OralChroma

HALITOSIS MEASURING DEVICE
CHM-2

Instruction Manual

FIS Inc.

Introduction

Thank you for purchasing an OralChroma (Model: CHM-2), halitosis measuring device.
Before using this unit, please read this instruction manual carefully for correct usage, and keep it near the product for easy accessibility..

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Safety Instructions

<table>
<tr><td align="center">⚠ WARNING</td></tr>
<tr><td>Improper use of the unit may cause physical injury or unit malfunction. For your safety, carefully read and understand this Instruction Manual before you use the OralChroma. Please note that we are not liable for any accident unless the cause of the accident is clearly attributable to failure of the product.</td></tr>
</table>

Shown below are the descriptions and explanations of the warnings and precautions in this instruction manual for the OralChroma.

⚠ **DANGER**:   Failure to follow this instruction may result in loss of life or serious injury.

⚠ **WARNING**:   A warning identifies a potential hazard, which, if ignored, may result in injury from electric shock, fire (burns), etc.

⚠ **CAUTION**:   A caution identifies a potential hazard, which, if ignored, may result in damage to the unit. The caution instructs you to follow the correct operating procedure.

Precautionary Statements

The following precautionary statements must be observed in order to use the unit safely and to make the most of its functions:

⚠️ **WARNING**

- Avoid damaging or abusing the power cord. A short circuit may cause variations in current, resulting in overheating and fire.
- Make sure that the unit is grounded and that the plug is fully inserted into the power supply. Ignoring this warning may cause overheating and fire.
- Avoid inserting/disconnecting the plug into/from the power supply with wet hands. Ignoring this warning may cause serious disaster due to electric shock.
- Do not modify the unit in any way. It may cause an accident or a breakdown.
- Do not insert the syringe for collecting oral gas samples deeply into the oral cavity. Inserting the syringe deeply into the oral cavity may cause injury or respiratory problems.
- If you should recognize something unusual while using the machine, immediately stop operation and contact the sales agent from whom you purchased this unit for inspection and repair.
- If the unit is used in a manner not specified in this manual, the unit's protection may be impaired.

⚠️ **CAUTION**

- Avoid installing, using, or storing the unit under the following conditions, which may cause inaccurate measurements or damage of the unit, as well as significantly decrease product life.
  - Ambient temperature is outside the range of 10 to 30 °C.
  - Ambient relative humidity is above 80%.
  - Temperature and humidity change drastically and condensation occurs.
  - Presence of odor or gas (including hydrogen, methane, odor of alcohol, formalin and other chemicals, cigarettes, or aromatic oils, etc.)
  - Vibration or impact directly affects the unit.
  - Exposure to water, oil, chemical, or steam.
  - Presence of dirt or dust.
  - There is a serious induction problem where static electricity, magnetism, and noise tend to be generated.
  - Exposure to direct sunlight.
  - The airflow from an air conditioner blows directly on the unit.
  - Rooms in which gas- or kerosene-fired heaters are used without ventilation to the outside

- · Places where gas tends to accumulate, such as a low position near a floor.
- This is a single-purpose oral breath-measuring unit. Never inject any material other than breath samples (E.g., liquid substances including chemicals, water, and saliva, or any kind of gas). Ignoring this warning may cause mechanical failure or performance degradation.
- To obtain a stable measurement result, leave the power on during office hours. If you have not powered on the machine for more than one week, the measured value may be lower than the actual value immediately after power on due to the characteristics of the sensor.
- If you are not using the unit for a long period of time, disconnect the plug from the power supply. Ignoring this warning may cause fire.
- Do not wipe the surface with benzine, thinner, alcohol, etc. Use a clean, dry cloth when cleaning. Ignoring this warning may cause inaccurate measurements, degradation of the unit, or fire.
- Do not wipe the syringe by rubbing it with alcohol. Do not touch the syringe with a bare or gloved hand that has been exposed to an antiseptic solution.
- Use only designated syringes.
- Allow ten minutes before measuring if the subject has used a product containing alcohol, such as mouthwash or toothpaste. It may affect the measurement results, or influence measurement value.
- Do not place anything on the machine. Ignoring this warning may cause overheating or damage.
- Do not disassemble the unit. We do not guarantee the accuracy of data or operation of the unit if the unit has been disassembled.

Overview

The OralChroma measures and classifies volatile sulfur compounds in human breath samples into three causal components (hydrogen sulfide, methyl mercaptan, and dimethyl sulfide), then displays each gas concentration on your PC. It is easy to use and requires only four minutes to analyze the sample. It provides more opportunities for people to check their oral breath.

■ Features

- Measures volatile sulfur compounds in the oral breath sample; classifies the sample into three causal components of halitosis: hydrogen sulfide, methyl mercaptan, and dimethyl sulfide; and displays each gas concentration on your PC in units of ng/10 ml and ppb.
- Measures gas concentrations with a high degree of accuracy by using a supersensitive semiconductor gas sensor and a column developed only for the purpose of detecting halitosis.
- Does not require a carrier gas cylinder although the gas chromatograph method has been adopted. Thus, the unit can be considered portable. It is very easy to operate and does not require any specialized knowledge. Just connect it to the power supply and use immediately.
- Requires only 4 minutes to measure the concentration of all three components.
- Small and light, the OralChroma is easy to carry.
- Real-time graphical representation of the measured data is produced by connecting the machine with a PC and using specially designed software.

■ Mechanism of measurement

The following constitutes the procedure for measuring oral breath concentrations:

1. Collect oral breath samples and inject the specified volume of gas into the column.
2. Separate volatile sulfur compounds from the gas by using the column and detect the gases with the semiconductor gas sensor.
3. Calculate gas concentrations from the peak patterns obtained.

■ Components and configuration

Shown below are the components and configuration for the OralChroma.
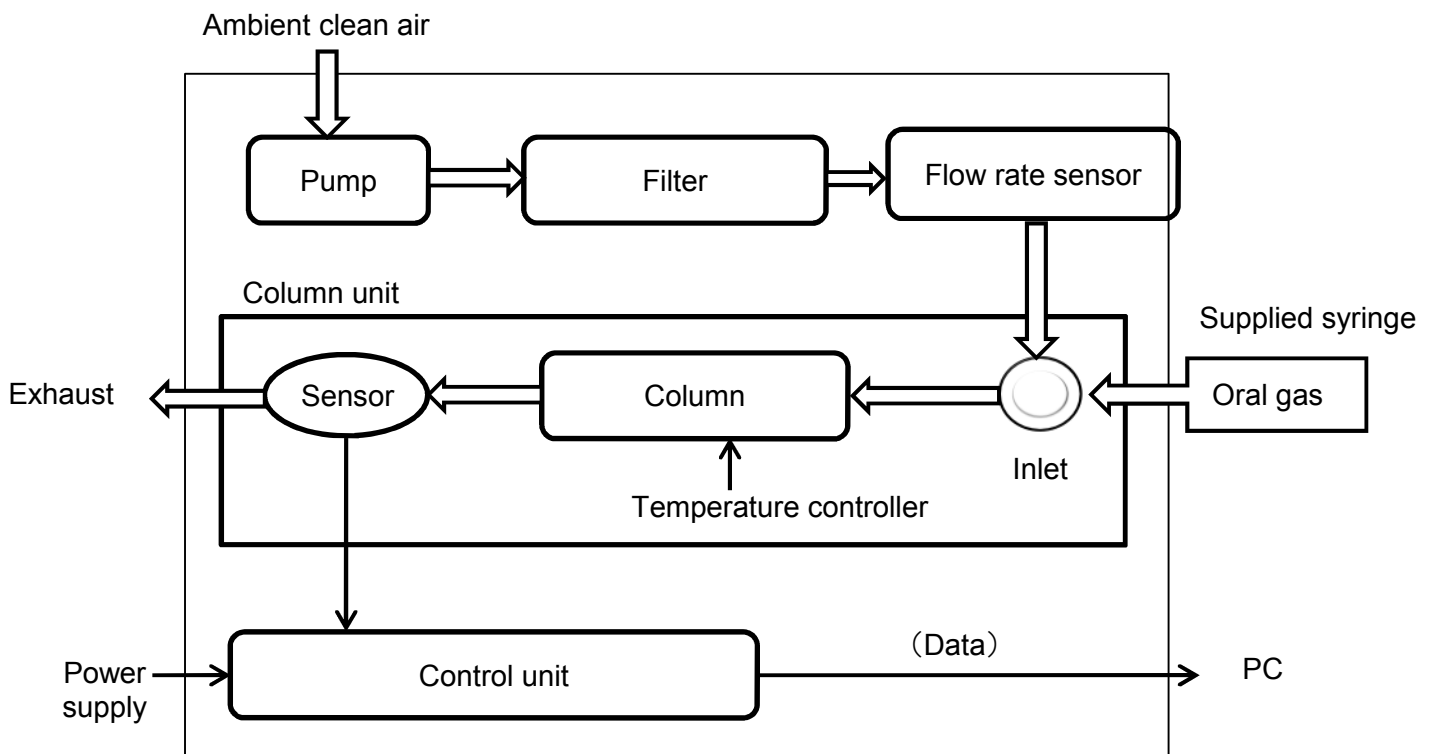
Confirm supplied items

When you receive the OralChroma, immediately check for any damage or abnormal conditions caused during delivery. Check thoroughly to ensure that all accessories are included. If there should be any missing components, damage, or malfunctions, i.e., the unit does not operate according to specifications, contact the agent from whom you purchased the unit.
The unit and all accessories are included in the box. The box and all packing should be kept, as they might be needed later if you send the unit back to us for servicing or warranty repair.

■ List of the contents

Components included	Quantity	Checkbox
OralChroma unit	1	
Power cable	1	
USB cable	1	
Application CD including: · OralChroma DataManager software · Instruction manual · USB driver software	1	
Syringe for collecting oral gas samples	100	
Warranty	1	
Notice of operation	1	

Confirm that all items listed above are included in the package and place a mark in the checkbox.

Names and Functions of Parts

■ Top

Power switch

POWER lamp

ERROR lamp

READY lamp

Lid

Gas inlet

■ Rear

USB port

Main switch

Fuse holder

AC power jack
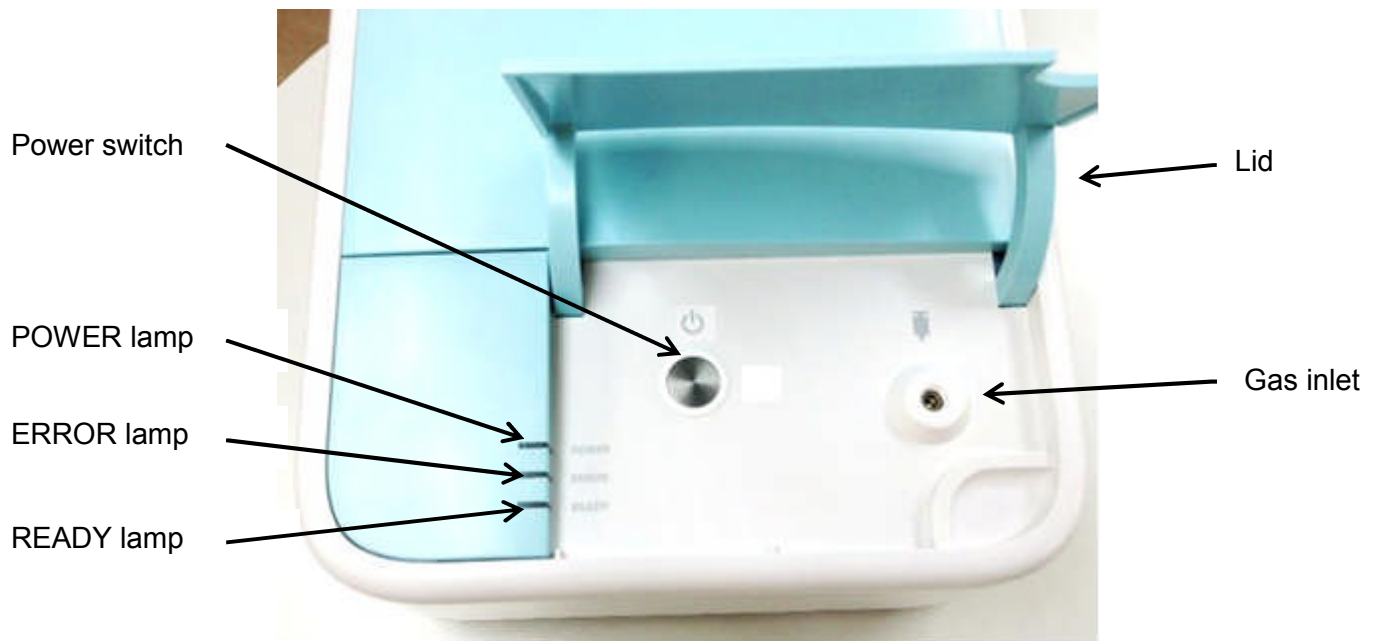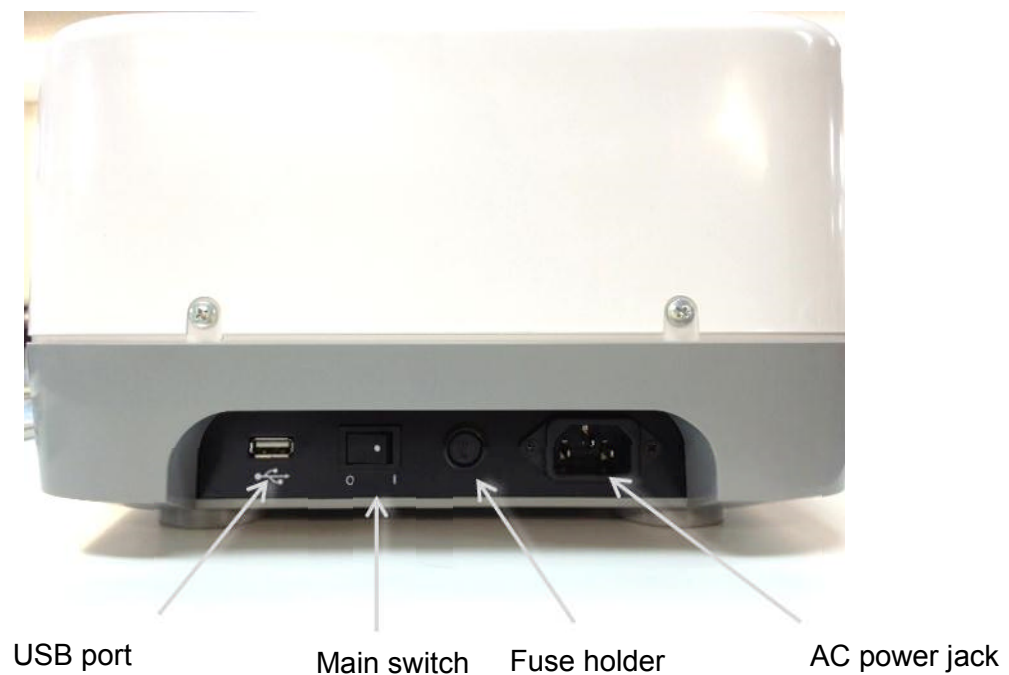
■ Functions

Place	Name	Functions
Top	Lid	Manually open/close Usually closed to prevent dust from coming into gas inlet.
	Gas inlet	Inject oral gas sample into this inlet with a supplied syringe.
	Power switch	Power on/off the unit. Keep pushing until buzzer sounds.
	POWER lamp	Orange light comes on when power is turned on.
	ERROR lamp	Red light comes on when error occurs.
	READY lamp	Green light comes on when the unit is ready for measurement. It goes off when the unit is in Waiting Status[*] or under measurement.
Rear	Main switch	Turning this switch on ("｜") enables you to turn Power switch on. Turn this switch off if not used for a long period.
	AC power jack	Connect a power cable to this jack.
	Fuse holder （Power supply fuse）	Check the fuse in the holder when abnormality occurs. Rating：3.15A, 250V （Mfr: Littelfuse, Model: 213_3.15）
	USB port	Connect the supplied USB cable to this port.

*Waiting Status: The status under which internal sensor and column are being stabilized after power-on or measurement.

Setting up the unit

■ How to set the unit before measurement.

1. Place the unit on a flat and stable place.

⚠ **CAUTION**
Position the OralChroma unit so that power cord and USB cable can be easily connected to or disconnected from the unit.

2. Connect power cord to the unit, then to receptacle of AC supply.

3. Do not connect the unit to PC with the supplied USB cable until the USB driver soft is installed. See page 10, "Setting up the PC" for details.

⚠ **CAUTION**
Do not start measurement. PC setup is required initially.

Setting up the PC

You need a personal computer (PC) and the supplied CD including "OralChroma DataManager" software to start measurement.
Prepare the PC specified below by yourself.

■ System requirements

OS	Windows XP（SP3）、Windows Vista(32/64bit), Windows 7(32/64bit), Windows 8(32/64bit)
Computer	Hardware on which the above OS runs without problems.
Display	XGA(1024×768) or higher
I/O	USB port: 1 port
CD drive	1 unit

Note: Install USB driver software in the supplied CD before installing DataManager.

⚠ CAUTION
Only the user with administrator privilege should install/un-install OralChroma DataManager.

■ Installing USB driver software

1. Power on the PC and start Windows.

2. Insert the supplied CD into the CD drive.

3. When the set up window appears, click "USB driver."

4. Follow the directions displayed on the window to proceed with the installation.

5. When the window below appears, click OK to complete the installation.
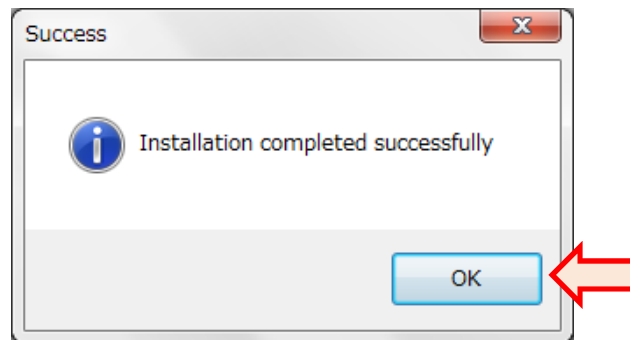
Installing and starting up the OralChroma DataManager

■ Installing OralChroma DataManager

1. Insert the supplied CD into the CD drive.

2. The setup program is automatically started. At this time, the warning window below may appear depending on your security status. If it does, click YES.
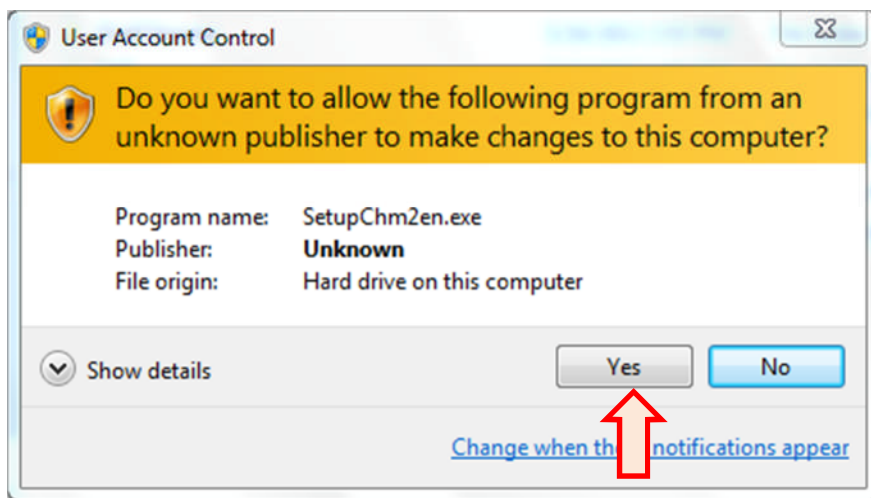
3. When the setup window appears, click "**OralChroma DataManager**" to proceed the installation.

4. When the window below appears, click "**OK**" to complete the installation.
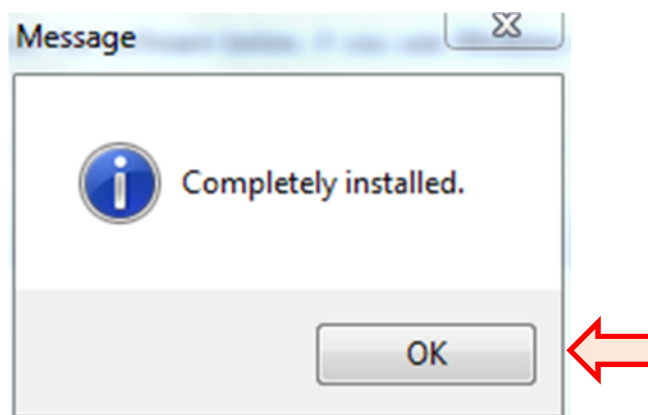
5. The following folder where the DataManager is installed appears.
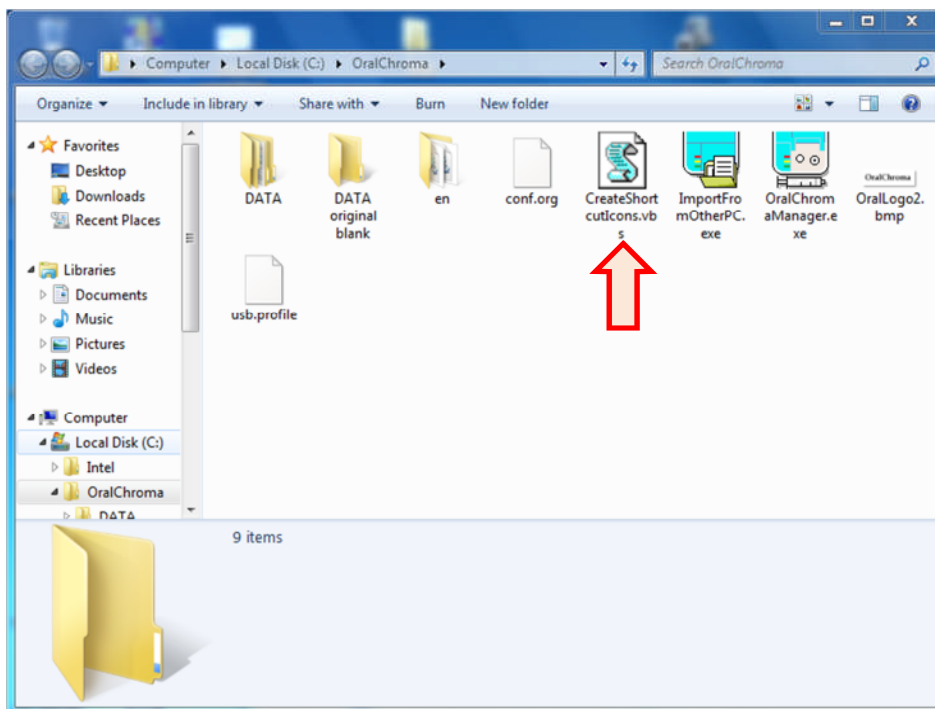
6. Double-click "**CreateShortcutIcons**" to create shortcut icons for DataManager and its manual on the desktop.

7. Close the setup window. At this time, the confirmation window below may appear depending on your security status. If it does, click "**This program installed correctly**."
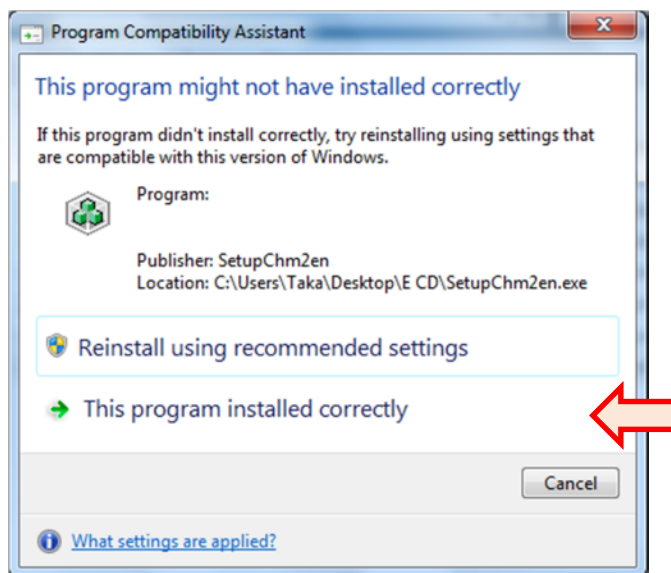
■ Starting OralChroma DataManager

1. Double-click "**OralChroma**" shortcut icon on the Windows desktop. When you first activate the program after installation, a message "**Select COM port.**" appears. Click "**OK**."
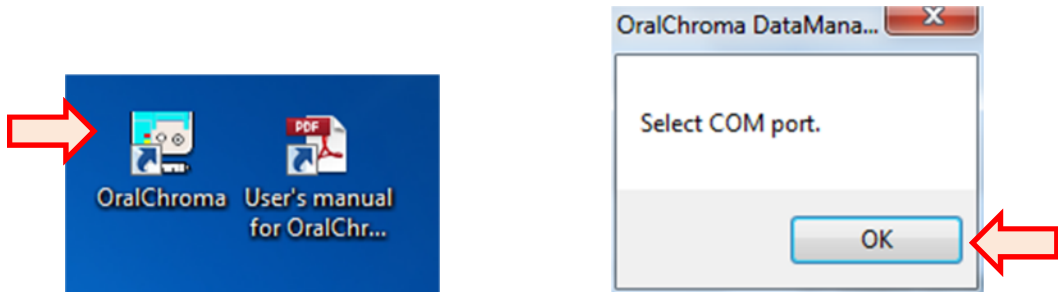
2. The OralChroma DataManager top window appears as below. This window is referred to as "**Main window**."
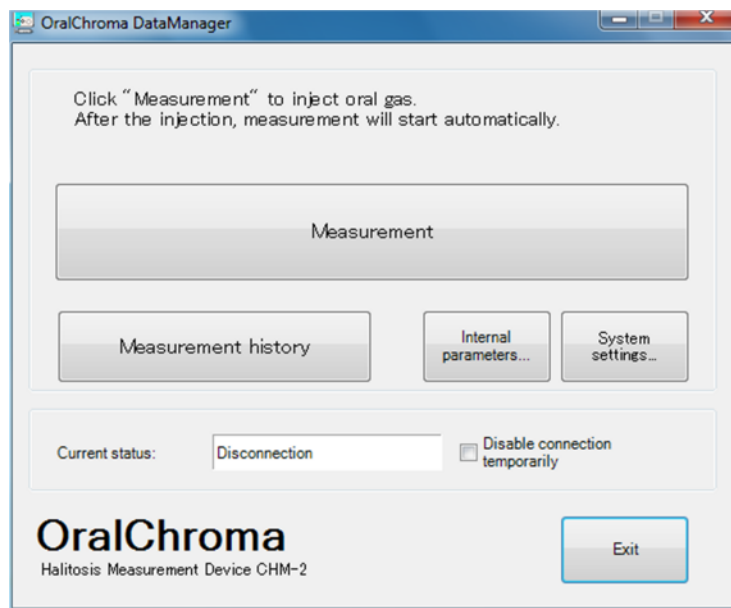
■ Uninstalling OralChroma DataManager

Delete "OralChroma" folder which is usually created under "C:\." Since the DATA folder is initially in this "OralChroma" folder, copy the DATA folder to another place by using "Export data folder" (See page 76.)

Importing data from the old version

Data files between current and old version DataManager softwares are not compatible.
If your PC has the old version, its data should be imported into the current version in advance.

■ How to import

1. Click "**System settings…**" on Main window.
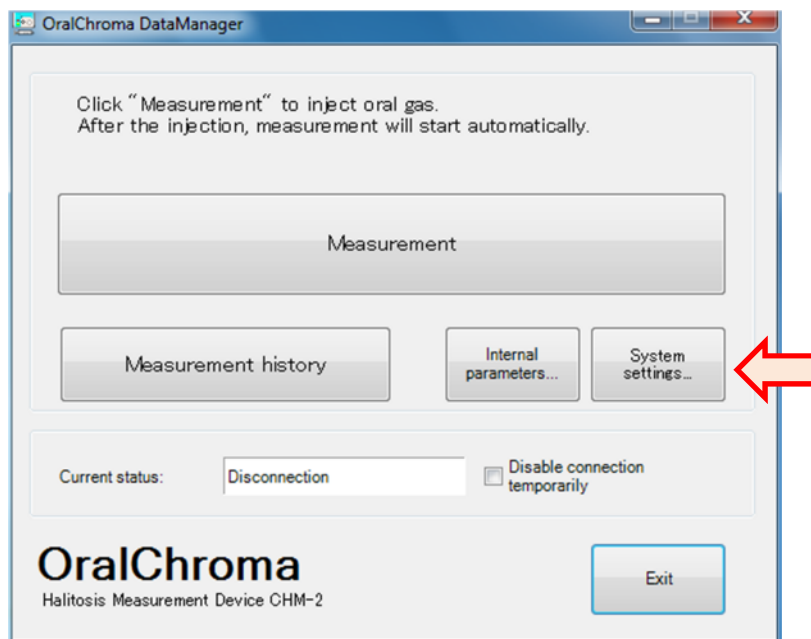
2. Select "**General**" tab to click "**Import data….**"
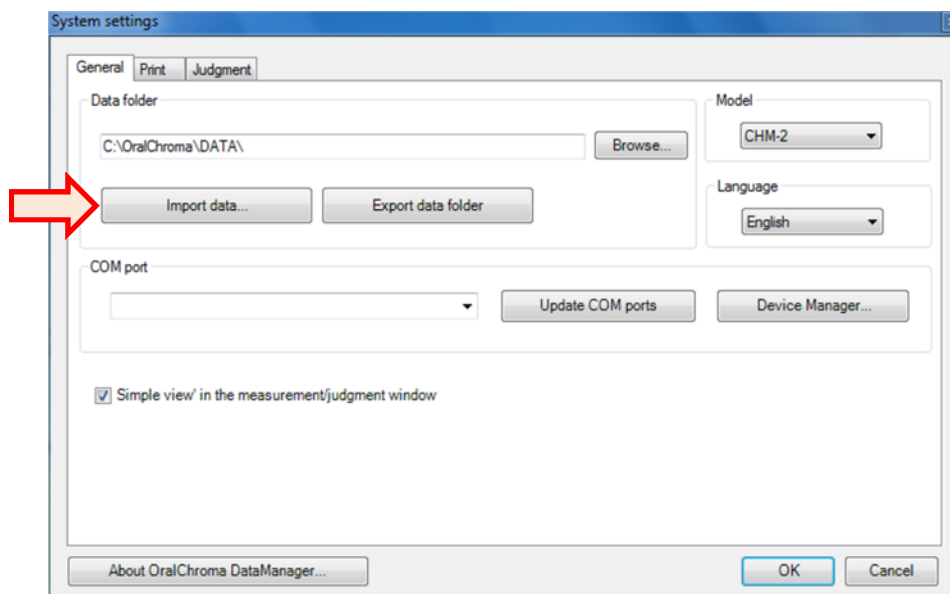
3. Data importing window appears.
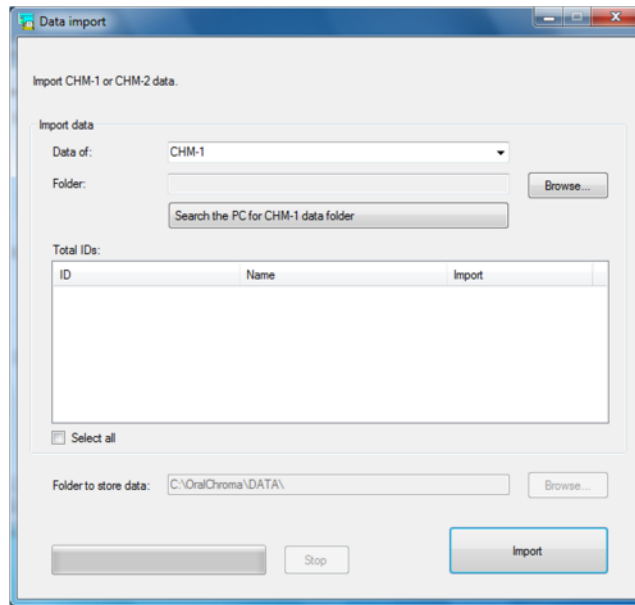
4. Select "**CHM-1**" for "**Data of**" column.
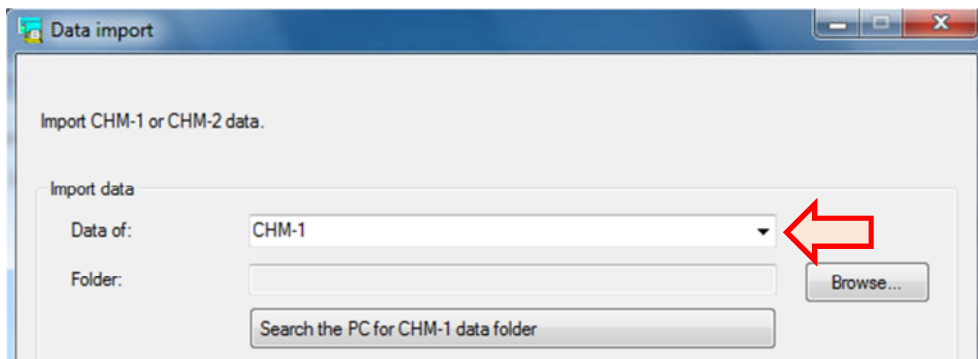
5. Click "Search the PC for CHM-1 data folder."
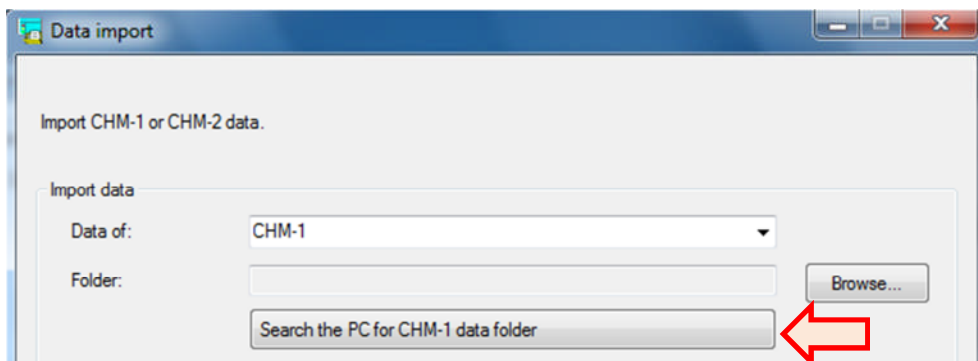
6. When PC finds the CHM-1 data folder, it is automatically imported in the "**Folder**" column and the data are shown as below. Click "**Import**."
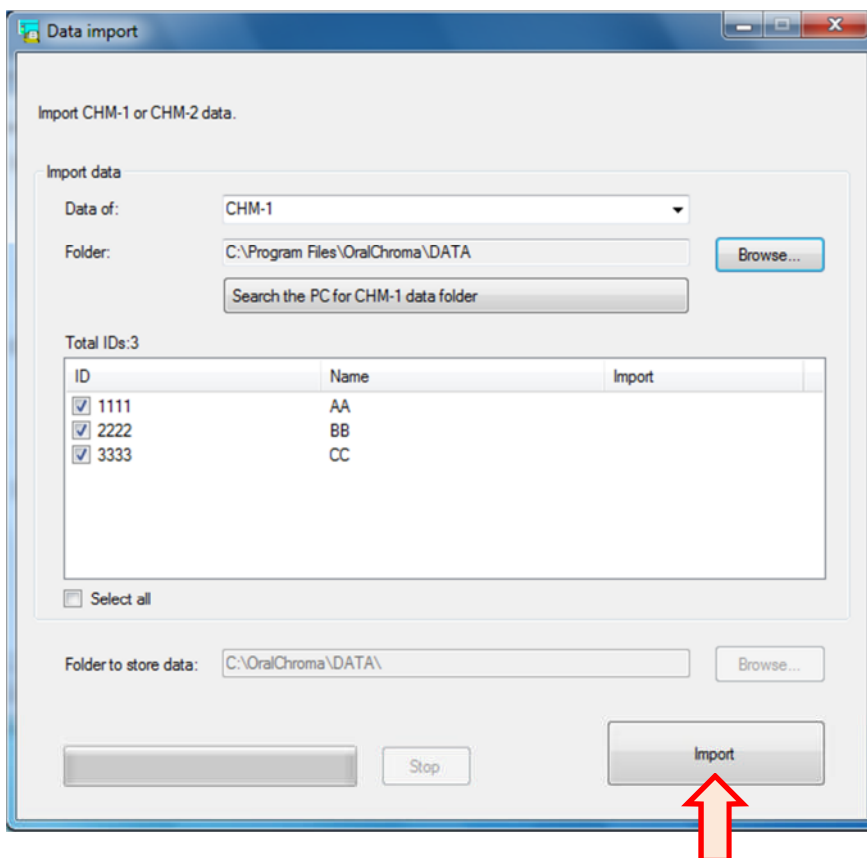
Note: If CHM-1 data folder cannot be found…
When your OS is Windows Vista, 7, or 8, the CHM-1 data folder may not be found, depending on your security settings on the OS. In this case, check "Show hidden files, folders, and drives" in View tab of Folder Options window. After that, click "**Browse**" to specify the folder below:
C:\Users\XXX\AppData\Local\VirtualStore\Program Files\OralChroma\DATA
XXX: Your log-in name
Program Files: This may be Program Files (x86) if the OS is 64 bit.

7. The message, "**Start to import**" appears. Click "**OK**."
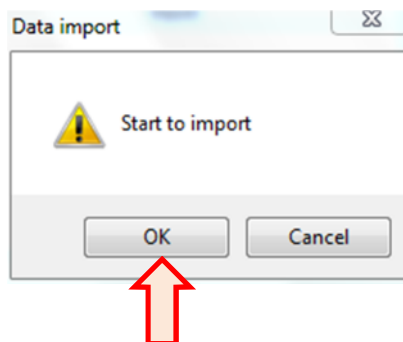
8. After the data import is executed, the results are shown in "**Import**" column as below.
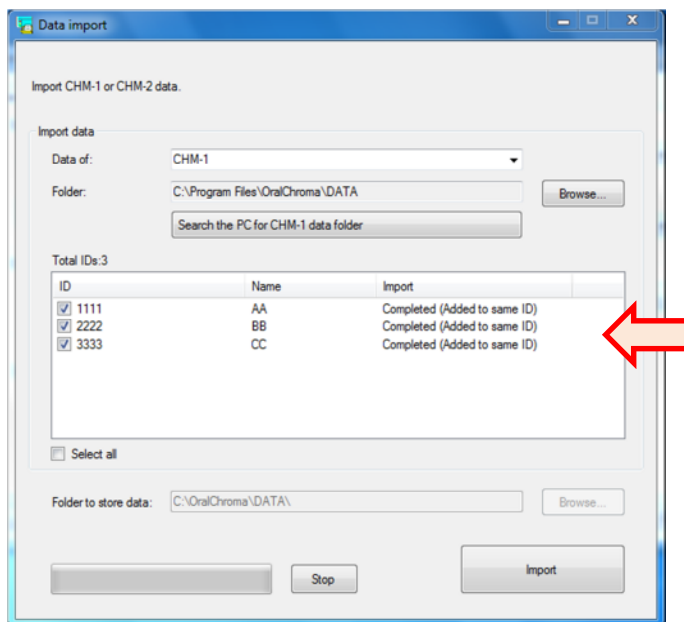
The meaning of messages in "**Import**" column is as listed below.

Completed (New ID created)	ID and data of the old version were successfully imported.
Completed (Added to same ID)	Because old version's ID exists in the current version data folder, the old version data was added to the ID in the current data folder.
Failed to import	Because old data folder and/or files have some errors, the old data could not be imported.

9. Click "**x**" to close the window.
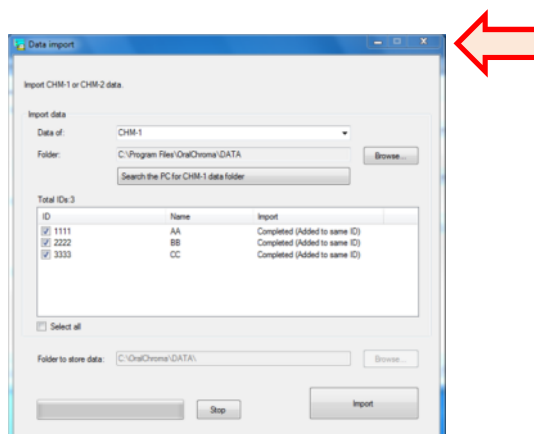
10. Click "**Cancel**" in System setting window to return to "Main window."

Initial set up of OralChroma DataManager

It is necessary to make the following setting for the DataManager before measurement.

■ Setting communication port number

Setting the communication port number you connect OralChroma to.

⚠ **CAUTION**
When you first use OralChroma and DataManager, be sure to set the communication port number you connect OralChroma to before measurement.

1. Connect the PC to OralChroma with the supplied USB cable and power on the OralChroma.
2. Select "**General**" tab in "**System settings**" window.
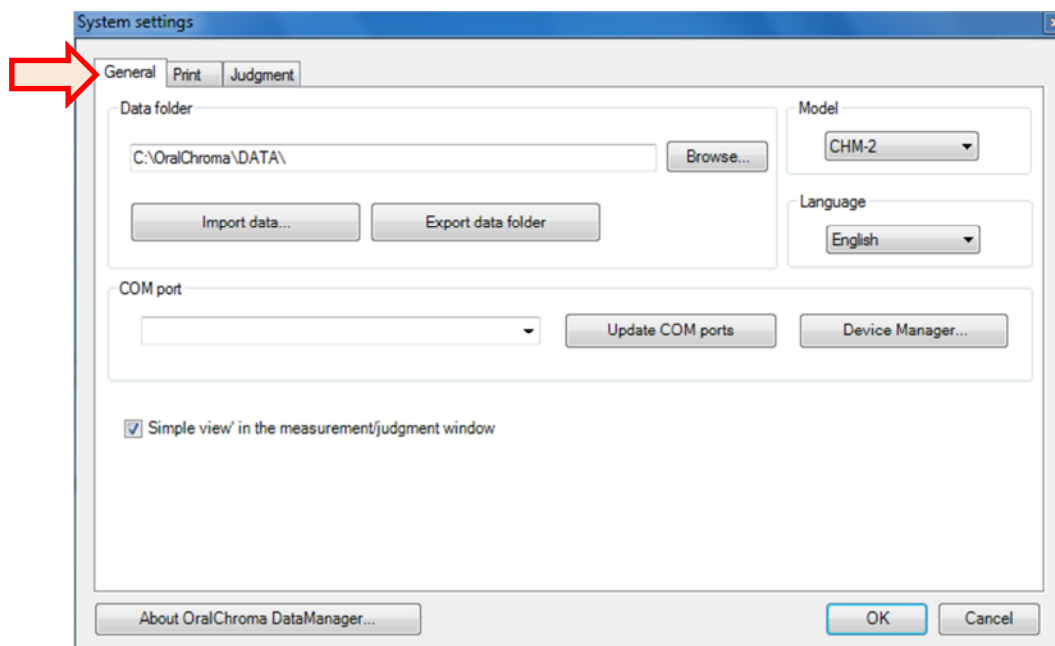
3. Click the drop-down list in "**COM port**" to specify the port number you connect OralChroma to. If no COM port appears, click "**Update COM ports**" to update the status.
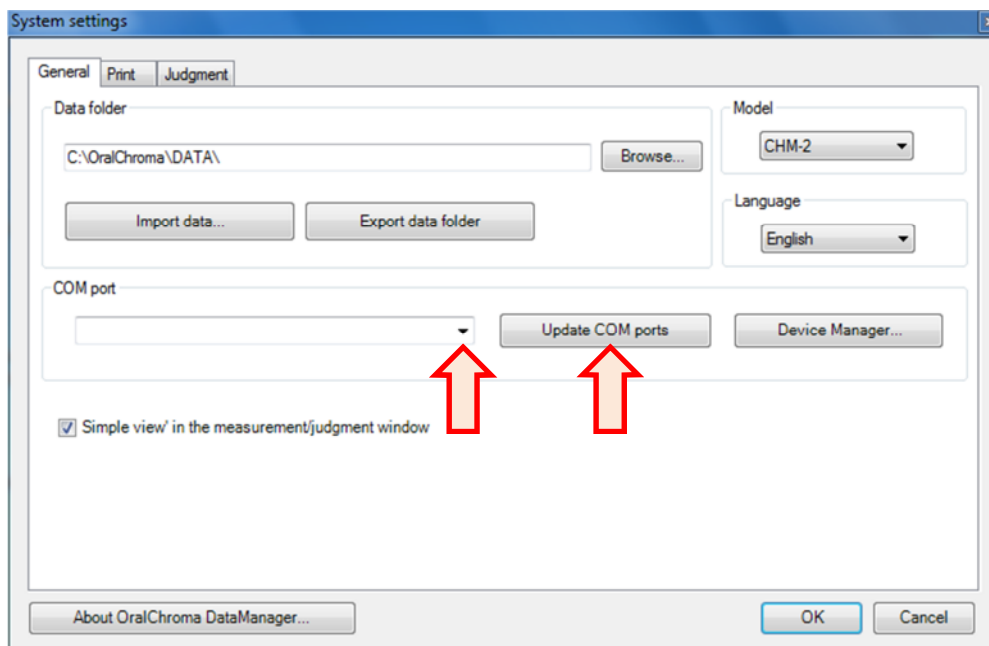
If several ports are listed and the correct port No. is unknown, click "**Device Manager**" to confirm as below.
Select "**Port (COM & LPT)**" to find "**Silicon Labs CP210x USB to UART Bridge (COMx)**."
The COMx is the connection port to OralChroma. COM11 is correct No. as shown in the picture below.
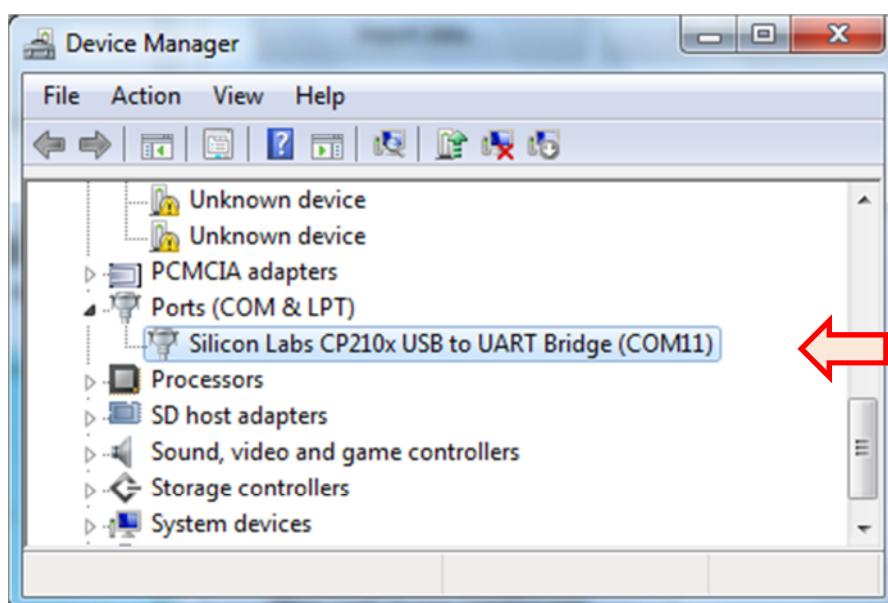
■ Setting data folder

As a default, the folder where the measurement data are stored is a subfolder under the software installed folder.

1. Select "**General**" tab in "**System settings**" window and click "**Browse**."
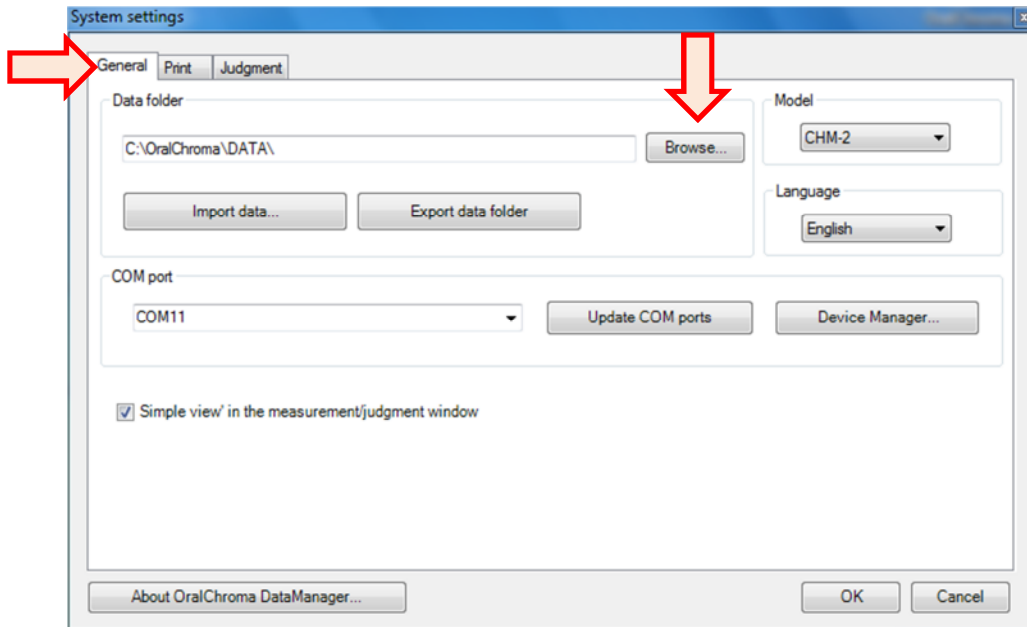
2. Specify the folder where the measurement data is saved in "**Browse For Folder**" window, and click "**OK**."
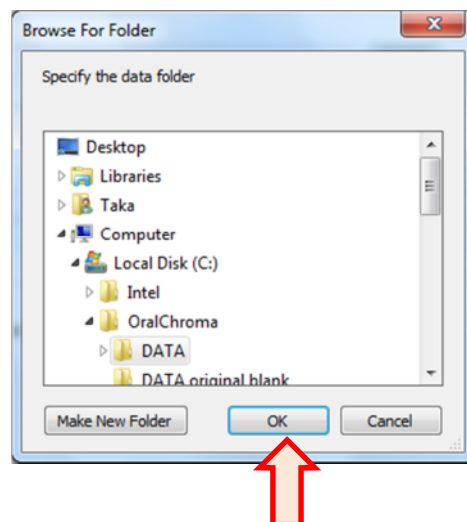
■ Setting user information column

You can input your own clinic logo, information or message to display on the upper right space of "**Judgment"** window or on printed paper.
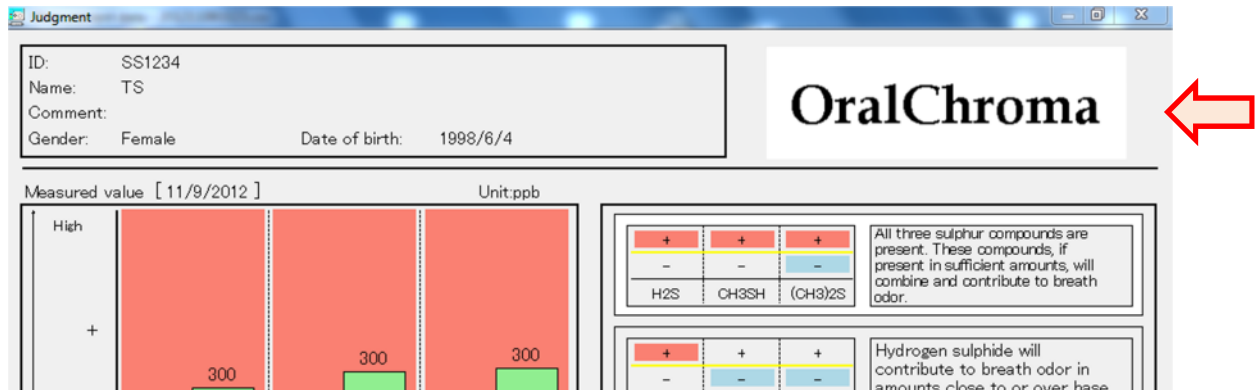
OralChroma logo is shown as an initial setting.
The message and/or logo is also displayed on the lower right of measurement data window and measurement history window.

● How to insert picture

1. Select "**Print**" tab in "**System setting**" window and click "**Picture**."
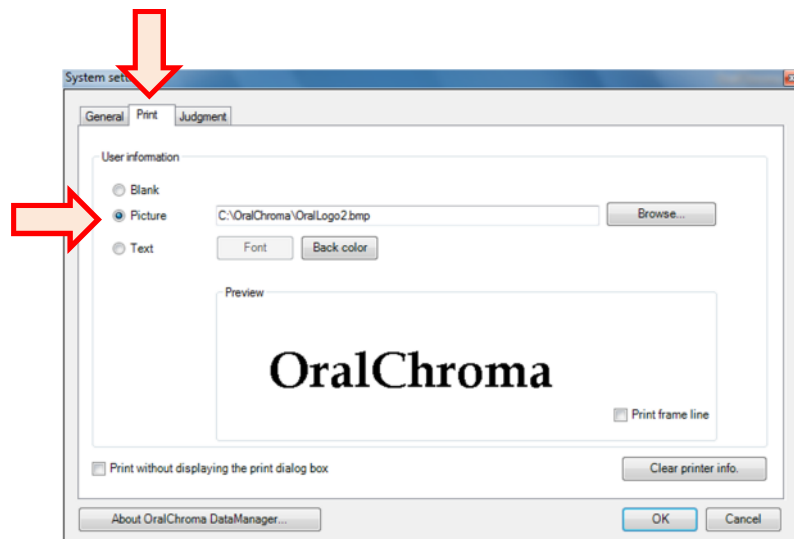
$2.$ Click "**Browse…**" to specify the picture file you want to use.
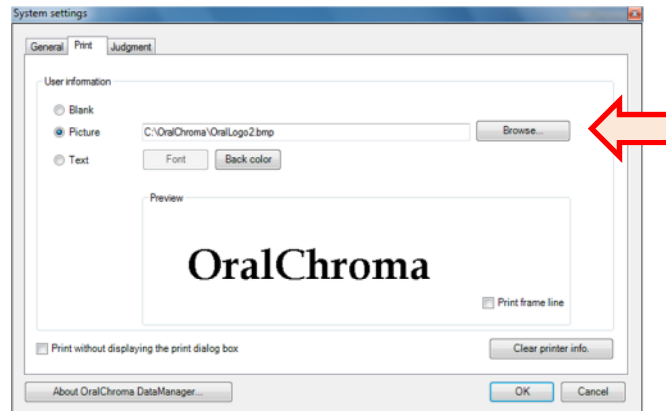
The image format that can be used is JPG, BMP, GIF, or PNG.
The default image size is 320×100 pixels. For larger or smaller size images, DataManager automatically resizes the picture to fit within the default image size.
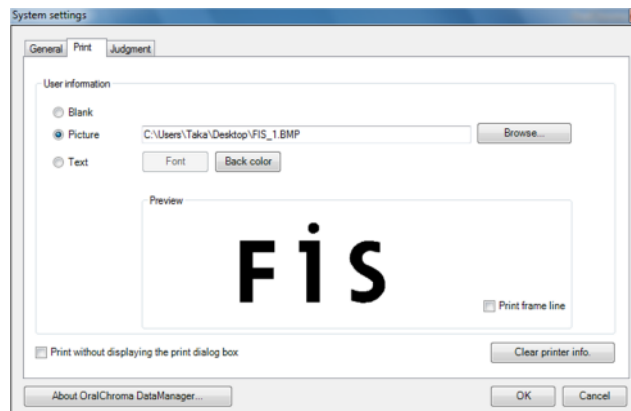
● How to insert the text

1. Select "**Print**" tab in "**System setting" window**" and click "**Text**."
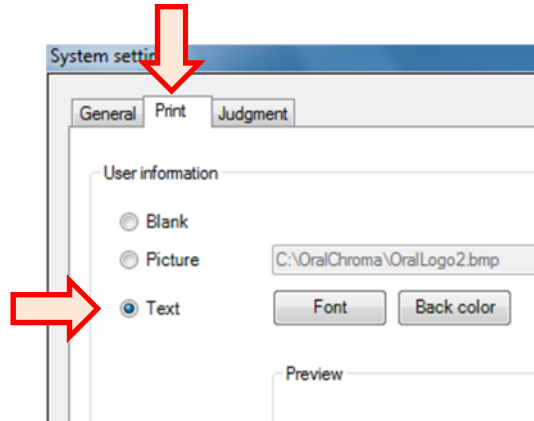
2. Click "**Preview**" box to enter text.
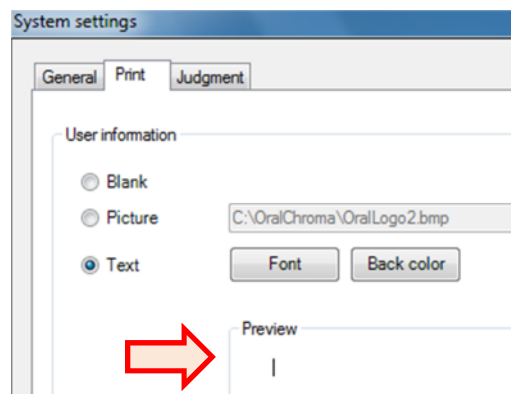
3. Click "**Font**" to change font and color.
4. Click "**Back color**" to change the background color.
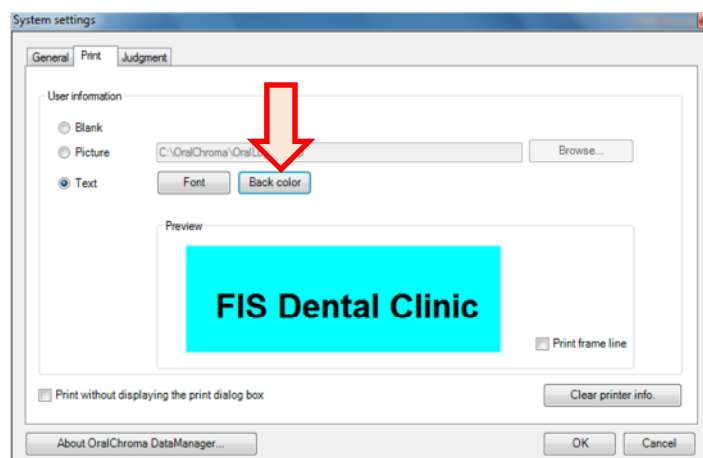
■ Setting the judgment

You can define the settings required for making judgments on the measurement value.

● Cognitive threshold

1. Click "**Judgment**" tab in "**System setting**" window.

2. Specify a threshold, a criterion for judgment, for each gas by clicking the up/down button. The unit is "ppb" and the default values are shown below:

General	Print	Judgment

Cognitive threshold (ppb)

Hydrogen sulfide[H2S]   112

Methyl mercaptan[CH3SH]   26

Dimethyl sulfide[(CH3)2S]   8

● Max of Y-axis for simple view mode

1. Click "**Judgment**" tab in "**System setting**" window.

2. Specify a maximum concentration of Y-axis for each gas by clicking the up/down button. The unit is "ppb" and the default values are shown below. This setting is effective for simple view mode only.

Max of Y-axis(ppb)

Hydrogen sulfide[H2S]   200

Methyl mercaptan[CH3SH]   200

Dimethyl sulfide[(CH3)2S]   200

● Editing judgment sentences

1. Click "**Judgment**" tab in "**System settings**" window.

2. Select one comment you want to change.

3. Enter texts.

4. The comment is changed by Enter or Tab key, or clicking the different cell in the table.

There is no upper limit for the numbers of characters. But when the numbers of characters increases, the font size becomes small, then the comments become hard to recognize.

5. Enter ESC key while editing the comment to cancel the change.

6. Click "**Discard comment changes**" to restore the comments when you opened this window.

■ Saving the setting change

Click "**OK**" on the "**System settings**" window to save the changes. Click "**Cancel**" button or "**x**" at upper right to close the window without saving the changes.

Preparing for measurement

■ Connecting OralChroma to a PC

For initial measurement, make sure to connect the OralChroma unit to a PC in this procedure. Because the connection in this procedure is not necessary after the initial measurement, start directly "Activating the unit"(page 28) excluding the following cases.
- **When you remove the power cord from the unit,**
- **When you turn off the main switch on the back, or**
- **When the power is down due to power failure, etc.**

1. Make sure that OralChroma is connected to PC with USB cable.

⚠ CAUTION
Do not yet turn on PC nor the Main switch of OralChroma

2. Turn on the PC to run **OralChroma DataManager**.

3. Confirm that "**Current status**" is "**Power off**."
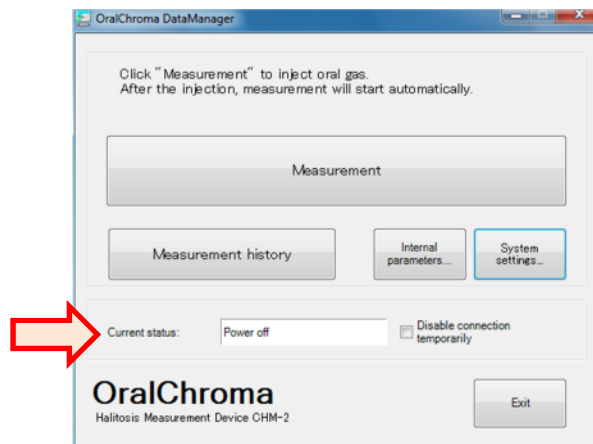
⚠ CAUTION
If the "**Disconnection**" is shown in "**Current status**", check if the USB cable is connected, USB driver software is installed, and COM port is properly set.

4. Turn on the Main switch (|) at the back of the unit.

■ Activating the unit

1. Open lid and keep pushing "Power switch" until the buzzer sounds. After that all lamps turn on for 3 seconds, after that the orange POWER lamp will glow, indicating the unit status "Waiting."

2. After several seconds, confirm that Current status indicates "**Waiting...**"
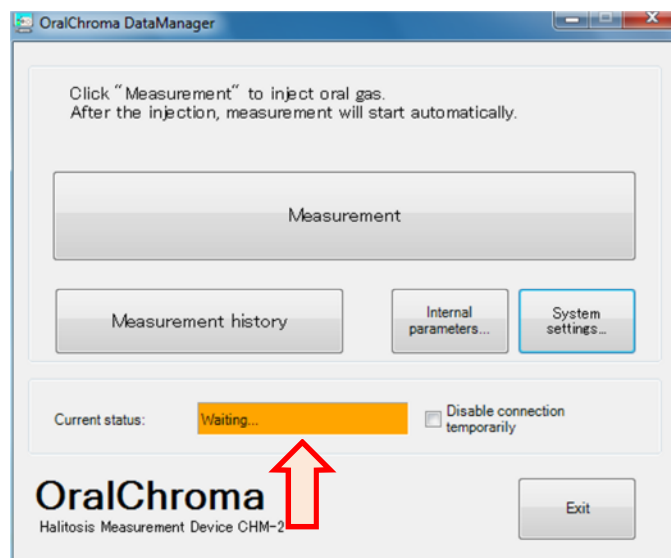
This waiting time is usually set as 60 minutes maximum. Green READY lamp turns on when the status becomes "**Ready to measure**" after the sensor and column in the OralChroma is stabilized.
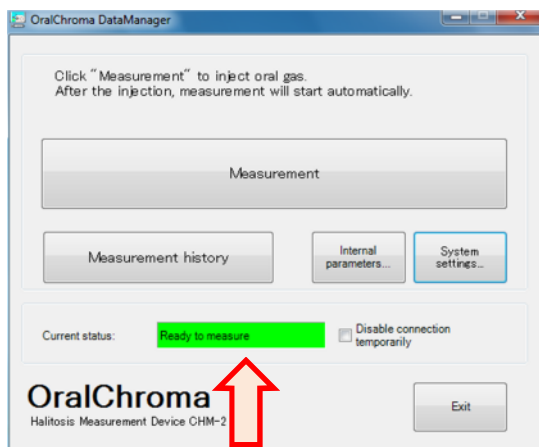
⚠ CAUTION

You can measure only when the green READY lamp on the unit is on.
If you mistakenly inject the sample breath gas to OralChroma when the lamp is off, "Waiting" time could be longer.

If the OralChroma has been powered off for a long period of time, or in case of immediately after the purchase, the Waiting time could continue more than 60 minutes due to the self-checking function of the OralChroma.

When the sensor and/or column does not become stable even after one hour, the red ERROR lamp turns on and the Current status on the Main window of the software shows the error of "Stability error.".

In this case, turn off the Main switch of OralChroma, wait for 30 minutes, then turn it on. "Connecting OralChroma to PC" in the previous section should be followed.

⚠ CAUTION

Repeat this procedure several times if Waiting time is still long with ERROR lamp lit.
In case the READY lamp hasn't turned on yet, power off the OralChroma and contact the agent from which you purchsed the OralChroma.

■ Registering subjects

OralChroma DataManager manages the measurement data with registered IDs, names, etc. of subjects. Register the new subject or select the registered subject before the measurement.

1. Turn on the PC to run OralChroma DataManager.
2. Click "**Measurement**" on the Main window.
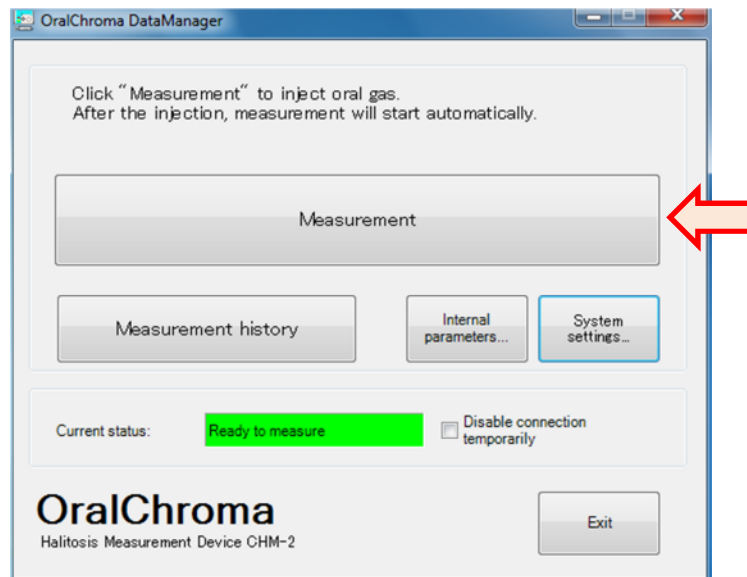
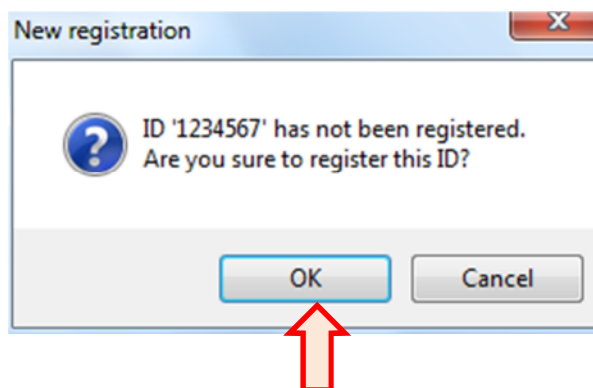3. The "**Measurement data**" window is displayed and then the "**ID entry**" window is displayed.
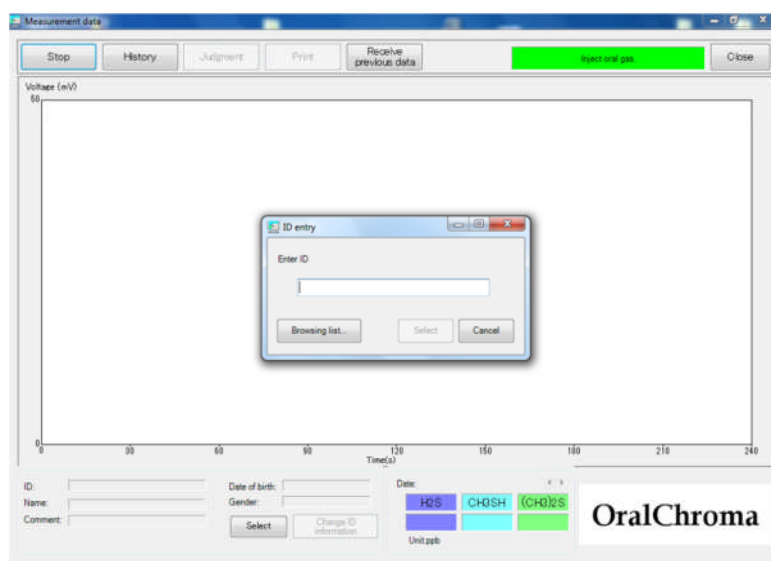
Follow the procedures below for registering new ID. Skip the procedure below for selecting already registered ID and go to [**Selecting registered ID**] or [**Selecting registered ID from a list**.]

● [Registering new ID]

1. Enter new ID on "**ID entry**" window and click "**Select**."
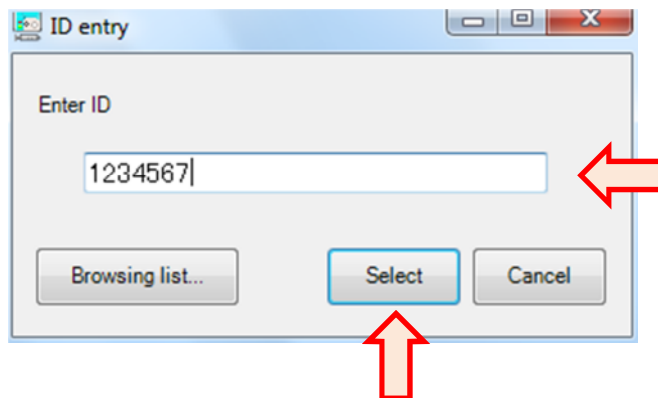
2. Confirmation window for new registration appears. Click "**OK**."

3. Enter the information of new subject.

Details on fields are as below:

Field	Content	Remarks
ID	Characters identifying subject	·Already registered ID cannot be registered. ·30 characters maximum ·Prohibited characters: \ / : * ? " < >	, ·Not case sensitive
Name	Subject name	·30 characters maximum ·Can be omitted
Comment	Comments	·30 characters maximum ·Can be omitted
Date of birth	Date of birth of subject	·30 characters maximum ·Can be omitted
Gender	Male or Female	·Select Male, Female, or "blank."

4. Click "**Register**" after filling fields. Confirmation window appears. Click "**OK**."
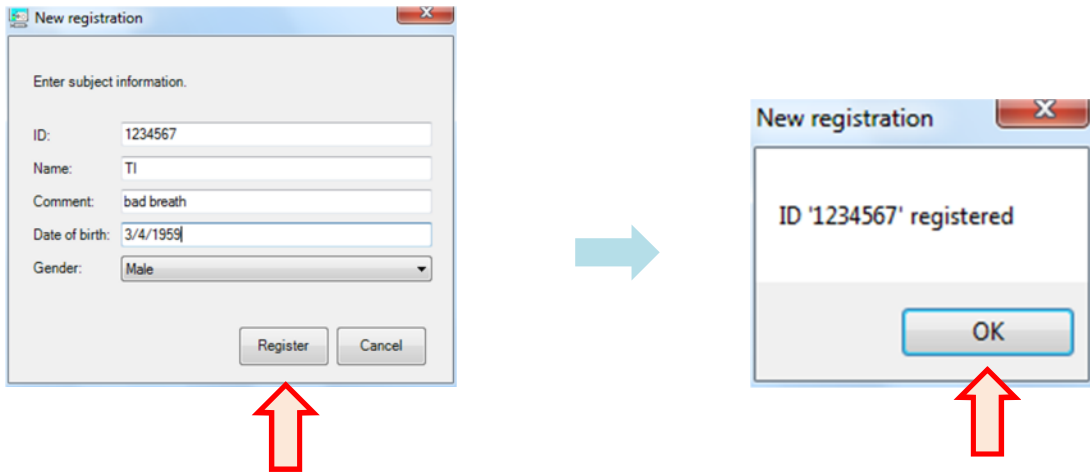
● [Selecting registered ID]

When entering character by character, the partially matched registered IDs are listed. Select one you want to use, then click "**Select**."
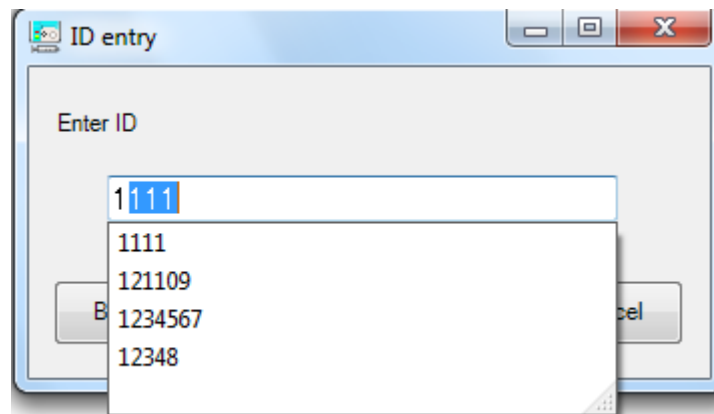
● [Selecting registered ID from a list]

1. Click "Browsing list…."
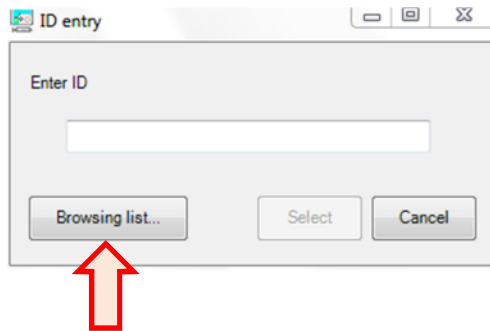
2. ID list appears. Select the subject and click "**Select**."
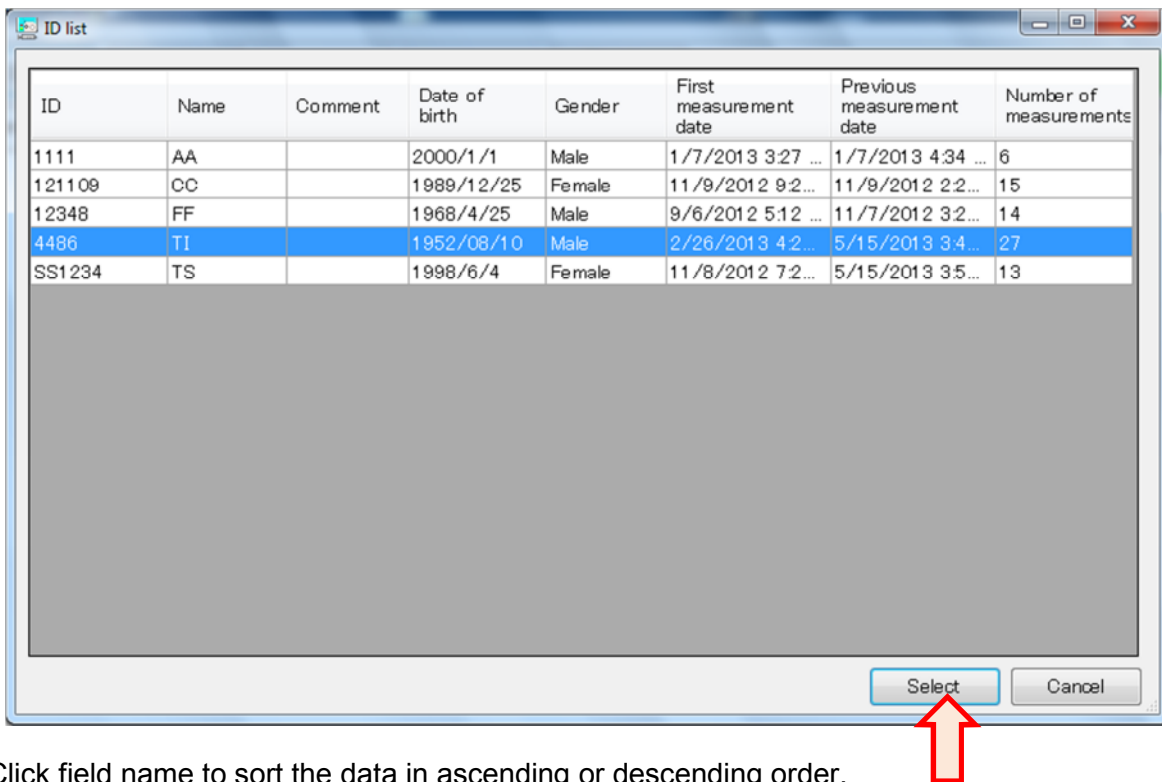
Click field name to sort the data in ascending or descending order.

After completing ID entry, the specified subject data appears on "**Measurement data**" window and the OralChroma is ready to measure.
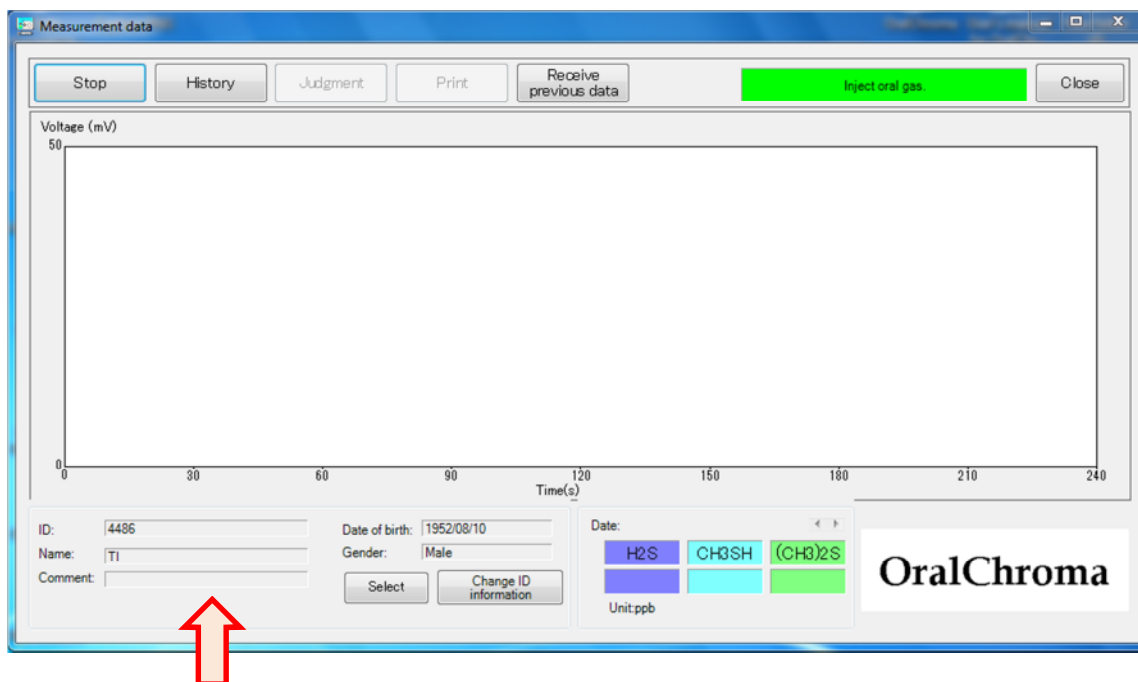
⚠ **CAUTION**
In case you inject the sample gas before clicking "Measurement" on Main window, Measurement data window with plotting data and ID entry window appear. Proceed ID entry as described above before completing the measurement, or the measured data will not be stored automatically. Even if you cannot complete ID entry while measurement, complete ID entry anyway. You can save the data by clicking "Select" on "Measurement data" window to select proper ID and click "Select."

Measurement

Sampling oral gas and injecting it to OralChroma.

■ Sampling oral gas

1. Take a syringe from the sealed bag.
2. Insert the syringe into the oral cavity until the flange reaches the lips. Softly bite on the syringe to fix it and close the mouth tightly.

Plunger   Flange
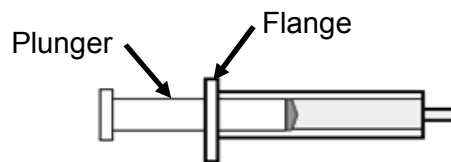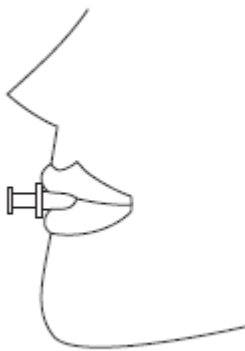
⚠ DANGER

- Be careful not to stick the tip of the syringe into the throat or place the complete syringe into the oral cavity.
- Children and handicapped people must not collect oral gas by themselves because of the possibility of swallowing the syringe. Doctors must hold the syringe during collection so that the subjects do not swallow it.
- Avoid collecting oral gas from the subjects while lying down because of the possibility of swallowing the syringe.
- Do not use the system with people who are incapable of closing their mouth tightly because of the possibility of swallowing the syringe.
- The subjects shall hold the syringe with their hand while it is in their oral cavity. Do not look up; keep the syringe in a horizontal position to avoid the possibility of swallowing the syringe.

<div style="border: 1px solid black; padding: 10px;">

⚠ WARNING

- Always use a new and unopened syringe. When you open the package, use the syringe immediately.
- Do not reuse the syringe. Doing so may cause infection. Used syringes shall be discarded according to the applicable laws of your country or region.
- If the syringe should cause any abnormalities to the lips or oral cavity, stop using it immediately.

</div>

<div style="border: 1px solid black; padding: 10px;">

⚠ CAUTION

When you sample oral gas immediately after using mouth washes and/or tooth powders, the included alcohols may influence the measurement.
Wait some time and then measure it.

</div>

3. Breathe through the nose, while keeping the oral cavity sealed and unventilated for at least 30 seconds. Avoid touching the tip of the syringe with the tongue.

<div style="border: 1px solid black; padding: 10px;">

⚠ CAUTION

Avoid putting saliva on the syringe. Touching the tip of the syringe with the tongue may allow saliva to enter the syringe, which may cause inaccurate measurements.

</div>

4. After 30 seconds or more, pull the piston to the very end of the syringe, and fill the syringe with a breath sample from the oral cavity. Then push the piston and return the gas to the oral cavity. Pull the piston again to the very end of the syringe to fill it with another breath sample and this time remove the syringe from the oral cavity.

   * To eliminate unwanted air in the syringe, this process requires pulling the piston twice.

5. Remove saliva from the tip of the syringe with tissue paper.

⚠ CAUTION
Do not rub syringe with alcohol to remove the saliva. If such alcohol enters into OralChroma, the accurate measurement cannot be expected because the sensor and other components in OralChroma become unstable.

6. Slowly push the plunger to the 1 cc (ml) position.

Adjust to 1cc.
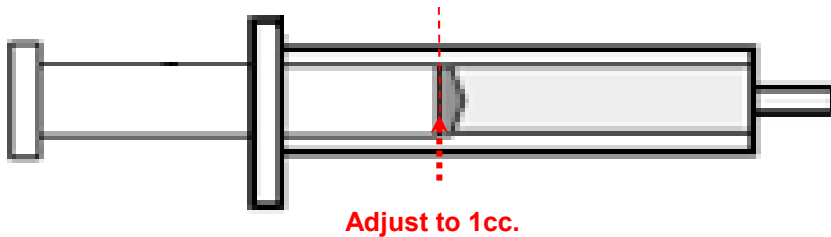
⚠ CAUTION
Inject the sampled gas within one minute after collecting the gas. If time elapses, the measurement result could be inaccurate because the gas may leak from the syringe or adsorb on to the inside surface of the syringe.

■ Injecting oral gas

1. Confirm that "**Inject oral gas**" is displayed at upper right of "**Measurement data**" window and that green READY lamp of OralChroma is lit.
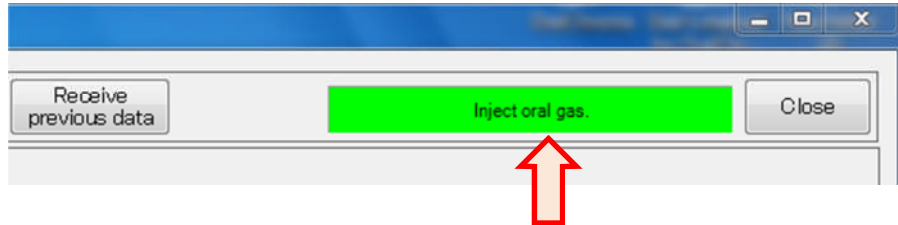
2. Open the lid on top of OralChroma.

3. Insert the tip of syringe at a right angle to the inlet and push down strongly on the plunger in one stroke to inject the entire breath sample into the OralChroma.

4. Remove the syringe from the inlet upon completing the injection.

5. Buzzer sounds and the green READY lamp turns off to start the measurement.

6. Receiving data is plotted on "Measurement data" window, and the elapsed time is indicated at upper right. You can select the view mode, "Chromatogram" or "Simple" by right-clicking on the graph area.

Chromatogram view mode
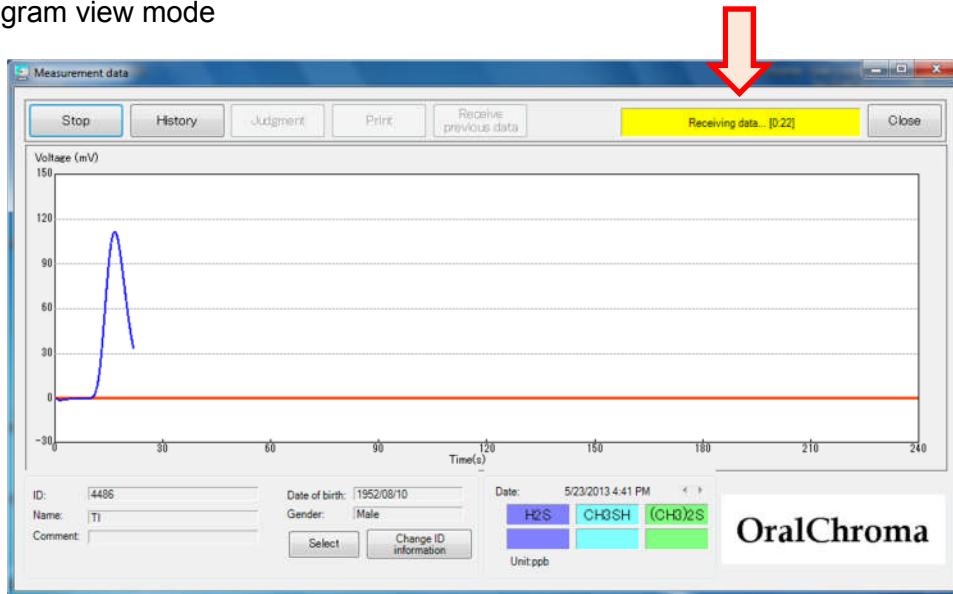
Simple view mode
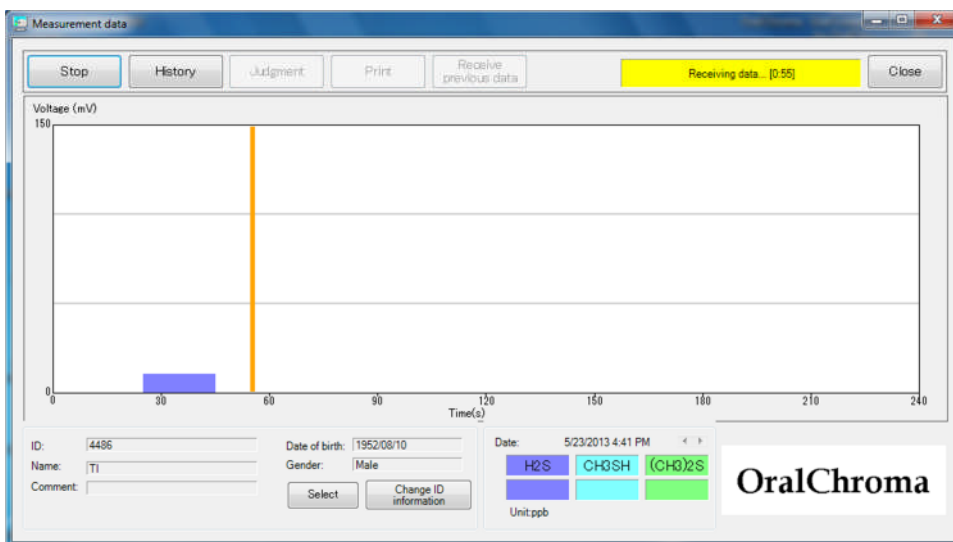
■ Completing measurement

The measurement time is 4 minutes.

1. When the measurement is completed, buzzer sounds and OralChroma enters "Waiting" status for one minute.

2. Measured data and results are saved in the file. The "**Measurement data**" window displays the chart and values of gas concentrations as below.

Chromatogram view mode
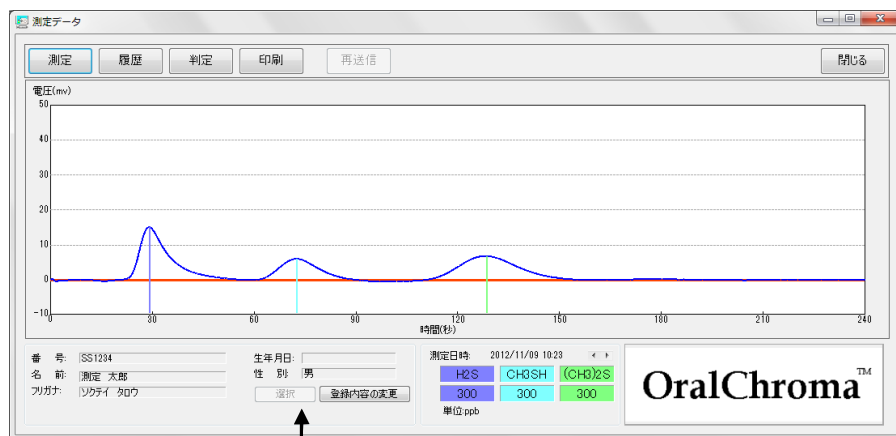
Gas concentration

Simple view mode

41
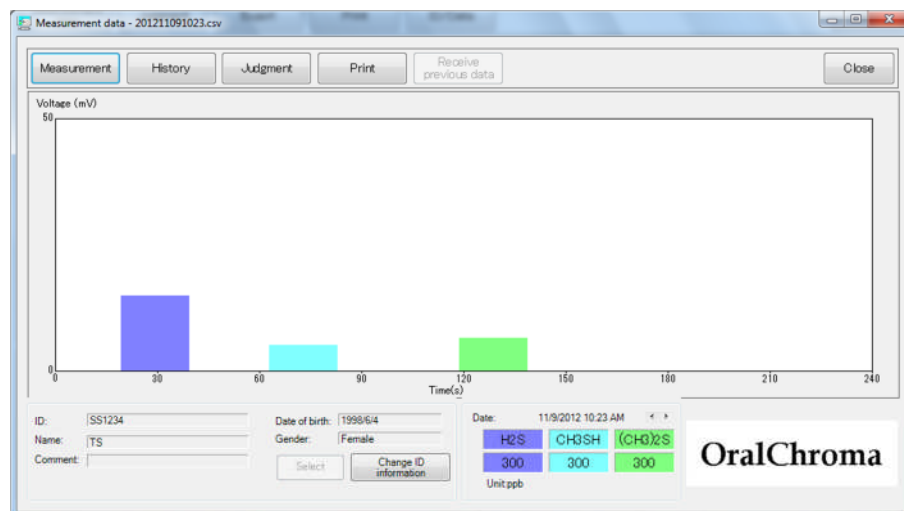
3. Confirmation message "**Measurement completed**" appears. Click "**OK**."
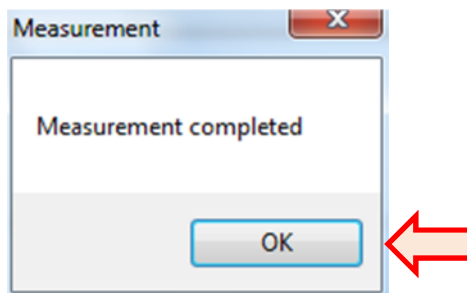
4. The "**Judgment**" window is displayed with flashing the judgment result.

For chromatogram view mode

Judgment result
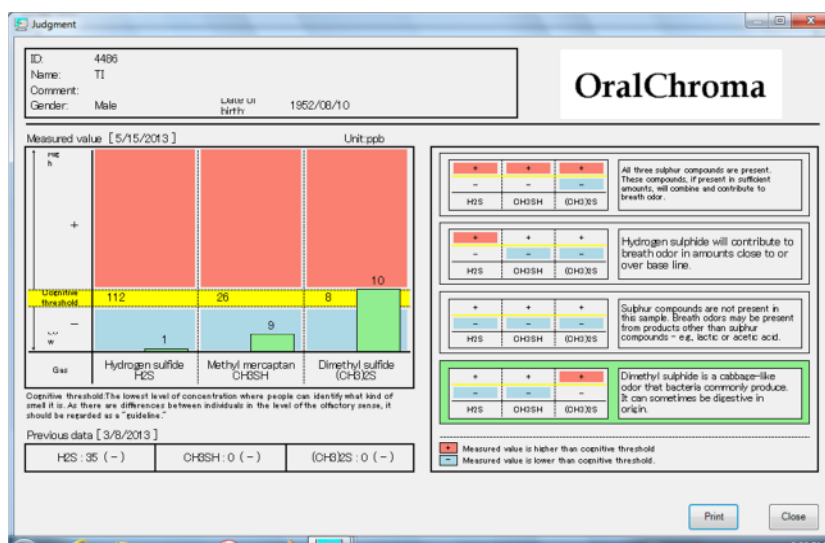
For simple view mode
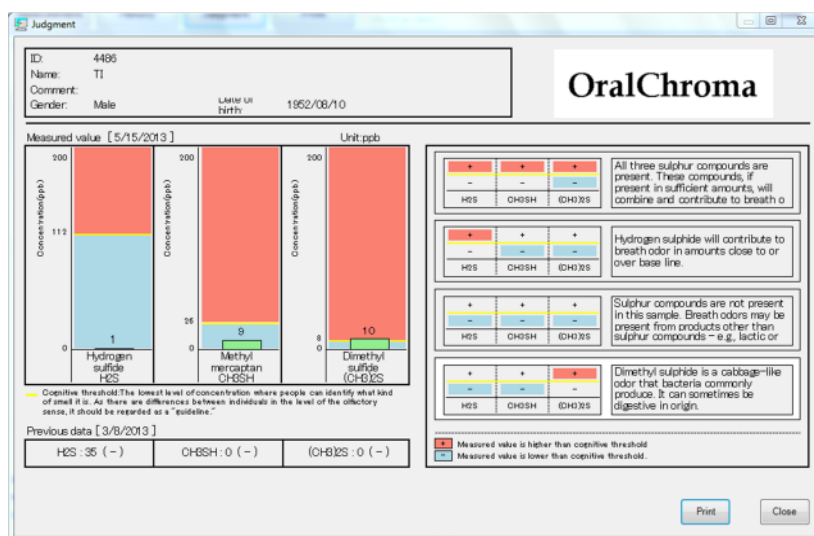
⚠ CAUTION

If no ID is specified in advance, no data is saved and no judgment is displayed.

■ Stopping measurement

1. Click "**Stop**" button if you want to stop the measurement before completing.
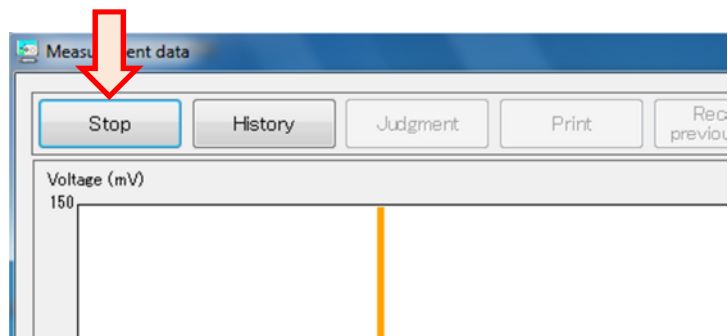
2. A buzzer sounds and OralChroma enters "Waiting" status for one minute. Green READY lamp is lit on the unit.

⚠ **CAUTION**
If the injected gas includes high concentration of halitosis gas components, the "Waiting" status may continue more than one minute.

■ Receiving previous data

One previous data is saved in the memory of OralChroma unit. You can receive this data. This is useful when the USB cable is mistakenly disconnected during measurement or measurement is started without running the software.

⚠ **CAUTION**
Once the measurement starts, the previous measurement data is cleared. So, be sure to receive the previous measurement data before new measurement starts. When you click "Stop" button to stop the measurement, you cannot receive the data.

1. Click "**Measurement**" on Main window to open "**Measurement data**" window.

2. Click "**Receive previous data**," and the previous measurement data is received from OralChroma to PC. It takes 10 to 20 seconds, then the chart and concentrations are displayed.The measurement data and the results are saved in the file and "**Judgment**" window automatically appears.
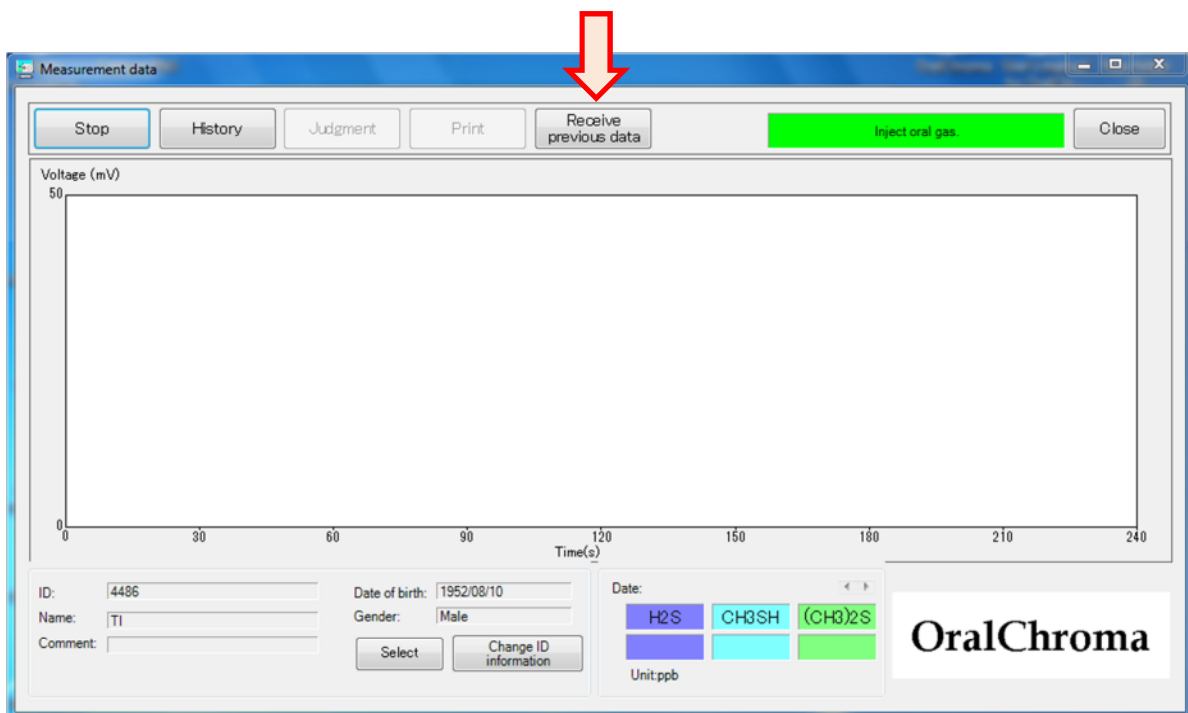
Ending measurement

Power off the OralChroma after ending the measurement.
You can use the software even if the unit is off.

■ How to end measurement

1. Keep pushing down on the Power switch of the unit until the buzzer sounds. The power is turned off with orange POWER lamp off.

2. Click "**Exit**" on Main window to end the software.
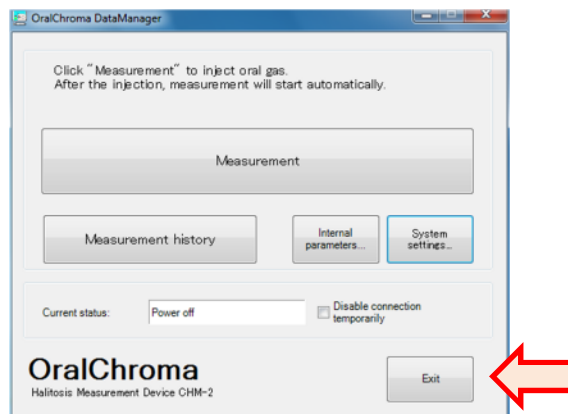
3. "**Are you sure to exit?**" message appears. Click "**OK.**"
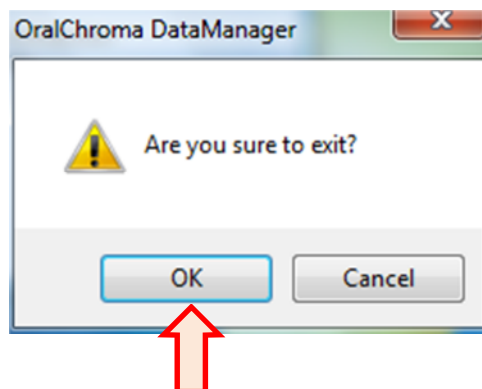
Viewing measurement history

Measurement history can be displayed in the form of graph and list from the saved data.

■ How to view measurement history

1. Click "**Measurement history**" on Main window.
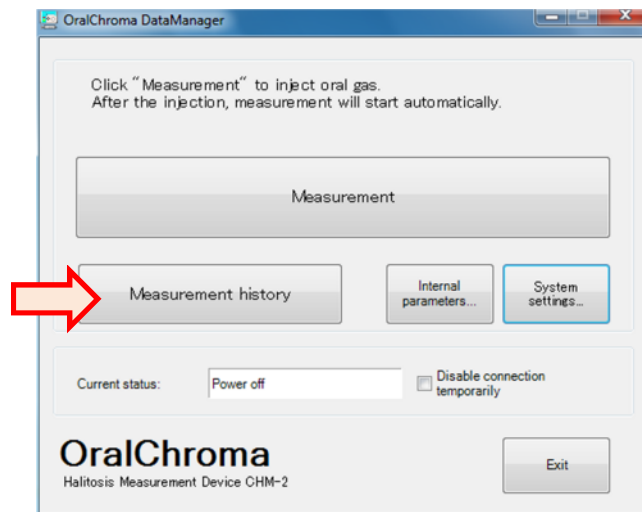
2. "**ID entry**" window appears. Enter the ID of which you want to display the subject and click "**Select**", or click "**Browsing list…**" to select the ID in "**ID list**" window.

3. The "**Measurement history**" window of the specified subject is displayed as below.

Graph
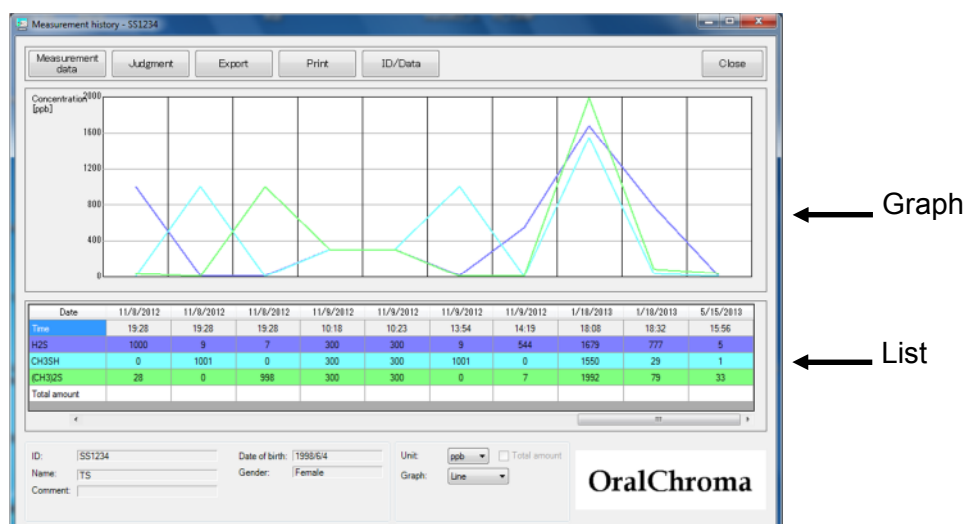
List

4. The number of measurements which can be displayed at a time is 10 maximum. If there are more than 10 measurements, move the scroll bar under the list to view other measurements.

■ Operating measurement history display

● Changing Y-axis scale

Right-click on the graph area to move the pointer to "**Y- axis range**", then select "**Large**", "**Small**", or "**Auto**."
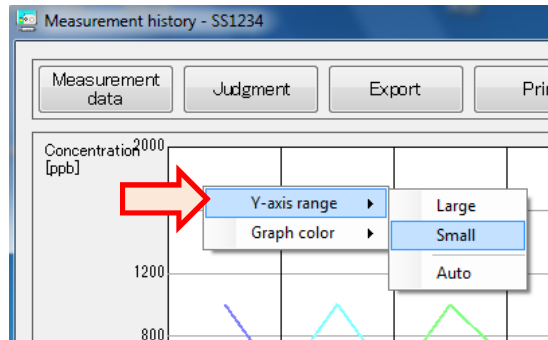
● Changing color

1. Right-click on the graph area to move the pointer to "**Graph color**", then select a gas or "**Total amount**."
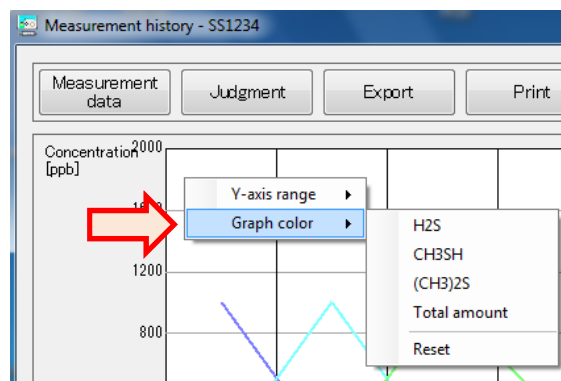
2. "Color" window appears. Select a new color and click "**OK**."
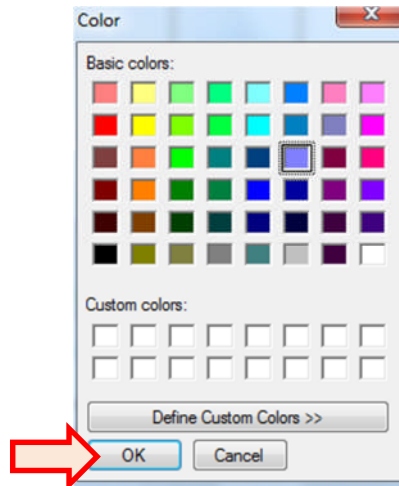
3. Select "**Reset**" of Graph color to change all the colors to initial setting.
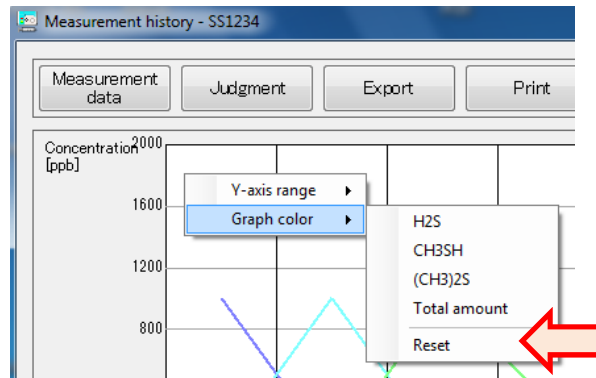
The above color change will be applied to the software completely. The color change of one measurement history window reflects other measurement histories and measurement data windows.

● Changing unit and showing total amount

Click drop-down list of "**Unit**" to select either "**ppb**" or "**ng/10mL**."
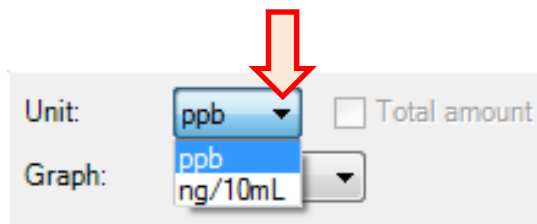
Check "**Total amount**" to display the total amount. Total amount is shown only when the unit is "**ng/10mL**."
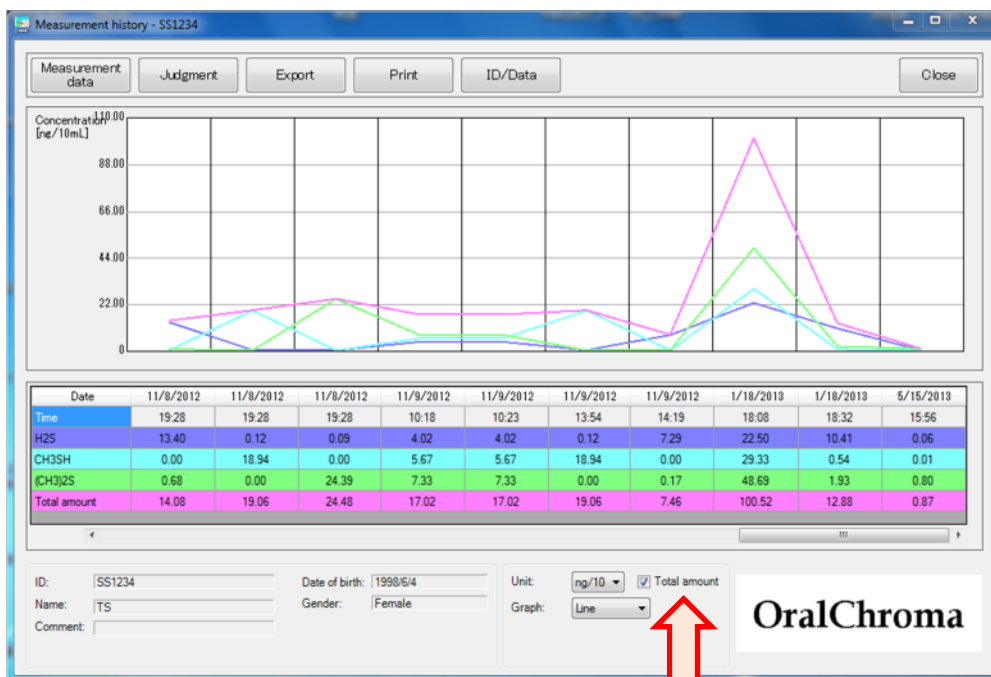
● Changing graph type

Click the drop-down list of "**Graph**" to select "**Line**" or "**Bar**."

The display below is a bar graph example.
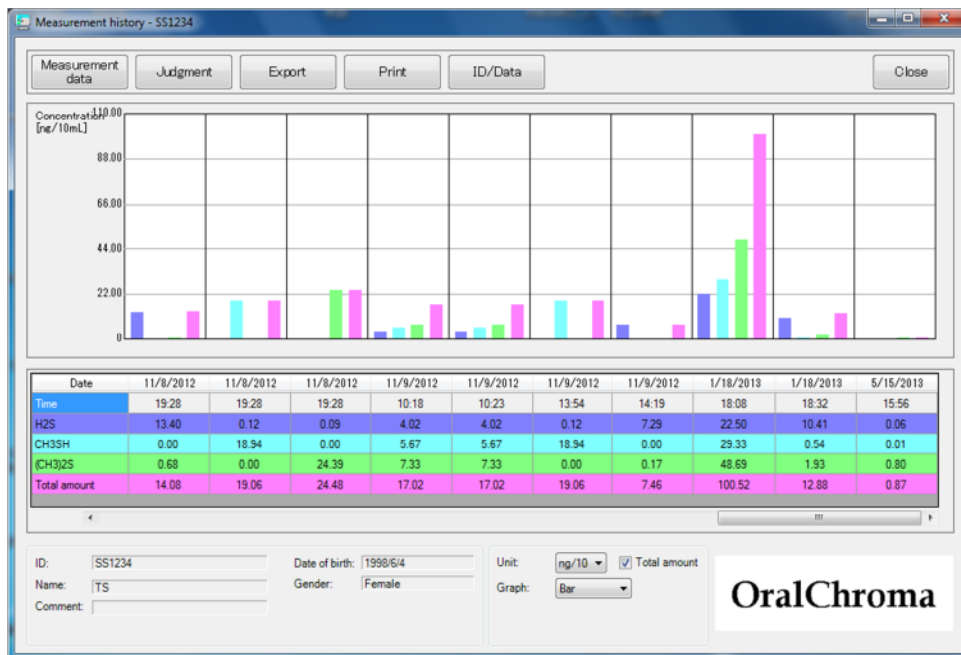
● Displaying measurement data

Double-click the row you want to display in the list of "**Measurement history**" window or select the date and click "**Measurement data**" to show the "**Measurement data**" window. See page 58, "Measurement data window" for details.

● Displaying judgment

Select the row you want to display in the list of "**Measurement history**" window and click "**Judgment**" to show judgment window.
See page 68, "Judgment window" for details.

● Exporting data

Measurement history data can be saved as a text file in CSV format.

1. Click "**Export**."
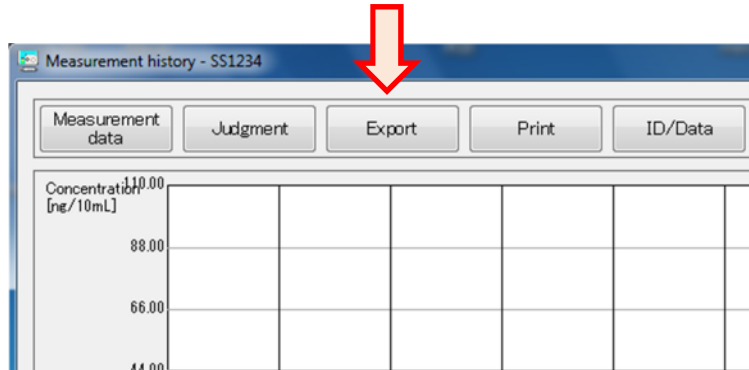
2. Enter the file name in the "**Export measurement data**" window and click "**Save**". The saved file can be used for spread sheet software such as Excel.

【Saved file example】

Unit of gas concentrations (rows "C" to "E" in the above example) is ppb (part per billion.) Vs0, Vh, FR, and CT（rows "F" to "I" in the above example）is parameters showing the OralChroma internal conditions.

■ Creating image file and printing of measurement history

The displayed window can be printed or saved as image file.

● Printing

1. Click "**Print**" or right-click "**Print**" then select "**Print**" to show "**Print**" window.

2. Click "**Print**" after selecting printer and setting paper size, etc.

* Selecting printer and setting paper size are stored and will be effective for the next printing automatically.
* Check "**Print without displaying the print dialog box**" in the "**Print**" tab in "**System settings**" window to print quickly the image without displaying the picture.

● Creating image file

1. Right-click "**Print**" and select "**Save as image file**."

2. Enter the file name, select file type (jpg or bmp) and then click "**Save**."

■ Managing measurement data

The measurement data can be moved and deleted, and the subject data can be deleted.

● Moving measurement data

When the wrong subject ID is chosen by mistake at the time of "Waiting" status and the measurement data is saved under such wrong subject ID, you can move such data to the correct subject ID.

1. Click the date or row in the list of "**Measurement history**" window to specify the data you want to move.

2. Click "**ID/Data**" to select "**Move data**."
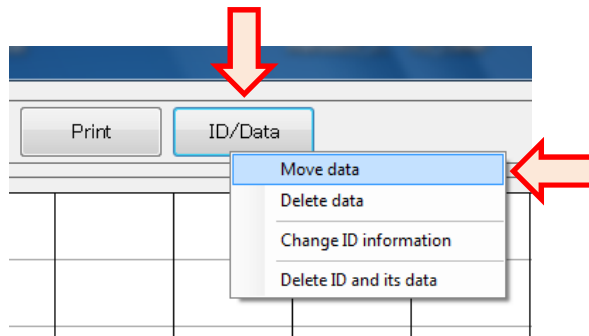
3. Confirmation message appears. Click "**Yes**."
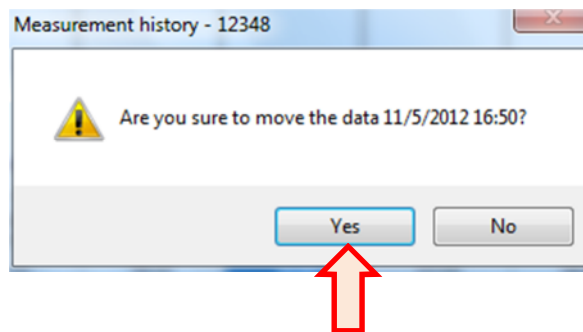
4. Enter or select the correct ID in "ID input" window, then click "**Select**."
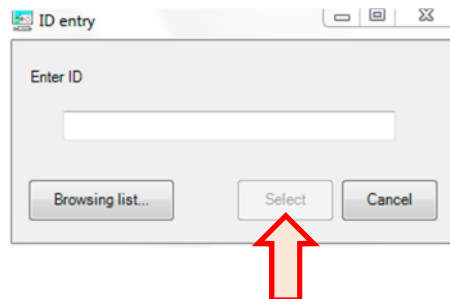
5. The data is moved from the wrong subject to the correct subject's ID.

*When the measurement history window for the correct subject ID is open at this time, close such window and re-open it to show the change.

● Deleting data

1. Click the date or row in the list of "**Measurement history**" window to specify the data you want to delete.

2. Click "**ID/Data**" to select "**Delete data**."
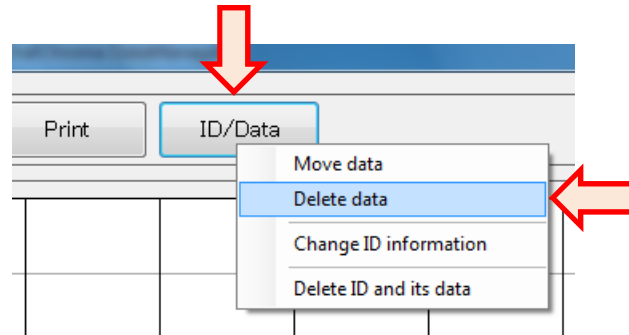
3. Confirmation message appears. Click "**Yes**."
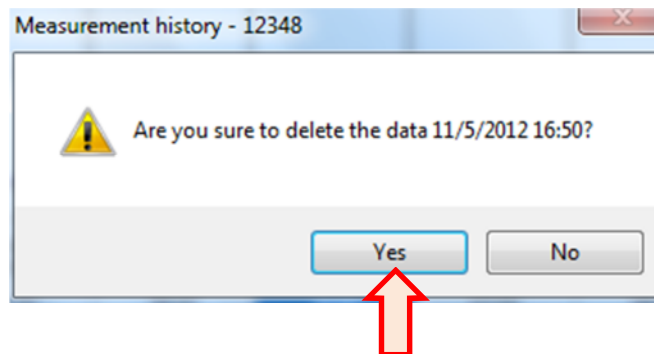
4. The data file is deleted and data is removed from the displayed window.

⚠ CAUTION
Deleted data cannot be restored.

● Changing subject ID information

You can change the registered information of the subjects.

1. Click "ID/Data" to select "Change ID information."
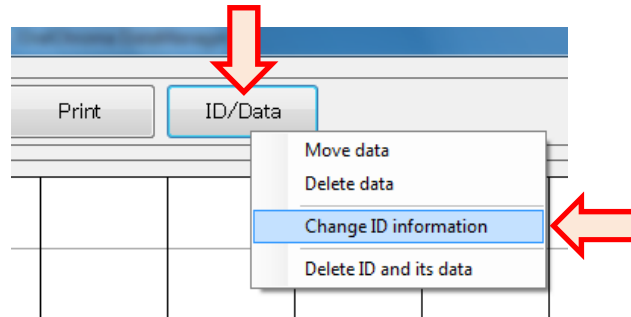
2. Change the personal information in "**ID information change**" window, then click "**Change**."
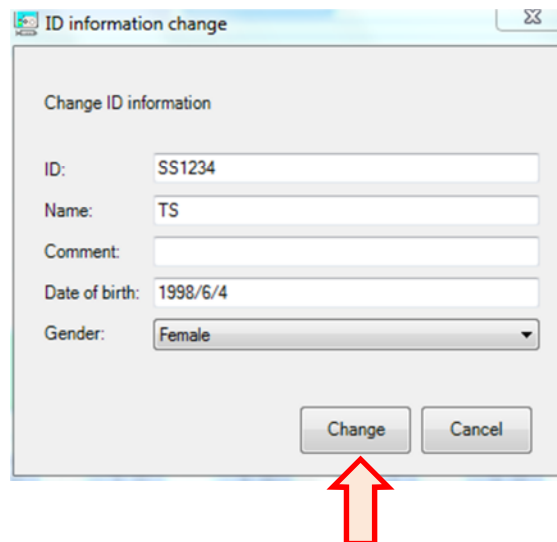
3. Personal information on "**Measurement history**" and "**Measurement data**" windows are updated.

<table>
<tr><td colspan="2">⚠ CAUTION</td></tr>
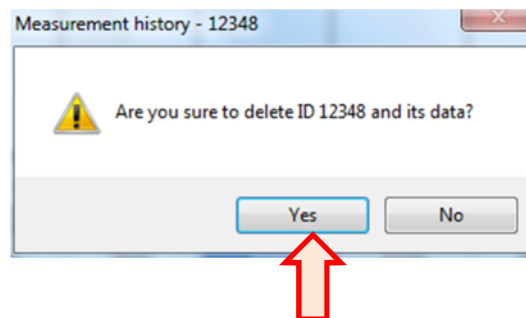<tr><td colspan="2">Changed data cannot be restored.</td></tr>
</table>

● Deleting subject ID

You can delete the subject personal information and the measurement data at the same time.

1. Click "ID/Data" to select "Delete ID and its data."
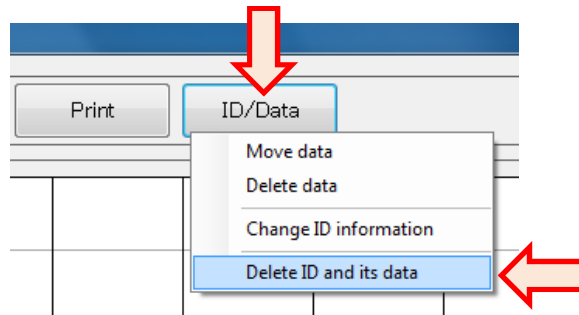
2. Confirmation message appears. Click "**Yes**."

3. After deleting the data, the measurement history window is automatically closed.

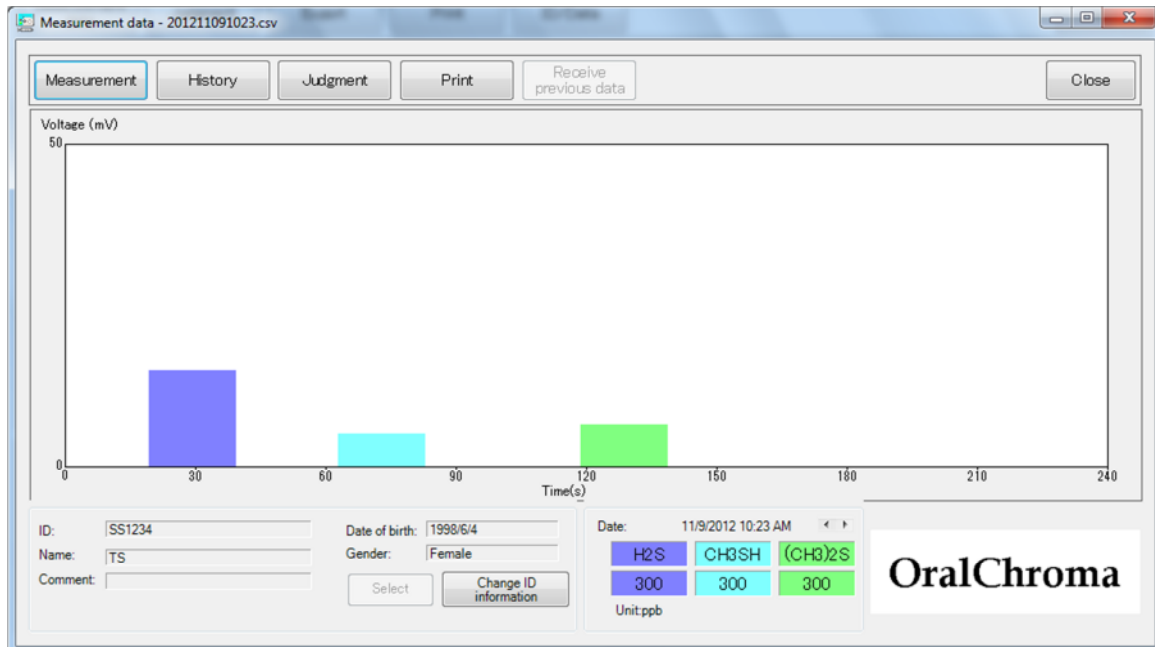| ⚠ **CAUTION** |
|---|
| Deleted data cannot be restored. |

Measurement data window

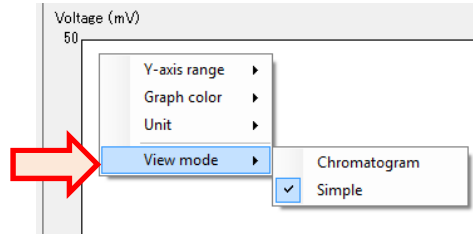The window displaying the measurement data has two viewing modes as below.

Chromatogram view mode
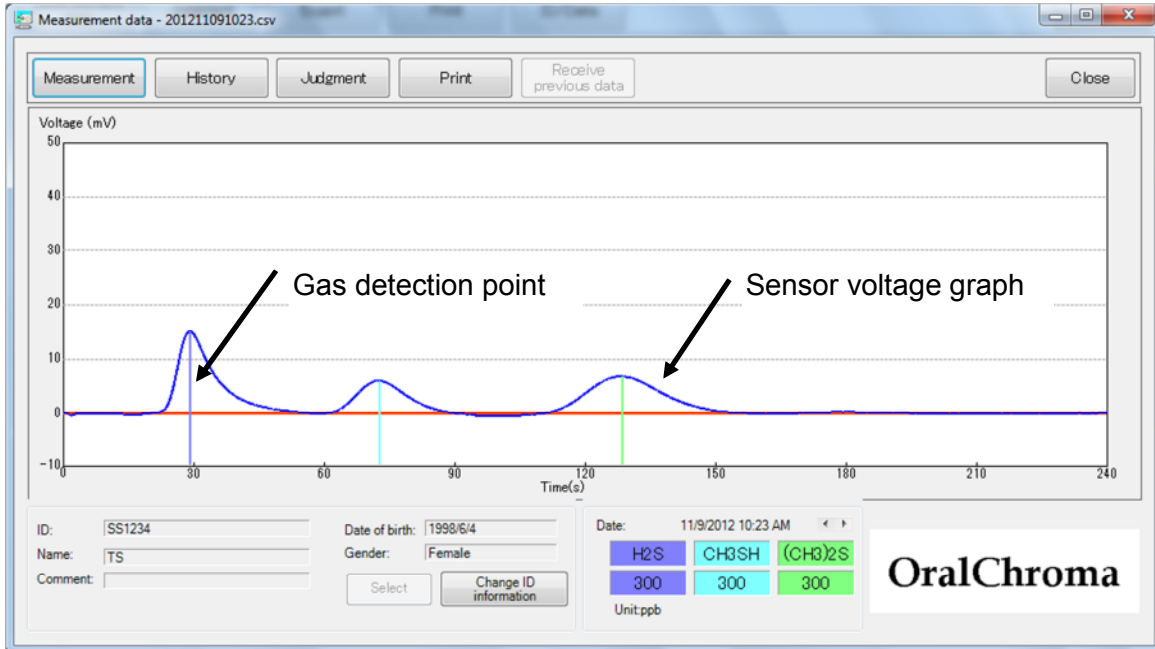
Simple view mode

■ Operating Measurement data window

● Changing View mode

Right-click on the graph area to move the pointer to "**View mode**", then select "**Chromatogram**" or "**Simple**."
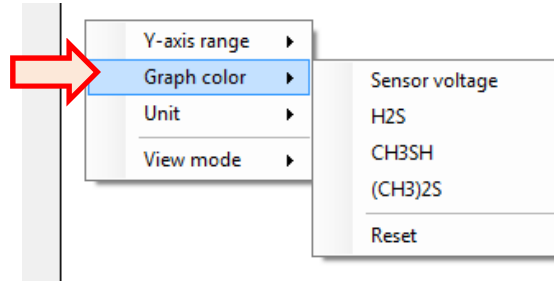

● Changing Y-axis range

Right-click on the graph area to move the pointer to "**Y-axis range**", then select "**Large**", "**Small**", or "**Auto**.
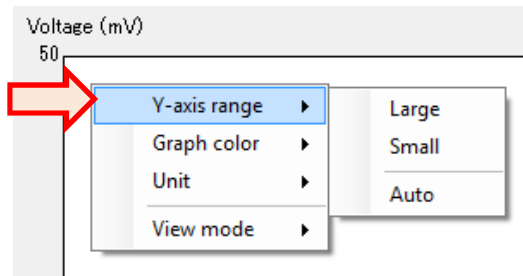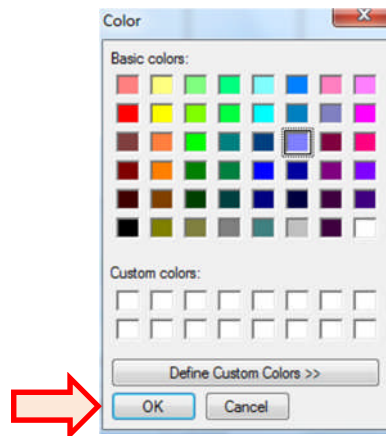

*Displayed maximum voltage is in the range of 50mV to 250mV by 50mV.

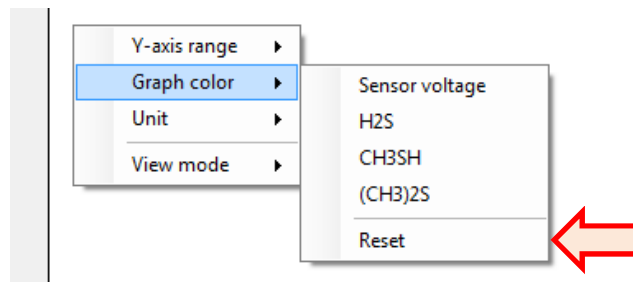## ● Changing color

1. Right-click on the graph area to move the pointer to "**Graph color**", then select "**Sensor voltage**" or gas name.

**2.** "Color" window appears. Select a new color and click "**OK**."

3. Select "**Reset**" of Graph color to change all the colors to initial setting.

*The above color change will be applied to the software completely. The color change of one measurement data window reflects other measurement history and measurement data windows.

● Changing concentration unit

1. Right-click on the graph area to move the pointer to "**Unit**", then select either "**ppb**" or "**ng/10mL**."
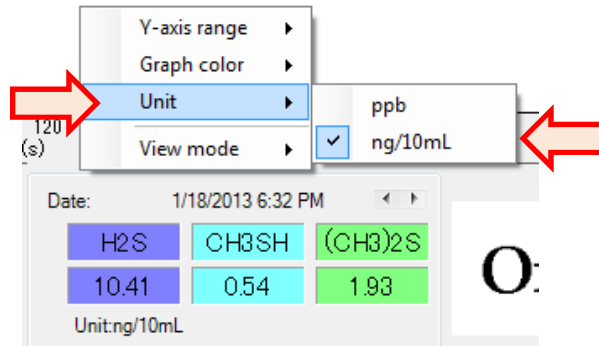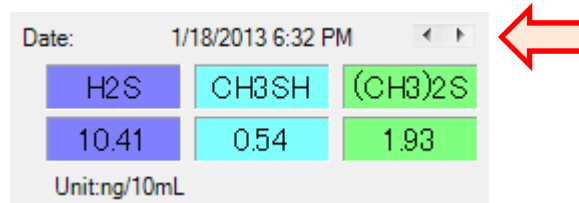

2. The concentration unit in the measurement result is changed.
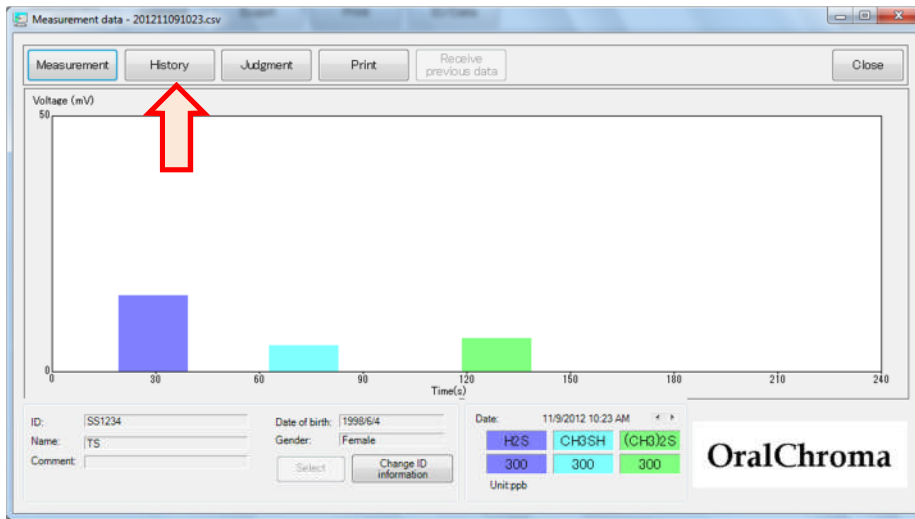
● Displaying other measurement data

Other measurement data of the same ID can be displayed without returning to the "**Measurement history**" window.
Click right or left button to change the data.
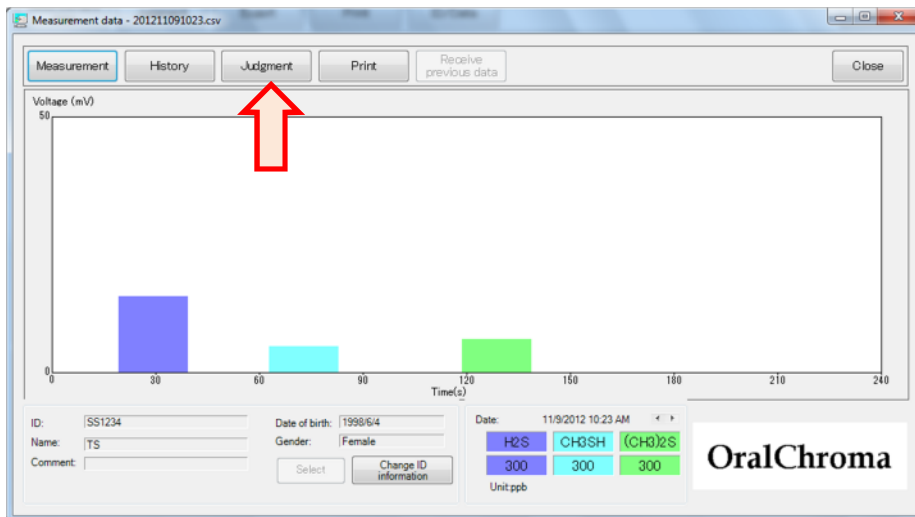
● Displaying measurement history window

Click "**History**" to display measurement history window.

*See page 46, "Viewing measurement history" for measurement history window.

● Displaying judgment window

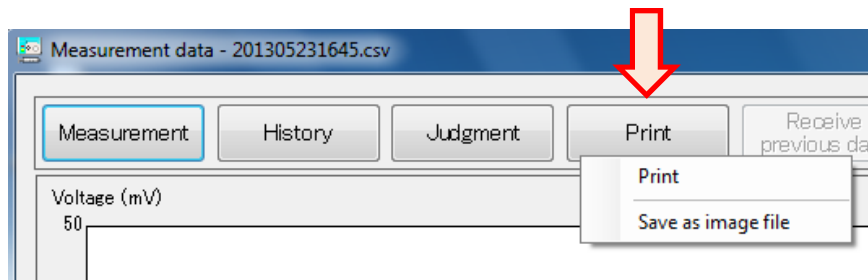Click "**Judgment**" to display the judgment window.

*See page 68, "Judgment window" for details.

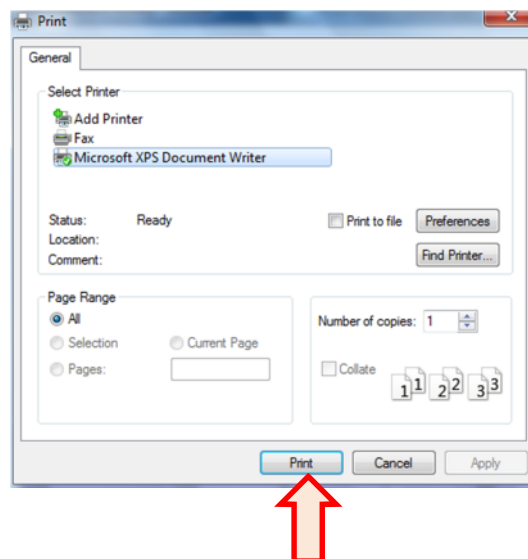# ■ Creating image file and printing of measurement data

The displayed window can be printed or saved as image file.

● Printing

1. Click "**Print**" or right-click "**Print**" then select "**Print**" to show "**Print**" window.

2. Click "**Print**" after selecting printer and setting paper size, etc.
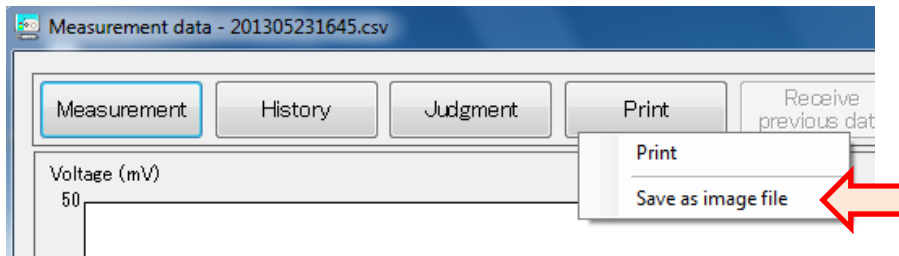

*Selecting printer and setting paper size are stored and will be effective for the next printing automatically.
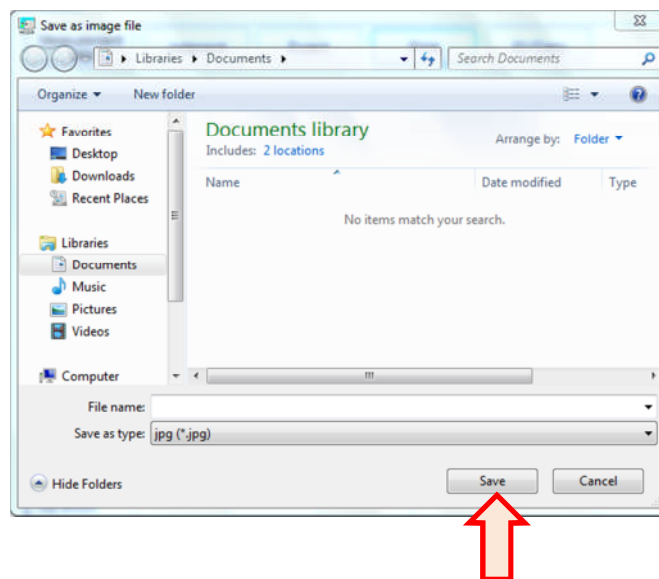*Check "**Print without displaying the print dialog box**" in the "**Print**" tab in "**System settings**" window to print quickly the image without displaying the picture.

● Creating image file

1. Right-click "**Print**" and select "**Save as image file**."

2. Enter the file name, select file type (jpg or bmp) and then click "**Save**."
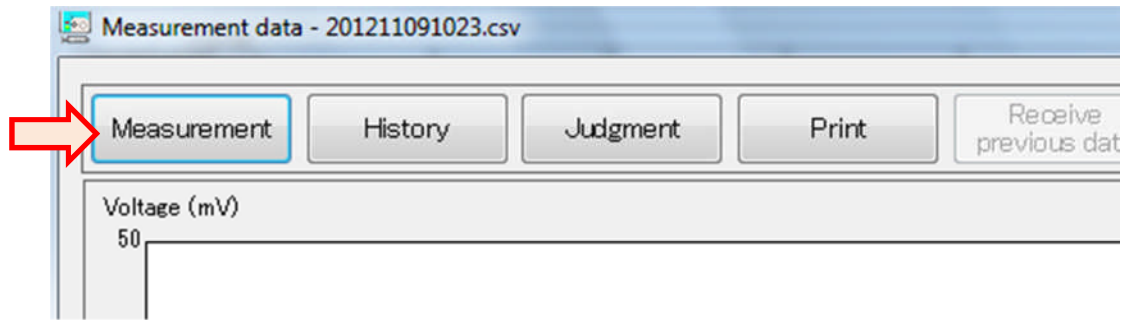
■ Starting measurement

You can start measurement from this window.

● Starting measurement

1. Click "Measurement" in "Measurement data" window.

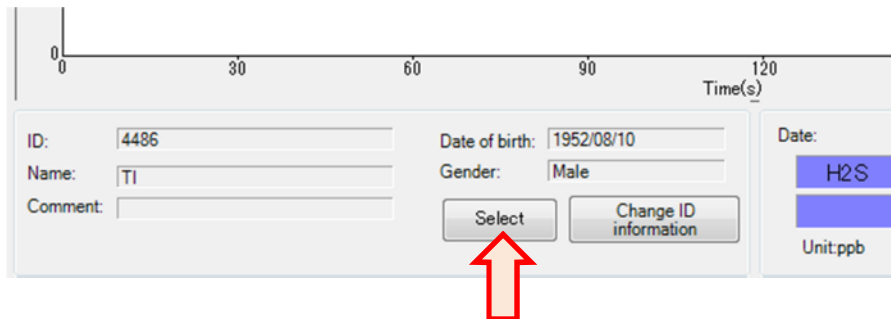*The measurement waiting window or measuring window, if any, is displayed on the current window.

2. The current graph disappears and OralChroma status is displayed at upper right in the window.

3. Inject the sampled oral gas to the inlet of OralChroma when green "READY" lamp turns on and "**Inject oral gas**" is displayed at upper right of the measurement data window.

OralChroma status
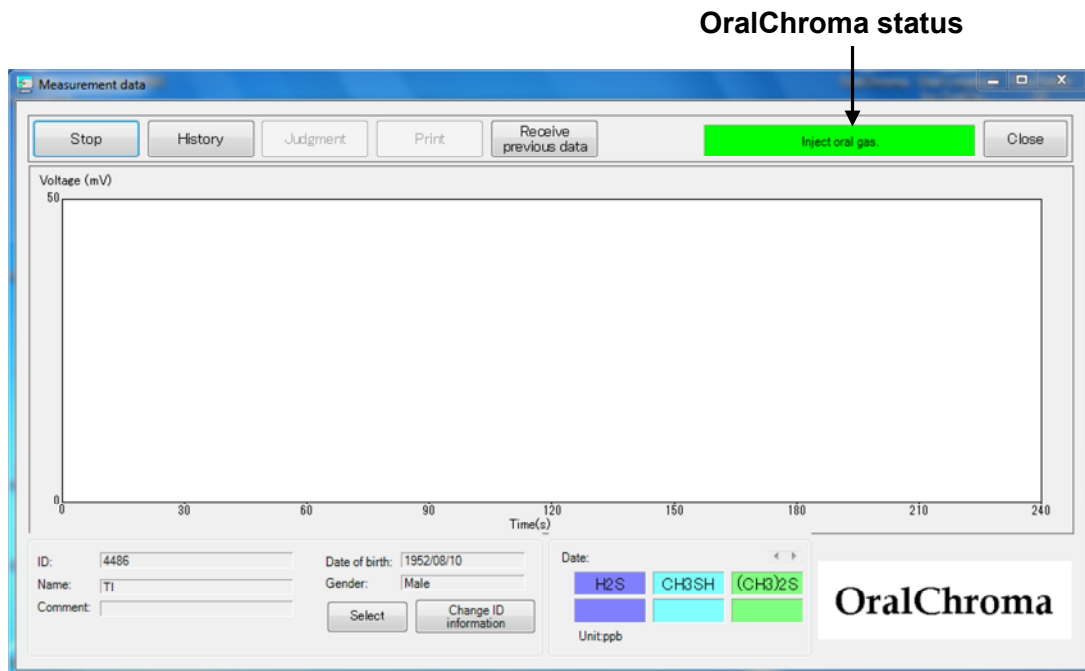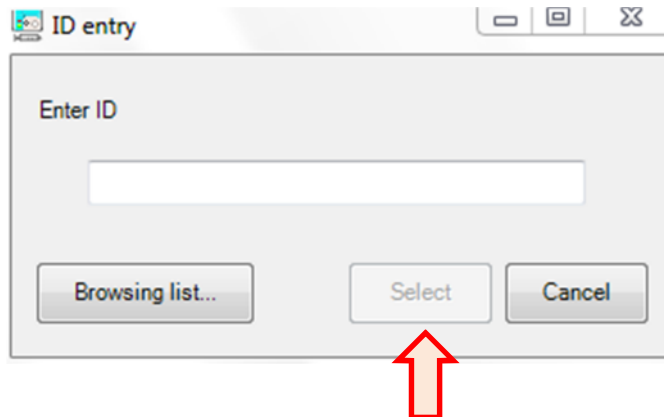
● Selecting subject

The subject can be re-selected on the measurement data window.

1. Click "**Select**."

2. Enter the subject ID and click "**Select**," or click "**Browsing list…**" and select the ID.
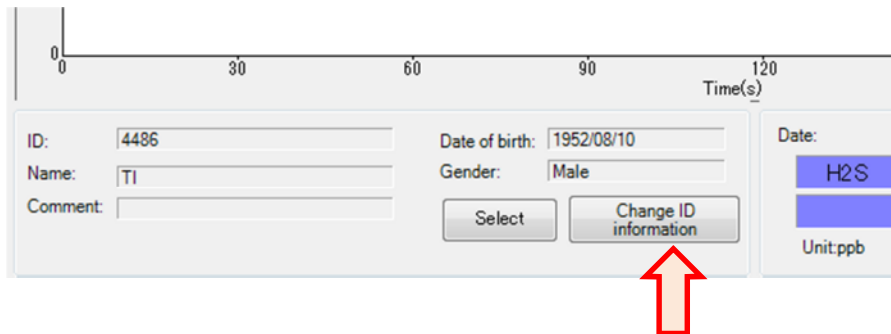
● Changing subject personal information
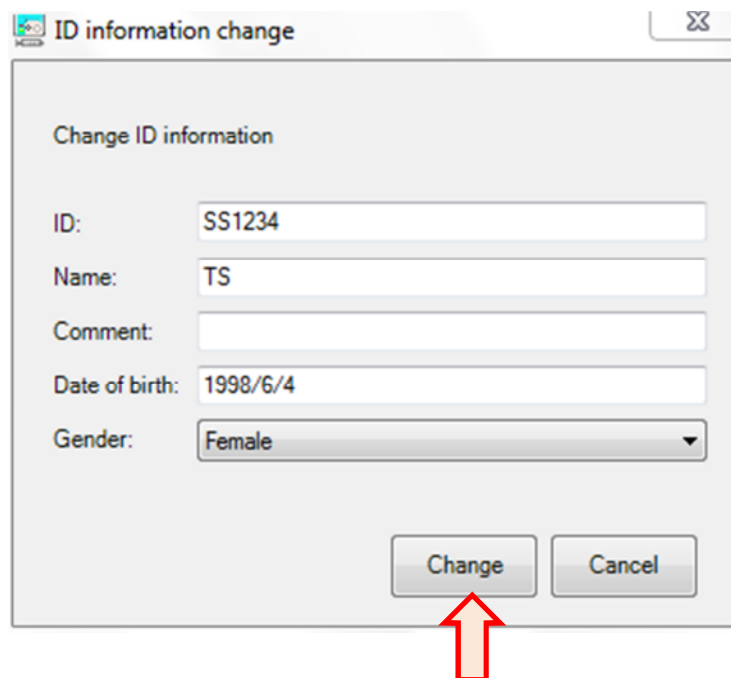
You can change the registered personal information of the subjects.

1. Click "Change ID information."

2. Change the personal information in "**ID information change**" window, then click "**Change**."

3. Personal information on "Measurement history" and "Measurement data" windows are updated.

Judgment window

Measurement values and halitosis cognitive threshold are compared and the judgment of the functional halitosis level is displayed.

For chromatogram view mode

Personal information of the subject

Measured gas concentration
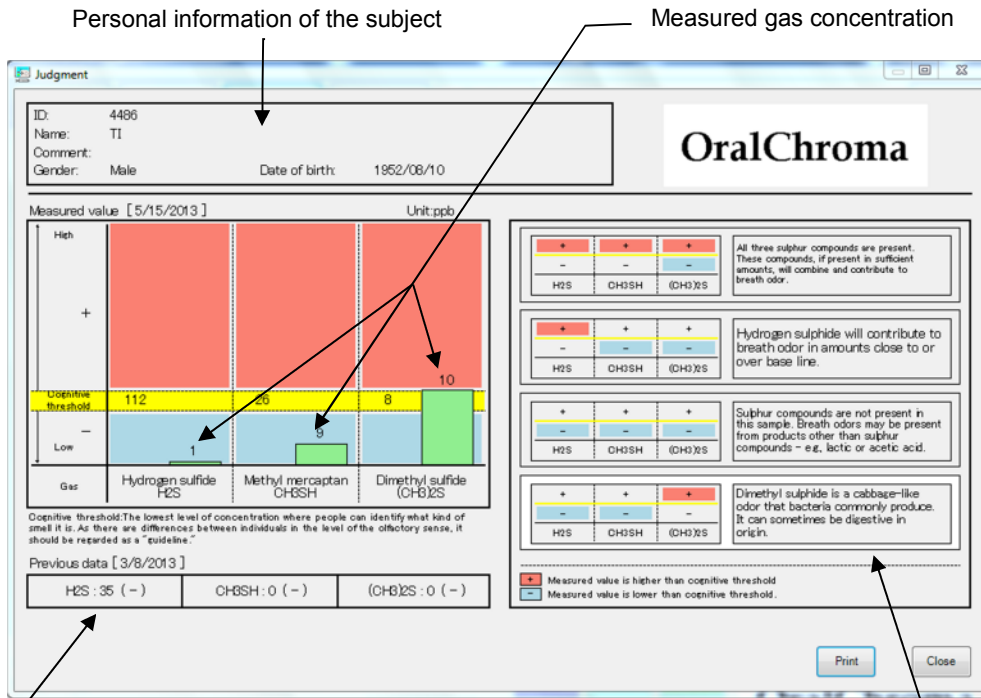
Data of the last measurement,[Name of gas: Measurement value (Judgment)]

Judgment of functional halitosis level (Green background blinks)

For simple view mode
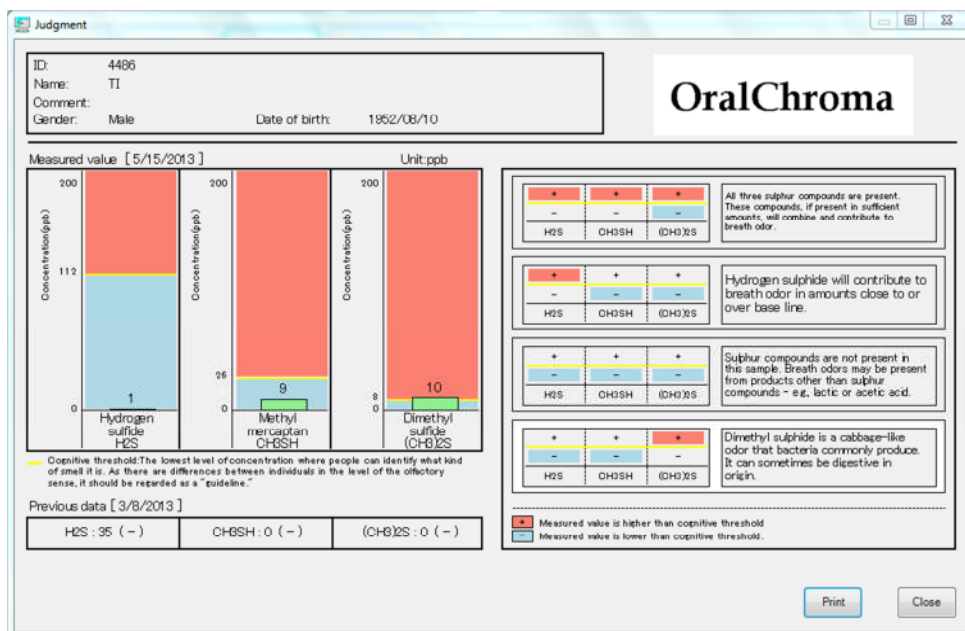
■ Displaying the Judgment window

Either of the following procedures opens the Judgment window.

● From the Measurement data window

· When measurement is completed, the judgment window is automatically displayed. If "**No judgment is displayed after measurement**" is checked on "**Judgment**" tab of the "**System setting**" window, the "**Judgment**" window is not displayed automatically.
· Click "**Judgment**" to display the Judgment window. You cannot click "**Judgment**" before and while measuring.

● From the Measurement history window

· Click "**Judgment**" to display the window.
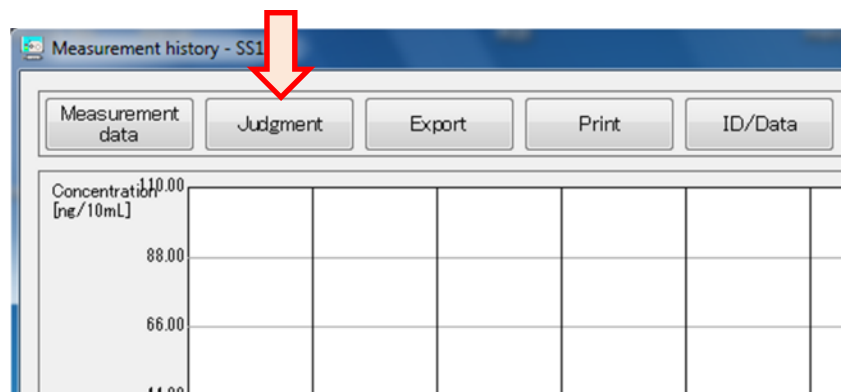
■ Method of Judgment

Measurement values of the three gases are compared with 'Cognitive thresholds'. If the value is above the threshold, '+' is given. If it is below the threshold, '-' is given. 'Cognitive threshold' is the lowest level of concentration where people can identify what kind of smell it is. As there are differences between individuals in the level of the olfactory sense, it should be regarded as a "guideline."

The combination of '+' and '-' is compared with the judgment patterns and the one with the same combination is the judgment given.

There are seven judgment patterns as follows:

| No.	H_2S	CH_3SH	$(CH_3)_2S$	Judgment sentence
1	-	-	-	Sulphur compounds are not present in this sample. Breath odors may be present from products other than sulphur compounds – e.g., lactic or acetic acid.
2	+	-	-	Hydrogen sulphide will contribute to breath odor in amounts close to or over base line.
3	+	+	+ or -	All three sulphur compounds are present. These compounds, if present in sufficient amounts, will combine and contribute to breath odour.
4	+	-	+	Hydrogen sulphide and dimethyl sulphide, if present in sufficient amounts, will combine and contribute to breath odour.
5	-	+	-	Methyl mercaptan can contribute to breath odour if present in amounts close to or over baseline.
6	-	+	+	Methyl mercaptan and dimethyl sulphide, if present in sufficient amounts, will combine and contribute to breath odour.
7	-	-	+	Dimethyl sulphide is a cabbage-like odour that bacteria commonly produce. It can sometimes be digestive in origin.

The default 'Cognitive thresholds' and 'Judgment sentences' have been specified. The values and contents, however, can be changed on "**System settings**" window.

■ Creating image file and printing of judgment window

The displayed window can be printed or saved as image file.

● Printing

1. Click "**Print**" or right-click "**Print**" then select "**Print**" to show "**Print**" window.
2. Click "**Print**" after selecting printer and setting paper size, etc.
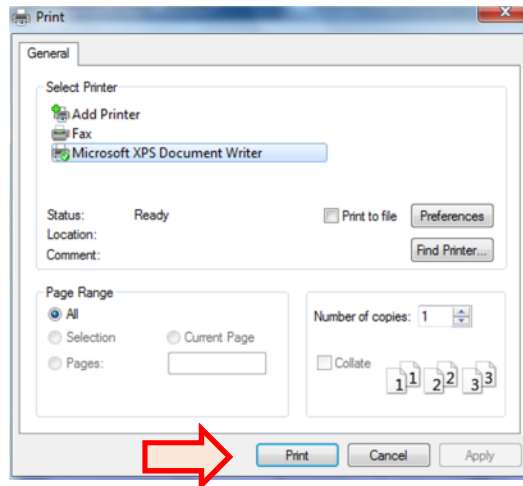
*Selecting printer and setting paper size are stored and will be effective for the next printing automatically.
*Check "**Print without displaying the print dialog box**" in the "**Print**" tab in "**System settings**" window to print the image quickly without displaying the picture.

● Creating image file

1. Right-click "**Print**" and select "**Save as image file**."
2. Enter the file name, select file type (jpg or bmp) and then click "**Save**."
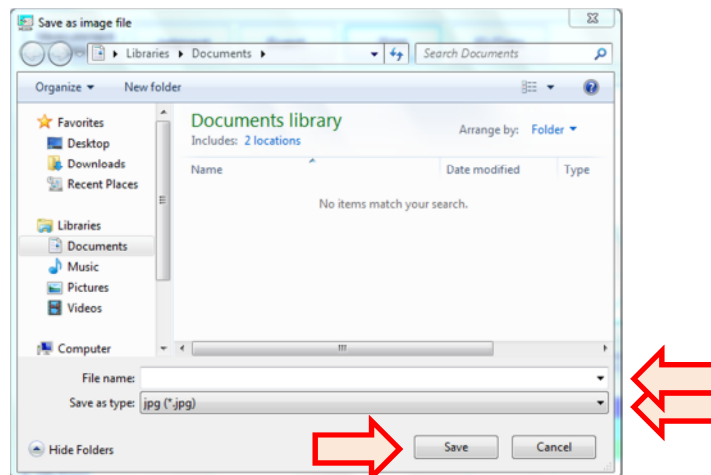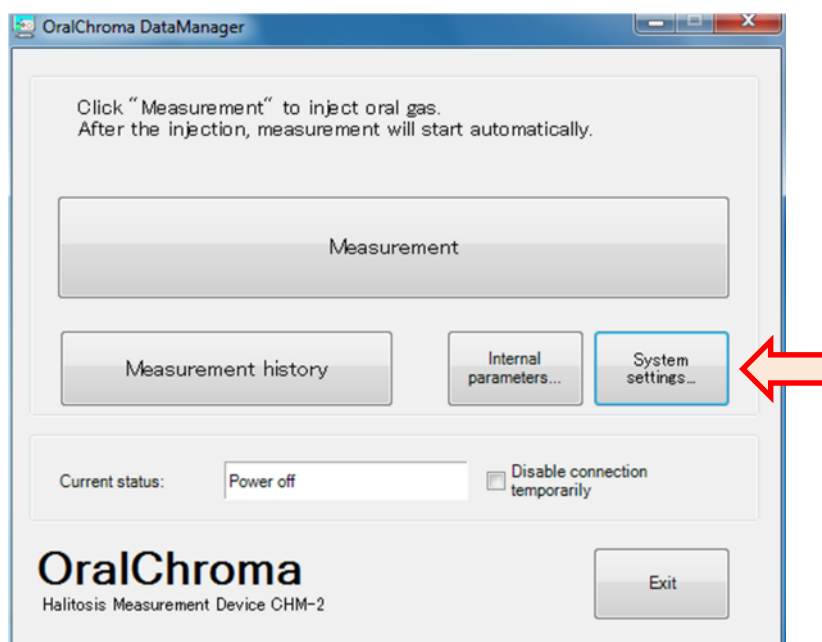
System settings window
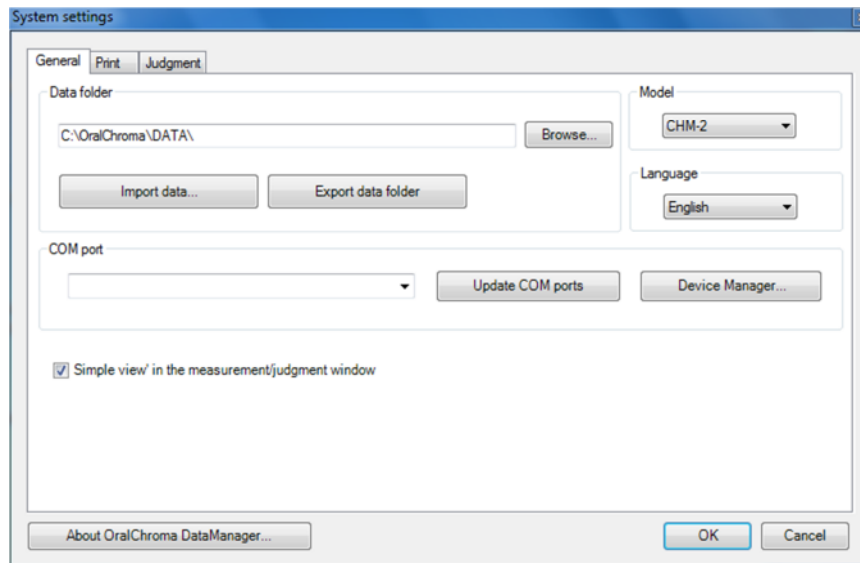
You can set various items for the software.

■ Displaying System settings window

Click "**System settings…**" on the Main window.

*While System settings window is being displayed, you cannot operate other windows.

■ General

● Data folder

Click "**Browse**" to change the folder where the measured data is stored. See page 21 for details.
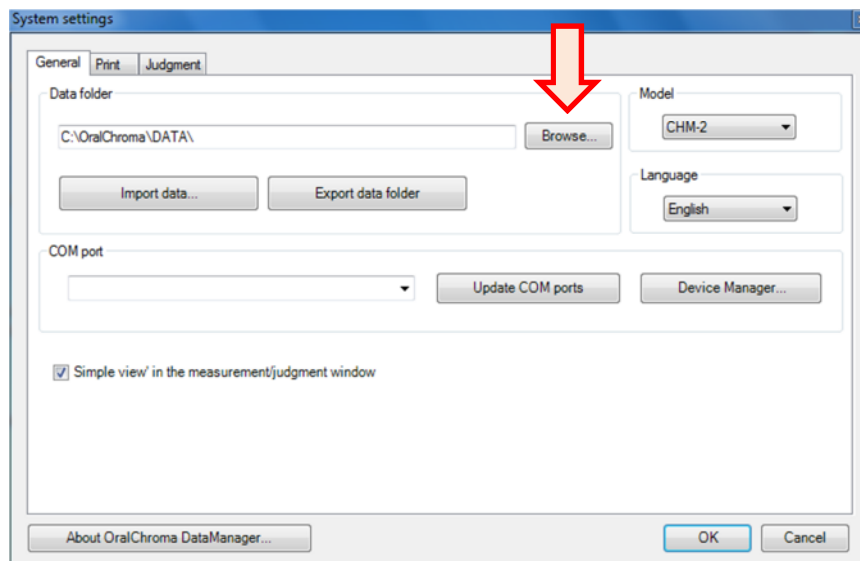
● Importing data

You can import the data from other computer to the current data folder. This is useful when you replace the PC.

1. Click "Import data…"

2. "**Data import**" window appears. Select either "**CHM-1**" or "**CHM-2**."
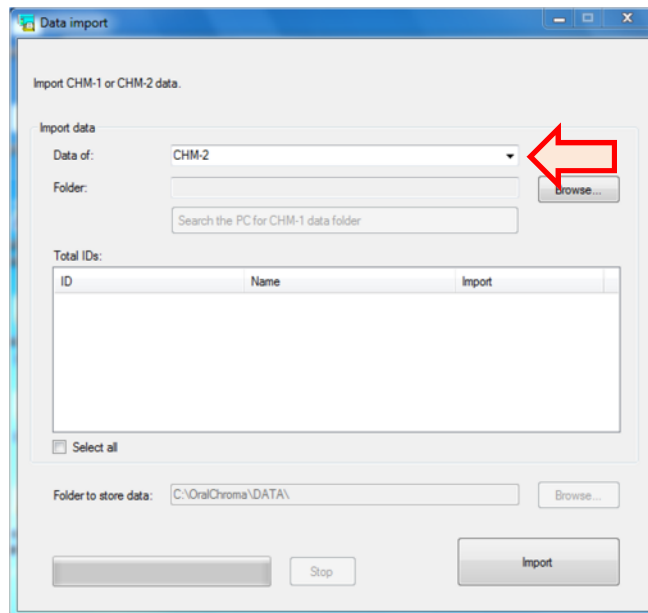
3. Specify the folder by clicking "**Browse…**."

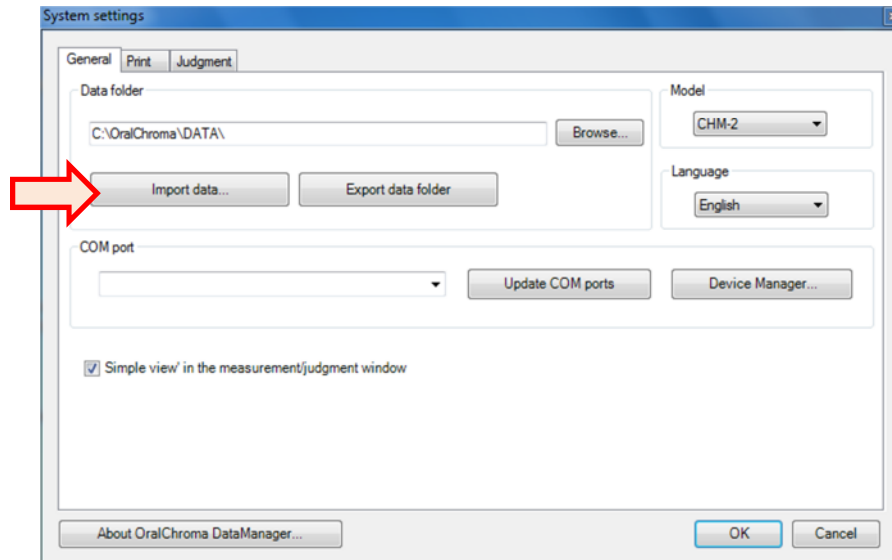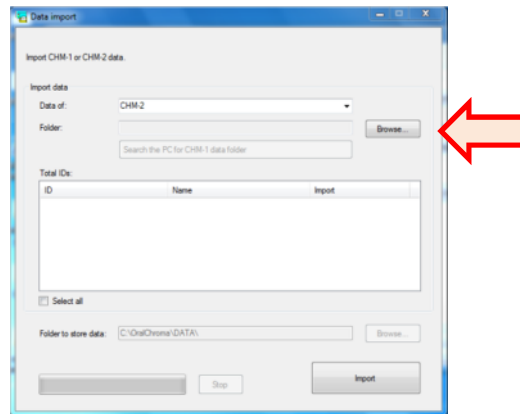4. IDs in the specified folder are listed as below. Check what you want to import. Clicking "**Select all**" checks all the IDs at a time.
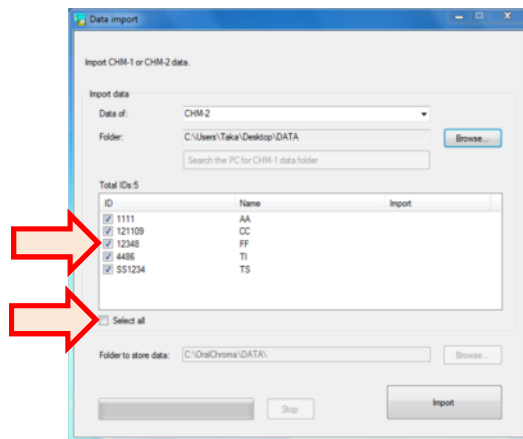
5. Click "**Import**" to start importing data. Confirmation window "**Data import**" window appears. Click "**OK**" to proceed the import.
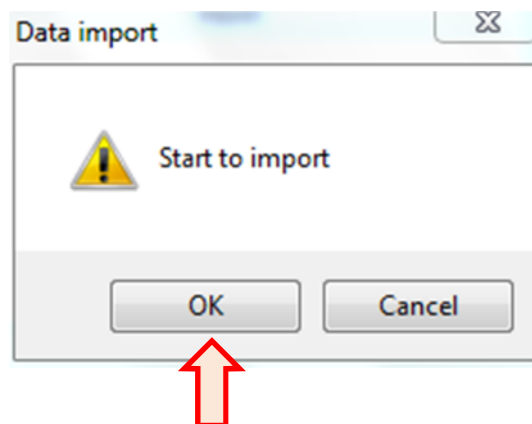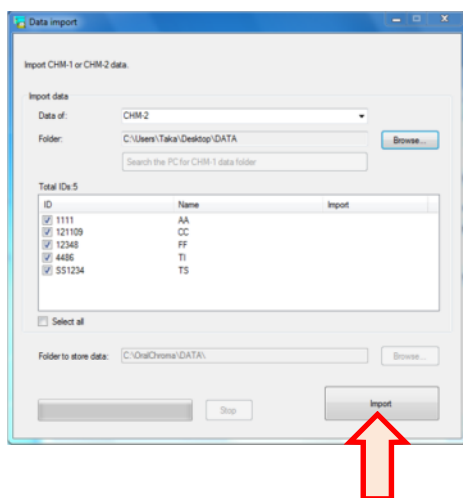
6. When "**Import completed**" is displayed, the import is completed. Click "**x**" at upper right to close the window.

● Exporting data

You can export the current data folder when you want to back up the data or use another PC.

1. Click "Export data folder."
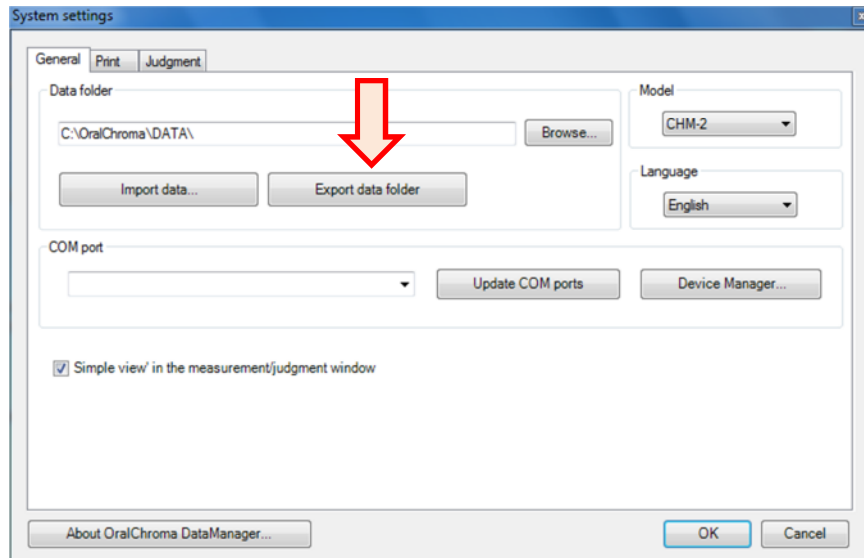
2. Specify the folder to which the current data folder should be copied, then click "**OK**."

*In case the old data folder exists in the above specified folder, it is overwritten with the exported new data folder.

⚠ **CAUTION**
Overwritten old data cannot be restored.

● Model

Select "CHM-1" only when you use the old model of CHM-1.
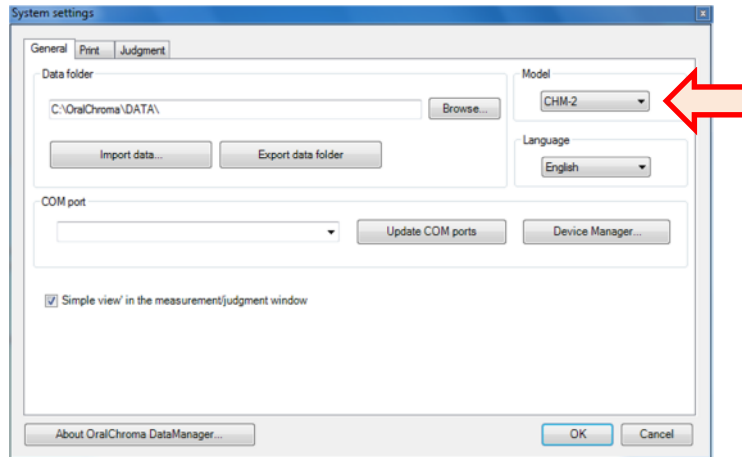
● Language

You can change the language.
Select the language in the drop-down list.
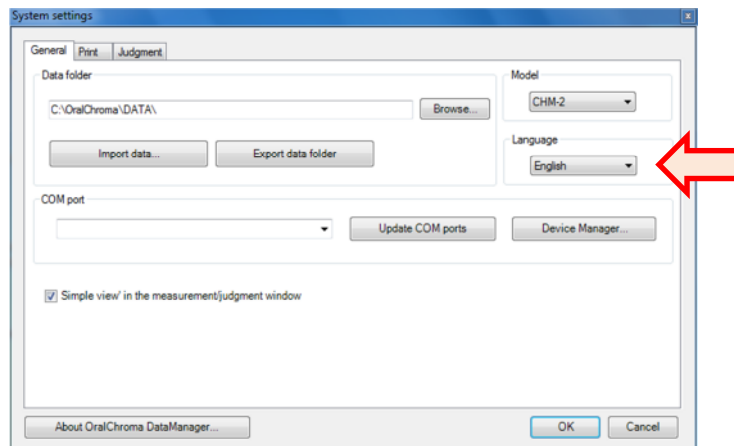
● COM port

Specify the communication port to which the OralChroma is connected.
See page 19 for details.
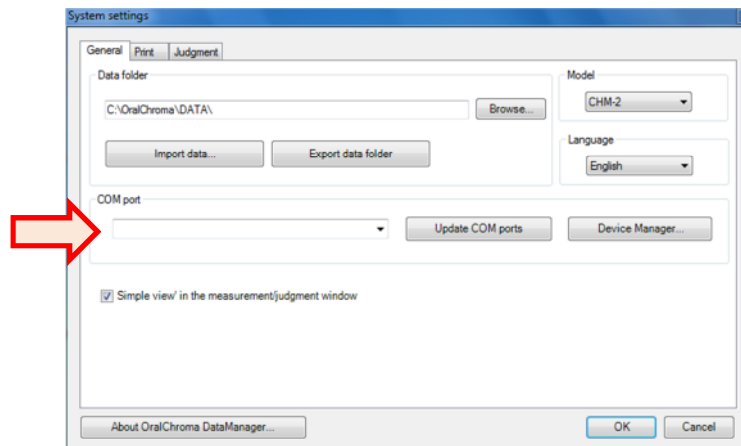
■ Print
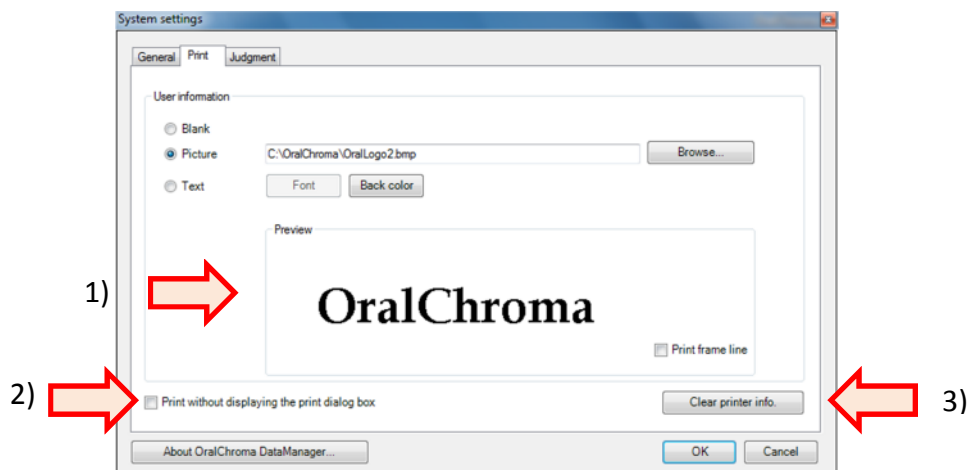
1) **Facility name, etc.**
   You can input your own clinic logo, information or message to display and print on the user information column. See page 22 for details.

2) **Print without displaying the print dialog box**
   Check this to quickly print the displayed "**Measurement data**" and "**Measurement history**" windows without specifying printer name, pages, etc.

3) **Clear printer info.**
   Click this in case any printing error occurs. Clicking this button clears printer information in DataManager.

■ Judgment
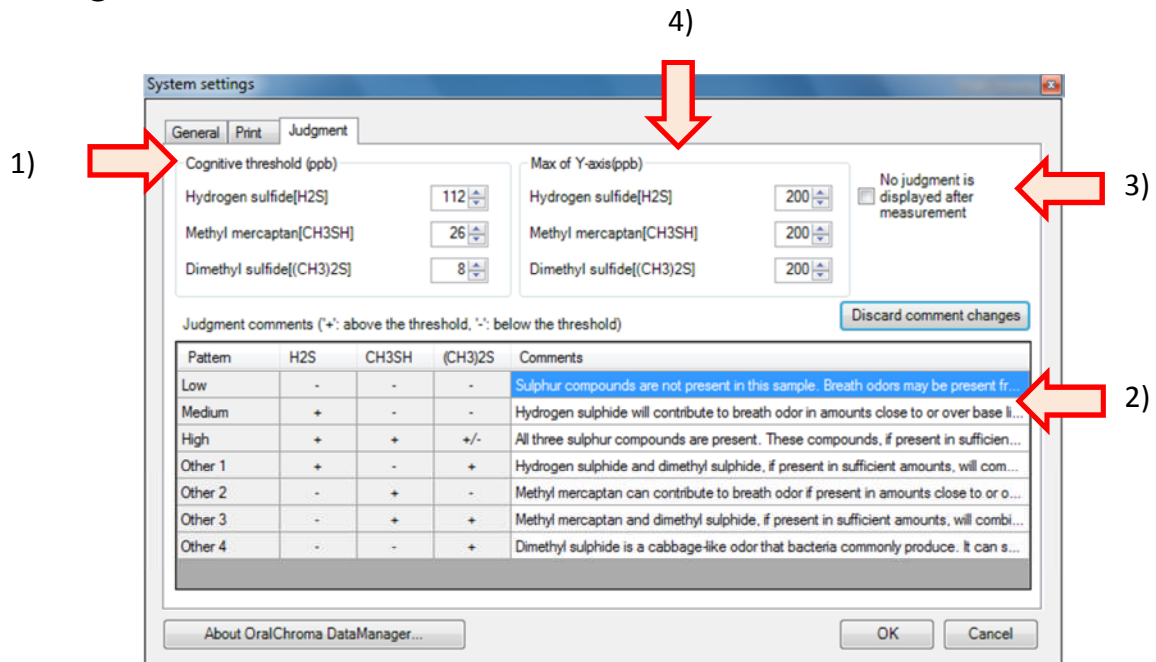
1) **Cognitive threshold(ppb)**
   Specify a threshold, a criterion for judgment for each gas.
   （See page 25）

2) **Judgment comments**
   Edit the judgment comments.
   （See page 26）

3) **No judgment is displayed after measurement**
   By checking this, the judgment window is not automatically displayed after the measurement.

4) **Max of Y-axis(ppb)**
   Specify the maximum value to be displayed on the Judgment window for simple view mode.

■ Saving the change

Click "**OK**" on the "**System setting**" window to save the changes.

Maintenance

■ Monitoring internal parameters

Click "**Internal parameters**" on the Main window to display the "**Internal parameter**s" window. This window shows some operating parameters in the OralChroma.
Usually, it is not necessary for customers to use this window.
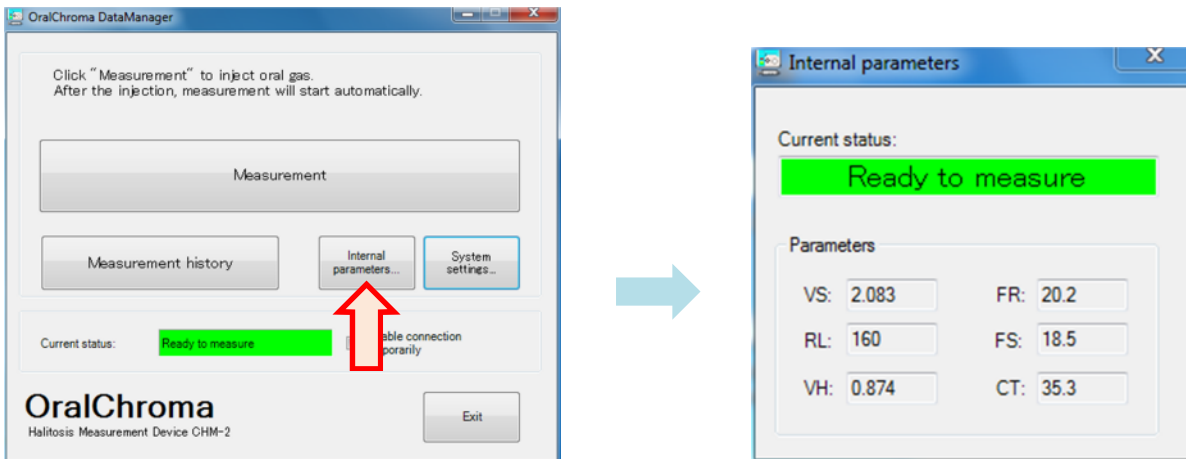
■ Error indication

When an error occurs, it is indicated at "**Current status**" on the Main window.
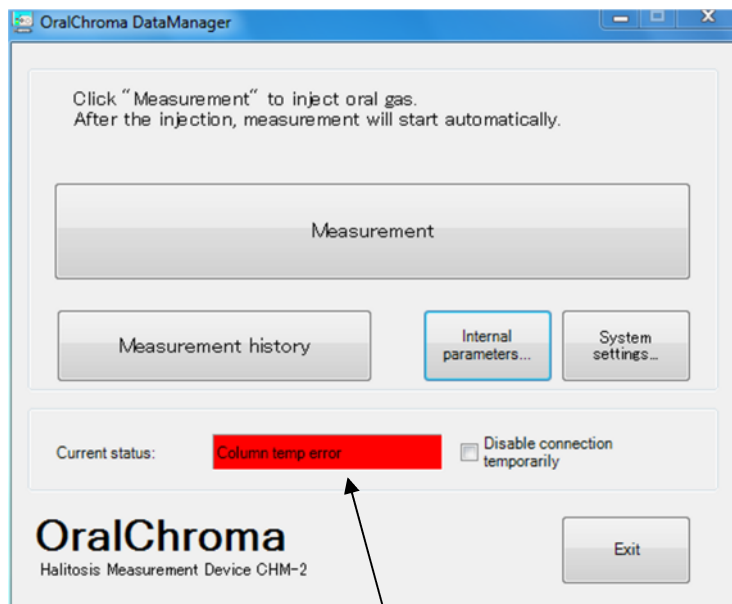
Current status of OralChroma

The following errors may occur.

·**Stability error/Flow rate error/Column temp error/Vh error/Communication error**

In either case, turn off the power of OralChroma and contact the agent you purchased it from.

■ Daily maintenance

To clean the surface of the OralChroma, wipe gently with a soft cloth.
If the dirt is thick, wipe with a cloth moistened with water or mild detergent and squeeze it.
Do not use detergent that contains benzene, alcohol, thinner, etc.

■ Consumable supplies

Use the syringe to sample oral gas as specified below.
If the syringe is out of stock, contact the sales agent from whom you purchased the unit.

Syringe for sampling oral gas:
  Plastic syringe 1 mL TOP #01001 including 100 pcs., or
  Tuberkulin plastic syringe 1mL HSW

⚠ CAUTION
Using other syringes than specified above may cause unit failure or may affect the measurement results.

Troubleshooting

Trouble	Cause	Measure
Power is not supplied.	Power cord is not connected.	Connect a power cord to the unit, then to a receptacle.
	Main switch is not turned on	Turn on the Main switch（｜）at the back of the unit.
	Power switch is not properly turned on.	Keep pushing Power switch until the buzzer sounds.
	A fuse has blown.	Replace the fuse.
Green READY lamp is not turned on.	Sensor or column has not yet been stabilized.	Waiting Status continues. Wait for a while.
	The previously measured gas contains any gas influencing the gas sensor.	
	The unit has been powered off for a long period of time.	
	Error is indicated on the main window of the software.	Contact sales agent.
Measurement will not start even after injecting oral gas.	Smaller amount of gas than specified was injected.	Inject 1cc.
	Injected very slowly.	Inject quickly.
	Injected while READY lamp was off.	Inject after READY lamp is turned on.
Displayed concentration varies widely.	Sensor and/or internal circuit is out of order.	Contact sales agent.
	Volume of sample gas is not constant.	Inject 1cc.
	Injection process is too slow.	Inject the gas quickly.
Measured concentration is always "0."	Sensor and/or internal circuit is out of order.	Contact sales agent.
	Injection process is too slow.	Inject the gas quickly.

Services

When you suspect a failure, first check the time the failure occurred, the processes involved, and the symptoms when the failure occurred before you request repair services. After that, contact the sales agent from whom you purchased the product. Repack the product in the original package and include a detailed explanation of the error. Please note that we are not liable for damage caused during shipment.
If there should be a failure caused by a defect in manufacturing within the warranty period (one year from the day of purchase), the machine will be repaired at no charge.
Service or repairs for the following, however, are subject to a charge:

- Damage caused by the customer's improper handling, including dropping and other impact occurred during shipment.
- Damage caused by natural calamity including fire, earthquake, flood, etc.
- Damage caused by equipment other than this machine.
- Damage caused by repair or modification by the customer without approval from the sales agent.
- The warranty is not filled out completely.
- The warranty period has expired.

Note that we are not liable for damage to other equipment, even if the damage was caused by this product.

If there should be a failure again in a part we have repaired or replaced, we will repair the machine at no charge as long as the second failure occurred within three months of the original failure.

We are still responsible for the repair even after the warranty period has expired despite the fact that the repair in question may be subject to a charge.
Please note that similar substitute repair parts may be used.

Periodic overhaul for a fee
The overhaul should be executed every two years.
Contact your sales agent for details.

Specifications

Product	
Product name	OralChroma
Model	CHM-2
Detection	
Principle	Gas chromatograph using semiconductor gas sensor
Detector	Highly sensitive semiconductor gas sensor
Carrier gas	Clean ambient air (sucked by built-in pump and purified by built-in filter)
Gas	
Detection gas	Hydrogen sulfide, methyl mercaptan and dimethyl sulfide in oral breath samples
Concentration range	50 to 1000ppb
Resolution	1ppb
Measurement	
Injection	Manual injection with supplied syringe
Sample volume	1cc
Time	4 minutes per measurement
Result	Gas concentration and chart by supplied software
Software	OralChroma DataManager
I/O	
Power supply	100 to 240VAC ±10%, 50/60 Hz
Power consumption	60VA
Interface	USB
Environment	
Installation	Indoor only
Installation category	II
Transient overvoltage	2500V
Altitude	Up to 2000m
Pollution degree	2
Operating	Temperature: 10 to 30°C, Relative humidity: lower than 80% (No condensation), Clean air
Storage	Temperature: -20 to 60°C, Relative humidity: 20 to 80% (No condensation), Clean air
Size and weight	
Size	280(W) X 170(H) X 385(D) mm（excluding protruding portion）
Weight	4.0Kg

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