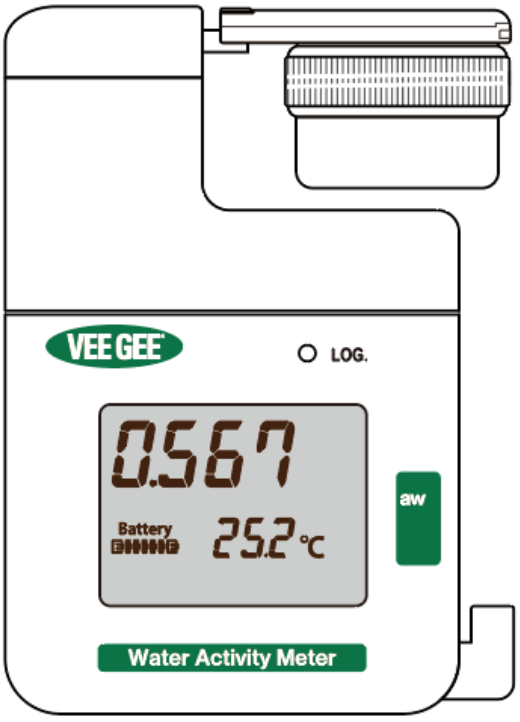
Water Activity Meter

47002

Instruction Manual



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Safety Precautions

Caution! Read the entire manual and become familiar with the operation of this device before using it. If you have any questions, contact Heathrow Scientific® LLC.
Your water activity meter is designed for testing in the food, pharmaceutical, and cosmetics industries. This instruction manual cannot address all safety hazards. It is the responsibility of the user to consult and observe all health and safety precautions and to assess the instruments suitability to the task.

Caution

Before using the Water Activity Meter for the first time, please read this instruction manual carefully. This manual contains important information, safeguards, and operating instructions.

1. Never use this product in any way inconsistent with these instructions.
2. This product is intended to be used indoors only.
3. Never operate the instrument in a hazardous or flammable environment.
4. Opening the instrument or improper use of the instrument voids the warranty. If there is a failure during the warranty period, contact Heathrow Scientific® LLC for warranty service. (See warranty section)
5. Only use original manufacturer's accessories and spare parts.
6. To clean dirty surfaces, wipe with a soft dry cloth (moistened with a neutral detergent for stubborn dirt).
7. Do not use at sites where the product could be splashed with water, or where there is a high concentration of dust.
8. Measure samples under conditions in which the sample temperature and humidity change only slightly. During water activity measurements, the measurements cannot be performed correctly if the sample temperature and humidity are changing. The measurements will be more accurate if the temperature is the same as for the standard used during calibration.
9. If samples with a high degree of water activity are measured, this could affect subsequent measurements. In this case, it is recommended that you leave the sensor assembly in an environment where the humidity is about 50% for at least 10 minutes.
10. Sensor calibration offset could occur if the meter is exposed for an extended time to samples with volatile substances or water activity values in the vicinity of 1.00. To prevent offset, after the measurements are finished, remove the sample immediately so that it will have less impact on the sensor.
11. This is a precision measurement device. It will malfunction if dropped or subjected to strong impacts.
12. Do not use this product under conditions that exceed the measurement range noted in the specifications. Doing so could damage the internal sensor.
13. After turning OFF the power switch, wait 30 seconds before turning ON again. Do not turn the power switch ON/OFF repeatedly within a short time. Doing so could damage this product.
14. Never insert a USB flash drive into the insertion port for the sensor assembly. Doing so could damage the USB flash drive and/or the main unit.

What's Included

Supplied Equipment

- 1 ea. Water activity Meter
- 1 ea. Sensor Assembly
- 5 ea. Extra Sample Cups with Lids
- 1 ea. USB micro B to USB type A cable
- 5 ea. Replacement Sensor Filters
- 1 ea. Hard Carrying Case

Software (see page 10 for instructions on how to download the software)

This software may be used only when you agree to all terms of this User Acceptance Agreement. Read this User Acceptance Agreement carefully before using this software for the first time. If you do not accept the terms of this User Acceptance Agreement, you may not use this software.

License Agreement and Warranty

Authorization

- This software and a set of related files may be used on a personal computer.

Prohibited

- You may not copy or distribute the written materials included with this software, such as the operation manual.
- Re-establishing these usage rights for this software in whole or in part.
- Investigating the source code for this software, reverse engineering, decompiling, revising, disassembling, or translating for the purpose of creating a product similar to this software.
- Using a previous version of this software or a copy of it after receiving the latest version either as an upgrade or replacement to this software.

Warranty

- The functions of this software have been thoroughly investigated for defects. It is not however guaranteed to operate with personal computers and peripheral equipment worldwide. We will do our utmost in such cases, but operation might not be possible depending on the individual characteristics of the personal computer, other installed software, or the environmental status of connected peripherals. In this event, no manufacturer's liability shall be assumed by Heathrow Scientific® LLC with respect to operational difficulties when used with personal computers.
- This document does not guarantee that the user must be satisfied with this software. In addition, it does not guarantee that there will be absolutely no errors in the content of this software.

Indemnity

- Regardless of this License Agreement and Warranty, in no event shall Heathrow Scientific® LLC be liable for any damages whatsoever, for any special or indirect damages, or damages caused by the installation or use of this software. Specific damages include any loss of profit to the user due to the use of this software, or inadvertent data loss, or the inability to use this software. Heathrow Scientific® LLC assumes absolutely no responsibility for damages.

Product Description

The 47002 Water Activity Meter indicates the water activity of samples in a container equipped with a precision humidity element. Water activity is the ratio of the vapor pressure of a sample to the vapor pressure of pure water at equilibrium. The sample moisture is divided into free water and bound water. The free water component is not bound to the sample, so it can have an impact on the proliferation of microorganisms. (Bound water is moisture that does not have an impact on the proliferation of microorganisms). Accordingly, in determining the ease of storage of samples (shelf life, for example), measuring water activity rather than moisture content is important, and can be useful in a variety of fields including food products, pharmaceuticals, and cosmetics. The measurement values are stored in the internal memory and can be downloaded to a computer for analysis and record keeping.

- Run a quick test or a long (stability) test using the same unit
- Built-in data logging function
- Data can be downloaded and processed on your PC
- Operates on general-purpose alkaline batteries for data logging
- The sensor can be calibrated, and the calibration value is stored with the sensor assembly; the calibration value can also be saved to your PC
- The meter automatically recognizes when the Capacitance sensor (included) or Electrical Resistance sensor (optional) is being used; use the optional Electrical Resistance sensor if your sample contains alcohol, which can attack the Capacitance sensor, affecting readings.

Technical Data

Item Number: 47002
Applications: Water activity of food products, pharmaceuticals, and cosmetics
Measurement Modes: Stability mode and Quick Mode
Sensor Type: Capacitance sensor (included) or optional Electrical Resistance sensor (for samples that included alcohol)
Measurement Time:

Quick Mode: 6 minutes
Stability Mode: approximately 5 to 30 minutes, depending on the sample

Measurement Range:

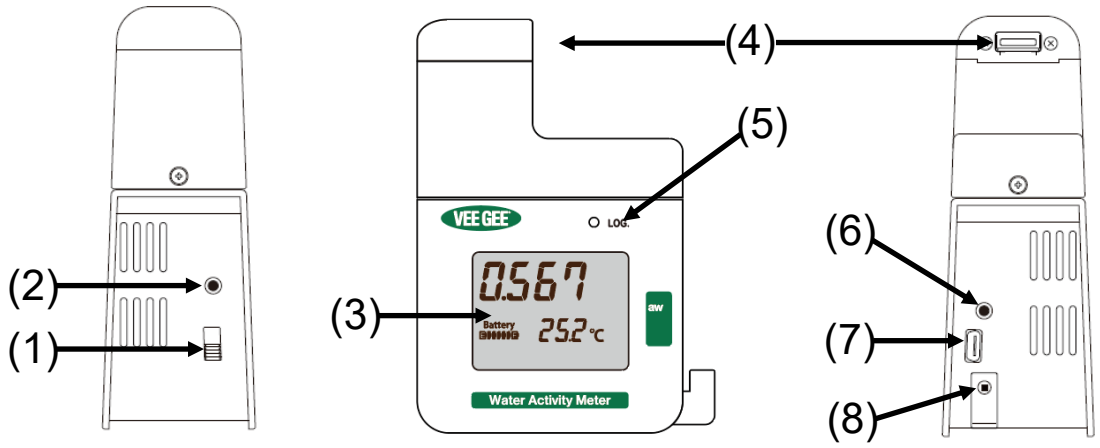
Water Activity: 0.001 to 1.000 aw, 0.001 aw resolution, with included sensor; 0.200 to 1.000 aw with optional Electrical Resistance sensor
Ambient Temperature: 0 to 80°C, 0.1°C resolution
Internal Temperature of Sample Container: 0 to 80°C, 0.1°C resolution
Relative Humidity: 10 to 95% RH, 0.1% RH resolution

Accuracy of Water Activity Measurement: ±0.01 aw (Note: ambient temperature fluctuations greater than ±0.2°C will affect the Water Activity accuracy)

With Optional Electrical Resistance Sensor: ±0.02 aw

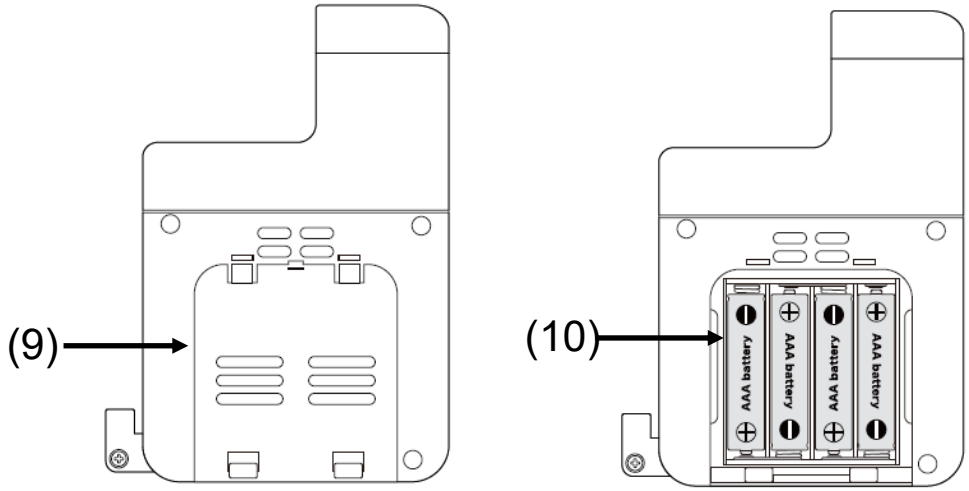
Data Logging: 99 sets of data in total. Data includes year, month, day, hour, minute, second, ambient temperature, ambient humidity, sample temperature, and water activity. (**Note:** The oldest data sets will be overwritten once you save more than 99 sets)
Logging Interval: 1 to 3600 seconds
Communication: connects to a computer through a USB cable (included)
Power: Four AAA alkaline batteries (not included) for datalogging; when doing setup or downloading data to a PC, the USB can power the instrument
Battery life: approximately 60 hours, with standard operating conditions of ambient temperature 25°C, relative humidity of 55% ±15%.
Dimensions: 130 mm H x 92 mm W x 47 mm D
Operating Conditions: Ambient temperature 5 to 45°C (41 to 113°F); 15 to 90% RH, non-condensing
Storage Conditions: Ambient temperature 0 to 50°C (32 to 122°F); 40 to 60% RH, non-condensing

Description of Parts

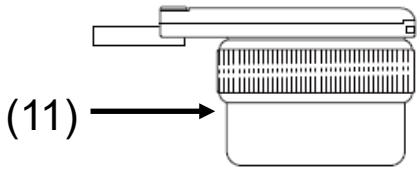


Left, Front, and Right Sides

Name		Description		
(1)	**Power switch**	This sliding switch turns the power ON/OFF. Push up for ON and down for OFF.		
(2)	**Display toggle switch**	Switches the display between ambient temperature and humidity. NOTE: You can only toggle between temperature and humidity before the sensor cup is installed.		
(3)	**Measurement display area**	Display during Standby "---" is displayed in the top area. (It flashes during ageing). Below shows the remaining battery charge and either the ambient temperature or humidity (selectable).		
		Display during Measurements The water activity value is displayed in the top area. (The value flashes until it stabilizes). Below shows the remaining battery charge and the sample temperature.		
(4)	**Insertion port for the sensor cup**	This is the insertion port for the sensor assembly.		
(5)	**Data logging indicator**	Stability mode	During ageing	Flashing
			During measurements	Steady illumination
		Quick mode	During ageing	Steady illumination
			During measurements	Steady illumination
(6)	**-**	Unused		
(7)	**Data Transfer Port**	For connection to the PC. It is a micro B type connection.		
(8)	**Temperature/humidity detection element**	This element detects the ambient temperature and humidity.		



Back



Name		Description
(9)	**Battery cover**	This covers the storage container for the batteries that power the product. The batteries are placed inside.
(10)	**Battery Holder**	This is where the batteries that power the product are placed. This product uses four AAA batteries (not included).
(11)	**Sensor Assembly**	Unscrew the sample cup form the sensor head, add your sample, and screw back on.

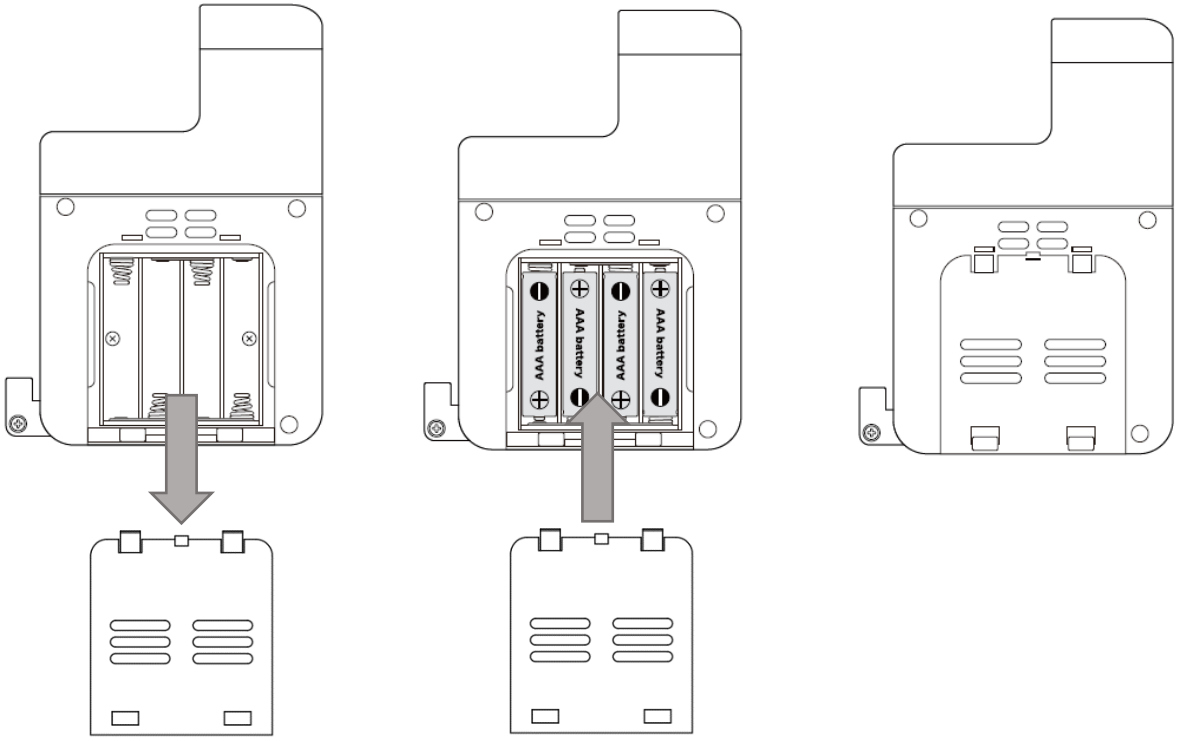
Operation

Inserting Batteries

Confirm that the power switch is in the OFF position. Remove the battery cover (9) on the back of the main unit.

- Gently push-in near the top of the battery cover to disengage the two plastic latches and slide the cover down and remove.

Insert four new AAA batteries (not included) of the same type, being careful to orient the positive and negative ends of the batteries correctly. Replace the battery cover.



When the batteries are drained, the bar graph in the display area showing the remaining battery life (see figure at right) will completely disappear.

Replace all four batteries when batteries are drained.

Downloading the Software and USB Drivers

The time and date on this product, parameter settings, and data downloads are performed from your computer using the software. Install the VG-WAM software and USB drivers on the computer you will be using.
The VG-WAM software and USB drivers can be downloaded from the VEE GEE website; or simply scan the QR code on the bottom of the unit to access a digital version of this manual and the software.

The software must be installed before connecting the unit to the computer.

(1) Browse to https://www.veegee.com and in the “Search all products” box at the top right side of the page, enter 47002 and press Enter

(2) Click the Water Activity Meter ad

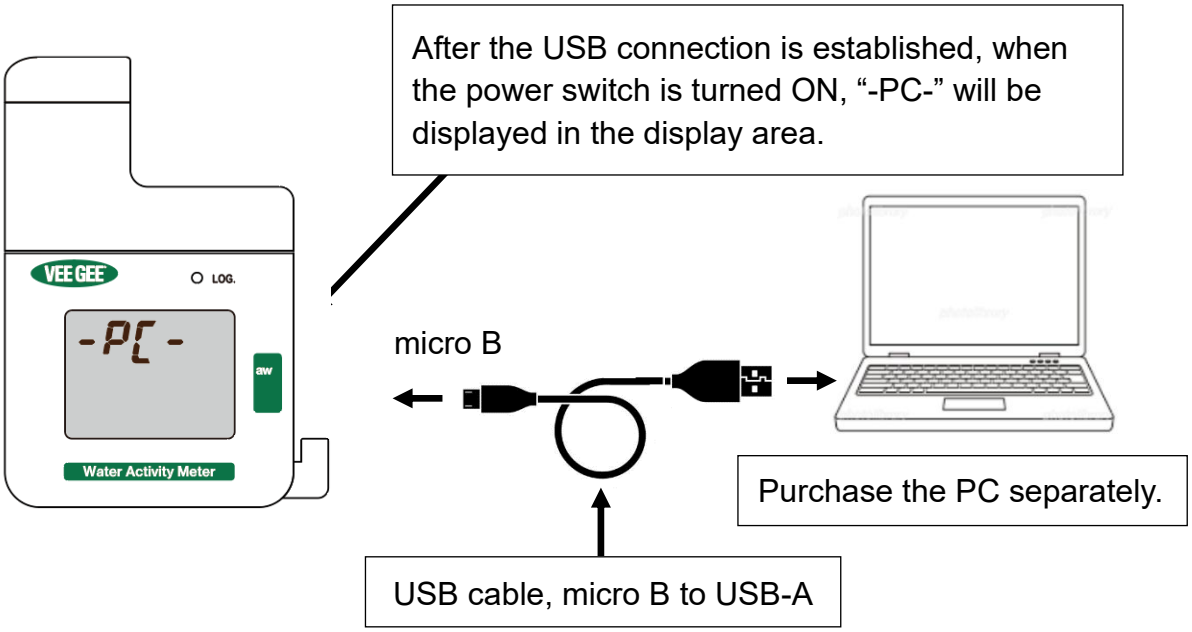
(3) Find the link in the ad to download the software

(4) Click the link and follow the prompts to install the software

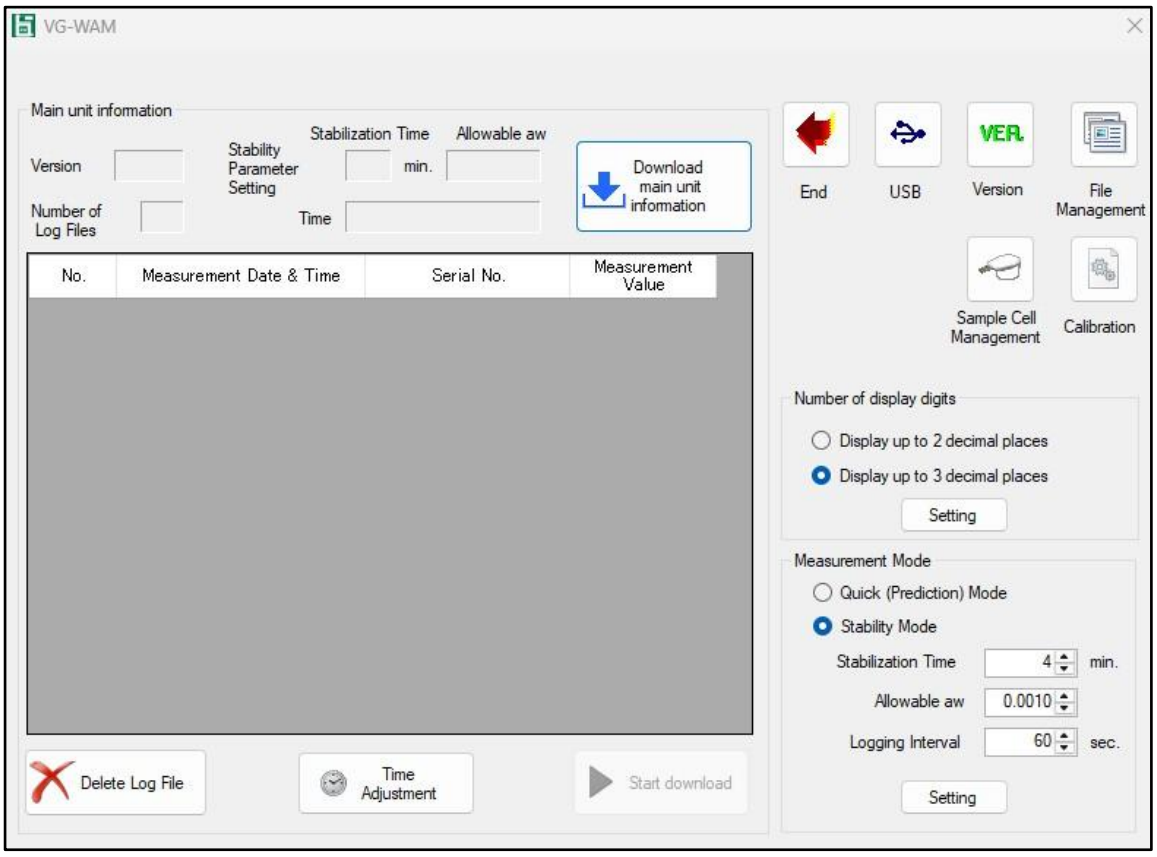
Connecting to a PC

Check that the power switch is OFF. Connect the micro B terminal of the USB cable to the data transfer port and connect the other end to the PC running VG-WAM.

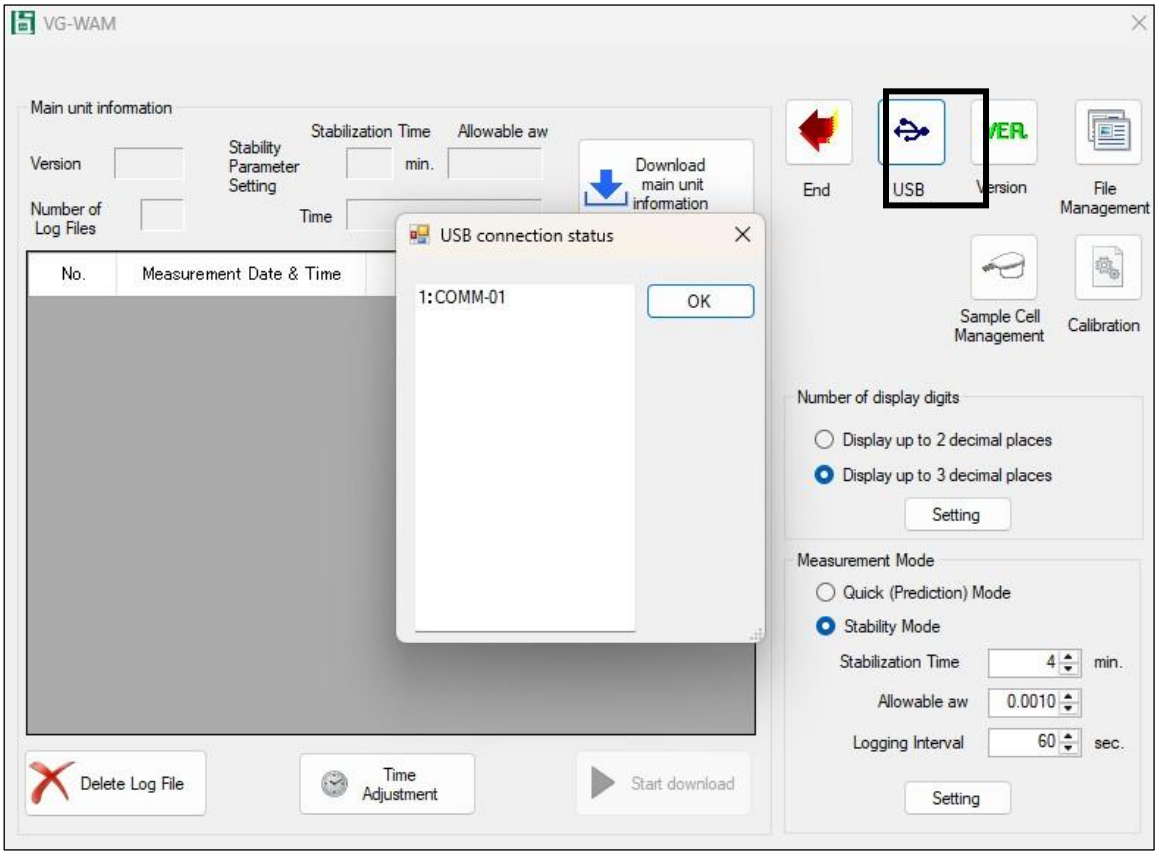
Turn the meter ON. If the analyzer is connected to the PC correctly, “-PC-” will be displayed in the display area.



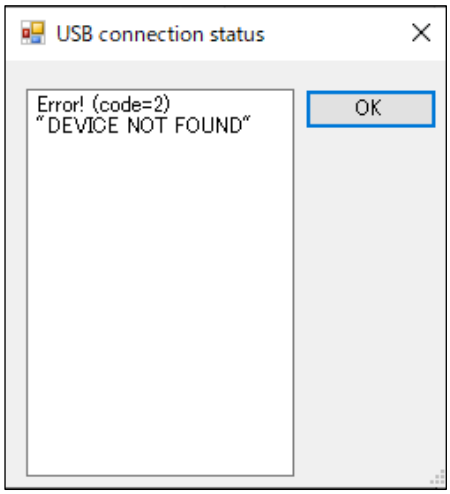
The VG-WAM startup window is shown below.



In the window, click the [USB] button to display the USB connection status dialog box. “1:COMM-01” will be displayed in this dialog box. Click [OK].



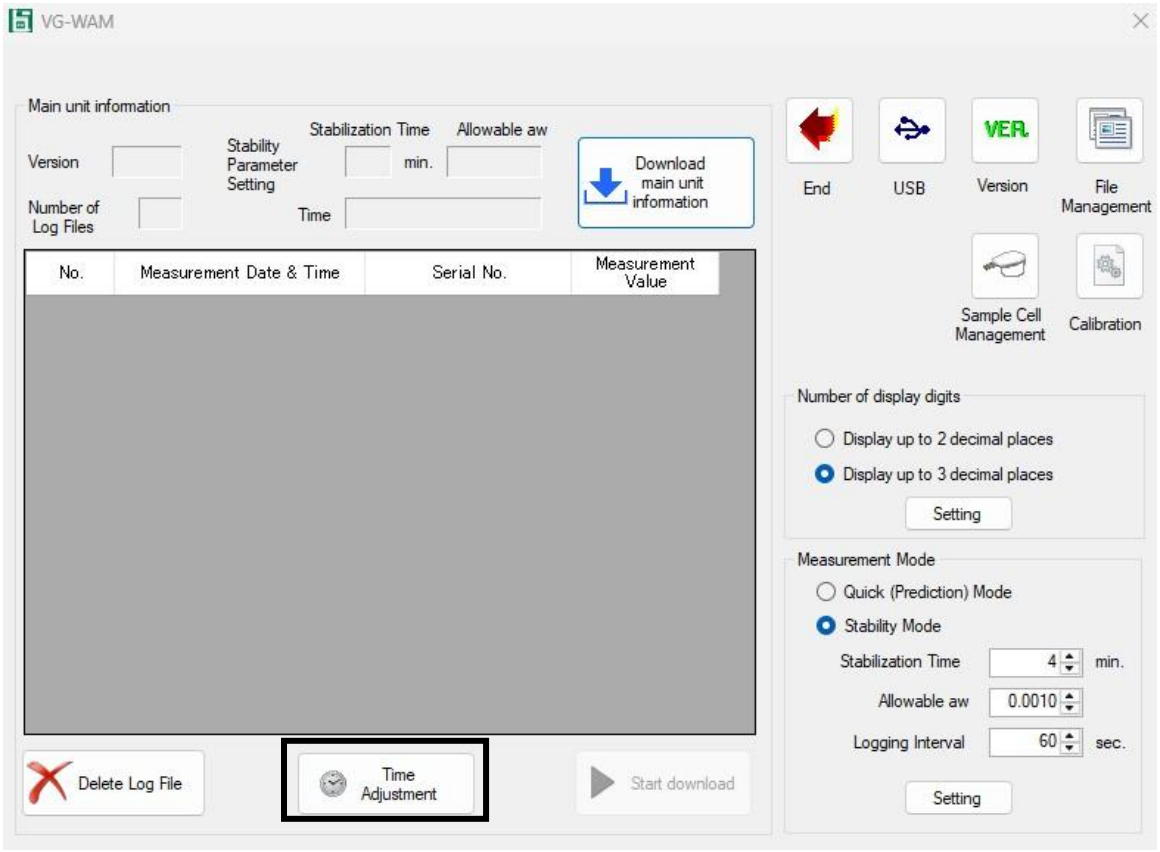
If the error message shown in the figure to the right is displayed in the USB connection status box, check the status of the USB cable and the USB drivers.



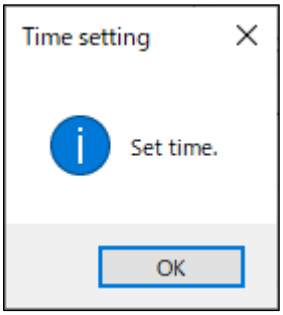
Setting the Date and Time

Confirm that the PC and the meter are connected properly. Then click Time Adjustment in the window shown below. The date and time of the connected PC will be transferred to the meter.

- If the date and time on the PC are incorrect, this incorrect data will be transferred to the meter.



If the time adjustment finishes properly, the dialog box shown to the right will be displayed.
Click [OK].



This completes the date and time setting.

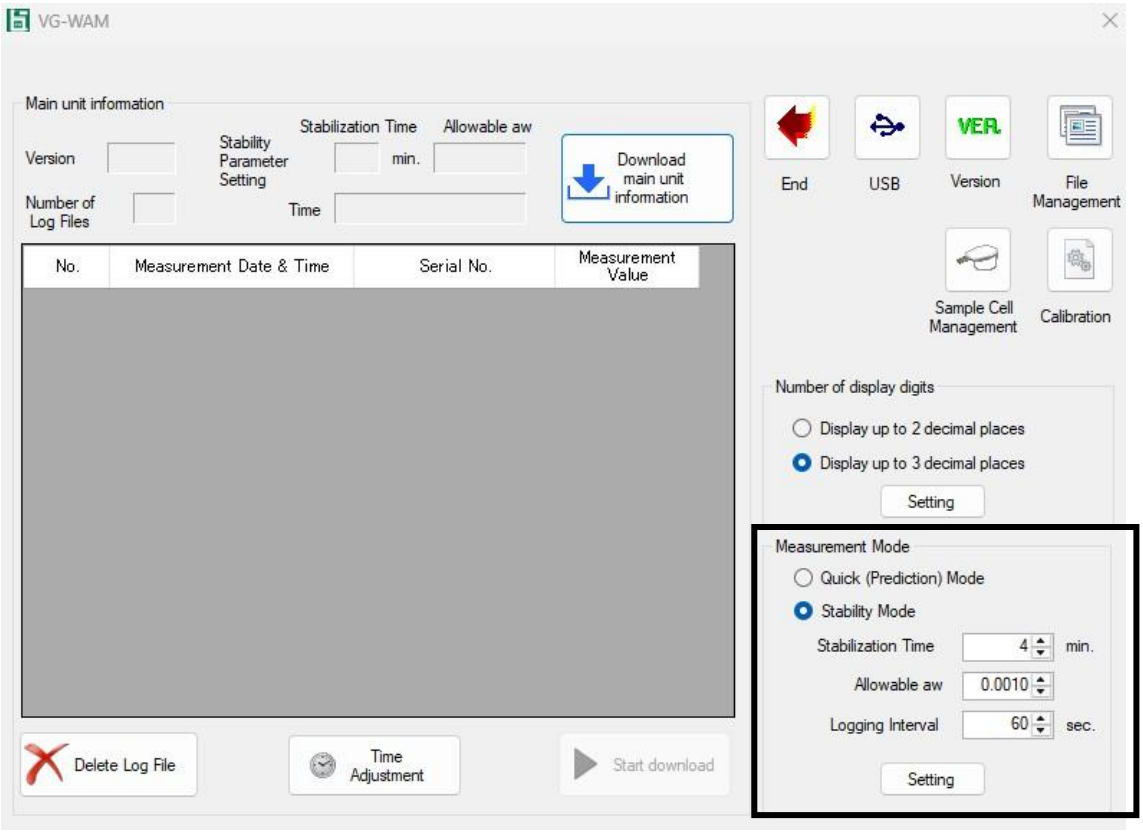
- Before closing the application, you can review other settings like “Switching the Measurement Mode” and “Number of Digits in the Water Activity Display” (pages 14 and 16). Otherwise, continue to the next step.

After finishing the above procedure, click [End] in the VG-WAM window.

Click [Yes] to close the application or [No] to keep it open.

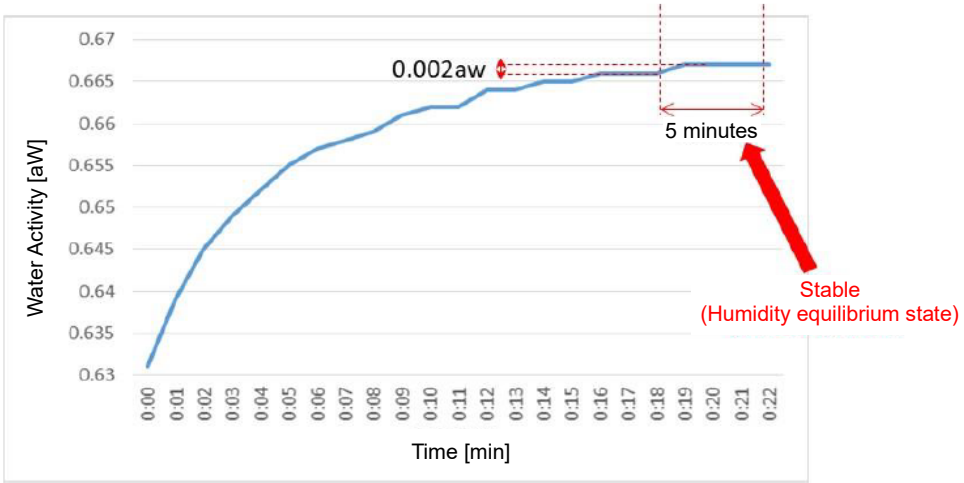
Switching the Measurement Mode

The water activity analyzer is equipped with two measurement modes: Stability mode and Quick (Prediction) mode. The settings can be changed through the software. Select the measurement mode and click [Setting].



■ Stability Mode

In the Stability Mode, the measurement continues until the water activity values settle down within a set fluctuation range (Allowable aw) and stays within that range for a set time (Stabilization Time).
Set the [Stabilization Time] and [Allowable aw] in the Measurement Mode box.
In addition, the data saved at the set logging interval can be downloaded and analyzed using the software. (For details, refer to the Data Logging section starting on page 31)



■ Quick (Prediction) Mode

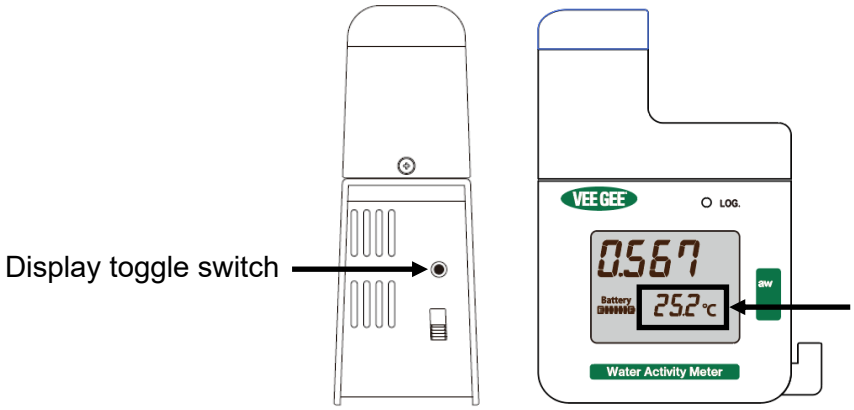
In the Quick (Prediction) Mode, ageing is performed for 1 minute, and measurements for 5 minutes, so the process ends after a total of 6 minutes.
This mode is intended for quick measurements.

- Quick Mode is a short-interval mode intended for users who are knowledgeable about water activity measurements, or as a quick check after using Stability Mode. Users who are inexperienced with water activity measurements are advised to initially use Stability Mode.

Switching the Display

■ When the Sensor Assembly is Not Inserted

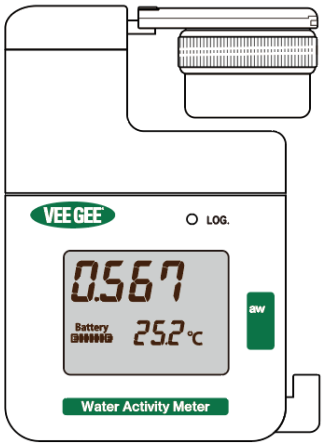
The ambient temperature and humidity can be checked with the meter.
To switch between the temperature display and the humidity display, press the display toggle switch.



When the temperature is displayed, “°C” is displayed.
When the humidity is displayed, no units are displayed.

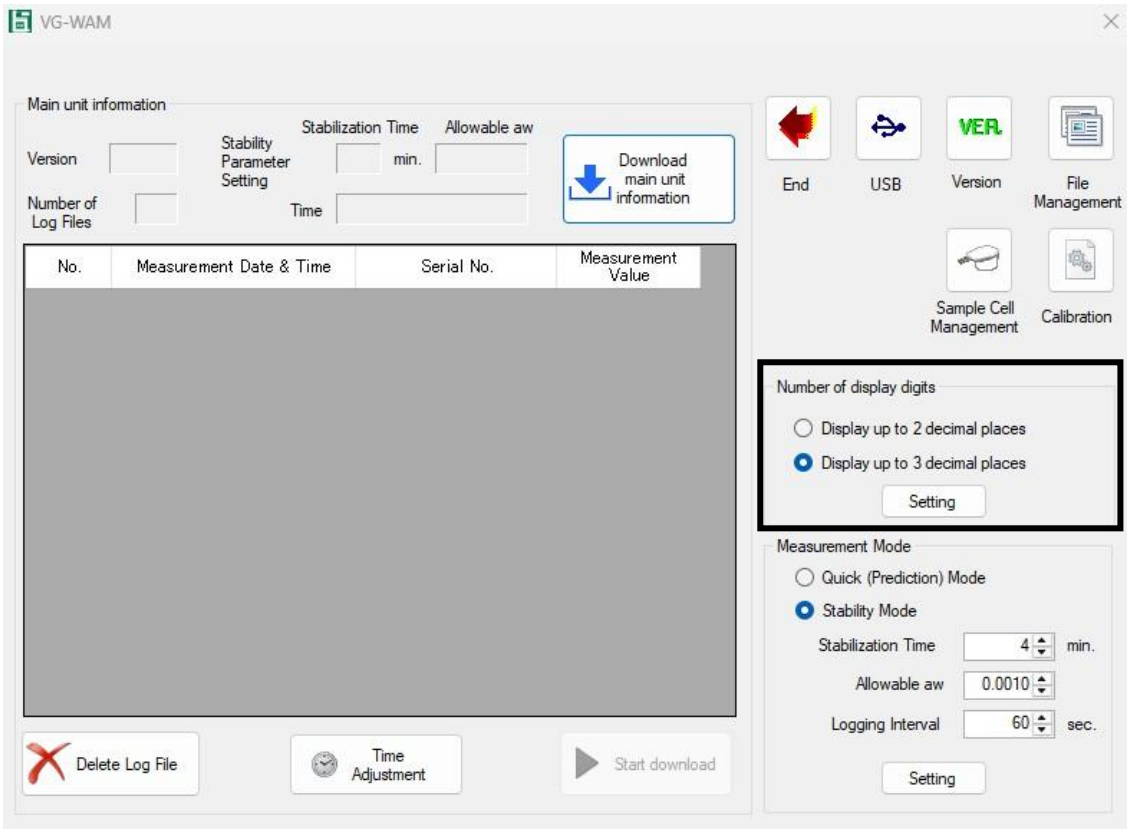
■ When the Sensor Assembly is Inserted

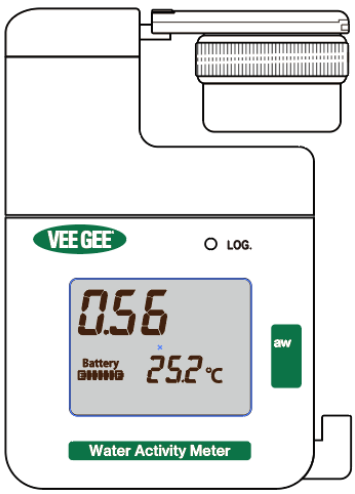
The water activity is displayed at the top of the display area. In the bottom area, the remaining dry cell life is shown to the left. The temperature inside the sensor assembly is shown to the right. The display cannot be switched once the sample assembly is connected.



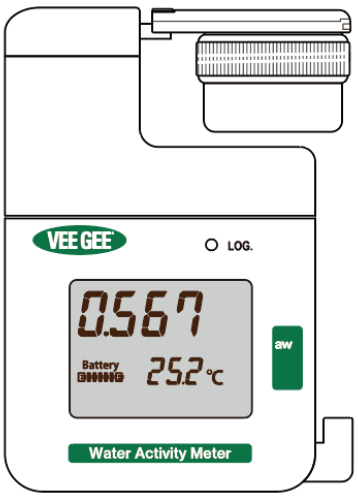
Number of Digits in the Water Activity Display

With this unit, the water activity display can be changed to either 2 or 3 digits after the decimal point. When 2 decimal places is selected, the third digit is truncated, not rounded.





Display with 2 Digits after the Decimal Point
(The 3rd digit is truncated.)



Display with 3 Digits after the Decimal Point

Measurements

When calibrating before measurement, refer to the Calibration section starting on page 20. Before starting a measurement, you must set up the measuring mode (see page 14). The meter cannot be plugged into the PC while taking measurements.

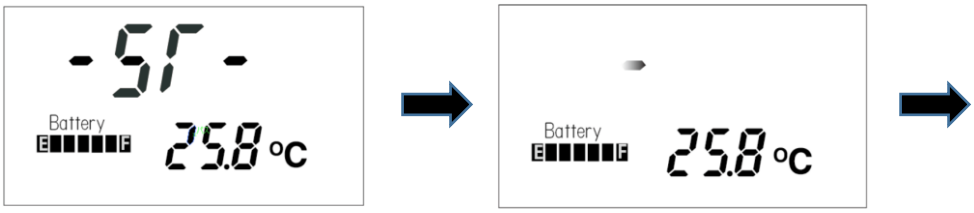
Measurements in Stability Mode

(1) Turn the meter on. Place a sample in the sensor sample container or one of the extra sample containers and screw the sensor lid on the container. The sample should fill between 70 and 80% of the container.
- "-ST-" is displayed before the sensor assembly is inserted.

(2) Plug the sensor assembly into the meter.

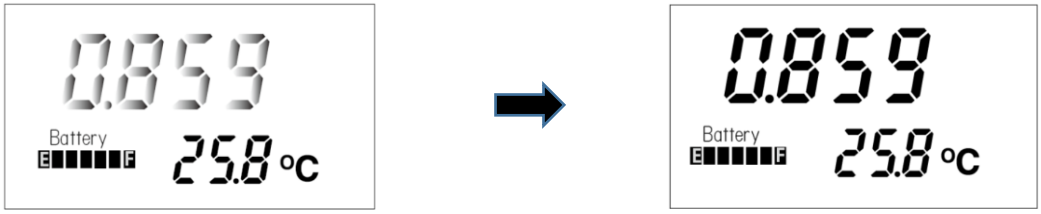
(3) During ageing (for 1 minute), "-" is displayed in the display area. During measurement, the water activity value will flash.

(4) The measurements are finished when the value changes from flashing to steady.
- To abort a measurement, remove the sensor assembly from the meter.



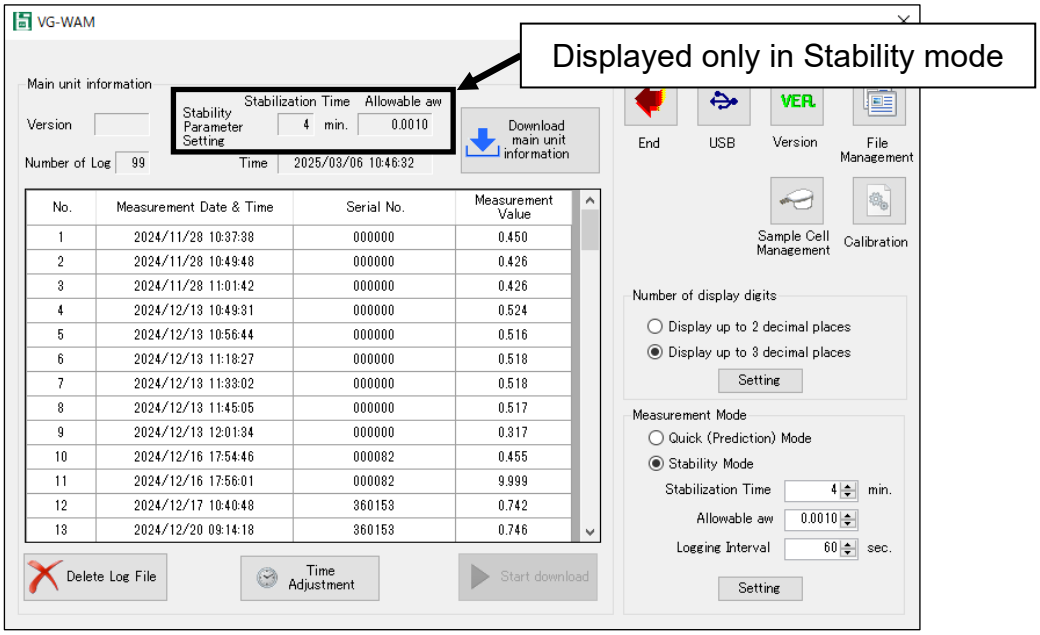
When the meter is ON

Directly after the sensor assembly is inserted (during aging)



During the water activity measurements

Water activity measurements are finished



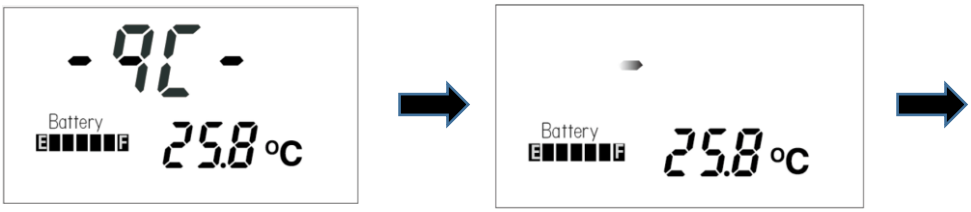
Measurements in Quick (Prediction) Mode

(1) Turn the meter on. Place a sample in the sensor sample container or one the extra sample containers and screw the sensor lid on the container. The sample should fill between 70 and 80% of the container.
- "-qc-" is displayed before the sensor assembly is inserted.

(2) Plug the sensor assembly into the meter.

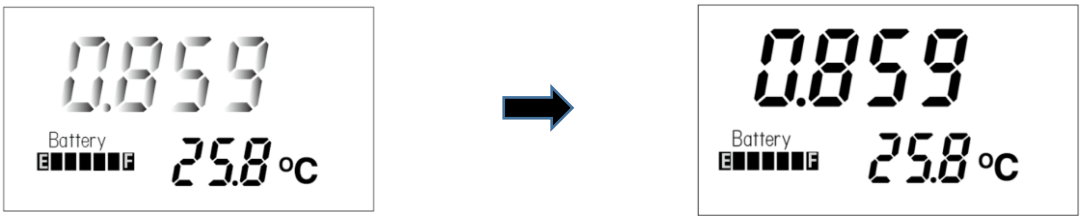
(3) During ageing (for 1 minute), "-" is displayed in the display area. During measurement, the water activity value will flash.

(4) The measurements are finished when the water activity value changes from flashing to steady.
- To abort a measurement, remove the sensor assembly from the meter.



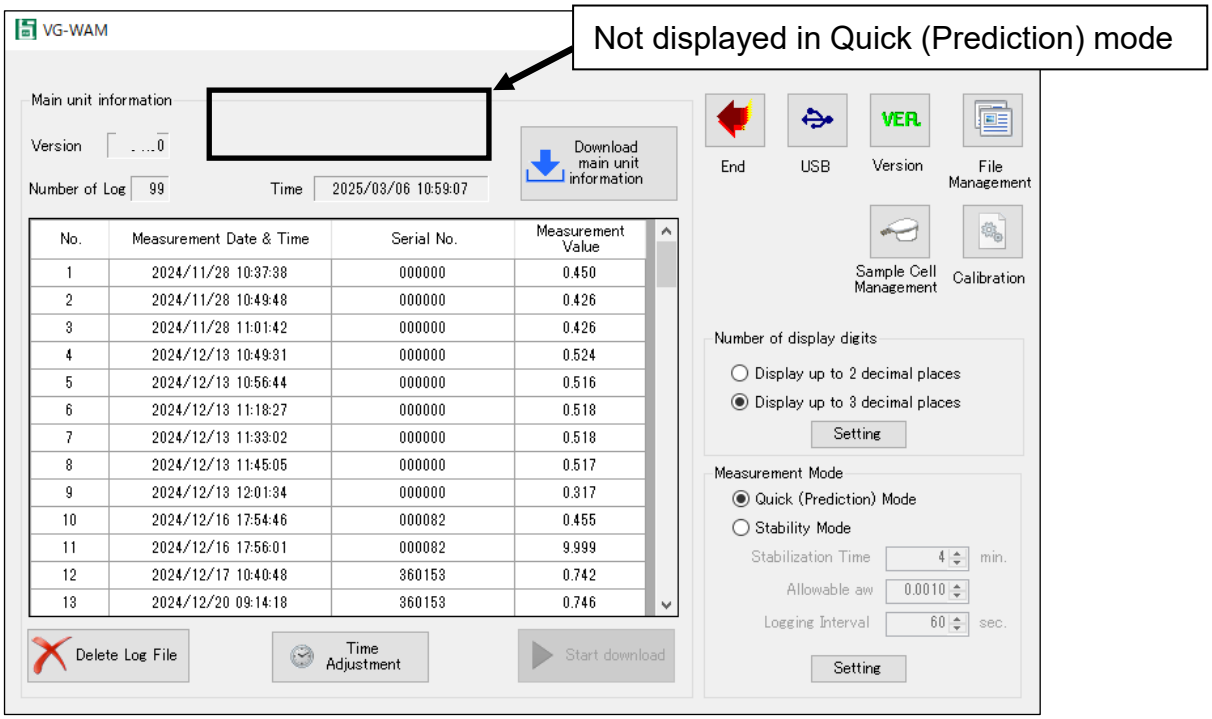
When the meter is ON

Directly after the sensor assembly is inserted (during aging)



During the water activity measurements

Water activity measurements are finished



Error Codes

Display	Problem	Corrective Measures
Err 1 Err 2 Err 3 Err 9	The meter and the sensor assembly are not connected properly.	Turn OFF the power and check that the sensor assembly has been inserted properly into the meter. If you repeat the procedure several times but the error persists, there may be a fault with either the sensor assembly or the meter.
“CELL” is displayed once every 5 seconds during the water activity measurements.	End of operating life of the sensor assembly (sensor deterioration)	Purchase a new sensor. There are no repairs that can be made once the sensor reaches the end of operating life.

Calibration

Water Activity Calibration

Calibration is done by measuring a salt standard which configures a calibration factor to adjust the water activity value of the sensor. If you have multiple sensor assemblies, this process must be done separately for each one.

■ Preparations

You will need the water activity meter, a sensor assembly, and a calibration salt

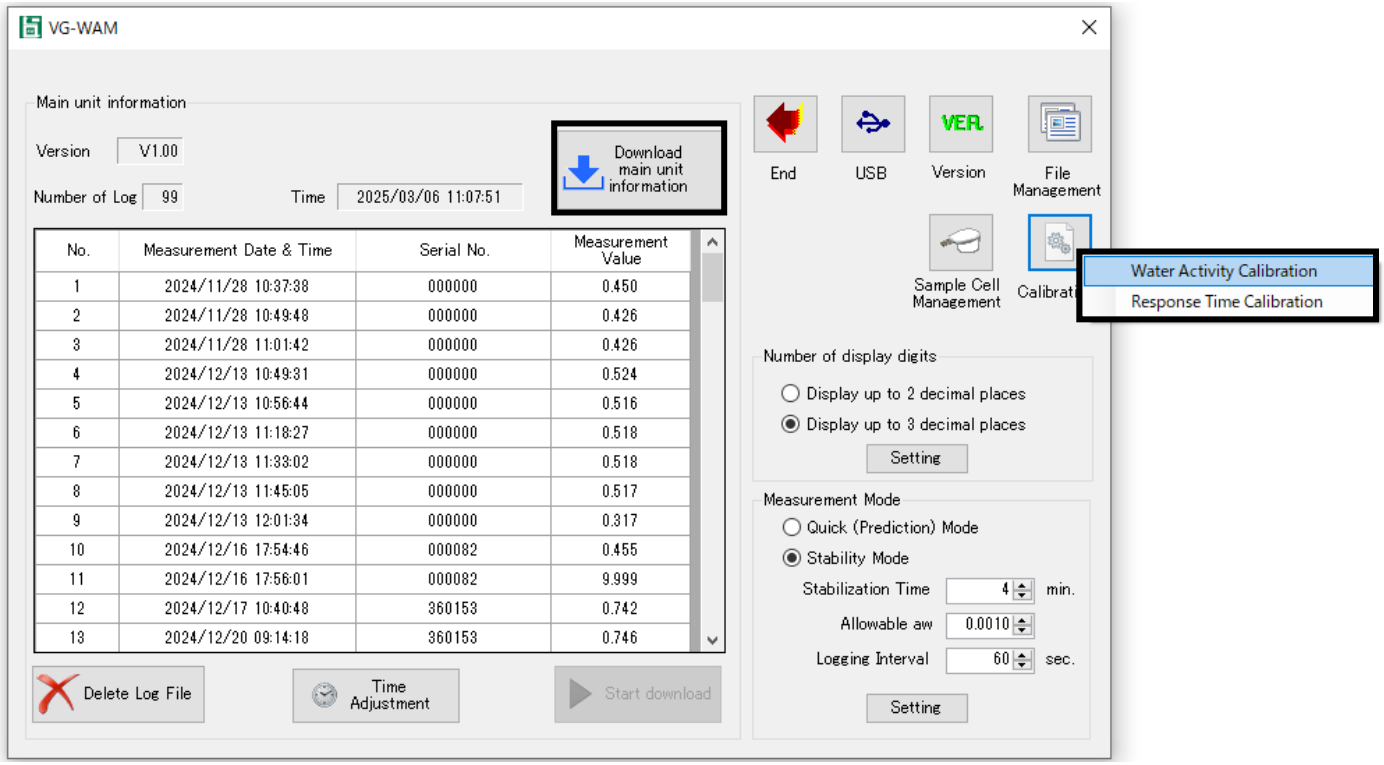
- Before measurement, remove the sensor assembly from the meter.

■ Calibration Method

(1) Connect the computer and the meter using the USB cable.

(2) Run the software and click [Download main unit information].

(3) Click [Calibration] and then select [Water Activity Calibration].



(4) Select one of the options in the [Mode of calibrate] area. Enter the values for the salt standards (you can use up to 3) and enter a measurement time per point. In the [Calibration points] area, select the number of salt standards you will be using. In the [Measurement end conditions in Stability mode] area, select either [Measurement Time] or [Stabilization Time].

Measurement end conditions in Stability mode

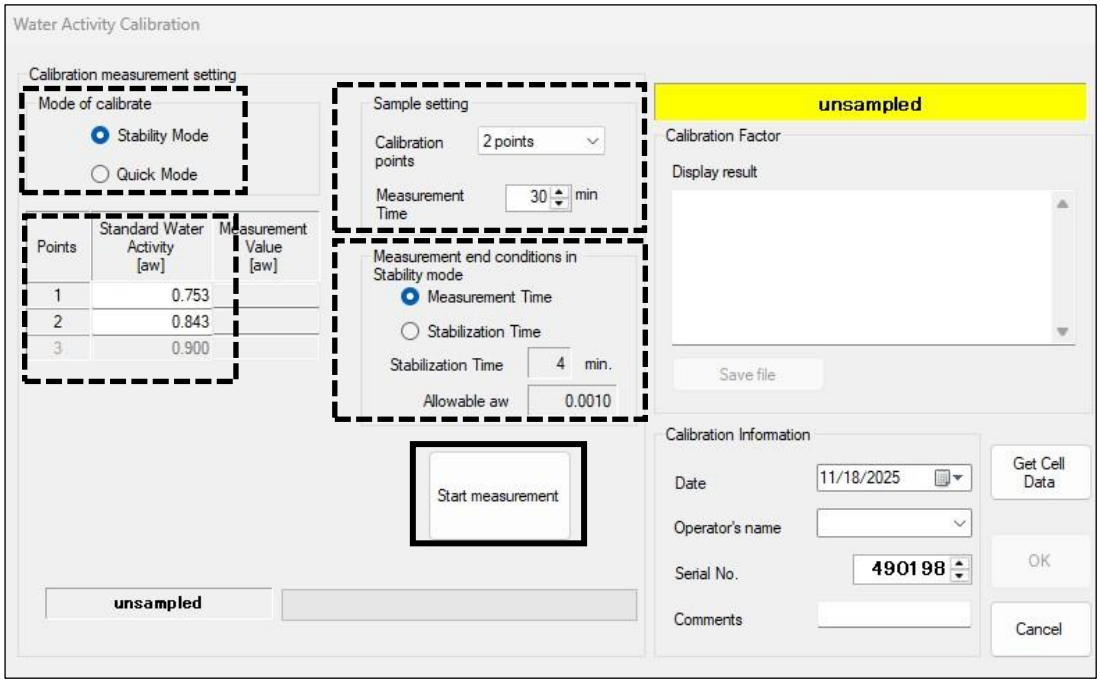
Measurement Time	The measurement time per point
Stabilization Time	As with stability mode, determined by the stabilization time and the allowable aw value (Refer to page 14.)

- The calibration factors for stability mode and quick mode are different. If using both modes, calibrate each respectively.
- To initialize the calibration factors, do so from cell management. (Refer to Cell Management starting on page 27)

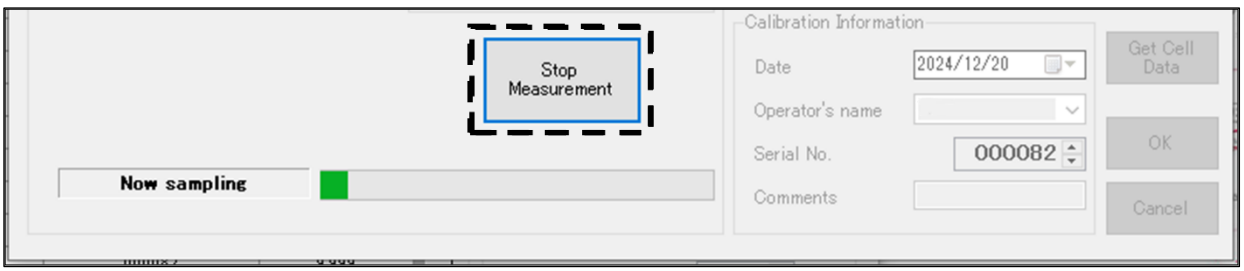
What follows is an example for 2 calibration points for Stability Mode calibration

(5) Enter the saturated salt for the 1st point in the sensor sample container and plug it into the meter.

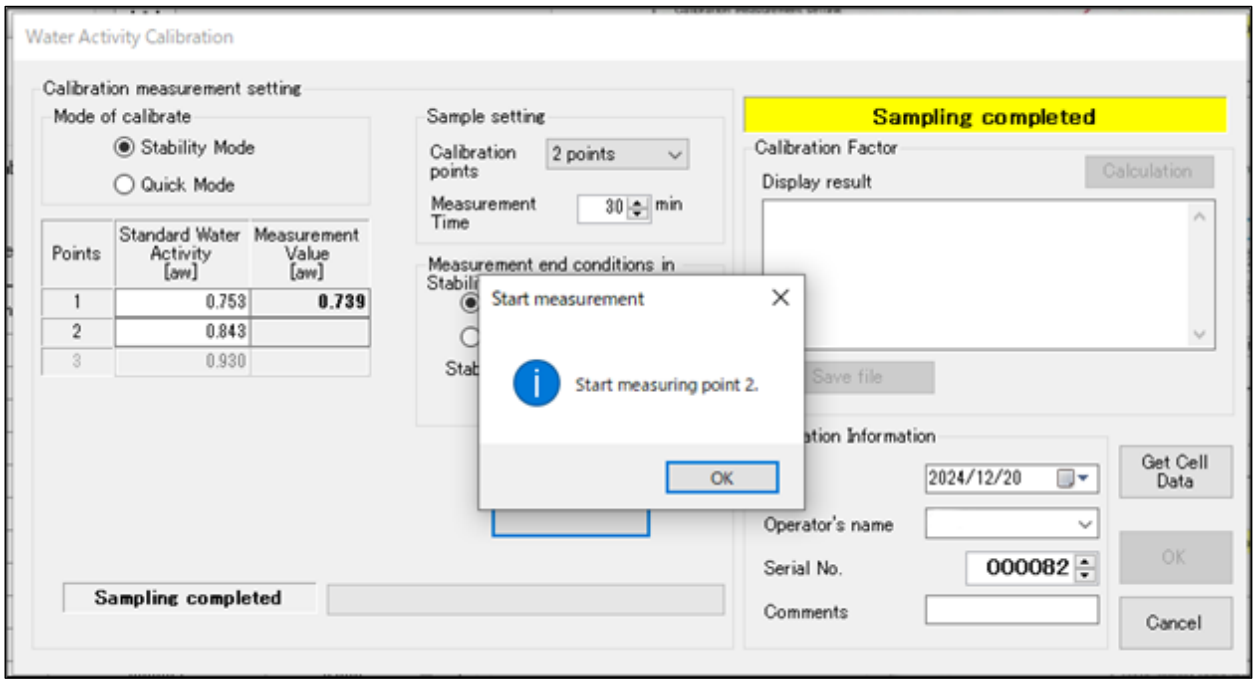
(6) Click [Start measurement] to start the measurement.



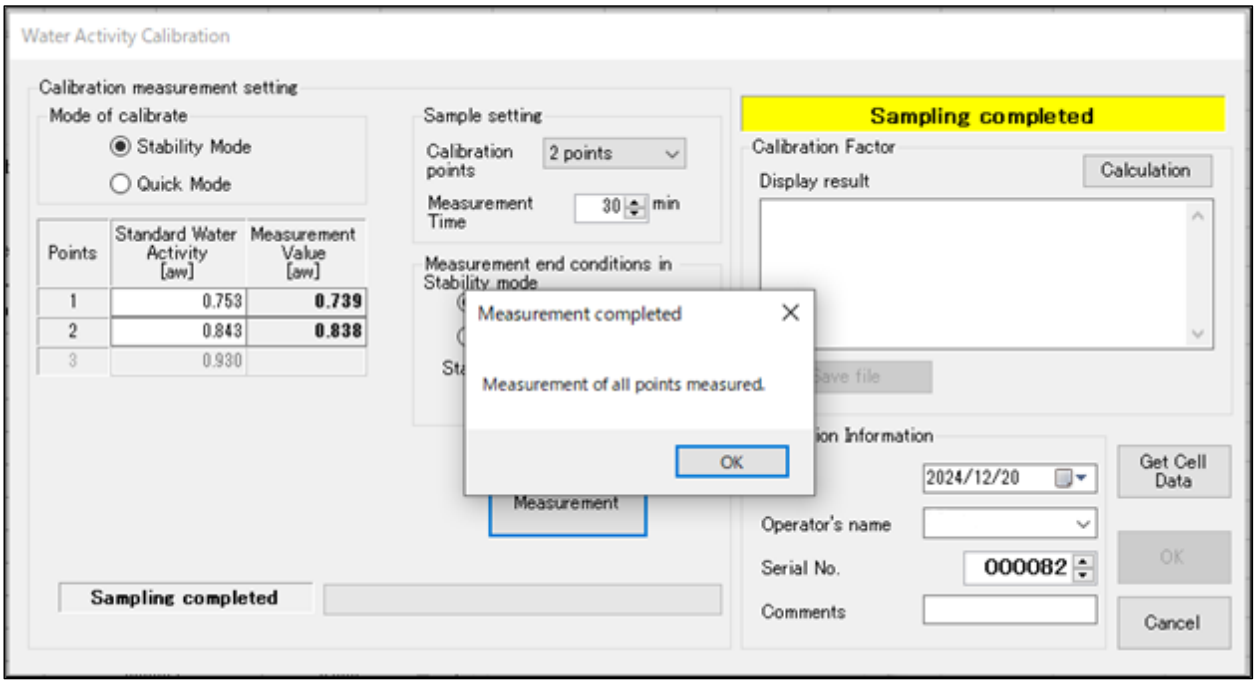
To abort the 1st point measurement, click [Stop Measurement].



(7) When the window shown below is displayed, remove the sensor assembly. Replace the contents with the saturated salt for the 2nd point and insert it into the meter again. Click [OK] in the window shown below.



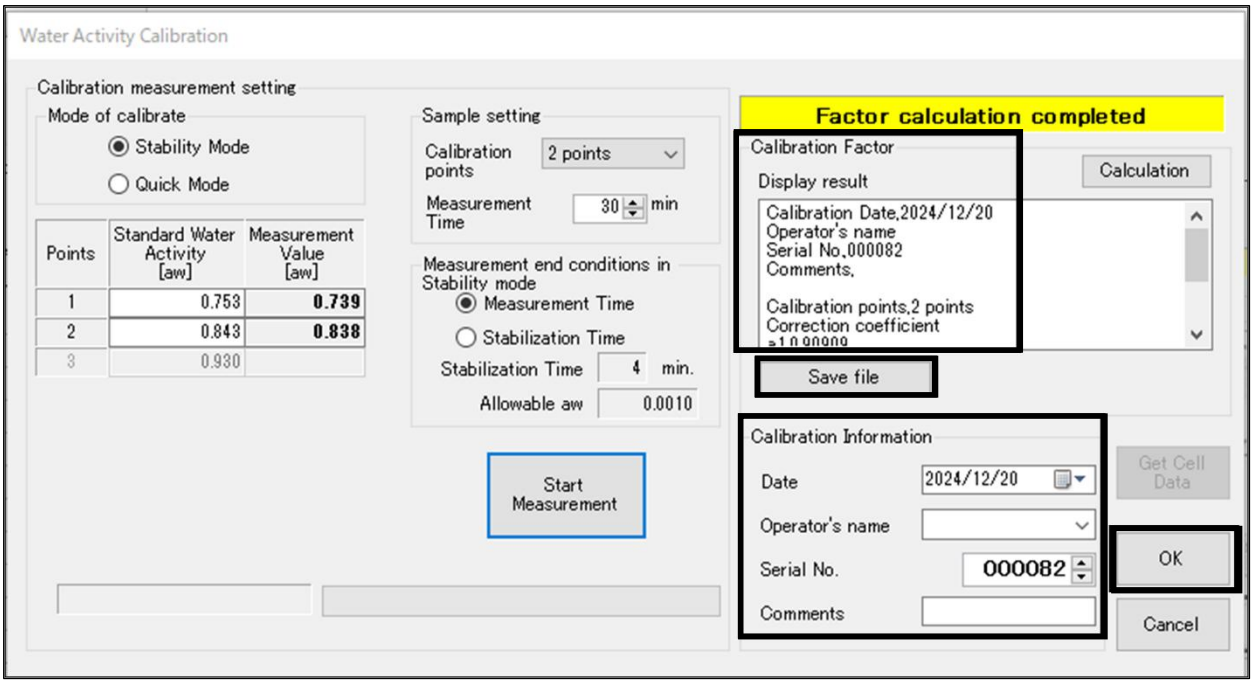
(8) When the measurement for the 2nd point is finished, the window shown below is displayed. Click [OK].



(9) After the measurements are finished, the Correction Coefficient will automatically calculate. Check the calibration information and the calibration factor displayed in the [Display result] area.

Enter the Calibration Information in the bottom right area and click [Save file].

- Enter the Calibration Information as needed. In the [Comments] field, enter alphanumerical characters only.



(10) Input the name of the file and click [Save].
The storage location is the “Windows(C:) → AWS_DSP → Data” folder.

(11) To finish the calibration, click [OK] at the bottom right of the window.

- Note: [OK] must be clicked for the calibration values to be saved.
- Ultimately, when [OK] is clicked, the calibration factor is saved to the sensor assembly even if it is not saved to a file.
- If you do not want to save the calibration factor, click [Cancel] to return to the startup window.

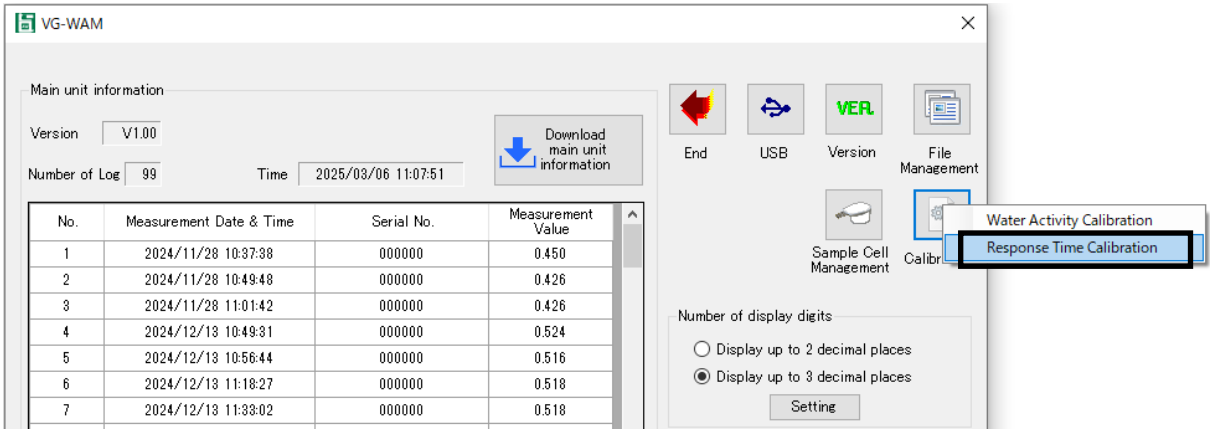
Response Time Calibration

An advanced function of the meter and software is Response Time Calibration. This is used only for the Quick Mode measurements. It allows you to see the difference between a Quick Mode measurement and what the reading would be after a longer selected response time. An offset is calculated and can be saved to the sensor assembly or to your PC so that you can get a compensated reading when using the Quick Mode. Response time calibration only supports 1-point calibration. You do not have to use the Response Time Calibration function, only select it if needed.

- Before measurement, remove the sensor assembly.

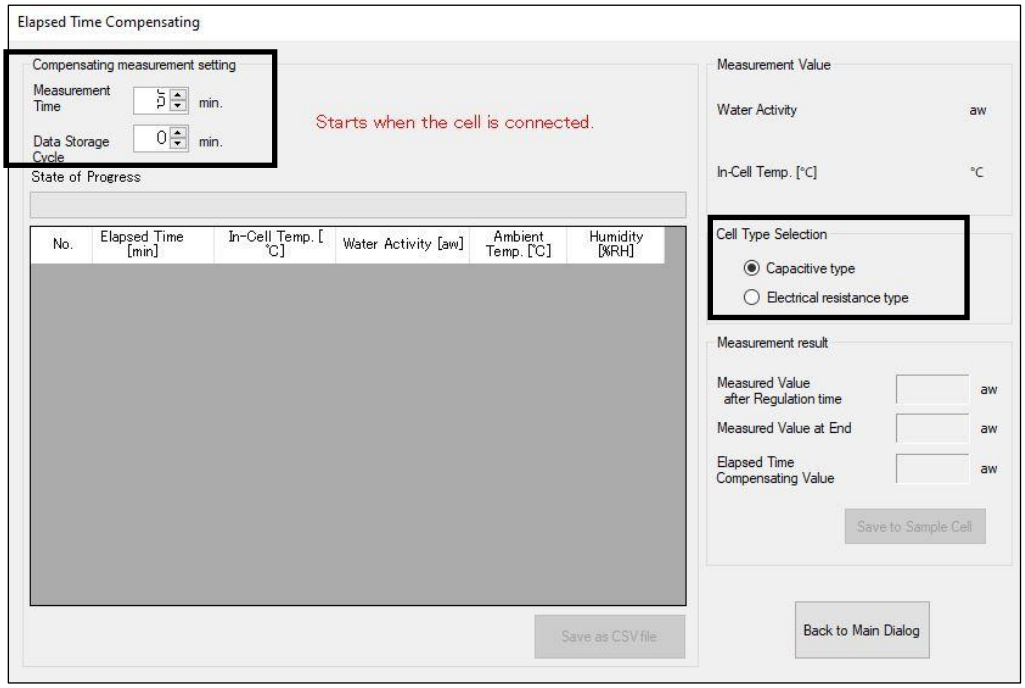
(1) Connect the PC and the meter using the USB cable.

(2) Click [Calibration] and then select [Response Time Calibration].

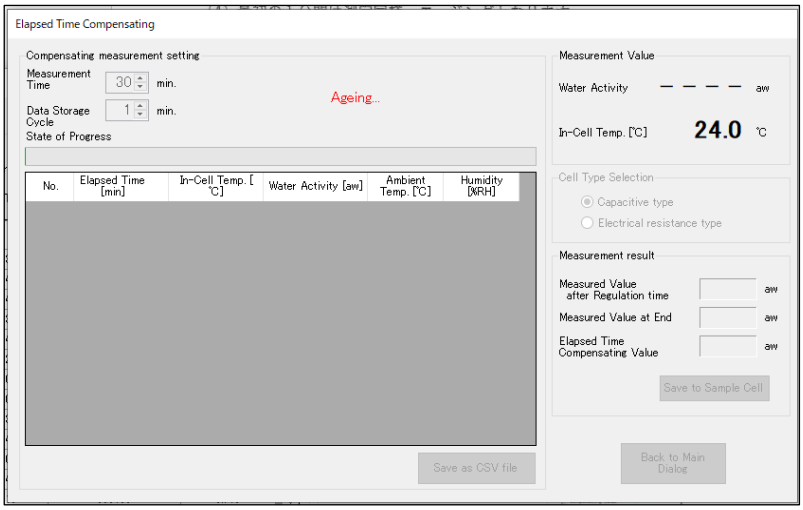


(3) Set the Measurement Time until stabilization as well as the Data Storage Cycle. Next, select the cell type (the Capacitive type is included with the meter; the Electrical Resistance type is optional). Then put a sample in the sensor sample container, connect the sensor assembly to the meter, and start the measurement.

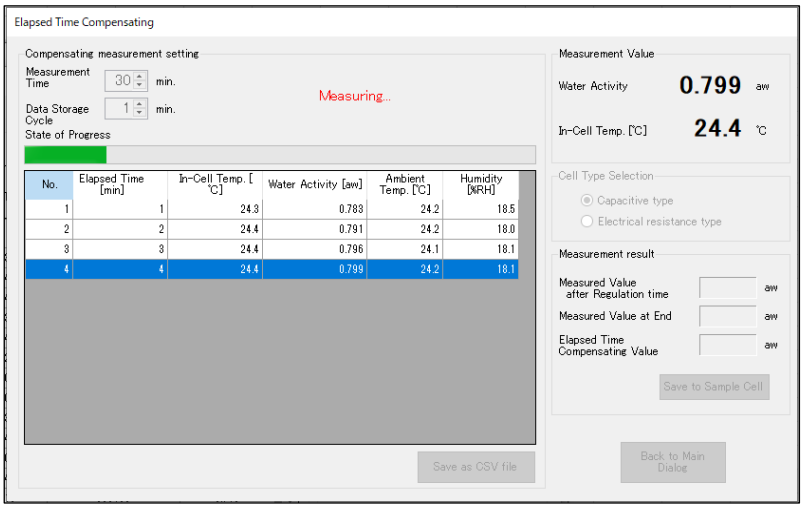
- The regulation time differs with the cell type (5 minutes for capacitance and 9 minutes for electrical resistance), so be careful to select the correct type.



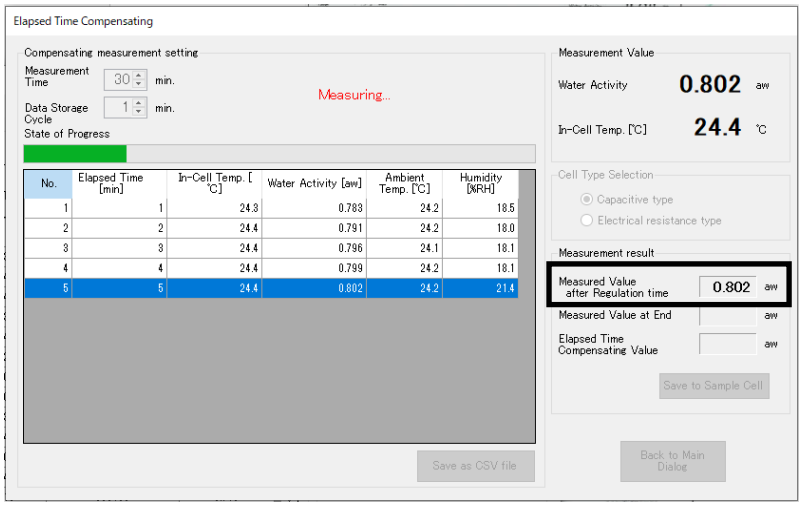
(4) The first minute of measurement time is always for ageing.



(5) The temperature inside the sensor assembly (internal cell temperature) as well as the ambient temperature and humidity are displayed each data storage cycle.

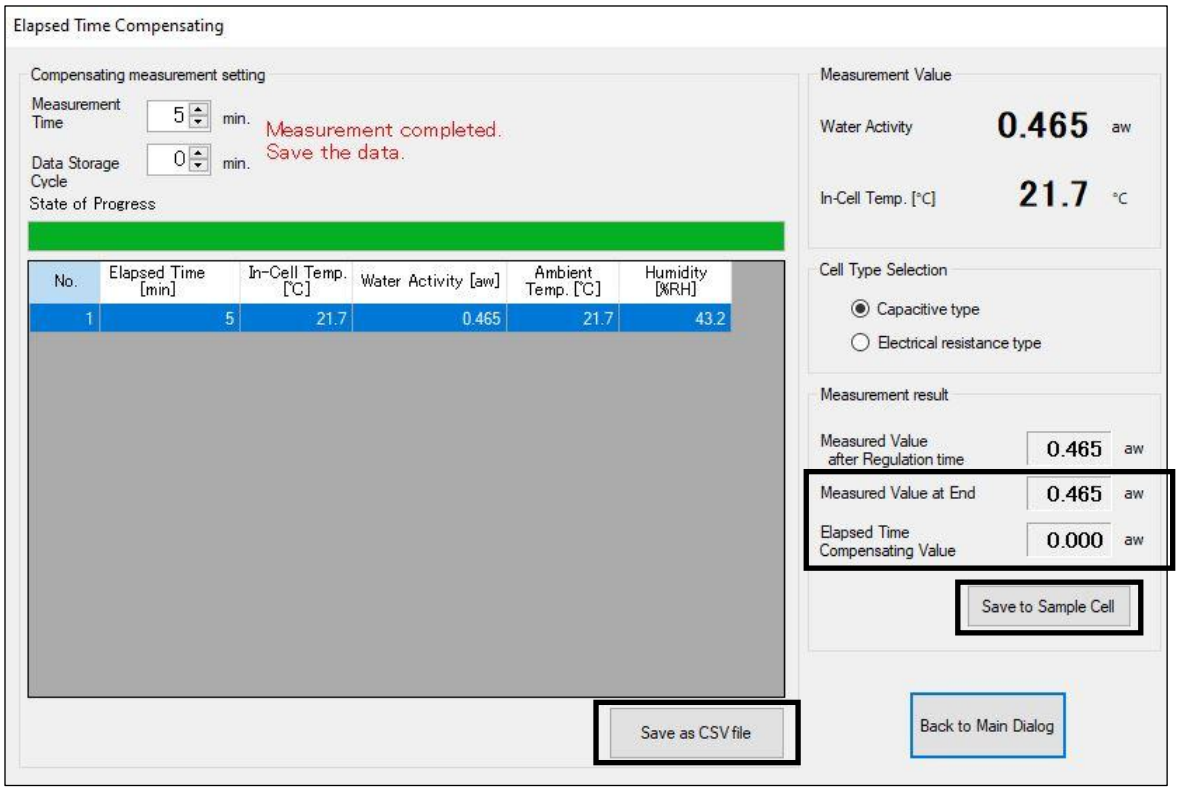


(6) When the Quick mode (regulation) time has elapsed, the measurement value at that time is displayed in the [Measurement result] area.



(7) When the measurement time has finished, the measurement value when the measurement time has elapsed and the response time calibration value are displayed.
Click [Save to Sample Cell] to save the results to the sensor assembly. To save the results to the PC, click [Save as CSV file].

To finish, click [Back to Main Dialog].



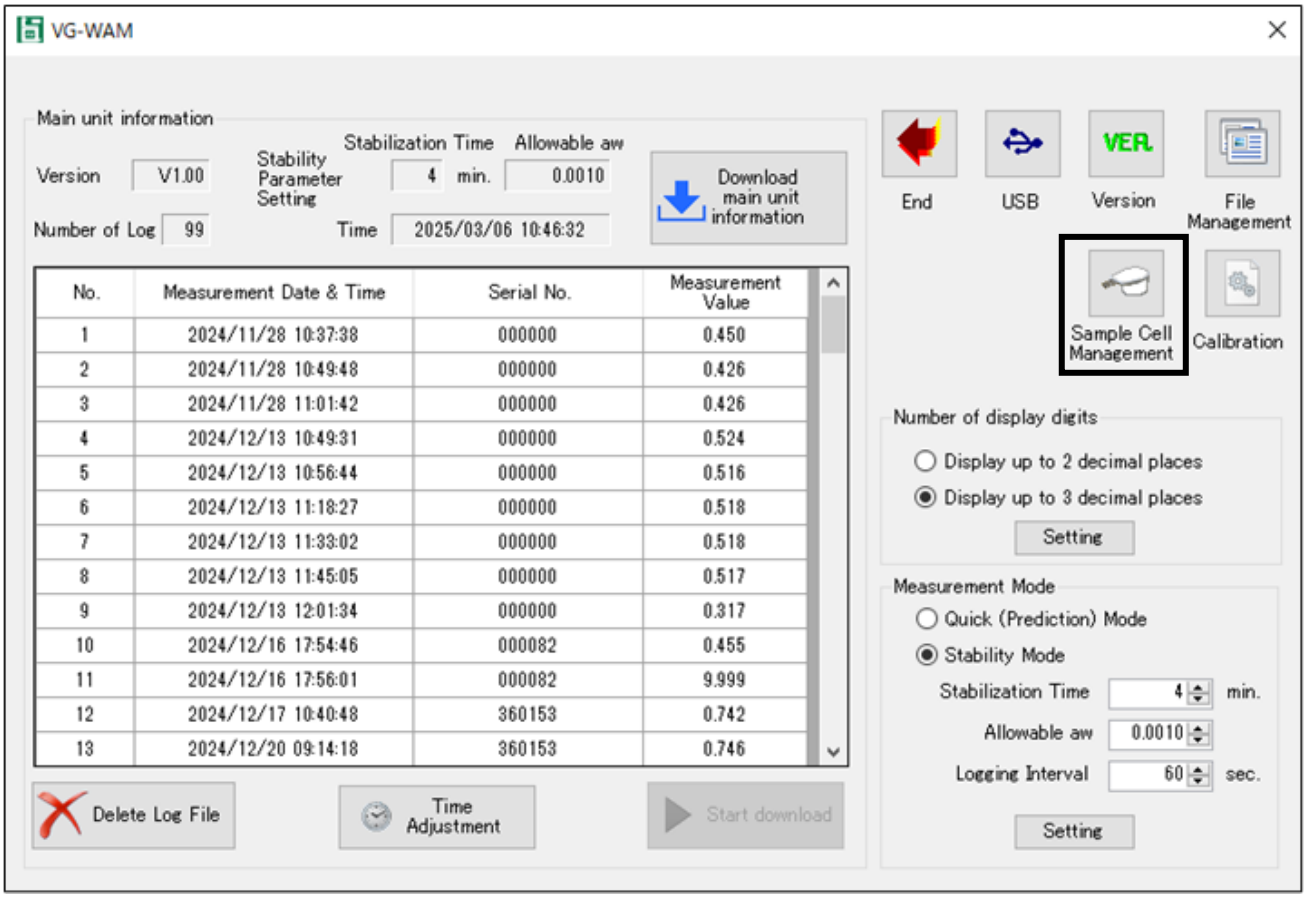
The default setting for the CSV file storage location is the “Windows(C:) → AWS_DSP → Data” folder.

Cell Management (Management of the Sensor Assemblies)

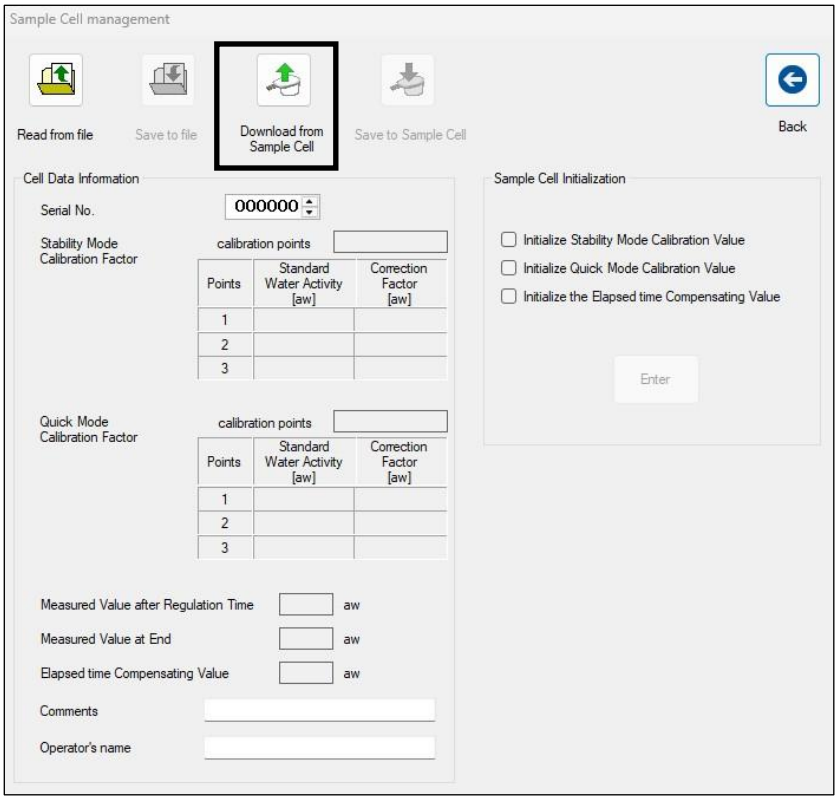
- Calibration data can be read from the sensor assembly and saved to a file; or a saved file of calibration data can be loaded to the sensor assembly.
    - This allows you to calibrate the unit at different values for different samples, save that calibration data to your computer, and then load that calibration data to the sensor assembly depending on which sample you are testing.

- Calibration data for the sensor assembly can be selected and initialized.

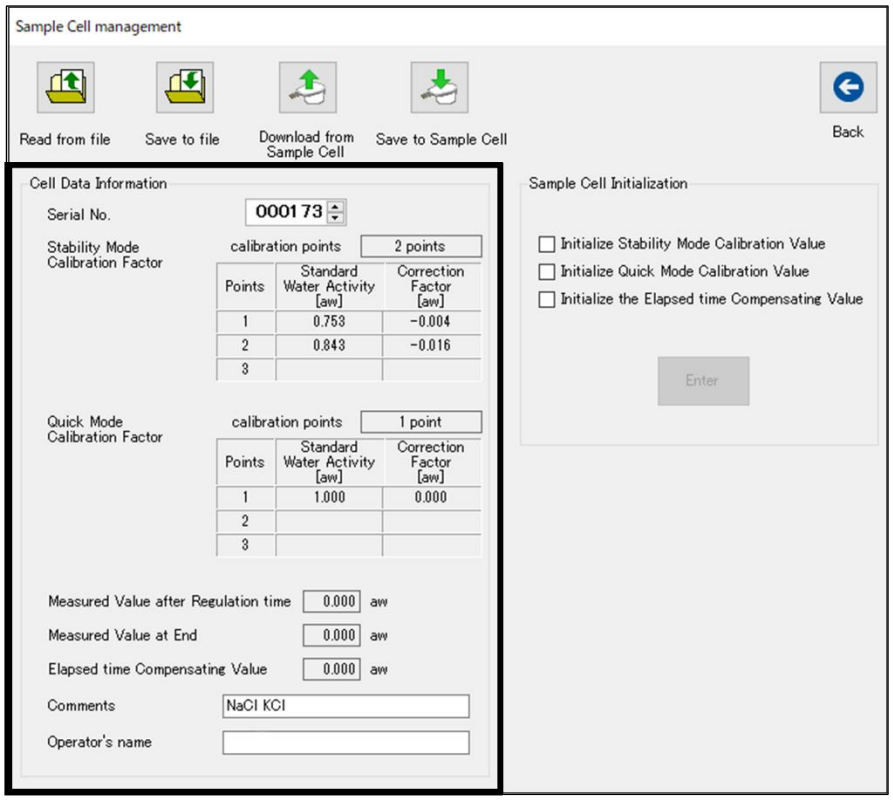
Click [Sample Cell Management] to display the [Sample Cell Management] window.



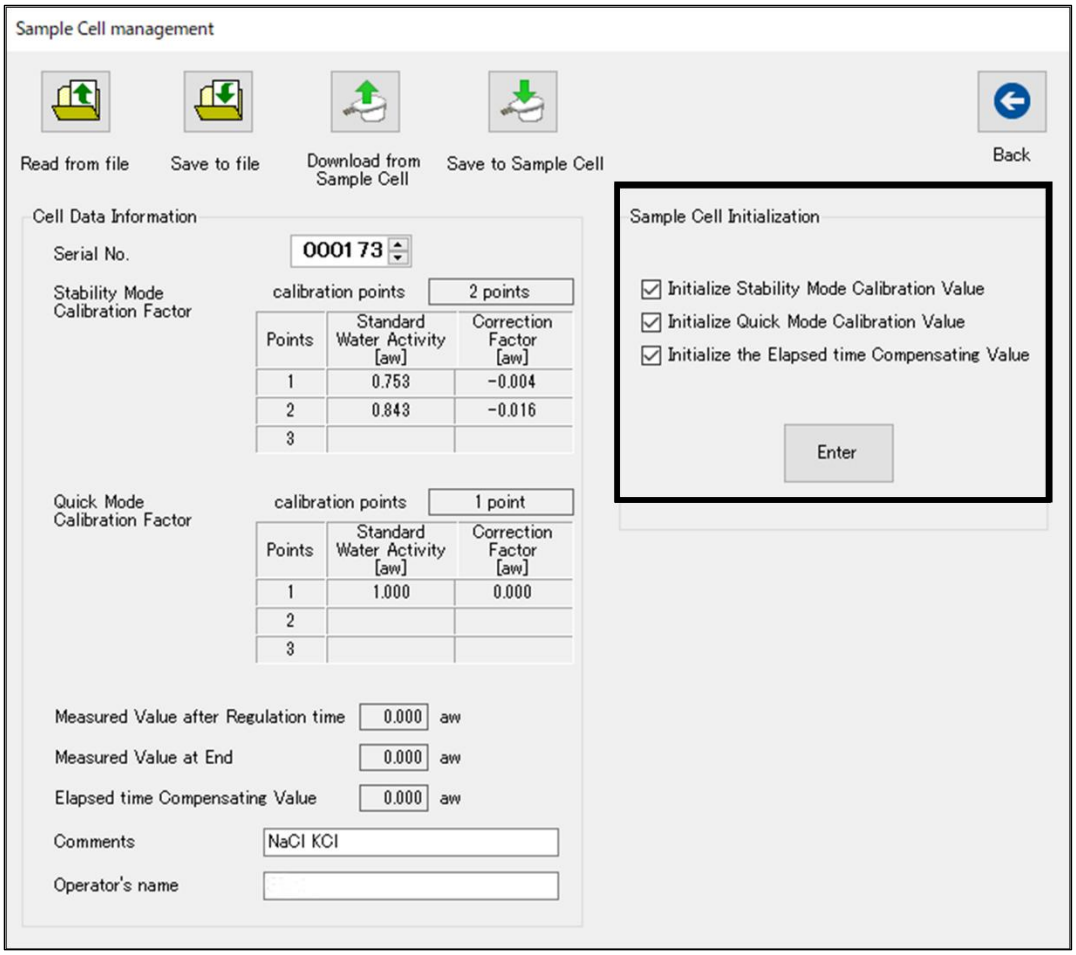
Click [Download from Sample Cell] to acquire information from a sensor assembly.



In the [Cell Data Information] area, the water activity calibration values for each mode, as well as the measured values during response time calibration and the compensating value (Elapsed Time Compensating Value) can be checked. In the [Comments] field at the bottom, a note consisting of up to 16 single-byte alphanumerical characters can be stored with the sensor assembly. You can also add an Operator's name.



To initialize and use a calibration value, select the checkbox for the item to initialize, and click [Enter].

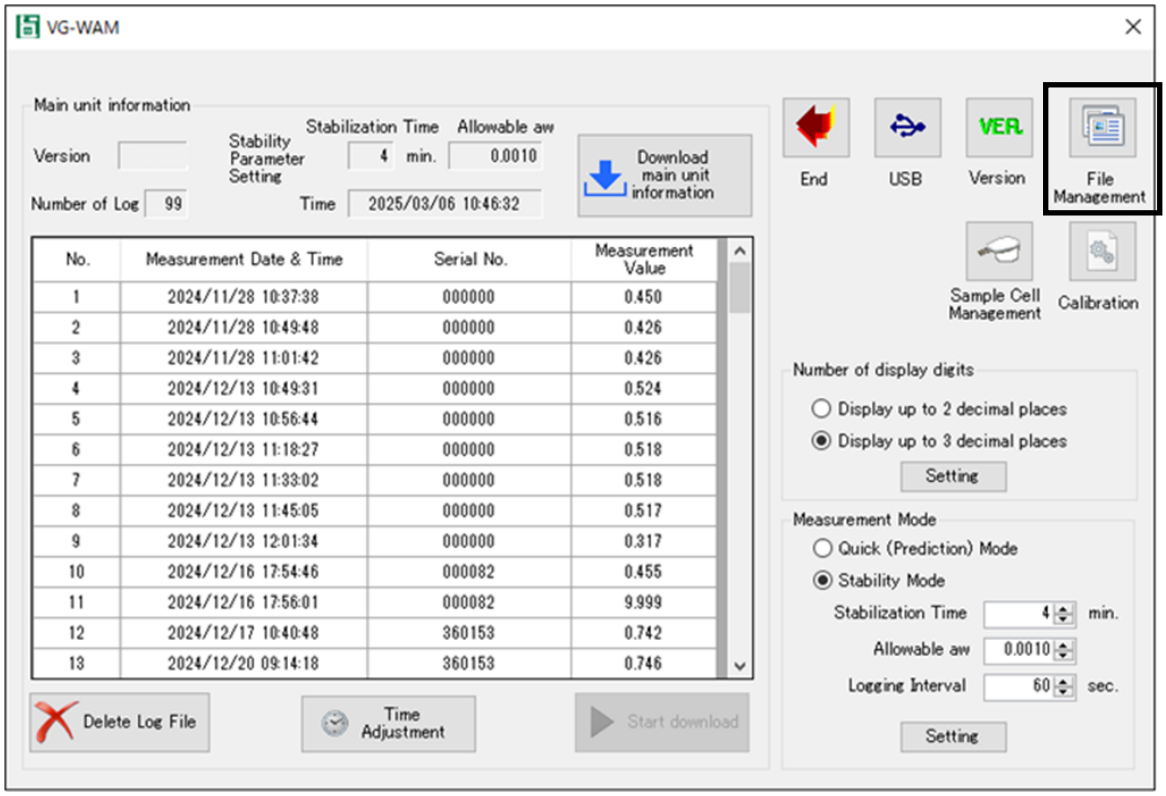


The data file acquired from the sensor assembly can also be saved by clicking the [Save to file] button.
The default setting for the file storage location is “Windows(C:) → AWS_DSP → Data”.

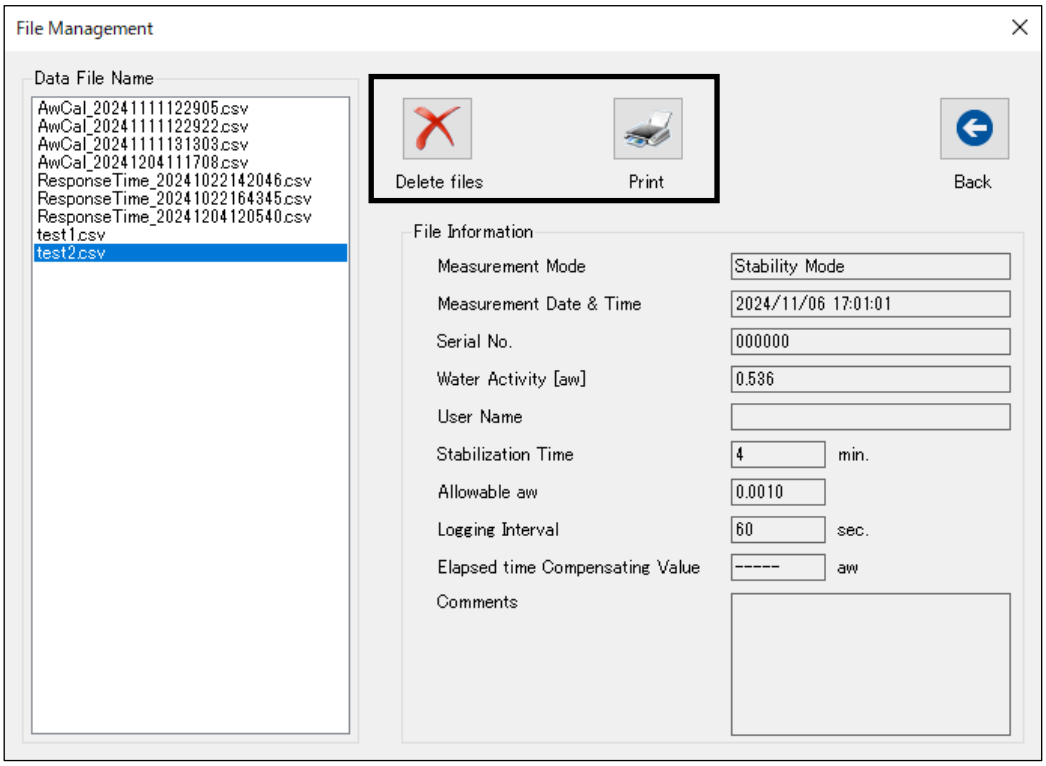
- The data is saved with the “awcell” extension.

File Management

The saved measurement data files can also be printed. Click [File Management].



Select the file to print, and click [Print].
To delete the files, click [Delete files].



- The data to print must first be saved to “Windows(C:) → AWS_DSP → Data”. Note that calibration data cannot be printed.

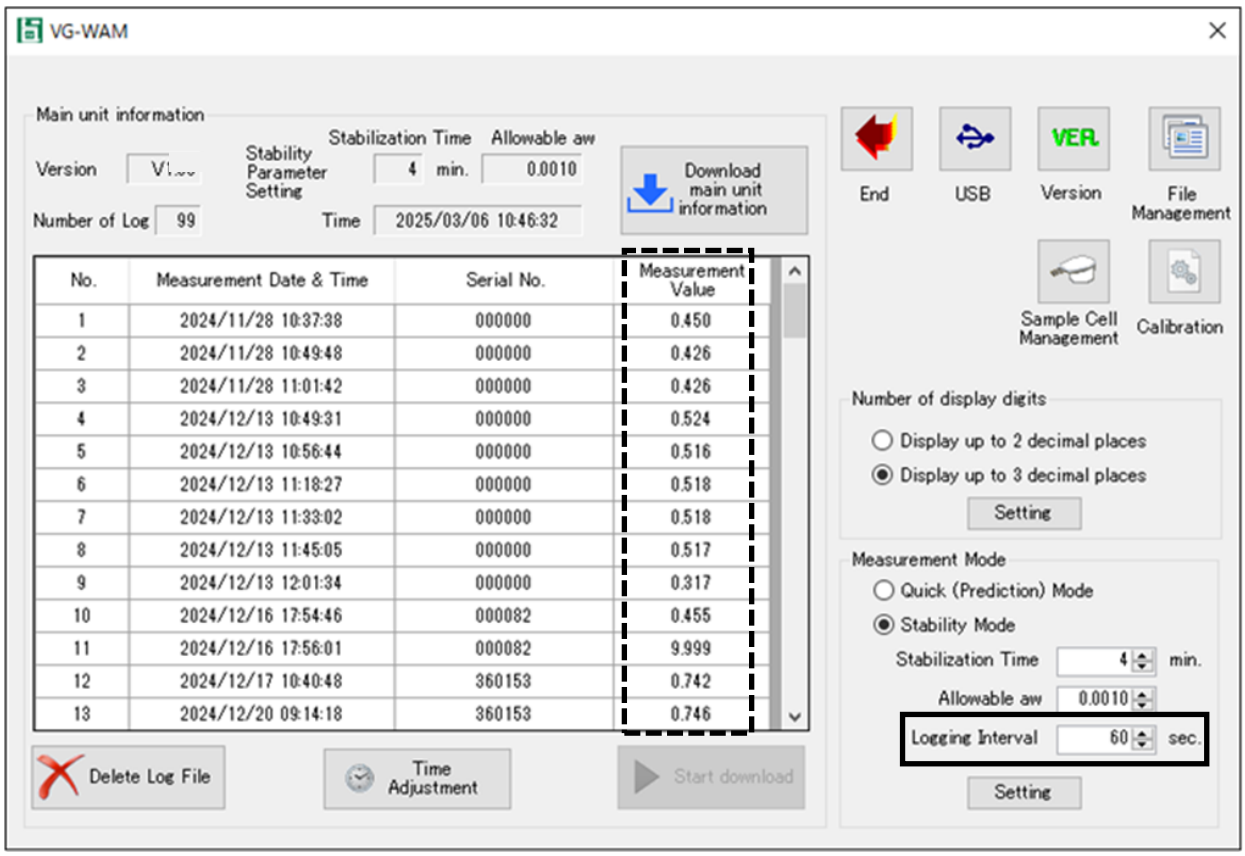
Data Logging

Each measurement value is stored in the internal memory of the main unit, and the data can be checked using the software.
In Quick (Prediction) mode, the final measurement result can be saved, and in Stability mode, water activity can be saved at data logging intervals.
Note that the data logging interval can be set using the VG-WAM software between 1 second and 3600 seconds (60 minutes. In essence, up to the set time).

When Measurement is Aborted

- In Quick (Prediction) mode, no record is kept.
- In Stability mode, the data up until the measurement was aborted is saved.

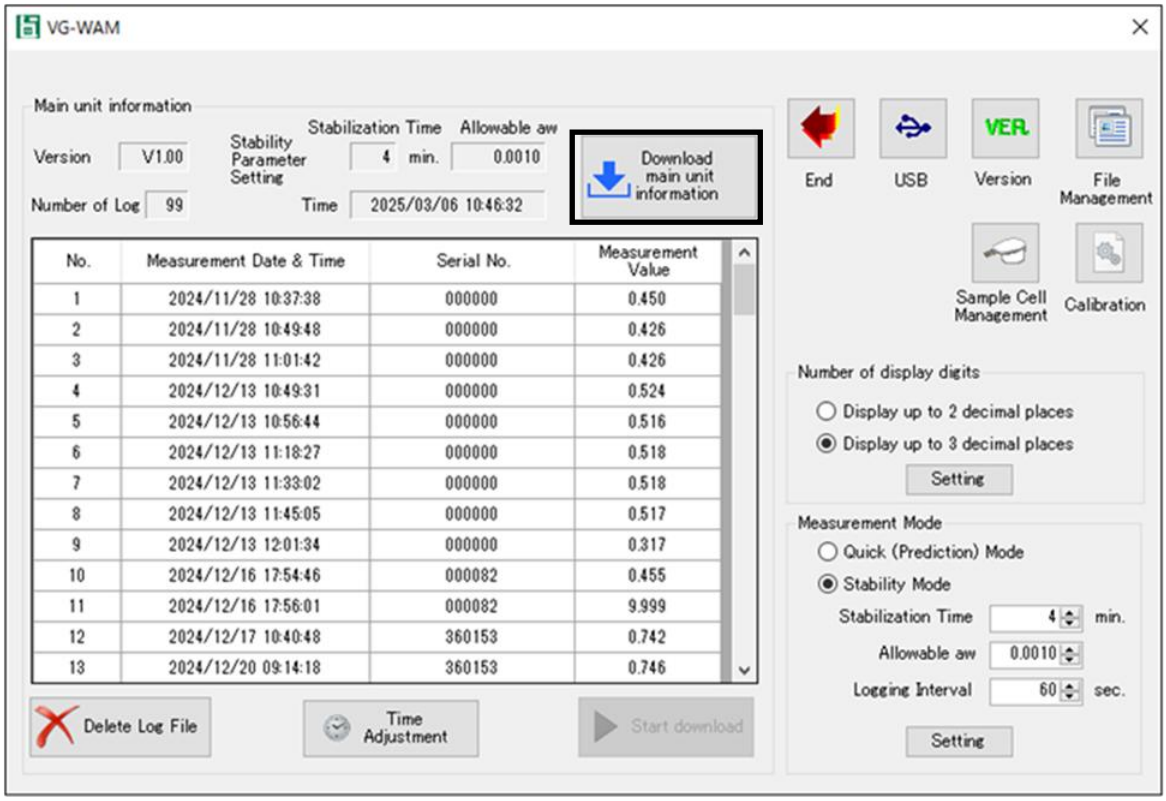
There are 99 internal memory data storage locations for total logged data sets.
If the memory reaches full capacity, the oldest data will be overwritten in sequence. Files should be saved to your PC if you need to keep them.



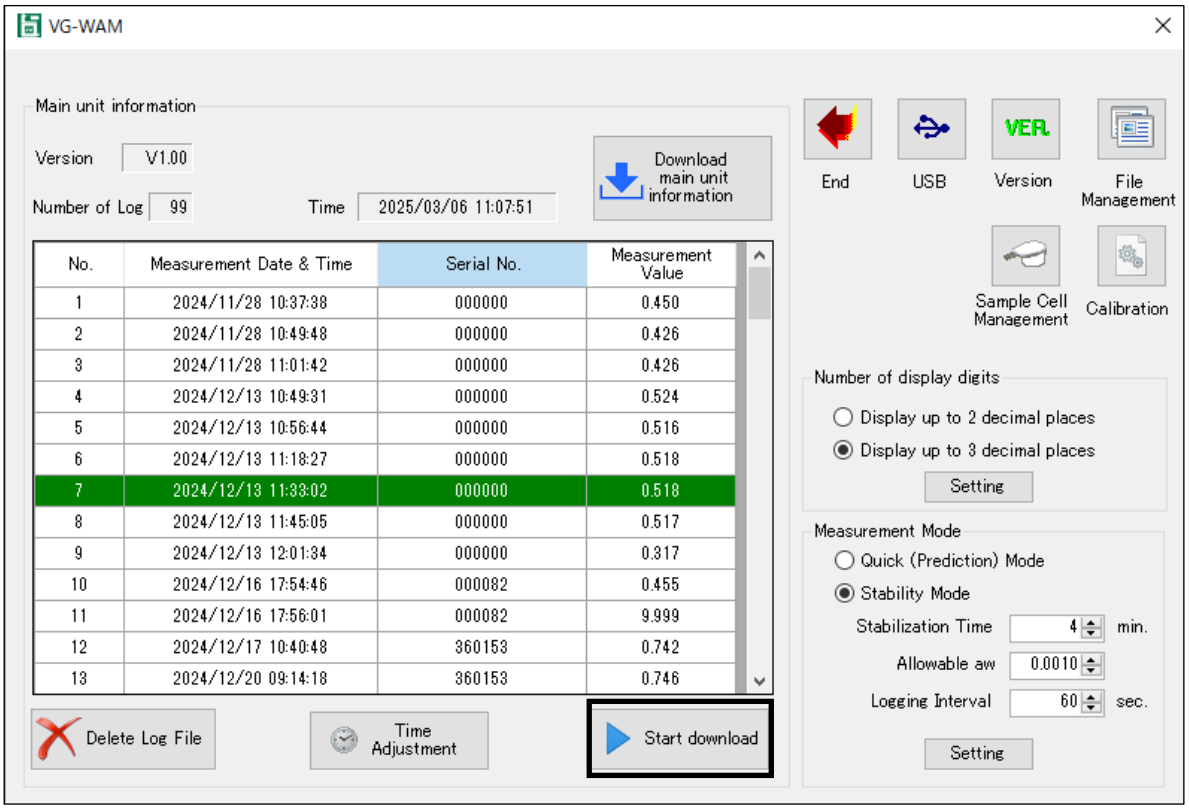
- When extracting logging data, if a measurement value is displayed as “9.999”, this indicates that a power supply error occurred during the measurement. Replace the batteries or check that the power supplied via USB is correct. The measurement value will also be displayed as “9.999” if the power supply is turned OFF during the measurement.

Extracting Logging Data

(1) Run the startup window. Click [Download main unit information] to acquire the information on the main unit.

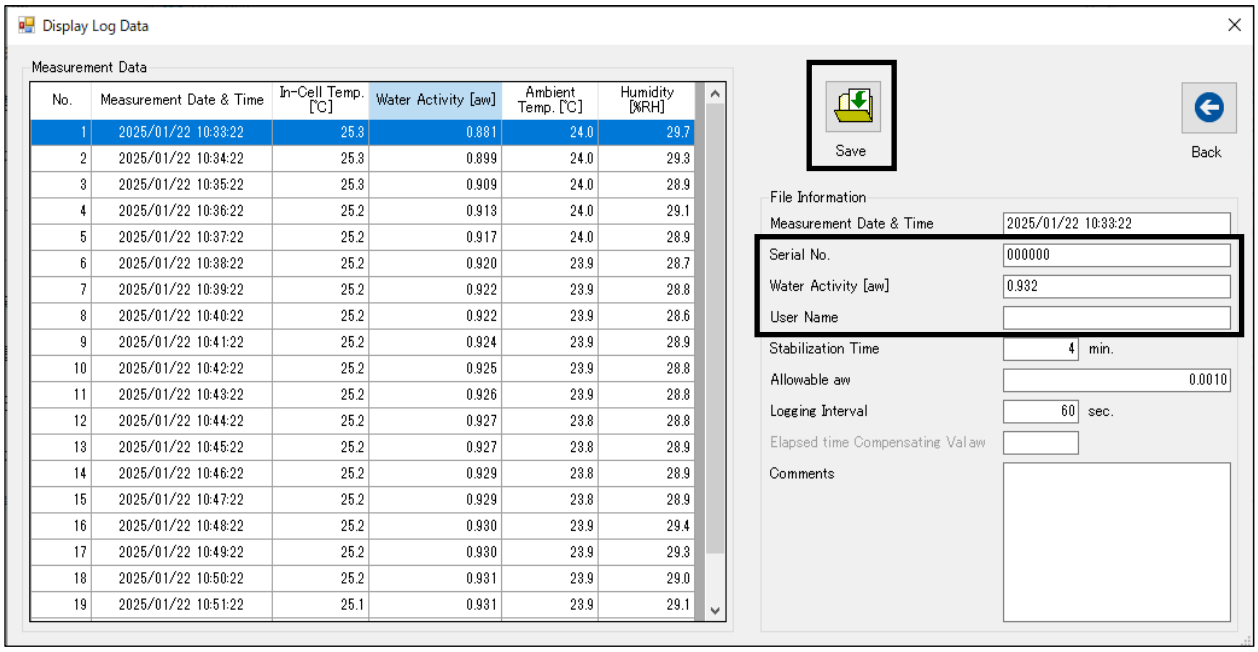


(2) Select the row of the log number you wish to acquire and click [Start download].
If the row selected is highlighted in green, it is Stability mode data.
If it is highlighted in blue, it is Quick (Prediction) mode data.



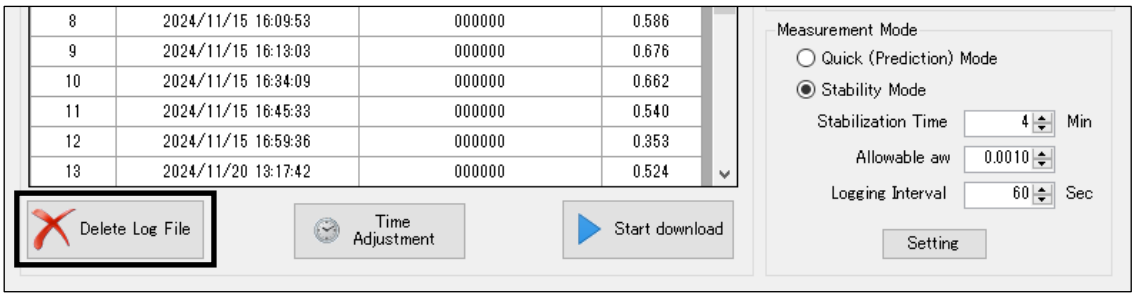
(3) Enter the serial no., the measurement value, and the user name in the file information area, and click [Save].

- With Quick mode, only the final measurement result will be recorded.
- The data is saved in CSV format.
- Up to 99 total data sets can be saved. Subsequent data sets will overwrite the oldest data.
- To print log data, refer to File Management (page 30).



Deleting Logging Data

To delete all logging data stored on the meter, click [Delete Log File].



Maintenance

Replacing the Protective Sensor Filter

If the protective filter inside the sensor assembly becomes dirty, replace it with one of the protective filters provided with the kit. Filters can also be purchased separately when needed.

- It is affixed to the sensor assembly in the same manner.

Calibration Frequency

If the sensor is in good condition, it does not require daily calibration.
However, it is good practice to measure the standard salt in order to determine whether the sample measurement results are valid. Before measuring a sample with the meter, measure the standard salt. If the value is offset, performing calibration is recommended.

- If the value is significantly offset in comparison to the standard sample, the sensor assembly may have exceeded its operating life. In that case, replace the sensor assembly.

Storage

Before storage, place the silica B type gel provided inside the sensor sample container, and attach the lid of the sensor assembly.

Ordering Information

Water Activity Meter 47002
Replacement Sensor Assembly 47001-SENSOR
Replacement Sensor Filters, Pack of 10 ..... 47001-FILTER
Sample Cups, Pack of 10 ..... 47001-SC
Optional Sensor Assembly for Alcohol 47001-ALSENSOR
Optional Sensor Filter for Alcohol Sensor 47001-ALFILTER
Calibration Salt, 0.225 aw 47010
Calibration Salt, 0.328 aw 47011
Calibration Salt, 0.529 aw 47012
Calibration Salt, 0.753 aw 47013
Calibration Salt, 0.843 aw 47014
Calibration Salt, 0.930 aw 47015
Calibration Salt, 0.973 aw 47016

Warranty

Limited Warranty
Heathrow Scientific® LLC warrants that the Water Activity Meter will be free from defects in workmanship and material for 1 year from the date of purchase.

If you believe that there is a defect in the product, you must, during the warranty period, notify Heathrow Scientific® LLC, provide proof of purchase and return the product to Heathrow Scientific® LLC with a Return Authorization form. To obtain a Return Authorization form, please call +1-847-816-5070.

If Heathrow Scientific® LLC is properly notified and, after inspection, confirms that there is a defect and the warranty period has not expired, Heathrow Scientific® LLC will repair, modify, or replace the product, at its sole option, at no charge.

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