Composition Analyser AN-920

Operating Manual
PC Software for Creating Calibration Curve

Ver 1.0.0.1

Precautions

■ Before use

Thank you for purchasing PC Software for Composition Analyser AN-920 ("this software" hereafter). Please read this operating manual thoroughly in order to fully use the functions of this PC software. To run this software, an operating system such as ©Microsoft Windows 7/8.1/10 needs to be installed. During operation of this software, the main unit operation of Composition Analyser AN-920 is also required. For details of operation, refer to the operating manual of the analyzer.

■ Purpose of use

This software provides functions to make calibration curves for Composition Analyser AN-920.

* **Microsoft and Windows are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.**

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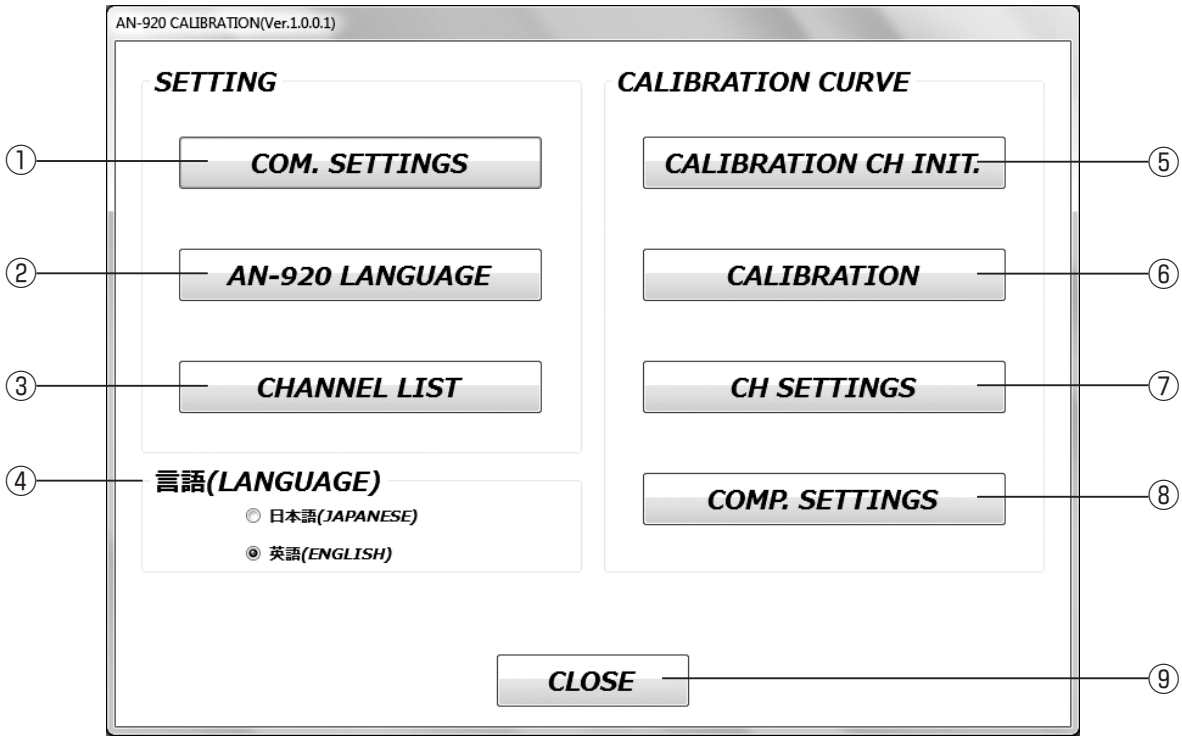
1. Operation Screen

<Main screen>



	Function	Description	Reference
①	Communication setting	Sets the communication port (COM).	P. 3
②	Languages for AN-920	Selects an operation language for AN-920 main unit.	P. 4
③	Channel list	Enables checking the sample name and the channel parameters such as the coefficient, and makes files.	P. 5
④	Language	Selects an operation language (Japanese or English) for the PC software display.	P. 3
⑤	Initialization of channels for making the calibration curve	Initializes the channels for making the calibration curve.	P. 6
⑥	Calibration	Obtains (measures) absorbance data, and calculates the regression based on the entered data and obtains coefficient. Also, it displays the regression calculation results in values and graphs.	P. 7
⑦	Channel setting	Enables checking and changing the sample name or the channel parameters such as the display setting.	P. 11
⑧	Composition setting	Enables checking and changing the composition parameters such as the composition name or display range.	P. 11
⑨	Exiting	Closes the main screen and exit the program.	–

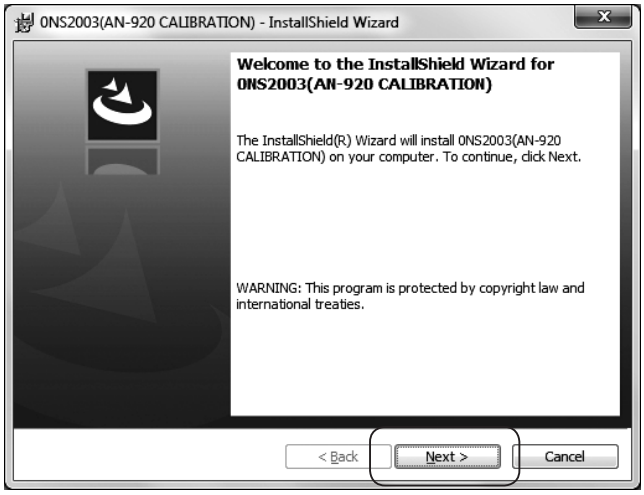
* **This PC software runs in the OS of Windows7/8.1/10. There are no special constraints other than OS for this PC software to run. In order to install this software, log in by the administrator authority.**
* **The operation flow with Windows7 is explained as an example.**

1 Set the disk to the CD drive.

Double-click [Start] → [Computer] → [Disk drive]. Copy the setup file in the disk to the desktop, and double-click ( ).

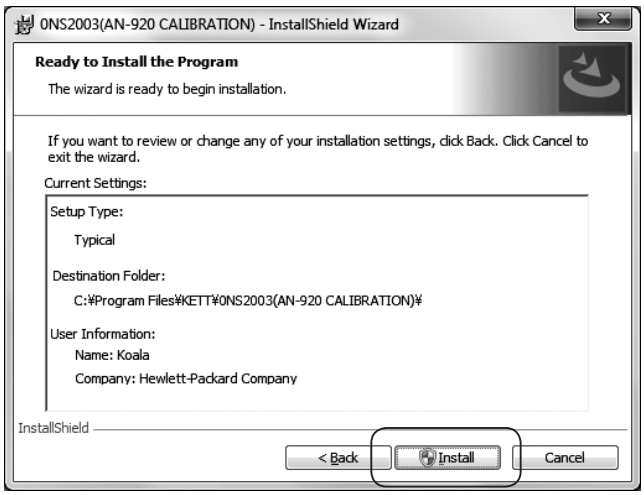
2 Start the setup.

Click the [Next] button.



3 Start the installation.

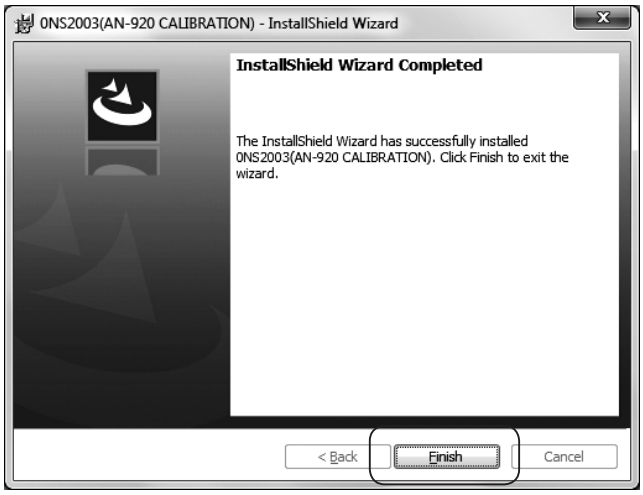
Click the [Install] button.



* **Click the [Yes] button when "Do you want to allow the following program from an unknown publisher to make changes to this computer?" is displayed.**

4 Installation is completed.

Click the [Finish] button.



5 Create a short-cut.

When the installation is successfully done, a short-cut icon will be created on the desk top ( ).

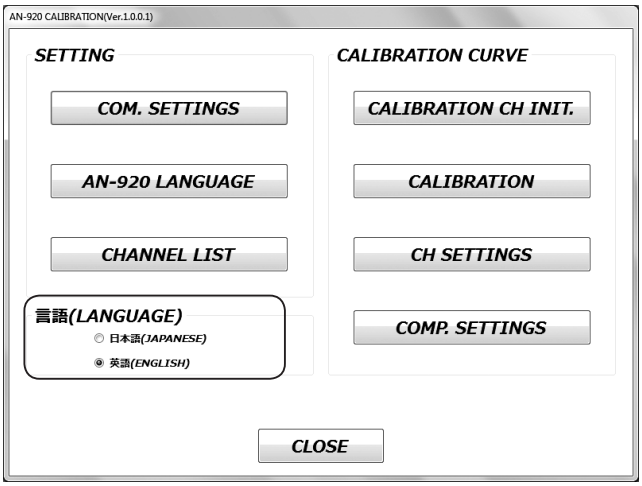
6 Start up the PC software.

Double-click the short-cut icon ( ), and start up the PC software.

3. Initial Setting

3-1. Selecting the language for PC software

1 **Select the language in the main screen (Japanese/ English).**



3-2. Setting up communication

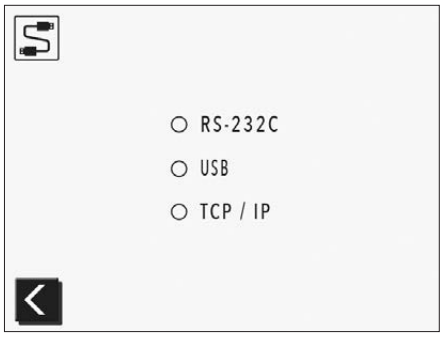
Set up the following to establish a communication between the main unit of AN-920 and the PC.

1 **Connect the main unit of AN-920 and the PC.**

Use the designated RS-232C cable (VZC-54: Cross cable, D-sub 9-pin female - D-sub 9-pin female).

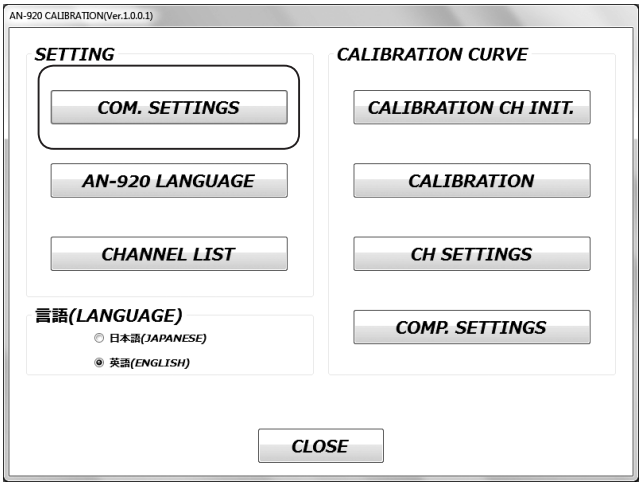
2 **Set up the AN-920 main unit communication.**

In the communication setting screen of AN-920 main unit, select "RS-232C". Then, long press on the [RS-232C] button position. All the buttons become unselected, and the communication with the PC software will be enabled.



*** Go back to the initial screen when the communication setting of AN-920 main unit is completed.**

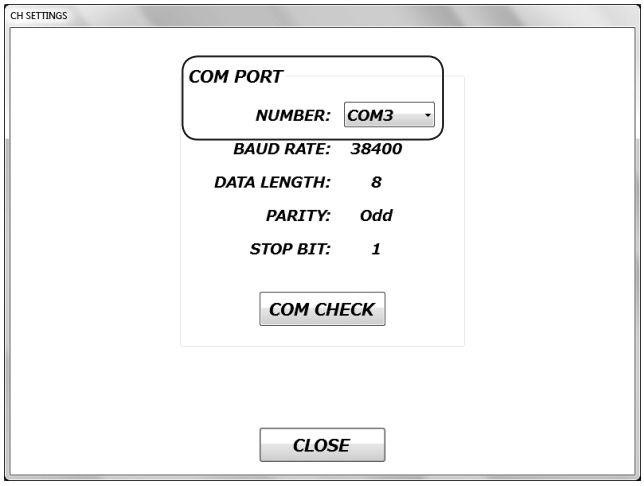
3 **Click the [COM.SETTING] button in the main screen.**



4 **Set the communication port (COM).**

Select the COM port from the pull-down menu.

* **The COM port number can be checked with the device manager.**

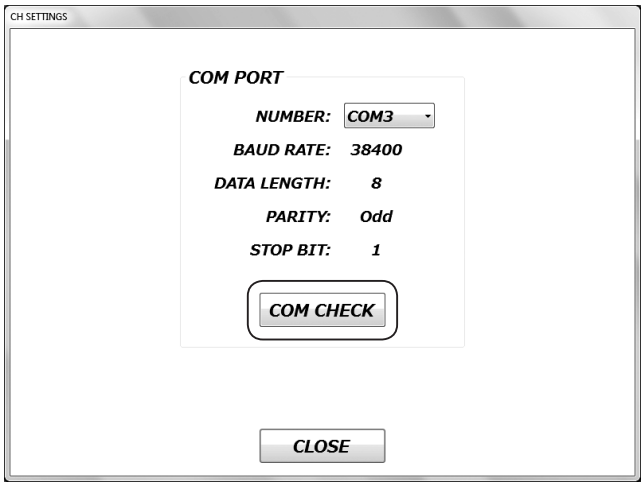


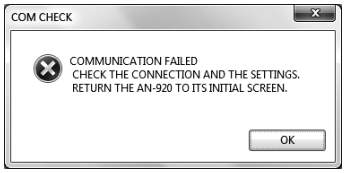
5 **Check the communication.**

When the [Communication Test] button is clicked, "OK!" will be displayed.

* **If a message "The port 'COM--' does not exist." is displayed, click the [OK] button, and check the COM port after returning to the "COM. SETTING" screen.**

* **The main screen can be restored by clicking the [CLOSE] button in the "COM. SETTING" screen.**

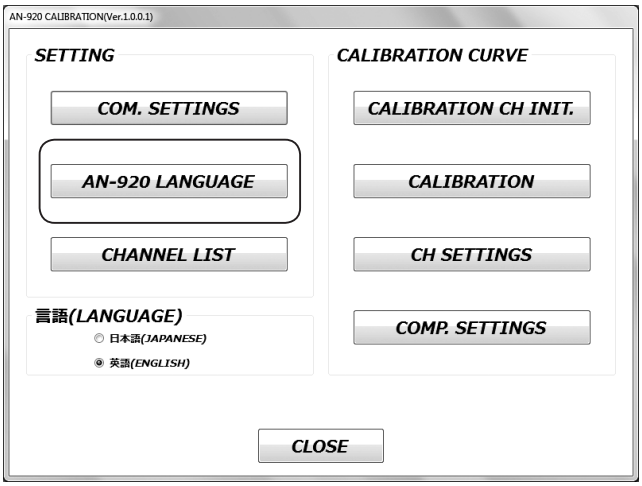




* **When "COMMUNICATION NG" is displayed, check the connection, breaks in the communication cable, and the COM port number again. Also, make sure that the initial screen is restored with AN-920 main unit**

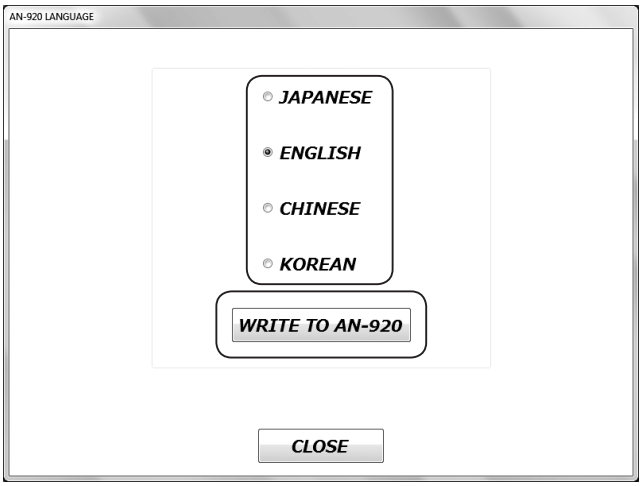
3-3. Selecting the language for AN-920 main unit

1 **Click the [AN-920 LANGUAGE] button in the main screen.**



2 **Selecting the language for AN-920 main unit**

Select the language and click the [WRITE TO AN-920] button.

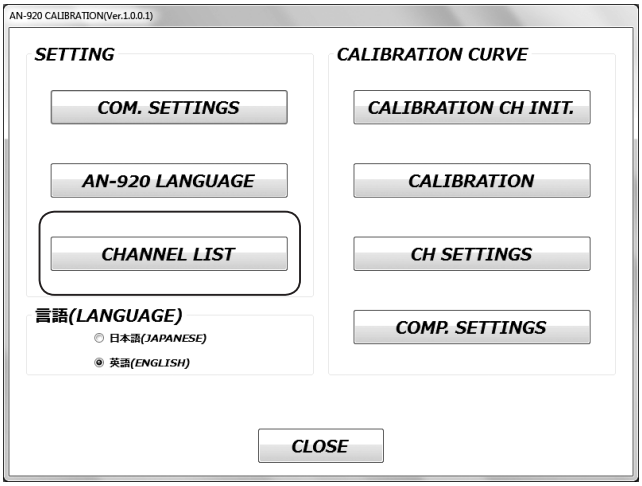


4. Preparation of making calibration curves

4-1. Data backup of the main unit

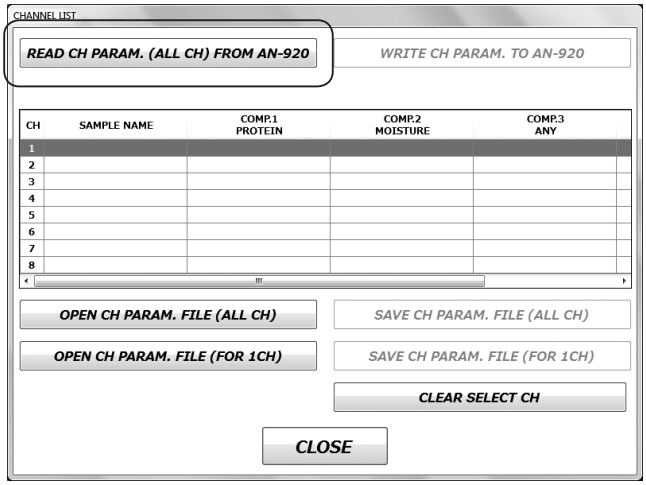
Before start making a calibration curve, it is recommended to buck up the data of the main unit in the CHANNEL LIST screen.

1 Click the [CHANNEL LIST] button in the main screen.



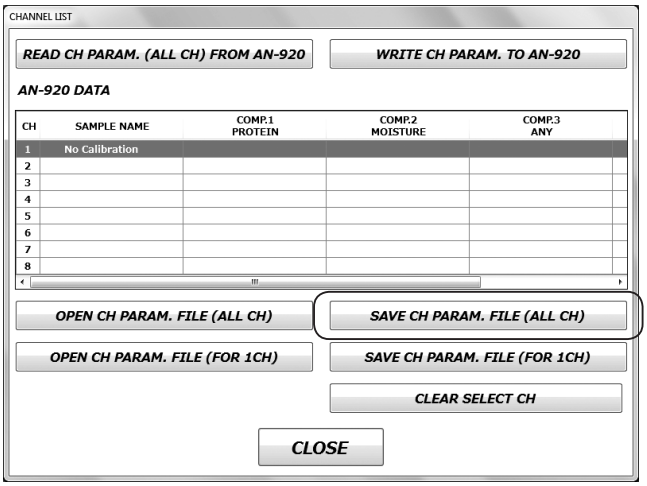
2 Read the main unit data.

Click the [READ CH PARAM. (ALL CH) FROM AN-920] button.

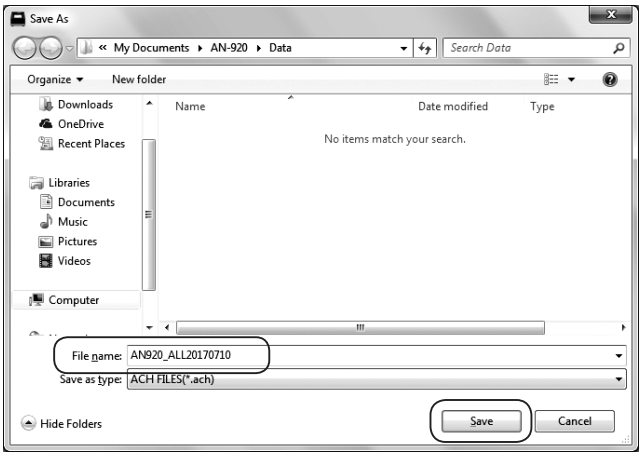


3 Save the main unit data in a file.

Click the [SAVE CH PARAM. FILE (ALL CH)] button.



The "Save As" dialog window will be displayed. Specify the save destination and the file name, and then click the [Save] button.



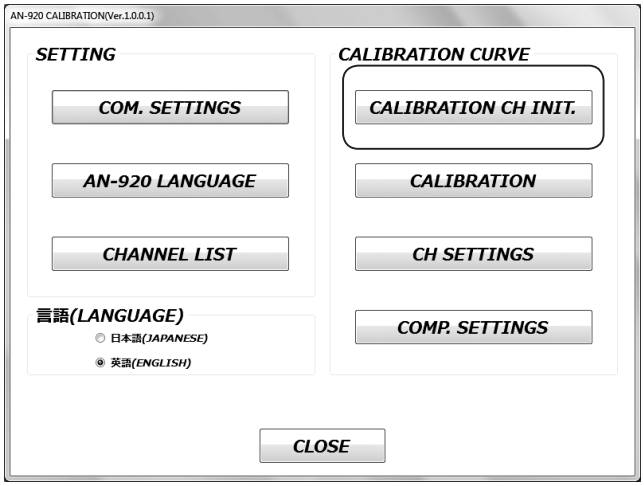
*** The default saving destination is My Document\AN-920\Data.**

*** The saved data can be written in AN-920 main unit by clicking the [OPEN CH PARAM. FILE (ALL CH)] - [WRITE CH PARAM. TO AN-920] buttons.**

4-2. Initializing the channels for making the calibration curve

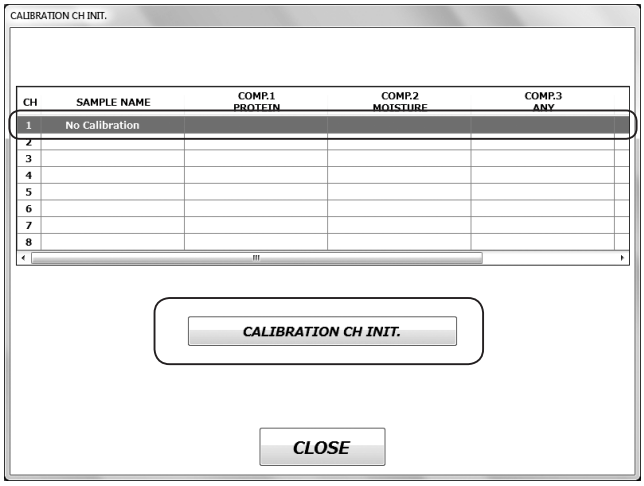
Initialize the channels for making the calibration curve.

1 Click the [CALIBRATION CH INT.] button in the main screen.

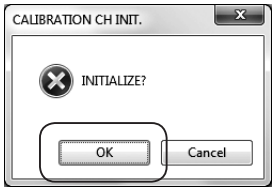


2 Initialize the channels for making the calibration curve.

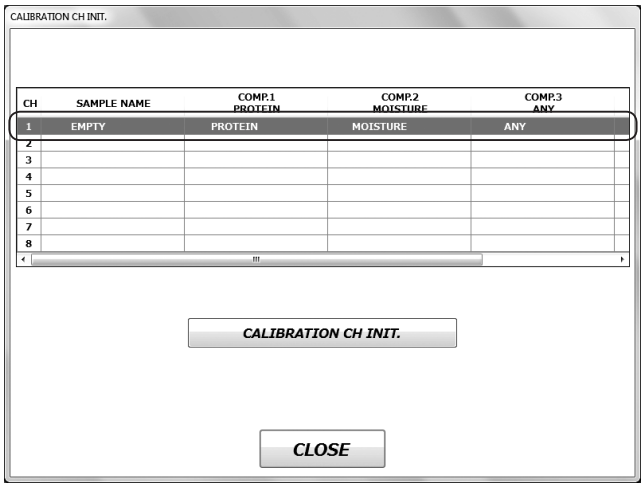
Select a channel, and click the [CALIBRATION CH INT.] button.



Click the [OK] button when the confirmation message is displayed.



The sample name of the initialized channel will be "EMPTY".



4-3. Samples for making a calibration curve

Prepare samples for making a calibration curve.

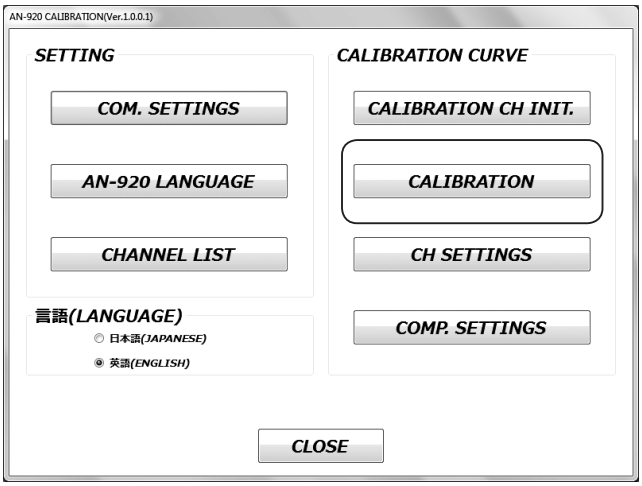
* **The sample for making a calibration curve is the one whose composition concentration is already known. The accurate composition concentration is needed since the calibration curve will be made based on this value. Generally, the value obtained from chemical analysis should be used as the standard value.**

* **To calculate regression for making a calibration curve, at least four different types of samples (four standards) are needed. It is recommended to prepare 50 to 100 types (50 to 100 standards) samples for making a calibration curve.**

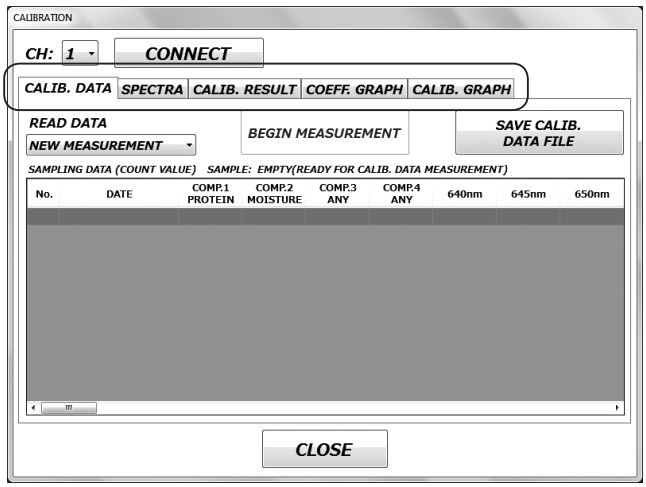
5. Calibration

Obtains (measures) absorbance data, and calculates the regression based on the entered data and obtains coefficient. Also, it displays the regression calculation results in values and graphs.

1 **Click the [CALIBRATION] button in the main screen.**



The "CALIBRATION" will be displayed.



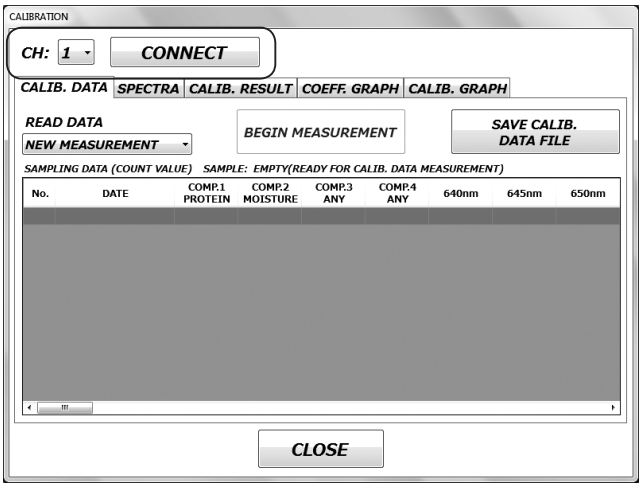
<About tabs>

- **CALIB. DATA**
  Enables obtaining absorbance data from the sample measurement and entering standard value.
- **SPECTRA**
  Displays absorbance data and standard values. Also, the range of wavelength for regression calculation can be set, and the calculation is executed in this tab.
- **CALIB. RESULT**
  Displays the result of regression calculation.
- **OEFF. GRAPH**
  Displays the obtained regression coefficient in a graph.
- **CALIB. GRAPH**
  Displays the calibration curve in a graph, enables writing the composition parameters to AN-920 and printing out.

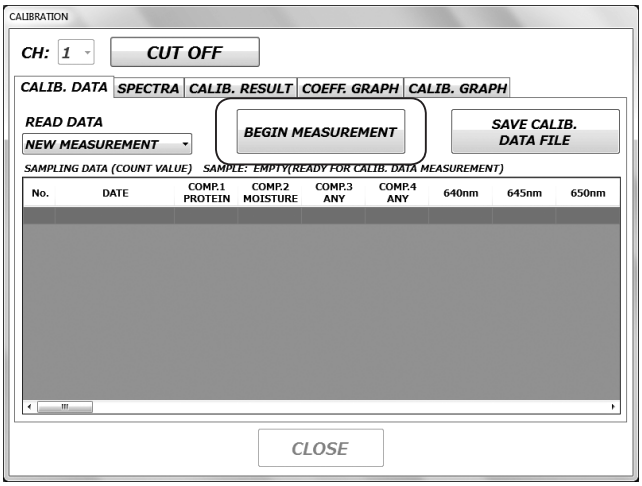
5-1. Obtaining the absorbance data and checking the spectrum

1 **Connect the main unit of AN-920.**
Select a channel for making the calibration curve from the CH pull-down menu, and click the [CONNECT] button.

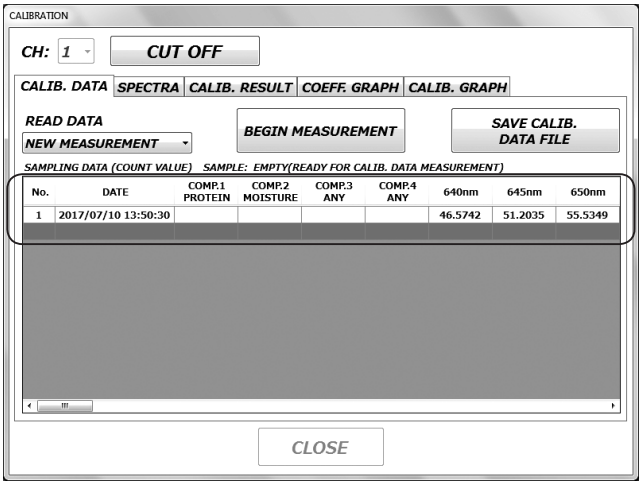
* **During connection, the [CLOSE] button is disabled. To close the screen, click the [CUT OFF] button.**



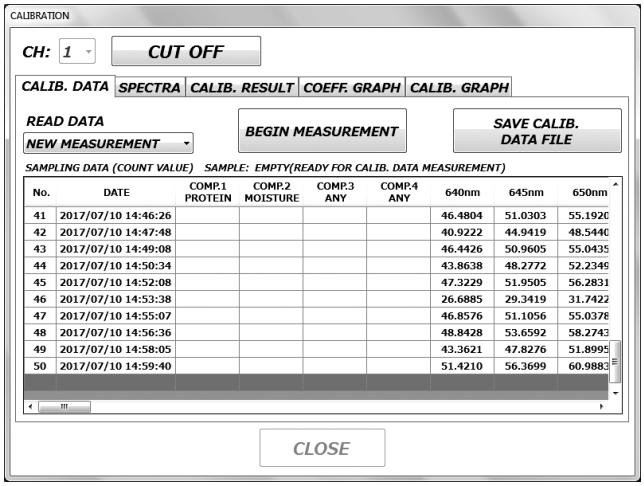
2 **Obtain the absorbance data.**
Click the [BEGIN MEASUREMENT] button. Make the calibration curve following the instructions displayed in the screen of AN-920 main unit.



When the measurement is complete, the absorbance is obtained and the result is displayed.

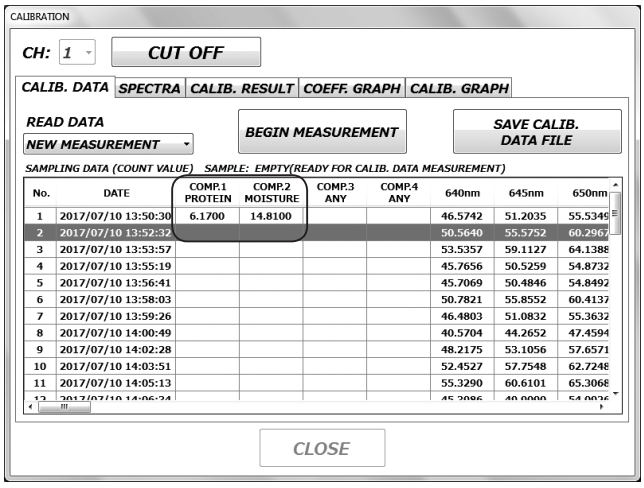


Continue measurements to obtain absorbance data.



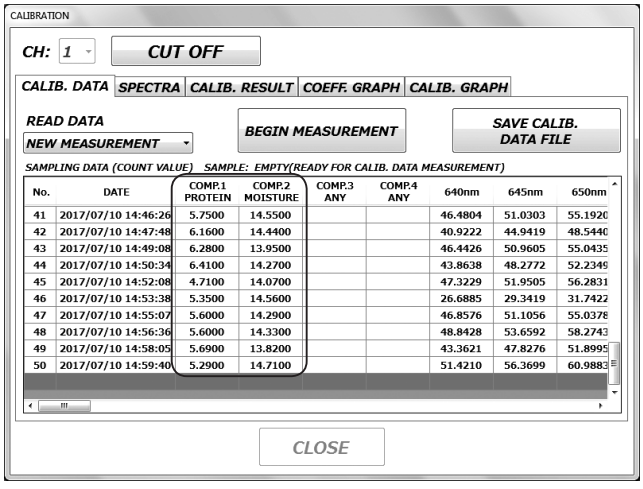
3 Enter the standard value.

Enter the standard value of the sample.



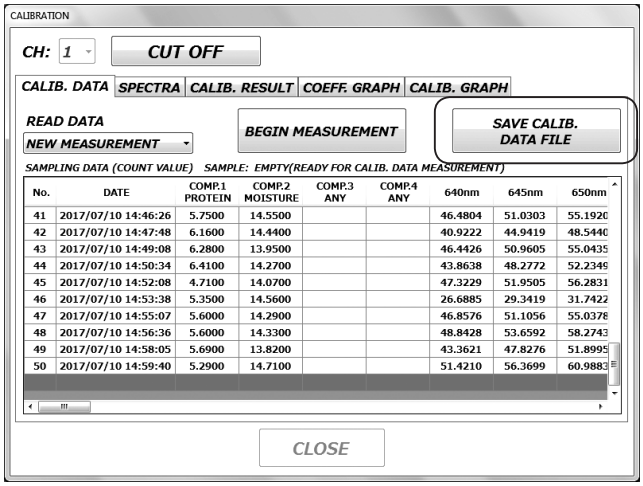
Enter the standard values of all the samples to be used in the regression calculation.

* **The data whose "STD. VALUE" is blank cannot be used in the calculation.**

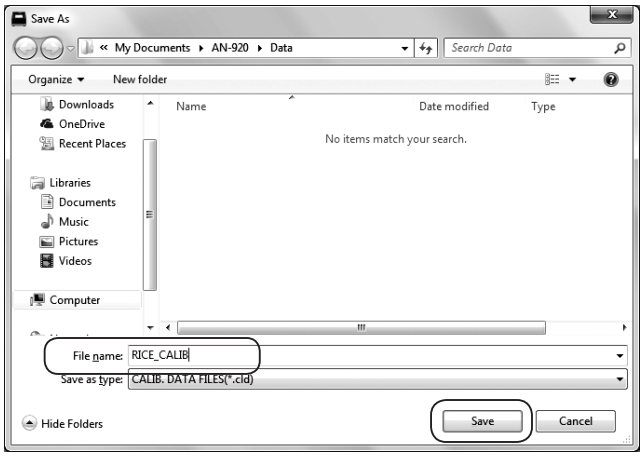


4 Save the calibration curve data.

Click the [SAVE CALIB. DATA FILE] button.



The "Save As" dialog window will be displayed. Specify the save destination and the file name, and then click the [Save] button.

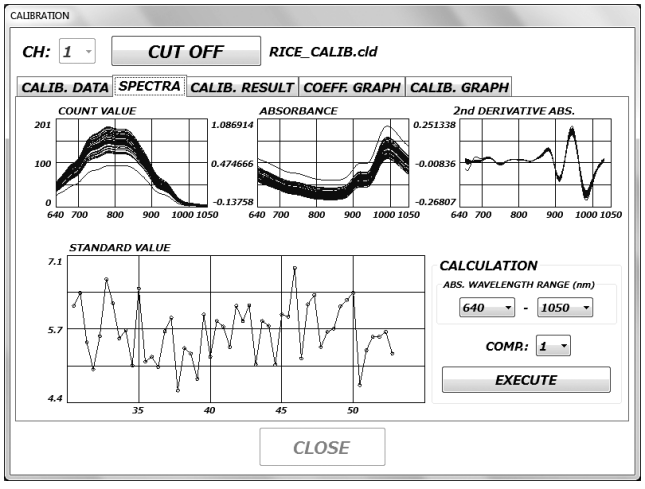


* **The default saving destination is My Document\AN-920\Data.**

* **The saved data can be read from the data read pull-down menu.**

5 Check the spectra and standard value.

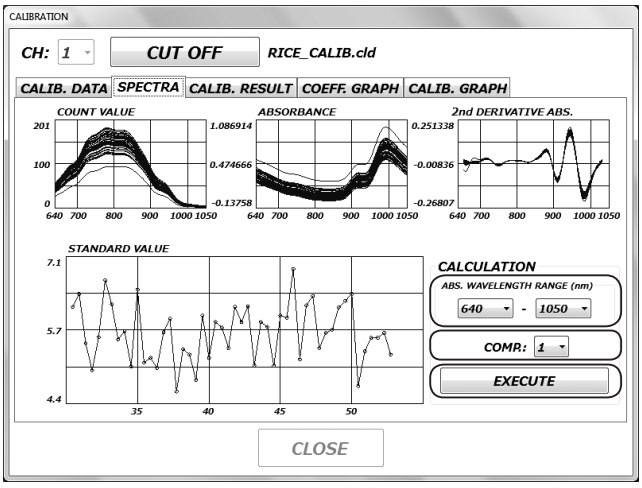
Double-click the "SPECTRA" tab. Check for measurement failure in the graph or erroneous input.



5-2. Setting up the wavelength range and executing calculation

1 **Set up the wavelength range and execute the calculation.**

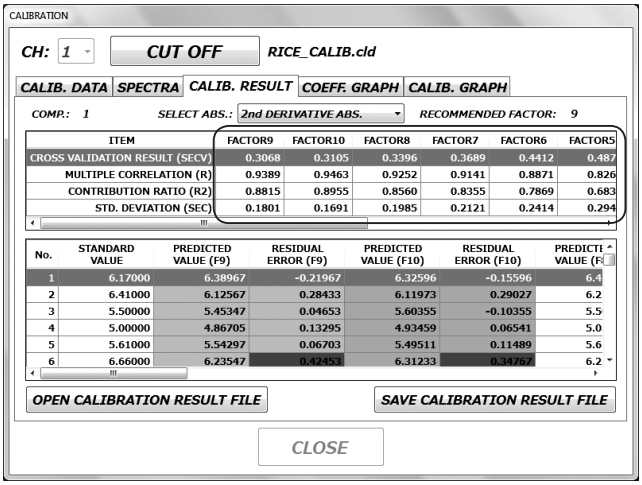
Set up the wavelength range for regression calculation. If the bad S/N ratio is seen in the vicinity of the lowest or highest point of the measurement wavelength, limit the wavelength range in the good S/N ratio. Select the composition for regression calculation from the pull-down menu, and click the [EXECUTE] button.



5-3. Checking the calibration result

1 **Check the calibration result.**

The result of regression calculation will be displayed in the "CALIB. RESULT" tab. The recommended PLS factors will be displayed from the left by a cross validation system.



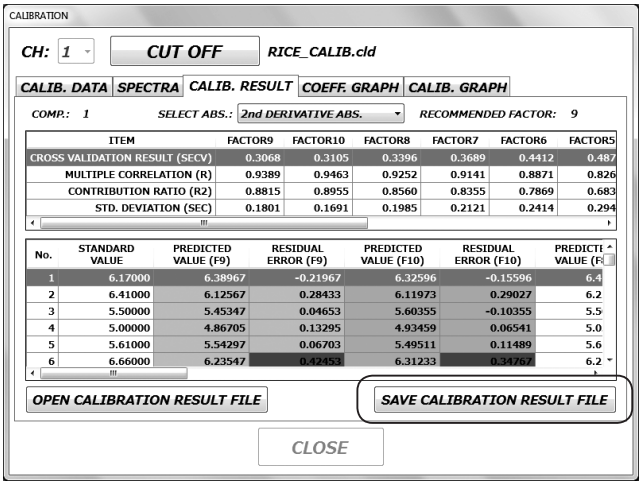
ITEM	FACTOR9	FACTOR10	FACTOR8	FACTOR7	FACTOR6	FACTOR5
CROSS VALIDATION RESULT (SECV)	0.3068	0.3105	0.3396	0.3689	0.4412	0.487
MULTIPLE CORRELATION (R)	0.9389	0.9463	0.9252	0.9141	0.8871	0.826
CONTRIBUTION RATIO (R2)	0.8815	0.8955	0.8560	0.8355	0.7869	0.683
STD. DEVIATION (SEC)	0.1801	0.1691	0.1985	0.2121	0.2414	0.294

No.	STANDARD VALUE	PREDICTED VALUE (F9)	RESIDUAL ERROR (F9)	PREDICTED VALUE (F10)	RESIDUAL ERROR (F10)	PREDICTED VALUE (F
1	6.17000	6.38967	-0.21967	6.32596	-0.15596	6.4
2	6.41000	6.12567	0.28433	6.11973	0.29027	6.2
3	5.50000	5.45347	0.04653	5.60355	-0.10355	5.5
4	5.00000	4.86705	0.13295	4.93459	0.06541	5.0
5	5.61000	5.54297	0.06703	5.49511	0.11489	5.6
6	6.66000	6.23547	0.42453	6.31233	0.34767	6.2

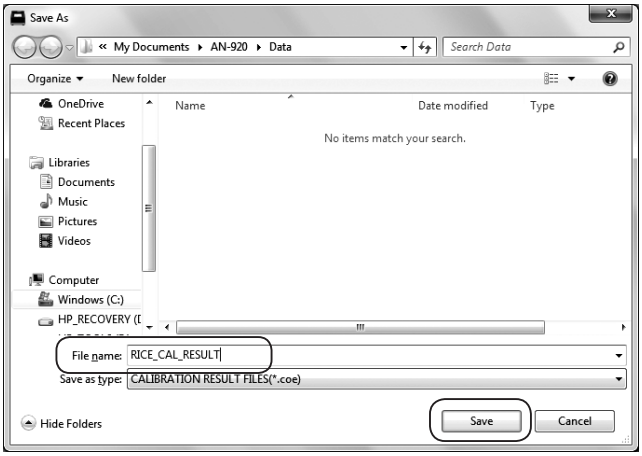
*** The error between the predicted value and the standard value that exceeds twice of "STD. DEVIATION (SEC)" will be displayed with the red background color.**

2 **Save the calibration data.**

Click the [SAVE CALIBRATION RESULT FILE] button.



The "Save As" dialog window will be displayed. Specify the save destination and the file name, and then click the [Save] button.

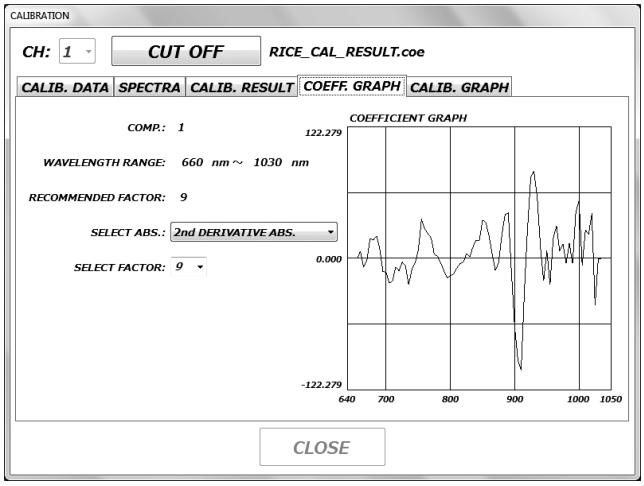


*** The default saving destination is My Document\AN-920\Data.**

*** The saved data can be read by clicking the [OPEN CALIBRATION RESULT FILE] button.**

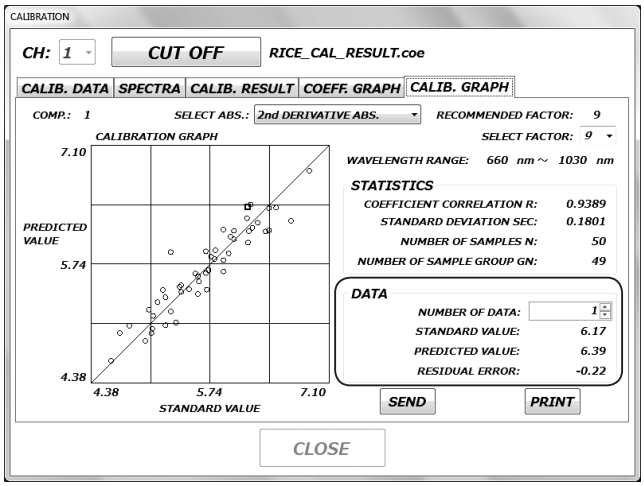
3 **Check the coefficient graph.**

In the "COEFF. GRAPH" tab, the coefficient graph can be checked.



4 **Check the calibration graph.**

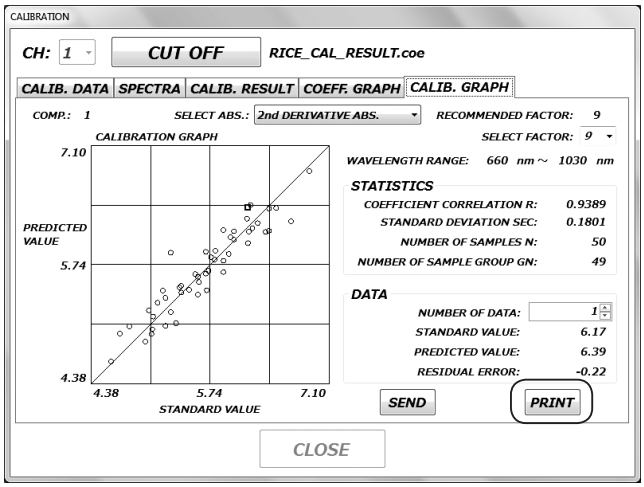
Click the "CALIB. GRAPH" tab, and check the calibration graph.



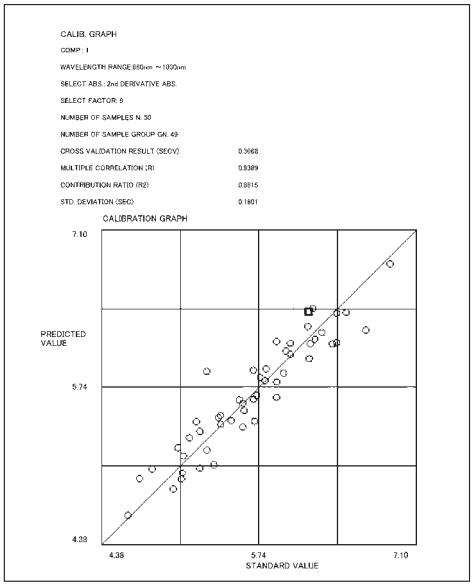
*** When a marker on the graph is clicked, data such as data number, standard value, predicted value, and residual error will be displayed in the data field on the right.**

5 **Print out the calibration result and graph.**

Click the [PRINT] button.



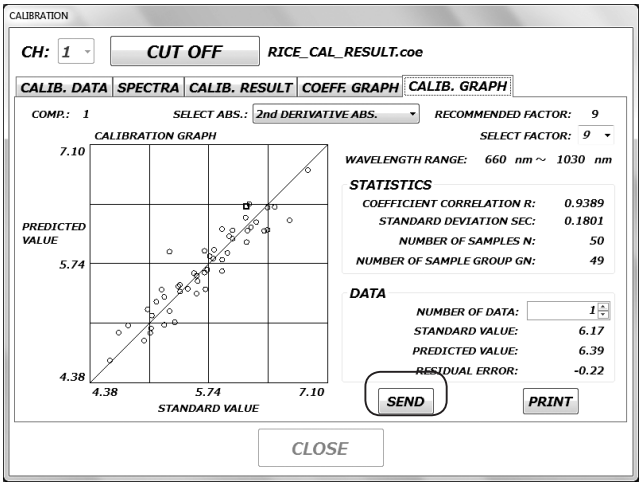
<Printout example>



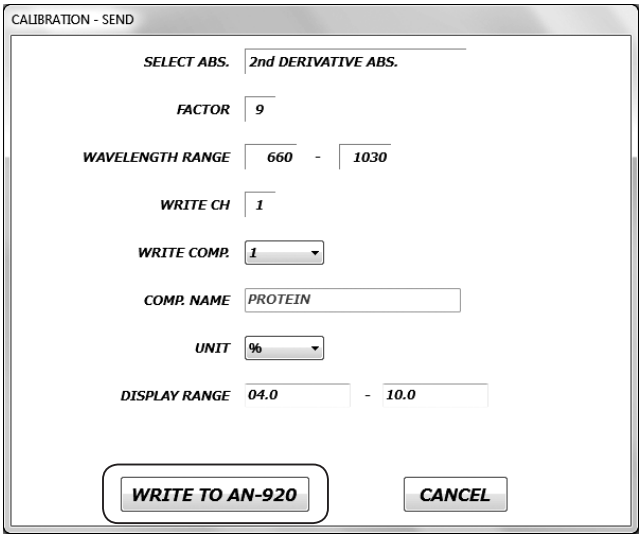
5-4. Writing the coefficient

1 **Write the calibration curve coefficient on the main unit of AN-920.**

Click the [SEND] button.



Select the composition, unit, and set the display range. Then, click the [WRITE TO AN-920] button.



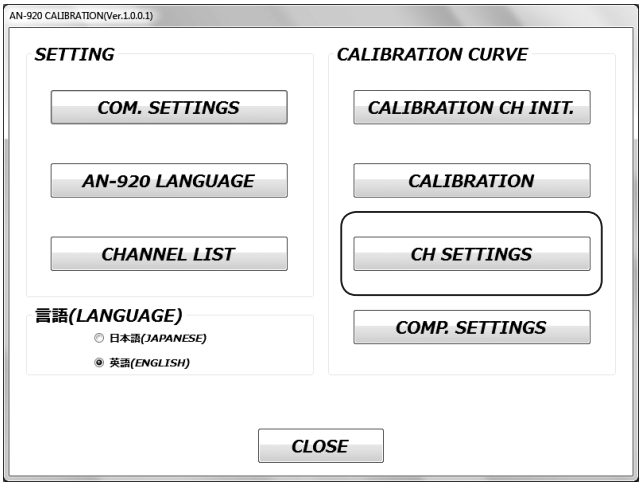
*** The name of the factor 3 and 4 can be changed. (Up to 20 alphanumerics)**

6. Channel setting / Composition setting

6-1. Channel setting

Enables checking and changing the sample name or the channel parameters such as the display setting.

1 Click the [CH SETTINGS] button in the main screen.



2 Check or change the channel parameters.

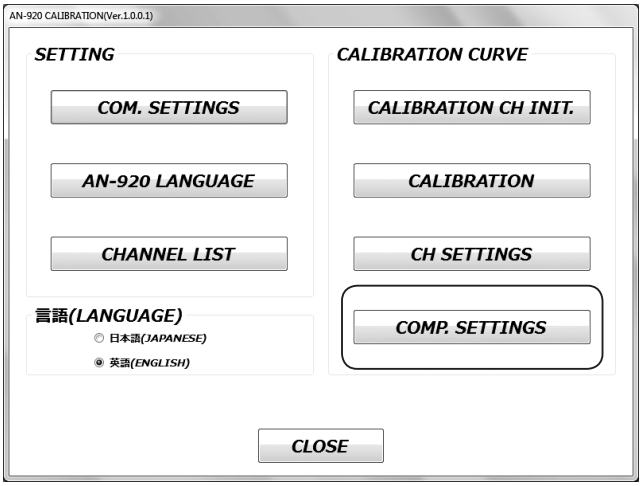
Select the channel from the CH pull-down menu, and check the channel parameter. Edit the channel parameters as required, and click the [WRITE TO AN-920] button.

* **Up to 20 alphanumerics can be input as a sample name.**

6-2. Composition setting

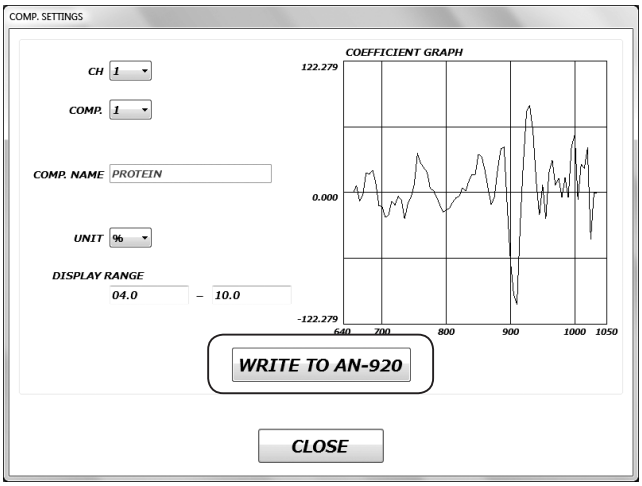
Enables checking and changing the composition parameters such as the composition name or display range.

1 Click the [COMP. SETTINGS] button in the main screen.



2 Check or change the composition parameters.

Select a channel from the CH pull-down menu, and select a composition from the COMP pull-down menu. Then, check the composition parameter. Edit the composition parameters as required, and click the [WRITE TO AN-920] button.



* **The name of the factor 3 and 4 can be changed. (Up to 20 alphanumerics)**

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