

Science Multimeter DIGI-MARU User's Manual

Thank you for purchasing this product.

The A05-7700 Science Multimeter DIGI-MARU is a convenient unit that can be used for multiple purposes in electrical circuit experiments. Please read the precautions for use before using this product.

Caution

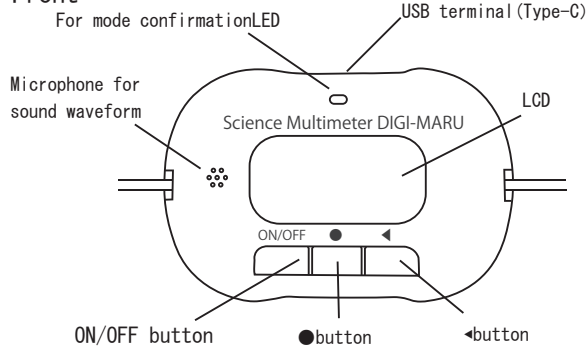
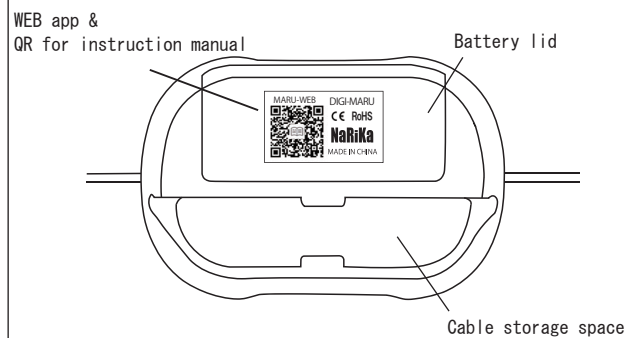
- Do not use fire. : Do not disassemble the equipment.
- Do not disassemble the equipment. : Disassembling the equipment may result in malfunction or injury.
- Do not expose the equipment to water. Wetting the equipment may cause electric shock or a malfunction.
- If you notice any unusual smell, abnormal heat generation, discoloration, deformation, or any other abnormalities during use or storage, do not use the device and contact us.
- Do not use the product in high temperature places such as in direct sunlight or in a car under the blazing sun, or do not leave it unattended. Doing so may cause deformation or malfunction of the device.
- Doing so may cause deformation or malfunction of the device.
- Do not press hard on the LCD display or pierce it with a pointed object.
- When conducting experiments, do not place the product on an unstable stand or on a tilted surface.
- Do not give the product a strong shock or throw it.
- Do not open the battery cover to short-circuit the inside of the product.
- When storing the product for a long period of time, remove the batteries before storing it.
- Do not use batteries in a circuit where a large current flows instantaneously (e.g. dry cell batteries). (e.g., short circuits of dry batteries or batteries, etc.)
- Do not use in circuits where high voltage flows instantaneously. (e.g., high-voltage generator, coil, etc.)
- Do not apply a voltage or current exceeding the measurement range for a long period of time.
- Do not use the product if the case is damaged or the cable is broken.
- This product was developed for simple measurement in science experiments. It is not intended for any use other than school experiments.

【AAA batteries for power supply】

- Do not open the battery cover to short-circuit the inside of the product.
- When storing the product for a long period of time, remove the AAA batteries from the product.
- Do not mix different types of batteries.
- Do not use batteries other than the specified ones.

Secification

Size	: 90 × 60 × 33 mm
Weight	: Approx. 70g
Shape	: Cable integrated
Measuring range	
Waveform	: Sound 0 ~ 15kHz Time 10 steps, Amplitude 8 steps
Voltage	: ±25V Time 10 steps, Amplitude 8 steps
Voltmeter	: ±25.0V (±5.00V range switching ON/OFF possible)
Ammeter	: ±500mA, ±5.0A (auto range switching)
Resistance meter	: 50 Ω, 500 Resistance meter: 50 Ω, 500 Ω, 5k Ω, 50k Ω, 500k Ω, 5M Ω (auto-range switching)
Function	: Auto power off (30 minutes)
Power supply	: 2 AAA batteries (sold separately)
Output terminal	: USB (Type-C) for terminal connection
Accessories	: USB cable (for communication)

◇Name of parts**Front****back****◇Battery set and cable storage**

Slide the battery cover in the direction of the OPEN arrow indicated on the battery cover, and then lift it up to remove the battery cover. Insert two AAA batteries with the correct polarity.

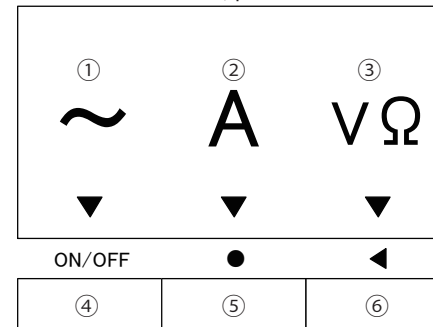
Slide the lid in the direction of the arrow and lift it up.



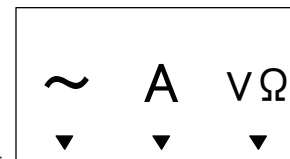
The cables at both ends of the DIGI-MARU can be stored in the cable compartment on the back. For storage, fold and push the cables into the compartment.

◇Basic operation

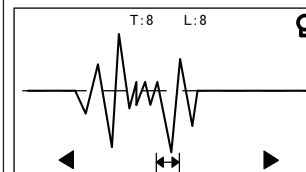
Press and hold the ON/OFF button to turn the power on. The first screen that appears will be the menu screen. To select each mode, press the button under each icon to move through the modes. At that time, the color of the confirmation LED changes corresponding to each mode. To return to the menu screen, press and hold the ◀ button.



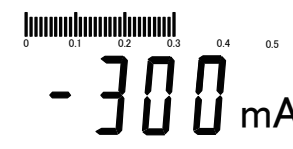
- ① Waveform mode
- ② Ammeter mode
- ③ Voltmeter/Resistometer Mode
- ④ ON/OFF button
Long press to turn on/off the power and go to the waveform mode in the menu screen.
- ⑤ ● button
You can switch display digits, pause, etc. In the menu screen, go to the ammeter mode.
- ⑥ ◀ button
Mainly used to return to the menu screen from each mode by pressing and holding. In the menu screen, go to the voltmeter/resistometer mode.

main menu

Short press of button in each mode



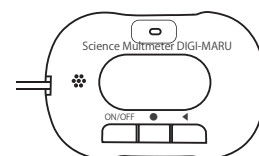
Waveform mode



Ammeter mode

◇LED for mode confirmation

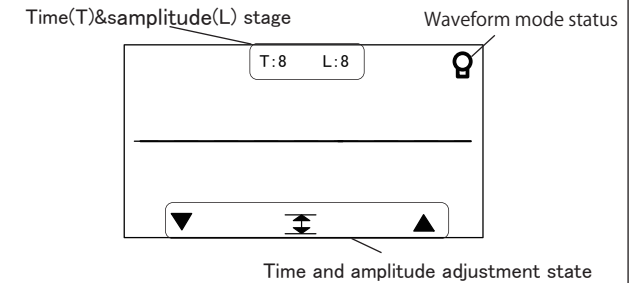
The color of the confirmation LED changes depending on the DIGI-MARU mode.



Waveform(sound) : cyan
Waveform(Voltage) :magenta
Ammeter mode :green
Voltmeter :blue
Resistometer :red

◇Waveform mode

Sound waveform and voltage waveform can be done by swapping menus.



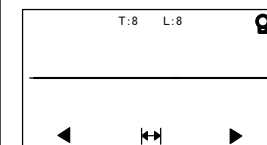
Time and amplitude adjustment state

【Time and amplitude adjustment】

The sound and voltage waveforms are initially adjusted to the optimum time and amplitude for a typical experiment, but settings should be changed according to the experiment. Time and amplitude can be adjusted in 10 steps for time and 8 steps for amplitude.

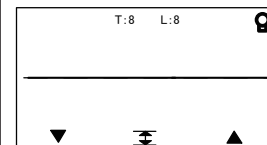
To switch between time and amplitude adjustment, press and hold the ● button. The icon on the LCD just above the ● button will change.

Switching time (sweep time)
Increasing the value of T shortens the sweep time.



Change the value of T at the top.
◀ button : value up
ON/OFF button : value down

Amplitude (Voltage) Switching
The waveform is expanded or reduced by changing the value of L.



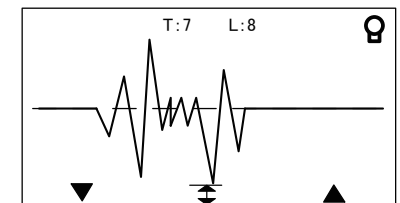
Change the value of L at the top.
◀ button : value up
ON/OFF button : value down

【Switching between sound waveform and voltage waveform】

The sound waveform and voltage waveform are switched by briefly pressing the ON/OFF button and the ◀ button simultaneously. When switching, the time and amplitude will return to the setting before switching.

🔊 【Sound waveform mode】

Displays the waveform of sound captured by DIGI-MARU's built-in microphone. In the initial state, the time and amplitude of the waveforms are set to those that are easy to capture, such as voice (T7 L8). Please set the time and amplitude according to the conditions.

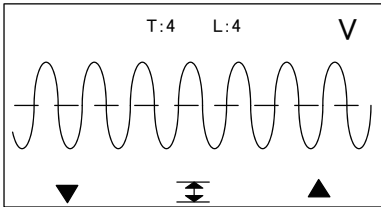
**Pause function**

When the waveform is displayed, press the ● button briefly. The waveform is stopped and displayed. To cancel, briefly press the ● button again.

V 【Voltage waveform mode】

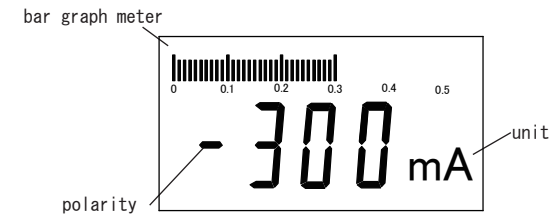
Displays the change in voltage applied between the red and black cables. It is ideal for checking AC voltage changes and voltage changes due to electromagnetic induction. In the initial state, the time and amplitude are set to easily capture AC power voltage changes (50Hz/60Hz). Please set the time and amplitude according to the conditions.

Setting example: Electromagnetic induction T1 L6 Waveform of AC power T4 L4

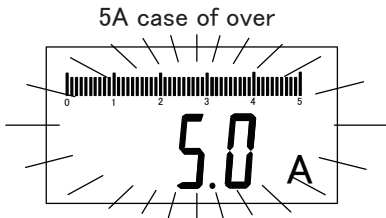
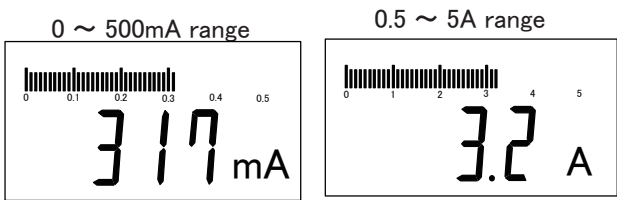


Pause function
When the waveform is displayed, press the **●** button briefly. The waveform is stopped and displayed. To cancel, briefly press the **●** button again.

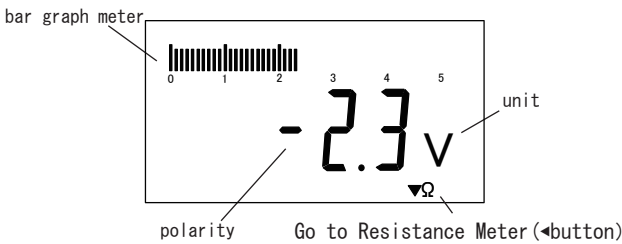
◇Ammeter mode
This mode measures and displays the value of current in a circuit. When connecting DIGI-MARU to the circuit you wish to measure, be sure to turn on the power beforehand and connect it to the circuit in the 0 point state.
*If the power supply is OFF, no electricity will flow even if it is connected to a circuit. When current flow is detected in the circuit, the value is measured and displayed (0.1A resolution).
The polarity is indicated by the direction of the current to the red/black cable. (+ is displayed for red to black, - for black to red)



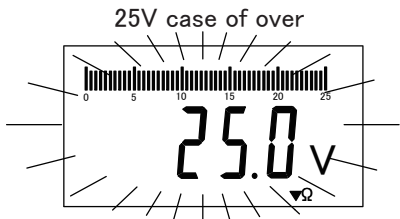
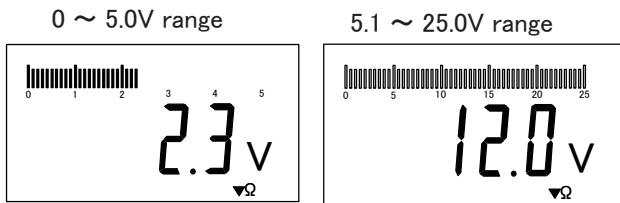
DIGI-MARU automatically switches the screen display according to the value of the flowing current. The measurement range is up to 5 A. If the current exceeds 5 A, the entire display will blink, and if the current continues to flow over 5 A for a long period of time, it will generate heat, which is dangerous.



◇Voltmeter mode
This mode measures and displays the value of voltage in a circuit. When connecting DIGI-MARU to the circuit to be measured, be sure to turn on the power beforehand and connect it in parallel to the circuit. In the voltmeter mode, when a voltage is applied between the red and black cables, the value is measured and displayed (0.01V resolution). The polarity is indicated by the direction of the current to the red and black cables (+ for red to black, - for black to red). (+ is displayed for red to black, - for black to red)

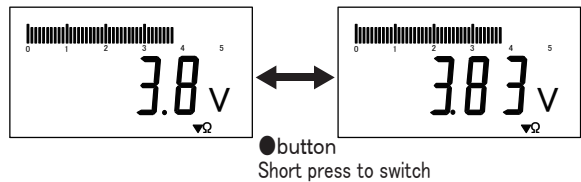


DIGI-MARU automatically switches the screen display according to the voltage value. The measurement range is up to 25 V. If the voltage exceeds 25 V, the entire display will blink.

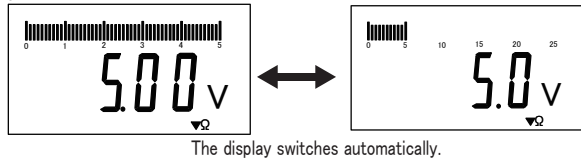


This product can switch the measurement range as desired. The measurement range can be switched by a short press of the **●** button in the voltmeter mode. When the power is turned on, the range is set to range ①.

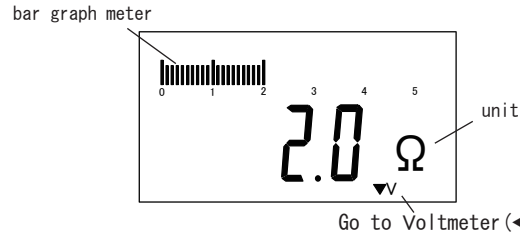
- ① $\pm 25.0V$ (one decimal place)
② $\pm 5.00V$ (two decimal place) $\rightarrow \pm 5.1V \sim \pm 25.0V$ (one decimal place)



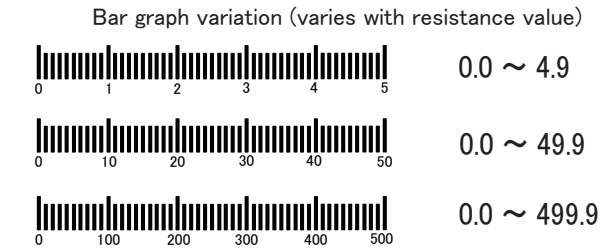
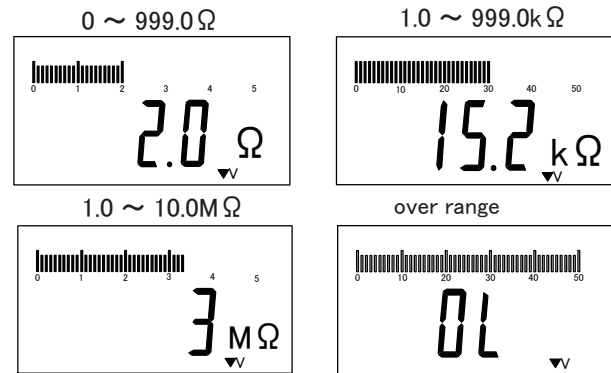
In the case of the measuring range of ②, the display automatically switches when the voltage exceeds 5.00V (to one decimal place). When the voltage falls below 5.00V, the display automatically returns to the original digits (up to two decimal places).



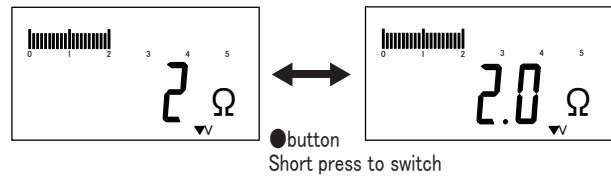
◇Resistivity mod
A short press of the **◀** button in the voltmeter mode moves to the resistometer mode. Resistance meter mode measures the resistance between the red and black cables.



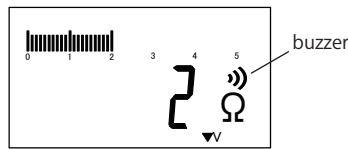
DIGI-MARU automatically switches the screen display according to the resistance value. The measurement range is up to 10 MΩ; if the value exceeds 10 MΩ, the display shows “OL” (unconnected). In the voltmeter mode, a short press of the **◀** button moves to the resistivity meter mode. Resistance meter mode measures the resistance between the red and black cables.



In the resistivity meter mode, the decimal point display can be switched by a short press of the **●** button. If you want to know the detailed value, use the decimal point display.

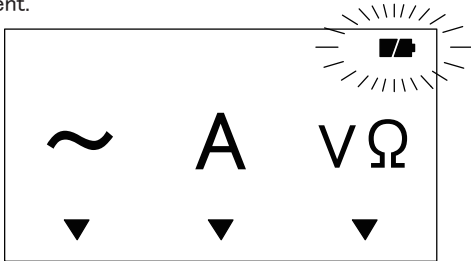


Continuity check
When the ON/OFF button is pressed briefly in the resistivity meter mode, a buzzer symbol appears above the unit. In this state, the buzzer will sound when the resistance value falls below 50 Ω. To release the buzzer, briefly press the ON/OFF button again.



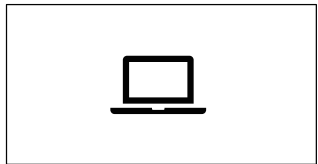
◇auto power off
When the current value is 0 with the power turned on, the power will automatically turn off after a certain period of time (30 minutes) (turn-off prevention function). Please be careful when experimenting for a long period of time.

◇Battery Replacement
When the batteries need to be replaced, the battery depletion symbol on the LCD will light up. Use this as a guide for battery replacement.



◇Use of web applications
The measurement can be made by connecting to a terminal (Windows, Chromebook) using the included USB cable and connecting to a dedicated web application.

Connection method
① Access the dedicated web application (MARU-WEB) from the QR code on the back of the product or the NARIKA website.
Chrome is recommended.
(2) Connect DIGI-MARU to your device using the USB cable provided.
Press the power button on DIGI-MARU to turn on the power. When the connection is established, the PC symbol will appear on the DIGI-MARU screen.
④ Press the connection button on the WEB application (MARU-WEB) to start communication between the WEB application and DIGI-MARU.
⑤ Use each function of the WEB application.
For details on how to use the WEB application, please refer to the instructions on the MARU-WEB dedicated website.



Display when connected to a terminal

MARU-WEB Website

