



Preface

Thank you for purchasing the SPS24 SENCOM PC Software.

Please read the following respective documents before installing and using the SPS24 SENCOM PC Software.

The SPS24 SENCOM PC Software is designed to connect and manage SENCOM sensors for tasks including calibration.

For information about the SENCOM sensor, WU11 SENCOM cable, and FLXA21 2-wire analyzer, please refer to their respective manuals.

- **Target readers of this document**

This document has been compiled for readers who have the basic software and hardware knowledge required to install the SPS24 SENCOM PC Software as well as to operate Microsoft Windows operation systems.

- **Version up**

The SPS24 SENCOM PC Software can download a version up product from the following site.

<http://www.yokogawa.com/an/soft/sps24/>

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● Signal Words

The following words are used in this manual.

CAUTION

This symbol gives information essential for understanding the operations and functions.

NOTE

This symbol indicates information that complements the present topic.

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Some drawings may be partially emphasized, simplified, or omitted, for the convenience of description.

Some screen images depicted in the user's manual may have different display positions or character types (e.g., the upper / lower case). Also note that some of the images contained in this user's manual are display examples.

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Number of License: 1 (one) License

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- (3) When this Agreement is terminated, Yokogawa shall not obligate to refund the price amount Yokogawa received to you.

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Concluded.

Model SPS24

SENCOM PC Software

IM 12A01S02-01E 1st Edition

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1. Introduction

This section outlines the SENCOM PC Software and explains general items users must understand before using this software.

1.1 Outline

The SPS24 SENCOM PC Software has the following features.

- Handling SENCOM sensors at a laboratory and so on
- Calibrating and measuring up to four sensors simultaneously
- Managing sensor related data such as calibration and setting sensor data
- Managing up to 100 SENCOM sensors simultaneously
- Setting each password according to its control level

SENCOM sensors can perform measurement in combination with the FLXA21 2-wire analyzer. Sensors are usually calibrated with the analyzer at the site. However, the SPS24 enables operators to calibrate sensors at a laboratory or other places as long as the SPS24-installed PC is provided.

SENCOM sensors are connected by using connectors, so they can be easily connected to or detached from the cable. After calibration, the SPS24 helps sensors store the calibration data in their own memory. When such a sensor is connected to the FLXA21, calibration data in the sensor is automatically sent to the FLXA21.

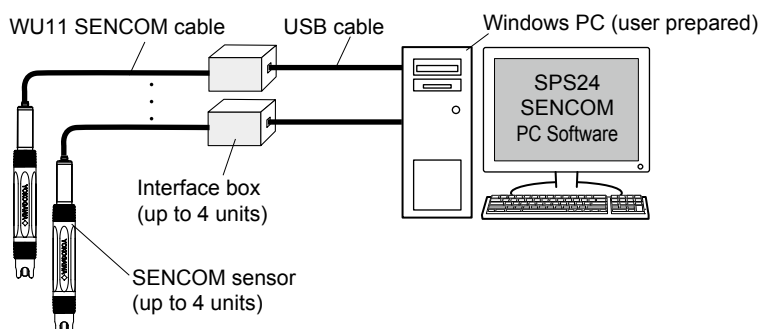


Figure 1.1 Connection example of SENCOM sensors

1.2 Screen Configuration

When launching the SPS24, the Current measurement readings screen appears. Content differs depending on settings or sensor connections.

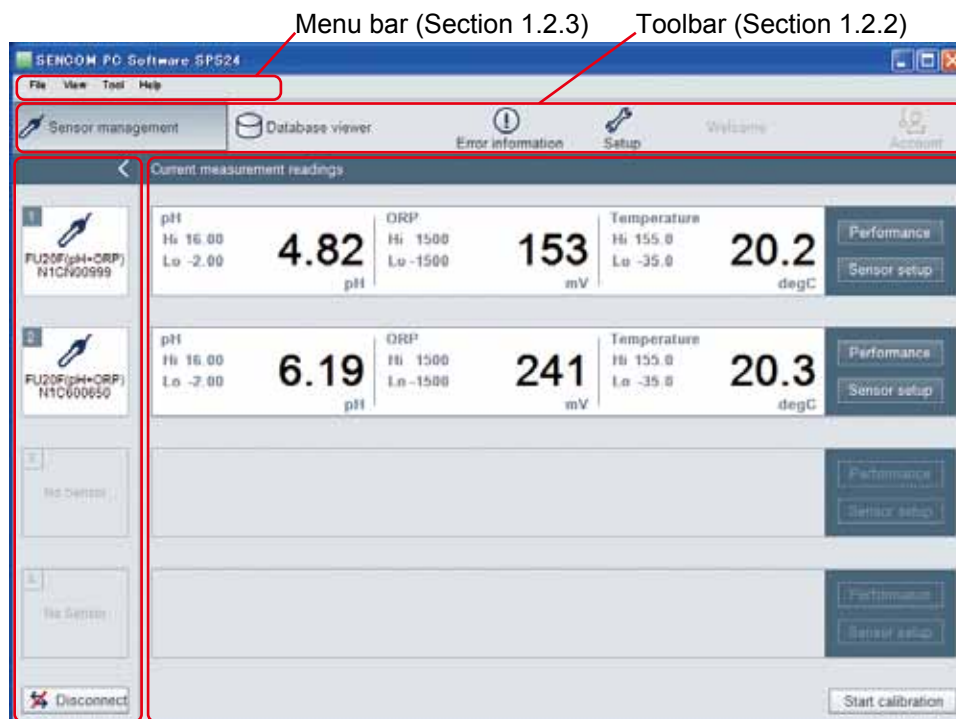


Figure 1.2 **Example of start screen (the number after the item refers to the relevant section)**

1.2.1 Connection Information Field

The connection information field displays the status and information of connected sensors, and can also be used for switching target sensors.

Sensors can be connected or disconnected by clicking on the [Connect] or [Disconnect] buttons at the bottom of the field.

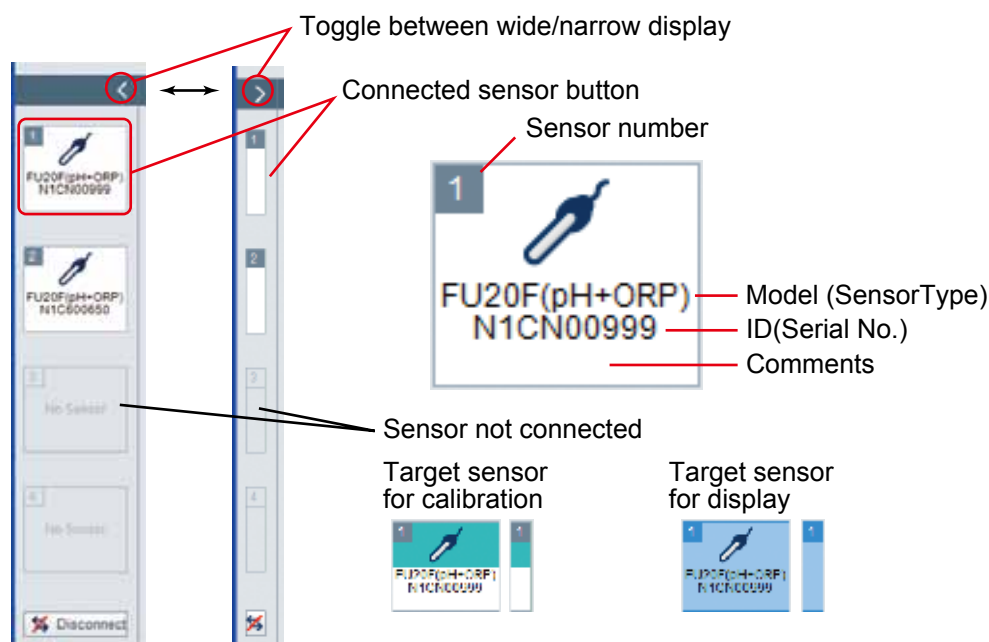


Figure 1.3 Screen example of connection information field

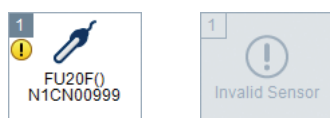
When “Sensor Not Connected” is shown despite a sensor being connected, disconnect the sensor from the cable, reconnect, and click [Connect] again.

Information about the connected sensor is displayed on the sensor connection button along with the connection status.

The sensor type can be set using [Sensor setup] (pH, ORP, pH+ORP).

An optional comment can be entered for sensor identification using [Database viewer] – [Edit data].

When the display shows the following icons, see “5. Error Information”.



1.2.2 Toolbar

The toolbar has function switch buttons for [Sensor management], [Database viewer], [Error information], [Setup], and others. Clicking a button displays the corresponding function screen. For details, see sections 3 to 7.

This operation is also available from [View] on the menu bar.

1.2.3 Menu Bar

Functions of the menu bar are as shown in Table 1.1.

By default, the menu bar is not displayed. It can be turned on or off from the pop-up menu (right-click to view), or from [Setup] – [Display].

Table 1.1 Menu Bar

Menu			Description
File	Export to PDF		Outputs the report in PDF format
	Export to Excel		Outputs the data in Excel format
	Print report		Prints a report via a printer
	Export		For data backup
	Import		
	Exit		Closes the SPS24
View	Sensor management		Moves to function views
	Database viewer		
	Error information		
	Setup		
Tool	Performance	Sensor 1 to 4	Displays the sensor performance
	Sensor Setup	Sensor 1 to 4	Configures setting per sensor
	Calibration		Starts calibration
	Edit data		Enters the edit mode
	Add ID		Only available for non-digital sensors
	Delete ID		Deletes database ID
	Show all		Selects the sensor data to be displayed
	Show checked		
	Select column		Selects items to be displayed
	Calibration history	pH history	Displays respective calibration histories
		ORP/rH history	
		Temperature history	
	RS port No.		Configures the RS port number
	Communication log		Not used
	Unit setting		Configures the display units
	Display		Selects the data format and the menu bar display
	Select language		Selects the SPS24 display language
	User account		Configures user registration (password)
	pH/ORP		Configures sensor common settings
Help	Open pdf manual F1		Displays the user's manual
	About SENCOM PC Software		Displays the SPS24 version information

● Pop-up Menu

Right-clicking anywhere on the screen displays the pop-up menu.

Table 1.2 Pop-up menu

Pop-up Menu		Description
Open pdf manual F1		Displays the user's manual
Print screen		Prints the display on the screen
Language	English Japanese	Selects the SPS24 display language
Menu bar display	ON OFF	Selects either to turn the menu bar on or off

1.2.4 Function Information Field

The display content varies depending on the function selected on the toolbar.

For details, see sections 3 to 7.

2. Preparation and Basic Operation

This section describes the procedures for using the SPS24 SENCOM PC Software.

● SPS24 system requirements

Operating system (OS): Windows 7 SP1 (32 bit/64 bit) or Windows XP Professional SP3

The operating system language and the software language are either English or Japanese.

PC hardware: Installed with either of the OSs above and equipped with the CPU and memory listed below.

Windows 7 Intel Core 2 Duo CPU E7500 or higher. Minimum 2 GB RAM

Windows XP Intel Pentium 4 CPU 1.6 GHz (x64/x86) or higher. Minimum 512 MB RAM

Display: XGA (1024×768) or larger

HDD: At least 100 MB for application (more space may be required to save data).

Drive: (required for installation)

Numbers of USB ports: Depends on the number of SENCOM sensors to be connected (1 to 4).

Printer: Units that can operate with either of the Windows systems above.

2.1 Driver Installation

When installing the driver for interface boxes, follow the messages that appear in the dialog box. SPS24 can be installed before this procedure.

CAUTION

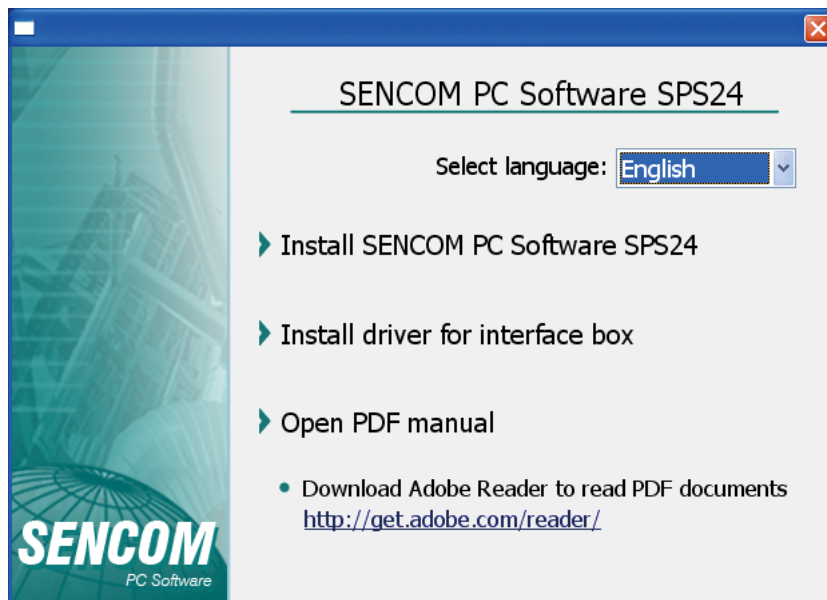
- Before installing the driver software, close all applications.
- Uninstall the driver software before re-installation.

CAUTION

- In the case of Window 7, log in as a user with system administrator privileges.
- In the case of Windows XP, log in with a user name (single-byte characters) that is included in the Administrator group. The program cannot be installed properly if the user name entered contains double-byte characters. The program will not run properly if logged in with a user name that is not included in the Administrator group.

■ Installation for Windows 7

1. Start Windows 7.
2. Insert the SPS24 CD into the drive. The startup screen automatically appears. When the AutoPlay view appears without the startup screen, clicking on "Run SPS24_Launcher.exe" displays the startup screen.



3. Click on "Install the interface box driver".
4. The "User Account Control" screen is displayed. Click "Yes" to continue.
5. The "Welcome to Yokogawa Driver for interface box setup" screen is displayed. Click "Next" to continue.
6. The "Ready to Install the Program" message appears. Click "Install".
7. The "Windows Security" screen appears. Click "Install". (USB device driver)
8. The "Windows Security" screen appears. Click "Install". (Com port driver)
9. The "InstallShield Wizard Complete" screen appears. Click "Finish".

Windows 7 driver installation is complete.

Connect a cable for the interface box to a USB port on the PC for automatic detection.

■ Installation for Windows XP

1. Start Windows.
2. Insert the SPS24 CD into the drive. The startup screen is automatically displayed.
3. Click on "Install the interface box driver".
4. The "Welcome to Yokogawa Driver for interface box setup" screen is displayed. Click "Next" to continue.
5. The "Ready to Install the Program" message appears. Click "Install".
6. A dialog box appears with a warning message that the driver has not passed Windows Logo testing for compatibility verification. Ignore this and click "continue". Although the same warning appears again, click "continue".
7. The "InstallShield Wizard Complete" screen appears. Click "Finish".

Windows XP driver installation is complete.

● Connecting a USB cable for the interface box

For Windows XP installation, connect a cable for the interface box to a USB port on the PC and install a COM port driver. For multiple interface boxes, installation is required for every new connection.

1. Inserting a cable for the interface box to a USB port on the PC automatically displays the “Hardware Update wizard”. Select “Install the software automatically (Recommended)” and click “Next”.
2. The dialog box appears with a warning message that the driver has not passed Windows Logo testing for compatibility verification. Ignore this and click “continue”.
3. Copying a USB driver for the cable starts, and a message appears when the installation is complete. Click “Finish”.
4. Installation of the virtual COM port driver follows.
Select “Install the software automatically (Recommended)” and click “Next”.
5. A dialog box appears with a warning message that the driver has not passed Windows Logo testing for compatibility verification. Ignore this and click “continue” again.
6. Copying of the virtual COM port driver starts, and a message appears when installation is complete. Click “Finish”.

Windows XP COM port driver installation is complete.

2.2 SPS24 Installation

After the interface box driver, install the SPS24 SENCOM PC Software.

CAUTION

- Before installing SPS24, close all applications.
- When installing the software, do not select a root directory only (e.g. C:\) as the destination for installation. It may cause incorrect installation.
- Uninstall the SPS24 software before re-installation.

CAUTION

- In the case of Window 7, log in as a user with system administrator privileges.
- In the case of Windows XP, log in with a user name (single-byte characters) that is included in the Administrator group. The software cannot be installed properly if the user name entered contains double-byte characters. The program will not run properly if logged in with a user name that is not included in the Administrator group.
- In the case of Windows 7, do not create a directory to store user files in the Program Files folder. It may cause SPS24 to malfunction.

When a directory to store SPS24 user files is located in the Program Files folder, do not upgrade the OS to Windows 7.

■ SPS24 Installation

1. Click on “Install SPS24 SENCOM PC Software” on the start screen. In the case of Windows 7, the “User Account Control” screen may be displayed. Click “Yes”.
2. The “Welcome to SPS24 Setup” screen appears. Click “Next” to continue.

3. "License Agreement" appears. Read the terms on the license agreement. Select "I accept the terms in the License Agreement" and click "Next".
(Selecting "I do not accept the terms in the License Agreement" aborts SPS4 installation. Click "Cancel" to leave the installation.)
4. The "User information" screen is displayed. Enter the user name and organization, and click "Next".
5. The "Install destination" screen appears.
If you need to change the install destination, enter the desired location and click "Next".
6. The "Ready to install" message appears. Click "Install".
7. Installation begins. When installation completes successfully, the "Setup Complete" dialog appears. Click "Finish" to continue.

SPS24 installation is complete.

2.3 Confirming Installation and Uninstallation

The procedure to confirm installation or uninstall drivers and SPS24 is as follows.

NOTE

To uninstall the USB driver, first disconnect the USB cable from the computer.

NOTE

To uninstall the SPS24, [Export] in Database viewer and Setup beforehand, and save the sensor information.

Go to Windows [Start] – [Control Panel] – [Programs and Features] ([Add or Remove Programs] in Windows XP).

For the driver, confirm that "Yokogawa Driver for interface box" is listed. For the SPS24, confirm that "Yokogawa SENCOM PC Software" is listed.

To uninstall the driver or software, right-click on the desired listing and click "Uninstall".

In the case of Windows XP, click "Delete".

SPS24 can be confirmed by using the following method.

Go to Windows [Start] – [All Programs] to confirm that [Yokogawa SENCOM PC Software] is listed.

Clicking "SENCOM PC Software" launches SPS24.

Clicking on "User's Manual" opens this document (IM 12A01S02-01E) in PDF format.

2.4 Sensor Connection

For information on how to connect FU20F SENCOM sensors and WU11 SENCOM cables, refer to IM 12B06J03-04E.

For the FLXA21 2-wire liquid analyzer, refer to IM 12A01A02-01E.

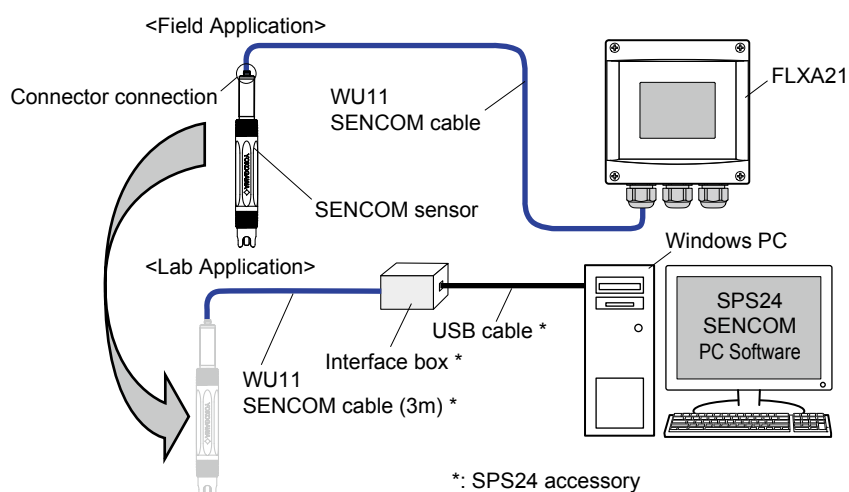


Figure 2.1 Example of SENCOM sensor connection and usage

Connect SENCOM sensors as shown in Figure 2.1.

When connecting to a FLXA21, connecting/disconnecting is performed at the connector by removing the WU11 SENCOM cable.

Connect the WU11 SENCOM cable terminal to the pin terminal of the interface box.

Connect the enclosed USB cable to the interface box and a USB port on the PC.

Up to 4 SENCOM sensors can be connected to a PC at the same time. For multiple connections, the same number of interface boxes and USB cables is required (see Figure 1.1).

2.5 How to use the SPS24

Go to Windows [Start] – [All Programs] – [Yokogawa SENCOM PC Software] and click “SENCOM PC Software” to launch the SPS24.

● First launch

At first launch, the “Please set RS port” message appears. Click “OK” to close the dialog box. Confirm the sensor connection and go to [Setup] – [RS port No.] to assign the RS port number to the sensor.

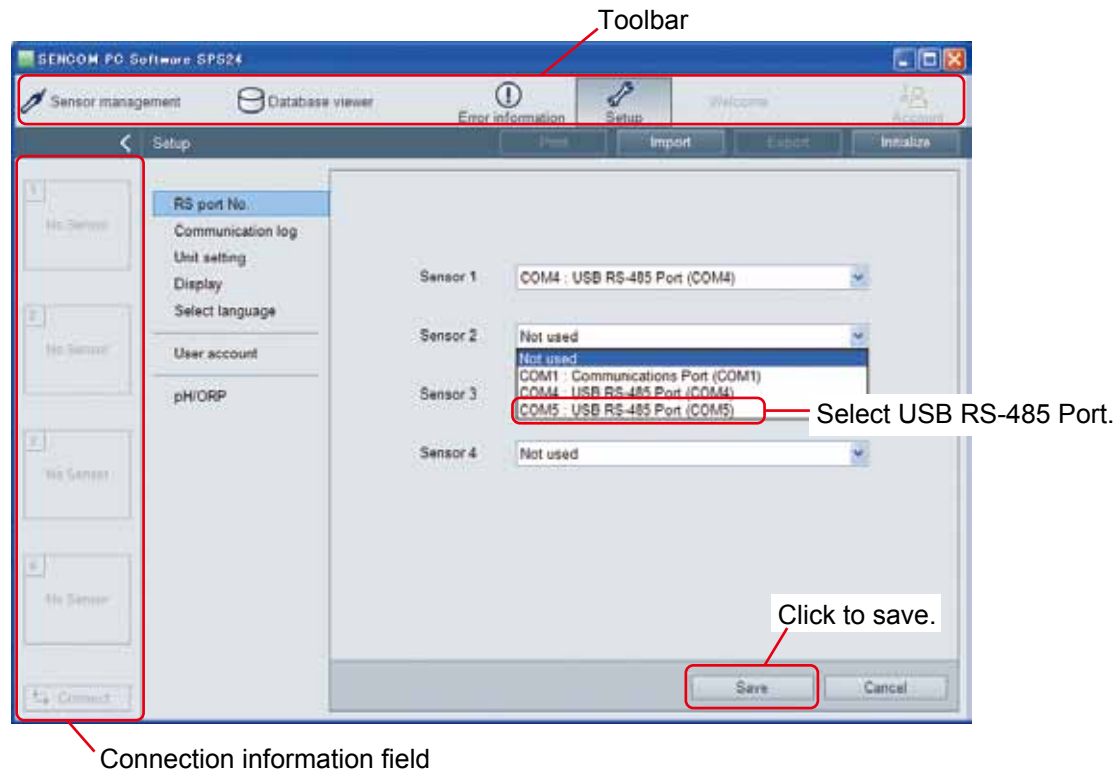


Figure 2.2 Example of RS port number setting (2 sensors are connected simultaneously)

Select USB RS-485 Port and click “Save” to store the change.

Clicking [Connect] in the connection information field detects the sensor and displays the connected sensor button.

The * mark after the COM number indicates the active connection.

● Multiple Sensor Connection

To connect multiple sensors, connect multiple interface boxes to the USB ports on the PC using USB cables.

Once the USB cables are connected, RS port numbers (COM numbers) are automatically allocated. RS port numbers do not change even after disconnecting USB cables.

In the case of Windows XP, the COM port driver must be installed for every connection.

The RS port number of the interface box can be confirmed by using the connected sensor button ID (serial No.) which appears every time a sensor is connected.

To allocate a particular interface box to sensors 1 to 4, set the RS port number individually by connecting one cable at a time.

To change the allocation, click [Disconnect] and perform the configuration again.

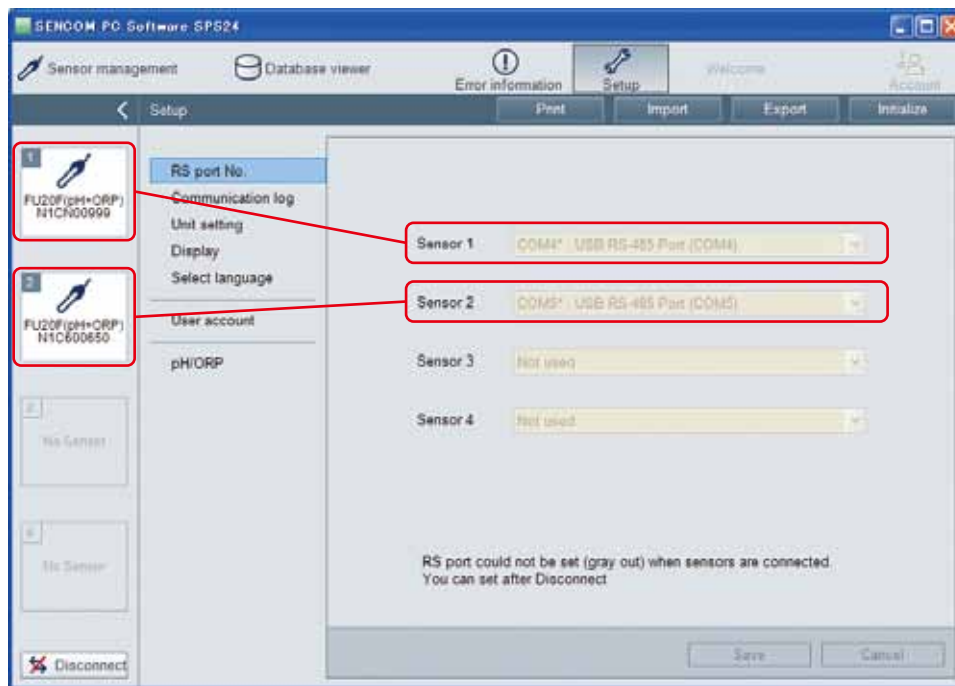


Figure 2.3 Example of RS port number view (2 sensors are connected simultaneously)

● Subsequent Launches (connections)

Connect the SENCOM sensor first and then launch SPS24. The sensor connection is automatically detected when the program launches. The RS port number setting is retained.

To connect the SENCOM sensor after the SPS24 launch, click [Connect] in the connection information field.

● Disconnection of SECOM Sensor (Close SPS24)

Click [Disconnect] in the connection information field. Disconnect the SENCOM sensor from the cable if required. Close SPS24.

CAUTION

Click [Disconnect] in SPS24 first and then disconnect the SENCOM sensors from the PC. Otherwise, the SENCOM sensors may be damaged.

3. Sensor Management

Clicking on [Sensor management] from the toolbar will display “Current measurement readings,” which shows the measurement value of sensors connected to the PC.

With this function, users can view sensor measurements, adjust sensor performance and settings, or calibrate sensors.

By default, measurement targets and calibration objects are as shown in Table 3.1.

Table 3.1 Measurement targets and calibration objects

Sensor type *1	pH+ORP measurement *2	Measurement Target	Calibration object *3
pH	Functions as a pH sensor regardless of the setting	pH, Temperature	pH, Temperature
ORP *4	Functions as an ORP sensor regardless of the setting	ORP, Temperature	ORP, Temperature
pH+ORP	pH	pH, Temperature	pH, Temperature
	ORP *4	ORP, Temperature	ORP, Temperature
	pH+ORP	pH, ORP, Temperature	pH, ORP, Temperature
	pH+rH	pH, rH, Temperature	pH, rH, Temperature
	rH	rH, Temperature	rH, Temperature

*1: “Sensor type” options of [Sensor management] – [Sensor setup].

*2: “pH+ORP measurement” options of [Setup] – [pH/ORP] – [pH/ORP common settings].

*3: “Calibration object” options of [Sensor management] – [Start calibration] – [Calibration wizard].

*4: In the case of the ORP measurement on the basis of a reference electrode, please choose “ORP” of Sensor type “pH+ORP.”
In the case of the ORP measurement on the basis of a glass electrode, please choose Sensor type “ORP.”

For details, refer to User’s Manual of Model FLXA21 2-Wire Analyzer (IM 12A01A02-01E).

3.1 [Performance]

Clicking on [Performance] in “Current measurement readings” will display the sensor performance screen, which shows the sensor information.

Table 3.2 Sensor performance

Item			Description
Calibration / Maintenance information	Last calibration	pH, ORP, rH, Temperature	Date/time of last calibration and type of calibration
	Projectes replacement		Date of sensor replacement required for measurement accuracy, which is predicted based on the preventative maintenance function.
Calibration data	pH	zero, slope	Calibration value and date/time of last update
	ORP	zero, slope	
	rH	zero, slope	
	Temperature	offset	
Sensor wellness	Zero, Slope, Impedance 1, Impedance 2		Sensor health Higher % value of each gauge means superior parameter health.
Measuring data	pH sensor		Electromotive force of the pH sensor
	ORP sensor		Electromotive force of the ORP sensor
	rH sensor		Electromotive force of the rH sensor
	Impedance 1		Glass membrane resistance (for detecting possible damage to the glass electrode)
	Impedance 2		Impedance of the reference electrode junction

3.2 [Sensor setup]

Clicking on [Sensor setup] in “Current measurement readings” will display the sensor setting screen, where settings can be applied to each sensor individually.

For the settings common to pH sensors, go to the pH/ORP common setting in [Setup].

This screen displays values stored in connected sensors. Changed values will be displayed in red. Click on [Synchronize] to send the new setting to SENCOM sensors.

- **[Import setting]**

Imports sensor setting data (excluding Calibration) from a file.

- **[Export setting]**

Exports sensor setting data (excluding Calibration) to a file.

The default file name is in the format of “Smart_SensorSetup(yymmddhhmmss).PH” which can be replaced with up to 255 single-byte characters (127 double-byte characters). A file name cannot contain any of the following characters: + * / ? ” < > |

- **[Initialize sensor]**

Initializes the setting stored in SENCOM sensors.

Table 3.3 Sensor setting

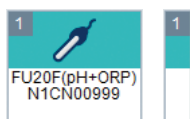
	Item		Range	Default	Remarks
Sensor settings	Sensor type		pH, ORP, pH+ORP	pH+ORP	
Calibration	pH settings	Zero	-120.0 to 120.0 mV 4.97 to 9.03 pH	0.000 mV 7.00 pH	Unit can be selected at the pH/ORP common settings.
		Slope	70.00 to 110.0 % 41.41 to 65.08 mV/pH	100.0 % 59.16 mV/pH	Unit can be selected at the pH/ORP common settings.
		ITP	0.00 to 14.00 pH	7.00 pH	
		pH Auto correct	Disable, Enable	Disable	
	ORP/rH settings	Zero	-120.0 to 120.0 mV	0.00 mV	
		Slope	70.00 to 110.0 %	100.0 %	
	Temperature compensation	Compensation	Manual, Automatic	Automatic	
		Manual temperature	0.0 to 100.0 degC 32.0 to 212.0 degF	25.0 degC 77.0 degF	Process temperature used for manual compensation
Sensor diagnostic settings	Define heat cycle diagnostic reference	Heat cycle temperature	1 to 250 degC 34 to 482 degF	50 degC 124 degF	
		Heat cycle time	0.1 to 60.0 min.	10.0 min.	
	Define SENCOM diagnostic reference	High pH value	-2.00 to 16.00 pH	13.00 pH	
		Low pH value	-2.00 to 16.00 pH	1.00 pH	
		Sterilization temperature	0.0 to 155.0 degC 32.0 to 311.0 degF	155.0 degC 311.0 degF	
		Sterilization time	0.0 to 100.0 min.	100.0 min.	
		High temperature 1	-35.0 to 155.0 degC -31.0 to 311.0 degF	155.0 degC 311.0 degF	
		High temperature 2	-35.0 to 155.0 degC -31.0 to 311.0 degF	155.0 degC 311.0 degF	

3.3 [Start calibration]

Clicking on [Start calibration] in “Current measurement readings” will display the selection screen that shows sensors to be calibrated.

Sensors of the same model and type can be calibrated simultaneously.

When a sensor is selected, the upper part of the sensor button turns blue for identification.



Before pH measurement, calibrate the pH sensor with the standard solution.

Before ORP measurement, check the electrode as regular maintenance.

Calibration objects are pH, ORP, rH, and temperature. pH calibration has manual and automatic modes, each with three calibration types.

■ pH Calibration (Manual)

The unit is adjusted to match the value of the buffer standards or a process solution with a known pH value (buffer solution).

The user determines the pH value, temperature influence, and stability.

Select the calibration type from among [Zero/slope], [Zero/slope/ITP(3point)], and [Zero/slope1,2(3point)].

Calibration is performed stepwise; follow the prompts displayed on the screen.

A stability check is conducted at each measurement point. Proceed to the next step only after the reading has stabilized.

At calibration, we advise leaving the sensors for three to five minutes in the buffer solution before proceeding to the next step even when the reading has stabilized. This will give reliable and accurate calibration results.

● Zero/slope

This calibration type is one-point or two-point calibration.

One-point calibration performs the zero adjustment only. Two-point calibration performs the zero and slope adjustments.

● Zero/slope/ITP(3point)

This calibration type is ITP-type three-point calibration.

If ITP does not have pH 7, three-point calibration is performed to obtain the zero (asymmetry), slope (sensitivity), and ITP (isothermal point) for calibration.

Limitations

- Three different buffer solutions whose difference in pH value between buffer solutions is 1 pH or more should be used.
(1st buffer < 2nd buffer < 3rd buffer or 1st buffer > 2nd buffer > 3rd buffer)
- The 2nd buffer solution should be pH 7 ± 2.
- The temperature difference between the 1st and 3rd buffer solutions should be 20°C or more.
- The temperature difference between the 2nd and 3rd buffer solutions should be 20°C or more.

● Zero/slope1,2(3point)

This calibration type is the line-segment type three-point calibration.

If the relation between electromotive force and pH is not in proportion for a wide range, divide the relevant range into two sections and obtain the zero (asymmetry) and slope (sensitivity) in each section to perform calibration.

Limitations

- Three different buffer solutions whose difference in pH value between buffer solutions is 1 pH or more should be used.
(1st buffer < 2nd buffer < 3rd buffer or 1st buffer > 2nd buffer > 3rd buffer)
- The temperature difference between the 1st and 2nd buffer solutions should be 20°C or less.
- The temperature difference between the 2nd and 3rd buffer solutions should be 20°C or less.

■ pH Calibration (Auto)

Calibration can easily be performed by following the calibration menus.

Pre-select the buffer solution to be used from among NIST/DIN 19266, DIN 19267, US, and Programmable in [Setup] – [pH/ORP] – [pH/ORP common settings] – [pH calibration settings] – “Select buffer set”.

If you select Programmable, calibration is performed based on the conditions registered in buffer tables 1 to 3. Use of the proper buffer table allows the system to perform reliable calibration.

In the same way as manual pH calibration, select the calibration type from among [Zero/slope], [Zero/slope/ITP(3point)], and [Zero/slope1,2(3point)].

Calibration is performed stepwise; follow the prompts displayed on the screen.

A stability check is conducted at each measurement point. Proceed to the next step only after the reading has stabilized.

● Zero/Slope

Select the solution that works with the “buffer solution” selected in calibration settings and perform calibration by following the prompts on the screen.

● Zero/Slope/ITP (3 points)

Calibration is performed in the sequence of the sequence selection menu (Table 3.4) of the solution that works with the “buffer solution” selected in calibration settings. Perform calibration by following the prompts on the screen.

Limitations

- Three different buffer solutions whose difference in pH value between buffer solutions is 1 pH or more should be used.
(1st buffer < 2nd buffer < 3rd buffer or 1st buffer > 2nd buffer > 3rd buffer)
- The 2nd buffer solution in the user defined buffer tables should be pH 7 ± 2 (at 25°C).
- The temperature difference between the 1st and 3rd buffer solutions should be 20°C or more.
- The temperature difference between the 2nd and 3rd buffer solutions should be 20°C or more.

● Zero/Slope 1, 2 (3 points)

Calibration is performed in the sequence of the sequence selection menu (Table 3.4) of the solution that works with the “buffer solution” selected in calibration settings. Perform calibration by following the prompts on the screen.

Limitations

- Three different buffer solutions whose difference in pH value between buffer solutions is 1 pH or more should be used.
(1st buffer < 2nd buffer < 3rd buffer or 1st buffer > 2nd buffer > 3rd buffer)
- The temperature difference between the 1st and 2nd buffer solutions should be 20°C or less.
- The temperature difference between the 2nd and 3rd buffer solutions should be 20°C or less.

Table 3.4 Buffer selection for 3-point calibration

Buffer for 3-point Calibration	Buffer Sequence
NIST/DIN19266	pH1.7→pH6.9→pH9.2
	pH4.0→pH6.9→pH9.2
	pH9.2→pH6.9→pH1.7
	pH9.2→pH6.9→pH4.0
DIN19267	pH4.7→pH6.8→pH9.2
	pH9.2→pH6.8→pH4.7
US	pH4.0→pH7.0→pH10.0
	pH10.0→pH7.0→pH4.0
User setting	Buffer Table 1 → Buffer Table 2 → Buffer Table 3
	Buffer Table 3 → Buffer Table 2 → Buffer Table 1

* In 2-point calibration, set the sequence for each buffer.

■ Temperature Calibration (Temperature Setting)

For the most accurate measurements, it is important to have a precise temperature measurement. Measure the temperature with a high-precision thermometer and adjust the sensor reading accordingly. For best accuracy, this should be done as near to the normal operating temperature as possible.

■ ORP Calibration (rH Calibration)

No automatic calibration feature is available in an ORP or rH calibration.

Calibration is performed stepwise. Follow the prompts displayed on the screen.

A stability check is made at each measurement point. Proceed to the next step only after the reading has stabilized.

4. Database Viewer

Clicking on [Database viewer] from the toolbar will display up-to-date information about the sensors connected to the SPS24. From this screen, the information database for sensors can be managed.

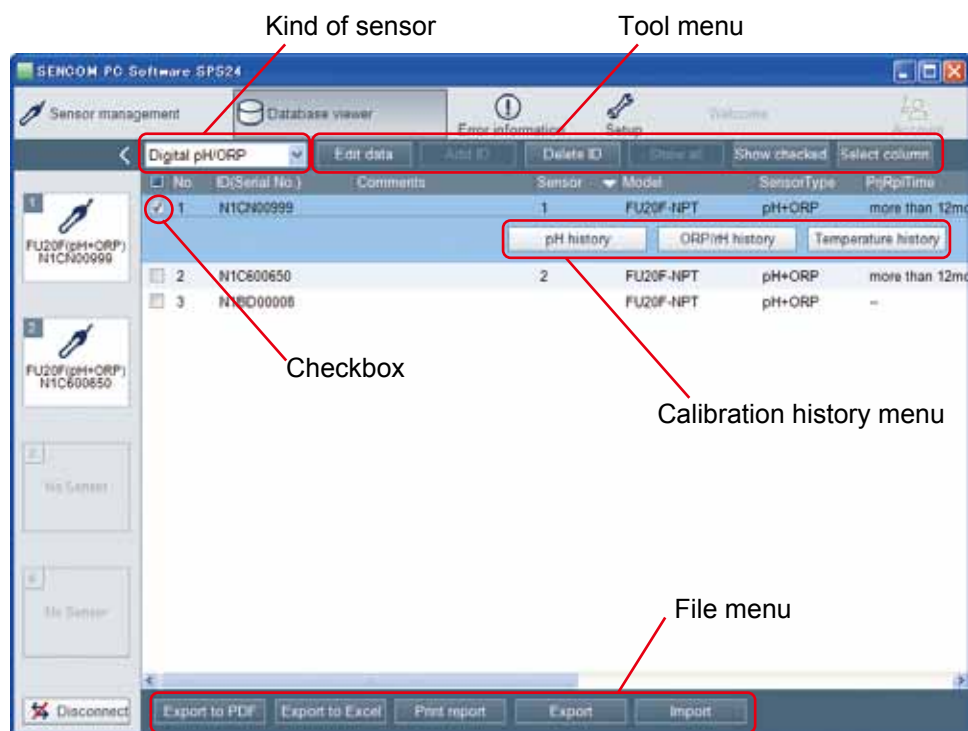


Figure 4.1 Example of Database Viewer screen

The “Sensor” field indicates the sensor numbers of sensors currently connected to the PC.

By clicking the item name, ▼ or ▲ icons are displayed for sorting the order on the display. “No.” is assigned automatically.

A scroll bar is displayed as needed.

■ Kind of Sensor

Kind of sensor is used for selecting the sensor to be displayed. SENCOR sensors are “Digital pH/ORP.” “Non-digital pH/ORP” can be used for managing data of non-digital pH/ORP sensors in the database.

■ Tool Menu

The Tool menu can be accessed from “Tool” on the menu bar.

● [Edit data]

Edit data is used for editing data.

Clicking on [Edit data] takes you to the editing mode.

The background color of editable fields turns white where information can be added or changed by clicking on the target field (only “Comments” field can be edited for digital pH/ORP).

Added or changed data will be displayed in red. Click [Save] to save the change.

- **[Add ID]**

Add ID is available only for non-digital pH/ORP sensors. Use this function for managing data of non-digital pH/ORP sensors in the database.

Register new ID data.

Add or change data by clicking on fields shown in boxes and save the changes.

- **[Delete ID]**

This function deletes sensor ID data that was selected with a checkbox.

Sensor ID data of any connected sensors cannot be deleted.

To delete multiple data, tick on "☐ Do this for all current items." Confirmation screens will not be displayed individually.

- **[Show all]/[Show checked]**

[Show all] displays all sensor data.

[Show checked] displays the data of only sensors that were selected with a checkbox.

- **[Select column]**

Selects items to be displayed. Number, ID (Serial No.), and Sensor fields are always displayed. The display order cannot be changed.

All fields can be selected by clicking on "Indication Item".

■ File Menu

This can also be accessed from "File" on the menu bar.

Output files include all information regardless of items displayed.

The file name can be up to 255 single-byte characters (127 double-byte characters).

A file name cannot contain any of the following characters: + * / ? " < > |

- **[Export to PDF]**

Creates a PDF file for the sensor data selected with a checkbox. Contents of the PDF are identical to those of the print-out generated with [Print report].

Multiple PDF files can be created. Each has a selected ID.

Clicking on [Export to PDF] displays a 3-line text box where comments can be entered. The comment entered will appear at the top right of the report. Up to 20 single-byte characters (10 double-byte characters) can be entered per line.

Enter the file name (default name is 1_ID(Serial No.).pdf) and save the file.

- **[Export to Excel]**

Creates an Excel file for the sensor data selected with a checkbox. Multiple files can be selected.

Each has a selected ID.

Enter the file name (default name is smart1_(yymmddhhmmss).xls) and save the file.

- **[Print report]**

Prints a report for the sensor data selected with a checkbox. Individual reports will be printed when multiple sensors are selected. Contents of the printed report are identical to those of the file generated with [Export to PDF].

- **[Export]**

Generates a backup file to save the data.

Choose whether to save the entire data or individual data (select with a checkbox).

Enter the file name (the default name is smart1_(yymmddhhmmss).smf) and save the file.

- **[Import]**

Imports a backup file that was generated with [Export]. Import is not required when operation is normal. Data of connected sensors cannot be imported.

Select the target file and choose whether to import the entire data or individual data. In the case of individual data, first choose either digital pH/ORP or non-digital pH/ORP and then pick the required data.

If the target ID already exists, the confirmation screen will appear.

■ Calibration history menu

Clicking on [pH history], [ORP/rH history], or [Temperature history] displays the calibration history data for the selected sensor. Up to 100 recent calibration histories can be displayed.


This can also be accessed from “Tool” – “Calibration history” on the menu bar.

On the calibration history screen, you can switch among “pH”, “ORP/rH”, and “Temperature” from the pull down menu at the top center of the screen.

- **[Add data], [Delete data], [Edit data]**

These are only available for non-digital pH/ORP. They can be used for managing non-digital pH/ORP sensor data with the database.

5. Error Information

When an error occurs, the color of [Error information] on the toolbar changes and an icon starts to flash. 

Clicking on [Error information] displays the error that is occurring in the connected sensor.

The error information screen displays the error that is occurring in any connected sensors, and any error or warning for the SPS24 itself. Errors are more critical than warnings.

Clicking on the error or warning information displays the actions required.

- **[History]**

Clicking on [History] on the error information screen displays the error history screen.

The error history screen shows sensor-dependent errors and general errors separately.

Whenever clicking any connected sensor buttons in the connection information field, the sensor-dependent error field switches information for the selected sensor.

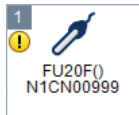
When the total of general errors and sensor errors exceeds 100, older information will be deleted.

“Type” in the display item indicates F (Fault) or W (Warning).

[Clear all] clears all error history.

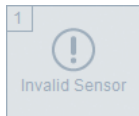
- **Connected Sensor Button**

Action is required when the connected sensor button displays the following status.



The stored setting for the connected sensor is corrupted.

Execute [Initialize sensor] from [Sensor management] – [Sensor setup].



The connected sensor is not supported.

Update SPS24 to support the connected sensor.

Before updating, it is recommended that you execute [Export] for the database viewer and the setup.

This indication does not change the display color of [Error information] on the toolbar.

Neither is it registered in the history.

6. Setup

Configures various settings.

For details about setting, refer to User's Manual of Model FLXA21 2-Wire Analyzer (IM 12A01A02-01E).

Clicking [Setup] on the toolbar takes you to the setup screen.

Clicking on each function takes you to the corresponding setting field. Each function can also be accessed from "Tool" on the menu bar.

Click "Save" to store the change.

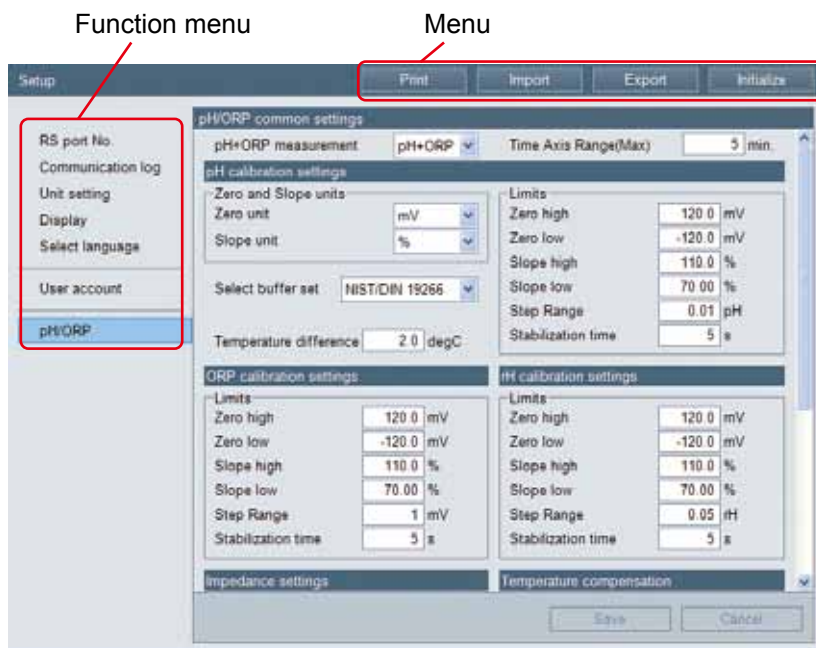


Figure 6.1 Setup screen example (pH/ORP common settings)

■ Menu

This is the general menu for the setup screen.

- **[Print]**

Prints setting information.

- **[Import]**

Imports a setting file generated with [Export].

Excluding: RS Port Number, Select Language, and User Account settings

Including: [Select column] setting of the database viewer

- **[Export]**

Exports settings to a file.

Does not include: RS Port Number, Select Language, and User Account settings

Includes: [Select column] setting of the database viewer

Enter the file name (the default name is Smart_SetupDB(yymmddhhmmss).sms) and save the file.

The file name can be up to 255 single-byte characters (127 double-byte characters).
A file name cannot contain any of the following characters: + * / ? " < > |

- **[Initialize]**

Initializes the settings.

Does not include: RS Port Number, Select Language, and User Account settings

Includes: [Select column] setting of the database viewer

6.1 RS Port Number

Configures the RS port number of each USB-RS485 conversion cable.

The RS port number cannot be changed for any connected sensors. Disconnect sensors before changing this setting. See “2.5 How to use the SPS24”.

This function is used when connecting new sensors or changing the configured sensor number.

6.2 Communication Log

CAUTION

Never use the communication log. This screen is used for troubleshooting by our service engineer only.

6.3 Unit Setting

Select between degC(°C) and degF(°F) for the temperature unit.

If your PC location is set in Japan, the setting is fixed to degC.

6.4 Display

Configures the date format and decides whether to show or hide the menu bar.

6.5 Select Language

Selects the system language (English or Japanese).

6.6 User Account

This function is used for enabling or disabling the user account (password management) and for configuring the user level and password of each user.

After registering users, set a password for each user and then control the available functions (see Table 6.2).

By enabling a user account, the name of the current logged-in user is displayed after “welcome” in the toolbar. See “7. Account” for more information.

Operator names are also recorded in the calibration history.

By default, the user account option is disabled (Level 4). See below for more details about levels. When this option is enabled, the Level 4 user account information screen is displayed for the purpose of confirmation. Entering the user ID and password changes the level to Level 1 and the Current measurement readings appears.

One user is registered by default.

User ID: A001
 Level: 4
 Operator: User
 Password: 123456

To enable password management, use the above user ID and password. For security, it is recommended that you change the password, or that you add a new Level 4 (administrator) user ID and delete the existing A001.

When registering a new user ID, access [Setup] – [User account] again and select [New...].

If password management is enabled, only Level 4 users can access the user account screen. The user ID of the current logged-in user cannot be edited or deleted. The password can be edited.

When the user account option is disabled, [New...], [Delete], [Edit...], and [Change password] for the user ID are not available.

CAUTION

Any user can change their own password. Level 4 (administrator) users must not forget their own password. They alone can access the user account screen.

If no one can access the user account screen, contact Yokogawa.

Table 6.1 **New user registration**

Registration Item	Description
User ID (account)	Enter a user account ID for log-in. Up to 10 single-byte letters or numbers. The field is case sensitive.
Operator	Enter the operator name. Up to 20 single-byte letters or numbers (10 double-byte characters).
Description	Optional information field. Can be used as memo. Up to 50 single-byte letters or numbers (25 double-byte characters).
Level	Select a user permission level (see Table 6.2). Level 2: Calibration operator, Level 3: Data editor, Level 4: Administrator
Password	6 to 20 single-byte letters or numbers. The field is case sensitive. Never forget the password.

Table 6.2 Levels and available functions

Function		Level 1 (General user)	Level 2 (Calibration operator)	Level 3 (Data editor)	Level 4 (Administrator)
Sensor management	Display measurements	A	A	A	A
	Display performance	A	A	A	A
	Set sensors	N/A	A	A	A
	Calibrate	N/A	A	A	A
Database viewer	Display the sensor database	A	A	A	A
	Edit the sensor database	N/A	N/A	A	A
	Print the database	A	A	A	A
	Import/export the database	N/A	N/A	A	A
Setup	Set user accounts	N/A	N/A	N/A	A
	Initialize the setup	N/A	N/A	A	A
	Import/export the setup configuration	N/A	N/A	A	A
	Set other configurations	N/A	A	A	A
Error information	Display error information	A	A	A	A
	Clear error information	N/A	N/A	A	A

A: Available N/A: Not available

6.7 pH/ORP

Configures common settings for pH/ORP sensors.

Sensor-dependent settings are configured from [Sensor management] – [Sensor setup].

Changed settings will be displayed in red. Click [Save] to save the change.

For setting details, refer to Chapter 16 of User's Manual of Model FLXA21 2-Wire Analyzer (IM 12A01A02-01E).

Table 6.3 pH/ORP common settings (numbers in parentheses indicate related sections of FLXA21 User's Manual (IM 12A01A02-01E))

Setting Item			Available Option	Initial Value	Remarks
	pH+ORP measurement		pH, ORP, pH+ORP, pH+rH, rH	pH+ORP	
	Time Axis Range(Max)		1 to 10 min.	5 min.	Timeline displayed on the calibration screen.
pH calibration settings	Zero and Slope units	Zero unit	mV, pH	mV	
		Slope unit	%, mV/pH	%	
	Select buffer set		NIST/DIN 19266, DIN 19267, US, Programmable	NIST/DIN 19266	
		Setup	0.00 to 20.00 pH	(Table 6.4)	Appears when selecting "Programmable".
	Temperature difference		1.0 to 5.0 degC -1.8 to 9.0 degF	2.0 degC 3.6 degF	Sets the maximum temperature offset between sensors for multiple calibration.
	Limits	Zero high	0.00 to 500.0 mV 0.00 to 8.45 pH	120.0 mV 2.03 pH	
		Zero low	-500.0 to 0.00 mV -8.45 to 0.00 pH	-120.0 mV 2.03 pH	
		Slope high	100.0 to 110.0 % 59.16 to 65.08 mV/pH	110.0 % 65.08 mV/pH	
		Slope low	70.0 to 100.0 % 41.41 to 59.16 mV/pH	70.00 % 41.41 mV/pH	
		Step Range	0.01 to 1.00 pH	0.01 pH	
		Stabilization time	2 to 30 s	10 s	
ORP calibration settings	Limits	Zero high	0.00 to 500.0 mV	120.0 mV	
		Zero low	-500.0 to 0.00 mV	-120.0 mV	
		Slope high	100.0 to 110.0 %	110.0 %	
		Slope low	70.0 to 100.0 %	70.00 %	
		Step Range	1 to 100 mV	1 mV	
		Stabilization time	2 to 30 s	10 s	
rH calibration settings	Limits	Zero high	0.00 to 500.0 mV	120.0 mV	
		Zero low	-500.0 to 0.00 mV	-120.0 mV	
		Slope high	100.0 to 110.0 %	110.0 %	
		Slope low	70.0 to 100.0 %	70.00 %	
		Step Range	0.01 to 10.00 rH	0.05 rH	
		Stabilization time	2 to 30 s	10 s	
Impedance settings	Impedance 1 high limit		1.000 kOhm to 1.000 MOhm (> Impedance 1 low limit)	200.0 kOhm	When Impedance 1 is "low*." In the case of "high," use the value of FINE limit for impedance 1 in SENCOM diagnostic criteria.
	Impedance 1 low limit		1.000 kOhm to 1.000 MOhm (< Impedance 1 high limit)	1.000 kOhm	
	Impedance 2 high limit		1.000 kOhm to 1.000 MOhm (> Impedance 2 low limit)	200.0 kOhm	When Impedance 2 is "low*." In the case of "high," use the value of FINE limit for impedance 2 in SENCOM diagnostic criteria.
	Impedance 2 low limit		1.000 kOhm to 1.000 MOhm (< Impedance 2 high limit)	1.000 kOhm	

Temperature compensation	Reference temperature		-30.0 to 140.0 degC -22.0 to 284.0 degF	25.0 degC 77.0 degF	
	Process Temp. compensation	pH	None, Temp. coefficient, Matrix, NEN6411	None	
		Setup	-0.100 to 0.100 pH/degC -0.1 to 0.1 pH/degF	0.000 pH/degC	Appears when "Temp. coefficient" is selected.
		Matrix settings..	Temperature range: -30.0 to 140.0 degC -22.0 to 284.0 degF pH: -2.00 to 20.00 pH	(Table6.5)	Appears when "Matrix" is selected.
		ORP	None, Temp. coefficient	None	
		Setup	-10.00 to 10.00 mV/degC -5.6 to 5.6 mV/degF	0.000 mV/degC	Appears when "Temp. coefficient" is selected.
Error display	Impedance 1 too high		off, Warning, Fault	off	
	Impedance 1 too low		off, Warning, Fault	off	
	Impedance 2 too high		off, Warning, Fault	off	
	Impedance 2 too low		off, Warning, Fault	off	
Define SENCOM diagnostic reference	FINE limit for impedance 1		1 to 10 MOhm	10.0 MOhm	When Impedance 1 is "high*." In the case of "low," use the value of Impedance 1 high/low limit in Impedance settings.
	FINE limit for impedance 2		1 to 10 MOhm	10.0 MOhm	When Impedance s is "high*." In the case of "low," use the value of Impedance 2 high/low limit in Impedance settings.

*: In the case of FU20F pH/ORP SENCOM sensors, Impedance 1 is high and Impedance 2 is low.

● Setting for user defined buffer

When "Programmable" is selected in pH calibration settings—Select buffer set, the user-defined buffer solution configuration screen appears. Configuration can set for 3 buffer solutions.

Before configuring a new table, click on [Clear table] to clear all preset values.

After entering, execute [Check values] to check there are no errors.

Table 6.4 Initial values of “Setting for user defined buffer”

			Buffer table 1	Buffer table 2	Buffer table 3
1. *	0.0 degC	32.0 degF	4.00 pH	6.98 pH	9.46 pH
2.	5.0 degC	41.0 degF	4.00 pH	6.95 pH	9.40 pH
3.	10.0 degC	50.0 degF	4.00 pH	6.92 pH	9.33 pH
4.	15.0 degC	59.0 degF	4.00 pH	6.90 pH	9.28 pH
5.	20.0 degC	68.0 degF	4.00 pH	6.88 pH	9.23 pH
6.	25.0 degC	77.0 degF	4.01 pH	6.87 pH	9.18 pH
7.	30.0 degC	86.0 degF	4.02 pH	6.85 pH	9.14 pH
8.	35.0 degC	95.0 degF	4.02 pH	6.84 pH	9.10 pH
9.	40.0 degC	104.0 degF	4.04 pH	6.84 pH	9.07 pH
10.	45.0 degC	113.0 degF	4.05 pH	6.83 pH	9.04 pH
11.	50.0 degC	122.0 degF	4.06 pH	6.83 pH	9.01 pH
12.	55.0 degC	131.0 degF	4.08 pH	6.83 pH	8.99 pH
13.	60.0 degC	140.0 degF	4.09 pH	6.84 pH	8.96 pH
14.	65.0 degC	149.0 degF	4.11 pH	6.84 pH	8.94 pH
15.	70.0 degC	158.0 degF	4.13 pH	6.85 pH	8.92 pH
16.	75.0 degC	167.0 degF	4.15 pH	6.85 pH	8.90 pH
17. *	80.0 degC	176.0 degF	4.16 pH	6.86 pH	8.89 pH

*: Required field

● Temperature Compensation pH Matrix settings

When “Matrix” is selected from Temperature compensation–Process temperature compensation–pH, the Matrix setting screen appears.

Before entering a new matrix, click on [Clear matrix] to clear all preset values.

After setting, execute [Check values] to check that there are no errors.

Table 6.5 Initial values of “Matrix settings”

				Solution1(min.)	Tref. *	6.40pH
Temperature range	Tmin. *	5.0degC	41.0degF		Tmin. *	6.42pH
	T2.	25.0degC	77.0degF		T2.	6.40pH
	T3.	45.0degC	113.0degF		T3.	6.34pH
	T4.	65.0degC	149.0degF		T4.	6.23pH
	Tmax. *	85.0degC	185.0degF		Tmax. *	6.11pH
Solution2	Tref.	7.00pH		Solution3	Tref.	7.30pH
	Tmin.	7.38pH			Tmin.	7.94pH
	T2.	7.00pH			T2.	7.30pH
	T3.	6.70pH			T3.	6.86pH
	T4.	6.45pH			T4.	6.54pH
	Tmax.	6.25pH			Tmax.	6.31pH
Solution4	Tref.	7.60pH		Solution5(max.)	Tref. *	9.00pH
	Tmin.	8.31pH			Tmin. *	9.74pH
	T2.	7.60pH			T2.	9.00pH
	T3.	7.06pH			T3.	8.40pH
	T4.	6.67pH			T4.	7.91pH
	Tmax.	6.40pH			Tmax. *	7.51pH

*: Required field

7. Account

The [Account] option is only available when [Setup] – [User account] (User account) is enabled. Initial level is set at Level 1. For more information on levels, see “Table 6.2 Levels and available functions”.

Clicking on [Account] of the toolbar displays the user account screen (when the logged-in user is not of Level 4). Enter the user name and password and log in.

If an incorrect user name or password is entered 3 times, the user account screen closes. Click on [Account] again.

Once logged in, “Welcome” and the operator name appear.



Figure 7.1 Example of toolbar display

● Login

To log in, click on [Account] or enter the user name and password at the prompt which automatically appears when trying to access unauthorized areas.

When exiting SPS24, the user is automatically logged out (Level 1).

● Logout

Click on [Account] to log out if already logged in.

Log-out changes the status to Level 1 and the screen switches to the Current measurement readings.

● Change password

Only logged-in users can change their password here.

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