Handheld Thermometer
Instruction Manual
HR-1650 / HR-1750

AE-100291

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Safety information

⚠Caution

To safely operate and service the thermometer and to prevent any product damage and/or maintain the precise temperature measurement results, please carefully follow the instructions below:

- Do not use this product for any purpose other than taking temperature measurements.
- If any abnormalities are found, immediately stop using the product.
- Do not disassemble or modify the product.
- Do not use any power supply other than commercially available dry batteries and/or a dedicated adaptor.
- Insert the batteries in the correct manner (pole+ to pole+).
- Remove the batteries when depleted or when the product is not expected to be used for an extended period of time.
- Do not mix old and new batteries or batteries of different makes or types.

⚠Warning

- Do not throw into an open fire. Do not short circuit, disassemble, or heat.
- Do not recharge the batteries at any time.
- Use specified type batteries.
- To prevent electric shock, do not touch the metal parts or terminals of the probe cable or output cable during measurement.
- To prevent electric shock, if the probe is still in contact with the voltage application part even when the power is turned off, disconnect the probe before setting the output cable or device.

※ When measuring under the influence of high voltage and high frequency, there is a risk of electric shock and measurement failure, so please contact us.

Introduction

Thank you very much for purchasing this Anritsu Meter product.
This instruction manual has been carefully prepared to ensure that the product can be used safely and securely.
Please carefully and thoroughly read this instruction manual, fully understand all the individual functions, and use the product properly.
Should you have any unclear issues or questions while operating the product, please refer to this instruction manual.

Notes

- The contents of this document and/or product specifications are subject to change without prior notice.
- Unauthorized reproduction of any part of this document is strictly prohibited.
- This instruction manual has been prepared with absolute care. Please free feel to contact our company or your retailer should you discover any omissions or mistakes.
- In no event is Anritsu Meter liable to anyone for any indirect, special, or consequential damages as a result of using this product.

Warranty and After-sales Service

- **Warranty**

This product has been submitted to strict tests and inspections prior to delivery. Anritsu Meter warrants this product to be free from defects in material and workmanship for a period of one (1) year from date of delivery. Should any failures arise due to defects during manufacture or accidents during transportation, please contact our company or your retailer. For any failures during the warranty period which are deemed our responsibility, we will exchange the necessary parts or carry out repairs at no cost.

However, the warranty will be considered to be voided (i.e., the customer pays for repairs) in the following cases:

- Failure due to a fire, earthquake, or any other force majeure.

- Failure due to misuse, abuse, and/or modification. (Please note that if the case of the product is opened or the screws are loosened, such an act will be regarded as a modification.)
Note: Our thermocouple probes are consumables and are not covered by the warranty.

- **After-sales Service**

- If you think the product is not correctly working, please refer to this instruction manual. Should any issue persist, please contact our company or your retailer.

- Repairs during the warranty period are subject to the content of the warranty sheet. However, only when used in Japan. Repairs after the warranty period has elapsed will be carried out only if such repairs recover and maintain the product functions.

- If there is a need to return the product for repair or calibration, please pack it in the original packaging that was used for delivery. If such packaging is not available, please enclose the product with sufficient cushioning material and return the product in a condition where no damage can be caused.

Table of Contents

1. General

This product is a handheld thermometer for high precision, reliability, and usability. It has a high-precision analog technology and a microcomputer to digitally correct measured data, making highly stable and high-precision temperature measuring possible.

2. Unpacking

2.1. Unpacking

Please check if the following items are present when unpacking. We make sure all items are carefully packed, but should you find any missing or failed items, please contact our company or your retailer.

Item	Q'ty
Main unit	1
Soft case	1
Hand strap	1
Alkaline AA battery	4
Instruction manual	1
Test report	1
Warranty sheet	1
User registration sheet	1

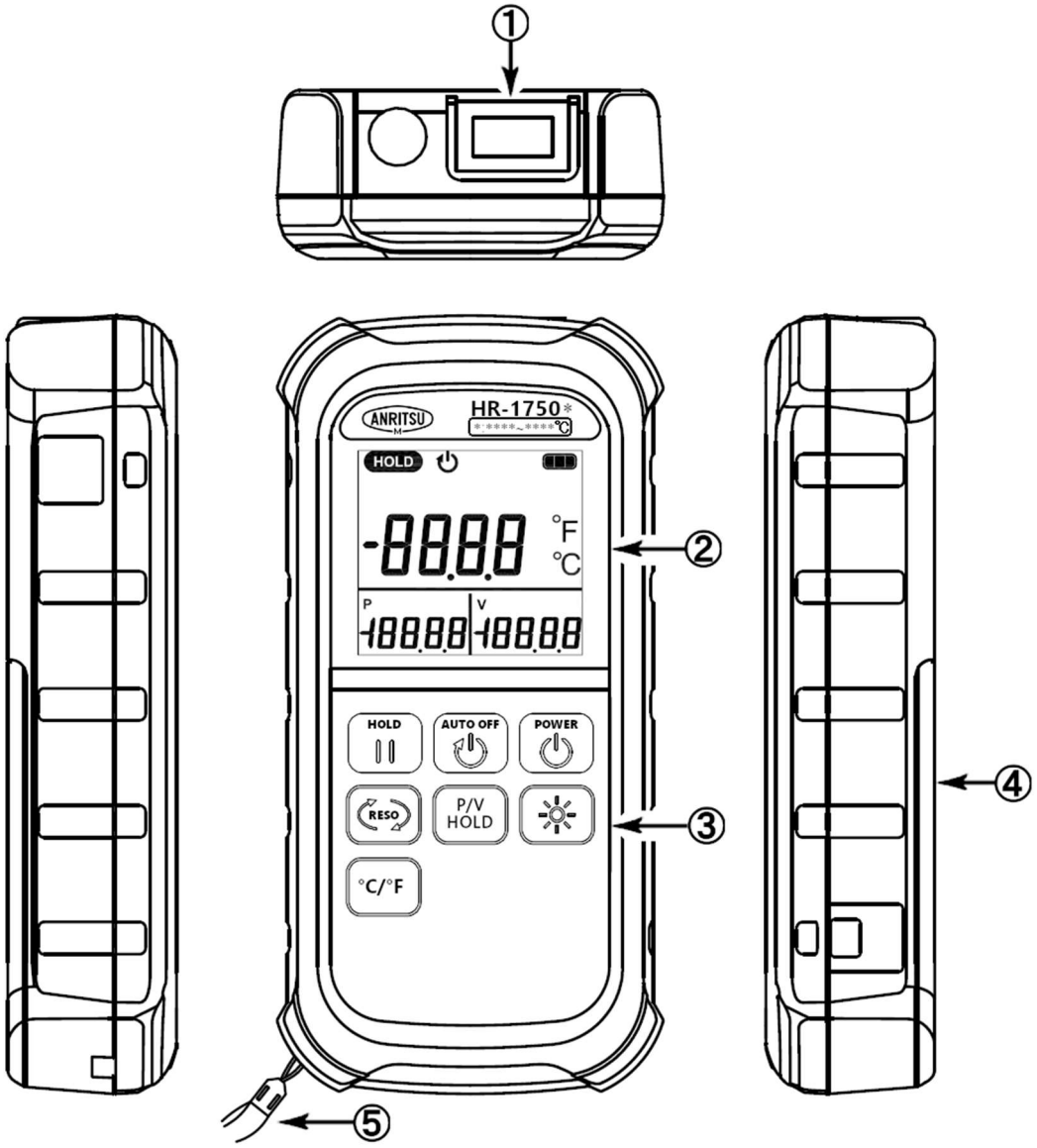
2.2. Repacking

To move this instrument (such as transportation by car), pack it in its original packaging. If such packaging is not available, fully protect the instrument with shock-absorbing material (Styrofoam, etc.). Please note that if packing materials generate dust or moisture, the instrument may become damaged. Please use dry packing materials that do not generate dust.

3. Name and Explanation of Each Part

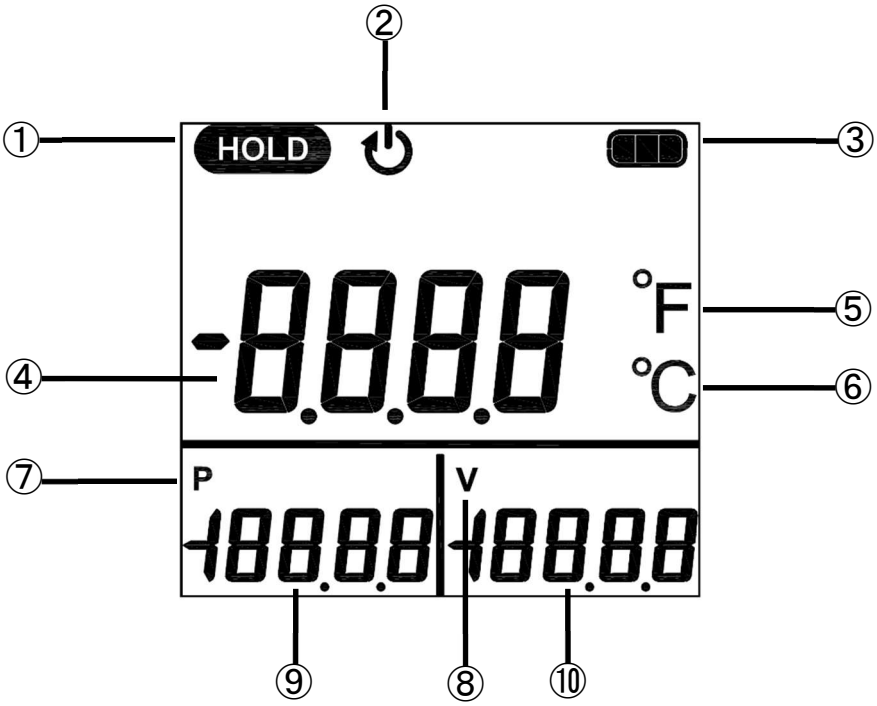
3.1. External View

(HR-1750)



① Probe input connector
② LCD display
③ Key switch panel
④ Battery housing
⑤ Hand strap

3.2. LCD Display

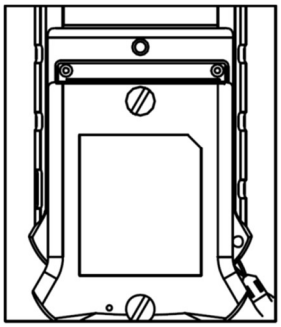


	Description	HR-1650	HR-1750
①	HOLD segment	●	●
②	A-OFF segment	●	●
③	Battery segment	●	●
④	Main display	●	●
⑤	˚F segment	●	●
⑥	°C segment	●	●
⑦	P segment		●
⑧	V segment		●
⑨	Sub display 1		●
⑩	Sub display 2		●

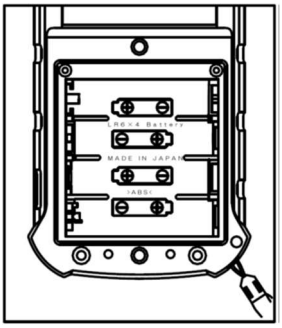
4. Preparations Before Taking Measurements

4.1. How to Install the Batteries

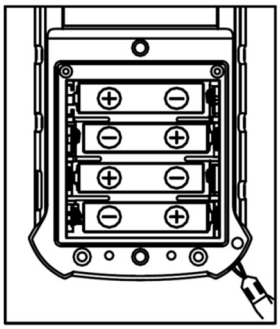
Make sure to turn the power off when replacing batteries.



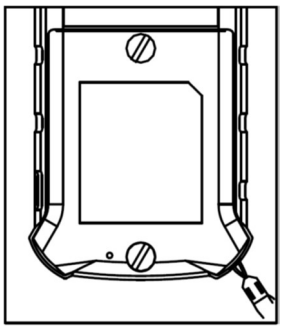
(1) Loosen both screws and open the cover of the battery housing.



(2) Pay attention to the orientation of the batteries.



(3) Install the batteries.



(4) Reattach the battery housing cover, tighten both screws, and then press the edge of the cover to secure it.

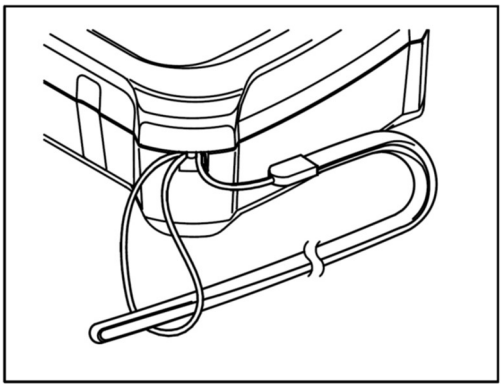
Note: To maintain the waterproofing performance, firmly tighten the screws on the battery cover.

Applicable models: HR-1650/HR-1750

4.2. How to Use the Hand Strap

Place the enclosed hand strap on your wrist to prevent the instrument from dropping.

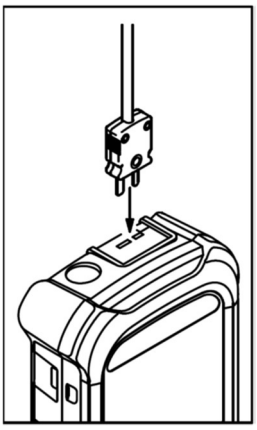
Loop the thin cord of the strap through the hole and then pull the other end of the hand strap through that loop.



4.3. How to Set the Probe

Set the probe to the main unit as shown in the illustration below. It is designed so that if the probe orientation is incorrect, it cannot be fully inserted. If the probe is forcefully inserted, failure may result. Please check the probe's orientation before inserting it.

[HR-1*50]



4.4. How to Use the Soft Case

To protect the instrument from dirt or scratches, etc., use the attached soft case.

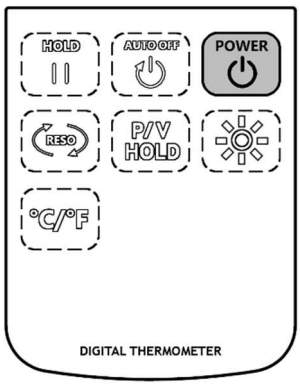
5. Operations and Functions

This instruction manual covers the HR-1650 Series, and the HR-1750 Series. Depending on the model purchased, some functions may not be available. Please refer to the table below.

Table of functions supported by individual series

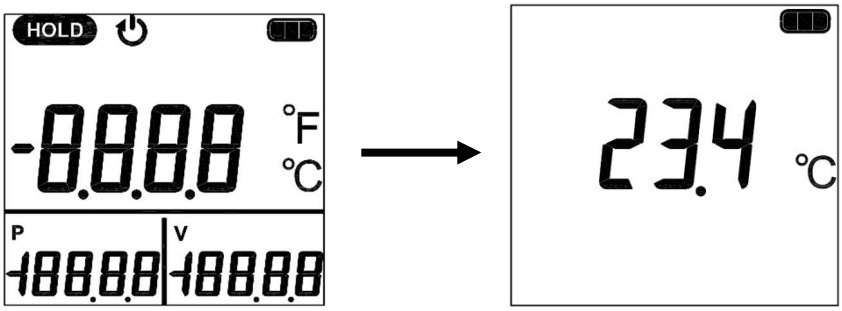
Function	HR-1650	HR-1750
Power ON/OFF	●	●
Hold	●	●
Automatic power OFF	●	●
Resolution change		●
P/V hold		●
Backlight		●
Waterproofing function (equivalent to IPX5)	●	●

5.1. Power ON/OFF



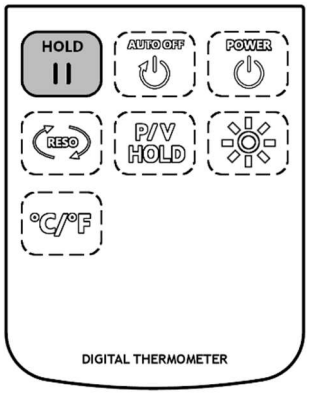
Pressing the POWER key will illuminate all the indicators for about three seconds and start the measurements. Press the POWER key again to turn the instrument off.

All illuminated (HR-1750) Normal measurement

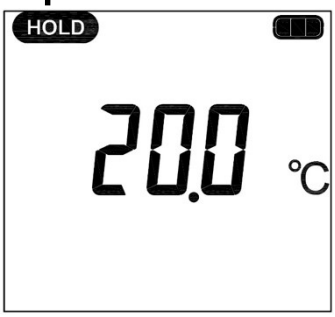


5.2. HOLD Function

Press the HOLD key to maintain the indicated values during measurements. HOLD will illuminate on the screen while HOLD is on. To release the HOLD function, press the HOLD key again.

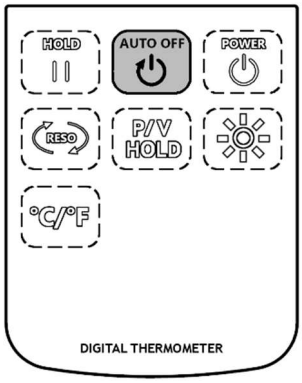


HOLD illuminated

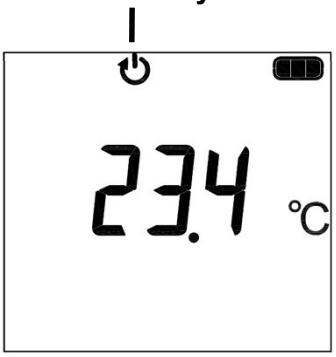


5.3. Automatic Power OFF Function

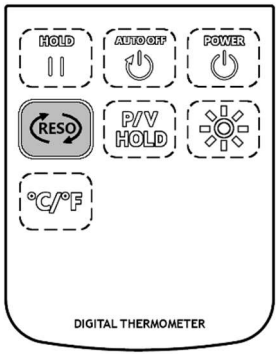
When the AUTO OFF key is pressed, “AUTO OFF” symbol will illuminate on the screen. If no key operation is performed for a certain period of time (about five minutes), the power will automatically be turned off, preventing the unit from remaining turned on. To release the Automatic Power OFF function, press the AUTO OFF key again.



“AUTO OFF” symbol illuminates



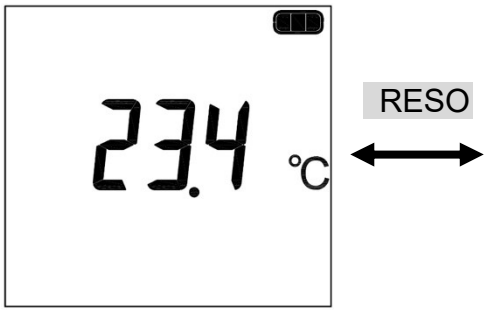
5.4. Resolution Change [Applicable Models: HR-1750]



Press the RESO key to switch the resolution.

- 0.1°C resolution indication: A range between -104.9 and 504.9°C is displayed with a 0.1°C resolution. If a temperature is out of this range, the instrument will automatically indicate it at a 1°C resolution.
- 1°C resolution indication: The 1°C resolution is applied to all temperatures.

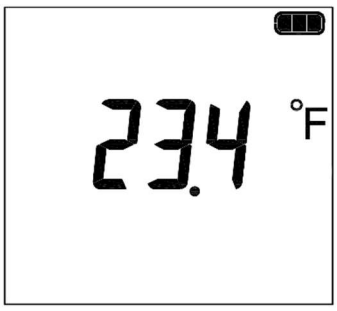
0.1°C resolution indication



RESO

1°C resolution indication

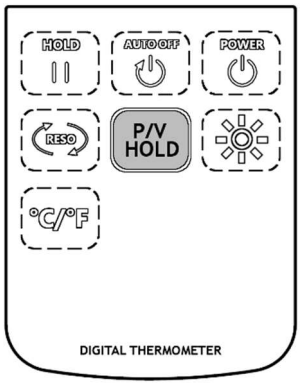
0.1 ° F resolution indication



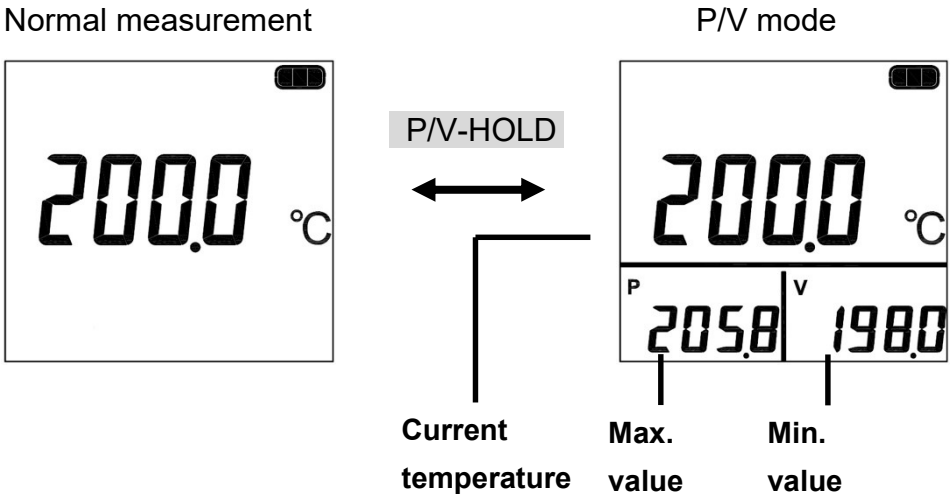
RESO

1 ° F resolution indication

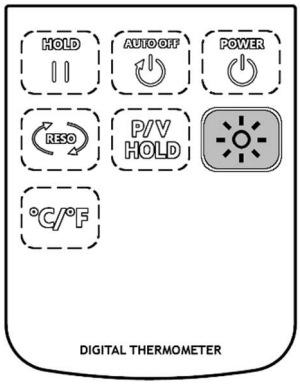
5.5. P/V Hold Function [Applicable Models: HR-1750]



Press the P/V-HOLD key to enter the P/V Hold function. The lowest and highest values will be displayed in the sub-screens. Press the P/V-HOLD again to return to normal measurements.



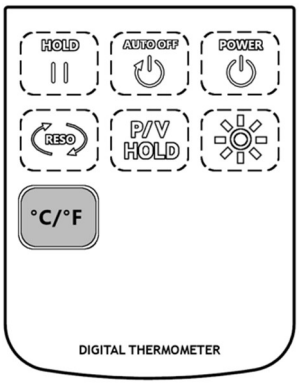
5.6. Turning the Backlight ON/OFF [Applicable Models: HR-1750]



Press the ☀ key to turn on the backlight so that indications on the screen can be seen in dark places. Press the ☀ key again to turn off the backlight.

Note: When the backlight is ON, more battery usage will be incurred. Don't forget to turn it off.

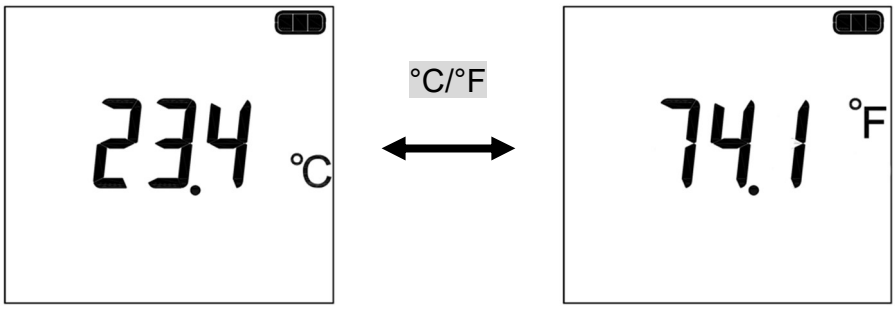
5.7. °C/°F Switch



Press the °C/°F key to switch temperature units (Celsius/Fahrenheit).

Celsius indication

Fahrenheit indication



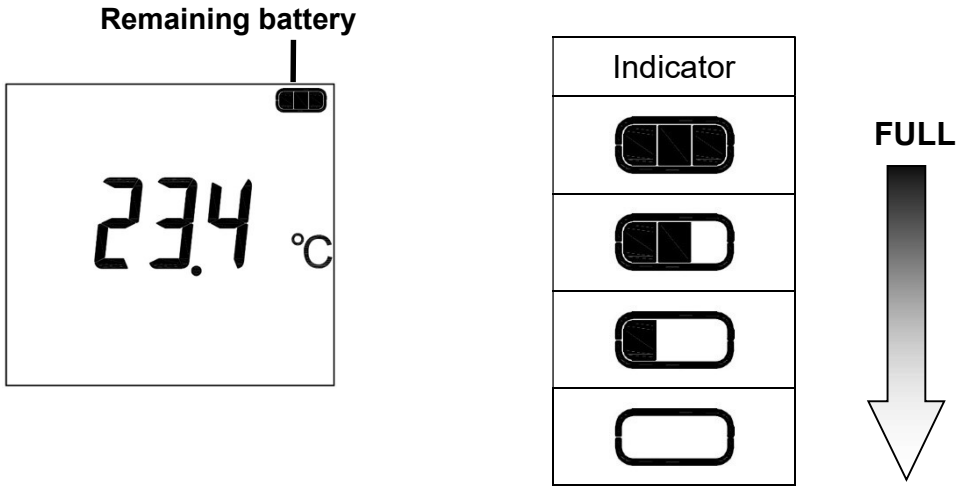
6. Retention of Setup Data

Some settings will be released when the batteries are exchanged or when the instrument is turned off. Please check the details in the following table:

Function	
HOLD	Released
Automatic power OFF	Retained
P/V hold	Released
Resolution/Analog output rate	Retained
Backlight	Released

7. Checking the Remaining Battery

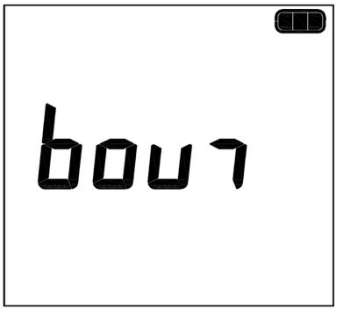
Remaining battery is displayed in the top right corner of the indication.
As properties vary, depending on batteries, use this value only as a reference.



When the indication of the indicator becomes ▭ ,replace the batteries with new ones.

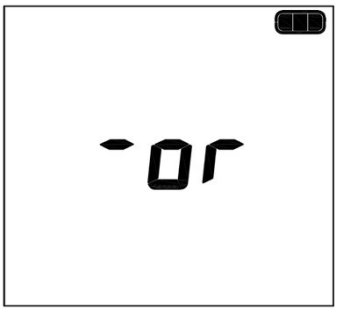
8. Error Messages

8.1. Indication of a Broken Element of the Probe

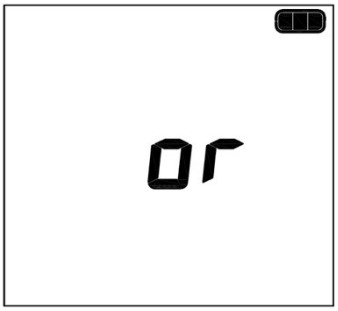


If the probe has a broken element or is disconnected, the burnout (broken element) indication is displayed. If this indication is displayed, replace the probe with a new one or connect the probe.

8.2. Overrange Indication



When the temperature in measurement exceeds the measurable range, the overrange indication is displayed.
If the element of the probe is about to become broken, this overrange indication may be shown. If it is clear that the temperature in measurement is within the measurable range, check the probe.



Even if the overrange indication is shown, it will not damage the instrument. However, the probe may be consumed, so relocate it to a place where the temperature is at a heat-resistant temperature or a lower temperature.

8.3. Battery Voltage Drop Indication

When batteries are depleted and the battery indication on the screen becomes ▭, replace the batteries with new ones.

9. Maintenance

9.1. Storage

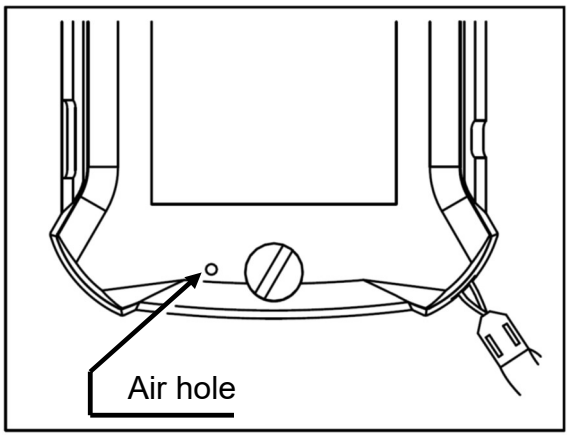
When storing the instrument, avoid the following places:
- In direct sunlight
- Subject to heavy vibrations
- High humidity (85%RH or more)
- High temperature atmosphere (50°C or higher)
- Filled with dust, waste, corrosive gas, and/or salt
- High electromagnetic field

To store the instrument for a long time, it is recommended to remove the batteries and store the unit in the original packaging at time of delivery.

9.2. When the Case of the Instrument Gets Dirty

When the case of the instrument gets dirty, please wipe it with a slightly damp cloth. Do not use alcohol, thinner, benzine, or other chemicals. Otherwise, the case or keyboard may become discolored or deformed.

* About waterproofing [Applicable models: HR-1650/HR-1750]
The simple water resistance specifications of this product are equivalent to IPX5. It can be washed with a small amount of water. However, do not directly spray water on the air hole near the battery housing.



10. Troubleshooting: Before Contacting Support

If you find any abnormalities or become unable to operate the instrument, first check for the following items. If you still cannot solve the issue, please contact your retailer or our company.

(1) The instrument does not operate when power is turned on:
- Is the orientation of the batteries in the correct manner?
Reset the batteries.
- Have the batteries been depleted?
Install new batteries.

(2) The indicated values of temperature are unstable:
- Is the element of the probe almost broken or is the probe deformed?
Do an appearance check of the probe.
- Is the probe connector inserted fully?
Re-insert the connector.
- Is the probe sufficiently making contact with the object of measurements?
Change how to set the probe.
- Is the measurement environment in a high electromagnetic field (such as a large motor)?
- Relocate the instrument or use the shield.

(3) If measurement errors are too large:
- Are the thermocouple types of the probe and the instrument the same?
Replace the probe.
- Is the head of the probe deformed?
Replace it with a new one.

(4) Keys are not responding:
- Is there any burn out (broken element) indication shown?
Set the probe.
- Are any functions running?
Terminate various functions and retry to operate the keys.

11. HR Series Specifications

ANP specifications (common)

Model (HR-)			1650, 1750
Operation switches			Membrane keyboard (with clicking function)
Input connector			ANP connector (thermocouple homogeneous metals)
Input			Thermocouple Type E or K
No. of input			One
Signal source resistance			1 kΩ or less
Measurement range	1°C resolution	E	-200 to 800°C [-328 to 1472°F]
		K	-200 to 1370°C [-328 to 2498°F]
	0.1°C resolution	E	-104.9 to 504.9°C [-156.9 to 940.9°F]
		K	-104.9 to 504.9°C [-156.9 to 940.9°F]
Measurement accuracy	1°C resolution	Less than 0°C	± (0.5% x indicated value + 1°C) ± [0.5% x indicated value + 2°F]
		0°C or more	± (0.1% x indicated value + 1°C) ± [0.1% x indicated value + 2°F]
	0.1°C resolution	Less than 0.0°C	± (0.15% x indicated value + 0.2°C) ± [0.15% x indicated value + 0.4°F]
		0.0°C or more	± (0.05% x indicated value + 0.2°C) ± [0.05% x indicated value + 0.4°F]
Accuracy of reference junction compensation			±0.2°C (at 25°C ± 10°C) ±0.4°F (at 77°F ± 18°F)
Temperature coefficient (Only when exceeding 25°C±10°C)			±0.03 × Δ*t*°C (Exceeded temperature Δ*t* is multiplied by the coefficient and then added to the indication tolerance (measurement accuracy + accuracy of the reference junction compensation) Ex. @50°C or 0°C environment: ± 0.5°C added
Operational conditions			0 to 50°C, [32 to 122°F] within 0 to 80% RH (no condensation)
Storage conditions			-20 to 50°C, [-4 to 122°F] within 0 to 85% RH (no condensation)
Sampling frequency			About 200 ms

Linearizer method	Digital linearizer method (compliant with JIS C 1602-2015)
Dimensions	82.1 × 166 × 36 mm (W × H × D) (Excluding connector extrusion)
Weight	About 350 g (including batteries)
Power supply	4 x Alkaline AA battery (LR6)
Battery life (continuous operation time)	About 900 hours
Accessories	Instruction manual, Test report, Warranty sheet, Soft case, Hand strap
Conformity standards (CE)	EMC: EN61326-1: 2013 EN 61326-2-1: 2013 class A Table2 (Industrial) RoHS: IEC EN 63000: 2018

* About the tolerance

The indication tolerance on the main unit of the thermometer is calculated as “measurement accuracy + accuracy of reference junction compensation”. However, this product is manufactured by customizing the reference junction compensation section for individual products. For this reason, the acceptance-rejection criterion at the time of shipment does not take the accuracy of the reference junction compensation into account and makes judgment for the measurement accuracy only. (This will narrow tolerance.)

For actual use, please calculate the indication tolerance with the formula: measurement accuracy + accuracy of reference junction compensation.

If the value exceeds 25°C ± 10°C, the formula will be: measurement accuracy + accuracy of reference junction compensation + temperature coefficient.

Specifications (power supply)

Model (HR-)	1650	1750
Batteries	4 x Alkaline AA battery (LR6)	
Battery life (continuous operation time)	About 900h	

Specifications (accessories)

Common	Instruction manual
	Test report
	Warranty sheet
	Soft case
	Hand strap
	4 x Alkaline AA battery (LR6)