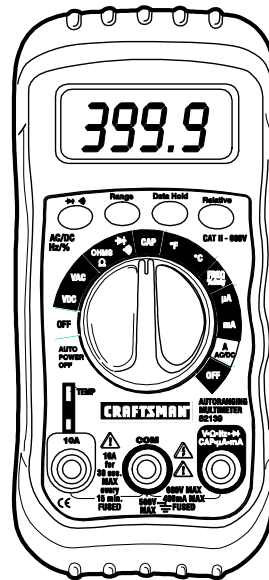


Owner's Manual



**AutoRanging  
Digital MultiMeter**

**Model No.  
82139**



**CAUTION:** Read, understand and follow Safety Rules and Operating Instructions in this manual before using this product.

- Safety
- Operation
- Maintenance
- Español

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### **ONE YEAR FULL WARRANTY**

#### **ONE YEAR FULL WARRANTY ON CRAFTSMAN MULTIMETER**

If this CRAFTSMAN Multimeter fails to give complete satisfaction within one year from the date of purchase, RETURN IT TO THE NEAREST SEARS STORE OR OTHER CRAFTSMAN OUTLET IN THE UNITED STATES, and Sears will replace it, free of charge.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Sears, Roebuck and Co., Dept. 817WA, Hoffman Estates, IL 60179

**For Customer Assistance Call 9am-5 PM (EST)**

**Monday through Friday 1-888-326-1006**

#### **WARNING: USE EXTREME CAUTION IN THE USE OF THIS DEVICE.**

Improper use of this device can result in injury or death. Follow all safeguards suggested in this manual. In addition to the normal safety precautions used in working with electrical circuits. DO NOT service this device if you are not qualified to do so.

### **SAFETY INSTRUCTIONS**

This meter has been designed for safe use, but must be operated with caution. The rules listed below must be carefully followed for safe operation.

1. **NEVER** apply voltage or current to the meter that exceeds the specified maximum:

Input Limits	
Function	Maximum Input
V DC or V AC	600V DC, 600V AC
mA DC/AC	400mA DC/AC
A DC/AC	10A DC/AC (30 seconds max every 15 minutes)
Frequency, Resistance, Capacitance, Duty Cycle, Diode test, Continuity	250V DC/AC
Temperature	60V DC/24V AC

2. **USE EXTREME CAUTION** when working with high voltages.
3. **DO NOT** measure voltage if the voltage on the "COM" input jack exceeds 500V above earth ground.
4. **NEVER** connect the meter leads across a voltage source while the function switch is in the current, resistance, or diode mode. Doing so can damage the meter.
5. **ALWAYS** discharge filter capacitors in power supplies and disconnect the power when making resistance or diode tests.
6. **ALWAYS** turn off the power and disconnect the test leads before opening the doors to replace the fuse or batteries.
7. **NEVER** operate the meter unless the back cover and the battery and fuse doors are in place and fastened securely.

### **SAFETY SYMBOLS**



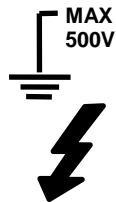
This symbol adjacent to another symbol, terminal or operating device indicates that the operator must refer to an explanation in the Operating Instructions to avoid personal injury or damage to the meter.



This **WARNING** symbol indicates a potentially hazardous situation, which if not avoided, could result in death or serious injury.



This **CAUTION** symbol indicates a potentially hazardous situation, which if not avoided, may result damage to the product.

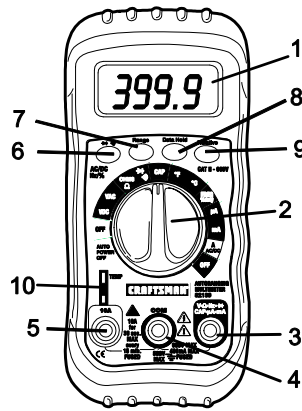


This symbol advises the user that the terminal(s) so marked must not be connected to a circuit point at which the voltage with respect to earth ground exceeds (in this case) 500 VAC or VDC.

This symbol adjacent to one or more terminals identifies them as being associated with ranges that may, in normal use, be subjected to particularly hazardous voltages. For maximum safety, the meter and its test leads should not be handled when these terminals are energized.

## CONTROLS AND JACKS

1. 4000 count Liquid Crystal Display with symbolic signs
2. Function switch
3. Positive input jack
4. COM (negative) input jack
5. 10A (positive) input jack for 10A DC or AC measurements
6. Continuity/Diode, Frequency/Duty Cycle or AC/DC selection button.
7. Range pushbutton
8. Data Hold pushbutton
9. Relative pushbutton
10. Temperature socket



## SYMBOLS AND ANNUNCIATORS

•)))	Continuity
BAT	Low Battery
→	Diode
DATA HOLD	Data Hold
AUTO	AutoRanging
AC	Alternating Current or Voltage
DC	Direct Current or Voltage

## SPECIFICATIONS

Function	Range	Resolution	Accuracy
DC Voltage (V DC)	400mV	0.1mV	±(0.5% reading + 2 digits)
	4V	1mV	±(1.0% reading + 2 digits)
	40V	10mV	
	400V	100mV	
	600V	1V	±(1.5% reading + 2 digits)
AC Voltage (V AC) (40 - 400Hz)	400mV	0.1mV	±(2.0% reading + 30 digits)
	4V	1mV	±(1.5% reading + 3 digits)
	40V	10mV	
	400V	100mV	
	600V	1V	±(2.0% reading + 4 digits)
DC Current (A DC)	400μA	0.1μA	±(1.5% reading + 3 digits)
	4000μA	1μA	
	40mA	10μA	
	400mA	100μA	
	10A	10mA	±(2.5% reading + 5 digits)
AC Current (A AC) (40 - 400Hz)	400μA	0.1μA	±(1.8% reading + 5 digits)
	4000μA	1μA	
	40mA	10μA	
	400mA	100μA	
	10A	10mA	±(3.0% reading + 7 digits)
Resistance	400Ω	0.1Ω	±(1.2% reading + 4 digits)
	4kΩ	1Ω	±(1.2% reading + 2 digits)
	40kΩ	10Ω	
	400kΩ	100Ω	
	4MΩ	1kΩ	
	40MΩ	10kΩ	

## SPECIFICATIONS

Function	Range	Resolution	Accuracy
Capacitance	4nF	1pF	±(5.0% reading + 10 digits)
	40nF	10pF	±(5.0% reading + 7 digits)
	400nF	0.1nF	±(3.5% reading + 5 digits)
	4μF	1nF	
	40μF	10nF	
		200μF	0.1μF
Duty Cycle	0.1-99.9%	0.1%	±(1.2% reading + 2 digits) Pulse width: 100μs - 100ms
Frequency	9.999Hz	0.001Hz	±(1.5% reading + 5 digits)
	99.99Hz	0.01Hz	±(1.2% reading + 2 digits)
	999.9Hz	0.1Hz	
	9.999kHz	1Hz	
	99.99kHz	10Hz	
	999.9kHz	100Hz	
	9.999MHz	1kHz	±(1.5% reading + 4 digits)
Temp °F	-4 to 1400°F	1°F	±(3.0% reading + 3 digits)
Temp °C	-20 to 760°C	1°C	

**NOTE:** 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.

**NOTE:** Accuracy is stated at 65°F to 83°F (18°C to 28°C) and less than 70% RH.

## **SPECIFICATIONS**

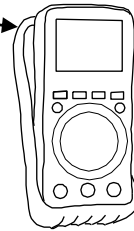
<b>Diode Test</b>	Test current of 0.3mA maximum, open circuit voltage 1.5V DC typical
<b>Continuity Check</b>	Audible signal will sound if the resistance is less than approximately 30 $\Omega$ , test current <0.7mA
<b>Temperature sensor</b>	Requires type K thermocouple
<b>Input Impedance</b>	7.5M $\Omega$ (VDC and VAC)
<b>Display</b>	4000 count LCD
<b>Overrange indication</b>	"OL" is displayed
<b>Polarity</b>	Automatic (no indication for positive polarity); Minus (-) sign for negative polarity.
<b>Measurement Rate</b>	2 times per second, nominal
<b>Auto Power Off</b>	Meter automatically shuts down after 15 minutes of inactivity
<b>Low Battery Indication</b>	" <b>BAT</b> " is displayed if battery voltage drops below operating voltage
<b>Batteries</b>	Requires two AAA batteries (sold separately)
<b>Fuses</b>	mA, $\mu$ A ranges, 0.5A/250V fast blow 10A range, 10A/250V fast blow
<b>Operating Temperature</b>	32°F to 122°F (0°C to 50°C)
<b>Storage Temperature</b>	-4°F to 140°F (-20°C to 60°C)
<b>Relative Humidity</b>	<70% operating, <80% storage
<b>Operating Altitude</b>	2000 meters (7000ft.) maximum.
<b>Weight</b>	9.17 oz. (260g).
<b>Size</b>	4.78" x 2.38" x 1.57" (121.5mm x 60.6mm x 40mm)
<b>Safety</b>	For indoor use and in accordance with Overvoltage Category II, Pollution Degree 2. Category II includes local level, appliance, portable equipment, etc., with transient overvoltages less than Overvoltage Category III.



## **BATTERY INSTALLATION**

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

1. Disconnect the test leads from the meter.
2. Remove the protective red plastic cover (holster) from the black meter by pushing it over the top of the black meter.
3. Open the battery door (top) by loosening the screw using a Phillips head screwdriver.
4. Insert the batteries into battery holder, observing the correct polarity.
5. Put the battery door back in place. Secure with the two screws.
6. Re-install the protective red cover over the meter.



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

**NOTE:** If your meter does not work properly, check the fuses and batteries to make sure that they are still good and that they are properly inserted.

## **OPERATING INSTRUCTIONS**

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

1. ALWAYS turn the function switch to the OFF position when the meter is not in use. This meter has Auto OFF that automatically shuts the meter OFF if 15 minutes elapse between uses.
2. If "OL" appears in the display during a measurement, the value exceeds the range you have selected. Change to a higher range.

**NOTE:** 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.

### **AUTORANGING / MANUALRANGING SELECTION**

When the meter is first turned on, it automatically goes into AutoRanging. This automatically selects the best range for the measurements being made and is generally the best mode for most measurements. For measurement situations requiring that a range be manually selected, perform the following:

1. Press the RANGE button. The "AUTO" display indicator will turn off.
2. Press the RANGE button to step through the available ranges until you select the range you want.
3. Press and hold the RANGE button for 2 seconds to exit the ManualRanging mode and return to AutoRanging.

### **DATA HOLD**

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

1. Press the DATA HOLD button to "freeze" the reading on the indicator. The indicator "HOLD" will appear in the display.
2. Press the DATA HOLD button to return to normal operation.

**NOTE:** The DATA HOLD function works in the FREQUENCY mode only when a signal is present.

## RELATIVE

The relative measurement feature allows you to make measurements relative to a stored reference value. A reference voltage, current, etc. can be stored and measurements made in comparison to that value. The displayed value is the difference between the reference value and the measured value.

1. Perform any measurement as described in the operating instructions.
2. Press the RELATIVE button to store the reading in the display and the "REL" indicator will appear on the display.
3. The display will now indicate the difference between the stored value and the measured value.
4. Press the RELATIVE button to return to normal operation.

## DC VOLTAGE MEASUREMENTS

**CAUTION:** Do not measure 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. Set the function switch to the V DC position ("mV" will appear in the display).
2. Insert the black test lead banana plug into the negative (COM) jack and the red test lead banana plug into the positive (V) jack.
3. Touch the test probe tips to the circuit under test. Be sure to observe the correct polarity (red lead to positive, black lead to negative).
4. Read the voltage in the display. The display will indicate the proper decimal point and value. If the polarity is reversed, the display will show (-) minus before the value.



## AC VOLTAGE MEASUREMENTS

**WARNING:** Risk of Electrocution. The probe tips may not be long enough to contact the live parts inside some 240V outlets for appliances because the contacts are recessed deep in the outlets. As a result, the reading may show 0 volts when the outlet actually has voltage on it. Make sure the probe tips are touching the metal contacts inside the outlet before assuming that no voltage is present.

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

1. Set the function switch to the V AC position.
2. Insert the black test lead banana plug into the negative (COM) jack and the red test lead banana plug into the positive (V) jack.
3. Touch the test probe tips to the circuit under test.
4. Read the voltage in the display. The display will indicate the proper decimal point, value and symbol (AC, V, etc.).



## DC CURRENT MEASUREMENTS

**CAUTION:** Do not make current measurements on the 10A scale for longer than 30 seconds. Exceeding 30 seconds may cause damage to the meter and/or the test leads.

1. Insert the black test lead banana plug into the negative (COM) jack.
2. For current measurements up to  $4000\mu\text{A}$  DC, set the function switch to the  $\mu\text{A}$  position and insert the red test lead banana plug into the ( $\mu\text{A}$ ) jack.
3. For current measurements up to 400mA DC, set the function switch to the mA range and insert the red test lead banana plug into the (mA) jack.
4. For current measurements up to 10A DC, set the function switch to the A position and insert the red test lead banana plug into the 10A jack.
5. Press the AC/DC button until "DC" appears in the display.



6. Remove power from the circuit under test, then open up the circuit at the point where you wish to measure current.
7. 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.
8. Apply power to the circuit.
9. Read the current in the display. The display will indicate the proper decimal point, value and symbol.

#### AC CURRENT MEASUREMENTS

**WARNING:** To avoid electric shock, do not measure AC current on any circuit whose voltage exceeds 250V AC.

**CAUTION:** Do not make current measurements on the 10A scale for longer than 30 seconds. Exceeding 30 seconds may cause damage to the meter and/or the test leads.

1. Insert the black test lead banana plug into the negative (COM) jack.
2. For current measurements up to 4000 $\mu$ A AC, set the function switch to the  $\mu$ A position and insert the red test lead banana plug into the ( $\mu$ A) jack.
3. For current measurements up to 400mA AC, set the function switch to the mA range and insert the red test lead banana plug into the (mA) jack.
4. For current measurements up to 10A AC, set the function switch to the A position and insert the red test lead banana plug into the 10A jack.
5. Press the AC/DC button until "AC" appears in the display.
6. Remove power from the circuit under test, then open up the circuit at the point where you wish to measure current.
7. Touch the black test probe tip to the negative side of the circuit and touch the red test probe tip to the positive side of the circuit.
8. Apply power to the circuit.
9. Read the current in the display. The display will indicate the proper decimal point, value and symbol.



## RESISTANCE MEASUREMENTS

**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 banana plug into the negative (COM) jack and the red test lead banana plug into the positive  $\Omega$  jack.
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. The display will indicate the proper decimal point, value and symbol.



## 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  $\rightarrow \bullet \rightarrow$  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  $\rightarrow \bullet \rightarrow$  button until the  $\bullet \rightarrow$  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  $30\Omega$ , 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.

## FREQUENCY or DUTY CYCLE MEASUREMENTS

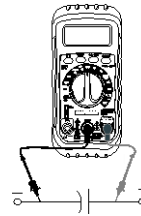
1. Set the function switch to the FREQ position.
2. Insert the black test lead banana plug into the negative (-) jack (COM) and the red test lead banana plug into the positive (+) jack (F).
3. Press the Hz/% key to select "Hz" or "%".
4. Touch the test probe tips to the circuit under test.
5. Read the frequency or duty cycle in the display. The digital reading will indicate the proper decimal point, symbols (Hz, kHz) and value.



### CAPACITANCE MEASUREMENTS

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

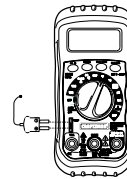
1. Set the function switch to the CAP position. ("nF" and a small value will appear in the display).
2. Insert the black test lead banana plug into the negative (-) jack (COM) and the red test lead banana plug into the positive (+) jack (CAP).
3. Touch the test leads to the capacitor to be tested. The display will indicate the proper decimal point, value and symbol.



### TEMPERATURE MEASUREMENTS

**WARNING:** To avoid electric shock, disconnect both test probes from any source of voltage before making a temperature measurement.

1. If you wish to measure temperature in °F, set the function switch to the °F range. If you wish to measure temperature in °C, set the function switch to the °C range.
2. Insert the Temperature Probe into the Temperature Socket, making sure to observe the correct polarity.
3. Touch the Temperature Probe head to the part whose temperature you wish to measure. Keep the probe touching the part under test until the reading stabilizes (about 30 seconds).
4. Read the temperature in the display. The digital reading will indicate the proper decimal point and value.



**WARNING:** To avoid electric shock, be sure the thermocouple has been removed before changing to another measurement function.



## **MAINTENANCE**

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

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

This MultiMeter is designed to provide years of dependable service, if the following care instructions are performed:

1. **KEEP THE METER DRY.** If it gets wet, wipe it off.
2. **USE AND STORE THE METER IN NORMAL TEMPERATURES.** Temperature extremes can shorten the life of the electronic parts and distort or melt plastic parts.
3. **HANDLE THE METER GENTLY AND CAREFULLY.** Dropping it can damage the electronic parts or the case.
4. **KEEP THE METER CLEAN.** Wipe the case occasionally with a damp cloth. DO NOT use chemicals, cleaning solvents, or detergents.
5. **USE ONLY FRESH BATTERIES OF THE RECOMMENDED SIZE AND TYPE.** Remove old or weak batteries so they do not leak and damage the unit.
6. **IF THE METER IS TO BE STORED FOR A LONG PERIOD OF TIME,** the batteries should be removed to prevent damage to the unit.

### **REPLACING THE BATTERIES**

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

1. When the batteries become exhausted or drop below the operating voltage, "BAT" will appear in the right-hand side of the LCD display. The batteries should be replaced.
2. Follow instructions for installing batteries. See the Battery Installation section of this manual.
3. Dispose of the old batteries properly.

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

#### **REPLACING THE FUSES**

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

1. Disconnect the test leads from the meter and any item under test.
2. Open the fuse door by loosening the screw on the door using a Phillips head screwdriver.
3. Remove the old fuse from its holder by gently pulling it out.
4. Install the new fuse into the holder.
5. Always use a fuse of the proper size and value (0.5A/250V fast blow for the 400mA range, 10A/250V fast blow for the 10A range).
6. Put the fuse door back in place. Insert the screw and tighten it securely.

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

#### **UL LISTED**

The UL mark does not indicate that this product has been evaluated for the accuracy of its readings.

## **TROUBLESHOOTING**

There may be times when your meter does not operate properly. Here are some common problems that you may have and some easy solutions to them.

### **Meter Does Not Operate:**

1. Always read all the instructions in this manual before use.
2. Check to be sure the batteries are properly installed.
3. Check to be sure the batteries are good.
4. If the battery is good and the meter still does not operate, check to be sure that both ends of the fuse are properly installed.

### **If You Do Not Understand How the Meter Works:**

Call our Customer Service Line **1-888-326-1006**.

## **SERVICE AND PARTS**

Item Number	Description
82374	Fuse kit
82378	Set of black and red Test Leads
82377	Thermocouple probe

For replacement parts shipped directly to your home  
Call Sears Parts Direct  
1-800-252-1698