TELEDYNE TEST TOOLS
Everywhereyoulook™

T3DMM5-5 Data Sheet

5.5 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 µA, AC Current 20 mA 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 µA to 10 A
True RMS AC Voltage	200 mV to 750 V
True RMS AC Current	20 mA 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 T3DMM5-5 is a 5½ 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 T3DMM5-5 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 T3DMM5-5 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 μA ~ 10 A
- AC Voltage: True-RMS, 200 mV ~ 750 V
- AC Current: True-RMS, 20 mA ~ 10 A
- 2/4-Wire Resistance: 200 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 ~ 1 MHz
- Period Measurement: 1 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

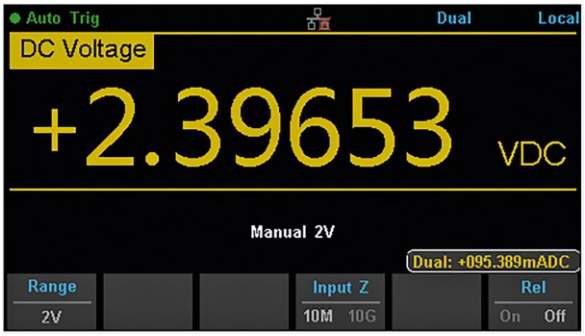
- Research Laboratory
- Development Laboratory
- Repair and Maintenance
- Calibration Laboratory
- Automatic Production Test
- General bench-top use

Main Features

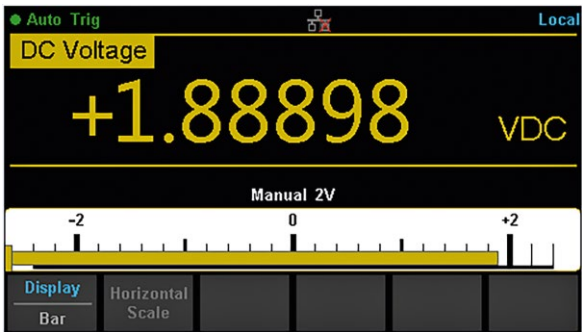
- Real 5½ digit (240,000 count) readings resolution
- Up to 150 rdgs/s measurement speed
- True-RMS AC Voltage and AC Current measuring
- 1 Gb flash memory for mass storage configuration files and data files
- Built-in cold terminal compensation for thermocouple
- Standard interface: USB Device, USB Host, LAN
- USB & LAN remote interfaces support common SCPI command set. Compatible with other popular DMMs on the market.

SPECIAL FEATURES

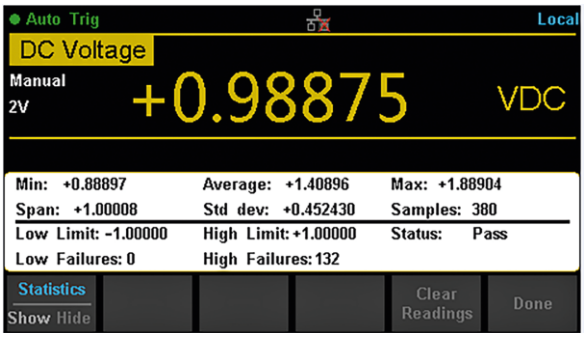
Dual Display



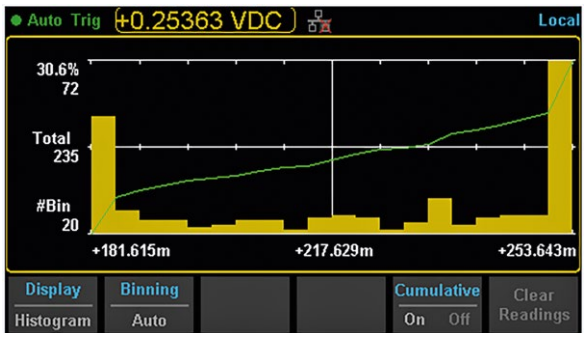
Bar Chart



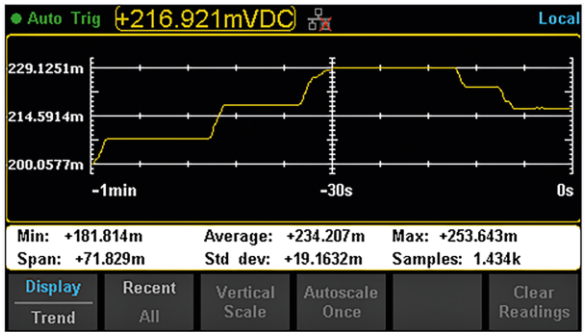
Statistics



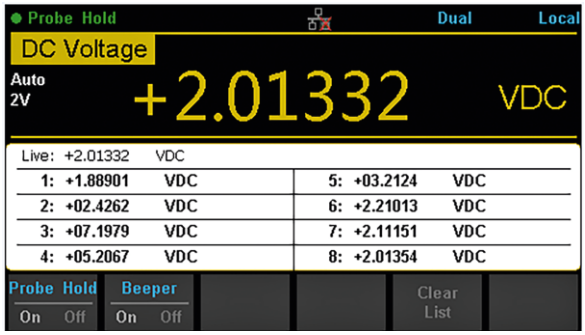
Histogram



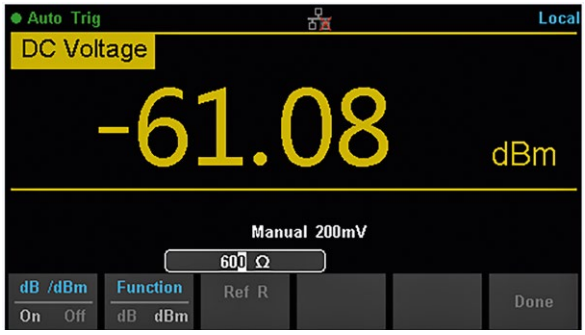
Trend Chart



Hold Measurement



dBm Hold Measurement



Rear Panel Interfaces

DC Characteristic

Accuracy ± (% of Reading + % of Range) [1]

Function	Range [2]	Test current or Load voltage	1 Year 23 °C ± 5°C	Temperature coefficient 0 °C ~ 18 °C 28 °C ~ 50 °C
DC Voltage	200 mV		0.015 + 0.004	0.0015 + 0.0005
	2 V		0.015 + 0.003	0.0010 + 0.0005
	20 V		0.015 + 0.004	0.0020 + 0.0005
	200 V		0.015 + 0.003	0.0015 + 0.0005
	1000 V [4]		0.015 + 0.003	0.0015 + 0.0005
DC Current	200 µA	< 8 mV	0.055 + 0.005	0.003 + 0.001
	2 mA	< 80 mV	0.055 + 0.005	0.002 + 0.001
	20 mA	< 0.05 V	0.095 + 0.020	0.008 + 0.001
	200 mA	< 0.5 V	0.070 + 0.008	0.005 + 0.001
	2 A	< 0.1 V	0.170 + 0.020	0.013 + 0.001
	10 A [5]	< 0.3 V	0.250 + 0.010	0.008 + 0.001
Resistance [3]	200 Ω	1 mA	0.030 + 0.005	0.0030 + 0.0006
	2 KΩ	1 mA	0.020 + 0.003	0.0030 + 0.0005
	20 KΩ	100 µA	0.020 + 0.003	0.0030 + 0.0005
	200 KΩ	10 µA	0.020 + 0.010	0.0030 + 0.0005
	2 MΩ	1 µA	0.040 + 0.004	0.0040 + 0.0005
	10 MΩ	200 nA	0.250 + 0.003	0.0100 + 0.0005
	100 MΩ	200 nA || 10 MΩ	1.75 + 0.004	0.2000 + 0.0005
Diode Test	2.0 V [6]	1 mA	0.05 + 0.01	0.0050 + 0.0005
	4 V	100 µA	0.05 + 0.01	0.0050 + 0.0005
Continuity Test	2000 Ω	1 mA	0.05 + 0.01	0.0050 + 0.0005

Remarks:
[1] Specifications are for 0.5 Hour warm-up, "Slow" measurement rate and calibration temperature 18 °C ~ 28 °C.
[2] 20 % 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 measurement or 2-wire measurement under "REF" operation. ± 0.2 Ω of extra error will be generated if performing a 2-wire measurement without "REF" operation.
[4] Plus 0.02 mV of error per 1 V after the first ± 500 VDC.
[5] 30 seconds OFF / 30 seconds ON is recommend for the continuous current greater than DC 7 A or AC RMS 7 A.
[6] Accuracy specifications are only for voltage measurements at the input terminals. The typical value of current in the measurement is 1 mA. Voltage drop at the diode junction may vary with current supply.

AC Characteristic

Accuracy ± (% of Reading + % of Range) [1)]

Function	Range [2)]	Frequency Range	1 Year 23 °C ± 5°C	Temperature coefficient 0 °C ~ 18 °C 28 °C ~ 50 °C
True-RMS AC Voltage [3)]	200 mV	20 Hz – 45 Hz	1.5 + 0.10	0.01 + 0.005
		45 Hz – 20 KHz	0.2 + 0.05	0.01 + 0.005
		20 KHz – 50 KHz	1.0 + 0.05	0.01 + 0.005
		50 KHz –100 KHz	3.0 + 0.05	0.05 + 0.010
	2 V	20 Hz – 45 Hz	1.5 + 0.10	0.01 + 0.005
		45 Hz – 20 KHz	0.2 + 0.05	0.01 + 0.005
		20 KHz – 50 KHz	1.0 + 0.05	0.01 + 0.005
		50 KHz –100 KHz	3.0 + 0.05	0.05 + 0.010
	20 V	20 Hz – 45 Hz	1.5 + 0.10	0.01 + 0.005
		45 Hz – 20 KHz	0.2 + 0.05	0.01 + 0.005
		20 KHz – 50 KHz	1.0 + 0.05	0.01 + 0.005
		50 KHz –100 KHz	3.0 + 0.05	0.05 + 0.010
	200 V	20 Hz – 45 Hz	1.5 + 0.10	0.01 + 0.005
		45 Hz – 20 KHz	0.2 + 0.05	0.01 + 0.005
		20 KHz – 50 KHz	1.0 + 0.05	0.01 + 0.005
		50 KHz –100 KHz	3.0 + 0.05	0.05 + 0.010
	750 V	20 Hz – 45 Hz	1.5 + 0.10	0.01 + 0.005
		45 Hz – 20 KHz	0.2 + 0.05	0.01 + 0.005
		20 KHz – 50 KHz	1.0 + 0.05	0.01 + 0.005
		50 KHz –100 KHz	3.0 + 0.05	0.05 + 0.010
True-RMS AC Current [4)]	20 mA	20 Hz – 45 Hz	1.5 + 0.10	0.015 + 0.015
		45 Hz – 2 KHz	0.50 + 0.10	0.015 + 0.006
		2 KHz – 10 KHz	2.50 + 0.20	0.015 + 0.006
	200 mA	20 Hz – 45 Hz	1.5 + 0.10	0.015 + 0.005
		45 Hz – 2 KHz	0.50 + 0.10	0.015 + 0.005
		2 KHz – 10 KHz	2.50 + 0.20	0.015 + 0.005
	2 A	20 Hz – 45 Hz	1.5 + 0.20	0.015 + 0.005
		45 Hz – 2 KHz	0.50 + 0.20	0.015 + 0.005
		2 KHz – 10 KHz	2.50 + 0.20	0.015 + 0.005
	10 A [5)]	20 Hz – 45 Hz	1.5 + 0.15	0.015 + 0.005
		45 Hz – 2 KHz	0.50 + 0.15	0.015 + 0.005
		2 KHz – 10 KHz	2.50 + 0.20	0.015 + 0.005

Additional wave crest factor error (not Sine) [6)]

Wave crest coefficient	Error (% Range)
1 – 2	0.05
2 – 3	0.2

Remarks:
[1)] Specifications are for 0.5 Hour warm-up, "Slow" measurement rate and calibration temperature 18 °C ~ 28 °C.
[2)] 20 % 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 extra 0.1 % of range error. For 50 kHz to 100 kHz, add extra 0.1 % of range error.
[4)] Specifications are for sine wave input > 5% of range. 0.1 % errors wills be added when the range of input sine wave is 1 % to 5 % .
[5)] 30 seconds OFF / 30 seconds ON is recommend for the continuous current that higher than DC 7 A or AC RMS 7 A.
[6)] For frequency < 100 Hz

SPECIFICATIONS

Frequency and Period Characteristic

Accuracy ± (% of Reading + % of Range) [1]

Function	Range	Frequency Range	1 Year 23 °C ± 5°C	Temperature coefficient 0 °C ~ 18 °C 28 °C ~ 50 °C
Frequency/Period	200 mV ~ 750 V [2]	20 Hz – 2 KHz	0.01 + 0.003	0.002 + 0.001
		2 KHz – 20 KHz	0.01 + 0.003	0.002 + 0.001
		20 KHz – 200 KHz	0.01 + 0.003	0.002 + 0.001
		200 KHz –1 MHz	0.01 + 0.006	0.002 + 0.002

Remarks:
[1] Specifications are for 0.5 Hour warm-up.
[2] Except for special marks, the AC input voltage is 15 % to 120 % of range when < 100 kHz and 30 % to 120 % 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 200 mV range.

Capacitance Characteristic

Accuracy ± (% of Reading + % of Range) [1]

Function	Range [2]	Max Testing Current	1 Year 23 °C ± 5°C	Temperature coefficient 0 °C ~ 18 °C 28 °C ~ 50 °C
Capacitance	2 nF	200 nA	3 + 1.0	0.08 + 0.002
	20 nF	200 nA	1 + 0.5	0.02 + 0.001
	200 nF	2 µA	1 + 0.5	0.02 + 0.001
	2 µF	10 µA	1 + 0.5	0.02 + 0.001
	200 µF	100 µA	1 + 0.5	0.02 + 0.001
	10000 µF	1 mA	2 + 0.5	0.02 + 0.001

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 120 % on 2 nF range and ranges from 10 % to 120 % on other ranges.

Temperature Characteristic

Accuracy ± (% of Reading + % of Range) [1]

Function	Probe Type	Probe Model	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 °C	0.08 + 0.002
	TC [3]	B	0 °C ~ 1820 °C	0.76 °C	0.14 °C
		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 ~ 1372 °C	0.5 °C	0.03 °C
		N	-270 °C ~ 1300 °C	0.5 °C	0.04 °C
		R	-270 °C ~ 1768 °C	0.5 °C	0.09 °C
		S	-270 °C ~ 1768 °C	0.6 °C	0.11 °C
		T	-270 °C ~ 400 °C	0.5 °C	0.03 °C

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	200 mV and 2 V Range 20 V, 200 V and 1000 V Range	10 MΩ or >10 GΩ selectable 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 20 dB is added if the "AC" filter is open (disconnected).	

Resistance

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

DC Current

Shunt Resistor	200 µA sampling voltage < 8 mV
	2 mA sampling voltage < 8 mV
	1 Ω for 20 mA and 200 mA
	0.01 Ω for 2 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 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: 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 flow to 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 hanging in the air)
	Trigger Condition	Rising and Falling selectable
	Input Impendance	≥ 20 KΩ//400 pF, DC-coupled
	Min Pulse	500 us
VMC	Level	TTL compatible
	Output Polarity	Positive and negative optional
	Output Impendance	200 Ω, typical

History Records

Volatile Memory	10 K reading 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	50/60 Hz
AC 200 V ~ 240 V	50/60 Hz
Consumption	20 VA max
Mechanism	
Dimension	282 mm × 260 mm × 105 mm
Weight	3.33 Kg
Other Characteristics	
Display Screen	4.3" TFT-LCD, 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
	Pollution Degree 2 (per IEC61010-1:2010)
Safety	Conforming to IEC61010-1:2001. Measure CAT I 1000 V/CAT II 600V Class of pollution: 2
Remote Interface	10/100 Mbit LAN, USB2.0 Full Speed Device and Host
Programmer Language	Standard SCPI
Warm Up Time	30 minutes

Ordering information

Product Name	**Teledyne Test Tools T3DMM5-5 Digital Multimeter**
Model	**T3DMM5-5** 5.5 Digit Broad Measurement Range Digital Multimeter
Standard Accessories	Two Test Leads, Two Alligator Clips
	A USB Cable
	A Quick Start
	A warranty Card
	Power Cord

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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