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Alignimals MF470

MF470 Capacitor Tester User Manual

Model: MF470 | Brand: Alignimals

1. INTRODUCTION

The Alignimals MF470 Capacitor Tester is a professional, auto-ranging capacitance meter designed for precise measurement of various capacitor types, including ceramic, electrolytic, and super capacitors. It offers a wide measurement range from 0.01pF to 470,000,000uF (470F) and features Estimated ESR (Equivalent Series Resistance) measurement for assessing capacitor health. With its high accuracy, fast reading speed, and PC software connectivity, the MF470 is an ideal tool for DIY enthusiasts, professional engineers, and electronic manufacturing.



Figure 1: Alignimals MF470 Capacitor Tester in use.

2. WHAT'S IN THE BOX

Your MF470 Capacitor Tester package includes the following items:

- 1 x MF470 Capacitance Meter
- 1 x Red Test Clip
- 1 x Black Test Clip
- 1 x User Manual (this document)

MF470

Capacitance Meter

Alignimals™

Packing List

- MF470 Meter 1pcs
- Red test clip 1pcs
- Black test clip 1pcs
- User guide 1pcs



MF470



Test clip



User guide



Weight approx : 0.3 lbs (140g)

Figure 2: Package contents of the MF470 Capacitor Tester.

3. SETUP

3.1 Powering the Device

The MF470 can be powered by two AA batteries (not included) or via an external Type-C USB power supply. For battery installation:

1. Locate the battery compartment on the back of the device.
2. Loosen the screw(s) securing the battery cover and remove it.
3. Insert two AA batteries, ensuring correct polarity (+/-).
4. Replace the battery cover and tighten the screw(s).

Alternatively, connect a Type-C USB cable to the device's Type-C port and plug the other end into a compatible USB power adapter or computer.

Tolerance Estimation

Tolerance Estimation For 47nF to 47mF Common Electrolytic Capacitor



Figure 3: MF470 Dual Power Source options.

3.2 Initial Power-On

After installing batteries or connecting external power, press the power button to turn on the device. The LCD screen will illuminate, displaying the initial measurement interface.

Video 1: Unboxing and battery installation of the MF470 Capacitor Tester.

4. OPERATING INSTRUCTIONS

4.1 Basic Capacitance Measurement

The MF470 features auto-ranging for most capacitance measurements. Simply connect the capacitor to the test clips (red for positive, black for negative) or insert it into the dual testing socket. The device will automatically detect the capacitance value and display it on the 5-digit LCD.

4.1.1 1-Key Zeroing

Before measuring small capacitance values (especially pF range), it is recommended to perform a 1-Key Zero operation to eliminate stray capacitance from the test leads. Disconnect the test leads from any components and press the 'ZERO' button. The screen will indicate 'ZEROING...' and then '0.00 pF' when complete.



Figure 4: Performing 1-Key Zeroing on the MF470.

4.1.2 Auto/Manual Range Selection

While the device is auto-ranging, you can press the 'MODE RANGE' button to cycle through manual ranges if needed for specific applications or to speed up measurements for certain capacitor types.

4.2 ESR Measurement

The MF470 can estimate the ESR (Equivalent Series Resistance) of capacitors in the 47uF to 47mF and 47mF to 470F ranges. The ESR value is displayed alongside the capacitance, providing an indication of the capacitor's internal resistance, which is crucial for assessing the condition of electrolytic and super capacitors.



Figure 5: ESR measurement display on the MF470.

4.3 Farad Capacitor Measurement

The MF470 is capable of measuring very large capacitance values up to 470 Farads. For large capacitors, the device performs a charge-discharge cycle to accurately calculate the capacitance. This process may take longer for higher Farad values to ensure stable readings.

Up to 470F Farad Capacitor Measurement

Can use in automotive audio's Farad Capacitor

1pF~470F Ultra Large Range



***Not for Li-Ion Type Farad Capacitors**

Figure 6: Measuring a large Farad capacitor with the MF470.



MF470

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SPECIFICATIONS

Range	Accuracy (After Zero, tested with 1nF, 1uF, 1000uF)	Refresh Time (Manual Mode)*Auto mode take 0 to 2s or more time depend on value Larger capacitance take more measuring time
0.01pF to 47.000nF	1%+2Digit (Reference to 1KHz Standard Capacitor)	~0.2s to 1s
47.00nF to 47.000uF	1%+1Digit (Reference to 1KHz Standard Capacitor)	~0.2s to 4s
47.00uF to 47.000mF	1 to 3%+1Digit (Reference to 100Hz Standard Capacitor)	~0.2s to 18s
(FARA) 47.00mF to 470.00F	3 to 12%+1Digit	~15s to 135s (need enough steady time for the dielectric material and terminal stable, longer testing time in this FARA range)

*Accuracy maybe affected by the test lead's length and distance of test leads. Especially testing pF small capacitance, shortest test lead is recommended, and be careful the surrounding EMI or RF noise may affect the pF reading. Human is also a conductor layer that affect pF reading

Capacitance Accuracy	Up to 1% (detail on above table)
High Resolution	5 digit
Measuring voltage	<0.8V
Clamping voltage	~1.25V (open voltage)
Battery	2X AA 1.5V battery
External Power	5V Type-C
Operating current	0.02A
Battery Life time	>80 Hours (Reference at range 1 measurement)

Figure 7: Tolerance estimation feature for common electrolytic capacitors.

Video 2: Demonstration of wide range capacitance and ESR measurement with the MF470.

4.4 PC Software Connection

The MF470 can connect to a PC via its Type-C USB port for digital analysis. The dedicated PC software (Cap Monitor 470) allows for real-time display of measurements, recording of capacitance changes, and quality control (QC) pass/fail checking based on set tolerance limits. This is particularly useful for batch testing or long-term monitoring.

Alignimals™

Dual Power Source



External Type-C Power Supply

or

**2 X AA Batteries
*not included**



 **PC Connection**

Figure 8: MF470 connected to PC software for advanced analysis.

Video 3: Instructions for using the MF470Monitor PC software.

5. SPECIFICATIONS

Feature	Description
Capacitance Range	0.01pF to 470,000,000uF (470F)
Accuracy (After Zero)	1% + 2 Digit (0.01pF to 47.000nF) 1% + 1 Digit (47.00nF to 47.000uF) 1 to 3% + 1 Digit (47.00uF to 47.000mF) 3 to 12% + 1 Digit (47.000mF to 470.00F)
Refresh Time (Manual Mode)	~0.2s to 1s (0.01pF to 47.000nF) ~0.2s to 4s (47.00nF to 47.000uF) ~0.2s to 18s (47.00uF to 47.000mF) ~15s to 135s (47.000mF to 470.00F)
High Resolution	5 digit
Measuring Voltage	<0.8V
Clamping Voltage	~1.25V (open voltage)
Battery	2 x AA 1.5V battery
External Power	5V Type-C
Operating Current	0.02A
Battery Life Time	>80 Hours (Reference at range 1 measurement)
Product Dimensions	5.7 x 3.2 x 1.1 inches
Item Weight	4.94 ounces (140 Grams)
Color	Yellow

**Accuracy may be affected by the test lead's length and distance of test leads. Especially testing pF small capacitance, shortest test lead is recommended, and be careful the surrounding EMI or RF noise may affect the pF reading. Human is also a conductor layer that affect pF reading.*

6. MAINTENANCE

6.1 General Care

- Keep the device clean and dry. Avoid exposure to dust, moisture, and extreme temperatures.
- Do not drop or subject the device to strong impacts.
- Store the device in a safe place when not in use, preferably in its original packaging.

6.2 Cleaning

Wipe the device with a soft, damp cloth. Do not use abrasive cleaners or solvents.

6.3 Battery Replacement

If the battery indicator on the display shows low power, replace the AA batteries as described in the Setup section (3.1 Powering the Device).

7. TROUBLESHOOTING

7.1 Eliminating Interference for pF Measurements

When measuring very small capacitance values (pF range), the device can be susceptible to environmental disturbances or interference from power supplies, leading to unstable or jumping readings. To mitigate this, it is recommended to ground the device.

The MF470 has a dedicated grounding screw located near the Type-C port. To create a grounding effect:

1. Loosen the grounding screw.
2. Connect a grounding wire (e.g., a simple insulated wire) to the screw.
3. Connect the other end of the grounding wire to a reliable ground source, such as a metal leg of your workbench or the ground pin of a power outlet (ensure safety precautions are followed).
4. Tighten the grounding screw.

This grounding technique helps stabilize the MF470 by providing a path for stray currents and reducing electromagnetic interference, resulting in more accurate pF readings.

Video 4: Demonstration of grounding the MF470 to reduce interference during measurements.

8. WARRANTY AND SUPPORT

The Alignimals MF470 Capacitor Tester comes with a standard manufacturer's warranty. Please refer to the warranty card included in your package or visit the official Alignimals website for detailed warranty terms and conditions.

For technical support, troubleshooting assistance, or any inquiries regarding your MF470, please contact Alignimals customer service through the contact information provided on the product packaging or the official website. Our support team is dedicated to providing prompt and helpful assistance.