

BM819 OPERATOR'S MANUAL

I. Introduction

Welcome to use this product.

The digital clamp meter adopts high-performance MCU processor, it is great value as has high reliability, security, automatically setting range function, hand-held clamp meter etc.. the product has a large digital display, full range overload protection, data-hold function, undervoltage indication, auto shut off function, it has TRUE RMS measurement function which can accurately measure frequency voltage, non-sinusoidal voltage, it also has temperature measurement function which can accurately measured -50~1000 °C, the instrument is suitable for frequency-converting power supply, air conditioning, refrigeration equipment such as refrigerators, motor performance test, It is more excellent for a new generation of practical electrical measuring instrument .

This product is ideal instrument for test, maintenance and repairs in college, smelting, communications, manufacturing, petroleum, electric power, national defense, electronic, electric power equipment .

II. Safety standard

The meter in structure complies with the safety requirements of ICE61010-1 CATIII 600V. Read the instruction carefully as follows before you use the meter:

1. When measuring voltage, AC or DC voltage should not be more than the voltage (DC / AC 600V RMS) of the meter.
2. Voltage of less than 36V is safety voltage. When the voltage is more than DC 51V or AC36V, the leads should be checked. The test lead should be connected correctly and their insulating property should be under excellent status against electric shock.
3. When change of functional measuring range, the test lead should be away from test point.
4. It is suggested that for safety the functions and range should be selected correctly although protective function for the full measuring range exists.
5. When measurement of current, the input current shouldn't be more than the maximum current labeled on input end.

6. Safety symbols:



Warning!



risk of high voltage and electric shock!



Double insulated.

III. Features

3.1 General

3.1.1 The meter is based on CMOS large scale IC and can automatically changed measuring range for measurement of AC/DC voltage, AC, resistance, frequency and capacity, which makes the meter easy to be used.

3.1.2 Display mode: Display by LCD.

3.1.3 Maximum display: 3999

3.1.4 Maximum span of jaw: 27mm.

3.1.5 Auto negative polarity indication: Displaying “-”.

3.1.6 Lack of battery power: Displaying “ ”.

3.1.7 Auto power OFF

After turning on the instrument and without turning the function switch or pressing any button, the instrument will automatically enter into sleep mode after 10 minutes, to save battery power. when it is in the sleep mode you can press the SEL key to wake up the instrument. If you don't need the automatic sleep mode, you should hold down the DH key to turn on the instrument, and then the symbol "O" will not be display on the LCD.

3.1.8 Work environment: 0°C-40°C, 75%RH.

3.1.9 Storage environment: -10°C-60°C, 85%RH.

3.1.10 Battery : AAA1.5V×2

3.1.11 External dimensions: 213 (L) × 80 (W) × 35 (H) mm

3.1.12 Weight: About 230g (including battery's weight)

3.2 Technical specifications

Accuracy: ±(% reading + digit); calibration term is one year.

Ambient temperature: 23°C±5°C; Ambient humidity: ≤70%RH

3.2.1 DCV

| Range | Accuracy | Resolution | Input impedance |
|-------|------------|------------|-----------------|
| 400mV | ±(0.5%+5d) | 0.1mV | About 10MΩ |
| 4V | | 1mV | About 10MΩ |
| 40V | | 10mV | About 10MΩ |
| 400V | | 100mV | About 10MΩ |
| 600V | | 1V | About 10MΩ |

3.2.2 ACV

| Range | Accuracy | Resolution | Input impedance |
|-------|------------|------------|-----------------|
| 4V | ±(1.2%+5d) | 1mV | About 10MΩ |
| 40V | | 10mV | About 10MΩ |
| 400V | | 100mV | About 10MΩ |
| 600V | | 1V | About 10MΩ |

Frequency: 10Hz~1kHz (Warning: Frequency for square wave accuracy is specified from 10Hz to 400Hz), display: TRUE RMS (sinusoidal waveform RMS calibration).

Overload protection: 250V at mV range, DC600V or peak value AC600V at V range

3.2.3 ACA

| Range | Accuracy | Resolution |
|-------|-----------|------------|
| 4A | ±(2%+10d) | 1mA |
| 40A | | 10mA |
| 400A | | 100mA |
| 600A | | 1A |

AC Conversion Type: TRUE RMS responding, calibrated readings consistent with sinusoidal waveform RMS. Frequency Range: 50~60Hz.

3.2.5 Resistance Ω

| Range | Accuracy | Resolution |
|-------|------------|------------|
| 400Ω | ±(1%+5d) | 0.1Ω |
| 4kΩ | | 1Ω |
| 40kΩ | | 10Ω |
| 400kΩ | | 100Ω |
| 4MΩ | | 1kΩ |
| 40MΩ | ±(1.5%+5d) | 10kΩ |

Overload protection: effective value 220V

3.2.5 Capacitance

| Range | Accuracy | Resolution |
|--------|------------|------------|
| 10nF | ± (3%+20d) | 0.001nF |
| 100nF | ± (3%+5d) | 0.01nF |
| 1uF | | 0.1nF |
| 10uF | | 1nF |
| 100uF | | 10nF |
| 1000uF | | 100nF |
| 10mF | ± (5%+5d) | 1uF |

Overload protection: effective value 250V

warning: There is about 20pF dead zone in the 10nF, capacitance below 20pF can not be measured

3.2.6 Frequency

| Range | Accuracy | Resolution |
|--------|-------------|------------|
| 100Hz | ± (0.5%+3d) | 0.01Hz |
| 1kHz | | 0.1Hz |
| 10kHz | | 1Hz |
| 100kHz | | 10Hz |
| 1MHz | | 100Hz |
| 10MHz | | 1kHz |
| 40MHz | | 10kHz |

Overload protection: effective value 250V. Input sensitivity RMS: effective value 1V.

NOTE: If the voltage of the frequency being measured is above 30V, s Please first drop the voltage amplitude below 30V and then measure to prevent damage to the instrument.

3.2.7 Temperature

| Range | Resolution | Accuracy |
|-------------|------------|------------|
| -50~300°C | 1°C | ±(1%+5) |
| 301~1000°C | 1°C | ±(1.9%+15) |
| -58~600 °F | 1 °F | ±(1.2%+6) |
| 601~1832 °F | 1 °F | ±(1.9%+25) |

Temperature sensor: K WRNM- 010 bare contact thermojunction

Overload protection: effective value 250V.

3.2.8 Forward voltage drop of diode

Displaying approximate forward voltage values of diode. Measuring condition: forward direct current is 1.5mA; opposite DC voltage is about 3V.

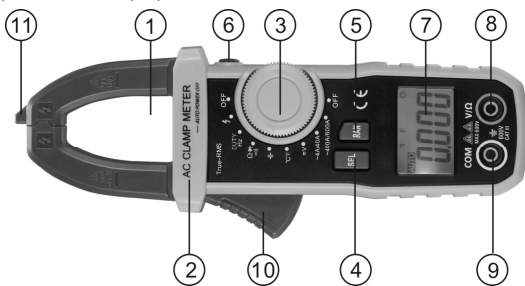
3.2.9 Continuity Test

In the case that the resistance between two tested points is less than about 90Ω±30Ω, the buzzer will bring up sound. Test condition: Open-circuit voltage is about 0.5V.

IV. Operation

4.1 Instruction for control panel

- (1) jaws
 - (2) Trigger
 - (3) Rotary switch: This switch is used to select functions such as current, voltage, capacitance, resistance, temperature, frequency, forward voltage drop of diode, continuity and turn on/off the meter.
 - (4) "SEL" button: When press the key continuously, change the range of all function for a proper range you need.
 - (5) "RAN" button: One may change the measuring range by pressing this button, press this key to cycle from small to large range of each function
 - (6) The DH/LIGHT key is Holding / the back light control key for the reading.
- A. DH reading maintenance
in the trigger movement way, when touches the key lightly, display value is locked and maintained invariably, and shows " DH " on the monitor; When presses again, the fixed condition is relieved, enters into the usual measure condition.
- B. LIGHT: back light controls
press LIGHT key more than 2 seconds to open the back light control signal, opens after the back light signal presses more than 2 seconds again switches off the back light control signal. After opening the back light, if don't press the LIGHT key for more than 2 seconds, it will shut off automatically after 10 seconds
- (7) LCD display
 - (8) "V Ω " jack: This is positive input terminal for voltage, resistance, frequency, temperature, capacity and diode.
 - (9) "COM" jack: This is negative (ground) input terminal
 - (10) Barrier
 - (11) NCV Sensor head



4.2 Measurement of AC/DC voltage

Turn the Rotary switch to "V". Then plug black lead in "COM" socket, and plug red lead in "V/ Ω " socket. when measuring AC voltage you need to push SEL to switch to the ACV function, connect the test lead with the two ends of the circuit and then directly read the reading on the LCD display NOTE: Don't measure the peak voltage more than 600V, otherwise it might damage the instrument ,if the screen only displays OL, it means that the tested voltage is higher than 660V.

4.3 AC current measurement

- (1) Set the rotary switch at AC400A/600A position.
 - (2) Press the trigger to open transformer jaw and clamp one conductor only, making sure that the jaw is firmly closed around the conductor. Read current value on LCD display.
 - (3) If current under test is smaller, the lower range has to be selected.
- Note:** a) Disconnect the test lead with the meter for safety before this measurement.
b) If two or more conductors are clamped, the meter will stop operating.
c) The accurate reading will be obtained by the conductor across center of the transformer jaws.

4.4 Measurement of resistance, continuity and forward Voltage drop of diode

Warning! When measurement of resistance or continuity, make sure that no voltage is with the circuit and components.

- (1) Turn the Rotary switch to the range of Ω / \rightarrow / \rightarrow . At this time, the meter is reserved at resistance range.
- (2) Plug red lead in "V/ Ω " socket, and plug black lead in "COM" socket
- (3) Connect the leads with the two ends of the circuit or component, and then read the value of resistance.
- (4) Push SEL key to change the range of \rightarrow / \rightarrow . When the resistance measured is less than about $90\Omega \pm 30\Omega$, the buzzer sounds. This is continuity testing.
- (5) When the test lead is under open-circuit or input-overload status, the display will display "OL".
- (6) When measuring diode, push the SEL key to the function of \rightarrow / \rightarrow .
- (7) Connect the test lead with the two ends of the diode, and then read the value of forward voltage drop value. This function can also be measured directly less than 3V LED operating voltage.

(8) When the test lead is under reverse connection or open-circuit status, the display will display "OL".

- Note:** a. When the resistance measured is above $1M\Omega$, it needs several seconds for the reading to be stable, it is normal when measuring high resistance.
b. When measuring high resistance, insert the resistance pin directly into the V Ω and COM jack, so as to avoid interference
c. When measuring resistance in a circuit make sure the power to the circuit is turned off and all capacitors are discharged.

4.5 Measurement of capacitance

Warning! When measurement of capacity, the measured capacitor should be completely discharged.

(1) Turn the Rotary switch to " \rightarrow / \rightarrow " function. Plug red lead in "V/ Ω " socket, and plug black lead in "COM" socket.

Warning: The range for capacitor can't be set manually. When the capacity value is large, the time for measurement may be a little longer.

- a. **Warning!** Do not take an external voltage or charged capacitor (especially a large capacitor) connected to the test terminal
- b. When a large capacitor is serious leakage or breakdown, the measurement value may be instability

4.6 Measurement of frequency / DUTY Ratio

- (1) Turn the Rotary switch to "Hz" function. if you want to measure DUTY Ratio, Press SEL key to switch
- (2) Plug red test lead in "V/ Ω " terminal and plug black lead in "COM" terminal.
- (3) Connect the leads with measured circuit and then read the reading.
- (4) If the voltage of the frequency being measured is above 30V, s Please first drop the voltage amplitude below 30V and then measure to prevent damage to the instrument.

4.7 Measurement of temperature

Turn the Rotary switch to the function of temperature, then plug the cold end (plug end) of temperature sensor to the V/ Ω and COM socket (black end for COM socket and red end for V/ Ω socket). Place the working end (temperature end) of the sensor on or in the measured object. Then read the temperature value (in $^{\circ}C$) on the display. If you need to measure that " $^{\circ}F$ ", push the SEL key to switch.

Warning! When the cold terminal of the sensor isn't inserted into the meter, the meter might display approximate environmental temperature. K WRNM-010 bare contact thermojunction has a limiting temperature of $250^{\circ}C$ ($300^{\circ}C$ for short time).

4.8 NON CONTACT VOLTAGE TESTING

Set the rotary switch at the desired " \rightarrow " range position. NCV and symbol will be displayed on the LCD, The NCV Sensor head approach the phase line of commercial power, switch, or charge, the meter will display " \rightarrow ", the higher the tested voltage is, the more " \rightarrow " will be displayed, and the buzzer will warning hurriedly. If the red test lead touch the conductor, when there is voltage between null line and ground line, much more " \rightarrow " will be displayed when measuring the phase line than the null line.

Warning!

1. Even if there is no indication, voltage may still exist. Do not judge the wire whether there is voltage absolutely through the non contact voltage testing, the testing may be effected by many factors such as the socket design, the insulation thickness and types etc.
2. Interference source of external environment, such as flash, motor etc, may false trigger the non contact voltage testing.

V. Maintenance of meter

Warning! Switch off the power, remove the test lead and any of input signals to prevent electric shock before opening the cover of meter or the cover of battery.

- 5.1 When the meter displays the symbol of " \rightarrow ", the battery should be changed. Open the battery cover, and then change the used battery with new battery to ensure the normal operation of the meter.
 - 5.2 Keep the meter and the pens clean, dry and non-destructive. Clean cloth or detergent may be used for cleaning the cover of the meter. No grinding agent or organic solvent can be used for the same cleaning purpose.
 - 5.3 The meter should be protected against damage, vibration and impact. It shouldn't be placed where high temperature or intense magnetic field exists.
 - 5.4 Calibrating of the meter is done on a yearly basis.
- #### VI. Accessories
- 6.1 Test lead: 1 set
 - 6.2 Users manual: 1 piece
 - 6.3 Temperature sensors: 1 set
 - 6.4 Cloth bag: 1 piece