

BM2000A Operating Instruction

I. Overview

Welcome to use the product!

This is a kind of 3½ digital clamp multimeter that can be used to measure current up to 2000A. Its overall circuit design centers on dual-slope A/D converter. All of its functions are controlled by a single chip. Adjustment and calibration of all ranges can be made without opening its case. All of its functions are provided with overload protection. The meter is equipped with surge protector that can better protect the meter from being overloaded and damaged. It can be used for measurement of parameters such as AC current, AC/DC voltage, resistance, continuity, maximum, peak-value, and diode forward voltage drop. The meter is compact in structure, easy to operate and convenient to carry. It is an ideal tool for electrical measurement. It is especially suitable to measure large current and transient current.

II. Safety Information

The meter is designed in accordance with safety requirements of IEC1010-1 standard. Please read the manual carefully prior to use.

(1) Description of safety symbols:

⚠ Warning!

⚡ Dangerous voltage is present!

□ Double insulation protection

(2) Do not exceed the specified maximum input value for any range when making measurement.

(3) In Ω range, do not apply voltage to the input terminal.

(4) Do not turn the rotary switch at random during measurement to protect the meter from damage.

(5) Be careful to operate when making measurement on higher voltage than DC 50V or AC 36V.

(6) Take special caution to avoid electric shock due to electric contact when clamping uninsulated lead.

(7) When measuring current, fingers must be put after the arm-guard.

(8) Protect the meter from exposure to direct sunlight, high temperature and humidity.

(9) After usage, be sure to turn the power off.

(10) If the meter is not used for a long time, be sure to take the battery out to avoid damage, due to battery leakage.

III. Features


3. 1 General features

(1) Display mode: LCD

(2) Maximum display: 1999 (Ω range: 1980)

(3) Maximum measurable lead diameter for mouth of the clamp: 55mm

(4) Automatic negative polarity indication: “-”

(5) Low-battery indication: “”

(6) Operating environment: 0°C~40°C, less than 75%RH

(7) Storage environment: -10°C~60°C, less than 80%RH

(8) Power supply: 9V battery (IEC6F22, NEDA1604, JIS006P or equivalent models)

(9) Dimension: 270 (L)×100 (W)×44 (H) mm

(10) Weight: Approx. 450 grams (including battery)



3. 2 Technical features

Accuracy: $\pm\%$ reading \pm digits one year warranty

Environment required to guarantee the accuracy: 23°C \pm 5°C, 70%RH

Function	Range	Resolution	Frequency range	Accuracy
AC current	20A	0.01	50~60Hz	$\pm(1.9\%+\pm 5)$
	200A	0.1A		
	2000A	1A		

Description: Measurement time should not be longer than 5 minutes when measuring current larger than 1000A

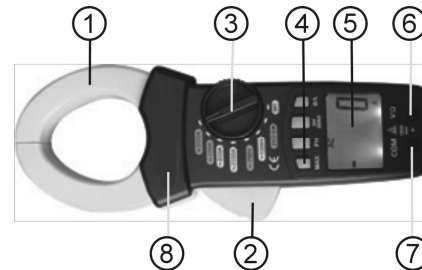
Function	Range	Resolution	Frequency range	Accuracy	Overload protection
AC voltage	700V	1V	50~60Hz	$\pm(1\%+\pm 5)$	710V
DC voltage	20V	0.01V	—	$\pm(0.5\%+\pm 2)$	1010V
	1000V	1V		$\pm(0.5\%+\pm 5)$	1010V
Resistance	2k Ω	1 Ω	—	$\pm(0.8\%+\pm 5)$	250V
Diode 	Approximate value of diode forward voltage is displayed. Testing condition: Approx. 1mA forward DC current and approx. 3V reverse DC voltage.				250V
Continuity 	The buzzer rings when the on-state resistance is smaller than approx. 50 Ω . Testing condition: Approx. 3V open circuit voltage.				250V

Input impedance: 10M Ω

IV. Method of use

4.1 Description of the panel (See the figure)

1. Mouth of the clamp
2. Trigger
3. Rotary switch: Used to select functions and ranges.
4. MAX, PH, DH and B/L key
5. LCD screen
6. “V/ Ω ” input jack
7. “COM” jack: common input terminal (common input ground)
8. Arm-guard




4.2 Instructions of function

1. Measurement of AC voltage

(1) Turn the rotary switch to “AC700V” position, insert one end of the black test lead and the red respectively into “COM” jack and “V/ Ω ” jack.


(2) Connect the other end of the two test leads across the circuit under measurement and get reading displayed on the LCD screen of the meter.

Note: When the reading is larger than 36V, “” symbol appears on the LCD screen to call user’s attention to safety. When the reading is larger than 710V, “OL” appears on the LCD screen, indicating the input voltage has exceeded the allowed value of the selected range.

2. Measurement of DC voltage

(1) Turn the rotary switch to “DC 1000V” position, insert one end of the black test lead and the red respectively into “COM” jack and “V/ Ω ” jack.

(2) Connect the other end of the two test leads across the circuit under measurement and get reading displayed on the LCD screen. When the reading is smaller than 20V, use DC 20V range to make measurement.

Note: When the reading is larger than 51V, “” symbol appears on the LCD screen to call user’s attention to safety. When the reading is larger than 1010V, “OL” appears on the meter, indicating the input voltage has exceeded the allowed value of the selected range.

3. Measurement of AC current

⚠ Warning! Prior to current measurement, make sure the test leads are not connected with the meter.

Turn the rotary switch to maximum range of AC current -- “AC2000A” position.

(2) Press the trigger and open mouth of the clamp. Clamp a single lead and get reading immediately (The lead should be put in the center of the closed mouth of the clamp as possible as can. The mouth of the clamp should be completely closed).

(3) If the reading is relatively small, turn the rotary switch to a lower range position.

⚠ Note: If you clamp more than two leads, no measurement can be made.

4. Resistance measurement of and continuity test

⚠ Warning! When making resistance measurement and continuity test, make sure no voltage exists over the circuit or components under measurement


(1) Turn the rotary switch to 2k Ω position.

(2) Insert one end of the black test leads and the red respectively into “COM” jack and “V/ Ω ” jack.

(3) Connect the other end of the two test leads across two ends of the circuit or components under measurement and read resistance value.

(4) If the test lead circuit is open or the input is overloaded, “OL” will appear on the LCD screen.

6. Measurement of diode forward voltage drop


(1) Turn the rotary switch to  position. When the input terminal circuit is open, the meter is in over-range state (“OL” will appear on the LCD screen).

(2) Insert one end of the black test lead and the red respectively into “COM” jack and “V/ Ω ” jack (The polarity of the red test lead is “+”).

(3) Connect the other end of the two test leads across two ends of the diode under measurement and read forward voltage drop value.


(4) When the diode is connected in reverse or the input terminal circuit is open, “OL” will appear on the LCD screen.

7. Continuity test

(1) Turn the rotary switch to  position. When the input terminal circuit is open, the meter is in over-range state (“OL” will appear on the LCD screen).

(2) Insert one end of the black test lead and the red respectively into “COM” jack and “V/Ω” jack (The polarity of the red test lead is “+”).

(3) Connect the other end of the two test leads across two ends of the circuit under test. If the resistance value between the two points under test is smaller than approx. 50Ω, the buzzer will ring.

 Note: Circuit continuity test must be tested with power off as any load signal would cause the buzzer to ring, resulting in a wrong measurement.

8. Data hold function (DH key)

Press DH key to lock the display value. “DH” will appear on the LCD screen. Press DH key again to disable data hold function

9. Maximum hold function (MAX key)

Press MAX key to lock currently displayed maximum. The display will be refreshed only when a measured value is larger than the locked value. “MAX” will appear on the LCD screen. Press MAX key again to disable maximum hold function.

10. Peak hold function (PH key)

Turn the range switch to AC voltage or AC current position and press PH key. Start measurement after “PH” symbol appears on the LCD screen. The meter can capture 10ms peak value.

11. Backlight (B/L)

When making measurement in darker light condition, backlight button (B/L) can be pressed to provide adequate light in order to read data clearly. Backlight source consumes relatively large quantity of electricity. Therefore, the backlight will be turned off automatically when the use time exceeds 6s.


V. Panel calibration:


1. Calibration of the meter is required as its accuracy decreases due to long time use. With its panel calibration function, there is no need to open the case of the meter. You only need to input standard signal (source) from measurement input terminal and use function key on the panel to make recalibration of the meter and obtain the factory accuracy. If accuracy of the signal source used for calibration is not high enough, the calibration can also be made with the help of a monitoring meter in high accuracy.

2. Calibration method

(1) Press and hold “MAX” key in power off state. Turn the rotary switch to turn the meter on. Simultaneously press and hold “B/L” key for approx. 3s. Release “MAX” and “B/L” key when hearing “di” sound. “Calibrate” will appear in the bottom left corner of the LCD screen and the meter enters calibration state.

(2) Turn the rotary switch to the position where you need to calibrate and input an accurate value you need. It is suggested the input accurate value be between 1/3 and 2/3 of maximum of the range to ensure measurement values of full range are accurate after calibration.


(3) Press “MAX” key to make display value of the meter increase successively, or press “B/L” key to make display value of the meter decrease successively until the display value is the same as your input accurate value. Here, “” symbol appears in the bottom right corner of the meter, indicating the calibration is made but not saved yet.

(4) The range is calibrated when you press “DH” key and hear “di, di” sound. “” symbol disappears simultaneously.


(5) Calibration of AC/DC 2000A shall be done in such two steps as: (a) calibrate the low side as per the accuracy below 800A current in the forms as above. After calibration of the low side, those users who have the conditions can calibrate the high side as stated in the following (6) if the high-side accuracy is not competent in the inspection:

(6) Calibration of AC/DC 2000A High Side:

In the shutdown status, press the “DH” button when holding down the “MAX” button for startup, and you will hear a “di” sound. Confirming this sound, you can loosen the MAX” button and “DH” button by pressing “PH” button. Finally loosen the “PH” button and the left lower part in the meter will show “Calibrate”, which means the meter has entered the status of calibration., 2000A high side can be calibrated. The 2000A high side can be calibrated in 11 separate points, which can assure the accuracy of this step. These points contain: 1000A, 1100A, 1200A, 1300A, 1400A, 1500A, 1600A, 1700A, 1800A, 1900A and 2000A.

(a) In the status of calibration, press and hold down the “PH” button, and press the “B/L” button for the first time, and the meter will show “D-10”, which means the hand in the meter points at 1000A calibrating point. And the right lower part in the meter show “” sign.

(b) Press the “B/L” button again and the meter will quit the “d-10” display, inputting the accuracy of 1000A,

(c) Press the “PH” button and you will hear a sound successively twice, which means this point has been calibrated. “” symbol disappears simultaneously.

(d) Repeat (a) and the meter will show “d-11”, which means the hand in the meter points at 1100A calibrating point.

(e) Repeat (b) and input the accuracy of 1100A ...


(f) Repeat (c) ...


The above can't be discontinued until the calibration of 2000A point is completed (“d-00” is the calibrating point of 0~999A). After calibration of meter, please shut down the machine first, and restart it up, thus the calibrated values can function.

Explanation:

1. Accurate value – the output indication of calibration source is 500A. However, the true value of the national standard is 501.5A. 501.5A is accurate value.
2. Display value – value displayed on the LCD screen of the meter. The displayed value is not necessarily the measured actual value. Therefore, calibration is required.

VI. Maintenance of the meter

 Warning! Before opening the meter case or the battery cover, it is necessary to turn the power off and disconnect test leads and any input signal to avoid electric shock hazard.

1. When “” symbol appears on the LCD screen, the battery needs to be replaced. Open the battery cover and change a new 9V battery.
2. Keep the meter and test leads clean, dry and undamaged. You can use a piece of clean cloth or detergent to clean the meter case. Do not use abrasive or organic solvent.
3. Avoid mechanical damage, shock and strike. Avoid exposure to high temperature and strong magnetic field.
4. Calibrate the meter once a year.

VII. Accessories

A pair of test leads,
one manual,
one cloth bag a
one 9V battery.