

- 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 +70°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 10H 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 70°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 <sub>max</sub>	Vnom	I <sub>max</sub>	
TMDC 10-7211H	80 - 160 VDC (110 VDC nom.)	5.1 VDC	2'000 mA			83 %
TMDC 10-7212H		12 VDC	833 mA			85 %
TMDC 10-7213H		15 VDC	666 mA			85 %
TMDC 10-7215H		24 VDC	416 mA			85 %
TMDC 10-7218H		48 VDC	208 mA			83 %
TMDC 10-7222H		+12 VDC	416 mA	-12 VDC	416 mA	85 %
TMDC 10-7223H		+15 VDC	333 mA	-15 VDC	333 mA	85 %
TMDC 10-7225H		+24 VDC	208 mA	-24 VDC	208 mA	84 %

### Input Specifications

Input Current	- At no load	20 mA typ.
	- At full load	108 mA typ.
Surge Voltage		170 VDC max. (1 s max.)
Under Voltage Lockout		65 VDC min. / 78 VDC typ.
Recommended Input Fuse		1'250 mA (slow blow)
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)
	- Cross Regulation (symmetrical load)	dual output models: 2% max.
	- Cross Regulation (25% / 100% asym. load)	dual output models: 5% max.
Ripple and Noise (20 MHz Bandwidth)	- single output	5.1 Vout models: 100 mVp-p max. 12 Vout models: 100 mVp-p max. 15 Vout models: 100 mVp-p max. 24 Vout models: 200 mVp-p max. 48 Vout models: 200 mVp-p max.
	- dual output	12 / -12 Vout models: 100 / 100 mVp-p max. 15 / -15 Vout models: 100 / 100 mVp-p max. 24 / -24 Vout models: 200 / 200 mVp-p max.
Capacitive Load	- single output	5.1 Vout models: 1'000 µF max. 12 Vout models: 470 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: 220 / 220 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

Safety Standards	- IT / Multimedia Equipment	EN 62368-1 IEC 62368-1 UL 62368-1
Pollution Degree		PD 3

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

## EMC Specifications

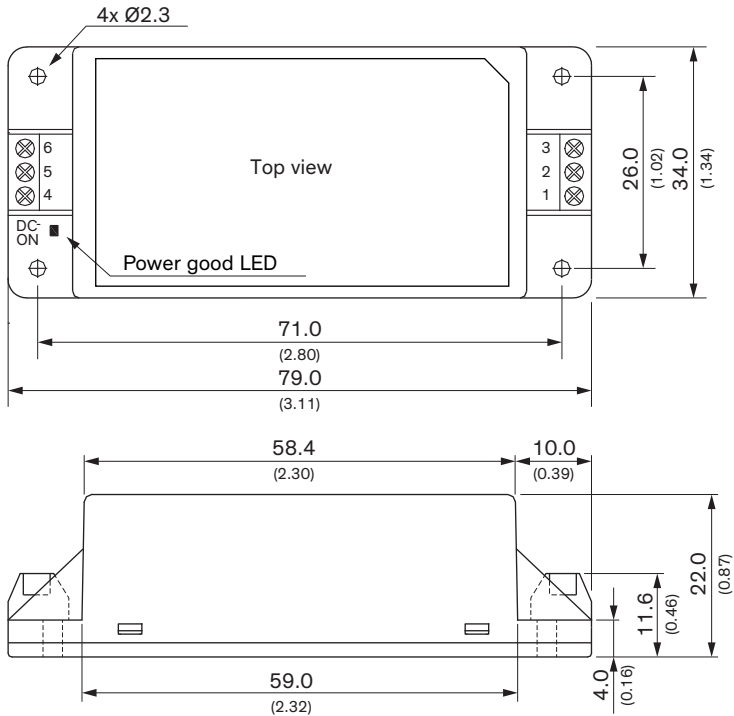
EMI Emissions	- Conducted Emissions	EN 55032 class A (internal filter) FCC Part 15, class A
	- Radiated Emissions	EN 55032 class A (internal filter) FCC Part 15, class A
EMS Immunity	- Electrostatic Discharge	Air: EN 55035 (Multimedia) EN 61000-4-2, ±8 kV, perf. criteria A
	- RF Electromagnetic Field	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

## General Specifications

Relative Humidity		95% max. (non condensing)
Temperature Ranges	- Operating Temperature	-40°C to +87°C
	- Case Temperature	+105°C max.
	- Storage Temperature	-50°C to +125°C
Power Derating	- High Temperature	2.86 %/K above 70°C
Cooling System		Natural convection (20 LFM)
Remote Control	- Voltage Controlled Remote	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		245 - 305 kHz (PWM)
		275 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 MΩ min.
Isolation Capacitance	- Input to Output, 100 kHz, 1 V	2'200 pF typ.
Reliability	- Calculated MTBF	3'746'600 h (MIL-HDBK-217F, ground benign)
Housing Material		Plastic resin (UL 94 V-0 rated)
Connection Type		Screw Terminal
Weight		69 g
Environmental Compliance	- Reach	
	- RoHS	

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

## Outline Dimensions



Dimensions in mm (inch)  
Tolerances: x.x  $\pm 0.5$  ( $\pm 0.02$ )  
x.xx  $\pm 0.25$  ( $\pm 0.01$ )

## 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: No Connection