

ALIENTEK DM40A

ALIENTEK DM40A/B/C Digital Multimeter Instruction Manual

Your comprehensive guide to the ALIENTEK DM40 series 3-in-1 Multimeter, Oscilloscope, and Signal Generator.

1. PRODUCT OVERVIEW

The ALIENTEK DM40 series is a professional 4.5-digit digital multimeter (59999 count Max) designed for fast and accurate measurements. It integrates the functions of a multimeter, oscilloscope, and signal generator into a single handheld device. Equipped with a high-precision 5ppm reference source, it ensures long-term stability and reliability for various applications, from automotive diagnostics to industrial and scientific use.

Key Features

- **Professional 4.5-Digit Multimeter:** Offers 59999 counts maximum, ensuring high precision and accuracy.
- **Integrated 3-in-1 Functionality:** Combines a digital multimeter, oscilloscope, and signal generator.
- **Automatic Measurement:** Features auto mV/V and μ A/mA/A gear measurement, eliminating the need for manual range switching.
- **AC+DC Mixed Measurement:** DM40B/C models can display both AC and DC components simultaneously for complex signal analysis.
- **Ultra-Fast Continuity & Diode Test:** Provides quick continuity checks and innovative diode function with multiple voltage drop measurements and distinct audible indicators.
- **High-Resolution IPS Touchscreen:** A 3.5-inch (480*320) screen offers fine display and convenient interactive control.
- **Oscilloscope Specifications:** 10-bit ADC, 50MHz sampling rate, and 10MHz bandwidth.
- **Signal Generator:** Built-in function for generating various waveforms.
- **Data Management:** Supports auto-measurement, relative measurement, data logging, data hold, and trend graph display.

Product Parameters

Basic Info				Model	DM40A	DM40B	DM40C	
Model	DM40A/B/C			Function	Range			Accuracy
Screen	Full Touch 3.5"IPS(480*320)			DC Voltage	400mV/4V/40V 400V/1000V	500mV/5V/50V 500V/1000V	600mV/6V/60V 600V/1000V	±(0.03%+5d)
Battery Life	≈12H(Multimeter)/10H(Oscilloscope)			AC Voltage	400mV/4V/40V 400V/750V	500mV/5V/50V 500V/750V	600mV/6V/60V 600V/750V	±(0.3%+15d)
Dimensions	140*83*25mm			DC Current	400uA/4000uA 40mA/400mA	500uA/5000uA 50mA/500mA	600uA/6000uA 60mA/600mA	±(0.15%+5d)
Weight	260g				4A/10A	5A/10A	6A/10A	±(0.2%+5d)
Interface	USB/MCX/Banana Seat			AC Current	400uA/4000uA 40mA/400mA	500uA/5000uA 50mA/500mA	600uA/6000uA 60mA/600mA	±(0.5%+15d)
Oscilloscope /Signal Generator Technical Parameters					4A/10A	5A/10A	6A/10A	±(0.75%+15d)
Sample Rate	50MSa/S	Input Impedance	1MΩ	Resistor	400Ω/4KΩ/40KΩ 400KΩ/4MΩ	500Ω/5KΩ/50KΩ 500KΩ/5MΩ	600Ω/6KΩ/60KΩ 600KΩ/6MΩ	±(0.1%+5d)
Bandwidth	10Mhz	Timebase Mode	YT/ROLL		40MΩ	50MΩ	60MΩ	±(0.2%+10d)
Memory Depth	64Kpts	Sweep Mode	Auto/Normal/Single	Capacitance	4nF/40nF/400nF 44uF/40uF	5nF/50nF/500nF 55uF/50uF	6nF/60nF/600nF 66uF/60uF	±(2.5%+30d)
Time Scale	100ns~50s	Trigger Type	Rising/Falling		400uF/4mF 40mF	500uF/5mF 50mF	600uF/6mF 60mF	±(3.5%+30d)
Vertical Scale	10mV~10V/div (X1)	Persistence	OFF /Min/1S/∞	Frequency	10Hz~40MHz	10Hz~50MHz	10Hz~60MHz	±(0.01%+5d)
Resolution	10bit	Math	FFT/ABS		-40°C~1000°C(Standard probe temperature measurement range -20°C~300°C) -40°F~1832°F	±(1.0%+5°C) ±(1.5%+5°F)		
Coupling	AC/DC	Waveform	Square/Sine Triangle/Sawtooth	Temperature	0Ω~1KΩ	±(0.2%+5d)		
					0V~3.0V, 0Ω~1KΩ	±(1%+5d)		

Figure 1: The ALIENTEK DM40 series combines multimeter, oscilloscope, and signal generator functions.

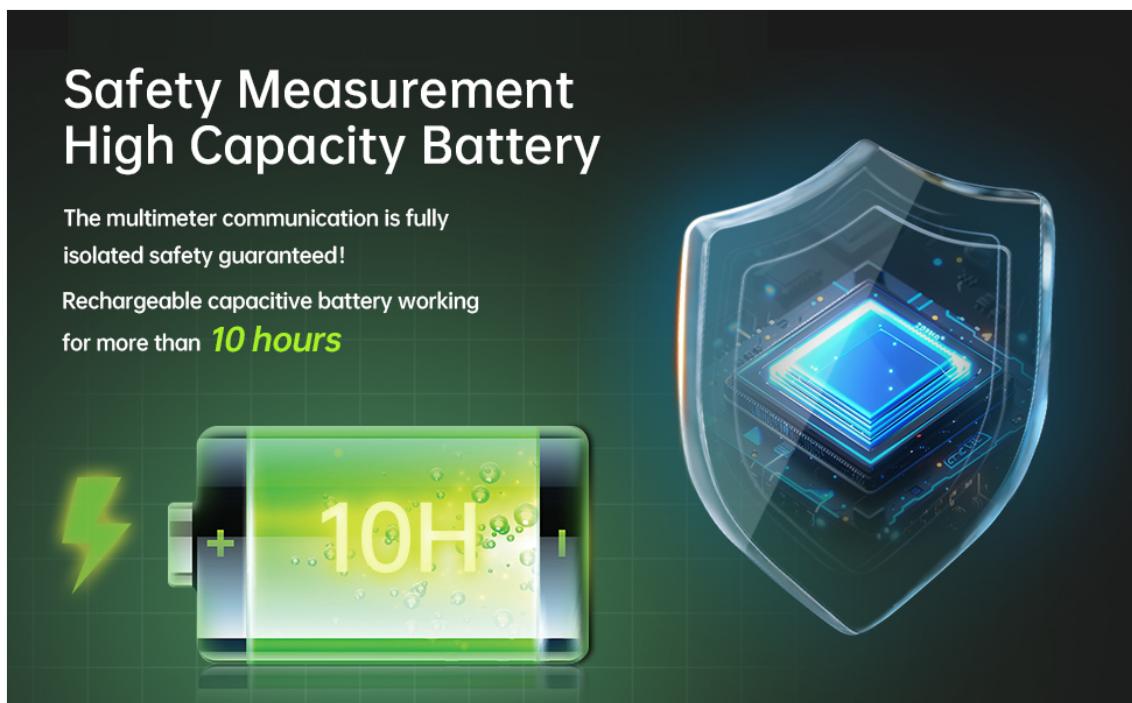


Figure 2: Overview of the DM40's high-quality features, including various measurement modes and display options.

2. WHAT'S IN THE Box

Please check the contents of your package upon receipt to ensure all items are present:

- ALIENTEK DM40A/B/C Digital Multimeter
- MP01 Test Leads (Red and Black)
- Probe Leads
- USB-C Cable
- 1 x 9V Battery (included)

3. SETUP

3.1 Battery Installation and Charging

The DM40 series multimeter is equipped with an internal rechargeable battery. Ensure the battery is properly installed and charged before initial use. Connect the device using the provided USB-C cable to a suitable power source (e.g., USB wall adapter, computer USB port) for charging. A full charge provides over 10 hours of continuous operation for multimeter functions and 10 hours for oscilloscope functions.

3.2 Connecting Test Leads

Proper connection of test leads is crucial for accurate and safe measurements. Refer to the following guidelines:

- For most measurements (Voltage, Resistance, Capacitance, Diode, Continuity, Frequency, Temperature), insert the black test lead into the **COM** (Common) port and the red test lead into the **VΩHz** port.
- For current measurements (μ A, mA, A), insert the black test lead into the **COM** port and the red test lead into the **A mA μ A** port. Ensure the correct port is used to avoid damage to the device or circuit.



Figure 3: Proper connection of test leads for voltage, resistance, and other measurements.

4. OPERATING INSTRUCTIONS

4.1 Power On/Off

To power on the device, press and hold the power button located on the side or front panel until the screen illuminates. To power off, press and hold the same button until the screen shuts down.

4.2 Automatic Measurement Mode

The DM40 series excels in its automatic measurement capabilities. In AUTO mode, the multimeter intelligently detects the type of measurement (DC/AC voltage, current, resistance, etc.) and automatically switches to the appropriate range. This feature significantly simplifies operation, especially for users who need to quickly assess various parameters without manual configuration.



Figure 4: Automatic voltage measurement in progress, showing auto-ranging capabilities.

4.3 Voltage Measurement (DC, AC, AC+DC)

To measure voltage, ensure test leads are connected to the VΩHz and COM ports. The multimeter automatically detects DC or AC voltage. For AC+DC mixed measurements (available on DM40B/C models), the device displays both AC and DC components simultaneously, providing a comprehensive view of complex signals. The small text on the top left and right of the display shows the AC and DC voltage values respectively.

Safety Warning: When the measured voltage exceeds 30V, the display font will turn red, and a red lightning symbol will appear, indicating potentially hazardous voltage levels. Always exercise extreme caution when working with high voltages.

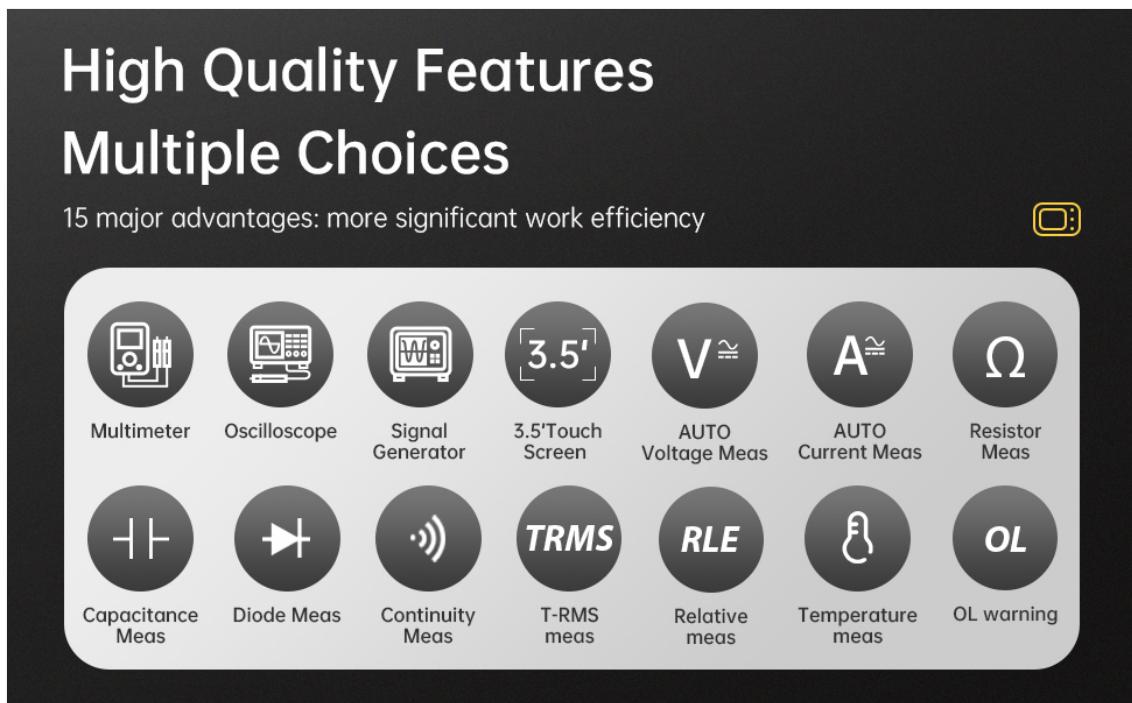


Figure 5: AC+DC mixed measurement and trend chart display on the DM40 multimeter.

4.4 Current Measurement (DC, AC, AC+DC)

For current measurements, insert the red test lead into the A mA μ A port and the black lead into the COM port. Use the current range button to cycle through DC, AC, or AC+DC measurement modes. The device supports automatic range switching for current, from microamperes (μ A) to amperes (A).

4.5 Diode Test

The innovative diode test function allows for precise voltage drop measurement across diodes. The device provides distinct audible indicators for different voltage drop ranges, making it easy to identify diode characteristics. This test is performed with high accuracy.



Figure 6: Diode test function displaying voltage drop measurements.

4.6 Continuity Test

The ultra-fast continuity test allows you to quickly check for open or closed circuits. An audible beep indicates a continuous path, while no sound suggests an open circuit. This function is highly responsive, with quick measurements typically less than 1 microsecond.

4.7 Oscilloscope Function

The integrated oscilloscope function provides advanced waveform analysis capabilities. With a 10-bit ADC, 50MHz sampling rate, and 10MHz bandwidth, it allows for detailed observation of electrical signals. Key features include various time scales, vertical scales, coupling options (AC/DC), and mathematical functions like FFT/ABS.

4.8 Signal Generator

The built-in signal generator can produce various waveforms, including sine, sawtooth, triangular, and square waves. This is useful for testing circuits, calibrating other equipment, or generating specific signals for experimental setups. Frequencies range from 1Hz to 10MHz depending on the waveform type.

4.9 IPS Touchscreen Interaction

The 3.5-inch IPS touchscreen provides an intuitive interface for navigating menus, selecting functions, and viewing measurement data. Its high resolution (480*320) ensures a clear and detailed display, enhancing user experience.

T-RMS/AC+DC/Trend Chart

T-RMS measure with higher accurate
AC and DC measure simultaneous
(can effectively measure complex signals)
Trend chart displays measurement
data periodically
3-speed adjustable time base
(160ms/320ms/640ms)



Note: AC+DC measurement only DM40B/C supported!

Figure 7: The high-resolution 3.5-inch IPS touchscreen for clear display and interaction.

4.10 Data Logging and Trend Graph

The DM40 supports essential data management features such as data logging, data hold, and relative measurement. The trend graph function allows users to visualize measurement data periodically, with adjustable time bases (160ms/320ms/640ms), aiding in the observation of signal changes and stability over time.

4.11 Official Product Video

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Video 1: This video demonstrates the voltage and current measurement capabilities of the ALIENTEK DM40 Digital Oscilloscope Multimeter, including auto-ranging, AC/DC measurements, and safety warnings for high voltage.

5. MAINTENANCE

5.1 Cleaning

To maintain the device's performance and appearance, wipe the exterior with a soft, damp cloth. Do not use abrasive cleaners, solvents, or harsh chemicals, as these can damage the casing or screen. Ensure the device is powered off and disconnected from any power source before cleaning.

5.2 Battery Care

The DM40 series features a high-capacity rechargeable battery designed for over 10 hours of use. For optimal battery life and performance:

- Avoid fully discharging the battery frequently.
- Charge the device regularly, even if not in constant use.
- Store the device in a cool, dry place when not in use for extended periods.
- The multimeter communication is fully isolated, ensuring safety during operation and charging.

5.3 Storage

Store the multimeter in a dry, dust-free environment away from direct sunlight, extreme temperatures, and high humidity. Keep it away from strong magnetic fields and corrosive gases. If storing for a long period, ensure the battery has a partial charge (around 50%) to prolong its lifespan.

6. TROUBLESHOOTING

This section addresses common issues you might encounter with your ALIENTEK DM40 multimeter.

6.1 "OL" Display (Overload)

If the display shows "OL" (Overload), it indicates that the measured value exceeds the current range or maximum input limit of the selected function. To resolve this:

- If in manual range mode, switch to a higher measurement range.
- Ensure the input is within the device's specified maximum limits for the selected function.
- For current measurements, verify that the test lead is inserted into the correct current measurement port (A mA µA) and not the voltage port.

6.2 No Reading or Inaccurate Readings

- **Check Test Lead Connections:** Ensure the test leads are securely inserted into the correct ports on the multimeter and are making good contact with the circuit being measured.
- **Battery Level:** Verify that the battery is sufficiently charged. A low battery can affect measurement accuracy.
- **Correct Mode Selection:** Confirm that the appropriate measurement mode (e.g., DC Voltage, AC Current, Resistance) is selected for the task.
- **Damaged Leads:** Inspect the test leads for any signs of damage (e.g., frayed wires, broken insulation). Replace damaged leads immediately.

6.3 Device Not Powering On

- **Charge Battery:** Connect the multimeter to a power source using the USB-C cable and allow it to charge for some time.
- **Power Button:** Ensure the power button is pressed and held correctly.

7. SPECIFICATIONS

Detailed technical specifications for the ALIENTEK DM40A/B/C Digital Multimeter are provided below.

7.1 Basic Information

Parameter	Value
Model	DM40A/B/C
Screen	Full Touch 3.5" IPS (480*320)
Battery Life	12H (Multimeter) / 10H (Oscilloscope)
Dimensions	5.5 x 3 x 1 inches (140 x 83 x 25 mm)
Item Weight	1.89 pounds (260g)
Interface	USB-C, MCX, Banana Seat
Power Source	Battery Powered (1 x 9V battery included)
Specification Met	CE, FCC

7.2 Oscilloscope / Signal Generator Technical Parameters

Parameter	Value
Sample Rate	50MSa/s
Bandwidth	10MHz
Memory Depth	64Kpts
Time Scale	100ns ~ 50s
Vertical Scale	10mV ~ 10V/div (X1)
Resolution	10Bit
Coupling	AC/DC
Input Impedance	1MΩ

Parameter	Value
Timebase Mode	Auto/Normal/Single
Sweep Mode	Rising/Falling
Math Functions	FFT/ABS
Waveform Types	Sine, Square, Triangular, Sawtooth

7.3 Measurement Ranges and Accuracy

Function	DM40A Range	DM40B Range	DM40C Range	Acc
DC Voltage	400mV/4V/40V/400V/1000V	500mV/5V/50V/500V/1000V	600mV/6V/60V/600V/1000V	±(0.1%)
AC Voltage	400mV/4V/40V/400V/750V	500mV/5V/50V/500V/750V	600mV/6V/60V/600V/750V	±(0.1%)
DC Current	400µA/4000µA/40mA/400mA, 4A/10A	500µA/5000µA/50mA/500mA, 5A/10A	600µA/6000µA/60mA/600mA, 6A/10A	±(0.1%) (µA/±(0.1%) (A))
AC Current	400µA/4000µA/40mA/400mA, 4A/10A	500µA/5000µA/50mA/500mA, 5A/10A	600µA/6000µA/60mA/600mA, 6A/10A	±(0.1%) (µA/±(0.1%) (A))
Resistance	400Ω/4KΩ/40KΩ/400KΩ/4MΩ/40MΩ	500Ω/5KΩ/50KΩ/500KΩ/5MΩ/50MΩ	600Ω/6KΩ/60KΩ/600KΩ/6MΩ/60MΩ	±(0.1%) (Ω), ±(0.1%) (MΩ)
Capacitance	4nF/40nF/400nF/4µF/40µF/400µF/4mF	5nF/50nF/500nF/5µF/50µF/500µF/5mF	6nF/60nF/600nF/6µF/60µF/600µF/6mF	±(2.0%) (nF), ±(3.0%) (mF)
Frequency	10Hz ~ 40MHz	10Hz ~ 50MHz	10Hz ~ 60MHz	±(0.1%)
Temperature	-40°C ~ 1000°C (-40°F ~ 1832°F)	-40°C ~ 1000°C (-40°F ~ 1832°F)	-40°C ~ 1000°C (-40°F ~ 1832°F)	±(1.0%) (probe 20°C) ±(1.0%)
Continuity	0Ω ~ 1KΩ	0Ω ~ 1KΩ	0Ω ~ 1KΩ	±(0.1%)
Diode	0V ~ 3.0V, 0Ω ~ 1KΩ	0V ~ 3.0V, 0Ω ~ 1KΩ	0V ~ 3.0V, 0Ω ~ 1KΩ	±(1%)

7.4 Special Features Comparison

Feature	DM40A	DM40B	DM40C
Maximum Display (Counts)	39999	49999	59999
AUTO Mode	✓	✓	✓
TRMS	✓	✓	✓
Frequency Response	10KHz	10KHz	10KHz
AC+DC Measurement		✓	✓
Duty Cycle Measure	5%~95%	5%~95%	5%~95%
Data Hold (HOLD)	✓	✓	✓
Relative Measurement (RLE)	✓	✓	✓
Extreme Value Measurement (Max/Min)	✓	✓	✓

Feature	DM40A	DM40B	DM40C
Trend Chart (WAVE)	✓	✓	✓

7.5 Signal Generator Waveform Parameters

Parameter	Sine Wave	Sawtooth Wave	Triangular Wave	Square Wave
Project	DM40A/B/C			
Frequency	1Hz ~ 50KHz			100KHz ~ 10MHz
Amplitude	0.5V ~ 3.0Vpp			3.0Vpp
Duty Cycle	Not adjustable			0 ~ 100%

8. SAFETY INFORMATION

Always adhere to the following safety precautions to prevent personal injury or damage to the multimeter or equipment under test.

- Safety Ratings:** The DM40 series is rated for CAT IV 600V and CAT III 1000V. Always ensure your measurements are within these categories and voltage limits.
- Maximum Limits:** Do not attempt to measure voltages or currents that exceed the specified maximums for each range. Refer to the specifications table.
- Isolated Communication:** The multimeter features fully isolated communication, enhancing safety during operation.
- Inspect Test Leads:** Always inspect test leads for any signs of damage (e.g., cracks, frayed insulation) before each use. Replace damaged leads immediately.
- High Voltage Warning:** When measuring voltages above 30V, the device will display a red warning on the screen. Exercise extreme caution and use appropriate personal protective equipment.
- Proper Port Usage:** Always connect test leads to the correct input jacks for the desired measurement. Incorrect connections can lead to damage or injury.

9. WARRANTY AND SUPPORT

9.1 Protection Plans

Optional protection plans are available to extend the coverage of your ALIENTEK DM40 Digital Multimeter:

- 3-Year Protection Plan:** Provides extended coverage for three years.
- 4-Year Protection Plan:** Provides extended coverage for four years.
- Complete Protect:** A comprehensive plan that covers all eligible past and future purchases (available with monthly billing).

Please refer to the specific terms and conditions of each protection plan for full details.

9.2 Customer Support

For technical assistance, warranty claims, or any further inquiries regarding your ALIENTEK DM40 Digital Multimeter, please contact ALIENTEK customer support through your purchase platform or visit the official ALIENTEK website for contact information. Our support team is available to help you with any questions or issues you may have.