

Medical Infrared Thermometer
PC828 / PC828EV

User's Manual



Version 1.0
2019.11.01

Contents

1.Introduction	1
2.Packing list	1
3.Product description.....	2
3.1 Overview.....	2
3.2 Intended use.....	2
3.3 Principle.....	3
3.4 Features.....	3
3.5 Components.....	3
3.6 Product structure.....	4
3.7 Digital display description.....	5
4.Warnings and precautions.....	6
5.Directions for use.....	8
5.1 Take your forehead temperature.....	8
5.2 Take your room temperature.....	9
5.3 Recall saved readings.....	10
5.4 °C and °F conversion.....	10
5.5 Turn on or off the buzzer/speaker.....	11
5.6 Set threshold for low fever.....	11
5.7 Set threshold for high fever.....	12
5.8 Shut down.....	12
5.9 Replace batteries.....	12
6.Temperature-taking tips.....	13
7.Cleaning and disinfection.....	14
7.1 Cleaning.....	14
7.2 Disinfection.....	14
8.Troubleshooting.....	15
9.Specifications.....	16
10.Symbol descriptions.....	17
11.Maintenance.....	17
12.After-sales service	18
13.Declaration	18
14.Appendix A: EMC Information - Guidance and Manufacturer's Declaration.....	18
15.Manufacturer information.....	22

1. Introduction

Dear customer, thank you for purchasing our Medical Infrared Thermometer. This device can be used to measure human body temperature by detecting infrared energy emitted from the forehead.

In order to obtain accurate readings, please read this manual before use.

Keep this manual so that you may read it whenever necessary.

Models covered for this manual and their differences are as follows:

Model	Difference
PC828	At the end of temperature measurement, the buzzer gives a 'beep' cue.
PC828EV	At the end of temperature measurement, the speaker broadcasts the temperature in English.

Aside from the above differences, the expected use of the two models is exactly the same.

2. Packing list

Medical infrared thermometer	1 pc
Storage bag	1 pc
User's manual	1 pc
AAA dry cell battery (optional)	2 pcs

3. Product description

3.1 Overview

The Medical Infrared Thermometer measures body temperature based on detecting infrared energy emitted from the forehead.

Users can quickly obtain measurement results after properly positioning the temperature probe on the forehead.

Normal body temperature has a range. The following table shows that this range also varies by measuring temperature at different sites. Therefore, readings from different sites should not be directly compared. It is very important to tell your doctor which type of thermometer you used and which part of the body you measured. Also keep this in mind if you are diagnosing yourself.

Measuring site	Normal temperature range
Forehead	36.1–37.5°C (97.0–99.5°F)
Ear	35.8–38.0°C (96.4–100.4°F)
Mouth	35.5–37.5°C (95.9–99.5°F)
Anus	36.6–38.0°C (97.9–100.4°F)
Axilla	34.7–37.3°C (94.5–99.1°F)

3.2 Intended use

The medical infrared thermometer is intended for measuring human body temperature by detecting forehead, it is for people of all ages.

3.3 Principle

The infrared temperature sensor collects infrared energy emitted by the skin of the forehead. After being focused by a lens, the infrared energy is converted into a temperature reading by the thermopiles and measurement circuits.

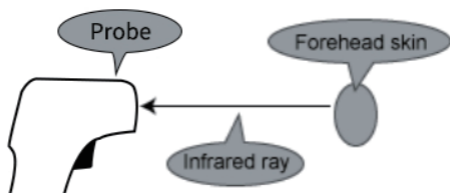


Fig. 1

3.4 Features

- Quick measurement in just 1 second
- Accurate and reliable
- One button design, making it easy to operate
- 32 memory slots, making it easy to save and recall temperatures
- Switch between Celsius ($^{\circ}\text{C}$) and Fahrenheit ($^{\circ}\text{F}$)
- Turn on/off the buzzer/speaker
- Orange LED indicates an intelligent low fever alarm
- Red LED indicates an intelligent high fever alarm
- Automatic shutdown for energy conservation

3.5 Components

The infrared thermometer consists of a shell, digital display, power/measure/set button, buzzer/speaker, probe with infrared sensor inside, optical filter, microprocessor, circuit board and measuring software.

3.6 Product structure



Fig. 2



Fig. 3

- | | |
|-------------------------|----------------------------|
| ① Top cover | ② Digital display |
| ③ Buzzer/Speaker outlet | ④ Right cover |
| ⑤ Optical filter | ⑥ Power/Measure/Set button |
| ⑦ Label | ⑧ Left cover |
| ⑨ Battery cover | |

3.7 Digital display description

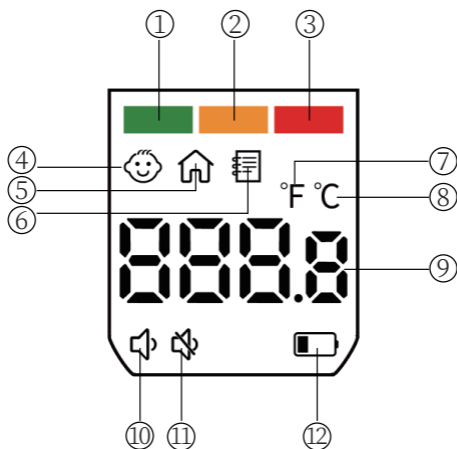


Fig. 4

- | | |
|-------------------------|-----------------------------|
| ① Green status light | ② Orange status light |
| ③ Red status light | ④ Forehead temperature mode |
| ⑤ Room temperature mode | ⑥ Memory mode |
| ⑦ Fahrenheit | ⑧ Celsius |
| ⑨ Temperature value | ⑩ Sound on |
| ⑪ Sound off | ⑫ Low battery indicator |

4. Warnings and precautions

- 1) Keep out of reach of children under 12 years of age.
- 2) Never immerse the thermometer in water or other liquid (it is not waterproof). For cleaning and disinfection, please follow the instructions in the 'Cleaning and disinfection' section.
- 3) Never use the thermometer for purposes other than its intended use. Please follow the general safety precautions when using it on children.
- 4) Keep the thermometer out of direct sunlight in a dry, dust-free, well-ventilated area at a temperature between 10.0–40.0°C (50.0–104.0°F). Do not use the thermometer in a high humidity environment (>85% RH).
- 5) Do not use the thermometer if there are signs of damage on the optical filter or elsewhere on the instrument. If damaged, never attempt to repair the instrument! Please contact the dealer or manufacturer.
- 6) This thermometer consists of high precision parts. Do not drop or twist the instrument. Protect it from severe impact and shock.
- 7) Please consult your doctor if you see such symptoms as unexplained irritability, vomiting, diarrhea, dehydration, changes in appetite or activity, seizure, muscle pain, shivering, stiff neck, pain when urinating, etc., even in the absence of fever.
- 8) Those who exhibit a normal temperature may still need to receive medical attention. When determining the severity of illness of people on antibiotics, analgesics or antipyretics, temperature readings should not be solely relied upon.
- 9) Temperature elevation may signal a serious illness, especially in adults who are elderly, frail or have a weakened immune system, or neonates and infants. Please seek professional advice immediately when there is a temperature elevation in a person who meets any of the following criteria:

- Over 60 years of age (fever may be dulled or even absent in elderly patients)
- Diagnosed with diabetes mellitus or a weakened immune system (e.g. HIV positive, cancer, chemotherapy, chronic steroid treatment, splenectomy)
- Bedridden (e.g. nursing home patient, stroke, chronic illness)
- A transplant patient (e.g. liver, heart, lung, kidney)

10) This thermometer is not intended for premature babies or small for gestational age babies. It is not intended to measure hypothermic temperatures. Do not allow children to take their temperatures unattended.

11) Use of this thermometer is not intended as a substitute for consultation with your physician or pediatrician. It is for household use only.

12) Do not use the thermometer for continuous temperature monitoring purposes.

13) Do not take a measurement while or immediately after nursing a baby.

14) Patients should not drink, eat, bathe or engage in physical activity for 30 minutes before using the thermometer. After eating, some organs have to work, such as the stomach, intestinal tract, etc., generating extra heat which affects temperature accuracy.

5. Directions for use

Please load the batteries before using the thermometer. Take the batteries out if you will not use the thermometer for a long time, such as over one month.

Additionally, referring to Part 6 in Fig. 3, this thermometer has a one-button design, so when we describe the 'Power' button, 'Measure' button and 'Set' button in this manual, we are referring to the same button.

5.1 Take your forehead temperature

Press the Power button to power on.

Let the optical filter aim at the middle of your forehead, then press and release the button. About 1 second later, a beep will be heard and the reading will be obtained. In Forehead Mode, the symbol ☺ will be displayed on the screen.

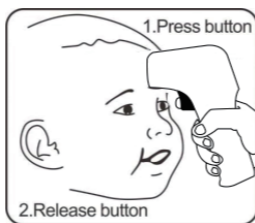


Fig. 5

Note: forehead measurement is an indicative reading. Measured forehead temperature can fluctuate up to 0.5°C/1°F from your actual body temperature. Please be aware of factors that influence accuracy as described in the sections 'Temperature-taking tips' and 'Warnings and Precautions'.


⚠ In order to improve accuracy, please make sure that your forehead is free from hair, sweat or dirt.

⚠ Make sure the optical filter is clean before using the thermometer.

⚠ Ensure that both the user and thermometer remain in the same room with a stable airflow and a room temperature between 10.0–40.0°C (50.0–104.0°F) for at least 30 minutes before using the thermometer.

5.2 Take your room temperature

Press and release the Power button to power on.

The thermometer will enter the self-check procedure, the three status lights at the top of the screen will be lit in green, orange, and red order, when the red light is on, hold down the Power button until the thermometer completes self-check and enters the room temperature measurement interface, the symbol  will be displayed on the screen.

Press and release the button. About 1 second later, a beep will be heard and the reading will be obtained.

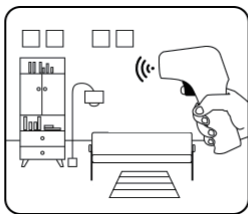



Fig. 6

⚠ Please note that room temperature is for reference only.

⚠ Please do not align the thermometer with the heat source or cold source, such as air conditioners, heaters, lights etc., otherwise the measured temperature data is not the real value of room temperature.


5.3 Recall saved readings

The thermometer can store 32 sets of forehead measurement data. When the data is full, the last reading will always replace the first. If you wish to review previous forehead measurement data, when the thermometer is shut down, press the Set button for about 3 seconds until you see the  symbol flicker on the screen, then release the button.

When you press the button, you will see the number '1' appear on the screen; this means the first saved reading. The number '1' will then disappear quickly and the first saved forehead temperature reading will appear. By pressing the button, you can go through all the saved forehead temperature readings one by one. After reviewing the saved readings, press the button for about 5 seconds to shut down the thermometer.





5.4 °C and °F conversion

If you wish to convert °C to °F or °F to °C, when the thermometer is shut down, press the Set button for about 6 seconds until you see the **'°C' symbol** or the '°F' symbol flicker on the screen, then release the button. Press the button again and the °C symbol or °F symbol will be converted to the other.

Do not release the button when the  symbol appears, but only release it when the '°C' symbol or '°F' symbol appears. After finishing conversion, press the button for about 5 seconds to automatically save the setting and shut down the thermometer.

5.5 Turn on or off the buzzer/speaker


The PC828, PC828EV models are different in how they interact with users when measurement is complete: the PC828 uses a buzzer to ‘beep’, the PC828EV communicates the temperature in English through a speaker. Please check the label on the left cover to determine which thermometer model you are using.

If you want to turn on/off the buzzer/speaker, when the thermometer is shut down, press the Set button for about 9 seconds until you see the ‘ON’ and  symbols or ‘OFF’ and  symbols flicker on the screen, then release the button. Press the Set button again, the ‘ON’ and  symbols or ‘OFF’ and  symbols will be converted to the other.

After selection, press the button for about 5 seconds to automatically save the setting and shut down the thermometer.

5.6 Set threshold for low fever


This thermometer has 37.5°C/99.5°F preset as an alarm temperature for low fever. However, 37.5°C/99.5°F is only a reference value. At this temperature, different people feel different, with some feeling uncomfortable and others feeling fine. If you do not agree with this low fever threshold, after consulting your doctor, you can manually change it to suit your own situation.

When the thermometer is shut down, press the Set button for about 12 seconds until you see the **orange status light**  flicker on the screen, then release the button. Ignore the other symbols that appear in the process.

By pressing the Set button, you can increase the threshold by 0.1 °C/0.2°F each time. The adjustment range is from 37.5°C/99.5°F to 37.9°C/100.2°F. Once it reaches the Max. value, press the button again; it will return to the Min. value and the cycle will repeat. After adjustment is complete, press the button for about 5 seconds to automatically save the setting and shut down the thermometer.

5.7 Set threshold for high fever

This thermometer has 38.0°C/100.4°F preset as an alarm temperature for high fever. However, 38.0°C/100.4°F is only a classic reference value. At this temperature, different people feel different, with some feeling bad and others not feeling too bad. If you do not agree with this high fever threshold, after consulting your doctor, you can manually change it to suit your own situation.


When the thermometer is shut down, press the Set button for about 15 seconds until you see the **red status light**  flicker on the screen, then release the button. Ignore the other symbols that appear in the process.


By pressing the Set button, you can increase the threshold by 0.1°C/0.2°F each time. The adjustment range is from 38.0°C/100.4°F to 38.9°C/102.0°F. Once it reaches the Max. value, press the button again; it will return to the Min. value and the cycle will repeat. After adjustment is complete, press the button for about 5 seconds to automatically save the setting and shut down the thermometer.

5.8 Shut down

When the thermometer is turned on, it will shut down automatically when it is not used for about 30 seconds. You can also press the Power button for 5 seconds to shut down the device manually.

5.9 Replace batteries

When the **low battery indicator**  appears on the screen, slide the battery cover off the shell, take out the two old batteries and insert two new AAA batteries into the battery compartment correctly according to the marked polarity symbols. Then close the battery cover and the thermometer will be restored to normal use.

 Take out the batteries if the thermometer will not be used for more than one month.

6. Temperature-taking tips

1) It is important to know the normal temperature of each individual when they are well. This is the only way to accurately diagnose a fever. Record readings twice a day, once in the early morning and once in the late afternoon. Take the average of these two temperatures to obtain the normal oral equivalent temperature. As temperature readings may vary among different locations on the forehead, always take the temperature in the same location.

2) The normal temperature of a child can be as high as 37.7°C/99.9°F or as low as 36.1°C/97.0°F. Please note that this thermometer reads 0.5°C/0.9°F lower than a rectal digital thermometer.

3) External factors may influence human body temperature, including when an individual has:

- a) been exposed to a very hot or very cold environment;
- b) just been swimming or bathing.

In these cases, return to normal condition by waiting quietly for 30 minutes before taking the reading.

4) The person to be measured and the thermometer should stay in a steady-state room condition for at least 30 minutes before taking the reading.

5) Before placing the thermometer probe on the forehead, remove hair, dirt or sweat from the measurement area. Wait 10 minutes after cleaning before taking the reading.

6) Wiping the forehead with a warm or cool cloth may affect the reading; in this case, it is advisable to wait 10 minutes before taking the reading.

7) In the following situations, it is recommended to measure 3–5 times in the same location and take the highest temperature as the reading:

- a) Newborn infants in the first 100 days;
- b) Children under 3 years of age with compromised immune systems;
- c) When the user is learning how to use the thermometer for the first time, until he/she has familiarized him/herself with the instrument and can obtain consistent readings.

7. Cleaning and disinfection

7.1 Cleaning

Wipe the thermometer shell with a slightly damp soft cloth, and gently dry the body with a piece of tissue paper. Take care not to scratch the surface of the optical filter and digital display screen.

Only use cotton swabs dipped in anhydrous ethanol to clean the optical filter.

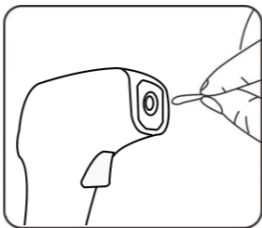


Fig. 7


- ⚠ Keep the optical filter away from water during the cleaning process.
- ⚠ The optical filter may be scratched if it is cleaned with a piece of tissue paper, resulting in inaccurate readings.
- ⚠ Do not allow the optical filter to make contact with hard objects.
- ⚠ Never use abrasive cleaning agents, thinners or benzene for cleaning.
- ⚠ Never immerse any part of the thermometer in liquid, or allow liquid to enter the device.

7.2 Disinfection

Disinfect the thermometer body with a soft cloth slightly moistened with 75% medical alcohol.

- ⚠ **Do not use 75% medical alcohol to disinfect the optical filter, as it contains water which may damage the optical filter.**
- ⚠ Do not use hot steam or ultraviolet radiation for disinfection, or else the thermometer may be damaged or quickly aged.










8. Troubleshooting

Symptom	Possible Cause	Solution
Failed to power on	The battery level is too low	Replace the batteries.
	The polarities of the batteries are reversed	Ensure that the batteries are inserted correctly.
	The thermometer is damaged	Contact the dealer or manufacturer.
Reading is too low	The optical filter is dirty	Use cotton swabs dipped in anhydrous ethanol to clean the optical filter.
	The distance between the optical filter and the target is too great	Keep the distance of 3-5cm between the optical filter and your forehead.
	You have just come from a cold environment	Stay in a room between 10.0–40.0 °C (50.0–104.0°F) for at least 30 minutes before taking a temperature measurement.
Reading is too high	You have just come from a hot environment	Stay in a room between 10.0–40.0 °C (50.0–104.0°F) for at least 30 minutes before taking a temperature measurement.
	You are exposed to hot air generated by an air conditioner or heater	Leave the environment for at least 30 minutes before taking a temperature measurement.
	Low battery	Replace the batteries.
Hi	Human body temperature over 43.0°C/109.4°F	<ol style="list-style-type: none"> 1. First make sure that the optical filter is clean and free from dirt. 2. If the environmental temperature is out of range, then both patient and thermometer should stay in a room between 10.0–40.0°C (50.0–104.0°F) for at least 30 minutes before taking a temperature measurement. 3. If the problem persists after trying the above method, please contact the dealer or manufacturer.
Lo	Human body temperature below 32.0°C/89.6°F.	<ol style="list-style-type: none"> 1. First make sure that the probe is clean and free from dirt. 2. If the environmental temperature is out of range, then both patient and thermometer should stay in a room between 10.0–40.0°C (50.0–104.0°F) for at least 30 minutes before taking a temperature measurement. 3. If the problem persists after trying the above method, please contact the dealer or manufacturer.
Err	Environmental temperature is not in the 10.0–40.0°C (50.0–104.0°F) range.	<ol style="list-style-type: none"> 1. First make sure that the probe is clean and free from dirt. 2. If the environmental temperature is out of range, then both patient and thermometer should stay in a room between 10.0–40.0°C (50.0–104.0°F) for at least 30 minutes before taking a temperature measurement. 3. If the problem persists after trying the above method, please contact the dealer or manufacturer.

9. Specifications

Product name	Medical Infrared Thermometer
Product model	PC828/PC828EV
Applicable regulations and laws	ASTM E 1965 / EN12470-5 / GB/T 19146
Power supply	DC 3.0V (2 × AAA batteries)
Battery life	More than 2,000 measurements
Low battery indicator	Appears on the screen when the voltage is below $2.6V \pm 0.1V$
Measurement modes	Forehead & Room temperature mode
Measurement time	1 second
Temperature units	°C and °F (convertible)
Measurement range	32.0–43.0°C (89.6–109.4°F)
Accuracy	$\pm 0.2^{\circ}\text{C}/0.4^{\circ}\text{F}$
Display resolution	0.1°C/°F
Automatic shutdown	About 30 seconds
Memory	32 saved reading slots
Operation environment	Temperature: 10.0–40.0°C (50.0–104.0°F) Humidity: 15–85% RH, non-condensing Atmospheric pressure: 70–106kPa
Storage and shipping environment	Temperature: -25.0–50.0°C (-13.0–122.0°F) Humidity: $\leq 95\%$ RH, non-condensing Atmospheric pressure: 70–106 kPa
Date of manufacture	See label
Life	5 years
Net weight	91 g (not including batteries)
Dimension	138.5 × 97.7 × 38.4 mm

10. Symbol descriptions

Symbol	Description
	Waste electrical materials should be sent to a dedicated collection point for recycling.
	Type BF applied part.
	Please read the instructions carefully.
	Manufacturer
	Date of manufacture
	Serial number
	Batch code
	AUTHORISED REPRESENTATIVE IN THE EUROPEAN COMMUNITY
	CAUTION Inaccurate readings or thermometer damage may occur if the thermometer is not correctly used.

11. Maintenance

- 1) Clean the thermometer strictly as described in 'Cleaning and disinfection'.
- 2) Store the thermometer in a dry, dust-free, well-ventilated area.
- 3) Ensure that the thermometer is not exposed to direct sunlight.
- 4) Ensure that the storage and transportation environments meet the requirements.
- 5) Check for safety risks on a regular basis.
- 6) Remove the batteries if the thermometer will not be used for more than one month.

12. After-sales service

This device is under warranty for one year from the date of acquisition. Applications for repairs should be presented during the warranty period. Damage caused by improper use does not fall under the scope of the warranty. Batteries and packaging are also not covered by the warranty.

13. Declaration

The electromagnetic compatibility (EMC) of this product complies with the IEC60601-1-2 standard. In compliance with ISO10993-1, ISO10993-5 and ISO10993-10, the materials which come into contact with the user are not toxic and have no effect on tissues.

14. Appendix A: EMC Information - Guidance and Manufacturer's Declaration

CAUTION!

- This Medical Infrared Thermometer requires special precautions regarding EMC, and must be installed and put into service according to the EMC information provided in the ACCOMPANYING DOCUMENTS.
- Portable and mobile RF communications equipment can affect the thermometer.
- This device should not be used adjacent to or stacked with other electric equipment.


Guidance and manufacturer's declaration - electromagnetic emissions - for all EQUIPMENT and SYSTEMS

Guidance and manufacturer's declaration - electromagnetic emissions		
The Medical Infrared Thermometer is intended for use in the electromagnetic environment specified below. The customer or user of the device should ensure that it is only used in such an environment.		
Emissions test	Compliance	Electromagnetic environment - guidance
RF emissions CISPR 11	Group 1	As this device only uses RF energy for its internal functions, its RF emissions are very low and not likely to cause any interference to nearby electronic equipment.
RF emissions CISPR 11	Class B	The device is suitable for use in all establishments, including domestic establishments and those directly connected to the public low-voltage power supply network which supplies buildings for domestic purposes.

Guidance and manufacture's declaration - electromagnetic immunity - for all EQUIPMENT and SYSTEMS

Guidance and manufacturer's declaration - electromagnetic immunity			
The Medical Infrared Thermometer is intended for use in the electromagnetic environment specified below. The customer or user of the device should ensure that it is only used in such an environment.			
Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment - guidance
Electrostatic discharge (ESD) IEC 61000-4-2	$\pm 6\text{KV}$ contact $\pm 8\text{KV}$ air	$\pm 6\text{KV}$ contact $\pm 8\text{KV}$ air	Floors should be wooden, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.

Guidance and manufacturer's declaration - electromagnetic immunity - for EQUIPMENT and SYSTEMS that are not LIFE-SUPPORTING

Guidance and manufacturer's declaration - electromagnetic immunity			
The Medical Infrared Thermometer is intended for use in the electromagnetic environment specified below. The customer or user of the device should ensure that it is only used in such an environment.			
Immunity test	IEC 60601 test level	Compliance level	Electromagnetic environment - guidance
Radiated RF IEC 61000-4-3	3 V/m 80 MHz To 2.5 GHz	3 V/m	Portable and mobile RF communications equipment should not be used closer to any part of the device.
			<p>Infrared Thermometer, including cables, than the recommended separation distance calculated by the equation applicable to the frequency of the transmitter. Recommended separation distance:</p> $d = \left[\frac{3.5}{V1} \right] \sqrt{P}$ $d = \left[\frac{3.5}{E1} \right] \sqrt{P} \quad 80 \text{ MHz to } 800 \text{ MHz}$ $d = \left[\frac{7}{E1} \right] \sqrt{P} \quad 800 \text{ MHz to } 2.5 \text{ GHz}$ <p>Where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer, and d is the recommended separation distance in metres (m). b Field strengths from mixed RF transmitters, as determined by an electromagnetic site survey, a should be less than the compliance level in each frequency range. b interference may occur in the vicinity of equipment marked with the following symbol: </p>
<p>Note 1: At 80 MHz and 800 MHz, the higher frequency range applies.</p> <p>Note 2: These guidelines may not apply in all situations. Electromagnetism is affected by absorption and reflection from structures, objects and people.</p>			
<p>Theoretically, the field strengths of such fixed transmitters as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radios, AM and FM radio signals and TV signals cannot be predicted with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. The field strength in the location in which the thermometer is to be used should be measured to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as re-orienting or relocating the thermometer. Over the frequency range of 150 kHz to 80 MHz, the field strength should be less than 3 V/m.</p>			

Recommended separation distances between portable and mobile RF communications equipment and the EQUIPMENT or SYSTEM - for EQUIPMENT and SYSTEMS that are not LIFE-SUPPORTING

Recommended separation distances between portable and mobile RF communications equipment and the Medical Infrared Thermometer.

The Infrared Thermometer is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or user of the infrared thermometer can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the thermometer as recommended below, according to the maximum output power of the communications equipment.

Rated maximum output power of transmitter W	Separation distance according to frequency of transmitter m		
	150 kHz to 80 MHz	80 MHz to 800 MHz	800 MHz to 2.5 GHz
	$d = \left[\frac{3.5}{\sqrt{f}} \right] \sqrt{P}$	$d = \left[\frac{3.5}{E1} \right] \sqrt{P}$	$d = \left[\frac{7}{E1} \right] \sqrt{P}$
0.01	/	0.12	0.23
0.1	/	0.38	0.73
1	/	1.2	2.3
10	/	3.8	7.3
100	/	12	23

For transmitters rated at a maximum output power not listed above, the recommended separation distance d in metres (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

Note 1: At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies.

Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

15. Manufacturer information



Shenzhen Pacom Medical Instruments Co., Ltd.

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