TELEDYNE TEST TOOLS
Everywhereyoulook™

T3MIL50 & T3MIL50X Data Sheet

D.C. Milli-Ohm Meters



Tools for Improved Debugging

• 3.5" Large TFT LCD Display.	✓ Clear visibility of your measurement results.
• Fast measurement rate of 60 readings per second with an accuracy of 0.05 %.	✓ Faster measurements without losing accuracy.
• Various drive modes: T3MIL50X: DC+/DC-, Pulsed, PWM, Zero, Standby T3MIL50: DC+, Standby	✓ Suitable for various measuring applications.
• Built-in temperature compensation measurement function.	✓ Accurate Temperature measurements.
• Standard interfaces: USB, RS-232C, HANDLER/SCAN/EXT I/O	✓ Remote control your measurements.
• 3 Years Warranty as standard.	✓ Reliable product gives peace of mind.

Key Specifications

Specification	T3MIL50/T3MIL50X
Resistance Measurement Range	5 mΩ to 5 MΩ
Sampling Rate	Fast: 60 readings/s Slow: 10 readings/s
Display	50,000 counts
Interface	USB, RS-232C, HANDLER/SCAN/EXT I/O

PRODUCT OVERVIEW



Teledyne Test Tools introduces a brand new series of D.C. Milli-Ohm meters. The T3MIL series offers two models T3MIL50 and T3MIL50X, which features a 3.5-inch TFT display with a measurement accuracy of 0.05 %, maximum 50,000 count measurement display and sampling rate of 60 readings per second. The T3MIL series also provides four wire measurement as well as temperature measurement and temperature compensation functions to meet the requirements of low resistance measurement applications.

Various Drive Modes (T3MIL50X only)

T3MIL50X provides Dry circuit and various drive modes (DC+, DC-,Pulsed, PWM) for measurement applications on different materials.

The pulsed current output mode is suitable for interacting conductors of different materials to reduce the influence of thermal EMF on the measurement. Thermal EMF is caused by electric potential difference generated from different conductors acting on different temperatures while conducting low resistance measurements.

The DC+ and DC- output modes are best for the measuring of inductive components.

The PWM output mode is suitable for measuring temperature sensitive materials to avoid any resistance variation caused by measurement current being applied for a long period of time.

Dry circuit testing is used to detect contaminates and oxides on mating contact surfaces. Typically, a dry circuit test is performed in conjunction with environmental stress tests intended to create contamination or metal oxides on connector contact surfaces. Excessive current through the contacts during testing can cause a physical change in the contact area on a microscopic level. Current can cause heating, which can soften or melt the contact points and surrounding area. The contact area enlarges, resulting in a reduction in resistance. To avoid "wiping away" the contaminates, a dry circuit method is used for testing. A dry circuit is one in which the voltage and current are limited to levels that can't cause changes in the physical and electrical condition of the contact junction. Generally, the open circuit voltage is 20 mV or less and the short circuit current is 100 mA or less. The Dry circuit measurement can also be made in DC+, DC- and Pulsed modes.

Communication Interfaces

T3MIL series provides a D-sub 25-pin combined interface to control the device for various functionalities such as Handler, Scan and EXT I/O. Handler function can be used for connecting the device to a sorting machine in a production environment. Scan and EXT I/O is useful when connecting to an external switch or for an external trigger control. T3MIL series also offers remote control and data retrieval through various interfaces such as RS 232C and USB.

PANEL INTRODUCTION





1. 3.5" Large TFT LCD provides clear visibility of setting parameters and measurement results
2. Independent functional keys and direction keys provide intuitive and fast operation
3. GND/Guard terminals are ideal for grounding to eliminate measurement noise
4. Reading display resolution will not be affected by speed selections
5. Four wire measurement terminal
6. RS-232C Port
7. Handler/Scan/EXT I/O Combined Port
8. General power input AC 100~240 V
9. Temperature probe port
10. USB Port

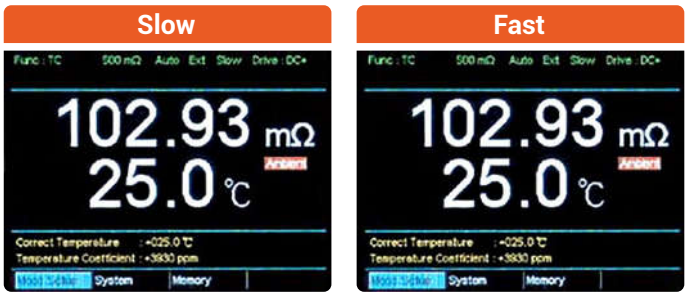
Features

- 50,000 Counts Display
- 3.5" (320 x 240) TFT LCD Display
- High Accuracy of 0.05 %
- 1Amp Test Current, 0.1 μΩ Resolution
- Fast measurement of 60 readings per second
- Four wire resistance measurement
- Temperature Compensation measurement function
- Delayed measurement
- 20 sets of panel setting memory
- Dry circuit testing (T3MIL50X only)
- Drive Modes:
  T3MIL50X: DC+/DC-, Pulsed, PWM, Zero, Standby
  T3MIL50: DC+, Standby
- Interface: USB Device, RS-232C, Handler/Scan/EXT I/O

Application Fields

- Production testing of contact resistance of switches, relays, connectors, cables, and other low Resistance Devices
- Production testing of various inductive components (coil, choke, and transformer winding etc.)
- Testing of low value resistors, fuses, and heating elements
- Winding resistance of motors, transformers, solenoids, and ballasts
- Conductivity evaluation in product design
- Incoming inspection and quality assurance testing

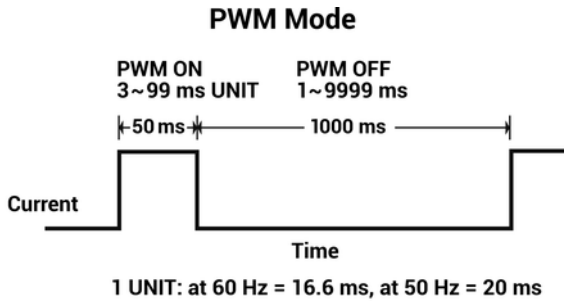
A. FASTER MEASUREMENT WITHOUT SACRIFICING RESOLUTIONN



T3MIL series offers Fast (60 readings per second) and Slow (10 readings per second) measurement speeds.

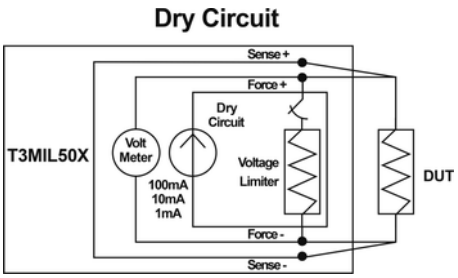
The measurement speed does not effect the measurement accuracy. The number of digits displayed remains the same irrespective of the measurement speed. The user can measure in Fast mode without losing accuracy.

B. VARIOUS DRIVE MODES (T3MIL50X Only)



T3MIL50X provides various current output drive modes to satisfy diversified and accurate low resistance measurement applications. The pulsed current output mode is suitable for interacting conductors of different materials to reduce the influence of thermal EMF on the measurement. Thermal EMF is caused by electric potential difference generated from different conductors acting on different temperatures while conducting low resistance measurements. The DC+ and DC- output modes are best for the measurement requirements of inductive components.

C. DRY CIRCUIT TEST(T3MIL50X only)



Dry circuit testing is used to detect contaminates and oxides on mating contact surfaces. Typically, a dry circuit test is performed in conjunction with environmental stress tests intended to create contamination or metal oxides on connector contact surfaces. Based upon MIL-STD-1344 method 3002-1 low signal level contact resistance, tests must be applied under the maximum open circuit voltage of 20 mV (or lower), and short circuit current of 100 mA (or lower) to avoid over voltage for the both ends of components. The over voltage will damage the oxide coating and the thin layer of contact surface, as a result, losing the validity of the measurement. T3MIL50X provides three levels (500 mΩ: 100 mA / 5 Ω: 10 mA / 50 Ω: 1 mA) to limit open circuit voltage at 20 mV to execute Dry circuit tests.

D. STANDARD INTERFACE FOR CONTROL AND COMMUNICATIONS



T3MIL series provides a D-sub 25-pin combined interface to control the device for various functionalities such as Handler, Scan and EXT I/O. Handler function can be used for connecting the device to a sorting machine in a production environment. Scan and EXT I/O is useful when connecting to an external switch or for an external trigger control. T3MIL series also offers remote control and data retrieval through various interfaces such as RS 232C and USB.

SPECIFICATIONS

Specifications

		T3MIL50			T3MIL50X
Display		50,000 counts			
Sampling Rate	**Slow**	10 readings/s			
	Fast	60 readings/s			
Resistance Measurement		**Range**	**Resolution**	**Test Current**	**Accuracy**
		5 mΩ	0.1 μΩ	1 A	± (0.1 % reading + 0.2 % of range)
		50 mΩ	1 μΩ	1 A	± (0.1 % reading + 0.02 % of range)
		500 mΩ	10 μΩ	100 mA	± (0.05 % reading + 0.02 % of range)
		5 Ω	100 μΩ	100 mA	± (0.05 % reading + 0.02 % of range)
		50 Ω	1 mΩ	10 mA	± (0.05 % reading + 0.02 % of range)
		500 Ω	10 mΩ	1 mA	± (0.05 % reading + 0.008 % of range)
		5 kΩ	100 mΩ	100 μA	± (0.05 % reading + 0.008 % of range)
		50 kΩ	1 Ω	100 μA	± (0.05 % reading + 0.008 % of range)
		500 kΩ	10 Ω	10 μA	± (0.05 % reading + 0.008 % of range)
		5 MΩ (T3MIL50)	100 Ω	1 μA	± (0.2 % reading + 0.008 % of range)
		5 MΩ (T3MIL50X)	100 Ω	1 μA	± (0.5 % reading + 0.008 % of range)
Temperature	**Range**	-50 °C ~ 399.9 °C			
	Accuracy	-10 °C ~ 40 °C: 0.3 % 0.5 °C; Other: 0.3 % 1.5 °C			
	Resolution	0.1 °C			
Dry Circuit		–			Open circuit less than 20 mV; For 500 mΩ, 5 Ω, 50 Ω range only
Drive Mode	**DC+ / DC-**	DC+ Only			Yes
	Pulsed	–			Yes
	PWM	–			Yes
	Zero	–			Yes
	Standby	Yes			Yes
Other Functions		Trigger – Internal, Manual, External; Math – ABS,REL, %, TC; Average: 2~10 times; Measurement Delay; TC for Transformer; Compare; Diode; Continuity beeper; Binning (only T3MIL50X)			
Interface	**USB**	Standard			Standard
	RS-232C	Standard			Standard
	HANDLER / SCAN / EXT I/O	Standard			Standard
Display		3.5" (320 x 240) TFT LCD			
Memory		20 sets for panel setting			
Power Source		AC 100 ~ 240 V, 50 / 60 Hz			
Comsumption		25 VA (max.)			
Dimension & Weight		223 (W) x102 (H) x 283 (D) mm; Approx. 3 kg			

Specifications subject to change without notice.

Ordering information

Models	**T3MIL50**	D.C. Milli-Ohm Meter	
	T3MIL50X	D.C. Milli-Ohm Meter – Advanced Features	
Standard Accessories	Power Cord		x 3
	Test Lead:	T3TL4K-150	x 1

ABOUT 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.

Distributed by:

Teledyne LeCroy (US Headquarters)

700 Chestnut Ridge Road
Chestnut Ridge, NY. USA 10977-6499

Phone:	800-553-2769 or 845-425-2000
Fax Sales:	845-578-5985
Phone Support:	1-800-553-2769
Email Sales:	contact.corp@teledynelecroy.com
Email Support:	support@teledynelecroy.com
Web Site:	http://teledynelecroy.com/

Teledyne LeCroy (European Headquarters)

Teledyne GmbH
Im Breitspiel 11c
D-69126 Heidelberg, Germany

Phone:	+49 6221 82700
Fax:	+49 6221 834655
Phone Service:	+49 6221 8270 85
Phone Support:	+49 6221 8270 28
Email Sales:	contact.gmbh@teledynelecroy.com
Email Service:	service.gmbh@teledynelecroy.com
Email Support:	tlc.t3.appsupport.eu@teledyne.com
Web Site:	http://teledynelecroy.com/germany

World wide support contacts can be found at:
https://teledynelecroy.com/support/contact/#

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T3 stands for Teledyne Test Tools.

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