DC/DC Converter

- Fully encapsulated chassis mount modules
- Harsh industrial EMC capabilities: Integrated filters for emission (EN 55032) & immunity (EN 55035)
- Ultra wide 4:1 input voltage range: 9-36 and 18-75 VDC
- Operating temperature range -40 to +80 °C without derating
- I/O-isolation 3'000 VDC
- 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 10 series (10 Watt) is the latest additions to Traco Power’s existing TMDC line of Industrial DC/DC off-board modules. Equipped with integrated filters which limit conducted and radiated emissions (EN 55032 class A) but also increase the modules EMC immunity (EN 55035), this series is suitable for many harsh industrial applications which require increased EMC and isolation (3000 VDC I/O-isolation) capabilities.

The modules come in fully encapsulated 3.11” x 1.34” x 0.87” plastic package and feature a temperature range from –40° to 80°C without derating. All models have an ultra wide 4:1 input voltage range from either 9-36 VDC or 18-75 VDC and fully regulated outputs. 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 applications.

### Models

<table>
<thead>
<tr>
<th>Order Code</th>
<th>Input Voltage Range</th>
<th>Output 1</th>
<th>Output 2</th>
<th>Efficiency typ.</th>
</tr>
</thead>
<tbody>
<tr>
<td>TMDC 10-2411</td>
<td>9 - 36 VDC (24 VDC nom.)</td>
<td>Vnom: 5.1 VDC, Imax: 2'000 mA</td>
<td>Vnom: 12 VDC, Imax: 833 mA</td>
<td>84 %</td>
</tr>
<tr>
<td>TMDC 10-2412</td>
<td>9 - 36 VDC (24 VDC nom.)</td>
<td>Vnom: 12 VDC, Imax: 833 mA</td>
<td>Vnom: 15 VDC, Imax: 666 mA</td>
<td>86 %</td>
</tr>
<tr>
<td>TMDC 10-2413</td>
<td>9 - 36 VDC (24 VDC nom.)</td>
<td>Vnom: 15 VDC, Imax: 666 mA</td>
<td>Vnom: 24 VDC, Imax: 416 mA</td>
<td>86 %</td>
</tr>
<tr>
<td>TMDC 10-2415</td>
<td>9 - 36 VDC (24 VDC nom.)</td>
<td>Vnom: 24 VDC, Imax: 416 mA</td>
<td>Vnom: 48 VDC, Imax: 208 mA</td>
<td>84 %</td>
</tr>
<tr>
<td>TMDC 10-2418</td>
<td>9 - 36 VDC (24 VDC nom.)</td>
<td>Vnom: 48 VDC, Imax: 208 mA</td>
<td>Vnom: +12 VDC, Imax: 416 mA</td>
<td>86 %</td>
</tr>
<tr>
<td>TMDC 10-2422</td>
<td>18 - 75 VDC (48 VDC nom.)</td>
<td>Vnom: +12 VDC, Imax: 416 mA</td>
<td>Vnom: +15 VDC, Imax: 333 mA</td>
<td>86 %</td>
</tr>
<tr>
<td>TMDC 10-2423</td>
<td>18 - 75 VDC (48 VDC nom.)</td>
<td>Vnom: +15 VDC, Imax: 333 mA</td>
<td>Vnom: +24 VDC, Imax: 208 mA</td>
<td>86 %</td>
</tr>
<tr>
<td>TMDC 10-2425</td>
<td>18 - 75 VDC (48 VDC nom.)</td>
<td>Vnom: +24 VDC, Imax: 208 mA</td>
<td>Vnom: –12 VDC, Imax: 416 mA</td>
<td>86 %</td>
</tr>
<tr>
<td>TMDC 10-4811</td>
<td>18 - 75 VDC (48 VDC nom.)</td>
<td>Vnom: 5.1 VDC, Imax: 2'000 mA</td>
<td>Vnom: 12 VDC, Imax: 833 mA</td>
<td>84 %</td>
</tr>
<tr>
<td>TMDC 10-4812</td>
<td>18 - 75 VDC (48 VDC nom.)</td>
<td>Vnom: 12 VDC, Imax: 833 mA</td>
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</tr>
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</tbody>
</table>

www.tracopower.com  July 13, 2020
Input Specifications

<table>
<thead>
<tr>
<th>Input Current</th>
<th>24 Vin models</th>
<th>48 Vin models</th>
</tr>
</thead>
<tbody>
<tr>
<td>At no load</td>
<td>30 mA typ.</td>
<td>20 mA typ.</td>
</tr>
<tr>
<td>At full load</td>
<td>490 mA typ.</td>
<td>245 mA typ.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Surge Voltage</th>
<th>24 Vin models</th>
<th>48 Vin models</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 VDC max. (1 s max)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>100 VDC max. (1 s max)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Under Voltage Lockout</th>
<th>24 Vin models</th>
<th>48 Vin models</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 VDC typ.</td>
<td></td>
<td>16 VDC typ.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Recommended Input Fuse</th>
<th>(The need of an external fuse has to be assessed in the final application)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input Filter</td>
<td>Internal Pi-Type</td>
</tr>
</tbody>
</table>

Output Specifications

<table>
<thead>
<tr>
<th>Voltage Set Accuracy</th>
<th>±2% max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regulation</td>
<td></td>
</tr>
<tr>
<td>- Input Variation (Vmin - Vmax)</td>
<td>single output models: 0.5% max.</td>
</tr>
<tr>
<td></td>
<td>dual output models: 0.5% max.</td>
</tr>
<tr>
<td>- Load Variation (0 - 100%)</td>
<td>single output models: 0.5% max. (Output 1)</td>
</tr>
<tr>
<td></td>
<td>dual output models: 0.5% max. (Output 2)</td>
</tr>
<tr>
<td>- Voltage Balance (symmetrical load)</td>
<td>dual output models: 2% max.</td>
</tr>
<tr>
<td>- Cross Regulation (25% / 100% asym. load)</td>
<td>dual output models: 5% max.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ripple and Noise (20 MHz Bandwidth)</th>
<th>5.1 Vout models</th>
<th>12 Vout models</th>
<th>15 Vout models</th>
<th>24 Vout models</th>
<th>43 Vout models</th>
<th>12 / -12 Vout models</th>
<th>15 / -15 Vout models</th>
<th>24 / -24 Vout models</th>
</tr>
</thead>
<tbody>
<tr>
<td>- single output</td>
<td>90 mVp-p typ.</td>
<td>90 mVp-p typ.</td>
<td>90 mVp-p typ.</td>
<td>180 mVp-p typ.</td>
<td>180 mVp-p typ.</td>
<td>90 / 90 mVp-p typ.</td>
<td>90 / 90 mVp-p typ.</td>
<td>180 / 180 mVp-p typ.</td>
</tr>
<tr>
<td>- dual output</td>
<td>12 / -12 Vout models</td>
<td>220 / 220 mVp-p typ.</td>
<td>150 / 150 mVp-p typ.</td>
<td>68 / 68 mVp-p typ.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Capacitive Load</th>
<th>5.1 Vout models</th>
<th>12 Vout models</th>
<th>15 Vout models</th>
<th>24 Vout models</th>
<th>48 Vout models</th>
</tr>
</thead>
<tbody>
<tr>
<td>- single output</td>
<td>1'000 µF max.</td>
<td>470 µF max.</td>
<td>330 µF max.</td>
<td>150 µF max.</td>
<td>68 µF max.</td>
</tr>
<tr>
<td>- dual output</td>
<td>12 / -12 Vout models</td>
<td>220 / 220 µF max.</td>
<td>150 / 150 µF max.</td>
<td>68 / 68 µF max.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Minimum Load</th>
<th>Not required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature Coefficient</td>
<td>±0.02 %/K max.</td>
</tr>
<tr>
<td>Start-up Time</td>
<td>60 ms max.</td>
</tr>
<tr>
<td>Short Circuit Protection</td>
<td>Continuous, Automatic recovery</td>
</tr>
<tr>
<td>Output Current Limitation</td>
<td>150% typ. of Iout max.</td>
</tr>
<tr>
<td>Transient Response</td>
<td>- Response Deviation 5% max. (75% to 100% Load Step)</td>
</tr>
<tr>
<td></td>
<td>- Response Time 500 µs max. (75% to 100% Load Step)</td>
</tr>
</tbody>
</table>

Safety Specifications

<table>
<thead>
<tr>
<th>Safety Standards</th>
<th>IT / Multimedia Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety Standards</td>
<td>EN 62368-1</td>
</tr>
<tr>
<td></td>
<td>IEC 62368-1</td>
</tr>
<tr>
<td></td>
<td>UL 62368-1</td>
</tr>
</tbody>
</table>

| 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 (internal filter)
- Radiated Emissions
  - EN 55032 class A (internal filter)
  - FCC Part 15 class A (internal filter)

EMS Immunity
- Electrostatic Discharge
  - Air: EN 61000-4-2, ±8 kV, perf. criteria A
  - Contact: EN 61000-4-2, ±6 kV, perf. criteria A
- RF Electromagnetic Field
  - 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 +93°C
- Case Temperature: +105°C max.
- Storage Temperature: −50°C to +125°C
Power Derating
- High Temperature: 4 %/K above 80°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
  2.5 mA typ.
  - Off Idle Input Current: −0.5 to 0.5 mA
Altitude During Operation 5'000 m max.
Switching Frequency
- Input to Output, 60 s: 330 kHz typ. (PWM)
Insulation System
- Functional Insulation
Isolation Test Voltage
- Input to Output, 60 s: 3'000 VDC
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: 4'100'000 h (MIL-HDBK-217F, ground benign)
Housing Material
- Plastic resin (UL 94 V-0 rated)
Connection Type
- Screw Terminal
Weight
- 65.8 g
Thermal Impedance
- 4.3 K/W (at 70°C)
Environmental Compliance
- Reach
- RoHS
www.tracopower.com/info/reach-declaration.pdf
www.tracopower.com/info/rohs-declaration.pdf

Supporting Documents
Overview Link (for additional Documents)

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

Pinout

<table>
<thead>
<tr>
<th>Pin*</th>
<th>Single Output</th>
<th>Dual Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Remote</td>
<td>Remote</td>
</tr>
<tr>
<td>2</td>
<td>–Vin (GND)</td>
<td>–Vin (GND)</td>
</tr>
<tr>
<td>3</td>
<td>+Vin (Vcc)</td>
<td>+Vin (Vcc)</td>
</tr>
<tr>
<td>4</td>
<td>–Vout</td>
<td>–Vout</td>
</tr>
<tr>
<td>5</td>
<td>NC</td>
<td>Common</td>
</tr>
<tr>
<td>6</td>
<td>+Vout</td>
<td>+Vout</td>
</tr>
</tbody>
</table>

NC: No Connection

* Wires 1.5 mm² max.

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