

Introduction

Thank you for selecting the Extech Model 381676. This instrument provides AC/DC Voltage, Resistance, Diode, & Continuity testing plus a built-in non-contact Voltage Detector. This device is shipped fully tested and calibrated and, with proper use, will provide years of reliable service. Please visit the Extech Instruments website (www.extech.com) to check for the latest version of this User Guide. Extech Instruments is an ISO-9001 certified company.

Safety



: Improper use of this device can result in electric shock or damage to the meter. Follow all safety guidelines presented in this manual and the usual safety precautions used when working with electrical circuits. This meter has been designed according to IEC-1010 with respect to electronic measurement instrumentation with an overvoltage category CAT III 600V and pollution 2.

When using the meter, observe all normal safety rules concerning:

- Protection against the dangers of electrical current
- Protection of the meter against misuse

When the meter is delivered, check that it has not been damaged in transit. When checking voltage, always test the meter on a known live circuit first. Test leads must be in good condition. Before use, verify that the test lead insulation is intact and free from lead wire exposure or other damage. Use only the supplied test leads.

- Be sure to set the appropriate function and range before use
- Never exceed the limits indicated in the specification table of this manual.
- Never touch probes, test leads, or alligator clip when connected to live circuit.
- Do not measure voltage on terminals that exceed 600V above earth ground.
- Always use caution when working with voltages above 60VDC or 30VACrms. Keep fingers behind probe barrier when taking measurements.
- Never connect test leads across a voltage source while the rotary switch is in the resistance, continuity, or diode mode of operation.
- Never perform resistance, continuity, or diode tests on live circuits.
- When taking non-contact voltage measurements ensure that the positive test lead is NOT exposed and that the negative (common) test lead is not connected to the bottom of the meter.
- Before changing functions using the rotary function dial, be sure to disconnect the meter's test leads from any circuit under test.
- Never use the meter in an explosive environment or where dust, dirt, or steam exists.
- Never use the meter if the housing or battery compartment is open.
- Do not store meter in direct sunlight, high temp./humidity, or condensation.
- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.
- ALWAYS discharge filter capacitors in power supplies and disconnect the power when making resistance or diode tests.



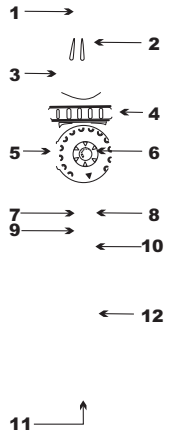
This symbol adjacent to another symbol, terminal or operating device indicates that the operator must refer to an explanation in the Operating Instructions to avoid personal injury or damage to the meter.



This symbol indicates that a device is protected throughout by double insulation or reinforced insulation.



This symbol advises the user that the terminal(s) so marked must not be connected to a circuit point at which the voltage with respect to earth ground exceeds 600V.



Operating Instructions

WARNING: Risk of electrocution. High-voltage circuits, both AC and DC, are very dangerous and should be measured with great care.

: On some low AC and DC voltage ranges, with the test leads not connected to a device, the display may show a random, changing reading. This is normal and is caused by the high-input sensitivity. The reading will stabilize and give a proper measurement when connected to a circuit.

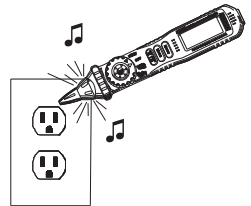
: The supplied black test leads (standard test lead and alligator clip probe) have protective plugs that must be removed before being inserted in the bottom of the meter. The protective apparatus must be removed from the end of the lead that plugs into the meter.

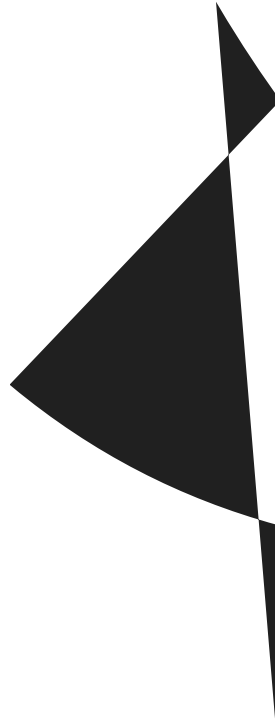
Test the AC voltage detector on a known live circuit before each use.

: Before using the meter in the AC Voltage Detector mode, verify that the batteries are fresh by confirming characters appear on the LCD when the function dial is turned to the voltage (V) position. Do not attempt to use the meter as an AC Voltage Detector if the batteries are weak or bad.

With the function switch set to the NCV position, this instrument can detect the presence of AC voltage (from 50 to 600VAC) simply by being held very near to a voltage source. The NCV function works when the meter's function dial is placed in the NCV position only.

1. Ensure that the retractable test lead is fully retracted.
2. Disconnect the common (negative) test lead from the bottom of the meter.
3. Put the function switch to NCV position.
4. Test the detector on a known live circuit.
5. Hold the top of the meter very close to the voltage source as shown.
6. Adjust the sensitivity dial to the highest sensitivity position (fully counter-clockwise) and then lower the sensitivity as required.
7. If voltage is present, the light at the top of the meter will flash and the alarm will sound.















bottom of the meter.

4. Carefully turn the test lead retracting nut (located at the top of the meter) clockwise to completely draw out the positive test lead probe.
 5. Touch the test probe tips to the circuit or wire under test.
 6. If the resistance is less than approximately 50Ω , the audible tone will sound. If the circuit is open, the display will indicate " ".
-
1. Set the function switch to the $\Omega \rightarrow$ position.
 2. Use the FUNC button to select the diode function \rightarrow
 3. Insert the black test lead banana plug into the negative (common) jack at the bottom of the meter.
 4. Carefully turn the test lead retracting nut (located at the top of the meter) clockwise to completely draw out the positive test lead probe.
 5. Touch the test probes to the diode under test.
 6. A good diode will indicate approx. 0.3V (germanium diodes) to 0.7V (silicon diodes) for the forward test and " " for the reverse test.
 7. A shorted diode will indicate the same value of voltage in both the reverse and forward test directions. An open diode will indicate " " in both test directions.



To freeze a displayed reading, press the DATA H button. The reading will freeze and the  display icon will be visible on the LCD. To release the display, press the DATA H button again. The indicator will switch off and the display will again show real time readings.

To display only the highest reading, press the MAX H button. The  display icon will be visible on the display while in the Max Hold mode. Now, the display will only change when a higher reading than the displayed reading is encountered. To return to normal operation, press the MAX H button again (the  display icon will switch off).

The FUNC (function) button is used to select  or  while in the VOLTAGE () mode. The FUNC button is also used to select diode  , Continuity  , or Resistance Ω while in the Ω mode.

The meter automatically selects the optimum range; however, the meter's ranges can be selected manually. When using the RANGE button to manually select a range, start with the highest range and then select successively lower ranges until the desired range is reached. The decimal place will move with each press of the RANGE button.

The meter is equipped with an automatic power off feature to preserve battery energy. After 15 minutes of inactivity, the meter will automatically turn off. To turn the meter on again, simply rotate the function switch to the desired function.

Maintenance


To avoid electrical shock, disconnect the test leads from any source of voltage before removing the back cover or the battery cover.

To avoid electrical shock, do not operate the meter until the battery cover is in place and fastened securely.

This meter was designed to provide years of dependable service. However, if the following guidelines are not followed, the dependability of the meter can be compromised:

1. If it gets wet, wipe it off and allow it to dry before use.
2. Environmental extremes can shorten the life of the electronic parts and distort or melt plastic parts.
- 3.
4. Wipe the case occasionally with a damp cloth. Do not use chemicals, cleaning solvents, abrasives, or detergents.
- 5.
- 6.

To avoid electrical shock, disconnect the test leads from any source of voltage before removing the battery cover. Do not operate meter unless the batteries are in place.

1. The  icon will appear when battery voltage is low.
2. Turn the Function dial to the OFF position.
3. Disconnect the negative (common) test lead from the meter.
4. Fully retract the positive test lead probe.
5. Remove the Phillips head screw at the rear center of the meter housing.
6. Remove the battery compartment cover to access the batteries.
7. Replace the two (2) 1.5V 'AAA' batteries observing polarity.
8. Secure the battery compartment cover.



All EU users are legally bound by the Battery Ordinance to return all used batteries to community collection points or wherever batteries / accumulators are sold. Disposal in household trash or refuse is prohibited.

Follow the valid legal stipulations in respect of the disposal of the device at the end of its lifecycle


- Never dispose of batteries in a fire. Batteries may explode or leak.
- Never mix battery types. Always install new batteries of the same type.

Specifications

Function	Range	Resolution	Accuracy
Non-contact AC Voltage detector (NCV)	50 to 600V	NA	
DC Voltage (VDC)	200mV	0.1mV	(0.7% reading + 2 digits)
	2.000V	1mV	
	20V	0.01V	
	200V	0.1V	
	600V	1V	
AC Voltage (VAC) (40 – 400Hz)	200mV	0.1V	(0.8% reading + 3 digits)
	2.000V	1mV	
	20V	0.01V	
	200V	0.1V	(1.0% reading + 3 digits)
	600V	1V	
Resistance (open circuit voltage: 0.25V)	200	0.1	(1.0% of reading + 3 digits)
	2k	0.001k	(1.0% of reading + 1 digit)
	20k	0.01k	
	200k	0.1k	
	2M	0.001M	
	20M	0.01M	

Accuracy Notes: Accuracy specifications consist of two elements:
 (% reading) – This is the accuracy of the measurement circuit
 (+ digits) – This is the accuracy of the analog to digital converter
 Accuracy is stated at 18°C to 28°C (65°F to 83°F) and less than 75% RH

General Specifications

Diode Test:	Forward DC bias Current: 1mA approx.; Reverse DC bias voltage: 1.5V approx. Overload protection: 250VDC or ACrms
Continuity Check	Audible signal will sound if the resistance is less than 50 Open circuit voltage: 0.5V; Overload protection: 250VDC or AC
Display	2000 count (0 to 1999) LCD
Input Impedance	10M Ω , AC & DC Voltage
Over-range indication	'OL' is displayed
Auto Power Off	After 15 minutes (approx.) of inactivity
Polarity	Automatic (no indication for positive readings) Minus (-) sign for negative readings.
Measurement Rate	2 times per second, nominal
Low Battery Indication	"  " is displayed to alert battery replacement
Batteries	Two (2) 1.5V 'AAA' batteries
Operating Temperature	
Storage Temperature	-20°C to 60°C (-4°F to 140°F)
Operating Humidity	Max 80% up to 31°C (87°F) decreasing linearly to 50% at 40°C (104°F)
Storage Humidity	<80%
Operating Altitude	2000meters (6560ft) operating
Weight / Size	110g (3.9oz) / 208 x 38 x 29mm (8.2 x 1.5 x 1.1")
Safety	For indoor use and in accordance with the requirements for double insulation to IEC1010-1 (1995): EN61010-1 (1995) Overvoltage Category III, Pollution Degree 2.

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