TELEDYNE TEST TOOLS
Everywhereyoulook™

T3DMM6-5 / T3DMM6-5-SC Data Sheet

6.5 Digit Digital Multimeter with optional Scanner capability

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 200 µA 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	200 µA 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 μA ~ 10 A
- AC Voltage: True-RMS, 200 mV ~ 750 V
- AC Current: True-RMS, 200 μA ~ 10 A
- 2/4-Wire Resistance: 200 Ω ~ 100 MΩ
- Capacitance: 2 nF ~ 100 mF
- Continuity Test: Range is fixed at 2 kΩ
- Diode Test: Adjustable range is 0 ~ 4 V.
- Frequency Measurement: 3 Hz ~ 1 MHz
- Period Measurement: 1 μs ~ 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

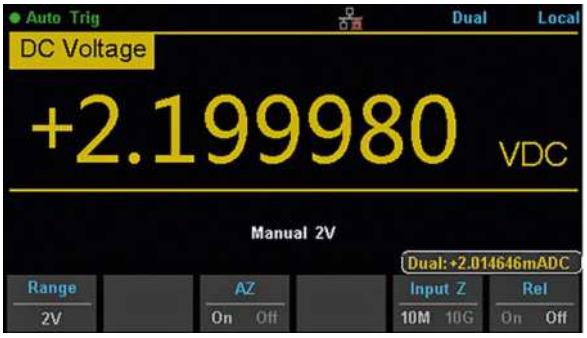
- Research Laboratory
- Development Laboratory
- Repair and Maintenance
- Calibration Laboratory
- Automatic Production Test
- General bench-top use

Main Features

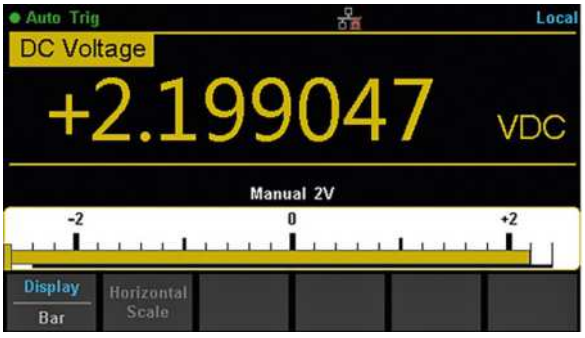
- Real 6½ digit (2,200,000 count) readings resolution
- Up to 10,000 rdgs/s measurement speed
- True-RMS AC Voltage and AC Current measuring
- 1 Gb flash memory for mass storage configuration files and data files
- Built-in cold terminal compensation for thermocouple
- T3DMM6-5-SC: Includes Scanner with 16 inputs (12 general purpose, 4 current channels)
- 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

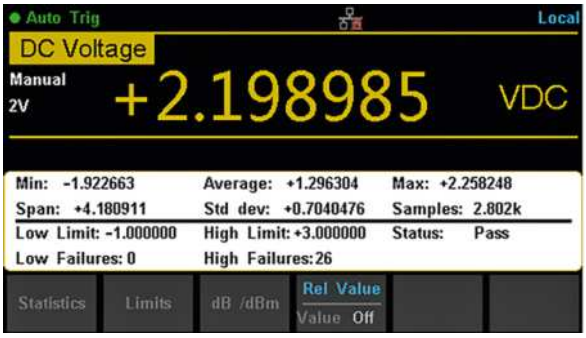
Dual Display



Bar Chart



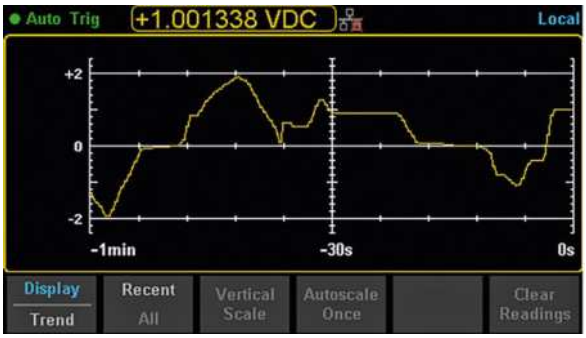
Statistics



Histogram



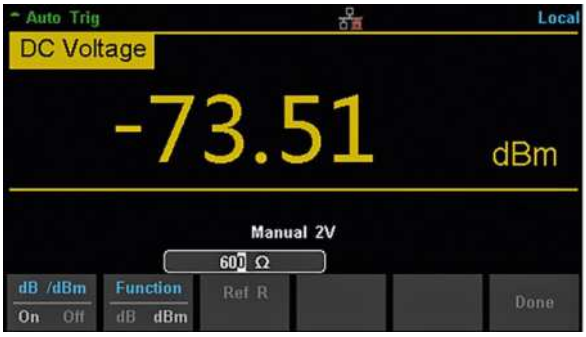
Trend Chart



Hold Measurement



dBm Hold Measurement



Rear Panel Interfaces



The Scanner Module is only included with the T3DMM6-5-SC DMM, it is not included with the T3DMM6-5

DC Characteristics

Accuracy ± (% of reading + % of range) [1)]

Function	Range [2)]	Test Current Or Shunt Voltage	24 Hour [3)] TCAL °C ± 1°C	90 day TCAL °C ± 5°C	1 Year TCAL °C ± 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 µA	< 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 KΩ	1 mA	0.0020 + 0.0005	0.008 + 0.001	0.010 + 0.001	0.0006 + 0.0001
	20.00000 KΩ	100 µA	0.0020 + 0.0005	0.008 + 0.001	0.010 + 0.001	0.0006 + 0.0001
	200.0000 KΩ	10 µA	0.0020 + 0.0005	0.008 + 0.001	0.010 + 0.001	0.0006 + 0.0001
	1.000000 MΩ	2 µA	0.0020 + 0.0010	0.010 + 0.001	0.012 + 0.001	0.0010 + 0.0002
	10.00000 MΩ	200 nA	0.015 + 0.001	0.030 + 0.001	0.040 + 0.001	0.0030 + 0.0005
	100.0000 MΩ	200 nA || 10 MΩ	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 ± 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]	NMRR[2]	Readings/s[3]	RMS Noise Adder[4] (% of Range)				
Number of Power line Cycles[5] (NPLC)	(ppm Range)	(dB)	50 Hz	60 Hz	DCV 20 V	DCV 2 V 200 V Resistance 2 KΩ 20 KΩ	DCV 1000 V DCI 2 mA 200 mA	DCV 200 mV Resistance 200 Ω DCI 10 A
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 ± 0.1 %. For power-line frequency ± 1 %, subtract 20 dB. For ± 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 & SINAD[1]

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 µA	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 µs aperture time and auto zero off.

AC Characteristics

Accuracy ± (% of reading + % of range) [1]

Function	Range [2]	Frequency Range	24 Hour [3] TCAL °C ± 1°C	90 day TCAL °C ± 5°C	1 Year TCAL °C ± 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 x 10^7 Volt-Hz. For input over 300 V rms, add 0.7 mV error for each additional volt.

AC Characteristics

Accuracy ± (% of reading + % of range) [1]

Function	Range [2]	Frequency Range	24 Hour [3] TCAL °C ± 1°C	90 day TCAL °C ± 5°C	1 Year TCAL °C ± 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 µA	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

Additional Low Frequency Errors (% of reading)				Additional Crest Factor Errors (non-sine wave) [7]	
Frequency	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 x 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 blow 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 µA, 2 mA, 2 A and 10 A ranges when frequency > 1 kHz.

Frequency and Period Characteristics

Accuracy± (% of Reading)[1) 2)]

Function	Range	Frequency Range	24 Hour[3)] TCAL °C ± 1°C	90 day TCAL °C ± 5 °C	1 Year TCAL °C ± 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 ≤ 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 × 107 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 × 10.
3) Relative to calibration standards.

Capacitance Characteristic

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

Function	Range[2)]	Test Current	1 Year TCAL °C ± 5 °C	Temperature coefficient 0 °C to (TCAL °C - 5 °C) (TCAL °C + 5 °C) to 50 °C
Capacitance	2.0000 nF	10 µA	2 + 2.4	0.05 + 0.06
	20.000 nF	10 µA	1 + 0.1	0.05 + 0.01
	200.00 nF	100 µA	1 + 0.1	0.01 + 0.01
	2.0000 µF	100 µA	1 + 0.1	0.01 + 0.01
	20.000 µF	1 mA	1 + 0.1	0.01 + 0.01
	200.00 µF	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] (R0 is 49 Ω to 2.1 kΩ)	α = 0.00385	-200 °C ~ 660 °C	0.16 °C	0.01 °C
	Thermocouple[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 ~ 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 rate[3]

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)
	100 NPLC	2 (1.67) s	0.5 (0.6)
AC Voltage AC Current	3 Hz AC Filter		0.5
	20 Hz		2
	200 Hz		50
Frequency and Period[1]	1 s Gate time		1
	0.1 s		10
	0.01 s		100
	0.001 s		500
Capacitance[2]	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 MΩ or > 10 GΩ (For these ranges, input beyond ±26V are clamped through 106 kΩ (typical)
	200 V and 1000 V ranges; 10 MΩ ± 1 %
Input Offset Current	50 pA, 25 °C, typical
Input Protection	1000 V
CMRR (common mode rejection ratio)	140 dB for 1 kΩ unbalance in LO lead, ± 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 kΩ ranges, 1 kΩ per lead on all other ranges
Offset Compensation	Available on 200 Ω, 2kΩ and 20 kΩ ranges
Input Protection	1000 V on all ranges

DC Current

Shunt Resistor	100 Ω for 200 µA, 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 ± 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 KΩ
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	≤ 5 at full range
Input Impedance	1 MΩ ± 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 kΩ unbalance in LO lead, < 60 Hz, ± 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 µs, 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 KΩ//500 pF
	Delay: < 50 µs
	Maximum Rate: 300 per second
	Minimum Pulse Width: 2 µs
VMC Output	Level: 5 V TTL Compatible
	Output Polarity: Positive and negative optional
	Output Impedance: typically 200 Ω
	Pulse Width: about 2 µs

History Records

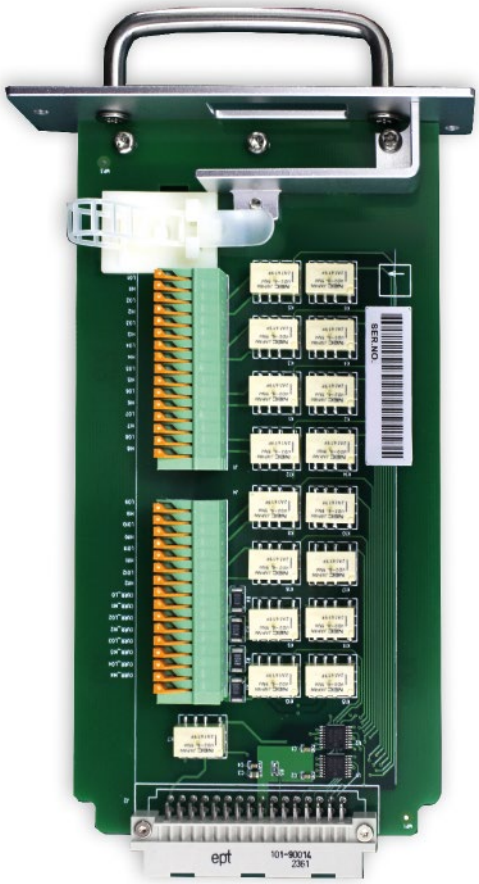
Volatile Memory	10 K of history records
Nonvolatile Memory	1 Gb Nand Flash, Mass storage configuration files and data files, Support U-disk external storage

Math Functions

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



Teledyne Test Tools T3DMM6-5-SC (Scanner Capability)



The Teledyne Test Tools T3DMM6-5-SC Scanner capability is a ready installed multiplexer that provides multi-point measurement capabilities to the T3DMM6-5-SC. The scanner features 12 multi-purpose + 4 current channels and supports the following measurement functions: DCV, ACV, DCI, ACI, 2WR, 4WR, CAP, FREQ, DIODE, CONT and TEMP (RTD and Thermocouple).

It provides a convenient and versatile solution for test applications that require multiple measurement points or signals and is an ideal tool for R&D burn-in and production testing.

The scanner option is not available separately for the T3DMM6-5 or as an upgrade for the T3DMM6-5.

Specifications

Please observe the specifications below to achieve the best performance from the T3DMM6-5-SC scanner capability.

Maximum Switching power	37.5 VA / 30 W
Maximum Switching voltage	250 V AC / 220 V DC
Maximum Switching Current	1 A
Contact Life	> 100000 operations, at 1 A 30V DC (at 0.5 Hz) > 100000 operations, at 0.3 A 125 V AC (at 0.5 Hz)
Contact Resistance	75 mΩ (maximum at 6 VDC, 1 A)
Actuation Time	5 ms maximum on/off (channel to channel)
Insulation Resistance	Minimum 1 GΩ (500 VDC)
Connector Type	Clamp terminal, #24 AWG wire size

Remarks: Please do not use the scanner capability to measure signals that exceed the specifications as this can damage or reduce the life of the scanner and cause electric shock or personal injury.

Channel Capabilities

Item	No. of wires	No. of channels
DCV, ACV	2 wires (H , L)	12 (CH1 ~ CH12)
DCI, ACI [1)]	2 wires (H , L)	4 (CH13 ~ CH16) (2A Range Only)
2W Resistance	2 wires (H , L)	12 (CH1 ~ CH12)
4W Resistance	4 wires (Input H , L + sense H, L)	6 pairs (CH1 [input] & CH7[sense], 2&8, •••, 6&12)
Capacitance	2 wires (H , L)	12 (CH1 ~ CH12)
Diode/Continuity	2 wires (H , L)	12 (CH1 ~ CH12)
Period/Frequency	2 wires (H , L)	12 (CH1 ~ CH12)
Temp (Thermocouple)	2 wires (H , L)	12 (CH1 ~ CH12)
Temp (RTD)	2 wires (H , L)	12 (CH1 ~ CH12)

Remarks:
[1)] For continuous current < 2.2 A, Accuracy ± (% 3 (reading) + 0.02 % (range)).

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
Working Environment	Full accuracy for 0 °C to 50 °C Full accuracy to 40 °C , 80 % R.H., Non-condensing
	Storage Temperature – 20 °C to 70 °C
	Shock and Vibration: conforming to MIL-T-28800E, III, 5 level (only for sine)
	Height above sea level: up to 3000 meters
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

Ordering Information

Product Name	**Teledyne Test Tools T3DMM6-5 Digital Multimeter**
Models	**T3DMM6-5** 6.5 Digit Digital Multimeter
	T3DMM6-5-SC 6.5 Digit Digital Multimeter including Scanner capability
Standard Accessories	Power Cord that fits the destination country
	Two Test Leads, Two Alligator Clips
	USB Cable
	Quick Start Guide
	Warranty Card

ABOUT TELEDYNE TEST TOOLS

TELEDYNE TEST TOOLS
Everywhereyoulook™

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.