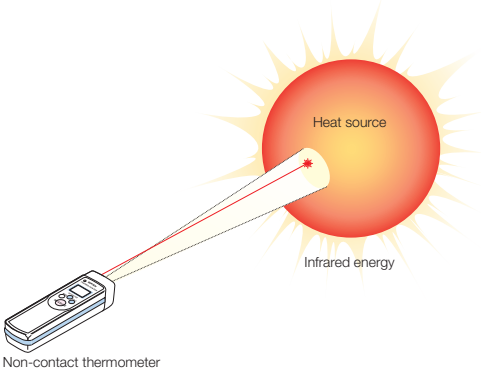
Q & A

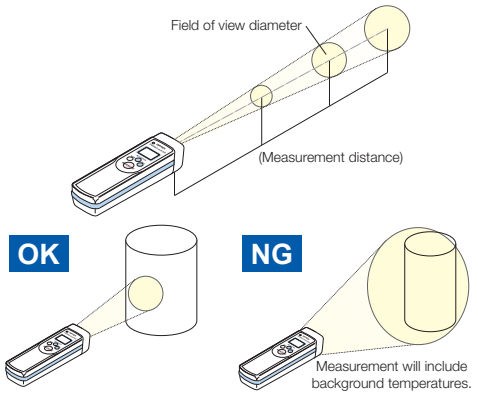
Q1 What is a non-contact thermometer?

The surfaces of individual objects emit infrared rays (with the heat of the object being proportional to the amount emitted). Non-contact thermometers measure the infrared rays without touching the object, and then convert the level of infrared emissions into temperature.



Q2 What is the relationship between the field of view and the measurement distance?

Non-contact thermometers measure the average temperature over a surface area of the measurement target. This area is called the field of view. The field of view varies depending on the measurement distance between the thermometer and the measurement target. The relationship between the field of view and the measurement distance varies for each product.
To ensure correct measurement, verify that the area of the part being measured sufficiently satisfies the field of view.

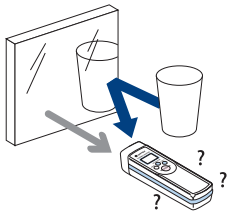


Q3 How far away can measurement be performed?

As indicated in Q2, the field of view widens as the measurement distance increases. Measurement is infinitely possible in principle, but the object to be measured must be larger than the field of view.

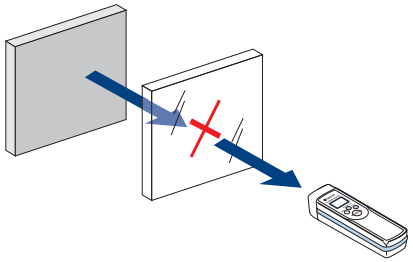
Q4 Can non-contact thermometers measure anything?

Non-contact thermometers are able to measure the surface temperature of both solids and liquids. (Measurement of gases, flames, and the inside of a solid/liquid is not possible.)
The following conditions make measurement difficult.
[Glossy metal surfaces]
Glossy metal surfaces have a very small level of infrared radiation. Moreover, because the glossy surface reflects the infrared rays of ambient heat sources, stable measurement is difficult using only general-purpose models.



• Use optional black tape (HB-250, sold separately) or create a matte finish using black spray to ensure stable measurement.

[Measuring through glass]
Although glass is able to transmit visible light, infrared rays are a different story. As such, measuring through glass is not possible. Instead, the thermometer will only measure the surface temperature of the glass itself.



Q5 Can measurement be performed on rotating targets?

Non-contact thermometers measure the temperature without touching the target, so measurement is possible even if a target is rotating. However, the average of the measured temperature from the surface rotated within the response time will be used as the surface temperature.

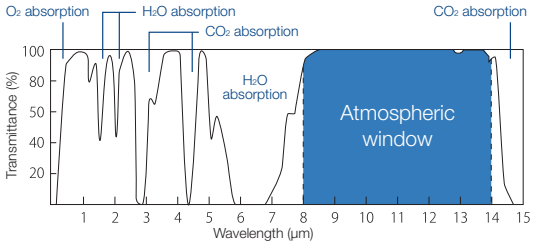
Q6 Can measurement be performed on uneven surfaces?

Unlike contact-type thermometers, non-contact thermometers measure an overall surface rather than a point. This means that average measurement is possible even if the surface in the field of view is uneven.

Q7 What is the spectral response?

Every object emits infrared rays at different wavelengths depending on the temperature and material composition. This means that non-contact thermometers based on detection of infrared rays must be selected according to the spectral response to be used for measurement. Moreover, any water vapor (H_2O) or carbon dioxide (CO_2) in the environment will absorb the infrared rays, so products with a spectral response that is not easily affected by these elements must be selected. Of all the long wavelength bands suitable for measurement, low-temperature non-contact thermometers from OPTEX FA utilize wavelengths between 8 and 14 µm, commonly referred to as the "atmospheric window" where influence from water vapor and carbon dioxide is minimal.

[Atmospheric window]



Q8 Is measurement affected by dust?

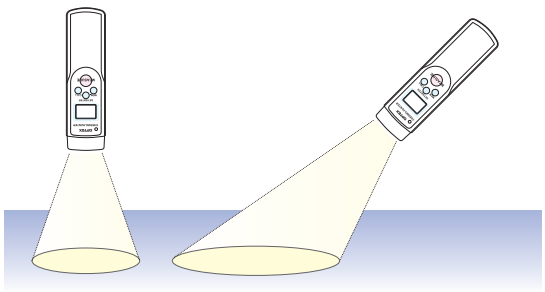
Invisible dust floating in the air has a minimal effect on measurement. However, care must be taken if the measurement target is not visually recognizable due to dust. In addition, any dust on the thermometer's lens (or filter) surface can affect measurement, so cleaning the lens on portable products or using an air purge pipe (sold separately) on stationary-type products is recommended.

Q9 Is measurement affected by water vapor?

As mentioned in Q6, OPTEX FA's non-contact thermometers use a spectral response that is not easily influenced by atmospheric water vapor or carbon dioxide. However, as explained in Q6, care must be taken if the measurement target is not visually recognizable due to water vapor.

Q10 Can measurement be performed at an angle?

When measurement is performed with the thermometer perpendicular to the surface of the measurement target, the field of view will become a circle (or square, depending on the model). Measuring at an angle will cause the field of view to instead become elliptical (or diamond-shaped), as shown below. Regardless of the shape of the field of view, measurement is possible so long as the field of view is smaller than the measurement target (see Q2). Exercise caution when measuring with an incident angle of 45 degrees or more.



Q11 Is measurement affected by color?

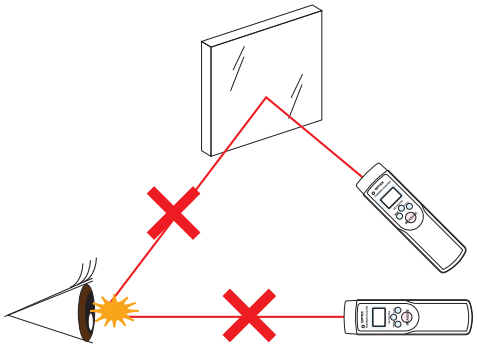
Measurement with non-contact thermometers can be affected by measurement target's surface conditions (such as whether the surface is glossy), but color generally does not affect measurement. This means that some paint materials (those with a slight gloss) may affect measurement. (Example: Metallic paint)

Q12 Can measurement be performed in the dark?

Non-contact thermometers detect infrared rays rather than visible light, so measurement is possible even in the dark.

Q13 Is the laser beam dangerous?

The lasers used in OPTEX FA non-contact thermometers are Class 2 lasers that conform to IEC 60825-1.
Do not look directly at the laser or intentionally aim the laser beam in another person's eyes.
Doing so may cause damage to the eyes or health.



Q14 Can the product measure body temperatures?

OPTEX FA non-contact thermometers are not designed for measuring body temperatures. Do not use these thermometers for medical practice.

Precautions when using stationary-type thermometers

General notes

- Be sure to read the instruction manual thoroughly before using the product.
- This instrument is not a thermometer for taking body temperatures. It is not intended for use in medical practices.
- Sudden changes in ambient temperature can cause measurement errors. Please ensure the product is not subject to sudden temperature changes during use.
- Do not use the product near objects that generate strong electromagnetic waves, or in environments with corrosive gases or explosive gases.
- Use only the rated power supply with the product. Using the product outside of the 12 to 24 VDC range may cause malfunction, short-circuiting, fire, or injury.
- Do not touch the product to the measurement target. This product is a non-contact thermometer. Contact with a high-temperature surface may result in deformation, the need for repairs, and measurement errors.

Fiber-type thermometers

[Applicable products: BF-30I-A]

Handling fibers

- This product uses glass-type optical fiber. This type of fiber is highly susceptible to bending, impacts, and other factors. Be sure to strictly adhere to the following usage guidelines.
  - Do not pull on the fiber.
  - Do not subject the fiber to impacts.
  - Do not bend at a radius of 50 mm (100 mm diameter) or less.

Situations where measurement may be difficult

- When measuring a mirror-like surface such as shiny metal.
  - Measure after attaching optional accessory HB-250 or after creating a matte finish using paint or the like.
- When measuring through glass.

Laser beam

[Applicable products: Products with laser markers/optional accessories only]

- This product uses a Class 2 laser that conforms to IEC 60825-1.
- Use the product according to the affixed warning labels.

Exporting

Laser warning labels

- Product specifications may differ slightly depending on the laws and compliance standards of the export destination country. Contact us for details.

CE mark

- All OPTEX FA non-contact thermometers are labeled CE Marks.
  They signify that non-contact thermometers have been assessed to meet statutory requirements.

Product warranty/Calibration

- The manufacturer's warranty will be valid for one year following the date of purchase.
- Contact us for inquiries regarding calibration services.

Precautions when using portable thermometers

General notes

- Be sure to read the instruction manual thoroughly before using the product.
- This instrument is not a thermometer for taking body temperatures. It is not intended for use in medical practices.
- Sudden changes in ambient temperature can cause measurement errors. Please ensure the product is not subject to sudden temperature changes during use.
- Avoid using the product near objects that generate strong electromagnetic waves.

Waterproofing

PT-5LD/7LD

- Although this product is waterproof, it cannot be used for underwater measurements. Moreover, any droplets adhering to the filter or around the filter can cause measurement errors. Be sure to wipe well before use.

PT-S80/U80, PT-2LD, PT-3S

- This product is not waterproof. Do not use this product in water or in a location where it may be exposed to water.

Situations where measurement may be difficult

- When measuring a mirror-like surface such as shiny metal.
  - Measure after attaching optional accessory HB-250 or after creating a matte finish using paint or the like.
- When measuring through glass.

Laser beam

[Applicable products: Products with laser markers (PT-5LD/7LD, PT-S80/U80, PT-2LD) only]

- This product uses a Class 2 laser that conforms to IEC 60825-1.
- Use the product according to the affixed warning labels.

Exporting

[Applicable products: Products with laser markers (PT-5LD/7LD, PT-S80/U80, PT-2LD) only]

Laser warning labels

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Product warranty/Calibration

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- Contact us for inquiries regarding calibration services.

Various standards

Degree of protection

The indicated degrees of protection are based on IEC (International Electrotechnical Commission), JIS (Japanese Industrial Standards), and JEM (Japan Electrical Manufacturers' Association) standards. This makes it possible to identify the estimated environmental resistance of our non-contact thermometers.

IP □ □

Degree of protection related to solids (body parts, foreign matter, etc.)

Rating	Degree of protection	IEC standard
5	No intrusion of dust capable of influencing operation	Dust-proof
6	No intrusion of dust	Dust-proof

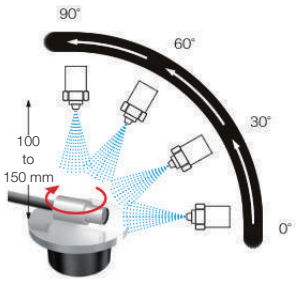
Degree of protection related to water

Rating	Degree of protection	IEC standard
5	Operation not affected by water projected in jets from any direction	Water-jet (washdown) resistant
6	No intrusion of water applied directly from any direction	Water-resistant
7	No intrusion of water under the prescribed conditions even when submerged	Watertight
8	Can be used even in water up to the specified pressure	Submersible

The above diagram does not include IP44 ratings and below.
1. "Dust-proof" refers to non-contact thermometers that do not show evidence of dust intrusion even after being exposed to an environment with a specific density of 75 µm or smaller dust particles.
2. "Watertight" refers to non-contact thermometers that do not show evidence of water intrusion even after being submerged in water for 30 minutes at a depth of 1 m.

What is IP69K?

IP69K is a protection rating stipulated by German standard DIN 40050 Part 9 concerning high-temperature, high-pressure water.



Test details	Sensors are placed on a turntable and rotated 5 times per minute while being sprayed with water under the following conditions.
Water pressure	80 to 100 bars
Flow rate	14 to 16/min
Water temperature	+80°C (+176°F)/±5°C (9.0°F)
Distance from spray nozzle	100 to 150 mm
Injection angle	0°, 30°, 60°, 90°
Spray time	30 seconds at each angle

• IP69K does not guarantee operation under the above conditions.
Water or oil that adhere to the optical surface could cause light to refract and prevent measurements from being performed correctly.

Laser beam safety standards

Light from the laser beam may be harmful to humans depending on the amount of exposure.
To prevent injury to users caused by laser products, the output level of laser equipment is classified according to safety using IEC (International Electrotechnical Commission) and JIS (Japanese Industrial Standards) criteria.
The risk assessments and classifications are listed to the right.
Lasers for OPTEX FA non-contact thermometers are Class 2 lasers.

When exporting/selling a non-contact thermometer with a built-in laser, be sure to verify the requirements for the destination country in advance as laser warning label requirements may vary.

Classification	Risk assessment
Class 1	This product is designed to be inherently safe. This class applies to output at wavelengths of 180 nm to 1 mm.
Class 1M	Direct observation of the beam with the naked eye (without optical means) is safe even for prolonged periods. This class applies to output at wavelengths of 302.5 to 4000 nm.
Class 1C	Intended for use in medical, surgical, and cosmetic procedures involving contact with human tissues other than the eyes (skin, muscle, etc.). Although laser emission may be equal to or greater than Class 3R lasers, exposure to the eyes is prevented through technical protection measures.
Class 2	Class 2 lasers emit visible light at wavelengths of 400 to 700 nm. The risk of damage to the eyes does not increase even when optical instruments are used.
Class 2M	Direct observation of the beam by optical means may be dangerous.
Class 3R	Class 3R lasers are not considered inherently safe. The risk of injury, however, is relatively small.
Class 3B	Exposure of the beam to the eyes is dangerous even with short, accidental exposure. Observation of diffuse reflection is generally considered safe.
Class 4	High output: Diffuse reflection can be dangerous. This includes risk of skin disorders and fire.

• Source: JIS C 6802:2014, Appendix C

PSC mark

In 2001, Japan's Ministry of Economy, Trade and Industry enacted the Consumer Product Safety Act requiring portable products equipped with lasers to clear specified technical standards. Only those products that pass conformity inspection by the accreditation body are cleared for sale.
Products that pass the conformity inspection are required to display/describe the following marks on the actual product.
OPTEX FA's portable non-contact thermometers equipped with lasers have passed conformity inspection by JQA (Japan Quality Assurance Organization).

CE mark

To allow for free circulation of products within Europe following the formation of the European Union, product safety regulations referred to as the EU directives were established. Products that conform to the requirements specified in the EU directives are affixed with the CE mark.
The inclusion of this mark is mandatory for any product that will be placed on the EU market.
Non-contact thermometers are products that are subject to the EU directives known as the EMC Directive and the RoHS Directive.
The EMC Directive requires that electromagnetic noise (electromagnetic waves, etc.) emitted from equipment does not interfere with other devices, and that the device is protected from interference from other electromagnetic noise (radio communication, surge, etc.). Most electrical and electronic equipment is subject to the EMC Directive.
The RoHS Directive is a law restricting the use of certain hazardous substances in electrical and electronic equipment. Six substance groups are included—lead, mercury, cadmium, hexavalent chromium, PBB (polybrominated biphenyls), and PBDE (polybrominated diphenyl ethers)—and the maximum concentration values are specified in the directive. In addition to these six substance groups, DEHP (bis(2-ethylhexyl) phthalate), BBP (butyl benzyl phthalate), DBP (dibutyl phthalate), and DIBP (diisobutyl phthalate) will be designated as hazardous substances in the future.

Information on discontinued models

Stationary-type non-contact thermometer

Discontinued models	Recommended alternative model	Page
MI-305	SA-80T-4A (J)	10
MI-710	CS-30TAC, 40TAC / CS-30TAC-HT, CS-40TAC-HT	6
BA-32T	BA-30TA-S / BA-30TV-S	12
BA-04T	BA-06TA-S / BA-06TV-S	12
BA-30TA	BA-30TA-S / BA-30TV-S	12
BA-30TA02	BA-30TA-S / BA-30TV-S	12
BA-30TV	BA-30TA-S / BA-30TV-S	12
BA-06TA	BA-06TA-S	12
BA-06TV	BA-06TV-S	12
BS-32T	BS-30T+BS-A, BS-30T+BS-V	18
BS-04T	BS-05T+BS-A, BS-05T+BS-V	18
BF-30G0	BF-30I-A	24
BF-30G1	BF-30I-A	24

Portable non-contact thermometer

Discontinued models	Recommended alternative model	Page
PT-2L	PT-2LD	32
PT-02L	PT-7LD	26
PT-02LD	PT-7LD	26
PT-3LD	PT-S80, PT-U80	30
PT-3L	PT-S80, PT-U80	30
PT-3LF	PT-S80, PT-U80	30
VF-3000	The after-sales service for this product has ended.	-