

T3DMM6-5 Data Sheet

6.5 Digit Digital Multimeter

Broad Measurement Range

DC: 1000 Volts

AC: 750 Volts

Current: 10A



Tools for Improved Debugging

- **Wide range of measurements** – DC/AC voltage and Current, Resistance, Capacitance, Frequency, Period, Temperature, and more.
 - ✔ **More application coverage from a single Digital multimeter.**
- **True-RMS measurements** – All AC Voltage and Current ranges give True-RMS readings.
 - ✔ **Excellent accuracy regardless of the waveform shape.**
- **Low level measurement, high sensitivity ranges** – Voltage ranges as low as 200 mV full scale, DC Current 200 μ A, AC Current 200 μ A full scale.
 - ✔ **High sensitivity ranges give greater accuracy of small signal measurements.**
- **Advanced measurement features** – Min, Max, Average, Standard Deviation dBm/dB, Pass/fail, Histogram, Trend, Relative measurements.
 - ✔ **Advanced features for today's measurement needs.**
- **Built-in cold terminal thermocouple compensation** – 4.3 inch (10.92 cm) color TFT-LCD 480 x 272 display.
 - ✔ **Accurate Temperature measurements.**
- **USB Device, USB Host and LAN support**
 - ✔ **Remote control your measurements.**

Key Specifications

| | |
|---------------------|-----------------------|
| DC Voltage | 200 mV to 1000 V |
| DC Current | 200 μ A to 10 A |
| True RMS AC Voltage | 200 mV to 750 V |
| True RMS AC Current | 200 μ A to 10 A |
| 2/4 Wire Resistance | 200 Ohms to 100 MOhms |
| Connectivity | USB Device, LAN |
| Remote Control | SCPI, LabView Driver |

PRODUCT OVERVIEW

Teledyne Test Tools T3DMM6-5 is a 6½ digit digital multimeter incorporating the latest 4.3 inch (10.92cm) dual-display technology which can be configured to show data histograms, Data fluctuation Trends, Bar Graph, Statistics or the traditional Number mode, all in an easy to use interface.

A great feature of the Teledyne Test Tools T3DMM6-5 is it's ability to made highly accurate True RMS AC Voltage and Current measurements, meaning no loss of accuracy even when measuring complex voltage and current waveforms.

The T3DMM6-5 is especially well suited for the needs of High precision multifunctional environments, as well as supporting a full range of automatic measurements.

Main Functions

Basic Measurement Function

- DC Voltage: 200 mV ~ 1000 V
- DC Current: 200 μ A ~ 10 A
- AC Voltage: True-RMS, 200 mV ~ 750 V
- AC Current: True-RMS, 200 μ A ~ 10 A
- 2/4-Wire Resistance: 200 Ω ~ 100 M Ω
- Capacitance: 2 nF ~ 100 mF
- Continuity Test: Range is fixed at 2 k Ω
- Diode Test: Adjustable range is 0 ~ 4 V.
- Frequency Measurement: 3 Hz ~ 1 MHz
- Period Measurement: 1 μ s ~ 333 ms
- Temperature: Support for TC and RTD sensor
- Max, Min, Average, Standard Deviation, dBm/dB, Relative Measurement, Pass/Fail Histogram, Trend Chart, Bar Graph

User-friendly Design

- 4.3" TFT-LCD, 480*272
- Dual display, Chinese and English Menu
- Built-in front panel accessible help system
- File management (support for U-disc and local storage)

Application fields

- Research Laboratory
- Development Laboratory
- Repair and Maintenance
- Calibration Laboratory
- Automatic Production Test
- General bench-top use

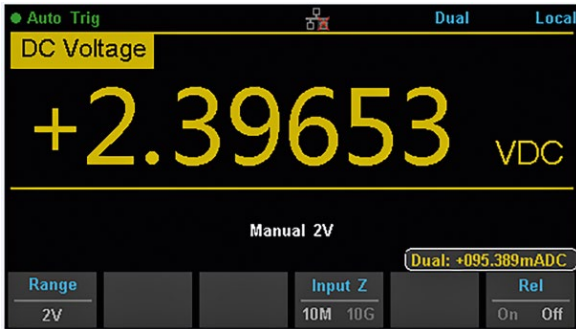
Main Features

- Real 6½ digit (2,200,000 count) readings resolution
- Up to 10,000 rdgs/s measurement speed
- True-RMS AC Voltage and AC Current measuring
- 1 Gb flash memory for mass storage configuration files and data files
- Built-in cold terminal compensation for thermocouple
- Standard interface: USB Device, USB Host, LAN
- USB & LAN remote interfaces support common SCPI command set. Compatible with other popular DMMs on the market.

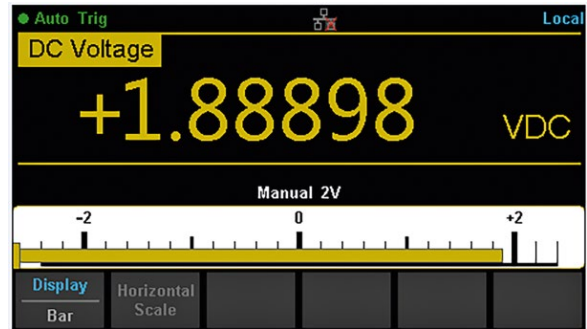


SPECIAL FEATURES

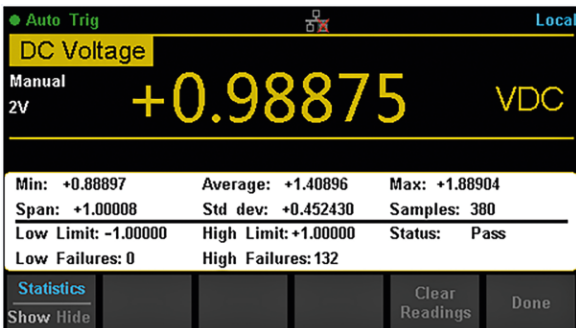
Dual Display



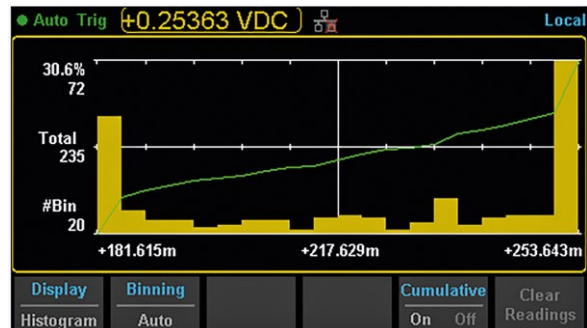
Bar Chart



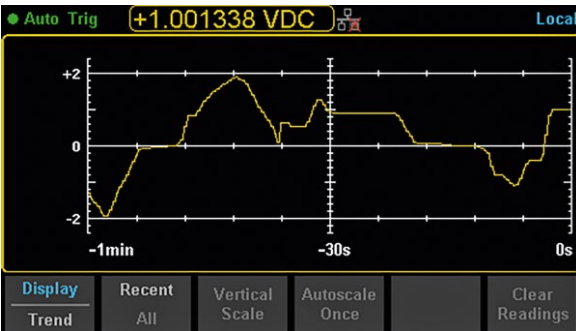
Statistics



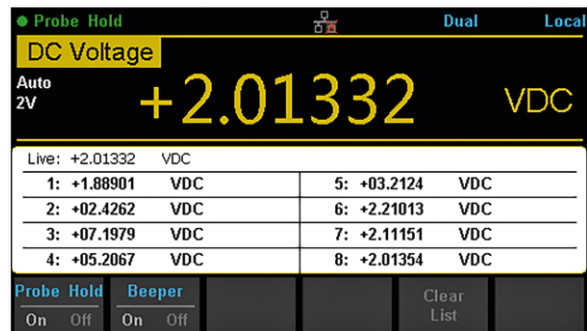
Histogram



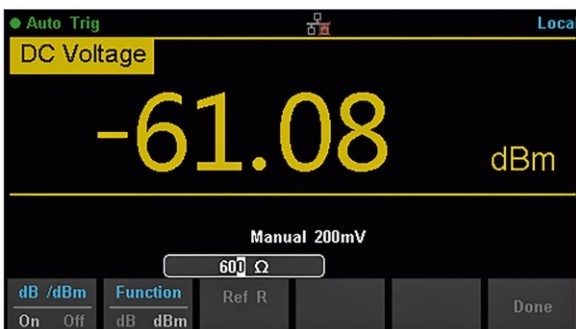
Trend Chart



Hold Measurement



dBm Hold Measurement



Rear Panel Interfaces



SPECIFICATIONS

DC Characteristics

Accuracy \pm (% of reading + % of range)¹⁾

| Function | Range ²⁾ | Test Current Or Shunt Voltage | 24 Hour ³⁾ TCAL °C \pm 1°C | 90 day TCAL °C \pm 5°C | 1 Year TCAL °C \pm 5°C | Temperature coefficient 0°C to (TCAL °C - 5°C) (TCAL °C + 5°C) to 50°C |
|--------------------------|--------------------------|-------------------------------|--|-----------------------------|-----------------------------|--|
| DC Voltage | 200.0000 mV | | 0.0020 + 0.0015 | 0.0030 + 0.0020 | 0.0040 + 0.0023 | 0.0005 + 0.0003 |
| | 2.000000 V | | 0.0015 + 0.0004 | 0.0020 + 0.0004 | 0.0035 + 0.0006 | 0.0005 + 0.0001 |
| | 20.00000 V | | 0.0020 + 0.0003 | 0.0030 + 0.0004 | 0.0040 + 0.0004 | 0.0005 + 0.0001 |
| | 200.0000 V | | 0.0020 + 0.0005 | 0.0040 + 0.0004 | 0.0050 + 0.0005 | 0.0005 + 0.0001 |
| | 1000.000 V ⁴⁾ | | 0.0020 + 0.0005 | 0.0040 + 0.0008 | 0.0055 + 0.0008 | 0.0005 + 0.0001 |
| DC Current | 200.0000 μ A | < 0.03V | 0.009 + 0.010 | 0.040 + 0.005 | 0.050 + 0.005 | 0.0020 + 0.0026 |
| | 2.000000 mA | < 0.25V | 0.007 + 0.001 | 0.030 + 0.001 | 0.050 + 0.002 | 0.0020 + 0.0001 |
| | 20.00000 mA | < 0.07 V | 0.006 + 0.008 | 0.030 + 0.005 | 0.050 + 0.005 | 0.0020 + 0.0015 |
| | 200.0000 mA | < 0.7V | 0.009 + 0.001 | 0.030 + 0.001 | 0.050 + 0.002 | 0.0020 + 0.0001 |
| | 2.000000 A | < 0.12 V | 0.045 + 0.015 | 0.080 + 0.005 | 0.100 + 0.012 | 0.0050 + 0.0008 |
| | 10.00000 A ⁵⁾ | < 0.6 V | 0.090 + 0.002 | 0.120 + 0.005 | 0.150 + 0.005 | 0.0050 + 0.0018 |
| Resistance ⁶⁾ | 200.0000 Ω | 1 mA | 0.0030 + 0.0031 | 0.008 + 0.005 | 0.010 + 0.004 | 0.0006 + 0.0006 |
| | 2.000000 K Ω | 1 mA | 0.0020 + 0.0005 | 0.008 + 0.001 | 0.010 + 0.001 | 0.0006 + 0.0001 |
| | 20.00000 K Ω | 100 μ A | 0.0020 + 0.0005 | 0.008 + 0.001 | 0.010 + 0.001 | 0.0006 + 0.0001 |
| | 200.0000 K Ω | 10 μ A | 0.0020 + 0.0005 | 0.008 + 0.001 | 0.010 + 0.001 | 0.0006 + 0.0001 |
| | 1.000000 M Ω | 2 μ A | 0.0020 + 0.0010 | 0.010 + 0.001 | 0.012 + 0.001 | 0.0010 + 0.0002 |
| | 10.00000 M Ω | 200 nA | 0.015 + 0.001 | 0.030 + 0.001 | 0.040 + 0.001 | 0.0030 + 0.0005 |
| | 100.0000 M Ω | 200 nA 10 M Ω | 0.300 + 0.010 | 0.800 + 0.010 | 0.800 + 0.010 | 0.1500 + 0.0002 |
| Diode Test ⁷⁾ | 0 ~ 2V | 1 mA | 0.002 + 0.009 | 0.008 + 0.020 | 0.010 + 0.020 | 0.0010 + 0.0020 |
| | 2 ~ 4V | 1 mA | 0.002 + 0.010 | 0.008 + 0.020 | 0.010 + 0.020 | 0.0010 + 0.0020 |
| Continuity Test | 2000.0 Ω | 1 mA | 0.002 + 0.010 | 0.008 + 0.020 | 0.010 + 0.020 | 0.0010 + 0.0020 |

Remarks:

¹⁾ Specifications are for 90-minute warm-up and 100 NPLC integration time. For integration time <100 NPLC, add the appropriate "RMS Noise Adder" listed in the following table.

²⁾ 10 % over range on all ranges except DCV 1000 V and DCI 10 A range.

³⁾ Relative to calibration standards.

⁴⁾ For each additional volt over \pm 500 V, add 0.03 mV error.

⁵⁾ For continuous current > 7A DC or 7A AC RMS, use 30 seconds ON followed by 30 seconds OFF.

⁶⁾ Specifications are for 4-wire resistance measurement or 2-wire resistance measurement using REL operation. Without REL operation, add 0.2 Ω additional error in 2-wire resistance measurement.

⁷⁾ Accuracy specifications for the voltage measured at the input terminal only. 1 mA test current is typical. Variation in the current source will create some variation in the voltage drop across a diode junction. Adjustable voltage range: 0 ~ 4V.

Performance Versus Integration Time – 50 Hz (60 Hz) Power-line Frequency

| Integration Time | Resolution ¹⁾ (ppm Range) | NMRR ²⁾ (dB) | Readings/s ³⁾ | | RMS Noise Adder ⁴⁾ (% of Range) | | | |
|--|---|----------------------------|--------------------------|-------|--|--|----------------------------------|--|
| | | | 50 Hz | 60 Hz | DCV 20 V | DCV 2 V 200 V Resistance 2 K Ω 20 K Ω | DCV 1000 V DCI 2 mA 200 mA | DCV 200 mV Resistance 200 Ω DCI 10 A |
| Number of Power line Cycles ⁵⁾ (NPLC) | | | | | | | | |
| 0.005(0.006) | 2.7 | 0 | 10000 | 10000 | 0.0006 | 0.0008 | 0.0015 | 0.0040 |
| 0.05 (0.06) | 1.6 | 0 | 1000 | 1000 | 0.0004 | 0.0005 | 0.0008 | 0.0025 |
| 0.5 (0.6) | 1 | 0 | 100 | 100 | 0.0003 | 0.0003 | 0.0006 | 0.0025 |
| 1 | 0.22 | 60 | 50 | 60 | 0 | 0.0001 | 0.0002 | 0.0005 |
| 10 | 0.08 | 60 | 5 | 6 | 0 | 0 | 0 | 0.0002 |
| 100 | 0.035 | 60 | 0.5 | 0.6 | 0 | 0 | 0 | 0 |

Remarks:

¹⁾ Typical value. Resolution is defined as the typical 20V range RMS noise.

²⁾ Normal mode rejection ratio for power-line frequency $\pm 0.1\%$. For power-line frequency $\pm 1\%$, subtract 20 dB. For $\pm 3\%$, subtract 30 dB.

³⁾ Maximum rate for DCV, DCI, 2-wire resistance and 4-wire resistance functions.

⁴⁾ The basic DC accuracy specifications include RMS noise at 100 NPLC. For <100 NPLC, add "RMS Noise Adder" to the basic DC accuracy specifications.

⁵⁾ When the power line frequency is 60 Hz, the cycles are 0.006, 0.06, 0.6, 1, 10, 100 NPLC.

SFDR & SINAD¹⁾

| Function | Range | Spurious-Free Dynamic Range (SFDR) | Signal-to-Noise-and-Distortion (SINAD) |
|----------|-------------|------------------------------------|--|
| DCV | 200 mV | 80 | 75 |
| | 2 V | 76 | 80 |
| | 20 V | 78 | 72 |
| | 200 V | 80 | 78 |
| | 1000 V | 82 | 80 |
| DCI | 200 μ A | 90 | 70 |
| | 2 mA | 90 | 80 |
| | 20 mA | 85 | 70 |
| | 200 mA | 80 | 75 |
| | 2 A | 70 | 60 |

¹⁾ Typical value. -1 dB FS, 1k Hz single tone. 100 μ s aperture time and auto zero off.

SPECIFICATIONS

AC Characteristics

Accuracy \pm (% of reading + % of range)¹⁾

| Function | Range ²⁾ | Frequency Range | 24 Hour ³⁾ TCAL °C \pm 1°C | 90 day TCAL °C \pm 5°C | 1 Year TCAL °C \pm 5°C | Temperature coefficient 0°C to (TCAL °C - 5°C) (TCAL °C + 5°C) to 50°C |
|-----------------------------------|---------------------|-------------------|--|-----------------------------|-----------------------------|--|
| True-RMS AC Voltage ⁴⁾ | 200.0000 mV | 3 Hz – 5 Hz | 1.00 + 0.03 | 1.00 + 0.04 | 1.00 + 0.04 | 0.100 + 0.004 |
| | | 5 Hz – 10 Hz | 0.35 + 0.03 | 0.35 + 0.04 | 0.35 + 0.04 | 0.035 + 0.005 |
| | | 10 Hz – 20 kHz | 0.04 + 0.03 | 0.05 + 0.04 | 0.06 + 0.04 | 0.005 + 0.004 |
| | | 20 kHz – 50 kHz | 0.10 + 0.05 | 0.11 + 0.05 | 0.12 + 0.05 | 0.011 + 0.005 |
| | | 50 kHz – 100 kHz | 0.55 + 0.08 | 0.60 + 0.08 | 0.60 + 0.08 | 0.060 + 0.008 |
| | | 100 kHz – 300 kHz | 4.00 + 0.50 | 4.00 + 0.50 | 4.00 + 0.50 | 0.20 + 0.02 |
| | 2.000000 V | 3 Hz – 5 Hz | 1.00 + 0.02 | 1.00 + 0.03 | 1.00 + 0.03 | 0.100 + 0.003 |
| | | 5 Hz – 10 Hz | 0.35 + 0.02 | 0.35 + 0.03 | 0.35 + 0.03 | 0.035 + 0.003 |
| | | 10 Hz – 20 kHz | 0.04 + 0.02 | 0.05 + 0.03 | 0.06 + 0.03 | 0.005 + 0.003 |
| | | 20 kHz – 50 kHz | 0.10 + 0.04 | 0.11 + 0.05 | 0.12 + 0.05 | 0.011 + 0.005 |
| | | 50 kHz – 100 kHz | 0.55 + 0.08 | 0.60 + 0.08 | 0.60 + 0.08 | 0.060 + 0.008 |
| | | 100 kHz – 300 kHz | 4.00 + 0.50 | 4.00 + 0.50 | 4.00 + 0.50 | 0.20 + 0.02 |
| | 20.00000 V | 3 Hz – 5 Hz | 1.00 + 0.03 | 1.00 + 0.04 | 1.00 + 0.04 | 0.100 + 0.004 |
| | | 5 Hz – 10 Hz | 0.35 + 0.03 | 0.35 + 0.04 | 0.35 + 0.04 | 0.035 + 0.004 |
| | | 10 Hz – 20 kHz | 0.04 + 0.04 | 0.07 + 0.04 | 0.08 + 0.04 | 0.008 + 0.004 |
| | | 20 kHz – 50 kHz | 0.10 + 0.05 | 0.12 + 0.05 | 0.15 + 0.05 | 0.012 + 0.005 |
| | | 50 kHz – 100 kHz | 0.55 + 0.08 | 0.60 + 0.08 | 0.60 + 0.08 | 0.060 + 0.008 |
| | | 100 kHz – 300 kHz | 4.00 + 0.50 | 4.00 + 0.50 | 4.00 + 0.50 | 0.20 + 0.02 |
| | 200.0000 V | 3 Hz – 5 Hz | 1.00 + 0.02 | 1.00 + 0.03 | 1.00 + 0.03 | 0.100 + 0.003 |
| | | 5 Hz – 10 Hz | 0.35 + 0.02 | 0.35 + 0.03 | 0.35 + 0.03 | 0.035 + 0.003 |
| | | 10 Hz – 20 kHz | 0.04 + 0.02 | 0.07 + 0.03 | 0.08 + 0.03 | 0.008 + 0.003 |
| | | 20 kHz – 50 kHz | 0.10 + 0.04 | 0.12 + 0.05 | 0.15 + 0.05 | 0.012 + 0.005 |
| | | 50 kHz – 100 kHz | 0.55 + 0.08 | 0.60 + 0.08 | 0.60 + 0.08 | 0.060 + 0.008 |
| | | 100 kHz – 300 kHz | 4.00 + 0.50 | 4.00 + 0.50 | 4.00 + 0.50 | 0.20 + 0.02 |
| 750.0000 V ⁵⁾ | 3 Hz – 5 Hz | 1.00 + 0.02 | 1.00 + 0.03 | 1.00 + 0.03 | 0.100 + 0.003 | |
| | 5 Hz – 10 Hz | 0.35 + 0.02 | 0.35 + 0.03 | 0.35 + 0.03 | 0.035 + 0.003 | |
| | 10 Hz – 20 kHz | 0.04 + 0.02 | 0.07 + 0.03 | 0.08 + 0.03 | 0.008 + 0.003 | |
| | 20 kHz – 50 kHz | 0.10 + 0.04 | 0.12 + 0.05 | 0.15 + 0.05 | 0.012 + 0.005 | |
| | 50 kHz – 100 kHz | 0.55 + 0.08 | 0.60 + 0.08 | 0.60 + 0.08 | 0.060 + 0.008 | |
| | 100 kHz – 300 kHz | 4.00 + 0.50 | 4.00 + 0.50 | 4.00 + 0.50 | 0.20 + 0.02 | |

Remarks:

¹⁾ Specifications are for 90-minute warm-up, > 3Hz ac filter and sine wave input.

²⁾ 10 % over range on all ranges except ACV 750 V and ACI 10 A ranges.

³⁾ Relative to calibration standards.

⁴⁾ Specifications are for sine wave input > 5 % of range. For inputs within 1 % and 5 % of range and < 50 kHz, add 0.1 % of range additional error. For 50 kHz to 100 kHz, add 0.13 % of range additional error.

⁵⁾ ACV 750 range limited to 8×10^7 Volt-Hz. For input over 300 V rms, add 0.7 mV error for each additional volt.

AC Characteristics

Accuracy \pm (% of reading + % of range)¹⁾

| Function | Range ²⁾ | Frequency Range | 24 Hour ³⁾ TCAL °C \pm 1°C | 90 day TCAL °C \pm 5°C | 1 Year TCAL °C \pm 5°C | Temperature coefficient 0°C to (TCAL °C - 5°C) (TCAL °C + 5°C) to 50°C |
|-----------------------------------|---------------------|-----------------|--|-----------------------------|-----------------------------|--|
| True-RMS AC Current ⁸⁾ | 200.0000 μ A | 3 Hz – 5 Hz | 1.10 + 0.06 | 1.10 + 0.06 | 1.10 + 0.06 | 0.200 + 0.005 |
| | | 5 Hz – 10 Hz | 0.35 + 0.06 | 0.35 + 0.06 | 0.35 + 0.06 | 0.100 + 0.005 |
| | | 10 Hz – 5 kHz | 0.15 + 0.06 | 0.15 + 0.06 | 0.15 + 0.06 | 0.015 + 0.005 |
| | | 5 kHz – 10 kHz | 0.35 + 0.70 | 0.35 + 0.70 | 0.35 + 0.70 | 0.030 + 0.005 |
| | 2.000000 mA | 3 Hz – 5 Hz | 1.00 + 0.04 | 1.00 + 0.04 | 1.00 + 0.04 | 0.100 + 0.005 |
| | | 5 Hz – 10 Hz | 0.30 + 0.04 | 0.30 + 0.04 | 0.30 + 0.04 | 0.035 + 0.005 |
| | | 10 Hz – 5 kHz | 0.12 + 0.04 | 0.12 + 0.04 | 0.12 + 0.04 | 0.015 + 0.005 |
| | | 5 kHz – 10 kHz | 0.20 + 0.25 | 0.20 + 0.25 | 0.20 + 0.25 | 0.030 + 0.005 |
| | 20.00000 mA | 3 Hz – 5 Hz | 1.10 + 0.06 | 1.10 + 0.06 | 1.10 + 0.06 | 0.200 + 0.005 |
| | | 5 Hz – 10 Hz | 0.35 + 0.06 | 0.35 + 0.06 | 0.35 + 0.06 | 0.100 + 0.005 |
| | | 10 Hz – 5 kHz | 0.15 + 0.06 | 0.15 + 0.06 | 0.15 + 0.06 | 0.015 + 0.005 |
| | | 5 kHz – 10 kHz | 0.35 + 0.70 | 0.35 + 0.70 | 0.35 + 0.70 | 0.030 + 0.005 |
| | 200.0000 mA | 3 Hz – 5 Hz | 1.00 + 0.04 | 1.00 + 0.04 | 1.00 + 0.04 | 0.100 + 0.006 |
| | | 5 Hz – 10 Hz | 0.30 + 0.04 | 0.30 + 0.04 | 0.30 + 0.04 | 0.035 + 0.006 |
| | | 10 Hz – 5 kHz | 0.10 + 0.04 | 0.10 + 0.04 | 0.10 + 0.04 | 0.015 + 0.006 |
| | | 5 kHz – 10 kHz | 0.20 + 0.25 | 0.20 + 0.25 | 0.20 + 0.25 | 0.030 + 0.006 |
| | 2.000000 A | 3 Hz – 5 Hz | 1.10 + 0.06 | 1.10 + 0.06 | 1.10 + 0.06 | 0.100 + 0.006 |
| | | 5 Hz – 10 Hz | 0.35 + 0.06 | 0.35 + 0.06 | 0.35 + 0.06 | 0.035 + 0.006 |
| | | 10 Hz – 5 kHz | 0.15 + 0.06 | 0.15 + 0.06 | 0.15 + 0.06 | 0.015 + 0.006 |
| | | 5 kHz – 10 kHz | 0.35 + 0.70 | 0.35 + 0.70 | 0.35 + 0.70 | 0.030 + 0.006 |
| 10.00000A ⁶⁾ | 3 Hz – 5 Hz | 1.10 + 0.08 | 1.10 + 0.10 | 1.10 + 0.10 | 0.100 + 0.008 | |
| | 5 Hz – 10 Hz | 0.35 + 0.08 | 0.35 + 0.10 | 0.35 + 0.10 | 0.035 + 0.008 | |
| | 10 Hz – 5 kHz | 0.15 + 0.08 | 0.15 + 0.10 | 0.15 + 0.10 | 0.015 + 0.008 | |

| Frequency | Additional Low Frequency Errors (% of reading) | | | Additional Crest Factor Errors (non-sine wave) ⁷⁾ | |
|-----------------|--|-------------------|--------------------|--|----------------------|
| | AC Filter > 3 Hz | AC Filter > 20 Hz | AC Filter > 200 Hz | Crest Factor | error (% of reading) |
| 10 Hz – 20 Hz | 0 | 0.74 | – | 1 – 2 | 0.05 |
| 20 Hz – 40 Hz | 0 | 0.22 | – | 2 – 3 | 0.2 |
| 40 Hz – 100 Hz | 0 | 0.06 | 0.73 | 3 – 4 | 0.4 |
| 100 Hz – 200 Hz | 0 | 0.01 | 0.22 | 4 – 5 | 0.5 |
| 200 Hz – 1 kHz | 0 | 0 | 0.18 | | |
| > 1 kHz | 0 | 0 | 0 | | |

Remarks:

¹⁾ Specifications are for 90-minute warm-up, > 3 Hz ac filter and sine wave input.

²⁾ 10 % over range on all ranges except ACV 750 V and ACI 10 A ranges.

³⁾ Relative to calibration standards.

⁴⁾ Specifications are for sine wave input > 5 % of range. For inputs within 1 % and 5 % of range and < 50 kHz, add 0.1 % of range additional error. For 50 kHz to 100 kHz, add 0.13 % of range additional error.

⁵⁾ ACV 750 range limited to 8×10^7 Volt-Hz. For input over 300 V rms, add 0.7 mV error for each additional volt.

⁶⁾ For continuous current > DC 7A or AC RMS 7A, use 30 seconds ON followed by 30 seconds OFF.

⁷⁾ For frequency below 100 Hz, the specification of the low frequency filters is for sine wave only.

⁸⁾ Specifications are for sine wave input > 5 % of range. For inputs within 1 % to 5 % of range, add 0.1 % of range additional error. Specifications are typical values for 200 μ A, 2 mA, 2 A and 10 A ranges when frequency > 1 kHz.

SPECIFICATIONS

Frequency and Period Characteristics

Accuracy \pm (% of Reading)^{1) 2)}

| Function | Range | Frequency Range | 24 Hour ³⁾ TCAL °C \pm 1 °C | 90 day TCAL °C \pm 5 °C | 1 Year TCAL °C \pm 5 °C | Temperature coefficient 0 °C to (TCAL °C - 5 °C) (TCAL °C + 5 °C) to 50 °C |
|----------------------|--------------------|-----------------|---|------------------------------|------------------------------|--|
| Frequency, Period | 200 mV to 750 V | 3 Hz – 5 Hz | 0.07 | 0.07 | 0.07 | 0.005 |
| | | 5 Hz – 10 Hz | 0.04 | 0.04 | 0.04 | 0.005 |
| | | 10 Hz – 40 Hz | 0.02 | 0.02 | 0.02 | 0.001 |
| | | 40 Hz – 300 KHz | 0.005 | 0.006 | 0.007 | 0.001 |
| | | 300 KHz – 1 MHz | 0.005 | 0.006 | 0.007 | 0.001 |

| Frequency | Gate Time (Resolution) | | | |
|-----------------|------------------------|---------------|-----------------|-------------------|
| | 1 s (0.1 ppm) | 0.1 s (1 ppm) | 0.01 s (10 ppm) | 0.001 s (100 ppm) |
| 3 Hz – 5Hz | 0 | 0.12 | 0.12 | 0.12 |
| 5 Hz – 10 Hz | 0 | 0.17 | 0.17 | 0.17 |
| 10 Hz – 40 Hz | 0 | 0.20 | 0.20 | 0.20 |
| 40 Hz – 100 Hz | 0 | 0.06 | 0.21 | 0.21 |
| 100 Hz – 300 Hz | 0 | 0.03 | 0.21 | 0.21 |
| 300Hz – 1 KHz | 0 | 0.01 | 0.07 | 0.07 |
| > 1 K Hz | 0 | 0 | 0.02 | 0.02 |

Remarks:

¹⁾ Specifications are for 90 minutes warm-up, using 1s gate time.

²⁾ For frequency \leq 300 kHz, the specification is the 10% to 110% of range of the AC input voltage. For frequency > 300 kHz, the specification is the 20% to 110% of range of the AC input voltage. The maximum input is limited to 750 V rms or 8×10^7 Volts-Hz (whichever is less). The 200 mV range is full range input or input that is larger than the full range. For 20 mV to 200 mV, multiply % of reading error \times 10.

³⁾ Relative to calibration standards.

Capacitance Characteristic

Accuracy \pm (% of Reading + % of Range)¹⁾

| Function | Range ²⁾ | Test Current | 1 Year TCAL °C \pm 5 °C | Temperature coefficient 0 °C to (TCAL °C - 5 °C) (TCAL °C + 5 °C) to 50 °C |
|-------------|---------------------|--------------|------------------------------|--|
| Capacitance | 2.0000 nF | 10 μ A | 2 + 2.4 | 0.05 + 0.06 |
| | 20.000 nF | 10 μ A | 1 + 0.1 | 0.05 + 0.01 |
| | 200.00 nF | 100 μ A | 1 + 0.1 | 0.01 + 0.01 |
| | 2.0000 μ F | 100 μ A | 1 + 0.1 | 0.01 + 0.01 |
| | 20.000 μ F | 1 mA | 1 + 0.1 | 0.01 + 0.01 |
| | 200.00 μ F | 1 mA | 1 + 0.1 | 0.01 + 0.01 |
| | 2.0000 mF | 1 mA | 1 + 0.1 | 0.01 + 0.01 |
| | 20.000 mF | 1 mA | 1 + 0.1 | 0.01 + 0.01 |
| | 100.00 mF | 1 mA | 3 + 0.1 | 0.05 + 0.02 |

Remarks:

¹⁾ Specifications are for 90 minutes warm-up and using REL operation. Additional errors may be caused by non-film capacitors.

²⁾ Specifications are the 1% to 110% of range on 2 nF range and 10% to 110% of range on all other ranges.

Temperature Characteristics

Accuracy± (% of Reading)¹⁾

| Function | Probe Type | Type | Optimum Range | 1 Year TCAL °C ± 5 °C | Temperature coefficient 0 °C to (TCAL °C - 5 °C) (TCAL °C + 5 °C) to 50 °C |
|-------------|---|-------------|-------------------|-----------------------|--|
| Temperature | RTD ²⁾ (RO is 49 Ω to 2.1 kΩ) | α = 0.00385 | -200 °C ~ 660 °C | 0.16 °C | 0.01 °C |
| | | B | 0 °C ~ 1820 °C | 0.76 °C | 0.14 °C |
| | Thermocouple ³⁾ | E | -270 °C ~ 1000 °C | 0.5 °C | 0.02 °C |
| | | J | -210 °C ~ 1200 °C | 0.5 °C | 0.02 °C |
| | | K | -270 °C ~ 1370 °C | 0.5 °C | 0.03 °C |
| | | N | -270 °C ~ 1300 °C | 0.5 °C | 0.04 °C |
| | | R | -270 °C ~ 1760 °C | 0.5 °C | 0.09 °C |
| | | S | -270 °C ~ 1760 °C | 0.6 °C | 0.11 °C |
| T | -270 °C ~ 400 °C | 0.5 °C | 0.03 °C | | |

Remarks:

¹⁾ Specifications are for 90 minutes warm-up. Exclusive of sensor error.

²⁾ Specification is for 4WR sensor measurement or 2WR measurement using REL operation.

³⁾ Relative to cold junction temperature, accuracy is based on ITS-90. Built-in cold junction temperature refers to the temperature inside the banana jack and its accuracy is ± 2.5 .

Measurement Rate

Measurement rate³⁾

| Function | Setting | Integration | Readings/s 50 Hz (60 Hz) |
|--|--------------------|--------------|--------------------------|
| DC Voltage DC Current 2-wire Resistance 4-wire Resistance | 0.005 (0.006) NPLC | 100 (100) μs | 10000 (10000) |
| | 0.05 (0.06) NPLC | 1 (1) ms | 1000 (1000) |
| | 0.5 (0.5) NPLC | 4 (4) ms | 100 (100) |
| | 1 NPLC | 20 (16.7) ms | 50 (60) |
| | 10 NPLC | 200 (167) ms | 5 (6) |
| AC Voltage AC Current | 100 NPLC | 2 (1.67) s | 0.5 (0.6) |
| | 3 Hz AC Filter | | 0.5 |
| | 20 Hz | | 2 |
| Frequency and Period ¹⁾ | 200 Hz | | 50 |
| | 1 s Gate time | | 1 |
| | 0.1 s | | 10 |
| | 0.01 s | | 100 |
| Capacitance ²⁾ | 0.001 s | | 500 |
| | 100 mF Range | | 0.5 |

Remarks:

¹⁾ 20 V range, 1 kHz input.

²⁾ The measurement period changes with the capacitance under test.

³⁾ Auto zero off, auto range off.

MEASURING METHOD AND OTHER CHARACTERISTICS

DC Voltage

| | |
|------------------------------------|--|
| Input Resistance | 200 mV, 2 V, 20 V ranges: Selectable 10 M Ω or > 10 G Ω (For these ranges, input beyond ± 26 V are clamped through 106 k Ω (typical) 200 V and 1000 V ranges; 10 M Ω \pm 1 % |
| Input Offset Current | 50 pA, 25 °C, typical |
| Input Protection | 1000 V |
| CMRR (common mode rejection ratio) | 140 dB for 1 k Ω unbalance in LO lead, \pm 500 VDC peak maximum |

Resistance

| | |
|-------------------------------|--|
| Measurement Method | Selectable 4-wire or 2-wire resistance Current source referenced to LO input |
| Open-circuit Voltage | Limited to < 10 V |
| Max. Lead Resistance (4-wire) | 10 % of range per lead for 200 Ω , 2 k Ω ranges, 1 k Ω per lead on all other ranges |
| Offset Compensation | Available on 200 Ω , 2k Ω and 20 k Ω ranges |
| Input Protection | 1000 V on all ranges |

DC Current

| | |
|------------------|--|
| Shunt Resistor | 100 Ω for 200 μ A, 2 mA 1 Ω for 20 mA, 200 mA 0.01 Ω for 2 A, 10 A |
| Input Protection | Rear panel: accessible 10 A, 250 V fast-melt fuse Internal 10 A, 250 V slow blow fuse for 2 A and 10 A ranges |

Continuity/Diode Test

| | |
|----------------------|--|
| Measurement Method | 1 mA \pm 5 % constant-current source or open-circuit voltage |
| Response Time | 300 samples/sec, with audible tone |
| Beeper | Yes |
| Diode Threshold | Adjustable from 0 to 4 V |
| Continuity Threshold | Adjustable from 1 Ω to 2 K Ω |
| Input Protection | 1000 V |

Settling Time Considerations

Reading settling times are affected by source impedance, cable dielectric characteristics and input signal changes. The default measurement delay is selected to the correct reading for most measurements.

Measurement Considerations

Teflon or other high-impedance, low-dielectric absorption wire insulation is recommended for these measurements.

True RMS AC Voltage

| | |
|------------------------------------|---|
| Measurement Method | AC-coupled True-RMS measurement with up to 400 V DC bias on any range. |
| Crest Factor | \leq 5 at full range |
| Input Impedance | 1 M Ω \pm 2 % in parallel with < 150 pF capacitance on any range |
| Input Protection | 750V rms on all ranges |
| AC Filter Bandwidth | Slow: 3 Hz ~ 300 KHz Medium: 20 Hz ~ 300 KHz Fast: 200 Hz ~ 300 KHz |
| CMRR (common mode rejection ratio) | 70 dB, for the 1 k Ω unbalance in LO lead, < 60 Hz, \pm 500 VDC peak maximum |

True RMS AC Current

| | |
|--------------------|--|
| Measurement Method | Direct coupled to the fuse and shunt; AC-coupled True RMS measurement (Measure the AC component only). |
| Crest Factor | ≤ 3 at full range |
| Max. Input | DC + AC current peak value < 300 % of range. The RMS current < 10 A rms including the DC component. |
| Shunt Resistor | 100 Ω for 200 uA , 2 mA |
| | 1 Ω for 20 mA, 200 mA |
| | 0.01 Ω for 2 A, 10 A |
| Input Protection | Externally accessible 500 mA, 250 V fast blow fuse |
| | Internal 12 A, 250 V slow blow fuse |

Settling Time Considerations

The default measurement delay is selected to give the correct reading for most measurements. Make sure the RC circuit of the input terminal has fully settled (about 1s) before taking higher accuracy measurements. Applying > 300 Vrms (or > 5 Arms) will cause self-heating of signal-conditioning components and these error are included in the instrument specifications. Internal temperature changes due to self-heating may cause additional error on lower ac voltage ranges. The additional error will be lower than 0.02 % of reading and will generally dissipate within a few minutes as the signal-conditioning components return to normal operating temperature.

Frequency and Period

| | |
|------------------------------|---|
| Measurement Method | Reciprocal-counting technique, AC-coupled input using the AC voltage function. |
| Input Impedance | 1 MΩ ± 2% in parallel with < 150 pF capacitance on any range |
| Input Protection | 750 V rms on all ranges |
| Measurement Considerations | All frequency counters are susceptible to error when measuring low-voltage, low-frequency signals. Shielding inputs from external noise is recommended. |
| Settling Time Considerations | Errors will occur when attempting to measure the frequency or period of an input following a dc offset voltage change. Make sure the RC input circuit at the input terminals has fully settled (about 1 s) before making accurate measurements. |

Capacitance Measurement

| | |
|----------------------------|--|
| Measurement Method | Apply constant current into the capacitance, and measure the rate of voltage change. |
| Connection Type | 2-wire |
| Input Protection | 1000 V on all ranges |
| Measurement considerations | Since small capacitance measurements are susceptible to the external noise, shielding inputs from external noise pickup is critical for minimizing measurement errors. |

Temperature Measurement

| | |
|----------------------------|--|
| Measurement Method | Support for TC and RTD types of sensor |
| Measurement considerations | The built-in cold junction temperature tracks the temperature inside the banana jack. The change of the temperature in the banana jack may cause additional error. When using the built-in cold junction compensation, connect the sensor terminal of the thermocouple to the banana jack and allow it to warm up for at least 3 minutes to minimize errors. |

MEASURING METHOD AND OTHER CHARACTERISTICS

Triggering and Storage

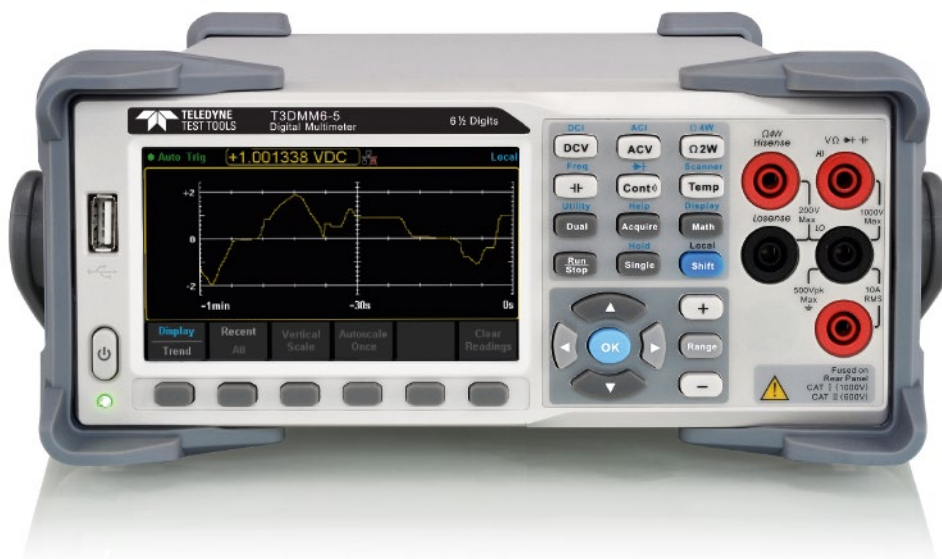
| | |
|------------------------|--|
| Trigger | Pre-trigger or Post-trigger, Internal Trigger or External Trigger, Rising Edge Trigger or Falling Edge Trigger |
| Time Base Resolution | 40 μ s, 0.01 % Accuracy |
| Trigger Delay | 0 to 1000s |
| Reading Sensitivity | 0.01 %, 0.1 %, 1 % or 10 % reading |
| Single Trigger Samples | 1 to 599999999 |
| External Trigger Input | Level: TTL compatible (High level when input terminal is disconnected) |
| | Trigger: Selectable rising edge or falling edge |
| | Input Impedance: ≥ 30 K Ω //500 pF |
| | Delay: < 50 μ s |
| | Maximum Rate: 300 per second |
| VMC Output | Minimum Pulse Width: 2 μ s |
| | Level: 5 V TTL Compatible |
| | Output Polarity: Positive and negative optional |
| | Output Impedance: typically 200 Ω |
| | Pulse Width: about 2 μ s |

History Records

| | |
|--------------------|---|
| Volatile Memory | 10 K of history records |
| Nonvolatile Memory | 1 Gb Nand Flash, Mass storage configuration files and data files, Support U-disk external storage |

Math Functions

Min/Max/Average, dBm, dB, Pass/Fail, Relative, Standard deviation, Hold, Histogram, Trend chart, Bar chart



GENERAL SPECIFICATIONS

Power Supply

| | |
|---|---------------|
| AC 100 V ~ 120 V | 45 Hz – 66 Hz |
| AC 200 V ~ 240 V | 45 Hz – 66 Hz |
| Detect the power-line frequency automatically at power-on, 400 Hz defaults to 50 Hz | |
| Power Consumption | 25VA max |

Mechanical

| | |
|-----------|--|
| Dimension | (length × width × height): 345.45 mm × 260.29 mm × 107.21 mm |
| Weight | 3.377 Kg (Net weight) |

Other characteristics

| | |
|----------------------|--|
| Display Screen | 4.3 "TFT-LCD with resolution 480*272 |
| Environmental | Operating Temperature: 0 °C to +40 °C |
| | Storage Temperature: -10 °C to +70 °C |
| | Humidity: 5 % to 90 % relative humidity (non-condensing) up to +30 °C. Upper limit derates to 50 % relative humidity (non-condensing) at +40 °C |
| | Operating Altitude: 2000 m (Max) |
| | Indoor Use only |
| EMC | Conforming to EMC (2004/108/EC) and EN 61326-1:2013 |
| Safety | IEC 61010-1; EN 61010-1; UL 61010-1; CAN/CSA-C22.2 No. 61010-1 Measurement CAT I 1000 V/CAT II 600 V |
| Remote Interface | 10/100Mbit LAN, USB2.0 Full Speed Device, Host |
| Programming Language | Standard SCPI |
| Warm Up Time | 90 minutes |

All T3DMM6-5 Digital Multimeters come with a 3 year return to Teledyne LeCroy warranty.

Ordering Information

| | |
|----------------------|---|
| Product Name | Teledyne Test Tools T3DMM6-5 Digital Multimeter |
| Models | T3DMM6-5 6.5 Digit Digital Multimeter |
| Standard Accessories | Power Cord that fits the destination country |
| | Two Test Leads, Two Alligator Clips |
| | USB Cable |
| | Quick Start Guide |
| | Calibration Certificate |

ABOUT TELEDYNE TEST TOOLS



Company Profile

Teledyne LeCroy is a leading provider of oscilloscopes, protocol analyzers and related test and measurement solutions that enable companies across a wide range of industries to design and test electronic devices of all types. Since our founding in 1964, we have focused on creating products that improve productivity by helping engineers resolve design issues faster and more effectively. Oscilloscopes are tools used by designers and engineers to measure and analyze complex electronic signals in order to develop high-performance systems and to validate electronic designs in order to improve time to market.

The Teledyne Test Tools brand extends the Teledyne LeCroy product portfolio with a comprehensive range of test equipment solutions. This new range of products delivers a broad range of quality test solutions that enable engineers to rapidly validate product and design and reduce time-to-market. Designers, engineers and educators rely on Teledyne Test Tools solutions to meet their most challenging needs for testing, education and electronics validation.

Location and Facilities

Headquartered in Chestnut Ridge, New York, Teledyne Test Tools and Teledyne LeCroy has sales, service and development subsidiaries in the US and throughout Europe and Asia. Teledyne Test Tools and Teledyne LeCroy products are employed across a wide variety of industries, including semiconductor, computer, consumer electronics, education, military/aerospace, automotive/industrial, and telecommunications.

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