# HIOKI

# LR5011

Instruction Manual

# TEMPERATURE LOGGER



**EN**

*600329153*

**1**

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Appendix

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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.

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 |
|---|---|---|---|---|---|---|---|---|---|

◆ **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                    ☐ **Instruction Manual (1)**

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

☐ **Stand (1)**

☐ **Operation Manual (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)
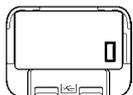
**See:** LR5091 specification:( p.84)

☐ **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.

☐ **LR9901 Wall-Mounted Holder**
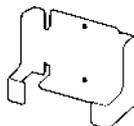
**See:** Method of mounting:( p.41)

☐ **LR9601, 9602, 9603, 9604 Temperature Sensor (molded resin type)**
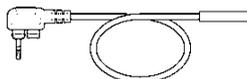
☐ **LR9611, 9612, 9613 Temperature Sensor (lug terminal type)**

☐ **LR9621 Temperature Sensor (sheath type)**
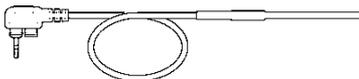
☐ **LR9631 Temperature Sensor (needle type)**
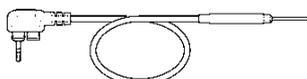
**See:** Temperature Sensor Specifications: ( p.87)

☐ **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 i n injury or death, as well a s 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)
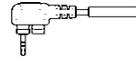
☐ LR5091 Communication Adapter(1)
(LR5000 Utility Program* CD [PC ap-
plication software] and USB Cable)

☐ Computer (1)
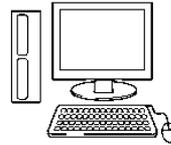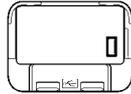
## Procedure:
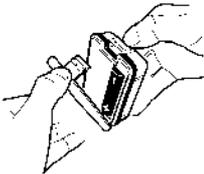
**1** Install the battery in the logger.
**See:** "2.1" ( p.17)
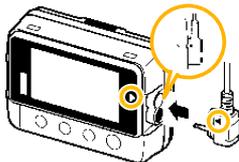
**2** Connect the LR9604 Temperature Sensor to the logger.
**See:** "2.2" ( p.20)

**3**
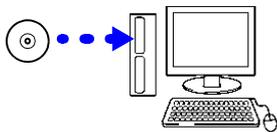


**3** Install the LR5000 Utility Program on the computer.
**See:** "2.3" ( p.21)

**4**



INTVL 10:00

**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**



TIME 2010
5-15

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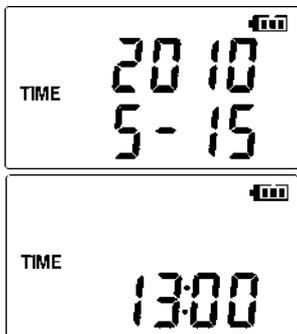
**5** Set the logger to the correct date and time (in this case, 15 May 2010, 13:00).
**See:** "Real-Time Clock Setting" ( p.29)

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

**6**



ENDLESS

oFF

**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**

STAT

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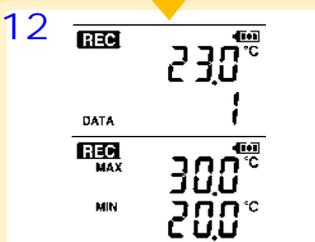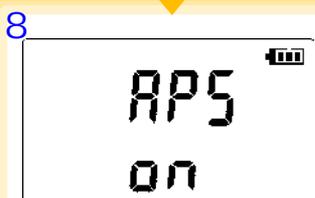
**7** Set the recording mode to **[OFF]**.

(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**

APS

on

**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)

**11**

REC                    ℃
23.0
0
DATA

**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**

REC          23.0 ℃
DATA          1
REC          30.0 ℃
MAX
MIN          20.0 ℃

**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**

**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.

REC 23.0℃

DATA 59999

**Splash-proof ingress protection (IP54)**
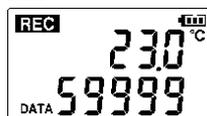
**Browse and manage data with LR5000 Utility Program on a PC.**

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.
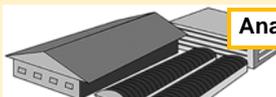
**Analysis Site**

**Measurement Sites**

# 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.
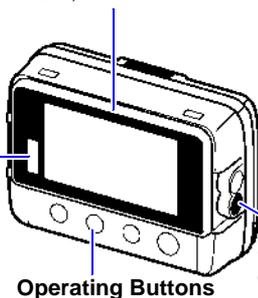
**Operating Buttons**

## 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)

### Sensor Jacks ( p.20)

Connect a temperature sensor.
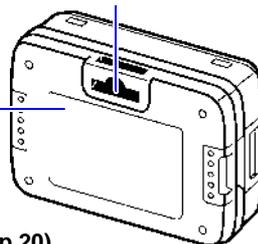
## Operating Buttons

### SET button

Displays settings.

### REC/STOP button

Hold for two seconds to start/stop recording.
From a setting display, switches to measurement display.
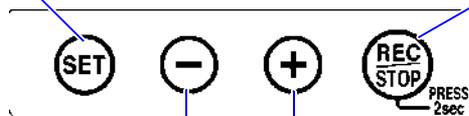
### (-) button, (+) button

Changes Measurement display contents.
Changes setting values on the Settings display.

## LR5091 Communication Adapter
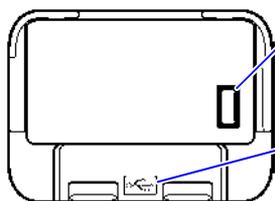
### IR Port ( p.44)

Communicates with the logger.

### USB Port ( p.32)

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

**1**

Chapter 1 Overview

## 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.

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

Not used by the logger.

**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.
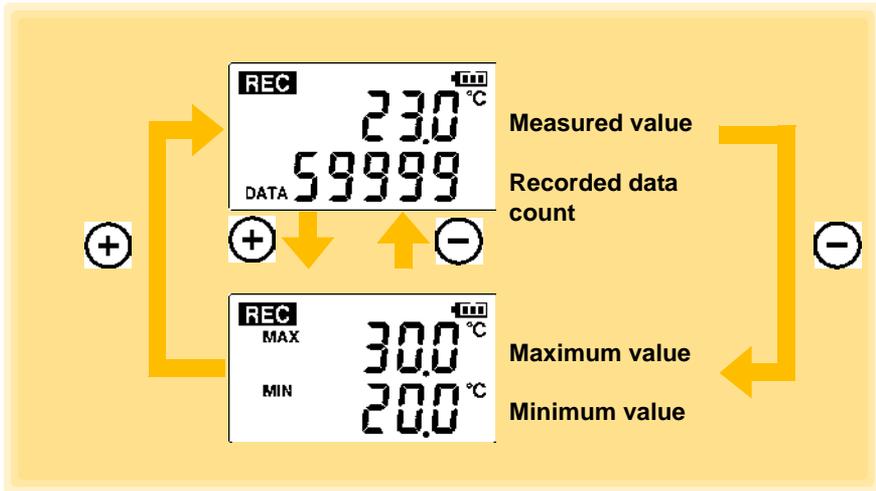


NOTE
- For instantaneous recording, the maximum and minimum values are obtained from all the data measured at each recording interval.
- For statistical recording, the maximum and minimum values are obtained from all the data measured every second.
- The maximum and minimum values are not displayed when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

**1**

## 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)

**Measuring Display**

**Power Save Setting ( p.31)**

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

**Recording Interval Setting ( p.28)**

**Recording Mode Setting ( p.31)**

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)

**Year Setting ( p.29)**

**Stop Method Setting ( p.30)**

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

**Month Setting ( p.29)**

**Minute Setting ( p.29)**

**Day Setting ( p.29)**

**Hour Setting ( p.29)**

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
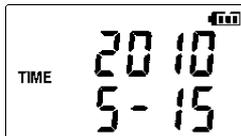
4. Year Setting display

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.

bAtt

## 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).

**2**

## Battery Replacement

Required Items: LR6 alkaline battery (1)

*1*

Battery cover

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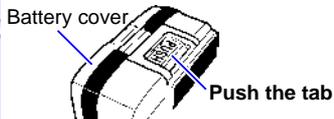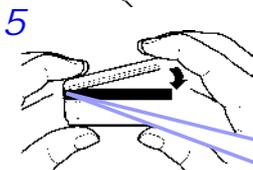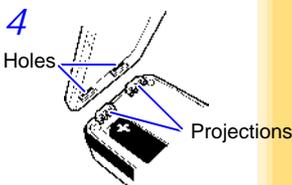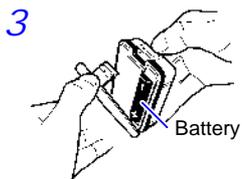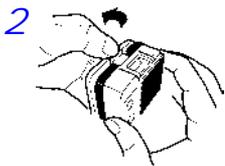
**1** Press the PUSH tab as shown, and pull the battery cover back.

*2*

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

**3** Install the battery as shown.

*3*

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

Battery

**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)

*4*

Holes

Projections

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.

*5*

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

*OK* 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
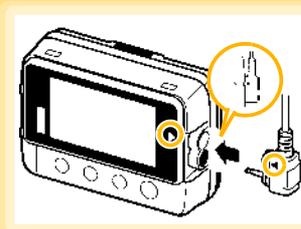


Align the triangle on the plug with the one in front of the sensor jacks, and insert the plug securely.

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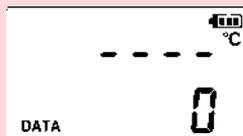


If values are not displayed correctly even when the plug is inserted properly, the logger or sensor may be damaged. Repair may be necessary.
**See:** "Requesting repairs" ( p.91)

## 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<br>Windows Vista SP1 or later<br>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<br>(Additional space is required for storing recorded data.<br>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
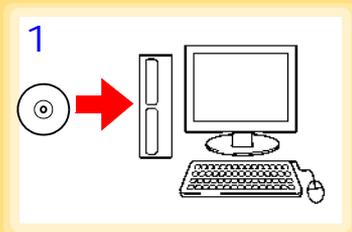


**1** Load the CD in the computer's CD-ROM drive.

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

**2** Chapter 2 Measurement Preparations

**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.
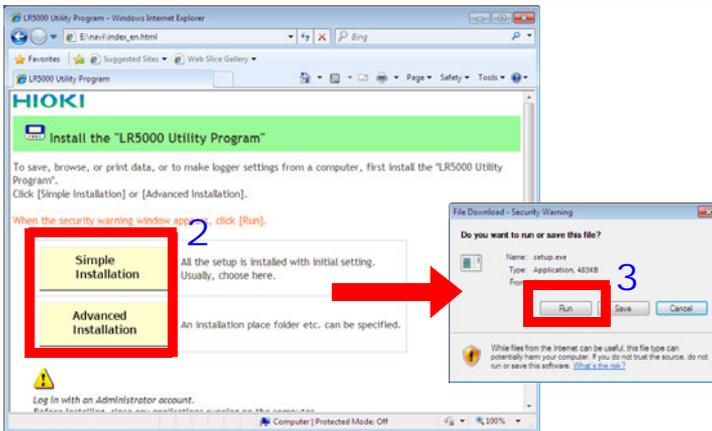


**How to start the program?**
The program starts automatically from the next Windows logon. (The icon appears in the task tray (notification area) ( p.32).)
 Click the icon and click **[Show Main Screen]**.

**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.)
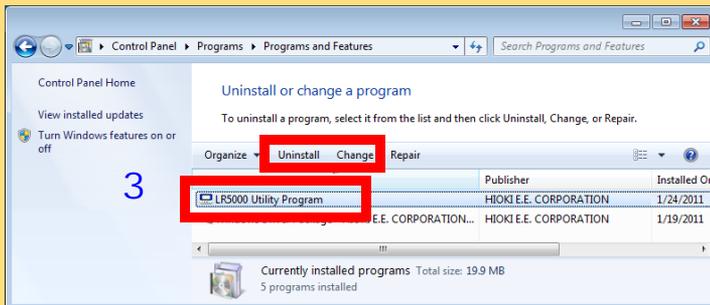


## Version Upgrading

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)

**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**

2011-01-23 20:51:28
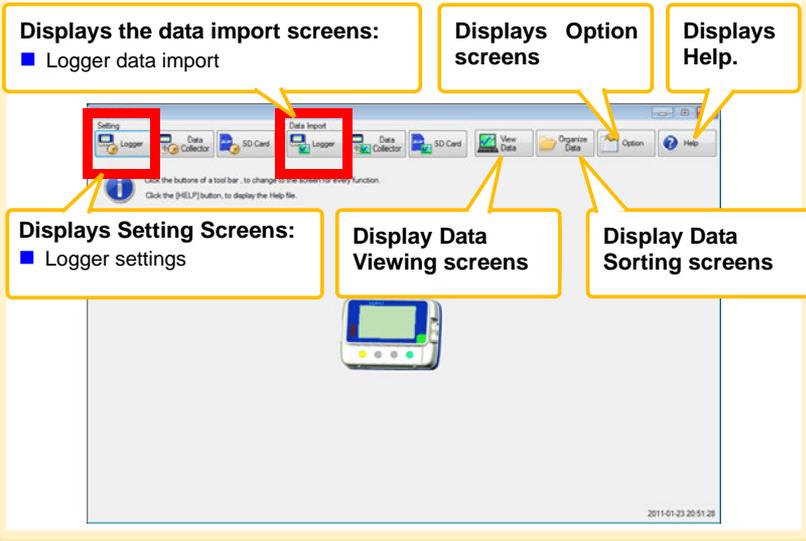
### Setting Screens ( p.33)

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**
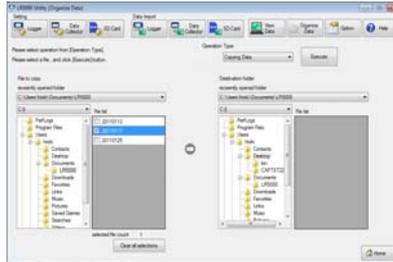


## Option Screens ( p.77)

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

**Example: Import Method Setting screen**
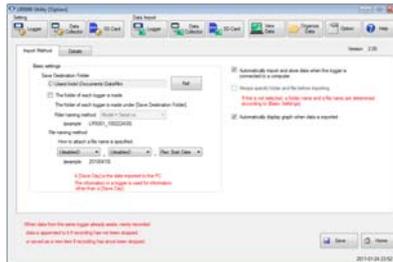
# Settings     Chapter 3

**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

**3**

**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**
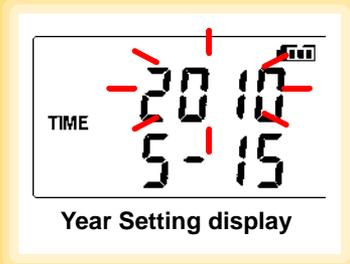
1   Press the **SET** button to display the time settings. (**[TIME]** is displayed, and the year setting blinks.)

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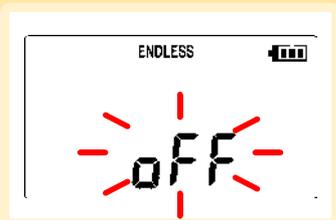
**1** Press the **SET** button to display the stop method setting. (The **[ENDLESS]** indicator appears, and the setting blinks.)

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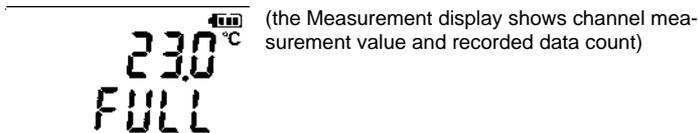
When memory becomes full during endless recording, the recorded data count (equal to the memory capacity) remains constant.

(instantaneous value recording display)

(statistical value recording display)
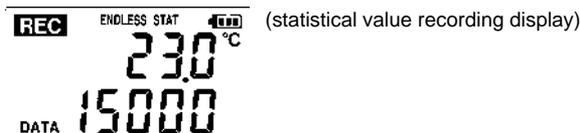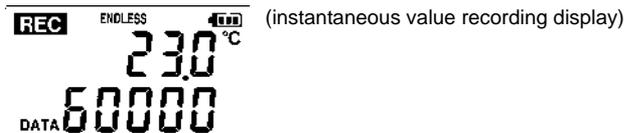
## Recording Mode Setting
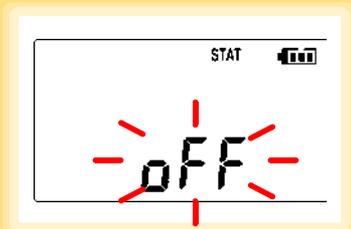
**1** Press the **SET** button to display the recording mode setting. (The **[STAT]** indicator appears, and the setting blinks.)

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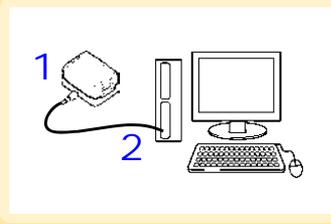
**1** Plug the USB cable into the USB port on the LR5091 (or LR5092-20), and into a USB port on the computer.

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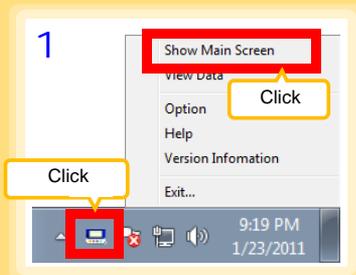
**1** If the main screen is not displayed on the computer, click the icon in the task tray (notification area), and click **[Show Main Screen]**.

The main screen appears.

Show Main Screen
View Data
Option
Help
Version Infomation
Exit...

Click

Click

9:19 PM
1/23/2011

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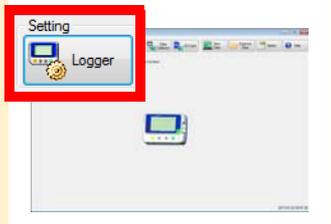
**2** For the **[Setting]**, click the **[Logger]** button.

Setting

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.

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.

**4**
Returns to the main screen.

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

**\* 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?**



Click a tab.
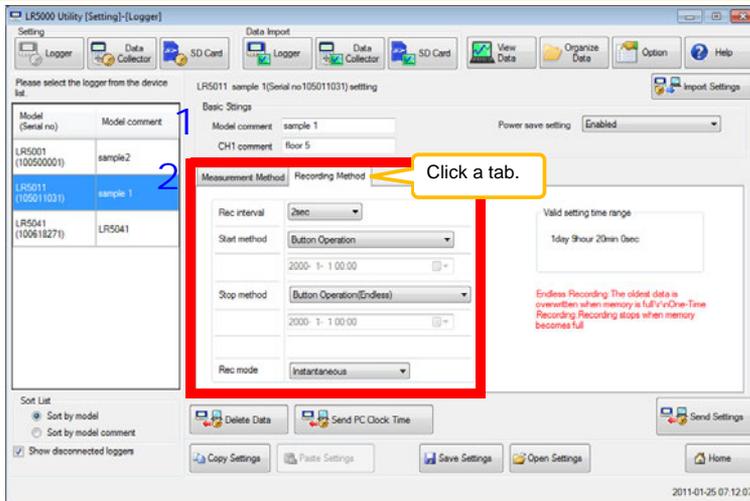
**1 Setting the [Basic Settings]**

| Model comment | Enter a comment to describe the logger as needed. |
|---|---|
| Power save setting | Enable or disable the power save setting ( p.31).<br>**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 — Click a tab.

CH1

| Scaling | Disabled | Edit |
|---|---|---|
| Alarm | Disabled | Edit |

Delete Data    Send PC Clock Time    Send Settings

Copy Settings    Paste Settings    Save Settings    Open Settings    Home
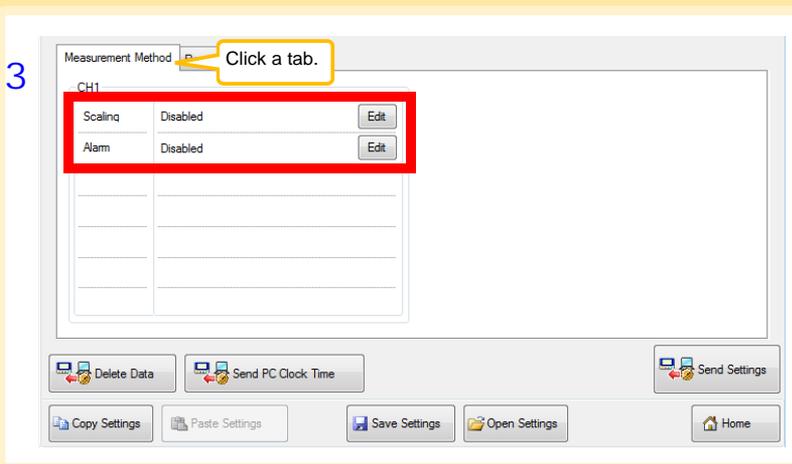
**Scaling (set as needed)** **See:** "What is Scaling?" ( p.38)

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.
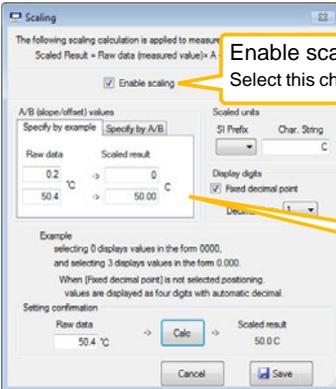
**Enable scaling**
Select this check box to enable scaling.

**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.)

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]**.<br>  (**[p]**=1E-12, **[n]**=1E-9, **[μ]**=1E-6, **[m]**=1E-3, blank =1E0, **[k]**=1E3, **[M]**=1E6, **[G]**=1E9, **[T]**=1E12)<br>• Enter the **[Char. String]** to identify the scaled units.<br>  (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.<br>  (Examples: selecting 0 displays values in the form 0000, and selecting 3 displays values in the form 0.000)<br>• 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.



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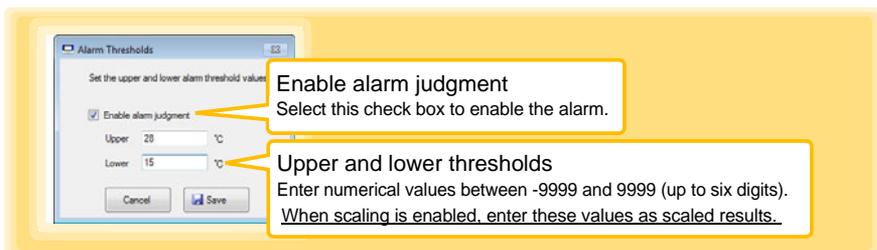
Click the **[Save]** button to save your settings.
(The display returns to the Logger Settings screen.)

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).

**3**

**Chapter 3 Settings**

## 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).

[Delete Data]   [Send PC Clock Time]

[Copy Settings]   [Paste Settings]   [Save Settings]   [Open Settings]
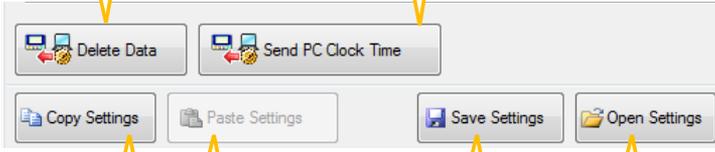
**Copy and Paste Settings**

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

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

**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).

## 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

(Scaled result)
[°C]
50.0
0.0
0.2  50.4  [°C]
Actual measured value (raw data)

A/B (slope/offset) values

| Specify by example | Specify by A/B |

Raw data → Scaled result

| 0.2 | → | 0 |
| 50.4 | → | 50.00 |
°C  C

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.

[°C]
1
Slope (coefficient A)
[°C]
-0.2 Offset (coefficient B)

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**

Chapter 4 Measurement and Analysis

# 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* Strap/stand attachment hole
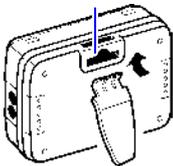
**1** Attach the stand to the strap/stand attachment hole.

*2*

**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*
*2*
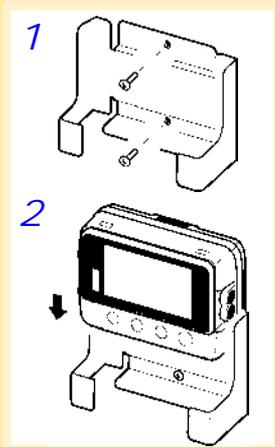
**1** Mount the LR9901 to the wall using the two screws.

**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*
*b*
*c*
*a*

*2*
Magnet
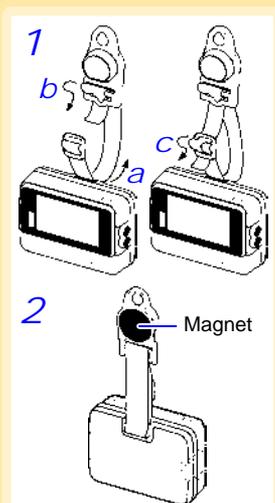
**1** Attach the Z5004 to the strap/stand attachment hole.

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

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

**4**

**Chapter 4 Measurement and Analysis**

## 4.3 Starting and Stopping Recording

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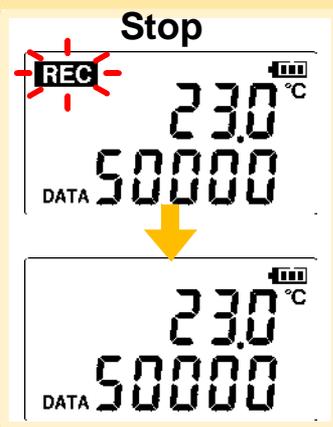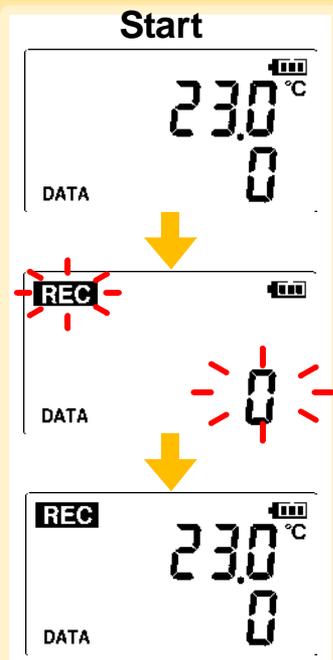
**Start** From the Measurement display, hold the **REC/STOP** button for two seconds.

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
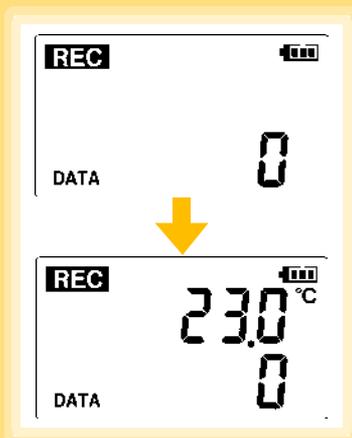


At 12:01:00, you press the **REC** button.
The **[REC]** indicator in the display turns on, but recording does not start yet.

**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.

12:01:00
Recording Start Operation

12:10:00
Actual Recording Start

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**
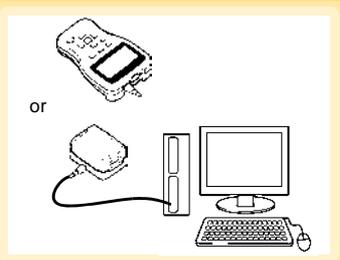
or

**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]**.
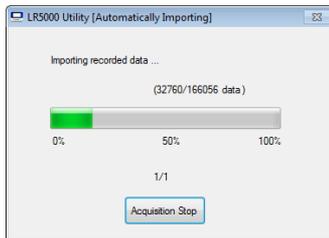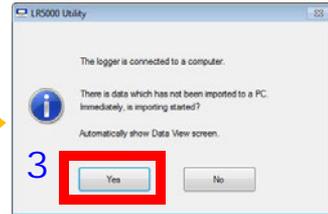


The data recorded in the logger is imported to the computer automatically.
Imported data is saved to a file (Auto Import).

Note: By default, **[Automatically import and store data when the logger is connected to a computer]** (on the Options screen) is enabled. ( p.78)
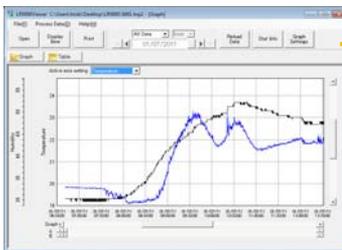
The viewer opens to display the graph (Auto Graph Display).

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.

**4**

Chapter 4 Measurement and Analysis

## Viewer Screen

The viewer screen appears as follows.

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

Opens a file containing recorded data.

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

The displayed time span can be specified.

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

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. |

**4**

Chapter 4 Measurement and Analysis

## Main Graph Features

The main graph features are shown below.

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]**.

**2** Click

Dotted Box

Magnify selected area
Return to previous picture
Save scale(No.1)   1/7/2011 6:37:30
Save scale(No.2)

? **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**
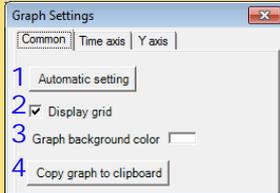
1  Automatically sets the time axis and Y-axis to the optimum scale.

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**
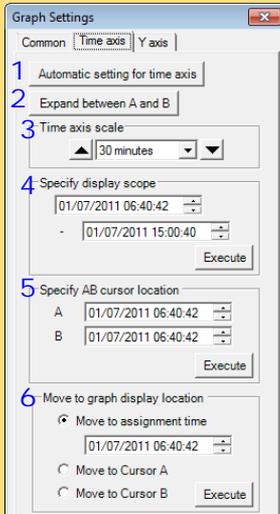
1  Automatically sets the time axis to the optimum scale.

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**



**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**

Times at A/B cursors

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



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**

## 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.

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.



1 Select up to 600 items for display.

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

### 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.**
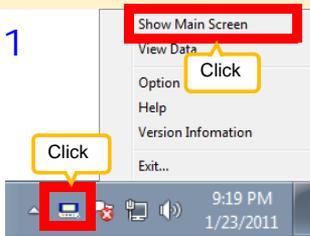
**1**

Show Main Screen
View Data
Option — Click
Help
Version Infomation
Click
Exit...

9:19 PM
1/23/2011

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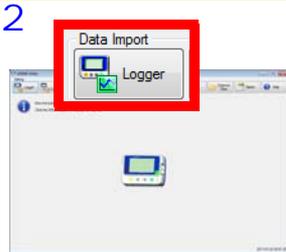
**2** For the **[Data Import]** device, click the **[Logger]** button.

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

**2**

Data Import

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 | Data Import

Logger | Data Collector | SD Card | Logger | Data Collector | SD Card | View Data | Organize Data | Option | Help

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 |
| --- | --- |
| LR5011 (105011031) | sample 1 |

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 |

**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.

Sort List
Sort by model
Sort by model comment

**See:** p.56

Re-import all data from the logger

**3** Start Importing

Home

Returns to the main screen.

2011-01-24 23:58:39

**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**



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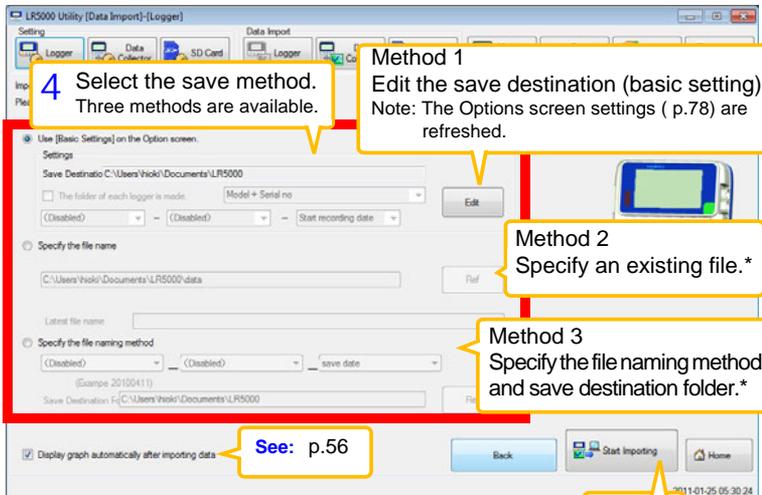
* When data from the same logger already exists, newly recorded data is appended to it if recording has not been stopped, or saved as a new item if recording has since been stopped.

**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**

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.**
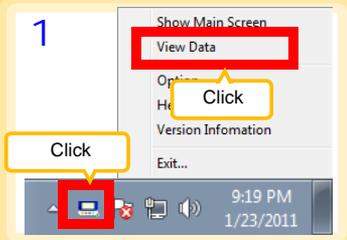
**1**

Show Main Screen
**View Data**
Click
Version Infomation
Exit...

9:19 PM
1/23/2011

Click

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

View Data

**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 | Data Import

Logger | Data Collector | SD Card | Logger | Data Collector | SD Card | View Data | Organize Data | Option | Help

View latest data | Search Folders

Select the logger from the list, and click [Display Graph] or [Display Table] button.
Select the logger from the list, show information about 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 |

Information about the latest data

Information about the latest data
Folder
C:\Users\hioki\Documents\LR5000
File name
20110125
Information 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 |

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

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

**3** Display Graph | Display Table | Home

2011-01-25 07:34.11

**4**

Chapter 4 Measurement and Analysis

## Other Data Viewing Screen Functions



**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.



**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
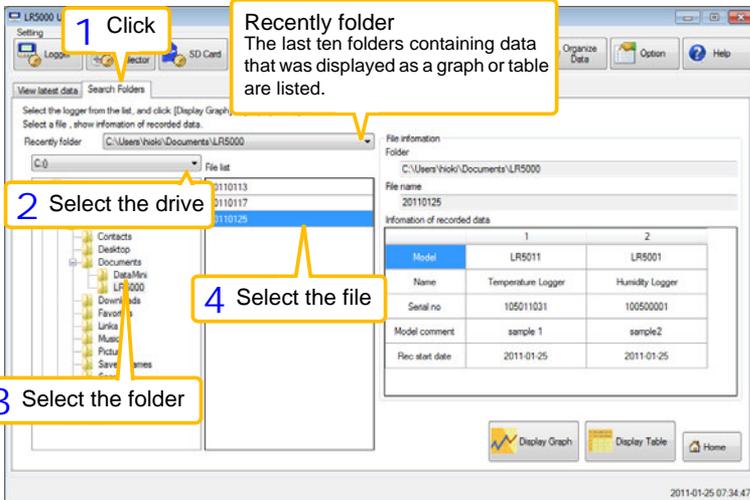
# 4.8 Printing Recorded Data

**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)

Click

LR5000Viewer C:\Users
File(F)    Process Data(D)    He  (H)
Open    Display Item    Print
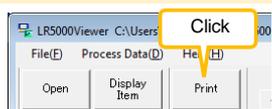
**How can I print only part of a graph?**
Specify the time span to print, and click **[Print]** button. Times that are not displayed are not printed.
**See:** "Viewer Screen" ( p.46)

**4**

Chapter 4 Measurement and Analysis

**Example Graph Printout**

**60**
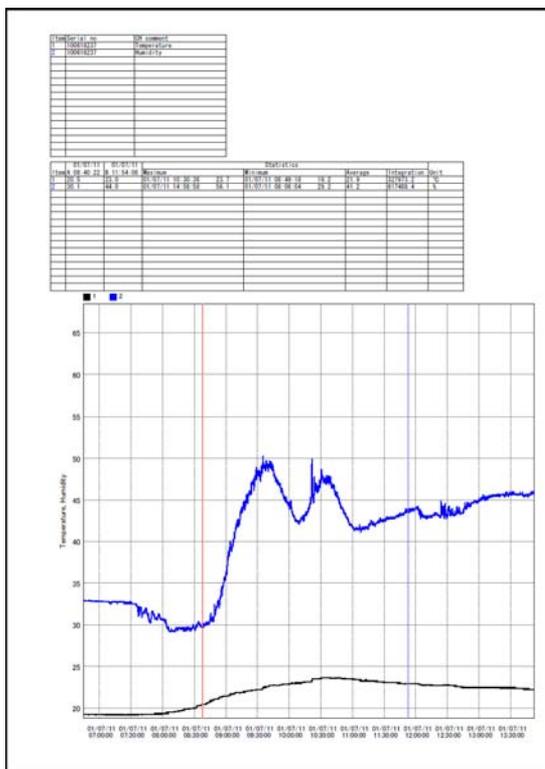
# Processing Recorded Data

# 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.**
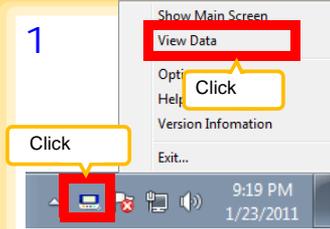


**1** If the LR5000 Utility Program is not running on the computer, click the icon in the task tray (notification area), and click **[View Data]**.

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.

Information about the latest data

**2** Click to select.
The currently selected logger's background is a different color.
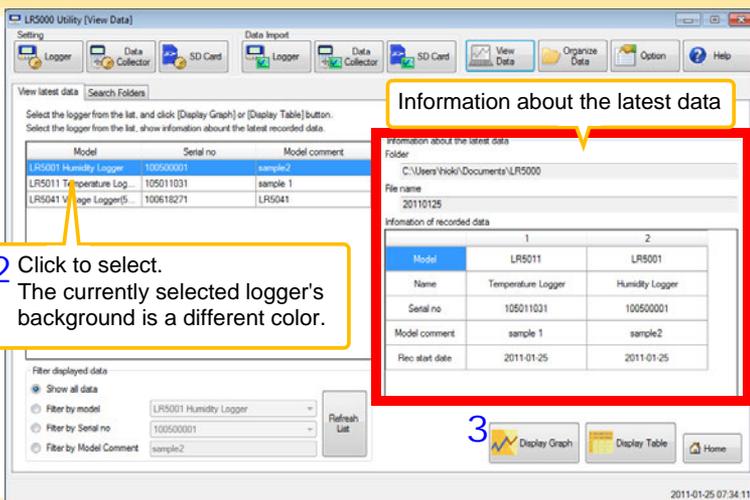
> **4** Click **[Process Data]** in the menu bar, and select the desired items.
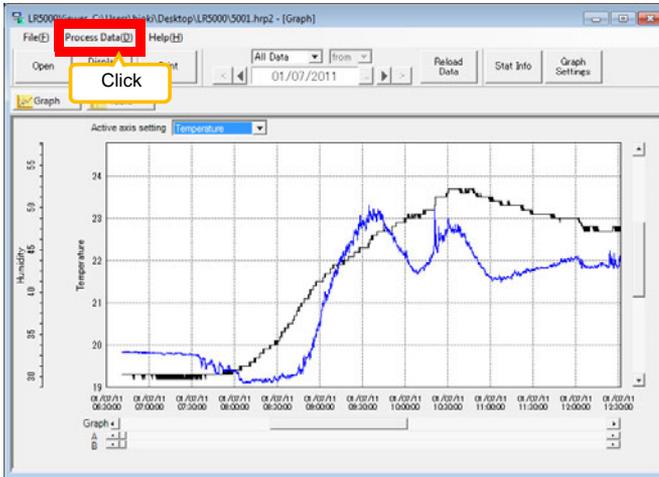


## [Process Data] Items

| 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.



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.)

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]**.<br>([p]=1E-12, [n]=1E-9, [μ]=1E-6, [m]=1E-3, blank =1E0, [k]=1E3, [M]=1E6, [G]=1E9, [T]=1E12)<br>• Enter a character string to identify the scaled units.<br>• (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.



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.

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.**
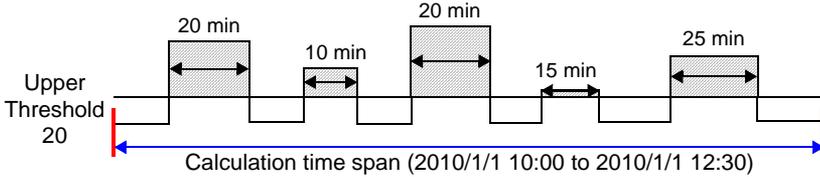


The sum of the times depicted by ⟷ is the operating time. (In the above diagram, operating time is 1.5 hours.)

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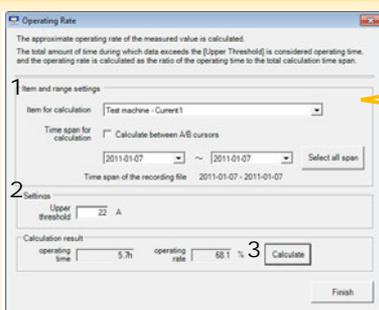


Item and range settings
Select the item for operating rate calculation, and the time span.
The time span can also be specified by setting the A/B cursors ( p.48) on a graph and selecting **[Calculate between A/B cursors]**.

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.



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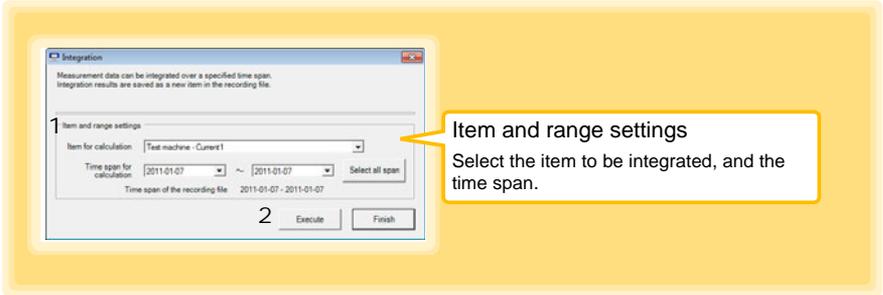
1. Select the item and time span.

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.



**Item and range settings**
Specify the temperature and humidity values, and the time span for calculation.
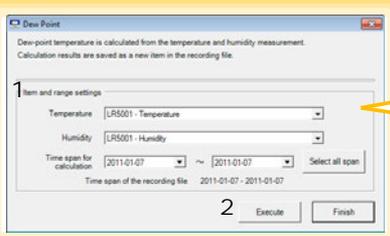
1. Select the items and time span.

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.



Item and range settings
Select the items for calculation, and the time span.
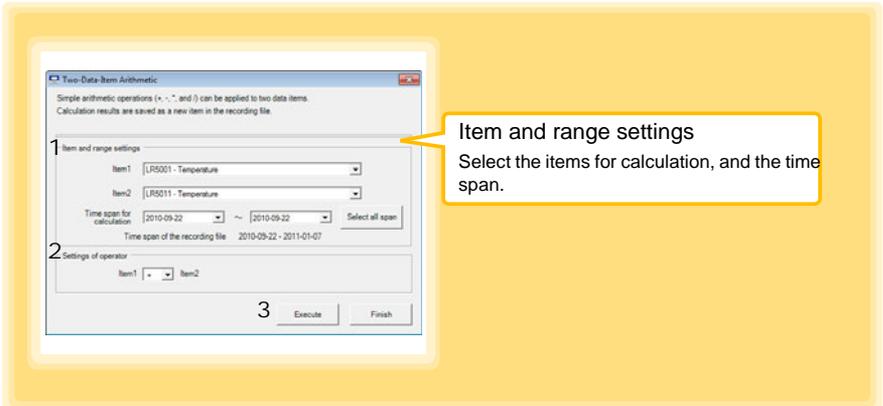
1. Select the items and time span.

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.



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
Click
Help
Version Infomation
Exit...

Click

9:19 PM
1/23/2011

**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.

**2** Organize Data

**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
Logger

Data Import

**3** Select
**4** Click

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

Execute

File to copy
recently opened folder
C:\Users\hioki\Documents\LR5000
C:0

File list
20110113
20110117
2011  5

**4** Select the desired file.

Destination folder
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
Saved Games
Searches

PerfLogs
Program Files
Users
hioki
Contacts
Desktop
bin
CAPTST22
Documents
LR5000
Downloads

**4** Select

Returns to the main screen.

selected file count:    1
Clear all selections

Home

Clears all selections (removes check marks).

Chapter 6 Organizing Data

**6**

# 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.**



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

**7** Click

**2** Select the drive.

**5** Select the drive.

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

**6** Select the folder.
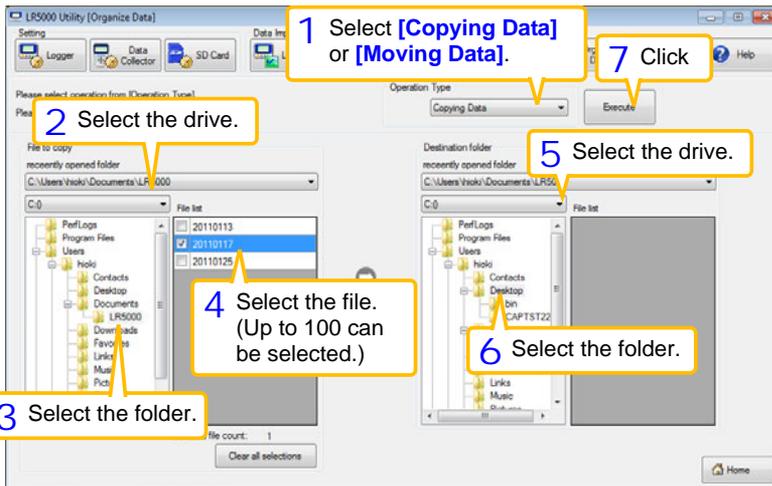
**3** Select the folder.

## 6.2 Deleting Data

**Select and delete logger recording files as follows.**

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



**1** Select **[Deleting Data]**.

**2** Select the drive.

**3** Select the folder.

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

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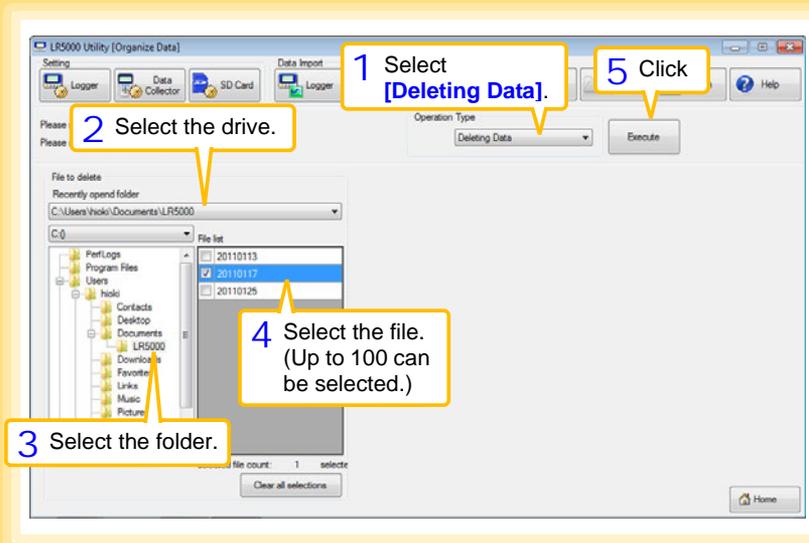
**How can I delete data from the logger's memory?**
See: "Delete Data" (p.38)

## 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.**



**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
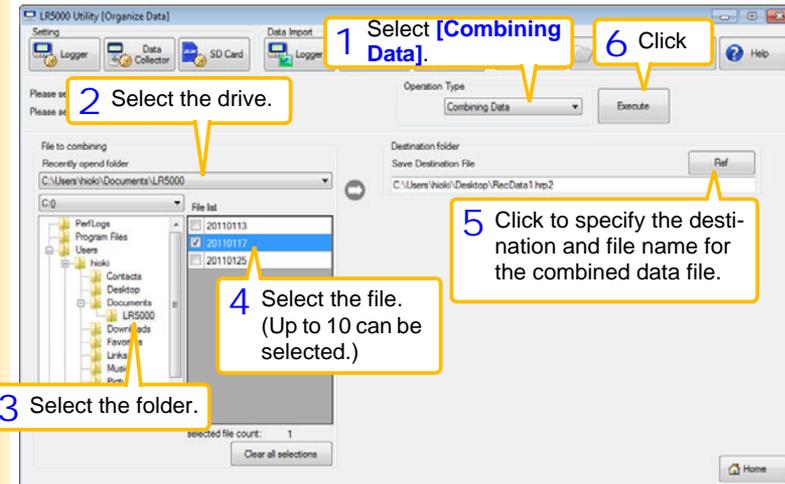
## 6.4 Extracting Data

**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.**

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

**1** Select **[Extracting Data]**.

**7** Click

**2** Select the drive.

**3** Select the folder.

**4** Select the file. (one only)

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

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# 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.

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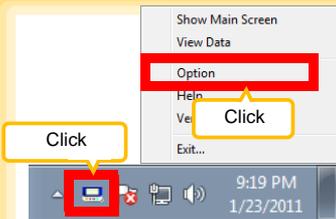
Note: If the LR5000 Utility Program is running, click **[Option]** on the main screen.

**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.

Returns to the main screen.
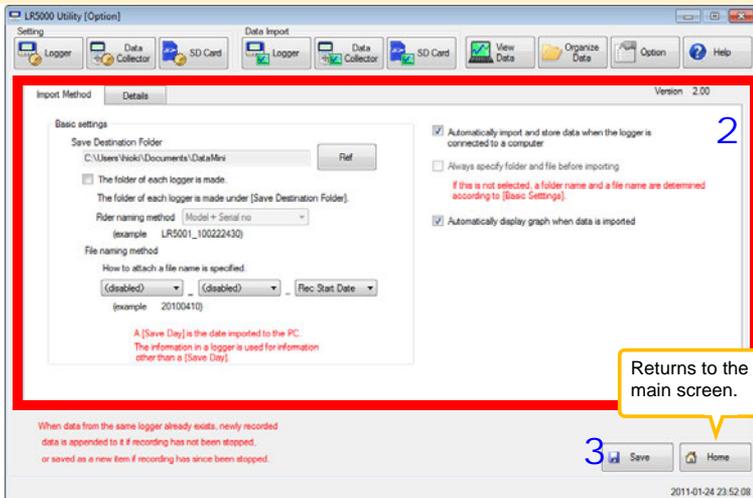
# 7.1 Changing the Saving Method for Imported Data

**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.
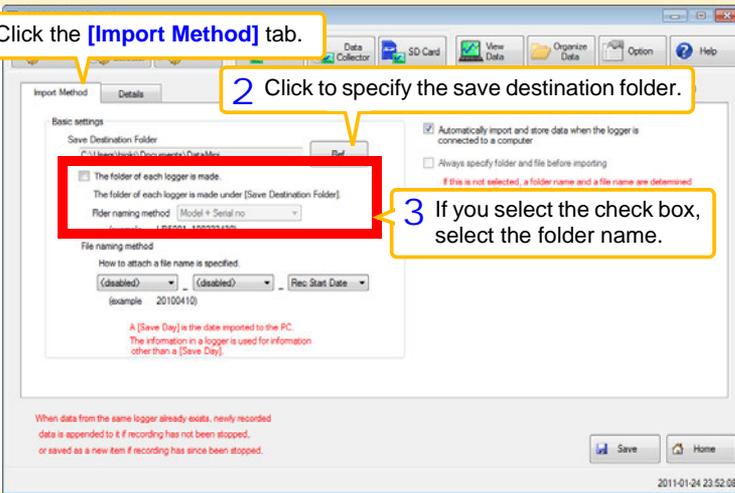
**How can the file naming method be changed?**

Set Auto Import and Auto Graph Display functions, if desired.
**See:** "4.5" ( p.44)
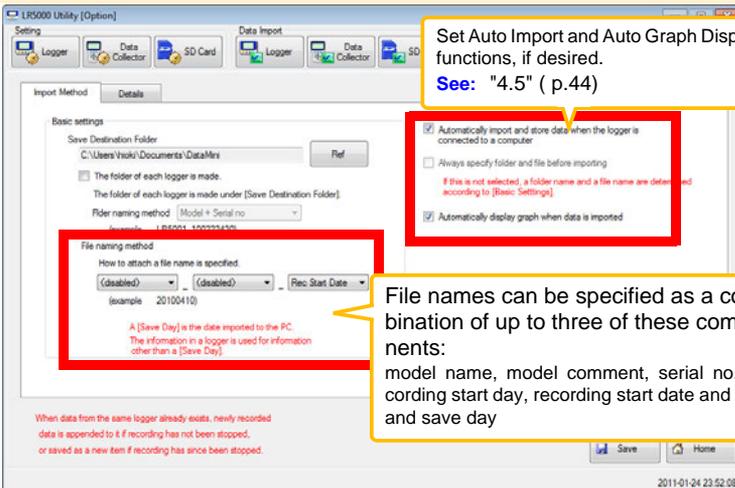
File names can be specified as a combination of up to three of these components:

model name, model comment, serial no., recording start day, recording start date and time, and save day

## 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?**
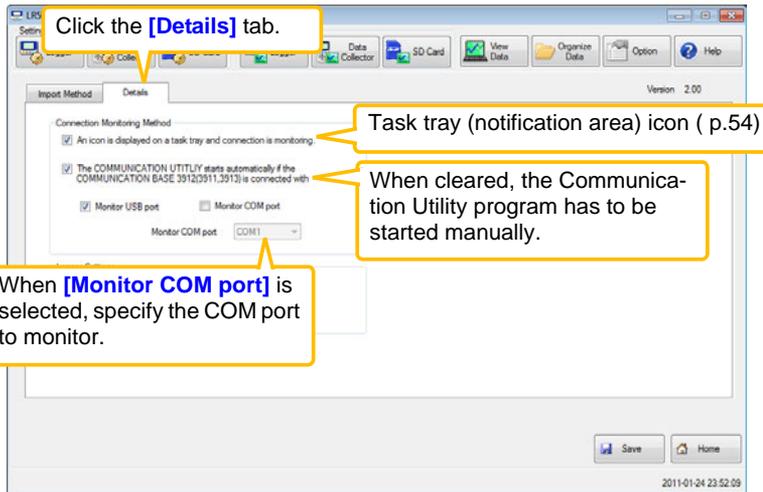
Click the **[Details]** tab.

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

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

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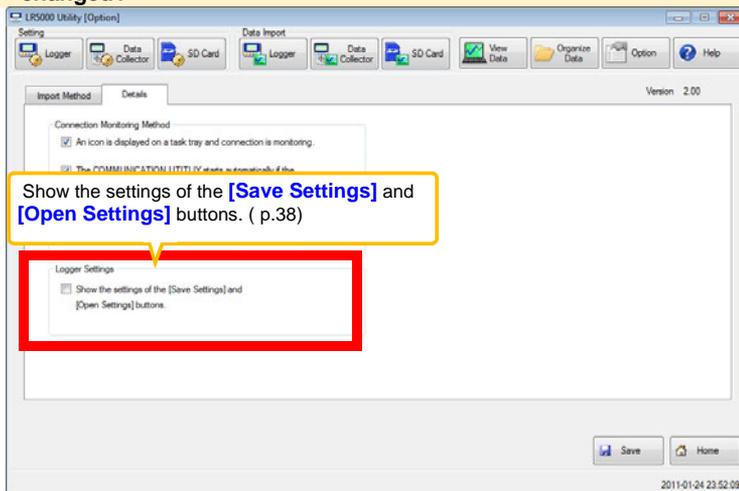
Show the settings of the **[Save Settings]** and **[Open Settings]** buttons. ( p.38)

# 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)<br>Note 1: Measurement range is limited according to sensor type.<br>Note 2: "UF" or "OF" indicates out-of-range measurement. |
| Measurement accuracy (logger + sensor) | • Temperature:<br>between -40.0°C (-40.0°F) and 0.0°C (32.0°F)　　　: ±1.0°C (±1.8°F)<br>between 0.0°C (32.0°F) and 35.0°C (95.0°F)　　　　: ±0.5°C (±0.9°F)<br>between 35.0°C (95.0°F) and 70.0°C (158.0°F)　　　: ±1.0°C (±1.8°F)<br>between 70.0°C (158.0°F) and 120.0°C (248.0°F) : ±2.0°C (±3.6°F)<br>120.0 to 180.0°C (248.0 to 356.0°F)　　　　　　: ±5.0°C (±9.0°F)<br> |
| Accuracy guarantee for temperature and humidity | • Temperature: -20.0°C to 70.0°C (-4.0°F to 158.0°F) (logger)<br>• Humidity: 80%RH or less (logger) non-condensating |
| Guaranteed accuracy period | 3 years |

8

Chapter 8 Specifications

## 8.2   Functional Specifications

| | |
|---|---|
| Display type | LCD |
| Display contents | Measured value, units (°C), recording (REC), endless recording (END-LESS), 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<br>• Statistical recording:<br>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<br>• Statistical recording:<br>15,000 instantaneous, maximum, minimum, and average values |
| Recording start method | • Logger button operation<br>• Instant or scheduled time (set by computer/Data Collector) |
| Recording stop method | • Logger button operation (endless recording)<br>• Logger button operation (one-time recording)<br>• Scheduled time (endless recording)<br>• Scheduled time (one-time recording)<br>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<br>• One LR6 alkaline battery<br>• 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))<br>• 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)<br>• Instruction Manual......................................... 1<br>• Operation Manual.......................................... 1<br>• Stand............................................................. 1 |
| Options | • LR5091 Communication Adapter<br>• LR5092-20 Data Collector<br>• LR9601 Temperature Sensor<br>• LR9602 Temperature Sensor<br>• LR9603 Temperature Sensor<br>• LR9604 Temperature Sensor<br>• LR9611 Temperature Sensor<br>• LR9612 Temperature Sensor<br>• LR9613 Temperature Sensor<br>• LR9621 Temperature Sensor<br>• LR9631 Temperature Sensor<br>• LR9901 Wall-Mounted Holder<br>• Z5004 Magnetic Strap |
| Environmental conditions | • Operating environment: indoors, pollution degree 2, up to 2000 m ASL<br>• Operating temperature and humidity: -20°C to 70°C (-4.0°F to 158.0°F), 80%RH or less (non-condensating)<br>• 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<br>• EMC  : EN61326 |

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Chapter 8 Specifications

## 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<br>Note: Communication with models LR5031 is supported by PC Utility version 1.05 and later.<br>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<br>• 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<br>• CPU: 1 GHz or faster processor clock<br>• RAM: at least 512 MB<br>• Operating system: Windows XP SP2 or later, Vista SP1 or later, or Windows 7<br>• Runtime library: .NET Framework 2.0/3.5<br>• Interface: USB (or COM port for models 3910, 3911, or 9612)<br>• Monitor resolution: 1024 x 768 or higher<br>• Hard disk: At least 30 MB free space<br> (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<br>Note1: Communication with models LR5031 is supported by PC Utility version 1.05 and later.<br>    LR5051 is supported by PC Utility version 1.01 and later.<br>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.<br>• All "Data Logger" models 363x to 364x<br>• Communication Base models 3910, 3911, and 3912 |
| Communication connections | Communication with LR5000-series loggers:<br>• Computer, USB cable, LR5091 Communication Adapter, and LR5000-series logger<br>• Computer, USB cable, LR5092-20 Data Collector, and LR5000-series logger<br>Communication with the LR5092-20 Data Collector:<br>Computer, USB cable, and LR5092-20 Data Collector |
| Setting functions | • Export/import settings by communication with the LR5000 series<br>• Settings exported from each LR5000 are stored on the computer<br>(the following functions are supported by the supplied PC Utility version 2.00, or later)<br>• Export/import settings by communication using the LR5092-20 Data Collector<br>• Import and save logger settings using the LR5092-20 Data Collector via communication or SD memory card<br>• 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. |

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**Chapter 8 Specifications**

| | |
|---|---|
| Data import functions | • Communicates with the LR5000-series loggers, and imports recorded data<br>• Combines recorded data<br>• Incorporates new data when an LR5000-series logger holds data not previously imported<br>(the following functions are supported by the supplied PC Utility version 2.00, or later)<br>• Communicates with the LR5092-20 Data Collector, and imports recorded data saved in the Data Collector<br>• 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<br>• Displays up to 16 Y-axes<br>• Displays one time base axis<br>• Set line colors for each channel, and display/hide lines and bar graphs for each channel<br>• Auto setting of time base and vertical axis<br>• Display/hide Y-axis grid lines, and set grid display density<br>• Select display background color<br>• Copy graph images to the clipboard<br>• A/B cursor functions<br>• Displays statistical data (maximum, minimum, and average) |
| Data list display functions | • Browse recorded data in tabular format<br>• Displays up to 600 channels<br>• Displays statistical data (maximum, minimum, and average) |
| Export functions | • Export all recorded data displayed in a table in CSV format<br>• Paste to Excel all recorded data displayed in a data table<br>• Export all recorded data between A/B cursors in CSV format<br>• Paste to Excel all recorded data between A/B cursors |
| Import functions | Import text files from the 3169 Clamp-On Power HiTester<br>Note: Only electric energy data recorded at one-second or longer interval can be imported |
| Printing functions | • Prints graphs and statistical data<br>• 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<br>(the following functions are supported by the supplied PC Utility version 2.00, or later)<br>• 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)<br>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)<br>Note: -20°C to 70°C (-4.0°F to 158.0°F) at connectors |
| Response time | Approx. 100 sec.<br>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<br>Sensor: Silicone |
| Dimensions | • Cable length (including sensor):<br>Approx. 1000 mm (39.37") (LR9601), Approx. 5000 mm (196.85") (LR9602), Approx. 10000 mm (393.70") (LR9603), Approx. 45 mm (1.77") (LR9604)<br>• 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)<br>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)<br>Note: -20°C to 70°C (-4.0°F to 158.0°F) at connectors |
| Response time | Approx. 45 sec.<br>Note: 90% response time for temperature (reference value) |
| Dust and water protection rating | No |
| Operating environment | Indoors |
| Dimensions | • Cable length (including metal tip):<br>Approx. 1000 mm (39.37") (LR9611), Approx. 5000 mm (196.85") (LR9612), Approx. 10000 mm (393.70") (LR9613)<br>• 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) |

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**Chapter 8 Specifications**

## 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)<br>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)<br>Note: -20°C to 70°C (-4.0°F to 158.0°F) at connectors |
| Response time | Approx. 90 sec.<br>Note: 90% response time for temperature (reference value) |
| Dust and water protection rating | No |
| Operating environment | Indoors |
| Materials | Cable: Silicone<br>Metal tip: SUS304 |
| Dimensions | • Cable length (including metal tip): Approx. 1000 mm (39.37")<br>• 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)<br>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)<br>Note: -20°C to 70°C (-4.0°F to 158.0°F) at connectors |
| Response time | Approx. 20 sec.<br>Note: 90% response time for temperature (reference value) |
| Dust and water protection rating | No |
| Operating environment | Indoors |
| Materials | Cable: Silicone<br>Metal tip: SUS304 |
| Dimensions | • Cable length (including metal tip):<br>Approx. 1000 mm (39.37")<br>• 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)**
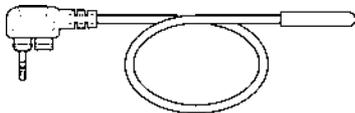


**LR9602 Temperature Sensor (Approx. length 5 m)**
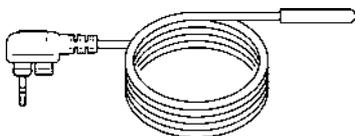


**LR9603 Temperature Sensor (Approx. length 10 m)**



**LR9604 Temperature Sensor (Approx. length 45 mm)**



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Chapter 8 Specifications
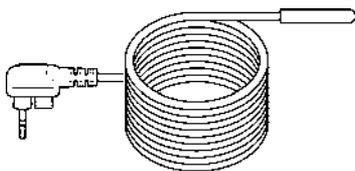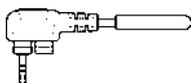
## lug terminal type

**LR9611 Temperature Sensor (Approx. length 1 m)**
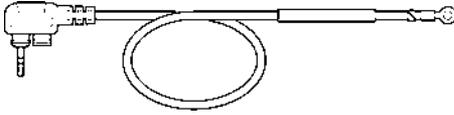
**LR9612 Temperature Sensor (Approx. length 5 m)**
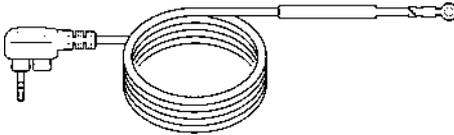
**LR9613 Temperature Sensor (Approx. length 10 m)**
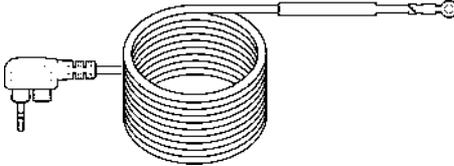
## sheath type

**LR9621 Temperature Sensor (Approx. length 1 m)**
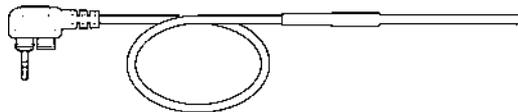
## needle type

**LR9631 Temperature Sensor (Approx. length 1 m)**
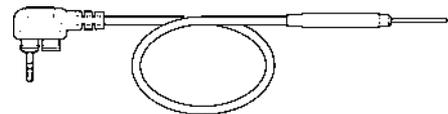
# Maintenance and Service　Chapter 9

## 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.<br>• The installation procedure may be incorrect. | Check the operating environment requirements, and try installing in (another) compatible computer.<br><br>**See:** "LR5000 Utility Program Operating Requirements" ( p.21)<br><br>Refer to the installation procedure, and try again.<br>Pay particular attention to the following:<br>• Be sure to log in with an Administrator account.<br>• Before installing, be sure to close any applications running on the computer.<br>• If the installation screen does not appear, execute X:\English\Setup.exe.<br><br>**See:** "Installation Procedure" ( p.21) |
| No measured value is displayed.<br><br>🔋 °C<br>- - - -<br>**DATA** 0 | • The sensor plug is inserted incorrectly.<br>• The sensor plug is not inserted all the way in.<br><br>_NOTE_<br>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.<br><br>If the values are not displayed despite these measures, the sensor and logger need to be inspected and repaired.<br>Please contact your dealer or Hioki representative.<br><br>**See:** "Requesting repairs" ( p.91)<br><br>**[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.<br><br>**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.<br>• A zinc-manganese battery is being used. | Install a new AA-size (LR6) alkaline battery.<br><br>**See:** "2.1 Installing (or Replacing) the Battery" ( p.17) |
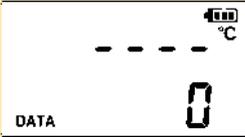
## Before requesting repairs

| 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.<br><br>**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.<br><br>**See:** "Other Settings on the Logger Settings Screen" ( p.38)<br><br>Note that data recorded prior to the last recording is automatically erased whenever recording starts.<br>(The logger retains the data from both current and most recent prior recording operation.)<br><br>**See:** "4.3 Starting and Stopping Recording" ( p.42) |
| How can recorded values be reorganized? | – | Enable scaling.<br>**See:** "5.1 Scaling" ( p.63)<br><br>Scaling settings can be made before recording.<br>**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.) |

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**Chapter 9 Maintenance and Service**

## Before requesting repairs

| Problem Symptom | Probable Causes | Remedies and References |
|---|---|---|
| The **[REC]** indicator disappears even though recording has not been stopped.<br><br>23.0°C<br>FULL | 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.<br><br>**See:** Making Settings on the Logger:"Stop Method Setting (for when memory becomes full)" ( p.30)<br>**See:** Making Settings from the LR5000 Utility Program:"Stop Method" ( p.35)<br><br>(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.)<br><br>**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).<br>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:<br>A fault occurred with the internal calibration data. | Inspection and repair is required. Please contact your dealer or Hioki representative.<br><br>**See:** "Requesting repairs" ( p.91) |
| **Err.2** | Microcomputer error:<br>A fault occurred in microcomputer ROM/RAM. | |
| **Err.3** | Data recording error:<br>A fault occurred in recording data or accessing settings. | |
| **bAtt** | Battery voltage is too low for normal logger operation. | Replace the battery.<br><br>**See:** "2.1 Installing (or Replacing) the Battery" ( p.17) |
| **oF.**<br>or<br>**UF.** | A measured value is out of range. | Out-of-range values cannot be displayed.<br>**[OF]** or **[UF]** is displayed when this data is imported by the Utility Program. |
| ▯▯▯ °C<br>- - - -<br>DATA **0** | • The sensor plug is inserted incorrectly.<br>• The sensor plug is not inserted all the way in.<br>• The sensor is damaged.<br>• The logger is damaged. | Verify the correct plug orientation, and insert it as far as possible.<br><br>If the values are not displayed despite these measures, the sensor and logger need to be inspected and repaired.<br>Please contact your dealer or Hioki representative.<br><br>**See:** "Requesting repairs" ( p.91)<br><br>**[ERROR]** is displayed when this (faulty) data is imported by the Utility Program. |
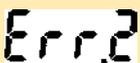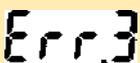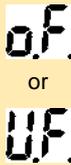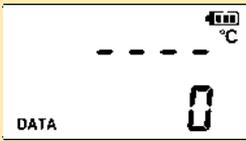
## LR5000 Utility Program Error Displays

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

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*9.4 Error Displays*

# 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.
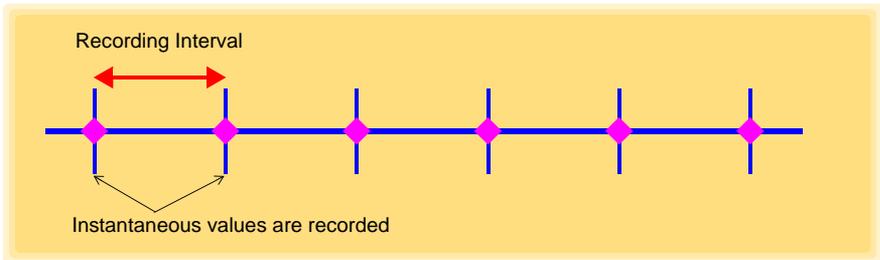


Recording Interval

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).
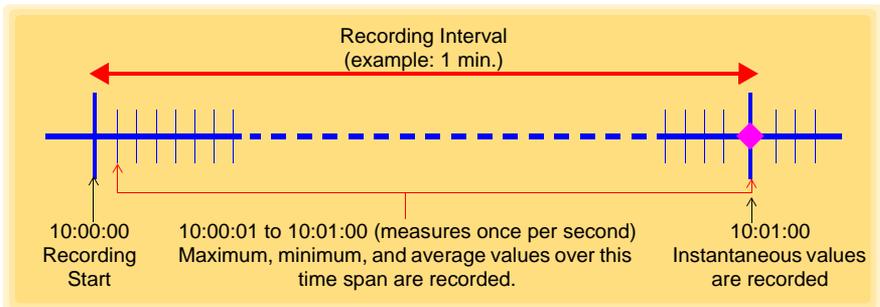


Recording Interval
(example: 1 min.)

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

# 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 |

# Index

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# Warranty Certificate

# HIOKI

| Model | Serial number | Warranty period |
|---|---|---|
| | | Three (3) years from date of purchase ( ___ / ___ ) |

Customer name: _____

Customer address: _____

**Important**
- Please retain this warranty certificate. Duplicates cannot be reissued.
- Complete the certificate with the model number, serial number, and date of purchase, along with your name and address. The personal information you provide on this form will only be used to provide repair service and information about Hioki products and services.

This document certifies that the product has been inspected and verified to conform to Hioki's standards.
Please contact the place of purchase in the event of a malfunction and provide this document, in which case Hioki will repair or replace the product subject to the warranty terms described below.

**Warranty terms**
1. The product is guaranteed to operate properly during the warranty period (three [3] years from the date of purchase). If the date of purchase is unknown, the warranty period is defined as three (3) years from the date (month and year) of manufacture (as indicated by the first four digits of the serial number in YYMM format).
2. If the product came with an AC adapter, the adapter is warrantied for one (1) year from the date of purchase.
3. The accuracy of measured values and other data generated by the product is guaranteed as described in the product specifications.
4. In the event that the product or AC adapter malfunctions during its respective warranty period due to a defect of workmanship or materials, Hioki will repair or replace the product or AC adapter free of charge.
5. The following malfunctions and issues are not covered by the warranty and as such are not subject to free repair or replacement:
    -1. Malfunctions or damage of consumables, parts with a defined service life, etc.
    -2. Malfunctions or damage of connectors, cables, etc.
    -3. Malfunctions or damage caused by shipment, dropping, relocation, etc., after purchase of the product
    -4. Malfunctions or damage caused by inappropriate handling that violates information found in the instruction manual or on precautionary labeling on the product itself
    -5. Malfunctions or damage caused by a failure to perform maintenance or inspections as required by law or recommended in the instruction manual
    -6. Malfunctions or damage caused by fire, storms or flooding, earthquakes, lightning, power anomalies (involving voltage, frequency, etc.), war or unrest, contamination with radiation, or other acts of God
    -7. Damage that is limited to the product's appearance (cosmetic blemishes, deformation of enclosure shape, fading of color, etc.)
    -8. Other malfunctions or damage for which Hioki is not responsible
6. The warranty will be considered invalidated in the following circumstances, in which case Hioki will be unable to perform service such as repair or calibration:
    -1. If the product has been repaired or modified by a company, entity, or individual other than Hioki
    -2. If the product has been embedded in another piece of equipment for use in a special application (aerospace, nuclear power, medical use, vehicle control, etc.) without Hioki's having received prior notice
7. If you experience a loss caused by use of the product and Hioki determines that it is responsible for the underlying issue, Hioki will provide compensation in an amount not to exceed the purchase price, with the following exceptions:
    -1. Secondary damage arising from damage to a measured device or component that was caused by use of the product
    -2. Damage arising from measurement results provided by the product
    -3. Damage to a device other than the product that was sustained when connecting the device to the product (including via network connections)
8. Hioki reserves the right to decline to perform repair, calibration, or other service for products for which a certain amount of time has passed since their manufacture, products whose parts have been discontinued, and products that cannot be repaired due to unforeseen circumstances.

**HIOKI E.E. CORPORATION**
http://www.hioki.com          18-07 EN-3

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