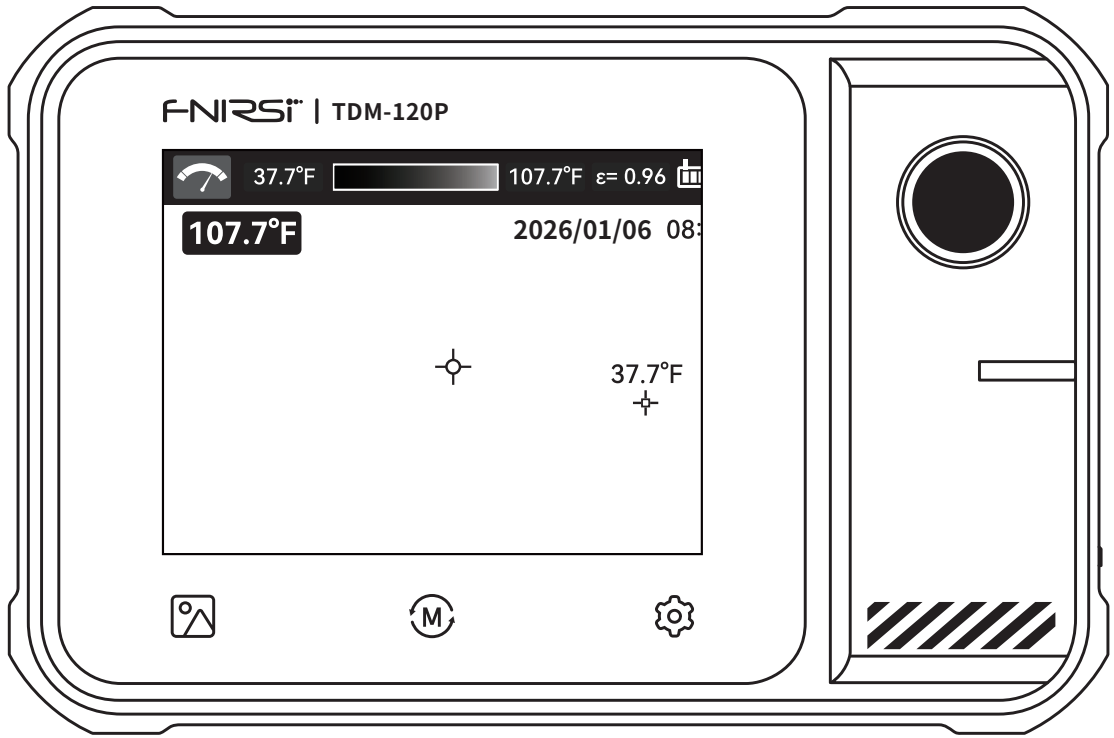
FNIRSI

TDM-120/TDM-120P

Thermal Imaging Multimeter User Manual V1.0



※Please read this instruction manual carefully before using the product and keep it properly.

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1. Safety Requirements

Precautions

- Avoid high temperatures, open flames, corrosive gases, humid, or dusty environments to prevent equipment failure.
- Before using the device interface, be sure to check whether there is any debris on it to avoid affecting normal use.
- When the device detects temperature, ensure that the thermal imaging camera is not blocked.

Keep away from the following items

- Heaters: Avoid overheating or fire risks.
- Water, chemicals, solvents: Leakage may damage the multimeter or cause a fire.
- Strong magnetic devices: Prevent magnetic fields from interfering with the normal operation of the device.
- Air conditioners or ventilation equipment: Prevent condensation from causing short circuits.

Waste Disposal

- Do not discard used batteries or multimeters with household waste. Dispose of them in accordance with national or local regulations.

2. Product Overview

2.1 Product Introduction

TDM-120P is a thermal imaging multimeter that combines thermal imaging technology with traditional multimeter functions, providing more comprehensive and intuitive test results in electrical testing and related applications. It is widely used in fields such as electricity, industrial manufacturing, construction, and security monitoring. The TDM-120P offers reliable technical support for equipment testing, fault diagnosis, and maintenance management, helping improve production efficiency, product quality, and overall safety. This manual contains important safety information and warning instructions. Please read carefully and strictly follow all precautions.

2.2 Product Operation

①**Black Test Pen COM Terminal:** Connect the black test pen here (common port).

②**Red Test Pen Input Terminal:** Used for measuring AC/DC voltage, resistance, continuity, capacitance, diode, etc.

③**Photo Capture:** In Thermal Imaging mode, capture measurement images and save them to the SD card.

④**Power Switch**

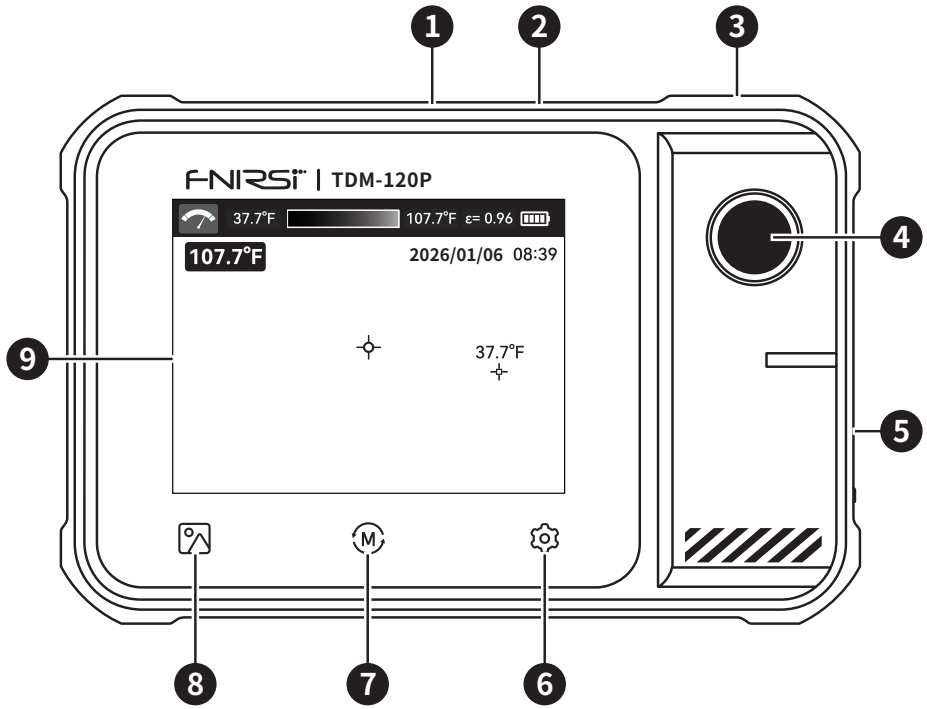
⑤**Power / SD Card Port:** Power input uses a Type-C connector; SD card is plug-and-play.

⑥**Settings:** Measurement Parameters, Temperature Settings, System Settings and About.

⑦**Mode Switch Key:** Switch between Thermal Imaging and Multimeter modes.

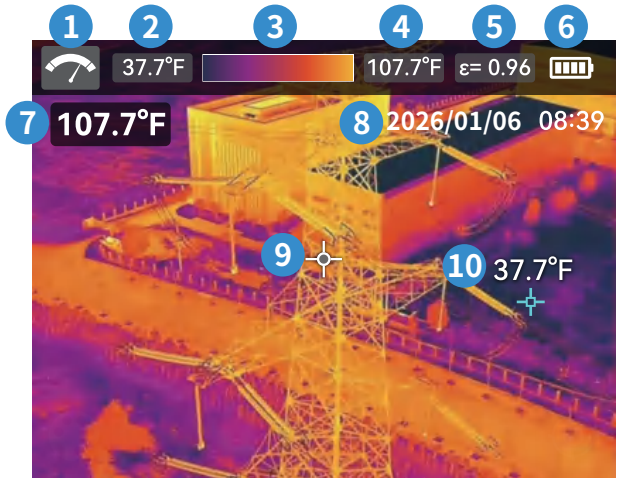
⑧**Image Viewing:** Requires an SD card to be inserted before use.

⑨**Touch Screen**



Button	Operation	Function
Power switch	Long press	Switch on/off
Convenient camera button	Short press	Take thermal imaging pictures and save them to SD card.
Mode switch button	Touch	Enter the multimeter function interface, press again to switch back to thermal imaging.
Image viewing button	Touch	Enter Image Viewing; an SD card must be inserted before use. Tap the image to check and record the measured temperature.
Settings	Touch	Enter the settings interface to configure measurement parameters, temperature settings, system settings, and About.

2.3 Thermal Imaging



① **Multimeter Switch:** Used to switch the device to Multimeter Mode.

② **Minimum Temperature:** Displays the minimum temperature within the current measurement range.

③ **Temperature Color Scale:** Displays the thermal color palette.

④ **Maximum Temperature：**Displays the maximum temperature within the current measurement range.

⑤ **Emissivity：**Shows the current emissivity setting, which affects temperature measurement accuracy.

⑥ **Battery Indicator：**Indicates the remaining battery level.

⑦ **Center Spot Temperature：**Displays the temperature at the center spot.

⑧ **Date & Time：**Displays the current date and time.

⑨ **Center Crosshair：**A fixed measurement point. The measured temperature is displayed simultaneously in the upper-left corner of the screen.

⑩ **Floating Measurement Cursor：**Intelligently tracks the hottest area of the target and automatically displays the real-time temperature of that area.

Button	Operation	Function
Power switch	Long press	Switch on/off
Convenient camera button	Short press	Take thermal imaging pictures and save them to SD card.
Mode switch button	Touch	Enter the multimeter function interface, press again to switch back to thermal imaging.

Image viewing button	Touch	Enter Image Viewing. An SD card must be inserted before use. Tap the image to check and record the measured temperature.
Settings	Touch	Enter the settings interface to configure measurement parameters, temperature settings, system settings, and About.
Touchscreen	Tap	Tap the screen to display the color palette mode and cursor settings at the bottom of the screen. Seven color palette modes are supported: Arctic, Iron, Red Hot, Rainbow, Lava, Black Hot and White Hot. Cursor settings include: Frame Cursor, Move Cursor, Center Cursor, Delete All.

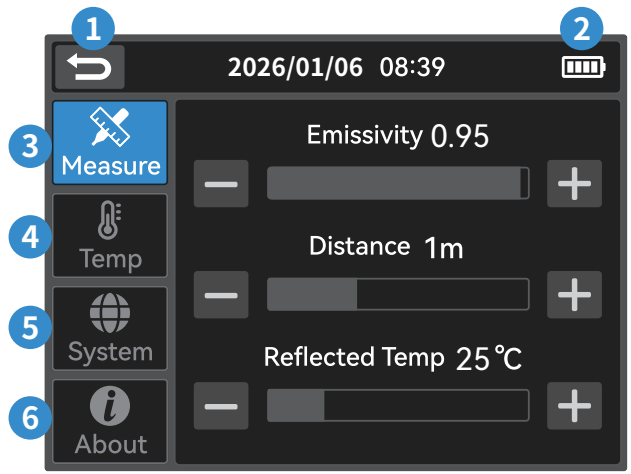
2.4 General Settings

①**Return Indicator:** Tap this area to exit the general settings interface.

②**Power Indicator**

③**Measurement Parameters:** Tap this area to configure emissivity, distance, and reflected temperature.

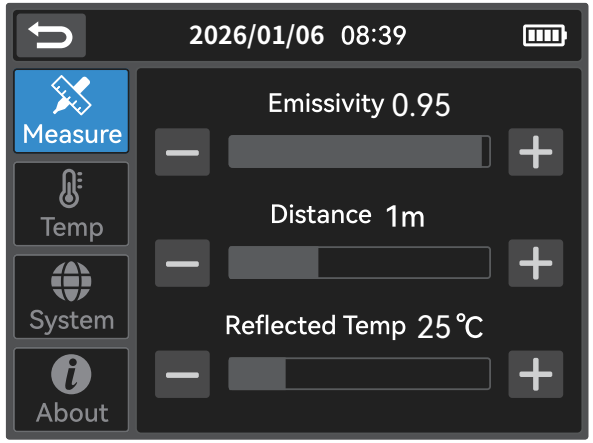
④**Temperature Settings:** Tap this area to configure the temperature range, temperature unit, maximum and minimum temperatures, and alarm settings.



⑤**System Settings:** Tap this area to configure language, auto power-off, screen brightness, USB mode, distance unit, date, and time.

⑥**About:** Tap to view device information or restore factory settings.

▶2.4.1 Measurement Parameters



① **Emissivity：**Adjustable from 0.01 to 1.00, with a default value of 0.95.

② **Distance：**Adjustable from 0.5 m to 3.0 m, with a default value of 1 m.

③ **Reflected Temperature：**Adjustable from –20 °C to 400 °C, with a default value of 25 °C.

▶2.4.2 Temperature Settings

①**Return Indicator**

②**Date and Time**

③**Power Indicator**

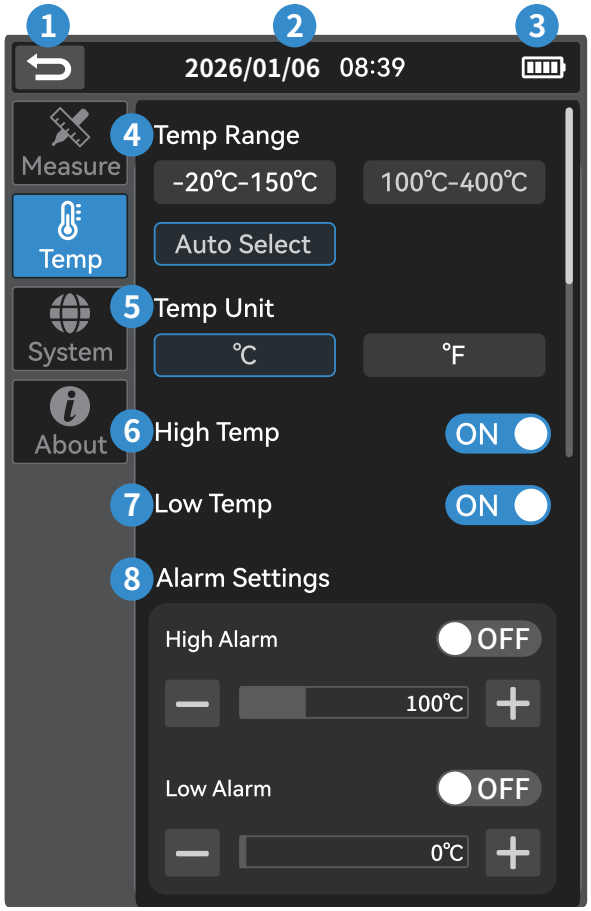
④**Temperature Range：**Selectable ranges include –20 °C to 150 °C, 100 °C to 400 °C, and Auto. The default setting is Auto.

⑤**Temperature Unit：**Selectable units are °C and °F, with °C set as the default.

⑥**Maximum Temperature:** When enabled, the maximum temperature marker is displayed; when disabled, it is hidden. The default setting is ON.

⑦**Minimum Temperature:** When enabled, the minimum temperature marker is displayed; when disabled, it is hidden. The default setting is ON.

⑧**Alarm Settings:** Allows enabling or disabling (OFF/ON) High Temperature Alarm and Low Temperature Alarm. The adjustable temperature range for both alarms is –20 °C to 400 °C. The default value for the High Temperature Alarm is 100 °C. The default value for the Low Temperature Alarm is 0 °C.



▶2.4.3 System Settings

①Return Indicator

②Date and Time

③Power Indicator

④Language: The device supports Simplified Chinese and English.

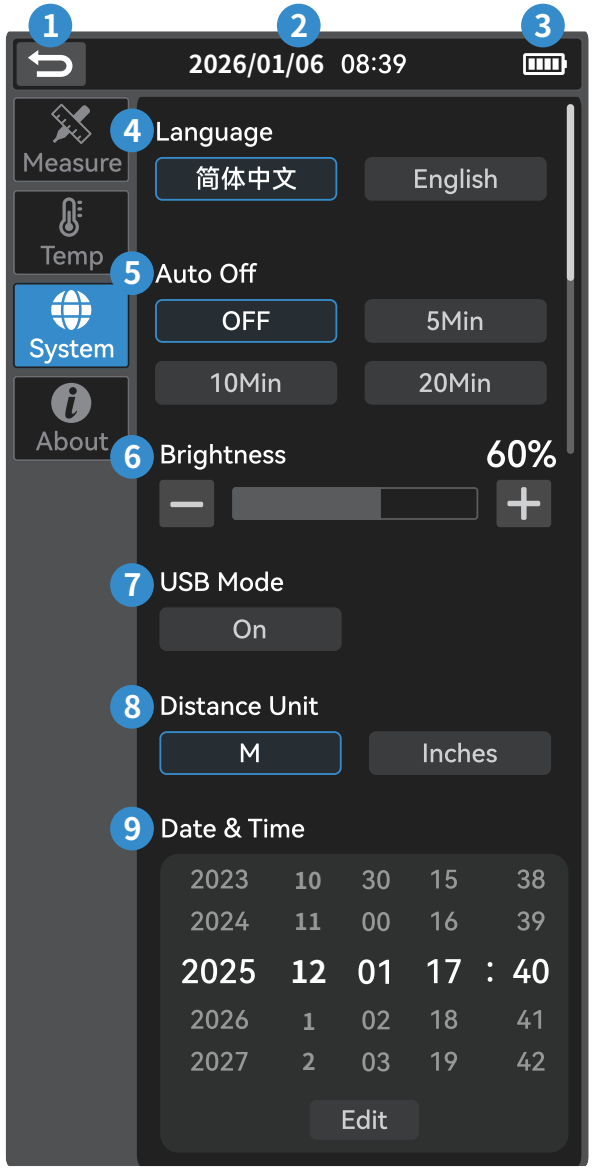
⑤Auto-Off: Can be set to OFF, 5 min, 10 min, or 20 min.

⑥Screen Brightness: Adjust the screen brightness freely by dragging.

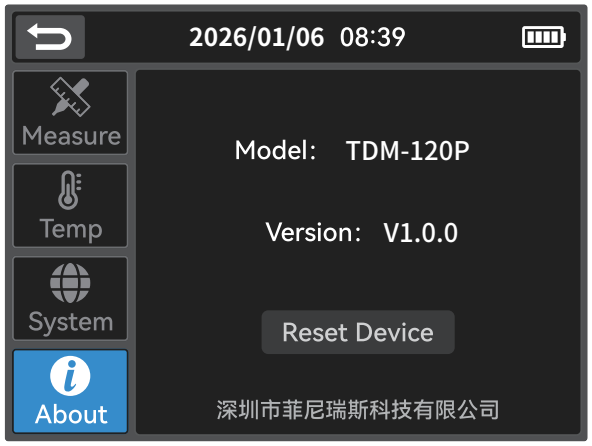
⑦USB Mode: Press the device to enter USB mode. Tap Back to return to the settings menu.

⑧ Distance Unit：The device supports two distance units (meters and inches), with meters set as the default.

⑨ Date & Time：Used to set the year, month, day, hour, and minute. The default date is December 1, 2025.

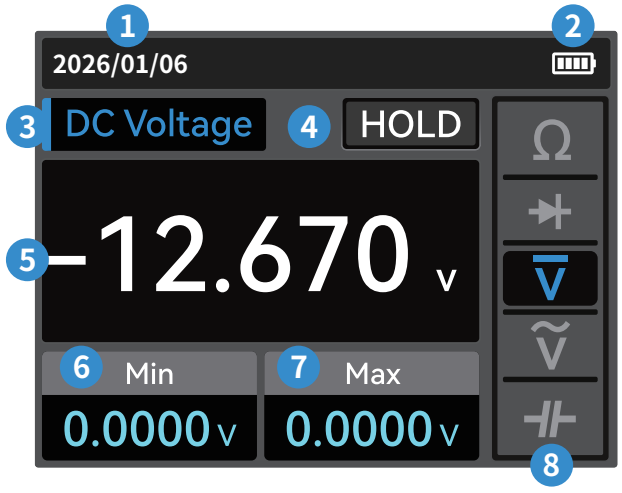


▶2.4.4 About



Displays device information, including model and version number. Factory reset can also be performed on this interface.

2.5 Multimeter (Supported on TDM-120P)



①**Date and Time**

②**Power Indicator**

③**Range Display Area:** Shows the current multimeter function range.

④**Data Hold Function:** Tap to enable/disable the HOLD function. This area changes background color to indicate status.

⑤**Main Display Area:** Displays the multimeter measurement data.

⑥**Min Value:** Shows the minimum value recorded during testing.

⑦**Max Value:** Shows the maximum value recorded during testing.

⑧**Range Switching Area:**Swipe up or down on the screen to select function ranges, including AC/DC voltage, resistance, continuity, capacitance, and diode.

3.Technical Specifications

3.1 Thermal Imaging Parameters

Parameters	Specifications	Parameters	Specifications
Product model	TDM-120 / TDM-120P	Color palette	Arctic / Hot Iron / Iron Red / Rainbow /Lava / Black Hot / White Hot
Detector type	Vanadium oxide	Field of view	50°
Screen	2.8-inch touchscreen	Frame rate	⩽25Hz
Infrared resolution	120*90	Temperature measurement display	Center point, automatic high/ low temperature tracking
Temperature range	-20°C~400°C	Temperature unit	°C / °F
Accuracy	±2°C or ±2% (maximum value measured)	High/low temperature alarm	Support
Emissivity	0.01-1 adjustable	Languages	Chinese / English

3.2 Multimeter Parameters

Function	Range	Accuracy
DC voltage	1.9999V/19.999V/199.99V/1000V	±(0.5%+3)
AC voltage	1.9999V/19.999V/199.99V/750.0V	±(1%+3)
Resistance	19.999MΩ/1.9999MΩ/199.99KΩ/19.999KΩ	±(0.5%+3)
	1.9999KΩ/199.99Ω	±(2.0%+3)
Capacitance	999.9μF/99.99μF/9.999μF/999.9nF/99.99nF/9.999nF	±(2.0%+5)
	9.999mF/99.99mF	±(5.0%+20)
Diode	✓	
Continuity	✓	

3.3 Material Emissivity Reference Table

Material Category	Specific Material & Surface Condition	Emissivity (ε) Reference Range
Metal Materials	Aluminum: Highly Polished	0.02-0.04
	Aluminum: Oxidized Surface	0.11 -0.40
	Copper: Polished	0.02 -0.05
	Copper: Oxidized Surface	0.40-0.80
	Steel/Iron: Oxidized Surface	0.70-0.90
	Stainless Steel: Polished	0.10-0.30
Building & Insulation Materials	Concrete	0.85 -0.95
	Brick (Red, Rough)	0.88 -0.96
	Plaster/Stucco	0.80-0.95
	Asbestos Board	0.95 -0.96
	Asphalt	0.93 -0.97

Other Common Materials	Human Skin	≈ 0.98
	Water	0.93 -0.98
	Wood (Natural)	0.80 -0.95
	Paper (Any Color)	≈ 0.90-0.95
	Plastic/Rubber (Opaque)	0.85 -0.95
	Glass (Flat)	0.85 -0.92
	Ceramic/Enamel	0.90 -0.95
High-Emissivity Reference Materials	Matte Black Paint/Tape (e.g., 3M Electrical Tape)	>0.95
	Carbon Black/Soot	≈0.95

4.Quick Start

4.1 Thermal Imaging Fast Measurement

- Turn on the thermal imaging multimeter, hold the device with the screen facing you, and aim at the area where temperature measurement is needed. Aim directly at the heat source for more accurate results.

- View real-time measured temperature, measurement time, and other data on the main display.
- Press the convenient camera button located at the upper right of the device to quickly capture thermal images. Captured images are automatically saved to the SD card.
- Tap the picture icon at the lower-left corner of the screen to enter the image viewing function, easily record measurement results, and clearly visualize temperature changes.

※ Note: An SD card must be inserted to use the capture and image viewing functions.

4.2 Multimeter Fast Measurement

- Connect the device to the red and black test leads, with the black test lead inserted into the left port on the top of the device, and the red test lead into the remaining port.
- After connecting the test leads, turn on the thermal imaging multimeter and tap the mode switch icon at the center bottom of the screen to switch to multimeter mode.
- Select the multimeter function according to the actual measurement needs: AC/DC voltage, resistance, continuity, capacitance, diode, etc. Then start measuring.
- View the measurement data on the device screen. Tap HOLD to save the readings.

5.Trouble shooting

5.1 Unable to Boot

Possible Causes:

- The battery is exhausted.
- The battery connection is loose or damaged.

Solution:

- Check the battery level and charge it if it is low.
- If the battery cannot be charged or the device still fails to boot, try reinstalling or replacing the battery.

5.2 Screen Cannot Display

Possible Causes:

- The screen backlight is off.
- Display hardware failure.
- System software abnormality.

Solution:

- Check and adjust the backlight brightness setting according to the manual.
- Try restarting the device to restore normal system operation.
- If the screen still does not display correctly, the display may need to be repaired or replaced.

6.Maintenance

6.1 Cleaning the Exterior of the Device

- **Frequency:** Clean once a month, depending on the usage environment.
- **Method:** Gently wipe the device surface with a soft cloth. Avoid using chemical cleaners, especially those containing alcohol, strong acids, or alkalis, to prevent damage to the casing or screen.
- **Notes:** Regularly clean dust around the interfaces and buttons to keep the device in good condition. Ensure that no liquid, dust, or debris enters the device interfaces.

6.2 Battery and Power Supply Check

- **Battery Maintenance:** For devices with built-in batteries, regularly check battery health. Avoid complete discharge. It is recommended to charge the battery periodically and avoid leaving the device unused for long periods.
- **Charging Specifications:** Use the official charger. Avoid overcharging or over-discharging, and ensure the battery operates within the proper voltage range.
- **Battery Replacement:** If the battery shows significant degradation (e.g., cannot charge normally or discharges very quickly), replace it promptly.

6.3 Storage and Handling

- **Storage Environment:** Store the device in a dry, well-ventilated environment, avoiding high temperature, high humidity, or drastic temperature changes. Do not expose the device to direct sunlight.

- **Handling:** Handle the device carefully to prevent dropping, especially during transport.

6.4 Software Update

- Regularly check for new firmware updates. The latest firmware can fix known bugs and improve device performance.
- Follow the correct update procedure, use only officially released firmware files, and avoid power interruptions or other interferences during updating.

①**Obtain the Latest Firmware Package:** Open a web browser and visit the FNIRSI official website (www.fnirsi.com). Locate the corresponding product (e.g. TDM-120P or TDM-120) and click Download to obtain the firmware file. Extract the downloaded firmware package to your computer.

②**Firmware Upgrade Steps:** On the instrument (TDM-120 / TDM-120P), enable USB mode in the Settings menu. Then copy the obtained firmware file (TDM120P/TDM120) to the newly added USB drive on the computer.

③**Check Whether the Upgrade Is Successful:** After the upgrade, restart the instrument and check the firmware version number in the Settings menu of the device (TDM-120 / TDM-120P). If the version number matches the newly downloaded firmware version, the upgrade is successful. If not, repeat Step 2.

6.5 Restore Factory Settings

- If the device malfunctions or does not operate properly, try restoring factory settings. Restoring will clear all custom configurations and return the device to its initial state.
- For instructions on restoring factory settings, refer to the user manual or contact the manufacturer’ s customer service.

7.Contact Us

Product Name: Thermal Imaging Multimeter

Model: TDM-120 / TDM-120P

Manufacturer: Shenzhen FNIRSI Technology Co., Ltd.

Address: 8th Floor, West Side, Building C, Weihua Da Industrial Park, Dalang Street, Longhua District, Shenzhen, Guangdong, China

Tel: +86 755 28020752

Service Email: support@fnirsi.com

Business Email: business@fnirsi.com

Website: www.fnirsi.com

Standard Implemented: GB/T 38883-2020

http://www.fnirsi.com/

8. Warranty Information

※This page is the basic warranty card. Please keep it.

Thank you for choosing our company's products. The warranty period of this product starts from the date of sale. During the product warranty period, if the product is installed and used in accordance with the product manual and used in normal environment and conditions, and the fault is caused by defects in the original materials and processing, you can enjoy free repair services according to the content of this warranty clause. Please keep this warranty card properly as a warranty certificate. No reissue will be issued if it is lost.

The following situations will incur paid repair services:

- Failure to present a valid original warranty card;
- Damage caused by improper installation not complying with product requirements, standards, or related regulations;
- Damage caused by accessories in the installation environment that do not meet product requirements, standards, or related regulations;
- Damage caused by improper use, poor maintenance, unauthorized disassembly, or unauthorized repairs;
- Warranty period has expired.

Warranty Card

Product Model	**TDM-120/TDM-120P**	**Qty.**	
Distributor Name (where to buy)		**Address**	
Contact		**Invoice Number** (Order Number)	
Purchase Date (as per invoice)	**Year** **Month** **Day**		
User Name:		**Address:**	
Contact:		**Fault Description:**	



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