC 60-4812		12 VDC	5'000 mA	92 %
TMDC 60-4815		24 VDC	2'500 mA	91 %
TMDC 60-4818		48 VDC	1'250 mA	91 %

### Options

TMP-MK2	- Optional DIN-Rail Mounting Kit: <a href="http://www.tracopower.com/products/tmp-mk2.pdf">www.tracopower.com/products/tmp-mk2.pdf</a>
---------	--

### Input Specifications

Input Current	- At no load	24 Vin models: 100 mA typ. 48 Vin models: 50 mA typ.
	- At full load	24 Vin models: 2'770 mA typ. 48 Vin models: 1'380 mA typ.
Surge Voltage		24 Vin models: 50 VDC max. (100 ms max.) 48 Vin models: 100 VDC max. (100 ms max.)
Under Voltage Lockout		24 Vin models: 7.5 VDC typ. 48 Vin models: 16 VDC typ.
Recommended Input Fuse		(The need of an external fuse has to be assessed in the final application.)
Input Filter		Internal Pi-Type

### Output Specifications

Voltage Set Accuracy		±2% max.
Regulation	- Input Variation (Vmin - Vmax)	1.5% max.
	- Load Variation (0 - 100%)	1% max.
Ripple and Noise (20 MHz Bandwidth)	5.1 Vout models:	100 mVp-p max.
	12 Vout models:	150 mVp-p max.
	24 Vout models:	150 mVp-p max.
	48 Vout models:	200 mVp-p max.
Capacitive Load	5.1 Vout models:	20'400 µF max.
	12 Vout models:	3'540 µF max.
	24 Vout models:	890 µF max.
	48 Vout models:	220 µF max.
Minimum Load		Not required
Temperature Coefficient		±0.02 %/K max.
Start-up Time		50 ms max.
Short Circuit Protection		Continuous, Automatic recovery
Output Current Limitation		150% typ. of Iout max.
Overvoltage Protection		120% typ. of Vout nom. (By Zener diode)
Transient Response	- Response Deviation	5% max. (75% to 100% Load Step)
	- Response Time	250 µs typ. (75% to 100% Load Step)

### Safety Specifications

Safety Standards	- IT / Multimedia Equipment	CSA-C22.2, No. 60950-1 EN 60950-1 EN 62368-1 IEC 60950-1 IEC 62368-1 UL 60950-1 UL 62368-1
	- Certification Documents	<a href="http://www.tracopower.com/overview/tmdc60">www.tracopower.com/overview/tmdc60</a>
Pollution Degree		PD 2

### EMC Specifications

EMI Emissions	- Conducted Emissions	EN 61000-6-4 (Generic Industrial) EN 61204-3 (Low Voltage Power Supplies) EN 55032 class A (internal filter) FCC Part 15 class A (internal filter)
	- Radiated Emissions	EN 55032 class A (with external filter) FCC Part 15 class A (with external filter)
	External filter proposal:	<a href="http://www.tracopower.com/overview/tmdc60">www.tracopower.com/overview/tmdc60</a>

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

EMS Immunity	<ul style="list-style-type: none"> <li>- Electrostatic Discharge</li> <li>- RF Electromagnetic Field</li> <li>- EFT (Burst) / Surge</li> <li>- Conducted RF Disturbances</li> <li>- PF Magnetic Field</li> </ul>	EN 55024 (IT Equipment) Air: EN 61000-4-2, $\pm 8$ kV, perf. criteria A Contact: EN 61000-4-2, $\pm 4$ kV, perf. criteria A EN 61000-4-3, 10 V/m, perf. criteria A EN 61000-4-4, $\pm 2$ kV, perf. criteria A EN 61000-4-5, $\pm 2$ kV, perf. criteria A EN 61000-4-6, 10 Vrms, perf. criteria A Continuous: EN 61000-4-8, 30 A/m, perf. criteria A
--------------	--	--

## General Specifications

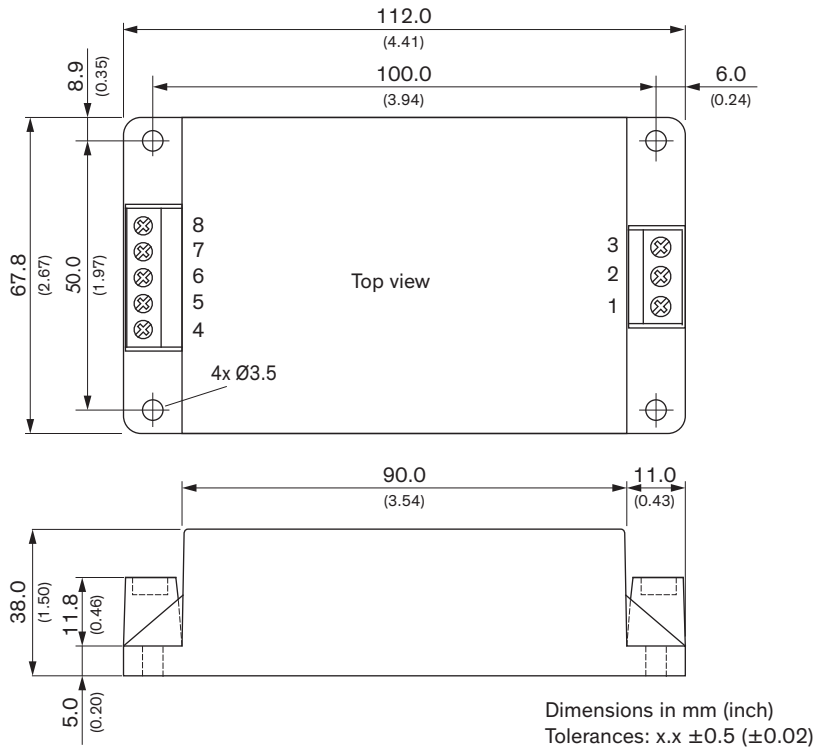
Relative Humidity		95% max. (non condensing)
Temperature Ranges	<ul style="list-style-type: none"> <li>- Operating Temperature</li> <li>- Approved Ambient Temp.</li> <li>- Case Temperature</li> <li>- Storage Temperature</li> </ul>	-40°C to +85°C +60°C max. (for compliance to 60950-1) +95°C max. -50°C to +125°C
Power Derating	<ul style="list-style-type: none"> <li>- High Temperature</li> </ul>	3.3 %/K above 70°C See application note: <a href="http://www.tracopower.com/overview/tmdc60">www.tracopower.com/overview/tmdc60</a>
Cooling System		Natural convection (20 LFM)
Remote Control	<ul style="list-style-type: none"> <li>- Voltage Controlled Remote</li> <li>- Off Idle Input Current</li> <li>- Remote Pin Input Current</li> </ul>	On: 3.5 to 12 VDC or open circuit Off: 0 to 1.2 VDC or short circuit Refers to 'Remote' and '-Vin' Pin 3 mA typ. -0.5 to 0.5 mA
Altitude During Operation		6'000 m max.
Switching Frequency		210 kHz typ. (PWM)
Insulation System		Functional Insulation
Isolation Test Voltage	- Input to Output, 60 s	2'500 VDC
Isolation Resistance	- Input to Output, 500 VDC	1'000 M $\Omega$ min.
Isolation Capacitance	- Input to Output, 100 kHz, 1 V	3'000 pF max.
Reliability	- Calculated MTBF	242'029 h (MIL-HDBK-217F, ground benign)
Housing Material		Plastic (UL 94 V-0 rated)
Potting Material		Silicone (UL 94 V-0 rated)
Housing Type		Plastic Case
Mounting Type		Chassis Mount
Connection Type		Screw Terminal
Weight		300 g
Thermal Impedance		3.5 K/W
Environmental Compliance	<ul style="list-style-type: none"> <li>- REACH Declaration</li> <li>- RoHS Declaration</li> </ul>	<a href="http://www.tracopower.com/info/reach-declaration.pdf">www.tracopower.com/info/reach-declaration.pdf</a> REACH SVHC list compliant REACH Annex XVII compliant <a href="http://www.tracopower.com/info/rohs-declaration.pdf">www.tracopower.com/info/rohs-declaration.pdf</a> Exemptions: 6c, 7c-I (RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule). The SCIP number is provided on request.)

## Supporting Documents

Overview Link (for additional Documents)	<a href="http://www.tracopower.com/overview/tmdc60">www.tracopower.com/overview/tmdc60</a>
--	--

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

**Outline Dimensions**



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

NC: Not Connected  
\* Wires 1.5 mm<sup>2</sup> max.