

9218 Digital Multimeter

Introduction

This range clamp meters have been designed according to IEC-61010-2-032 concerning electronic measuring instruments with 600V CAT III and pollution 2.

9218 multimeter has been designed as a higher stable, higher reliable, and with excellent accurate A/D converter as the core for large scale integrated circuit to ensure measure AC/DC Voltage, AC/DC current, Resistance, Capacitance, Frequency, Diode, Transistor, Continuity and Temperature test. All these features made 9218 series multimeters to be an ideal tool on field working, laboratory, factory, hobbyist, as well as household applications.

To fully utilize this meter, please keep this manual for reference carefully.

Specification

| | | |
|------------------------|--------------|------------|
| Max.Display | | 2000 |
| DC Voltage (DCV) | 0.1mV~1000V | √ |
| AC Voltage (ACV) | 0.1mV~750V | √ |
| DC Current (DCA) | 0.1uA~20A | √ |
| AC Current (ACA) | 0.1uA~20A | √ |
| Resistance (Ω) | 0.1Ω~200MΩ | √ |
| Frequency (Hz) | 1Hz~200KHz | √ |
| Capacitance (F) | 10pF~200uF | √ |
| Temperature (°C/°F) | -20°C~1000°C | √ |
| | 0°F~1832°F | √ |
| True RMS | | √ |
| NCV Detection | | √ |
| Continuity | | √ |
| Diode | | √ |
| Transistor | | √ |
| Wake-up Function | | √ |
| Auto Power-off | | √ |
| LED Light | | √ |
| Range Mode | | Manual |
| Low Voltage Indication | | √ |
| Icon Display | | √ |
| Overload Display | | OL |
| Power Supply | | 1.5V AAA×2 |

Safety

Cautions:

- * Before measurement, the meter should be preheated to 30 seconds.
- * Do not operate meter if there are damages of meter or test leads
- * Only use the factory supplied test leads, or need to replace the same specification test lead to ensure safety.
- * If meter is operated in a noisy environment, the readings should be not stable or with the error.
- * Do not connect test leads to circuit under test once to shift the ranges.
- * Put the max. range position once unknown the range of signal under test.
- * Make sure the correct jacks of test leads insert or correct position of rotary switch during the operation.
- * Hold the insulation part of test leads once measuring.
- * Use great care when making measurements if the voltages are greater 60VDC or 36V AC RMS, these voltages are considered a shock hazard.
- * To avoid damages to the meter, do not exceed the maximum limits of the input values shown in the specification.
- * Do not insert test leads into jacks once measuring current
- * Always discharge capacitors and remove power from the device under test before performing Diode, Resistance or Continuity tests
- * When  icon appears at the display, please change the new battery to avoid wrong readings.

Safety Symbols

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

-  Earthing
-  Double Insulation
-  High Voltage

Technical Specification

General Specifications:

- Operating temp.: 0~40 °C / Humidity: <80%RH
- Storage temp.: -10~60 °C / Humidity: <70%RH, (remove battery)
- Maximum input voltage between input socket and the earth: 750VRMS, DC1000V
- The measuring principle: double integral A/D conversion
- The sampling rate: about 2 times/sec
- Input polarity indicator: Automatically display “-”
- Low battery indication: When battery is running shortly, “” or “” will appear in LCD display
- Product Size: 155(W)×80(L)×47(H)mm
- Weight: About 192g (Battery includes)
- Accessory:
 - User Manual – 1pc
 - Test Leads – 1 set
 - Warranty card – 1pc
 - Temperature probe – 1pc

Measurement Specifications:

Accuracy: ±(%readings + digit)
 Warranty period: 12 months
 Environment temperature: 18°C~28°C; humidity: ≤80%

DC Voltage (DCV)

| Range | Resolution | Accuracy |
|-------|------------|------------|
| 200mV | 0.1mV | ±(0.5%+3d) |
| 2V | 0.001V | |
| 20V | 0.01V | |
| 200V | 0.1V | ±(1.0%+5d) |
| 1000V | 1V | |

Input impedance: 10MΩ

Overload protection: mV Range at 250VDC or AC RMS, other range at 1000V DC

AC Voltage (ACV)

| Range | Resolution | Accuracy |
|-------|------------|------------|
| 200mV | 0.1mV | ±(1.2%+3d) |
| 2V | 0.001V | |
| 20V | 0.01V | ±(0.8%+5d) |
| 200V | 0.1V | |
| 750V | 1V | ±(1.0%+5d) |

Input impedance: 10MΩ

Frequency response: 40~1000Hz

Overload protection: mV range at 250VDC or AC RMS, other range at 750V AC

DC Current (DCA)

| Range | Resolution | Accuracy |
|-------|------------|------------|
| 200uA | 0.1uA | ±(1.0%+3d) |
| 2mA | 0.001mA | |
| 20mA | 0.01mA | ±(1.5%+5d) |
| 200mA | 0.1mA | |
| 20A | 0.01A | ±(2.5%+5d) |

Overload protection:

mA jack: Fuse FF200mA/250V

A jack: Fuse FF20A/250V

AC Current (ACA)

| Range | Resolution | Accuracy |
|-------|------------|------------|
| 200uA | 0.1uA | ±(1.8%+3d) |
| 2mA | 0.001mA | |
| 20mA | 0.01mA | ±(1.2%+5d) |

| | | |
|-------|-------|-------------|
| 200mA | 0.1mA | ±(2.0%+5d) |
| 20A | 0.01A | ±(3.0%+10d) |

Overload protection:

mA jack: Fuse FF200mA/250V

A jack: Fuse FF20A/250V

Frequency response: 40~1000Hz

Resistance (Ω)

| Range | Resolution | Accuracy |
|-------|------------|-------------|
| 200Ω | 0.1Ω | ±(0.8%+3d) |
| 2kΩ | 0.001KΩ | |
| 20kΩ | 0.01KΩ | |
| 200kΩ | 0.1KΩ | |
| 2MΩ | 0.001MΩ | ±(1.2%+8d) |
| 20MΩ | 0.01MΩ | |
| 200MΩ | 0.1MΩ | ±(5.0%+10d) |

Overload protection: 250VDC or AC RMS

Measured resistance value = Displayed value – test leads short circuit value

Diode and Continuity

| Range | Description |
|---|---|
|  | Built-in buzzer will be sounded if resistance is less than 50Ω±30Ω |
|  | Display approximate forward voltage of diode, reverse shows “OL” or “1” |

Overload protection: 250V DC or AC RMS

Temperature (TEMP)

| Range | Resolution | Accuracy |
|----------------|------------|-------------|
| -20°C ~ 400°C | 1°C | ±(2.0%+3°C) |
| 400°C ~ 1000°C | | |
| 0°F ~ 750°F | 1°F | ±(2.0%+3°F) |
| 750°F ~ 1800°F | | |

Overload protection: 250V DC or AC RMS

Frequency (FREQ)

| Range | Resolution | Accuracy |
|--------|------------|------------|
| 2kHz | 0.001kHz | ±(0.1%+2d) |
| 200kHz | 0.1kHz | |

Overload protection: 250V DC or AC RMS

Capacitance (CAP)

| Range | Resolution | Accuracy |
|-------|------------|-------------|
| 2nF | 1pF | ±(4.0%+25d) |
| 20nF | 10pF | |
| 200nF | 100pF | ±(4.0%+15d) |
| 2uF | 1nF | |
| 20uF | 10nF | |
| 200uF | 100nF | |

Overload protection: 250V DC or AC RMS

 Note: It is normal once the small value of capacitance dose not return zero, deduct the readings during measurement for getting the accurate value.

Transistor Test (hFE)

| Range | Description |
|-------|----------------------------------|
| hFE | Display approx. hFE value 1~1000 |

Operation Instruction

Voltage Measurement

- Set the rotary switch to the voltage position, based on the demands to the desired range.
- According voltage measurement requirements, select

the DC or AC function.

■ Insert the black test lead into COM jack, red test lead into V/Ω jack.

■ Touch the black test probe tip to the negative side of the circuit; touch the red test probe tip to the positive side of circuit.

■ Read the value of voltage in the LCD display.

△Note:

* In small range testing, even without input or connection of test leads, the meter may display the value, that is normal and not affect the accuracy of the measurement.

* To avoid electrical shock and/or damage to the instrument, do not attempt to take any voltage measurement that might exceed 1000VDC or 750VAC RMS.

Current Measurement

■ Set the rotary switch to current measuring rang, and select the preferred range.

■ According voltage measurement requirements, select the DC or AC function.

■ Inert the black test lead into COM jack, red test lead into mA jack or A input jack.

■ Remove the power from the circuit under test and discharge the capacitors of the circuit.

■ Break the circuit under test, connect the black test lead to the more negative side of the break, and connect the red test lead to the more positive side of break.

■ Read the value in the LCD display.

△Note:

* According to current range and demands of insert jack to select the measuring ranges, max. current less than 200mA in mA jack, and max. current less than 20A in A jack.

* Never attempt to input the current in excess of input jack requirements to avoid damage meter.

Diode test and Continuity check

■ Set the rotary switch to  or  range.

■ Insert the black test lead into COM jack, red test lead into V/Ω jack.

■ Place the red test lead on the anode of diode and black test lead on the cathode of diode, the meter will show the approx. forward voltage of diode, reverse voltage will indicate 1 or OL.

■ Touch the test probe tips to the circuit or wire you wish to check, the max. value of resistance under check will be showed in display, if the resistance is less than $50\Omega \pm 30\Omega$, the audible signal will be sounded..

■ Read the values in LCD display.
Diode unit is "V" and Continuity unit is "Ω"

△Note:

* Disconnect power to the unit under test and discharge all capacitors before taking diode test.

* To avoid damage the meter, do not input any voltage.

Resistance Measurement

■ Set the rotary switch to resistance range.

■ Insert the black test lead into COM jack, red test lead into V/Ω jack.

■ Touch the test probe tips across the circuit or part under test.

■ Read the value in LCD display.

△Note:

* Disconnect power to the unit under test and discharge all capacitors before test.

* To avoid damage the meter, do not input any voltage.

Capacitance Measurement

■ Set the rotary switch to capacitance range.

■ Insert the black test lead into COM jack, red test lead into V/Ω jack.

■ Discharge all capacitors under testing.

■ Touch the test leads to the capacitor to be tested, black test lead connect the negative and red test lead connect the positive of capacitor.

■ Read the value in LCD display.

■ When measuring the small value capacitors, meter may not return zero due to interfere, subtract the residual value in LCD displayed during the measurement.

△Note:

* Disconnect power to the unit under test and discharge all capacitors before test.

* To avoid damage the meter, do not input any voltage.

Temperature Measurement

■ Set the rotary switch to °C or °C/°F range, and slightly press the key locates middle of rotary switch to select °C or °F temperature measurement).

■ LCD displays values of environmental of temperature.

■ Insert the K-type temperature probe red plug into the input V/Ω jack, insert black plug of thermo probe into COM jack, and using thermo. probe to contact the measured object or area

■ Read the temperature value in the LCD

△Note:

Since cold-junction compensating circuit stalled Inside meter, due to good sealing of meter, it takes long time to reach the thermal balance with the measuring environment, the meter needs to be placed in the measuring environments for a longer time to get the more accurate readings.

Frequency Measurement

■ Set the rotary switch to frequency range.

■ Insert the black test lead into COM jack, red test lead into V/Ω jack.

■ Touch the test lead tips to the circuit under test.

■ Read the frequency value in the LCD display.

△Note:

To avoid electric shock, do not apply more than 250V AC before taking frequency measurement.

Transistor Measurement

■ Set the rotary switch to hFE range.

■ Insert E,B,C of triode under testing into E.B.C holes of triode seat on the panel.

■ Read the magnification times of triode in LCD display.

△Note:

To avoid damage the meter, do not input any voltage.

Non-Contact Voltage Detection (NCV)

■ Set the rotary switch to NCV range position.

■ LED displays "NCV", approach the top part of meter with the circuit under test.

■ Once detecting the voltage, the indicating LED will be flashed and audible signal will be sounded.

■ When LCD displays "H" means high voltage detected, and then be careful operation.

△Note:

* The detection result is for reference; do not determine the voltage by NCV detection ONLY.

* Detection may interfere by socket design, insulation thickness and other variable conditions.

* The external interference sources, such as flashlight, motor, etc, may cause the wrong detection.

* To avoid damage meter, do not measure voltage under NCV range.

Maintenance

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

To avoid electric shock, do not operate the meter until the battery and fuse covers are in place and fastened securely.

Battery Installation

To avoid the false readings, replace the battery as soon as the battery indicator  appears.

- 1) Turn power off and disconnect the test leads from the meter.
- 2) Open the rear battery cover by using screwdriver.
- 3) Insert the battery into battery holder, observing the correct polarity.
- 4) Put the battery cover back in place, secure with the screws.

Replacing the Fuses

- 1) Turn power off and disconnect the test leads from the meter.
- 2) Remove the battery cover and the battery.
- 3) Remove the screws securing the rear cover.
- 4) Gently remove the old fuse and install the new fuse into fuse holder.
- 5) Replace and secure the rear cover, battery and battery cover.