



# INSTRUCTION MANUAL

## MTC45

### 2-IN-1 WIRE/CABLE TESTER & MULTIMETER





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## 1. INTRODUCTION

2-in-1 Wire/Cable Tester & Multimeter is an innovative tester that allows the user easy to measure DC/AC Voltage/Current, Resistance, Continuity, diode and verify the cable continuity, quickly trace and identify cables or wires within a group and also check the operation of phone lines. The Wire/Cable Tester includes a Tone generator and an Amplifier probe. Proper use and care of this meter will provide years of reliable service.

## 2. FEATURES

- 2-in-1 Wire/Cable Tester & Multimeter
- Measures DC/AC Voltage, DC/AC Current, Resistance, Continuity, Diode and Wire/Cable tester
- 3-1/2 digit (2000 count) LCD display for multimeter functions
- LED Displays the operation of phone cable lines
- Low battery indication
- Selectable continuous or variable tone generation and alligator clips, RJ45/RJ11 modular
- CAT III 600V; CAT II 1000V
- Provides easy to read continuity and fault status display
- Tests include wire trace, continuity test, clear/busy/ringing line test and tip/ring identification
- Wire/Cable tester has the function of 220V High voltage protection
- Auto ranging with auto power off for multimeter functions

## 3. SAFETY

### 3.1. International Safety Symbols



This symbol, adjacent to another symbol or terminal, indicates the user must refer to the manual for further information.



This symbol, adjacent to a terminal, indicates that, under normal use, hazardous voltages may be present.



Double insulation

### 3.2. Safety Precautions

1. Improper use of this meter can cause damage, shock, injury or death. Read and understand this users manual before operating the meter.
2. Make sure any covers or battery covers are properly closed and secured.
3. Always disconnect the test leads from any voltage source before replacing the battery or fuses.
4. Do not exceed the maximum rated input limits.

## Input Limits

Function	Maximum Input
V DC or V AC	600V DC/AC
$\mu$ A AC/DC	200mA/250V fast acting Fuse
Resistance, Diode & Continuity Test	600V DC/AC

- Always discharge capacitors and remove power from the device under test before performing Diode, Resistance or Continuity tests.
- Remove the battery from the meter if the meter is to be stored for long periods.

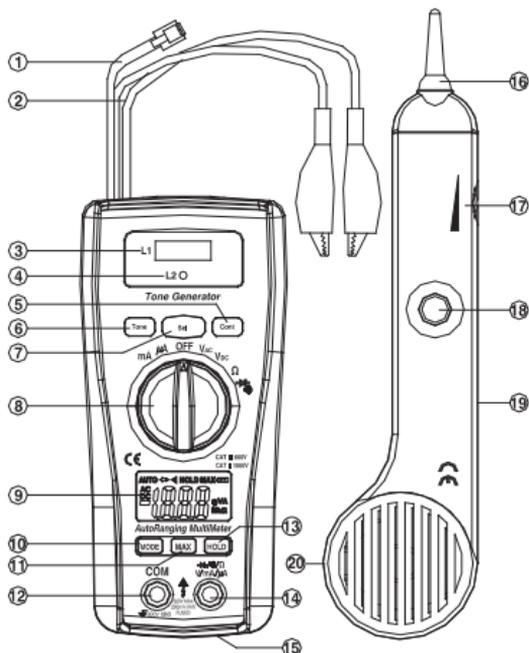
## 4. METER DESCRIPTION

### Wire/Cable tester part Description (1~7 & 16~20)

- |  |                                     |
|--|-------------------------------------|
| 1 - Modular connector RJ11                         | 6 - Tone Switch for Tone generating |
| 2 - Test leads                                     | 7 - Sel Switch for tones selections |
| 3 - LED display for telephone cable line condition | 16 - Probe tip                      |
| 4 - LED display for low battery of Tone Generator  | 17 - Volume/Sensitivity control     |
| 5 - Cont Switch for continuity test                | 18 - Power button                   |
|  | 19 - Battery compartment (rear)     |
|  | 20 - Headphone jack                 |

### Digital multimeter part Description (8~15):

- Function switch
- 3 1/2 Digit (2000 count) LCD display for DMM functions
- MODE button
- MAX Hold button
- COM input jack
- Data Hold button
- V,  $\Omega$ ,  $\mu$ A, mA input jack
- Battery Compartment (rear)



## 5. SPECIFICATIONS

### 5.1. Electrical Specifications

Function	Range	Accuracy
DC Voltage	200mV,	$\pm(0.5\% \text{ rdg} + 3d)$
	2.000V, 20.00V,	$\pm(1.0\% \text{ rdg} + 3d)$
	200.0V, 600V	$\pm(1.0\% \text{ rdg} + 3d)$
AC Voltage 50-60Hz	2.000V, 20.00V	$\pm(1.0\% \text{ rdg} + 5d)$
	200.0V, 600V	$\pm(1.5\% \text{ rdg} + 10d)$
DC Current	200.0 $\mu$ A, 2000 $\mu$ A	$\pm(1.5\% \text{ rdg} + 3d)$
	20.00mA, 200.0mA	$\pm(2.0\% \text{ rdg} + 3d)$
AC Current	200.0 $\mu$ A, 2000 $\mu$ A	$\pm(1.8\% \text{ rdg} + 8d)$
	20.00mA, 200.0mA	$\pm(2.5\% \text{ rdg} + 8d)$
Resistance	200.0 $\Omega$	$\pm(0.8\% \text{ rdg} + 5d)$
	2.000k $\Omega$ , 20.00k $\Omega$	
	200.0k $\Omega$	$\pm(1.2\% \text{ rdg} + 3d)$
	2.000M $\Omega$	$\pm(2.0\% \text{ rdg} + 5d)$
	20.00M $\Omega$	$\pm(5.0\% \text{ rdg} + 8d)$

Function	Range
Max input voltage	600V AC/DC
Diode Test	Test current 1mA max., open circuit voltage of 1.5V typical
Continuity Check	Audible signal if the resistance is <150 $\Omega$
Display	2000 count 3 -1/2 digit LCD
Over range indication	LCD displays "OL"
Polarity	Minus (-) sign for negative polarity.
Low Battery Indication	"BAT" symbol indicates low battery condition.
Input Impedance	>7.5M $\Omega$ (VDC & VAC)
AC Response	Average responding
ACV Bandwidth	50Hz to 60Hz
Auto Power Off	15 minutes (approximately)
Fuse	mA, $\mu$ A ranges; 0.2A/250V fast acting Fuse
Tone output	Continuity: 800 – 860Hz - Wobble:800-1050HZ
Batteries	Two 9V batteries and two "AAA" batteries
Operating Temperature	0°C to 40°C (32°F to 104°F)
Storage Temperature	-10°C to 50°C (14°F to 122°F)
Weight	328g
Size	162 x 74.5 x 44.0mm
Standard	IEC61010-1 CAT III-600V Pollution degree II, CE Approved

## 6. OPERATION

### 6.1. Auto Ranging Multimeter

#### 6.1.1. AC/DC Voltage Measurements

**CAUTION:** Do not measure AC/ DC voltages if a motor on the circuit is being switched ON or OFF. Large voltage surges may occur that can damage the meter.

1. Insert the black test lead into the negative COM terminal and the red test lead into the positive V terminal.
2. Set the function switch to VAC or VDC position.
3. Connect the test leads in parallel to the circuit under test.
4. Read the voltage measurement on the LCD display.

#### 6.1.2. AC/DC Current Measurements

1. Set the function switch to the  $\mu\text{A}/\text{mA}$  position.
2. Insert the black test lead into the negative COM terminal and the red test lead into the positive  $\mu\text{A}/\text{mA}$  terminal.
3. For current measurements up to  $2000\mu\text{A}$  DC/AC, set the function switch to the **mA** position
4. Press the MODE button to indicate "DC" / "AC" on the display.
5. Remove power from the circuit under test, then open up the circuit at the point where you wish to measure current.
6. Touch the black test probe tip to the negative side of the circuit. Touch the red test probe tip to the positive side of the circuit.
7. Apply power to the circuit.
8. Read the current on the display

#### 6.1.3. Resistance Measurement

**WARNING:** To avoid electric shock, disconnect power to the unit under test and discharge all capacitors before taking any resistance measurements. Remove the batteries and unplug the line cords.

1. Set the function switch to the  $\Omega$  position.
2. Insert the black test lead into the negative COM terminal and the red test lead into the positive  $\Omega$  terminal.
3. Touch the test probe tips across the circuit or part under test. It is best to disconnect one side of the part under test so the rest of the circuit will not interfere with the resistance reading.
4. Read the resistance on the display

#### 6.1.4. Continuity Check

**WARNING:** To avoid electric shock, never measure continuity on circuits or wires that have voltage on them.

1. Set the function switch to the   position.
2. Insert the black test lead into the negative COM terminal and the red test lead into the positive  $\Omega$  terminal.
3. Press the MODE button to indicate  on the display
4. Touch the test probe tips to the circuit or wire you wish to check.
5. If the resistance is less than approximately  $150\Omega$ , the audible signal will sound. If the circuit is open, the display will indicate "OL".

#### 6.1.5. Diode Test

1. Set the function switch to the   position.
2. Press the MODE  $\Delta$  button to indicate  on the display under test. Touch the test probes to the diode. Forward voltage will typically indicate 0.400 to 0.700V. Reverse voltage will indicate "OL". Shorted devices will indicate near 0V and an open device will indicate "OL" in both polarities

#### 6.1.6. MAX Hold Button

To hold the highest reading on the LCD.

1. Press the MAX hold button. The meter reading will not change as readings change
2. Press the MAX hold button again to return to normal operation.

#### 6.1.7. Hold Button

The Data Hold function allows the meter to "freeze" a measurement for later reference.

1. Press the "DATA HOLD" button to "freeze" the display, the "HOLD" indicator will appear.
2. Press the "DATA HOLD" button to return to normal operation.

#### 6.1.8. Auto Power Off

The auto off feature will turn the meter off after 15 minutes.

#### 6.1.9. Replacing the Battery

1. Remove the bottom cover and secure the screw.
2. Replace old battery with new Two 1.5V AAA & 9V type battery.
3. Replace the bottom cover and secure the screw.

### 6.1.10. Replacing the Fuses

**WARNING:** To avoid electric shock, disconnect the test leads from any source of voltage before removing the fuse cover.

1. Disconnect the test leads from the meter.
2. Remove the protective rubber holster.
3. Remove the battery cover (two "B" screws) and the battery.
4. Remove the four "A" screws securing the rear cover.
5. Lift the center circuit board straight up from the connectors to gain access to the fuse holders.
6. Gently remove the old fuse and install the new fuse into the holder.
7. Always use a fuse of the proper size and value (0.2A/250V fast blow for the 200mA range).
8. Align the center board with the connectors and gently press into place.
9. Replace and secure the rear cover, battery and battery cover.

### 6.2. Wire/Cable tester (Tone generator and Amplifier probe)

**Note:** Make sure the battery power is sufficient. Insufficient battery power will lead to dimmed LEDs and incorrect results.

#### 6.2.1. Cable/Wire tracing

1. Connect the tone generator to the cable
  - a) For cables terminated at one end, connect the red alligator clip to a wire and the black alligator clip to equipment ground.
  - b) For unterminated cables, connect the red alligator clip to one wire and the black alligator clip to another wire.
  - c) For cables with modular connectors, plug the RJ11 connectors directly into the matching cable connectors.
2. Set the Tone Switch on (the Tone switch on down position).
3. On the amplifier probe, press and hold the side on/off button.
4. Hold the insulated probe tip against the wire in question to pick up the signal generated by the tone generator.
5. Rotate the volume/sensitivity control on the top of the probe for the appropriate level and sensitivity to identify and trace the wire.
6. The tone will be the loudest on the wires connected to the tone generator.

**Note:** A headphone jack is located on the bottom of the probe.

#### 6.2.2. Identifying telephone cable Tip and Ring – Using Alligator Clips

1. Switch the tone generator to the OFF position (the Tone, Sel, Cont switch on up position)

2. Connect the red test lead to one line and the black lead to the other line.
3. The LED color indicates the connection to the RED test lead as:  
GREEN = Ring side, RED = Tip side.

### **6.2.3. Identifying Telephone Cable Tip and Ring – Using the RJ-11 Connectors**

1. Switch the tone generator to the OFF position (the Tone, Sel, Cont switch on up position)
2. Connect the RJ-11 connector mating cable connector.
3. The LED color indicates the condition of the telephone jack wiring.  
GREEN = Jack wired properly, RED = Jack wired with reversed polarity.

### **6.2.4. Identifying Telephone Cable Line Condition**

1. Switch the tone generator to the OFF position (the Tone, Sel, Cont switch on up position)
2. Connect the red test lead to the RING side and the black test lead to the TIP side.
3. The LED will indicate line condition by:  
GREEN = CLEAR , OFF = BUSY, Flickering YELLOW = RINGING
4. Switch the tone generator's Cont switch to down position to terminate the call.

### **6.2.5. Continuity Testing**

**WARNING:** To avoid electric shock before testing for continuity, check line polarity to ensure that the line is not powered.

1. Connect the test leads to the wire pair .
2. Switch the Cont Switch to down position.
3. The LED will glow bright GREEN for a low resistance or continuity. The LED will glow less brightly as the resistance increases and will extinguish at approximately 10,000ohms.

### **6.2.6. Tone Selection**

The output of the tone generator can be set to continuous or wobble. Use the Sel Switch on the Tone-generator to change the tone of output to "continuity" (down position) or "wobble" (up position)

### **6.2.7. Low Battery Indicator**

When a low battery condition is detected. Low battery LED will light up.

### 6.2.8. Battery Replacement

1. The tone generator and amplifier probe require one standard/Alkaline 9 Volt battery for operation.
2. Slide back the battery cover to replace new battery.

- CAUTION:**
1. When the test is over, make sure all the switches are set to the off position (up position).
  2. Leaving the battery in the tester for long periods of time without use could drain power from the battery



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