

User's Guide

**EXTECH**<sup>®</sup>  
INSTRUMENTS

A FLIR COMPANY

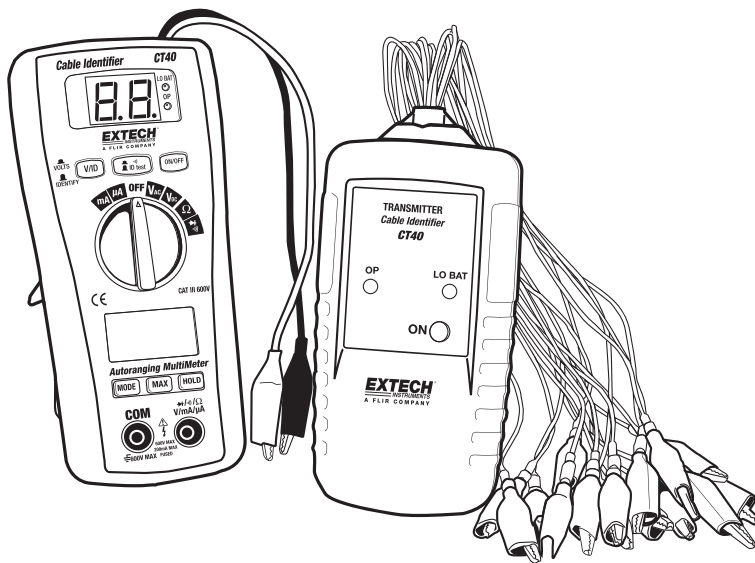
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# Cable Tester and Digital Multimeter

## Model CT40



## Introduction

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Congratulations on your purchase of the Extech CT40. This meter is shipped fully tested and calibrated and, with proper use, will provide years of reliable service. The CT40 is a cable tester which uses a transmitter/receiver to allow for wire identification of an individual core to the end of a multi-core cable. The meter's digital multimeter functions provides for easy measurement of AC/DC Voltage, AC/DC Current, Resistance, Continuity and Diode check.

## Safety

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### 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

### Safety Notes

- Do not exceed the maximum allowable input range of any function.
- Set the function switch OFF when the meter is not in use.
- Remove the battery if meter is to be stored for longer than 60 days.

### Warnings

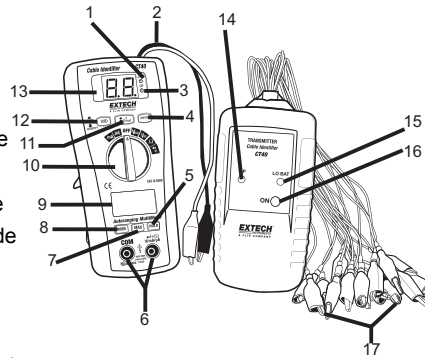
- Set function switch to the appropriate position before measuring.
- Do not measure current on a circuit whose voltage exceeds 600V.
- When changing ranges always disconnect the test leads from the circuit under test.

### Cautions

- Improper use of this meter can cause damage, shock, injury or death. Read and understand this user manual before operating the meter.
- Always remove the test leads before replacing the battery.
- Inspect the condition of the test leads and the meter itself for any damage before operating the meter. Repair or replace any damage before use.
- Use great care when making measurements if the voltages are greater than 25VAC rms or 35VDC. These voltages are considered a shock hazard.
- Voltage checks on electrical outlets can be difficult and misleading because of the uncertainty of connection to the recessed electrical contacts. Other means should be used to ensure that the terminals are not "live".
- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

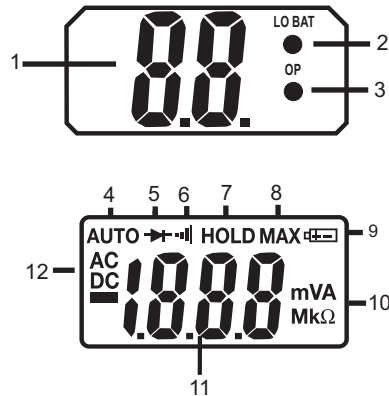
## Meter Description

1. Low Battery Indicator -Receiver
2. Receiver Alligator Test Leads
3. Operation Indicator -Receiver
4. On/Off Switch -Receiver
5. Hold Switch – Digital Multimeter Mode
6. DMM Input Jacks
7. Max Button – Digital Multimeter Mode
8. Mode Button – Digital Multimeter Mode
9. LCD Display – Multimeter Mode
10. Rotary Switch – Multimeter Mode
11. R Test Button –Continuity Beep Test
12. V Check Button – Cable Voltage Check
13. LCD Display for Cable Identifier Function
14. Operation Indicator- Transmitter
15. Low Battery Indicator –Transmitter
16. On/Off Switch – Transmitter
17. Transmitter Alligator Test Leads – CH1-16



## LCD display descriptions

1. Cable ID Number Display
2. Low bat LED
3. OP operation LED
4. Autorange Indicator
5. Diode Test
6. Continuity
7. Display Hold
8. Max
9. Low Battery Indicator
10. Units
11. DMM Digit Display
12. AC/DC Indicators



## Operation

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### Transmitter and Receiver Cable Tester Operation

1. Press down the receiver's ON/OFF switch. The upper blue display will indicate "00" and the **OP** LED should light.
2. Press down the transmitter's ON switch. The **OP** LED will flash.
3. Connect one of the transmitter's alligator clips (CH1 to CH16) to each core (wire) of the cable under test.
4. Connect the transmitter's "COM" reference lead (black alligator) to a known common for all cables, such as ground or cable sheath.
5. Connect the receiver's "COM terminal" (black alligator) to the common.
6. Touch the receiver's "input terminal" (red alligator) test lead to one core of the cable under test.
7. The number of the wire selected is indicated on the display of the receiver (1-16).

**CAUTION: Do not apply over 50V (AC or DCV) to test leads of transmitter or receiver. This could result in permanent damage to the meter.**

### Continuity Beep Test

1. Press the R TEST button down.
2. Connect the receiver's red and black alligator clips to each end of a wire.
3. If there is continuity ( $<100\Omega$ ) there will be an audible tone.

### Voltage Check

1. Press the **V check** button down.
2. Connect both of the receiver's alligator clips to each end of the cable under test.
3. If the display indicates "**UU**" then voltage is present on the cable. Locate and remove the voltage source before proceeding with cable testing.

## Digital Multimeter Functions

### AC/DC Voltage Measurements

1. Insert the black test lead into the negative COM terminal and the red test lead into the positive V terminal.
2. Set the rotary 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.

**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.

### 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. Connect the meter in series with the circuit under test, the black test probe tip to the negative side of the circuit and the red test probe tip to the positive side of the circuit.
6. Apply power to the circuit.
7. Read the current in the display




### Resistance Measurements

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 in the display

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




## 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 lead banana plug into the negative (-) jack (COM) and the red test lead banana plug into the positive (+) jack ( $\Omega$ ).
3. Press the  button until the  symbol appears in 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. The display will also show the actual resistance.

## DIODE TEST

**WARNING:** To avoid electric shock, do not test any diode that has voltage on it.

1. Set the function switch to  position.
2. Press the  button until the  **symbol** appears in the display.
3. Insert the black test lead banana plug into the negative (-) jack (COM) and the red test lead banana plug into the positive (+) jack ( $\Omega$ ).
4. Touch the test probe tips to the diode or semiconductor junction you wish to test. Note the meter reading.
5. Reverse the probe polarity by switching probe position. Note this reading.
6. The diode or junction can be evaluated as follows:
  - A. If one reading shows a value and the other reading shows OL, the diode is good.
  - B. If both readings show OL, the device is open.
  - C. If both readings are very small or 0, the device is shorted.

**NOTE:** The value indicated in the display during the diode check is the forward voltage.

## MAX Hold Function

1. Press the MAX Hold **Button**. The meter continues taking measurements but the display shows only the highest (MAX) reading recorded.
2. Press the Max Hold Button again to return to normal operation.

## Data Hold Function

1. Press the Data Hold Button. The HOLD indicator will appear. The hold function freezes the reading in the display.
2. Press the Data Hold Button again to return to normal operation.

## Auto Power OFF Function

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

## Maintenance

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

**WARNING:** To avoid electric shock, do not operate your meter until the fuse cover is in place and fastened securely.

### BATTERY INSTALLATION

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

1. When the "Low Battery Indicator" is lit on the Transmitter or the Receiver it is necessary to replace the battery.
2. Turn power off and disconnect the test leads from the meter.
3. Open the rear battery cover by removing the screw.
4. Insert the battery into battery holder, observing the correct polarity.
5. Put the battery cover back in place. Secure with the screw.

**WARNING:** To avoid electric shock, do not operate the meter until the battery cover is in place and fastened securely.

### Calibration and Repair Services

Extech offers repair and calibration services for the products we sell. Extech also provides NIST certification for most products. Call the Customer Care Department for information on calibration services available for this product. Extech recommends that annual calibrations be performed to verify meter performance and accuracy.



#### Support line (781) 890-7440

Technical Support: Extension 200; E-mail: [support@extech.com](mailto:support@extech.com)

Repair & Returns: Extension 210; E-mail: [repair@extech.com](mailto:repair@extech.com)

#### Product specifications subject to change without notice

For the latest version of this User Guide, Software updates, and other up-to-the-minute product information, visit our website: [www.extech.com](http://www.extech.com)  
Extech Instruments Corporation, 285 Bear Hill Road, Waltham, MA 02451

## Specifications

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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 <150Ω
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	>7.5MΩ (VDC & VAC)
AC Response	Average responding
ACV Bandwidth	50Hz to60Hz
Auto Power Off	15 minutes (approximately)
Fuse	mA, μA ranges; 0.2A/ <b>250V fast</b> acting Fuse
Batteries	9V battery and two "AAA" batteries
Operating Temperature	32°F to 104°F (0°C to 40°C)
Storage Temperature	14°F to 122°F (-10°C to 50°C)
Weight	10.8 oz (308g)
Size	6.3x2.9x1.7", (162x74.5x44.0mm)
Standards	IEC61010-1 CAT III-600V Pollution degree II, CE Approved

### Transmitter Specifications

Display	Two red LED lamps
Alligators	17Croc clips-red*16, black*1
Cable resistance	30K Ohm max
Power	9V battery
Power current	1.8mA
Operating temperature	0°C to 40°C (32°F to 104°F)
Storage temperature	-10°C to 50°C (14°F to 122°F)

### Receiver Specifications

Display	Two digit blue LED display
Alligators	2 Croc clips-red*1, black*1
Power	9V battery
Power current	23mA
Operating temperature	0°C to 40°C (32°F to 104°F)
Storage temperature	-10°C to 50°C (14°F to 122°F)
Continuity test	Beep if less than 100Ω
Cable voltage check	5V to 16V DC

## Multimeter Specifications

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

## Warranty

**EXTECH INSTRUMENTS CORPORATION** (A FLIR COMPANY) warrants this instrument to be free of defects in parts and workmanship for **one year** from date of shipment (a six month limited warranty applies to sensors and cables). If it should become necessary to return the instrument for service during or beyond the warranty period, contact the Customer Service Department at (781) 890-7440 ext. 210 for authorization or visit our website [www.extech.com](http://www.extech.com) for contact information. A Return Authorization (RA) number must be issued before any product is returned to Extech. The sender is responsible for shipping charges, freight, insurance and proper packaging to prevent damage in transit. This warranty does not apply to defects resulting from action of the user such as misuse, improper wiring, operation outside of specification, improper maintenance or repair, or unauthorized modification. Extech specifically disclaims any implied warranties or merchantability or fitness for a specific purpose and will not be liable for any direct, indirect, incidental or consequential damages. Extech's total liability is limited to repair or replacement of the product. The warranty set forth above is inclusive and no other warranty, whether written or oral, is expressed or implied.

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