User Manual

DIGI-SENSE™

Digital Multimeter with Thermal Imager

with Bluetooth® Mobile App and
NIST-Traceable Calibration

Model 20250-66

CE THE STANDARD IN PRECISION MEASUREMENT

Introduction

The Digi-Sense Digital Multimeter with Thermal Imager and Bluetooth® Connectivity (model 20250-66) allows you to transmit data directly to your Android™ or iOS® device using our free D/S T-View app. Now you can view data at a safe distance from potentially hazardous parameters or even use your smart device as a real-time secondary display for checking measurements, eliminating the need to write down readings on paper. The results are automatically stored in the app with a date-and-time stamp and can be saved as a CSV file and emailed for future reference, manipulation, or analysis to help determine trends and conditions over a long period of time. You can also use the app to attach photos and notes to the records creating a clear reference point for your work—ideal for record keeping at large sites.

Setup is simple. Download the free D/S T-View app to your Android or iOS device. Place the meter in Bluetooth mode and open the app on your smart device. The meter will be sensed by your device and be listed as an available source that you can select. Once selected, the measured electrical data is displayed on your device and some of the instrument functions can be accessed. A full description of its operation is available for download in the app.

The Digital Multimeter with Thermal Imager provides fast A/D converting sampling time, high accuracy with data logging and trend capture features. This instrument is fully tested and calibrated to NIST-traceable standards for reliable measurements right out of the box, saving you time and money.

Key Features

• Bluetooth interface

• User-friendly mobile app

• 6000 count 2.8'' TFT color LCD

• Double-molded IP65-rated housing

• Built-in Thermal imager with Max, Min and Center crosshair targeting

• 50 Hz fast thermal image frame rate

• DC voltage

• AC, AC+DC TRMS voltage

• DC current

• AC, AC+DC TRMS current

• Resistance and continuity test

• Diode test

• Capacity

• Frequency

• Duty cycle

• Temperature with type K probe

• Flexible coils current

Unpacking

Check individual parts against the list of items below. If anything is missing or damaged, please contact your instrument supplier immediately.

1. Meter

2. Test leads

3. One type K temperature probe

4. Two rechargeable Li-ion batteries

5. Battery charger cradle with international adapters

5. Hard carrying case

6. User manual

7. NIST-traceable calibration report with data

Safety

This symbol adjacent to another symbol, terminal or operating device indicates that the operator must refer to an explanation in the Operating Instructions to avoid personal injury or damage to the meter.

WARNING This WARNING symbol indicates a potentially hazardous situation, which if not avoided, could result in death or serious injury.

CAUTION This CAUTION symbol indicates a potentially hazardous situation, which if not avoided, may result damage to the product.

MAX This symbol advises the user that the terminal(s) so marked must not connected to a circuit point at which the voltage with respect to earth ground exceeds (in this case) 1000 VAC or VDC.

This symbol adjacent to one or more terminals identifies them as being associated with ranges that may, in normal use, be subjected to particularly hazardous voltages. For maximum safety, the meter and its test leads should not be handled when these terminals are energized.

This symbol indicates that a device is protected throughout by double insulation or reinforced insulation.

Safety Instructions

This meter has been designed for safe use, but must be operated with caution. The rules listed below must be carefully followed for safe operation.

• NEVER apply voltage or current to the meter that exceeds the specified maximum:

Input Protection Limits	
Function	Maximum Input
V DC or V AC	1000VDC/AC RMS
mA AC/DC	800mA 1000V fast acting fuse
A AC/DC	10A 1000V fast acting fuse
Frequency, Resistance, Capacitance, Duty Cycle, Diode Test, Continuity	1000VDC/AC rms
Surge Protection: 8kV peak per IEC 61010	

• USE EXTREME CAUTION when working with high voltages.

• DO NOT measure voltage if the voltage on the "COM" input jack exceeds 1000V above earth ground.

• NEVER connect the meter leads across a voltage source while the function switch is in the current, resistance, or diode mode. Doing so can damage the meter.

• ALWAYS discharge filter capacitors in power supplies and disconnect the power when making resistance or diode tests.

• ALWAYS turn off the power and disconnect the test leads before opening the covers to replace the fuse or batteries.

• NEVER operate the meter unless the back cover and the battery and fuse covers are in place and fastened securely. If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Description and reference guide

Front description

1. NCV detector area
2. LCD
3. Navigation/Menu buttons
4. MODE button
5. RANGE button
6. Rotary function switch
7. Positive (+) probe input jack for A (current)
8. Positive (+) probe input jack for mA (current)
9. COM(-) probe input jack
10. Positive (+) probe input jack for all inputs except A and mA
11. Thermal mode/light button
12. Hold/capture button
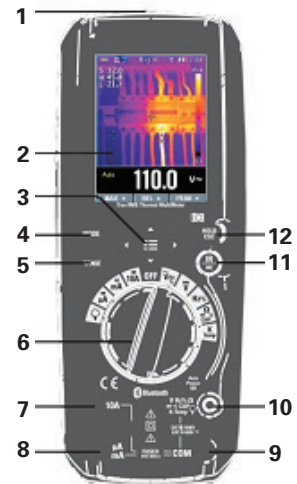
Back description

13. No-slip slope
14. Thermal imager lens
15. Lens cover
16. Work light
17. Laser
18. Support plate
19. Battery cover lock
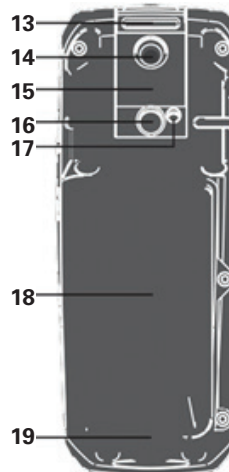
Understanding the Push Buttons

The 9 push buttons on the front of the Meter activate features that augment the function selected using the rotary switch, navigate menus or control power to Meter circuits.

• **Cursor buttons:**

Select an item in a menu, adjust display contrast, scroll through information, and perform data entry.

PEAK   Use Navigation UP button to select **PEAK** function.

REL   Use Navigation Left button to select **REL** function.

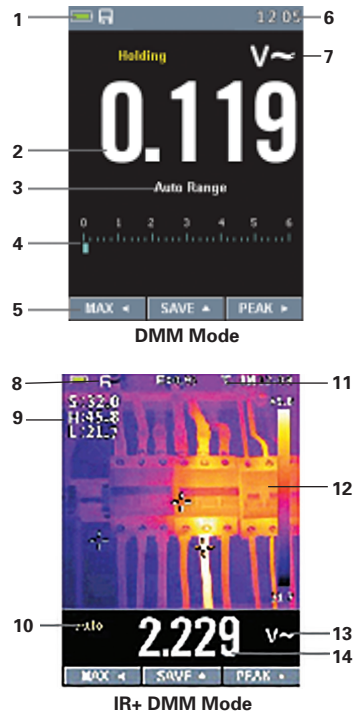MAX   Use Navigation Right button to select **MAX** function.

• **Physical buttons:**

HOLD ESC	Freezes the present reading in the display and allows display to be saved. Also wake up for APO.
MODE	Press the MODE key to switch the functions.
RANGE	Press the RANGE key to manual range.
☰	Enter function of the menu selects.
IR	Press the IR key to switch DMM MODE and IR+DMM MODE.
⊡	Navigation buttons.

Understanding the Display

• **Measurement on LCD**

1. Indication of battery charge level
2. Indication of measuring result
3. Indication of Automatic/Manual mode
4. Analog bar graph
5. Indications associated with function keys
6. Indication of the system's time
7. Indication of measuring unit
8. SD card
9. Temperature measuring result
10. Indication of Automatic/Manual mode
11. Temperature unit
12. IR camera
13. Indication of measuring unit
14. Indication of measuring result

DMM Mode

IR+ DMM Mode

• **Icons on LCD**

⚡	Voltage is over 30V (AC or DC)	△	Relative	≋	AC+DC voltage or Current
⚠	Warning	⊓	High edge time	•)))	Continuity function
⦿	Flexible coils	∼	AC voltage or current	➤⊢	Diode function
⅄	Traditional clamps	▬	DC voltage or current	Ω	Ohms

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Understanding the Rotary Switch

V~	AC voltage measurements
V⁓	DC and AC+DC voltage measurements
HZ %	Frequency and Duty measurements
Ω CAP ➤⊢ •)))	Resistance, Diode test, Capacitance and Continuity measurements
K Temp	Temperature measurements
A	AC, DC and AC+DC amps measurements
mA	AC, DC and AC+DC milliamps measurements
µA	AC, DC and AC+DC microampere measurements up to 6,000 µA
Ọ	Flexible coils current

Select a primary measurement function by positioning the rotary switch to one of the icons around its perimeter. For each function, the meter presents a standard display for that function (range, measurement units, and modifiers). Button choices made in one function do not carry over into another function.

DMM Measurement and Setup

DC Voltage Measurements

CAUTION: Do not measure DC voltages if a motor on the circuit is being switched ON or OFF. Large voltage surges may occur that can damage the meter.

• Set the function switch to the VDC position.

• Insert the black test lead banana plug into the negative COM jack. Insert the red test lead banana plug into the positive V jack.

• Read the voltage in the display.

AC+DC Voltage Measurements

CAUTION: Do not measure DC voltages if a motor on the circuit is being switched ON or OFF. Large voltage surges may occur that can damage the meter.

• Set the function switch to the VDC position.

• Insert the black test lead banana plug into the negative COM jack. Insert the red test lead banana plug into the positive V jack.

• Press the **MODE** key to switch the V AC+DC Voltage functions.

• Read the AC+DC voltage in the display.

AC Voltage Measurements

WARNING: Risk of Electrocution. The probe tips may not be long enough to contact the live parts inside some 240V outlets for appliances because the contacts are recessed deep in the outlets. As a result, the reading may show 0 volts when the outlet actually has voltage on it. Make sure the probe tips are touching the metal contacts inside the outlet before assuming that no voltage is present.
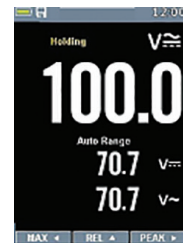
CAUTION: Do not measure AC voltages if a motor on the circuit is being switched ON or OFF. Large voltage surges may occur that can damage the meter.

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• Set the function switch to the VAC position.

• Insert the black test lead banana plug into the negative COM jack. Insert red test lead banana plug into the positive V jack.

• Read the voltage in the main display.

Frequency Measurements

• Set the function switch to the Hz% position.

• Insert the black test lead banana plug into the negative COM jack. Insert the red test lead banana plug into the positive V jack.

• Read the Frequency in the display.

• Press the **MODE** key to switch the Duty functions.

• Read the Duty in the display.

Resistance Measurements

To avoid electric shock, disconnect power to the unit under test and discharge all capacitors before taking any resistance measurements. Remove the batteries and unplug the line cords.

• Set the function switch to the Ω CAP ⇥ •))) position.

• Insert the black test lead banana plug into the negative COM jack. Insert the red test lead banana plug into the positive Ω jack.

• Read the resistance in the display.

Continuity Check

WARNING: To avoid electric shock, disconnect power to the unit under test and discharge all capacitors before taking any resistance measurements. Remove the batteries and unplug the line cords.

• Set the function switch to the Ω CAP ⇥ •))) position.

• Insert the black test lead banana plug into the negative COM jack. Insert the red test lead banana plug into the positive jack.

• Press the **MODE** key to switch the continuity functions.

• If the resistance is less than approximately 50 Ω, the audible signal will sound. If the circuit is open, the display will indicate "OL".

4.7. Diode Test

• Set the function switch to the Ω CAP ⇥ •))) position.

• Insert the black test lead banana plug into the negative COM jack and the red test lead banana plug into the positive V jack.

• Press the **MODE** key to switch the Diode functions.

• Forward voltage will typically indicate 0.400 to 3.000V. Reverse voltage will indicate "OL". Shorted devices will indicate near 0V and an open device will indicate "OL" in both polarities.

Capacitance Measurements

WARNING: To avoid electric shock, disconnect power to the unit under test and discharge all capacitors before taking any capacitance measurements. Remove the batteries and unplug the line cords.

• Set the rotary function switch to the Ω CAP ➔ •))) position.

• Insert the black test lead banana plug into the negative COM jack. Insert the red test lead banana plug into the positive V jack.

• Press the **MODE** key to switch the Capacitance functions.

• Read the capacitance value in the display.

Temperature Measurements

• Set the function switch to the TEMP (°C or °F) position.

• Insert the temperature probe into the input jacks, making sure to observe the correct polarity.

• Read the temperature in the display.

• Press the **MODE** key to switch the Unit (°C or °F).

Flexible Coil Current Measurements

• Set the function switch to the Flexible coil position.

• Insert the black test lead banana plug into the negative COM jack. Insert the red test lead banana plug into the positive V jack.

• Read the current in the display.

• Press the **MODE** key to switch the AC, DC and AC+DC current.

• Press the RANGE key to switch range. 1000mA, 10A, 30A, 40A, 100A, 300A, 400A, 1000A, 3000A.

DC Current Measurements

• Insert the black test lead banana plug into the negative COM jack.

• For current measurements up to 6000µA DC, set the function switch to the µA position and insert the red test lead banana plug into the µA/mA jack.

• For current measurements up to 600mA DC, set the function switch to the mA position and insert the red test lead banana plug into the µA/mA jack.

• For current measurements up to 10A DC, set the function switch to the 10A position and insert the red test lead banana plug into the 10A jack.

• Press the **MODE** button to indicate "=" on the display.

• Read the current in the display.

AC Current Measurements

CAUTION: Do not make 10A current measurements for longer than 30 seconds. Exceeding 30 seconds may cause damage to the meter and/or the test leads.

• Insert the black test lead banana plug into the negative COM jack.

• For current measurements up to 6000µA AC, set the function switch to the yellow µA position and insert the red test lead banana plug into the µA/mA jack.

• For current measurements up to 600mA AC, set the function switch to the yellow mA position and insert the red test lead banana plug into the µA/mA jack.

• For current measurements up to 10A AC, set the function switch to the yellow 10A position and insert the red test lead banana plug into the 10A jack.

• Press the MODE button to indicate "~" on the display.

• Read the current in the display.

AC+DC Current Measurements

CAUTION: Do not make 10A current measurements for longer than 30 seconds. Exceeding 30 seconds may cause damage to the meter and/or the test leads.

• Insert the black test lead banana plug into the negative COM jack.

• For current measurements up to 6000µA AC+DC, set the function switch to the yellow µA position and insert the red test lead banana plug into the µA/mA jack.

• For current measurements up to 600mA AC+DC, set the function switch to the yellow mA position and insert the red test lead banana plug into the µA/mA jack.

• For current measurements up to 10A AC+DC, set the function switch to the yellow 10A position and insert the red test lead banana plug into the 10A jack.

• Press the MODE button to indicate "~" on the display.

• Read the current in the display.

Using RANGE

Press the **RANGE** key to activate the manual mode and to disable the Autorange function. The message "Manual Range" appears on the upper left part of the display instead of "Auto Range". In manual mode, press the **RANGE** key to change measuring range: the relevant decimal point will change its position. The **RANGE** key is not active in positions ➔ •))) **%** Temp °C °F 10A ≅. In Autorange mode, the instrument selects the most appropriate ratio for carrying out measurement. If a reading is higher than the maximum measurable value, the indication "O.L" appears on the display. Press and hold the **RANGE** key for more than 1 second to exit the manual mode and restore the Autorange mode.

Hold and AutoHold Mode

To freeze the display for any function, press key **HOLD**.

And again press key **HOLD** to release freeze.

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Capturing Minimum and Maximum Values

The MAX MIN Record mode captures minimum and maximum input values. When the input goes below the recorded minimum value or above the recorded maximum value, the meter beeps and records the new value. This mode is for capturing intermittent readings, recording minimum and maximum readings unattended, or recording readings while equipment operation precludes watching the meter.

To activate the MAX MIN mode, press soft key labeled ◀. If the meter is already in MAX MIN function, pressing ◀ causes the Meter to turn off MAX MIN function.

Relative Values

To activate the Relative mode, press the soft key labeled ▲.

If the meter is already in the relative function, pressing ▲ causes the meter to turn off Relative mode.

Capturing Peak Values

To activate the Peak mode, press the soft key labeled ▶.

If the meter is already in the peak function, pressing ▶ causes the meter to turn off Peak mode.

Non-Contact AC Voltage Detector (100 to 1000V AC)

WARNING: Risk of Electrocution. Before use, always test the Voltage Detector on a known live circuit to verify proper operation.

WARNING: Insulation type and thickness, distance from the source, and other factors may effect operation. Always verify live voltage using other methods before working on electrical circuits.

• The non-contact voltage detector operates when the meter is set to any measuring function. The detector does not operate when Auto Power Off turns the meter off or when the rotary function switch is set to the Off position.

• Slowly move the detector probe closer to the conductor being tested.

• If AC voltage within the specified range is present, the indicator light will illuminate.

NOTE: The detector is designed with high sensitivity. Static electricity and other sources of electrical energy may randomly activate the detector. This is normal operation. The detector only activates the indicator light when AC voltage is present. It does not indicate the voltage level on the LCD.
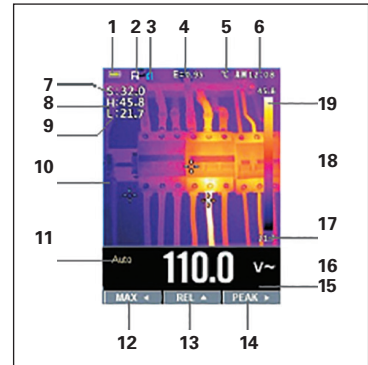
Thermal imager and DMM Operation

Thermal imager basics

In the Thermal imaging and DMM mode user can measure a targeted surface's temperature and use Multimeter at the same time. The measured result will display under the thermal image.

• Press the red **"IR"** button to open the Thermal Imager. In the image shown the thermal image is set to color palette **IRON**. Select other palettes in the Menu Settings.

• Open the protective lens cover on the back of the meter.

1. Battery capacity indicator.

2. SD card icon. If this icon is displayed there is an SD card inserted.

3. Bluetooth icon. If this icon is displayed the Bluetooth is opened.

4. The currently selected emissivity value. Use the Thermal Settings Menu to change the emissivity value.

5. Temperature unit icon. Use the Thermal Settings Menu to select °C, °F, or K.

6. Current time display.

7. Center cross of the thermal imager temperature measurement represents the center spot temperature of the scene.

8. Highest temperature spot of the thermal imager temperature measurement, represents the highest spot temperature of the scene.

9. Minimum temperature spot of the thermal imager temperature measurement, represents the minimum spot temperature of the scene.

10. Current scene on the thermal image frame.

11. Range icon of the meter.

12. Max soft button.

13. REL soft button.

14. PEAK soft button.

15. DMM measurement, shown below thermal image.

16. Unit of the meter.

17. Lowest reading measured in the current frame.

18. Thermal scale shows the range color for thermal images. The lighter the color, the warmer the temperature; the darker the color, the cooler the temperature.

19. Highest reading measured in the current frame.

Using the thermal imager

For basic operation follow these steps:

1. Set the function switch to any position.

2. Press the "**IR**" button to switch the thermal imager ON. Target the object by the thermal imager lens.

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3. The display will show the temperature measurement in the upper left hand corner for the targeted area along with the currently selected emissivity value.

4. In the Thermal imaging mode, the laser pointer and display cross hairs can be used to assist in targeting. Tools can be switched ON or OFF in the Setting menu.

5. In the Thermal imaging mode, the highest temperature will be auto marked by a red cross, and the lowest temperature will be auto marked by a blue cross, the two spots can be switched ON or OFF in the Setting menu.

6. In the Thermal imaging mode, the meter continues to operate normally as a multimeter allowing any of the electrical functions to be used.

7. Press the **HOLD** button to hold the thermal image frame, then long press the **HOLD** button. You will capture the screen and save a bitmap with measure data into SD card. The saved bitmap later can be analyzed by PC software or smartphone apps.

8. The thermal imager FOV (Field of View) is 21 by 21°.

9. FOV is the largest area that your imager can see at a set distance.

10. This table lists the horizontal FOV, vertical FOV and IFOV for lens.

Focal Length	Horizontal FOV	Vertical	FOVIFOV
7.5mm	21°	21°	4.53mrad

IFOV (Instantaneous Field of View) is the smallest detail within the FOV that can be detected or seen at a set distance, the unit is rad. The formula is this:

IFOV = (Pixel Size)/(Lens focal length);

$D:S_{theoretical}$ ($=1/ IFOV_{theoretical}$) is the calculated spot size based on the pixel size of the Thermal Imager detector array and lens focal length.

Example: if thermal imager uses 9mm lens, because the Pixel Size of detector is 34µm, horizontal FOV is 21°, vertical FOV is 21°, and the IFOV is 34µm/7.5mm = 4.53mrad;

$D:S_{theoretical}$ ($= 1/ IFOV_{theoretical}$) = 220:1

Spot Size=100.00cm*100.00cm (Based upon $IFOV_{theoretical}$)

80m

80m

21°

21°

220m

$D:S_{measure}$ ($= 1/ IFOV_{measure}$) is the spot size needed to provide an accurate temperature measure. Typically, $D:S_{measure}$ is 2 to 3 times smaller than $D:S_{theoretical}$, which means the temperature measurement area of the target needs to be 2 to 3 times larger than that determined by the calculated theoretical D:S
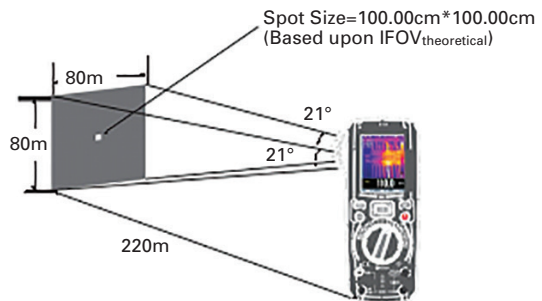
Using the Multimeter with the thermal imager on IR+DMM mode, MODE key, RANGE key, HOLD key and REL Function is same DMM mode.

• **Capturing MAXMIN values on IR+DMM mode**

1. To activate the MAXMIN mode, press the soft key labeled ◀, and display max value.

2. If the Meter is already in the MAXMIN function, then press the ◀ key to display min value, then press the ◀ key to display current measurement value. Next press the ◀ key to display max value again.

3. Press and hold the ◀ key for more than 1 second to exit MAXMIN mode.

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• **Capturing Peak Values on IR+DMM mode**

1. To activate the peak mode, press the soft key labeled ▶, and display Peak max value.

2. If the Meter is already in the peak function, then press the ▶ key to display Peak min value, then Press the ▶ key to display current measurement value. Next press ▶ key again to display peak max value.

3. Press and hold the ▶ key for more than 1 second to turn off peak.
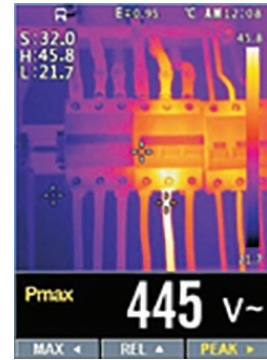
Settings Menus

Using Settings Menus

• Press **MENU** button to open the Settings Menus, as shown here:

• Press **UP/DOWN** button to select menu item or change the value of current focus item.

• Press **RIGHT/MENU** button to enter the submenu or set focus on the current selected item. Press **LEFT** button to return to the previous menu.

• To exit settings menus, press **MODE/RANGE/HOLD/IR** button or press **LEFT** button in root menu.
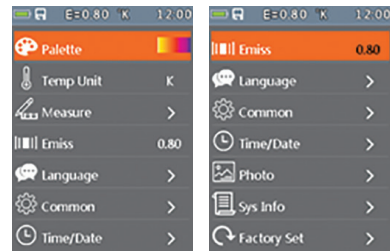
Setting details

• Palette mode

Thermal imager has five kinds of palettes, such as:

Press **RIGHT/MENU** button to select one of the display color palettes.

Temp Unit

Press **RIGHT/MENU** button to set focus on this option and the color of option value will change to black °C . In focus state, use the **RIGHT/MENU** button to toggle °C, °F, and K. Use **LEFT/RIGHT/MENU** button to exit focus state and the color of option value will change to white K .

Measure

Press **RIGHT/MENU** button to enter measure menu.

Two selections are available: HOT POINT and COLD POINT. Press **RIGHT/MENU** button to set your select item on or off.

• Hot point: This option enables thermal imager to automatically detect the highest temperature point.

• Cold point: This option enables thermal imager to automatically detect the lowest temperature point.
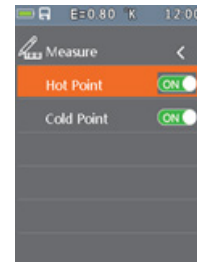
Emissivity

• Press **RIGHT/MENU** button to set focus on this option. In focus state, use **UP/DOWN** button to increase or decrease emissivity's value, use **LEFT/RIGHT/MENU** button to exit focus state. The available range is 0.01 to 0.99 in 0.01 steps.

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Language

• Press **RIGHT/MENU** button to enter language menu.

Three options are available: Simplified Chinese, Traditional Chinese and English. Use **UP/DOWN** button to select language and use **RIGHT/MENU** button to set selected language to be valid.

Common

Press **RIGHT/MENU** button to enter common menu.

Five options are available: Beep, Bluetooth, Laser, Brightness and Auto Off.

• Beep: Use **RIGHT/MENU** button to set beep on or off.

• Bluetooth: Use **RIGHT/MENU** button to set bluetooth power on or off.

• Laser: Use **RIGHT/MENU** button to set laser pointer on or off.

• Brightness: Press **RIGHT/MENU** button to set focus on this option. In focus state, use **UP/DOWN** button to change LCD's brightness, use **LEFT/RIGHT/MENU** button to exit focus state. The available brightness range is 100% to 10% in 10% steps.

• Auto Off: Press **RIGHT/MENU** button to set focus on this option. In focus state, use **UP/DOWN** button to choose the time period after which the meter enters the sleep mode.
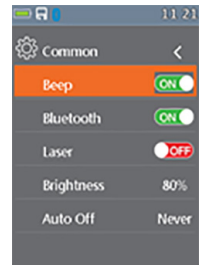
Bluetooth® Connect

1. Turn on the Bluetooth function on the instrument.

2. Turn on the Bluetooth of smartphone, press the icon Thermview+ and enter into the home interface. Press Connect Device icon on the Home interface, Bluetooth device name will appear.

3. Touch the device name listed in Bluetooth devices list to connect the device.

The detail information about Thermview+, please refer to Thermview+ APP help file.
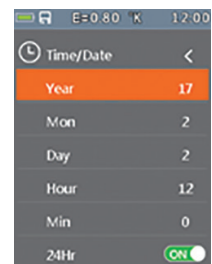
Thermview+ for Android: Please search in Google Play with keyword: "Thermview+", download and run.

Thermview+ for iOS: Please search in Apple store with keyword "Thermview+", download and run.
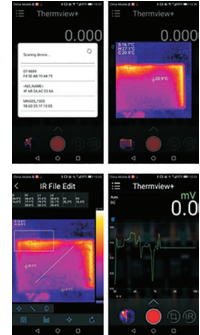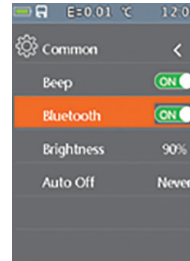
Time/Date

Press RIGHT/MENU button to enter time menu. In this menu, year, month, day, hour, minute and time format can be set. The changes take effect after exiting settings menus.

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Photo

Press **RIGHT/MENU** button to enter photo menu.

Two options are available: Photo Review and Delete Photo.

• Photo Review: press **RIGHT/MENU** button to enter image browser function, and exit settings menus immediately.

• Delete Photo: After pressing **RIGHT/MENU** button dialog box will be displayed as shown at right.
Warning: selecting 'YES' will delete all the photos in the memory card which has been captured by user.
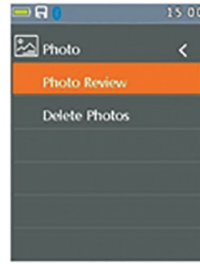
Sys Info

• Press **RIGHT/MENU** button to enter system information menu. This menu contains software's version, hardware's version, and thermal imager's version
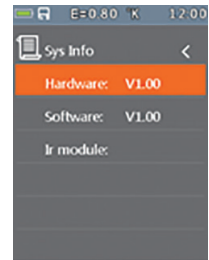
Factory Set

• Select Factory Set option after pressing **RIGHT/MENU** button. The dialog box will be displayed as shown right. Select 'YES' button and system parameter will be reset.

Record measurements

• With a measurement on the display (Fig 1), press **Button** key Menu to enter the instrument's general menu (Fig 2). The screen is shown on the display. Press the Button ▲ or ▼ key to select Record Item. Press the Button ▶ and enter Record Menu (Fig 3).

• In Record Menu press the Button ▲ or ▼ key to select Sample Interval Item or Duration Item (Fig 3). Press the Button ▶. Then Press the Button ▲ or ▼ key to adjust time. Setting of sampling interval is from 1s to 59min:59s (Fig 4).

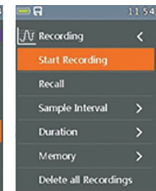Setting of recording duration is from 1min to 9h:59min (Fig 5) .

Fig 1   **Fig 2**   **Fig 3**

Fig 4   **Fig 5**
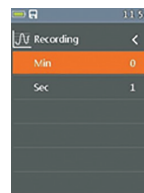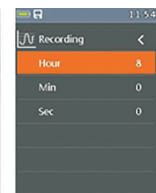
- In Record Menu. Press the Button 5 or 6 key to select Start record Item. Press the button 4. Enter Save Record Measurement (Fig 6).
In Save Record Measurement, press the Button 4 to stop record. Press the Button 5 Save.

- In Record Menu. Press the Button ▲ or ▼ key to select Review Item. Press the Button ▶ to view record measurement (Fig 7).

Fig 6   **Fig 7**

- Press the Button MODE key to Trend record (Fig 137). Press the button ◀ or ▶ key to select previous record measurement or next record measurement. Press the button **ESC** key to exit view record measurement.
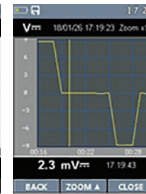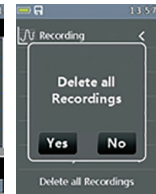
- In Record View Display, press the Button ◀ or ▶ key to move the cursor on the graph. Press the Button ▲ key to activate the zoom function of the graph (Fig 138), increasing resolution (symbol "Zoom Xy" where y=max zoom dimension appears at the top of the display on the right side). You can zoom X1 for at least 10 measuring points, X2 for at least 20 measuring points, X3 for at least 40 measuring points and so on for maximum of 6 zooming operations.

Fig 137   **Fig 138**   **Fig 139**

- In Record Menu. Press the Button ◀ or ▶ key to select Delete all Recordings Item (Fig 139). Press the Button ▶, enter Delete Box and select Yes or No.

Image Browser

- In Image Browser mode user can browse the pictures in the memory card. Press **LEFT/RIGHT** button to select previous or next picture. Press any other keys to exit Image Browser mode.

1. LEFT key instruction.
2. Current displayed picture's filename.
3. RIGHT key instruction.
4. Picture display area.
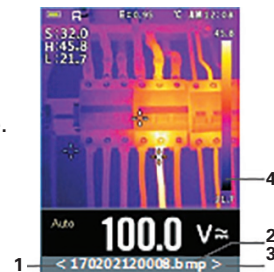
- **How to capture screen**

When in DMM mode or Thermal imaging + DMM mode, use **HOLD** button to enter hold mode, as shown below. Press **UP** button to capture screen. After saving to TF card completely, multimeter will exit hold mode.

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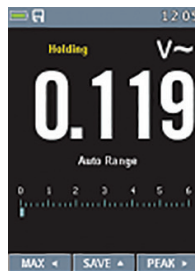
Technical specifications

Technical characteristics

• Thermal imager

Field of view (FOV) / Minimum focus distance	21° x 21°/ 0.5 m
Spatial resolution (IFOV)	4.53 mrad
IR resolution	80 × 80 pixels
Thermal sensitivity / NETD	< 0.1°C @ +30°C (+86°F) / 100 mK
Image frequency	50 Hz
Focus mode	Focus free
Focal length	7.5mm
Focal Plane Array (FPA) / Spectral range	Uncooled microbolometer / 8–14 µm
Object temperature range	–20°C to +260°C (–4°F to +500°F)
Accuracy	±3°C (±5.4°F) or ±3% of reading (Environment temperature 10 to 35°C, object temperature >0°C)

Accuracy calculated as [%reading + (num. digits*resolution)] at 18°C ÷ 28°C <75%RH.

• DC Voltage

Range	Resolution	Accuracy	Input impedance	Protection against overcharge
600.0 mV	0.1 mV	±(0.09% reading + 5 digits)	>10 MΩ	1000 VDC/ACrms
6.000 V	0.001 V			
60.00 V	0.01 V			
600.0 V	0.1 V	±(0.2%reading + 5 digits)		
1000 V	1 V			

• AC TRMS Voltage

Range	Resolution	Accuracy(*)		Protection against overcharge
		(50 Hz÷60 Hz)	(61 Hz÷1k Hz)	
6.000 V	0.001 V	±(0.8% reading + 5 digits)	± (2.4% reading + 5 digits)	1000 VDC/ACrms
60.00 V	0.01 V			
600.0 V	0.1 V			
1000 V	1 V			

(*) Accuracy specified from 10% to 100% of the measuring range, sine wave. Input impedance: >9 MΩ; Accuracy PEAK function: ±10% rdg, PEAK response time: 1 ms.

• AC+ DC TRMS Voltage

Range	Resolution	Accuracy (50 Hz÷1k Hz)	Input impedance	Protection against overcharge
6.000 V	0.001 V	±(2.4% reading +20 digits)	>10MΩ	1000 VDC/ACrms
60.00 V	0.01 V			
600.0 V	0.1 V			
1000 V	1 V			

• DC Current

Range	Resolution	Accuracy	Protection against overcharge
600.0 µA	0.1 µA	±(0.9% reading + 5 digits)	Quick fuse 800 mA/1000 V
6000 µA	1 µA		
60.00 mA	0.01 mA		
600.0 mA	0.1 mA	±(0.9% reading + 8 digits)	
10.00 A	0.01 A	±(1.5% reading + 8 digits)	Quick fuse 10 A/1000 V

• AC TRMS Current

Range	Resolution	Accuracy	Protection against overcharge
600.0 µA	0.1 µA	±(1.2% reading + 5 digits)	Quick fuse 800 mA/1000V
6000 µA	1 µA		
60.00 mA	0.01 mA		
600.0 mA	0.1 mA		
10.00 A	0.01 A	±(1.5% reading + 8 digits)	Quick fuse 10 A/1000V

(*) Accuracy specified from 5% to 100% of the measuring range, sine wave. Accuracy PEAK function:
±10%rdg , AC+DC TRMS Current: accuracy (50Hz÷1kHz): ±(3.0%reading + 20dgt).

• Flexible Coil Current

Range	Resolution	Accuracy		Protection against overcharge
		(50 Hz÷60 Hz)	(61 Hz÷1k Hz)	
30.00 A	0.01 A	±(0.8% reading + 5 digits)	±(2.4% reading + 5 digits)	1000 VDC/ACrms
300.0 A	0.1 A			
3000 A	1 A			

• Diode test

Function	Test current	Max voltage with open circuit
▶⊦	<1.5 mA	3.3 VDC

• Resistance and Continuity test

Range	Resolution	Accuracy	Buzzer	Protection against overcharge
600.0 Ω	0.1 Ω	±(0.5% reading + 10 digits)	>50 MΩ	1000 VDC/ACrms
6.000 kΩ	0.001 kΩ	±(0.5% reading + 5 digits)		
60.00 kΩ	0.01 kΩ			
600.0 kΩ	0.1 kΩ			
6.000 MΩ	0.001 MΩ			
60.00 MΩ	0.01 MΩ	±(2.5% reading + 10 digits)		

• Frequency (electronic circuits)

Range	Resolution	Accuracy	Protection against overcharge
40.00 Hz to 10 kHz	0.01 Hz to 0.001 kHz	±(0.5% reading)	1000 VDC/ACrms

Sensitivity: 2Vrms

• Frequency (electronic circuits)

Range	Resolution	Accuracy	Protection against overcharge
60.00 Hz	0.01 Hz	±(0.09% rdg + 5 digits)	1000 VDC/ACrms
600.0 Hz	0.1 Hz		
6.000 kHz	0.001 kHz		
60.00 kHz	0.01 kHz		
600.0 kHz	0.1 kHz		
6.000 MHz	0.001 MHz		
10.00 MHz	0.01 MHz		

Sensitivity: >2 Vrms (@ 20% 80% duty cycle) and f<100kHz;
>5 Vrms (@ 20% 80% duty cycle) and f>100kHz

• Duty Cycle

Range	Resolution	Accuracy
5.0% to 95.0%	0.1%	±(1.2% reading + 2 digits)

Pulse frequency range: 40 Hz to 10k Hz, Pulse amplitude: ±5V (100 µs to 100ms)

• Capacity

Range	Resolution	Accuracy	Protection against overcharge
60.00 nF	0.01 nF	±(1.5% reading + 20 digits)	1000 VDC/ACrms
600.0 nF	0.1 nF	±(1.2% reading + 8 digits)	
6.000 µF	0.001 µF	±(1.5% reading + 8 digits)	
60.00 µF	0.01 µF	±(1.2% reading + 8 digits)	
600.0 µF	0.1 µF	±(1.5% reading + 8 digits)	
6000 µF	1 µF	±(2.5% reading + 20 digits)	

• Temperature with type K probe

Range	Resolution	Accuracy (*)	Protection against overcharge
−40.0 to 600.0°C	0.1°C	±(1.5% reading + 3°C)	1000 VDC/ACrms
600 to 1000°C	1°C		
−40.0 to 600.0°F	0.1°F	±(1.5% reading + 5.4°F)	
600 to 1800°F	1°F		

(*) Instrument accuracy without probe; Specified accuracy with stable environmental temperature at ±1°C.
For long-lasting measurements, reading increases by 2°C.

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• Reference standards

Safety:	IEC/EN61010-1
EMC:	IEC/EN 61326-1
Insulation:	double insulation
Pollution level:	2
Overvoltage category:	C

AT IV 600V, CAT III 1000V
Max operating altitude:	6562 ft (2000 m)

• General characteristics
Mechanical characteristics

Size (L x W x H):	7" x 3" x 2" (175 x 85 x 55 cm)
Weight (batteries included):	19 oz (540 g)

• Power supply

Battery type:	1x7.4V rechargeable Li-ION battery, 2300 mAh
Battery charger power supply:	100/240 V AC, 50/60 Hz, 10 VDC, 1 A
Low battery indication:	symbol "▭" on the display
Auto Power Off:	after 15 to 60 min minutes of nonuse (may be disabled)
Fuses:	F10A/1000V, 10 x 38 mm (input 10A)

• Display

Conversion:	TRMS F800mA/1000V, 6 x 32 mm (input mA µA)
Characteristics:	color TFT, 6000 dots with bar graph
Sampling frequency:	3 times/s

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Environmental conditions for use

Reference temperature: 18 to 28°C (64 to 82°F)
Operating temperature: 5 to 40°C (41 to 104°F)
Allowable relative humidity: <80% RH
Storage temperature: –20 to 60°C (–4 to 140°F)
Storage humidity: <80% RH

Maintenance, Recalibration, and Repair

• Clean the device with a soft, damp and lint-free cloth. Ensure that no moisture enters the housing. Do not use any sprays, solvents, alcohol-based cleaning agents or abrasive cleaners: only use clean water.

• The product must be repaired by the manufacturer.

It is recommended that Digi-Sense products are calibrated annually to ensure proper function and accurate measurements; however, your quality system or regulatory body may require more frequent calibrations. To schedule your recalibration, please contact InnoCal, an ISO 17025 calibration laboratory accredited by A2LA.

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