AMS-950
User's Manual

Thank you for purchasing the AMS-950 dedicated personal computer software for the TWS/AM-9000 Series.

Please note that the contents of this manual are subject to change without prior notice. If there is any problem with this manual, please contact us.

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(3) The act of using the Software in multiple devices after separating it into its constituent parts. This is because the Software is provided as one integral product.

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(1) When the purchaser has lost the rights to use the Software, the purchaser will erase or destroy the Software and all its duplicates.

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7. Miscellaneous rules

(1) Since the Software is designed for use in Japan, this agreement is intended to be compliant with Japanese laws.

(2) If the Software falls under the application of Japanese foreign exchange or foreign trade laws or the regulations ancillary thereto or the United States export restraint or control regulations, then the purchaser will observe the said laws and regulations.

Table of Contents

1 Overview

AMS-950 is software that allows the user to collect data from the wireless Thermologger TWS Series and the Thermologger AM-9000 Series. It facilitates processes such as creating graphs, tables, and files and printing them.

The use of this software requires the following operating environment:

Supported OS: Microsoft Windows 10
Microsoft Windows 11

A personal computer that has the specs required for the above OSs to operate normally.

*   Operation is not guaranteed for all personal computers with the recommended environment.
*   The software is available only for users with administrator rights.
*   Macintosh is not supported.
*   Microsoft® Windows® 10 and Windows® 11 are registered trademarks or trademarks of Microsoft Corporation in the United States, Japan, and other countries.

2 Packaging

At the time of purchase, check that the following items that are included. If there is any missing or faulty item, please contact your distributor or Anritsu Meter from the details shown on the bottom of the front cover.

(1)   AMS-950 (CD-ROM)   ………………….. 1 CD
(2)   User's Manual   ………………….. 1 copy
(3)   User registration FAX form   ………………….. 1 copy

3 Types of Available Measuring Instruments

This software can be used with the following measuring instruments. For communication, connect the measuring instrument to the personal computer with a dedicated USB communication cable*.

Product name	Model name	Type of communication
Thermologger	AM-9000, AM-9100, AM-9200, AM-9300	USB 2.0 communication
Wireless Thermologger	TWS-1, TWS-100	

It cannot be used with the AM-8000 series or older models or with FL-2000/FL-2400.

*   The USB cable supplied with your measuring instrument should be used as the dedicated communication cable.
    If you want to use a commercially available cable, select a double-shield USB 2.0 A/micro-B cable with a length of 1 m or less.

4 Quick Guide to Operation

● For the first use (installation)

To install AMS-950 on a personal computer, make sure you are connected to the Internet and follow the instructions below.

If the computer cannot connect to the Internet or if it has a limitation on installation, see section 6 "Installation" to install the software.

1) Turn on the measuring instrument, and then insert the CD-ROM into the personal computer.
2) Connect the measuring instrument to the personal computer with the dedicated USB communication cable.
3) Install AMS-950.
4) Run AMS-950, and then configure communication port settings.
 * For details, see **section 6 "Installation"**.

● How to collect data stored in the measuring instrument

1) Turn on the measuring instrument.
2) Connect the measuring instrument to the personal computer with the dedicated USB communication cable.
3) Run AMS-950, and then select [Input data] from the [Communication] menu.
* For details, see **section 8.4 "How to Transfer Data from the Measuring Instrument"**.

● How to View a Saved File

1) Select [Open] from the [File] menu.
2) Specify the file name and then open the file.
* For details, see **section 8.6 "Reading and Viewing Existing Files"**.

● How to Open a Saved File in Excel

1) Select [Convert file] from the [File] menu, and then select [CSV format].
2) Specify the file name and then click [OK]. A text file will be created. It can be opened in Excel.
* For details, see **section 8.10 "How to Use Data in a Spreadsheet Software"**.

● How to Draw a Graph in a Real-time Manner

1) Turn on the measuring instrument.
2) Connect the measuring instrument to the personal computer with the dedicated USB communication cable.
3) Select [Real-time measurement] and [Measurement settings] from the [Communication] menu. Configure the measurement settings such as data capture timing.
4) Select [Real-time measurement] and [Start measurement] from the [Communication] menu.
5) Specify the location in which data is to be stored.
 * For details, see **section 8.5 "How to Perform Real-time Measurement"**.

5 How to Connect Equipment

Use a dedicated USB communication cable that has a USB A plug on the side of the personal computer and a USB micro-B plug on the side of the measuring instrument. Connect the plug to a connector with a [⟷ USB ⟶] mark on the personal computer

USB micro-B plug   USB A plug

Measuring instrument   Personal computer
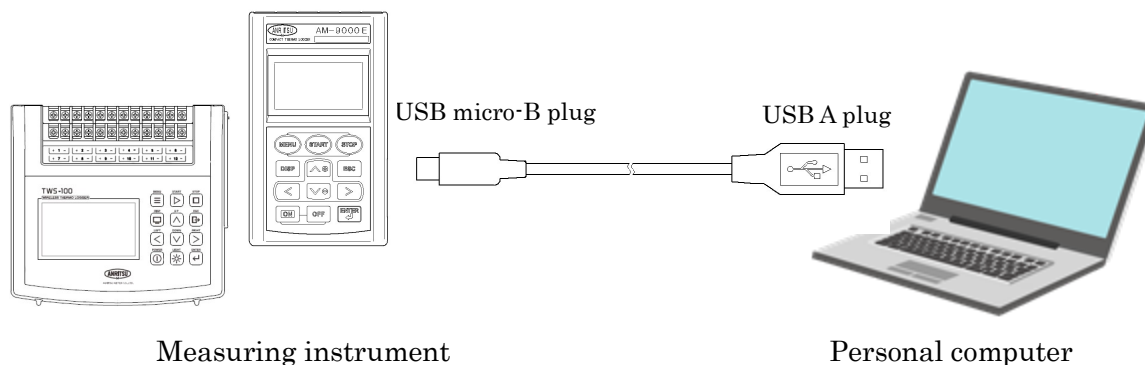
[Note]

When not communicating with the personal computer, be sure to disconnect the measuring instrument from the personal computer (remove the communication cable).

If other application software is used with the measuring instrument when remaining connected, it may malfunction or break down.

The USB cable supplied with your measuring instrument should be used as the dedicated communication cable. If you want to use a commercially available cable, select a double-shield USB 2.0 A/micro-B cable with a length of 1 m or less.

Also, this measuring instrument is not USB-rechargeable.

6 Installation

Terminate all running application software. If other application software is running, the installation may not be completed correctly.

6.1 Installing USB Drivers

* Note that if any of the following applies to your personal computer, the necessary files may not be found.
- You do not have an administrator account on the personal computer. (Use a personal computer on which you have an administrator account.)
- In the personal computer, a USB driver provided by another company blocks installation of another USB driver. (Use another personal computer. Alternatively, restore the personal computer to its factory settings.)

(1) Connect the measuring instrument to the personal computer with the dedicated USB communication cable.

(2) The installation of the drivers will start automatically.
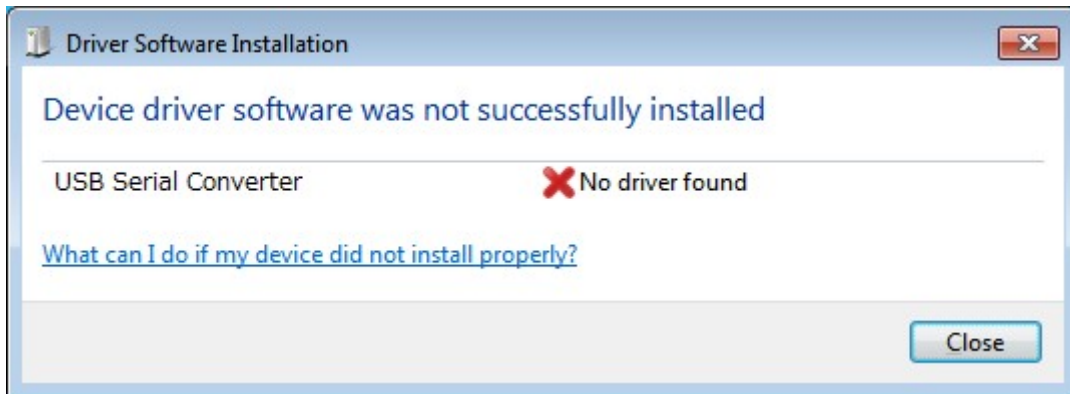
To install the drivers on the personal computer when it is not connected to the Internet, run CDM21228_Setup.exe, which can be found in the USB driver folder of the CD.

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6.2　Installing AMS-950
　(1) Insert the CD-ROM of AMS-950 into the CD-ROM drive, and then double-click
　　　the CD-ROM icon.
　(2) Double-click setup.exe.
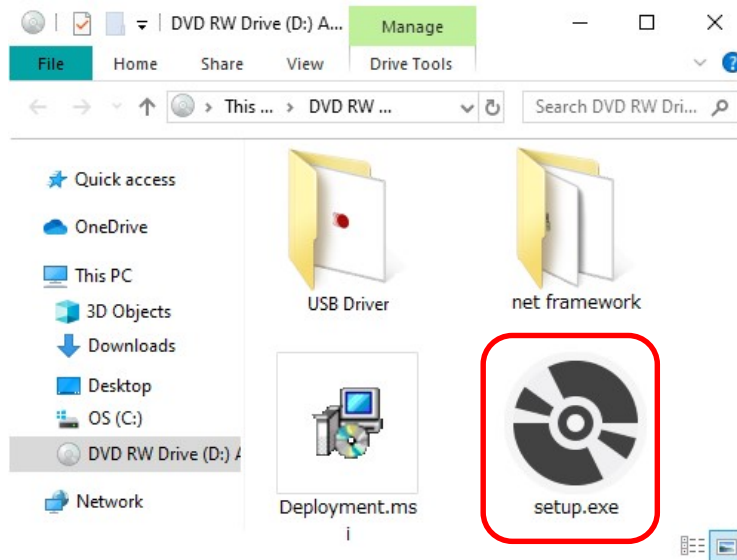
　(3) The correct operation of AMS-950 requires Microsoft .NET Framework 4.6.1 or
　　　higher to be installed on the personal computer.
　　　If it is not installed, a setup screen will appear. Read the terms and
　　　conditions and then check [Agree] if there is no problem. Next, press the
　　　[Install] button.
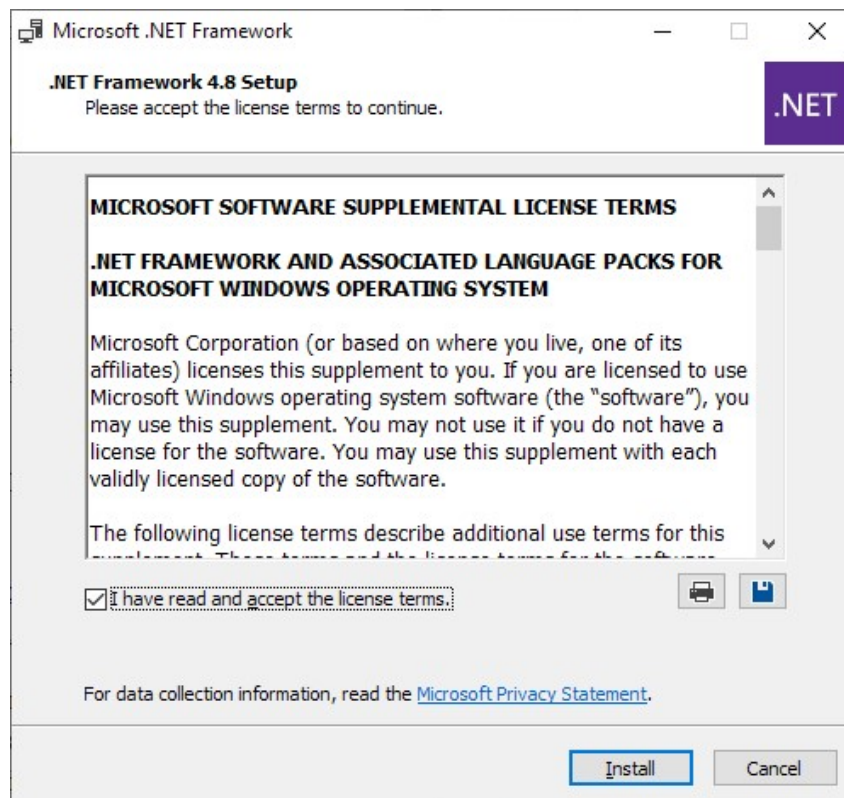
Depending on the configuration of the personal computer, you will be asked to permit installation. In that case, click [Yes].

To install the software on the personal computer when it is not connected to the Internet, run NDP462-KB3151800-x86-x64-AllOS-ENU.exe, which is an offline installer of Microsoft .NET Framework 4.6.2 contained in the net framework folder of the CD.
* NDP462-KB3151800-x86-x64-AllOS-JPN.exe is a Japanese language pack. Install it after installing Microsoft .NET Framework 4.6.2 by using the offline installer.

(4) Next, install AMS-950. Follow the instructions for installation.
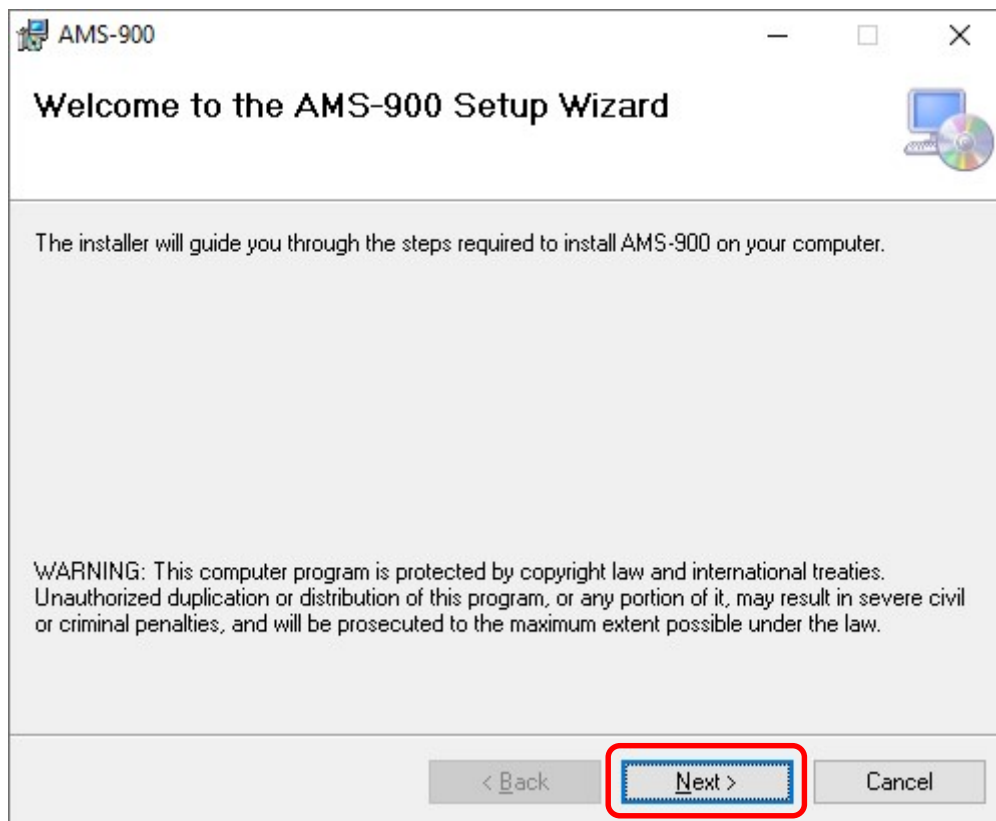
※ The name displayed in the Setup Wizard is "AMS-900", but the application is "AMS-950".
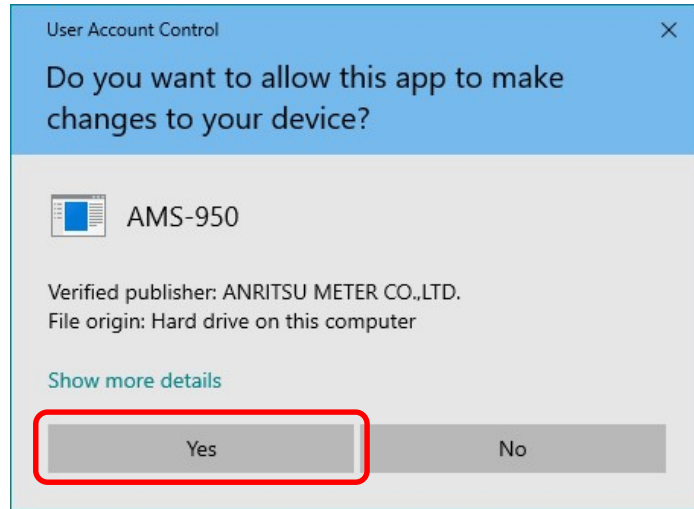
Enter the name of the folder into which AMS-950 is to be installed. Normally, you should choose the default folder displayed. Also, check "Just me".
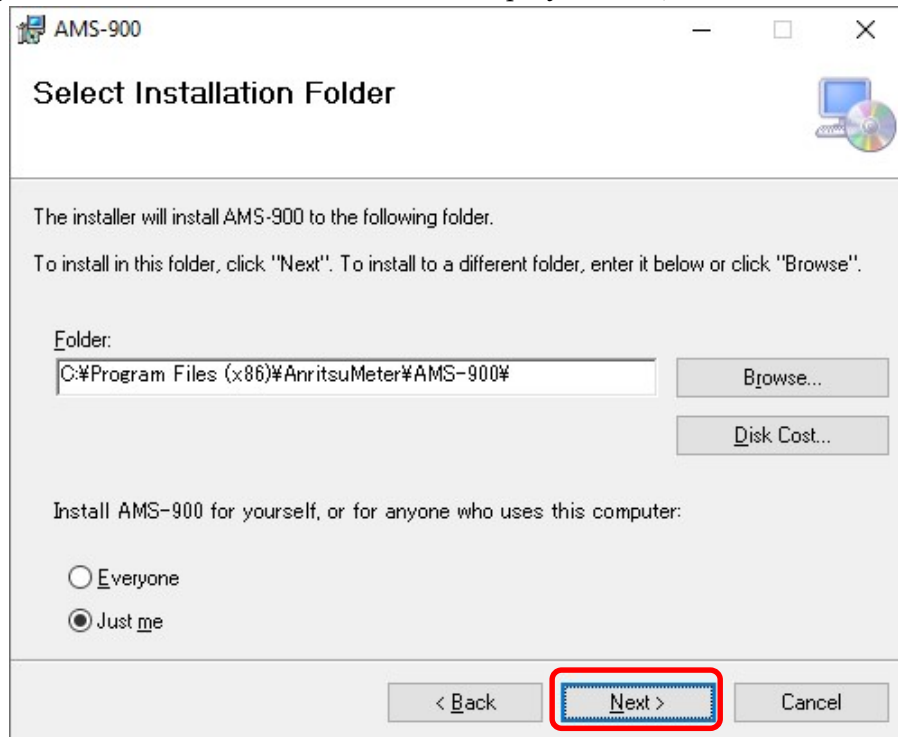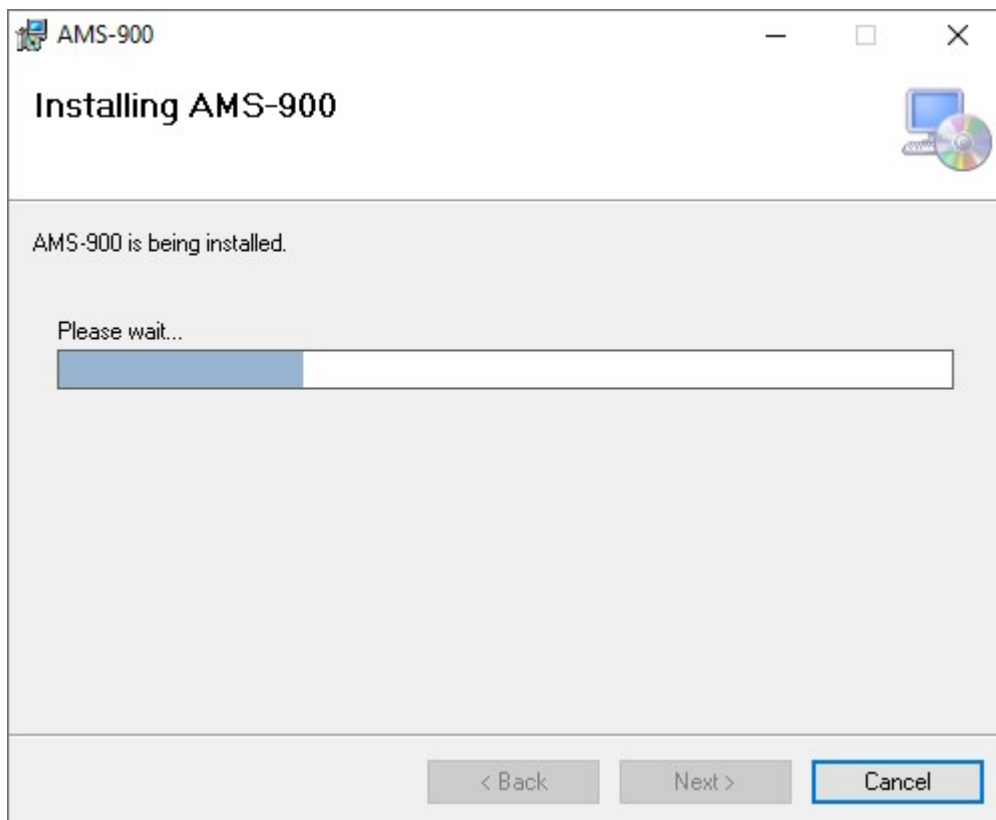

※ The default folder name is "AMS-900".

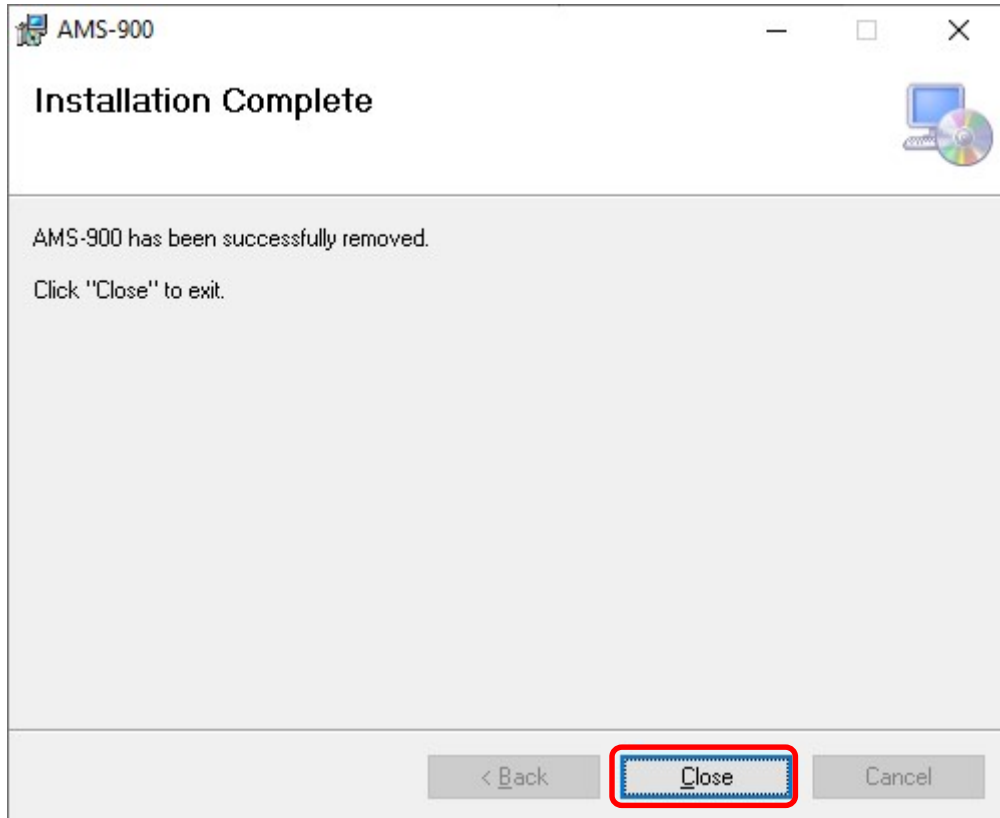Clicking [Next] starts the installation of AMS-950.
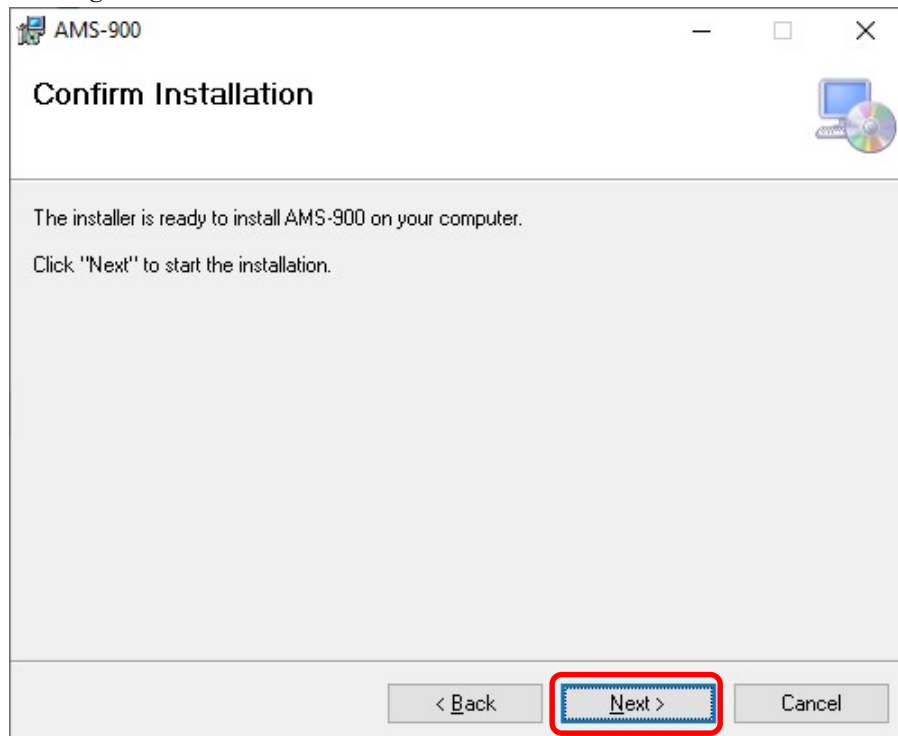
If the User Account Control screen appears during installation, click "Yes".

(5) AMS-950 has been installed successfully. Click [Close] to finish the installation. "AMS-950" is added to the programs in the Windows "Start" menu. Also, a shortcut icon is created on the desktop.

※ The installation name is "AMS-900", but the application to start is "AMS-950".

7 Screen Configuration

7.1 Parts and Functions of the Main Screen
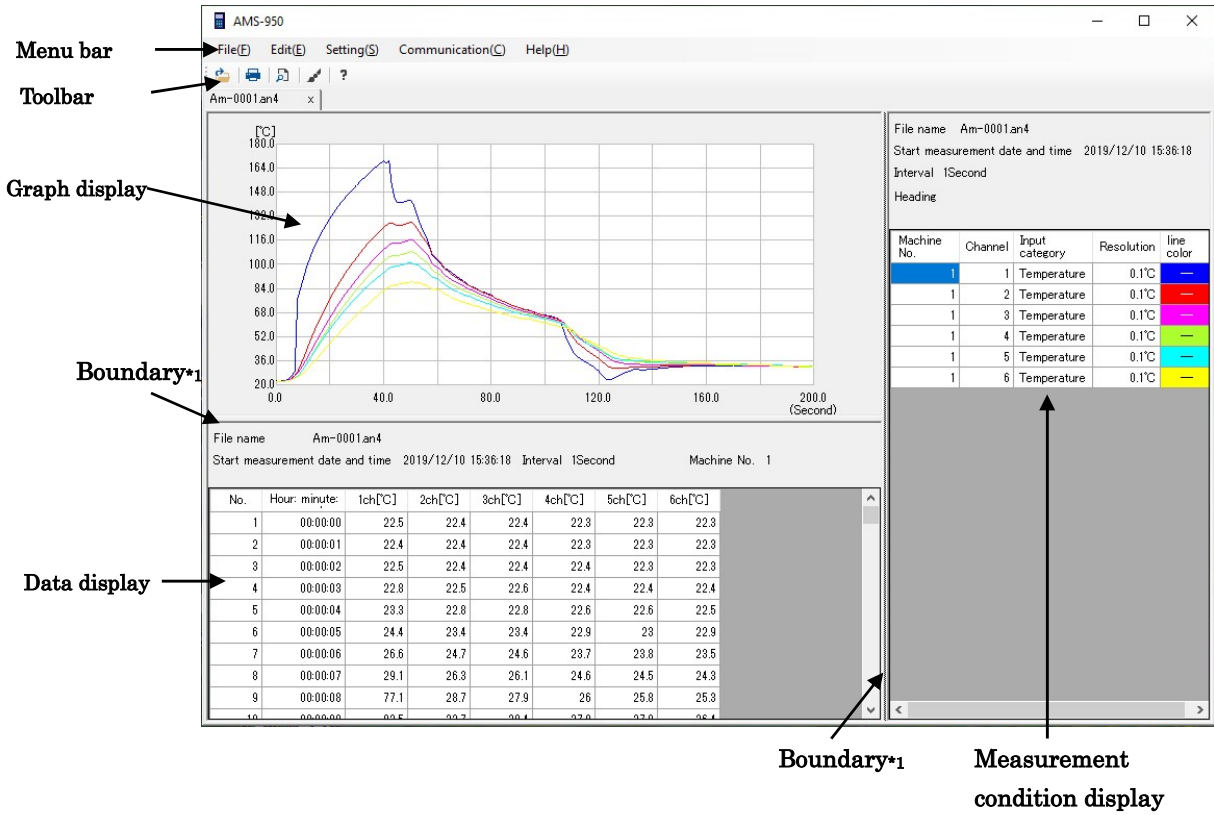
Menu bar: Allows you to configure functions or perform measurements.
Toolbar: Contains buttons for frequently used functions.
Graph display screen: Shows a graph of measurement data.
Data display screen: Shows a table of measurement data.
Measurement condition display screen: Shows a table of measurement settings of each channel.

*1 By moving the boundaries, you can change the size of each screen.
* During real-time measurement, changing the height of the data display screen to be smaller than one line may cause an error.

7.2 How to Perform Operations

<Mouse operations>

Clicking an item on the menu bar or toolbar can select an item.
Also, you can use mouse scrolling on the data display or graph display screen.

<Keyboard operations>

By using the keyboard, you can also select an item on the menu bar or toolbar in the same way as using the mouse.
Alphabetical symbols are shown to the right of the items on the menu bar (e.g. "File (F)") for the operations below:

- Menu bar   : **ALT (GRPH) + symbol**

              ("File (<u>F</u>)", "Communication (<u>C</u>)", etc.)

- Pull-down menu: symbol   ("Open (<u>O</u>)", "Print (<u>P</u>)", etc.)

- TAB key   : Moves the input focus to another location.
       (For example, it is used to move between items in a dialog box.)

*　Before establishing communication between AMS-950 and the measuring instrument, be sure to turn on the measuring instrument. If the measuring instrument is turned off, AMS-950 will not be able to come out of a state of waiting for a response and is then forcibly terminated.

8 How to Operate the Software
8.1 Configuring the Communication Port

● Select the serial port number of the personal computer to communicate with from the [Setting(S)] menu.
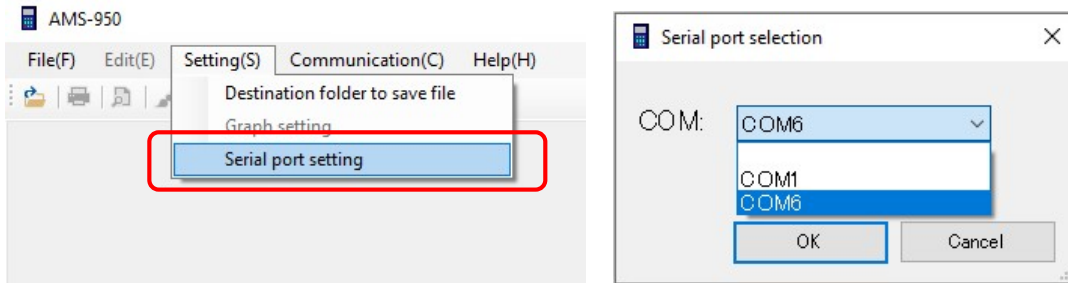
* If you do not know the serial port number or if you want to check the USB connection, perform the following:

1) Connect the measuring instrument to the personal computer with the dedicated USB communication cable, and then turn on the measuring instrument.
2) Right-click on the windows mark (⊞), and then select [Device Manager].
3) Check the item below:

Select the value "COM**" in "USB Serial PORT (COM**)" under "Ports (COM and LPT)" as the serial port.
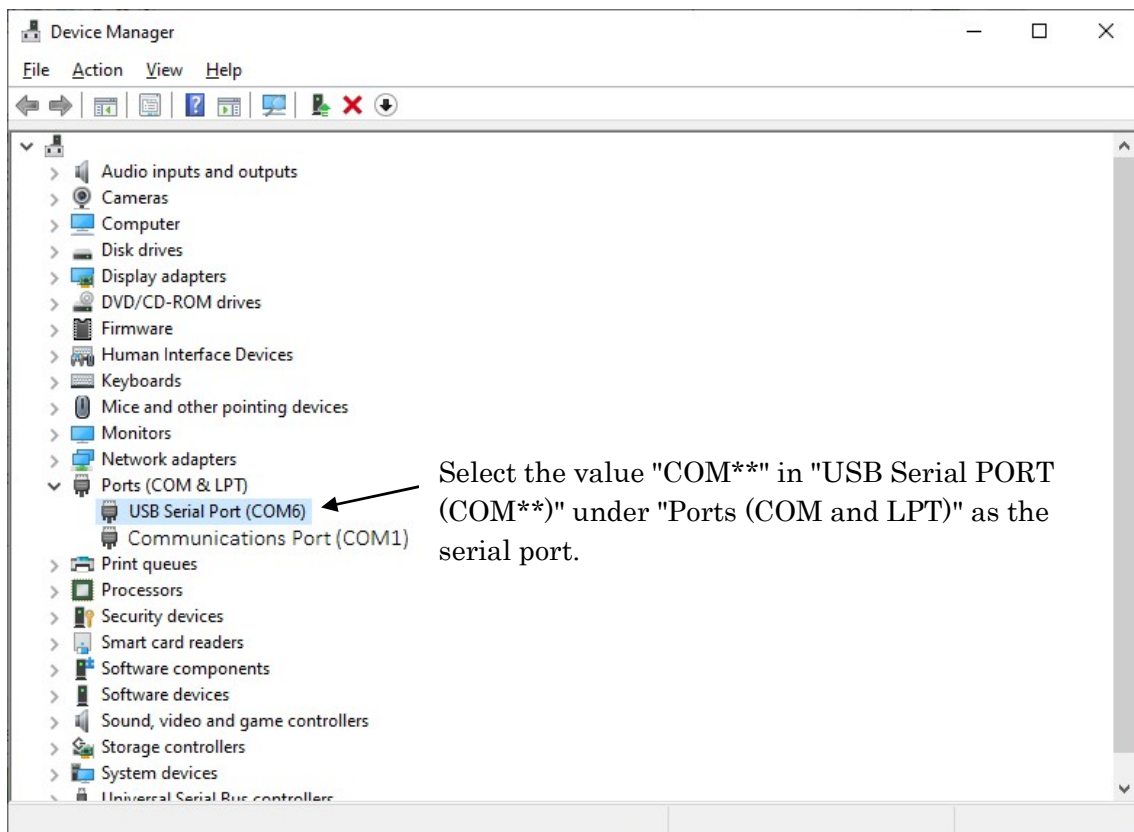
8.2 How to Configure the Wireless Settings (models: TWS-1, TWS-100)

Here you can configure the wireless settings.

(1) Make sure that the measuring instrument and the personal computer are connected, and then turn on the measuring instrument.

(2) Configure [Destination folder to save file] and [Serial port setting] in the [Setting(S)] menu.

(3) Configure [Wireless setting (master)] (or [Wireless setting (slave)]) in [Wireless setting] in the [Communication(C)] menu.

Wireless settings for base unit: TWS-1 (hereafter, base unit)

Wireless settings for terminal: TWS-100 (hereafter, terminal)

Available values are as follows:
- PANID: **0 to 16383**
- Short address: **01 to 99**
- Base unit address: **01 to 99**
- Channel No.: **33 to 61** (33 is assigned automatically)

The setting values of the three items below must be the same between the base unit and the terminals that are connected. Otherwise, the base unit and the terminals cannot be used in combination.

① "PANID" for base unit = "PANID" for terminals
② "Short address" for base unit = "Base unit address" for terminals
③ "Transmission output" for base unit = "Transmission output" for terminals

✧ The transmission output is expressed as the number of watts. Increasing the number of watts extends the communication distance, so the transmission output should be determined according to the installation environment.

After configuring the settings, restart both the base unit and the terminals.
Also, if you have two or more base units, set the short address (base unit address on the terminal setup screen) of each base unit to a different number. Otherwise, crosstalk may occur, causing communication failure.

*$_1$ The channel No. should be assigned to an unused number so that crosstalk does not occur with peripheral equipment.
Crosstalk may cause communication errors, resulting in loss or delay of data.

* The terminals do not require their short address to be set. Assign any value you want.
* The channel No. of a terminal is automatically set, so you do not need to set it.

## 8.3 How to Change the Settings for the Measuring Instrument

1) Connect the measuring instrument to the personal computer with the dedicated USB communication cable, and then turn on the measuring instrument.
2) Select [Serial port setting] from the [Setting(S)] menu, and then select the serial port to use.
3) Select [Remote setting] from the [Communication(C)] menu.
* If the wireless function is in use, the processing may take a long time depending on the state of communication.
4) Items are separated by tabs. Select the tab that contains the item you want to set.
5) Settings are configured on each tab separately. Therefore, press the "Setting" button after changing the settings.
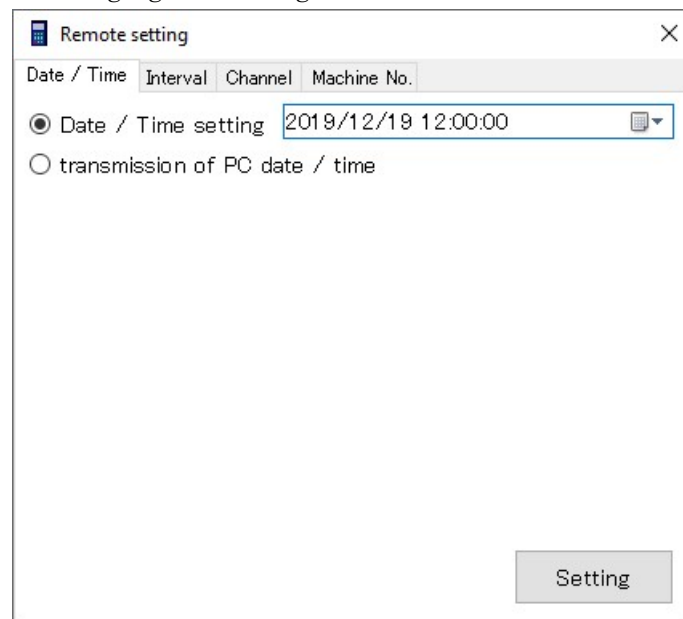
A. Setting the clock

Here you can set the date & time of the measuring instrument. Select the date & time tab.
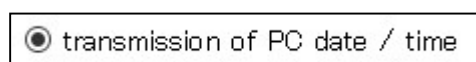
<Manual setup>
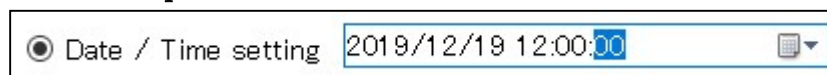
Select the radio button on the right and then enter numbers into the date & time entry field.
* In the entry field, you cannot use the backspace or delete key. If you enter a wrong number, reenter a correct number.

<Use of the clock of the personal computer>

Select the radio button on the right. The date and time of the personal computer will be assigned.

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B. Setting the measurement interval

Here you can set the measurement interval.

Select the interval tab.

- Select the radio button, and then enter the interval.

* You can set the interval in milliseconds depending on the model of the measuring instrument; however, please note that the data being sent when the "Set" button is pressed is the interval time on the selected radio button.
* Care should be taken for models that allow you to select from two or more units of time.

The available intervals of each model are as follows:

Model	Interval
TWS-1	Up to 2 terminals: 1 sec to 99 min 59 sec (in increments of 1 sec) 3 terminals or more: 2 sec to 99 min 59 sec (in increments of 1 sec)
AM-9000	1 sec to 99 min 59 sec (in increments of 1 sec) 100 msec to 990 msec (in increments of 10 msec)
AM-9100, AM-9200, AM-9300, TWS-100	1 sec to 99 min 59 sec (in increments of 1 sec) 200 msec to 990 msec (in increments of 10 msec)

C. Configuring the channels to be used

Here you can configure the channels to be used for measurement. Select the channel tab.

Select the input type (temperature, voltage, or non-use) and the resolution of each channel. (The number of available channels, input types, and resolutions vary depending on the model.)

* For multi-input models, thermocouple types E, K, J, T, and R are added to the input types.
* It is impossible to change the channel settings of a terminal by means of the base unit.

D. Setting the machine No.

Here you can assign a machine No. to the measuring instrument. Select the machine No. tab.

* The available values are from **01 to 99.**

8.4 How to Transfer Data from the Measuring Instrument

Here you can transfer data stored in the measuring instrument to the personal computer, and then create a file.

Data is divided into blocks in the measuring instrument, so a file of each block is created individually.

First you will specify the location to save measurement data. Once the save location is specified, data will always be saved into that specified folder.

* If the specified save location does not exist or no longer exists, an error occurs.

1) Connect the measuring instrument to the personal computer with the dedicated USB communication cable, and then turn on the measuring instrument.
2) Select [Serial port setting] from the [Setting(S)] menu, and then select the serial port to use.
3) Select [Destination folder to save file] from the [Setting(S)] menu.
4) Specify the data save location. After specifying it, press the "Setting" button.
   In the example below, a folder named "AM-DATA" is created on the desktop.
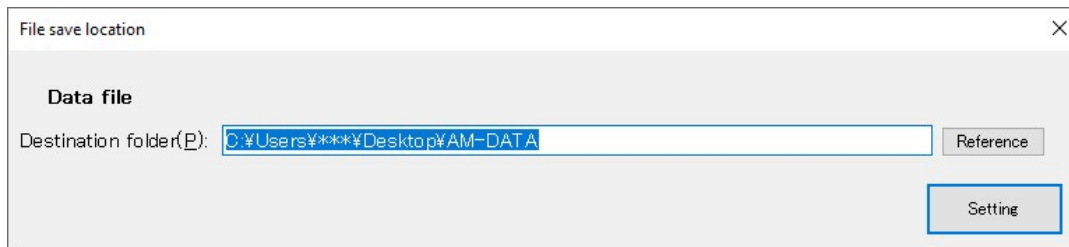
Pressing the "Reference" button allows you to view the folders. Also, you can create a new folder on the screen. (Click "Make New Folder".)
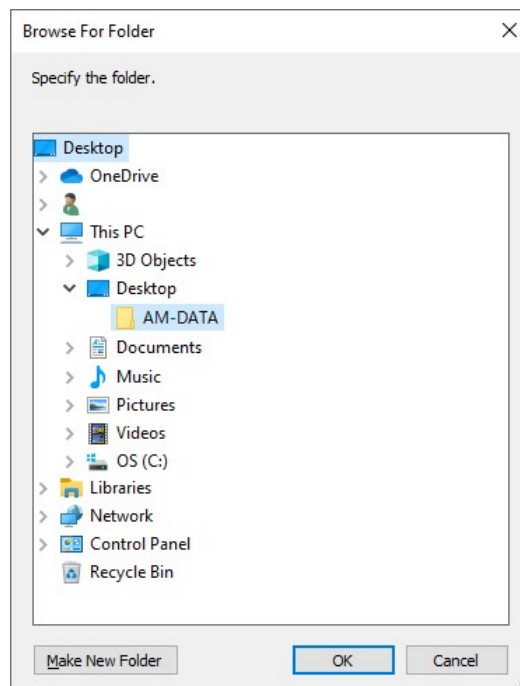

* You cannot save data directly on the C drive due to User Account Control (Windows security), so if "C:\" (default value) is entered, AMS-950 terminates abnormally.

5) Select [Data input] from the [Communication(C)] menu. A confirmation message will appear. Select [Yes].
(To cancel data input, select [No].)

During communication, the transfer progress bar is displayed as shown below, allowing you to check the status of data transfer. If you press [Interruption], the communication is interrupted, and data being transferred or not yet transferred is not saved.
It may take several to several tens of minutes to transfer a large amount of data.
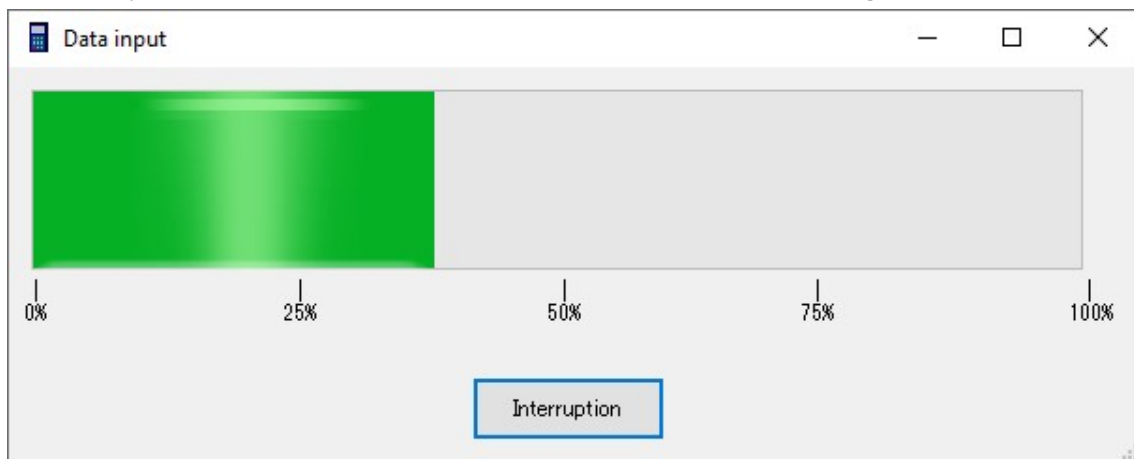
＊ Do not perform any key operation on the measuring instrument during communication; otherwise, an abnormal termination or malfunction may occur.
＊ After data input, the data still exists in the measuring instrument. If a communication error or the like has occurred, perform data input again.

Upon completion of data input, a newly created data file is displayed.
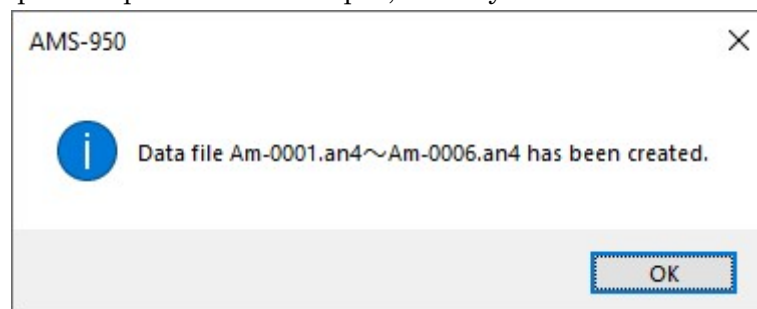
* About file names:

A file is named Am-****.an4.

"****" in the file name denotes sequential numbers from 0001 to 9999, which are assigned to each folder. Also, even if you delete a file, the numbers of other files remain unchanged.

For example, if files numbered up to 9999 are stored in a folder and the files numbered 0001 to 9998 are deleted, then the file numbered 9999 is left alone. In this case, it is impossible to save an additional file into the folder where the highest numbered file (#9999) is stored.

To store new data in this folder, change the file name.

(Example)

   Change "Am-9999.an4" to "experiment1.an4" or another name.

* ".an4" is a file extension. It is not displayed with normal personal computer settings.

   Select and right-click the file, and then select "Rename" to change the file name.

8.5 How to Perform Real-time Measurements

Here you can display a graph during measurement. Data is saved into a file and not into the measuring instrument.

* Real-time measurement depends on the performance of your personal computer. Note that the simultaneous execution of other software, in particular, leads to a delay or error in measurement.

* A USB-interfaced measuring instrument is vulnerable to noise, and therefore could stop during real-time measurement. If you carry out long-term measurement, carry out careful checks in advance of use.

* If the wireless function is in use, the processing may take a long time depending on the state of communication.

(1) Connect the measuring instrument to the personal computer with the dedicated USB communication cable, and then turn on the measuring instrument.

(2) Select [Real measurement] and [Measurement setting] from the [Communication(C)] menu. Configure graphical representation settings.

(3) Items are separated by tabs. Select the tab that contains the item you want to set.

      1) Graph setting tab

      Set the vertical axis by specifying the displayed upper and lower limit values.

      Set the horizontal axis by specifying the number of displayed samples. The maximum number of samples is 120,000.

When measuring temperature and voltage simultaneously, set the temperature and voltage display ranges separately.

* If the difference between the upper and lower limit values is too small or if too many samples are displayed, then the graph may be deformed, but there is no problem with the data itself.

2) Channel selection tab
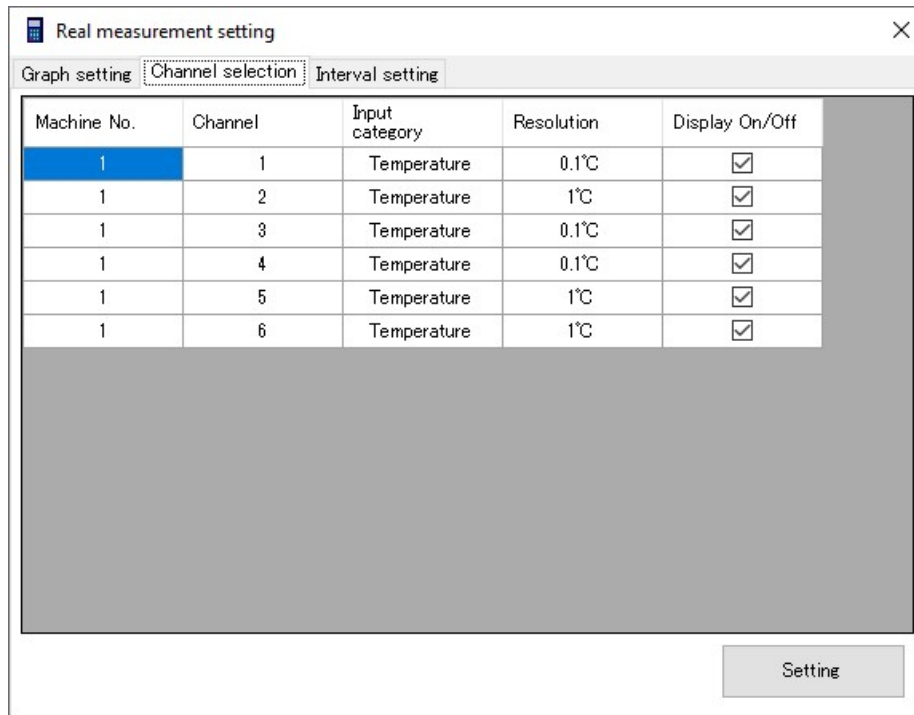
Select the channels to draw a graph by using the checkboxes in the show/hide column. You cannot edit other columns.

3) Interval setting tab
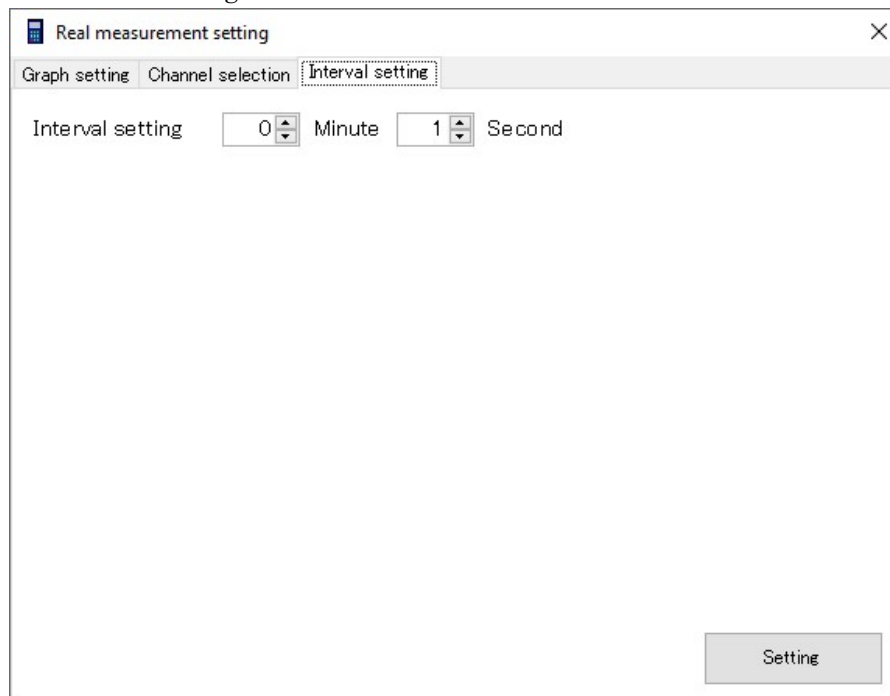
Set the measurement interval.

The available intervals are 1 sec to 99 min 59 sec.

If the interval is set to 1 sec with three or more terminals connected to the base unit, then an error occurs. Set it again to 2 sec or more.

(4) Select [Real measurement] and [Start measurement] from the [Communication(C)] menu.

(5) To perform measurement, press [Yes] and then specify the save location.
Real-time measurement will start.
The file is named "Am-****.an4" ("****" denotes a number from 0001 to 9999).
* ".an4" is a file extension. It is not displayed with normal personal computer settings.

To terminate real-time measurement, select [Stop measurement] from the [Communication(C)] menu.

* During real-time measurement, you cannot change measurement settings.

* Up to 120,000 pieces of sample data can be displayed on the graph during real-time measurement.
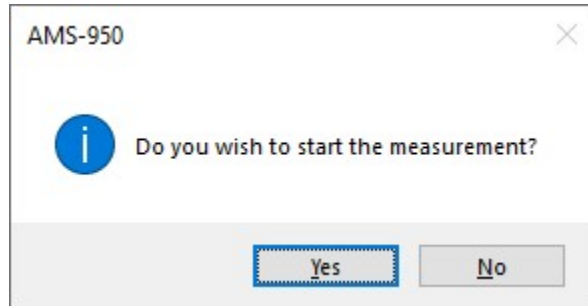If an attempt is made to display more than 120,000 pieces of data, the graph display screen is initialized; however, after real-time measurement, all the data can be displayed graphically by changing scale values in the graph settings.

* During real-time measurement, if the measuring instrument is turned off or if the communication cable is removed, then an abnormal termination occurs. If an abnormal termination occurs, restart AMS-950 and the measuring instrument again.
The data measured before the immediate occurrence of an error is saved in the specified save location.

* If the measuring instrument is scheduled for measurement, it returns to the command waiting screen at the measurement end time even during real-time measurement. In that case, an abnormal termination occurs. Therefore, be sure to cancel the scheduled measurement when carrying out real-time measurement.

* Do not close the tab where measurement is in progress during real-time measurement.
  Even if the tab is closed, the measurement continues without interruption.
  To terminate real-time measurement, select [Stop measurement] from the [Communication(C)] menu.

* During real-time measurement, changing the height of the data display screen to be smaller than one line may cause an error.

* If real-time measurement is carried out for a long time (12 hours or more) and then is terminated by selecting [Stop measurement], AMS-950 may become unable to respond.
  In that case, a timeout process takes place and AMS-950 returns to normal after about two minutes.

8.6 Reading and Viewing Existing Files

Open an existing file saved by AMS-950.

1) Select [Open(O)] from the [File(F)] menu.
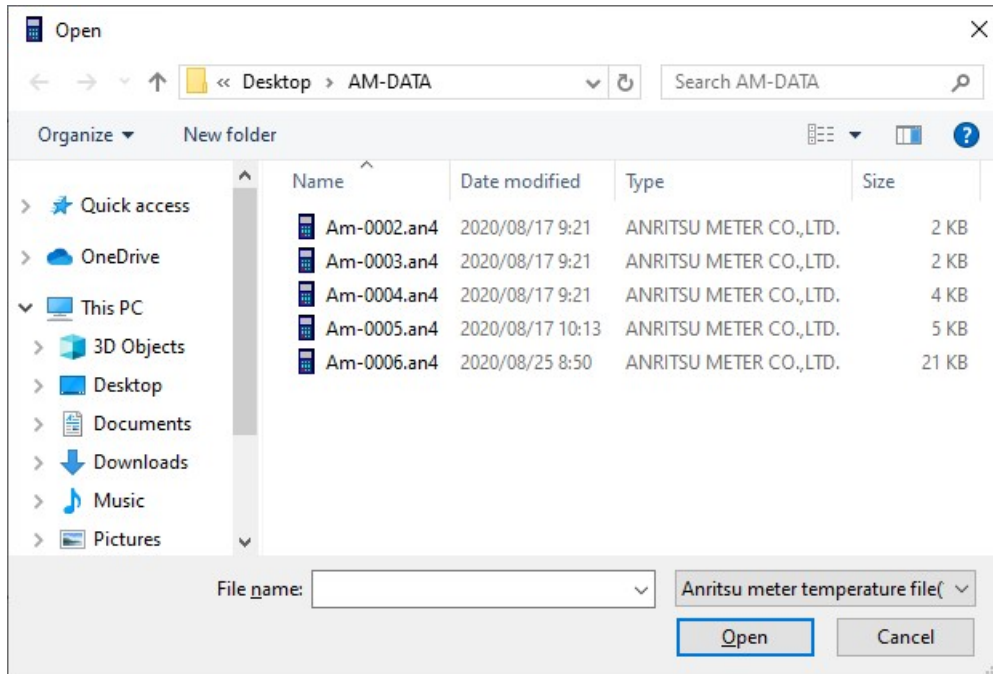
2) Specify a file and then press [Open].

      * Before opening the selected file, make sure that its name is shown in the file name field.
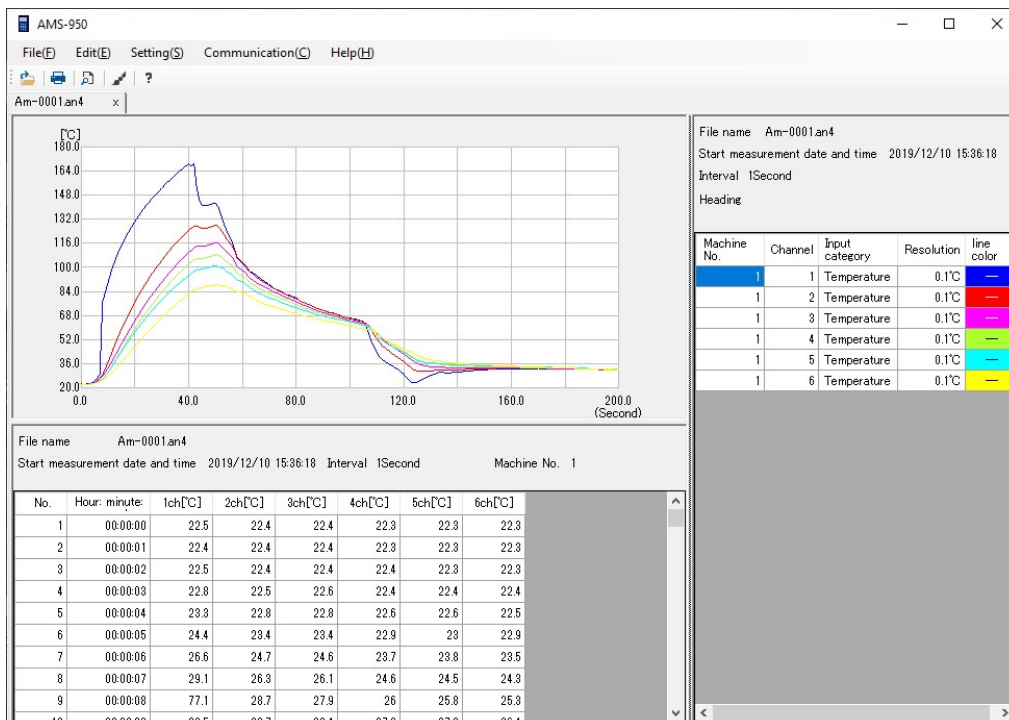
      * See section 8.9 "Graph Settings" when changing the graph display range, graph line color, or graph line style.
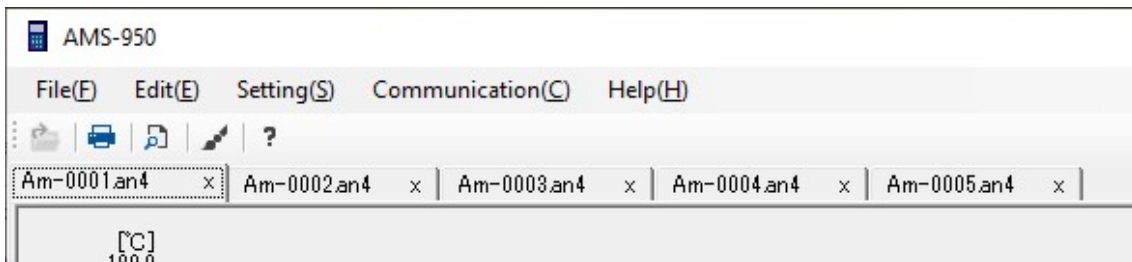
* Up to five files can be opened.
   The opened files are separated by tabs.

* Comparing files:
To display files side-by-side to compare data, double-click the icon of the data file instead of [Open(O)] in the [File(F)] menu.
The second and subsequent files will be opened by AMS-950 (For BROWSE MODE).
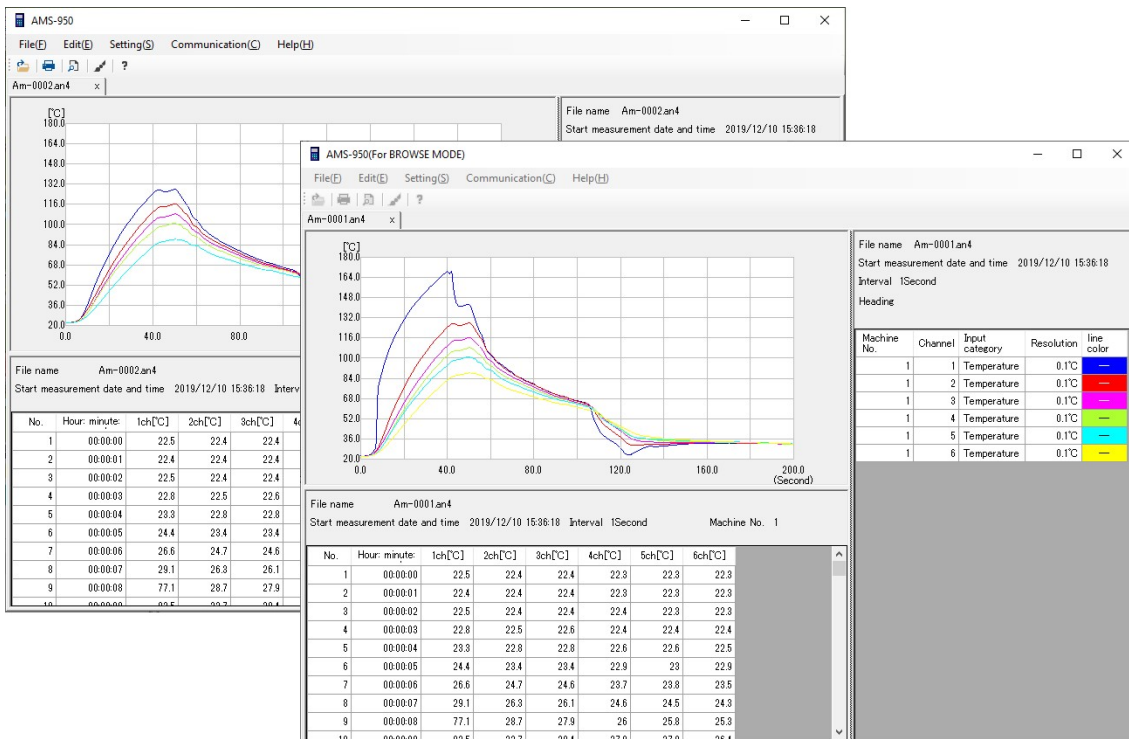
* If two or more data files are opened simultaneously, a malfunction may occur, resulting in an error because the second and subsequent files are all opened by AMS-950 (For BROWSE MODE) at the same time.
   It is recommended that when AMS-950 (For BROWSE MODE) is started, data files should be opened one at a time.

8.7　Incorrect Input Conversion

* The incorrect input correction is a dedicated function for multi-input models.
  AM-9000, AM-9100, and TWS-1 do not support it.

If the thermocouple type of a temperature sensor that is connected to the measuring instrument differs from the thermocouple type that is set to the channel, and data is recorded, then the function recalculates the file of the recorded data into correct data.

* The resulting numerical values are based on calculation. There may be an error compared with the actual data. The function must be used as a temporary measure when there is an incorrect setting.
* Data on real-time measurement cannot be changed.

(1)　Select [Open(O)] from the [File(F)] menu.

(2)　Specify the file and then press [Open].
　* Before opening the selected file, make sure that its name is shown in the file name field.

(3)　Select [Multiple input error conversion] from the [Edit(E)] menu.

(4)　The thermocouple setup screen will appear.
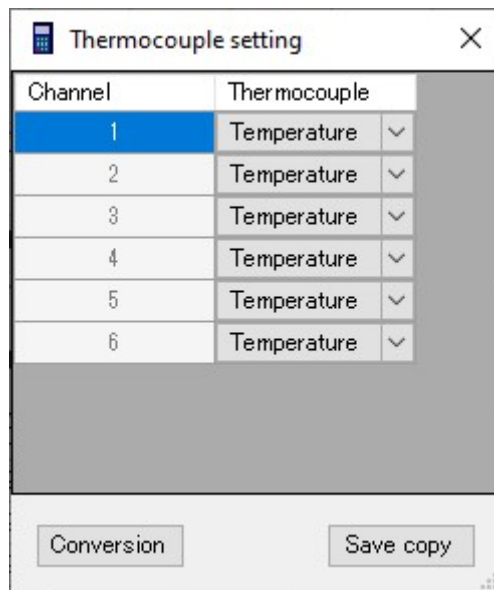
Select the thermocouple type of the channel to be reconfigured.
　* If the channel is configured for voltage, it cannot be changed.

(5)　After reconfiguration, press the "Conversion" button.
　　The data file Am-XXXX-*.an4 (a sub-number is added to the name of the opened file) will be created.
　　Pressing the "Save copy" button makes a copy of the original data file.
　　The file is named "Am-XXXX-*.an4" (a sub-number is added to the name of the opened file).
　* ".an4" is a file extension. It is not displayed with normal personal computer settings.

Data file before incorrect input conversion

AMS-950 — □ ×

File(F)　Edit(E)　Setting(S)　Communication(C)　Help(H)

Am-0001.an4　x

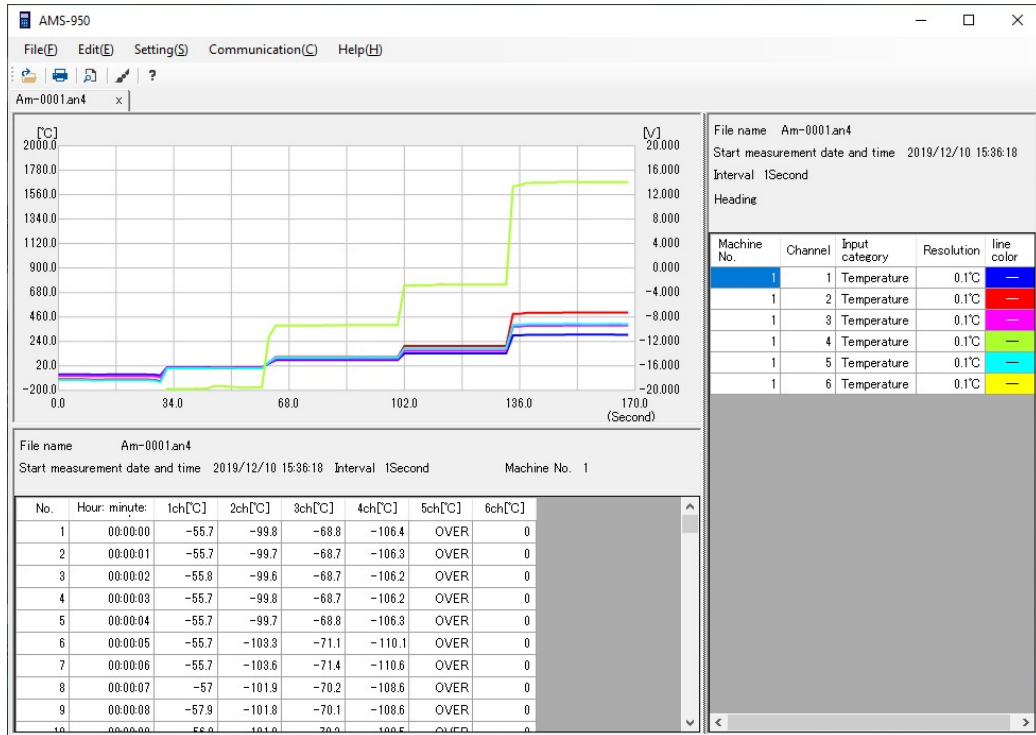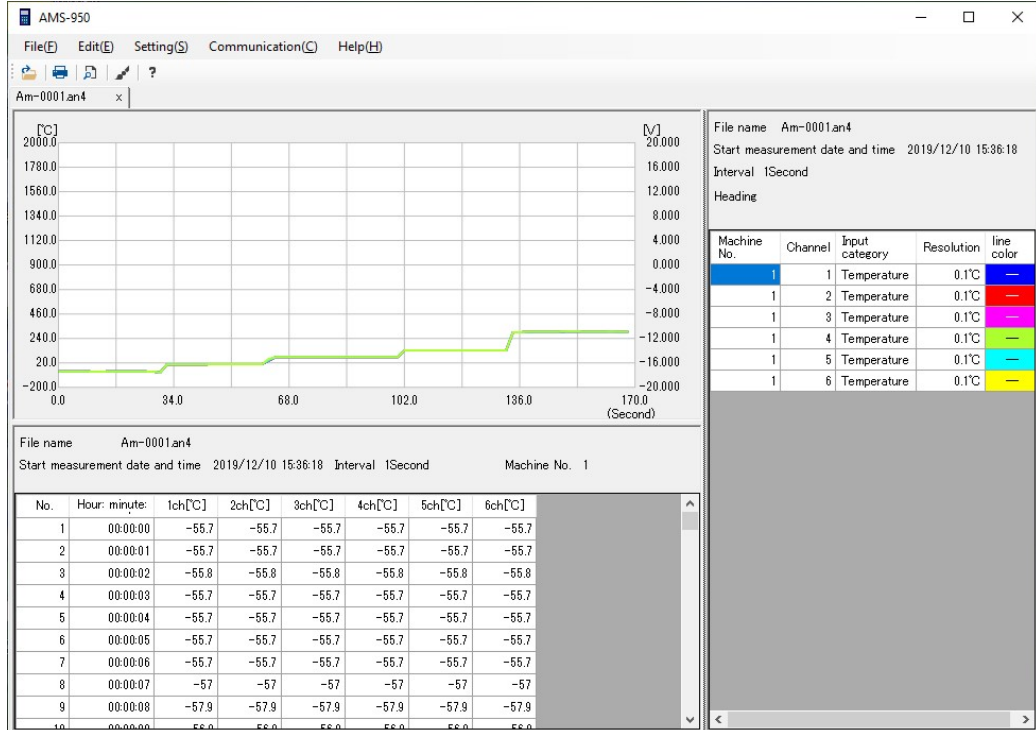| No.	Hour: minute:	1ch[℃]	2ch[℃]	3ch[℃]	4ch[℃]	5ch[℃]	6ch[℃]
1	00:00:00	−55.7	−99.8	−68.8	−106.4	OVER	0
2	00:00:01	−55.7	−99.7	−68.7	−106.3	OVER	0
3	00:00:02	−55.8	−99.6	−68.7	−106.2	OVER	0
4	00:00:03	−55.7	−99.8	−68.7	−106.2	OVER	0
5	00:00:04	−55.7	−99.7	−68.8	−106.3	OVER	0
6	00:00:05	−55.7	−103.3	−71.1	−110.1	OVER	0
7	00:00:06	−55.7	−103.6	−71.4	−110.6	OVER	0
8	00:00:07	−57	−101.9	−70.2	−108.6	OVER	0
9	00:00:08	−57.9	−101.8	−70.1	−108.6	OVER	0

File name Am-0001.an4
Start measurement date and time 2019/12/10 15:36:18
Interval 1Second
Heading

Machine No.	Channel	Input category	Resolution	line color
1	1	Temperature	0.1℃	
1	2	Temperature	0.1℃	
1	3	Temperature	0.1℃	
1	4	Temperature	0.1℃	
1	5	Temperature	0.1℃	
1	6	Temperature	0.1℃	

File name Am-0001.an4
Start measurement date and time 2019/12/10 15:36:18　Interval 1Second　Machine No. 1

Data file after incorrct input conversion

AMS-950 — □ ×

File(F)　Edit(E)　Setting(S)　Communication(C)　Help(H)

Am-0001.an4　x

No.	Hour: minute:	1ch[℃]	2ch[℃]	3ch[℃]	4ch[℃]	5ch[℃]	6ch[℃]
1	00:00:00	−55.7	−55.7	−55.7	−55.7	−55.7	−55.7
2	00:00:01	−55.7	−55.7	−55.7	−55.7	−55.7	−55.7
3	00:00:02	−55.8	−55.8	−55.8	−55.8	−55.8	−55.8
4	00:00:03	−55.7	−55.7	−55.7	−55.7	−55.7	−55.7
5	00:00:04	−55.7	−55.7	−55.7	−55.7	−55.7	−55.7
6	00:00:05	−55.7	−55.7	−55.7	−55.7	−55.7	−55.7
7	00:00:06	−55.7	−55.7	−55.7	−55.7	−55.7	−55.7
8	00:00:07	−57	−57	−57	−57	−57	−57
9	00:00:08	−57.9	−57.9	−57.9	−57.9	−57.9	−57.9

File name Am-0001.an4
Start measurement date and time 2019/12/10 15:36:18
Interval 1Second
Heading

Machine No.	Channel	Input category	Resolution	line color
1	1	Temperature	0.1℃	
1	2	Temperature	0.1℃	
1	3	Temperature	0.1℃	
1	4	Temperature	0.1℃	
1	5	Temperature	0.1℃	
1	6	Temperature	0.1℃	

File name Am-0001.an4
Start measurement date and time 2019/12/10 15:36:18　Interval 1Second　Machine No. 1
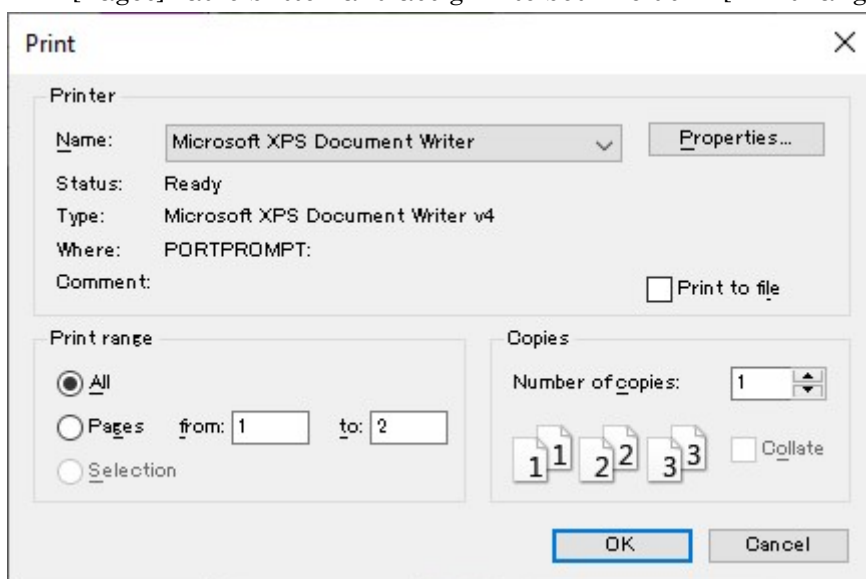
8.8 How to Print Data

Here you can print data displayed on the screen.

1) Run AMS-950, and then open the data file you want to print. (See section 8.6.)
2) Select [Print] from [Print] in the [File(F)] menu, and then press [OK] to print the file.
3) Select the time format for printing, and click [OK] to print.
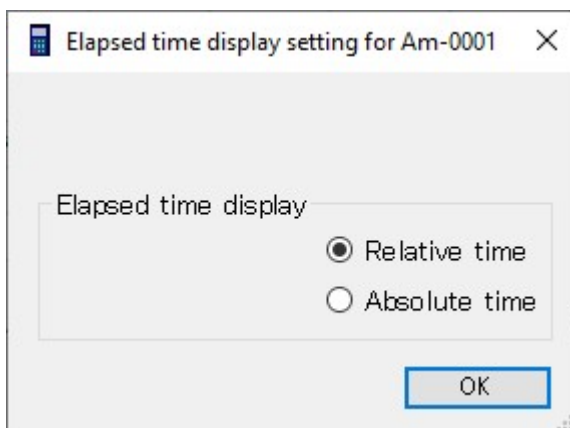
*Whichever relative or absolute time you choose, data files acquired in manual mode do not show hours, minutes, or seconds.
* "Absolute time" cannot be selected for data files that are acquired at measurement intervals in milliseconds.

Here you will print a graph and data. To print a graph only, select the [Pages] radio button and assign 1 to both fields in [Print range].

Whether to print data in black and white or in color, and the print direction depends on the model of the printer.

- You can display a print preview by selecting [Print preview] from [Print] in the [File(F)] menu.
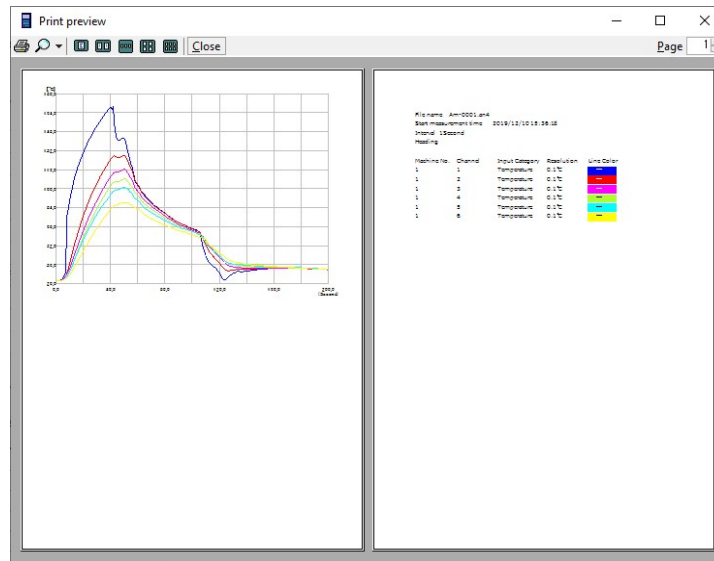
※ Vertical only.
※ If there is a lot of data, the graph will not be displayed, but it will be displayed when printed.

8.9 Graph Settings

- Run AMS-950, and then open the data file. (See section 8.6.)
- Select [Graph setting] from the [Setting(S)] menu.
- Items are separated by tabs. Select the tab that contains the item you want to set.
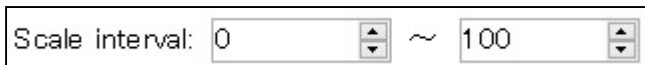
A. Configuring the channels
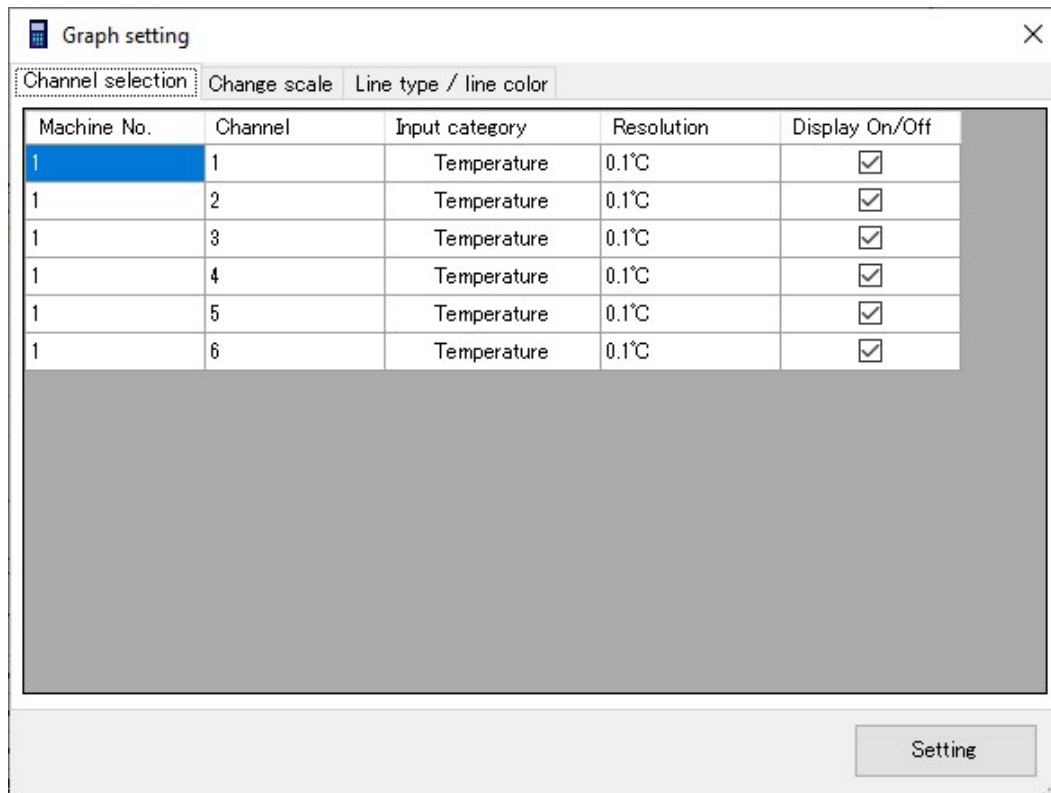
- Select whether to show or hide the channels by using the checkboxes in the show/hide column.
- You cannot edit other columns.
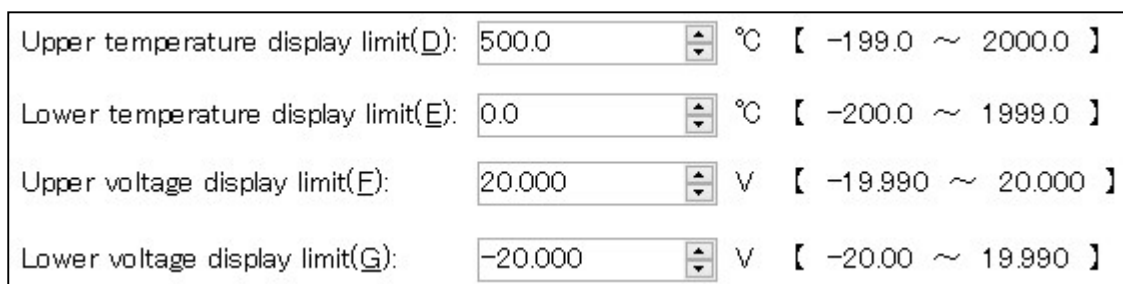
B. Changing the scale
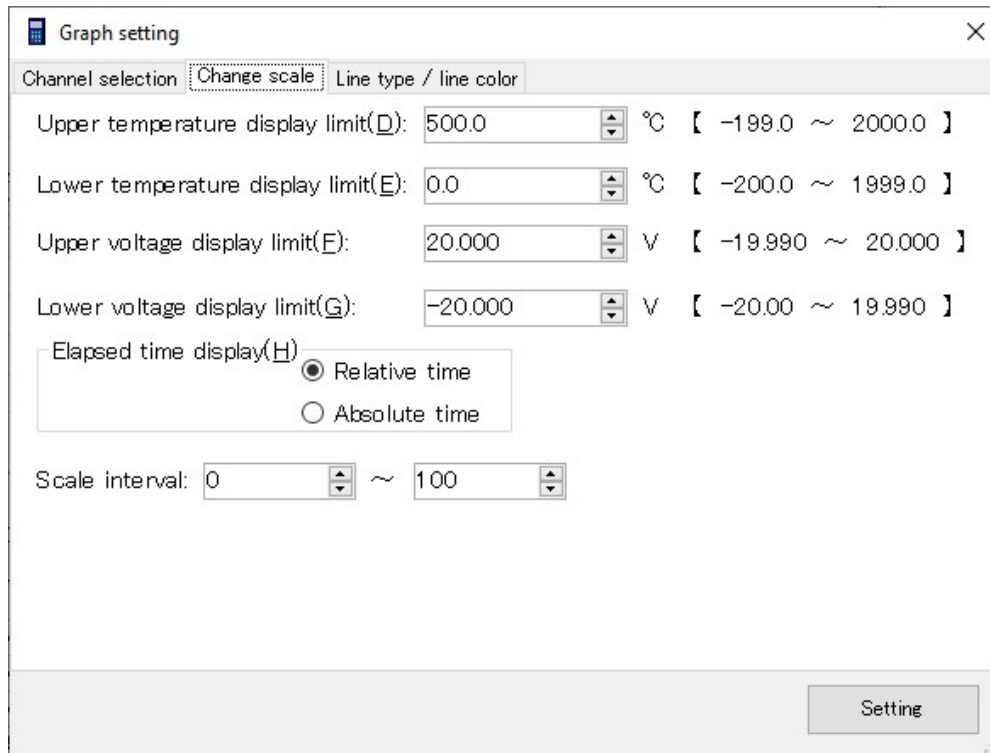
(a) Changing the horizontal axis scale

- You can set the number of samples displayed on the graph by means of the scale.

  Set the range of sample Nos. you want to display. Up to 99999999.

(b) Changing the vertical axis scale

- Set the display range of the vertical axis by specifying the displayed upper and lower limit values.

  The temperature settings are "Upper temperature display limit(D)" and "Lower temperature display limit(E)".

- The voltage settings are "Upper voltage display limit(F)" and "Lower voltage display limit(G)".

* If the difference between the upper and lower limit values is too small or if too many samples are displayed, then the graph may be deformed, but there is no problem with the data itself.

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(c) Selecting the time representation

```
┌─ Elapsed time display(H) ──────────────┐
│                    ◉ Relative time      │
│                    ○ Absolute time      │
└────────────────────────────────────────┘
```

- ● Select the time representation.
  - The relative time represents the time that elapsed from the start of measurement.
  - The absolute time represents the date and time of measurement.

C. Setting the line color and style
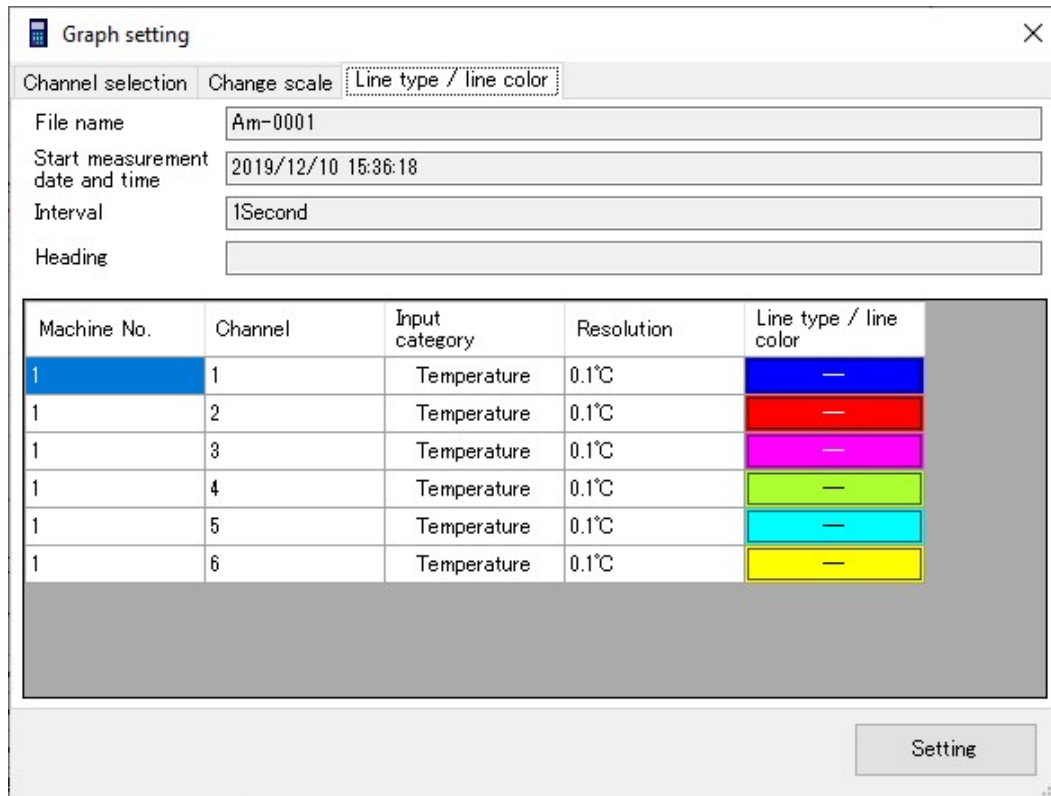
1) Click the [Line type/line color] for the channel you want to change.
    The line color/style setup screen will appear.
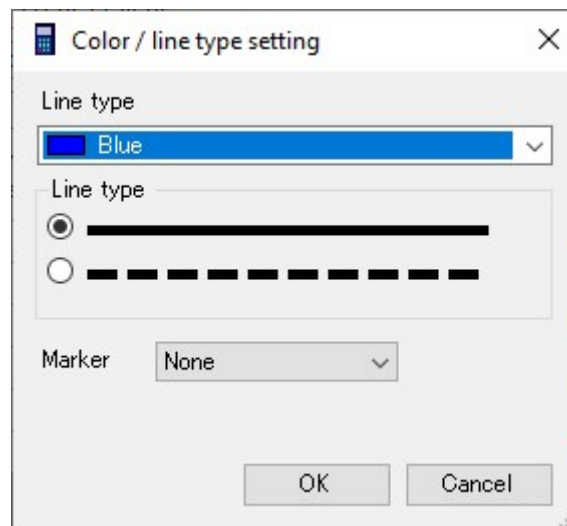
2) Select the desired color from the drop-down list. The HTML color codes are applied to the color.
3) Select solid or dotted line as the line style.
4) Select the desired marker.
    Nine types are available: none, ●, ◆, ■, ▲, ▼, ＊, ×, ＋.
* If many channels are used, changing the line style or marker may delay the drawing of the graph.

8.10 How to Use Data in a Spreadsheet Software

You can use data files you created using this software in a spreadsheet software such as Excel by converting them into CSV files.

(1) Select [CSV format] from [File conversion] in the [File(F)] menu.
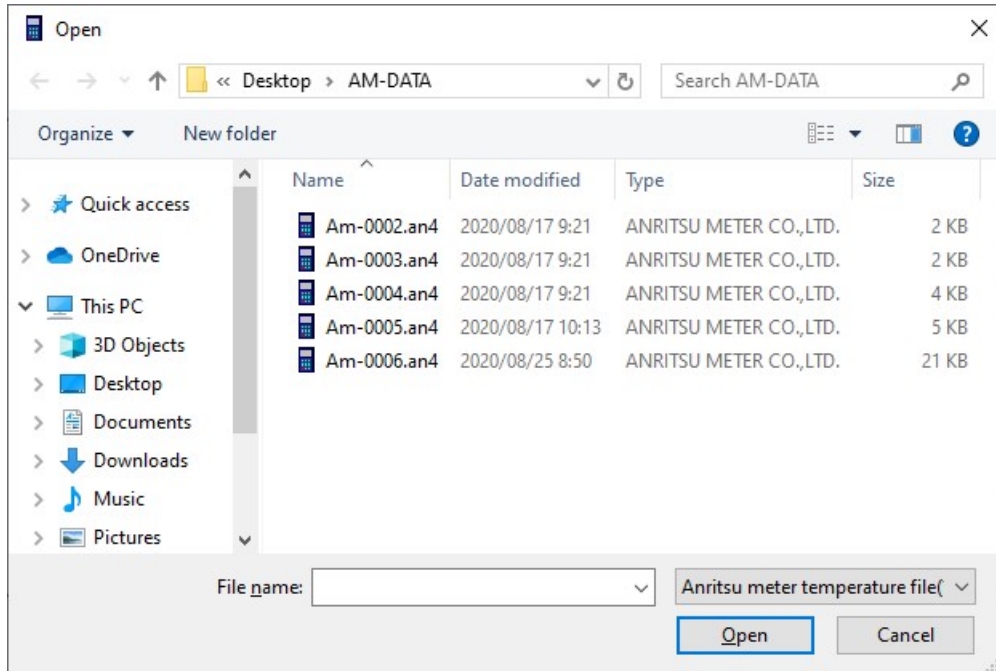
(2) Specify the file you want to convert, and then press [Open].

The converted file will be created in the folder that contains the original file. It has the same file name as the original file except for the file extension ".csv".

(Example)

Original file: C:¥Users¥ Users ¥AMS-950¥Data¥Am-0001.an4

Converted file: C:¥Users¥ Users ¥AMS-950¥Data¥Am-0001.csv

 * ".an4" and ".csv" are file extensions. They are not displayed with normal personal computer settings. CSV files are identified by the icon of Excel, etc. to the left of their file names.

(3) Select the representation of the time displayed when creating the text file.
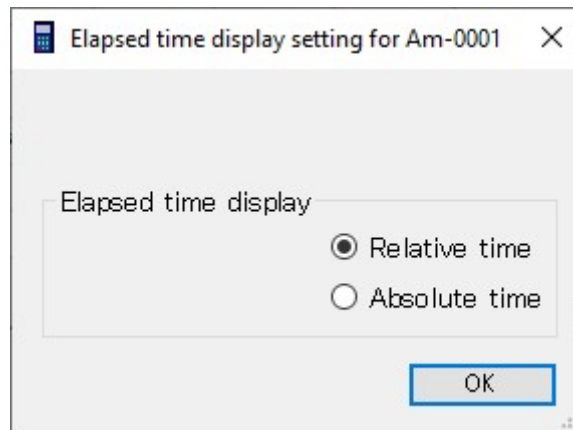
Elapsed time display setting for Am-0001

Elapsed time display

◉ Relative time
○ Absolute time

OK

- The relative time represents the time that elapsed from the start of measurement.
- The absolute time represents the date and time of measurement.

* Whichever relative or absolute time you choose, data files acquired in manual mode do not show hours, minutes, or seconds.
* "Absolute time" cannot be selected for data files that are acquired at measurement intervals in milliseconds.
* If "relative time" is selected, the time is represented in the range from 00:00:00 to 23:59:59 (hr, min, sec), and the time for measurement data acquired for 24 hours or more is represented in the range from *.00:00:00 to *.23:59:59 (elapsed days, hr, min, sec).
* If "absolute time" is selected, the time can be represented only in the range from 00:00:00 to 23:59:59 (hr, min, sec). Therefore, please note that the time for measurement data acquired for 24 hours or more is represented by repeating this display.

(4) Double-clicking the text file runs the spreadsheet software.
　　In Excel, the text file is displayed as shown in the example below.
　　The use of Excel functions allows you to create graphs.

<Time representation: relative time>

E31			fx	83.2				
	A	B	C	D	E	F	G	H
1	File name	Am-0001						
2	Start measurement time	2019/12/10 15:36	Interval	1Second	Machine No.	1		
3	No.	Hour: minute: second	1ch[°C]	2ch[°C]	3ch[°C]	4ch[°C]	5ch[°C]	6ch[°C]
4	1	0:00:00	22.5	22.4	22.4	22.3	22.3	22.3
5	2	0:00:01	22.4	22.4	22.4	22.3	22.3	22.3
6	3	0:00:02	22.5	22.4	22.4	22.4	22.3	22.3
7	4	0:00:03	22.8	22.5	22.6	22.4	22.4	22.4
8	5	0:00:04	23.3	22.8	22.8	22.6	22.6	22.5
9	6	0:00:05	24.4	23.4	23.4	22.9	23	22.9
10	7	0:00:06	26.6	24.7	24.6	23.7	23.8	23.5
11	8	0:00:07	29.1	26.3	26.1	24.6	24.5	24.3
12	9	0:00:08	77.1	28.7	27.9	26	25.8	25.3
13	10	0:00:09	83.5	32.7	30.4	27.9	27.9	26.4
14	11	0:00:10	89.9	36.9	33	30.2	30.2	27.7
15	12	0:00:11	96	41.3	36	33	32.8	29.3

Am-0001-1

<Time representation: absolute time>

H3			fx	6ch[°C]				
	A	B	C	D	E	F	G	H
1	File name	Am-0001						
2	Start measurement time	2019/12/10 15:36	Interval	1Second	Machine No.	1		
3	No.	Hour: minute: second	1ch[°C]	2ch[°C]	3ch[°C]	4ch[°C]	5ch[°C]	6ch[°C]
4	1	15:36:18	22.5	22.4	22.4	22.3	22.3	22.3
5	2	15:36:19	22.4	22.4	22.4	22.3	22.3	22.3
6	3	15:36:20	22.5	22.4	22.4	22.4	22.3	22.3
7	4	15:36:21	22.8	22.5	22.6	22.4	22.4	22.4
8	5	15:36:22	23.3	22.8	22.8	22.6	22.6	22.5
9	6	15:36:23	24.4	23.4	23.4	22.9	23	22.9
10	7	15:36:24	26.6	24.7	24.6	23.7	23.8	23.5
11	8	15:36:25	29.1	26.3	26.1	24.6	24.5	24.3
12	9	15:36:26	77.1	28.7	27.9	26	25.8	25.3
13	10	15:36:27	83.5	32.7	30.4	27.9	27.9	26.4
14	11	15:36:28	89.9	36.9	33	30.2	30.2	27.7
15	12	15:36:29	96	41.3	36	33	32.8	29.3

Am-0001-2

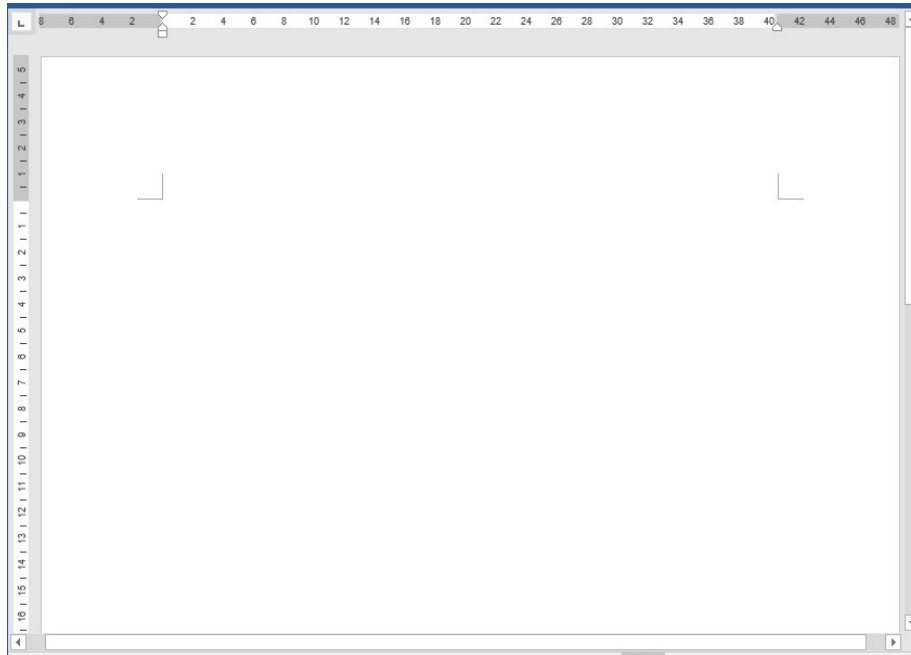Graph Title

1ch[℃] 2ch[℃] 3ch[℃] 4ch[℃] 5ch[℃] 6ch[℃]
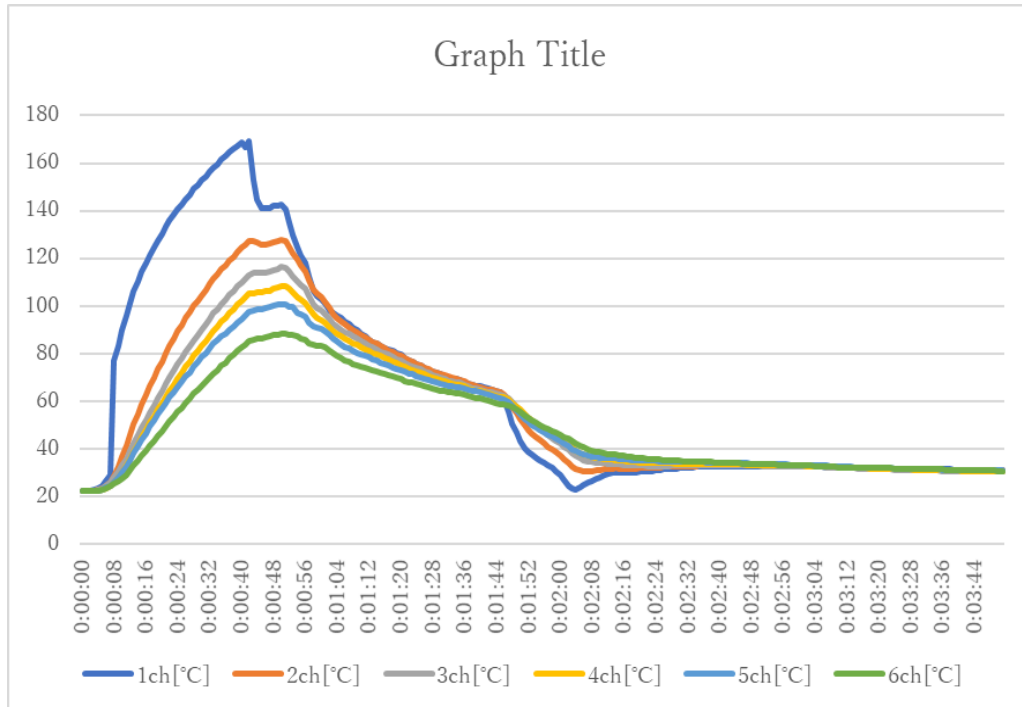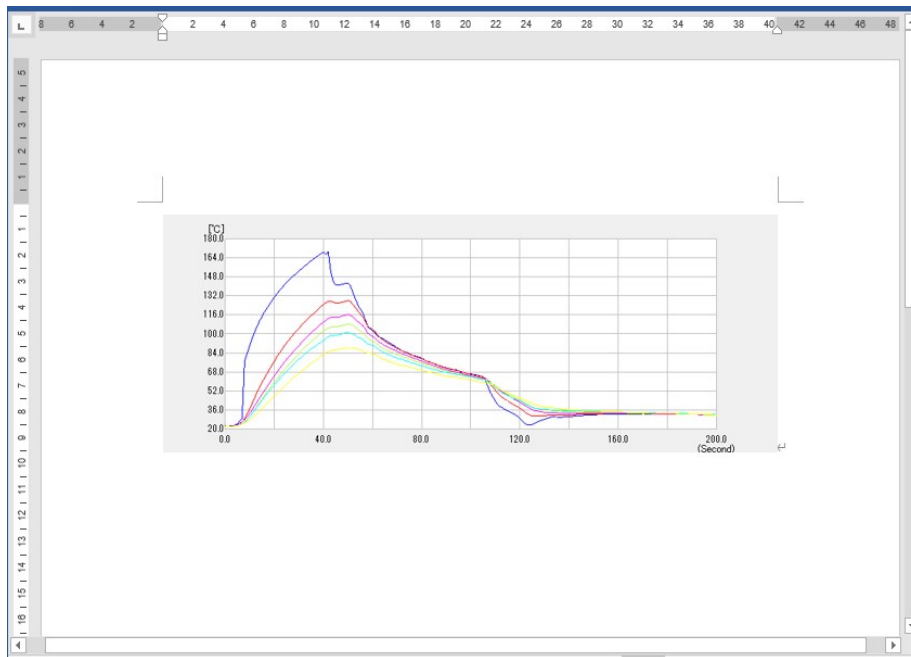
8.11 How to Paste Data to a Document File

1) Run AMS-950, and then open a data file. (See section 8.6.)

2) Select the data screen you want to copy, and then right-click to select [Screen Copy(C)]. The screen data will be copied onto the clipboard.
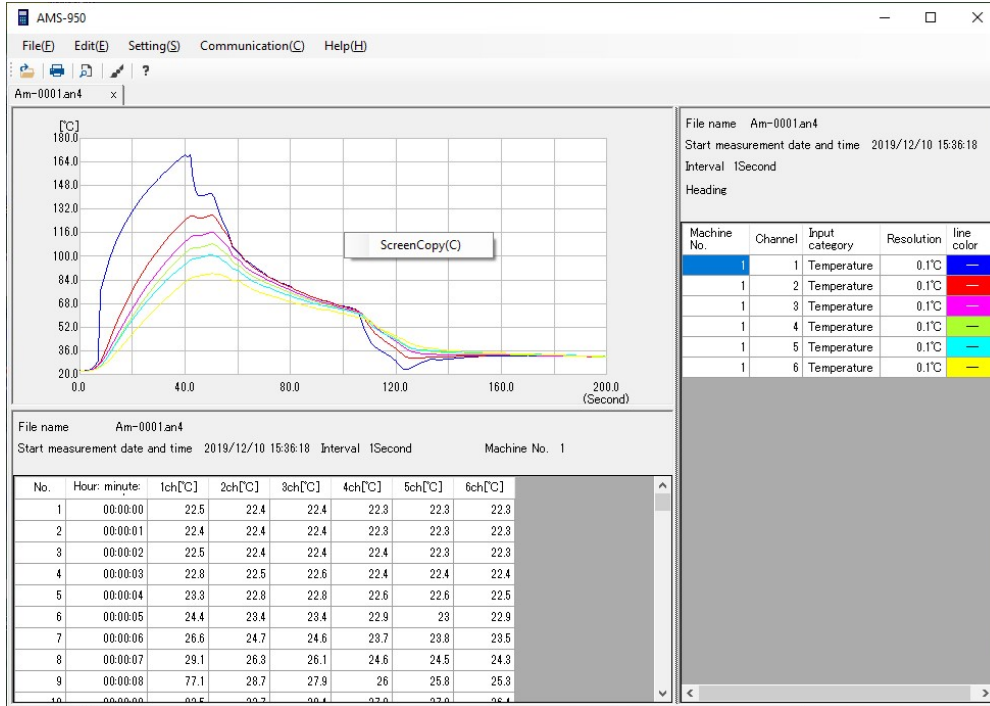
3) Open a document file such as a Word document.

4) Move the mouse cursor into the document, and then paste the screen data
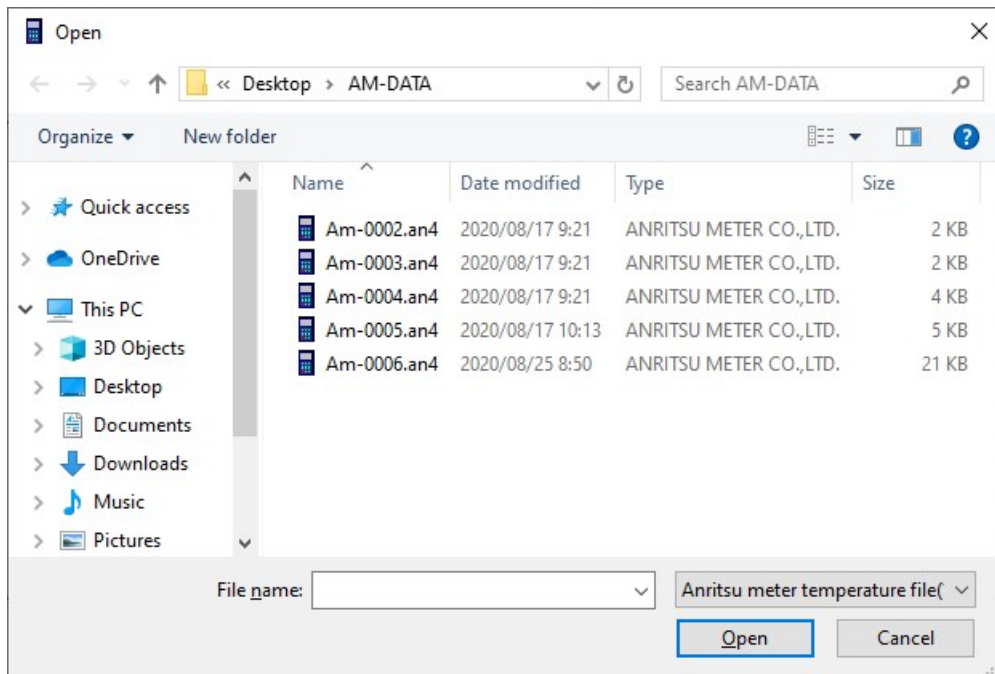   in the desired position.

* Microsoft Word is used for explanation in this example, and similarly, this
  function can also be used in other word-processing software.

8.12 Preventing Data Falsification

Converting data files created by this software into XPS files can prevent data falsification.

(1) Select [XPS format] from [File conversion] in the [File(F)] menu.

(2) Specify the file you want to convert, and then press [Open].

The converted file will be created in the folder that contains the original file. It has the same file name as the original file except for the file extension ".xps".

(Example)
Original file: C:¥Users¥ Users ¥AMS-950¥Data¥Am-0001.an4
Converted file: C:¥Users¥ Users ¥AMS-950¥Data¥Am-0001.xps

* ".an4" and ".xps" are file extensions. They are not displayed with normal personal computer settings. XPS files are identified by the icon of XPS Viewer, etc. to the left of their file names.

* If XPS Viewer is not installed on the personal computer, follow the steps below to install it.

1. Select [Settings] from the Start menu.
2. On the [Settings] screen, select Apps -> Apps & Features -> Manage optional features.
3. Click [+ Add a feature].
4. Select [XPS Viewer] from the list of features to add, and then click [Install].

(3) Select the representation of the time displayed when creating the XPS file.
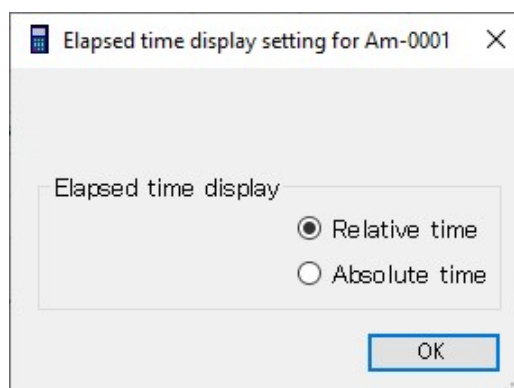
- The relative time represents the time that elapsed from the start of measurement.
- The absolute time represents the date and time of measurement.

* The paper direction is vertical only.

* Whichever relative or absolute time you choose, data files acquired in manual mode do not show hours, minutes, or seconds.

* "Absolute time" cannot be selected for data files that are acquired at measurement intervals in milliseconds.

* If "relative time" is selected, the time is represented in the range from 00:00:00 to 23:59:59 (hr, min, sec), and the time for measurement data acquired for 24 hours or more is represented in the range from *.00:00:00 to *.23:59:59 (elapsed days, hr, min, sec).

* If "absolute time" is selected, the time can be represented only in the range from 00:00:00 to 23:59:59 (hr, min, sec). Therefore, please note that the time for measurement data acquired for 24 hours or more is represented by repeating this display.

(4) Double-clicking an XPS file runs XPS Viewer.

As the number of pieces of data increases, the number of pages becomes larger.

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8.13 Set a Title

1) Run AMS-950, and then open a data file. (See section 8.6.)

2) Select [Edit remark] from the [Edit(E)] menu.

3) Enter the content of data in the recorded file, the environment conditions for recording, etc.

4) A save confirmation message will appear. Select [Yes] to save the remark. If you want to make a correction, click [Cancel] to return to the remark edit screen.
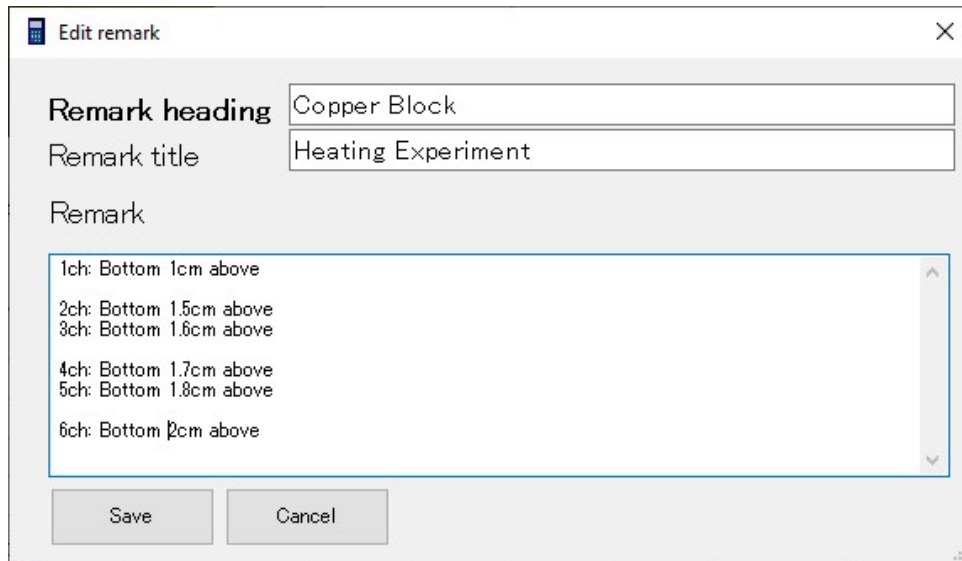
● The title is displayed on the measurement condition screen.
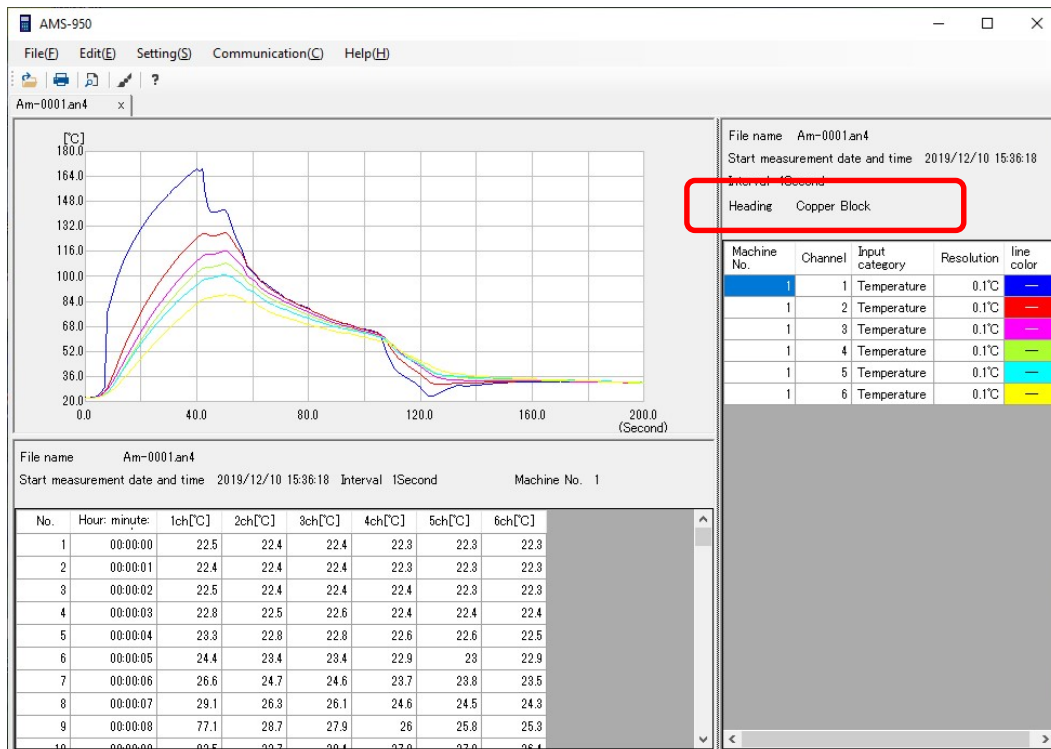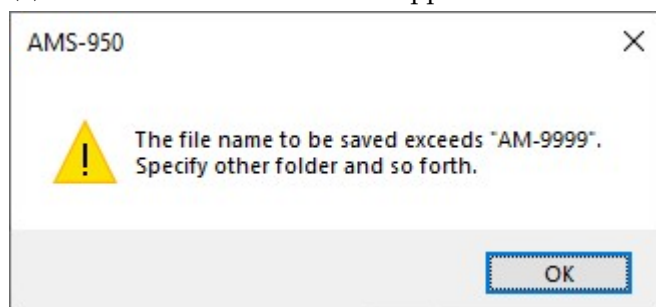
9 Version Information

Selecting [Version information] from the [Help(H)] menu allows you to check the version of this software.
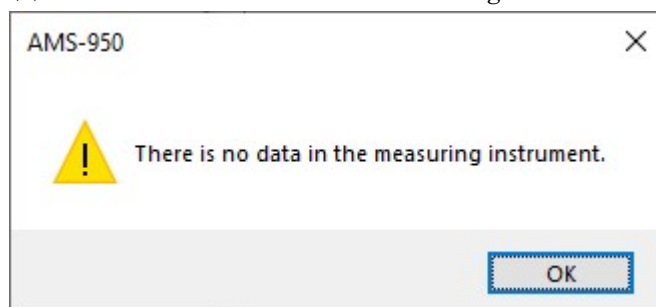

10 Error Messages

This section describes the typical error messages of this application software.
If any of the following messages appears, follow the instructions.

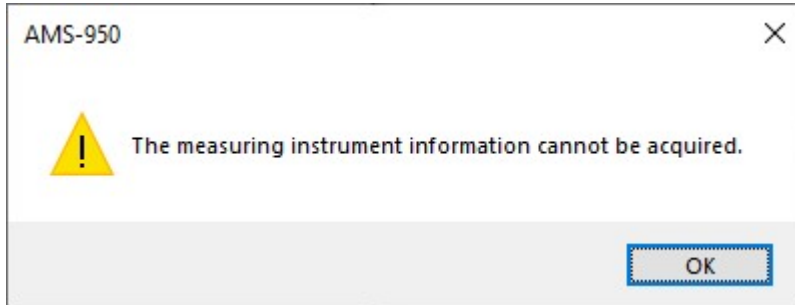(1) The file name reaches the upper limit.

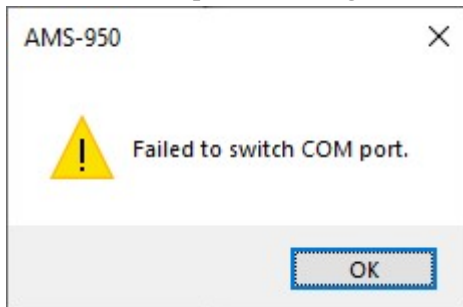See "About File Names" in section 8.4.

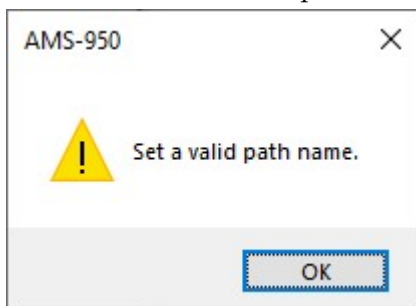(2) No data is stored in the measuring instrument.

(3) It is impossible to communicate with the measuring instrument.

AMS-950 ✕
⚠ The measuring instrument information cannot be acquired.
OK

(4) No serial port is configured.

AMS-950 ✕
⚠ Failed to switch COM port.
OK

(5) The save location path is incorrect.

AMS-950 ✕
⚠ Set a valid path name.
OK

(6) Communication with the measuring instrument is cut off during data input.

AMS-950 ✕
⚠ Data input failed.
OK
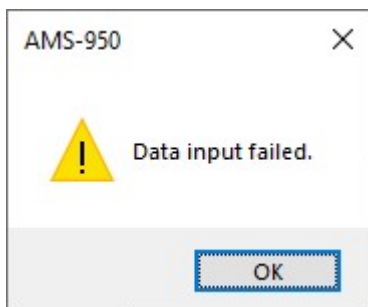
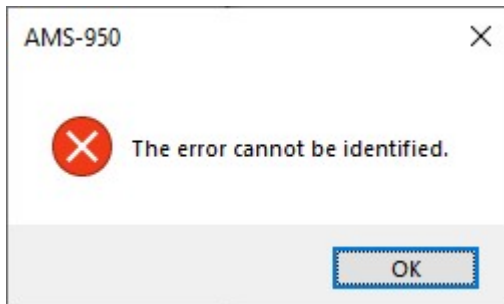(7) A recent file does not exist in the specified location.
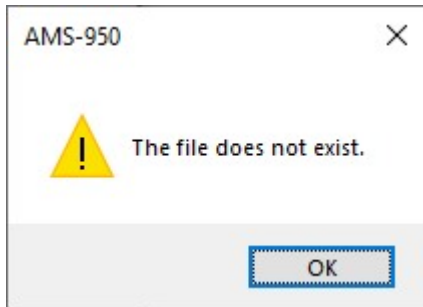
(8) The file is already converted.
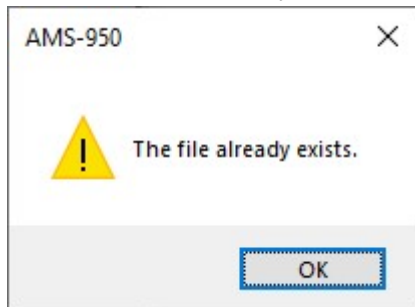
See section 8.10 "How to Use Data in a Spreadsheet Software" and section 8.12 "Preventing Data Falsification".

(9) Other cases

11 Command List

11.1 Description of the Menu Bar

<File(F)>

1) **Open(O)**

    Opens a data file.

2) **File conversion**

    1. **XPS format**
    2. **CSV format**

    Converts graph, data, and measurement condition screens into the specified format.

3) **Print**

    1. <u>P</u>rint
    2. <u>P</u>rint preview

    Prints the active data file or shows a print preview.

4) **Recently used files**

    Shows a history of ten recently used data files.

5) **Close**

    Terminates AMS-950.

<Edit(E)>

1) **Multiple input error conversion**

    Changes the thermocouple type of measured data, and then recalculate temperatures.

    AM-9000, AM-9100, and TWS-1 do not support this function.

2) **Edit remark**

    Allows you to enter file information, etc.

<Setting(S)>

1) **File save location**

    Allows you to set the data save location.

2) **Graph settings**

    Allows you to configure graph settings.

3) **Serial port settings**

    Allows you to configure the communication port.

<Communication(C)>

1) **Data input**

    Transfers data stored in the measuring instrument.

2) **Remote setting**

    Allows you to set the clock of the measuring instrument and the measurement conditions.

3) **Wireless setting (TWS-1/TWS-100 only)**

    1. **Wireless setting(master)**
    2. **Wireless setting (slave)**

    Allow you to configure wireless settings for the measuring instrument.

4) **Real measurement**
    1.   **Measurement setting**
    2.   **Start measurement**
    3.   **Stop measurement**
    Display a graph of data of the measuring instrument in a real-time manner.

5) **Communication test**
    1.   **START command**
    2.   **END command**
    Send commands to the measuring instruments.

\<Help\>
Version information
    Shows information on the version of AMS-950.

11.2 Description of the Toolbar

1) Opens a data file.
2) Prints a graph or data.
3) Shows a print preview of data.
4) Allows you to set the line color/style of a graph.
5) Shows the version information.