



**9216-F520
DIGITAL MULTIMETER
OPERATION MANUAL**

PLEASE SCAN QR CODE
TO WATCH THE OPERATION
VIDEO OF PRODUCTS.



1. Safety

1-1. 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.

WARNING

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

CAUTION

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.

1-2. Safety Instructions

The following safety information must be observed to insure maximum personal safety during the operation at this meter:

- Do not use the meter if the meter or test leads look damaged, or if you suspect that the meter is not operating properly.

- Never ground yourself when taking electrical measurements, do not touch exposed metal pipes, outlets, fixtures, etc., which might be at ground potential, keep your body isolated from ground by using dry clothing, rubber shoes, rubber mats, or any approved insulating material.
- Turn off power to the circuit under test before cutting, unsoldering or breaking the circuit, small amounts of current can be dangerous.
- Use caution when working above 60V dc or 30V ac rms, such voltages pose a shock hazard.
- When using the probes, keep your fingers behind the finger guards on the probes.

- Measuring voltage which exceeds the limits of the multimeter may damage the meter and expose the operator to a shock hazard, always recognize the meter voltage limits as stated on the front of the meter.
- Never apply voltage or current to the meter that exceeds the specified maximum.

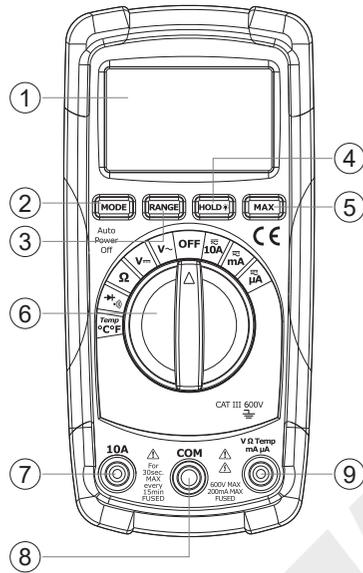
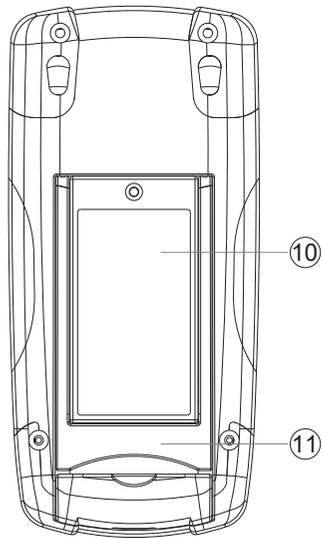
1-3. Input Limits

Function	Maximum Input
V DC or V AC	CAT III 600V DC /AC
mA DC/AC	200mA/250V DC/AC
A DC/AC	10A/250V DC/AC (30 seconds max every 15 minutes)
Resistance, Diode Test, Continuity, Temperature	250V DC/AC

2. Description

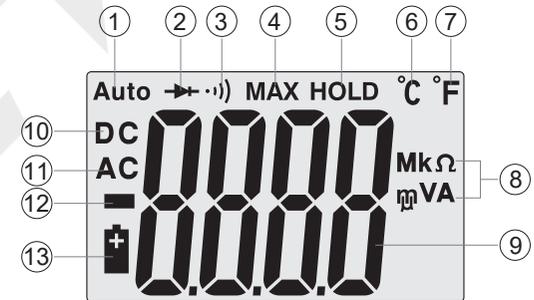
2-1. Meter Description

- 1-LCD Display
- 2-MODE Button
- 3-RANGE Button
- 4-Data Hold/Backlight Button
- 5-MAX Hold Button
- 6-Function Switch
- 7-10A Input Jack
- 8-COM Input Jack
- 9-Positive Input Jack
- 10-Battery Cover
- 11-Tilt Stand



2-2. Symbols Used on LCD Display

- 1-Auto Ranging
- 2-Diode Test
- 3-Continuity
- 4-MAX Hold
- 5-Data Hold
- 6-Degrees Centigrade
- 7-Degrees Fahrenheit
- 8-Units of Measure List
- 9-Measurement Display Digits
- 10-Direct Current
- 11-Alternating Current
- 12-Negative Reading Display
- 13-Low Battery



3. 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. Open the battery door by loosening the screw using a Phillips head screwdriver.
3. Insert the battery into battery holder, observing the correct polarity.
4. Put the battery door back in place, secure with the two screws.

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 battery to make sure that they are still good and that they are properly inserted.

4. Button Function

4-1. MODE Button

To select Diode/Continuity, DC/AC Current and Temperature (°C/°F).

4-2. RANGE Button

- When the meter is first turned on, it automatically goes into Auto Ranging.
- 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 Manual Ranging mode and return to Auto Ranging.

4-3. Data Hold/Backlight Button

1. Press the **Data Hold/Backlight** Button to “freeze” the reading on the indicator, the indicator “**HOLD**” will be appear in the display.
2. Press the **Data Hold/Backlight** Button again to return to normal operation.
3. Press and hold the **Data Hold/Backlight** Button for 2 seconds to turn the backlight on.
4. Pressing and holding the **Data Hold/Backlight** Button again for 2 seconds can turn the backlight off.

4-4. MAX Hold Button

1. Press the **MAX Hold** Button to measure the maximum value, the maximum measured value is up dated continuously.
2. Press the **MAX Hold** Button again, will release the hold and allow a further measurement.

5. Operating Instructions

WARNING:

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

Note:

Always turn the function switch to the **OFF** Position when the meter is not in use.

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.

5-1. DC Voltage Measurement

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 **VDC** Position.
2. Insert the black test lead plug into the **COM** Input Jack; Insert the red test lead plug into the **Positive** Input 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), if the polarity is reversed, the display will show (-) minus before the value.
4. Read the voltage in the display, the display will indicate the proper decimal point and value.



5-2. AC Voltage Measurement

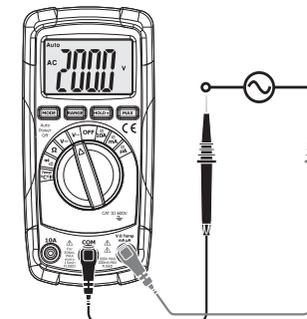
WARNING:

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 highest **VAC** Position.
2. Insert the black test lead plug into the **COM** Input Jack; Insert the red test lead plug into the **Positive** Input 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 and value.



5-3.DC Current Measurement

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 plug into the **COM** Input Jack.
- 2.For current measurements up to **2000 μ A DC**, set the function switch to the **μ A** Position and insert the red test lead banana plug into the **Positive** Input Jack.
- 3.For current measurements up to **200mA DC**, set the function switch to the **mA** Position and insert the red test lead banana plug into the **Positive** Input Jack.
- 4.For current measurements up to **10A DC**, set the function switch to the **10A** Position and insert the red test lead plug into the **10A** Input Jack.
- 5.Press the **MODE** 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.



5-4.AC Current Measurement

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 plug into the **COM** Input Jack.
- 2.For current measurements up to **2000 μ A AC**, set the function switch to the **μ A** Position and insert the red test lead banana plug into the **Positive** Input Jack.
- 3.For current measurements up to **200mA AC**, set the function switch to the **mA** Position and insert the red test lead banana plug into the **Positive** Input Jack.
- 4.For current measurements up to **10A AC**, set the function switch to the **10A** Position and insert the red test lead plug into the **10A** Input Jack.
- 5.Press the **MODE** 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 test probe tips to the circuit under test.
- 8.Apply power to the circuit.
- 9.Read the current in the display, the display will indicate the proper decimal point, value and symbol.



5-5. 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 Ω Position.
2. Insert the black test lead plug into the **COM** Input Jack; Insert the red test lead plug into the **Positive** Input 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.

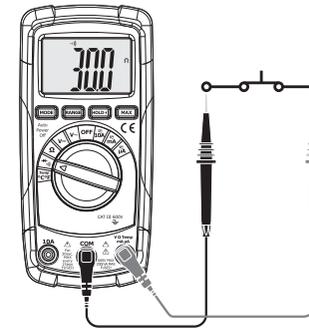


5-6. Continuity Check

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 Position.
2. Insert the black test lead plug into the **COM** Input Jack; Insert the red test lead plug into the **Positive** Input Jack.
3. Press the **MODE** Button until the “ \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 30Ω , the audible signal will sound, the display will also show the actual resistance.



5-7. Diode Test

WARNING:

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

1. Set the function switch to the \rightarrow Position.
2. Insert the black test lead plug into the **COM** Input Jack; Insert the red test lead plug into the **Positive** Input Jack.
3. Press the **MODE** Button until the “ \rightarrow ” symbol appears in the display.
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:
 - If one reading shows a value and the other reading shows OL, the diode is good.
 - If both readings show OL, the device is open.
 - 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.



5-8. Temperature Measurement

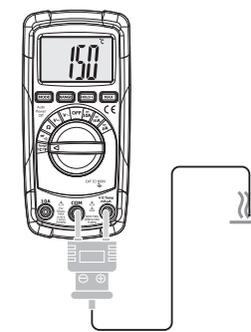
WARNING:

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

1. Set the function switch to the **Temp °C/°F** Position.
2. Press the **MODE** Button until the “°C” or “°F” symbol appears in the display.
3. Insert the Type K thermocouple probe black test lead banana plug into the **COM** Input Jack and the red test lead banana plug into the **Positive** Input Jack.
4. 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).
5. 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.



6.Replacing the Battery

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, “” will appear in the right-hand side of the LCD display, the battery should be replaced.

2.Follow instructions for installing battery, see the Battery Installation section of this manual.

3.Dispose of the old battery properly.

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

7.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 (0.2A/250V fast blow for the 200mA 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.

8.Specifications

8-1.Technical Specifications

Function	Range	Resolution	Accuracy
DC Voltage (Auto Ranging)	200mV	0.1mV	±(0.5% + 2 digits)
	2V	1mV	
	20V	10mV	±(1.0% + 2 digits)
	200V	100mV	
	600V	1V	±(1.2% + 2 digits)

Input Impedance: 10MΩ
Maximum Input: 600V DC RMS

AC Voltage (Auto Ranging Except 200mV)	200mV	0.1mV	±(1.5% + 30 digits)
	2V	1mV	±(1.2% + 3 digits)
	20V	10mV	±(1.5% + 3 digits)
	200V	100mV	
	600V	1V	±(2.0% + 4 digits)

Input Impedance: 10MΩ
Frequency Range: 50 to 60Hz
Maximum Input: 600V DC/AC RMS

DC Current (Auto Ranging for μA and mA)	200μA	0.1μA	±(1.0% + 3 digits)
	2000μA	1μA	±(1.5% + 3 digits)
	20mA	10μA	
	200mA	100μA	±(2.5% + 5 digits)
10A	10mA		

Overload Protection: 0.2A/250V and 10A/250V Fuse.
Maximum Input: 200mA DC or 200mA AC RMS on μA/mA ranges;
10A DC or AC RMS on 10A range.

AC Current (Auto Ranging for μA and mA)	200μA	0.1μA	±(1.5% + 5 digits)
	2000μA	1μA	±(1.8% + 5 digits)
	20mA	10μA	
	200mA	100μA	±(3.0% + 7 digits)
10A	10mA		

Overload Protection: 0.2A/250V and 10A/250V Fuse.
Frequency Range: 50 to 60Hz
Maximum Input: 200mA DC or 200mA AC RMS on μA/mA ranges;
10A DC or AC RMS on 10A range.

Function	Range	Resolution	Accuracy
Resistance (Auto Ranging)	200Ω	0.1Ω	±(1.2% + 4 digits)
	2kΩ	1Ω	±(1.0% + 2 digits)
	20kΩ	10Ω	
	200kΩ	100Ω	±(1.2% + 2 digits)
	2MΩ	1kΩ	
	20MΩ	10kΩ	±(2.0% + 3 digits)

Input Protection: 250V

Temperature	-50 to 1000°C	1°C	±(3% + 5 digits)
	-58 to 1832°F	1°F	±(3% + 8 digits)

Sensor: Type K Thermocouple

Overload Protection: 250V DC or AC RMS

Function	Test Current	Resolution	Accuracy
Diode Test	0.3mA Typical	1mV	±(10% + 5 digits)

Open Circuit Voltage: 1.5V DC Typical

Overload Protection: 250V DC or AC RMS

Audible Continuity	Audible Threshold: Less than 100Ω		
	Test Current: <0.3mA		
	Overload Protection: 250V DC or AC RMS		

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 18 to 28°C (65 to 83°F) and less than 70%RH.

8-2.General Specifications

The Instrument Complies With	EN61010-1
Insulation	Class2, Double insulation
Overvoltage Category	CAT III 600V
Display	2000 counts LCD display with function indication.
Polaritytion	Automatic, (-) negative polarity indication.
Overrange	“OL” mark indication.
Low Battery Indication	The “  ” is displayed when the battery voltage drops below the operating level.
Measurement Rate	2 times per second, nominal.
Auto Power Off	Meter automatically shuts down after approx. 15 minutes of inactivity.
Operating Environment	0 to 50°C (32 to 122°F) at <70% Relative Humidity
Storage Environment	-20 to 60°C (-4 to 140°F) at <80% Relative Humidity
For Inside Use, Max Height	2000m
Pollution Degree	2
Power	One 9V battery, NEDA 1604, IEC 6F22
Dimensions (HxWxD)	150x70x48mm
Weight	Approx. 255g