TELEDYNE TEST TOOLS
Everywhereyoulook™

T3DMM4-5 Data Sheet

4.5 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.
• 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	600 mV to 1000 V
DC Current	600 µA to 10 A
True RMS AC Voltage	600 mV to 750 V
True RMS AC Current	60 mA to 10 A
2/ 4 Wire Resistance	600 Ohms to 100 MOhms
Connectivity	USB Device, LAN
Remote Control	SCPI, LabView Driver

PRODUCT OVERVIEW

Teledyne Test Tools T3DMM4-5 is a 4½ 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 T3DMM4-5 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 T3DMM4-5 is especially well suited for the needs of the general purpose multifunctional environment, as well as supporting a full range of automatic measurements.

Main Functions

Basic Measurement Function

- DC Voltage: 600 mV ~ 1000 V
- DC Current: 600 μA ~ 10 A
- AC Voltage: True-RMS, 600 mV ~ 750 V
- AC Current: True-RMS, 60 mA ~ 10 A
- 2/4-Wire Resistance: 600 Ω ~ 100 MΩ
- Capacitance: 2 nF ~ 10000 μF
- Continuity Test: Range is fixed at 2 kΩ
- Diode Test: Adjustable range is 0 ~ 4 V.
- Frequency Measurement: 20 Hz ~ 500 KHz
- Period Measurement: 2 μs ~ 0.05 s
- Temperature: Support for TC and RTD sensor
- Max, Min, Average, Standard Deviation, dBm/dB, Relative Measurement, Pass/Fail Histogram, Trend Chart

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

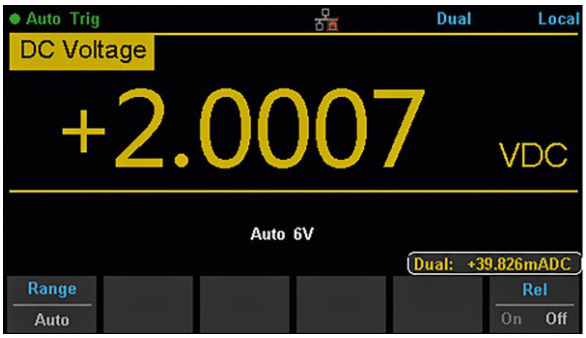
- Research Laboratory
- Development Laboratory
- Detection and Maintenance
- Calibration Laboratory
- Automatic Production Test

Main Features

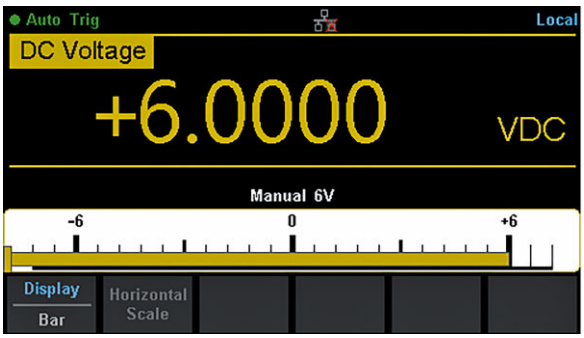
- Real 4½ digit (66000 count) readings resolution
- Up to 150 rdgs/s measurement speed
- True-RMS AC Voltage and AC Current measuring
- 1 Gb flash memory for mass storage configuration files and data files
- Built-in cold terminal compensation for thermocouple
- Standard interface: USB Device, USB Host, LAN
- USB & LAN remote interfaces support common SCPI command set. Compatible with other popular DMMs on the market.

SPECIAL FEATURES

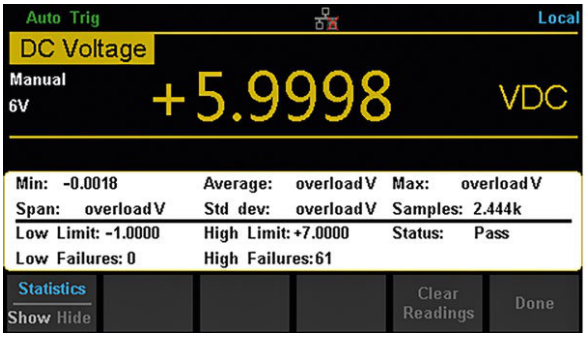
Dual Display



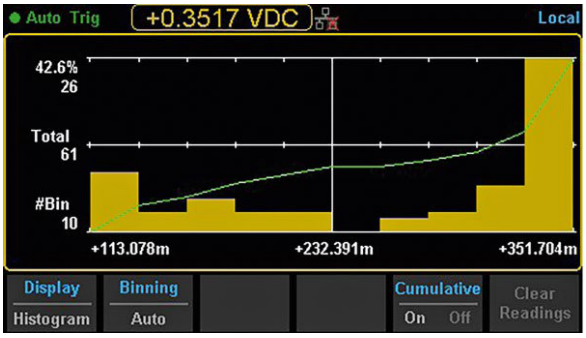
Bar Chart



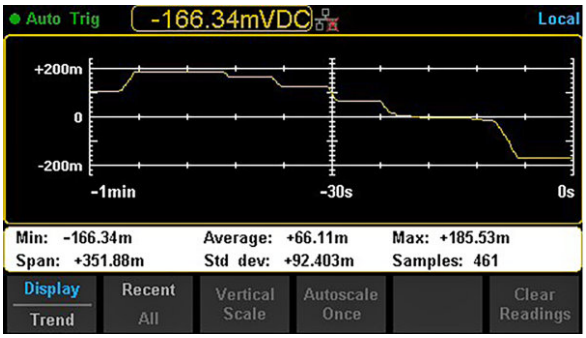
Statistics



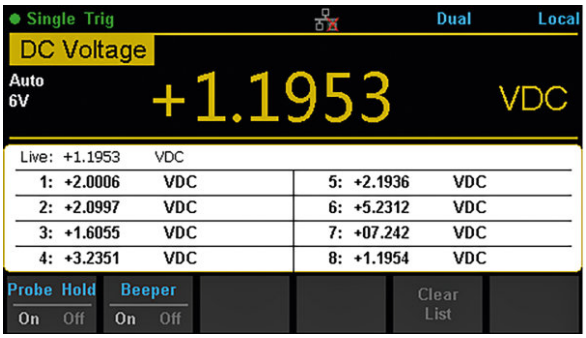
Histogram



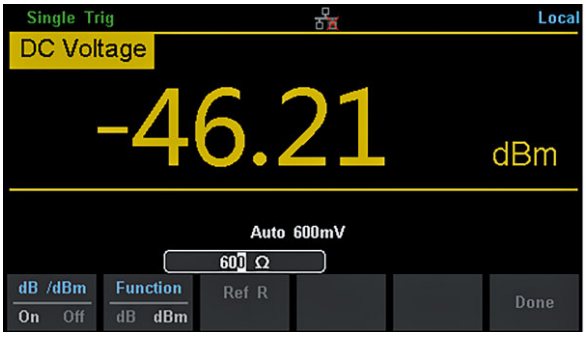
Trend Chart



Hold Measurement



dBm Hold Measurement



Interface

SPECIFICATIONS

DC Characteristic

Accuracy ± (%of Reading + count)[1)]

Function	Range[2)]	Test current or Load voltage	Resolution	Accuracy (one year; 23°C ± 5°C)
DC Voltage	600 mV		0.01 mV	0.02 + 6
	6 V		0.0001 V	0.02 + 6
	60 V		0.001 V	0.02 + 6
	600 V		0.01 V	0.02 + 6
	1000 V[4)]		0.1 V	0.02 + 6
DC Current	600 µA	< 33 mV	0.01 µA	0.05 + 3
	6 mA	< 330 mV	0.0001 mA	0.05 + 3
	60 mA	< 0.05 V	0.001 mA	0.05 + 3
	600 mA	< 0.5 V	0.01 mA	0.12 + 6
	6 A	< 0.33 V	0.0001 A	0.20 + 5
	10 A[5)]	< 0.6 V	0.001 A	0.25 + 4
Resistance[3)]	600 Ω	1 mA	0.01 Ω	0.08 + 6
	6 KΩ	1 00 µA	0.0001 KΩ	0.04 + 6
	60 KΩ	10 µA	0.001 KΩ	0.04 + 6
	600 KΩ	1 µA	0.01 KΩ	0.08 + 6
	6 MΩ	200 nA	0.0001 MΩ	0.12 + 3
	60 MΩ	200 nA || 10 MΩ	0.001 MΩ	0.85 + 3
	100 MΩ	200 nA || 10 MΩ	0.01 MΩ	1.75 + 3
Diode Test[6)]	0~2 V	1 mA	0.0001 V	0.05 + 3
	2~4 V	1 mA	0.0001 V	0.35 + 3
Continuity Test	2000 Ω	1 mA	0.1 Ω	0.05 + 3

Remarks:

1) Specifications are after 0.5 Hour warm-up, “Slow” measurement rate and calibration temperature 18°C ~ 28°C.
2) 10 %over range on all ranges except for DCV 1000 V, ACV 750 V, DCI 10 A and ACI 10 A.
3) Specifications are for 4-wire measure or 2-wire measure under “REF” operation. ±0.2 Ω of extra errors will be generated if perform 2-wire measure without “REF” operation.
4) Plus 0.02 mV of error per 1 V after the first ±500 VDC.
5) 30 seconds OFF after 30 seconds ON is recommend for continuous current that higher than DC 7 A or AC RMS 7 A.
6) Accuracy specifications are only for voltage measuring at input terminal. The typical value of current under measure is 1 mA. Voltage drop at diode junction may vary with current supply. Adjustable voltage range: 0 ~ 4 V.

AC Characteristic

Accuracy ± (%of Reading + count)[1)]

Function	Range[2)]	Frequency Range	Resolution	Accuracy (one year; 23°C ± 5°C)
True-RMS AC Voltage[3)]	600 mV	20 Hz – 45 Hz	0.01 mV	2.0 + 20
		45 Hz – 100 Hz	0.01 mV	0.6 + 10
		100 Hz – 20 KHz	0.01 mV	0.3 + 20
		20 KHz – 50 KHz	0.01 mV	2.0 + 40
		50 KHz –100 KHz	0.01 mV	3.0 + 10
	6 V	20 Hz – 45 Hz	0.0001 V	2.0 + 20
		45 Hz – 100 Hz	0.0001 V	0.6 + 10
		100 Hz – 20 KHz	0.0001 V	0.8 + 20
		20 KHz – 50 KHz	0.0001 V	2.0 + 40
		50 KHz –100 KHz	0.0001 V	3.0 + 40
	60 V	20 Hz – 45 Hz	0.001 V	2.0 + 20
		45 Hz – 100 Hz	0.001 V	0.6 + 10
		100 Hz – 20 KHz	0.001 V	0.8 + 20
		20 KHz – 50 KHz	0.001 V	2.0 + 40
		50 KHz –100 KHz	0.001 V	3.0 + 40
	600 V	20 Hz – 45 Hz	0.01 V	2.0 + 20
		45 Hz – 100 Hz	0.01 V	0.6 + 10
		100 Hz – 20 KHz	0.01 V	0.8 + 20
		20 KHz – 50 KHz	0.01 V	2.0 + 40
		50 KHz –100 KHz	0.01 V	3.0 + 40
	750 V	20 Hz – 45 Hz	0.01 V	2.0 + 20
		45 Hz – 100 Hz[4]	0.01 V	0.6 + 10
		100 Hz – 20 KHz	0.01 V	0.8 + 20
		20 KHz – 50 KHz	0.01 V	2.0 + 40
		50 KHz –100 KHz	0.01 V	3.0 + 40
True-RMS AC Current[5)]	60 mA	20 Hz – 45 Hz	0.001 mA	2.0 + 20
		45 Hz – 2 KHz	0.001 mA	0.5 + 20
		2 KHz – 10 KHz	0.001 mA	2.5 + 30
	600 mA	20 Hz – 45 Hz	0.01 mA	2.0 + 20
		45 Hz – 2 KHz	0.01 mA	0.5 + 20
		2 KHz – 10 KHz	0.01 mA	2.5 + 30
	6 A	20 Hz – 45 Hz	0.0001 A	2.0 + 20
		45 Hz – 2 KHz	0.0001 A	0.5 + 20
		2 KHz – 10 KHz	0.0001 A	2.5 + 20
	10 A[6)]	20 Hz – 45 Hz	0.001 A	1.5 + 45
		45 Hz – 2 KHz	0.001 A	0.5 + 35
		2 KHz – 10 KHz	0.001 A	2.5 + 25

Additional wave crest factor error (not Sine)[7)]

Wave crest coefficient	Error (% Range)
1 – 2	0.05
2 – 3	0.3

Remarks:

[1)] Specifications are for 0.5 Hour warm-up, “Slow” measurement rate and calibration temperature 18°C ~ 28°C.

[2)] 10 %over range on all ranges except for DCV 1000 V, ACV 750 V, DCI 10 A and ACI 10 A.

[3)] Specifications are for amplitude of sine wave input > 5 %of range. For inputs from 1%to 5 %of range and <50 kHz, add 0.1%of range as extra error. For 50 kHz to 100 kHz, add 0.1%of range as extra error.

[4)] Plus 0.025 V of error per 1 V after the first ± 400 VAC.

[5)] Specifications are for sine wave input > 5 %of range. 0.1%error will be added when the range of the input sine wave is 1%to 5 %.

[6)] 30 seconds OFF/ 30 seconds ON is recommend for the continuous current higher than DC 7 A or AC RMS 7 A.

[7)] For input Frequency Range < 100 Hz

SPECIFICATIONS

Frequency and Period Characteristic

Accuracy ± (%of Reading + count)[1)]

Function	Range	Frequency Range	Resolution	Accuracy (one year; 23°C ± 5°C)
Frequency/Period	600 mV to 750 V[2)]	20 Hz – 2 KHz		0.01 + 3
		2 KHz – 20 KHz		0.01 + 2
		20 KHz – 200 KHz		0.01 + 2
		200 KHz –500 KHz		0.01 + 2

Remarks:
[1)] Specifications are for 0.5 Hour warm-up.
[2)] Except for exceptional levels, the AC input voltage is 5 %to 110 %of range when <100 kHz and 10 %to 110 %of range when >100 kHz. 750 V range is limited to 750 Vrms. The accuracy is 10 times %of Reading when the measurement range of AC voltage is in 600 mV range.

Capacitance Characteristic

Accuracy ± (%of Reading + count)[1)]

Function	Range[2)]	Max Testing Current	Resolution	Accuracy (one year; 23°C ± 5°C)
Capacitance	2 nF	10 µA	0.001 nF	3 + 10
	20 nF	10 µA	0.01 nF	1 + 10
	200 nF	100 µA	0.1 nF	1 + 9
	2 µF	100 µA	0.001 µF	1 + 10
	20 µF	1 mA	0.01 µF	1 + 10
	200 µF	1 mA	0.1 µF	1 + 9
	10000 µF	1 mA	1 µF	2 + 50

Remarks:
[1)] Specifications are for 0.5 Hour warm-up and “REF” operation. Using of non-film capacitor may generate additional errors.
[2)] Specifications are for from 1%to 110 %on 2 nF range and ranges from 10 %to 110 %on other ranges.

Temperature Characteristic

Accuracy ± (%of Reading + count)[1)]

Function	Probe Type	Probe Mode	Working Temperature Range	Accuracy (one year; 23°C ± 5°C)	Temperature coefficient 0°C ~ 18°C 28°C ~ 50°C
Temperature	RTD[2)]	α = 0.00385	-200°C ~ 660°C	0.16	0.09
	TC[3)]	B	0°C ~ 1820°C	0.76	0.14
		E	-270°C ~ 1000°C	0.5	0.02
		J	-210°C ~ 1200°C	0.5	0.02
		K	-270°C ~ 1370°C	0.5	0.03
		N	-270°C ~ 1300°C	0.5	0.04
		R	-50°C ~ 1760°C	0.5	0.09
		S	-50°C ~ 1760°C	0.6	0.11
		T	-270°C ~ 400°C	0.5	0.03

Remarks:
[1)] Specifications are for 0.5 Hour warm-up, not include probe error.
[2)] Specifications are for 4-wire measure or 2-wire measure under “REF” operation.
[3)] Built-in cold terminal compensation for thermocouple, accuracy is ±2°C.

MEASURING METHOD AND OTHER CHARACTERISTICS

DC Voltage

Input Resistance	600 mV 10 MΩ or 10 GΩ selectable 6 V, 60 V, 600 V and 1000 V Range 10 MΩ ± 2 %
Input Bias Current	< 90 pA, 25°C
Input Protection	1000 V on all ranges
CMRR	120 dB (For the 1 KΩ unbalanced resistance in LO lead, max ± 500 VDC)
NMRR	60 dB at “slow” measurement rate

Resistance

Testing Method	4-wire resistance or 2-wire resistance selectable
Input Protection	1000 V on all ranges

DC Current

Shunt Resistor	600 µA sampling voltage < 33 mV
	6 mA sampling voltage < 0.33 V
	1 Ω for 60 mA, 1 Ω for 600 mA
	0.01 Ω for 6 A, 10 A
Input Protection	Rear panel: accessible 10 A, 250 V fast-melt fuse
	Internal: 12 A, 250 V slow-melt fuse

Continuity/Diode Test

Measurement Method	1 mA ± 5 %constant-current source or open-circuit voltage
Beeper	yes
Continuity Threshold	Adjustable
Input Protection	1000 V

True-RMS AC Voltage

Measurement Method	AC Coupled true RMS measure – up to 1000 V DC bias are permitted on every range.
Wave Crest Factor	≤ 3 at full scale
Input Impedance	1 MΩ ± 2 %in parallel with < 100 pF on all ranges
AC Filter Bandwidth	20 Hz ~ 100 KHz
CMRR	60 dB (For the 1 KΩ imbalance resistance among Lo lead and < 60 Hz, Max ± 500 VDC)

True-RMS AC Current

Measurement Method	DC Coupled to the fuse and shunt; AC Coupled True-RMS measurement (measures the AC components only)
Wave Crest Factor	≤ 3 at full scale
Max Input	< 10 A (include DC component)
Shunt Resistor	1 Ω for 60 mA, 600 mA; 0.01 Ω for 6 A, 10 A
Input Protection	Rear panel: accessible 10 A, 250 V fast-melt fuse Internal: 12 A, 250 V slow-melt fuse

Frequency/Period

Measurement Method	Reciprocal-counting technique, AC Coupled input, AC voltage or AC current measurement function
Additional Errors	Percentage Error increases in all frequency counters when measuring low voltage or low frequency signal.

Capacitance Measuring

Measurement Method	Measure the rate of change of voltage generated during the current flowing in the capacitor
Connection Type	2-wire
Input Protection	1000 V on all ranges

MEASURING METHOD AND OTHER CHARACTERISTICS

Temperature Measuring

Measurement Method	Support for TC and RTD types of sensor

Trigger and Memory

Samples/Trigger	1 ~ 10000	
Trigger Delay	6 ms ~ 10000 ms optional	
External Trigger Input	Input Level	TTL compatible (High level when left input terminal is Disconnected
	Trigger Condition	Rising and Falling selectable
	Input Impedance	≥ 20 KΩ//400 pF, DC-coupled
VMC	Level	TTL compatible
	Output Polarity	Straight and negative optional
	Output Impedance	200 Ω, typical

History Records

Volatile Memory	10 K reading of history records
Nonvolatile Memory	1 Gb Nand Flash, Mass storage configuration for 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	
Consumption	20 VA max	
Mechanism		
Dimension	293.75 mm × 260.27 mm × 107.21 mm	
Weight	3.76 Kg	
Other Characteristics		
Display Screen	4.3” TFT-LCD with aresolution of 480*272	
Operating Environment	Full accuracy from 0°C to 50°C, 80 %RH and 40°C, non condensing	
	Storage Temperature: -20°C -70°C	
	Shock and Vibration: conforming to MIL-T-28800E, , 5 level (only for sine)	
	Height above sea level: up to 3000 meters	
electromagnetic compatibility	Conforming to EMC (2004/108/EC) and EN 61326-1:2013	
Safety	Conforming to EN61010-1:2010 and low voltage instructions (2006/95/EC)	
Remote Interface	10/100 Mbit LAN, USB2.0 Full Speed Device and Host	
Programmer Language	Standard SCPI, compatible with commands of main stream multimeters	
Warm Up Time	30 minutes	

Ordering information

Product Name	Teledyne Test Tools T3DMM4-5 Digital Multimeter
Model	T3DMM4-5
Standard Accessories	Two Test Leads, Two Alligator Clips
	A USB Cable
	A Quick Start
	A Guarantee Card
	Power Cord

The T3DMM4-5 comes with a 3 year return to Teledyne LeCroy warranty.

ABOUT TELEDYNE TEST TOOLS

TELEDYNE TEST TOOLS
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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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T3 stands for Teledyne Test Tools.

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