



INSTRUCTION MANUAL



HANDHELD THERMOMETER

HD-1100/HD-1200/HD-1300 Series

2nd edition Feb., 2012

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TO ENSURE SAFE AND RELIABLE OPERATION

Please observe the following matters to ensure safe and reliable operation of products.

Caution

- This product should not be used for any purpose except temperature measurement.
- Stop using as soon as any problems are discovered.
- Do not take the unit apart or remodeling.
- Use the specified battery cells or specified AC-adaptor.

※This product is not rechargeable model.

Concerning the battery cells

Please observe the following matters to guard the battery leakage, exothermic reaction and ignition.

Warning

- Do not throw away the battery cells in the fire, and avoid short between electrodes.
- Do not charge or heat.
- Use the specified battery cells.

Caution

- Set the battery cells correctly 「+」 and 「-」 .
- Remove the battery cells when the battery life is finished, or long time no using.
- Do not mix old and new, or variety battery cells.
- The battery life will be affected by the environmental temperature.

Preface

Thank you for purchasing this product from ANRITSU METER CO., LTD.

We prepared this manual so that you can use this product with ease and confidence.

Please read this manual carefully and understand each functions of this product for your safety and correct using.

Caution

- This contents and the specification of this product are subject to change without notice.
- Reproduction in part or whole of any material from this booklet is prohibited by law.
- We surely make this manual, however if there are any error or not clear, please contact the place of purchase or us.
- We are not responsible for the consequences of using this product.

After-sales Service

ANRITSU METER CO., LTD. ships products after severe company's inspection. Should you find any failure resulting from poor material and workmanship or accident during transportation, please contact the place of purchase or us.

We recommend that you may use the original packaging for this product when you send it to us for repairing or periodical checkup. If you no longer have the original carton, be sure to use plenty of wrapping to guard against damage during shipping.



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1. General

This handheld thermometer allows easy temperature measurement.

These general-purpose thermometers can be used for on-site temperature measurement and various other applications.

A microprocessor is used for constant compensation of zero-point and full scale, thus ensuring extremely stable, high precision measurement.

2. Unpacking

2.1. Unpacking

Open the carton and check that the following are provided. If any of them is missing or out of order, please contact the place of purchase or us.

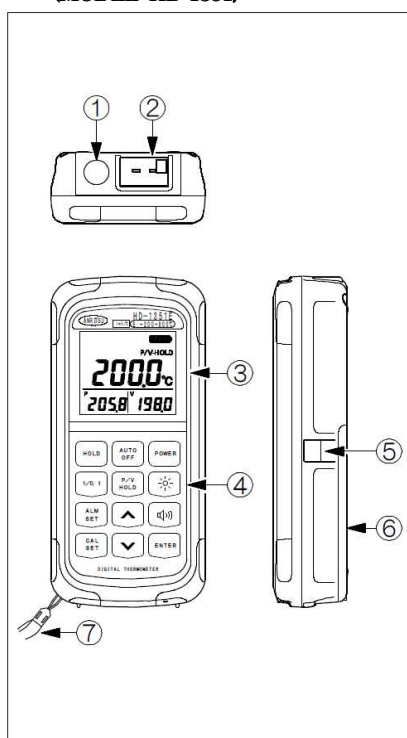
1. Main unit
2. Soft case
3. Hand strap
4. Analog Output cable (HD-1**1, HD-1**2 only)
5. Alarm Output cable (HD-13** only)
6. AA-size alkaline battery cells
7. Instruction manual
8. Test Report

2.2 Repacking

Use the original carton of the instrument for its transportation by mail or car. If the original case is not available, carefully wrap the instrument in shock-absorbing material (polystyrene foam and the like). Wrapping material should be dry and free of dust generation otherwise the instrument may be damaged.

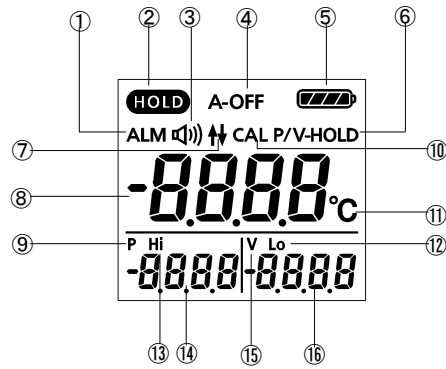
3. Name of Components

3.1. Name of Components (MODEL: HD-1351)



- ① Alarm Output / Analog Output connector
- ② Sensor Input connector
- ③ LCD Display
- ④ Key switch panel
- ⑤ AC adaptor jack
- ⑥ Battery housing
- ⑦ Hand strap

3.2. Display of all segments

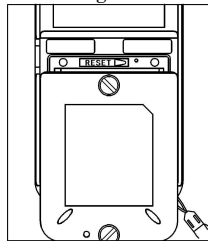


Segments	HD-11*0	HD-12**	HD-13**
① Alarm			●
② Hold	●	●	●
③ Alarm Buzzer			●
④ Auto-power-off	●	●	●
⑤ Battery	●	●	●
⑥ P/V Hold		●	●
⑦ ↑ ↓ alarm			●
⑧ Main display	●	●	●
⑨ Peak		●	●
⑩ Calibration			●
⑪ °C	●	●	●
⑫ Lo			●
⑬ Hi			●
⑭ Sub-display 1		●	●
⑮ Valley		●	●
⑯ Sub-display 2		●	●

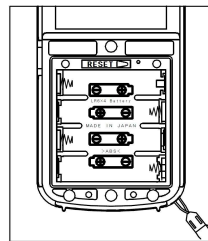
4. Preparation for Operation

4.1. Battery Installation

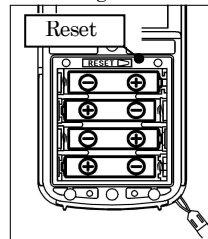
Be sure to keep the power OFF during the battery cells change.



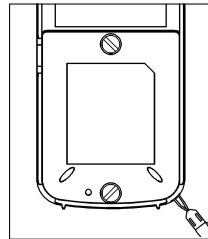
(1) Remove the two screws and detach the battery housing cover.



(2) Set battery cells correctly.



(3) After setting battery cells, press the Reset switch.



(4) Reattach the battery housing cover, tighten the two screws and press the edges of the battery housing cover firmly.

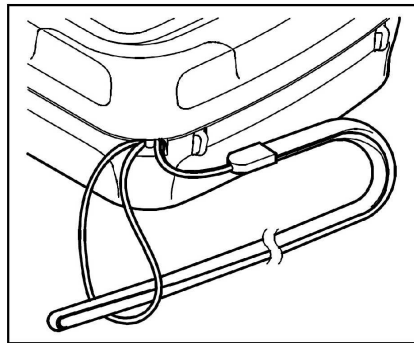
●The Reset switch is a small push button in the upper section of the battery housing. Use a thin stick to lightly press it. Please do not push with the breakable object.

※To maintain waterproof properties, make sure that the battery housing cover is not partially open when reattaching the battery housing cover.
Corresponding models : HD-11*0/ HD-12*0

4.2. How to Use Hand Strap

Hang the hand strap around the hand to prevent in advertent drop of the instrument.

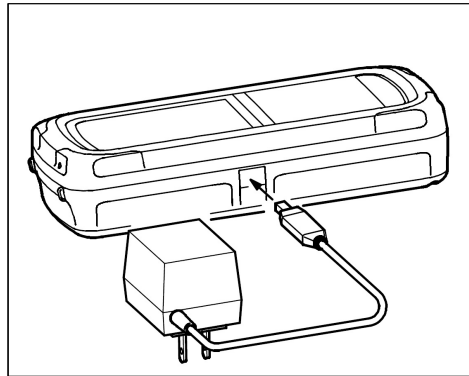
Thread the fine cord end of the hand strap through the strap attachment on the instrument. Pull the hand strap end through the loop.



4.3. AC-power Supply

HD-12*1 / HD-12*2 /HD-13** series come in a variety of models shown below.

- (1) After turning power OFF, connect the AC-adaptor connection plug to the main unit as shown.



- (2) Connect the power plug of the AC-adaptor to commercial power.

※Be sure to use the specified AC-adaptor.

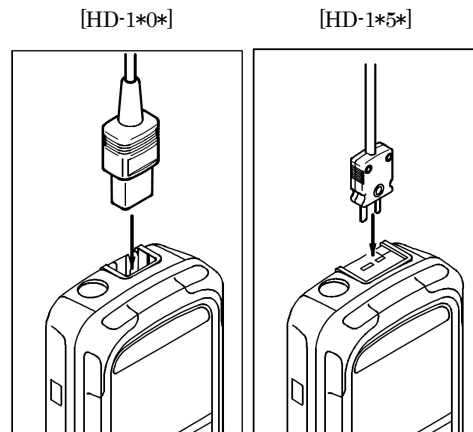
4.4. Sensor Setting

Set the sensor as shown.

The plug is so designed that it will not be set when the polarity is reversed.

Forcible insertion will damage the instrument.

Be sure to check the polarity.



4.5. Soft case

Use the attached soft case for protection instrument against dirt or flaw.

In case of the combined use attached Soft case and the AC-adaptor, please bore the hole at the AC-adaptor jack part of Soft case by scissors, etc.

5. Operation

HD-1100 / HD-1200 / HD-1300 series come in a variety of models shown below.

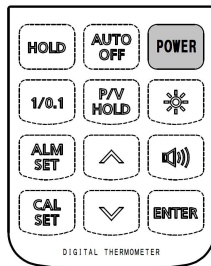
Table of the Function and HD series

Function	HD-11*0	HD-12**	HD-13**
Power ON/OFF	●	●	●
Hold	●	●	●
Automatic Power OFF	●	●	●
Resolution change		●	●
P/V hold		●	●
Backlight		●	●
Calibration			●
Alarm			●

Analog Output model

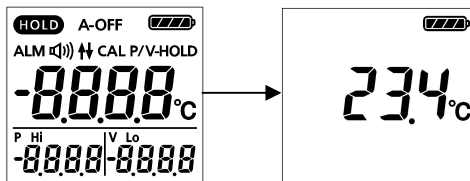
	HD-1**1	HD-1**2
1mV/C	●	
10mV/C		●

5.1. Power ON/OFF



Press the **Power** key to turn power ON and all segments appear on the display for 1 second, and start measurement as be shown below.

Press the key again to turn power OFF.

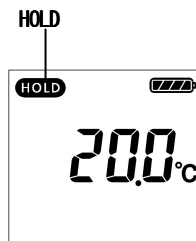
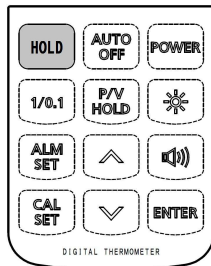


5.2. Hold

Press the **HOLD** key to stop measurement and show the measured Temperature on the display.

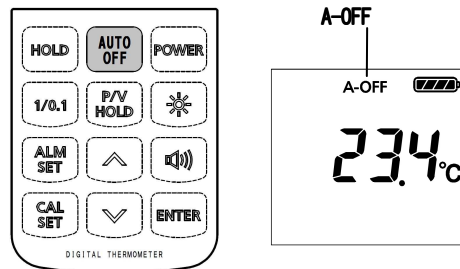
Then HOLD appears on the display.

Press the key again to return to the normal mode.



5.3. Automatic Power OFF

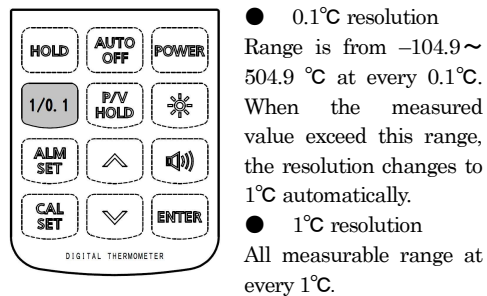
Press the **AUTO OFF** key to enter the Automatic Power OFF mode that is provided to automatically turn Power OFF after a certain period time (about 5 minutes) no key operation. Press the key again to return to normal mode.



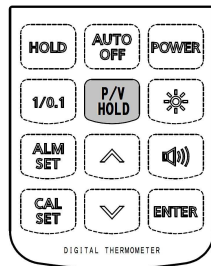
5.4. Resolution change

[HD-12**/HD-13**]

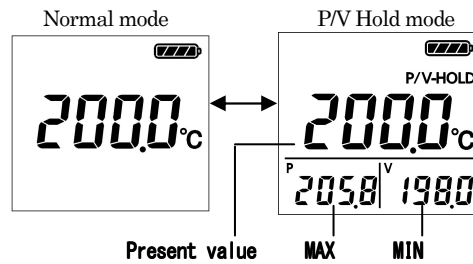
Press the **1/0.1** key to change the resolution of the displayed temperature.



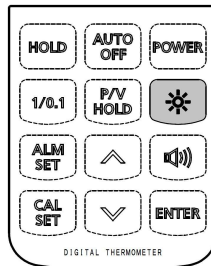
5.5. P/V Hold [HD-12**/HD-13**]



Press the **P/V HOLD** key to enter P/V Hold mode that the maximum value, the minimum value and the present value are displayed simultaneously. Press the key again to return normal mode.



5.6. Backlight [HD-12**/HD-13**]

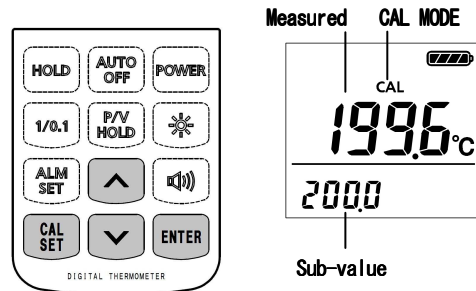


Press the **☀** key to turn the backlight ON, and the display on the screen will be visible even in the dark. Press the key again to turn the backlight OFF.

※ The battery consumption is double when the backlight is ON. Be sure to turn OFF the backlight.

5.7. Calibration set [HD-13**]

This function permits calibration of a measured value.

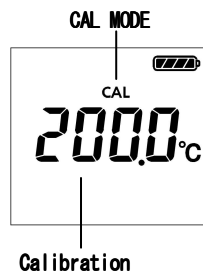


(1) Calibration set

- ① Touch the sensor probe to the target and press the **CAL SET** key.
 - ※ The calibration value is added the adjusted value of last calibration set. In case of above the display, the adjusted value is +0.4°C.
- ② Set the calibration value (Sub-value) to the desired temperature by pressing the **▲** key and the **▼** key.
 - ※ The sub-value for calibration is limited to $\pm 10^{\circ}\text{C}$
- ③ Press the **ENTER** key to complete calibration setting, and enter the calibration mode.

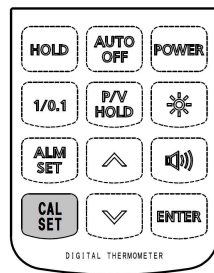
If the **CAL SET** key is pressed before the completion of calibration setting, this mode will be canceled and return to normal mode.

(2) Calibration mode



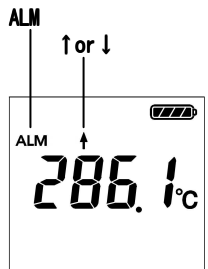
CAL appears on the display. The Main display indicates the calibration value that is added the adjusted value. In case of the shown display, the present value is 199.6°C, the adjusted value is +0.4°C.

(3) Canceling calibration



Press the **CAL SET** key twice to cancel calibration mode.

5.8. Alarm
[HD-13]**



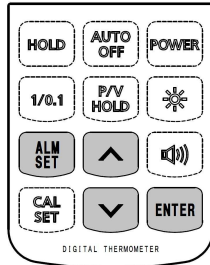
This function presets high / low limits and gives the alarm when the measured value goes beyond the limits.

The alarm function is set in the ON position at all measurement.

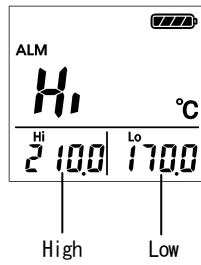
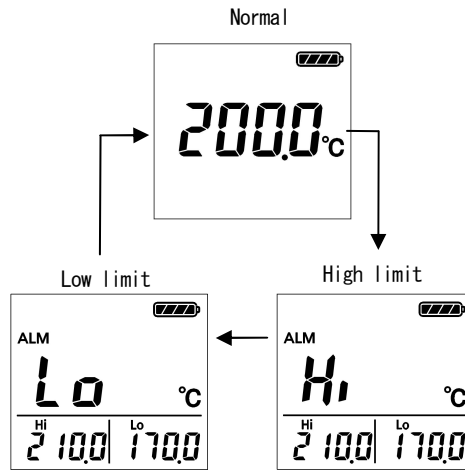
When the measured value goes beyond limits, ALM appears on the display.

Measurement condition	Display
High limit < Measured value	ALM ↑
Low limit > Measured value	ALM ↓
Within limits	NON

(1) High/Low limit setting





① Press the ALM SET key to change the setting display as shown.



② Set the high limit or low limit setting with the Δ key and the ∇ key. When the keys are kept pressing, value will be changed by 10 steps.

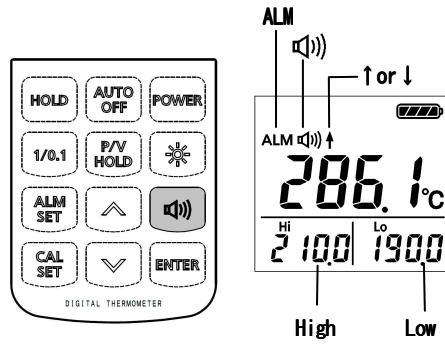
③ Press the **ENTER** key to end setting. If the **ALM SET** key is pressed before the completion of Alarm setting, this mode will be canceled and return to normal mode.

(2) Alarm Buzzer ON / OFF

Press the  key to turn the alarm buzzer ON and ALM and  are appeared on the display.

When the measured value goes beyond limits, the alarm buzzer sounds.

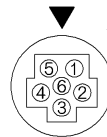
Press the key again to return to normal mode.



(3) Alarm Output

① Signal names and Connector pin arrangement

Pin No.	Signal name
1	ALM 1 (MAX)
4	ALM 2 (MIN)
2	V 1 (Power 1)
3	V 2 (Power 2)



※ ALM1 and ALM2 are directly coupled with C-MOS IC.

② Output Signal

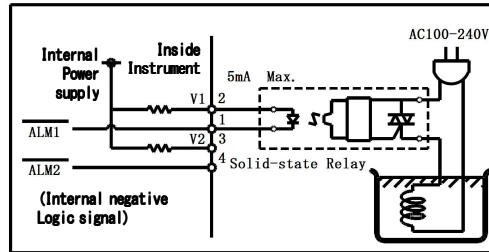
Output signal is digital ("L"0V/"H"5V) as below table from comparison of the present value and the high / low limits.

Measured value	MAX ALM	MIN ALM
Over High	"H" (5V)	"L" (0V)
Within Limits	"L" (0V)	"L" (0V)
Below Low	"L" (0V)	"H" (5V)

*V1/V2 potential difference based on ALM1/ALM2 signals.

③ Signal takeout and example of use

Shown circuit is an example of simple temperature measurement (ON / OFF) control with the high limit alarm.



- ※ Signal current of up to 5 mA can be taken out. Examine the junction circuit (driver, etc.) in accordance with the driving load.
- ※ Be sure to turn the power OFF before connecting to or separating from other equipment.

6. Default Configuration

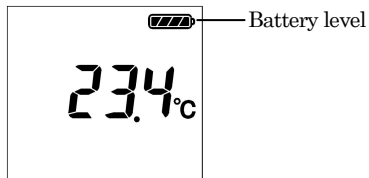
When the instrument turns the power OFF, Reset or Battery exchange, some setting will be canceled. Default Configuration is below tables.

Function	
HOLD	Cancel
Auto Power OFF	Default
P / V Hold	Cancel
Resolution	Default
Backlight	Cancel
Alarm	Default
Alarm buzzer ON / OFF	Cancel
Calibration set	Default
Calibration ON / OFF	Default




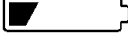
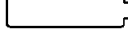
7. Indicator of Battery remain

The battery level is indicated in the upper section of the display.

In accordance with operation hours, the indicator lights go out as shown below.



This table is tentative value because of the battery remains according to variety battery specification.

Indicator	Battery remain
	Over 50%
	25 ~ 50%
	10 ~ 25%
	Under 10%
	Exhausted Battery

This instrument can work for a while after the Exhausted Battery sign appears. However, Change battery as soon as possible, otherwise satisfactory function will not be available.

8. Analog Output [HD-1**1/HD-1**2]

There are two analog output rates. The rate of output is shown in follow table.

Model	Rate	Output range
HD-1**1	1 mV /°C	All measurable range at 1°C resolution
HD-1**2	10mV /°C	-100.0~500.0°C at 0.1°C resolution

When the display is the Over range or the Burned out etc., the Analog Output is shown in follow table.

Plus Over	:	About	5 1 0 0 mV
Minus Over	:	About	- 2 2 0 0 mV
Burn out	:	About	- 2 3 0 0 mV

Signal names and Connector pin arrangement

Pin No.	Signal name
5	+ side
6	- side



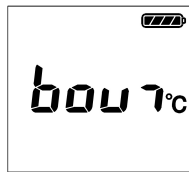
8.1. Connection of Recording

- (1) Turn off the power of recorder and instrument.
- (2) Connect the red terminal of the attached the Analog Output cable to the positive: + side of the recorder terminal and the black terminal to the negative: - side of the recorder terminal.
- (3) Adjust the recorder input range to the measuring range of the instrument.
- (4) Turn on the power of recorder and instrument.
- (5) Check the Automatic Power OFF mode is canceled.

Caution: Never short-circuit the cable or cable itself otherwise failure will result.

9. Error Messages

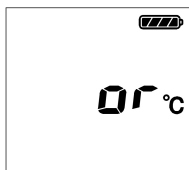
9.1. Indication of Sensor Burnout



If the sensor burns out or is not coupled, the Burnout display appears shown as left.

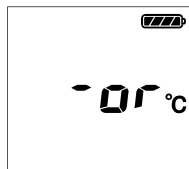
Check whether the sensor burns out or does not connect to instrument.

9.2. Indication of Over range



If the temperature exceeds the measurable range during measuring, the Over range display appears shown as left.

● If the sensor is almost cut, the Over range display sometimes appears.

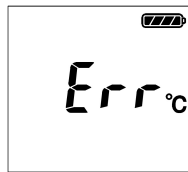


Please check the sensor cut if measuring temperature is in the range.

● The over range display does not damage the instrument, however the sensor will be exhausted. Avoid the sensor to the place in measurable temperature.

9.3. Indication of Error

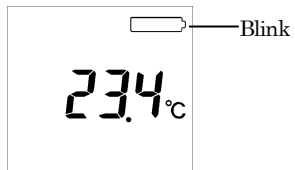
The instrument is broken, please contact the place of purchase or us.



9.4. Indication of Exhausted Battery

When the battery is exhausted, Battery indicator blinks.

Then replace the old battery cells with new ones.



10. Maintenance

10.1. Storage

Avoid places subject to the following when storing the instruments.

- Direct Sunlight
- Strong vibration
- High humidity (85%RH or more)
- Hot atmosphere (50°C or more)
- Dust, corrosive gas, or salt
- Strong electromagnetic field

It is recommended to put the instrument in the original case when storing it for a long time.

10.2. Case cleaning

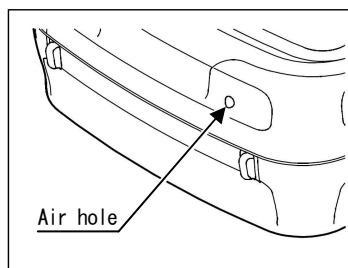
When the case is dirty, lightly wipe it with a cloth slightly impregnated with water.

Do not use thinner or benzene, otherwise the case or keyboard may discolor or deform.

Water resistance

The HD-11*0 and HD-12*0 feature basic water resistance (equivalent to the IPX5 standard).

The instrument can be rinsed using a small amount of water. However, take care to keep water from entering the air hole near the battery housing.



11. In case of Trouble

Issues of instruments operation trouble, please check follows. If your trouble is not solved, please contact the place of purchase or us.

- (1) **Display does not show any segments.**
 - **Push the Reset switch**
 - **Check the pole of battery cells**
 - **Replace the old battery with new ones**
 - **If you use the AC-Adaptor, please pull it out.**
- (2) **Measurement value does not stable.**
 - **If sensor is deformation or broken junction, please contact us for repairing.**
 - **Pull out and put in the plug of the sensor with the instrument again.**
 - **If the sensor does not hold in the correct position, measurement value does not stable.**
 - **If you measure in the environment of strong electromagnetic field (a big motor, etc.), please shield the instruments and the sensor against electrical noise.**
- (3) **Measurement value error is too big (Not acceptable).**
 - **If the thermocouple type of the sensor is not corresponded to the instruments, measurement value is not correct. Please replace the correct sensor.**
 - **If sensor is deformation, please contact us**
- (4) **The key switch is not operated**
 - **When the Burn out display appears, no operation. Please put the sensor in, or check the sensor broken junction.**

12. Specification

Display	7 segments LCD display
Operation key	Membrane switch
Water-resistant construction	Equivalent to IPX5 (HD-11*0 and HD-12*0 only)
Linearizer	Digital (based on JIS C 1602-1995)
Sampling rate	Approximately 300 ms
Signal source resistance	500 Ω
Power supply	Battery cells (AA) 4 pieces or AC-Adaptor
Environmental limit	Operation : 0~40°C, 0~80%RH Storage : -20~50°C, 0~85%RH
Dimensions	76(W) × 167(H) × 36(D)mm
Weight	Approximately 350 g
Accessories	Soft case Instruction manual Battery cells (AA) 4 pieces Hand Strap / Test Report HD-13** : Alarm Output cable HD-1**1, HD-1**2 : Analog Output cable

Battery life

HD-11*0	HD-12*0	HD-12*1 HD-12*2	HD-13*0	HD-13*1 HD-13*2
Approx. 300h	Approx. 300h	Approx. 150h	Approx. 300h	Approx. 150h

Analog Output (HD-11, HD-1**2)**

Model	HD-1**1	HD-1**2
Rate	1 mV/°C	10 mV/°C
Range	All range at 1°C resolution	All range at 0.1°C resolution
Resistance	100 Ω	
Accuracy	± (0.15% of F/S + 1 mV) at 25°C±5°C ± (0.15% of F/S + 1 mV) ± (0.01% of F/S) except 25°C±5°C	

Alarm (HD-13)**

Measured value	MAX ALM	MIN ALM
Over high	“H” (5V)	“L” (0V)
Within Limits	“L” (0V)	“L” (0V)
Below low	“L” (0V)	“H” (5V)

Accuracy

E	Measurement range	1°C	-205~805°C
		0.1°C	-104.9~504.9°C
	Accuracy 1°C resolution	0°C or more	±(0.1% of reading + 1°C)
		Below 0°C	±(0.5% of reading + 1°C)
	Accuracy 0.1°C resolution	0°C or more	±(0.05% of reading + 0.2°C)
		Below 0°C	±0.5°C
K	Measurement range	1°C	-205~1372°C
		0.1°C	-104.9~504.9°C
	Accuracy 1°C resolution	0°C or more	±(0.1% of reading + 1°C)
		Below 0°C	±(0.5% of reading + 1°C)
	Accuracy 0.1°C resolution	0°C or more	±(0.05% of reading + 0.2°C)
		Below 0°C	±0.5°C
Accuracy Cold-junction compensation		0.2°C at 25°C±10°C	
Temperature coefficient		±0.01% of F/S/°C except 25°C±10°C	