

# Infrared Thermometer MDI231



## USER MANUAL



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## 1. Summary of infrared thermometer

Thank you for choosing our Infrared Thermometer. The MDI231 Infrared Thermometer is used to measure an objects temperature based on the relationship between temperature and measurable infrared radiation. Simply aim the unit's probe toward the surface to be measured to obtain a quick and accurate temperature. To ensure proper use, please be sure to read this user manual carefully, paying close attention to the safety precautions.

- In order to use this product correctly, please read the user manual before use.
- In order to properly use this product, please carefully read the full text of this manual before using, in particular the "safety precautions" section.
- Please keep the instructions on the side for easy checking.

### Basic principles:

All objects above absolute zero temperature emit certain percentage of infrared radiation energy based on its temperature. The amount of the radiation energy and the distribution of the wavelength have a very close relationship. When human body temperature in 36-37°C, it emits wavelength 9-13um of infrared radiation. Based on this principle, according to the relationship between surface forehead temperature and eardrum of ear temperature, we are able to measure the human bodies actual temperature.


## 2. Safety precautions

### Warning !

- Use of this thermometer is not intended as a substitute for consultation with your physician. It is dangerous for user to perform a self-evaluation and self-treatment based on the measuring result. Be sure to follow doctor's instruction.

- Keep the thermometer out of reach of children. For accidental swallow of battery or other component, please consult the doctor at once.
- For patients who suffer with external otitis and media otitis or other ear disease, should be prohibited from using the product to measure their ear temperature. It may worsen the lesion.
- Don't throw the battery into fire.

## Notice

- The device is a precision instrument, don't drop, tramp or impose any vibration or impact on the thermometer. 
- Do not touch the lens of the probe with your fingers, and do not disassemble the device by yourself.
- Before measuring forehead temperature, make sure the hair is parted and any sweat dried.
- After you do some exercise, eating and/or bathing, you should stay still indoors and rest about 30 minutes before measurement.
- To make the measurement data reliable and stable, when ambient temperature varies a lot, the thermometer should be placed indoors for about 30 minutes before using.
- When we measure somebody continuously, the temperature should be measured every minute, if you need to measure yourself continuously for a short time, there are some slight errors when you read the temperature, which is a normal phenomenon. At this time, we should choose the average. We recommend that you measure yourself continuously for a maximum of three times in any unit of time and because of human error while conducting the thermometer, it may affect the accuracy of measurement.
- There is no absolute standard for the actual temperature of the human body, so please try to collect recordings of individuals' normal temperatures to use as a reference for having a fever or not.
- Do not measure the sites of scarred tissue or tissue compromised by skin disorders, because sensing the body provides inaccurate temperatures from these sites of scarred tissue or tissue compromised by skin disorders.
- Do not measure the site of forehead temperature if that patients has trauma on forehead.
- Do not measure if that patient is treated with certain drug therapies.
- Do not immerse the device into water or any other liquid, and do not directly expose to sunlight.

- Do not use a mobile or cordless phone near the thermometer when measuring.
- Body temperature may increase in the drug within the effort time limit. Please don't measure.
- In order to ensure the accuracy of measurement data, please don't take measurement of body temperature in strong electromagnetic interference environment (such as microwave, high frequency equipment operation environment).
- Do not forcibly insert the probe in the ear. If you feel abnormal such as pain during measurement, stop using the unit. It may injure the external auditory canal.
- If the ear is cooled such as being exposed to the cold for a long period, wait until the ear is warmed up, then measure. The measured result may be indicated low when you use an ice bag or immediately after coming home from outside in winter.
- Do not use the unit to measurement ear temperature when the external auditory canal is wet such as after swimming or a bath. It may cause inaccurate measurement.
- Do not disassemble, repair, or modify the unit.
- This thermometer is only a personal device, please do not use with others.
- Do not touch the battery output when measuring.
- The thermometer must be stored according to the technical specifications.
- The materials (ABS) of expected contact with the patient have passed the ISO 10993-5 and ISO 10993-10 standard test, no toxicity, allergy and irritation reaction. They are compliant with the MDD requirements. Based on the current science and technology, other potential allergic reactions are unknown.
- The patent is an intended operator. The patient can measure, read data and replace battery under normal circumstances and maintain the device and its accessories according to the user manual.
- The device is not intended for PATIENT transport outside a healthcare facility.

## Recommendations

1. Don't use this thermometer for other purposes.
2. It is forbidden to leave the product exposed to any chemical solvent, direct sunshine or high temperature.

3. Do not expose the thermometer under direct sunlight for a long time so as not to damage the battery.
4. Do not measure while talking on the phone.
5. Please report to MANUFACTURER if any unexpected operation or events occur.

### 3. Intended use

This thermometer is intended to measure ear canal and forehead temperature at home or hospital, including anyone, such as infants, children and adults.

For the safety reason, children or the baby's temperature must be measured by parent or adults.

### 4. Temperature measurement mode and range description

The infrared thermometer has the following measurement mode:

- 1) Forehead temperature measurement mode -- measures the skin surface of human forehead's temperature accurately, take the place of traditional mercury thermometer and electrical thermometer.
- 2) Ear temperature measurement mode – measures the skin surface of human eardrum's temperature accurately, take the place of traditional mercury thermometer and electrical thermometer.

#### Normal temperature range for different measuring position

Measuring position	Normal temperature(°C)	Normal temperature(°F)
Anus	36.6-38.0	97.9-100.4
Oral	35.5-37.5	95.9-99.5
Armpit	34.7-37.3	94.5-99.1
Ear	35.5-37.8	95.9-100
Forehead	35.8-38.0	96.4-100.4

## Normal forehead temperature range for different ages

Ages	Normal temperature (°C)	Normal temperature (°F)
0-2 years old	36.4-38.0	97.5-100.4
3-10 years old	36.1-37.8	97.0-100.0
11-65 years old	35.9-37.6	96.6-99.7
>65 years old	35.8-37.5	96.4-99.5

**NOTE:** The normal temperature and difference between them of the different body parts is individual. To define yours, measure your temperature for at least 2 weeks at the same ear canal, forehead position and time.

**NOTE:** When consulting your physician, communicate that which position the temperature is measured by infrared thermometer MDI231, note the individual's normal temperature range by infrared thermometer MDI231 as additional reference.

**NOTE:** Because the forehead temperature is affected obviously by the external environment (eg: environment, air convection and skin tone, etc), we advice that you take the forehead temperature only as reference. When you have a doubt about the measurement result, please use the ear canal temperature to confirm it.

## 5. Feature

### High reliability

This product has passed the manufacturer's internal life and reliability test, time to failure is  $\geq 1000\text{h}$ .

### A wide range of temperature

The measurement range:  $32.0^{\circ}\text{C}$ - $43.0^{\circ}\text{C}$  ( $89.6^{\circ}\text{F}$  –  $109.4^{\circ}\text{F}$ ).



## High accuracy

This product has passed the infrared thermometer performance standards of the European Union and China for measuring clinical requirements, measuring clinical repeatability is no more than  $\pm 0.3^{\circ}\text{C}$  ( $0.5^{\circ}\text{F}$ ).

## Humanization design

When the temperature exceeds the range, LED will display the Lo or Hi prompt.

When operating environment exceeds the designed specifications, LED will display the Err prompt.

When the thermometer battery power is insufficient, it has low voltage icon.

Has the hardware self-test function, when hardware malfunction is detected, LED will display the ErA or ErC prompt.

## Power saving function

After starting the thermometer without any operation, or no operation after temperature measurement, the thermometer will shut off and LED go out with one short beep in  $60\text{s}\pm 5\text{s}$ .

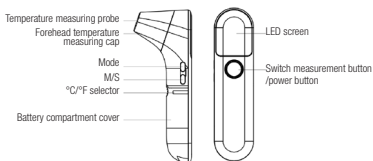
## Three-color backlight indication function

Has designed the three-color backlight function to indicate the temperature range: When the correct result is measured, the backlight from LED will light different color to indicate the temperature range as below:

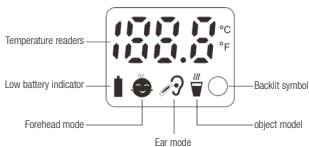
Temperature Range $^{\circ}\text{C}$	Temperature Range $^{\circ}\text{F}$	Indicator Color	Duration of light	Way of Beep
$T < 37.5^{\circ}\text{C}$	$T < 99.5^{\circ}\text{F}$	Green	4 seconds	1 long beep
$37.5^{\circ}\text{C} \leq T < 38.0^{\circ}\text{C}$	$99.5^{\circ}\text{F} \leq T < 100.4^{\circ}\text{F}$	Orange	4 seconds	3 short beep
$38.0^{\circ}\text{C} \leq T$	$100.4^{\circ}\text{F} \leq T$	Red	4 seconds	3 short beep

## 6. Overall description

### 【Main component including】



### 【LED display description】



## 7. Operation instruction

### 【Preparation】

1) Check battery

Replace the batteries to ensure power supply if there is low voltage icon for the thermometer.

2) Check sensor

If signs of pollution and spray, please clean it. (For cleaning method see the chapter 8 Care and Cleaning for details.) If the sensor's lens is damaged, please stop using.

3) Check thermometer

When you press the Switch measurement button, the system will have self testing of software and hardware. If there are problems, LED will display "ErA/ErC " symbol. If found, please refer to the chapter 13 Trouble-shooting.

4) In order to make the accurate measuring result, put the thermometer in the measurement environment for 30 minutes.

5) Accuracy of unexpected fluctuations in ambient temperature may decrease the measurement results. When the thermometer at the same measurement position display at different ambient temperature, or measure temperature in front of the air conditioner, it will not be able to obtain accurate results.

6) If you measure forehead temperature, clean forehead and arrange hair, make sure the forehead is naked and clean, in order to ensure the accuracy of measurement.

## 【Instruction for use】

### 1) Operation before measurements

Open the machine, the LED screen shows all the ICONS about 1 seconds, then the LED display about 1 seconds after the last measurement record values, buzzer “beep” sound short, products entering the ear temperature measurement model, the temperature measuring head into the ear canal, press the power button, “beep” sound prompt, complete measurement and measurement results show, when temperature is  $< 37.5^{\circ}\text{C}$ ——the backlight is green color, when the temperature is like this  $37.5^{\circ}\text{C} \leq \text{temperature} < 38.0^{\circ}\text{C}$ ——backlight is orange, when the temperature  $\geq 38.0^{\circ}\text{C}$ ——backlight is red, as the picture below :



Remove or equip the forehead cap, the thermometer can automatically switch between ear mode or forehead mode for temperature measurement.



## 2) Function Setup mode

### -- Measurement unit selection

The thermometer is shipped with the Fahrenheit °F or Celsius °C temperature scale activated. If you wish to switch between °C or °F, proceed as follows:

1. In the temperature measurement mode, press the M/S button for a short time to turn off or on the prompt tone for one time.




2. Taking off the battery cover and keeping the thermometer in the temperature measurement mode, please press the °C/°F button in the cover for a short time. When the “beep” appears, the present temperature unit after converted will be displayed on the LED screen, the body temperature could be measured at this time



## 3) Temperature measuring

### - Taking Temperature in Ear Temperature Mode

1. Remove the forehead cap, and the thermometer enters into the ear mode.
2. When measuring ear temperature, the LED will be showing  symbol, insert the probe into the ear canal firstly, then press the power button. One second later you will hear “Beep”, and you can remove the thermometer. The measurement is completed.



#### 4) Measure memory value query and cleanup:

- A. In the off state, press the M/S button briefly to prompt the audio to display the measured values in turn as shown above, and to illuminate the corresponding backlight at the same time.



- B. In the power-on state, short press the mode key to switch to calibration mode (object mode).



#### 5) Product self-testing procedure:

The hardware or sensor damage of this product is shown as follows, you need to contact the manufacturer to deal with it:



#### NOTE:

1. Keep the probe surface clean, otherwise the measurement can't be accurate.
2. Clean the probe with clean cloth or paper moistened with water or alcohol, and conduct measurement after the water on the surface of the probe all evaporates.

## **TEMPERATURE TAKING HINTS**

- The right ear temperature may differ from the left ear. Therefore, always take the temperature in the same ear.
- The ear must be free from obstruction excess earwax build-up to take an accurate reading.
- External factors may influence ear temperatures, including when an individual has:
  - Been laying on ear or other
  - Had their ears covered
  - Been exposed to very hot or very cold temperatures.
  - Been recently swimming or bathing
- In these cases, remove the individual from the situation and wait 30 minutes prior to taking a temperature.
- Use the untreated ear if prescription ear drops or other ear medication have been placed in the ear canal.
- Don't use the thermometer outdoors.

## **--Taking Temperature in Forehead Mode**

### **To achieve a quick measurement:**

Make sure the forehead cap is on, and press the power button directly to measure the forehead temperature.

## TEMPERATURE TAKING HINTS

- Before take the temperature, please fix the forehead hair to prevent measured deviation.
- The sweat on head or cosmetic can affect the accuracy of measurement, please maintain the cleanness of the forehead when measuring.
- It is normal that there may be temperature difference depending on various skin types and color, since different skin type will reflect different voltage of infrared ray.
- Don't use the thermometer outdoors.

### NOTE:

1. When measuring, if the environment exceed the 10-40°C range will be showing Err;
2. If the measuring process is incorrect, the backlight can help to remind you that an inaccurate measurement has been taken.

Temperature Range °C	Temperature Range °F	Backlight
T<32.0°C	T<89.6°F	Green
T>43.0°C	T>109.4°F	Red

Duration of light	Way of Beep	LED symbol
4 seconds	1 long beep	"Lo"
4 seconds	3 short beep	"Hi"

## 6) Automatic shutdown

If you do nothing after the temperature measurement is completed, then 60 seconds later, the thermometer will automatically enter into the standby mode without any display on the screen.



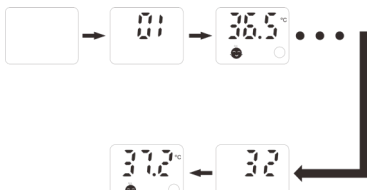
## 7) Memory function

The thermometer stores the last 32 temperature measurements. The last temperature will be automatically displayed when it is turned on again. The display will show "MEM".

Remark: The abnormal body temperature result cannot be stored in the memory (such as Lo, Err or Hi).

### --Takes These Steps to Check the Records.

1. In the off state, short press the M/S button to look over the recorded temperature values.
3. Each time the M/S button is pressed, the recorded temperature values are displayed( up to MEM 32, then go back to MEM 01 ).



4. MEM 01 is the most current reading, MEM 32 is the oldest. New readings will replace the oldest reading.
5. The memory mode is left automatically after 10 seconds if there is no operation.

**Remark: The abnormal body temperature result cannot be stored in the memory (such as Lo, Err or Hi).**

## 8) Three-color backlight function

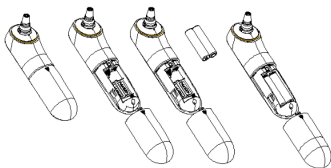
The backlight from LED will light different color to indicate the temperature range as below table:

Temperature Range °C	Temperature Range °F	Indicator Color	Duration of light	Way of Beep
$T < 37.5^{\circ}\text{C}$	$T < 99.5^{\circ}\text{F}$	Green	4 seconds	1 long beep
$37.5^{\circ}\text{C} \leq T < 38.0^{\circ}\text{C}$	$99.5^{\circ}\text{F} \leq T < 100.4^{\circ}\text{F}$	Orange	4 seconds	3 short beep
$38.0^{\circ}\text{C} \leq T$	$100.4^{\circ}\text{F} \leq T$	Red	4 seconds	3 short beep

## 9) Battery installment and replacement

Insert new batteries when the battery symbol appears on the display. Open the battery compartment. Remove the batteries and replace with new batteries, making sure the poles are in the right direction. Slide battery door back until it snaps in place.

Note: always change batteries when LED displays the low battery indicator to make sure of an accurate measurement.



### Notice:

- Please observe the related national laws of disposing the abandoned battery and don't litter to the garbage can.
- Please take out the battery if the device is not used for long periods of time.
- Please don't put the battery in the fire.

***To protect the environment, dispose of empty battery at your retail store or at appropriate collection sites according to national or local regulations.***

## 8. Care and cleaning

The probe tip and lens are the most delicate part of the thermometer. It has to be clean and intact to ensure accurate readings.

If the thermometer is ever accidentally used, please clean the probe and lens as follows:

- Very gently wipe the surface with a cotton swab or soft cloth moistened with alcohol. Only use the thermometer after the alcohol has completely dried out.
- If the lens is damaged, contact the distributor.

### Clean the unit body:

- Use a soft, dry cloth to clean the thermometer display and unit body.
- If very dirty, use a soft cloth with alcohol for cleaning.

### NOTES:

- Don't use abrasive cleaners.
- Don't use other non-recommended methods to perform disinfection.
- Non-waterproof, don't use the abrasive cleaner to clean the product, don't drop the thermometer into water or other liquid.

## 9. Maintenance

- 1) We do not authorize any institution or individual to maintain and repair of the product. If you suspect that the products have any questions, please contact the manufacturer or distributor to handle the case.
- 2) The user must not attempt any repairs to the device or any of its accessories. Please contact the retailer for repair.
- 3) Opening of the equipment by unauthorized agencies is not allowed and will terminate any claim to warranty.

**WARNING: No modification of this equipment is allowed!**

## 10. Calibration

The thermometer is initially calibrated at the time of manufacture. If this thermometer is used according to the user instructions, periodic re-adjustment is not required. If any time you question the accuracy of measurement, please contact distributor or manufacturer, for contact information see last page.

## 11. Storage







- 1) Don't put the thermometer in direct sunshine, high temperature and moist environment or someplace which may cause fire or is vulnerable to vibration.
- 2) Take the battery out if you don't intend to use the device in a long time.

## 12. Accessories

Only use original accessories. Check that the contents of the delivery are complete.

Quantity	Parts
1pc	MDI231 device
1pc	User manual

## 13. Trouble-shooting

Troubles or error message	Checklists or situation	Countermeasures or solution
No response/ Automatically reset	The batteries are used up?	Replace new batteries.
	Battery in wrong polarity or type?	Take out the batteries and replace new ones.
	Poor battery contact	Take out batteries and reinsert it correct.
The thermometer show the symbol "Hi" 	Temperature hampered by an air flux. In the forehead measurement mode: --Temperature readings too close together. -- Measured the other object, such as the sunlight, the air from the fireplace. Hi: Higher than 43.0°C (109.4°F);	Please leave the status and wait for 30 minutes to measure. Re-measure according to the manual.
The thermometer show the symbol "Lo" 	The hair and sweat prevent the temperature achievement.	
	Temperature hampered by an air flux.	
	In the forehead measurement mode: -- The measuring distance is too far. -- Measured the other object, such as the air from the air conditioner. Lo: Less than 32.0°C (89.6°F)	
	The ambient temperature is beyond of range of measurement (10°C-40°C/ 50°F -104.0°F)	Keep the thermometer in the room where temperature is (10°C-40°C/50°F -104.0°F) for 30 minutes
 	The hardware is damaged.	Excluding the possibility of temperature allowance first, then send the device to your dealer for repair
	Lower battery, however you can't use it	Replace the new battery.

## 14. Specifications

Device name	Infrared Thermometer
Model	MDI231
Measurement mode	Forehead and ear measurement modes (Adjusted)
Measurement site	Forehead and ear canal
Power supply	d.c.3V , 1.5 V type AAA (LR 03) batteries
Measuring range:	32.0-43.0°C (89.6°F~109.4°F)
Measuring accuracy: (At laboratory conditions)	±0.2°C/0.4°F during 35.0°C-42.0°C (95.0°F-107.6°F) other ±0.3°C/0.5°F
Clinical repeatability:	within ±0.3°C
Resolution of display	0.1°C/0.1°F
Operation condition	10-40°C(50°F-104°F ), Relative humidity ≤Rh85%, 70-106kPa
Storage condition	-20-55°C(-4°F-131.0°F ), Relative humidity ≤Rh85%, 70-106kPa
Size	149*38.5*38.5mm
Weight	about 67g(without batteries)
High body temperature hint	≥38.0°C(100.4°F)
Applied part	Type BF applied part, including the whole unit
Battery life	≥1000 times
Valid period	5 years
Note: Not intended to be sterilized. Not for use in an OXYGEN RICH ENVIRONMENT	

## 15. Standard list

Declares that the MDI231 complies with following applicable standards:

EN 980	Symbols for use in the labeling of medical devices
EN 1041	Information supplied by the manufacturer with medical devices
EN 60601-1	Medical electrical equipment Part 1: General requirements for basic safety and essential performance
EN 60601-1-2	Medical electrical equipment -- Part 1-2: General requirements for basic safety and essential performance - Collateral standard: Electromagnetic compatibility - Requirements and tests
EN 60601-1-6	Medical electrical equipment – Part1-6: General requirements for basic safety and essential performance – Collateral standard: Usability
ISO 80601-2-56	Medical electrical equipment part 2-56: particular requirements for basic safety and essential performance of clinical thermometers for body temperature measurement
EN 60601-1-11	Medical electrical equipment – Part 1-11: General requirements for basic safety and essential performance – Collateral standard: Requirements for medical electrical equipment and medical electrical systems used in home healthcare environment
EN 12470-5	Clinical thermometers – Part 5: Performance of infra-red ear thermometers (with maximum device)
ASTM E1965	Standard Specification for Infrared Thermometer for Intermittent Determination of Patient Temperature
EN 62304	Medical device software - Software life-cycle processes
EN 62366	Medical devices – Application of usability engineering to medical devices
EN ISO 10993-1	Biological evaluation of medical devices - Part 1: Evaluation and testing within a risk management process

## 16. Disposal



At the end of the product lifecycle, do not throw this product into the normal household garbage, but bring it to a collection point for the recycling of electronic equipment.

Waste Electrical and Electronic Equipment can have potentially harmful effects on the environment.

Incorrect disposal can cause harmful toxins to build up in the air, water and soil and can be harmful to human health.

### NOTES:











- Handling of battery and wastes method, please act according to the native law to proceed to handle.
- Take out the battery if you are not going to use the unit for a long time.



To protect the environment, dispose of empty battery at your retail store or at appropriate collection sites according to national or local regulations.



## 17. Normalized symbols

	Follow operating instructions
	Caution! Consult accompanying documents.
	Type BF applied parts
	Batch code
<b>IP22</b>	IP code of the device: this device's grade of against ingress of solid foreign objects
	Date of manufacture
	Disposal in accordance with Directive 2002/96/EC (WEEE)
	Keep dry
	UP
	Fragile, handle with care
	Stacking layer limit

## 18. EMC declaration

- 1) The digital thermometer needs special precautions regarding EMC and needs to be installed and put into service according to the EMC information provided in the ACCOMPANYING DOCUMENTS.
- 2) Wireless communications equipment such as wireless home network devices, mobile phones, cordless telephones and their base stations, walkie-talkies can effect this equipment and should be kept at least a distance  $d=1.0$  m away from the equipment.

**Note:** As indicated in Table 6 of IEC 60601-1-2 for ME EQUIPMENT, a typical cell phone with a maximum output power of 2W yields  $d=1.0$  m at an IMMUNITY LEVEL of 10V/m.

## 19. Guarantee

We grant you a lifetime guarantee after the date of purchase for one year. Any damage caused by improper handling shall not be covered by the guarantee. Batter and packaging are also excluded from the guarantee. All other damage claims excluded. A guarantee claim must be submitted with the purchase receipt. Please pack your defective instrument well and send with sufficient postage to the distributor.

The date of production is printed on the outer package  
Made in China  
Mar.2021.VER.1.0

尺寸：60\*145±1mm

材质：封面封底铜版纸，  
80g 书写纸

黑白印刷

封面的另一面和封底要空白面

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