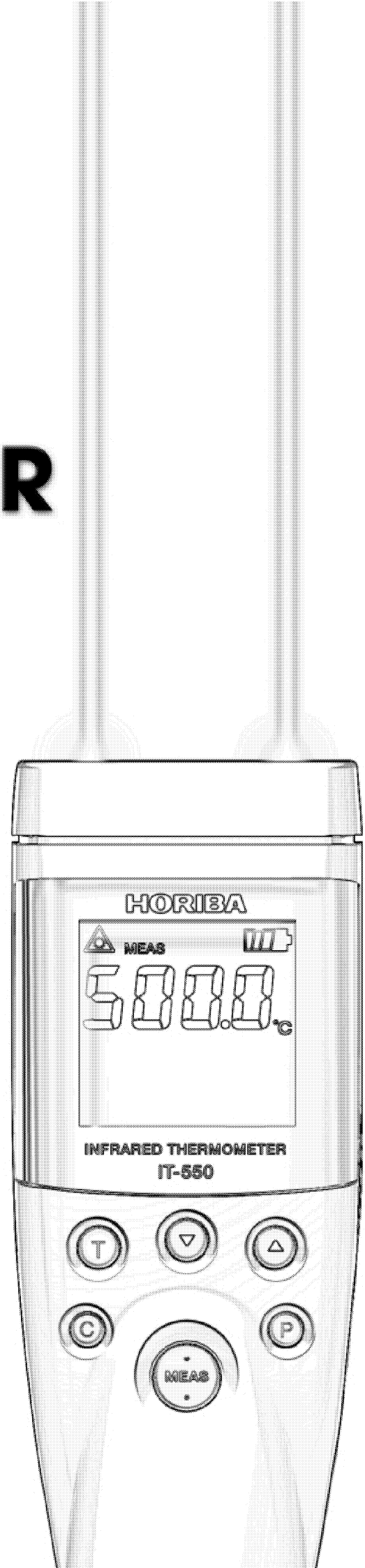
HORIBA

INFRARED THERMOMETER

IT-550F (For field use)

CODE : I1000151000C



INSTRUCTION MANUAL

Before using the INFRARED THERMOMETER, throughly read this manual for the proper operation. After reading, keep this manual for future reference.

Printed in Japan

Introduction

Thank you for purchasing our IT-550F infrared thermometer. This Instruction Manual describes the operating procedure for IT-550F.
Be sure to read this manual before using the IT-550F, and store the manual in a safe place so it is readily available whenever necessary.

Limitation of responsibility

Please note the following limitation before using this product.
HORIBA, Ltd. will assume no responsibility for damage to data resulting from the breakdown of this product or the wrong operation of the product by you or a third party.

Conformable Directive

This equipment conforms to the following directives and standards;
Directives : The EMC Directives 89/336/EEC as amended by 91/263/EEC, 92/31/EEC and 93/68/EEC, in accordance with the Article 10 (1) of the Directive.
Standards : EN61326:1997/A2:2001 Class B Minimum requirements (Emission tests were conducted according to the requirements of EN55011:1998)

CE

FCC rules

Warning: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the **FCC Rules.** These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.
Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

SAFETY PRECAUTIONS

HORIBA's Safety Policy

We arrange warning labels on our product. Each warning message is described by the following style in this instruction manual. For your safety operation of the equipment, these instruction are to be followed strictly.

⚠ Warning:

This indicates an imminently hazardous situation which, if not avoided, may result in death or serious injury.

⚠ Caution:

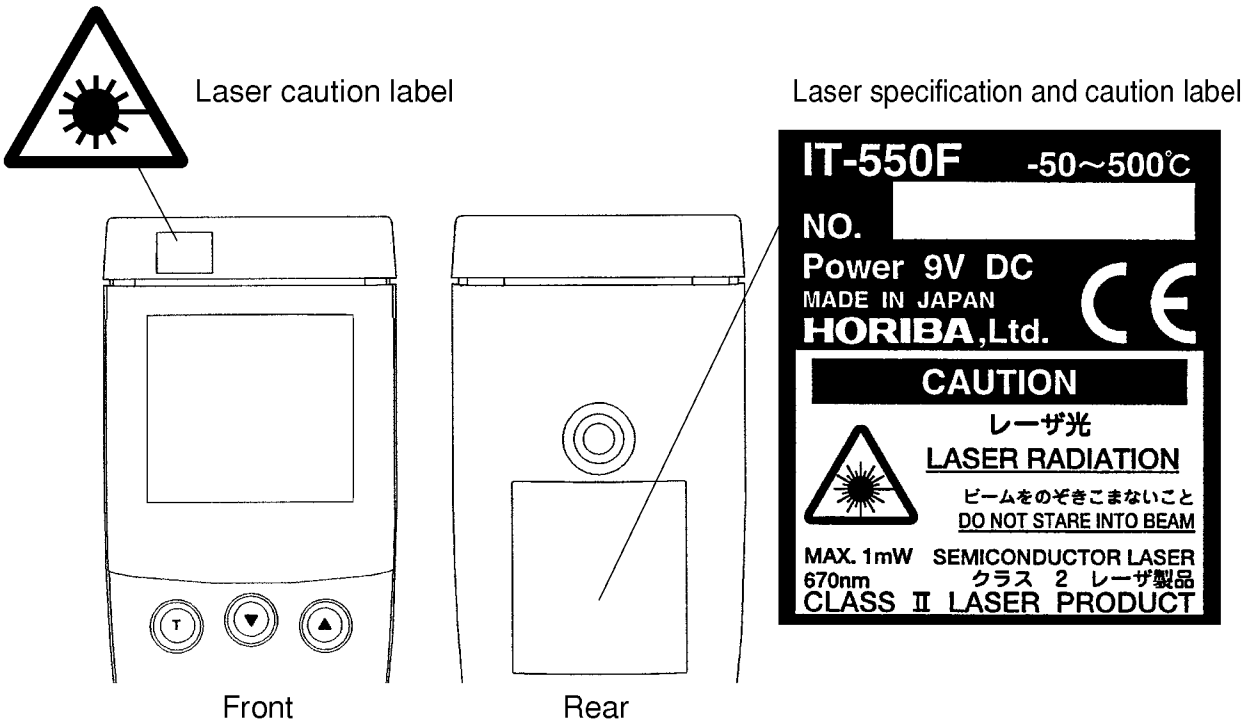
This indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

Note:

This indicates a matter you need to be careful about during operation.

Warning Labels

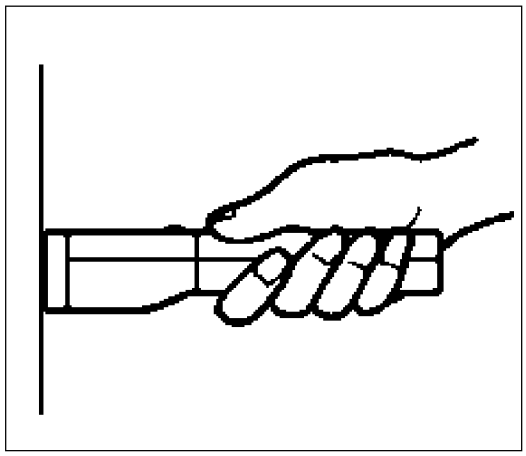
Location of labels used in the IT-550F are as follows.



Caution!

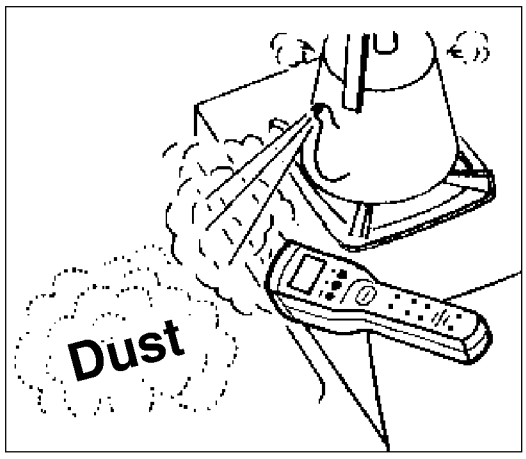
Follow the instructions below, to avoid breakage or malfunction.

■ Usage:



- Do not touch the unit to the objects to be measured.
- Never drop the unit or subject it to strong impact.
- Do not touch the lens with anything hard, and do not apply force on or insert foreign substances into the lens.
- Do not bring the unit into contact with electrically charged bodies.
- Error may occur when unit emissivity is set differently from that of object being measured.
- Never clean the unit with water or soak it in water, this may damage the unit.

■ Environment:



- Do not use or store the IT-550F in direct sunlight, and do not expose to dust, high temperature or high humidity, corrosive enviroment.
- Do not use the unit near any objects that have strong electromagnetic fields such as transceivers and radiophones.
- Do not allow condensation to form on the unit (ex., bringing it from cold to warm environments).
- This unit has been constructed with some degree of water resistance. However if it is subjected to direct contact with water for a long period of time, water may penetrate the unit. Further, water drops left on the lens will cause measurement errors. Wipe off any water drops immediatery.
- Make sure that the connector cover is closed and the screws of the battery box are firmly tightened when exposed to water.
- When ℃ indicator blinks, operating temperature is out of acceptable range. Stop operation immediately.

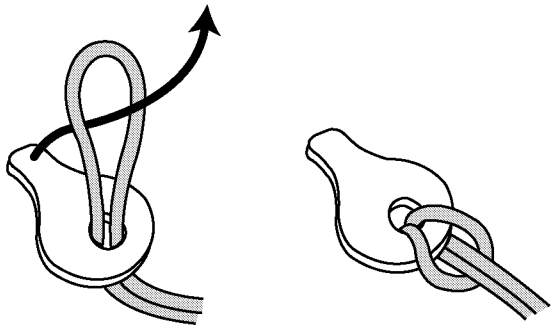
Contents

Before operating

Before to operating the thermometer, follow the instructions below:

1 Attaching the accessory screwdriver

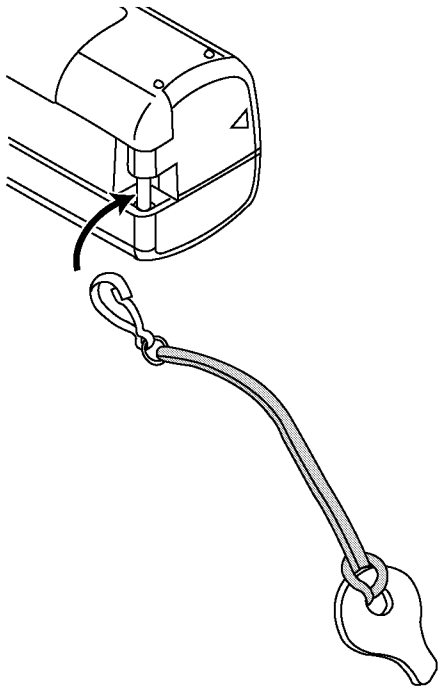
Attach the accessory screwdriver to the hand strap so it will not get lost. This screwdriver is used to remove the battery cover screws.



Attaching the accessory screwdriver

2 Attaching the hand strap

Attach the hand strap to the instrument to help prevent it from being dropped.



Attaching the hand strap

3 Loading the battery

Place the battery correctly in the battery compartment at the back of main body.
For loading the battery, refer to "Battery loading and replacement" on page 3.

4 Setting the date and time

For how to set the date and time, refer to " Setting the date and time" on page 4.

Battery loading and replacement

⚠ Caution:

- This thermometer does not come with the battery loaded. Load the battery according to the procedure described below.
- If the battery indicator starts to blink, promptly replace the battery.

If the main body is wet, be sure to wipe off the water, set the battery compartment facing downward so that any water will not enter the case, and then remove the battery cover.

Dry battery used:	Manganese battery 6F22 or alkali battery 6LR61

1 Remove the battery cover

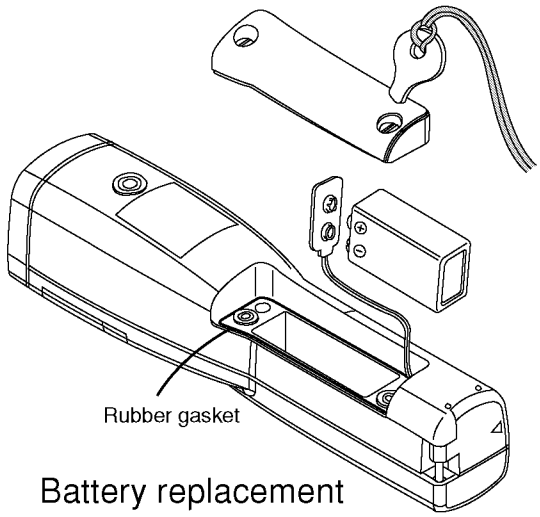
Loosen the screws of the battery cover at the back of the main body with the accessory screwdriver and remove the battery cover.

2 Replace the battery

Remove the old battery.
Check the polarity (+ or -) of the new battery, and load it correctly.

3 Close the battery cover

After the battery is loaded, close the battery cover, and tighten the screws evenly and firmly.



Battery replacement

⚠ Caution:

- Take care not to get the wire caught in the battery cover.
- Do not close the battery cover if the rubber gasket is dirty or twisted. Otherwise, the water-resistance of the instrument's main body will not be maintained.
- When the battery is removed, various set values are lost. When replacing the battery, set the emissivity and the date and time. (Refer to "Setting emissivity (ε)" on page 14. " Setting the date and time" on page 4.)
- Never dispose of by incineration. Do not attempt to recharge old batteries.
- Return exhausted battery to electric appliance store, or dispose in accordance with environmental regulations.
- Remove batteries when the unit is not used for more than six months.
- The batteries included with IT-550F have a limited life.

Setting the date and time

When using the unit for the first time or after battery replacement, set the date and time.

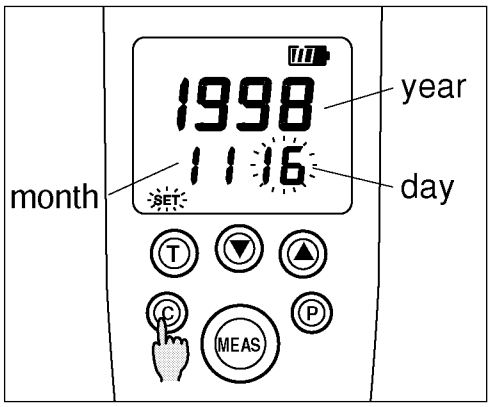
Date

Operating procedure

1 Display the date

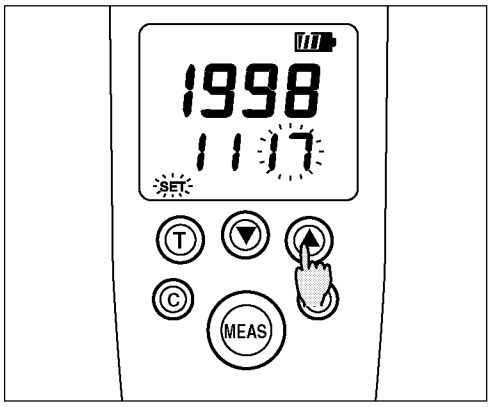
Press the Ⓒ key when the power is OFF. The date can then be set (the word SET will blink).
Every time Ⓒ key is pressed, the setting item changes in the order of day → month → year.

day → month → year



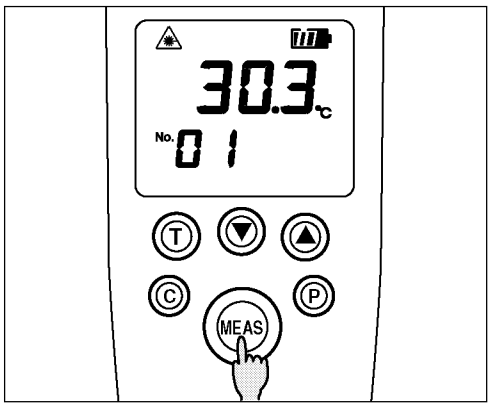
2 Change the date

Blinking figures can be changed with the ▼▲ keys.



3 Completing the date setting

Pressing the Ⓣ key moves to the time setting mode.(Refer to page 5.)
Pressing the MEAS key completes the date setting.



Note:

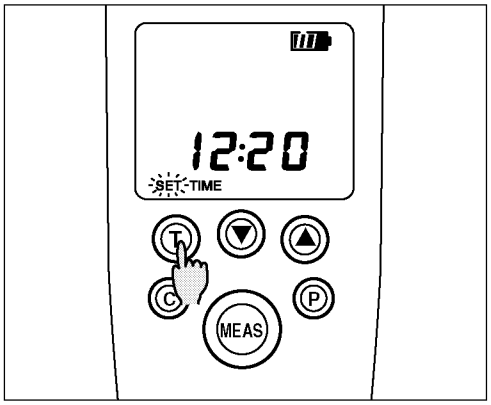
Setting is also possible for a date that does not actually exist (for example, November 31, February 31, etc.), so confirm the date after setting it.

Time

Operating procedure

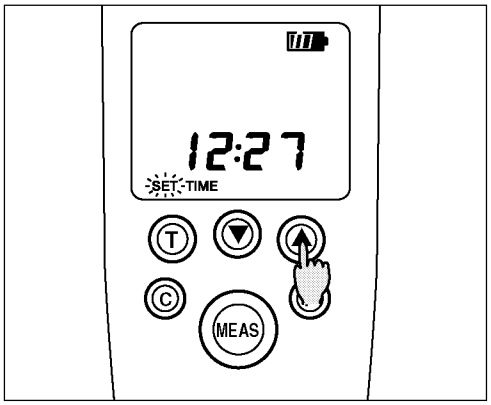
1 Display the time

Press the Ⓣ key when the power is OFF. The time is displayed, and the word TIME will blink. Press the Ⓣ key again. The time can be set (the word SET will blink).



2 Change the time

Using the ▼▲ keys, set the present time.
Time is displayed in 24-hour format.



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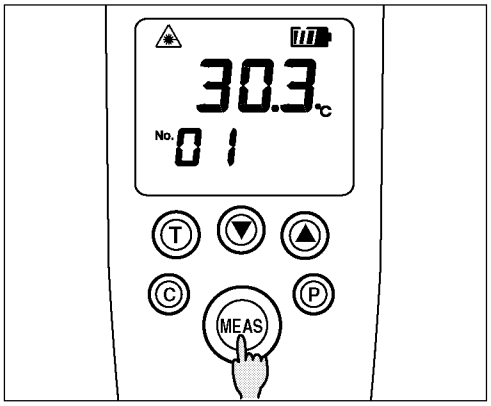


Maintenance

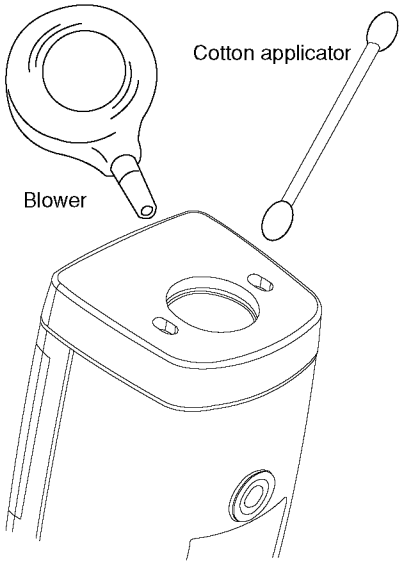
Lens cleaning

⚠ Caution:

Lens dirt may cause measurement error and may result in lens erosion.

If the lens gets dirty:

- Remove the dust on the lens using a camera lens blower.
- Wipe off any water drops with gauze or a cotton applicator.
- Wipe away any persistent dirt with a cotton applicator soaked in alcohol.



Lens cleaning

Body cleaning

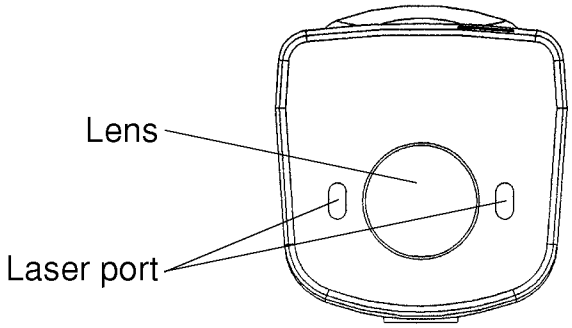
Wipe gently with dry cloth. Persistent dirt may be wiped with slightly damp cloth containing diluted neutral detergent.

⚠ Caution:

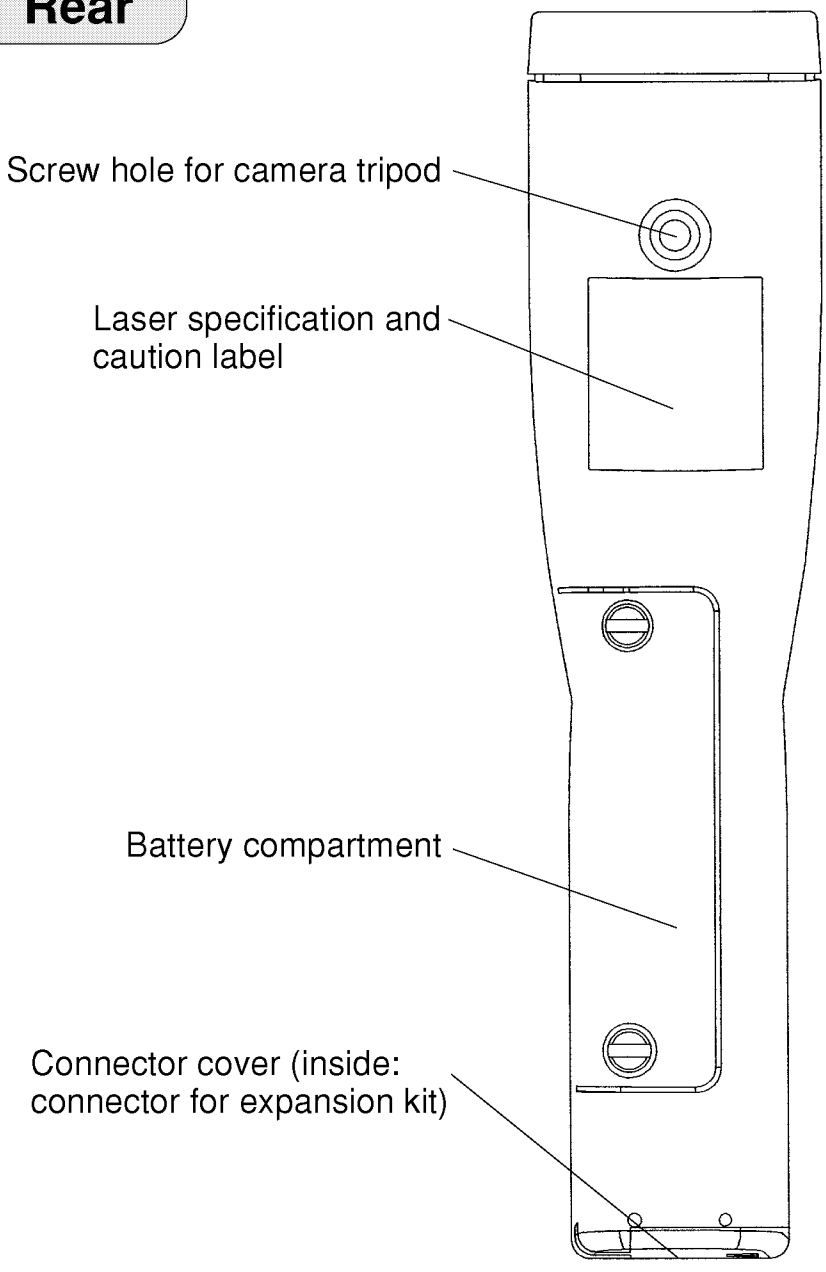
Organic solvents cause surface erosion, and should not be used.
The main body is water-resistant, but it is not waterproof. Never wash the main body with water or soak it in water. Doing so will damage the thermometer.

Names and Functions of Each Part

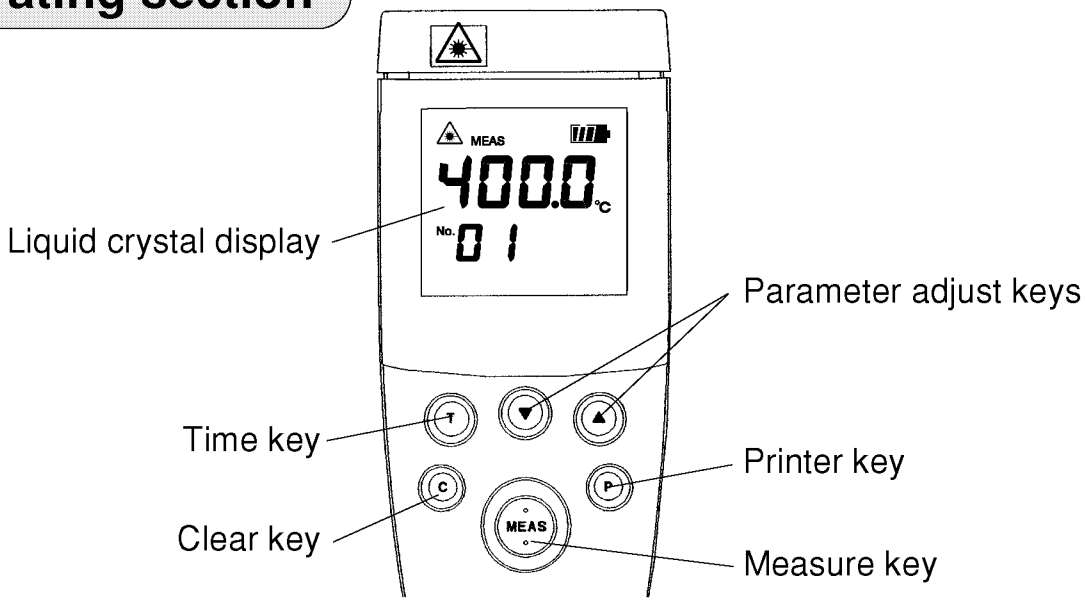
Front



Rear



Operating section



T Time key

Used to set the time and to check the time of stored data.

▼▲ Parameter adjust keys

Used to set the time and to check the time of stored data.
Used to change the date, time, and emissivity, and to increase/decrease the memory data No.
▼ : Decrease
▲ : Increase

C Clear key

Used to set the date and to clear displayed memory data.

MEAS Measure key

Performs measurement while (MEAS) is being pressed.Measured value is held when the key is released.

P Printer key

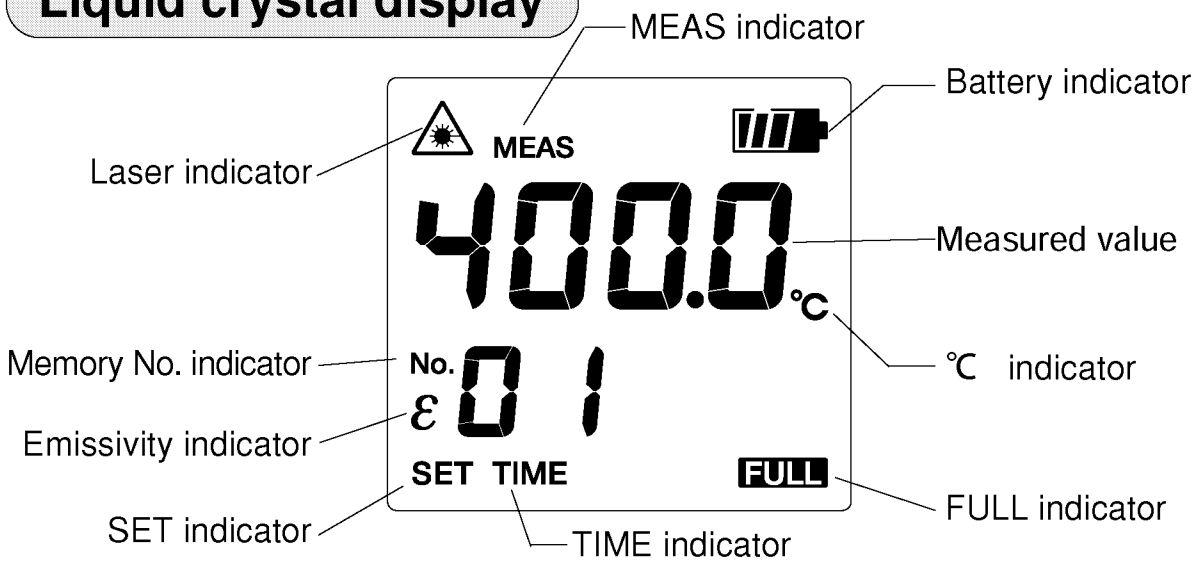
Pressing the Ⓟ key outputs the stored data to an external printer.

Note:
To use the printer output function, an optional expansion kit is required. The printer must be provided by the user. ※1

There is no power switch.
Pressing the (MEAS) key turns ON the power. Power is cut OFF in about 15 sec. if the key is not pressed, except output to printer (automatic power OFF).

※1 Printer with RS-232C interface.

Liquid crystal display



MEAS indicator

Blinks when measurement is being carried out.

Laser indicator

Displayed when laser is not emitted.
Blinks when laser is being emitted.

Memory No. indicator

Displayed together with address of data memory.

Emissivity indicator

Displayed when emissivity is being set and displayed.

SET indicator

Blinks when date, time, and emissivity are being set.

TIME indicator

Displayed when time is set and the time of data memory is displayed.
Blinks during time operation.

FULL indicator

Blinks when data memory is full. (max. 130)

℃ indicator

Unit of centigrade.

Measured value

The entire display blinks when the measurement value falls outside the measurement range (-50 to 500℃).

Battery indicator

Blinks when battery needs to be replaced.

Operation

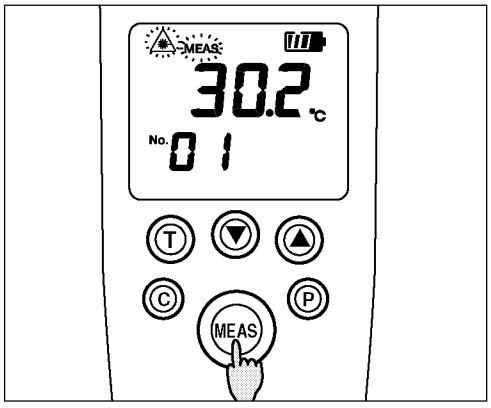
First, confirm that the emissivity setting matches the object to be measured. (Default is 0.95.) Perform measurement according to the following procedure. For the method to decide emissivity, refer to "Setting emissivity (ε)" on page 14.

⚠ Warning:

Class Ⅱ laser is used.
Never stare into the beam or direct it toward the eyes.
Also, be careful to avoid reflected light from a mirror, etc.

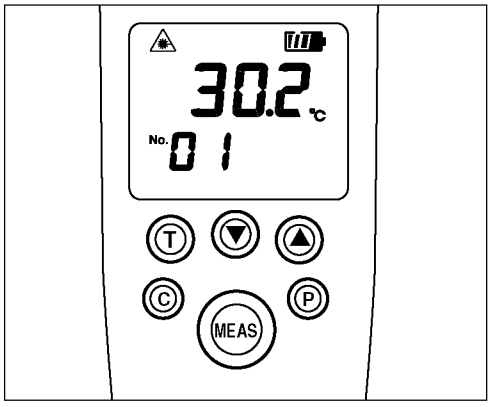
1 Start measurement

Press (MEAS) key to turn ON the power. Next, aim the lens toward the object to be measured, and press the (MEAS) key to start measurement. While the (MEAS) key is being pressed, measurement is performed and the laser sighting beam is emitted.
Aiming the laser beam at the object makes sighting easy.



2 Complete measurement

Releasing the (MEAS) key completes the measurement. The laser beam turns OFF, and the measured value is stored in the address indicated by "No." The automatic power OFF function turns OFF the power in about 15 seconds.



Emissivity (0.95)

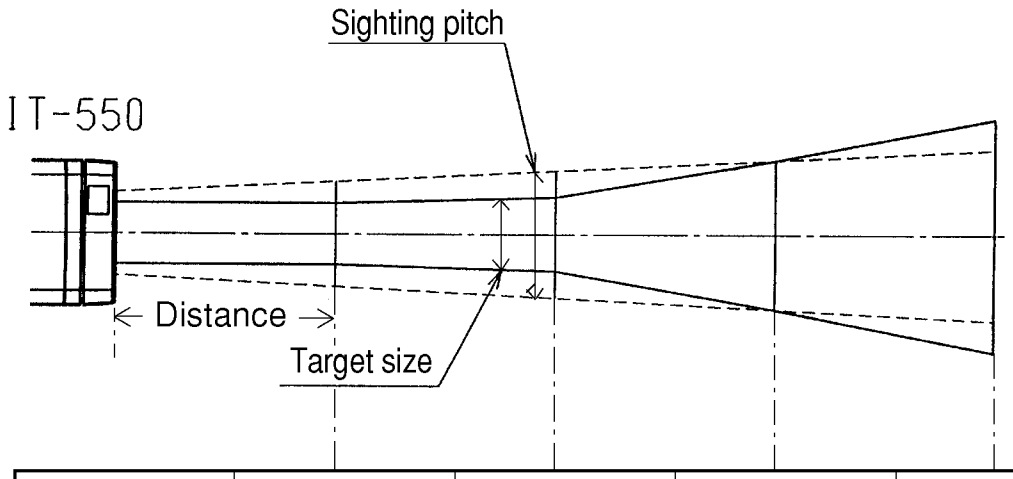
The emissivity of this unit has been set at 0.95.
Most rubber, plastic, paper, and food can be measured correctly with this value.

Target size and sighting

The size of the object to be measured must be sufficiently larger than the sighting pitch shown in the Target size and sighting pitch diagram.
The sighting beam must encompass the area to be measured up to the maximum. measurement distance of 1.5 meters.

Note:

Target size is based on 90% energy limit. For best results, the diameter of the object should be 1.5 times or more larger than the target size.



Distance	0.5 m	1 m	1.5 m	2 m
Target size	φ20mm	φ24mm	φ48mm	φ80mm
Sighting pitch	34mm	41mm	48mm	55mm

Target size and sighting pitch

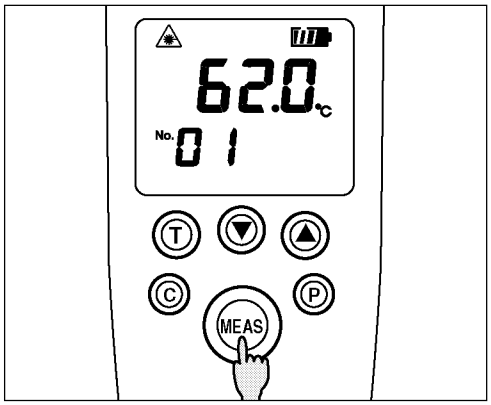
Measurement distance

The mean value of the temperature in each point within "Target size" area may be displayed when the distance is more than 2 meters.
It should be considered that the emission from the object may be influenced by absorption and scattering in the optical path.

Storing the data

Storing the data

Releasing the (MEAS) key completes the measurement and stores the measured value in the address indicated by memory "No." Data can be stored in any address (1 to 64) by changing the No. using the ▼▲ keys. Further, multiple data can be stored in the same address.



The maximum number of measurements that can be stored is 130.

A maximum of 130 measurements can be stored in memories No. 1 to No. 64.

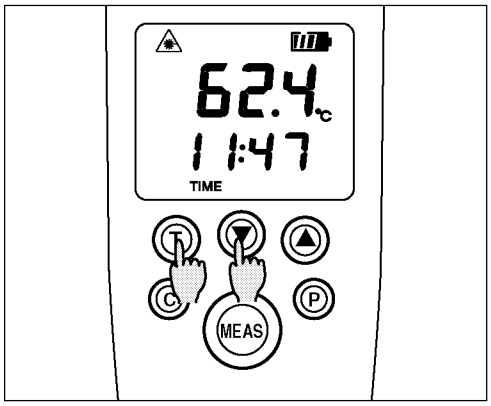
It is recommended to clear all memory data before storing new data.

Note: When the battery is runs out, all memory data is lost.

Displaying data memory

The data of the last memory No. in the stored data can be displayed using the ▼▲ keys.

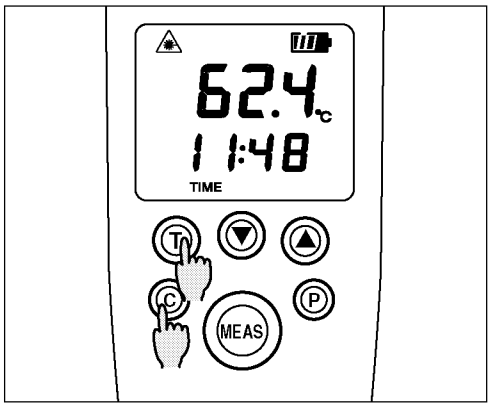
Data in the same No. can be displayed using the ▼▲ keys while pressing the T key. The time of data memory is displayed.



Clearing the data memory

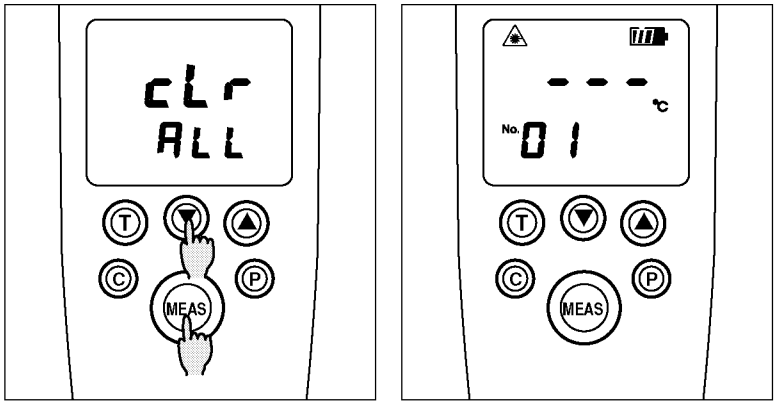
Pressing the Ⓒ key clears the displayed data.

Display the past data in the same memory No. by pressing the ▼▲ keys with the Ⓣ key held down. Then, press the Ⓒ key. The displayed data will be cleared.

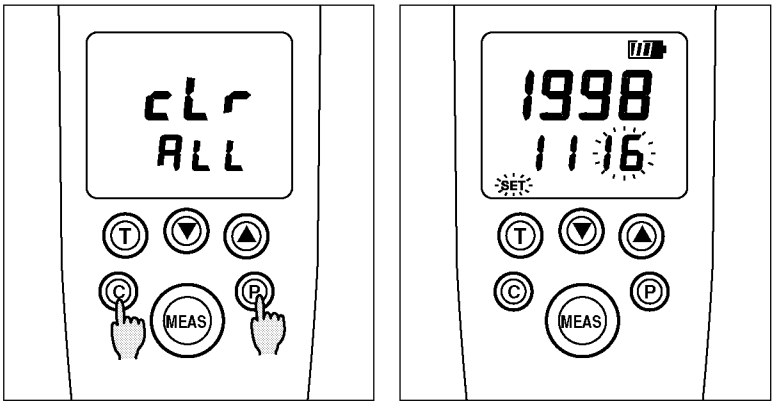


Clearing data memory completely

All the stored data can be cleared by pressing the (MEAS) key while pressing the ▼ or ▲ key when the power is OFF.



Press the Ⓒ key with the Ⓟ key held down when the power is OFF. The date can be confirmed after the data memory has been completely cleared.

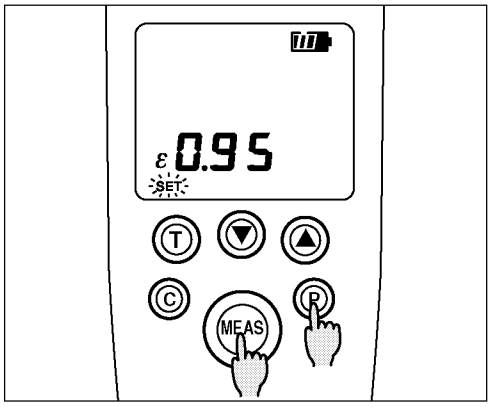


Setting emissivity (ε)

Each substance has a particular emissivity. Precise measurement requires appropriate setting.

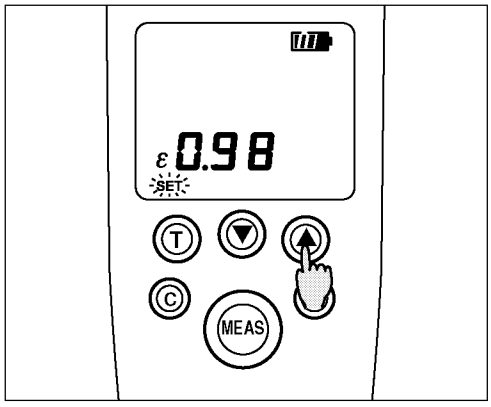
1 Displaying emissivity (ε)

To display emissivity, press the (MEAS) key while pressing the Ⓟ key when the power is OFF.
The SET indicator will blink.



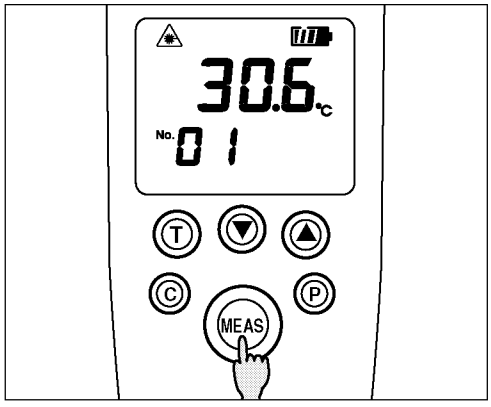
2 Setting emissivity (ε)

Numerals can be changed with the ▼▲ key.



3 Completing the emissivity (ε)

Press the (MEAS) key to complete the setting. Measurement can be started immediately.



Examples of emissivity

Objects with low emissivity may cause readout fluctuation. Use of an optional black-body spray or tape is recommended.

Emissivity differs according to not only the matter but also to the surface type (unevenness) or thickness of the material. Examples in the table below are for reference only.

Item	Emissivity	Item	Emissivity
Asphalt	0.90 to 0.98	Charcoal (powder)	0.96
Concrete	0.94	Paint, lacquer	0.80 to 0.95
Cement	0.96	Paint, lacquer (gloss)	0.97
Sand	0.90	Rubber (black)	0.94
Soil	0.92 to 0.96	Plastic	0.85 to 0.95
Water	0.92 to 0.96	Wood	0.90
Ice	0.96 to 0.98	Paper	0.70 to 0.94
Snow	0.83	Alumina	0.76
Glass	0.90 to 0.95	Chromite	0.81
Ceramics	0.90 to 0.94	Cuprite	0.78
Marble	0.94	Ferrite	0.78 to 0.82
Fluorite	0.30 to 0.40	Nitrite	0.90
Gypsum	0.80 to 0.90	Titanite	0.40 to 0.60
Plaster	0.89 to 0.91	Zn Oxide	0.11 to 0.28
Brick (red)	0.93 to 0.96	Brass oxide	0.56 to 0.64
Fiber	0.90	Irregular bronze surface	0.55
Cloth (black)	0.98	Rolled stainless steel	0.45
Skin (human)	0.98	Red-rusted steel	0.69
Leather	0.75 to 0.80		

Troubleshooting

Problem	Cause	Countermeasure
No readout	Battery is dead.	Replace the battery.
Incorrect readout	Dirt or water drops are on the lens.	Clean lens.
	High temp. heat source near by.	Shield unit from source.
	Improper emissivity setting.	Correct setting.
	Battery capacity is low. (indicator is blinking.)	Replace the battery.
℃ indicator blinks.	Operating temperature range (0 to 40℃) exceeded.	Use in operating temperature range.
"Err" displayed.	Unit defective.	Contact representative.

Specifications

Model	IT-550F
Detector/optical lens	Thermopile/Silicon
Spectral response	8 to 16 μm
Measurement temp. range	-50 to 500℃
Display resolution	0.1℃
Accuracy -50.0 to -0.1℃ 0.0 to 200.0℃ 200.1 to 500.0℃	within ± (10% of reading -2.0)℃ within ± 2.0℃ within 1% of reading
Repeatability -50.0 to -0.1℃ 0.0 to 500.0℃	within ± 1.0℃ within ± 0.5℃
Response time	Less than 1.6 s (95% response)
Target size	24 ± 3 mm/ 1m (90% energy limit)
Sighting	2-beam laser sight (class 2)
Data memory	1 to 64 (multiple data can be stored in the same No.)
Number of memory	130 (total of No. 1 to No. 64)
Displayable memory content	No. , measured value and time
Emissivity setting	Normally fixed at 0.95 (can be changed in 0.10 to 1.00 with the keys)
Other functions	Date setting, time setting, memory clear, memory full display, printer output RS-232C interface ※1
Power	1 battery (6F22 or 6LR61) 9 V
Battery life	20 hours or more under continuous operation at sighted lighting (alkali battery)
Operating ambient temperature, etc.	Temperature 0 to 40℃, relative humidity 35 to 85%, no condensation
Dustproof, waterproof	IP54 ※2
Storage temperature	-20 to 55℃, no condensation
Dimensions (mm)	200 (L) ×47 (W) ×48 (H)
Mass (including battery)	280 g

※1 To use the printer output function and RS-232C interface, an optional expansion kit is required.

※2 IP54: No harmful influence when splashed from any direction(based on IEC529 (1989))

Standard accessories

- Battery (6F22) ·····1
- Hand strap·····1
- Screwdriver (for removing battery cover) ·····1
- Carrying case ·····1
- Instruction manual ·····1

Optional accessories

- Expansion kit (expansion box, modular cable, analog voltage output cable, software for personal computer)
- Black-body spray
- Black-body tape
- AC adapter (above expansion kit is necessary.)

Optional expansion kit provides the following functions:

- Printer out put of measured data
- Input of data to personal computer
- AC adapter connection ※1

※1 AC adapter itself is not included in the expansion kit.

⚠ Warning:

Use of any AC adapter not recommended by HORIBA may cause a fire or damage the instrument.

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