Mastfuyi FY12DMM

Mastfuyi FY12DMM Thermal Imager Multimeter User Manual

Model: FY12DMM | Brand: Mastfuyi

1. Introduction

The Mastfuyi FY12DMM is a versatile 2-in-1 device combining a high-resolution thermal imager with a comprehensive digital multimeter. This instrument is designed for professionals and enthusiasts requiring precise measurements and visual thermal analysis in various fields, including electrical, mechanical, construction, and automotive diagnostics. This manual provides essential information for safe and effective operation.

2. Safety Information

Always adhere to the following safety precautions to prevent personal injury or damage to the device.

- Read and understand all instructions before use.
- Do not operate the device if it appears damaged or is not functioning correctly.
- Ensure proper test lead connection before taking any measurements.
- Do not exceed the maximum input ratings for any function.
- Use caution when working with live electrical circuits.
- Keep the device dry and clean.
- Only use accessories and replacement parts specified by the manufacturer.

3. Package Contents

Verify that all items are present in the package:

- 1 x Mastfuyi FY12DMM Thermal Imager Multimeter
- 1 x Charging Cable (USB Type-C)
- 1 x Carrying Case
- 1 x User Manual (this document)
- Test Leads (Red and Black)

Note: The flexible AC current clamp is not included in the standard package.

Figure 3.1: Mastfuyi FY12DMM Thermal Imager Multimeter with included accessories, including test leads, charging cable, and carrying case.

4. Device Overview

The Mastfuyi FY12DMM integrates thermal imaging and digital multimeter functionalities into a single, portable unit. Its design focuses on ease of use and comprehensive diagnostic capabilities.

Figure 4.1: The Mastfuyi FY12DMM showcasing its dual functionality, 3.98-inch touchscreen, and internal battery.

Key components include:

- **3.98-inch TFT LCD Touch Screen:** A full-view display for clear visualization of thermal images, multimeter readings, and intuitive menu navigation.
- **Thermal Imager Lens:** The optical component responsible for capturing infrared radiation.
- **Multimeter Input Jacks:** Standard ports for connecting test leads for electrical measurements.
- **Power Button:** Controls the device's power state.
- **Navigation Wheel/Buttons:** Provides alternative control for menu selection and parameter adjustments.
- **USB Type-C Port:** Used for charging the internal battery and transferring data to a computer.

Figure 4.2: A summary of the Mastfuyi FY12DMM's core features, including its thermal resolution, screen size, storage, temperature range, battery capacity, and multi-language support.

5. Setup

5.1 Initial Charging

Before first use, fully charge the device.

1. Connect the supplied USB Type-C charging cable to the device's charging port.
2. Connect the other end of the cable to a standard USB power adapter (not included) or a computer USB port.
3. The charging indicator will illuminate. Allow the device to charge until the indicator shows a full charge.

Figure 5.1: The Mastfuyi FY12DMM being charged via its USB Type-C port, illustrating the built-in 3.7V 2500mAh lithium battery.

5.2 Power On/Off

- To power on: Press and hold the power button until the screen illuminates.
- To power off: Press and hold the power button until the shutdown prompt appears, then confirm.

6. Operating the Thermal Imager

6.1 Basic Thermal Imaging

Upon powering on, the device typically defaults to thermal imaging mode, displaying a real-time thermal image with temperature readings.

- **Temperature Range:** Measures temperatures from -20°C to 550°C (-4°F to 1022°F).
- **IR Resolution:** Features a 320 x 320 pixel infrared resolution for clear and detailed thermal images.
- **Refresh Rate:** Operates at 25Hz, providing a smooth, real-time thermal video feed.

- **Thermal Sensitivity (NETD):** With a sensitivity of less than 60mk, the device can detect subtle temperature differences.

The device can perform microscopic detection at a component level, though a macro lens is not included as a standard accessory. If detailed close-up thermal imaging is required, a corresponding macro lens package would need to be acquired separately.

Figure 6.1: The FY12DMM demonstrating its capability for microscopic thermal detection. Note that a macro lens is an optional accessory.

6.2 Thermal Palettes

The device offers 15 distinct thermal palettes to enhance the visualization of temperature differences. Selecting the appropriate palette can significantly improve the clarity of thermal patterns for specific applications.

- Access palette options via the touchscreen menu or navigation controls.
- Experiment with palettes like Iron Red, Rainbow, White Hot, and Black Hot to find the most suitable display for your inspection.

6.3 Emissivity Adjustment

Accurate temperature measurements depend on correct emissivity settings. The emissivity value (adjustable from 0.01 to 1.0)

should match the material surface being measured.

- Locate the emissivity setting in the thermal imaging menu.
- Consult standard emissivity tables for common materials or adjust the value to achieve the most accurate readings for your specific target.

6.4 High and Low Temperature Alarm

The intelligent alarm function allows you to set custom temperature thresholds. The device will trigger immediate audible and visual alerts if temperatures exceed or fall below these predefined safety ranges.

- Access the alarm settings through the thermal imaging interface.
- Configure the upper and lower temperature limits to suit your monitoring requirements.

7. Operating the Multimeter

The FY12DMM includes a 20,000-count digital multimeter for precise electrical measurements.

7.1 Connecting Test Leads

- Insert the red test lead into the "VΩmA" input jack.
- Insert the black test lead into the "COM" (common) input jack.
- For AC current measurements with an optional clamp, refer to the clamp's instructions.

7.2 Measurement Functions

Use the touchscreen or navigation to select the desired measurement function. The device supports auto-ranging for most functions.

- **DC Voltage:** Up to 1000V.
- **AC Voltage:** Up to 750V.
- **Resistance:** Up to 200MΩ.
- **Capacitance:** Up to 99.999mF.
- **Diode Test:** Checks diode functionality.
- **Continuity Test:** Audible indication for continuity.
- **Flexible AC Current:** Up to 2000A (requires optional clamp).
- **Temperature:** -20°C to 1300°C (-4°F to 2372°F) using a K-type thermocouple (not included).

The device features a **Hold** function to freeze the current reading and **Range** measurement modes for manual range selection if desired.

8. Data Management

8.1 Image Storage

The FY12DMM has a built-in memory card capable of storing up to 30,000 images in BMP format.

- To save a thermal image, press the designated capture button on the screen.
- Images are automatically saved to the internal memory.

Figure 8.1: The Mastfuyi FY12DMM connected to a computer, demonstrating the ability to export and analyze stored BMP images from its built-in 4GB memory card.

8.2 Exporting Data

Stored images and recorded waveform data can be exported to a computer for further analysis.

1. Connect the device to a computer using the USB Type-C cable.
2. The device should appear as a removable storage device.
3. Copy the desired BMP image files or data logs to your computer.

9. Maintenance

9.1 Cleaning

- Wipe the device exterior with a soft, damp cloth. Do not use abrasive cleaners or solvents.
- Gently clean the thermal imager lens with a lens cleaning cloth.

- Ensure the device is powered off and disconnected from any power source before cleaning.

9.2 Battery Care

- Recharge the battery regularly, even if the device is not in frequent use, to maintain battery health.
- Avoid storing the device in extreme temperatures.

10. Troubleshooting

Problem	Possible Cause	Solution
Device does not power on.	Low or depleted battery.	Charge the device fully using the supplied USB Type-C cable.
Inaccurate temperature readings.	Incorrect emissivity setting; dirty lens.	Adjust emissivity for the target material; clean the thermal imager lens.
Multimeter readings are unstable or incorrect.	Poor test lead connection; incorrect function selected.	Ensure test leads are securely connected; verify the correct measurement function is selected.
Cannot transfer data to computer.	Faulty USB cable; incorrect connection mode.	Try a different USB Type-C cable; ensure the device is properly connected and recognized by the computer.

11. Specifications

11.1 Infrared Camera Specifications

Feature	Specification
Display Size	3.98 Inch TFT LCD
IR Resolution	320 x 320 pixels
Screen Resolution	320 x 480 pixels
Angle of View (FOV)	50.0°(H) x 50.0°(V) / 72.1°(D)
Spatial Resolution (IFOV)	8.89mrad
Temperature Range	-20℃ to 550℃ (-4℉ to 1022℉)
Thermal Sensitivity/NETD	Less than 60mk
Refresh Rate	25Hz
Distance Settings	0.3 - 3 meters
Emissivity	0.01 - 1.0 (adjustable)
Thermal Palettes	15
Number of Storage Images	19,000 (internal memory)

Sensor Type	Vanadium oxide (Vox) microbolometer	Key	Power key, up key, down keyback key, trigger key
Response Band	8~14 microns	Temperature alarm	Screen font color alarm
Thermal Image Resolution	320x320 pixels	Image storage	Built-in memory card
Noise equivalent temperature difference	≤60 mK (@25°C, F#1.0)	Number of image files	30000
Angle of view (FOV)	50.0° (H) × 50° (V) / 72.1° (D)	Image format	BMP picture
Spatial Resolution	8.89 mrad	Focusing mode	non-focusing
Frame Frequency	25Hz	Hardware interface	Type-C USB
Imaging Lens focal length	1.35 mm	Battery type	Rechargeable lithium battery(3.7V/2500mAh)
Temperature measurement focal length	Adjustable from 0.3m to 3m	Battery operatingtime	>5h@25°C
Temperature Range	-20°C ~ 550°C	Charging time	<3h@25°C
Temperature Measurement Accuracy	±2°C or readout ±2% (take a larger reading)	Boot speed	Boot in about 3 seconds
Thermometric unit	Degrees Celsius, Degrees Fahrenheit, Kelvin	Automatic shutdown	Off(default) configurable 10,20,30,40,50,60 minutes
Temperature Resolution	0.1°C	Operating temperature	-10°C-50°C
Emissivity	Adjustable from 0.01 to 1.00	Storage temperature	'40°C~70°C
Thermometric display	Central point temperature measurement, high and low temperature tracking	Working humidity	≤85%RH(non-condensing)
Display screen	3.98 "TFT capacitive touch screen	Product size	169*81*26.8 mm

Display resolution	320x480	Product weight	270.7 g
Swatches	White Heat, black heat, Fusion 1, Rainbow, Fusion 2, Iron red 1, Iron red 2. dark brown, Color 1, color 2, Fire and Ice, Rain, green heat, Red heat, dark blue		

Figure 11.1: Detailed thermal imaging parameters for the Mastfuyi FY12DMM.

11.2 Digital Multimeter Specifications

Feature	Range	Resolution	Accuracy
MAX Display	20000 counts		
DC Voltage	20mV/200mV/2V/20V/200V/1000V	0.001mV to 0.1V	±(0.05%+3) to ±(0.5%+3)
AC Voltage	20mV/200mV/2V/20V/200V/750V	0.001mV to 0.1V	±(0.1%+3) to ±(0.5%+3)
Flexible AC Current	200A/2000A	0.1A/1A	±(1.0%+5)
Resistance	200Ω to 200MΩ	0.01Ω to 0.01MΩ	±(0.2%+3) to ±(5%+5)
Capacitance	999.99nF to 99.999mF	0.01nF to 0.001mF	±(2%+5) to ±(5%+20)
Temperature	-20℃~1300℃/-4℉-2372℉	1℃/1℉	±(2%+5)
Diode	Yes		
Continuity	Yes		

	1000V	0.1V	1000V
DC voltage (mV)	20.000mV	0.001mV	20.000mV
	200.00mV	0.01 mV	200.00mV
AC voltage (V)	2.0000V	0.001mV	2.0000V
	20.000V	0.01 mV	20.000V
	200.00V	0.0001V	200.00V
	750V	0.001V	750V
AC voltage (mV)	20.000mV	0.001mV	20.000mV
	200.00mV	0.01 mV	200.00mV
AC voltage frequency response:40Hz~1kHZ			
Resistance	200.00Ω	0.01Ω	200.00Ω
	2.0000KΩ	0.0001KΩ	2.0000KΩ
	20.000KΩ	0.001KΩ	20.000KΩ
	200.00KΩ	0.01KΩ	200.00KΩ
	2.0000MΩ	0.0001MΩ	2.0000MΩ
	20.000MΩ	0.001MΩ	20.000MΩ
	200.00MΩ	0.01MΩ	200.00MΩ
Capacitance	999.99nF	0.01nF	999.99nF
	9.999uF	0.001μF	9.999uF
	999.99uF	0.01μF	999.99uF
	99.999mF	0.001mF	99.999mF
Flexible Current clampAC Current (A)	200.0A	0.1A	200.0A
	2000A	1A	2000A
The current clamp is AC/50Hz, and the corresponding relationship between current and voltage is 1mv/10A. The matching current coil is 100mv@1000A.			
Temperature	(-20~1300)°C	1°C	(-20~1300)°C
	(-4~2372)°F	1°F	(-4~2372)°F
Diode	√		
On-off	√		

Figure 11.2: Detailed multimeter parameters for the Mastfuyi FY12DMM.

11.3 General Specifications

- **Power:** 2500mAh rechargeable battery (built-in)
- **Size:** 169 x 81 x 26.8 mm
- **Weight:** 270g
- **Operating System Languages:** English, Spanish, German, French, Italian, Japanese, Chinese (selectable)

Figure 11.3: The Mastfuyi FY12DMM's language selection menu, showing support for 7 languages.

12. Warranty and Support

For warranty information and technical support, please refer to the warranty card included with your product or visit the official Mastfuyi website.

Visit the Mastfuyi Store on Amazon for more products and support resources.