AUTOOL DM303

AUTOOL Automotive Multimeter Oscilloscope TRMS Instruction Manual

Model: DM303 | Brand: AUTOOL

1. Product Overview

The AUTOOL DM303 is a versatile automotive diagnostic multimeter and oscilloscope kit designed for comprehensive electrical testing in vehicles. It combines the functions of a digital multimeter with an oscilloscope, offering a wide range of measurement capabilities for both general electrical work and specialized automotive diagnostics.

Figure 1.1: AUTOOL DM303 Multimeter Oscilloscope and its accessories, including various test leads and a carrying case.

Key Features:

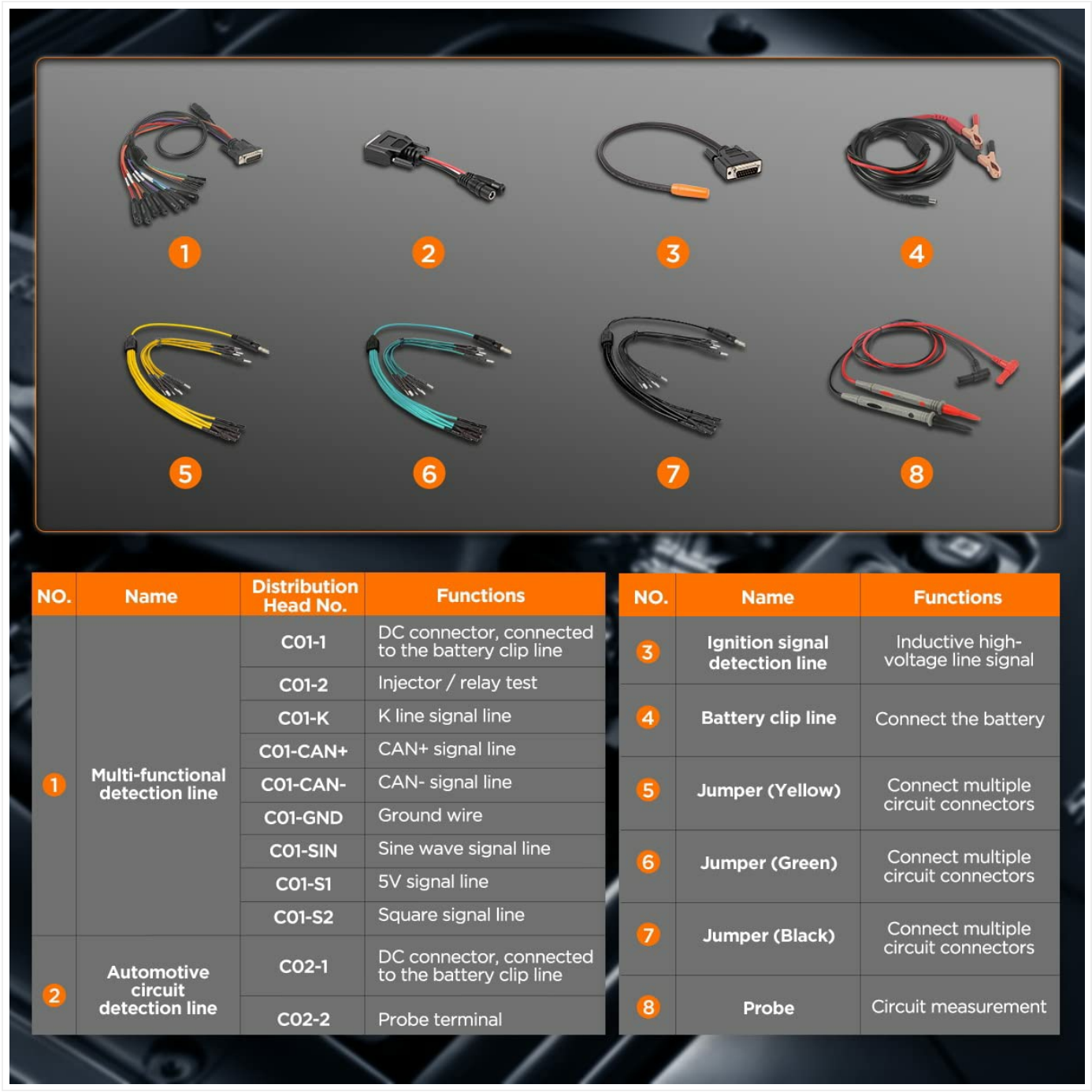
- **Multimeter Capabilities:** Accurately measures AC/DC voltage (0-1000V DC, 0-700V AC), resistance (0-1MΩ), continuity, AC/DC current (0-20A, 0-200mA), capacitance, frequency (1-1MHz), diodes, and duty cycle.
- **Oscilloscope Function:** Features a 500KHz waveform test bandwidth for measuring slowly changing signals, ideal for automotive circuits such as motor drive signals, ignition signals, camshaft/crankshaft signals, wheel speed sensor signals, and oxygen sensor signals.
- **Auto Range & True RMS:** Automatically selects appropriate measurement ranges and provides accurate readings for non-sinusoidal waveforms.
- **Specialized Wiring Functions:** Includes 8 types of wiring lines for diverse applications, such as battery voltage testing, fuel injector/relay testing, K-wire and CAN bus signal testing, and ECU diagnostics.
- **Starting Test & Analog Signal Output:** Evaluates battery starter systems and outputs 5V square wave and 5Vpp sine wave signals (1Hz-10KHz, 10%-90% duty cycle).
- **User-Friendly Display:** Equipped with a 2.8-inch colorful screen with backlight, adjustable brightness, button sound, and sleep time for enhanced readability and convenience in various working environments.

Video 1.2: General overview of the AUTOOL DM303 digital oscilloscope multimeter for automotive diagnostics, showcasing its various functions and applications.

2. Setup and Components

2.1 Package Contents

The AUTOOL DM303 kit includes the main multimeter unit, various test leads, and a carrying case. Refer to the diagram below for a detailed view of the included wiring lines and their functions.



NO.	Name	Distribution Head No.	Functions
1	Multi-functional detection line	C01-1	DC connector, connected to the battery clip line
		C01-2	Injector / relay test
		C01-K	K line signal line
		C01-CAN+	CAN+ signal line
		C01-CAN-	CAN- signal line
		C01-GND	Ground wire
		C01-SIN	Sine wave signal line
		C01-S1	5V signal line
		C01-S2	Square signal line
2	Automotive circuit detection line	C02-1	DC connector, connected to the battery clip line
		C02-2	Probe terminal

NO.	Name	Functions
3	Ignition signal detection line	Inductive high-voltage line signal
4	Battery clip line	Connect the battery
5	Jumper (Yellow)	Connect multiple circuit connectors
6	Jumper (Green)	Connect multiple circuit connectors
7	Jumper (Black)	Connect multiple circuit connectors
8	Probe	Circuit measurement

Figure 2.1: Overview of the 8 specialized wiring lines and their applications.

2.2 Device Layout and Connections

Familiarize yourself with the main components and connection points of the DM303 unit.

Figure 2.2: Front and back view of the DM303 with key components labeled.

2.3 Initial Setup

To begin using the DM303, ensure the device is powered on and test probes are correctly connected.

1. **Power On:** Press the power button to turn on the device. The screen will display the AUTOOL logo during startup.
2. **Connect Test Probes:** Insert the red test probe into the VΩA jack (red) and the black test probe into the COM jack (black). For current measurements, connect the red probe to the mA/µA jack (green) for small currents or the 10A jack (yellow) for larger currents, and the black probe to the COM jack.
3. **Battery Installation:** The device uses AAA cells but has a socket for Li-Ion rechargeable batteries. Ensure batteries are correctly installed if not using the internal rechargeable option.

[redacted]

Video 2.3: Demonstrates powering on the device and connecting test probes for voltage measurement, including connecting to a car battery. This video shows the initial setup and basic voltage testing.

3. Operating Instructions

The AUTOOL DM303 offers various measurement modes accessible via the main menu. Use the directional keys and OK button to navigate and select functions.

3.1 Multimeter Functions

The DM303 functions as a comprehensive digital multimeter with auto-ranging capabilities.

Figure 3.1: Examples of voltage, current, and resistance measurements on the DM303 display.

3.1.1 Voltage Measurement (AC/DC)

To measure voltage, select the "Voltmeter" (V) function from the main menu. The device will automatically detect AC or DC voltage. For AC voltage, press the Fn key to switch to AC measurement mode.

[redacted]

Video 3.1: Demonstrates how to measure alternating current (AC) voltage using the multimeter function, including connecting probes to an AC power source.

3.1.2 Current Measurement (AC/DC)

Select the "Ammeter" (A) function. For small currents (mA/μA), connect the red probe to the green jack. For larger currents (up to 20A), connect the red probe to the yellow jack. Press F2 to switch between mA and 20A measurement modes.

[redacted]

Video 3.2: Illustrates the ammeter function for fuel pump inspection, showing how to measure current by inserting probes into the fuse box after removing the fuel pump fuse.

3.1.3 Resistance Measurement

Select the "Ohmmeter" (Ω) function to measure resistance. The device supports continuity circuit tests and diode tests.

[redacted]

Video 3.3: Demonstrates resistance measurement for remote key fob leakage detection, showing how to connect the probes to the key fob battery terminals and observe the standby current reading.

3.2 Oscilloscope Function

The oscilloscope function allows for waveform analysis of various automotive signals.

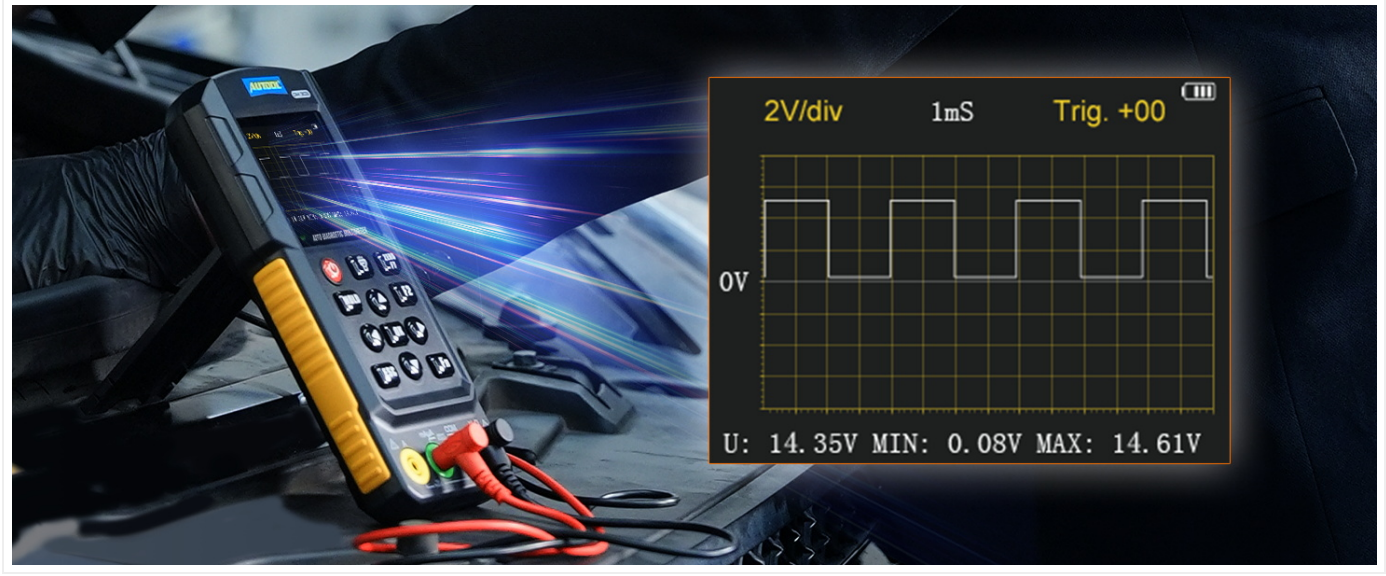


Figure 3.2: Oscilloscope display showing a waveform.

3.2.1 OBD Interface Testing

Use the oscilloscope function to test the OBD interface. Connect the test probes to the corresponding ports and observe the waveform while interacting with the vehicle (e.g., pressing the accelerator pedal) to identify abnormalities.

[redacted]

Video 3.4: Demonstrates using the oscilloscope function to test the OBD interface, showing waveform changes when the accelerator pedal is pressed.

3.2.2 Camshaft Detection

The oscilloscope can be used to detect camshaft signals. Start the engine and insert the red test probe into the power circuit, touching the contact parts to be tested. Use the up/down keys to adjust voltage display per grid and left/right keys to switch frequency for detailed waveform analysis.

[redacted]

Video 3.5: Illustrates camshaft detection using the oscilloscope, showing how to connect probes and adjust display settings to analyze the camshaft signal waveform.

3.3 Automotive Specific Tests

3.3.1 Cranking Test

Perform a cranking test to evaluate the battery's starter system. Connect the device to the battery terminals and initiate the engine start sequence. The DM303 will display current, minimum voltage, and starting voltage to assess battery health and starting power.

Figure 3.3: Cranking test in progress, showing the device connected to the car battery.

3.3.2 Injector Test

The injector test function allows you to simulate engine speed to test fuel injectors. Connect the appropriate test lines to the injector and the DM303, then set the desired RPM to observe injector operation.

Figure 3.4: Injector test setup, simulating engine speed for diagnostic purposes.

3.3.3 Relay Test

Test automotive relays by connecting them to the DM303 using the appropriate wiring. The device can check the contact status and resistance of the relay.

Figure 3.5: Relay test in progress, part of a composite image demonstrating multiple automotive diagnostic functions.

3.3.4 Ignition Pulse Signal Test

Measure ignition pulse signals to diagnose ignition system issues. Connect the ignition pulse signal test line and observe the waveform on the oscilloscope display.

3.3.5 K-line & CAN Bus Signal Test

The DM303 can test K-line and CAN bus signals, providing data for network communication diagnostics in vehicles.

3.3.6 Automotive Lamp Circuit Simulation Testing

Simulate and test automotive lamp circuits to check for functionality and identify damaged components. Use the red test probe to touch the car lights circuit and output voltage to drive the electrical component.

[redacted]

Video 3.6: Demonstrates automotive lamp circuit simulation testing, showing how to connect the device and activate car lights to check for proper operation.

3.3.7 Analog Signal Output

The multimeter can output 5V square wave and 5Vpp sine wave signals with adjustable frequency (1Hz-10KHz) and duty cycle (10%-90%). This function is useful for testing various sensors and components that require a specific input signal.

Figure 3.6: Analog signal test in progress, part of a composite image demonstrating multiple automotive diagnostic functions.

4. Maintenance

- **Cleaning:** Wipe the device with a soft, dry cloth. Do not use abrasive cleaners or solvents.
- **Storage:** Store the DM303 in its carrying case in a cool, dry place away from direct sunlight and extreme temperatures.
- **Battery Care:** If the device uses removable batteries, remove them if the unit will not be used for an extended period to prevent leakage. For the internal rechargeable battery, ensure it is charged periodically to maintain its health.
- **Probe Care:** Inspect test leads and probes regularly for any signs of wear, damage, or frayed insulation. Replace damaged components immediately to ensure accurate and safe operation.

- **Software Updates:** Check the manufacturer's website for any available firmware updates to ensure optimal performance and access to new features.

5. Troubleshooting

If you encounter issues with your AUTOOL DM303, refer to the following common troubleshooting steps:

- **Device Not Powering On:**
  - Ensure the battery is charged or correctly installed.
  - Verify the power button is pressed firmly.
- **Inaccurate Readings:**
  - Check that test probes are securely connected to the correct input jacks for the selected measurement type.
  - Ensure the probes are making good contact with the circuit or component being tested.
  - Verify the correct measurement mode is selected (e.g., AC vs. DC voltage, mA vs. 20A current).
  - Clean the probe tips if they appear dirty or corroded.
- **No Display or Dim Display:**
  - Adjust the screen brightness setting in the device menu.
  - Ensure the battery has sufficient charge.
- **Function Not Responding:**
  - Restart the device.
  - Ensure the correct accessory cable (e.g., C04 Multi-functional Test Cable) is properly connected for specialized tests.

If troubleshooting steps do not resolve the issue, please contact AUTOOL customer support for further assistance.

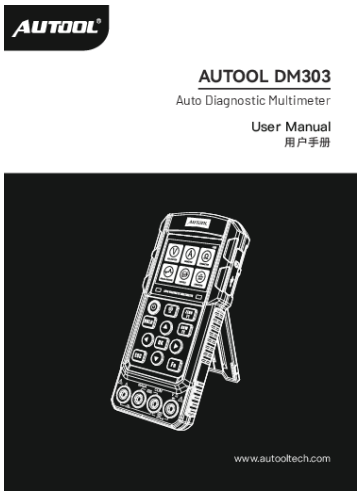
6. Specifications

Specification	Value
Voltage Measurement Range	DC 0-1000V, AC 0-700V
Current Measurement Range	0-20A, 0-200mA
Resistance Measurement Range	0-1MΩ
Frequency Measurement Range	1Hz-1MHz
Automotive Circuit Drive Current	0-5A
Injector Drive Signal Output	500-6000RPM
Working Temperature	0°C-40°C (32°F-104°F)
Product Dimensions	10.23 x 7.87 x 4.33 inches
Item Weight	3.7 Pounds
Power Source	Battery Powered

Figure 6.1: Visual representation of product dimensions and key specifications.

7. Warranty and Support

AUTOOL provides a **Three Years Warranty** for the DM303 against any quality problems. If the product has any defect, AUTOOL will provide a new replacement or solutions without delay. Lifetime technical support is also provided.
For any needs or technical assistance, you are welcome to contact AUTOOL customer support. They aim to respond within 24 hours.



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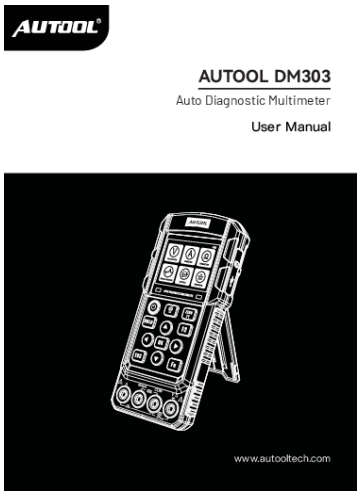

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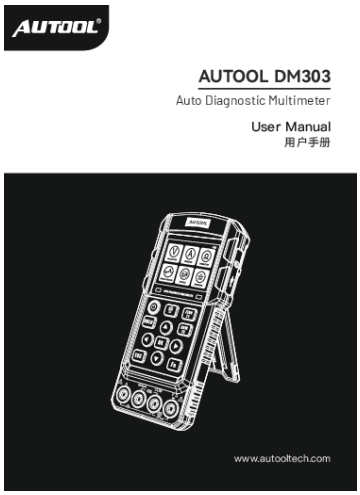

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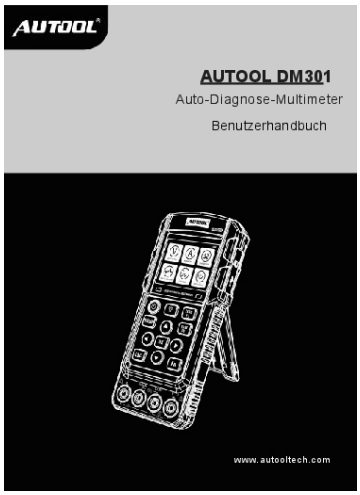

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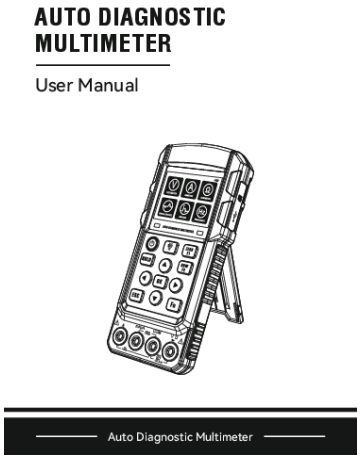

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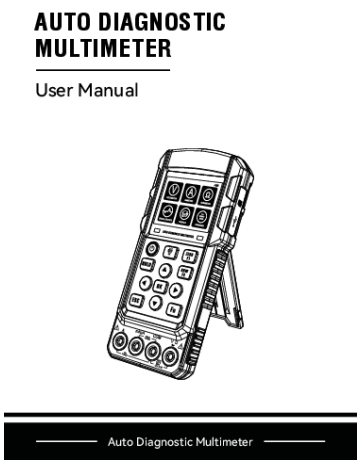

Auto Diagnostic Multimeter User Manual

Comprehensive user manual for the AUTOOL Auto Diagnostic Multimeter, covering its features, operation, and various automotive testing functions including voltage, current, resistance, oscilloscope, car circuit tests, injector tests, relay tests, and signal analysis.

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