AD-4772

INSTRUCTION MANUAL

Digital Refractometer

A&D Company, Ltd.

1WMPD4005514A

⚠ This product can be used as a Brix measuring device. When measuring Brix, do not configure the coefficients. For details about the Brix measurement method, see pages 64-65.

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Contents

1. Introduction

Thank you for purchasing the AD-4772 digital refractometer. In order to use the product safely and effectively, make sure to read this manual thoroughly before use. This manual also includes a warranty, so make sure to store it carefully after you are finished reading it.
For information on the AD-4772, see the AD-4772 product page. You can also download the latest version of this instruction manual from the product page.
A&D website: https://www.aandd.jp

AD-4772 product page

This instruction manual

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December 2025
A&D Company, Limited

3. Safety Precautions

This manual contains safety precautions to prevent danger to yourself and other persons and ensure that the purchased product is used safely.
Always note the following precautions when operating the device.

⚠CAUTION

- **Repairs**

  Do not open the case to perform repair work as this should only be done by a qualified repairman. Doing so will void your warranty and may cause damage to the device or impair its functionality.

- **Device Trouble**

  If a problem occurs with the device, stop using it immediately, and place a sign on the device indicating that it is out of service or move it to a location where it will not be used accidentally. Continuing to use the device is extremely dangerous.
  When a repair is required, contact the store where you purchased the product or A&D.

4. Product Features

This product is a measuring instrument that can measure the refractive index (sugar content) of cutting fluid, perform corrective calculation based on coefficients recorded internally, and display the cutting fluid density.

- ❑ The product has a color LCD screen, which is easy to view even in dark locations.
- ❑ The product is rechargeable for repeated use.
- ❑ The product can record up to five pairs of correction coefficients a and b, which are input from the main unit or from a computer via a USB connection.
- ❑ The product can automatically record and store up to 100 items of measurement data.
- ❑ The product can be connected to a computer to output data recorded with the dedicated software in the CSV format.
- ❑ The product can also measure Brix.
  (Measurement range: 0.0% to 65.0% Brix)
  For the Brix measurement method, see pages 64-65.
- ❑ The product has a wide measurement stage made of stainless steel that is easy to maintain.
- ❑ The product has IP67 water-resistance.

5. Included Parts

Confirm that the following items are included when opening the product.

- AD-4772 main unit 1

Accessories

- USB cable (Type-A to Type-C) 1
- Storage case 1
- Cleaning cloth 1
- Dropper 2
- Strap 1
- Instruction manual 1
- Inspection certificate 1

6. Cautions Regarding Use

- ❑ Subjecting the product to a strong impact may cause damage or failure.

- ❑ Do not use the product in a location exposed to direct sunlight for long hours, inside a sealed vehicle, or near a device such as a heater. The range of operating temperatures for the product is 5.0 to 45.0°C. Using the product outside this range may cause failure.

- ❑ Avoid moving the product from a hot location to a cold location, or from a cold location to a hot location. Sudden changes in temperature may cause moisture to form inside the product and cause failure.

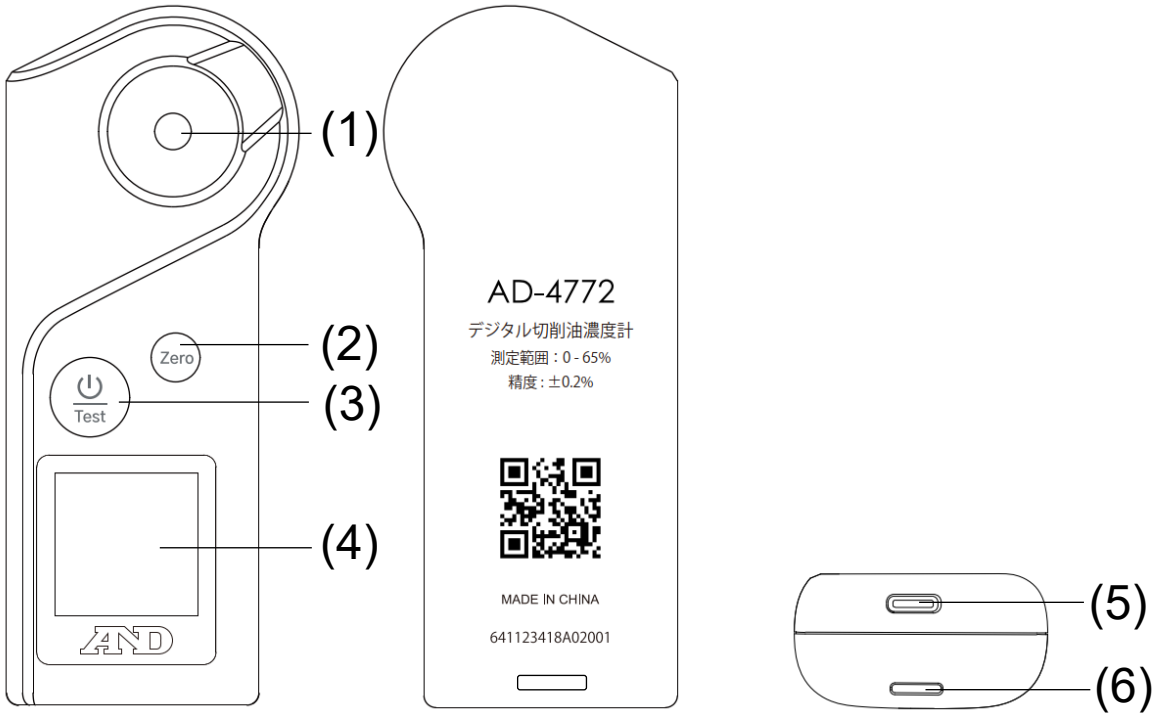
- ❑ Locations subject to strong magnetic fields or electric fields (such as near a television, IH cooking equipment, or microwave) may affect the operation of the device. Avoid using the device in such a location.

- ❑ This product complies with JIS C 0920 protective class 7 for water-resistance, which means it can maintain water-resistance for 30 minutes in 1 m of still water at ordinary temperatures.

- ❑ The USB terminal is also water-resistant, but if water or cutting fluid enters the terminal, clean it well before use. Otherwise, connection problems or failure may occur.

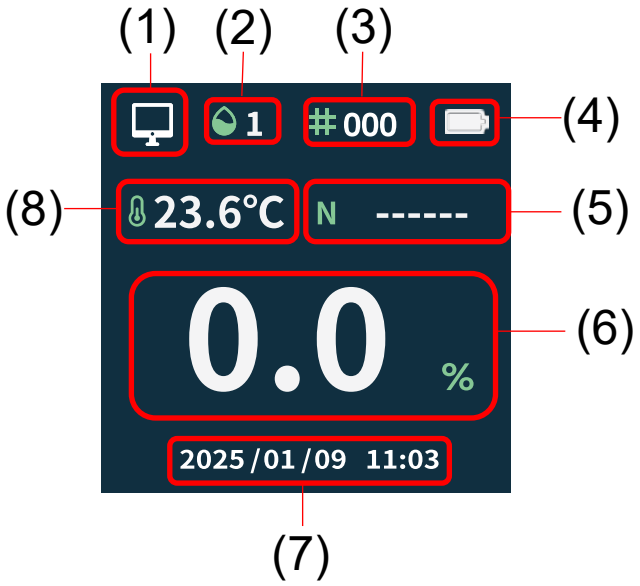
7. Names of Parts

7-1 Names of Main Unit Parts



(1) Sample stage
(2) Zero (zero calibration) button
(3) Power button / Test (measurement) button
(4) LCD screen
(5) USB Type-C terminal
(6) Strap hole

7-2 Display



Number	Description
(1)	Displays the computer connection status. When connected to a computer: When not connected to a computer:
(2)	Displays the selected cutting fluid coefficient pair.
(3)	Displays the memory number.
(4)	Displays the battery level.
(5)	Displays the refractive index.
(6)	Displays the cutting fluid density.
(7)	Displays the year, month, day, and time.
(8)	Displays the sample stage temperature.

8. Power

This product uses a lithium-ion battery.
The internal lithium-ion battery cannot be replaced.

⚠WARNING Cautions Regarding the Use of the Lithium-Ion Battery

Make sure to follow the instructions below to ensure that the battery is handled safely.

- ❑ **Do not disassemble or modify the battery. The battery contains safety mechanisms and protective mechanisms to prevent danger. Hindering those mechanisms may cause the generation of heat, generation of smoke, rupturing, or fire.**
- ❑ **Do not charge the battery near open flame or under the blazing sun. If the battery reaches a high temperature, the protective mechanism for preventing danger will operate and prevent charging, or the protective mechanism may fail and cause charging to occur with abnormal current or voltage, which can cause abnormal chemical changes inside the battery and lead to the generation of heat, generation of smoke, rupturing, or fire.**
- ❑ **Do not use this product if the battery emits an abnormal smell, generates heat, becomes discolored or deformed, or otherwise exhibits abnormal behavior during use, charging, or storage. Continuing to use the product may cause the generation of heat, generation of smoke, rupturing, or fire.**

Charging the Battery

When the product does not turn ON or the battery level is low, charge the battery.

The charging port is on the base of the main unit. Use the included USB cable or a commercially-available USB cable.

A USB charger is not included. Purchase a commercially-available USB charging adapter that outputs 5 V at 0.5 A.

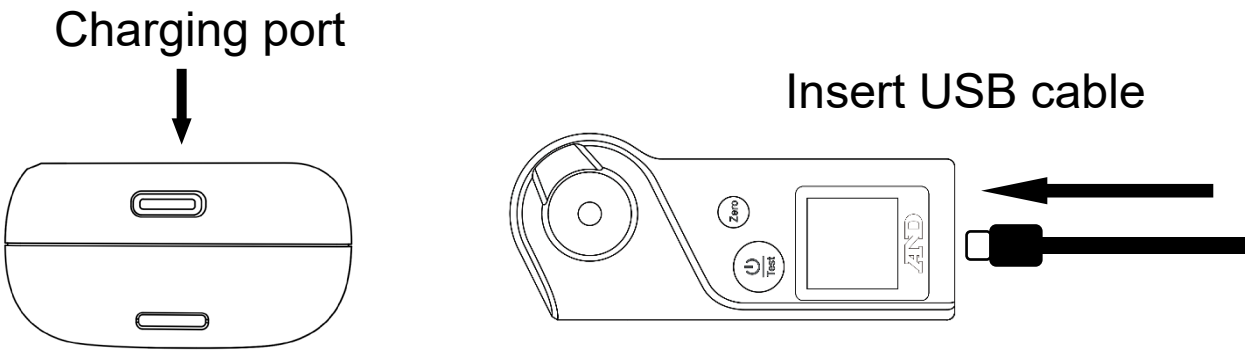
Charging Procedure

Step 1. Connect the Type-C connector of the included USB cable to the charging port on the base of the main unit.

Step 2. Connect the Type-A connector of the USB cable to the USB charging adapter.

Step 3. Connect the USB charging adapter to the power outlet to start charging. It takes about 3.5 hours for the battery to fully charge when it is completely exhausted.

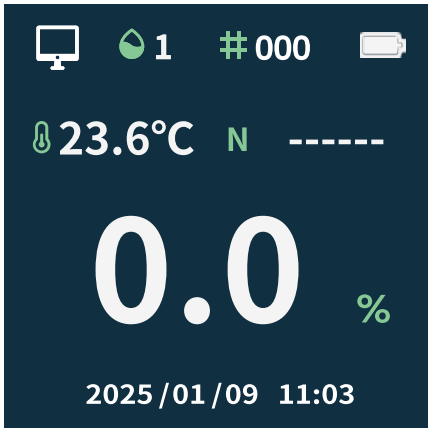
NOTE) Rapid charging is not supported.



9. Basic Operations (First Measurement)

Step 1. Turn the power ON.

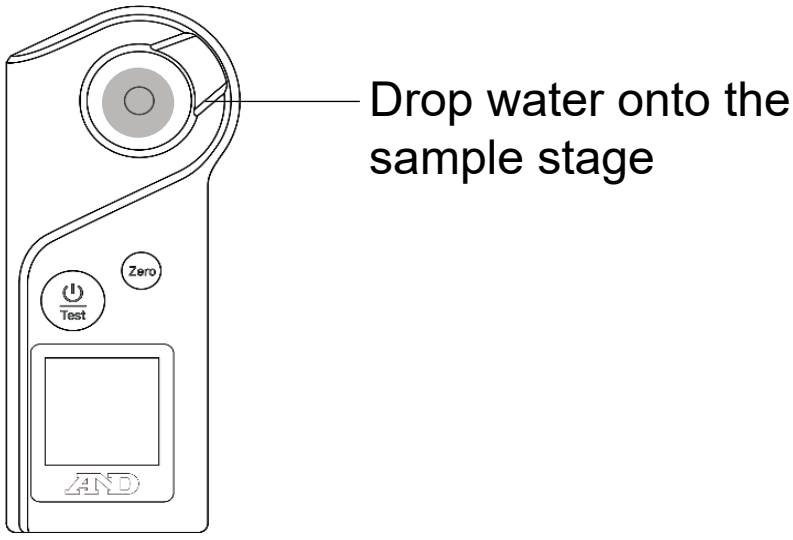
Press the Test button. The power turns ON, the A&D logo is displayed for about one second and then, the measurement screen is displayed.



Step 2. Perform zero point calibration.

(i) Wash the sample stage with water, then wipe it clean with the included cleaning cloth or a similar object.

(ii) Drop several drops of water onto the sample stage. Press the Zero button. Zero point calibration starts and "**Zeroing**" is displayed. When "**Complete**" is displayed, zero calibration is complete.



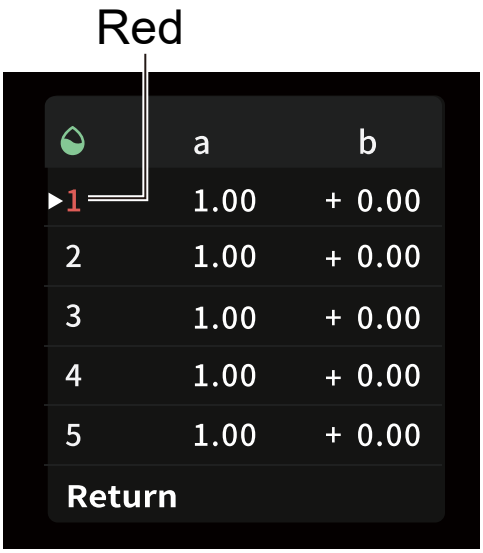
Step 3. Configure the coefficients.

When configuring 1.25 for coefficient a and -1.25 for coefficient b in coefficient pair 2.

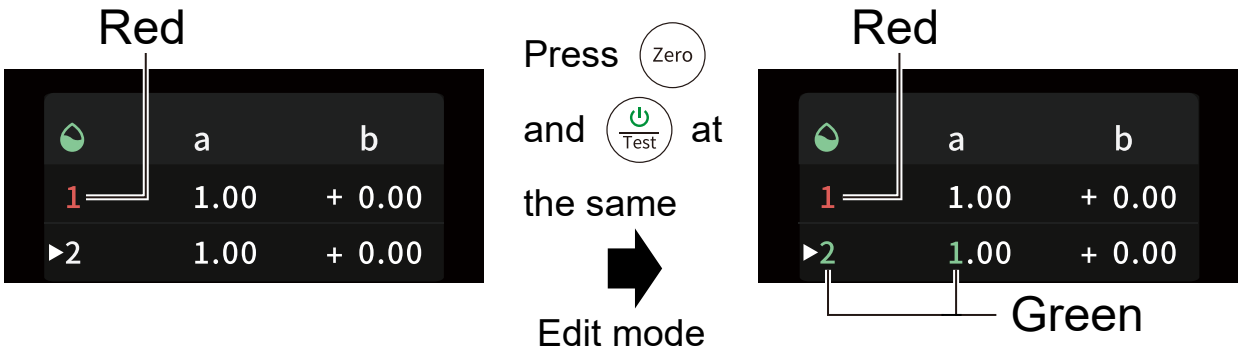
CAUTION

If the actual coefficient a (gradient) and coefficient b (change) are not indicated in the instruction manual of the cutting fluid, ask the manufacturer of the cutting fluid or derive the coefficients via the indicated formula. (See "11-2 Deriving the Coefficients" on page 24.)

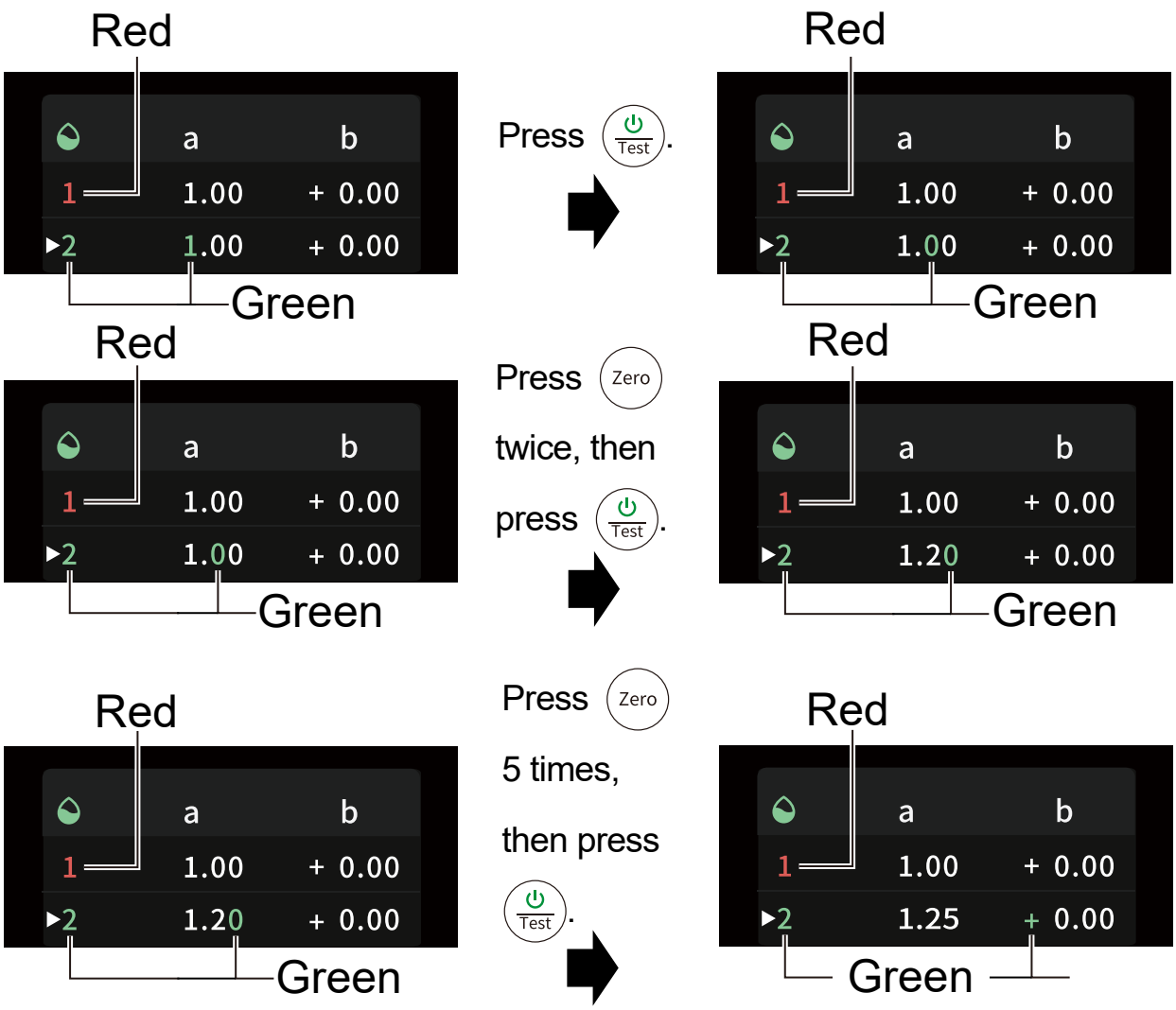
(i) In the measurement screen, press the Zero button and Test button at the same time. The configuration screen is displayed, and the number of the coefficient pair you are using is displayed in red. When configuring the settings for the first time, "1" is displayed in red.



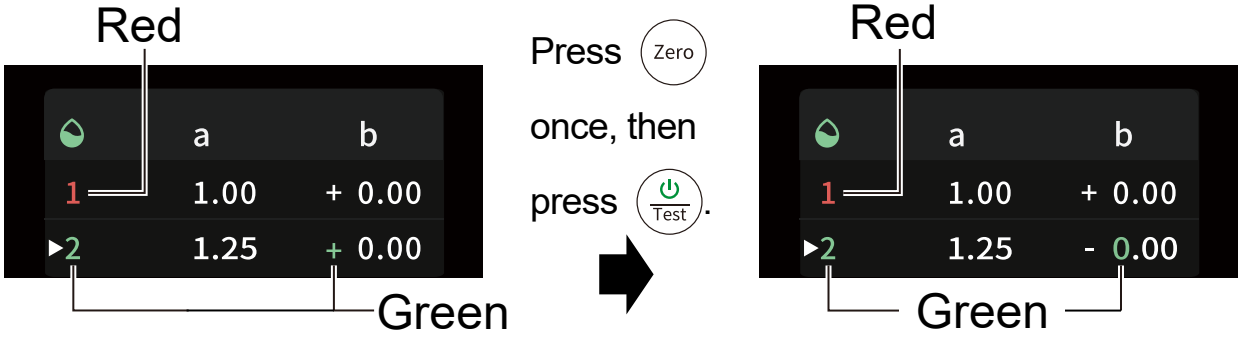
(ii) Press the Zero button once to align the cursor with coefficient pair 2, then press the Zero button and Test button at the same time to enter the edit mode for the coefficient values. The first digit of coefficient a (gradient) is displayed in green and can be changed.

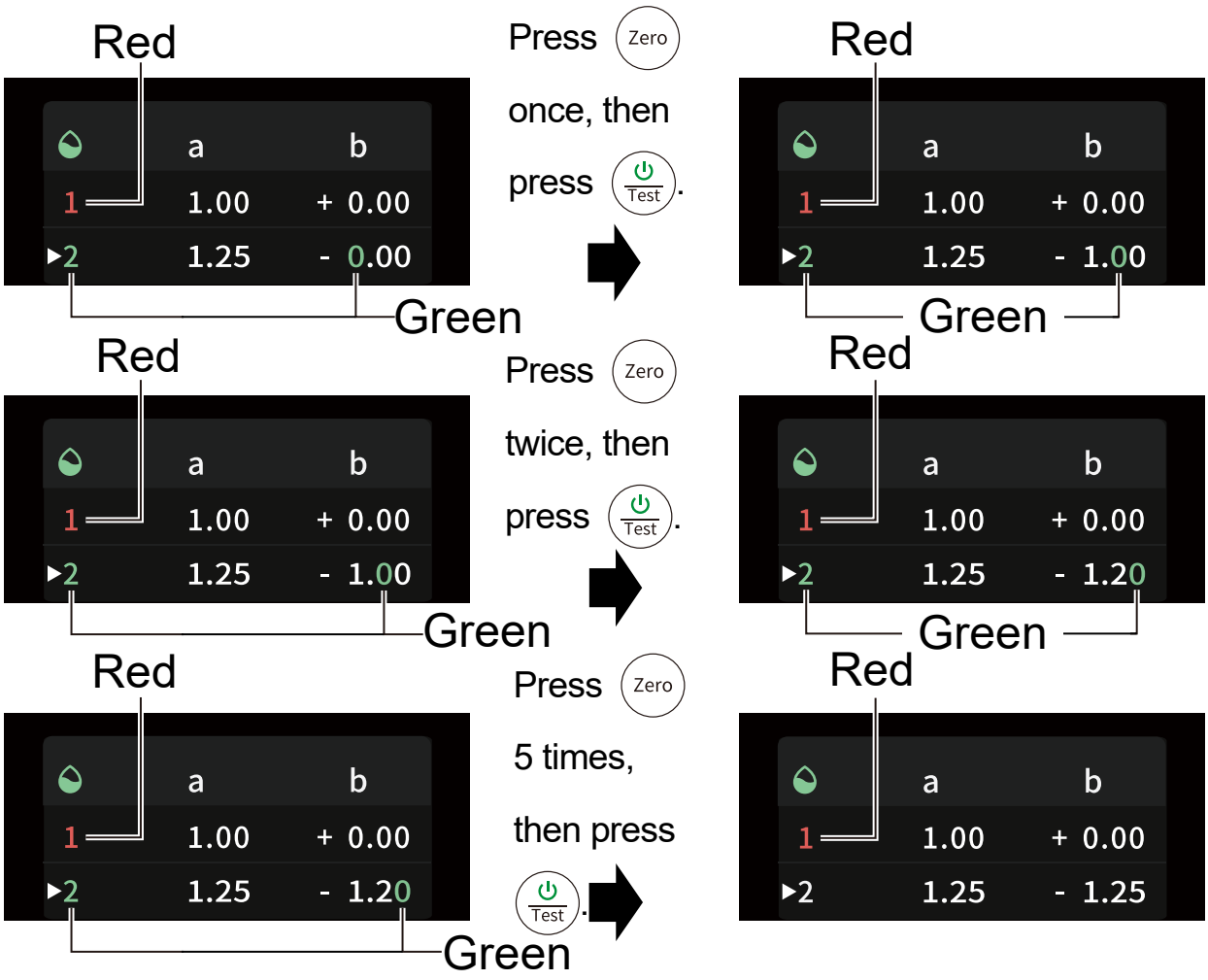


(iii) To set coefficient a (gradient) to 1.25, perform the following operations.



(iiii) To set coefficient b (change) to -1.25, perform the following operations.

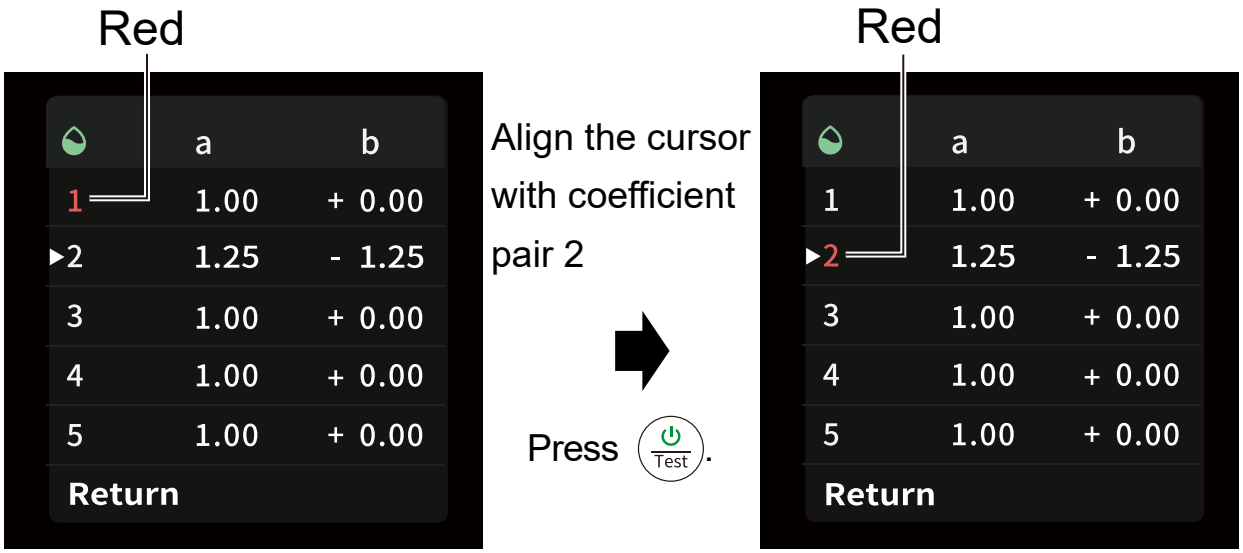




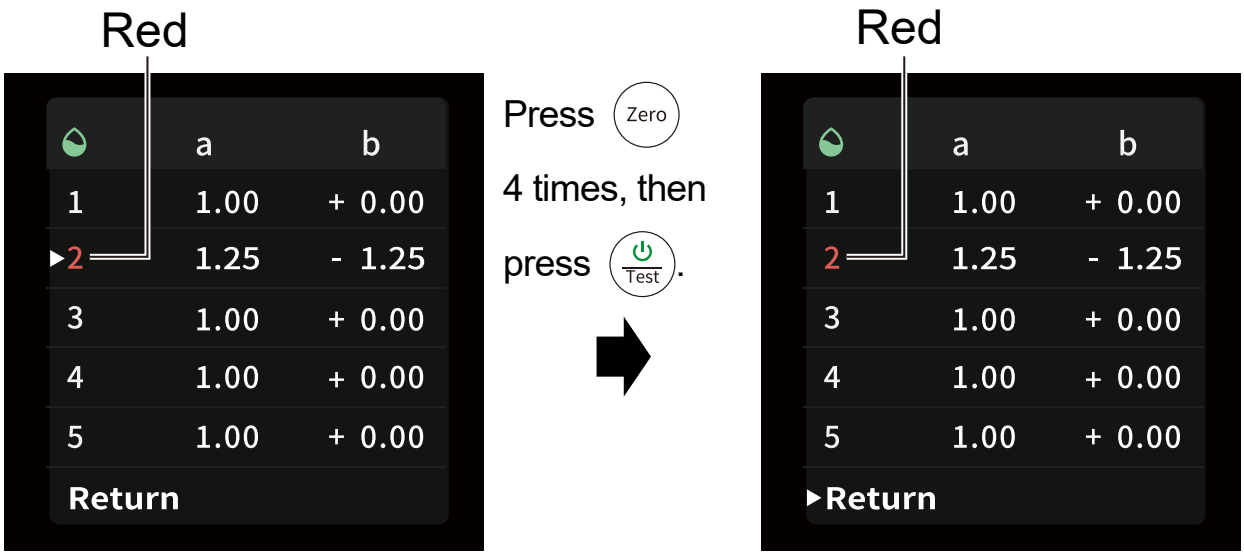
Step 4. Select the coefficient pair.

To select coefficient pair 2:

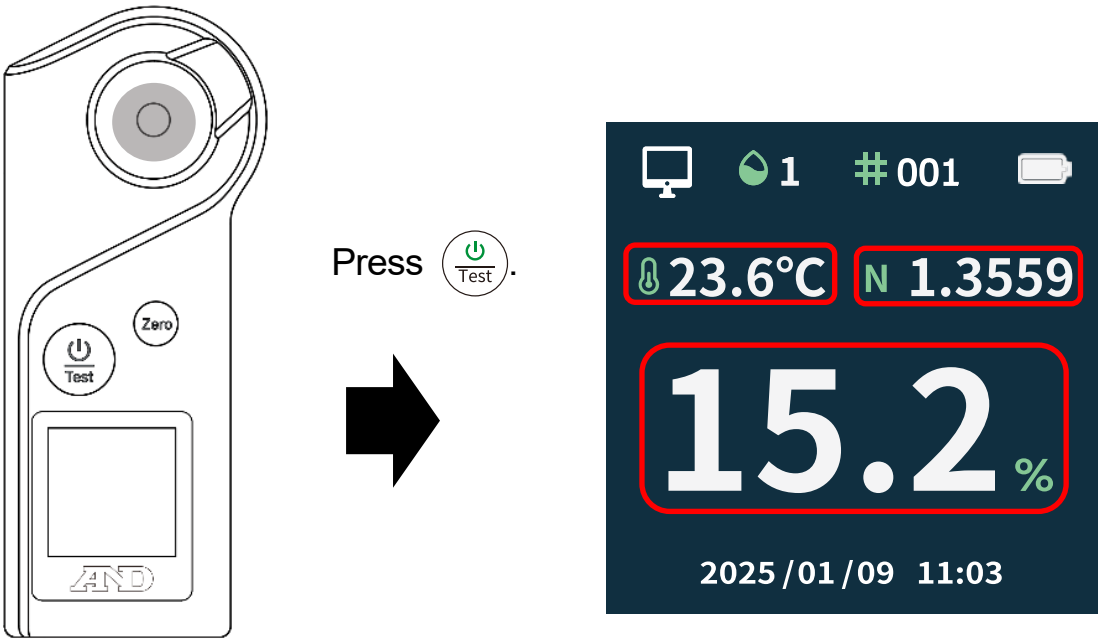
(i) After configuring the coefficients, the cursor is aligned with coefficient pair 2, so press the Test button to confirm.



(ii) Return to the measurement screen.



Step 5. Perform measurement.
Drop sample liquid to about half the depth of the sample stage, then press the Test button to start measurement. "**Testing**" is displayed, then the sample stage temperature, sample refractive index, and density are displayed on the screen.



Step 6. Turn the power OFF.
Press and hold the Test button. The displayed screen disappears, and the power turns OFF.

10. Measurement

10-1 Preparing for Measurement

(i) Check the year, month, day, and time.

The year, month, day, and time set in the product are reflected to the saved data when measurement is performed. Confirm that the year, month, day, and time are correct before performing measurement.

For information on changing the year, month, day, and time, see "18-8 Configuring the Year, Month, Day, and Time" on page 56.

(ii) Perform zero point calibration.

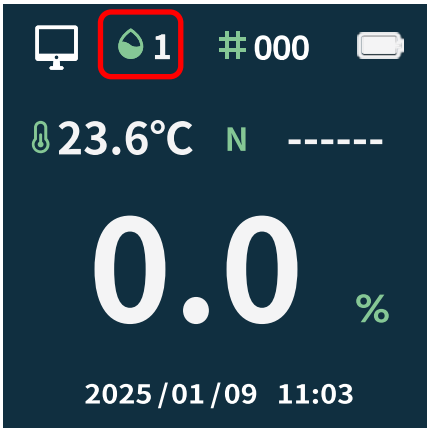
If measuring water does not give a result of 0.0% or you want to ensure accurate measurement, perform zero calibration.

Step 1. Wash the sample stage with water, then wipe it clean with the included cleaning cloth or a similar object.

Step 2. Drop several drops of water onto the sample stage. Press the Zero button. Zero point calibration starts and "**Zeroing**" is displayed. When "**Complete**" is displayed, zero calibration is complete.

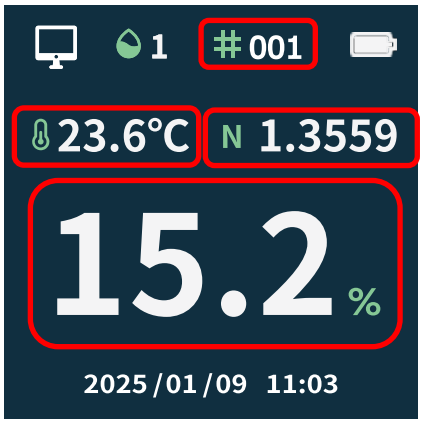
10-2 Performing Measurement

After preparing for measurement, you can follow the procedure below to measure the cutting fluid density. The coefficient pair being used is displayed on the top of the measurement screen.



Step 1. To derive the coefficients to use, follow the procedure in "12-1 Configuring the Coefficients" on page 27 or "18-4 Configuring the Coefficients" on page 49. To select the coefficients to use, follow the procedure in "12-2 Selecting the Coefficient Pair to Use" on page 33 or "18-5 Selecting the Coefficients" on page 50.

Step 2. Drop sample liquid to about half the depth of the sample stage, then press the Test button to start measurement. "**Testing**" is displayed, then the sample stage temperature, sample refractive index, and density are displayed on the screen.



The measured data is automatically saved. The number on the top right of the screen (#000) is incremented and displayed as "#001".

Cautions regarding measurement:

- **When using the product outdoors, correct measurement may not be possible if the product is in direct sunlight. When using the product outdoors, it is recommended that it is used in the shade to ensure correct measurement.**
- **When placing the liquid to measure on the sample stage, take care to ensure that it has no air bubbles. These can cause measurement errors.**

11. Density Display

11-1 Density Calculation

This product displays the cutting fluid density calculated based on the refractive index (sugar content) of the sample. The correlation between the refractive index and cutting fluid density depends on the type of cutting fluid. Therefore, make sure to configure/select and use appropriate coefficients for the type of cutting fluid.

11-2 Deriving the Coefficients

The relationship between the cutting fluid density and measured value (Brix%) is indicated below.

$y = ax + b$

y: cutting fluid density; x: measured value (Brix%);
a: gradient; b: change

[Deriving coefficient a (gradient) only]

This formula is for deriving the coefficient from a water soluble cutting fluid diluted by a factor of approximately 10.

The procedure below calculates coefficient a (gradient) when coefficient b (change) is set to 0. Coefficient a (gradient) is set to 1 and coefficient b (change) is set to 0 when performing measurement.

1) When 10 mL of cutting fluid is diluted with 90 mL of water to create a solution of 100 mL, the density is 10.0%.
   It is assumed that 8.0% was displayed when the density of this solution was measured using this product.

2) This solution is expressed as the following formula based on the relationship between the cutting fluid density and measured value (Brix%).

Cutting fluid density = displayed value × a
-> cutting fluid density / displayed value = a
-> 10.0 / 8.0 = 1.25
This results in a coefficient a (gradient) of 1.25.

[Deriving coefficients a (gradient) and b (change)]
This formula is for deriving the coefficient from a water soluble cutting fluid diluted by a factor of approximately 10 and 20.

The procedure below calculates coefficient a (gradient) and coefficient b (change). Coefficient a (gradient) is set to 1 and coefficient b (change) is set to 0 when performing measurement.

1) When 10 mL of cutting fluid is diluted with 90 mL of water to create a solution of 100 mL, the density is 10.0%.
   It is assumed that 8.0% was displayed when the density of this solution was measured using this product.

2) This solution is expressed as the following formula based on the relationship between the cutting fluid density and measured value (Brix%).

Cutting fluid density = displayed value × a + b -> 10.0 = 8.0 × a + b

3) When 20 mL of cutting fluid is diluted with 80 mL of water to create a solution of 100 mL, the density is 20.0%.
It is assumed that 16.2% was displayed when the density of this solution was measured using this product.

4) This solution is expressed as the following formula based on the relationship between the cutting fluid density and measured value (Brix%).

Cutting fluid density = displayed value × a + b -> 20.0
= 16.2 × a + b

5) Solve the simultaneous equations in 2) and 4) to calculate the coefficients.

$$\begin{array}{ll} 10.0 = 8.0 \times a + b & a = -10.0 / -8.2 \\ -)\underline{20.0 = 16.2 \times a + b} & a \fallingdotseq 1.22 \\ -10.0 = -8.2 \times a & b \fallingdotseq 0.24 \end{array}$$

This results in a coefficient a (gradient) of 1.22 and a coefficient b (change) of 0.24.

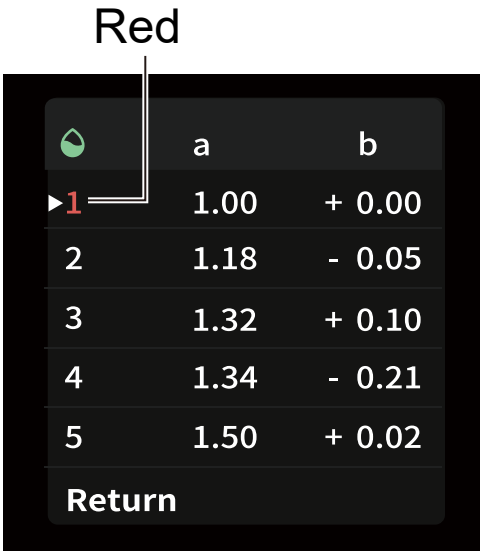
12. Calculation Function

By default, coefficient a (gradient) is set to 1 and coefficient b (change) is set to 0.

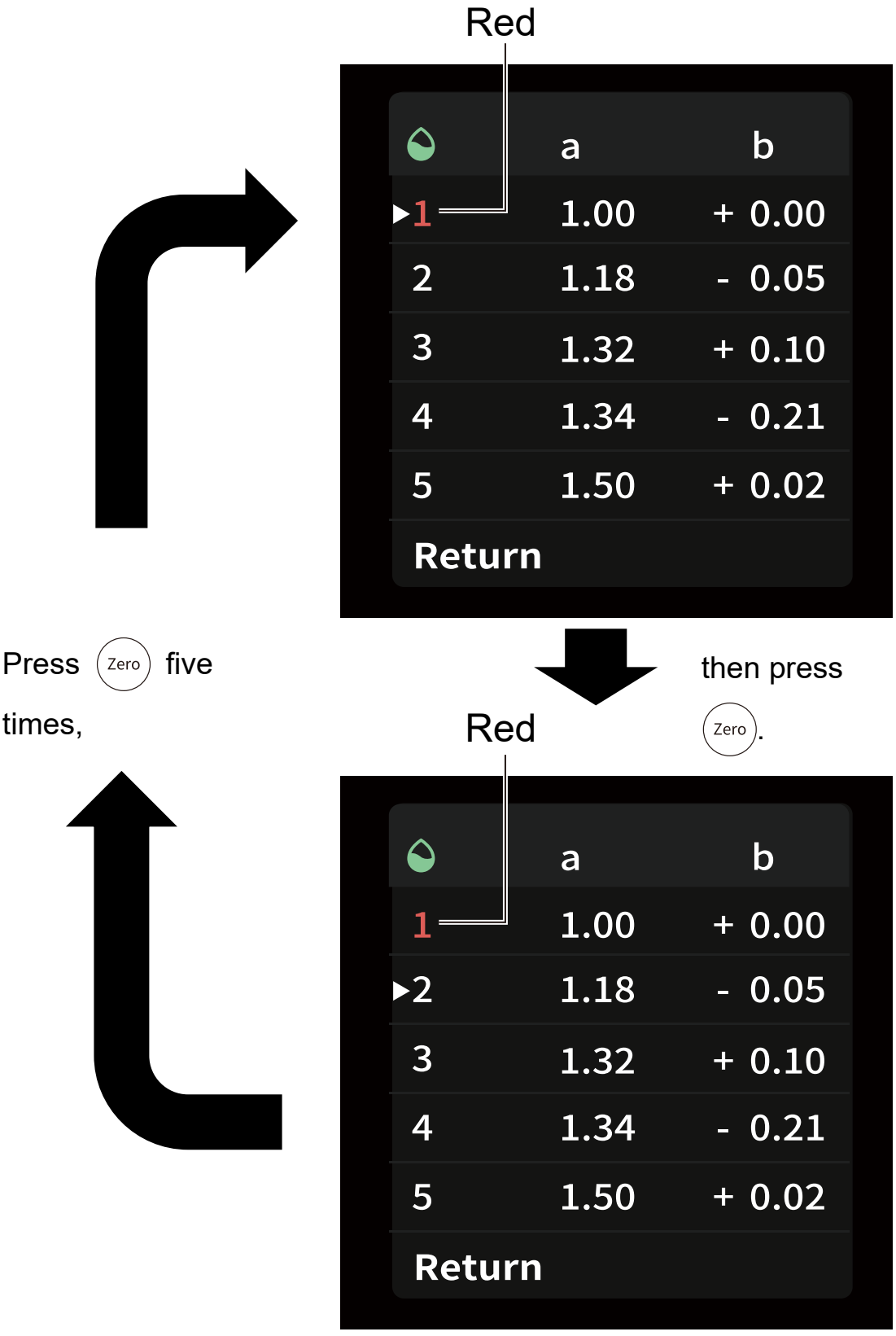
12-1 Configuring the Coefficients

The calculation function is useful for correctly measuring the fluid density.
Up to five pairs of coefficients can be registered.
For information on using the dedicated application to configure the coefficients, see "18-4 Configuring the Coefficients" on page 49.

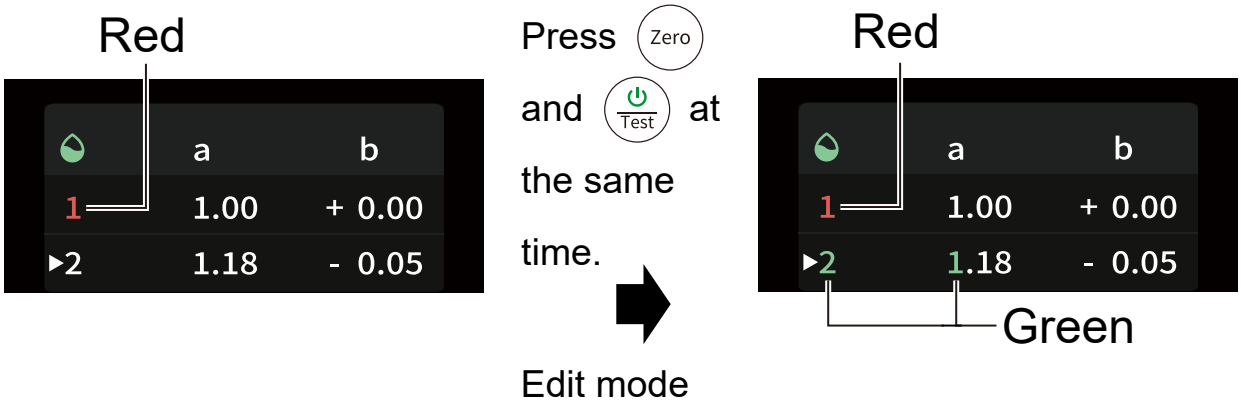
Step 1. In the measurement screen, press the Zero button and Test button at the same time. The configuration screen is displayed, and the number of the coefficient pair you are using is displayed in red. When configuring the settings for the first time, "1" is displayed in red.



Step 2. Press the Zero button. The cursor switches in the order 1 -> 2 -> 3 -> 4 -> 5 -> Return -> 1.

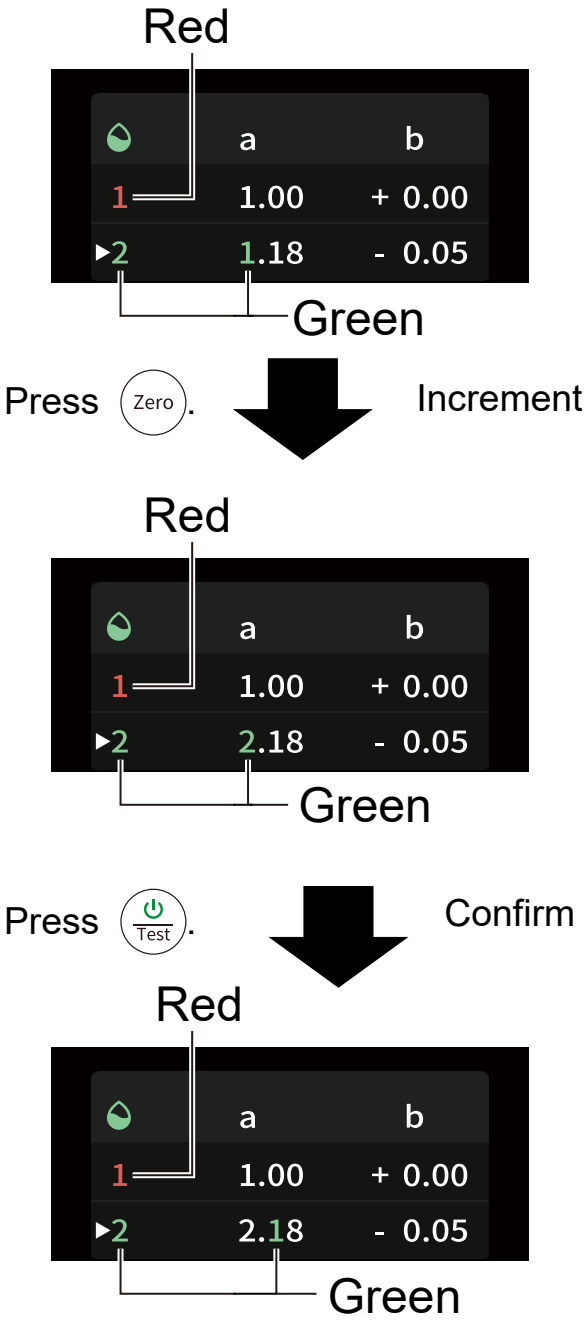


Step 3. Align the cursor with the coefficient pair to change, then press the Zero button and Test button at the same time to enter the edit mode for the coefficient values. The first digit of coefficient a (gradient) is displayed in green and can be changed.

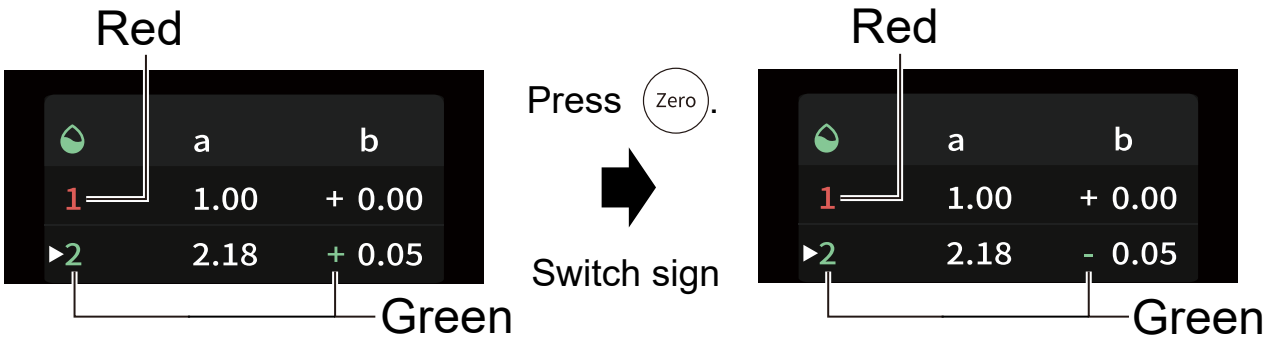


NOTE) Coefficient a (gradient) can be set to a value within the range 0.01 to 9.99. Coefficient b (change) can be set to a value within the range -9.99 to 9.99.

Step 4. Press the Zero button. The green number is incremented each time the button is pressed. When you press the Test button, the displayed value is confirmed and the next digit is displayed in green.



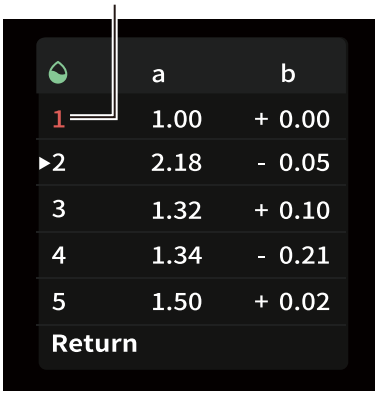
Step 5. Repeat step 4 to configure all the digits for coefficient a (gradient). When configuration is complete, the sign of coefficient b (change) is displayed in green. The sign switches between positive and negative each time the Zero button is pressed.
When you press the Test button, the sign is confirmed and the first digit of coefficient b (change) is displayed in green.



Step 6. Repeat step 4 to configure all the digits for coefficient b (change).

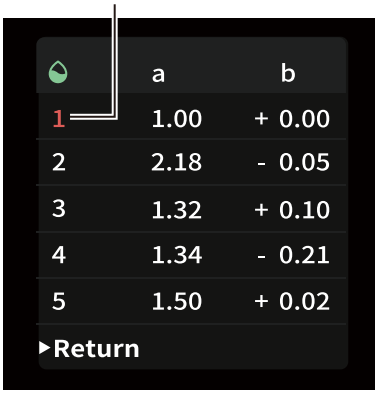
Step 7. When the last digit of coefficient b (change) is set, the position of the cursor does not change and the coefficient pair number is selected again. To configure another coefficient pair, use the Zero button to move the cursor to the desired number, then configure the coefficients.
When you have finished configuring coefficients, move the cursor to [**Return**], then press the Test button to return to the measurement screen.

Red

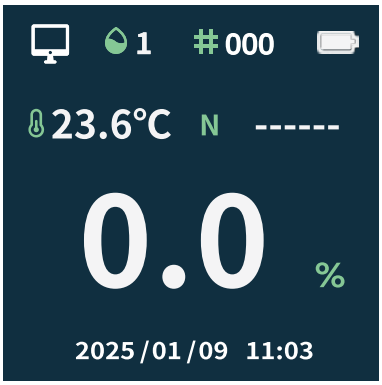


Press Zero four times,

Red



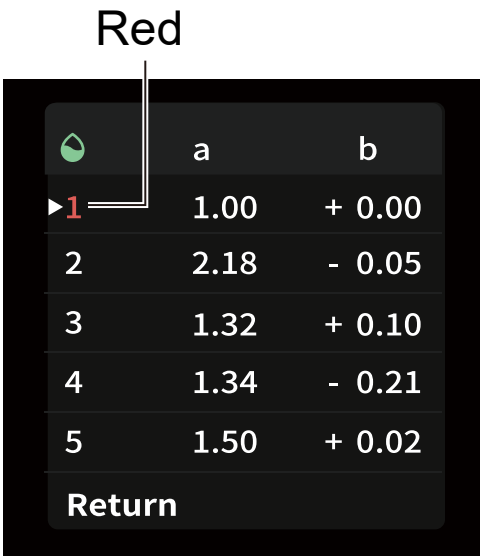
then press Test.



12-2 Selecting the Coefficient Pair to Use

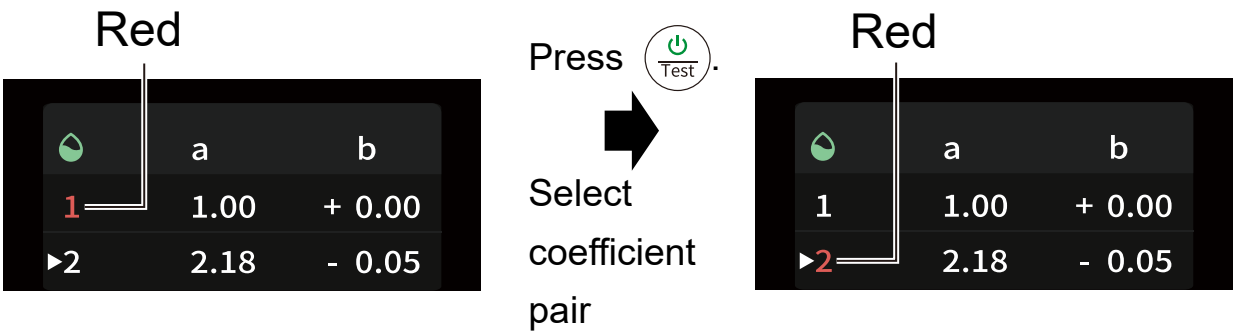
This section describes the procedure for selecting the coefficient pair to use for measurement.

Step 1. With the power ON, press the Zero button and Test button at the same time to display the configuration screen.



Step 2. When the configuration screen is displayed, the number of the coefficient pair you are using is displayed in red. When configuring the settings for the first time, "1" is displayed in red.

Step 3. Press the Zero button. The green cursor switches in the order 1 -> 2 -> 3 -> 4 -> 5 -> Return -> 1. Align the cursor with the coefficient pair to use, then press the Test button to select the coefficient pair, which changes to red.



Step 4. Move the cursor to [**Return**], then press the Test button to return to the measurement screen.

13. Data Log Function

The product automatically records data each time measurement is performed.
Up to 100 points can be recorded, and the dedicated app can be used to transfer measured data to a computer and save it as a file in the CSV format. For details on transferring data, refer to "18-6 Transferring Data" on page 51.

CAUTION

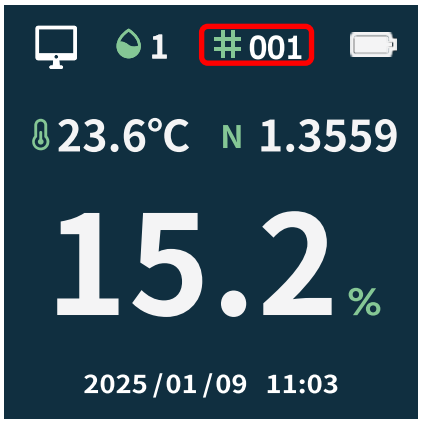
When 100 points have been recorded, "100" is displayed for the memory number. If you perform measurement in this state, "#FULL" is displayed. Measurement can be performed, but recording is not possible.

14. Deleting Measured Data

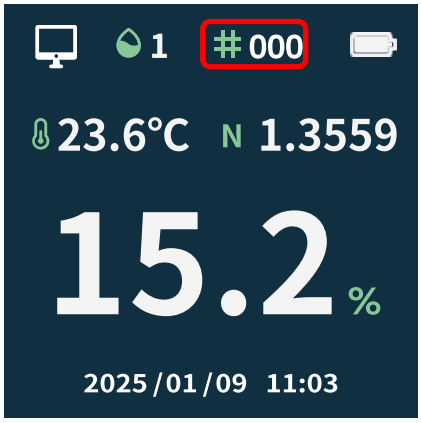
This section describes how to delete the last item of data from the device.
You can use the dedicated application to delete all the data. For details on operating the application, refer to "18-7 Deleting All Measured Data" on page 54.

Step 1. In the measurement screen, press and hold the Zero button to delete the data displayed on the screen.

Note) When "#FULL" is displayed for the memory number, data for the 100th point will be deleted.



Step 2. When data is deleted, the memory number is decremented by 1.



15. Configuring the Language (Using the Main Unit)

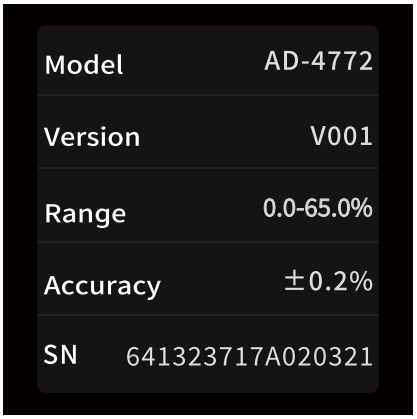
The language of this product can be switched between Japanese and English. (The default language is Japanese.) The language can also be changed from the application. For details, see "18-9 Configuring the Language (Using the Application)" on page 57.

CAUTION

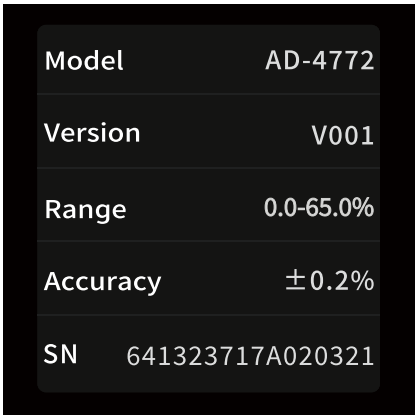
- **If you change the language setting in AD-4772 Tools with the device connected, the device setting will be synchronized with the application.**

Step 1. Turn the power of the main unit OFF.

Step 2. Press the Test button while holding down the Zero button to display the product information screen.

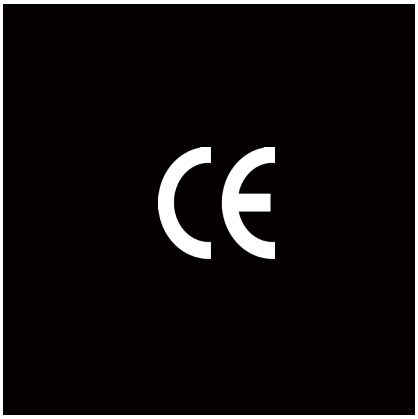


Step 3. In the product information screen, press the Zero button to display the certification screen.



Press Zero.

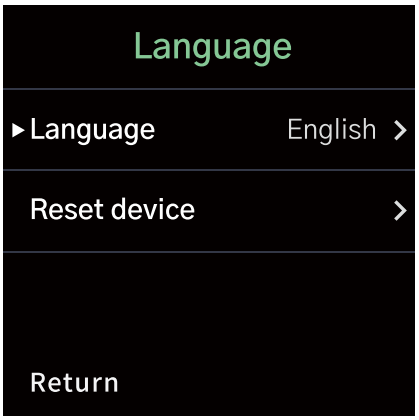
The certification screen is displayed.



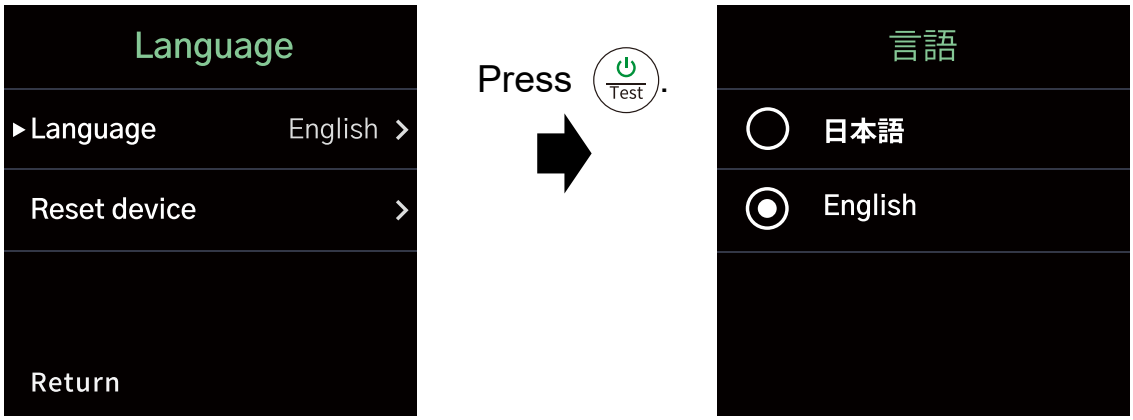
Step 4. In the certification screen, press the Zero button to display the configuration screen, where you can set the language or reset the device.

Press Zero.

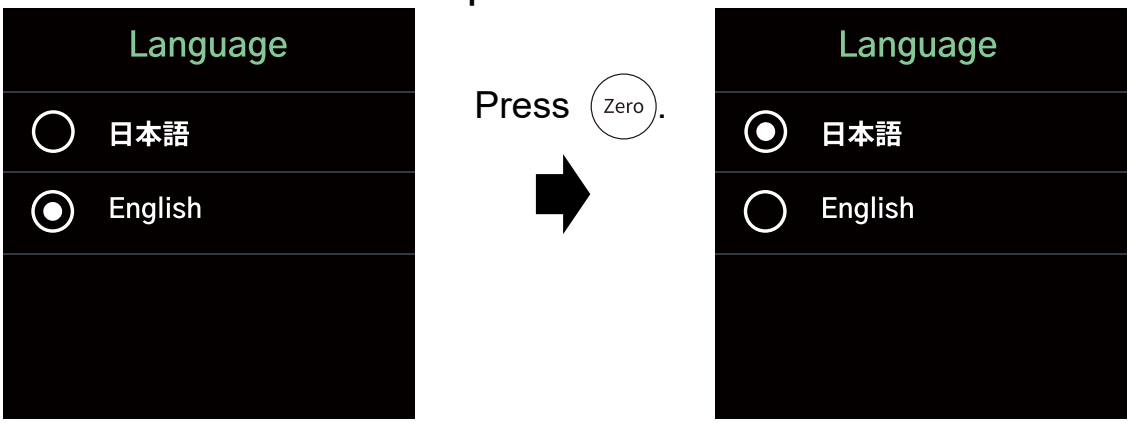
The certification screen is displayed.



Step 5. Move the cursor to [Language], then press the Test button.

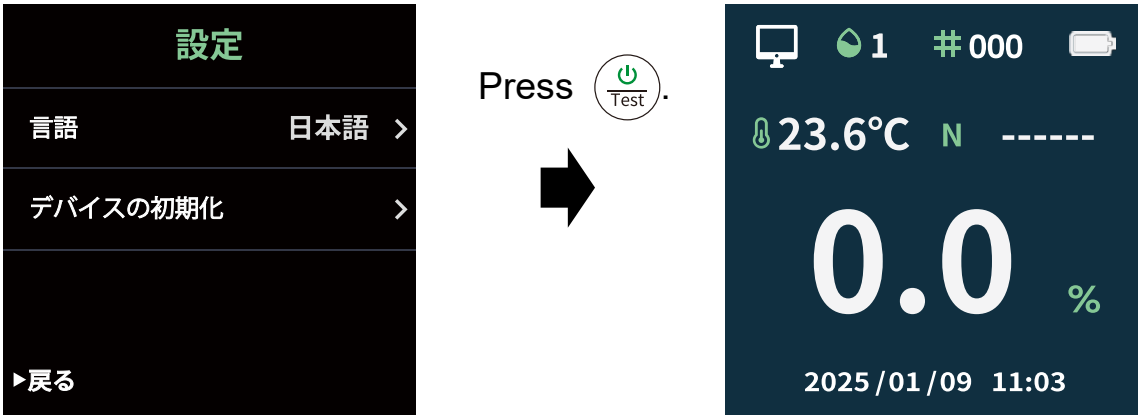


Step 6. Press the Zero button and select "日本語" from the options.



Step 7. Press the Test button to switch to Japanese.

Step 8. Move the cursor to [戻る] on the bottom of the configuration screen, then press the Test button to return to the measurement screen.

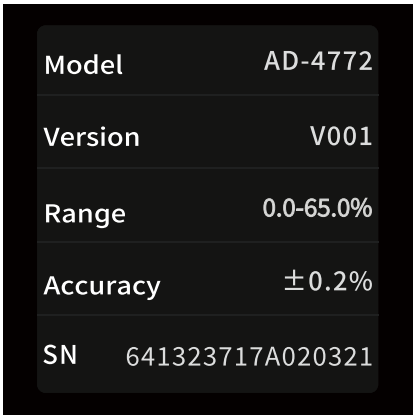


16. Initializing the Device

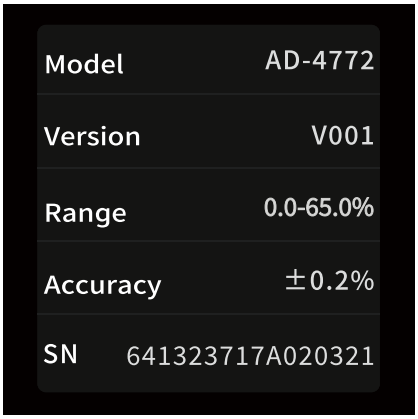
Device initialization enables you to restore the default factory settings of the product. Perform device initialization when you want to restore the default factory settings or when the product does not operate normally.

Step 1. Turn the power of the main unit OFF.

Step 2. Press the Test button while holding down the Zero button to display the product information screen.



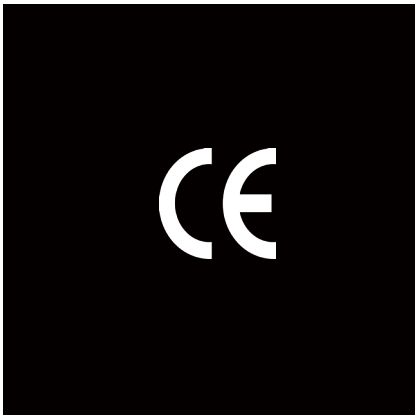
Step 3. On the product information screen, press the Zero button to display the certification screen.



Press Zero.

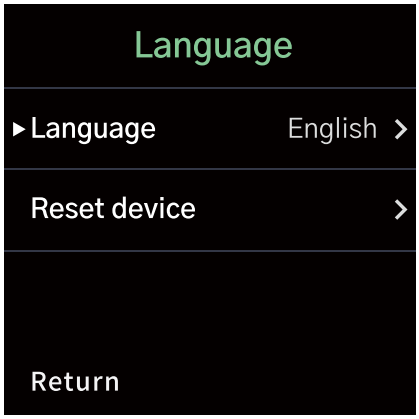
The certification screen is displayed.

Step 4. In the certification screen, press the Zero button to display the configuration screen, where you can set the language or reset the device.

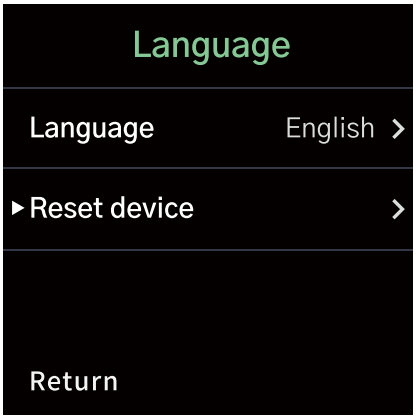


Press Zero.

The configuration screen is displayed.



Step 5. Move the cursor to [**Reset device**], then press the Test button.



Step 6. A screen confirming whether you want to initialize the device is displayed. Select [**Yes**], then press the Test button to initialize the device. When the initialization process is complete, turn the power of the product OFF.

17. Messages Displayed

Message	Description
Insufficient Sample	There is insufficient sample fluid to measure. Add sample fluid.
Testing Error	An error occurred while measuring the sample fluid. Clean the sample stage, drop sample fluid again, then perform measurement.
Zeroing Error	An error occurred while performing zero calibration. Clean the sample stage, drop water again, then perform measurement.
Error code	Indicates device failure. Contact A&D.
Testing	Indicates that the sample fluid is being measured.
Zeroing	Indicates that zero calibration is being performed.

18. Operating the Application

18-1 Downloading and Launching AD-4772 Tools

This application enables you to configure coefficient settings, select coefficients, transfer data, configure the year, month, day, and time, delete measurement data, and configure the language.
Download the application from the QR code for the AD-4772 product page in "1. Introduction" on page 5 or from the product information page for the AD-4772 on the A&D website.
You can also download the application from the link in the QR code below.
Save the downloaded application to a location of your choice.

AD-4772 Tools

Note: The software may be updated without notice. The actual application images may differ from those in this manual.

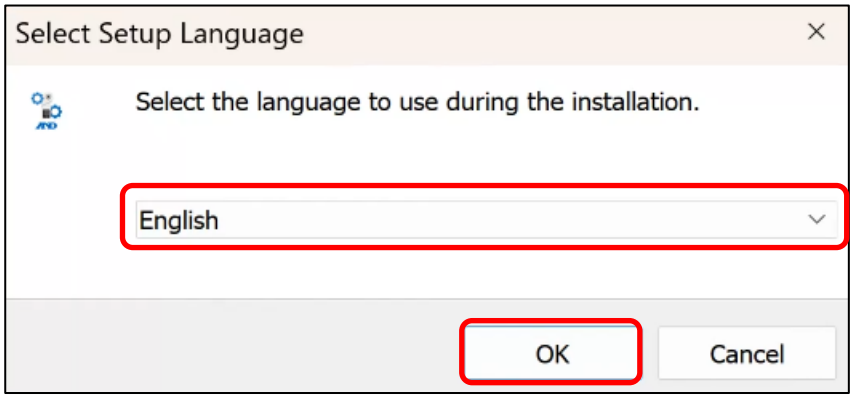
18-2 Installing "AD-4772 Tools"

CAUTION

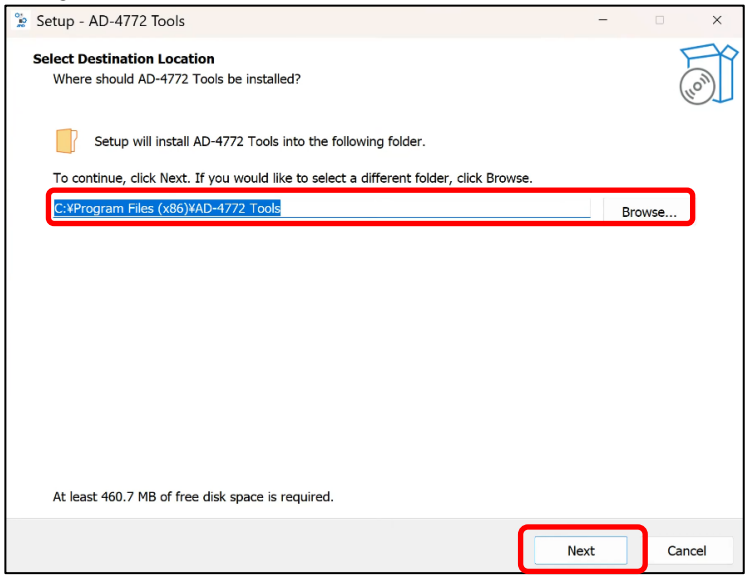
Permission may be requested by User Account Control. Select "Yes" to proceed. If permission is not granted, select "No". Please note that selecting "No" will prevent the use of this software.

Double-click the .exe file in its saved location.

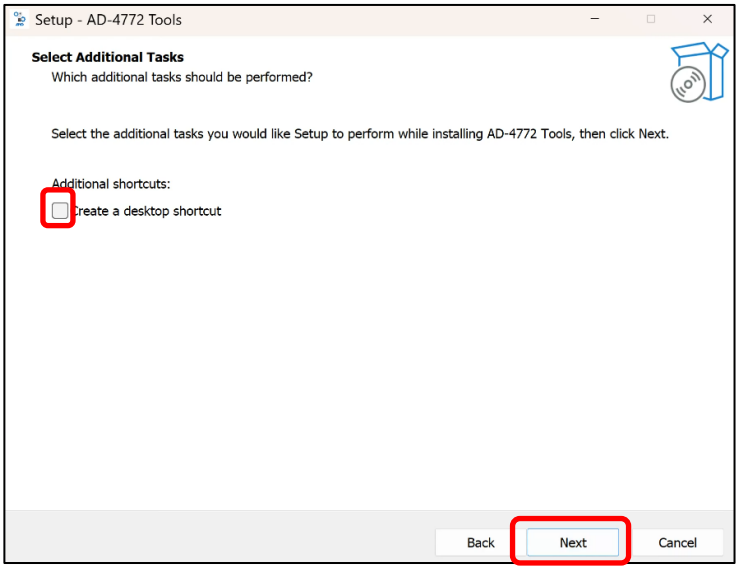
The installation screen will launch. Select the language to use and click "**OK**".



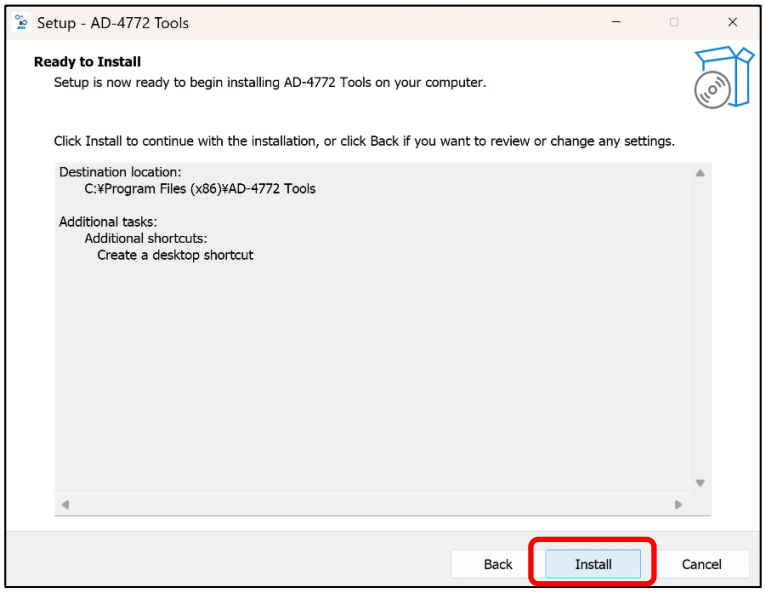
Confirm the destination folder and click "Install".
You can specify a different location for the destination folder.



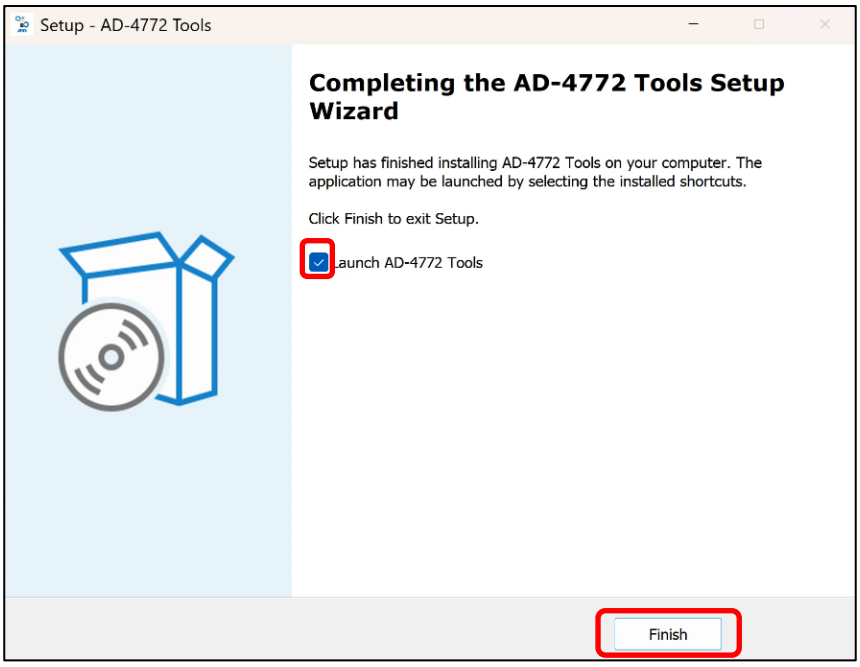
To create a shortcut for the application, check the checkbox and click “Next”.



The save location and shortcut creation location will be displayed. If there are no issues, click “Install”.



When the installation is complete, the following will be displayed. To run the application immediately, ensure the checkbox for “Run AD-4772 immediately” is checked. To run it later, uncheck the checkbox and click “Finish” to complete the installation.

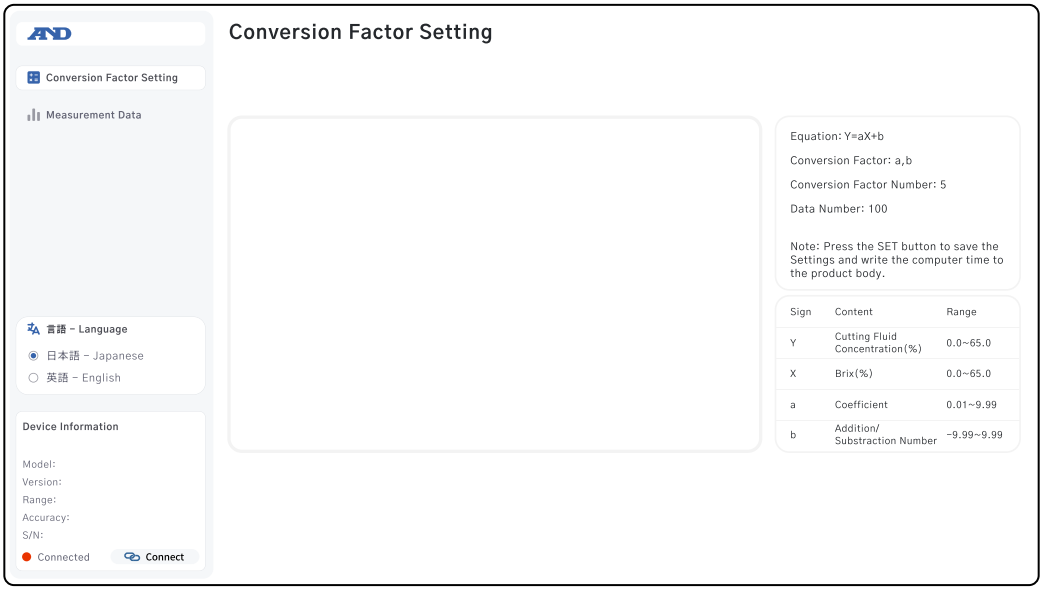


18-3 Launching "AD-4772 Tools"

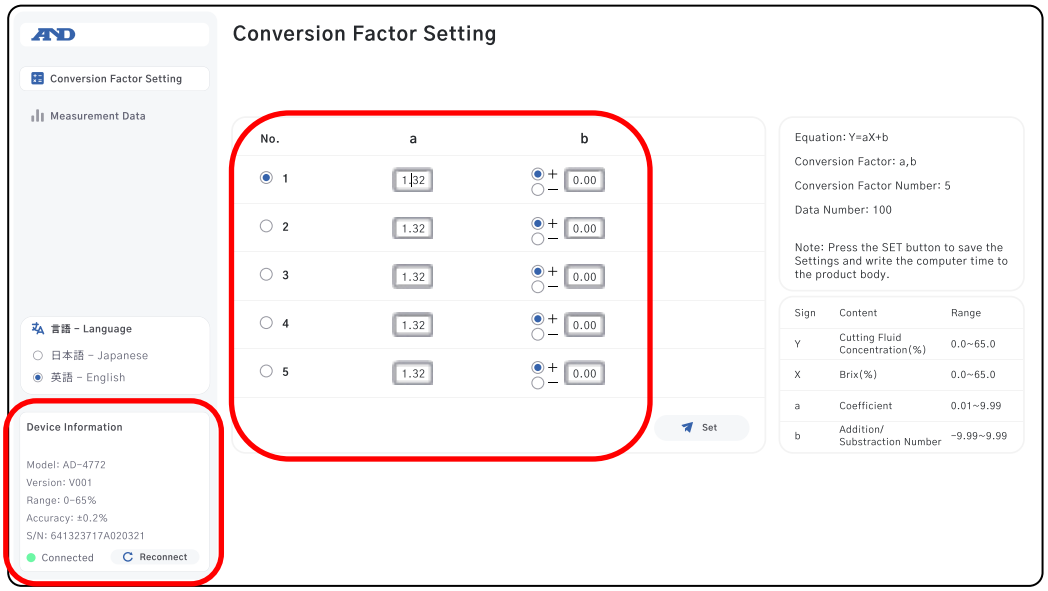
Follow the steps below to launch the application.

After the application installation is complete, the following shortcut icon will be created. Double-click the icon.

The following application home screen will be displayed. After turning on the power of the main unit, connect it to the PC with the included USB cable.



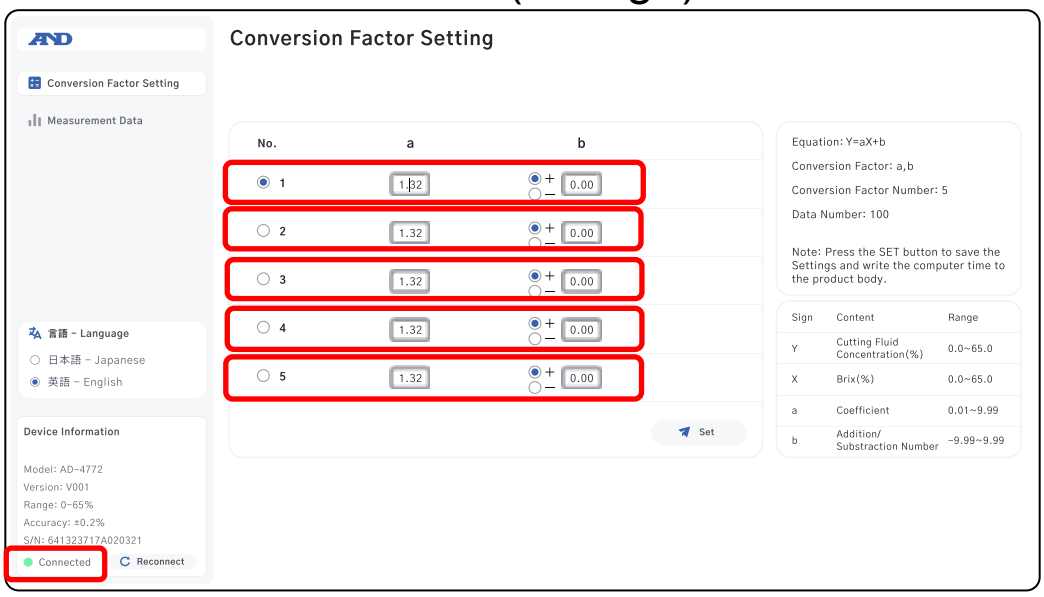
When communication between the PC and the application is established, the coefficients and device information of the main unit settings will be displayed as shown below.



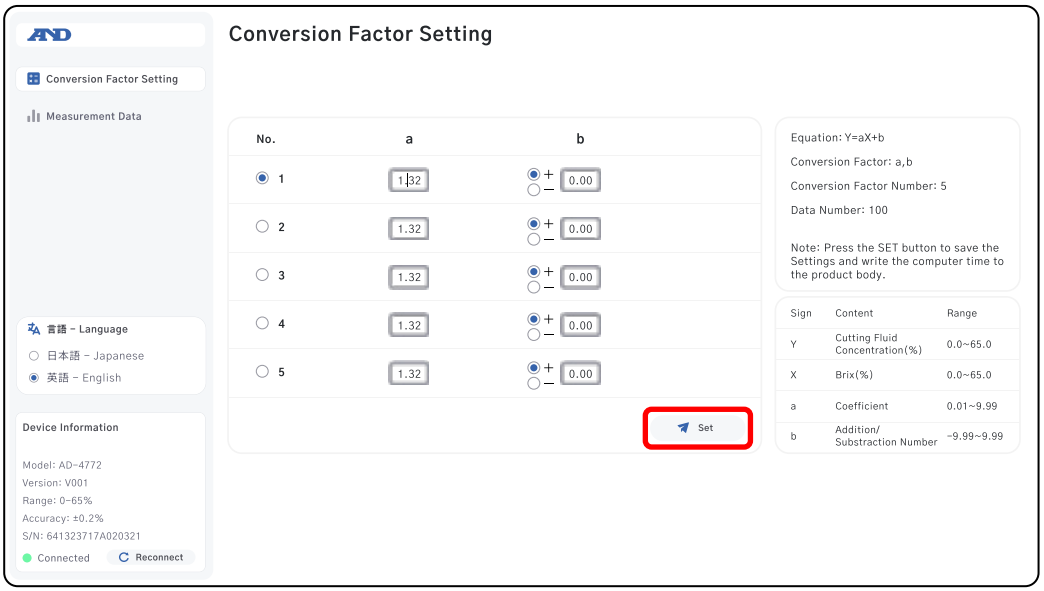
18-4 Configuring the Coefficients

The coefficients can also be configured using the main unit.
For details, see "12-1 Configuring the Coefficients" on page 27.

Step 1. If the main unit and computer are connected via the USB cable, "Connected" is displayed in the device information on the bottom left of the startup screen.
Enter numbers in the text fields of the coefficients that you want to configure.
Coefficient a (gradient): 0.01 to 9.99
Coefficient b (change): −9.99 to 9.99



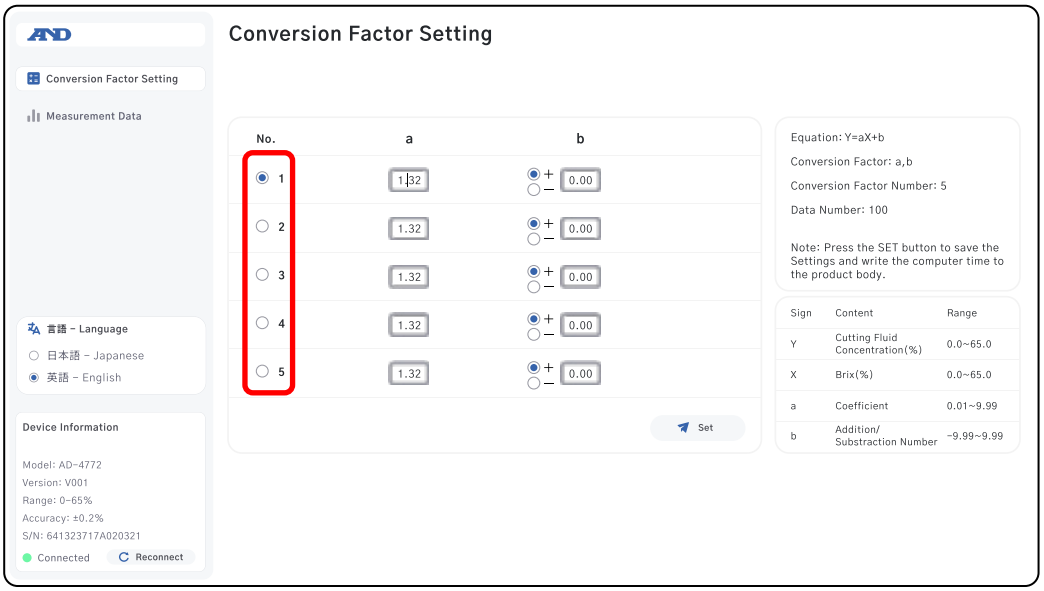
Step 2. When you have entered the coefficients, click Set to save the coefficients to the main unit.



When the coefficients are saved, "**Save completed**" is displayed.

18-5 Selecting the Coefficients

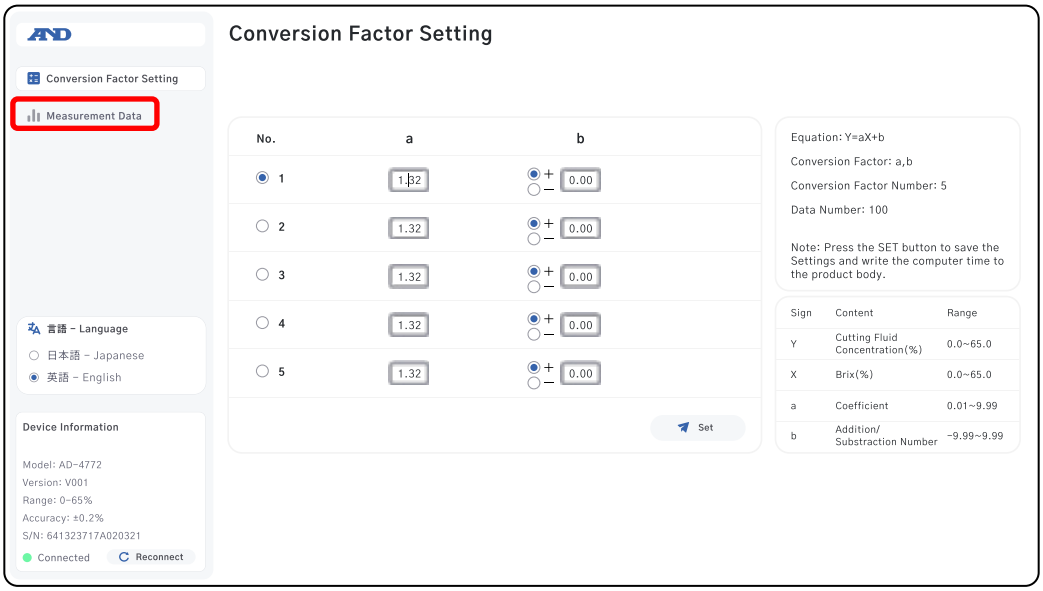
The coefficients can also be selected using the main unit. For details, see "12-2 Selecting the Coefficient Pair to Use" on page 33. To select a coefficient pair, select its radio button.



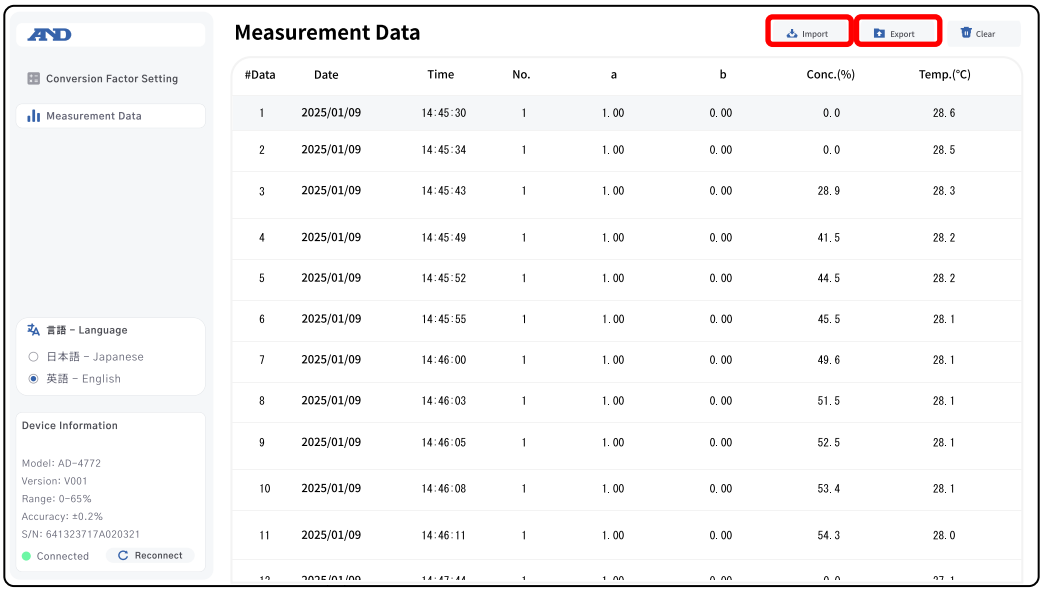
To change the settings, click Set.

18-6 Transferring Data

Click Measurement Data on the left of the screen to display the measurement data screen.



(i) To transfer the measured data from the main unit to the computer, click (1) Import. The measured data is read from the main unit and displayed on the screen. (1) (2)



(ii) To save measurement data transferred from the device to a PC, click (2) Export. The measured data is saved in the CSV format. In the displayed dialog box, specify the location and file name and then, click save.

Example of Recorded CSV File (with Language Set to English)

Data	Date	Time	Coefficient Pair
1	2025/01/09	15:50:23	1

Coefficient a	Coefficient b	Cutting fluid density (%)	Temperature (°C)
1.32	-0.01	15.2	23.6

Description of CSV File

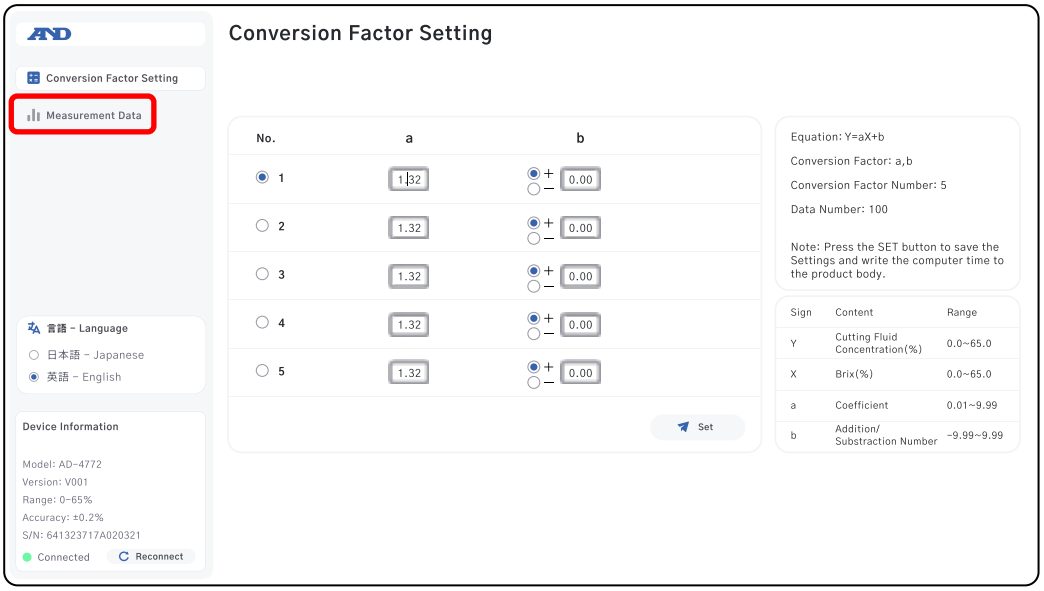
Item Name		Unit	Description	Column
日本語	English			
番号	#Data	-	The memory number	1
日付	Date	-	The year, month, and day, with a fixed number of digits.	2025/01/09
時刻	Time	-	The hour, minute, and second.	15:50:23
係数番号	No.	-	The number of registered coefficient pair.	1
係数 a	a	-	The gradient coefficient.	1.32
係数 b	b	-	The change coefficient.	-0.01
切削油濃度 (%)	Conc.(%)	%	The cutting fluid density (the sugar content when a = 1 and b = 0).	15.2
温度(°C)	Temp.(°C)	°C	The temperature.	23.6

18-7 Deleting All Measured Data

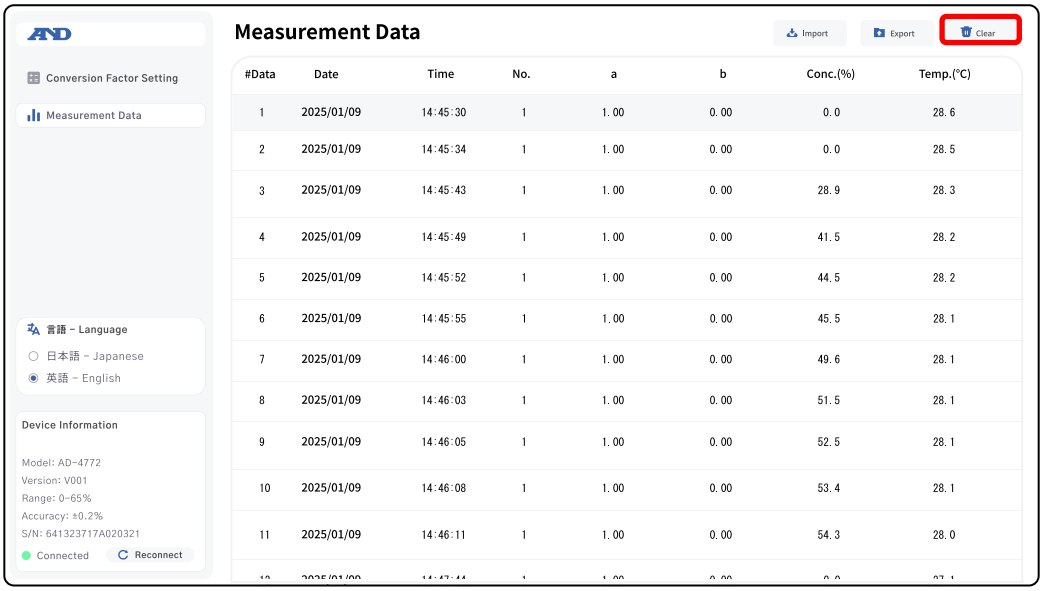
This application can only delete all the measured data at once.

For information on the procedure for deleting the latest item of data using the main unit, see "14 Deleting Measured Data" on page 35.

Step 1. Click Measurement Data on the left of the screen to display the measurement data screen.



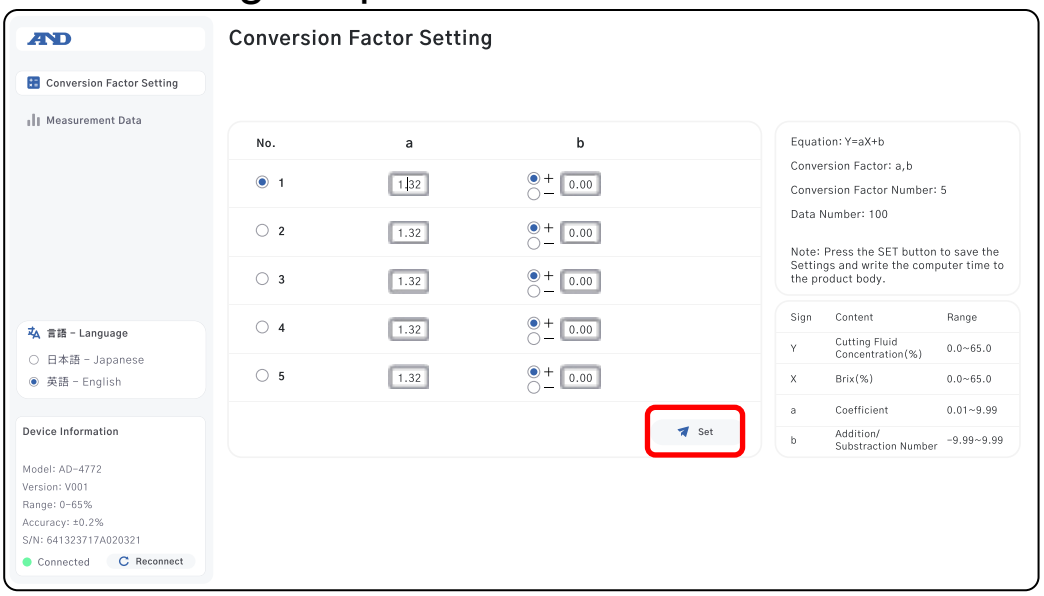
Step 2. Click Clear on the top right of the screen to delete all the data.



Step 3. When the confirmation screen is displayed, select Yes to delete all the data saved in the device.

18-8 Configuring the Year, Month, Day, and Time

The year, month, day, and time are reflected to the saved data when measurement is performed. Configure the correct year, month, day, and time before using the product.



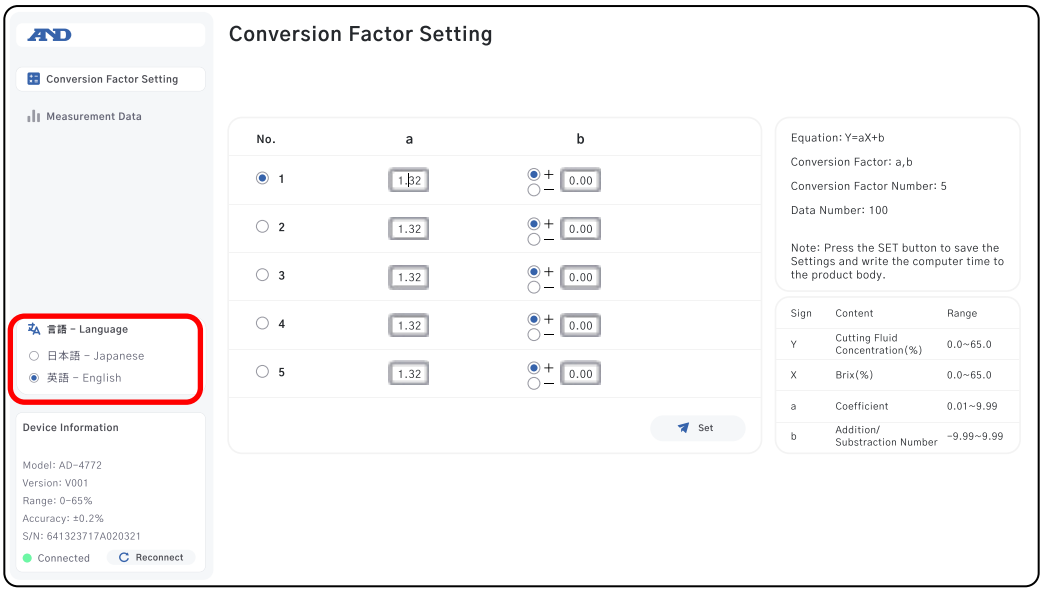
Step 1. Click Set. The time of the computer is reflected to the product and saved. The registered coefficient settings are also saved.

Step 2. When the writing of the time and the registration of the coefficient settings are complete, "**Save completed**" is displayed.

18-9 Configuring the Language (Using the Application)

The language of this product can be switched to Japanese or English.

Click the [日本語 - Japanese] radio button on the left of the screen.



The display changes to Japanese as indicated in the image below.

CAUTION

- **When the device is connected, changing the language will also change the language of the device.**
- **The display language of item names will also change with the language setting.**

19. Maintenance

When cleaning the product, dampen a soft cloth, wring the cloth out well, then gently wipe the product clean.
Do not use spray products when cleaning, as doing so may cause failure.
Do not use volatile solvents such as thinner or benzene, or any solvents.

20. Errors Displayed

Message		Description
Density display	LL.L	The measured value is below the lower limit of the range that can be displayed. Ensure that the value is within the measured range. For information on the measured range of densities, see "22. Specifications" on page 62.
	HH.H	The measured value is above the upper limit of the range that can be displayed. Ensure that the value is within the measured range. For information on the measured range of densities, see "22. Specifications" on page 62.
Temperature display	LL.L	The measured value is below the lower limit of the range that can be displayed. Ensure that the value is within the measured range. For information on the measured range of temperatures, see "22. Specifications" on page 62.
	HH.H	The measured value is above the upper limit of the range that can be displayed. Ensure that the value is within the measured range. For information on the measured range of temperatures, see "22. Specifications" on page 62.

Message		Description
Refractive index display	L.LLL	The measured value is below the lower limit of the range that can be displayed. Ensure that the value is within the measured range. For information on the measured range of refractive indices, see "22. Specifications" on page 62.
	H.HHH	The measured value is above the upper limit of the range that can be displayed. Ensure that the value is within the measured range. For information on the measured range of refractive indices, see "22. Specifications" on page 62.

21. Troubleshooting

Nothing is displayed.	Check the battery level.
The screen is faint and hard to see.	Check the battery level. The LCD display is fainter in low temperature environments, but this is normal.
The product does not operate normally.	The internal circuits may have stopped operating for some reason. When the battery level is low, the product may not operate correctly. Charge the battery.
The measured value is displayed too high or too low.	The zero point may be incorrect. Perform zero point calibration. Follow the procedure in "10-1 (ii) Perform zero point calibration." on page 21.

22. Specifications

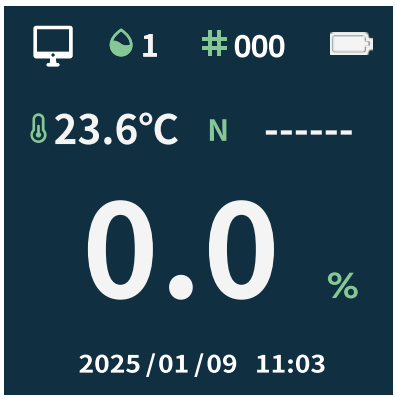
Item		Description
Density (Brix)	Range measured	0.0 to 65.0% (refractive index: 1.3329 to 1.4534)
	Range displayed	0.0 to 65.0% (refractive index: 1.3329 to 1.4534)
	Resolution	0.1% (refractive index: 0.0001)
	Measurement precision	±0.2% (5.0 to 45.0°C)
Temperature	Range measured	5.0 to 75.0°C (5.0 to 45.0°C)
	Range displayed	5.0 to 75.0°C
	Resolution	0.1°C
	Measurement precision	±1°C
Coefficient (gradient a; change b) setting range		Coefficient a (gradient): 0.01 to 9.99 Coefficient b (change): −9.99 to 9.99
Maximum number of coefficients registered		5
Maximum items of data saved		100
Measurement time		Approx. 2 seconds
Auto power OFF		Approx. 3 min
Operating temperature		5.0 to 45.0°C
Automatic temperature compensation range		5.0 to 45.0°C

Item	Description
Storage temperature	Temperature: −10.0 to 55.0°C Humidity: 10 to 95%
Dust-resistance/water-resistance	IP67
Power	3.7 V/900 mAh lithium-ion battery
Battery life	Approx. 490 uses (with full charge)
Charging time	Approx. 3.5 hours (rated output 5 V at 0.5 A)
Dimensions	115 × 48 × 25 mm
Weight	102 g
Included accessories	USB cable (Type-A to Type-C) Storage case Cleaning cloth Droppers Strap Instruction manual Inspection certificate
Material	Main unit: ABS; Display: PC
Options sold separately	Storage case: AXP-AD4772-1 Dropper × 2: AXP-AD4771-1 Strap: AXP-AD4771-2

23. Measurement of Brix

Step 1. Turn the power ON.

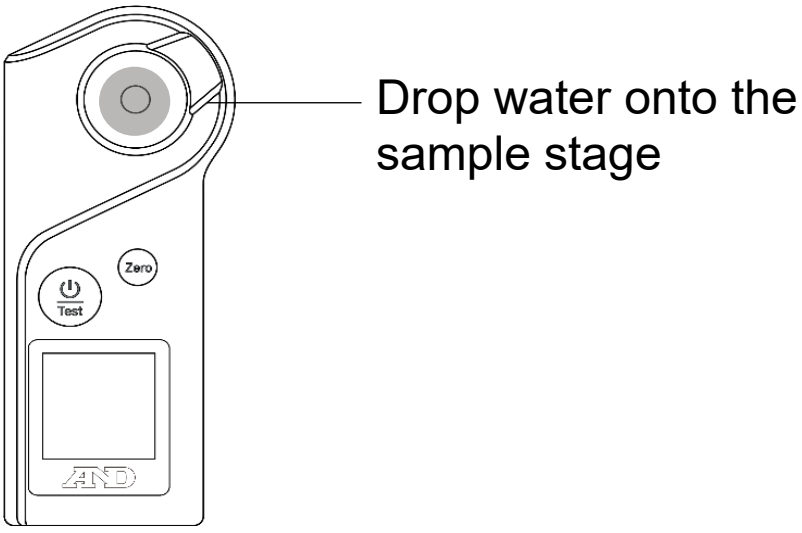
Press the Test button. The power turns ON, the A&D logo is displayed for about one second and then, the measurement screen is displayed.



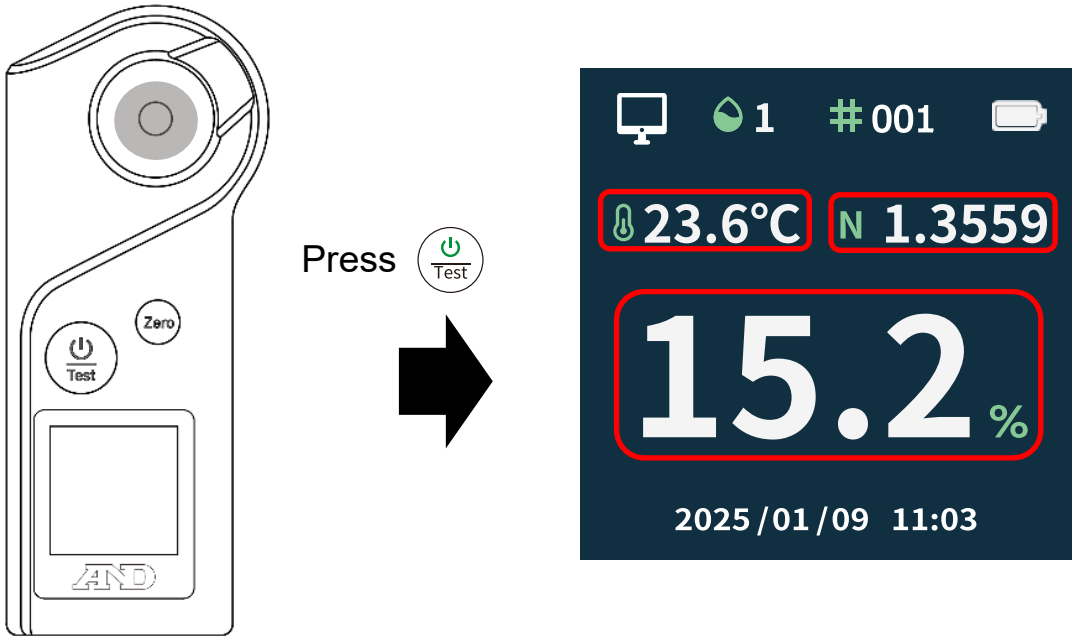
Step 2. Perform zero point calibration.

(i) Wash the sample stage with water, then wipe it clean with the included cleaning cloth or a similar object.

(ii) Drop several drops of water onto the sample stage. Press the Zero button. Zero point calibration starts and "**Zeroing**" is displayed. When "**Complete**" is displayed, zero calibration is complete.



Step 3. Perform measurement.
Drop sample liquid to about half the depth of the sample stage, then press the Test button to start measurement. "**Testing**" is displayed, then the sample stage temperature, sample refractive index, and Brix are displayed on the screen.



⚠ CAUTION
Measure without configuring the coefficients.

Step 4. Turn the power OFF.
Press and hold the Test button. The displayed screen disappears, and the power turns OFF.

MEMO

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