HIOKI

Instruction Manual

LR5011

TEMPERATURE LOGGER

HIOKI E. E. CORPORATION

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Introduction

Thank you for purchasing the HIOKI "Model LR5011 Temperature Logger." To obtain maximum performance from the instrument, please read this manual first, and keep it handy for future reference.

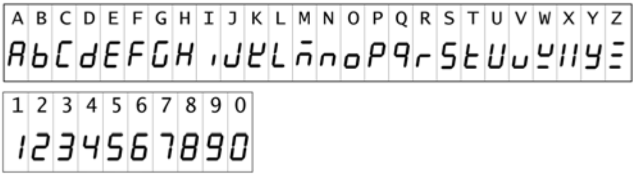
Registered Trade Marks

Windows is a registered trademark of Microsoft Corporation in the United States and/or other countries.

Notation

🛇	Indicates a prohibited action.
(p.)	Indicates the location of reference information.
❓➡	Indicates quick references for operation and remedies for troubleshooting.
*	Indicates that descriptive information is provided below.
[ ]	Menus, commands, dialogs, buttons in a dialog, and other names on the screen and the keys are indicated in brackets.
SET (Bold characters)	Bold characters within the text indicate operating button labels.
Windows	Unless otherwise specified, “Windows” represents Windows XP, Windows Vista, or Windows 7.
Dialog	Dialog box represents a Windows dialog box.

The screen of this instrument displays characters in the following manner.



◆ Mouse Operation

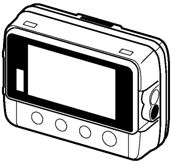
Click	Press and quickly release the left button of the mouse.
Right-click	Press and quickly release the right button of the mouse.
Double click	Quickly click the left button of the mouse twice.
Drag	While holding down the left button of the mouse, move the mouse and then release the left button to deposit the chosen item in the desired position.
Activate	Click on a window on the screen to activate that window.

Verifying Package Contents

When you receive the instrument, inspect it carefully to ensure that no damage occurred during shipping. In particular, check the accessories, panel switches, and connectors. If damage is evident, or if it fails to operate according to the specifications, contact your dealer or Hioki representative.

Quantities in parentheses ( ).

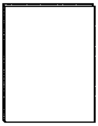
☐ **LR5011 (1)**



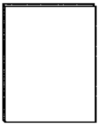
Accessories

☐ **LR6 alkaline battery (1)**
(Pre-installed in the logger.)

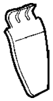
☐ **Operation Manual (1)**



☐ **Instruction Manual (1)**



☐ **Stand (1)**

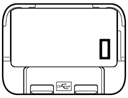


See: Other specified options:"Options" (p.3)

Options

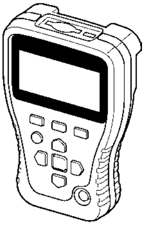
The following logger options are available separately. Even if purchased previously, you may want to confirm that you have them at hand.

☐ **LR5091 Communication Adapter(1)**
(Includes LR5000 Utility Program* CD [PC application software] and USB Cable)



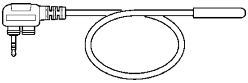
See: LR5091 specification:(p.84)

☐ **LR5092-20 Data Collector**
(Includes LR5000 Utility Program* CD [PC application software], LR03 alkaline battery x2, Instruction manual, Operation manual, and USB Cable)

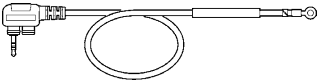


*The latest version can be downloaded from our web site.

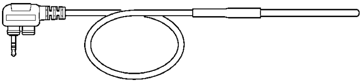
☐ **LR9601, 9602, 9603, 9604 Temperature Sensor (molded resin type)**



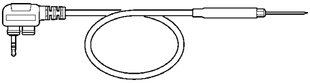
☐ **LR9611, 9612, 9613 Temperature Sensor (lug terminal type)**



☐ **LR9621 Temperature Sensor (sheath type)**

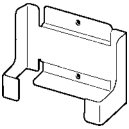


☐ **LR9631 Temperature Sensor (needle type)**



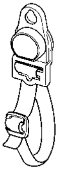
See: Temperature Sensor Specifications: (p.87)

☐ **LR9901 Wall-Mounted Holder**



See: Method of mounting:(p.41)

☐ **Z5004 Magnetic Strap**



See: Method of mounting:(p.41)

Transporting Precautions

Use the original packing materials when transporting the instrument, if possible.
Pack the instrument so that it will not sustain damage during shipping, and include a description of existing damage. We do not take any responsibility for damage incurred during shipping.

Safety Information

This manual contains information and warnings essential for safe operation of the instrument and for maintaining it in safe operating condition. Before using it, be sure to carefully read the following safety precautions.

⚠ DANGER

This instrument is designed to comply with IEC 61010 Safety Standards, and has been thoroughly tested for safety prior to shipment. However, mishandling during use could result in injury or death, as well as damage to the instrument. However, using the instrument in a way not described in this manual may negate the provided safety features.
Be certain that you understand the instructions and precautions in the manual before use. We disclaim any responsibility for accidents or injuries not resulting directly from instrument defects.

Safety Symbols

Markings on the logger have the following meanings.

⚠	In the manual, the ⚠ symbol indicates particularly important information that the user should read before using the instrument.
⚠	The ⚠ symbol printed on the instrument indicates that the user should refer to a corresponding topic in the manual (marked with the ⚠ symbol) before using the relevant function.
⎓	Indicates DC (Direct Current).

Symbols for Various Standards

Markings on the logger have the following meanings.

CE	WEEE marking: This symbol indicates that the electrical and electronic appliance is put on the EU market after August 13, 2005, and producers of the Member States are required to display it on the appliance under Article 11.2 of Directive 2002/96/EC (WEEE).
	This symbol indicates that the product conforms to safety regulations set out by the EC Directive.

Danger Levels

The following symbols in this manual indicate the relative importance of cautions and warnings.

⚠ **DANGER**	Indicates that incorrect operation presents an extreme hazard that could result in serious injury or death to the user.
⚠ **WARNING**	Indicates that incorrect operation presents a significant hazard that could result in serious injury or death to the user.
⚠ **CAUTION**	Indicates that incorrect operation presents a possibility of injury to the user or damage to the instrument.
NOTE	Indicates advisory items related to performance or correct operation of the instrument.

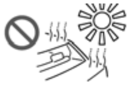
Operating Precautions

Follow these precautions to ensure safe operation and to obtain the full benefits of the various functions.

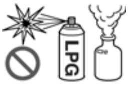
Installation Precautions

Operating temperature and humidity:
Logger: -20 to70°C (-4.0 to 158.0°F), 80%RH or less (non-condensating),
Temperature Sensor: As specified for each sensor
Storage temperature and humidity:
Logger: -20 to70°C (-4.0 to 158.0°F), 80%RH or less (non-condensating)
Temperature Sensor: As specified for each sensor

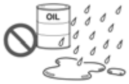
Avoid the following locations that could cause an accident or damage to the instrument.



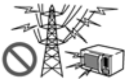
Exposed to direct sunlight
Exposed to high temperature



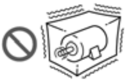
In the presence of corrosive or explosive gases



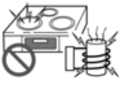
Exposed to liquids
Exposed to high humidity or condensation



Exposed to strong electromagnetic fields
Near electromagnetic radiators



Subject to vibration



Near induction heating systems
(e.g., high-frequency induction heating systems and IH cooking utensils)

CAUTION

- The protection rating for the enclosure of this device (based on EN60529) is *IP54.
- Although this instrument is designed to resist the ingress of dust and water, it is not entirely water- or dust-proof, so to avoid shock or damage, do not use it in a wet or dusty environment.
- If used outside the specified environmental ranges for operation (or storage), the operation of the unit cannot be guaranteed.
- Temperature sensors other than Models LR9601 to LR9604 are not designed with ingress prevention against water and dust. Do not use it in an especially dusty environment, nor where it might be splashed with liquid. This may cause damage.
- This temperature sensor is not drip-proof. Water droplets on the grip or connector may result in malfunctions.

*IP54 :This indicates the degree of protection provided by the enclosure of the device against use in hazardous locations, entry of solid foreign objects, and the ingress of water.
5 : Protected against access to hazardous parts with wire measuring 1.0 mm in diameter. Dust-proof type (The penetration of dust cannot be prevented completely, but quantities of dust that may hinder the stated operation of equipment or safety cannot penetrate the enclosure.)
4 : The equipment inside the enclosure is protected against the harmful effects of spraying water.

Avoiding Logger Damage

CAUTION

To avoid damage to the instrument, protect it from physical shock when transporting and handling. Be especially careful to avoid physical shock from dropping.

CD Handling

CAUTION

- Always hold the disc by the edges, so as not to make fingerprints on the disc or scratch the printing.Never touch the recorded side of the disc. Do not place the disc directly on anything hard.
- Do not wet the disc with volatile alcohol or water, as there is a possibility of the label printing disappearing.
- To write on the disc label surface, use a spirit-based felt pen. Do not use a ball-point pen or hard-tipped pen, because there is a danger of scratching the surface and corrupting the data. Do not use adhesive labels.
- Do not expose the disc directly to the sun's rays, or keep it in conditions of high temperature or humidity, as there is a danger of warping, with consequent loss of data.
- To remove dirt, dust, or fingerprints from the disc, wipe with a dry cloth, or use a CD cleaner. Always wipe from the inside to the outside, and do no wipe with circular movements. Never use abrasives or solvent cleaners.
- Hioki shall not be held liable for any problems with a computer system that arises from the use of this CD, or for any problem related to the purchase of a Hioki product.

Preliminary Checks

Before using the instrument the first time, verify that it operates normally to ensure that the no damage occurred during storage or shipping. If you find any damage, contact your dealer or Hioki representative.

WARNING

Before using the instrument, make sure that the insulation on the sensor cables is undamaged and that no bare conductors are improperly exposed. Using the instrument in such conditions could cause an electric shock, so contact your dealer or Hioki representative for replacements.

Measurement Preparation to Data Analysis

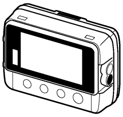
The steps from measurement preparation to data analysis are illustrated with a typical measurement example.

Example Case: Record warehouse temperature at 10-minute intervals for one month, and store the data on a computer.

Required Items:

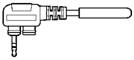
Quantities in parentheses ( ).

☐ LR5011 (1)

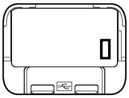


☐ LR6 alkaline battery (1)

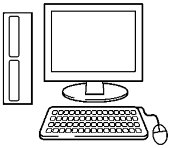
☐ LR9604 Temperature Sensor (1)



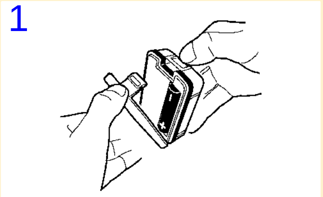
☐ LR5091 Communication Adapter(1) (LR5000 Utility Program* CD [PC application software] and USB Cable)



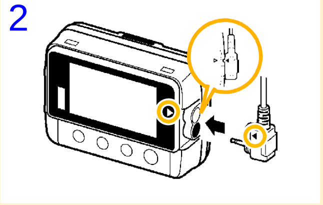
☐ Computer (1)



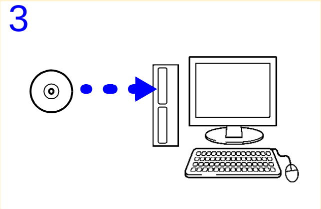
Procedure:



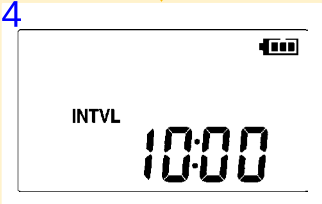
1 Install the battery in the logger.
See: "2.1" (p.17)



2 Connect the LR9604 Temperature Sensor to the logger.
See: "2.2" (p.20)

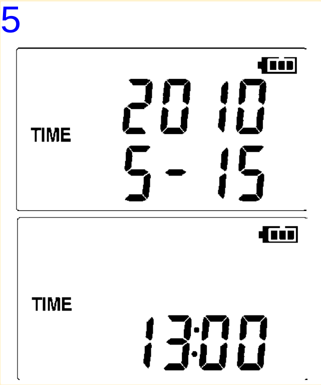


3 Install the LR5000 Utility Program on the computer.
See: "2.3" (p.21)



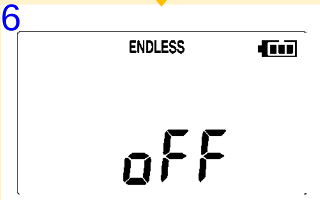
4 Select the recording interval for the logger (in this case, 10 minutes).
See: "Recording Interval Setting" (p.28)

(The setting can be made also from the LR5000 Utility Program.) (p.35)



5 Set the logger to the correct date and time (in this case, 15 May 2010, 13:00).
See: "Real-Time Clock Setting" (p.29)

(With the LR5000 Utility Program, the logger can be set to the computer time.) (p.38)

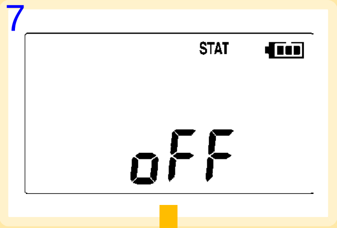


6 Set the stop method to **[OFF]**.

(This setting provides one-time measurement: recording stops when memory becomes full.)

See: "Stop Method Setting (for when memory becomes full)" (p.30)

(The setting can be made also from the LR5000 Utility Program.) (p.35)

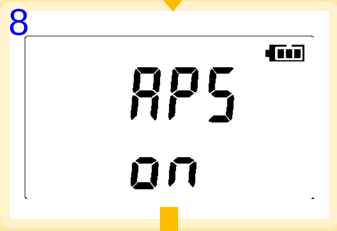


7 Set the recording mode to **[OFF]**.

(This setting provides instantaneous measurement.)

See: "Recording Mode Setting" (p.31)

(The setting can be made also from the LR5000 Utility Program.) (p.35)



8 Set the power save setting to **[ON]**.

(The on (enabled) setting is recommended for long-term recording.)

See: "Power Save Setting" (p.31)

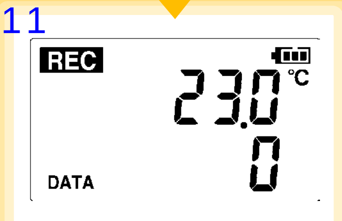
(The setting can be made also from the LR5000 Utility Program.) (p.34)

9 Pre-measurement inspection (p.39)

10 Install the logger at the measurement site in the warehouse.

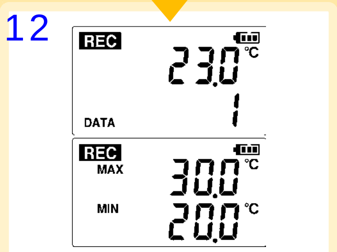
See: "4.2" (p.40)

(It can be wall-mounted.)



11 Hold **REC/STOP** on the logger for two seconds to start recording.

See: "4.3" (p.42)



12 Press **(+)** and **(-)** on the logger to confirm that the recording count is incrementing, and that recording data (maximum and minimum values) are displayed.

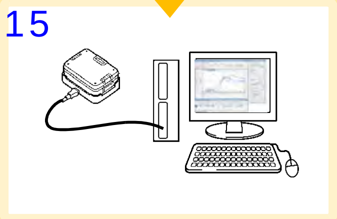
(Confirm that recording is actually occurring.)

See: "4.4" (p.44)

13 After a month, hold **REC/STOP** on the logger again for two seconds to stop recording.

See: "4.3" (p.42)

14 Retrieve the logger from the measurement site.



15 Import recorded data from the logger to a connected computer. For analysis, display the data in a graph.

See: "4.5" (p.44)

(The data is automatically saved when imported to the computer. By default, it is also automatically displayed in a graph.)

16 Print recorded data as needed.

See: "4.8" (p.59)

Overview Chapter 1

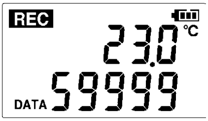
1.1 Product Overview and Features

This instrument is a compact portable data logger for measuring, displaying, and recording temperature.

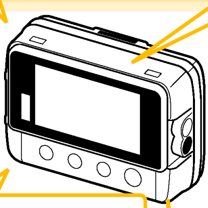
- **Data can be imported while recording.**
- **Records up to 60,000 measurements**

Large display shows measured temperature value and recorded data count

Measures temperature on one channels.

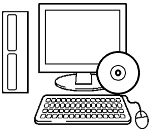


Splash-proof ingress protection (IP54)



Browse and manage data with LR5000 Utility Program on a PC.

The LR5000 Utility Program PC application is very easy to install.
After installation, data management and browsing is easy with auto-start, data display and saving.



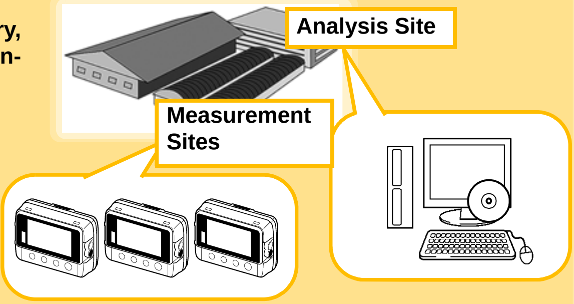
- **Data is preserved independently of battery state**
- **Recording continues (for approx. 30 s) during battery replacement**

Advanced functions included

- Record statistical values (p.30), (p.35)
- Scaling (p.36), (p.63)
- Alarm display (p.37)

For home, office, factory, and warehouse environment measurements

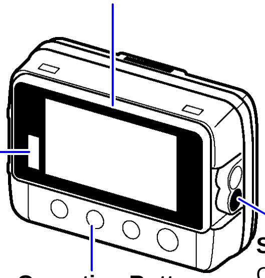
Suitable for ESCO, HACCP, and ISO environmental measurements.



1.2 Part Names/Functions and Display Indicators

Front

LCD(p.13)
The display blanks after 30 seconds of operator inactivity (auto power save).The display reappears by pressing a button.
When the display is visible, it refreshes about once per second.



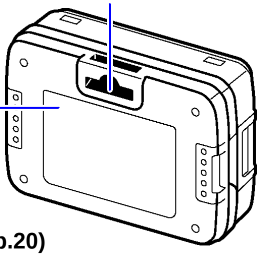
IR Port (p.44)
Communicates with the LR5091 Communication Adapter or LR5092-20 Data Collector.

Operating Buttons

Sensor Jacks (p.20)
Connect a temperature sensor.

Back

Stand/Strap Attachment Hole (p.40)
Attach the logger to a wall or other surface by hanging it on a screw. (Supported screw head dimensions: up to approx. 6.8 mm in diameter and approx. 2.5 mm in thickness)

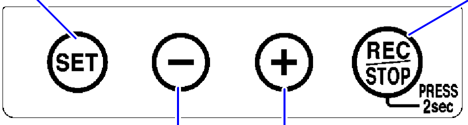


Battery Cover (p.17)

Operating Buttons

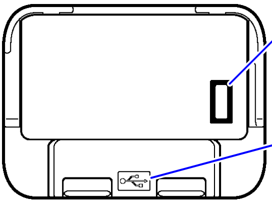
SET button
Displays settings.

REC/STOP button
Hold for two seconds to start/stop recording.
From a setting display, switches to measurement display.



(-) button, (+) button
Changes Measurement display contents.
Changes setting values on the Settings display.

LR5091 Communication Adapter



IR Port (p.44)
Communicates with the logger.

USB Port (p.32)
Connect a USB cable here to communicate with a computer. (Mini-B receptacle)

Display Indicators

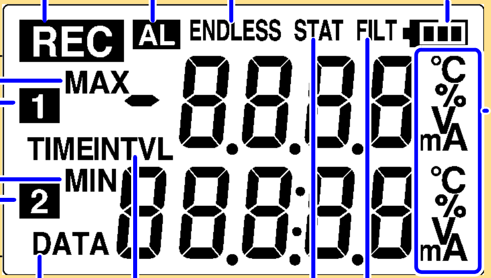
The display indicators provide the following information.

REC Indicator
Indicates recording in progress. (Blinks when waiting to record.)

AL indicator
When the alarm* function is enabled, this indicates when a measured value is outside of the specified (upper/lower value*) range.

ENDLESS indicator
Indicates the Stop Method Setting display.
Also appears on the Measurement display to indicate endless recording (p.30) is enabled.

Battery Status Indicator
Indicates the battery charge status. (p.18)



MAX indicator
Indicates that the value displayed at the right is the maximum.

Measurement Channel

MIN indicator
Indicates that the value displayed at the right is the minimum.

Units
Indicates the unit of measurement on each channel.

Not used by the logger.

DATA indicator
Indicates that the value displayed at the right is the data count.

STAT indicator
Indicates the Recording Mode Setting display.
Also appears on the Measurement display to indicate statistic recording (p.31) is enabled.

TIME indicator
Indicates the Date-Time Setting display.

INTVL indicator
Indicates the Recording Interval Setting display.

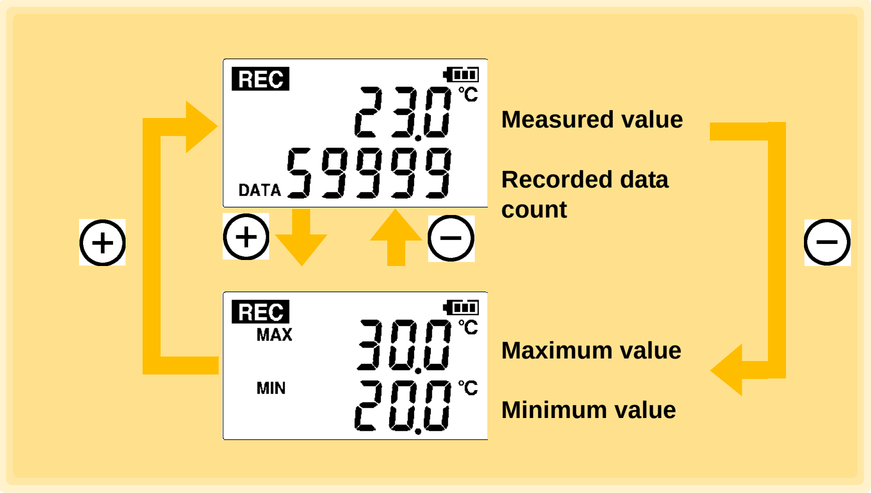
*** Setting is available from the LR5000 Utility Program or via the LR5092-20 Data Collector.**
See: "3.3 Making Settings from the LR5000 Utility Program" (p.32),
LR5092-20 Data Collector Instruction Manual

1.3 Display Organization

The logger has two general display types: Measurement and Settings.

Measuring display

The **(+)** and **(-)** buttons switch the display type.


REC
23.0 ℃
DATA 59999
Measured value
Recorded data count
REC
MAX
30.0 ℃
MIN
20.0 ℃
Maximum value
Minimum value

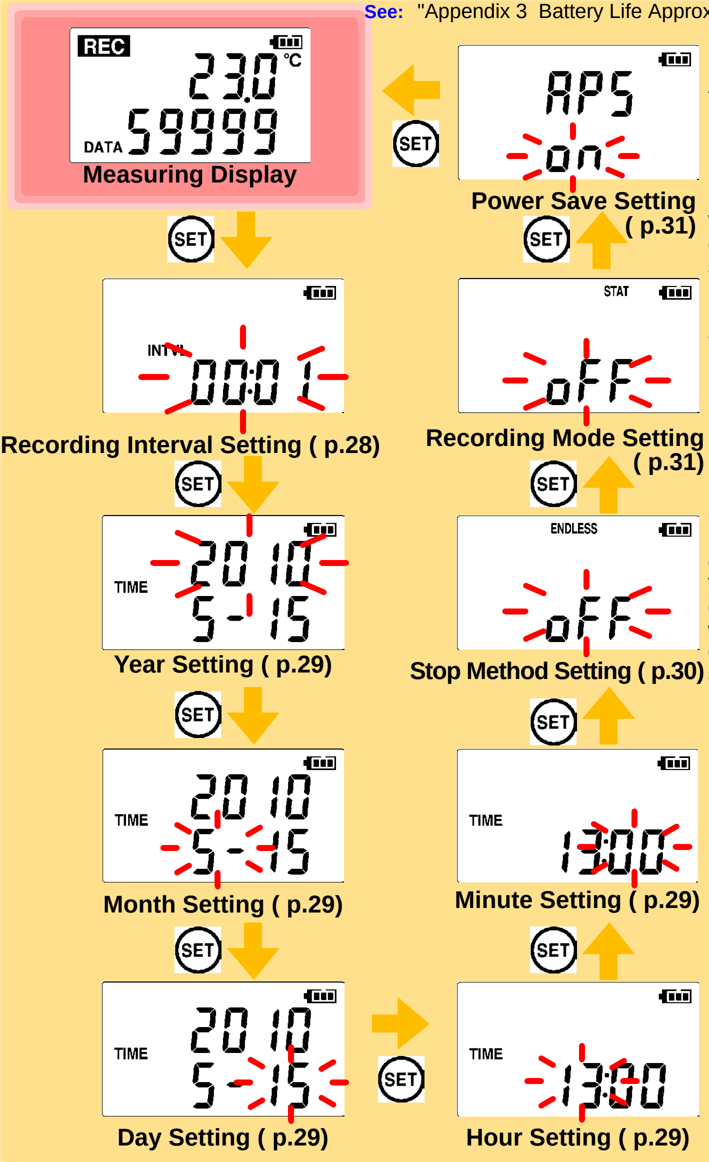
NOTE

- For instantaneous recording, the maximum and minimum values are obtained from all the data measured at each recording interval.
- For statistical recording, the maximum and minimum values are obtained from all the data measured every second.
- The maximum and minimum values are not displayed when the recorded data count is 0.

Setting Display

Select the display with the **SET** button. Press **(+)** and **(-)** to change a setting.
Press the **REC/STOP** button to switch to the Measurement display from any other.

See: "Appendix 3 Battery Life Approximation" (p.A2)


REC
23.0 ℃
DATA 59999
Measuring Display
SET
APS
on
Power Save Setting
(p.31)
SET
INTVL
00:01
Recording Interval Setting (p.28)
STAT
oFF
Recording Mode Setting
(p.31)
SET
TIME
2010
5-15
Year Setting (p.29)
ENDLESS
oFF
Stop Method Setting (p.30)
SET
TIME
2010
5-15
Month Setting (p.29)
TIME
13:00
Minute Setting (p.29)
SET
TIME
2010
5-15
Day Setting (p.29)
SET
TIME
13:00
Hour Setting (p.29)

Battery life is extended when on (enabled). (Default is on.)

When on (statistical recording), instantaneous, maximum, minimum, and average values are recorded at each interval. Battery life is shorter. (Default is off.) (Record instantaneous values)

Select what happens when memory becomes full. When on, the oldest data is overwritten, and when off, recording stops. (Default is on.)

NOTE

- When no operation occurs for 30 seconds with the Settings display, automatically switches to Measurement display.
- When the ▭ battery indicator appears, settings cannot be changed (although they can still be displayed).
- Settings cannot be changed while recording. However, settings can still be displayed by pressing the **SET** button from the Measurement display.

Measurement Preparations Chapter 2

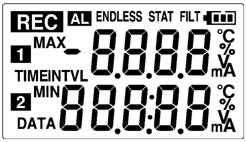
2.1 Installing (or Replacing) the Battery ⚠

⚠WARNING

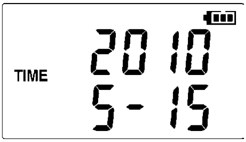
- **After replacing the battery, replace the cover before using the logger.**
- **Be sure to insert them with the correct polarity. Otherwise, poor performance or damage from battery leakage could result. Replace batteries only with the specified type.**
- **Battery may explode if mistreated. Do not short-circuit, recharge, disassemble or dispose of in fire.**
- **Handle and dispose of batteries in accordance with local regulations.**

NOTE

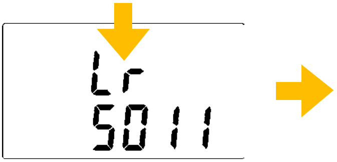
- Data and settings stored in the logger are retained even when the battery is depleted, and during battery replacement.
- Once the ▮▯ battery indicator appears, operation can still continue for about 30 seconds when the battery is removed during recording.
- Testing monitor batteries installed in the unit may possibly be weak. Replace batteries before extended measurement usage.
- Use only LR03 Alkaline batteries. Using manganese batteries may not result in accurate measurements or proper communication with the LR5091 Communication Adapter and LR5092-20 Data Collector.
- After installing the batteries, the following displays appear, and the date and time need to be set. (p.29)



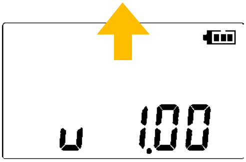
1. All segments



4. Year Setting display



2. Model name

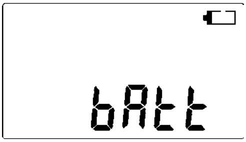


3. Firmware version

- When the ▯ battery indicator appears, settings cannot be changed (although they can still be displayed).

NOTE

- When battery voltage is too low to operate the logger, the following appears. Replace the battery to restore normal operation.



Battery Status Indicator

This indicator is displayed at the top right corner.

▮▮▮	Battery charge remains. Fewer blocks within the indicator signify weaker battery charge.
▮	Replace the discharged battery as soon as possible.(Even when the battery is removed during recording, operation can continue for about 30 seconds.)
▯	In this state, recording and communication with the LR5091 Communication Adapterr and LR5092-20 Data Collector are not possible.

Using a NiMH Battery

The battery status indicator does not accurately show the remaining battery capacity when using a NiMH battery. Moreover, the battery life will vary greatly with the capacity, charging conditions and repeated uses. Please take note of these points when using it.
The device's battery status display and battery life are based on the usage of a brand-new alkaline battery.

When the logger will not be used for long time

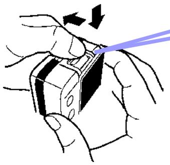
⚠CAUTION

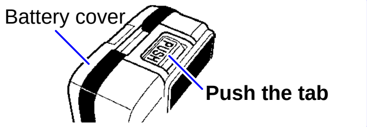
To avoid corrosion and damage to this instrument from battery leakage, remove the batteries from the instrument if it is to be stored for a long time (1 week).

Battery Replacement

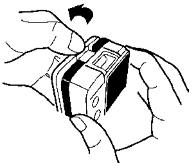
Required Items: LR6 alkaline battery (1)

1

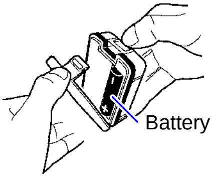




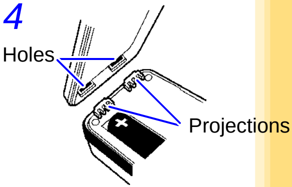
2



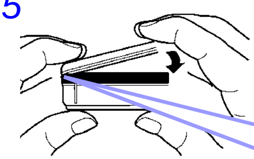
3



4



5



1 Press the PUSH tab as shown, and pull the battery cover back.

2 Hold the battery cover while separating it from the logger.

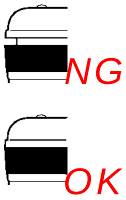
3 Install the battery as shown.

4 Align the holes in the battery cover with the projections on the back of the logger.

5 While confirming that there are no gaps, press with your fingers to close the battery cover.

When the battery is installed, the logger turns on.
(there is no power switch)

NOTE Note that the battery cover is designed to seal tightly to preserve dust- and drip-resistance.
When the holes in the battery cover are properly aligned with the projections, the battery cover should close smoothly.



The cover will not close correctly if there are any gaps.

Never attempt to force the battery cover closed when not aligned properly. Doing so could cause damage.

2.2 Connecting a Temperature Sensor ⚠

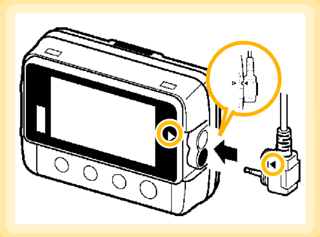
Connect a temperature sensor to the logger's sensor jacks.

⚠CAUTION

- A temperature sensor is precision machined. Applying an excessively high voltage pulse or static electricity may damage the sensor.
- Avoid subjecting the temperature probe tip to physical shock, and avoid sharp bends in the leads. These may damage the probe or break a wire.
- Take care that the temperature sensor does not exceed the specified temperature range.
- To avoid breaking the sensor, do not bend or pull it.
- Avoid stepping on or pinching cables, which could damage the cable insulation.
- To avoid damage to the logger, do not apply voltage to sensor jacks.

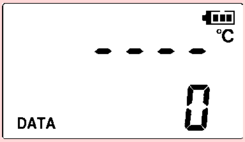
Connection Method

Required Items: Hioki LR9601 to LR9631 Temperature Sensor



Align the triangle on the plug with the one in front of the sensor jacks, and insert the plug securely.

Values are not displayed correctly if the sensor plug is inserted incorrectly or not inserted far enough.



If values are not displayed correctly even when the plug is inserted properly, the logger or sensor may be damaged. Repair may be necessary.

See: "Requesting repairs" (p.91)

Compatible Sensors

LR9601 to LR9604 Temperature Sensor (molded resin type)	Approx. length 1 m/5 m/10 m/45 mm
LR9611 to LR9613 Temperature Sensor (plug terminal type)	Approx. length 1 m/5 m/10 m
LR9621 Temperature Sensor (sheath type)	Approx. length 1 m
LR9631 Temperature Sensor (needle type)	Approx. length 1 m

2.3 Installing the PC Application Program

To save, browse, or print data, or to make logger settings from a computer, first install the "LR5000 Utility Program".

LR5000 Utility Program Operating Requirements

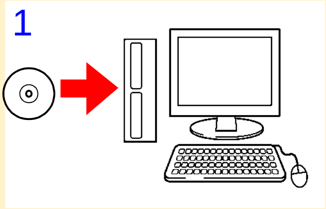
CPU	1 GHz or faster processor clock
RAM	At least 512 MB
OS	Windows XP SP2 or later Windows Vista SP1 or later Windows 7
Library	.NET Framework 2.0/3.5
Interface	USB
Monitor Resolution	1024×768 or higher
Hard Disk	At least 30 MB free space (Additional space is required for storing recorded data. Another 500 MB may be required if .NET Framework 2.0 or 3.5 is not yet installed.)

Installation Procedure

Log in with an Administrator account.

Before installing, close any applications running on the computer.

Required Items: Supplied CD
(for Windows XP) LR5091 Communication Adapter, USB cable



1 Load the CD in the computer's CD-ROM drive.

The computer's Auto Play function should display the html file on the CD in a web browser.

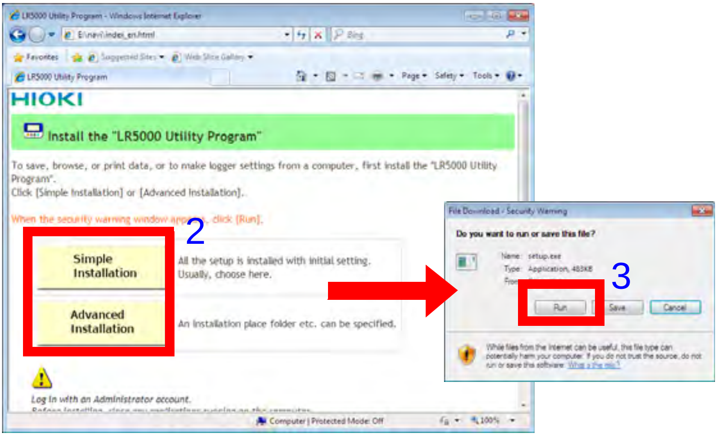
2 Click **[Simple Installation]** or **[Advanced Installation]** on the screen.

Installation of the LR5000 Utility Program and device driver begins.

3 When the security warning window appears, click **[Run]**.

4 After installation, start the program by selecting **[Programs]-[Hioki]-[LR5000 Utility Software]-[LR5000 Utility]** from the Windows **[Start]** menu.

The main screen (p.24) appears.


LR5000 Utility Program - Windows Internet Explorer
E:\navi\index_en.html
Bing
Favorites
Suggested Sites
Web Slice Gallery
LR5000 Utility Program
Page
Safety
Tools
HIOKI
Simple Installation
Advanced Installation
2
3
File Download - Security Warning
Run
Save
Cancel
Computer | Protected Mode: Off
100%

Install the "LR5000 Utility Program"

To save, browse, or print data, or to make logger settings from a computer, first install the "LR5000 Utility Program".
Click [Simple Installation] or [Advanced Installation].

When the security warning window appears, click [Run].

All the setup is installed with initial setting. Usually, choose here.

An installation place folder etc. can be specified.

Log in with an Administrator account.

Do you want to run or save this file?

Name: setup.exe
Type: Application, 483KB

While files from the Internet can be useful, this file type can potentially harm your computer. If you do not trust the source, do not run or save this software. What's the risk?

How to start the program?

The program starts automatically from the next Windows logon. (The icon appears in the task tray (notification area) (p.32).)
Click the icon and click **[Show Main Screen]**.

If the installation screen does not appear?

- Execute X:\English\Setup.exe, where X is the CD-ROM drive letter.
  After starting setup.exe, follow the on-screen instructions to complete installation. (If .NET FrameWork 2.0 or 3.5 is not already installed, it is installed first.)
- You may be prompted to reboot during installation.
  If installation does not resume after rebooting, execute setup.exe again.

NOTE For setting and importing recorded data from loggers other than the LR5000 series, use the Communication Utility program supplied with the model 3911 or 3912 Communication Base. You can browse the recorded data by using LR5000 Utility Program also.

NOTE Settings and recorded data are not deleted when uninstalling or upgrading the program.

Uninstall Procedure

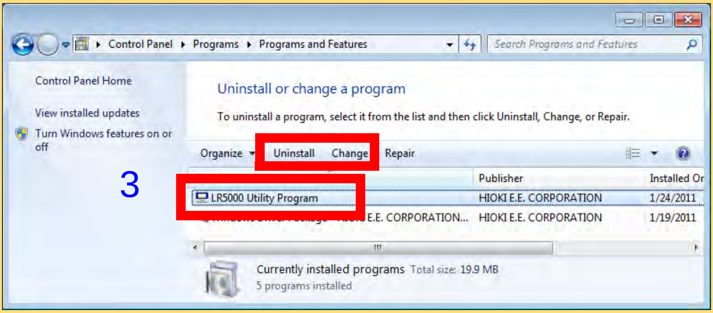
Follow this procedure to uninstall the LR5000 Utility Program.

1. Click **[Start]**-**[Control Panel]**.
   (The **[Control Panel]** dialog box appears.)

2. Click **[Programs and Features]**.
   (The **[Programs and Features]** screen appears.)

3. Select the **[LR5000 Utility Program]**, and click the **[Uninstall/ Change]** button.
   (The **[File Delete Confirmation]** dialog box appears.)

4. Click **[Yes]**.
   (The program is uninstalled.)


Control Panel ▸ Programs ▸ Programs and Features
Search Programs and Features
Control Panel Home
View installed updates
Turn Windows features on or off
Uninstall or change a program
Organize
Uninstall
Change
Repair
3
Publisher
Installed On
LR5000 Utility Program
HIOKI E.E. CORPORATION
1/24/2011
E.E. CORPORATION...
HIOKI E.E. CORPORATION
1/19/2011
Currently installed programs Total size: 19.9 MB
5 programs installed

To uninstall a program, select it from the list and then click Uninstall, Change, or Repair.

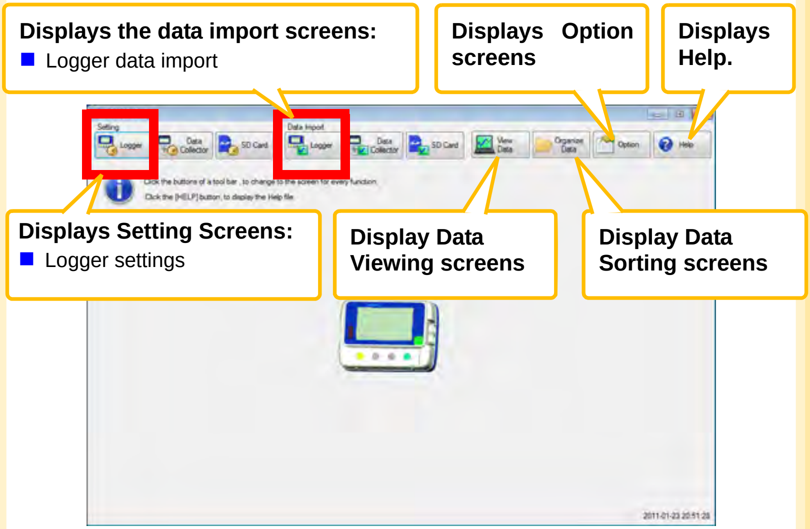
Version Upgrading

Download the latest version of the LR5000 Utility Program from our website (**http://www.hioki.com**).

Follow the procedure on the download page to install the latest version.
(The old version is uninstalled automatically.)

LR5000 Utility Program Screens

Main Screen (p.32)


Setting
Logger
Data Collector
SD Card
Data Import
Logger
Data Collector
SD Card
View Data
Organize Data
Option
Help
2011-01-23 20:51:28

Click the buttons of a tool bar, to change to the screen for every function.
Click the [HELP] button, to display the Help file.

Displays the data import screens:
- Logger data import

Displays Option screens

Displays Help.

Displays Setting Screens:
- Logger settings

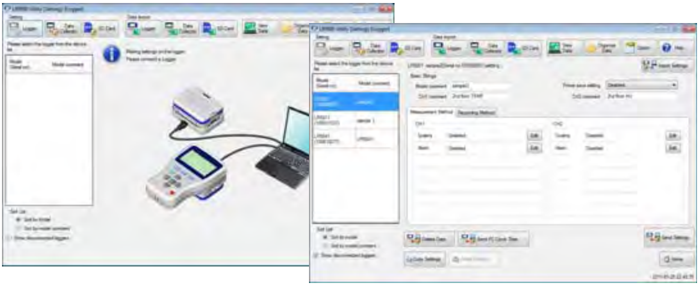
Display Data Viewing screens

Display Data Sorting screens

Setting Screens (p.33)

Make and export logger settings.

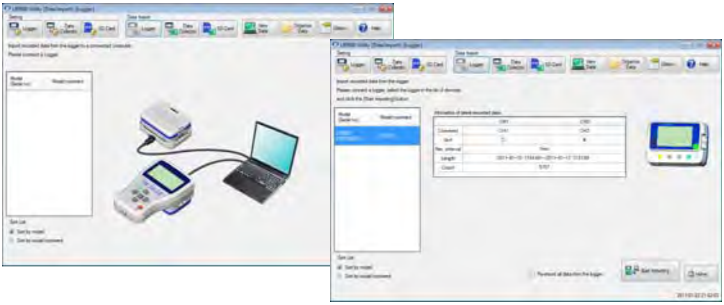
Example: Logger settings



Data Import Screens (p.54)

Import data from the logger with these screens.

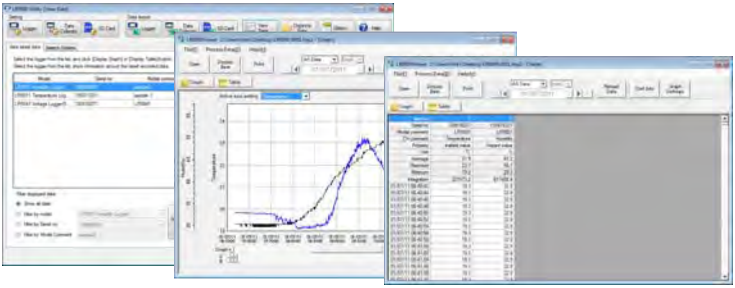
Example: Logger import screen



Data Viewing Screens (p.57)

View imported data on these screens.
Select a file to view, as a graph or table.

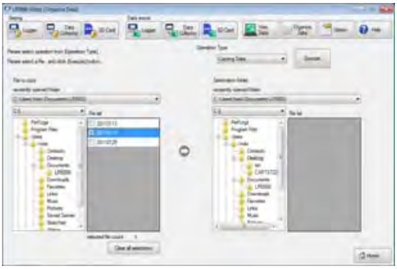
Example: Screens for viewing the latest data



Data Sorting Screens (p.71)

Sort imported data on these screens.
You can copy, delete, move, combine, and extract data.

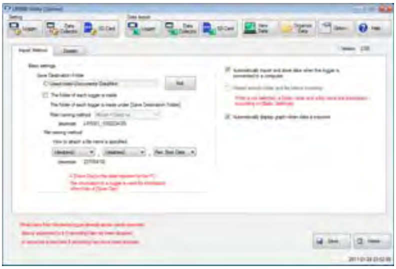
Example: Data Copy screen



Option Screens (p.77)

Make advanced settings on these screens.
You can specify the data importing method.

Example: Import Method Setting screen



Settings

Chapter 3

Configure measurement settings before starting to record.
Logger settings can also be made from a PC running the LR5000 Utility Program. (p.32)

3.1 Settings List

Following is a list of all settings.
Although all settings are available from the LR5000 Utility Program, some settings are limited when made from the logger.

Setting Item	Setting Options	Logger	Refer To	LR5000 Utility Program	Refer To
Recording Interval	Sets the recording interval.	Yes	(p.28)	Yes	(p.35)
Current Date and Time	Set the current year, month, day, hour, and minute. (The LR5000 Utility Program can set the logger's clock to match the computer's.)	Yes	(p.29)	Yes	(p.29)
Stop Method	Select the processing method when memory becomes full.	Yes	(p.30)	Yes	Included in the recording stop method
Recording Mode	Selects instantaneous or statistical value recording (measurements are taken once per second, and instantaneous, maximum, minimum, and average values are saved at each recording interval).	Yes	(p.31)	Yes	(p.35)
Power Save	Battery life is extended when on (enabled).	Yes	(p.31)	Yes	(p.34)
Model Comment	Enter a comment for the specified logger.	No	-	Yes	(p.34)
Channel Comment	Enter a comment for the specified measurement channel.	No	-	Yes	(p.34)
Recording Start Method	Select the recording start method. (The start time can be specified.)	No	-	Yes	(p.35)
Recording Stop Method	Select the recording stop method. (The stop time can be specified.)	No	-	Yes	(p.35)
Scaling	Use to scale measured values to display as adjusted values.	No	-	Yes	(p.36)
Alarm Thresholds	Set upper and lower threshold values to display the alarm indicator **[AL]** on the logger.	No	-	Yes	(p.37)

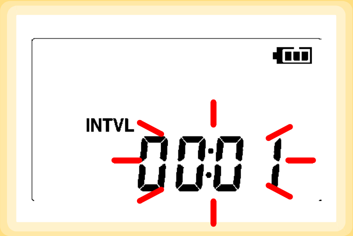
3.2 Making Settings on the Logger

To return to the Measurement display from any Settings display, press the REC/ STOP button.

NOTE

- When the ▭ battery indicator appears, settings cannot be changed (although they can still be displayed).
- When no operation occurs for 30 seconds with Settings displayed, automatically switches to Measurement display.
- Settings cannot be changed while recording. However, settings can still be displayed by pressing the **SET** button from the Measurement display.

Recording Interval Setting



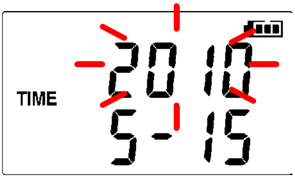
1. Press the **SET** button to display the interval setting. (The **[INTVL]** indicator appears, and the setting blinks.)
2. Press the **(+)** and **(-)** buttons to change the recording interval.

   Example of configuration:
   1sec 00:01, 1 minute 01:00
3. Press the **SET** button to accept the setting.

   (The year setting is displayed.)

Recording Interval	1(Default)/2/5/10/15/20/30 sec. , 1/2 /5/10/15/20/30/60 min

Real-Time Clock Setting



Year Setting display

1. Press the **SET** button to display the time settings. (**[TIME]** is displayed, and the year setting blinks.)
2. Press the **(+)** and **(-)** buttons to change the year.
3. Press the **SET** button to accept the year setting.

   (The month setting starts blinking.)
4. Repeat this procedure to set the month, day, hour, and minute.
5. Press the **SET** button to accept the setting.

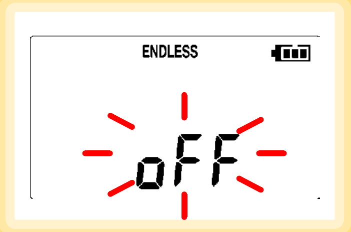
   (The stop method setting is displayed.)

Setting Range	01/01/2010, 00:00 to 12/31/2039, 23:59

Note: Seconds are not settable. However, seconds are set to zero at the instant the display is switched away from the minute setting.

NOTE After the battery has been removed for a long time, or if the clock is incorrect, reset it.

Stop Method Setting (for when memory becomes full)



1 Press the **SET** button to display the stop method setting. (The **[ENDLESS]** indicator appears, and the setting blinks.)

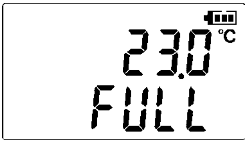
2 Press the **(+)** and **(-)** buttons to select **[ON]** or **[OFF]**.

3 Press the **SET** button to accept the setting.

(The recording mode setting is displayed.)

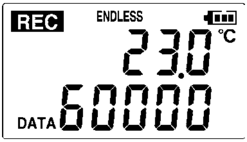
Setting Options	Descriptions
OFF	Recording stops when memory becomes full (One-Time Recording).
ON(Default)	The oldest data is overwritten when memory is full (Endless Recording).

NOTE When memory becomes full during one-time recording, the recorded data count appears as follows.

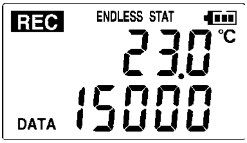


(the Measurement display shows channel measurement value and recorded data count)

When memory becomes full during endless recording, the recorded data count (equal to the memory capacity) remains constant.

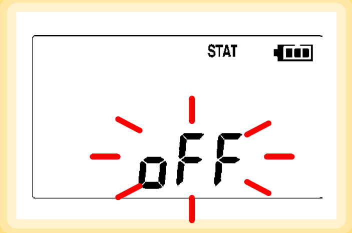


(instantaneous value recording display)



(statistical value recording display)

Recording Mode Setting



1 Press the **SET** button to display the recording mode setting. (The **[STAT]** indicator appears, and the setting blinks.)

2 Press the **(+)** and **(-)** buttons to select **[ON]** or **[OFF]**.

3 Press the **SET** button to accept the setting.

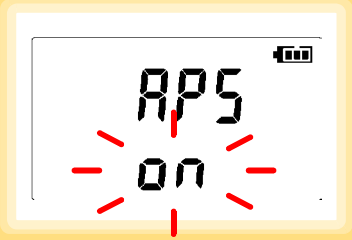
(The power save setting is displayed.)

Setting Options	Descriptions
OFF (Default)	The instantaneous value is recorded at each recording interval (instantaneous recording).
ON	When on, measurements are taken once per second, and instantaneous, maximum, minimum, and average values are recorded at each recording interval. (statistical recording). (Up to 15,000 data values can be recorded.)

NOTE Statistical recording cannot be selected when the recording interval is set to one second.

Power Save Setting

The power save function turns off the display 30 seconds after the last button is pressed. The display reappears upon the next button press.



1 Press the **SET** button to display the power save setting (**[APS]** appears, and the setting blinks).

2 Press the **(+)** and **(-)** buttons to select **[ON]** or **[OFF]**.

3 Press the **SET** button to accept the setting.

(The measurement display appears.)

Setting Options	Descriptions
ON (Default)	Power save is enabled.
OFF	Power save is disabled (the display remains visible).

NOTE The Auto Power Save feature consumes a small amount of current

See: "Appendix 3 Battery Life Approximation" (p.A2)

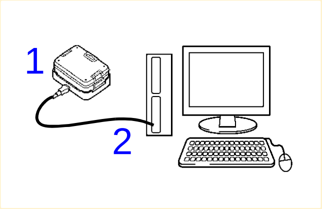
3.3 Making Settings from the LR5000 Utility Program

Logger settings can be made with the LR5000 Utility Program supplied with the LR5091 Communication Adapter and the LR5092-20 Data Collector.
Install the Utility Program on the computer before connecting. (p.21)

Connecting the Logger, LR5091, and Computer

Connect to the computer using the supplied USB cable.

Required Items: Logger, LR5091 Communication Adapter, USB cable, Computer



1 Plug the USB cable into the USB port on the LR5091 (or LR5092-20), and into a USB port on the computer.

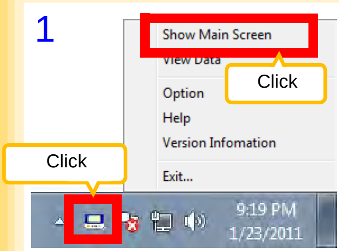
2 Dock the logger in the LR5091 (or LR5092-20).

(When docking, be sure that the infrared ports are aligned.)

The main display appears automatically (by default).

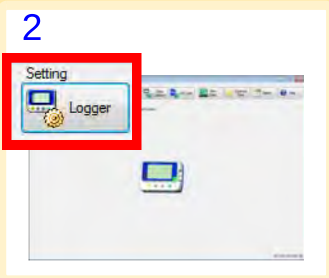
When the logger contains recorded data, the import confirmation dialog appears.
Click **[Yes]** to import the data automatically.
(p.44)

Logger Settings



1 If the main screen is not displayed on the computer, click the icon in the task tray (notification area), and click **[Show Main Screen]**.

The main screen appears.

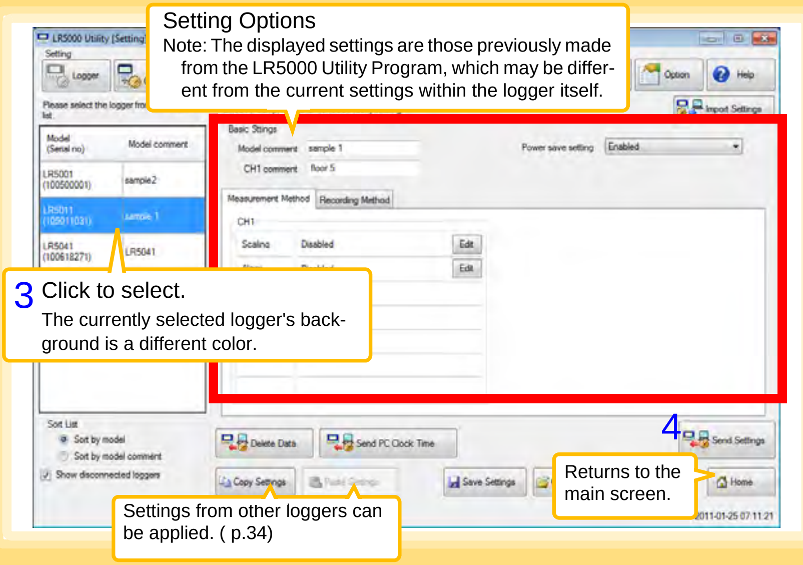

2
Setting
Logger

2 For the **[Setting]**, click the **[Logger]** button.

The Logger Settings screen appears.
(If the logger is not connected, you are prompted to connect it. Connect the logger.)

3 Select the logger from the device list*, and edit the settings. (p.34)

4 Click the **[Send Settings]** button.


LR5000 Utility [Setting]
Setting
Logger
Option
Help
Import Settings
Please select the logger from list.
Basic Sttings
Measurement Method
Recording Method
CH1
Edit
Edit
Sort List
○ Sort by model
○ Sort by model comment
☑ Show disconnected loggers
Delete Data
Send PC Clock Time
4
Send Settings
Copy Settings
Paste Settings
Save Settings
Home
2011-01-25 07:11:21

Model (Serial no)	Model comment
LR5001 (100500001)	sample2
LR5011 (105011031)	sample 1
LR5041 (100618271)	LR5041

Model comment: sample 1
CH1 comment: floor 5
Power save setting: Enabled
Scaling: Disabled

Setting Options
Note: The displayed settings are those previously made from the LR5000 Utility Program, which may be different from the current settings within the logger itself.

3 Click to select.
The currently selected logger's background is a different color.

Settings from other loggers can be applied. (p.34)

Returns to the main screen.

*** About the Device List**

- Up to ten loggers can be displayed when connected to the computer.
- When **[Show disconnected loggers]** is selected, disconnected loggers that had settings previously saved appear in the list.
- The list can be sorted in ascending order (**[Sort List]**).

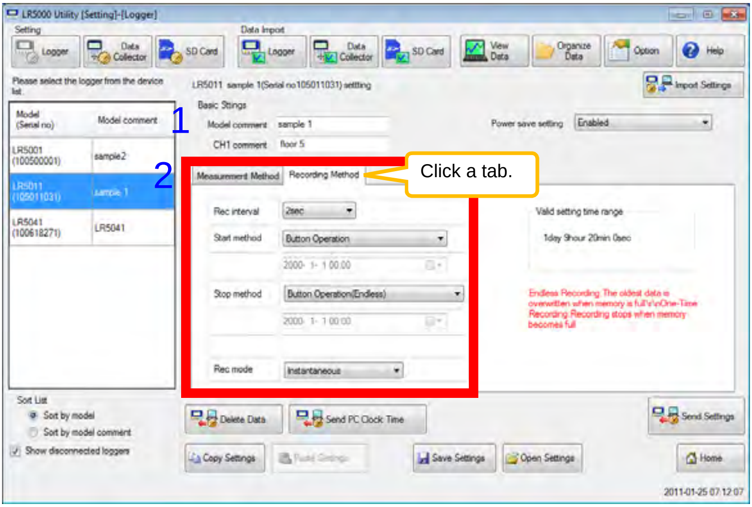
How can current settings be imported from the connected logger?

1. Click the **[Import Settings]** button at the upper right of screen. (A dialog appears.)
2. Click the **[Import Settings to Computer]** button. (The logger's settings are now reflected in the program.)

How can the settings from one logger be copied to another?

1. From the device list, select a logger with settings to be copied, and click the **[Copy Settings]** button.
2. From the device list, select a logger as the destination for the settings, and click the **[Paste Settings]** button. (A dialog appears.)
3. Click the **[Paste]** button in the dialog box. (The settings are copied.)

How can I learn more about changing settings?


LR5000 Utility [Setting]-[Logger]
Setting
Logger
Data Collector
SD Card
Data Import
Logger
Data Collector
SD Card
View Data
Organize Data
Option
Help
Import Settings
1
2
Measurement Method
Recording Method
Delete Data
Send PC Clock Time
Send Settings
Copy Settings
Paste Settings
Save Settings
Open Settings
Home

Please select the logger from the device list.

Model (Serial no)	Model comment
LR5001 (100500001)	sample2
LR5011 (105011031)	sample 1
LR5041 (100618271)	LR5041

Sort List
● Sort by model
○ Sort by model comment
☑ Show disconnected loggers

LR5011 sample 1(Serial no105011031) setting

Basic Sttings
Model comment: sample 1
CH1 comment: floor 5
Power save setting: Enabled

Click a tab.

Rec interval: 2sec
Start method: Button Operation
2000- 1- 1 00:00
Stop method: Button Operation(Endless)
2000- 1- 1 00:00
Rec mode: Instantaneous

Valid setting time range
1day 9hour 20min 0sec

Endless Recording: The oldest data is overwritten when memory is full\r\nOne-Time Recording: Recording stops when memory becomes full

2011-01-25 07:12:07

1 Setting the [Basic Settings]

Model comment	Enter a comment to describe the logger as needed.
Power save setting	Enable or disable the power save setting (p.31). **See:** "Appendix 3 Battery Life Approximation" (p.A2)
CH1 comment	Enter a comment to describe the measurement channel as needed.

Note: Comments may consist of up to 20 characters.
The following characters are not allowed: \, /, :, *, ?, ", <, >, and |.

2 Settings on the [Recording Method] tab

NOTE The Auto Power Save feature consumes a small amount of current

Rec Interval

Sets the recording interval.

1/2/5/10/15/20/30 sec., 1/2 /5/10/15/20/30/60 min

Start Method

Select the recording start method.
When **[Scheduled Time]** is selected, specify the start date and time.

Setting Options	Descriptions
Button Operation	Starts recording by pressing the button on the logger.
Start After Sent	Starts recording by pressing the **[Send Settings]** button.
Scheduled Time	Starts recording at the scheduled time after pressing the **[Send Settings]** button.

Valid setting time range	01/01/2010, 00:00 to 12/31/2039, 23:59

NOTE When the **[Scheduled Time]** start method is enabled, the **[REC]** indicator on the logger display blinks until the specified start time.

Stop Method

Select the recording stop method.
When **[Scheduled Time (Endless)]** or **[Scheduled Time (One-Time)]** is selected, the date and time need to be set.

Setting Options	Descriptions
Button Operation (endless)	Stops recording by pressing the button on the logger. The oldest data is overwritten when memory is full.
Button Operation (one-time)	Stops recording by pressing the button on the logger. Recording also stops when memory becomes full.
Scheduled Time (Endless)	Stops recording at the scheduled time. The oldest data is overwritten when memory is full.
Scheduled Time (One-Time)	Stops recording at the scheduled time. Recording also stops when memory becomes full.
Hold Data at Scheduled Time	Specify when setting **[Scheduled Time (Endless)]**. Select this check box to record the data at the scheduled time and stop recording.

Rec Mode

Select the recording mode.

Setting Options	Descriptions
Instantaneous	The instantaneous value is recorded at each recording interval.
Statistical	Measurements are taken once per second, and instantaneous, maximum, minimum, and average values are recorded at each recording interval. (Up to 15,000 data values can be recorded.)

Statistical recording results in shorter battery life.

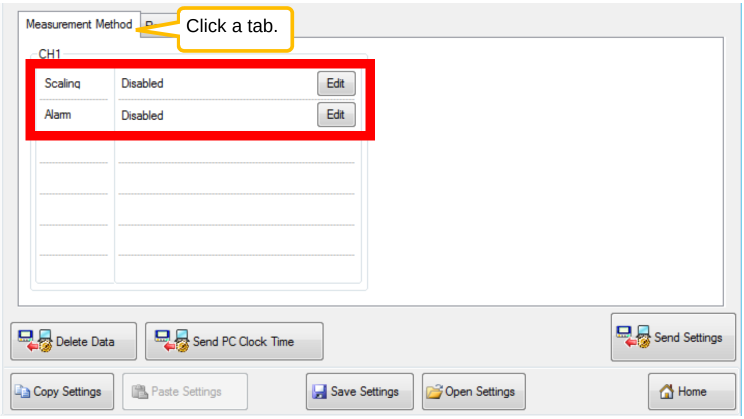
See: "Appendix 3 Battery Life Approximation" (p.A2)

NOTE Statistical recording cannot be selected when the recording interval is set to one second.

3 Settings on the [Measurement Method] tab

Click the **[Edit]** button to display the setting dialog box.

3


Measurement Method
CH1
Delete Data
Send PC Clock Time
Send Settings
Copy Settings
Paste Settings
Save Settings
Open Settings
Home

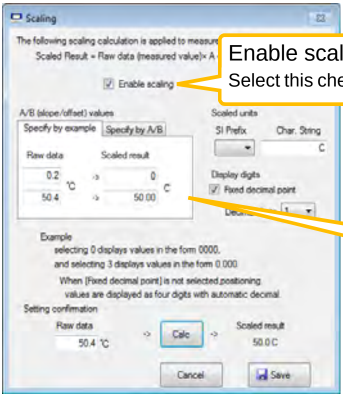
Click a tab.

Scaling	Disabled	Edit
Alarm	Disabled	Edit

Scaling (set as needed)

See: "What is Scaling?" (p.38)

The following scaling calculation is applied to measured values.
Scaled Result = Raw data (measured value)× A + B× SI prefix (multiplier)
The scaled result is displayed on the logger.


Scaling
Calc
Cancel
Save

The following scaling calculation is applied to measure
Scaled Result = Raw data (measured value)× A

☑ Enable scaling

A/B (slope/offset) values

Specify by example | Specify by A/B

Raw data			Scaled result	
0.2	°C	->	0	C
50.4		->	50.00	

Scaled units
SI Prefix
Char. String: C

Display digits
☑ Fixed decimal point
Decima 1

Example
selecting 0 displays values in the form 0000,
and selecting 3 displays values in the form 0.000
When [Fixed decimal point] is not selected,positioning values are displayed as four digits with automatic decimal.

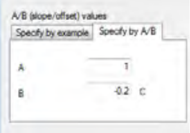
Setting confirmation
Raw data 50.4 °C -> Calc -> Scaled result 50.0 C

Enable scaling

Select this check box to enable scaling.

Specify by example, or Specify by A/B

Clicking this tab changes the setting options. Make settings on either tab. (The settings are applied to the other tab.)



A/B (slope/offset) values
Specify by example | Specify by A/B
A 1
B -0.2 C

1. Set the following options.

Setting Options	Descriptions
Specify by example	Enter two known conversion points (up to ten digits each).
Specify by A/B	Enter the scaling coefficients (A and B, up to ten digits each).
Scaled units	• Select the **[SI Prefix]**. (**[p]**=1E-12, **[n]**=1E-9, **[μ]**=1E-6, **[m]**=1E-3, blank =1E0, **[k]**=1E3, **[M]**=1E6, **[G]**=1E9, **[T]**=1E12) • Enter the **[Char. String]** to identify the scaled units. (Up to five characters, except \, /, :, *, ?, ", <, >, and |.)
Display digits	• Select **[Fixed decimal point]** and specify the **[Decimal digits]** to be displayed to the right of the decimal point. Valid settings are 0 to 3. (Examples: selecting 0 displays values in the form 0000, and selecting 3 displays values in the form 0.000) • When **[Fixed decimal point]** is not selected, values are displayed as four digits (0.000 to ±9999) with automatic decimal positioning.

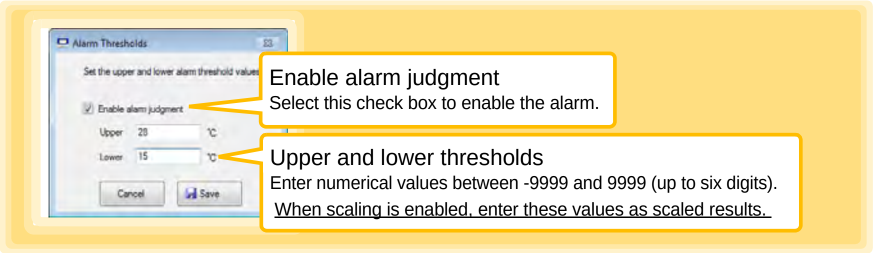
2. Confirm settings.

Setting confirmation	Confirm that scaling is performed properly. Enter any numerical value as raw data, and click the **[Calc]** button to display the scaled result.

3. Click the **[Save]** button.
   (Scaling settings are saved, and the display returns to the Logger Settings screen.)
   Note: If you click the **[Cancel]** button without saving the settings, the display still returns to the Logger Settings screen.

Alarm Thresholds (set as needed)

Set the upper and lower alarm threshold values.When a measurement is outside of the specified area, the **[AL]** (alarm) indicator is displayed on the logger.



Alarm Thresholds

Set the upper and lower alarm threshold values

☑ Enable alarm judgment

Upper 28 ℃

Lower 15 ℃

Enable alarm judgment
Select this check box to enable the alarm.

Upper and lower thresholds
Enter numerical values between -9999 and 9999 (up to six digits).
When scaling is enabled, enter these values as scaled results.

Click the **[Save]** button to save your settings.
(The display returns to the Logger Settings screen.)

Note: If you click the **[Cancel]** button without saving the settings, the display still returns to the Logger Settings screen.

Note: Alarm judgment is performed at every recording interval during instantaneous recording, and once per second during statistical recording.

Note: Alarm judgment is performed using measurement values with a larger number of digits than the values (4 digits) indicated in the LR5011 display.

Note: The **[AL]** indicator appears when the measured value is out of range (OF/UF displayed), and when a sensor anomaly occurs (- - - - displayed).

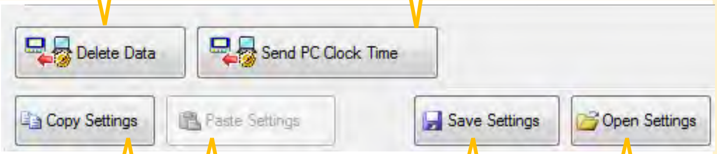
Other Settings on the Logger Settings Screen

Delete Data

Deletes recorded data in the selected logger (only while connected).

Send PC Clock Time

Set the logger's clock to match the computer's clock (after confirming the computer's clock is correct).



Copy and Paste Settings

Settings can be copied from another logger. (p.34)

Save Settings *

Saves settings to a computer file. In the dialog box that appears, specify the location and name of the destination file (extension .conf).

Open Settings *

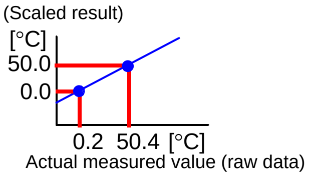
Loads settings from a computer file. In the dialog box that appears, specify the location and name of the saved settings file (extension .conf).

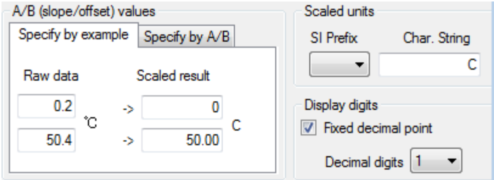
* Appears only when **[Show the settings of the [Save Settings] and [Open Settings] buttons.]** is selected on the Options screen.

What is Scaling?

Scaling converts actual measurement values to their corresponding values in arbitrarily determined units for display. It is useful for reconciling the difference between values measured with the logger and those of a reference device.

For example, when two points of correspondence are known between values measured with the logger and those of the reference device, select **[Specify by example]**. (1) When the logger measures 0.2°C the reference device measures 0.0°C, and (2) when the logger measures 50.4°C the reference device measures 50.0°C





A/B (slope/offset) values

Specify by example | Specify by A/B

Raw data			Scaled result	
0.2	°C	->	0	C
50.4		->	50.00	

Scaled units

SI Prefix: ▾ Char. String: C

Display digits

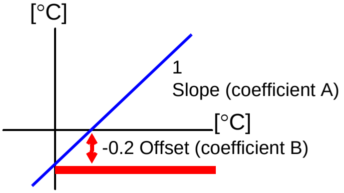
☑ Fixed decimal point

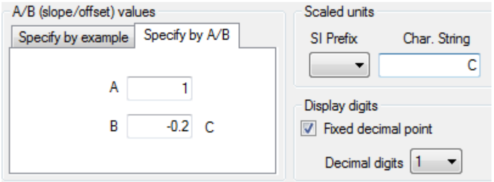
Decimal digits: 1 ▾

Alternatively, when one point of correspondence is known between the logger and reference device, select **[Specify by A/B]**.

(1) The logger measures 0.2°C and the reference device measures 0.0°C.

Since only one point is known, set the slope to "1" and enter the offset only.





A/B (slope/offset) values

Specify by example | Specify by A/B

A: 1

B: -0.2 C

Scaled units

SI Prefix: ▾ Char. String: C

Display digits

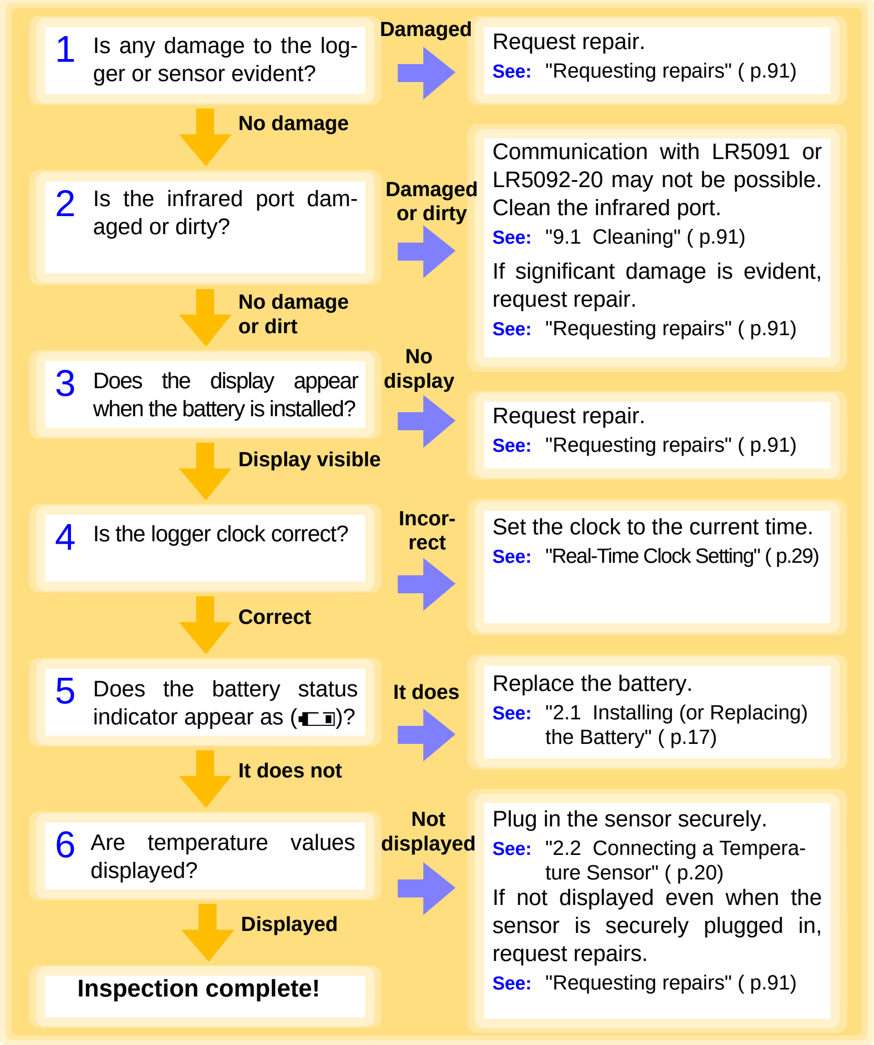
☑ Fixed decimal point

Decimal digits: 1 ▾

Measurement and Analysis Chapter 4

4.1 Pre-Measurement Inspection

Inspect the following items before starting measurement.



1 Is any damage to the logger or sensor evident?

Damaged → Request repair.
See: "Requesting repairs" (p.91)

No damage ↓

2 Is the infrared port damaged or dirty?

Damaged or dirty → Communication with LR5091 or LR5092-20 may not be possible. Clean the infrared port.
See: "9.1 Cleaning" (p.91)
If significant damage is evident, request repair.
See: "Requesting repairs" (p.91)

No damage or dirt ↓

3 Does the display appear when the battery is installed?

No display → Request repair.
See: "Requesting repairs" (p.91)

Display visible ↓

4 Is the logger clock correct?

Incorrect → Set the clock to the current time.
See: "Real-Time Clock Setting" (p.29)

Correct ↓

5 Does the battery status indicator appear as (▮▭)?

It does → Replace the battery.
See: "2.1 Installing (or Replacing) the Battery" (p.17)

It does not ↓

6 Are temperature values displayed?

Not displayed → Plug in the sensor securely.
See: "2.2 Connecting a Temperature Sensor" (p.20)
If not displayed even when the sensor is securely plugged in, request repairs.
See: "Requesting repairs" (p.91)

Displayed ↓

Inspection complete!

4.2 Installing the Logger

After inspection, install the logger at the measurement site.
Be sure to read the””Installation Precautions" (p.5) before installing.
Install the logger as necessary according to the following procedure.

⚠WARNING **Persons wearing electronic medical devices such as a pacemaker should not use the Z5004 strap with magnet. Such persons should avoid even proximity to the Z5004, as it may be dangerous. Medical device operation could be compromised, presenting a hazard to human life.**

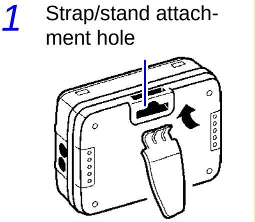
⚠CAUTION Do not apply heavy downward pressure with the stand extended. The stand could be damaged.

NOTE

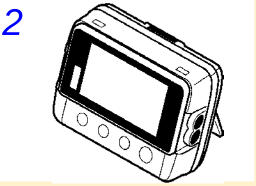
- Avoid shocking the Z5004, such as by dropping. Shock can cause it to be chipped or cracked.
- Do not use the Z5004 where it may be subject to rain, dust, or condensation. Use in such conditions may cause corrosion or deterioration of the magnet.
- If the Z5004 is brought near a magnetic memory device such as a floppy disk, credit/debit card, or pre-paid card or ticket, the device may become unusable due to data corruption. It can also cause damage if brought near a precision electronic device such as a computer, TV, or electronic wristwatch.

Using the Stand

Required Items: Stand (Accessory)



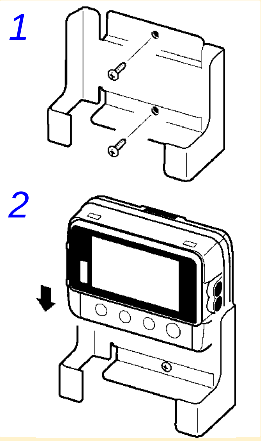
1 Attach the stand to the strap/stand attachment hole.



2 Stand up the logger.

Wall Mounting with the LR9901 Wall-Mounted Holder

Required Items: LR9901 (Option), 2 screws (supplied with the LR9901) screwdriver, etc. (as needed)



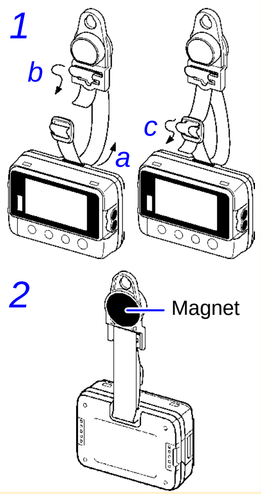
1 Mount the LR9901 to the wall using the two screws.

2 Insert the logger into the LR9901.

The logger can also be attached to a wall or other surface by hanging the strap or attachment hole on a screw. (Supported screw head dimensions: up to approx. 6.8 mm in diameter and approx. 2.5 mm in thickness)

Wall Mounting with the Z5004 Magnetic Strap

Required Items: Z5004 (Option)



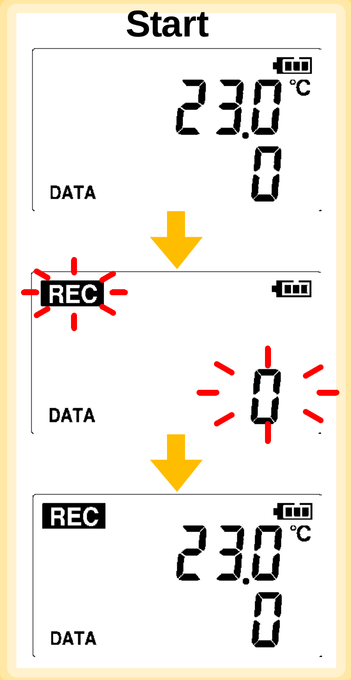
1 Attach the Z5004 to the strap/stand attachment hole.

(feed the strap through a, b, and c)

2 Attach the magnet to the wall (ferrous material).

4.3 Starting and Stopping Recording

Start recording after installing the logger.



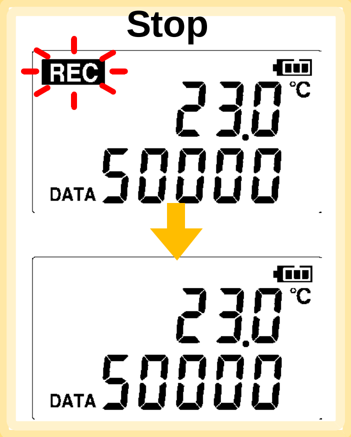
Start From the Measurement display, hold the **REC/STOP** button for two seconds.

The **[REC]** indicator and the data count blink.
Note: Continue pressing the button until the **[REC]** indicator changes from a blinking to on state.

When the blinking stops and the data count is zeroed, recording starts.

Logger memory contains the data for two recording sessions. (Be aware that old data is erased when starting recording after two recording sessions.)

After one second, the measurement display reappears.



Stop Hold the **REC/STOP** button for two seconds while recording (while **[REC]** is displayed).

[REC] blinks.
Note: Continue pressing the button until the **[REC]** indicator changes from a blinking to off state.

Data can be imported to a computer without stopping recording.
See: "4.5 Automatically Importing (Saving) Recorded Data to a Computer, and Graph Display" (p.44)

[REC] disappears when recording stops.

If the stop method is set to [OFF] (one-time recording), recording stops automatically when memory becomes full. (p.30)

NOTE

Recording cannot start when the battery is depleted. When the battery becomes exhausted during recording, recording stops.

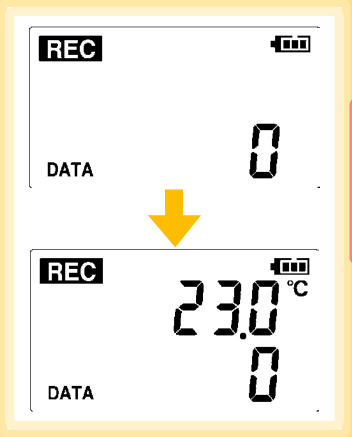
See: "2.1 Installing (or Replacing) the Battery" (p.17)

Automatic Recording Start at Convenient Times

Depending on the selected recording interval, recording start is automatically delayed until the next convenient clock time.

Recording Interval	Recording Start Time
1 sec.	00 to 59 s (1-second interval)
2 sec.	00 to 58 s (2-seconds interval)
5 sec.	00 to 55 s (5-seconds interval)
10 sec.	00 to 50 s (10-seconds interval)
15 sec.	00 to 45 s (15-seconds interval)
20 sec.	00 to 40 s (20-seconds interval)
30 sec.	00 to 30 s (30-seconds interval)
1 min	00 min, 00 s to 59 min, 00 s (1-minute interval)
2 min	00 min, 00 s to 58 min, 00 s (2-minutes interval)
5 min	00 min, 00 s to 55 min, 00 s (5-minutes interval)
10 min	00 min, 00 s to 50 min, 00 s (10-minutes interval)
15 min	00 min, 00 s to 45 min, 00 s (15-minutes interval)
20 min	00 min, 00 s to 40 min, 00 s (20-minutes interval)
30 min	00 min, 00 s to 30 min, 00 s (30-minutes interval)
60 min	00 h, 00 min, 00 s to 23 h, 00 min, 00 s (1-hour interval)

Example: When the button is pushed to start recording at 12:01:00, and the recording interval is 10 minutes

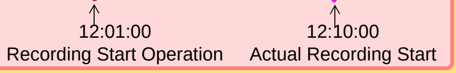


At 12:01:00, you press the **REC** button.

The **[REC]** indicator in the display turns on, but recording does not start yet.

If you try starting at 12:00 but are one minute late.

Actual recording starts at 12:10, which is considered the next convenient time.



At 12:10:00

Recording starts.

In the case of instantaneous value recording, the number of data soon becomes 1.

In the case of statistical value recording, the number of data becomes 1 at 12:20:00.

4.4 Confirming Currently Measured Values and Data Recording

**Confirm data recording on the Measurement display (p.14).
You can browse current measurement values (instantaneous), the count of recorded data items, and maximum and minimum values.
The (+) and (-) buttons select the type of value displayed.**

How to switch from a Setting display to Measurement display?
To switch to the Measurement display from any other display, press **REC/STOP**.

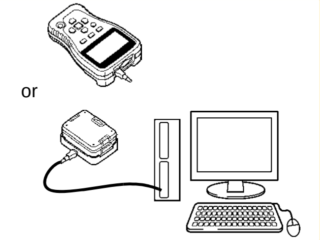
NOTE

- When power saving (p.31) is enabled, the display blanks after no operation occurs for 30 seconds. To browse measurement values (instantaneous) and verify each recorded data value, press any button to turn on the Measurement display.
- The currently displayed instantaneous measurement value is refreshed about once per second, regardless of the recording interval setting.

4.5 Automatically Importing (Saving) Recorded Data to a Computer, and Graph Display

Data recorded in the logger can be imported to the computer. Install the LR5000 Utility Program on the computer beforehand. (p.21)

Required Items: Logger, LR5091 Communication Adapter (or LR5092-20 Data Collector), USB cable, Computer



1 Plug the USB cable into the USB port on the LR5091 (or LR5092-20), and into a USB port on the computer.

2 Dock the logger in the LR5091 (or LR5092-20).

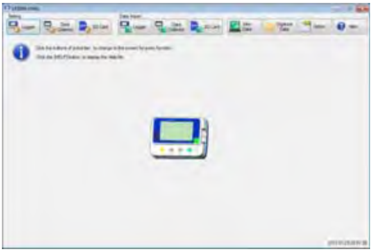
(When docking, be sure that the infrared ports are aligned.)

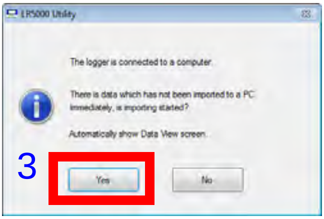
The main screen appears automatically.

If newly recorded data exists, the import confirmation dialog appears.

If the data import screen is displayed before connecting the logger, the import confirmation dialog does not appear. Import manually. (p.54)

3 Click **[Yes]**.



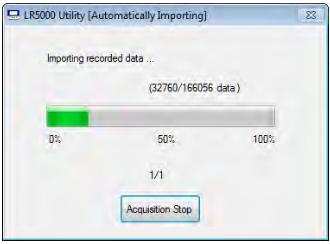


LR5000 Utility

The logger is connected to a computer.

There is data which has not been imported to a PC. Immediately, is importing started?

Automatically show Data View screen.



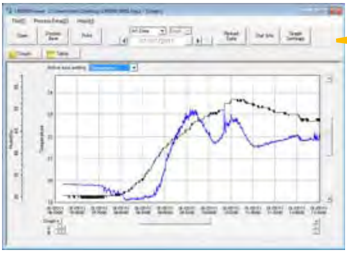
LR5000 Utility [Automatically Importing]

Importing recorded data ...

(32760/166056 data)

The data recorded in the logger is imported to the computer automatically.
Imported data is saved to a file (Auto Import).

Note: By default, **[Automatically import and store data when the logger is connected to a computer]** (on the Options screen) is enabled. (p.78)



The viewer opens to display the graph (Auto Graph Display).

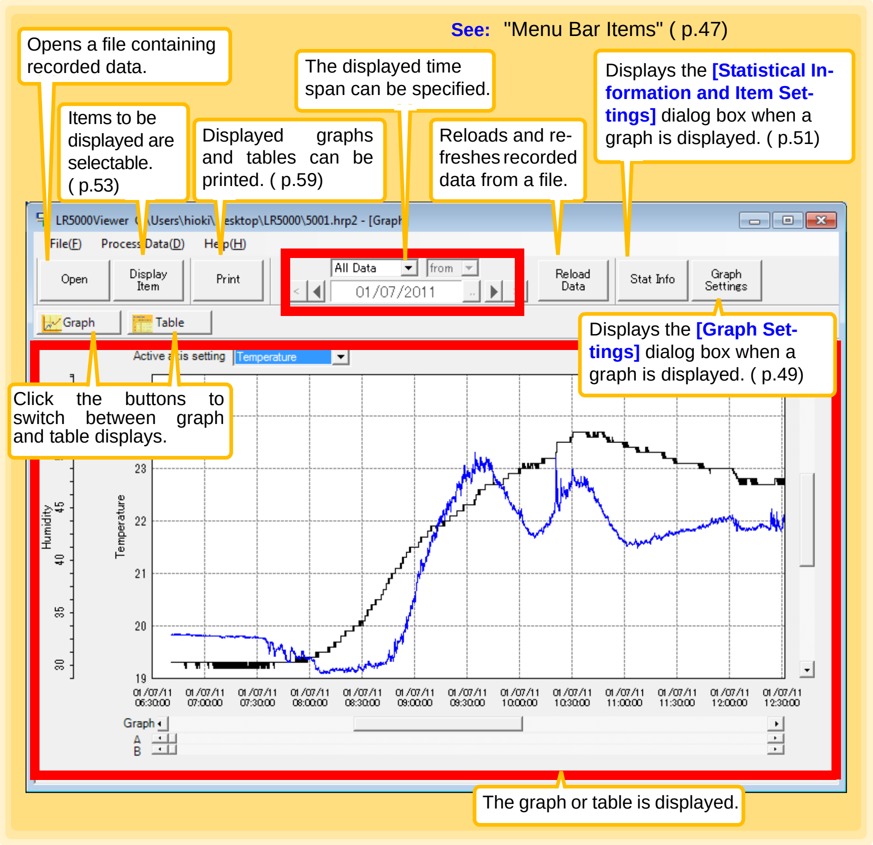
Note: By default, **[Automatically display graph when data is imported]** (on the Options screen) is enabled. (p.78)

How is recorded data saved?

Recorded data is automatically saved when imported to a computer.
The save destination and file name are specified as a basic setting on the Options screen.

Viewer Screen

The viewer screen appears as follows.


LR5000Viewer C:\Users\hioki\Desktop\LR5000\5001.hrp2 - [Graph
File(F) Process Data(D) Help(H)
Open
Display Item
Print
All Data
from
01/07/2011
Reload Data
Stat Info
Graph Settings
Graph
Table
Active axis setting
Temperature
Humidity
Temperature
30 35 40 45
19 20 21 22 23
01/07/11 06:30:00
01/07/11 07:00:00
01/07/11 07:30:00
01/07/11 08:00:00
01/07/11 08:30:00
01/07/11 09:00:00
01/07/11 09:30:00
01/07/11 10:00:00
01/07/11 10:30:00
01/07/11 11:00:00
01/07/11 11:30:00
01/07/11 12:00:00
01/07/11 12:30:00
Graph
A
B

See: "Menu Bar Items" (p.47)

Opens a file containing recorded data.

Items to be displayed are selectable. (p.53)

Displayed graphs and tables can be printed. (p.59)

The displayed time span can be specified.

Reloads and refreshes recorded data from a file.

Displays the **[Statistical Information and Item Settings]** dialog box when a graph is displayed. (p.51)

Displays the **[Graph Settings]** dialog box when a graph is displayed. (p.49)

Click the buttons to switch between graph and table displays.

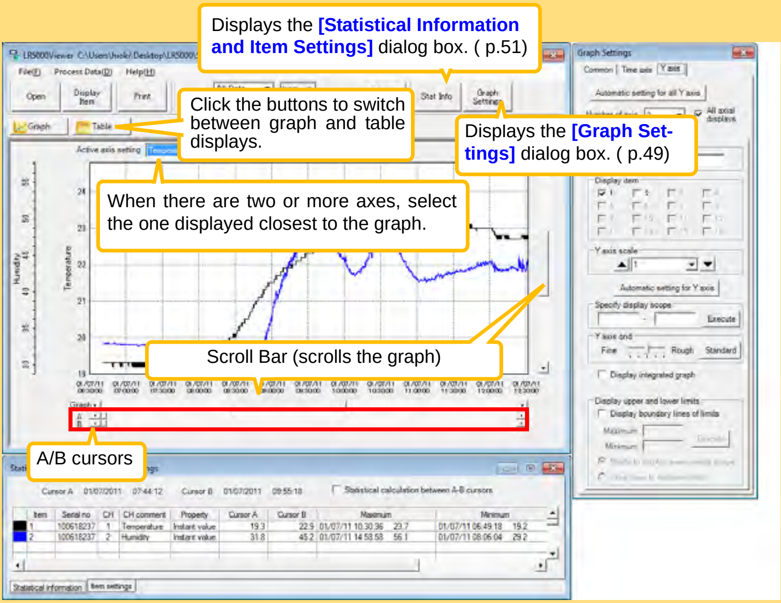
The graph or table is displayed.

Menu Bar Items

Menu	Item	Contents
File	Open	Opens a file containing recorded data.
	Recently opened recording files	Opens recently used files.
	Save recording file as	Currently displayed recording data is saved as a new file.
	Print graph	Prints data in graphic format. (p.59)
	Paste to Microsoft Excel	Pastes displayed data into Microsoft Excel.
	Export CSV file	Exports displayed data as a CSV file.
	Exit	Closes the program.
Process Data	Scaling	Applies scaling to data on one channel. (p.63)
	Power Calculation	Performs approximate electric power calculation. (p.64)
	Energy Cost	Performs approximate energy cost calculation. (p.65)
	Operating Rate	Performs approximate operating rate calculation. (p.66)
	Integration	Performs data integration. (p.67)
	Dew Point	Performs dew-point temperature calculation. (p.68)
	Two-Data-Item Arithmetic	Performs approximate two-data-item arithmetic calculation. (p.69)
	OVER Data Revision	Converts data outside of the upper and lower threshold settings to specified values, and saves as new data. (p.70)
Help	Help	Displays the help file.
	Version	Displays LR5000 Utility Program version information.

Main Graph Features

The main graph features are shown below.


Open
Display Item
Print
Stat Info
Graph Settings
Graph
Table

Displays the **[Statistical Information and Item Settings]** dialog box. (p.51)

Click the buttons to switch between graph and table displays.

Displays the **[Graph Settings]** dialog box. (p.49)

When there are two or more axes, select the one displayed closest to the graph.

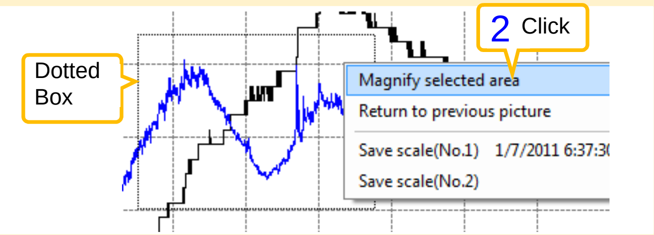
Scroll Bar (scrolls the graph)

A/B cursors

How can the displayed area be magnified?

1 Drag over the area to be enlarged to enclose it in a dotted box.

2 Right click to open the pop-up menu, and click **[Magnify selected area]**.


Magnify selected area
Return to previous picture
Save scale(No.1) 1/7/2011 6:37:3
Save scale(No.2)

Dotted Box

2 Click

How can graph line color and display be switched?

Change settings on the **[Item settings]** tab in the **[Statistical Information and Item Settings]** dialog box (p.51)

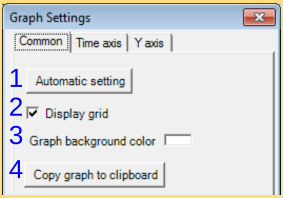
How can graph details be set?

Detailed settings are available in the **[Graph Settings]** dialog box. (p.49)

[Graph Settings] dialog box

Graph details can be set as follows. Click each tab to access various settings.

[Common] tab

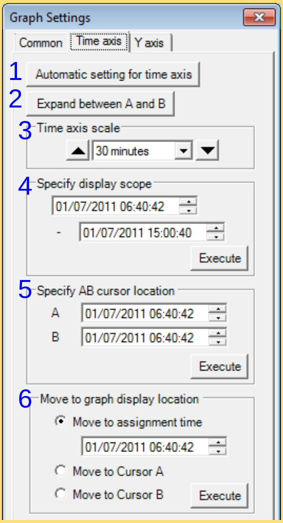

Graph Settings
Common
Time axis
Y axis
1
Automatic setting
2
3
4
Copy graph to clipboard

☑ Display grid

Graph background color

1. Automatically sets the time axis and Y-axis to the optimum scale.
2. Select to display the grid.
3. Changes the graph background color.
4. Copies the graph to the clipboard. The graph can then be pasted into Microsoft Word etc.

[Time axis] tab


Graph Settings
Common
Time axis
Y axis
1
Automatic setting for time axis
2
Expand between A and B
3
4
Execute
5
Execute
6
Execute

Time axis scale: 30 minutes

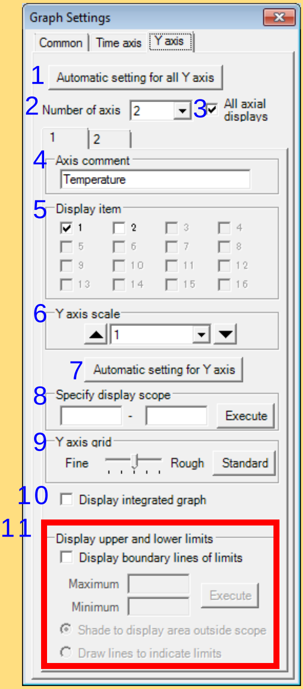
Specify display scope: 01/07/2011 06:40:42 - 01/07/2011 15:00:40

Specify AB cursor location
A 01/07/2011 06:40:42
B 01/07/2011 06:40:42

Move to graph display location
● Move to assignment time 01/07/2011 06:40:42
○ Move to Cursor A
○ Move to Cursor B

1. Automatically sets the time axis to the optimum scale.
2. Zooms the display to show only the time span between A/B cursors.
3. Changes the time base scale.
4. Specifies the displayed time span on the time axis. Click **[Execute]** to apply the settings.
5. Specifies cursor positions. Click **[Execute]** to apply the settings.
6. Specifies the graph start position (time). Click **[Execute]** to apply the settings.

[Y axis] tab


Graph Settings
Common
Time axis
Y axis
1
Automatic setting for all Y axis
2
Number of axis
3
All axial displays
4
Axis comment
5
Display item
6
Y axis scale
7
Automatic setting for Y axis
8
Specify display scope
Execute
9
Y axis grid
Fine
Rough
Standard
10
Display integrated graph
11
Display upper and lower limits
Display boundary lines of limits
Maximum
Minimum
Execute
Shade to display area outside scope
Draw lines to indicate limits

Number of axis: 2
☑ All axial displays
Axis comment: Temperature
Display item: ☑ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 ☐ 11 ☐ 12 ☐ 13 ☐ 14 ☐ 15 ☐ 16
Y axis scale: 1
☐ Display integrated graph
☐ Display boundary lines of limits
● Shade to display area outside scope
○ Draw lines to indicate limits

1 Automatically sets all Y-axes to the optimum scale.

2 When the Y-axis is different for each item, set the number of axes to a value other than one. The axes can be set to the number of displayed items (up to 16).

3 Displays all axes.

4 A comment can be entered for each axis.

5 Select the item assigned to each axis.

6 Sets the Y-axis scale for each axis.

7 Automatically sets the currently selected Y-axis to the optimum scale.

8 Specifies the display span on the Y-axis. Click **[Execute]** to apply the settings.

9 Sets the Y-axis grid spacing.

10 Display the items selected in **[Display item]** on an integrated graph.

11 Upper and lower thresholds can be displayed as solid lines on the graph, or out-of-range areas can be filled with a solid color.

[Statistical Information and Item Settings] dialog box

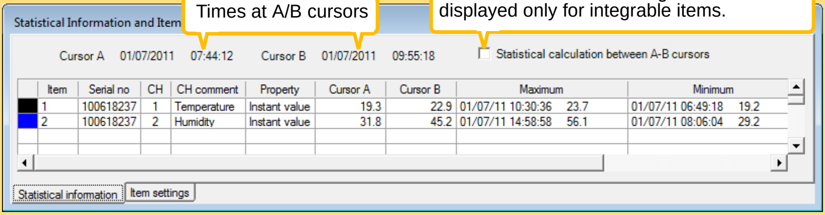
The following items appear on the **[Statistical information]** tab.

- Item no.
- Serial no.
- Channel no.
- Channel comments
- Property (Type of measurement value)
- Measured values at A/B cursors
- Statistical data
- Units

[Statistical information] tab

Select to calculate and display maximum, minimum, average, and integration values between A/B cursors. Integration values are displayed only for integrable items.

Times at A/B cursors



Statistical Information and Item

Cursor A 01/07/2011 07:44:12 Cursor B 01/07/2011 09:55:18

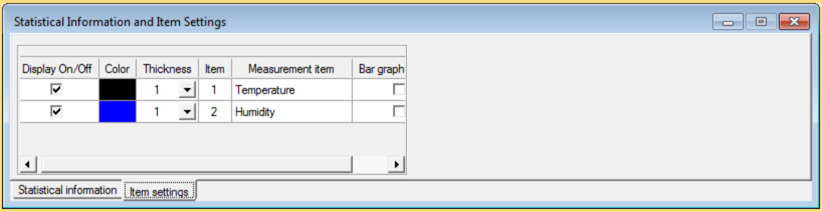
☐ Statistical calculation between A-B cursors

	Item	Serial no	CH	CH comment	Property	Cursor A	Cursor B	Maximum		Minimum	
■	1	100618237	1	Temperature	Instant value	19.3	22.9	01/07/11 10:30:36	23.7	01/07/11 06:49:18	19.2
🟦	2	100618237	2	Humidity	Instant value	31.8	45.2	01/07/11 14:58:58	56.1	01/07/11 08:06:04	29.2

The following items appear on the **[Item settings]** tab.

- Display on/off
- Graph line colors and thickness
- Bar graph display on/off

[Item settings] tab

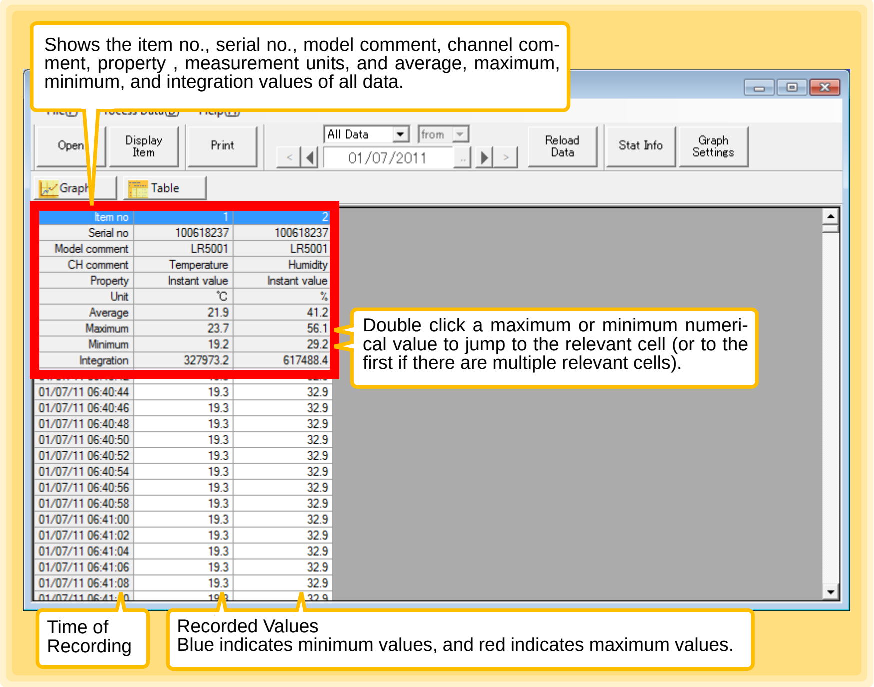


Statistical Information and Item Settings

Display On/Off	Color	Thickness	Item	Measurement item	Bar graph
☑	■	1	1	Temperature	☐
☑	🟦	1	2	Humidity	☐

Main Table Features

The main table features are shown below.



Shows the item no., serial no., model comment, channel comment, property , measurement units, and average, maximum, minimum, and integration values of all data.

Item no	1	2
Serial no	100618237	100618237
Model comment	LR5001	LR5001
CH comment	Temperature	Humidity
Property	Instant value	Instant value
Unit	℃	%
Average	21.9	41.2
Maximum	23.7	56.1
Minimum	19.2	29.2
Integration	327973.2	617488.4
01/07/11 06:40:44	19.3	32.9
01/07/11 06:40:46	19.3	32.9
01/07/11 06:40:48	19.3	32.9
01/07/11 06:40:50	19.3	32.9
01/07/11 06:40:52	19.3	32.9
01/07/11 06:40:54	19.3	32.9
01/07/11 06:40:56	19.3	32.9
01/07/11 06:40:58	19.3	32.9
01/07/11 06:41:00	19.3	32.9
01/07/11 06:41:02	19.3	32.9
01/07/11 06:41:04	19.3	32.9
01/07/11 06:41:06	19.3	32.9
01/07/11 06:41:08	19.3	32.9

Double click a maximum or minimum numerical value to jump to the relevant cell (or to the first if there are multiple relevant cells).

Time of Recording

Recorded Values
Blue indicates minimum values, and red indicates maximum values.

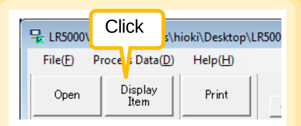
Convenient Table Functions

Use the following operations to scroll the table and copy data to the clipboard.

Item	Contents
Press **Ctrl** and **Home** keys simultaneously	Moves to the upper left corner of the table.
Press **Ctrl** and **End** keys simultaneously	Moves to the lower right corner of the table.
Home key	Scrolls to display the left edge of the table.
End key	Scrolls to the right edge of the table.
Press **Ctrl** and **C** keys simultaneously	Copies the value of the currently selected cell to the clipboard.

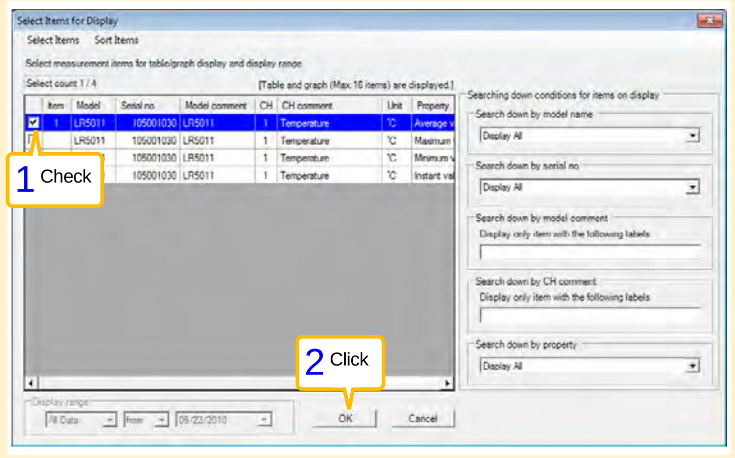
Selecting Items for Display

Click the **[Display Item]** button in the viewer to display the **[Select Items for Display]** screen.


Click
LR5000\ ...s\hioki\Desktop\LR500
File(F)
Proce...
Data(D)
Help(H)
Open
Display Item
Print

1 Select up to 600 items for display.

2 Click the **[OK]** button.

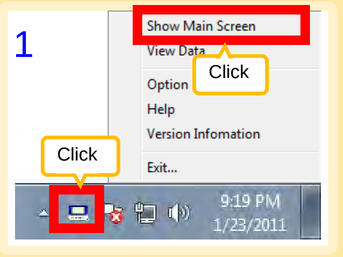

Select Items for Display
Select Items
Sort Items
Select measurement items for table/graph display and display range
Select count 1 / 4
[Table and graph (Max. 16 items) are displayed.]
Item
Model
Serial no
Model comment
CH
CH comment
Unit
Property
LR5011
105001030
Temperature
℃
Average v
Maximum
Minimum v
Instant val
1 Check
Searching down conditions for items on display
Search down by model name
Display All
Search down by serial no
Display All
Search down by model comment
Display only item with the following labels
Search down by CH comment
Display only item with the following labels
Search down by property
Display All
Display range
All Data
From
09/23/2010
2 Click
OK
Cancel

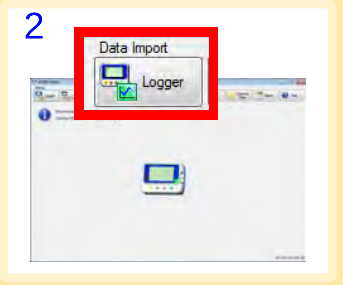
Menu Bar Items

Menu	Items	Contents
Select Items	Check selection range Clear checks of selection range	Add and clear selection of multiple items (display in blue) selected with the mouse.
	Select all selections Clear all selections	When there are 600 item in the above list, click to select or clear all items.
	Select all instant values Select all maximum values Select all minimum values Select all average values	Select all items (up to 600) of the same property.
Sort Items	Sort by model name Sort by serial no Sort by model comment	Sort by model name, serial no., or model comment.
	Move selected item up Alt+Up Move selected item down Alt+Down	Move blue mouse-selected items up or down.
	Restore original order	Restore original order.

4.6 Manually Importing (Saving) Recorded Data to a Computer, and Graph Display

You can manually import (save) recorded data to a computer, and display it in a graph.


1
Show Main Screen
View Data
Click
Option
Help
Version Infomation
Exit...
Click
9:19 PM
1/23/2011


2
Data Import
Logger

1 If the LR5000 Utility Program is not running on the computer, click the icon in the task tray (notification area), and click **[Show Main Screen]**.

The main screen appears.

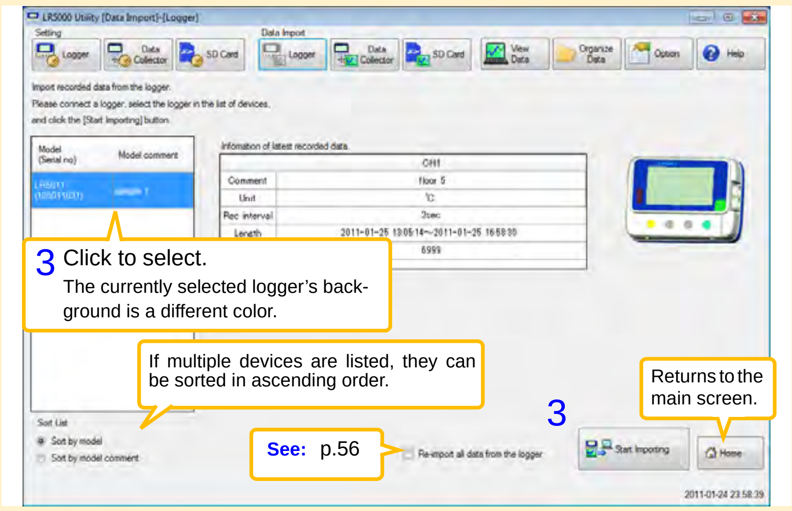
2 For the **[Data Import]** device, click the **[Logger]** button.

The Data Import screen appears. If the logger is not connected, you are prompted to connect it. Connect the logger.

3 Select the logger in the list of devices, and click the **[Start Importing]** or **[Next]*** button.

* If **[Always specify folder and file before importing]** on the Options screen is enabled (p.78).

If you click the **[Start Importing]** button, data importing starts ("Screen after importing data" (p.56)).
If you click **[Next]**, the Save Method screen appears (p.55).


LR5000 Utility [Data Import]-[Logger]
Setting
Logger
Data Collector
SD Card
Data Import
Logger
Data Collector
SD Card
View Data
Organize Data
Option
Help
Sort List
● Sort by model
○ Sort by model comment
☐ Re-import all data from the logger
Start Importing
Home
3

Import recorded data from the logger.
Please connect a logger, select the logger in the list of devices, and click the [Start Importing] button.

Model (Serial no)	Model comment

Infomation of latest recorded data.

	CH1
Comment	floor 5
Unit	℃
Rec interval	2sec
Length	2011-01-25 13:05:14~2011-01-25 16:58:30
	6999

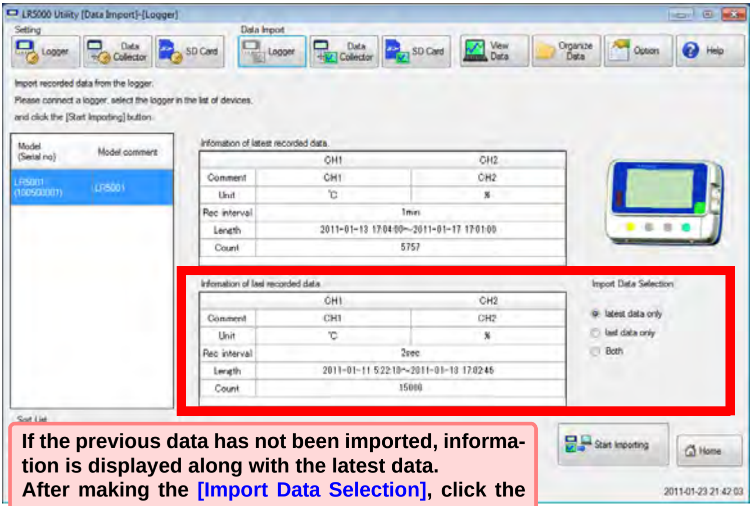
2011-01-24 23:58:39

3 Click to select.
The currently selected logger's background is a different color.

If multiple devices are listed, they can be sorted in ascending order.

See: p.56

Returns to the main screen.


LR5000 Utility [Data Import]-[Logger]
Setting
Logger
Data Collector
SD Card
Data Import
Logger
Data Collector
SD Card
View Data
Organize Data
Option
Help
Start Importing
Home
2011-01-23 21:42:03

Import recorded data from the logger.
Please connect a logger, select the logger in the list of devices,
and click the [Start Importing] button.

Model (Serial no)	Model comment
LR5001 (100500001)	LR5001

Infomation of latest recorded data

	CH1	CH2
Comment	CH1	CH2
Unit	℃	%
Rec interval	1min	
Length	2011-01-13 17:04:00~2011-01-17 17:01:00	
Count	5757	

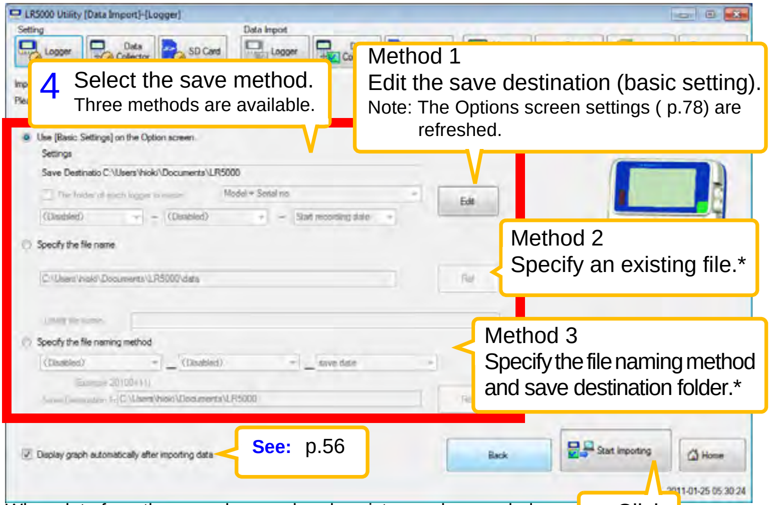
Infomation of last recorded data

	CH1	CH2
Comment	CH1	CH2
Unit	℃	%
Rec interval	2sec	
Length	2011-01-11 5:22:10~2011-01-13 17:02:46	
Count	15000	

Import Data Selection
- ● latest data only
- ○ last data only
- ○ Both

If the previous data has not been imported, information is displayed along with the latest data.
After making the [Import Data Selection], click the [Start Importing] or [Next] button.

Save Method Screen


LR5000 Utility [Data Import]-[Logger]
Setting
Logger
Data Collector
SD Card
Data Import
Logger
Edit
Ref
Back
Start Importing
Home
2011-01-25 05:30:24

● Use [Basic Settings] on the Option screen
Settings
Save Destinatio C:\Users\hioki\Documents\LR5000
☐ The folder of each logger is made Model + Serial no
(Disabled) - (Disabled) - Start recording date
○ Specify the file name
C:\Users\hioki\Documents\LR5000\data
○ Specify the file naming method
(Disabled) _ (Disabled) _ save date
Example 20100411)
Save Destination Fo C:\Users\hioki\Documents\LR5000
☑ Display graph automatically after importing data

4 Select the save method.
Three methods are available.

Method 1
Edit the save destination (basic setting).
Note: The Options screen settings (p.78) are refreshed.

Method 2
Specify an existing file.*

Method 3
Specify the file naming method and save destination folder.*

See: p.56

5 Click

* When data from the same logger already exists, newly recorded data is appended to it if recording has not been stopped, or saved as a new item if recording has since been stopped.

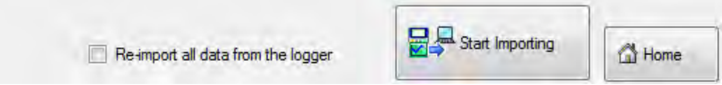
How is automatic importing performed?

On the Options screen, enable **[Automatically import and store data when the logger is connected to a computer]**. (p.78)

How can all data be imported from the logger?

Select **[Re-import all data from the logger]**.
(All data in the logger (including any previously imported) is imported to the computer, and duplicated data is overwritten.)

Data Import screen (p.54)



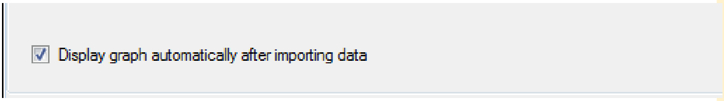
☐ Re-import all data from the logger

Start Importing
Home

How is the graph automatically displayed after importing data?

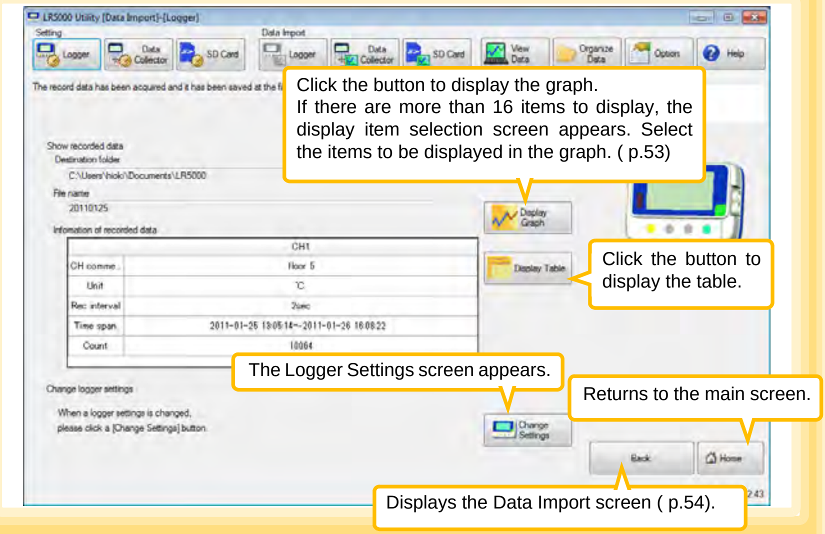
Select **[Display graph automatically after importing data]**.(When not selected, the file list is saved and displayed when importing is finished.)

Save Method Screen (p.55)



☑ Display graph automatically after importing data

Screen after importing data



LR5000 Utility [Data Import]-[Logger]

The record data has been acquired and it has been saved at the fi

Show recorded data
Destination folder
C:\Users\hioki\Documents\LR5000
File name
20110125
Infomation of recorded data

	CH1
CH comme...	floor 5
Unit	℃
Rec interval	2sec
Time span	2011-01-25 13:05:14~2011-01-26 18:08:22
Count	10064

Change logger settings
When a logger settings is changed,
please click a [Change Settings] button.

Setting
Logger
Data Collector
SD Card
Data Import
Logger
Data Collector
SD Card
View Data
Organize Data
Option
Help
Display Graph
Display Table
Change Settings
Back
Home

Click the button to display the graph.
If there are more than 16 items to display, the display item selection screen appears. Select the items to be displayed in the graph. (p.53)

Click the button to display the table.

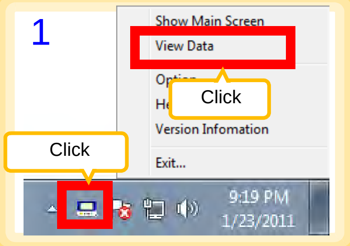
The Logger Settings screen appears.

Returns to the main screen.

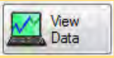
Displays the Data Import screen (p.54).

4.7 Displaying a Graph of Saved Recording Data

Use the LR5000 Utility Program to display saved recording data as a graph.


1
Show Main Screen
View Data
Option
He
Click
Version Infomation
Click
Exit...
9:19 PM
1/23/2011

Note: If the LR5000 Utility Program is running, click **[View Data]** on the main screen.



1 If the LR5000 Utility Program is not running on the computer, click the icon in the task tray (notification area), and click **[View Data]**.

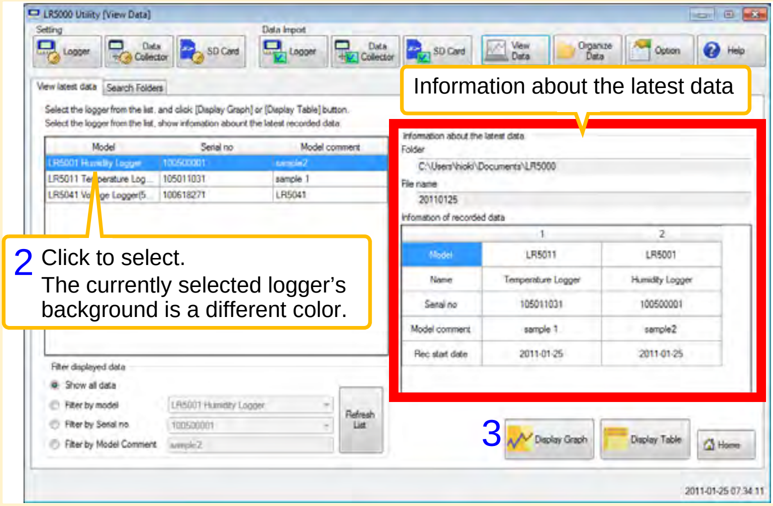
The Data View screen appears.
The **[View latest data]** tab shows a list of the loggers with data saved on the computer.

2 Select the logger from the list.

Information about the latest data appears.

3 Click the **[Display Graph]** button.

The viewer opens to display the graph (p.46).
If there are more than 16 items to display, the display item selection screen appears. Select the items to be displayed in the graph (p.53).


LR5000 Utility [View Data]
Setting
Logger
Data Collector
SD Card
Data Import
Logger
Data Collector
SD Card
View Data
Organize Data
Option
Help
View latest data
Search Folders
Information about the latest data
3
Display Graph
Display Table
Home
Refresh List

Select the logger from the list. and click [Display Graph] or [Display Table] button.
Select the logger from the list, show infomation abount the latest recorded data

Model	Serial no	Model comment
LR5001 Humidity Logger	100500001	sample2
LR5011 Te perature Log...	105011031	sample 1
LR5041 Vo ge Logger(5...	100618271	LR5041

2 Click to select.
The currently selected logger's background is a different color.

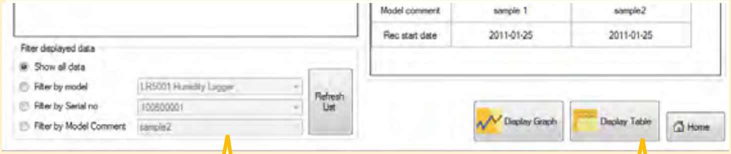
Infomation about the latest data
Folder
C:\Users\hioki\Documents\LR5000
File name
20110125
Infomation of recorded data

	1	2
Model	LR5011	LR5001
Name	Temperature Logger	Humidity Logger
Serial no	105011031	100500001
Model comment	sample 1	sample2
Rec start date	2011-01-25	2011-01-25

Filter displayed data
● Show all data
○ Filter by model LR5001 Humidity Logger
○ Filter by Serial no 100500001
○ Filter by Model Comment sample2

2011-01-25 07:34:11

Other Data Viewing Screen Functions



Filter displayed data
● Show all data
○ Filter by model: LR5001 Humidity Logger
○ Filter by Serial no: 100500001
○ Filter by Model Comment: sample2

Model comment	sample 1	sample2
Rec start date	2011-01-25	2011-01-25

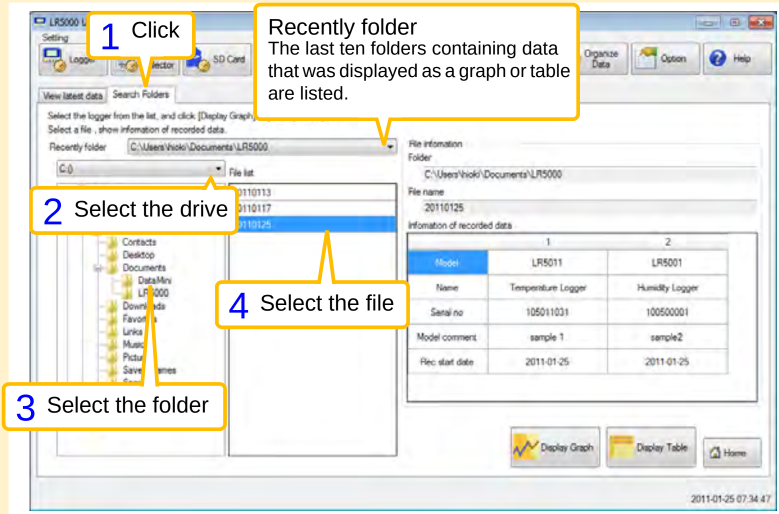
Refresh List
Display Graph
Display Table
Home

Filter displayed data
You can filter which loggers appear in the list. Specify the desired filtering criteria, and click the **[Refresh List]** button.
Note: You can enter up to 20 characters for **[Filter by Model Comment]**.

Display Table
Opens the viewer to display the table of imported (or selected) data.

How can past data be viewed?

On the **[Search Folders]** tab, select the folder and file name to display.



Select the logger from the list, and click [Display Graph]
Select a file , show infomation of recorded data.
Recently folder: C:\Users\hioki\Documents\LR5000
C:()
File list: 0110113, 0110117, 0110125
File infomation
Folder: C:\Users\hioki\Documents\LR5000
File name: 20110125
Infomation of recorded data

	1	2
Model	LR5011	LR5001
Name	Temperature Logger	Humidity Logger
Serial no	105011031	100500001
Model comment	sample 1	sample2
Rec start date	2011-01-25	2011-01-25

2011-01-25 07:34:47

LR5000 U
Setting
Logge
lector
SD Card
Organize Data
Option
Help
View latest data
Search Folders
Contacts
Desktop
Documents
DataMini
LR5000
Downloads
Favorites
Links
Music
Pictures
Saved Games
Display Graph
Display Table
Home

1 Click

Recently folder
The last ten folders containing data that was displayed as a graph or table are listed.

2 Select the drive

3 Select the folder

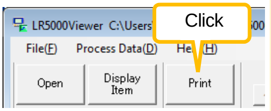
4 Select the file

4.8 Printing Recorded Data

Saved recording data can be printed as a graph. Graphs displayed in the LR5000 Utility Program can be printed on A3, A4, or B4-size paper.

With the desired graph displayed, click the [Print] button.

See: Graph Display Methods:"4.5" (p.44), "4.6" (p.54), and"4.7" (p.57)

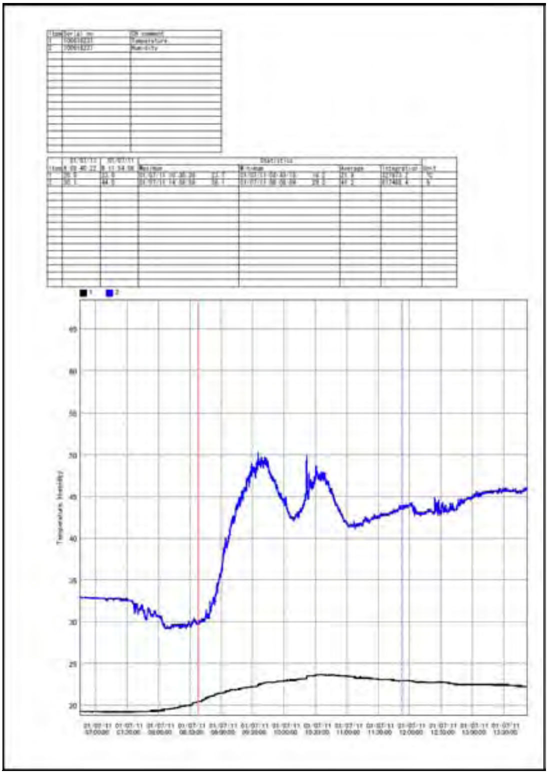

LR5000Viewer C:\Users
File(F)
Process Data(D)
He (H)
Open
Display Item
Print
Click

How can I print only part of a graph?

Specify the time span to print, and click **[Print]** button. Times that are not displayed are not printed.

See: "Viewer Screen" (p.46)

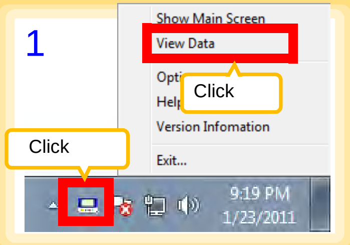
Example Graph Printout



Processing Recorded Data

Chapter 5

Recorded data saved on the computer can be processed by scaling, electric power calculation, energy cost calculation, operating rate calculation, integration, dew-point temperature calculation, two-item arithmetic calculation, and out-of-range data revision. The LR5000 Utility Program performs the calculations.


1
Show Main Screen
View Data
Option
Help
Version Infomation
Exit...
9:19 PM
1/23/2011

Click

Click

1 If the LR5000 Utility Program is not running on the computer, click the icon in the task tray (notification area), and click **[View Data]**.

The Data View screen appears.
The **[View latest data]** tab shows a list of the loggers with data saved on the computer.

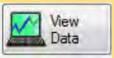
2 Select the logger from the list.

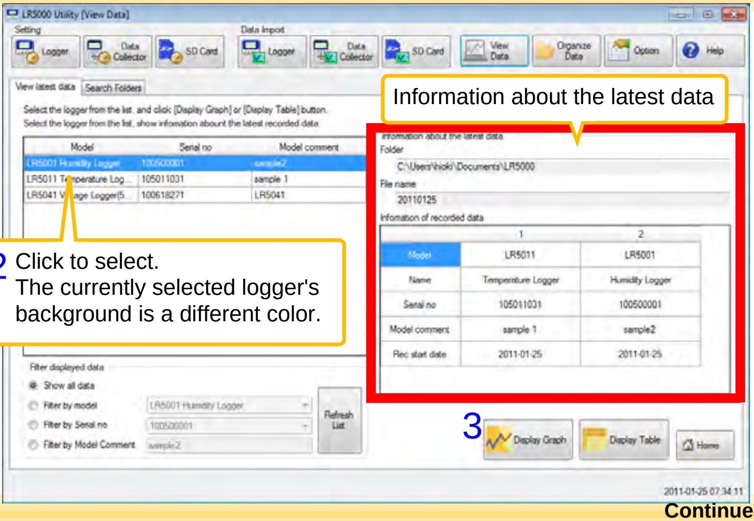
Information about the latest data appears.

3 Click the **[Display Graph]** button.

The viewer opens to display the graph
(If there are 16 or more items to display, the display item selection screen appears. Select the data items for processing.) (p.53).

Note: If the LR5000 Utility Program is running, click **[View Data]** on the main screen.




LR5000 Utility [View Data]
Setting
Logger
Data Collector
SD Card
Data Import
Logger
Data Collector
SD Card
View Data
Organize Data
Option
Help
View latest data
Search Folders
Refresh List
3
Display Graph
Display Table
Home

Select the logger from the list, and click [Display Graph] or [Display Table] button.
Select the logger from the list, show infomation abount the latest recorded data

Model	Serial no	Model comment
LR5001 Humidity Logger	100500001	sample2
LR5011 Temperature Log...	105011031	sample 1
LR5041 Voltage Logger(5...	100618271	LR5041

Filter displayed data
● Show all data
○ Filter by model LR5001 Humidity Logger
○ Filter by Serial no 100500001
○ Filter by Model Comment sample2

Information about the latest data

Infomation about the latest data
Folder
C:\Users\hioki\Documents\LR5000
File name
20110125
Infomation of recorded data

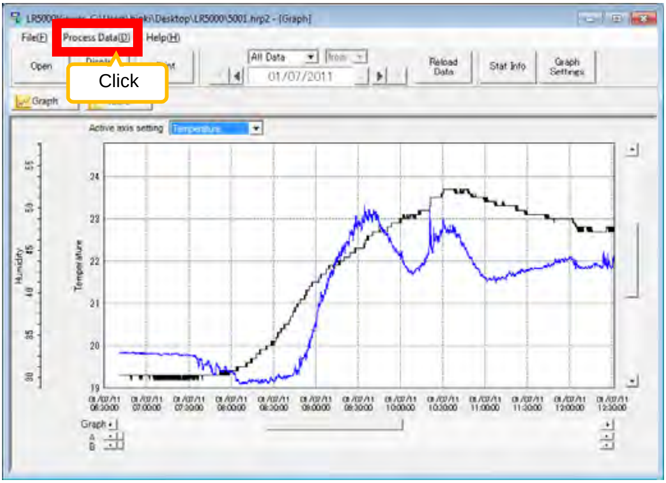
	1	2
Model	LR5011	LR5001
Name	Temperature Logger	Humidity Logger
Serial no	105011031	100500001
Model comment	sample 1	sample2
Rec start date	2011-01-25	2011-01-25

2011-01-25 07:34:11

2 Click to select.
The currently selected logger's background is a different color.

Continued →

4 Click **[Process Data]** in the menu bar, and select the desired items.

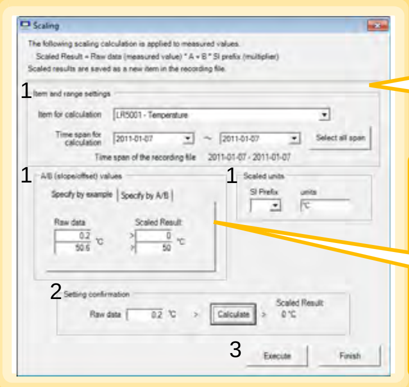

File(F)
Process Data(D)
Help(H)
Click
Open
All Data
01/07/2011
Reload Data
Stat Info
Graph Settings
Graph
Active axis setting
Temperature
Humidity
Temperature
Graph

[Process Data] Items

Items	Contents	See
Scaling	Performs scaling on the data of one channel.	(p.63)
Power Calculation	Performs approximate electric power calculation.	(p.64)
Energy Cost	Performs approximate energy cost calculation.	(p.65)
Operating Rate	Performs approximate operating rate calculation.	(p.66)
Integration	Integrates displayed data.	(p.67)
Dew Point	Performs dew-point temperature calculation.	(p.68)
Two-Data-Item Arithmetic	Performs approximate two-data-item arithmetic calculation.	(p.69)
OVER Data Revision	Converts data outside of the upper and lower threshold settings to specified values, and saves as new data items.	(p.70)

5.1 Scaling

The following scaling calculation is applied to measured values.
Scaled Result = Raw data (measured value) × A + B × SI prefix (multiplier)
Scaled results are saved as a new item in the recording file.



The following scaling calculation is applied to measured values.
Scaled Result = Raw data (measured value) * A + B * SI prefix (multiplier)
Scaled results are saved as a new item in the recording file.

Item and range settings
Item for calculation: LR5001 - Temperature
Time span for calculation: 2011-01-07 ~ 2011-01-07
Time span of the recording file: 2011-01-07 - 2011-01-07

A/B (slope/offset) values
Raw data 0.2 °C > Scaled Result 0 °C
Raw data 50.6 °C > Scaled Result 50 °C

Scaled units
SI Prefix:
units: °C

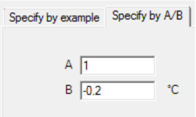
Setting confirmation
Raw data 0.2 °C > Scaled Result 0 °C

Item and range settings

Select the item to be scaled, and the time span.

A/B (slope/offset) values

Clicking this tab changes the setting options. Make settings on either tab. (The settings are applied to the other tab.)



A: 1
B: -0.2 °C

1. Select the items, time span, and the following options.

Setting Options	Descriptions
Specify by example *	Enter two known conversion points (up to ten digits each).
Specify by A/B *	Enter the scaling coefficients (A and B, up to ten digits each).
Scaled units	• Select the **[SI Prefix]**. (**[p]**=1E-12, **[n]**=1E-9, **[μ]**=1E-6, **[m]**=1E-3, blank =1E0, **[k]**=1E3, **[M]**=1E6, **[G]**=1E9, **[T]**=1E12) • Enter a character string to identify the scaled units. • (Up to five characters, except \, /, :, *, ?, ", <, >, and |.)

* Set either one.

2. Confirm settings.

Setting confirmation	Confirm that scaling is performed properly. Enter any numerical value as raw data, and click the **[Calculate]** button to display the scaled result.

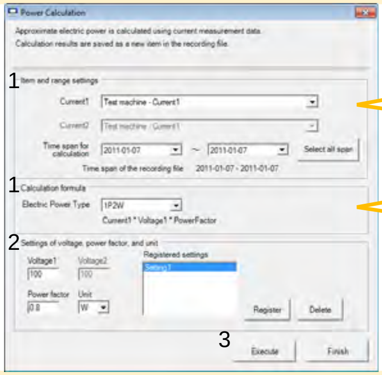
3. Click the **[Execute]** button.
   (The scaled results are saved.)
   Note: Click the **[Finish]** button to close the **[Scaling]** dialog box.

5.2 Calculating Electric Power

Approximate electric power is calculated using current measurement data from a clamp logger.
Calculation results are saved as a new item in the recording file.

NOTE

- Electric power calculations are only approximate, so results do not always equal the true electric power value. Use a wattmeter if accurate power measurements are required.
- There is no way to confirm that a specified data item is really a current value. Calculation occurs regardless of data type.



Power Calculation

Approximate electric power is calculated using current measurement data.
Calculation results are saved as a new item in the recording file.

1 Item and range settings
Current1: Test machine - Current1
Current2: Test machine / Current1
Time span for calculation: 2011-01-07 ~ 2011-01-07
Time span of the recording file 2011-01-07 - 2011-01-07

1 Calculation formula
Electric Power Type: 1P2W
Current1 * Voltage1 * PowerFactor

2 Settings of voltage, power factor, and unit
Voltage1: 100
Voltage2: 100
Power factor: 0.8
Unit: W
Registered settings: Setting1

Item and range settings
Specify two measured current values and the time span for calculation.

Calculation formula

[Electric Power Type]
Choose **[1P2W]**, **[1P3W]** or **[3P3W]** to select the appropriate calculation formula.

1. Select the items, time span, and calculation formula to be used.

2. Specify the voltage, power factor, and units.
   •To save the settings, click the **[Register]** button.
   •To apply a registered setting, double click it ("Setting1" in the above screenshot).
   •To delete a setting, click it then click the **[Delete]** button.

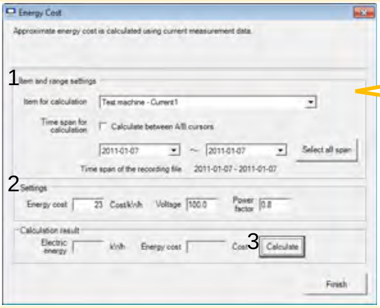
3. Click the **[Execute]** button.
   (Calculation results are saved.)
   Note: Click the **[Finish]** button to close the **[Power Calculation]** dialog box.

5.3 Calculating Energy Cost

Approximate energy cost is calculated using current measurement data from a clamp logger.

NOTE

- Energy cost calculations are only approximate, so results do not always equal the true energy cost.
- There is no way to confirm that a specified data item is really an electric power value. Calculation occurs regardless of data type.



Approximate energy cost is calculated using current measurement data.

Item for calculation: Test machine - Current1

Time span for calculation: ☐ Calculate between A/B cursors

2011-01-07 ~ 2011-01-07

Time span of the recording file 2011-01-07 - 2011-01-07

Energy cost: 23 Cost/kWh; Voltage: 100.0; Power factor: 0.8

Electric energy: kWh; Energy cost: Cost

Item and range settings

Specify the measured current value and the time span for calculation.The time span can also be specified by setting the A/B cursors (p.48) on a graph and selecting **[Calculate between A/B cursors]**.

1. Select the item and time span.

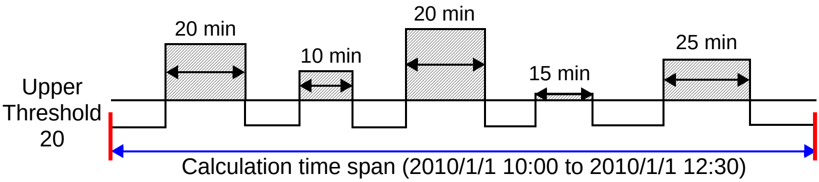
2. Specify the cost per kWh, voltage, and power factor.

3. Click the **[Calculate]** button.
   (Electric power consumption and energy cost values are calculated and displayed.)
   Note: Click the **[Finish]** button to close the **[Energy Cost]** dialog box.

5.4 Calculating Operating Rate

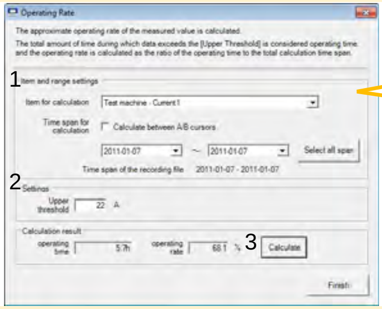
The approximate operating rate of the measured value is calculated.
The total amount of time during which data exceeds the **[Upper threshold]** is considered operating time, and the operating rate is calculated as the ratio of the operating time to the total calculation time span.

Example: The time during which a device consumes 20 A or more is considered the operating time.



The sum of the times depicted by ↔ is the operating time. (In the above diagram, operating time is 1.5 hours.)

Operating time (1.5 h) ÷ calculation time span (2.5 h) × 100 = 60% operating rate


Operating Rate

The approximate operating rate of the measured value is calculated.

The total amount of time during which data exceeds the [Upper Threshold] is considered operating time and the operating rate is calculated as the ratio of the operating time to the total calculation time span.

1 Item and range settings

Item for calculation: Test machine - Current 1

Time span for calculation: ☐ Calculate between A/B cursors

2011-01-07 ~ 2011-01-07

Time span of the recording file: 2011-01-07 - 2011-01-07

2 Settings

Upper threshold: 22 A

Calculation result

operating time: 5.7h

operating rate: 68.1 %

Item and range settings

Select the item for operating rate calculation, and the time span.

The time span can also be specified by setting the A/B cursors (p.48) on a graph and selecting **[Calculate between A/B cursors]**.

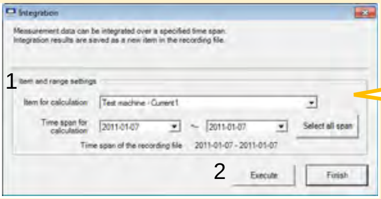
1. Select the item and time span.

2. Set the upper threshold.

3. Click the **[Calculate]** button.
   (Operating hours and operating rate values are calculated and displayed.)
   Note: Click the **[Finish]** button to close the **[Operating Rate]** dialog box.

5.5 Integration

Measurement data can be integrated over a specified time span.
Integration results are saved as a new item in the recording file.



Measurement data can be integrated over a specified time span.
Integration results are saved as a new item in the recording file.

Item and range settings

Item for calculation: Test machine - Current1

Time span for calculation: 2011-01-07 ~ 2011-01-07

Time span of the recording file: 2011-01-07 - 2011-01-07

Item and range settings
Select the item to be integrated, and the time span.

1. Select the item and time span.

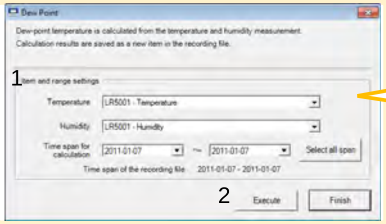
2. Click the **[Execute]** button.
   (Integration results are saved.)
   Note: Click the **[Finish]** button to close the **[Integration]** dialog box.

5.6 Calculating Dew-Point Temperature

Dew-point temperature is calculated from the temperature and humidity measurement data from the logger.
Calculation results are saved as a new item in the recording file.

NOTE

- There is no way to confirm that a specified data item is really a temperature or humidity value. Dew-point calculation occurs regardless of data type.
- Only the specified temperature and humidity data measured during the specified recording time span is applied to calculations and saved.
- The valid range for calculation input measurement data is -100 to 100 degrees, and 0 to 100% humidity. Values outside of these ranges are replaced with the maximum or minimum value within the valid range.



Dew-point temperature is calculated from the temperature and humidity measurement.
Calculation results are saved as a new item in the recording file.

1 Item and range settings

Temperature: LR5001 - Temperature

Humidity: LR5001 - Humidity

Time span for calculation: 2011-01-07 ~ 2011-01-07

Time span of the recording file 2011-01-07 - 2011-01-07

Item and range settings

Specify the temperature and humidity values, and the time span for calculation.

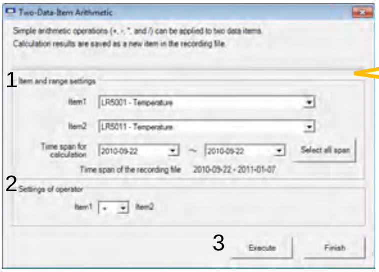
1. Select the items and time span.

2. Click the **[Execute]** button.
   (Calculation results are saved.)
   Note: Click the **[Finish]** button to close the **[Dew Point]** dialog box.

5.7 Two-Data-Item Arithmetic Calculations

Simple arithmetic operations (+, -, *, and /) can be applied to two data items. Calculation results are saved as a new item in the recording file.

NOTE Only the values of data items measured during the specified recording time span are applied to calculations and saved.


Two-Data-Item Arithmetic
1
Item and range settings
2
Settings of operator
3
Select all span
Execute
Finish

Simple arithmetic operations (+, -, *, and /) can be applied to two data items.
Calculation results are saved as a new item in the recording file.

Item1: LR5001 - Temperature
Item2: LR5011 - Temperature
Time span for calculation: 2010-09-22 ~ 2010-09-22
Time span of the recording file: 2010-09-22 - 2011-01-07
Item1 + Item2

Item and range settings

Select the items for calculation, and the time span.

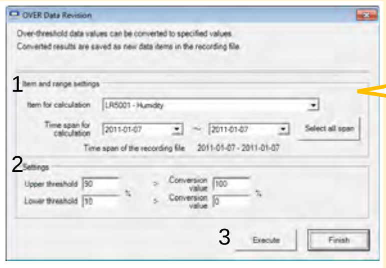
1. Select the items and time span.

2. Select the calculation operator.

3. Click the **[Execute]** button.
   (Calculation results are saved.)
   Note: Click the **[Finish]** button to close the **[Two-Data-Item Arithmetic]** dialog box.

5.8 Converting Over-Threshold Data Values

Data values larger than the upper threshold and smaller than the lower threshold can be converted to specified values.
Converted results are saved as new data items in the recording file.



OVER Data Revision

Over-threshold data values can be converted to specified values.
Converted results are saved as new data items in the recording file.

1 Item and range settings

Item for calculation: LR5001 - Humidity

Time span for calculation: 2011-01-07 ~ 2011-01-07

Time span of the recording file: 2011-01-07 - 2011-01-07

2 Settings

Upper threshold: 90 % > Conversion value: 100 %

Lower threshold: 10 % > Conversion value: 0 %

Item and range settings

Select the items for conversion, and the time span.

1. Select the items and time span.

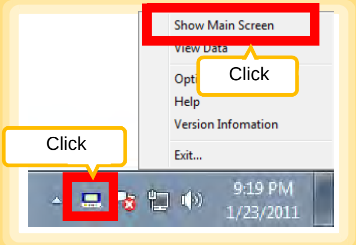
2. Set the upper and lower threshold values, and their corresponding conversion values.

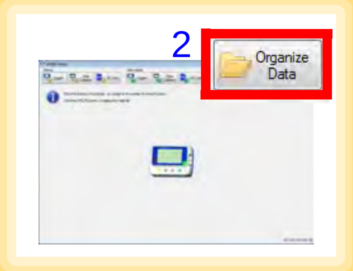
3. Click the **[Execute]** button.
   (Conversion results are saved.)

   Note: Click the **[Finish]** button to close the **[OVER Data Revision]** dialog box.

Organizing Data Chapter 6

The LR5000 Utility Program can reorganize (copy, delete, move, combine, and extract) imported data.


Show Main Screen
View Data
Opti
Help
Version Infomation
Exit...
Click
Click
9:19 PM
1/23/2011


2
Organize Data

1 If the LR5000 Utility Program is not running on the computer, click the icon in the task tray (notification area), and click **[Show Main Screen]**.

The main screen appears.

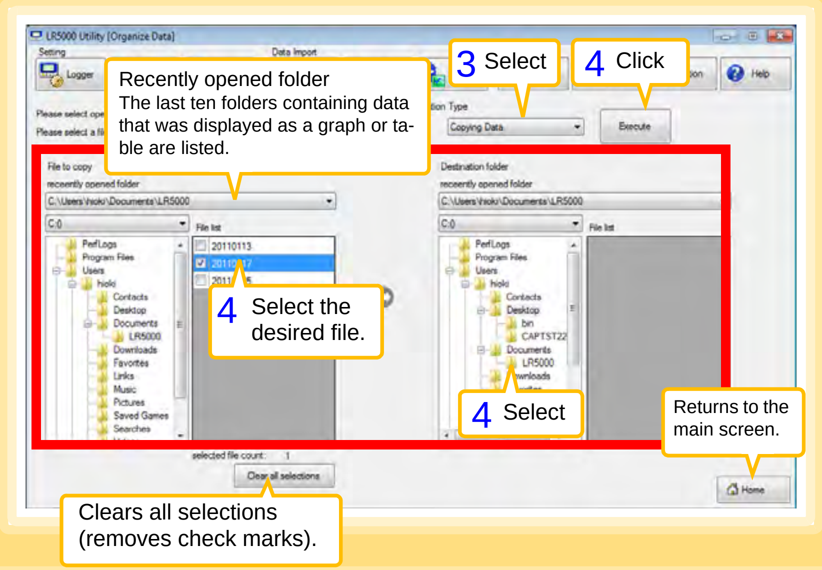
2 Click the **[Organize Data]** button.

The data reorganization screen appears.

3 Select the **[Operation Type]**.

See: "6.1 Copying and Moving Data" (p.72)
"6.2 Deleting Data" (p.73)
"6.3 Combining Data" (p.74)
"6.4 Extracting Data" (p.75)

4 Select the working folder or recording file, and click the **[Execute]** button.


LR5000 Utility [Organize Data]
Setting
Data Import
Logger
Help
Copying Data
Execute
File to copy
recently opened folder
C:\Users\hioki\Documents\LR5000
C:0
File list
Destination folder
recently opened folder
C:\Users\hioki\Documents\LR5000
C:0
File list
selected file count: 1
Clear all selections
Home
3 Select
4 Click
4 Select
4 Select the desired file.

Recently opened folder
The last ten folders containing data that was displayed as a graph or table are listed.

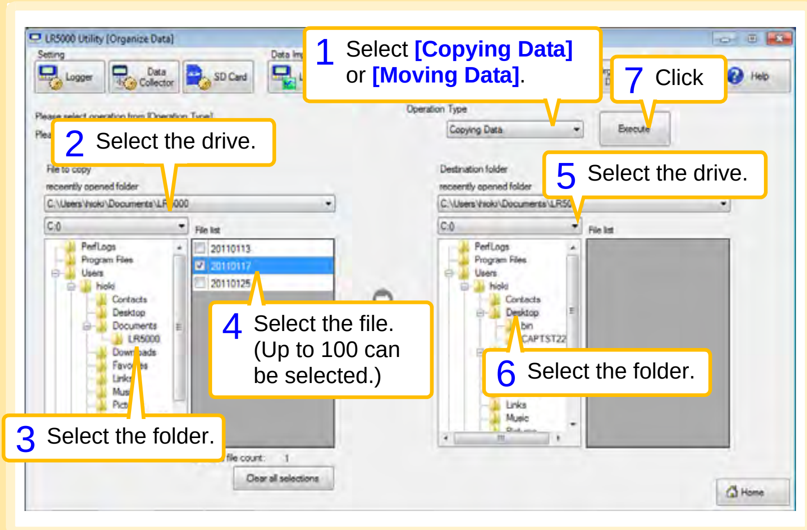
Returns to the main screen.

Clears all selections (removes check marks).

6.1 Copying and Moving Data

The selected logger recording files can be copied or moved to any folder.

Example: Copy a file from the folder C:\Users\hioki\Documents\LR5000 to C:\Users\hioki\Desktop.


LR5000 Utility [Organize Data]
Setting
Logger
Data Collector
SD Card
Help
Please select operation from [Operation Type]
Operation Type
Copying Data
Execute
File to copy
recently opened folder
C:\Users\hioki\Documents\LR5000
C:0
File list
PerfLogs
Program Files
Users
hioki
Contacts
Desktop
Documents
LR5000
Downloads
Favorites
Links
Music
Pictures
20110113
20110117
20110125
file count: 1
Clear all selections
Destination folder
bin
CAPTST22
Home

1 Select **[Copying Data]** or **[Moving Data]**.

2 Select the drive.

3 Select the folder.

4 Select the file. (Up to 100 can be selected.)

5 Select the drive.

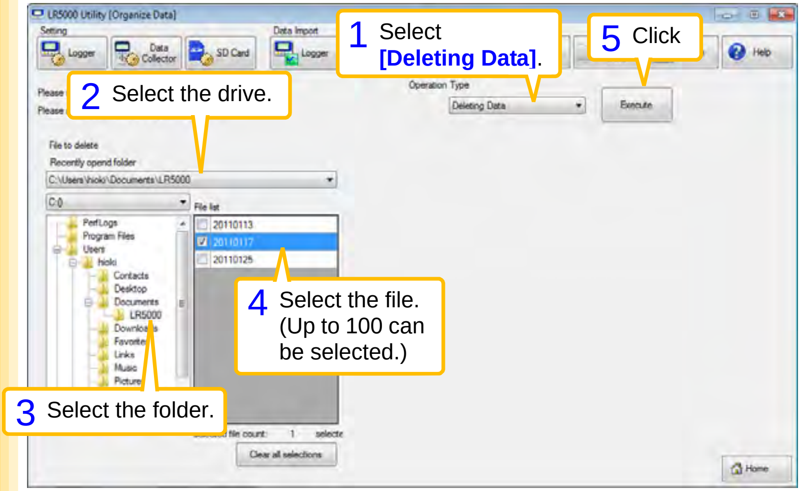
6 Select the folder.

7 Click

6.2 Deleting Data

Select and delete logger recording files as follows.

Example: Delete a file from the folder C:\Users\hioki\Documents\LR5000.


LR5000 Utility [Organize Data]
Setting
Logger
Data Collector
SD Card
Data Import
Logger
Help
Please
Please
Operation Type
Deleting Data
Execute
File to delete
Recently opend folder
C:\Users\hioki\Documents\LR5000
C:\
PerfLogs
Program Files
Users
hioki
Contacts
Desktop
Documents
LR5000
Downloads
Favorites
Links
Music
Pictures
File list
☐ 20110113
☑ 20110117
☐ 20110125
file count: 1
selecte
Clear all selections
Home

1 Select **[Deleting Data]**.

2 Select the drive.

3 Select the folder.

4 Select the file. (Up to 100 can be selected.)

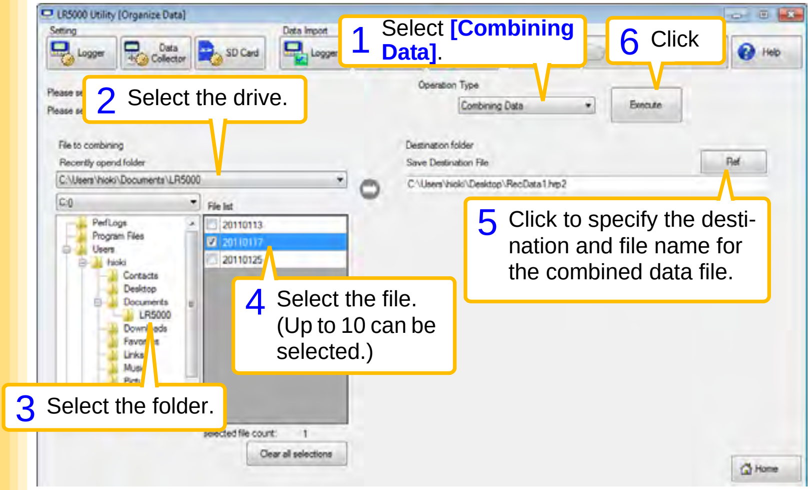
5 Click

How can I delete data from the logger's memory?
See: "Delete Data" (p.38)

6.3 Combining Data

Separate logger recording files can be combined into one set of recording data.

Example: Combine file 20110117 with other files in C:\Users\hioki\Documents/LR5000, and save the combined data file in C:\Users\hioki/Desktop.


LR5000 Utility [Organize Data]
Setting
Logger
Data Collector
SD Card
Data Import
Logger
Help
Please se
Please se
File to combining
C:0
File list
PerfLogs
Program Files
Users
hioki
Contacts
Desktop
Documents
LR5000
Downloads
Favorites
Links
Music
Pictu
Destination folder
Ref
Execute
Clear all selections
Home

Operation Type: Combining Data

Recently opend folder: C:\Users\hioki\Documents\LR5000

File list:
- ☐ 20110113
- ☑ 20110117
- ☐ 20110125

selected file count: 1

Save Destination File: C:\Users\hioki\Desktop\RecData1.hrp2

1 Select **[Combining Data]**.

2 Select the drive.

3 Select the folder.

4 Select the file. (Up to 10 can be selected.)

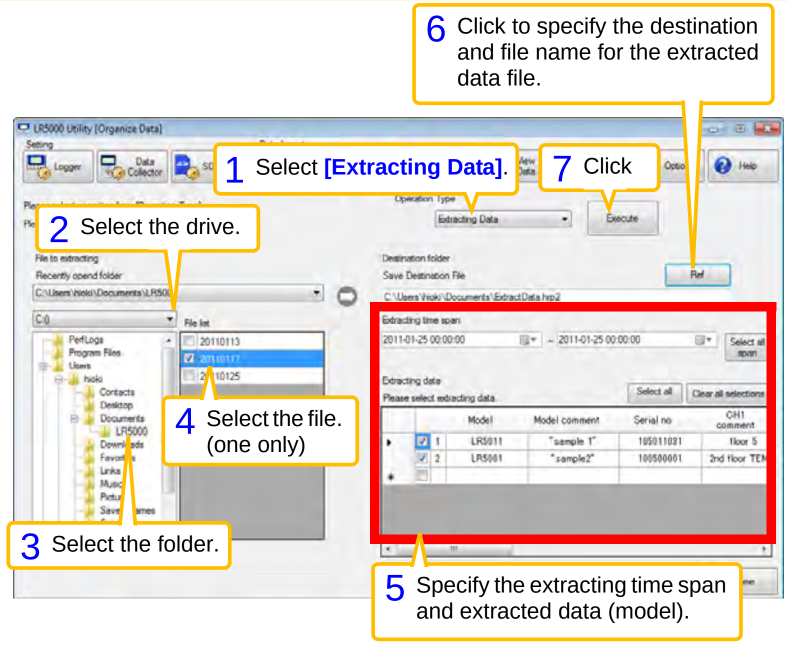
5 Click to specify the destination and file name for the combined data file.

6 Click

6.4 Extracting Data

Data in a logger recording file can be extracted to a specified time span and saved with a different file name.

Example: Extract the data of January 25th from the file 20110117, and save to a different file.



1 Select **[Extracting Data]**.

2 Select the drive.

3 Select the folder.

4 Select the file. (one only)

5 Specify the extracting time span and extracted data (model).

6 Click to specify the destination and file name for the extracted data file.

7 Click

Operation Type: Extracting Data

Save Destination File: C:\Users\hioki\Documents\ExtractData.hrp2

Extracting time span: 2011-01-25 00:00:00 ~ 2011-01-25 00:00:00

Extracting data

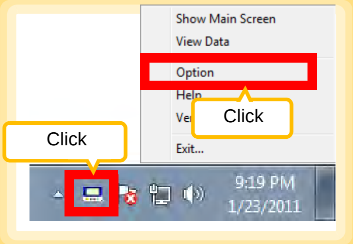
Please select extracting data

		Model	Model comment	Serial no	CH1 comment
☑	1	LR5011	"sample 1"	105011031	floor 5
☑	2	LR5001	"sample2"	100500001	2nd floor TEM
☐					

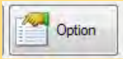
LR5000 Utility [Organize Data]
Setting
Logger
Data Collector
View Data
Option
Help
Execute
Ref
File to extracting
Recently opend folder
C:\Users\hioki\Documents\LR50
C:\
PerfLogs
Program Files
Users
hioki
Contacts
Desktop
Documents
LR5000
Downloads
Favorites
Links
Music
Pictures
Saved Games
File list
20110113
20110117
20110125
Destination folder
Select all span
Select all
Clear all selections

Options Settings (LR5000 Utility Program) Chapter 7

These settings determine the saving method for imported logger data, device connection monitoring, and logger setting display functions.


Show Main Screen
View Data
Option
Help
Ver
Exit...
Click
Click
9:19 PM
1/23/2011

Note: If the LR5000 Utility Program is running, click **[Option]** on the main screen.



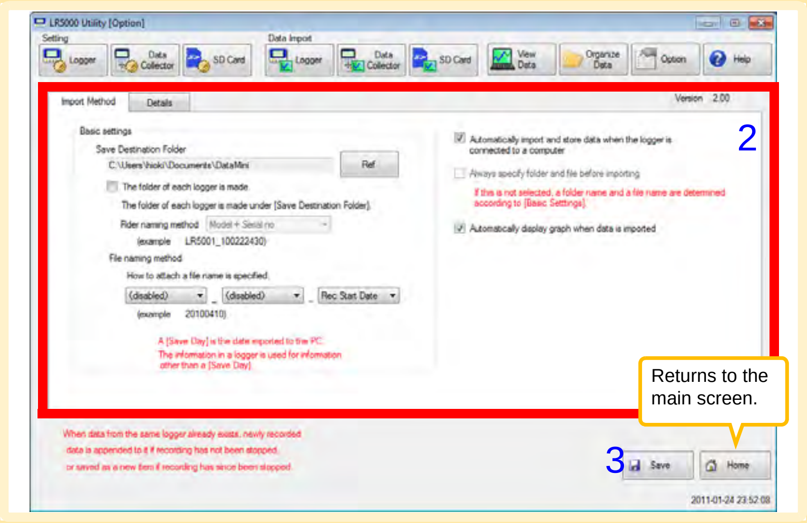
1 If the LR5000 Utility Program is not running on the computer, click the icon in the task tray (notification area), and click **[Option]**.

The Options screen appears.

2 Change the settings as needed.

See: "7.1 Changing the Saving Method for Imported Data" (p.78)
"7.2 Changing the Connection Monitoring Method, and Logger Settings Displays" (p.79)

3 Click the **[Save]** button.


LR5000 Utility [Option]
Setting
Logger
Data Collector
SD Card
Data Import
Logger
Data Collector
SD Card
View Data
Organize Data
Option
Help
Import Method
Details
Ref
2
3
Save
Home
Returns to the main screen.

Version 2.00

Basic settings

Save Destination Folder

C:\Users\hioki\Documents\DataMini

☐ The folder of each logger is made

The folder of each logger is made under [Save Destination Folder].

Folder naming method Model + Serial no

(example LR5001_100222430)

File naming method

How to attach a file name is specified.

(disabled) _ (disabled) _ Rec Start Date

(example 20100410)

A [Save Day] is the date imported to the PC.
The information in a logger is used for information other than a [Save Day].

☑ Automatically import and store data when the logger is connected to a computer

☐ Always specify folder and file before importing

If this is not selected, a folder name and a file name are determined according to [Basic Settings].

☑ Automatically display graph when data is imported

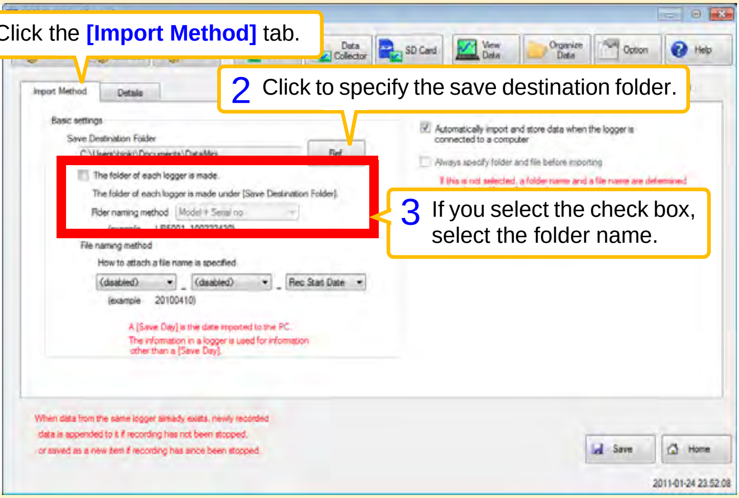
When data from the same logger already exists, newly recorded data is appended to it if recording has not been stopped, or saved as a new item if recording has since been stopped.

2011-01-24 23:52:08

7.1 Changing the Saving Method for Imported Data

The saving method for imported logger data can be changed as follows.

How can the save destination folder be changed?



1 Click the **[Import Method]** tab.

2 Click to specify the save destination folder.

3 If you select the check box, select the folder name.

Basic settings

Save Destination Folder: C:\Users\ \Documents\DataMini

☐ The folder of each logger is made.

The folder of each logger is made under [Save Destination Folder].

Folder naming method: Model + Serial no

File naming method

How to attach a file name is specified

(disabled) _ (disabled) _ Rec Start Date

(example 20100410)

A [Save Day] is the date imported to the PC.
The information in a logger is used for information other than a [Save Day].

☑ Automatically import and store data when the logger is connected to a computer

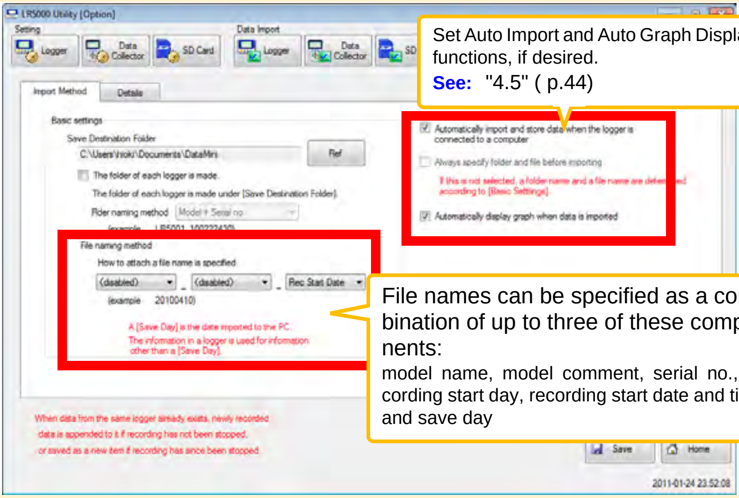
☐ Always specify folder and file before importing

If this is not selected, a folder name and a file name are determined

When data from the same logger already exists, newly recorded data is appended to it if recording has not been stopped, or saved as a new item if recording has since been stopped.

2011-01-24 23:52:08

How can the file naming method be changed?



Set Auto Import and Auto Graph Display functions, if desired.
See: "4.5" (p.44)

Basic settings

Save Destination Folder: C:\Users\ \Documents\DataMini

☐ The folder of each logger is made.

The folder of each logger is made under [Save Destination Folder].

Folder naming method: Model + Serial no

File naming method

How to attach a file name is specified

(disabled) _ (disabled) _ Rec Start Date

(example 20100410)

A [Save Day] is the date imported to the PC.
The information in a logger is used for information other than a [Save Day].

☑ Automatically import and store data when the logger is connected to a computer

☐ Always specify folder and file before importing

If this is not selected, a folder name and a file name are determined according to [Basic Settings].

☑ Automatically display graph when data is imported

File names can be specified as a combination of up to three of these components:
model name, model comment, serial no., recording start day, recording start date and time, and save day

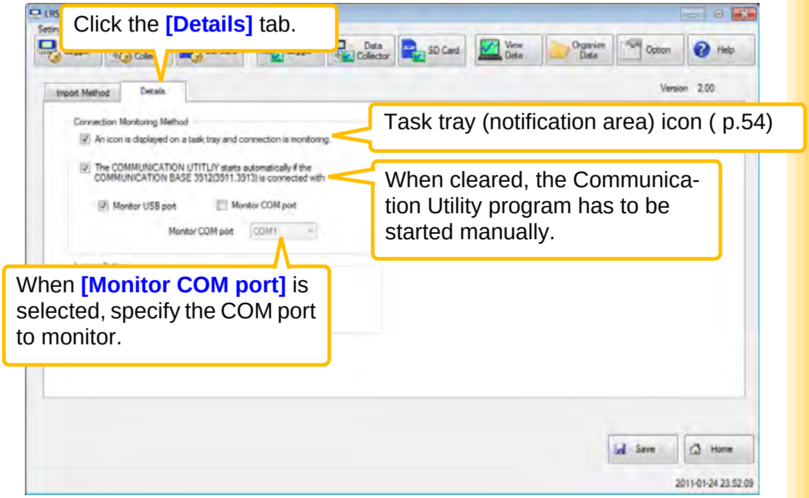
When data from the same logger already exists, newly recorded data is appended to it if recording has not been stopped, or saved as a new item if recording has since been stopped.

2011-01-24 23:52:08

7.2 Changing the Connection Monitoring Method, and Logger Settings Displays

Change the device connection monitoring settings and the functions on the logger settings displays as follows.

How can the device connection monitoring setting be changed?


LR5
Setting
Logger
Collector
SD Card
Logger
Data Collector
SD Card
View Data
Organize Data
Option
Help
Import Method
Details
Version 2.00
Save
Home
2011-01-24 23:52:09

Click the **[Details]** tab.

Connection Monitoring Method

☑ An icon is displayed on a task tray and connection is monitoring.

Task tray (notification area) icon (p.54)

☑ The COMMUNICATION UTITLIY starts automatically if the COMMUNICATION BASE 3912(3911,3913) is connected with

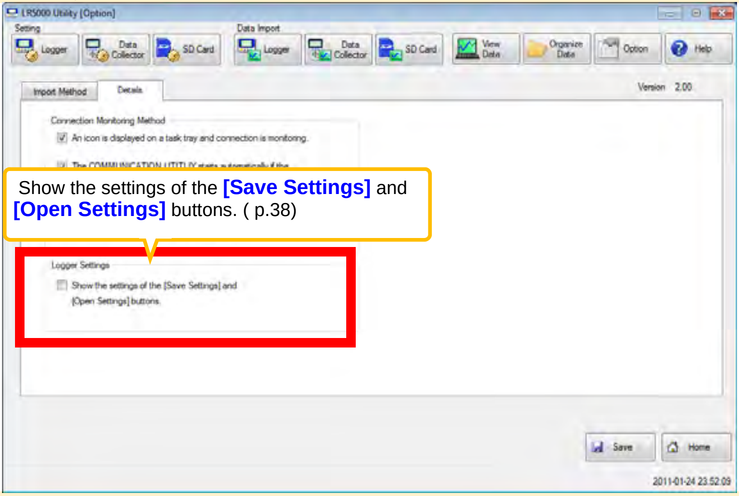
When cleared, the Communication Utility program has to be started manually.

☑ Monitor USB port ☐ Monitor COM port

Monitor COM port COM1

When **[Monitor COM port]** is selected, specify the COM port to monitor.

How can the function settings of the logger's settings displays be changed?


LR5000 Utility [Option]
Setting
Logger
Data Collector
SD Card
Data Import
Logger
Data Collector
SD Card
View Data
Organize Data
Option
Help
Import Method
Details
Version 2.00
Save
Home
2011-01-24 23:52:09

Connection Monitoring Method

☑ An icon is displayed on a task tray and connection is monitoring.

☑ The COMMUNICATION UTITLIY starts automatically if the

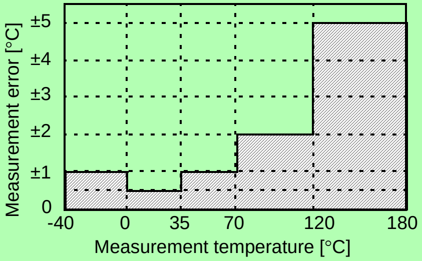
Show the settings of the **[Save Settings]** and **[Open Settings]** buttons. (p.38)

Logger Settings

☐ Show the settings of the [Save Settings] and [Open Settings] buttons.

Specifications Chapter 8

8.1 Measurement Specifications

Sensor	External temperature sensor 1channel (Thermistor)
Measurement ranges	• Temperature: -40.0°C to 180.0°C (-40.0°F to 356.0°F) Note 1: Measurement range is limited according to sensor type. Note 2: "UF" or "OF" indicates out-of-range measurement.
Measurement accuracy (logger + sensor)	• Temperature: between -40.0°C (-40.0°F) and 0.0°C (32.0°F) : ±1.0°C (±1.8°F) between 0.0°C (32.0°F) and 35.0°C (95.0°F) : ±0.5°C (±0.9°F) between 35.0°C (95.0°F) and 70.0°C (158.0°F) : ±1.0°C (±1.8°F) between 70.0°C (158.0°F) and 120.0°C (248.0°F) : ±2.0°C (±3.6°F) 120.0 to 180.0°C (248.0 to 356.0°F) : ±5.0°C (±9.0°F) 
Accuracy guarantee for temperature and humidity	• Temperature: -20.0°C to 70.0°C (-4.0°F to 158.0°F) (logger) • Humidity: 80%RH or less (logger) non-condensating
Guaranteed accuracy period	1 year

8.2 Functional Specifications

Display type	LCD
Display contents	Measured value, units (°C), recording (REC), endless recording (ENDLESS), statistical recording (STAT), recording interval (INTVL), date and time (TIME), alarm (AL), battery status, recorded data count (DATA), maximum value (MAX), minimum value (MIN), auto power saving (APS)
Operation key	Four ("SET", "REC/STOP", "+", "-")
Recording interval	1/2/5/10/15/20/30 sec., 1/2/5/10/15/20/30/60 min.
Recording modes	• Instantaneous recording: The instantaneous value is recorded at each recording interval • Statistical recording: Measurements are taken once per second, and instantaneous, maximum, minimum, and average values are saved at each recording interval (cannot be selected when the recording interval is set to one second).
Recording capacity	• Instantaneous recording: 60,000 values • Statistical recording: 15,000 instantaneous, maximum, minimum, and average values
Recording start method	• Logger button operation • Instant or scheduled time (set by computer/Data Collector)
Recording stop method	• Logger button operation (endless recording) • Logger button operation (one-time recording) • Scheduled time (endless recording) • Scheduled time (one-time recording) Scheduled time is set by computer/Data Collector
Retained recording sessions	Two sessions (each from recording start to stop)
Alarm	Indicates when measured values are outside of the range defined by upper and lower thresholds set from a computer or the Data Collector
Scaling	Scales and displays measured values according to settings made from a computer or the Data Collector
Power save setting	The measurement data display turns off about 30 seconds after the last button operation (cancel power save for continuous display)
Real-time clock	Provided

8.3 Miscellaneous

Clock accuracy	±50ppm (@25°C (77°F)) ±4.32 s/day
Backup	Recorded data and settings (independent of battery)
Interface	Half-duplex start/stop synchronous infrared serial communication between the logger and Communication Adapter or Data Collector
Power supply	• Rated supply voltage: 1.5 VDC • One LR6 alkaline battery • Recording and clock operation, and maximum and minimum values are retained for about 30 seconds during battery replacement
Maximum rated power	0.1 VA
Battery life	• Approx. 2 year (instantaneous recording, with 1-minute recording interval and auto power saving, @20°C (68°F)) • Approx. 2 month (with 1-second recording interval, @20°C (68°F))
Dimensions	Approx. 79W×57H×28D mm (3.11"W×2.24"H×1.10"D)
Mass	Approx. 105 g (3.7 oz.) (w/battery)
Dust and water protection rating	IP54 (EN60529) (with sensor connected, but not including sensor tip)
Accessories	• LR6 alkaline battery .... 1(Internal in the logger) • Instruction Manual....................................... 1 • Operation Manual... 1 • Stand 1
Options	• LR5091 Communication Adapter • LR5092-20 Data Collector • LR9601 Temperature Sensor • LR9602 Temperature Sensor • LR9603 Temperature Sensor • LR9604 Temperature Sensor • LR9611 Temperature Sensor • LR9612 Temperature Sensor • LR9613 Temperature Sensor • LR9621 Temperature Sensor • LR9631 Temperature Sensor • LR9901 Wall-Mounted Holder • Z5004 Magnetic Strap
Environmental conditions	• Operating environment: indoors, pollution degree 2, up to 2000 m ASL • Operating temperature and humidity: -20°C to 70°C (-4.0°F to 158.0°F), 80%RH or less (non-condensating) • Storage temperature and humidity: -20°C to 70°C (-4.0°F to 158.0°F), 80%RH or less (non-condensating)
Applicable Standards	• Safety: EN61010 • EMC : EN61326

8.4 LR5091 Communication Adapter Specifications

Main Unit General Specifications

Functions	Converts between the logger's infrared signals and USB signals to support communications between the logger and a computer (USB port).
Compatible loggers	LR5001 Humidity Logger, LR5011 Temperature Logger, LR5031 Instrumentation Logger, LR5041 Voltage Logger (50 mV), LR5042 Voltage Logger (5 V), LR5043 Voltage Logger (50 V), LR5051 Clamp Logger Note: Communication with models LR5031 is supported by PC Utility version 1.05 and later. LR5051 is supported by PC Utility version 1.01 and later.
Operating temperature and humidity	Temperature: 0°C to 40°C (32.0°F to 104.0°F), Humidity: 80%RH or less (non-condensating)
Storage temperature and humidity	Temperature: -10°C to 50°C (14.0°F to 122.0°F), Humidity: 80%RH or less (non-condensating)
Operating environment	Indoors, pollution degree 2, up to 2000 m ASL
Power supply	5 VDC (USB bus-powered)
Maximum rated power	0.5 VA
Dimensions	Approx. 83W×61H×19D mm (3.27"W×2.40"H×0.75"D) (without projections)
Mass	Approx. 43 g (1.5 oz.) (without USB cable)
Applicable Standards	• Safety: EN61010 • EMC : EN61326

USB standard	USB 2.0 compliant, Full Speed support
Connector	Mini B series receptacle
Connectable device	Computer
Communication speed	115,200bps

Communication method	Half-duplex start/stop synchronous infrared serial communication
Communication speed	115,200bps

Accessories

USB cable (1 m)	1
LR5000 Utility Program (CD)	1

Supplied LR5000 Utility Program Specifications

Supplied medium	CD 1
Operating environment	Personal computer meeting the following specifications • CPU: 1 GHz or faster processor clock • RAM: at least 512 MB • Operating system: Windows XP SP2 or later, Vista SP1 or later, or Windows 7 • Runtime library: .NET Framework 2.0/3.5 • Interface: USB (or COM port for models 3910, 3911, or 9612) • Monitor resolution: 1024 x 768 or higher • Hard disk: At least 30 MB free space (Another 500 MB may be required if .NET Framework 2.0 or 3.5 is not yet installed. Additional space is required for storing recorded data.)
Model communication support	All LR5000-series loggers Note1: Communication with models LR5031 is supported by PC Utility version 1.05 and later. LR5051 is supported by PC Utility version 1.01 and later. Note2: The COMMUNICATION UTILITY program supports the following models' settings and data import functions. A computer COM port and 9612 RS-232C cable are required when using the model 3910 or 3911 Communication Base. • All "Data Logger" models 363x to 364x • Communication Base models 3910, 3911, and 3912
Communication connections	Communication with LR5000-series loggers: • Computer, USB cable, LR5091 Communication Adapter, and LR5000-series logger • Computer, USB cable, LR5092-20 Data Collector, and LR5000-series logger Communication with the LR5092-20 Data Collector: Computer, USB cable, and LR5092-20 Data Collector
Setting functions	• Export/import settings by communication with the LR5000 series • Settings exported from each LR5000 are stored on the computer (the following functions are supported by the supplied PC Utility version 2.00, or later) • Export/import settings by communication using the LR5092-20 Data Collector • Import and save logger settings using the LR5092-20 Data Collector via communication or SD memory card • Settings exported to the LR5092-20 Data Collector are stored on the computer
Auto-start function	A small resident program (icon in the task tray/notification area) detects when a logger or the Data Collector is connected to the computer, and automatically starts the LR5000 Utility Program.

Data import functions	• Communicates with the LR5000-series loggers, and imports recorded data • Combines recorded data • Incorporates new data when an LR5000-series logger holds data not previously imported (the following functions are supported by the supplied PC Utility version 2.00, or later) • Communicates with the LR5092-20 Data Collector, and imports recorded data saved in the Data Collector • Imports data saved to an SD memory card in the LR5092-20 Data Collector
Graph display functions	• Displays up to 16 channels in a graph • Displays up to 16 Y-axes • Displays one time base axis • Set line colors for each channel, and display/hide lines and bar graphs for each channel • Auto setting of time base and vertical axis • Display/hide Y-axis grid lines, and set grid display density • Select display background color • Copy graph images to the clipboard • A/B cursor functions • Displays statistical data (maximum, minimum, and average)
Data list display functions	• Browse recorded data in tabular format • Displays up to 600 channels • Displays statistical data (maximum, minimum, and average)
Export functions	• Export all recorded data displayed in a table in CSV format • Paste to Excel all recorded data displayed in a data table • Export all recorded data between A/B cursors in CSV format • Paste to Excel all recorded data between A/B cursors
Import functions	Import text files from the 3169 Clamp-On Power HiTester Note: Only electric energy data recorded at one-second or longer interval can be imported
Printing functions	• Prints graphs and statistical data • Supports A3, A4, and B4 paper sizes
Data processing functions	Scaling (y=a×x+b), electric power calculation, energy cost calculation, operating rate calculation, integration, dew-point temperature calculation, arithmetic calculations, out-of-range data revision
File management functions	• Copy and delete data saved on the computer (the following functions are supported by the supplied PC Utility version 2.00, or later) • Delete data saved to an SD memory card in the LR5092-20 Data Collector
Help function	Displays helpful operating instructions

8.5 Temperature Sensors Specifications

General Specifications

LR9601, LR9602, LR9603, LR9604 (molded resin type)

Sensor type	Thermistor
Operating temperature	-40°C to 180°C (-40.0°F to 356.0°F) (with no condensation on connectors) Note: -20°C to 70°C (-4.0°F to 158.0°F) at connectors
Storage temperature	-40°C to 180°C (-40.0°F to 356.0°F) (with no condensation on connectors) Note: -20°C to 70°C (-4.0°F to 158.0°F) at connectors
Response time	Approx. 100 sec. Note: 90% response time for temperature (reference value)
Dust and water protection rating	Water ingress protection (JIS C 0920) When connected to LR5011 Temperature Logger
Operating environment	Indoors
Materials	Cable: Silicone Sensor: Silicone
Dimensions	• Cable length (including sensor): Approx. 1000 mm (39.37”) (LR9601), Approx. 5000 mm (196.85”) (LR9602), Approx. 10000 mm (393.70”) (LR9603), Approx. 45 mm (1.77”) (LR9604) • Sensor element: Approx. 6 mm (0.24”) diameter, and 28 mm (1.10”) long
Mass	Approx. 16 g (0.6 oz.) (LR9601), Approx. 60 g (2.1 oz.) (LR9602), Approx. 115 g (4.1 oz.) (LR9603), Approx. 6 g (0.2 oz.) (LR9604)

LR9611, LR9612, LR9613 (lug terminal type)

Sensor type	Thermistor
Operating temperature and humidity	-30°C to 180°C (-22.0°F to 356.0°F), 80%RH or less (non-condensating) Note: -20°C to 70°C (-4.0°F to 158.0°F) at connectors
Storage temperature and humidity	-30°C to 180°C (-22.0°F to 356.0°F), 80%RH or less (non-condensating) Note: -20°C to 70°C (-4.0°F to 158.0°F) at connectors
Response time	Approx. 45 sec. Note: 90% response time for temperature (reference value)
Dust and water protection rating	No
Operating environment	Indoors
Dimensions	• Cable length (including metal tip): Approx. 1000 mm (39.37”) (LR9611), Approx. 5000 mm (196.85”) (LR9612), Approx. 10000 mm (393.70”) (LR9613) • Metal tip: Outside diameter Approx. 7 mm (0.28”), Inside diameter Approx. 3.2 mm (0.13”), Thickness Approx. 0.5 mm (0.02”)
Mass	Approx. 17 g (0.6 oz.) (LR9611), Approx. 61 g (2.2 oz.) (LR9612), Approx. 116 g (4.1 oz.) (LR9613)

LR9621 (sheath type)

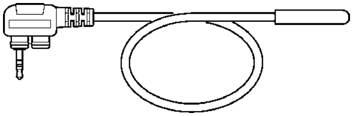
Sensor type	Thermistor
Operating temperature and humidity	-40°C to 120°C (-40.0°F to 248.0°F), 80%RH or less (non-condensating) Note: -20°C to 70°C (-4.0°F to 158.0°F) at connectors
Storage temperature and humidity	-40°C to 120°C (-40.0°F to 248.0°F), 80%RH or less (non-condensating) Note: -20°C to 70°C (-4.0°F to 158.0°F) at connectors
Response time	Approx. 90 sec. Note: 90% response time for temperature (reference value)
Dust and water protection rating	No
Operating environment	Indoors
Materials	Cable: Silicone Metal tip: SUS304
Dimensions	• Cable length (including metal tip): Approx. 1000 mm (39.37”) • Metal tip: Outside diameter Approx. 4 mm, Length Approx. 180 mm
Mass	Approx. 23 g (0.8 oz.)

LR9631 (needle type)

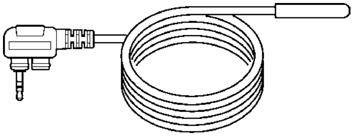
Sensor type	Thermistor
Operating temperature and humidity	-40°C to 120°C (-40.0°F to 248.0°F), 80%RH or less (non-condensating) Note: -20°C to 70°C (-4.0°F to 158.0°F) at connectors
Storage temperature and humidity	-40°C to 120°C (-40.0°F to 248.0°F), 80%RH or less (non-condensating) Note: -20°C to 70°C (-4.0°F to 158.0°F) at connectors
Response time	Approx. 20 sec. Note: 90% response time for temperature (reference value)
Dust and water protection rating	No
Operating environment	Indoors
Materials	Cable: Silicone Metal tip: SUS304
Dimensions	• Cable length (including metal tip): Approx. 1000 mm (39.37”) • Metal tip: Diameter Approx. 1.3 mm (0.05”), Length Approx. 25 mm (0.98”)
Mass	Approx. 17 g (0.6 oz.)

Appearance
molded resin type

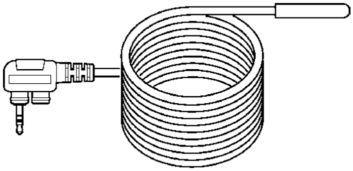
LR9601 Temperature Sensor (Approx. length 1 m)



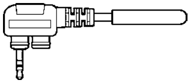
LR9602 Temperature Sensor (Approx. length 5 m)



LR9603 Temperature Sensor (Approx. length 10 m)

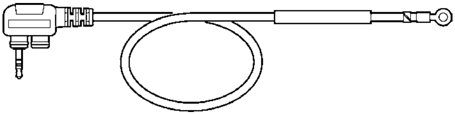


LR9604 Temperature Sensor (Approx. length 45 mm)

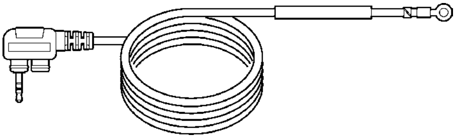


lug terminal type

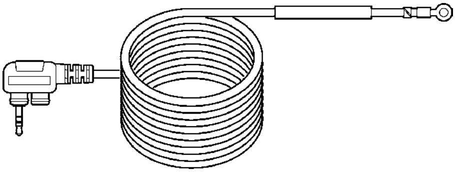
LR9611 Temperature Sensor (Approx. length 1 m)



LR9612 Temperature Sensor (Approx. length 5 m)

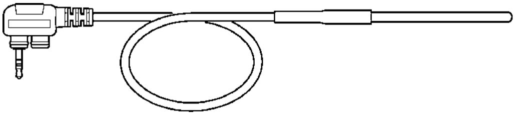


LR9613 Temperature Sensor (Approx. length 10 m)



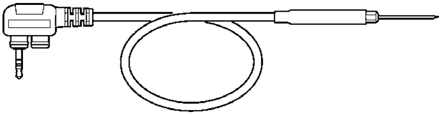
sheath type

LR9621 Temperature Sensor (Approx. length 1 m)



needle type

LR9631 Temperature Sensor (Approx. length 1 m)



Maintenance and Service

Chapter 9

Requesting repairs

- Use the original packing materials when transporting the instrument, if possible.
- Pack the instrument so that it will not sustain damage during shipping, and include a description of existing damage. We do not take any responsibility for damage incurred during shipping.
- Please contact your dealer or Hioki representative for information on where to submit products for repair.

When the logger will not be used for long time

⚠CAUTION To avoid corrosion and damage to this instrument from battery leakage, remove the batteries from the instrument if it is to be stored for a long time (1 week).

9.1 Cleaning

To clean the instrument, wipe it gently with a soft cloth moistened with water or mild detergent. Never use solvents such as benzene, alcohol, acetone, ether, ketones, thinners or gasoline, as they can deform and discolor the case.

NOTE Wipe the LCD gently with a soft, dry cloth.

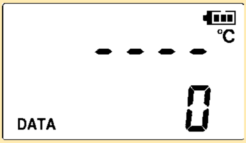
9.2 Disposing of the Logger

Obey local regulations for disposal of electronic equipment.

9.3 Troubleshooting

If damage is suspected, check the "Before requesting repairs" section before contacting your dealer or Hioki representative.

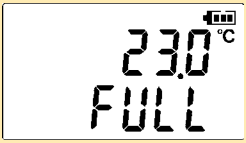
Before requesting repairs

Problem Symptom	Probable Causes	Remedies and References
The Utility Program cannot be installed.	• The computer operating environment may be incompatible. • The installation procedure may be incorrect.	Check the operating environment requirements, and try installing in (another) compatible computer. **See:** "LR5000 Utility Program Operating Requirements" (p.21) Refer to the installation procedure, and try again. Pay particular attention to the following: • Be sure to log in with an Administrator account. • Before installing, be sure to close any applications running on the computer. • If the installation screen does not appear, execute X:\English\Setup.exe. **See:** "Installation Procedure" (p.21)
No measured value is displayed. 	• The sensor plug is inserted incorrectly. • The sensor plug is not inserted all the way in. **NOTE** The maximum and minimum values are not displayed when the recorded data count is 0.	Verify the correct plug orientation, and insert it as far as possible. If the values are not displayed despite these measures, the sensor and logger need to be inspected and repaired. Please contact your dealer or Hioki representative. **See:** "Requesting repairs" (p.91) **[ERROR]** is displayed when this (faulty) data is imported by the Utility Program.
The display is blank.	Power save is enabled.	Press any button or send a communication signal to turn on the display. **See:** "Part Names/Functions and Display Indicators" (p.12)
The battery is depleted too quickly.	• The battery supplied with the logger is still being used. • A zinc-manganese battery is being used.	Install a new AA-size (LR6) alkaline battery. **See:** "2.1 Installing (or Replacing) the Battery" (p.17)

Before requesting repairs

Problem Symptom	Probable Causes	Remedies and References
Logger settings cannot be changed.	Dead battery.	When the 🔋 battery indicator appears, settings cannot be changed (but only displayed). Replace the battery. **See:** "2.1 Installing (or Replacing) the Battery" (p.17)
How can the logger's memory be erased?	–	Logger memory can be erased using the LR5000 Utility Program. **See:** "Other Settings on the Logger Settings Screen" (p.38) Note that data recorded prior to the last recording is automatically erased whenever recording starts. (The logger retains the data from both current and most recent prior recording operation.) **See:** "4.3 Starting and Stopping Recording" (p.42)
How can recorded values be reorganized?	–	Enable scaling. **See:** "5.1 Scaling" (p.63) Scaling settings can be made before recording. **See:** "Scaling (set as needed)" (p.36)
Recorded data has disappeared.	Recording was restarted after stopping.	Note that if recording is accidentally restarted after stopping, data recorded prior to the last recording is automatically erased. (The logger retains the data from both current and most recent prior recording operations.)

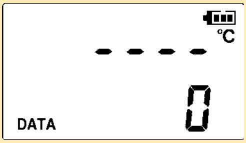
Before requesting repairs

Problem Symptom	Probable Causes	Remedies and References
The **[REC]** indicator disappears even though recording has not been stopped. 	The one-time recording stop method is selected.	With one-time recording, recording stops automatically when memory becomes full. Change the stop method to endless recording. **See:** Making Settings on the Logger:"Stop Method Setting (for when memory becomes full)" (p.30) **See:** Making Settings from the LR5000 Utility Program:"Stop Method" (p.35) (With endless recording, the oldest data is overwritten when memory is full, so be sure to save data to a computer periodically during long-term recording. Data can be saved to a computer without stopping recording.) **See:** "4.5 Automatically Importing (Saving) Recorded Data to a Computer, and Graph Display" (p.44)
The logger cannot communicate with the new LR5091 (LR5092).	The installation of the device driver to the LR5091 (LR5092) failed.	For Window XP, the driver may be required to be installed to each LR5091 (LR5092). Open Windows Device Manager and re-install the driver.

9.4 Error Displays

The display appears as follows when an error occurs on the logger.

Logger Error Displays

Error Displays	Meaning	Remedies and References
Err.1	Calibration data error: A fault occurred with the internal calibration data.	Inspection and repair is required. Please contact your dealer or Hioki representative. **See:** "Requesting repairs" (p.91)
Err.2	Microcomputer error: A fault occurred in microcomputer ROM/RAM.	
Err.3	Data recording error: A fault occurred in recording data or accessing settings.	
bAtt	Battery voltage is too low for normal logger operation.	Replace the battery. **See:** "2.1 Installing (or Replacing) the Battery" (p.17)
o.F. or U.F.	A measured value is out of range.	Out-of-range values cannot be displayed. **[OF]** or **[UF]** is displayed when this data is imported by the Utility Program.
	• The sensor plug is inserted incorrectly. • The sensor plug is not inserted all the way in. • The sensor is damaged. • The logger is damaged.	Verify the correct plug orientation, and insert it as far as possible. If the values are not displayed despite these measures, the sensor and logger need to be inspected and repaired. Please contact your dealer or Hioki representative. **See:** "Requesting repairs" (p.91) **[ERROR]** is displayed when this (faulty) data is imported by the Utility Program.

LR5000 Utility Program Error Displays

Error Displays	Meaning	Remedies and References
OF	A measured value is out of range.	Out-of-range values cannot be displayed.
UF		

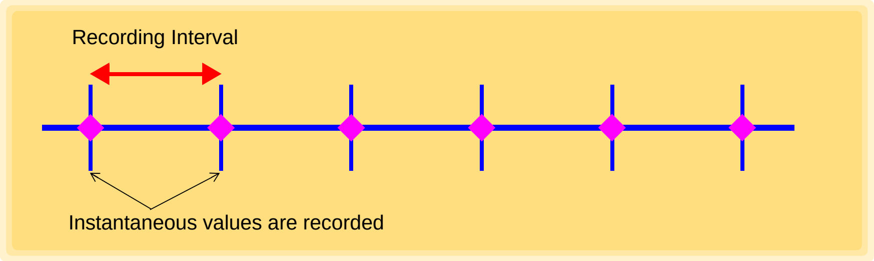
Appendix

Appendix 1 About Recording Modes

The recording method depends on the selected recording mode. The recording modes are as follows.

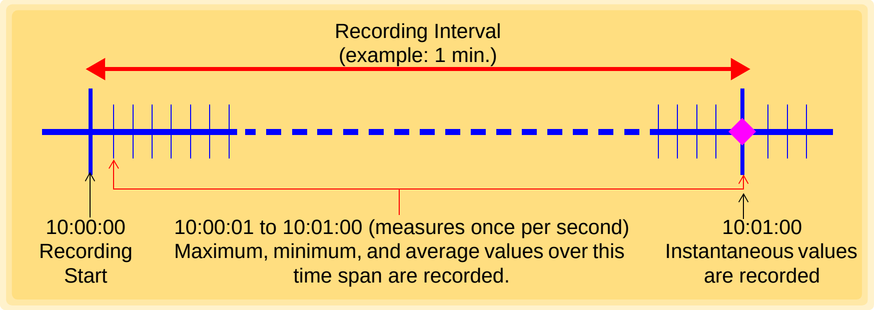
Instantaneous Recording

Measurements are recorded in internal memory at each recording interval.


Recording Interval
Instantaneous values are recorded

Statistical Recording

Measurements are taken once per second, and instantaneous, maximum, minimum, and average values are saved to internal memory at each recording interval.
Data at the recording start time is not recorded (in the following case, data at 10:00:00 is not recorded).


Recording Interval
(example: 1 min.)
10:00:00
Recording
Start
10:00:01 to 10:01:00 (measures once per second)
Maximum, minimum, and average values over this
time span are recorded.
10:01:00
Instantaneous values
are recorded

NOTE Statistical recording cannot be selected when the recording interval is set to one second.

Appendix 2 Recording Intervals and Maximum Recording Times

The recording time is calculated according to the recording capacity.

NOTE The maximum recording time is limited by the remaining battery capacity.

Instantaneous Recording

Up to 60,000 values can be recorded.

Recording Interval	Recording Time	Recording Interval	Recording Time
1 sec	16 h, 40 min	1 min	41 d, 16 h
2 sec	1 d, 9 h, 20 min	2 min	83 d, 8 h
5 sec	3 d, 11 h, 20 min	5 min	208 d, 8 h
10 sec	6 d, 22 h, 40 min	10 min	416 d, 16 h
15 sec	10 d, 10 h	15 min	625 d
20 sec	13 d, 21 h, 20 min	20 min	833 d, 8 h
30 sec	20 d, 20 h	30 min	1250 d
		60 min	2500 d

Statistical Recording

Up to 15,000 values can be recorded.

Recording Interval	Recording Time	Recording Interval	Recording Time
1 sec (Cannot be set)	-	1 min	10 d, 10 h
2 sec	8 h, 20 min	2 min	20 d, 20 h
5 sec	20 h, 50 min	5 min	52 d, 2 h
10 sec	1 d, 17 h, 40 min	10 min	104 d, 4 h
15 sec	2 d, 14 h, 30 min	15 min	156 d, 6 h
20 sec	3 d, 11 h, 20 min	20 min	208 d, 8 h
30 sec	5 d, 5 h	30 min	312 d, 12 h
		60 min	625 d

Appendix 3 Battery Life Approximation

Battery life depends on the recording interval.
The following table shows battery life when power saving (p.31) is enabled. Battery life is approximately two months when power saving is disabled or when the statistical recording mode is enabled.

Recording Interval	Battery Life	Recording Interval	Battery Life
1 sec	Approx. 60 days	30 sec	Approx. 1.5 year
10 sec	Approx. 1 year	1 min or more	Approx. 2 year

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