

DC/DC Converter

TMDC 06H Series, 6 Watt

- Fully encapsulated chassis mount modules
- High 2:1 input voltage range: 80-160 VDC
- Reinforced I/O-isolation 3'000 VAC
- Harsh industrial EMC capabilities: Integrated filters for emission (EN 55032) & immunity (EN 55035)
- Operating temperature range -40 to +80°C without derating
- Protection against overload, undervoltage and short circuit
- DC-OK (LED) and Remote On/Off function
- IEC/EN/UL 62368-1 safety approvals
- 3-year product warranty



The TMDC 06H series complements Traco Power's successful TMDC line of Industrial DC/DC off-board modules. All models provide a high 2:1 input voltage range from 80-160 VDC and a reinforced 3000 VAC isolation voltage as well as fully regulated outputs. Internal filters limit conducted and radiated emissions (EN 55032 class A) but also increase the modules EMC immunity (EN 55035). The modules come in fully encapsulated plastic packages and feature a high temperature range from -40° up to 80°C without derating. Latest IT safety certifications (UL 62368-1) and DC-OK and remote on/off functions complete the package to provide an ideal solution for many harsh industrial and 110 VDC battery applications in need of a reinforced isolation to provide a safe SELV output.

Models

Order Code	Input Voltage Range	Output 1		Output 2		Efficiency typ.
		Vnom	I _{max}	Vnom	I _{max}	
TMDC 06-7211H	80 - 160 VDC (110 VDC nom.)	5.1 VDC	1'200 mA			79 %
TMDC 06-7212H		12 VDC	500 mA			83 %
TMDC 06-7213H		15 VDC	400 mA			83 %
TMDC 06-7215H		24 VDC	250 mA			84 %
TMDC 06-7218H		48 VDC	125 mA			82 %
TMDC 06-7222H		+12 VDC	250 mA	-12 VDC	250 mA	84 %
TMDC 06-7223H		+15 VDC	200 mA	-15 VDC	200 mA	84 %
TMDC 06-7225H		+24 VDC	125 mA	-24 VDC	125 mA	83 %

Options

TMDC-MK1	- Optional DIN-Rail Mounting Kit: www.tracopower.com/overview/tmdc-mk1
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Input Specifications

Input Current	- At no load	8 mA typ.
	- At full load	66 mA typ.
Surge Voltage		170 VDC max. (1 s max.)
Under Voltage Lockout		69 VDC min. / 74 VDC typ.
Recommended Input Fuse		1'250 mA (slow blow)
		(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)	single output models: 0.5% max. dual output models: 0.5% max.
	- Load Variation (0 - 100%)	single output models: 0.5% max. dual output models: 0.5% max. (Output 1) 0.5% max. (Output 2)
	- Voltage Balance (symmetrical load)	dual output models: 2% max.
	- Cross Regulation (25% / 100% asym. load)	dual output models: 5% max.
	- single output	5.1 Vout models: 75 mVp-p typ. 12 Vout models: 75 mVp-p typ. 15 Vout models: 75 mVp-p typ. 24 Vout models: 180 mVp-p typ. 48 Vout models: 180 mVp-p typ.
	- dual output	12 / -12 Vout models: 75 / 75 mVp-p typ. 15 / -15 Vout models: 75 / 75 mVp-p typ. 24 / -24 Vout models: 180 / 180 mVp-p typ.
Capacitive Load	- single output	5.1 Vout models: 680 µF max. 12 Vout models: 330 µF max. 15 Vout models: 330 µF max. 24 Vout models: 150 µF max. 48 Vout models: 68 µF max.
	- dual output	12 / -12 Vout models: 150 / 150 µF max. 15 / -15 Vout models: 150 / 150 µF max. 24 / -24 Vout models: 68 / 68 µF max.
Minimum Load		Not required
Temperature Coefficient		±0.02 %/K max.
Start-up Time		30 ms typ. / 60 ms max.
Short Circuit Protection		Continuous, Automatic recovery
Output Current Limitation		120 - 180% of Iout max.
		150% typ. of Iout max.
Transient Response	- Response Deviation	5% max. (75% to 100% Load Step)
	- Response Time	500 µs max. (75% to 100% Load Step)

Safety Specifications

Standards	- IT / Multimedia Equipment	EN 62368-1 IEC 62368-1 UL 62368-1
	- Certification Documents	www.tracopower.com/overview/tmdc06h
Pollution Degree		PD 3

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

EMC Specifications

EMI (Emissions)	- Conducted Emissions	EN 55032 class A (internal filter) FCC 47 Part 15 class A (internal filter)
	- Radiated Emissions	EN 55032 class A (internal filter) FCC 47 Part 15 class A (internal filter)
EMS (Immunity)	- Electrostatic Discharge	Air: EN 55035 (Multimedia) EN 61000-4-2, ± 8 kV, perf. criteria A
	- RF Electromagnetic Field	Contact: EN 61000-4-2, ± 6 kV, perf. criteria A EN 61000-4-3, 10 V/m, perf. criteria A
	- EFT (Burst) / Surge	EN 61000-4-4, ± 2 kV, perf. criteria A EN 61000-4-5, ± 2 kV, perf. criteria A
	- Conducted RF Disturbances	EN 61000-4-6, 10 Vrms, perf. criteria A
	- PF Magnetic Field	Continuous: EN 61000-4-8, 100 A/m, perf. criteria A
EMC / Environmental	- Certification Documents	www.tracopower.com/overview/tmdc06h

General Specifications

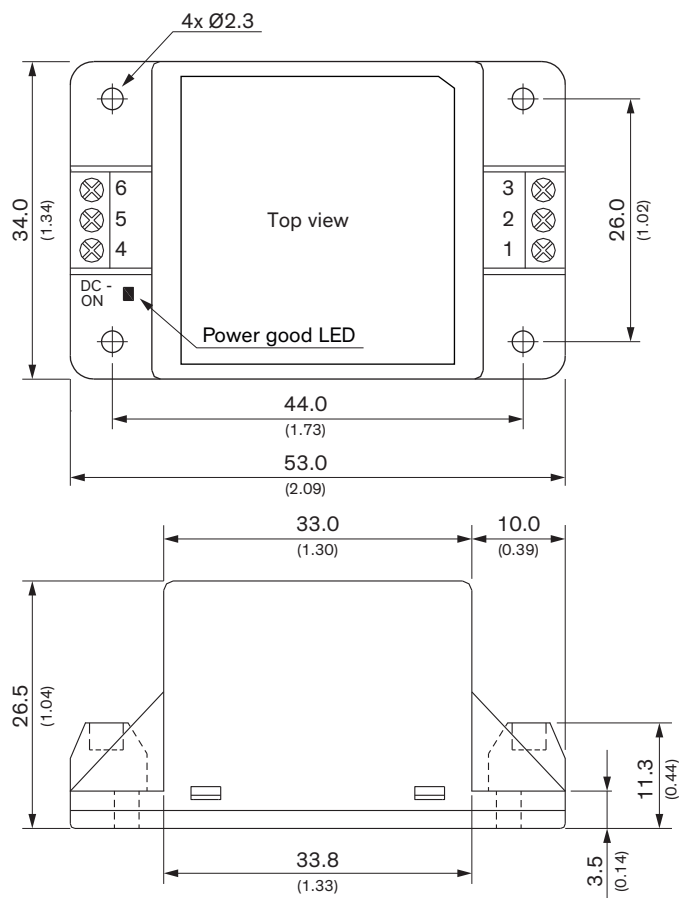
Relative Humidity		95% max. (non condensing)
Temperature Ranges	- Operating Temperature	-40°C to +93°C
	- Case Temperature	+105°C max.
	- Storage Temperature	-50°C to +125°C
Power Derating	- High Temperature	4 %/K above 80°C
	See application note: www.tracopower.com/overview/tmdc06h	
Cooling System		Natural convection (20 LFM)
Remote Control	- Voltage Controlled Remote (passive = on)	On: 3.5 to 12 VDC or open circuit Off: 0 to 1.2 VDC or short circuit Refers to 'Remote' and '-Vin' Pin
	- Off Idle Input Current	2.5 mA typ.
	- Remote Pin Input Current	-0.5 to 0.5 mA
Altitude During Operation		5'000 m max.
Switching Frequency		220 - 280 kHz (PWM)
		250 kHz typ. (PWM)
Insulation System		Reinforced Insulation
Working Voltage (rated)		1'000 VAC
Isolation Test Voltage	- Input to Output, 60 s	3'000 VAC
Isolation Resistance	- Input to Output, 500 VDC	1'000 M Ω min.
Isolation Capacitance	- Input to Output, 100 kHz, 1 V	2'200 pF typ.
Reliability	- Calculated MTBF	4'163'000 h (MIL-HDBK-217F, ground benign)
Housing Material		Plastic resin (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		48 g
Environmental Compliance	- REACH Declaration	www.tracopower.com/info/reach-declaration.pdf REACH SVHC list compliant REACH Annex XVII compliant
	- RoHS Declaration	www.tracopower.com/info/rohs-declaration.pdf Exemptions: 6c, 7a (RoHS exemptions refer to the component concentration only, not to the overall concentration in the product (O5A rule).)
	- SCIP Reference Number	3b583642-a1b6-4a79-9fe6-c04049e41c13

Supporting Documents

Overview Link (for additional Documents)	www.tracopower.com/overview/tmdc06h
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Outline Dimensions



Dimensions in mm (inch)
 Tolerances: x.x ±0.5 (±0.02)
 x.xx ±0.25 (±0.01)

Mounting screw locked torque: 0.2 Nm (2.04 kgfcm)

Pinout		
Pin*	Single Output	Dual Output
1	Remote	Remote
2	-Vin (GND)	-Vin (GND)
3	+Vin (Vcc)	+Vin (Vcc)
4	-Vout	-Vout
5	NC	Common
6	+Vout	+Vout

NC: Not connected

* Wires 1.5 mm² max.

Terminal screw locked torque: 0.2 Nm max.