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iMars LM2020

iMars 2-in-1 Handheld Oscilloscope Multimeter User Manual

Model: LM2020 (also known as ET828) | Brand: iMars

1. Introduction

The iMars 2-in-1 Handheld Oscilloscope Multimeter is a professional-grade instrument designed for comprehensive electrical testing. It combines the functionality of a high-speed sampling oscilloscope with a versatile digital multimeter, offering a compact and efficient solution for various applications. This manual provides detailed instructions for the safe and effective use of your device.



Figure 1: iMars 2-in-1 Handheld Oscilloscope Multimeter

2. Product Overview & What's in the Box

Your iMars 2-in-1 Handheld Oscilloscope Multimeter package includes all necessary components to begin your measurements immediately. Upon unboxing, you will find the main unit, test probes, and a user manual.

Included Components:

- 1 x iMars 2-in-1 Handheld Oscilloscope Multimeter Unit
- 2 x Heavy-Duty Test Probes (Red and Black)
- 3 x AAA Batteries (pre-installed or included separately)
- 1 x Protective Sleeve
- 1 x User Manual

Visual Demonstration:

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Video 1: Product Unboxing and Feature Overview (Review by Drone Valley)

This video provides a visual guide to the product's contents and a general overview of its capabilities, including the quality of the included probes and the illuminated display.

3. Key Features & Specifications

The iMars Oscilloscope Multimeter is equipped with advanced features for precise and reliable measurements.

Key Features:

- **Faster Sampling Speed:** 2.5Msps high-speed A/D data collection for high sampling rate and bandwidth.
- **Automatic Waveform Capture:** One-key transform to waveform function during measuring.
- **Multiple Waveform Scanning Modes:** Automatic, Conventional, and Single.
- **Wide Detection Range:** DC voltage 0 ~ 1000V, AC voltage 0 ~ 750V, DC/AC Current 0 ~ 10A, Resistance 0 ~ 40MΩ, Capacitance 0 ~ 100μf, Frequency 0 ~ 5MHZ.
- **Diode / Continuity Test:** Open circuit voltage 1.5V, judgment resistance 50Ω.
- **Transistor Amplification Test:** Meets various test requirements.
- **High Accuracy:** Dedicated chip with software calibration technology for precise measurements.
- **LED Backlight & Storage:** 240x320 color screen with LED backlighting for clear visibility. Stores up to 10 waveforms and 100 sets of measurement values.
- **Overload Protection:** Built-in 500mA/10A double protective tube for dual instrument protection.
- **Auto Shutdown:** Option for automatic shutdown or continuous operation.



Figure 2: Multimeter Functions Overview

Technical Specifications:

Measurement Type	Range / Accuracy
AC Voltage	400mV ~ 750V (±2.0%rdg + 10dgt)
DC Voltage	400mV ~ 1000V (±1.5%rdg + 10dgt)
AC Current	40mA ~ 10A (±1.5%rdg + 10dgt)
DC Current	40mA ~ 10A (±1.2%rdg + 10dgt)
Resistance	400Ω ~ 40MΩ (±3.0%rdg + 10dgt)
Capacitance	51.2nF ~ 100μF, 10mF
Frequency	5Hz ~ 5MHz (±1.0%rdg + 5dgt)

Measurement Type	Range / Accuracy
Diode / Continuity Test	Open circuit voltage 1.5V; judgment resistance 50Ω
Max Real-time Sampling Rate	2.5Msps
Storage	100 sets of data, 10 sets of waveform

4. Setup

4.1 Battery Installation

1. Locate the battery compartment on the rear of the multimeter.
2. Open the battery cover.
3. Insert 3 AAA batteries, ensuring correct polarity (+/-).
4. Close the battery cover securely.

4.2 Probe Connection

- Connect the black test probe to the 'COM' (common) input jack.
- Connect the red test probe to the appropriate input jack based on your desired measurement (e.g., 'VΩCap' for voltage, resistance, capacitance; 'mA' for milliampere current; '10A' for 10 Ampere current).



Figure 3: Multimeter and Oscilloscope Display

5. Operating Instructions

5.1 Power On/Off

- To power on, rotate the central rotary knob from 'OFF' to any desired measurement function.
- To power off, rotate the central rotary knob back to 'OFF'.
- **Quiet Mode:** To disable keypress beeps, press and hold the 'F4' button and then rotate the rotary knob to turn on the instrument.

5.2 Multimeter Functions

Select the desired measurement function using the central rotary knob. The display will show the measurement type and value.

- **Voltage (DC/AC):** Select 'V' for voltage measurement. The device automatically detects AC or DC.
- **Current (DC/AC):** Select 'mA' or '10A' for current measurement.
- **Resistance:** Select 'Ω' for resistance measurement.
- **Capacitance:** Select 'Cap' for capacitance measurement.
- **Frequency:** Select 'Hz' for frequency measurement.
- **Diode Test:** Select the diode symbol for diode testing.
- **Continuity Test:** Select the continuity symbol for continuity testing.

5.3 Oscilloscope Functions

The oscilloscope function allows for visual analysis of waveforms.

- **Waveform Capture:** The device features an automatic waveform capture function.
- **Scanning Modes:** Choose between Automatic, Conventional, or Single scanning modes using the function buttons (F1-F4) as indicated on the display.
- **Waveform Parameters:** Adjust Time Base, Range, Trigger Level, and Trigger Slope using the function buttons to fine-tune waveform display.

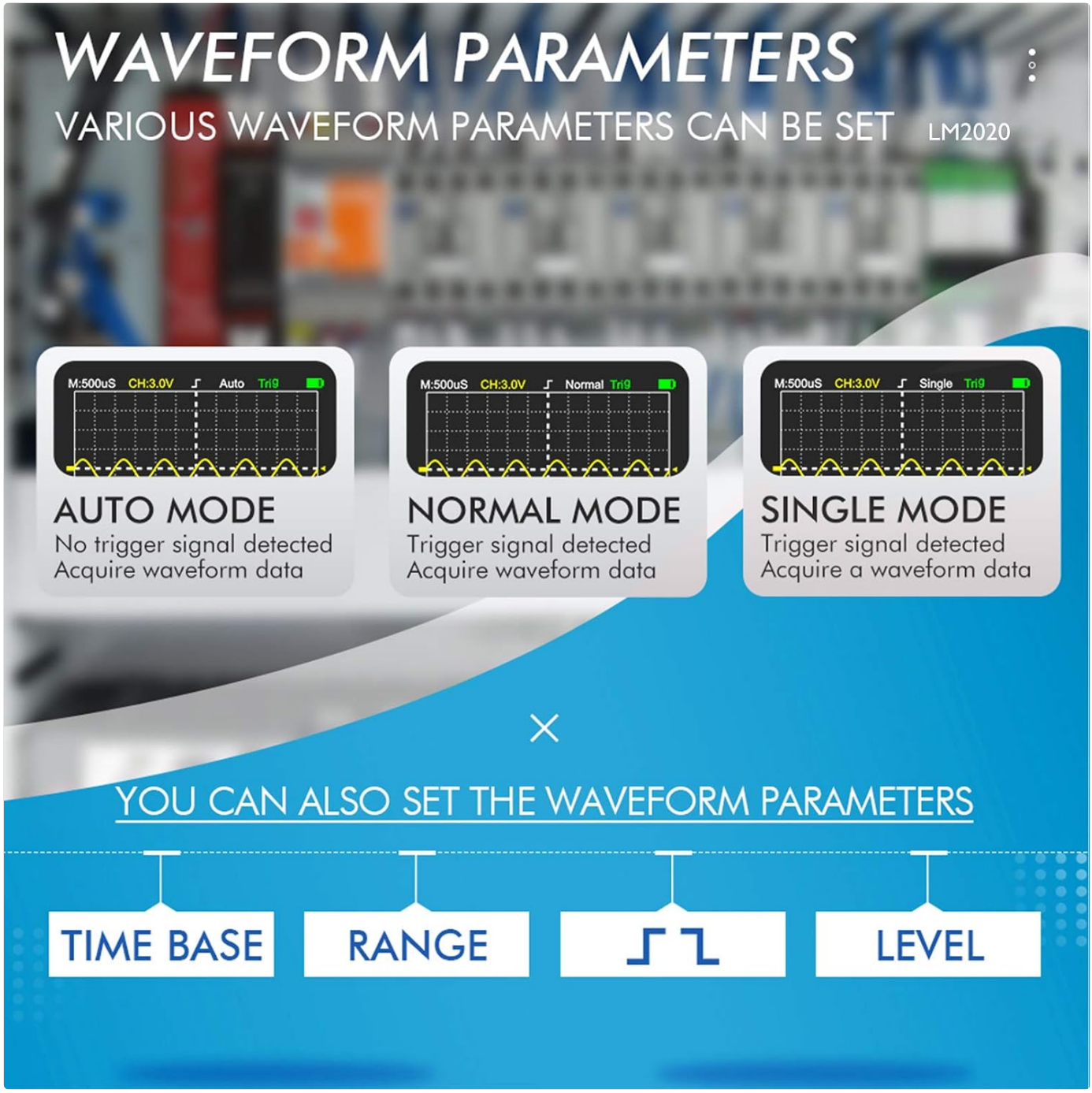


Figure 4: Waveform Parameters and Scanning Modes

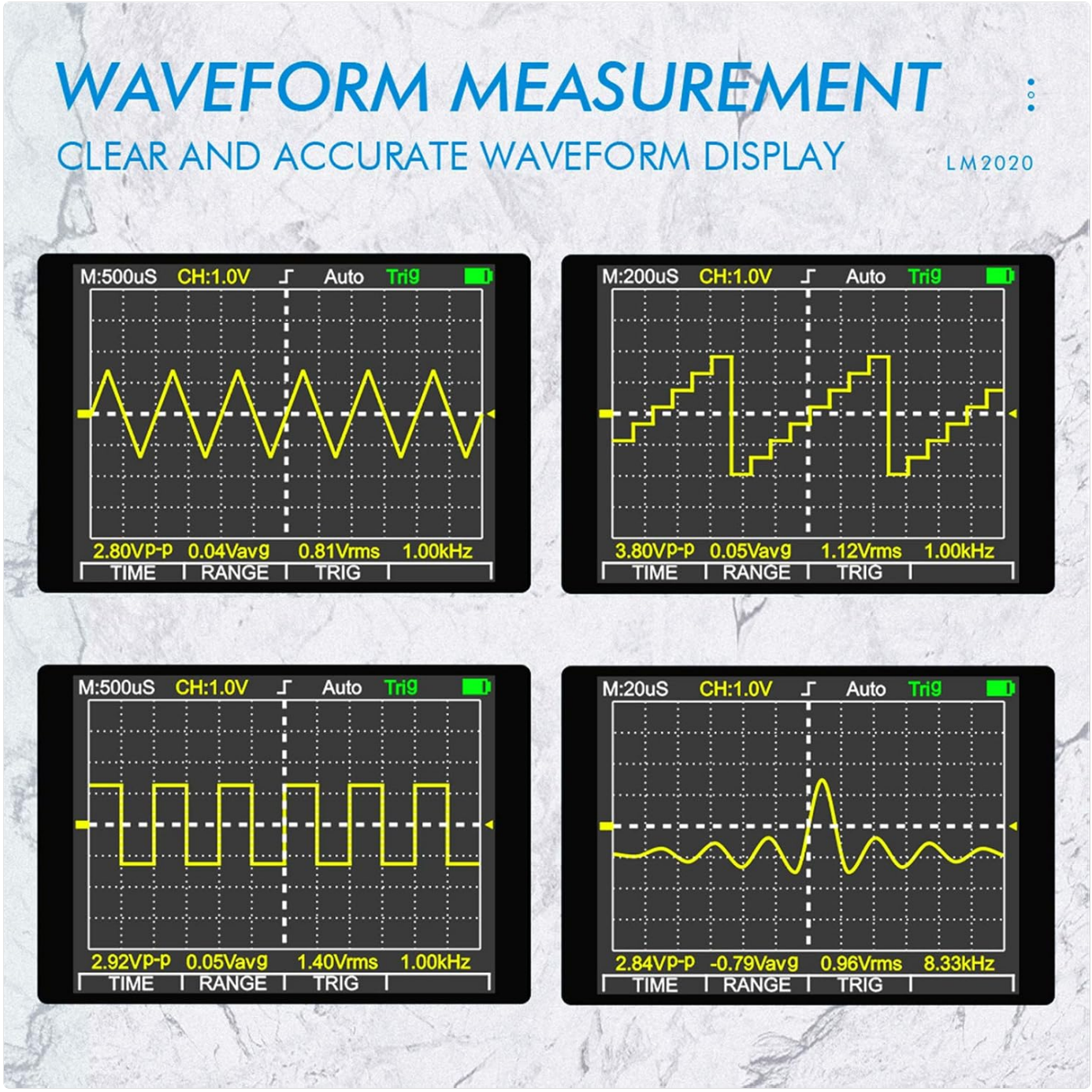


Figure 5: Clear and Accurate Waveform Display

5.4 Data Storage & Readout

- The device can store up to 10 waveforms and 100 sets of measurement values.
- Use the 'HOLD' function to freeze the current display.
- Access stored data and waveforms through the menu options (refer to the on-screen prompts or manual for specific navigation).

5.5 Relative Value & Max/Min Test

- **Relative Value (REL):** Press the 'REL' button to effectively eliminate the influence of lead resistance on the measurement result, providing more accurate readings.
- **Max/Min Test:** Use the 'P-H' (Peak Hold) or similar function to record the maximum and minimum values during a measurement process.

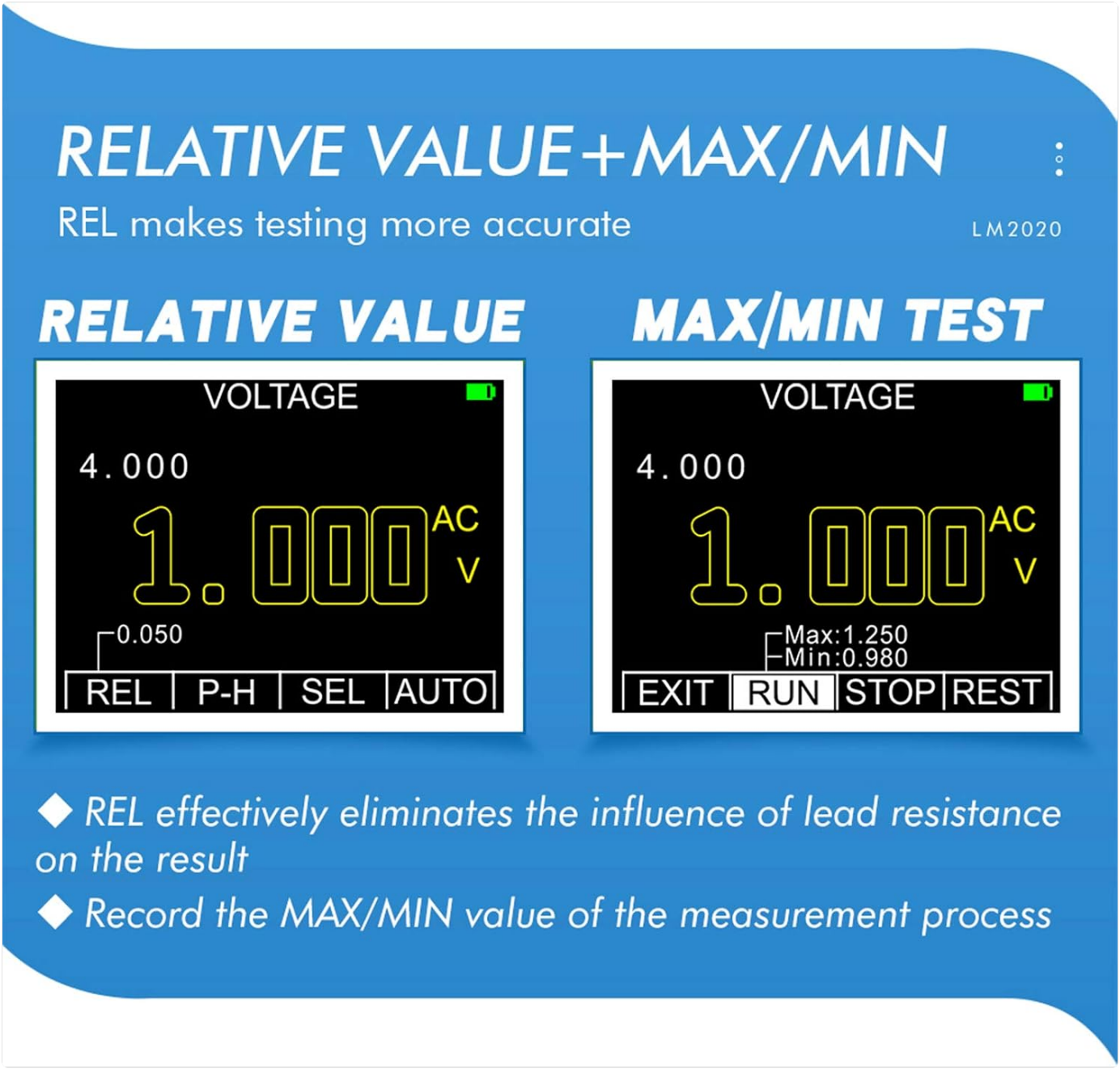


Figure 6: Relative Value and Max/Min Test Functions

6. Maintenance

6.1 General Cleaning

Regularly clean the device with a soft, dry cloth. Do not use abrasive cleaners or solvents. Ensure the device is powered off before cleaning.

6.2 Battery Replacement

When the low battery indicator appears on the display, replace the 3 AAA batteries promptly to ensure accurate readings and proper operation. Refer to Section 4.1 for battery installation steps.

6.3 Storage

When not in use, store the multimeter in its protective sleeve in a cool, dry place, away from direct sunlight and extreme temperatures. Remove batteries if storing for extended periods to prevent leakage.

7. Troubleshooting

If you encounter issues with your iMars 2-in-1 Handheld Oscilloscope Multimeter, please refer to the following common troubleshooting steps:

- **Device Not Powering On:** Check if the batteries are correctly installed and have sufficient charge. Replace batteries if necessary. Ensure the rotary knob is set to a function other than 'OFF'.
- **Inaccurate Readings:** Verify that the test probes are securely connected to the correct input jacks for the selected measurement type. Ensure the 'REL' function is not inadvertently activated if you are not intending to use it. Check for damaged probes or cables.
- **No Waveform Display:** Confirm that the oscilloscope function is selected and the input signal is within the device's measurement range. Adjust waveform parameters (Time Base, Range, Trigger Level) to properly capture the signal.
- **Display Issues:** If the display is dim or unreadable, ensure the backlight is activated. If the issue persists, the batteries may be low.
- **Overload Indication:** If 'OL' or an overload symbol appears, the input signal exceeds the selected range. Disconnect the probes immediately and select a higher range or a different measurement type.

For persistent issues not resolved by these steps, please contact the manufacturer's support.

8. Warranty & Support

For information regarding product warranty, technical support, or service, please refer to the official documentation provided by the manufacturer, LIUMYARTISTOREGO, or visit their official website. Keep your purchase receipt as proof of purchase for warranty claims.

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