

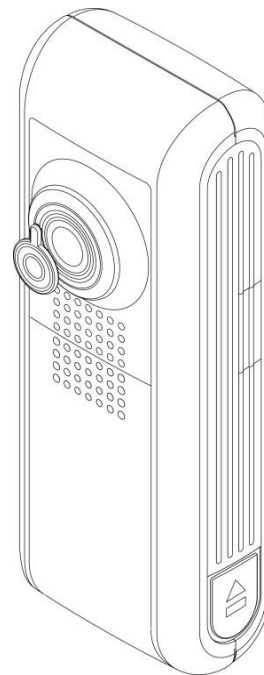
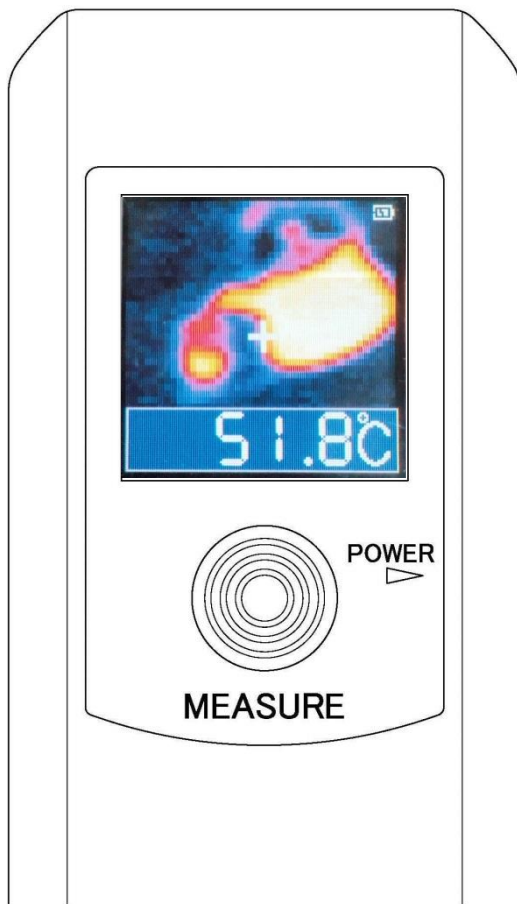
**CHINO**

TP-S

**Easy Thermo**

**Instruction Manual**

# INSTRUCTIONS



Please store this instruction manual in a designated place for future reference.

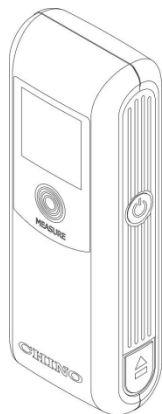
**CHINO**

# ■ Introduction

Thank you for purchasing the Model TP-S Easy Thermo. In order to use this product safely, please read this instruction manual completely before use and confirm the correct handling and instructions. In addition, please retain this instruction manual for future reference.

## ■ Before using

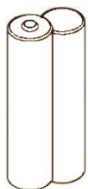
Please confirm the contents of packing. If something is missing, please contact to your nearest distributor.



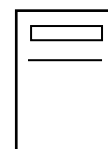
Easy Thermo



Strap (Attached to this product)



AA (UM-3) alkaline battery, 2 pieces (For operation check)



Instruction Manual: 1 copy

- The batteries are not loaded in this product with shipment. Referring to [Loading/replacing of battery (P.2)], load 2 pieces of AA (UM-3) alkaline battery and use this product.
- The supplied batteries are for operation check. We do not guarantee of their life.
- The eneloop® batteries are recommended to use this product.

## ■ About this instruction manual



- Under absolutely no circumstances may the contents of this instruction manual, in part or in whole, be transcribed or copied without permission.
  - The contents in this instruction manual are subject to change without notice in future.
  - The figures in this instruction manual may be emphasized, simplified or omitted.
  - Every effort has been made to ensure that the details of this manual are accurate. However, should any errors be found or important information be omitted, please inform your nearest distributor.
- 
- The enloop® is the registered trademark of SANYO Electric Co., Ltd. of Panasonic Group.
  - The company names and brand names used in this manual are the trademarks or registered trademarks of respective companies.

## About exemption from responsibility


- Unless otherwise specified in the guarantee clauses, we do not offer any guarantee about this product.
- We shall not be liable to a customer or a third party for any damages or indirect damages by using this product or by unpredictable defects of the product.


# ■ Safety precautions

- The safety precautions shown in this manual indicate the important contents about safety. Please be sure to understand and follow these precautions.
- In this manual, in order to use this product safely, the precautions are described with the following indications and marks.

 <b>Warning</b>	This indicates a potentially hazardous situation that, if not avoided, will result in death or serious injury.
 <b>Caution</b>	This indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury or cause property damage.

## [Safety precautions]

 <b>Warning</b>
<ul style="list-style-type: none"> <li>● Do not operate this product in a place where flammable gas or explosive gas exists. It is extremely dangerous to use this product under such environment.</li> <li>● Stop using this product immediately, turn off the power source and contact to your nearest distributor if it is broken or there is smoke/abnormal odor from this product. Otherwise, it may cause fire.</li> <li>● Do not repair or modify this product. If it is modified, operation of this product will not be guaranteed. It may also cause fire/electric shock.</li> <li>● When this product is strongly shocked such as fall, it may cause injury by broken and scattering of the sensor, etc. Do not drop it or have strong shocks on this product.</li> </ul>

 <b>Caution</b>
<ul style="list-style-type: none"> <li>● Avoid the use of this product in the following places. <ul style="list-style-type: none"> <li>A place where ambient temperature varies widely</li> <li>A place where humidity is high</li> <li>A place where rain/water is splashed</li> <li>A place where there are dusts like sand or dirt</li> <li>A place where it is subjected to exposed in scorching heat or direct sunlight</li> <li>A place where it is subjected to radiation</li> <li>A place where strong electric circuit exists beside this product</li> <li>A place where there is any inductive interference</li> <li>A place where there is mechanical vibration/shock</li> </ul> </li> <li>● Do not use any batteries other than the specified battery. It may cause trouble on this product by liquid spill or explosion of the batteries.</li> <li>● Do not aim the sensor to a high temperature object like sun, or the imaging element may be damaged and it may cause trouble on this product.</li> <li>● In order to use this product safely, refer to "requirements" and handling methods mentioned in this manual or it may cause damage or malfunction to this product or cause damage also to other equipments.</li> <li>● Optical components have special coating. Be careful that these parts become easily dirty when they are dew-condensed. In addition, the infrared transmission is deteriorated under the dew condensation and a clear image is not provided.</li> </ul>



## Precautions for use

- This product is a precision instrument. Do not drop it or have strong shock on this product.
- This product is not waterproofed construction. Do not use this product in the environment where water is poured.
- Keep this product away from equipments generating strong static electricity and electromagnetic waves including TVs, microwave ovens and wireless applications, or it may cause malfunction or trouble on this product.
- Keep this product away from equipment generating strong high frequency or surge voltage, or it may cause malfunction or trouble on this product.
- Do not make it absolute to grasp only a strap and to brandish a product. It causes an accident and an injury, the damage of household effects, the trouble.
- For cleaning this product except the lens, use neutral detergent and wipe it off lightly by rubbing with the cloth squeezed firmly. Do not use chemicals or bleaches including benzene, thinner and alcohol.
- For cleaning the lens, wipe off dust and dirt with a blower. Do not wash the lens with water nor wipe it off by clothes. It may cause breakage of the lens.
- Do not use this product in the following places.
  - A place where ambient temperature becomes lower than 0°C or higher than 50°C
  - A place where dew is condensed
  - A place where ambient humidity becomes lower than 10%RH or higher than 80%RH
- Do not use or place this product in a place subjected to direct sunshine, dusty, high temperature/high humidity or corrosive atmosphere.
- Remove batteries from the instrument, if the instrument is not in use for a long period or is put in storage.
- When you discard this unit, unload the batteries first and discard this unit under the waste disposal and public cleaning law by your local government.
- This instrument uses battery with Perchlorate Material.  
Special handling may apply, see  
[www.dtsc.ca.gov/hazardouswaste/perchlorate](http://www.dtsc.ca.gov/hazardouswaste/perchlorate)
- When any service is required including repair, contact to your nearest distributor.

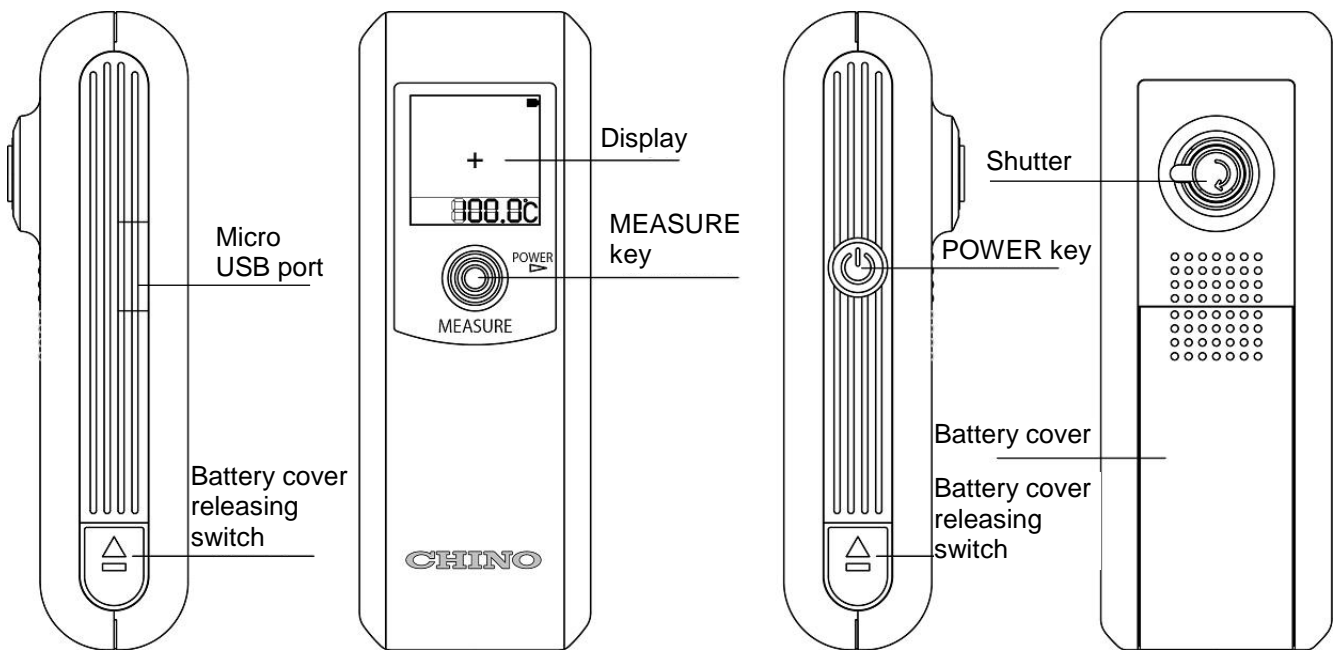
When you use accessories connected to this product, follow the instructions relating to regarding the safety in this manual. If you do not follow these instructions, safety of this product and the system will not be guaranteed.

Your extra consideration is required when this product is used in an application that may subject to life threatening to human or property damage. Pay extra attention to safety measures, avoid usage under extreme environment and build a fail-proof system.

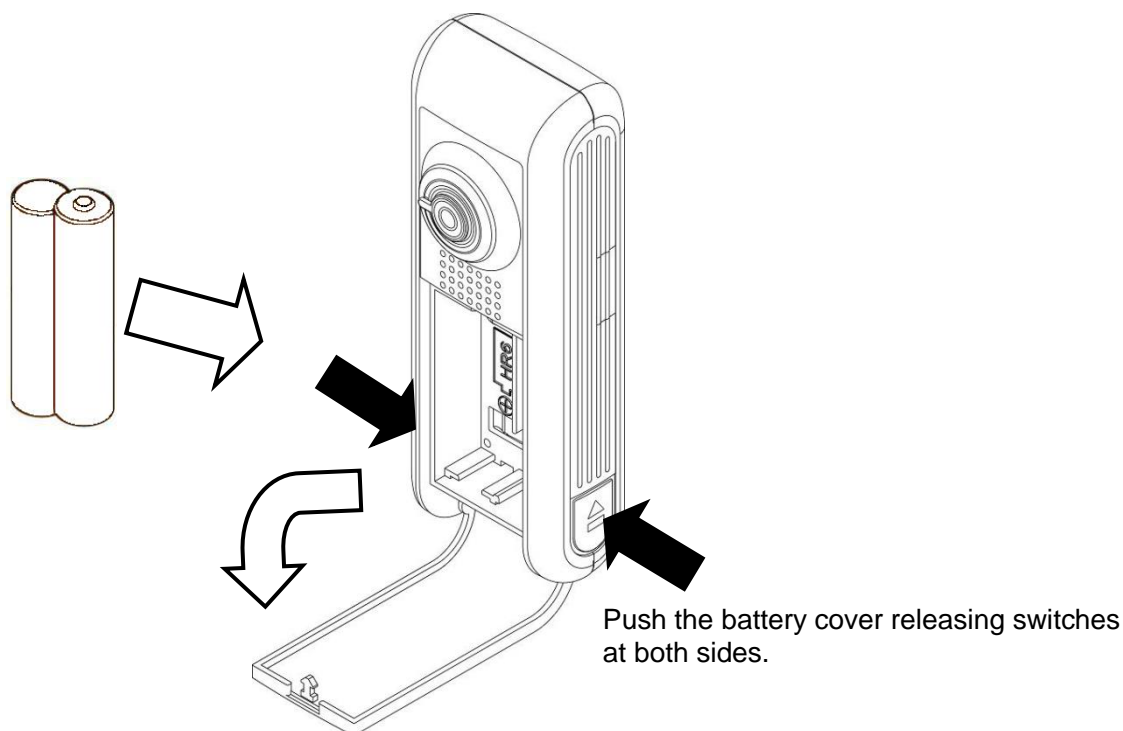
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# Names and functions



## ■ Loading/replacing of batteries

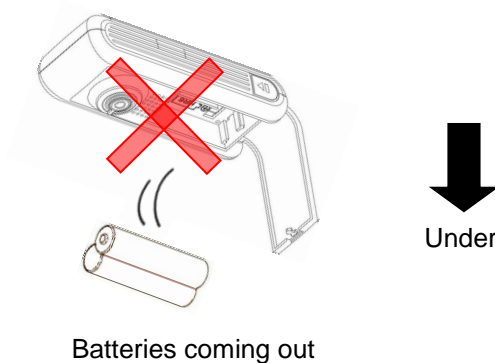


### 【Loading of batteries】

- ① Push the battery cover releasing switches at both sides simultaneously. The battery cover will open.
  - ② On the inner surface of the back side of this product, there is a stamp indicating the battery loading direction. Load 2 pieces of the AA (UM-3) batteries following this direction.
  - ③ Close the battery cover by pressing until it clicks.
- ※ Batteries for use  
We recommend using the eneloop® for this product.

### ! Cautions

- For replacing the batteries, be careful that water drops, etc. do not get inside of this product.
- For opening the battery cover, make sure the battery cover is not facing down. If not, the batteries may come out of this product. (Refer to the figure shown below.)
- Don't mix and use a new dry cell, an old dry cell, and the dry cell by which a kind is different.
- When replacing batteries, do replace 2 batteries at the same time.
- Make sure to close the battery cover following the above procedure.

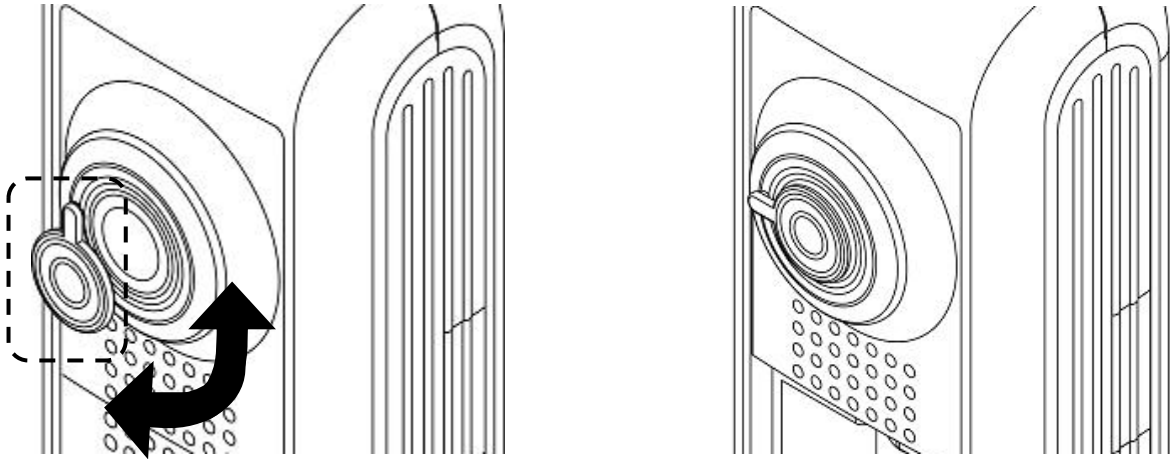




# Function of shutter/Passing of strap

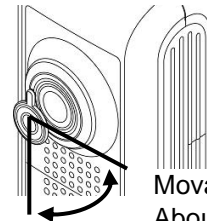
## Function of shutter

For using this product, open the shutter by sliding it downward.  
Close the shutter for protection of the lens if this product is not used.



## ! Cautions

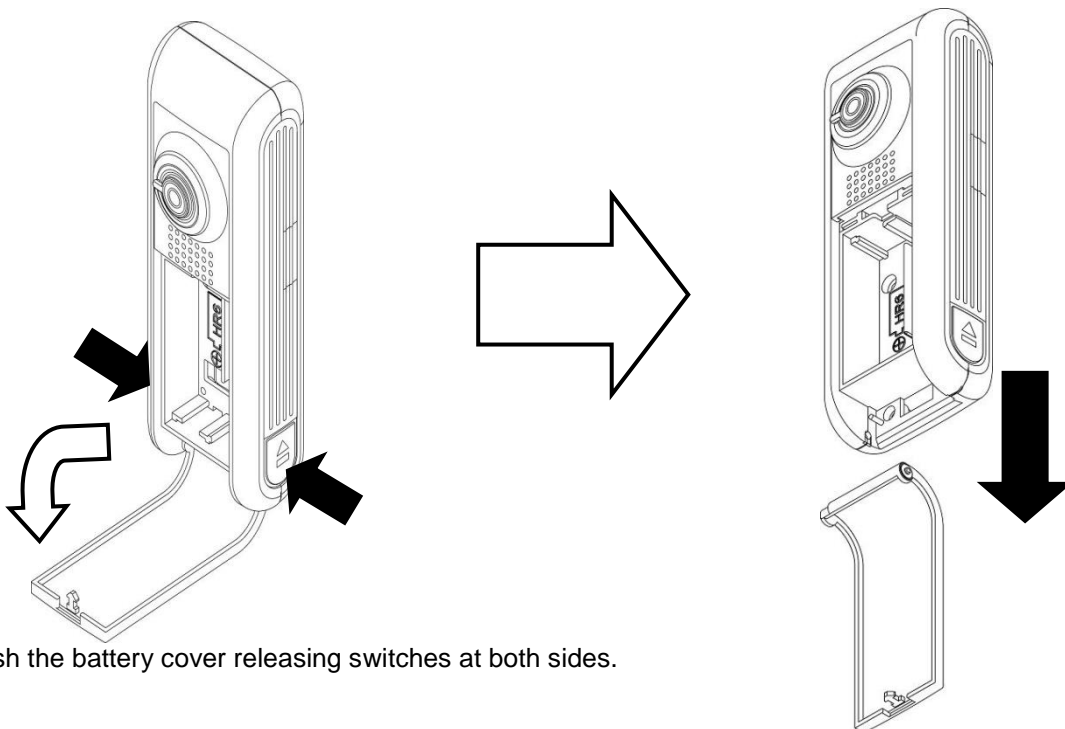
- Do not move the shutter forcibly, it may cause breakage of the shutter. Move the shutter referring to the movable range shown in the right figure.



Movable range of shutter  
About 90°

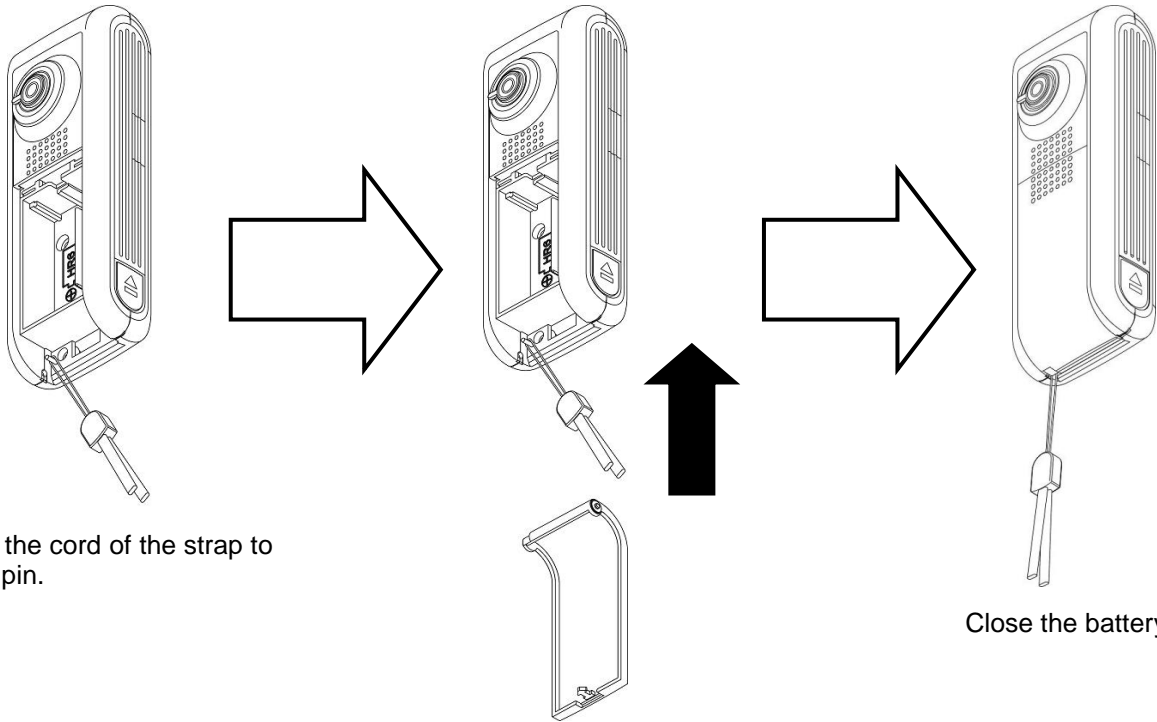
## Passing of strap

Replace or take of the strap following the procedure shown below.



Push the battery cover releasing switches at both sides.

Pull the battery cover downward and take of the battery cover from this product.



Set the cord of the strap to the pin.

Close the battery cover.

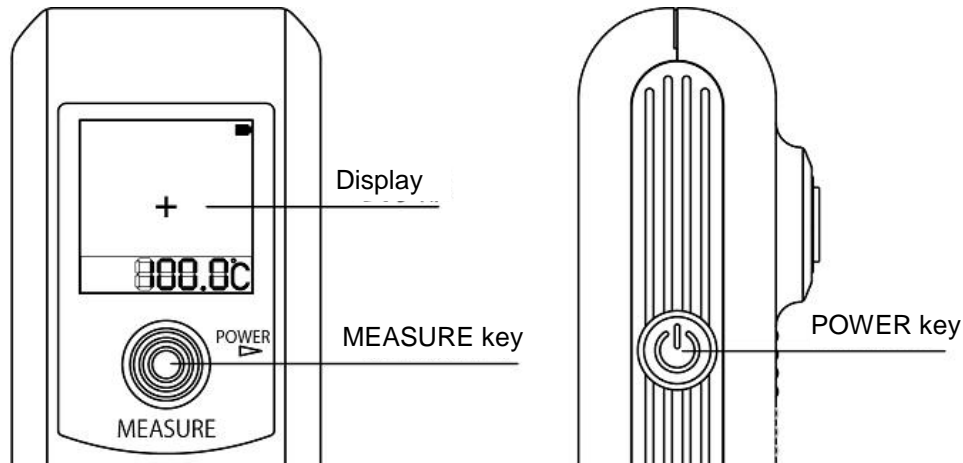
Return the battery cover to this product.

- ① Push the battery cover releasing switches at both sides simultaneously. The battery cover will open.
- ② Pull the battery cover downward and take of the battery cover from this product.
- ③ Set the cord of the strap to the pin placed at the lower left of the battery housing portion.
- ④ Return the battery cover to this product.
- ⑤ Close the battery cover by pressing until it clicks.

**! Cautions**

- Do not take of the battery cover forcedly, it may cause breakage of this product.
- Do not pull the strap rapidly. The strap may come off.
- Do not lift the product by grasping the battery cover. There are cases where the battery cover is removed from the product, and falls.

# How to operate keys



## 1. POWER key

For turning power on, press the POWER key on condition that power is not turned on. The logo of [CHINO] will appear on the display when power is turned on.  
For turning the power supply off, press and hold the POWER key on condition that power is turned on.

### ! Cautions

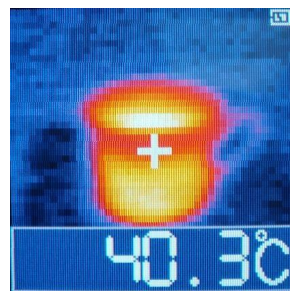
- Do not press with a sharp object and nail the POWER key.  
There are cases where the internal switch may be damaged.

## 2. MEASURE key

By pressing the MEASURE key on condition that power is turned on, the measurement will start and the measured temperature will be updated.  
With the MEASURE key being pressed, the measurement will be continuously executed. By releasing the MEASURE key, the measured value will be held.  
Furthermore, in the hold condition, by pressing the MEASURE key to target a new measuring object, the temperature of the new object will be measured and its temperature will be held by releasing the MEASURE key.



Measuring condition



Holding condition

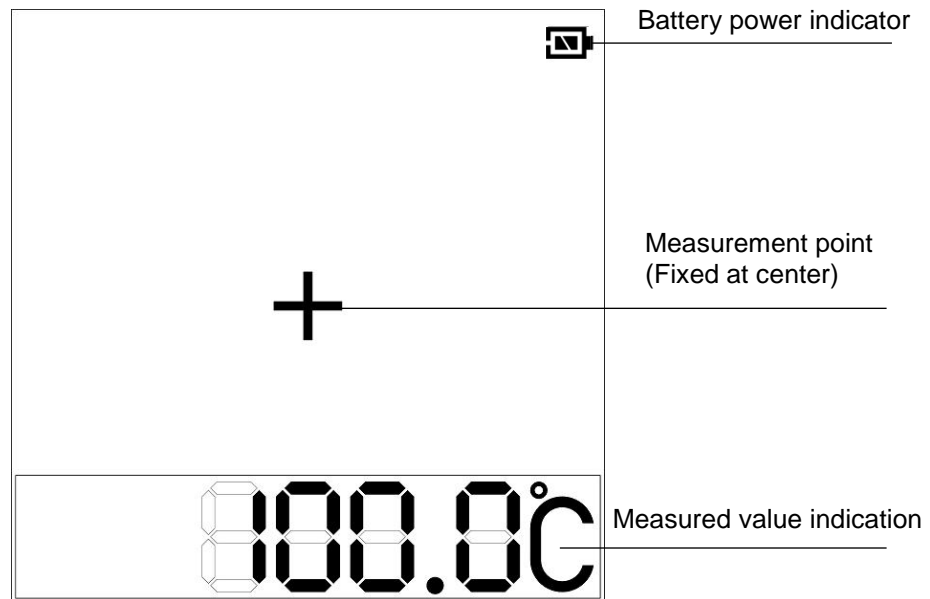
### ! Cautions

- Do not press with a sharp object and nail the MEASURE key.  
There are cases where the internal switch may be damaged.

### ■ Auto power off

Power is turned off by the auto-power-off function if this product is not operated for 5 minutes.  
When power is turned off, press the POWER key again to turn power on.

## ■ Contents displayed



## ■ Display in measuring and holding conditions

### Measuring condition



- With the MEASURE key being pressed, the mode becomes the measuring condition.
- On the measuring condition, a frame border on the measured value indication portion will be disappeared and the measured temperature will be updated constantly.
- On the measuring condition, the unit (°C) will blink.

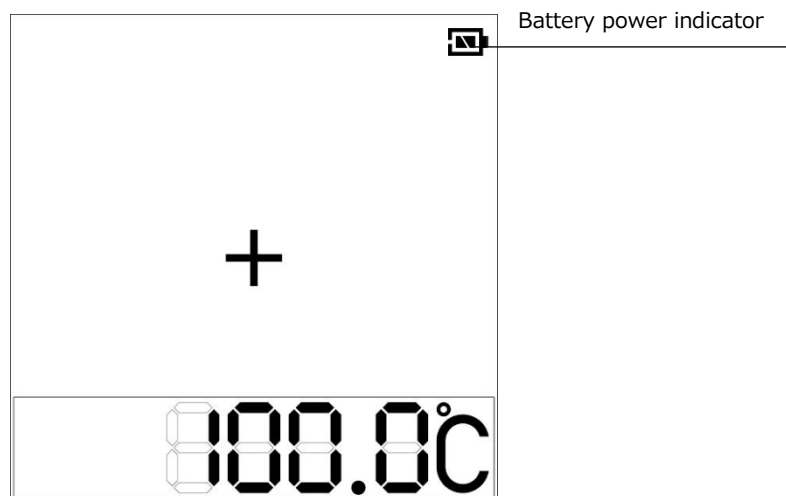
### Holding condition



- By releasing the MEASURE key, the mode becomes the holding condition.
- The display will be held with the measured image and the measured value when the MEASURE key is released.
- On the holding condition, a frame border will be appeared on the measured value indication portion.

## ■ Battery power indicator

The battery power indicator is prepared on the upper right of the display.  
 Replace the batteries referring to the table shown below.



Display	Battery power
	Fully charged
 Replace the batteries	Fully discharged
	Connected to an external power source

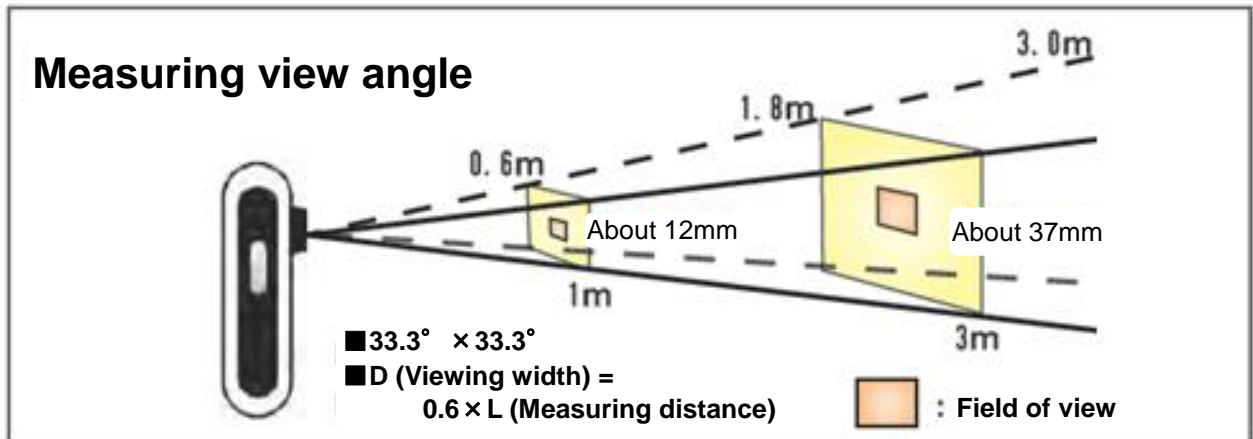
※The changing speed of the battery power indication will largely be affected by the kind of batteries being used and ambient temperature.

## ■ For accurate measurement

For accurate measurement, refer to the figure shown below and make sure that a measuring object is imaged at the center of the display as large as possible. Larger measuring area needs longer distance.

Ensure a sufficient measuring area for accurate measurement.

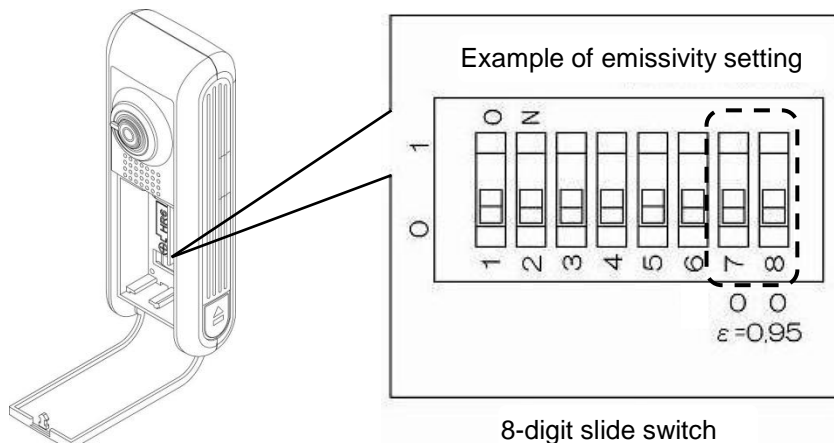
For accurate measurement, 4 x 4 pixels or more are needed for a target area.



This product is the measured distance 1m has been designed to be the measurement rating is in the measurement specifications under the conditions of (emissivity  $\varepsilon = 1.00$ ).

Emissivity changes with target for measurement.

## ■ Setting of emissivity



The emissivity setting can be changed by 2 digits (No.7 and 8 in the figure shown above) of the 8-digit slide switch placed on the bottom edge portion of the battery housing. The factory default emissivity is 0.95.

4 kinds of the emissivity can be set from 0.85 to 1.00 with 0.05 increments.

Set the emissivity referring to the setting mode of the slide switch shown on the battery cover or the table shown below.

No. 7	No. 8	Emissivity
OFF	OFF	$\varepsilon = 0.95$
OFF	ON	$\varepsilon = 0.90$
ON	OFF	$\varepsilon = 0.85$
ON	ON	$\varepsilon = 1.00$

 **Caution**

- Do not change any digits other than the digits specified. If not, it may cause abnormal operation.
- When operating the 8-digit slide switch, please use a precision screwdriver.  
If not, the 8-digit slide switch might be damaged.

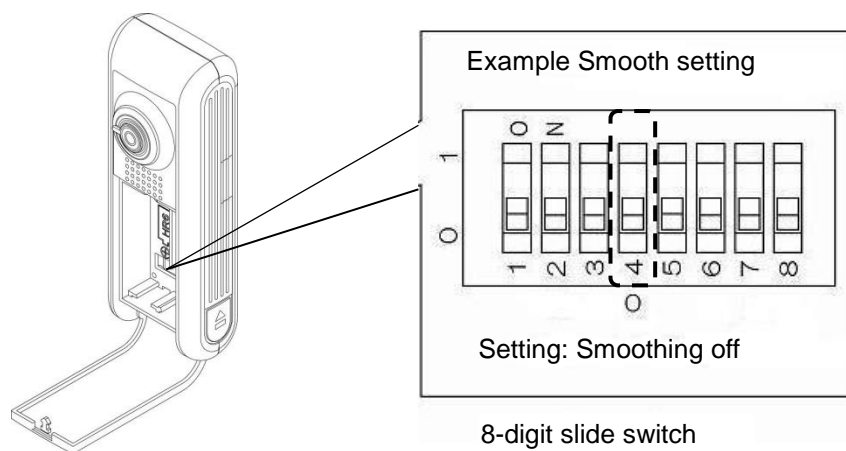
## □ Setting Emissivity (Reference)

Quantity of infrared radiation irradiated from objects depends on the objects' material, surface conditions, measuring temperatures and so on. The table below shows emissivity of some objects. Please note that these values are just for reference.

### ◆ Emissivity of Objects

<b>Material</b>	<b>Emissivity</b>
Water, Ice	0.98
Soil	0.92~0.96
Concrete (wet)	0.96~0.98
Concrete (dry)	0.91~0.95
Ceramics	0.85~0.95
Stone, Asbestos	0.92
Plastics	0.90~0.95
Rubber (black)	0.95
Wood	0.98
Paper	0.92
Cloth, Fabric (colored)	0.95
Leather, Fur	0.96
Human Skin	0.99
Vegetable, Fruit	0.98
Dough	0.98
Meat	0.98

# Setting of Smoothing filter



No.4	Function
OFF	Smoothing process is not applied
ON	Smoothing process is applied

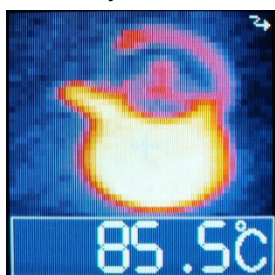
Smooth function: moving average process for thermal image and measurement result.



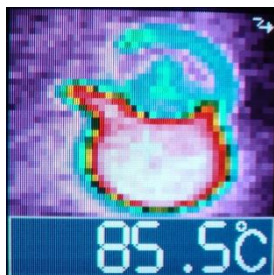
# Setting of color palette

The color palette can be selected from 4 kinds of Iron/Rainbow/Gradation/Gray.

The factory default color palette is Iron.



① 【Iron】



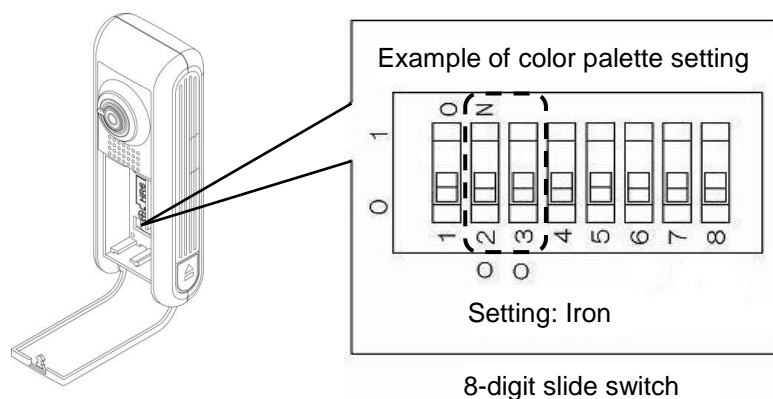
② 【Rainbow】



③ 【Gradation】



④ 【Gray】



The color palette can be changed by 2 digits (No. 2 and 3 in the figure shown above) of the 8-digit slide switch placed on the bottom edge portion of the battery housing.

Change the color palette by referring to the settings of the slide switch shown in the table below.

No. 2	No. 3	Color palette	Drawing No.
OFF	OFF	Iron	①
ON	OFF	Rainbow	②
OFF	ON	Gradation	③
ON	ON	Gray	④

## ⚠ Caution

- Do not change any digits other than the digits specified. If not, it may cause abnormal operation.
- When operating the 8-digit slide switch, please use a precision screwdriver.  
If not, the 8-digit slide switch might be damaged.

# Switching the temperature unit

The temperature unit is changed.

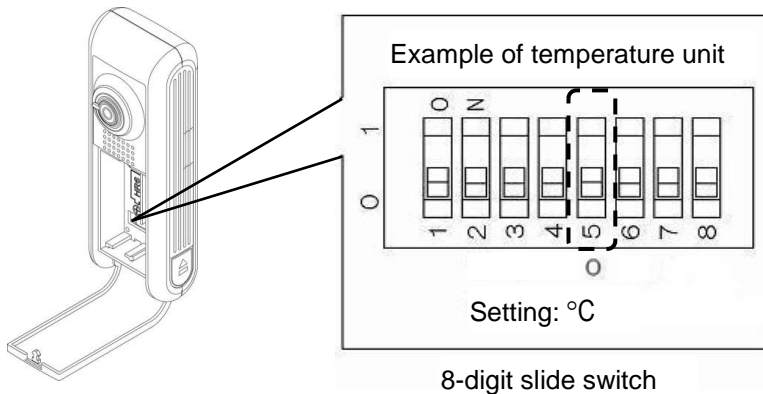
The factory default temperature unit is °C.



【 °C 】



【 °F 】



The temperature unit can be changed by 1 digit (Nos. 5 in the figure shown above) of the 8-digit slide switch placed on the bottom edge portion of the battery housing.

Change the temperature unit by referring to the settings of the slide switch shown in the table below.

No. 5	Temperature unit
OFF	°C
ON	°F


## ! Caution

- Do not change any digits other than the digits specified. If not, it may cause abnormal operation.
- When operating the 8-digit slide switch, please use a precision screwdriver.  
If not, the 8-digit slide switch might be damaged.

# Connection of external power source

Through . Power can be supplied to this product.

By connecting a battery pack to the micro USB port located on the side of this product, power can be supplied.

When a battery pack is connected, the indication of the battery power indicator (Refer to [Display]) is changed to the  mark.

## ! Cautions

- The micro USB port is used for power supply only.  
The charging function through the micro USB port to any rechargeable batteries is not available.

# Specifications

Items		Specifications
	Model	TP-S
Measurement specifications	Detecting element	Thermopile array 2000 pixels
	Measurement wavelength	Center wavelength 10μm
	Measurement view angle	33.3° x 33.3°
	Temperature measurement range	-10°C to 300°C
	Temperature resolution	0.5°C (at 100°C black body)
	Accuracy ratings	±2% of measured value or ±3°C, whichever is greater (Ambient temperature 25 ± 2°C, Measuring distance 1m)
	Focus	Fixed focus
	Radius resolution	12mrad
	Repeatability	0.3°C
	Response time	0.5 second (95% response)
Function specifications	Emissivity setting	0.85 to 1.00 (0.05 increments) Default: 0.95 The emissivity value is changed by the slide switch placed on the bottom edge portion of the battery housing.
	Color palette	Iron/Rainbow/Gradation/Gray Default: Iron The color palette is changed by the slide switch placed on the bottom edge portion of the battery housing.
	Auto power off	Power is turned off if this product is not operated for 5 minutes.
	Smoothing	On/Off is changed by the slide switch placed on the bottom edge portion of the battery housing.
Display/setting specifications	Monitor	1.5-inch color organic EL display Display size: 28mm x 28mm
	Measurement indication function	Spot temperature indication 1-point (Fixed at center)
	Function keys	POWER key . . . Turning power on/off (Press and hold to turn off.) MEASURE key . . . Pressing the key starts measurement and releasing the key holds the measured value.
General specifications	Working temperature range	0°C to 50°C
	Working humidity range	10 to 80%RH (no dew condensation)
	Storage temperature range	-20°C to 55°C(no dew condensation) (Note) For storage of this product in long term, unload the batteries.
	Storage humidity range	5 to 85%RH(no dew condensation)
	Housing	Not available
	External dimensions	W50 x H138 x D39mm (The values are maximum for each direction. The lens portion is included.)
	Weight	About 174g (including batteries)
	Material	ABS (Antibacterial specification)
	Conforming standard	CE (EN61326-1:2013) In EMC environment: ±5% of range (-10 to 300°C) Ambient temperature 25°C (In case that power is supplied through the micro USB port, this specification is not applied.)

	Power supply	AA (UM-3) battery, 2 pieces (The eneloop® is recommended.) Or power is supplied from . (5V, more than 2A) The micro USB port is used for power supply only. The charging function from the micro USB port to any rechargeable batteries is not available.
	Battery life	About 2 hours Environmental condition: Ambient temperature 25°C (when the eneloop® standard batteries are used.)

## Precautions (For maintaining of measurement accuracy)

Pay attention to the followings for maintaining the measurement accuracy.

- Vibration and shock  
Vibration and shock causes not only a damage to the thermal image sensor in a long term but in stability of the measurement
- Light path  
Select a measurement place where water drops, dirt, dust, smoke, steam, or other foreign substances are not existed between the thermal image sensor and a measuring object.
- Disturbances causing higher temperature indication  
Avoid places where high temperature heat source such as sunlight, light/flame of incandescent electric lamps is not reflecting on a measurement surface and the thermal image sensor. If such condition is present, cover the area with an opaque object.

## ■ Troubleshooting

If you are experiencing difficulties with the sensor or noticing an abnormality on its operation, refer to the followings. If the difficulties or abnormality is still present, contact to your nearest distributor.

Symptoms	Causes	Measures
Power is not turned on.	The batteries are fully discharged or loaded incorrectly.	Replace the batteries or load them correctly again.
Battery life is short.	This product is used in low temperature.	Confirm the recommended temperature range of use for the batteries.
	Manganese batteries are used.	Use the eneloop® or alkaline batteries.
Image/temperature value abnormally fluctuates.	Strong statistic electricity, electromagnetic wave or high frequency may be present around the sensor.	Keep this product away from an equipment generating strong static electricity or electromagnetic wave.
	Area of the measuring object is too small.	Confirm the measuring diameter and measure the object with sufficiently-large area.
Measured value is not stable.	This product is affected by rapid temperature change.	For measurement, leave this product for a while until the temperature of this product stabilizes.

## ■ External dimensions

