

- 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 +85°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 20H 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 85°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 20-7211H | 80 - 160 VDC<br>(110 VDC nom.) | 5.1 VDC  | 4'000 mA         |          |                  | 87 %            |
| TMDC 20-7212H |                                | 12 VDC   | 1'670 mA         |          |                  | 88 %            |
| TMDC 20-7213H |                                | 15 VDC   | 1'340 mA         |          |                  | 88 %            |
| TMDC 20-7215H |                                | 24 VDC   | 830 mA           |          |                  | 88 %            |
| TMDC 20-7218H |                                | 48 VDC   | 420 mA           |          |                  | 86 %            |
| TMDC 20-7222H |                                | +12 VDC  | 830 mA           | -12 VDC  | 830 mA           | 87 %            |
| TMDC 20-7223H |                                | +15 VDC  | 670 mA           | -15 VDC  | 670 mA           | 87 %            |
| TMDC 20-7225H |                                | +24 VDC  | 420 mA           | -24 VDC  | 420 mA           | 87 %            |

### Options

|         |  |
|---------|--|
| TMP-MK1 | - Optional Din-Rail mounting kit: <a href="http://www.tracopower.com/products/tmp-mk1.pdf">www.tracopower.com/products/tmp-mk1.pdf</a> |
|---------|--|

### Input Specifications

|                        |                |                            |
|------------------------|----------------|----------------------------|
| Input Current          | - At no load   | 10 mA typ.                 |
|                        | - At full load | 209 mA typ.                |
| Surge Voltage          |                | 170 VDC max. (100 ms max.) |
| Under Voltage Lockout  |                | 65 VDC min. / 70 VDC typ.  |
| Recommended Input Fuse |                | 1'800 mA                   |
| Input Filter           |                | Internal Pi-Type           |

### Output Specifications

|                                     |  |   |
|-------------------------------------|--|---|
| Voltage Set Accuracy                |  | ±2% max.  |
| Regulation                          | - Input Variation (Vmin - Vmax)            | single output models: 1% max.<br>dual output models: 1% max.  |
|                                     | - Load Variation (0 - 100%)                | single output models: 1% max.<br>dual output models: 1% max. (Output 1)<br>1% max. (Output 2)   |
|                                     | - Voltage Balance (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.<br>12 Vout models: 150 mVp-p max.<br>15 Vout models: 150 mVp-p max.<br>24 Vout models: 150 mVp-p max.<br>48 Vout models: 200 mVp-p max. |
|                                     | - dual output                              | 12 / -12 Vout models: 150 / 150 mVp-p max.<br>15 / -15 Vout models: 150 / 150 mVp-p max.<br>24 / -24 Vout models: 200 / 200 mVp-p max.                                  |
| Capacitive Load                     | - single output                            | 5.1 Vout models: 6'800 µF max.<br>12 Vout models: 1'200 µF max.<br>15 Vout models: 750 µF max.<br>24 Vout models: 300 µF max.<br>48 Vout models: 75 µF max.             |
|                                     | - dual output                              | 12 / -12 Vout models: 380 / 380 µF max.<br>15 / -15 Vout models: 380 / 380 µF max.<br>24 / -24 Vout models: 150 / 150 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           |  | 180% max. of Iout max.<br>150% typ. of Iout max.  |
| Overvoltage Protection              |  | 120% typ. of Vout nom.<br>(5.1, 15, ±15 Vout models)<br>125% typ. of Vout nom. (other models)<br>(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 | EN 62368-1<br>IEC 62368-1<br>UL 62368-1  |
|                  | - Certification Documents   | <a href="http://www.tracopower.com/overview/tmdc20h">www.tracopower.com/overview/tmdc20h</a> |

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)<br>FCC Part 15, class A   |
|               | - Radiated Emissions        | EN 55032 class A (internal filter)<br>FCC Part 15, class A   |
|               |                             | External filter proposal: <a href="http://www.tracopower.com/overview/tmdc20h">www.tracopower.com/overview/tmdc20h</a> |
| EMS Immunity  | - Electrostatic Discharge   | Air: EN 55035 (Multimedia)<br>EN 61000-4-2, ±8 kV, perf. criteria A  |
|               | - RF Electromagnetic Field  | Contact: EN 61000-4-2, ±6 kV, perf. criteria A<br>EN 61000-4-3, 10 V/m, perf. criteria A                               |
|               | - EFT (Burst) / Surge       | EN 61000-4-4, ±2 kV, perf. criteria A<br>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

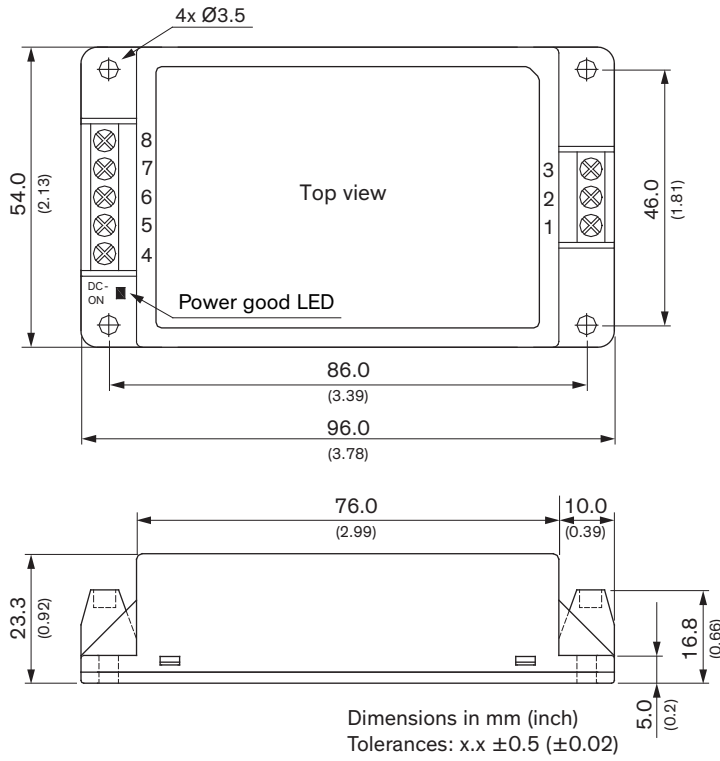
|                          |                                 |  |
|--------------------------|---------------------------------|--|
| Relative Humidity        |                                 | 95% max. (non condensing)  |
| Temperature Ranges       | - Operating Temperature         | -40°C to +95°C   |
|                          | - Case Temperature              | +105°C max.  |
|                          | - Storage Temperature           | -50°C to +125°C  |
| Power Derating           | - High Temperature              | 4.76 %/K above 84°C  |
| Cooling System           |                                 | Natural convection (20 LFM)  |
| Remote Control           | - Voltage Controlled Remote     | On: 3.5 to 12 VDC or open circuit<br>Off: 0 to 1.2 VDC or short circuit<br>Refers to 'Remote' and '-Vin' Pin     |
|                          | - Off Idle Input Current        | 3 mA typ.  |
|                          | - Remote Pin Input Current      | -0.5 to 0.5 mA   |
| Switching Frequency      |                                 | 187 - 253 kHz (PWM) (5.1 Vin models)<br>238 - 322 kHz (PWM) (other models)                                       |
| 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 max.  |
| Reliability              | - Calculated MTBF               | 697'000 h (MIL-HDBK-217F, ground benign)   |
| Housing Material         |                                 | Plastic resin (UL 94 V-0 rated)  |
| Connection Type          |                                 | Screw Terminal   |
| Weight                   |                                 | 107 g  |
| Environmental Compliance | - Reach                         | <a href="http://www.tracopower.com/info/reach-declaration.pdf">www.tracopower.com/info/reach-declaration.pdf</a> |
|                          | - RoHS                          | <a href="http://www.tracopower.com/info/rohs-declaration.pdf">www.tracopower.com/info/rohs-declaration.pdf</a>   |

### Supporting Documents

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|--|--|
| Overview Link (for additional Documents) | <a href="http://www.tracopower.com/overview/tmdc20h">www.tracopower.com/overview/tmdc20h</a> |
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**Outline Dimensions**



| Pinout |               |             |
|--------|---------------|-------------|
| Pin    | Single Output | Dual Output |
| 1      | Remote        | Remote      |
| 2      | -Vin (GND)    | -Vin (GND)  |
| 3      | +Vin (Vcc)    | +Vin (Vcc)  |
| 4      | NC            | NC          |
| 5      | -Vout         | -Vout       |
| 6      | NC            | Common      |
| 7      | +Vout         | +Vout       |
| 8      | NC            | NC          |

NC: Not Connected