

Handy Thermometer

DP-350

Instruction Manual

IM350DP01-E5

Thank you for purchasing this RKC product. In order to achieve maximum performance and ensure proper operation of your new instrument, carefully read all the instructions in this manual. Please place the manual in a convenient location for easy reference.



WARNING

- Never use this product for medical equipment.
- This instrument must be used in accordance with the specifications to prevent fire or damage to instrument and equipment.
- This instrument is not intended for use in locations subject to flammable or explosive gases.
- If any abnormality such as smoke, smell of burning or noise was found, do not use the product. If so, fire may occur.
- RKC is not responsible if this instrument is repaired, modified or disassembled by other than factory-approved personnel. Malfunction can occur and warranty is void under these conditions.

CAUTION

- This product is intended for use with industrial machines, test and measuring equipment. (It is not designed for use with medical equipment and nuclear energy.)
- All precautions described in this manual should be taken to avoid damage to the instrument or equipment.
- Prevent metal fragments or lead wire scraps from falling inside instrument case to avoid electric shock, fire or malfunction.
- Do not drop nor apply strong impact to the product. If so, failure may result.
- Do not use the product while the battery cover is being removed. If so, failure may result.
- Load a battery so that its polarity will meet the indication on the product. If not, the battery electrolyte may leak or heat be generated to result in injury or failure.
- If the product is not used for a long period of time, remove the battery from the mainframe. If not, the battery electrolyte may leak to result in failure.
- Battery service life may change depending on battery performance, operating condition and measuring environment.
- Use this product within the following ambient temperature and ambient humidity.
 - Allowable ambient temperature: 0 to 50 °C (32 to 122 °F)
 - Allowable ambient humidity: 45 to 85 %RH (Non condensing)
- Do not use or store the product in places such as listed below:
 - Rapid changes in ambient temperature which may cause condensation.
 - Corrosive or inflammable gases.
 - Direct vibration or shock to the mainframe.
 - Direct water, oil, chemicals, vapor or steam splashes.
 - Excessive dust, salt or iron particles.
 - Excessive induction noise, static electricity, magnetic fields or noise.
 - Direct air flow from an air conditioner.
 - Exposure to direct sunlight.
 - Excessive heat accumulation.
- Turn off the power supply before cleaning the instrument.
- Do not use a volatile solvent such as paint thinner to clean the instrument. Deformation or discoloration will occur. Use a soft, dry cloth to remove stains from the instrument.
- To avoid damage to instrument display, do not rub with an abrasive material or push front panel with a hard object.

NOTICE

- The figures, diagrams and numeric values used in this manual are only for purpose of illustration.
- RKC is not responsible for any damage or injury that is caused as a result of using this instrument, instrument failure or indirect damage.
- RKC is not responsible for any damage and/or injury resulting from the use of instruments made by imitating this instrument.
- Periodic maintenance is required for safe and proper operation of this instrument. Some components have a limited service life, or characteristics that change over time.
- Every effort has been made to ensure accuracy of all information contained herein. RKC makes no warranty expressed or implied, with respect to the accuracy of the information. The information in this manual is subject to change without prior notice.
- No portion of this document may be reprinted, modified, copied, transmitted, digitized, stored, processed or retrieved through any mechanical, electronic, optical or other means without prior written approval from RKC.

1. PRODUCT CHECK

■ Model code

Model code	Accessory (Optional)
DP-350C * A	No optional
DP-350C * A-1	With anti-shock cover (Silicon jacket) ^{1, 2}
DP-350C * A-2	With simple waterproof cover ^{1, 3}
DP-350C * A-3	With soft case ¹

¹ Purchase of each cover only is available. Refer to the following part numbers:

350P-K01: Anti-shock cover (Silicon jacket)
350P-K02: Simple waterproof cover
350P-K03: Soft case

² Anti-shock performance:

Free fall up to 80 cm (with the optional cover fitted)

³ Waterproof/dustproof performance:

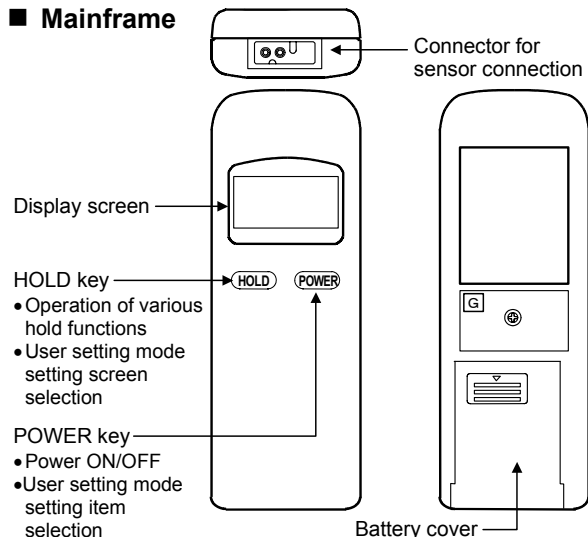
Protection class close to IP54 (IEC60529) with the optional cover fitted.
[Sensor connecting part is excluded. Take caution to avoid splashing water on this part. If the water gets through between the instrument and the simple waterproof cover, remove all the water immediately.]

■ Accessories

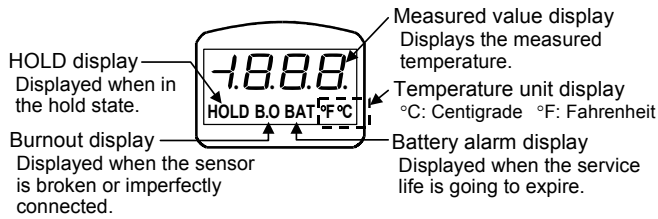
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Alkaline batteries (LR6) [AA].....	2
Hand strap	1
Optional (Purchase of the covers only is available):	
Anti-shock cover (For DP-350C * A-1)	
Simple waterproof cover (For DP-350C * A-2)	
Soft case (For DP-350C * A-3)	

2. PARTS DESCRIPTION

■ Mainframe



■ Display screen



The above figure shows all of the characters, but may differ from the actual display.

3. BEFORE OPERATION

3.1 Preparation

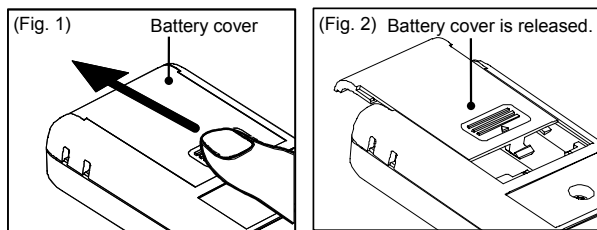
1. Loading batteries

Remove the battery cover at the rear of the mainframe, then load alkaline batteries (attached as accessory) in the direction indicated by the mark in the battery box. Then, close the battery cover.

The batteries supplied with this product may have a shorter life expectancy due to storage conditions.

● How to remove battery cover

To release the lock of the battery cover, press down on the area and slide it off as described in figure 1.



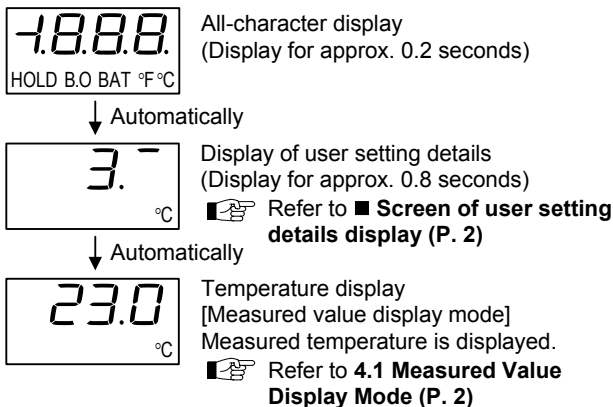
2. Connect the temperature sensor

Connect the temperature sensor to the connector (for sensor connection) at the top of the mainframe.

3.2 Power ON/OFF

■ Power ON

Press the **(POWER)** key. The following displays appear in order.

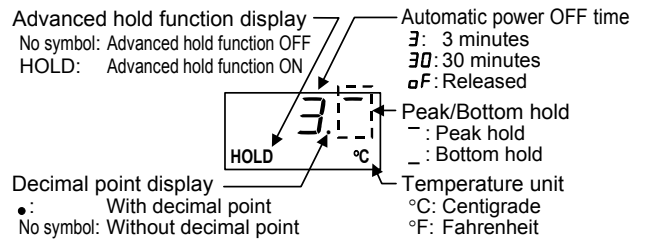


■ Power OFF

Pressing the **(POWER)** key again turns off the power.

When the automatic power-OFF function is used, the power is automatically turned off if the preset time is over. (Factory set value: 3 minutes.)

■ Screen of user setting details display



4. OPERATION

This thermometer is provided with “Measured value display mode” in which measured temperature is displayed and “User setting mode” in which the setting relating to the function or action can be changed.

4.1 Measured Value Display Mode

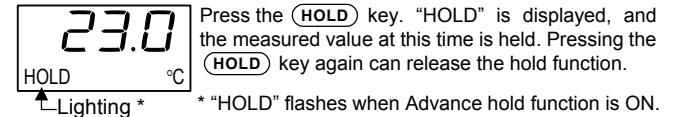
Temperature display screen
 Display range: -200 to +1200 °C
 -328 to +1999 °F
 -199.9 to +199.9 °C (°F) *
 * Display range with the resolution of 0.1°C (°F). The resolution out of this range is 1 °C (°F).

The display resolution and unit can be changed in User setting mode.

Screen to be selected during normal operation.

■ Measured value hold function/Advanced hold function

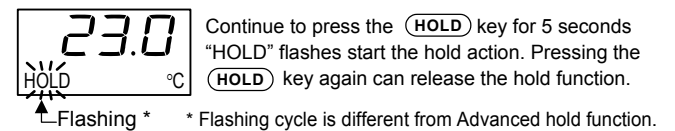
This function is used to display measured value in succession by pressing the **(HOLD)** key during measurement. To flash “HOLD” character, turn Advanced hold function ON. (Flashing interval: lighting for 0.6 seconds and shutoff for 3 seconds) Advance hold function can be set in the User setting mode. (Default value: Advanced hold function OFF)



Even if the power is turned off in the HOLD state, the hold data (measured value) is held. If the power is turned on again, the thermometer starts from the HOLD state. However, if the batteries are replaced, the hold data and state are released.

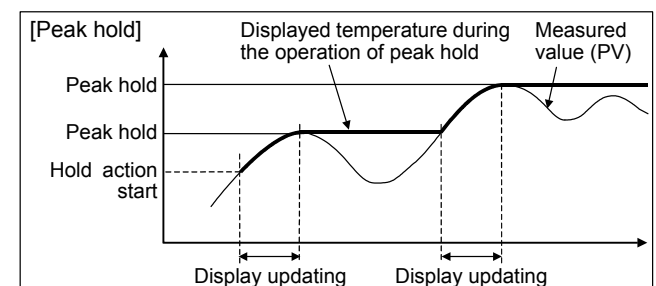
■ Peak hold & Bottom hold functions

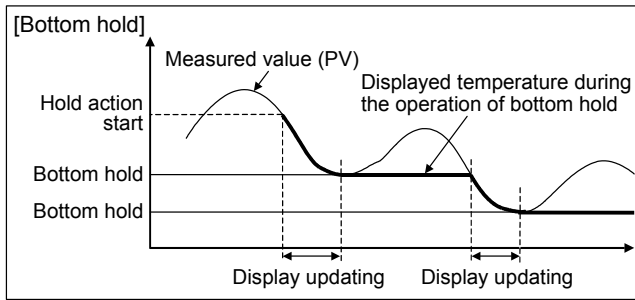
This function is used to always store, then display the maximum (peak) or minimum (bottom) measured value while following up measured value changes.



The peak/bottom hold function can be selected in “Peak/bottom hold” screen of User setting mode. (Factory set value: Peak hold)

Peak hold function (or Bottom hold function) is released when the sensor is broken or disconnected at measurement, or error occurs.



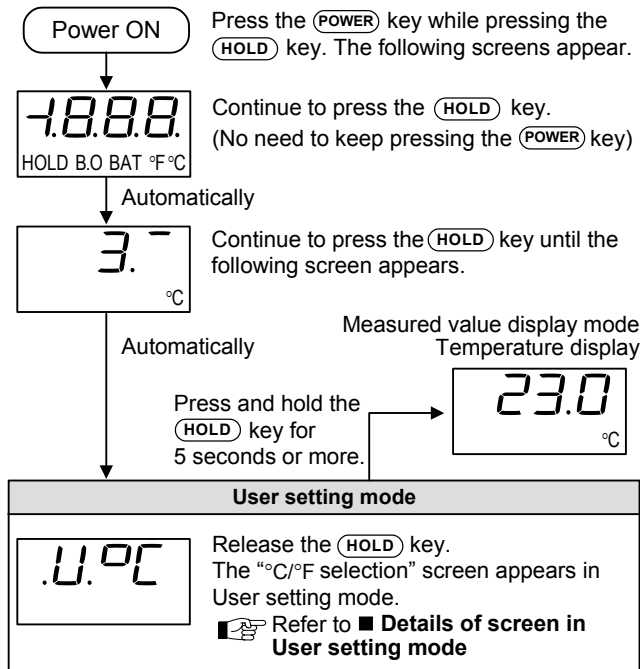


Automatic power off function

This function is used to automatically turn off the power after a lapse of 3 minutes or 30 minutes following power ON. The automatic power off function can be set in "Automatic power off function" screen of User setting mode. (This function can also be released.)

4.2 User Setting Mode

Entry into User setting mode



It is impossible to enter User setting mode from Measured value display mode.

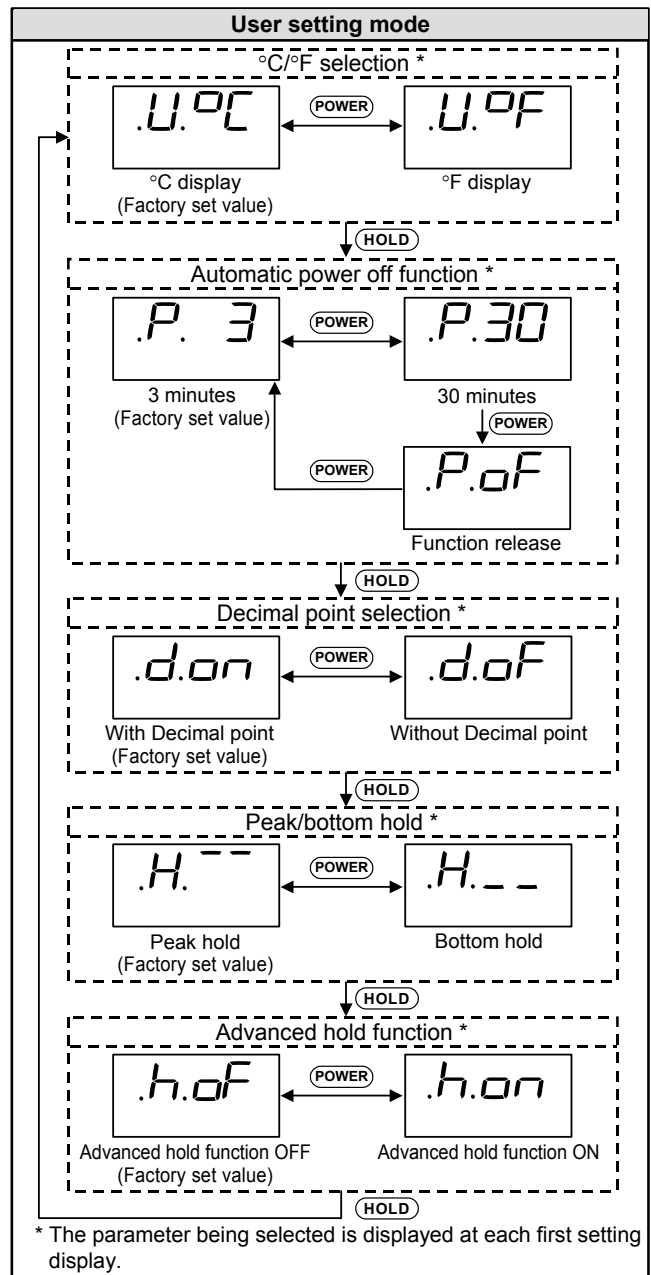
Exit from User setting mode

The power is automatically turned off after a lapse of approx. 3 minutes following the thermometer set to User setting mode regardless of the automatic power off function. In addition, User setting mode can be terminated by changing the thermometer to Measured value display mode. In this case, User setting mode can be changed to Measured value display mode from any screen by pressing the (HOLD) key for more than 5 seconds.

As for the contents of the setting at User setting mode, the setting data before the power off and the setting data just before the switching to the Measured value display mode are held. These data items are stored in the nonvolatile RAM.

Details of screen in User setting mode

Select each screen by pressing the (HOLD) key, then select the setting details by pressing the (POWER) key. The details thus set are established just when the next setting screen is selected by the (HOLD) key.



5. TROUBLESHOOTING



For inquiries, repairs or replacement resulting from cause other than those described below, please contact RKC sales office or the agent, to confirm the specifications of the product.

Prior to replacing the battery and the sensor, always turn off the power.

Error display

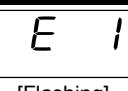
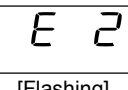
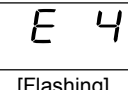
Display	Description	Solution
BAT	Service life is going to expire.	Change both batteries at the same time.
B.O [Flashing]	Burnout The sensor is broken or imperfectly connected.	Check connecting state of sensor. Confirm that the sensor or wire is not broken.

Continued on the next page.

Display	Description	Solution
 [Flashing]	Over-scale Measured temperature is above the Measuring range high limit value.	Check connecting state of sensor. Confirm that the sensor or wire is not broken.
 [Flashing]	Underscale Measured temperature is below the Measuring range low limit value.	

■ Self-diagnostic error

If two or more errors occur simultaneously, the total summation of these error codes is displayed.

Display	Description	Solution
 [Flashing]	Adjusted data error Adjusted data range is abnormal.	Turn OFF then restart the instrument or remove, insert the batteries and restart.
 [Flashing]	Data back-up error Error in reading/writing of EEPROM	When the operation returns to normal upon restoring the instrument, noise may cause an error. Check the noise level near the instrument.
 [Flashing]	A/D conversion error Response signal from A/D converter is abnormal. Temperature compensation error Ambient temperature exceeds 90 °C.	Check for the external noise source. If an error occurs after the power is turned on again, the DP-350C must be repaired or replaced. Please contact RKC sales office or the agent.

■ Problem and solution

Problem	Probable cause	Solution
No power is turned on. (No display appears)	No battery is loaded.	Load a battery.
	The battery with less service life is used.	Change both batteries at the same time.
Measured temperature display is abnormal	The battery with less service life is used.	Change both batteries at the same time.
	Noise source is present near the instrument.	Separate the noise source from the instrument.
	Proper sensor is not used.	Use the specified sensor.
	Sensor insertion depth is insufficient.	Check whether sensor is inserted loosely. If yes, fully insert the sensor
	Sensor insertion position is not appropriate.	Insert the sensor at the specified location.
The display does not change No key operation is accepted	CPU overrun	Keep the thermometer away from the noise generation source, then take the following measures. ① Remove the batteries. ② Load new batteries after a lapse of more than 10 seconds. ③ Press the (POWER) key to turn on the power. If the thermometer does not operate normally even after the above measures are taken, please contact RKC sales office or the agent.



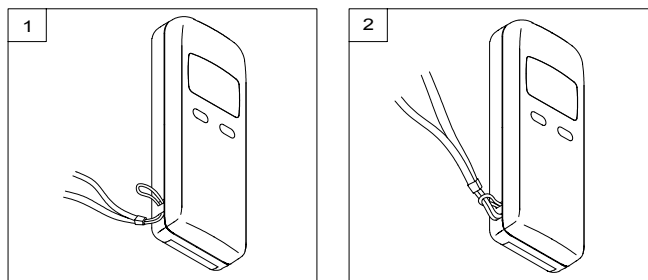
Replaceable dry batteries:
Alkaline (AA Size [LR6], 1.5 V, 2 pcs.) or
Manganese (AA Size [R6], 1.5 V, 2 pcs.)

6. SPECIFICATIONS

Input type:	Thermocouple type K (JIS/IEC)
Influence of external resistance:	Approx. 0.1 $\mu\text{V}/\Omega$
Measuring range:	-200 to +1200 °C -328 to +1999 °F -199.9 to +199.9 °C (°F) *
	* Display range with the resolution of 0.1°C (°F). The resolution out of this range is 1 °C (°F).
Sampling cycle:	Approx. 0.3 seconds
Action of input break:	Upscale (B.O display lights)
Display:	LCD (TN type)
Display accuracy:	\pm (0.2 % of indicated value + 1 digit) or Within ± 2 °C (4 °F) Less than the value whichever is greater However, for less than -100 °C (-150 °F): Within ± 4 °C (8 °F)
Resolution:	1 °C (°F) or 0.1 °C (°F)
Power supply:	AA Size (LR6 or R6) dry batteries, 1.5 V, 2 pcs.
Battery life:	Approx. 1000 hours (Total of operating hours) [When using alkaline dry batteries in the ambient temperature near 23 °C] However, the battery service life varies depending on the operating condition and environment. Therefore, the above service life period is only for reference.
Power consumption:	5 mW (Mean value)
Allowable ambient temperature:	0 to 50 °C (32 to 122 °F)
Allowable ambient humidity:	45 to 85 % RH
Ambient operating:	Free from no corrosive gases, atmosphere no large amount of dust and a splash of water.
Weight:	Approx. 140 g (Including dry batteries)
Dimensions:	145 × 52 × 25 mm (H × W × D)

7. BINDING THE HAND STRAP

Binding the hand strap to the DP-350 as follows.



When requiring the strap for replacement, please contact RKC sales office or the agent.

The first edition: FEB. 1997
The fifth edition: NOV. 2010 [IMQ01]

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