SATO

Instruction manual

SK-L200 II Series Dataloggers

No. 8161-00 Model SK-L200TII
(Temperature Measurement)

No. 8175-00 Model SK-L200THIIα
(Temperature/Humidity Measurement)

CE

SATO KEIRYOKI MFG. CO., LTD.

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Introduction

Thank you for purchasing the SK-L200II Series Dataloggers.

- This product is designed to measure temperature or temperature/humidity. Do not use it for other purposes.
- Read this manual thoroughly before using. Keep the manual in a safe place for future reference whenever necessary.

⚠ WARNING

The SK-L200II Series Dataloggers are not explosion-proof. Never use it in an atmosphere containing flammable gases.

Beware of explosion!

⚠ Safety Precautions

To use the Datalogger safely, follow the precautions below.

- Never disassemble or modify the unit. Doing so may cause a malfunction.
- The unit is precision-machined. Never drop the unit or knock it over.
- Do not use the unit in a place exposed to direct sunlight or near a heat source. Doing so affects the measurement accuracy, and could result in a deformation or malfunction of the unit.
- If this unit is used in an environment where electrical noise is generated, the display may become unstable or the measurement error may increase.
- Never use the unit in an environment other than standard atmosphere (air composition).
- The main unit and probes are not waterproof. Never let them get wet.
- Measuring temperature or humidity outside the measurable range may result in unit and/or sensor malfunctions.
- If the unit is not to be used for a long period of time, remove the batteries. Otherwise, the batteries may leak, resulting in malfunctions.
- Do not dispose of used batteries in a fire.
- Keep the battery out of the reach of children. If the battery has been swallowed accidentally, consult a doctor immediately.
- For environmental conservation purposes, dispose of the used battery in compliance with local rules and regulations.

- Do not modify, forcibly pull, bend or tie the sensor cord. Placing heavy objects on the sensor cord or heating it will also damage the cord.
- Do not wash or wipe this unit with alcohol, thinner, or other organic solvents. If the unit becomes dirty, wipe it with a tightly-wrung gauze or the like that has been dipped in warm water with neutral detergent.
- Never touch the humidity sensor (Model SK-L200TH IIα) with bare hands.
- If the dew point is exceeded and condensation occurs while the humidity sensor (SK-LTH IIα series) is being used, immediately stop using and allow time for the sensor to dry naturally at room temperature.
- The SK-LTH IIα series probes are used with SK-L200TH IIα and are not usable with SK-L200TH II.

For repair or calibration, contact the retailer from which the Datalogger was purchased or your nearest local sales representative.

Overview

Datalogger is a device that logs data of temperature and/or humidity and stores this data in its memory so that you can manage or analysis it on a computer.

Features

- **Storage of up to 8100 lines of data. (→ P.49)**

Ensuring long-term measurement:
If the Datalogger is set to log data every 30 minutes, approximately 165 days. If the Datalogger is set to log data every 90 minutes, approximately 480 days.

- **Four logging options to allow for selection of the setting that best suits your needs (→ P.51)**

1. Once (default)
The Datalogger keeps logging until the memory becomes full or 8100 lines of data are collected.

2. Repeatedly (overwriting)
The Datalogger overwrites the existing data from the start once the 8100 lines of data are collected. This setting is ideal for collecting data during a certain period.

3. Ends at… (limited amount)

The Datalogger only collects a certain amount of data (up to 8100 lines) as specified by the user. This setting is ideal when you want to limit the amount of data to be collected.

4. By pages (partitioning)

The Datalogger performs four different logging tasks in sequence by storing each task's data in the four divided memory blocks. This setting is ideal if you want to collect data from multiple sites with one Datalogger.

● Scheduled logging (→ P.60)

You can preset the time to start logging. This setting is ideal if you want to start logging automatically.

● Real-time communications (→ P.64)

The logged data of temperature and/or humidity can be downloaded to computers while the Datalogger is still logging.

● USB connection

USB easily offers a connectivity to your computers than the conventional RS-232C.

- **Displays the approximate amount of memory currently used. (→ P.52)**

Easy to determine how much more logging is possible.

- **Probes can be interchangeablely used.**

The probes are fully compatible among the series models so that, in case of probe failure, it is easy to replace by interchanging with another probe.

- **14 logging intervals (→ P.50)**

The logging intervals available are in seconds (1, 2, 5, 10, 15, 30) and in minutes (1, 2, 5, 10, 15, 30, 60, 90).

- **ID on each Datalogger (→ P.48)**

The ID numbers of 1 to 9 can be set for easy identification when multiple Dataloggers are used.

- **No data loss even if the batteries go dead**

There is no data loss even if there is a power failure, as the logged data is stored in the EEPROM.

- **Warning display for upper/lower limit of temperature or humidity**

The Alarm mark lights on the LCD if the temperature or humidity exceeds the preset threshold. This helps to prevent damage to your product.

- **Easy to use software program for data analysis**

The logged data can be fully utilized by plotting in graphs and displaying in real time. Data can also be saved in CSV format and analyzed by commercial spreadsheet software.

1. What's in the Box?

The following items are included in the box.
Check the box contents and place a check mark in the box next to each item.
If you find any item missing, please contact the store where you purchased this product or our Service Network.

☐ Datalogger	1
☐ Hand strap	1
☐ USB port cap (Factory set)	1
☐ This Instruction Manual	1
☐ Software program CD	1
☐ USB cable	1
☐ Alkaline batteries, AAA/LR03	2

*** Probe is an option and has not been included in the box.**

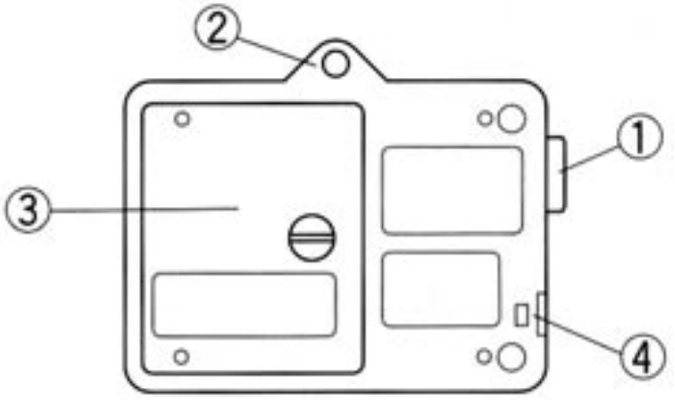
2. Names and Functions of Parts

2-1. Main Unit

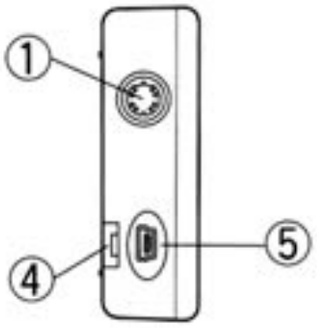
(For SK-L200T II and SK-L200TH IIα)

Front view

Rear view



Left side view



① Sensor connector

Temperature probe or temperature/humidity probe is connected.
For connecting or removing the probe, please see section 1 "Installing the Probes and Batteries" of Chapter 3 "Getting Started."
Never rotate the sensor unit. It will cause the device to fail.

② Wall mounting hole

③ Battery cover

*Temperature unit switch

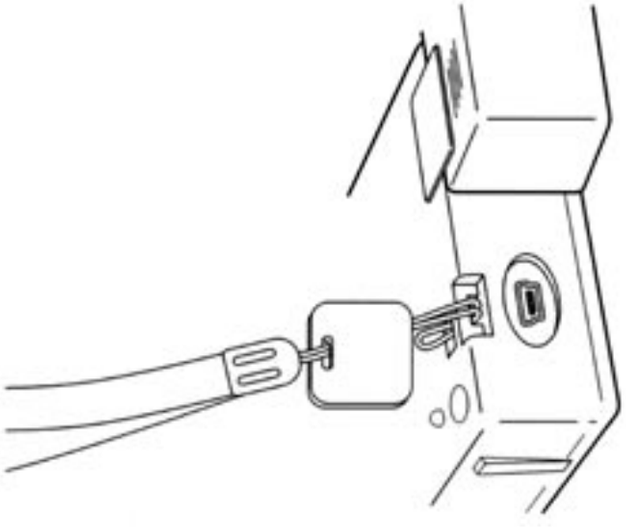
Display of temperature unit (°C and °F) can be changed by a switch located in a battery compartment.

°C (default) : Slide the switch to upward
°F : Slide the switch to downward

④ Hand strap mount

⑤ USB port

Use to plug in the USB cable connecting the Datalogger and the computer.
While not being used, the dedicated USB port cap should be in place.
In order not to lose the cap, we recommend that you attach the dedicated hand strap to the cap.



Function keys

(For SK-L200T II and SK-L200TH II α)

① UP/DOWN key

・Pressing the ▲ key will increase the value. Pressing the ▼ key will decrease the value.
Holding down ▲/▼ will change the value rapidly.

・Pressing ▲ and ▼ simultaneously for one second or more while measuring will erase the logged data.

② CALL/OUT key

・Pressing the CALL/OUT key while measuring will start real-time communication.

・Pressing the CALL/OUT key while logging will display the current reading on the LCD.

・Pressing the CALL/OUT key while setting will return to the measurement state.

③ MODE key

・Used to display Current Date and Time, ID, Logging Interval, Logging Option, Warning Thresholds or Preset Start.

④ REC/STOP key

・Pressing the REC/STOP key for two seconds or more while measuring will start logging.
・Pressing the REC/STOP key for two seconds or more will end logging and return to measuring temperature and/or humidity.
・Pressing the REC/STOP key upon setting will confirm the newly set value.

⑤ POWER ON/OFF key

・Pressing the POWER ON/OFF key will turn the unit on or off.
・Pressing the POWER ON/OFF key while the unit is off will turn it on. Pressing the key once again will turn off the unit.

Note: Be sure to press and hold the POWER ON/OFF key for one second or more. This feature prevents the unit from being turned on or off accidently.

LCD display

(For SK-L200T II and SK-L200TH II α)

① Alphanumeric display (LCD)

Displays the current reading of temperature and/or humidity or setting information. No humidity will be displayed on an SK-L200T II (temperature model).

② Alarm

Lights up when the upper or lower threshold is reached.

③ Hi and Lo

The indicator "Hi" lights up when the upper threshold is exceeded. The indicator "Lo" lights up when the lower threshold is exceeded.

④ B mark

Flashes when the battery power becomes low. If it happens, immediately replace the batteries. Data will be retained even if the batteries are replaced, but logging will stop the moment the batteries are removed from the unit and all settings will be reset to the defaults.

⑤ TIME

Lights up while a date and time is being set or while they are displayed.

⑥ OUT

Lights up while downloading data or communicating in real time.

⑦ RES

Flashes while in standby for preset start.

⑧ Memory indicator

Indicates the approximate level of memory consumption. For further information on the memory indicator, see section 3 "Setting Logging Option" of Chapter 6 "Advanced Operations."

⑨ °F °C % rh: Indicates the unit of measurement.

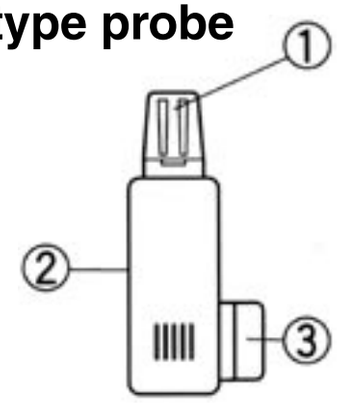
Note: The temperature unit is set with °C. For displaying temperature reading with °F, slide the switch that is in the battery compartment to downward. For returning to °C display, slide the switch to upward.

⑩ REC: Flashes when logging starts and lights up while logging.

2-2. Standard Probes

Note: The probes are not interchangeable between the different types of models. The probe for SK-L200T II (temperature) cannot be used for SK-L200TH IIα (temperature and humidity) and vice versa. For further information, please see the Specifications at the end of this manual.

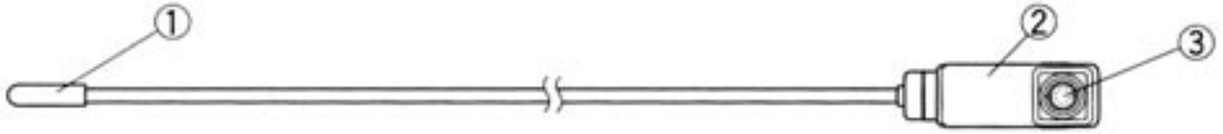
- **Plug-in type probe**



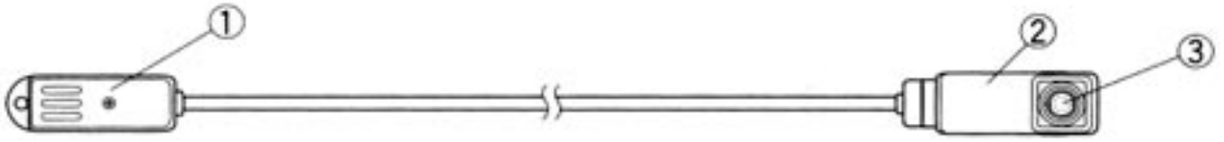
① Sensor
② Sensor unit
③ Connector

- **Probe with sensor cord type**

For SK-L200T II



For SK-L200TH IIα



* The optional probes are available. Contact the dealer or visit our web-site.

3. Getting Started

3-1. Installing Probe and Batteries

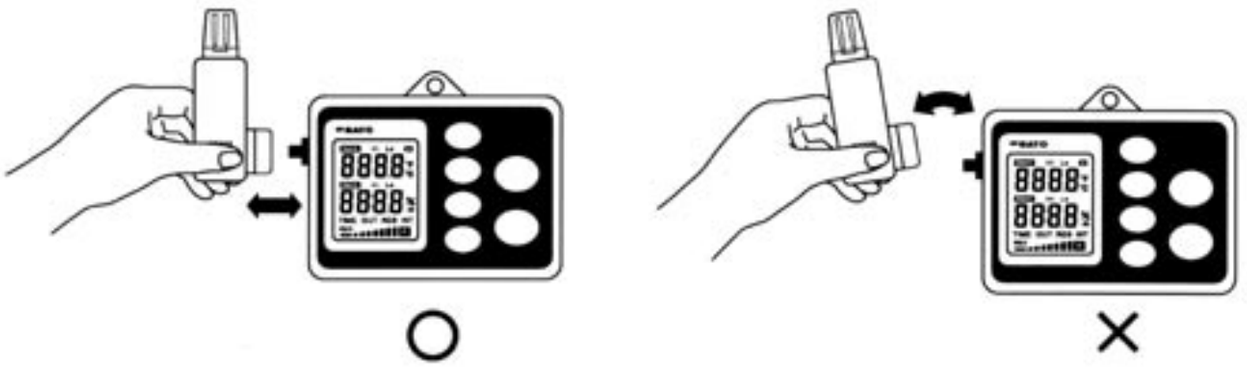
(1) Loosen the screw on the battery cover on the back of the main unit by rotating it counterclockwise with a coin or the like.
Tip: The screw has been designed to be undetachable from the unit to prevent loosing it.

(2) Remove the battery cover.

(3) Load two AAA/LR03 batteries.
Be sure to place them in the correct directions.

(4) Install the battery cover.

(5) Install the temperature/temperature and humidity probe as follows:
Push the sensor unit into the sensor connector until you hear a “click”.
To remove the probe, pull it straight toward you in the reverse direction of the installation. Never rotate the sensor unit while pulling.



3-2. Setting Current Date and Time

(1) Press the POWER ON/OFF key for one second or more to turn the unit on.

The LCD turns on to indicate that the SK-L200T II or SK-L200TH IIα is in the measurement state for temperature or temperature and humidity, respectively.

(2) Press the MODE key twice.

(3) The TIME mark lights and the "year" display flashes. Use the ▲ or ▼ key to set the year (ex. “2012”)

Tips: ・ Hold down the ▲/▼ key to quickly change the value.

・ Press the MODE key to skip the current setting and to proceed to the next item.

・ If no key is pressed for one minute, the unit returns to the measurement state.

(4) Press the REC/STOP key to confirm the year setting.

(5) The "month" display flashes. Use the ▲ or ▼ key to set the month (ex. “9” for September)

(6) Press the REC/STOP key to confirm the month setting.

(7) The "date" display flashes. Use the ▲ or ▼ key to set to "1". (For the day)

(8) Press the REC/STOP key to confirm the date setting.

(9) The "hour" display flashes. Use the ▲ or ▼ key to set to "10". (For the hour)

(10) Press the REC/STOP key to confirm the hour setting.
Note: The Datalogger uses the 24-hour clock format.

(11) The "minute" display flashes. Use the ▲ or ▼ key to set to "30". (For the minutes)

(12) Press the REC/STOP key to confirm the minute setting. The Datalogger starts clocking from the "00" seconds.

(13) Press the CALL/OUT key once.
Now the setting of current date and time is complete. The SK-L200T II or SK-L200TH IIα returns to the measurement state for temperature or temperature and humidity, respectively.

(14) Press and hold the POWER ON/OFF key for one second or more to turn off the unit.

 Caution

Caution on Use

- Be sure to observe the operating temperature range of your Datalogger. Although the SK-L200T II Datalogger can be used for measuring low temperatures or high temperatures with the probe with sensor cord, never

bring the unit to the ultra-low temperature or ultra-high temperature atmosphere or place it in such an environment. Doing so will damage the electronic circuit inside. The operating temperature range of the Datalogger is -10 to 60°C. For further information, please see "Specifications" on page 74.

- When the Datalogger is used at the temperature 5°C or below
  Always turn off the Datalogger at the ambient temperature if it was used at 5°C or lower.
  Moving the Datalogger to a warmer place (room temperature) to turn it off may form condensation inside and outside of the unit. Condensation can cause an unstable electronic circuit, resulting in a malfunction.

  Note: It is not necessary to observe the above caution when the Datalogger stops operation due to a memory full state, as it automatically turns off. However, be sure that the unit surface is dry and no water drops are present before turning it on again.

- Never wet the Datalogger, as it is not waterproof.

- The air vent on the sensor is designed to improve the response speed. Do not cover the vent with vinyl tape or the like. Protect the vent from water splash.

- When the unit is hung on the wall, make sure that it is securely fastened.

4. Software Use Agreements

This software shall be ued only by users who have agreed on the following terms:

Exemption from liability

We, Sato Keiryoki Mfg. Co., Ltd., check for general operation performance of the program, however we do not guarantee for those under all possible situations.
We do not take any responsibilities on any damages caused directly or indirectly by the program.

Copy Rights

1. All rights related to the program itself and documentations of the "Memory Device for Windows" are reserved by Sato Keiryoki Mfg. Co., Ltd.
2. The "Memoory Device for Windows" can be used at free of charge under following limitations:
   - Any recompilation class file analysis or alteration is strongly restricted.
   - Any damages caused during usage of the program are not responsible of Sato Keeiryoki Mfg. Co., Ltd.
   - The responsibilities related to redistribution of the program are entirely onto users; in case of redistrubution, the program shall not be used for commercial reasons even when used incorporation, inter-corporation or by others.
   - Sato Keiiryoki Mfg. Co., Ltd. shall not take any responsibilities for any damages caused by redistrubuted program by a user.

5. Installing DATALOGGER for Windows

・Make sure that you have logged on as Administrator. If not, restart your computer and log on as Administrator. If your computer is managed by a network administrator, consult with him/her before making any modification to the system.
・Turn off your anti-virus program or any other programs currently running on your system.
・Make sure any previous version of DATALOGGER for Windows has been uninstalled.
・Do not connect your Datalogger until installation is successfully completed.
・Read Help file of DATALOGGER for Windows before starting the software.

・Minimum System Requirements

CPU	:	Pentium4 or higher
OS	:	Windows7(64-bit/32-bit) SP 1 or later
Memory	:	more than 1GB
Hard disk drive	:	2GB or more free space
Others	:	USB interface Microsoft .NET Framework 4

Cautions:
・Please read the instructions of the USB hub if you use one to connect the Datalogger to computer.

Note that the proper communications will not be guaranteed when a USB hub is used.

- The performance used by a serial conversion cable will be out of guarantee.
- This DATALOGGER for Windows can be used with SK-L200II series dataloggers only.
- The file stored with the previous version can be opened, however it cannot be opened under the previous version once it is stored again.

Instruction procedure

1.Turn on your computer.

2. Insert the “DATALOGGER for Windows” CD on your CD-ROM drive.

Auto-play window appears. Click "SKInstaller.exe"

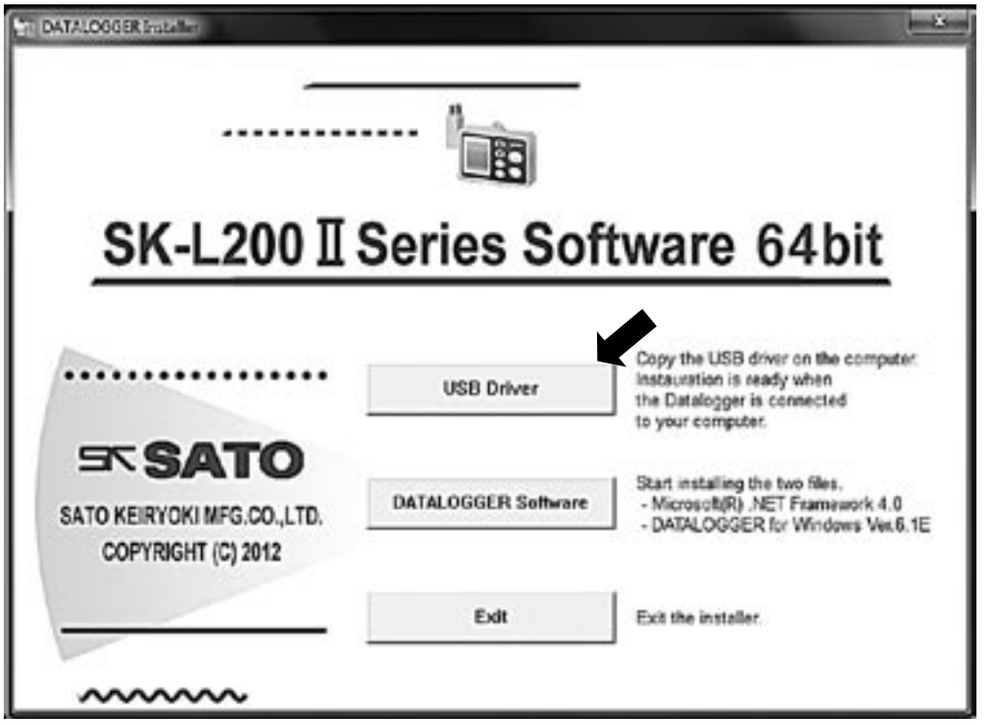
The message below automatically appears. Click OK to proceed.

A main menu of the installer for 64-bit appears.

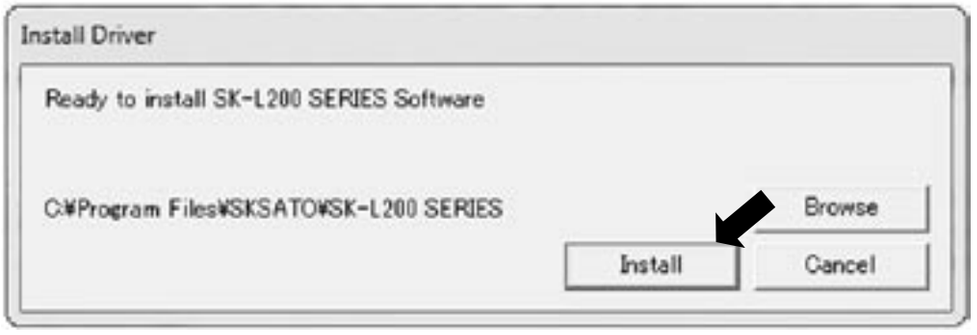
※ Installation procedure of 64-bit and 32-bit is the same. Read this instruction replacing 64-bit to 32-bit when you install 32-bit.

3. Installation of USB driver

(1) Click "USB Driver" on the main menu.



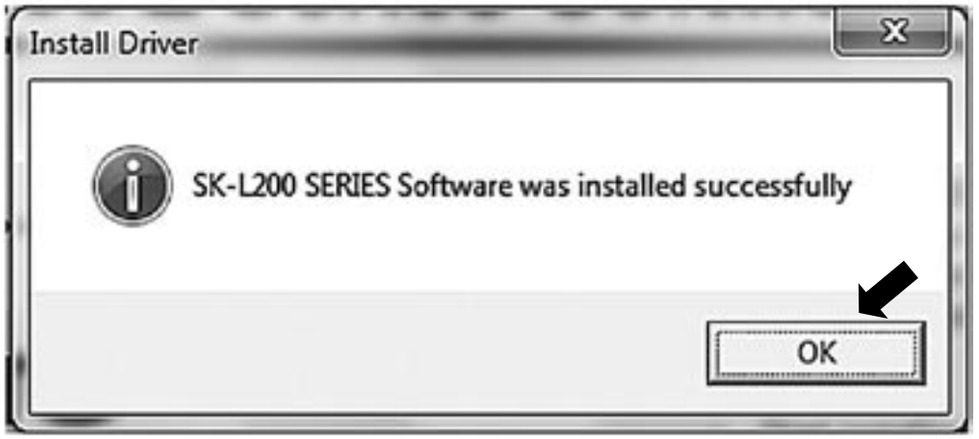
(2) The message below appears. Click “Install” to start installation.



(3) A confirmation message on the USB controller appears. Click “Install” to continue the installation.

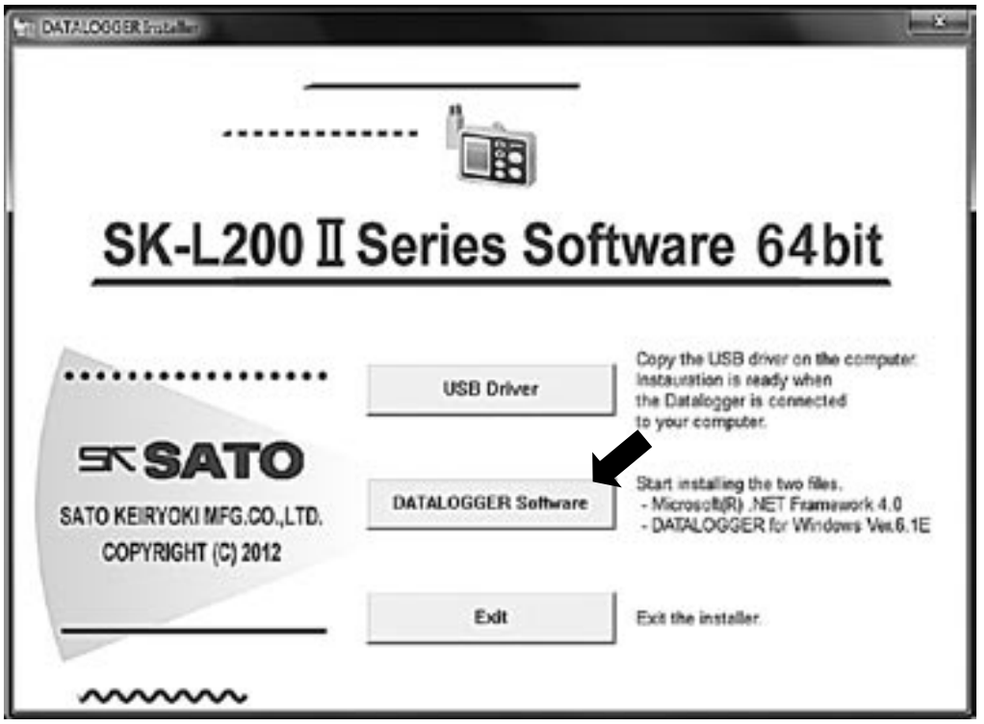
(4) A confirmation message on ports (COM and LPT) appears. Click “Install” to continue the installation.

(5) When the installation is successfully completed, a message confirming the installation appears. Click OK to end the installation of USB Driver.



4. Installation of DATALOGGER for Windows

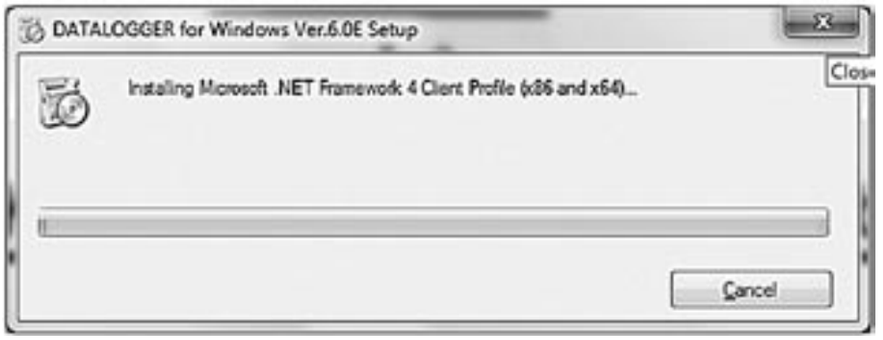
(1) The main menu appears again. This time, click “DATALOGGER Software”



(2) The license terms on Microsoft .NET Framework 4 are displayed. If you accept the terms of the License Agreement, click “Accept” to continue the installation.

Note : If Microsoft .NET Framework 4 is already installed on your computer, the display automatically changes to the wizard for DATTERLOGGER for Windows.

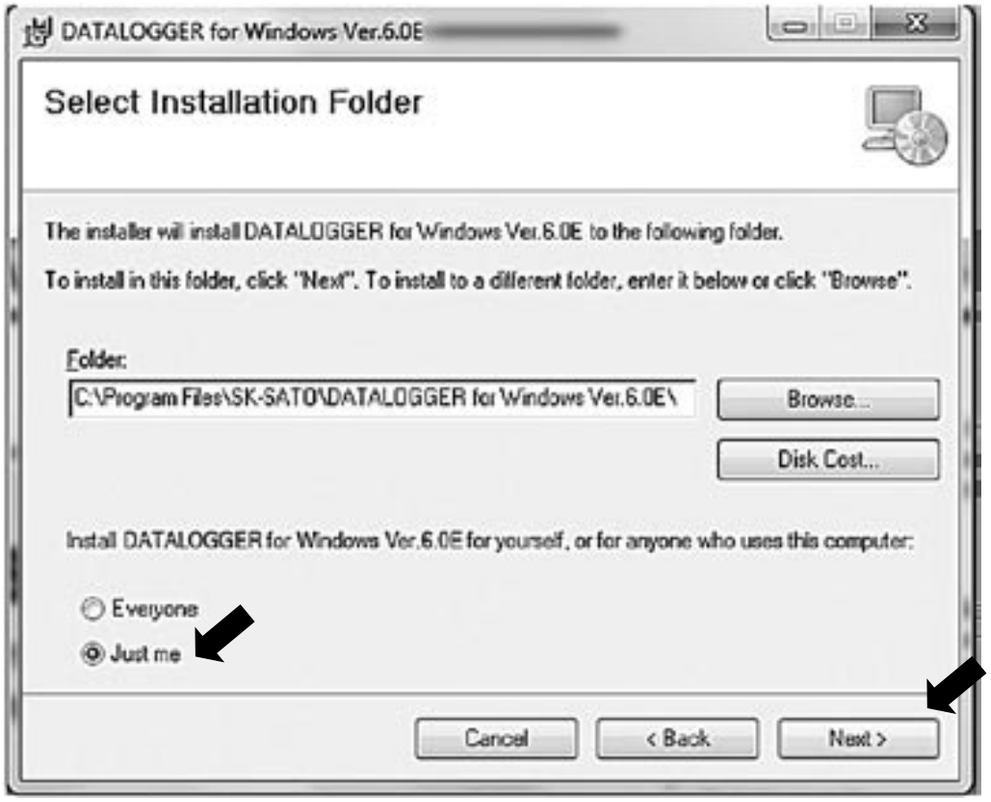
(3) The installation of Microsoft .NET Framework 4 begins.



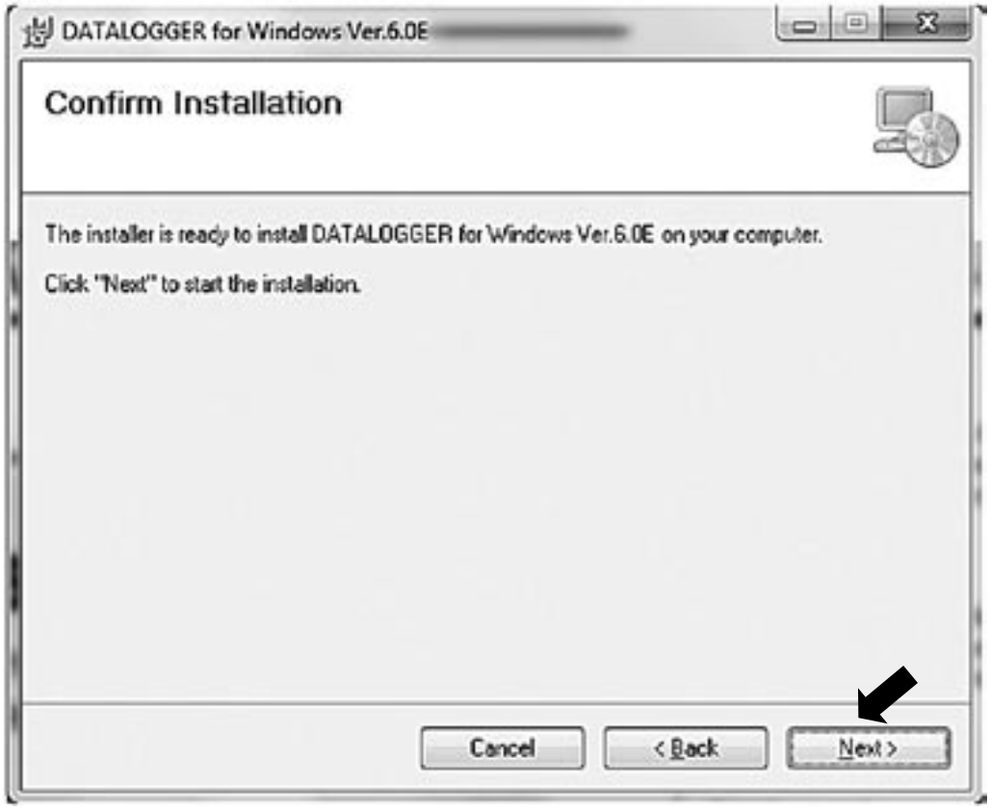
(4) After the installation of Microsoft .NET Framework 4 is ended, the window below appears. Click “Next >”.

(5) The window below appears. Do not change the default installation folder.
Click “Next >”.

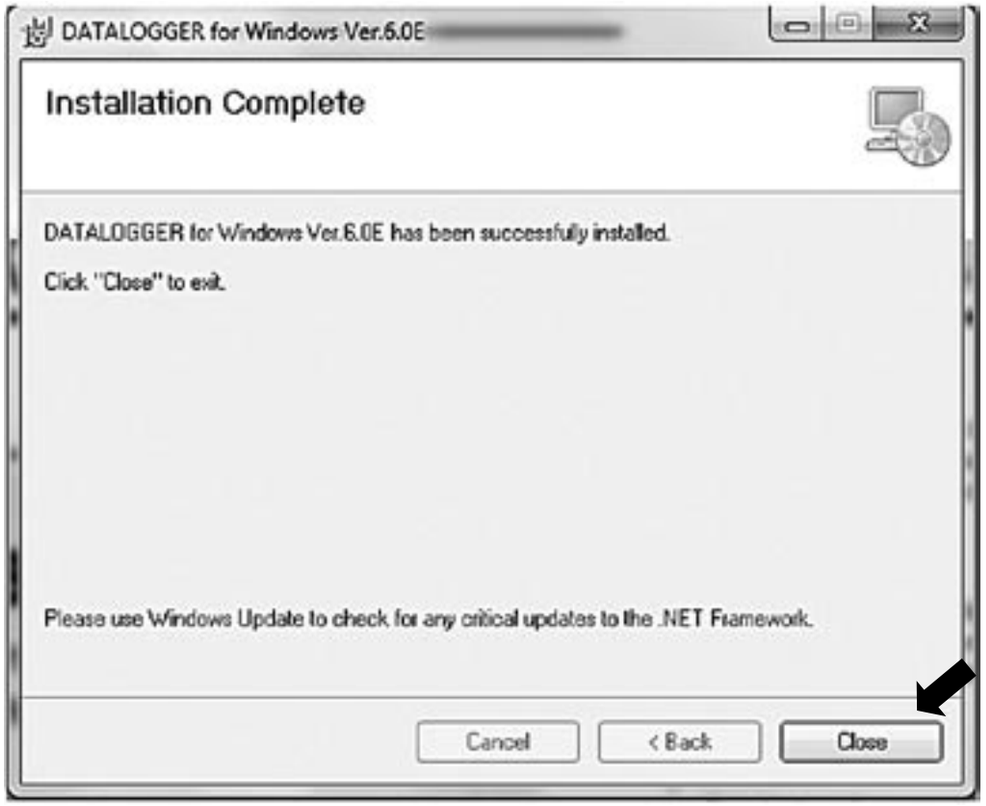
※ Select the user of the computer for “Everyone” or “Just me”



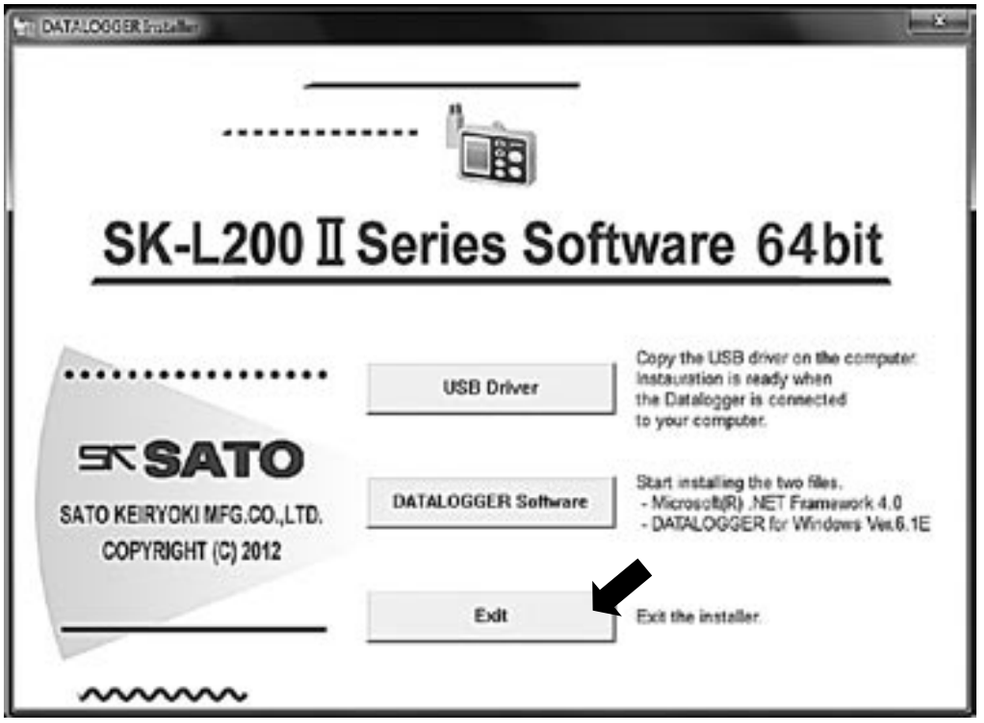
(6) “Confirm Installation” window appears. Click “next>” to start the installation.



(7) When the installation is successfully completed, the ending window below appears. Click “Close”.



(8) Click “Exit” on the main menu to finish the installer.

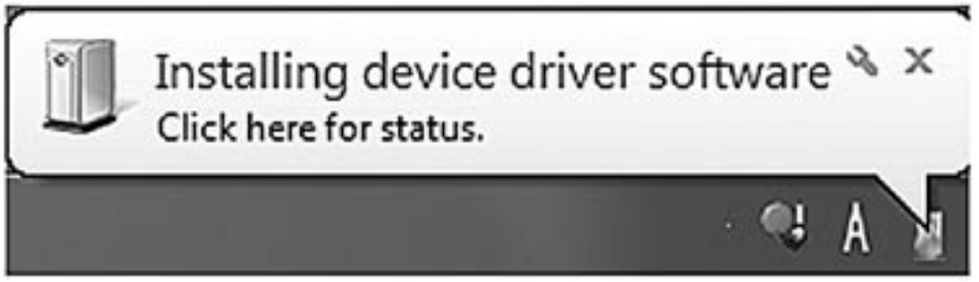


Now the software installation is successfully completed,

■ Connecting the Datalogger to your computer

1. To run the software, click「Start」→「All Programs」→「SK-SATO」→「DATALOGGER for Windows」. Press the “Power ON/OFF” button of the datalogger to turn the unit on and connect the datalogger to your computer using the provided USB cable.

Note : When the USB Driver software is successfully installed, a message below appears at lower right of the desktop.

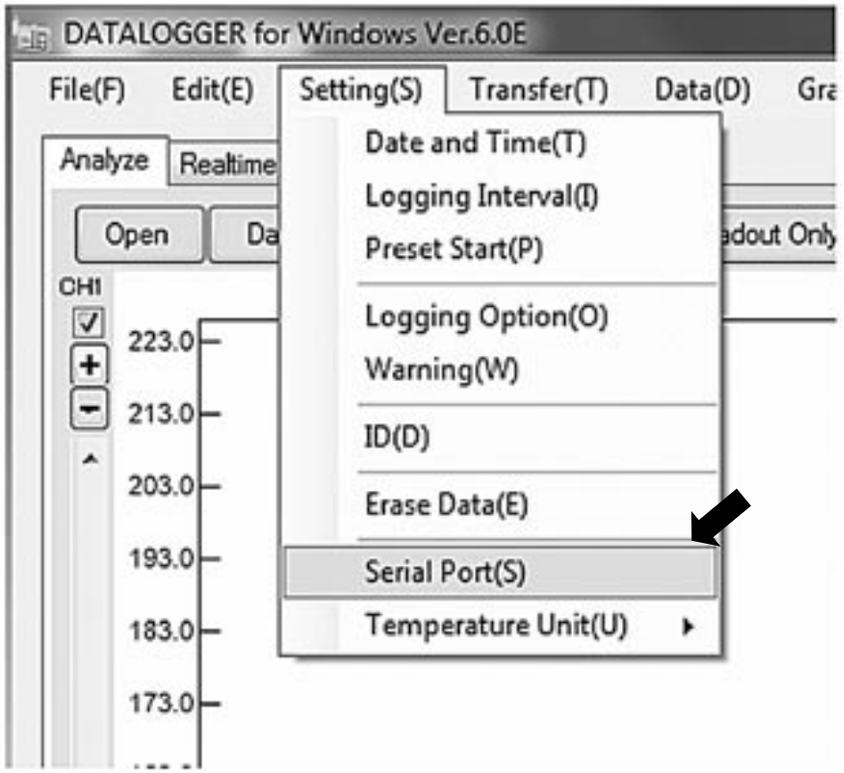


2. Check the COM port.
   1) Select「Device Manager」from「System and Security」or「Control Panel」and click it to check the COM port state.

2) The Com port being used on your computer is displayed in Ports (COM & LPT).

※ The COM port number may vary depending on the computer being used or USB port connected.
Be sure to confirm and set the serial port when you connect the datalogger.

3) From the Setting menu「Setting(S)」, click「Serial Port(S)」. Set the COM port number and click OK.



4) Message “Connection is correct” appears when the COM port is correctly set. Click OK.

The software setting is now complete.
For the details of usage of the software, refer to software help or the instruction manual that came with the product.

6. Basic Operation

Let's start with an example to view data using DATALOGGER for Windows.

Tip: Make sure that the date and time have been set on the Datalogger (see Chapter 3 “Getting Started”), and DATALOGGER for Windows has been installed to your computer (see Chapter 4 "Installing DATALOGGER for Windows").

6-1. Operating the Datalogger

Follow the steps below to log test data with the Datalogger.

(1) Press and hold the POWER ON/OFF key for one second or more to turn on the unit.
The LCD turns on to indicate that the SK-L200T II or SK-L200TH IIα is in the measurement state for temperature or temperature and humidity, respectively.

(2) Press the MODE key seven times to set the logging interval.

(3) The INT mark of the LCD lights. Use the ▲ or ▼ key to set the interval one second as "00:01"

(4) Press the REC/STOP key to confirm.

(5) Press the CALL/OUT key once. The SK-L200T II or SK-L200TH IIα returns to the measurement state for temperature or temperature and humidity, respectively.

(6) Press and hold the REC/STOP key for two seconds or more.
The LCD goes out, and then the REC mark and the leftmost bar of the memory indicator light up to indicate that the logging has started.

(7) Wait for three minutes, then press and hold the REC/STOP key for two seconds or more. The logging ends and the unit returns to the measuring state.

Now you have collected about 180 readings for a 3-minute measurement period using the logging interval of one second.

(8) Press and hold the POWER ON/OFF key for one second or more to turn off the unit.
Note: The logged data will not be erased even the power is turned off.

6-2. Operating the Computer

Follow the steps below to download the test data to your computer.

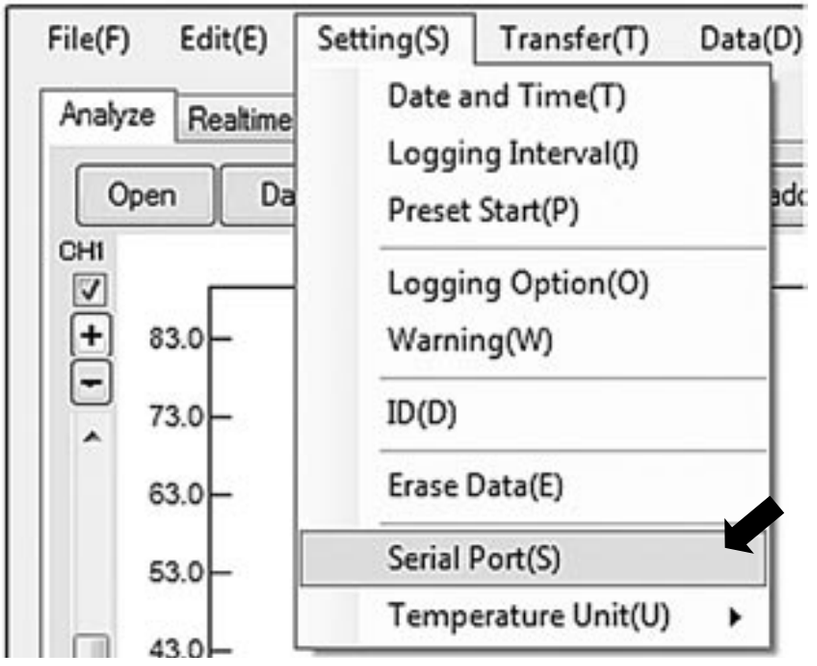
(1) Make sure that the Datalogger is connected to your computer with the provided USB cable.

(2) Press and hold the POWER ON/OFF key for one second or more to turn on the Datalogger. The LCD turns on to indicate that the SK-L200T II or SK-L200TH IIα is in the measurement state for temperature or temperature and humidity, respectively.

Tip: If you connect the USB cable to a port different from the one described in Chapter 4 "Installing DATALOGGER for Windows" Windows may recognize that a new device has been connected on startup.

(3) Click Start, all Programs, SK-SATO, and then click DATALOGGER for Windows to run the program.

(4) From the Setting menu, click「Serial Port(S)」.



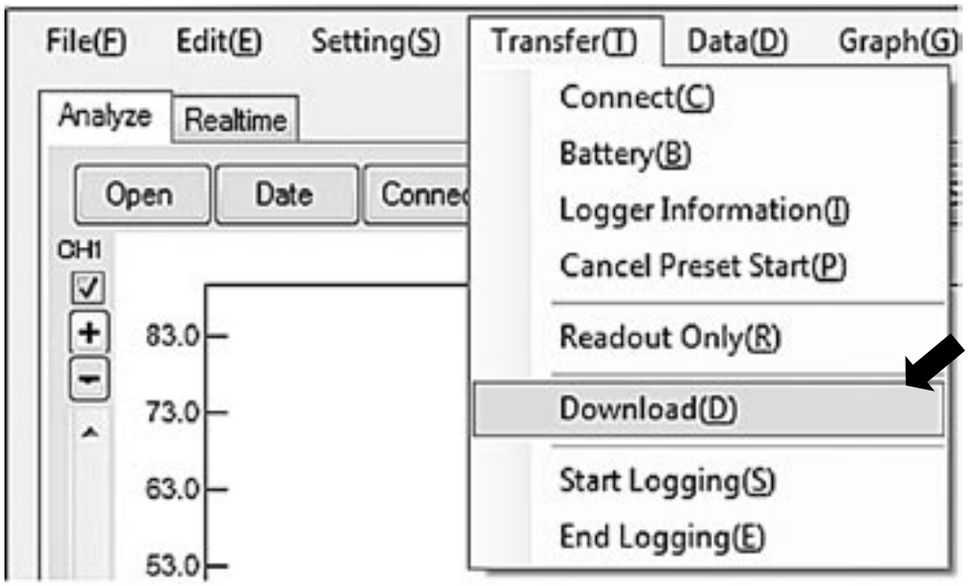
(5) Set the serial port number.

Tip: The serial port number may vary depending on the computer being used.

(6) The message "Connection is correct" appears when the Datalogger and the computer are correctly connected. Click OK.

Tip: If the message "Connection is incorrect" appears, check the serial port number again and make sure that the USB cable is plugged into the port properly.

(7) From the Transfer menu, click「Download (D)」.



(8) When downloading is completed, check the data and click Close.
Now you have successfully downloaded the test data. For details on how to use DATALOGGER for Windows, please refer to the online Help.

(9) Erase the old data on the Datalogger.
Click「Erase Data (E)」from the Setting menu, or press the ▲ and ▼ keys together for one second or more. The memory indicator flashes to indicate that the logged data on the Datalogger is being erased.

⚠ Caution:

- The Datalogger turns off if the logging ended under the following conditions:
  - Logging option was “Once” (default) and the logging ended because the memory became full (8100 readings).

- The logging option was “Ends at...” (limited amount) and logging ended because the quantity of logging data reached the set end-point.
- The logging option was “By pages” (partitioning) and the logging ended because the memory became full (2000 readings in each page of four pages).

To download data, turn on the Datalogger again.

- Download all the necessary data at a time and do not leave any out. Data stored on the Datalogger will be erased once logging starts again.
- When setting the parameters using the software or while downloading is in progress, do not disconnect the cable or turn the power off and then on again, as this may cause a setting error and/or missing logged data.
- Before erasing the recorded data, make sure that the low battery mark is turned off. Do not remove the batteries while erasing data, otherwise the erasing may fail.

  If the battery power runs out while data is being erased, immediately replace the batteries with new ones, and then follow the steps below to resume operation.

  ① Turn on the unit and press and hold the REC key for at least two seconds until the REC mark on the display lights up.
  ② Press and hold the REC key again for at least two seconds to stop recording.
  ③ Erase the recorded data (refer to step (9) of page 42).

  The memory bars on the display turn off after blinking to indicate that the data has been successfully erased.

- If the battery power becomes low (low battery state) during operation, the datalogger automatically does the following.
  ① While logging: Datalogger immediately stops logging and is powered off. (The collected data are stored)
  ② In standby for preset start: Er1 is displayed and the preset start is canceled.

- The unit automatically stops logging.
  ① If memory becomes full in “Once” or the quantity of logging data reaches the set end-point in “End at…” and “By page”.
  ② If the battery power becomes low (low battery state) while logging.
  ③ If something is wrong in the connected probe.

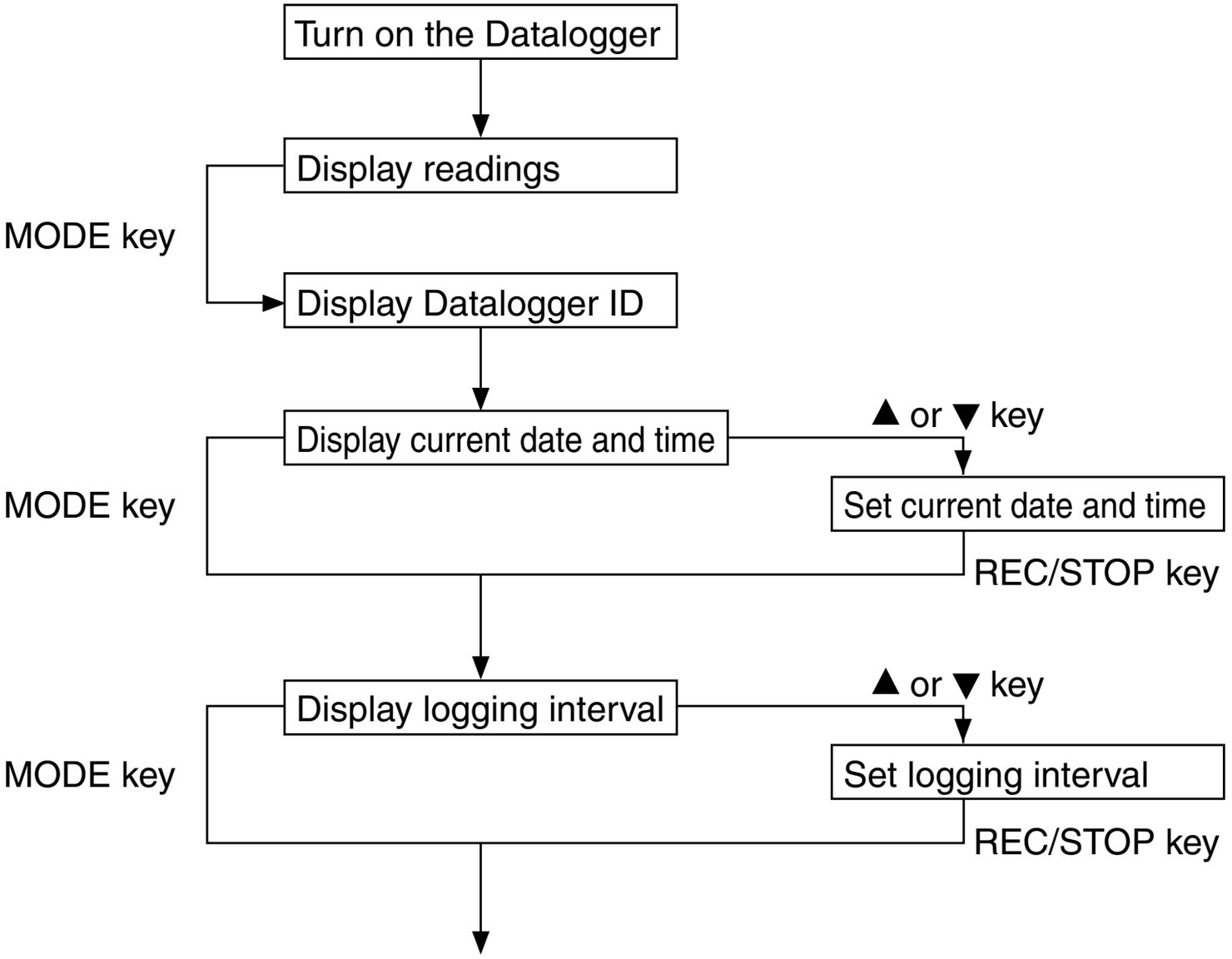
  The stop condition can be checked by clicking the “DATA” on software.

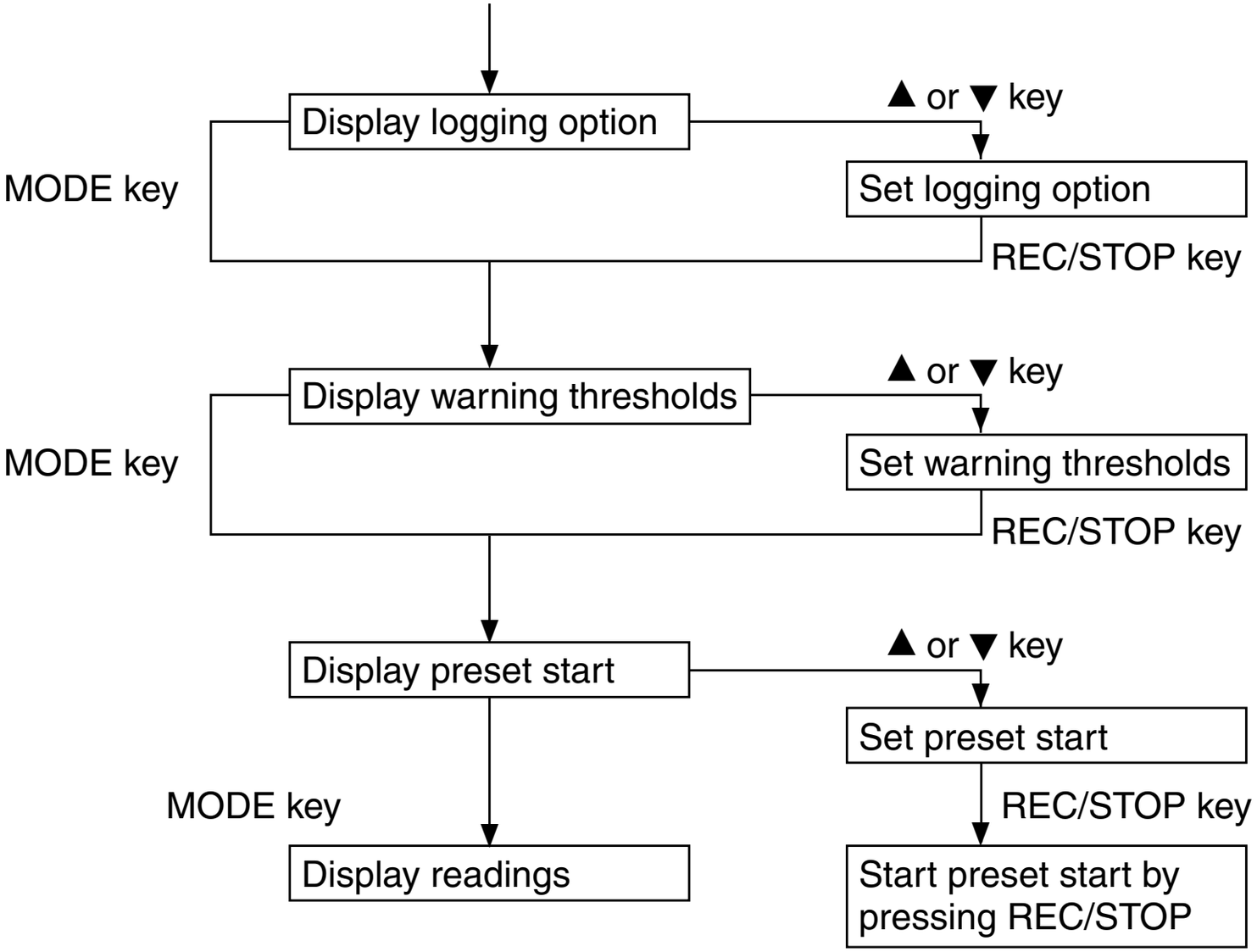
7. Advanced Operations

The table below shows the operations performed by the Datalogger and computer.

	Datalogger	Computer
Turning Datalogger on or off	Yes	No
Setting Current Date and Time	Yes	Yes
Start/End logging	Yes	Yes
Starting data download	No	Yes
Setting the unit ID	No	Yes
Setting the logging option	Yes	Yes
Setting logging interval	Yes	Yes
Setting preset start	Yes	Yes
Confirming preset start info	Yes	Yes
Canceling preset start	Yes	Yes
Setting warning thresholds	Yes	Yes
Starting/Ending real-time communication	No	Yes
Erasing collected data	Yes	Yes

Operation Procedures





Notes: To set the date and time for a preset start, use the same method as setting the current date and time.

7-1. Setting the Datalogger ID

This function is used to identify multiple Dataloggers. An ID number from 1 to 9 can be assigned to each Datalogger used.

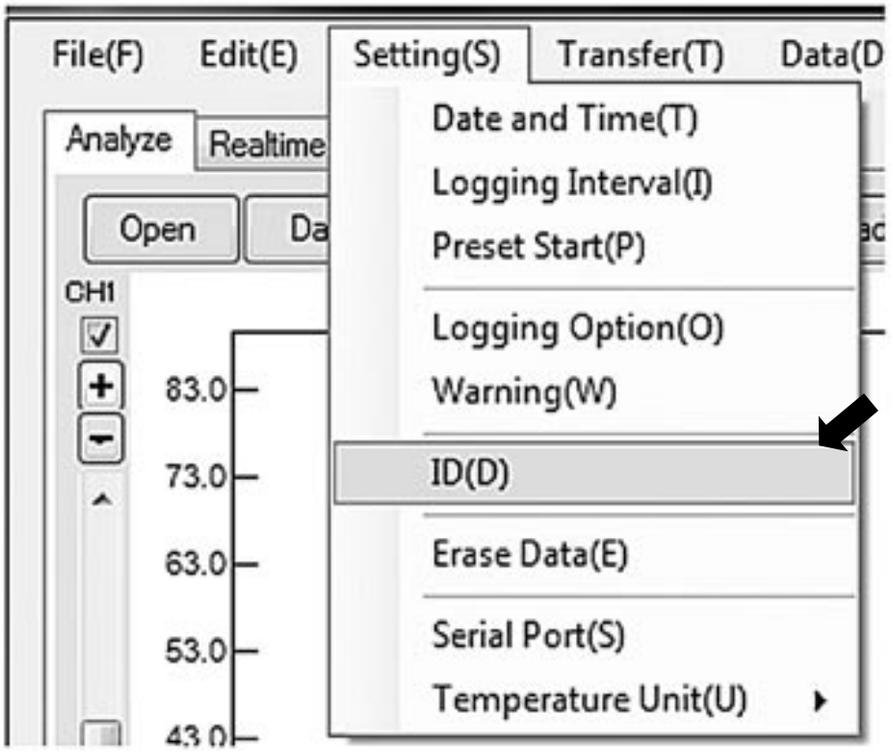
Tips: You can only set the ID from DATALOGGER for Windows. Be sure to erase all the data stored on the Datalogger before setting. For instructions on how to erase the data, please refer to step (9) of Chapter 5 "Basic Operation."
* The factory default setting is OFF.

(1) Make sure that the Datalogger is connected to your computer with the provided USB cable.

(2) Press and hold the POWER ON/OFF key for one second or more to turn on the Datalogger. The LCD turns on to indicate that the SK-L200T II or SK-L200TH IIα is in the measurement state for temperature or temperature and humidity, respectively.

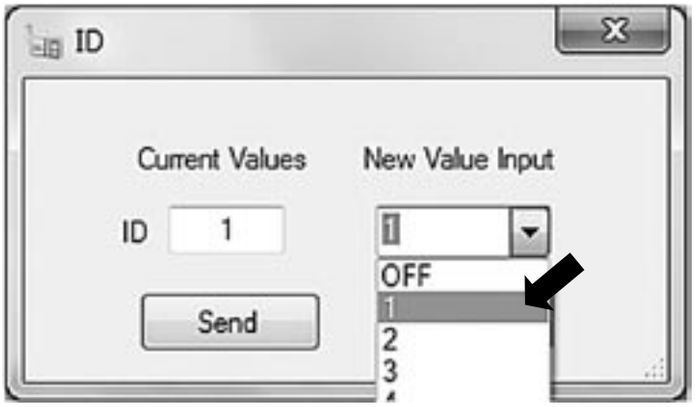
(3) Start DATALOGGER for Windows

(4) From the Setting menu, click「ID (D)」.



(5) The confirmation message appears. Click OK.

(6) Choose the number and click Send.



(7) Click OK to complete.

7-2. Setting the Logging Interval

This function is used to specify the preferred logging interval.

There are 14 types of logging interval to choose: in seconds (1, 2, 5, 10, 15, 30), and in minutes (1, 2, 5, 10, 15, 30, 60, 90).

Tip: You can set the logging interval from DATALOGGER for Windows. For further information, please refer to the online Help.

(1) Press and hold the POWER ON/OFF key for one second or more to turn on the Datalogger. The LCD turns on to indicate that the SK-L200T II or SK-L200TH IIα is in the measurement state for temperature or temperature and humidity, respectively.

(2) Press the MODE key seven times.

(3) The INT mark of the LCD lights. Use the ▲ or ▼ key to set the desired logging interval. The first two digits represent the "minute" and last two represent the "second."
(Example: The display of "05:00" represents five minutes.)

(4) Press the REC/STOP key to confirm.

(5) Press the CALL/OUT key.
The SK-L200T II or SK-L200TH IIα returns to the measurement state for temperature or temperature and humidity, respectively.

7-3. Setting the Logging Option

There are four logging options to choose: Once (default), Repeatedly (overwriting), Ends at... (limited amount), By pages (partitioning).

Once (default)

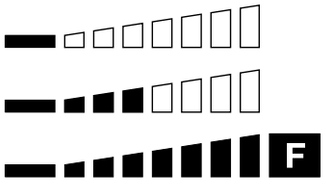
When Once is chosen, the Datalogger keeps logging until the memory becomes full. The Datalogger stops logging when 8100 lines of data are recorded.

Memory indicator

Logged data : 1 to 1000 lines

: 3001 to 4000 lines

: 8100 lines



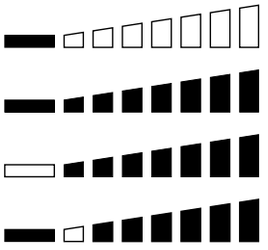
Repeatedly (overwriting)

The Datalogger overwrites the existing data from the start once the 8100 lines of data are recorded. This is ideal for collecting data during a certain period.

Be sure to make a note of the time logging ends. You will need it to analyze the data with the DATALOGGER for Windows.

Memory indicator

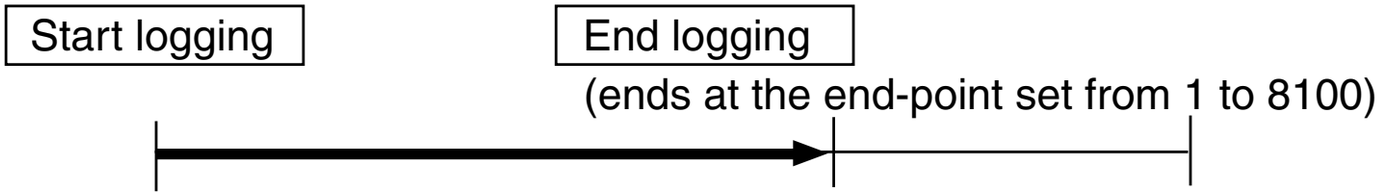
Logged data : 1 to 1000 lines
: 7001 to 8100 lines
: 8101 to 9000 lines
: 9001 to 10000 lines



From here, the dim bar is shifted to the right in succession.

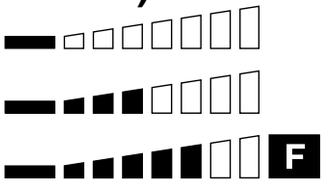
Ends at… (limited amount)

With this logging option, you can specify the end-point for the Datalogger to stop logging. This setting is ideal when you want to limit the amount of data to be collected



Memory indicator (example: end-point is 5500)

Logged data : 1 to 1000 lines
: 3001 to 4000 lines
: 5500 lines



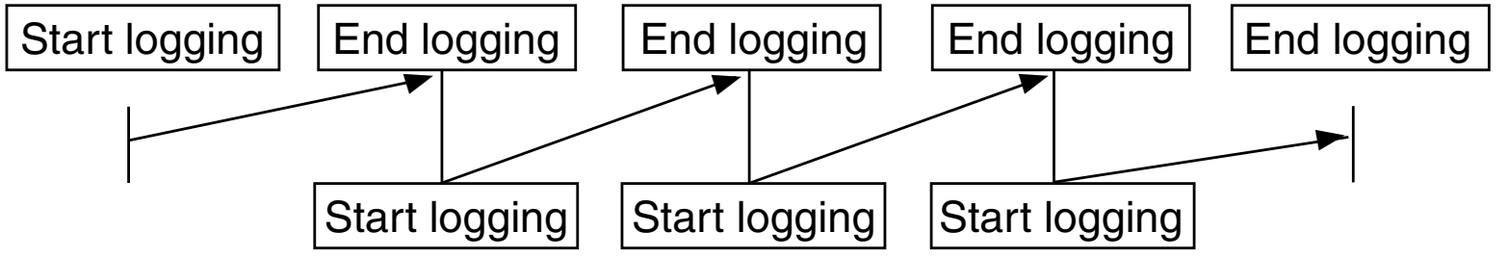
By pages (partitioning)

The storage memory is partitioned into four blocks, each having the capacity to store 2000 lines of data. This enables the Datalogger to perform

four different tasks in sequence while storing each task's data in one of the four different memory blocks (pages). This is ideal when you want to collect data from multiple sites using one Datalogger.

Tips: The memory is used on a page-by-page basis. Therefore, even if there are less than 2000 stored data lines at the end of logging (REC/STP pressed), the entire page containing any number of lines becomes unavailable for further use.
Upon logging again, the new data will be stored in a different unused page. When the four pages are used up, erase all the data before performing the next logging.

Dividing into four blocks, each to store up to 2000 lines of data.



Memory indicator (two bars represent 2000 lines of data per page)
Example 1: The first page has 500 and the second page has 1500 lines.

Example 2: The first and fourth pages have 500 lines each, the second has 1500 lines and the third has 1200 lines.

How to set the logging option

Tips: Aside from the steps below, you can also set the logging option from DATALOGGER for Windows. For further information, please refer to the online Help.

Be sure to erase all the data stored on the Datalogger before setting the logging option.

For instructions on how to erase the data, please refer to step (9) of Chapter 5 "Basic Operation."

(1) Press and hold the POWER ON/OFF key for one second or more to turn on the Datalogger.

The LCD turns on to indicate that the SK-L200T II or SK-L200TH IIα is in the measurement state for temperature or temperature and humidity, respectively.

(2) Press the MODE key eight times.

(3) The logging option currently set is displayed.

Logging Option	Upper LCD	Lower LCD
Once (default)	1	O n E
Repeatedly (overwriting)	2	E n d
Ends at… (limited amount)	3	d A t A
By pages (partitioning)	4	P A G E

(4) Use the ▲ or ▼ key to set the number (1 to 4) representing the logging option desired on the upper LCD.

(5) Press the REC/STOP key to confirm.

(6) If the “Ends at…” (3 on the LCD) is chosen, proceed to step 7 below. For other options (1 for Once, 2 for Repeatedly, 3 for By pages), press the CALL/OUT key once.
The SK-L200T II or SK-L200TH IIα returns to the measurement state for temperature or temperature and humidity, respectively.

(7) The left two digits start flashing. Use the ▲ or ▼ key to display the desired number from 0 to 81. (Example: For 7500 lines, choose "75.")

(8) Press the REC/STOP key to confirm.

(9) The right two digits start flashing. Use the ▲ or ▼ key to display the desired number from 0 to 99.
(Example: For 7500 lines, choose "00.")
You cannot set a value larger than 8100.

(10) Press the REC/STOP key to confirm.

(11) Press the CALL/OUT key.
The SK-L200T II or SK-L200TH IIα returns to the measurement state for temperature or temperature and humidity, respectively.

Notes on logging

Logging ends if the temperature measurement fails. In this state, “Er” appears on the display in the temperature section of the indicator LCD.
The condition that caused the indicator to stop logging is “Abnormal pulses detected”.
Note that the SK-L200TH IIα ends logging only if the probe is removed from the indicator.

Notes on data downloading

Download the stored data according to the logging option selected.

(1) For the “Once” (default) and the “Ends at...” (limited amount) options:
From the Transfer (T) menu, click「Download (D)」.

(2) For the Repeatedly (overwriting) option:
Download in the same way as for (1) above, and enter the date and time logging ended.
Note: Take a note of the date and time at which the logging ended.

(3) For the “By pages” (partitioning) option:
From the Transfer (T) menu, click「Readout Only (R)」to display information on the data stored on the indicator. Click the page number to be downloaded, and then click「Download (D)」.
Note: Select one page at a time; you cannot download all pages at once.

7-4. Setting the upper and lower thresholds for warning

This function is used to turn on the Alarm mark (Hi or Lo) when the temperature or humidity threshold is triggered.

Note: No sound is produced while the Alarm mark is lit.

Tip: Aside from the steps below, you can set this function from DATALOGGER for Windows. For further information, please refer to the online Help.

(1) Press and hold the POWER ON/OFF key for one second or more to turn on the Datalogger.
The LCD turns on to indicate that the SK-L200T II or SK-L200TH IIα is in the measurement state for temperature or temperature and humidity, respectively.
Set the upper limit for the temperature first.

(2) Press the MODE key nine times.

(3) The Alarm and Hi marks light. Press the ▲ and ▼ keys at the same time.

Tip: Pressing the ▲ key and ▼ key simultaneously one more time will turn off the warning function.

(4) Use the ▲ or ▼ key to display the desired value for upper limit.

(5) Press the REC/STOP key to confirm. Next, set the lower limit for temperature.

Tip: If the lower limit is not necessary, press the CALL/OUT key once. The SK-L200T II or SK-L200TH IIα returns to the measurement state for temperature or temperature and humidity, respectively.

(6) The Alarm and Hi marks light. Press the ▲ and ▼ keys at the same time.

Note: Pressing the ▲ key and ▼ key simultaneously one more time will turn the warning function off.

(7) Use the ▲ or ▼ key to display the desired value for lower limit.

(8) Press the REC/STOP key to confirm.

Tips: If the lower limit is not necessary, press the CALL/OUT key once. The SK-L200T II or SK-L200TH IIα returns to the measurement state for temperature or temperature and humidity, respectively. For setting the humidity upper/lower limit in the SK-L200TH IIα model, repeat steps (3) to (8) above.

(9) Press the CALL/OUT key once to complete the setting.
The SK-L200T II or SK-L200TH IIα returns to the measurement state for temperature or temperature and humidity, respectively.

7-5. Setting the Preset Start

Setting the Date and Time

This function is used to specify the date and time to start logging automatically.

Notes: Starting this operation clears the logged data stored on the Datalogger depending on the logging option that has been set. Always download the necessary data before setting this function. For further information, please see the table below.

Logging Option	Data stored on the Datalogger
Once (default)	Erased
Repeatedly (overwriting)	Erased
Ends at… (limited amount)	Erased
By pages (partitioning)	Not erased. The setting is retained in the free memory block (page). To perform a preset start, there must be at least one free block to store data. If no free block is left, erase the data in a block first. For instructions on how to erase data, please see step (9) of Chapter 5 "Basic Operation".

Tip: Aside from the steps below, you can also set this function from DATALOGGER for Windows. For further information, please refer to the online Help.

For example, if you want to start logging at 10:30 am, Sep. 1, 2012.

(1) Press and hold the POWER ON/OFF key for one second or more to turn on the Datalogger.
The LCD turns on to indicate that the SK-L200T II or SK-L200TH IIα is in the measurement state for temperature or temperature and humidity, respectively.

(2) Press the MODE key 11 times (L200T II) or 13 times (L200TH IIα).

Note: The key must be pressed correctly depending on the model being used. Press the MODE key until the RES mark is displayed on the LCD.

(3) The RES mark of the LCD lights. Use the ▲ or ▼ key to display "On"

(4) Press the REC/STOP key to confirm.
The "year" digits start flashing. Use the ▲ or ▼ key to set to "2012"

(5) Press the REC/STOP key to confirm the year setting.

(6) The "month" digits start flashing. Use the ▲ or ▼ key to set to "9"

(7) Press the REC/STOP key to confirm the month setting.

(8) The "date" digits start flashing. Use the ▲ or ▼ key to set to "1"

(9) Press the REC/STOP key to confirm the date setting.

(10) The "hour" digits start flashing. Use the ▲ or ▼ key to set to "10"

(11) Press the REC/STOP key to confirm the hour setting.

Note: The Datalogger uses the 24-hour clock format.

(12) The "minute" digits start flashing. Use the ▲ or ▼ key to set to "30"

(13) Press the REC/STOP key to confirm the minute setting. The LCD goes out and the RES mark lights to indicate that the Datalogger enters the standby state for preset start.

Note: ・ The preset start date and time must be later than the current date and time.
・ For setting, make sure to connect a probe with the main unit. (When Er is indicated on the LCD, the date and time can not be set.)

Tips: To confirm the settings while in the standby for preset start, press the MODE key. Pressing the key once displays each setting at a time. To change any of the settings, refer to the instructions for each setting.

Canceling preset start

Preset start can be canceled using any one of the three ways described below.

A. Canceling from DATALOGGER for Windows

(1) Start DATALOGGER for Windows.
(2) From the Transfer (T) menu, click 「Cancel Preset Start (P)」.
(3) The message to confirm the cancel appears. Click OK.

B. Turning off the Datalogger

(1) Press and hold the POWER ON/OFF key for one second or more.
(2) The power to the Datalogger goes out and the preset start is canceled.

C. Canceling from the Datalogger

(1) Press the MODE key until the RES mark is indicated.
(2) After confirming the RES mark of the LCD lights, use the ▲ or ▼ key to display "OFF."
(3) Press the REC/STOP key to confirm.
The SK-L200T II or SK-L200TH IIα returns to the measurement state for temperature or temperature and humidity, respectively.

7-6. Real-time Communications

This function is used to display the logged data of temperature and/or humidity on the computer screen in real time.

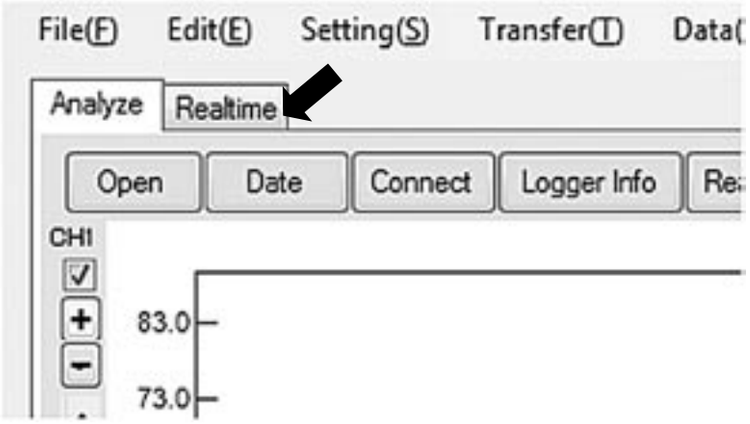
(1) Using DATALOGGER for Windows

① Connect the Datalogger to your computer with the provided USB cable.

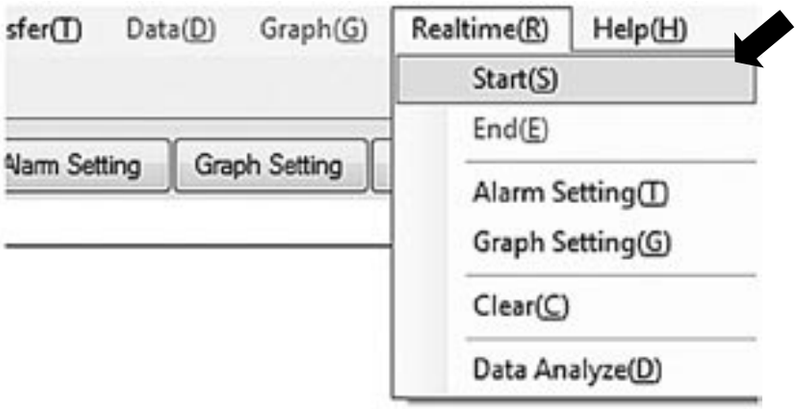
② Press and hold the POWER ON/OFF key for one second or more to turn on the Datalogger.
The LCD turns on to indicate that the SK-L200T II or SK-L200TH IIα is in the measurement state for temperature or temperature and humidity, respectively.

③ Start DATALOGGER for Windows.

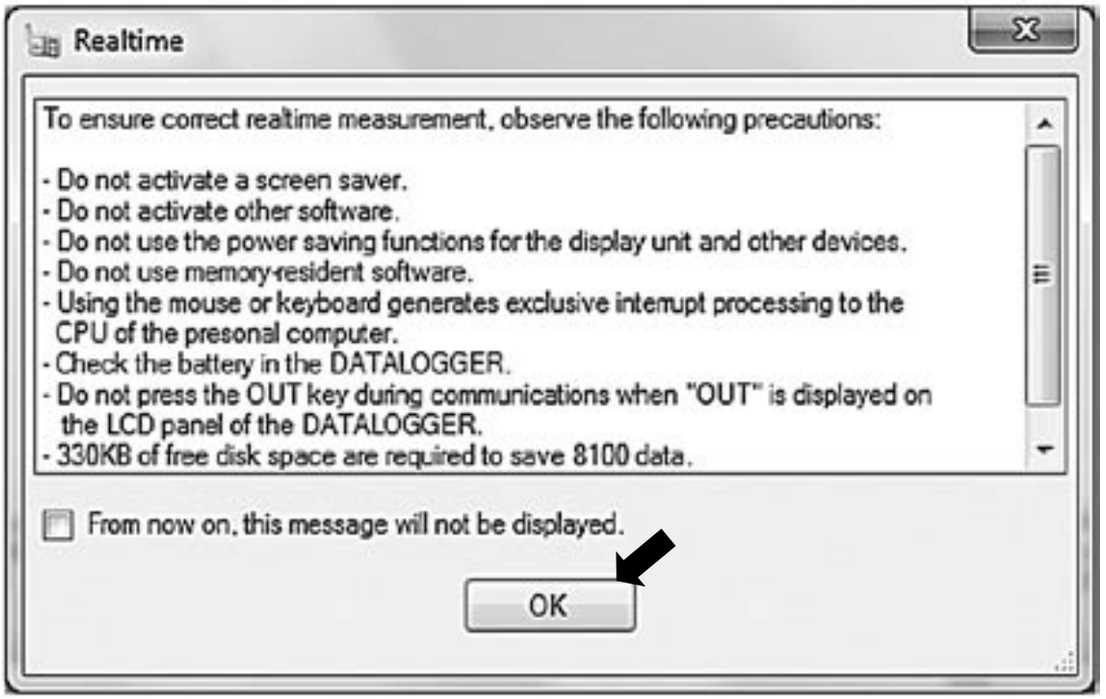
④ Click the Realtime tab.



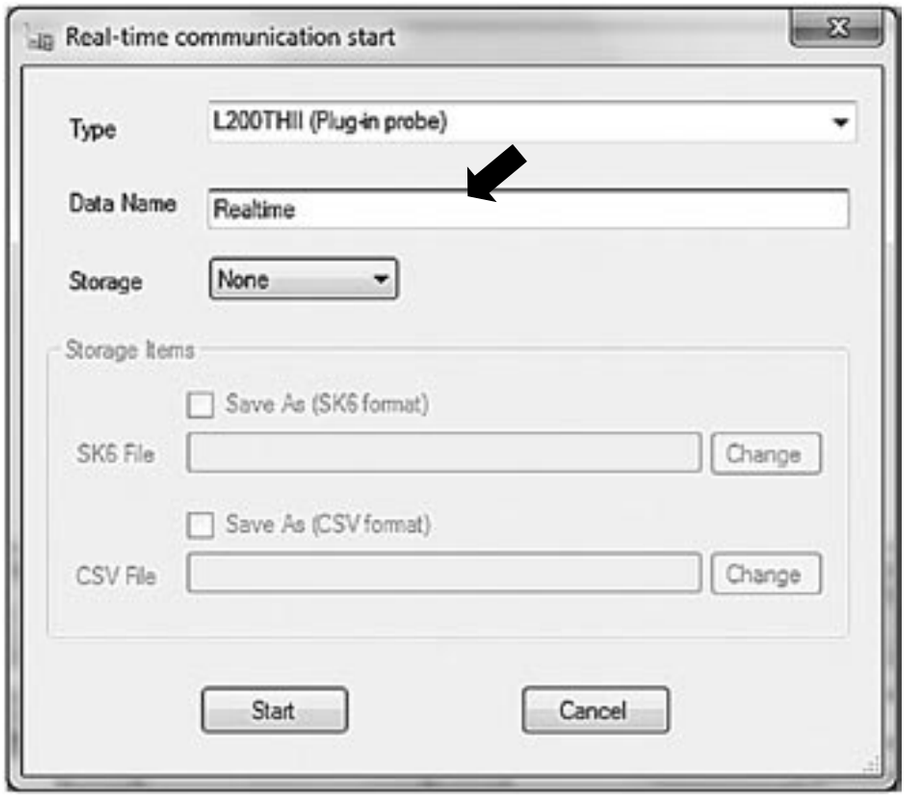
⑤ From the Realtime menu, click「Start (S)」.



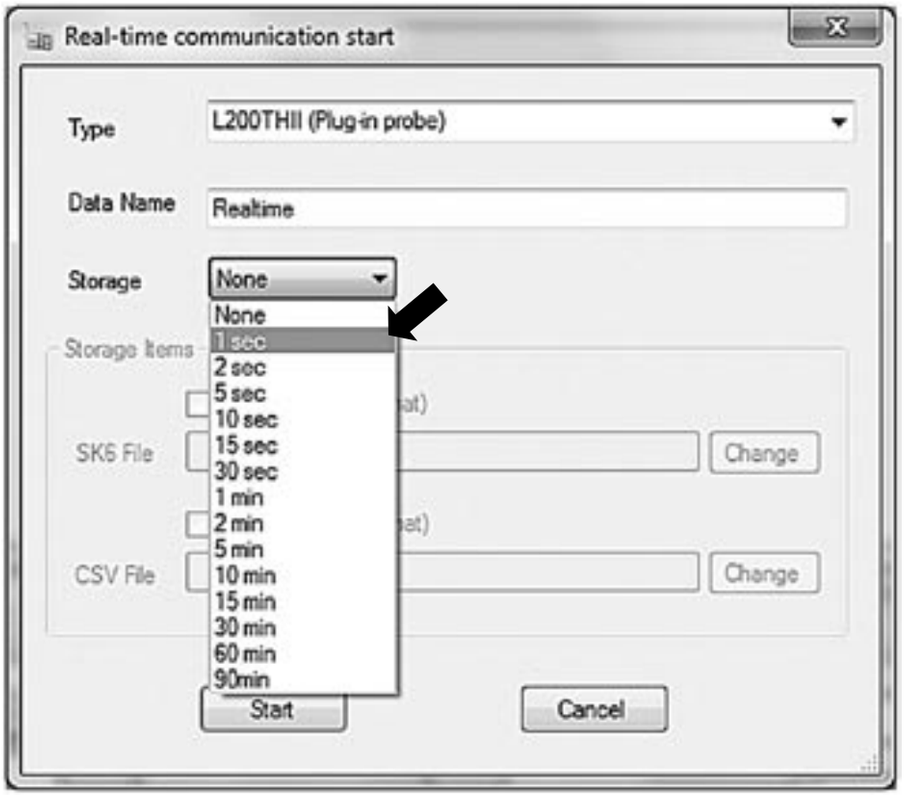
⑥ The Notes on Realtime window appears. Read it thoroughly and click OK to continue.



⑦ Create and type an easily identifiable name for the data.

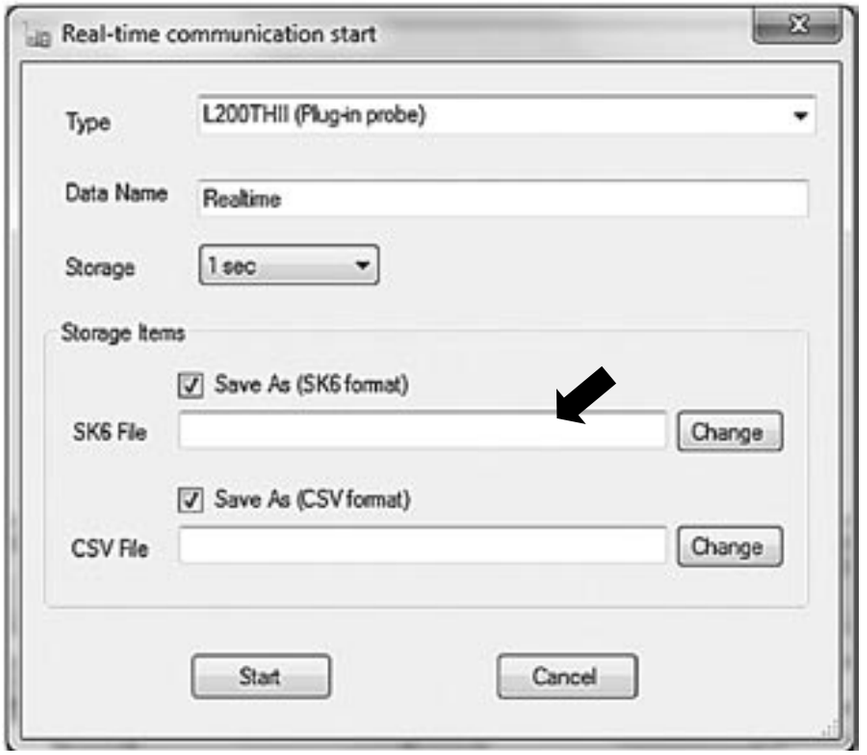


⑧ Choose the "Storage Interval" from the list as necessary.
Choose "None" if data is not to be stored automatically.



⑨ Once the "Stored Interval" has been set, the "Storage Items" fields become active.

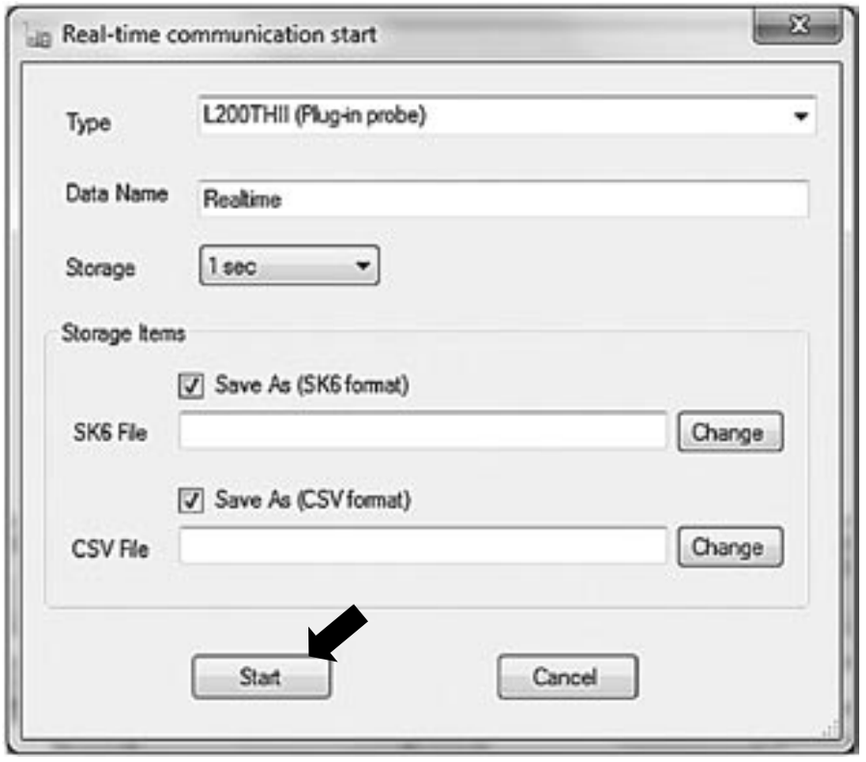
Click Change if you want to save the backup file in a different folder. The default folder is \Document folder.



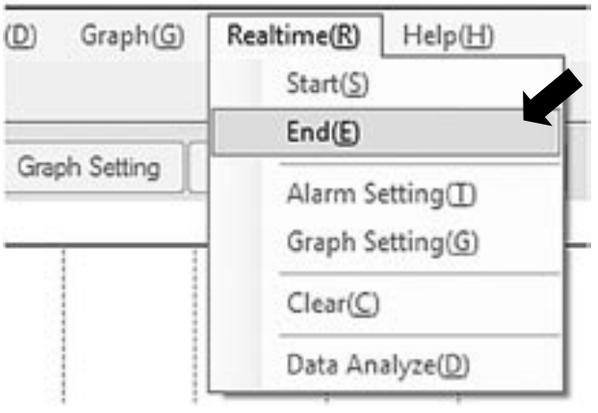
Tips: The SK6 format refers to the file format specially designed to be used with DATALOGGER for Windows. The CSV format is a generic file format used in commercial spreadsheet software.

The Datalogger has the capacity to store up to 8100 lines of data. If the number of lines reaches 8100, real-time communication automatically stops.

⑩ Click “Start” to return to the graph display and real-time communication starts.



⑪ To stop, click「End (E)」from the Realtime menu.



⑫ Click OK to confirm.

Note: The battery life under real-time communication is about 500 hours. Check the battery life before using real-time communication.

(2) Transmitting the data to other communication device

During measurement, press the CALL/OUT key to start transmitting the data to a communication device. At this time. “OUT” is displayed. Press the CALL/OUT key again to end the transmission. “OUT” will be disappeared.

- Communication standard

Bit/sec.: 19200
Data bit: 8
Parity check: non
Stop bit: 1
Flow control: Xon/Xoff

- Output format

  stx S -XXXX,-XXXX Cr Lf ※ First data

  stx R -XXXX,-XXXX Cr Lf ※ Second and subsequent data

  ・Temperature/humidity data

  (if the value is minus) : – X X X X, – X X X X

  (if the value is plus) : (space) X X X X, (space) X X X X

  ・X X X X : 4 digit in denary.

  10 times the actual temperature/humidity value

  ※ Temperature measurement type: humidity data output as 「– E – □□」

  ・Errors (H i, L o, E r) are as follows.

  H i : 「– H – □□」

  L o : 「– H – □□」

  E r : 「– E – □□」

Note: The software that you have created is not supported by us.

8. Troubleshooting

If an error occurs, one of the error codes listed below will be displayed on the LCD. Check the details of the error and take corrective actions as appropriate. If the problem persists, please contact the store where you purchased this product or our Service Network.

Error code	Description	Action
E r (upper LCD)	Cannot measure temperature.	・Check if the probe is properly connected to the Datalogger.
E r (lower LCD) (only SK-L200 TH IIα)	Cannot measure humidity.	・Check if the probe is properly connected to the Datalogger. ・Check if "Hi", "Lo" or "Er" is displayed on the upper LCD. ・Humidity reading may be out of the measuring range.
E r 1	Battery power problems: ・The preset start was set when the battery power was low. ・The battery power became low while in standby for preset start. ・The battery power became low while logging.	・Replace the batteries with new ones.
E r 3	・The logging option chosen was different from that used in the data currently stored in the Datalogger.	・Erase the data stored on the Datalogger. If necessary, store the data before erasing.

E r 4	・The date and time chosen were prior to the current date and time.	・Check the current and preset dates and times, and correct them as necessary.
E r 5 (only By pages)	・The logging operation was started when all pages were full with data. ・The logging operation was started when there was data left whose logging ended because the battery was removed.	・Erase the data stored on the Datalogger. If necessary, store the data before erasing.
E r 7	・The ID was changed when there was data on the Datalogger.	・Erase the data stored on the Datalogger. If necessary, store the data before erasing.
Momery bar flashies starting from the left-most bar in turn.	・The logging ended because the battery was removed.	・Erase the data stored on the Datalogger. If necessary, store the data before erasing.
Hi	・The measurement exceeded the upper threshold.	・Restart measuring within the measuring range.
Lo	・The measurement exceeded the lower threshold.	・Restart measuring within the measuring range.

9. Specifications

9-1. Main unit

Model		SK-L200T II (Temperature)	SK-L200TH IIα (Temperature & humidity)
Cat. No.		8161-00	8175-00
Display range	Temperature	-45.0 to 205.0°C *	-15.0 to 65.0°C *
	Humidity		10 to 99.9%rh *
Resolution	Temperature	0.1°C (-9.9 to 205.0°C) 1°C (-10°C or below)	0.1°C (-9.9 to 65.0°C) 1°C (-10°C or below)
	Humidity	—	0.1%rh (15.0 to 99.9%rh) 1%rh (below 15.0%rh)
Accuracy at 23°C	Temperature	±(0.1°C + 1digit)	±(0.1°C + 1digit)
	Humidity	—	±(0.1%rh + 1digit)
Dedicated probes		SK-LT II series	SK-LTH IIα series
Display	Temperature upper limit warning (Hi), temperature lower limit warning (Lo), humidity upper limit warning (Hi), humidity lower limit warning (Lo), temperature warning is on (Alarm), humidity warning is on (Alarm), low battery indicator, memory indicator (in bars), logging is on (REC), standby for preset start (RES), real-time measuring or communication is on (OUT), current date and time are being displayed (TIME), logging interval is being displayed (INT), current date and time (year, month, date, hour and minute), logging interval, logging option (number and code), warning thresholds, error codes, unit ID. (No display items related to the humidity on the SK-L200T II)		

Display sampling	Approx. 1 second
Memory capacity	Maximum 8100 readings. For By pages (memory partitioning logging option), 2000 readings x 4 pages
Logging interval	In seconds (1, 2, 5, 10, 15, 30) and in minutes (1, 2, 5, 10, 15, 30, 60, 90)
Communication	USB
Operating ambient	-10.0 to 60.0°C, no condensing
Storage temperature	0.0 to 50.0°C
EMC Basic Standard	EN61326-1, class B
Power	Two alkaline batteries (AAA/LR03)
Battery life (at normal ambient)	・Approx. 500 hours for continuous measuring ・Recording of 8100 readings at any logging interval. (ex. 506 days at a 90-minute interval) (With the LCD off)
Weights (approx.)	123 g (without batteries)
Dimensions	Approx. 100 (W) x 73 (H) x 22 (D) mm
Material	ABS resin
Accessories	・CD-ROM: DATALOGGER for Windows 1 ・Hand strap 1 ・USB cable 1 ・USB port cap (Factory set) 1 ・Battery (Alkaline, AAA/LR03) 2 ・Instruction Manual 1

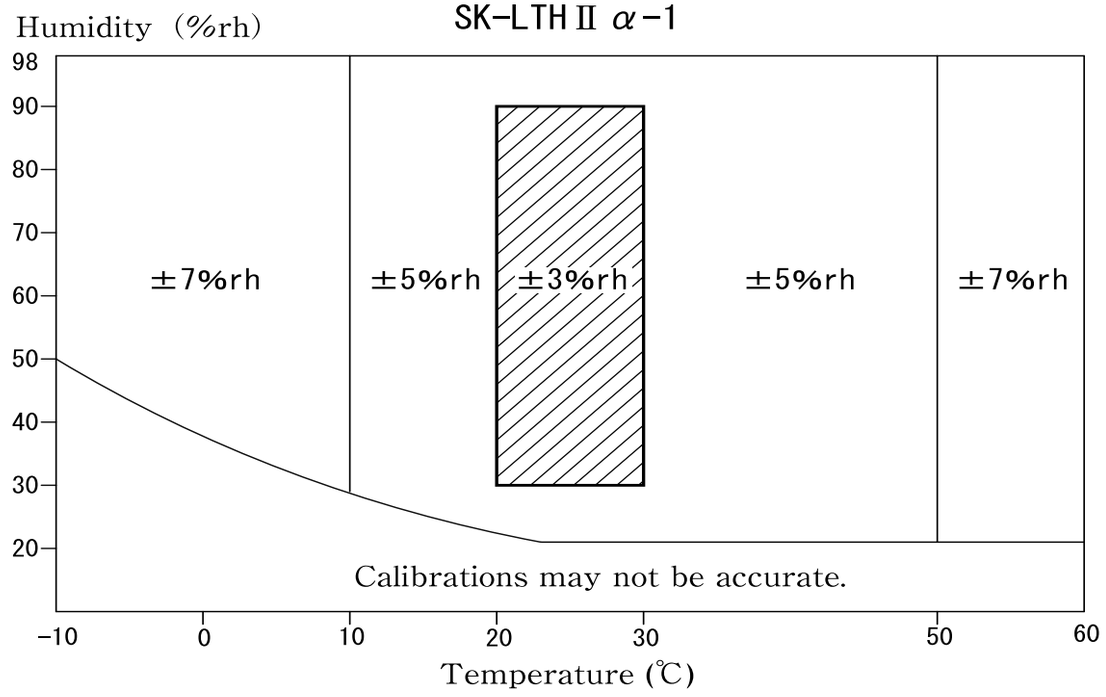
Note that the battery life refers to the life of a new alkaline dry cell battery.

9-2. Standard Probes

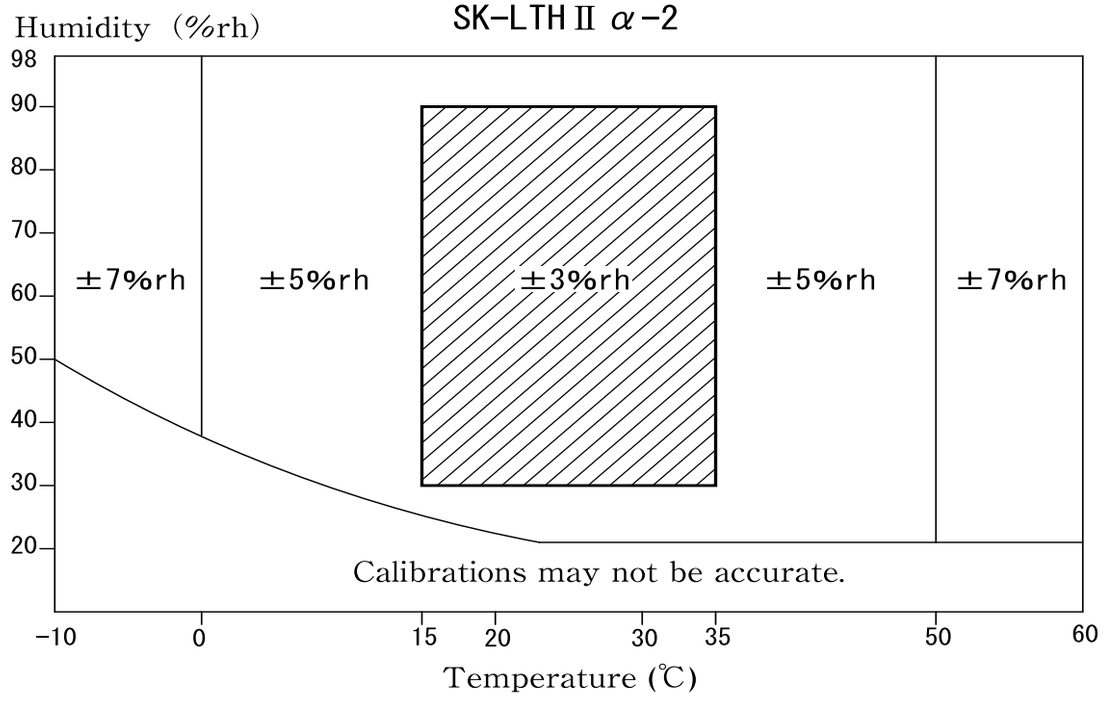
Model	SK-LT II - 1 (Plug-in type)	SK-LT II - 2 (w/ sensor cord)	SK-LTH IIα - 1 (Plug-in type)	SK-LTH IIα - 2 (w/ sensor cord)
Cat. No.	8162-00	8163-00	8176-00	8177-00
Sensor (Temp.)	Thermistor		Thermistor	
(Humi.)	—		High Polymeric resistance change humidity sensor	
Measuring range	-10.0 to 60.0°C	-40.0 to 105.0°C	-10.0 to 60.0°C 20.0 to 98.0% RH (at 23°C)	
Temperature accuracy	±0.5°C (20 to 30° C) ±1°C at other than above	±2°C (-10°C or lower) ±0.5°C (15 to 35° C) ±1°C at other than above	±0.5°C (20 to 30°C) ±1°C at other than above	±0.5°C (15 to 35°C), ±1°C at other than above
Humidity accuracy	—	—	refer to the charts of page 77	
Weight	16 g	46 g	15 g	65 g
Dimensions	25 (W) x 70 (H) x 20 (D) mm	Tip: 5 (dia.) x 20 (L) mm; Cord 1.5 m Body: 25 (W) x 62 (H) x 20 (D) mm	25 (W) x 70 (H) x 20 (D) mm	Tip: 18 (W) x 51.3 (H) x 10.3 (D) mm; Cord 1.5 m Body: 25 (W) x 62 (H) x 20 (D) mm
Material	ABS resin	ABS resin, PVC resin, Stainless steel	ABS resin	ABS resin, PVC resin

ACCURACY OF R. HUMIDITY

SK-LTHⅡ α-1



SK-LTHⅡ α-2



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