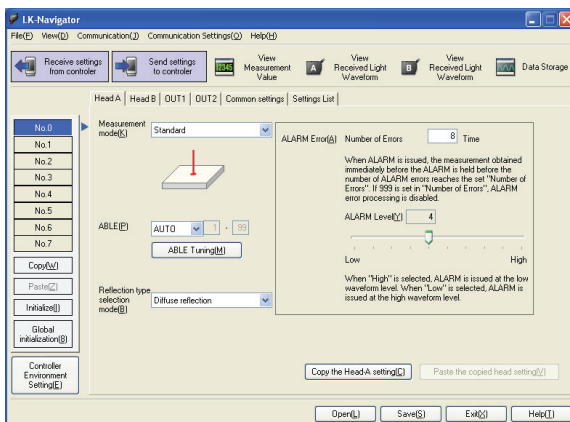


For LK-G Series Setting and Support Software LK-H1W

LK-Navigator User's Manual

Read this manual before using the software in order to achieve maximum performance.

Keep this manual in a safe place for future reference.



Introduction

This manual describes installation procedure, handling method, operating procedure and precautions of the LK-Navigator. Read this manual carefully before starting to use the software to ensure the optimum performance and full function of the LK-Navigator. Keep this manual in a safe place for future reference.

Together with this User's Manual, read the LK-G series User's Manual when using the "LK-Navigator".

The following terminology is used in this manual.

"Controller": Indicates the Controller (LK-G3001V, LK-G3001) of the LK-G series.

■ Symbols

The following symbols alert you to matters concerning the prevention of human injury and product damage beforehand in this Manual.

► Note

Provides additional information on proper operations that can be easily mistaken.

Reference

Provides advanced and useful information for operation.

Safety Precautions

"LK-Navigator" and User's Manual contain the important information to prevent injury or death to the machine operators and other people, to prevent damage to the assets beforehand, and to ensure safe use. Fully understand the meanings of the warning indications (conventions and symbols) first. Then, read the User's Guide thoroughly and follow the safety rules as specified. Read the User's Guides and Operation Manuals of the related devices and equipment before starting to use the system.

■ Symbols

► Note

Provides additional information on proper operations that can be easily mistaken.

Reference

Provides advanced and useful information for operation.

■ General Cautions

- At startup and during operation, be sure to monitor the functions and performance of the LK-Navigator.
- We recommend that you take substantial safety measures to avoid any damage in the event of a problem occurring.
- Do not attempt to open or modify the sensor or use it in any way other than as described in the specifications. If the sensor is modified or used other than as described, the warranty will be voided.
- When the sensor is used in combination with other devices, functions and performance may be degraded, depending on the operating conditions and surrounding environment.
- The information and contents described herein are subject to change without prior notice.

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Organization of this Manual

| | | |
|----------------------------|--------------------------------------|--|
| Chapter 1 | Overview | Describes the package contents, outline of the LK-Navigator, and operating environment. |
| Chapter 2 | Preparations | Describes the installation procedure, startup and stop of the "LK-Navigator". |
| Chapter 3 | Operations and Functions of Software | Describes the method of setting parameters and operation procedure of the "LK-Navigator". |
| Appendices | Appendices | Describes the list of error messages together with their remedies, and index of the words and terms used in this Manual. |

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Overview

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Overview of LK-Navigator

1

The "LK-Navigator" is the parameter setting and monitoring software of the controller. When the controller is connected to a PC, this software enables the operator to set the parameters and to monitor the operating status of the controller from a PC.

Functions and Features

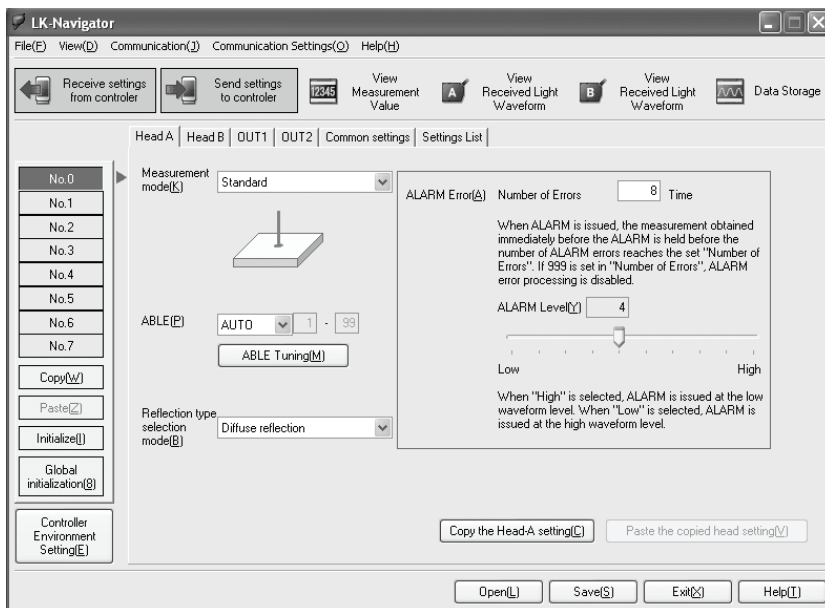
The main functions and features of the "LK-Navigator" are described as follows.

■ Operation Setting

- The settings of the controller can be received by a PC, enabling the operator to check and modify the settings. When multiple equipment or programs need to be set, they can be quickly and easily set by using the Copy and Paste functions of the software.
- The settings created on the PC can then be sent to the controller to set it. Communication between the controller and PC is done simply by pressing the corresponding buttons.
- The settings of the controller can be read and saved by PC. Because the controller settings can be saved in a PC, the settings can be recovered from a file saved in the PC in the event of accidental erasure of the settings in the controller.

The following settings can be made from a PC.

- Head Settings
- OUT Settings
- Common Settings
- Environment Settings

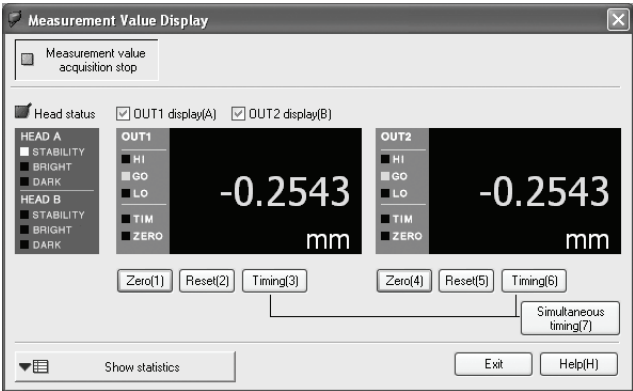


■ Monitoring Function

This software can monitor the following two items.

- Measured value
- Received light waveform

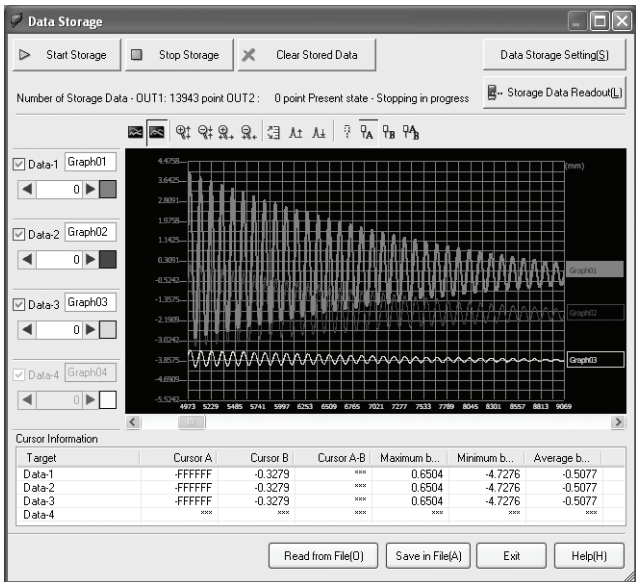
The following screen shows an example of [Measurement Value Display].



■ Data Storage

This controller has a data storage function that can store the measured values. The functions that can be operated from a PC are shown below.

- Starting/stopping/clearing the data storage
- Determining the method of data storage
- Sending and receiving the settings between the controller and PC
- Receiving the stored data from the controller
- Reading and saving the stored data from a PC
- Displaying on a PC up to four waveforms of data received from the controller
- Displaying the calculated values between two waveforms selected by moving the cursor



Operating Environment

The following environment is required to run the "LK-Navigator". Check that the system complies with the following conditions and the required equipment is available.

| | |
|-------------------------|---|
| CPU | Pentium III, 400 MHz or higher |
| Supported OS | Windows 11 Pro Windows 10 ^{*1} Windows 7 (SP1 or later) ^{*2} Windows Vista (SP2 or later) ^{*3} Windows XP (SP3 or later) ^{*4} |
| Memory capacity | 64 Mbytes or more |
| Display resolution | 800 x 600 pixels, 256 colors or more |
| Free space on hard disk | 10 Mbytes or more |
| Interface | RS-232C (serial port) or USB (version 1.1 onward) must be installed. |

- *1 Home, Pro, and Enterprise editions each are supported.
- *2 Home Premium, Professional, and Ultimate editions each are supported.
- *3 Ultimate, Business, Home Premium, and Home Basic editions each are supported.
- *4 Professional and Home Edition editions each are supported.

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Preparations

2

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Connecting the Controller to a PC

The method to connect the controller to a PC is described below. Either the USB or RS-232C interface can be used. Select an appropriate method in accordance with the PC.

► Note

The USB and RS-232C interfaces cannot be used at the same time even though they are both connected.

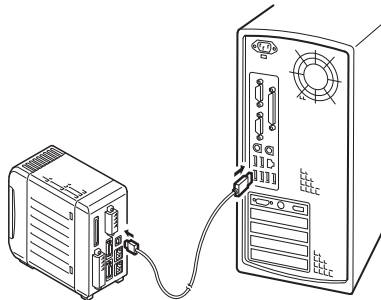
Connection using USB

The method to connect the controller to a PC via a USB cable is described as follows.

- 📖 The location and direction of the USB connector may differ depending on PC. When connecting a USB cable, refer to the Operating Instructions supplied with the PC.

► Note

The USB connector of the controller is Type-B connector. Connect the USB cable that has the Type-B connector at one end.



1 Connect the Type-B connector of the USB cable to the controller.

2 Connect the other end to the USB connector of the PC.

If the PC is already running, it will recognize the controller automatically.


- 📖 When connecting the controller to the PC with the USB interface for the first time, install the driver software. Refer to "Installing the USB Driver" (page 2-10).

► Note

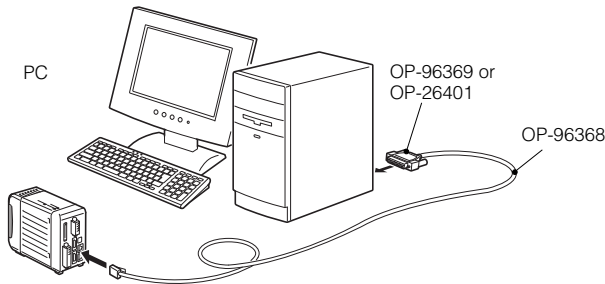
Do not remove the USB cable while the controller is running. Otherwise, the controller may not function correctly. If the communication is disabled by accidental disconnection of the USB cable, restart both of the "LK-Navigator" and the controller.

Connection using RS-232C

The method to connect the controller to a PC using the RS-232C cable is described as follows.

 The location and direction of the RS-232C port may differ depending on PC. When connecting the RS-232C cable, refer to the Operating Instructions supplied with the PC.

To connect the controller to a PC using the RS-232C cable, a dedicated cable OP-96368 (straight cable 2.5 m) and a OP-96369 (D-sub 25-pin connector) or OP-26401 (D-sub 9-pin connector) are required as shown below.



- 1** Connect the dedicated cable OP-96368 to the RS-232C connector of the controller.
- 2** Connect OP-96368 to OP-96369, and connect the cable to the RS-232C connector of a PC.

Connection using OP-96369 (D-sub 25-pin connector) is shown as an example.

Installation

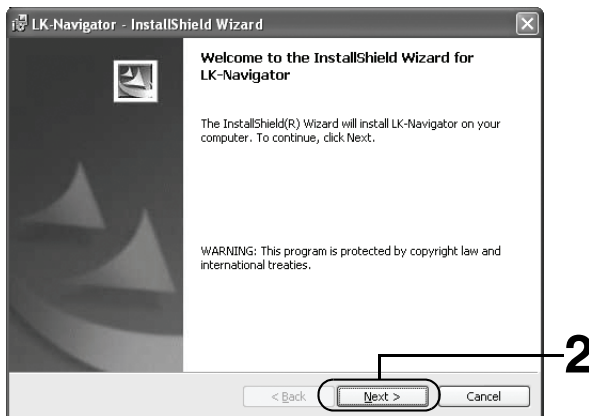
The procedure to install the "LK-Navigator" and "USB Driver" in a PC is described below.

► Note

- Installation of the USB driver in Windows XP is described as an example.
- Before starting installation, quit all applications that are already running.
- To install the USB driver, log on to the PC as the user that has administrator authority.

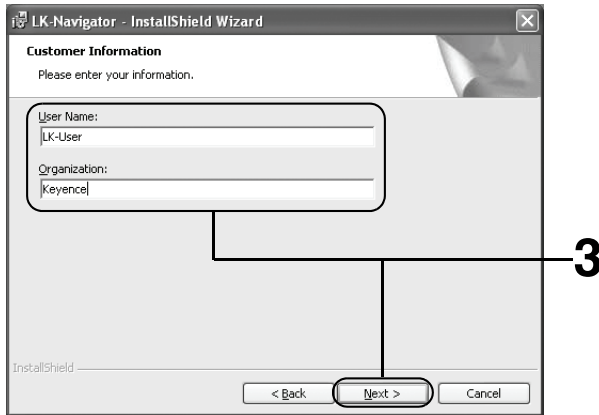
1 Insert "LK-H1W" in the CD-ROM drive and double-click "Setup.exe".

The [InstallShield Wizard] window appears.



2 Click the [Next] button.

The [Customer Information] window appears.



3 Enter the User name and Organization name, then click the [Next] button.

The [Destination Folder] window appears.



4 Confirm the destination folder and click the [Next] button.

The [Ready to Install the Program] window appears.



Reference

- By default, the program is installed in "C:\Program Files\KEYENCE\LK-Navigator\".
- If you want to change the destination folder of installation, click the [Change] button, and select the desired drive name and folder name.

5 Check the setting and click the [Install] button.

If the [Device Driver Installation Wizard] window appears, follow the instructions.

When installation ends successfully, the [InstallShield Wizard Completed] window appears.



6 Click the **[Finish]** button.

This completes the installation.

► Note

The "LK-Navigator" Help file is displayed using the "Acrobat Reader " supplied by the Adobe Systems Incorporated. If "Acrobat Reader" has not been installed in your PC, double-click the "Acrobat Reader51_JPN.exe" in the supplied CD-ROM (LK-H1W) and install it by following the instructions on the screen.

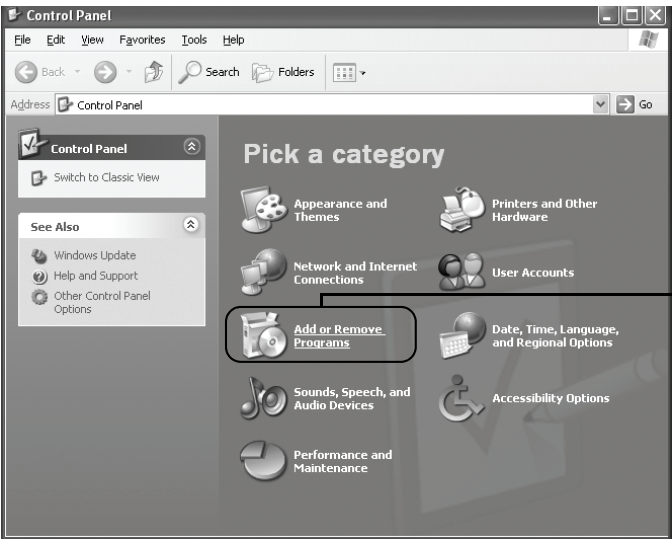
Uninstallation

The procedure to uninstall the "LK-Navigator" from a PC is described below.

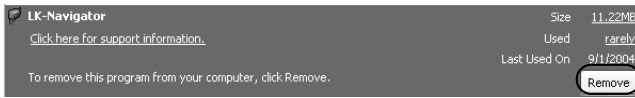
Note

- Uninstallation of "LK-Navigator" from Windows XP is described as an example.
- Before starting uninstallation, quit all applications that are already running.
- To uninstall "LK-Navigator", log onto the PC as the user that has administrator authority.

1 Double-click [Add/Remove Programs] on the Control Panel.

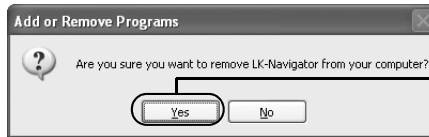


The [Add/Remove Programs] window appears.



2 Select "LK-Navigator" and click the [Remove] button.

The window prompting you to confirm removal appears.



3 Click the [Yes] button.

Uninstallation starts.

If uninstallation does not complete even after performing steps 1 to 3, continue to execute the following steps 4 to 6.

4 Insert the CD-ROM "LK-H1W" in the CD-ROM drive and double-click "Setup.exe".

The [Confirming the file to remove] window appears.

5 Click the [OK] button.

The [Maintenance completed successfully] window appears.

6 Click the [Finish] button.

This completes the uninstallation.

Installing the USB Driver

This procedure is not required because the installer installs the USB driver when installing application software. If the driver installation is cancelled while installing the application software, follow the procedure to install the USB driver that is described below. When the USB driver is installed in a PC, it recognizes the controller automatically.

► Note

- Installation of the USB driver in Windows XP is described as an example.
- Before starting installation, quit all applications that are already running.
- To install the USB driver, log on to the PC as the user that has the administrator authority.
- The USB connector of the controller is Type-B. Use a USB cable that has a Type-B type connector at one end.
- The controller conforms to the USB 2.0 Full Speed. Since the USB interface maintains the backward compatibility, the controller can communicate with a PC in which USB version 1.1 is installed.

1 Start up the controller and the PC.

2 Connect the controller to the PC using the USB cable.

The [New hardware search wizard] window appears.

3 Insert the CD-ROM "LK-H1W" in the CD-ROM drive and double-click the [Next] button.

The [Installing the software. Please wait a while] window appears. Installation starts.

Reference

- If the following window appears during installation, click the [Continue] button.
- Depending on your Windows version, [Found New Hardware Wizard] may appear, prompting you to connect Windows Update. In this case, select [No, not this time] and click the [Next] button.

When installation ends successfully, the [New hardware search wizard ends] window appears.

4 Click the [End] button.

This completes the USB driver installation.

Start and Quit

The procedures to start and quit the "LK-Navigator" are described below.

Start

2

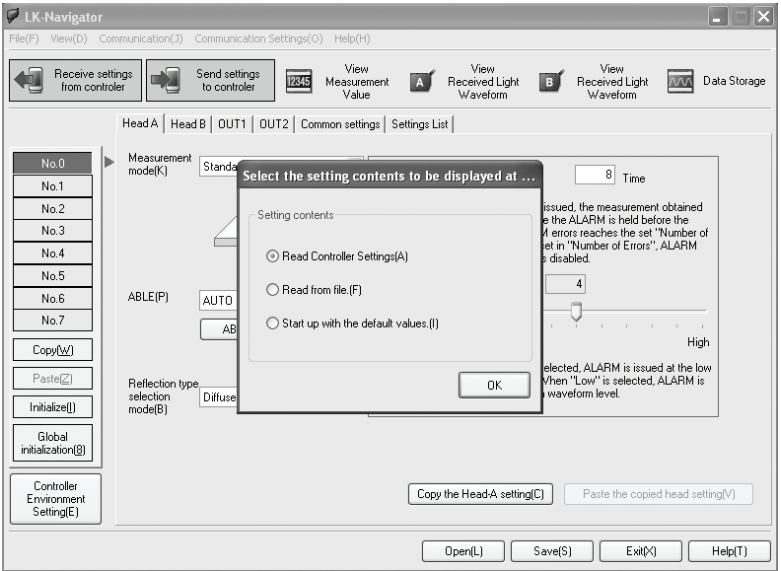
1 From the [Start] button, select [LK-Navigator].



► Note

- "LK-Navigator" cannot be start up multiple times simultaneously.
- The USB and RS-232C interfaces cannot be used at the same time even though they are both connected.
- Communication is disabled when the controller is in the "Setting mode".

[LK-Navigator] starts up, and the main screen and the [Select the setting contents to be displayed at startup] window are displayed.

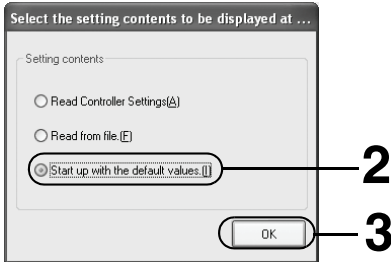


2 Select [Start up with the default values].

When [Start up with the default values] is selected, the PC settings return to the default values.

► Note

Even though [Start up with the default values] is selected here, the controller's settings do not return to the default values.



When any other item as shown below is selected, refer to the respective procedures.

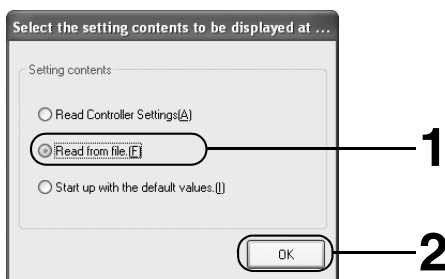
- [Read from file.]
Refer to "Procedure for reading from a file" (page 2-13).
- [Read Controller Settings]
Refer to "Procedure to read the setting contents of the connected controller" (page 2-13).

3 Click the [OK] button.

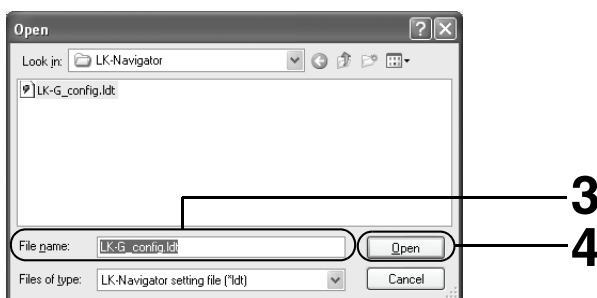
The program is initialized.

■ Procedure for reading from a file

Execute step 1 of [Start] to start up "LK-Navigator".

1 Select [Read from file.]**2 Click the [OK] button.**

The [Open] window appears.

**3 Select the setting file you want to read.**

Select "LK-G_Config.ldt" here.

4 Click the [Open] button.

The setting contents are read out.

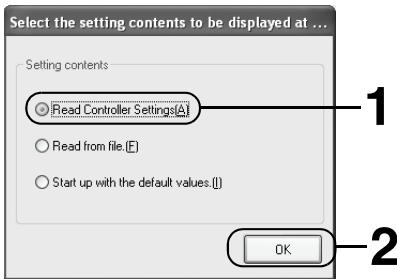
Reference

If you click the [Cancel] button here, the same operation as that of [Start up with the default values] is executed. (📖 page 2-12).

■ Procedure to read the setting contents of the connected controller

Execute step 1 of [Start] to start up "LK-Navigator".

1 Select [Read Controller Settings].



2 Click the [OK] button.

The setting contents are read out from the controller.

Reference

The communication settings that were in use at the time of quitting "LK-Navigator" last time are also used.

► Note

If the controller is not connected, or if communication fails, an error message is displayed. The communication setting when the software is started up for the first time is shown below.

- Interface : USB

If the communication fails, the same operation as that of [Start up with the default values] is executed. (📖 page 2-12).

Quit

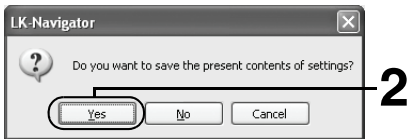
- 1 Click the [Exit] button in the bottom right of the main screen.



Reference

When you click the button of the Title Bar, the same operation will be executed.

When the settings are modified, the window prompting to save current setting is displayed.

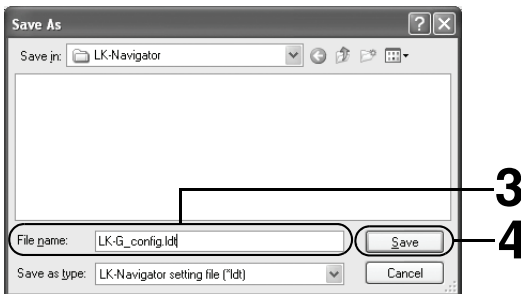


- 2 Click the [Yes] button.

Note

- If you click the [No] button, the program is terminated without saving the settings.
- If you click the [Cancel] button, the screen returns to the original display.

The [Save As] window is displayed.



- 3 Enter the name of the file in which the setting contents are to be saved.
Enter "LK-G_Config.Idt" here.

Reference

The extension ".Idt" is automatically added to the saved file to indicate that the file is the setting file of the LK-G series.

- 4 Click the [Save] button.

The settings are saved in the file and "LK-Navigator" is terminated.

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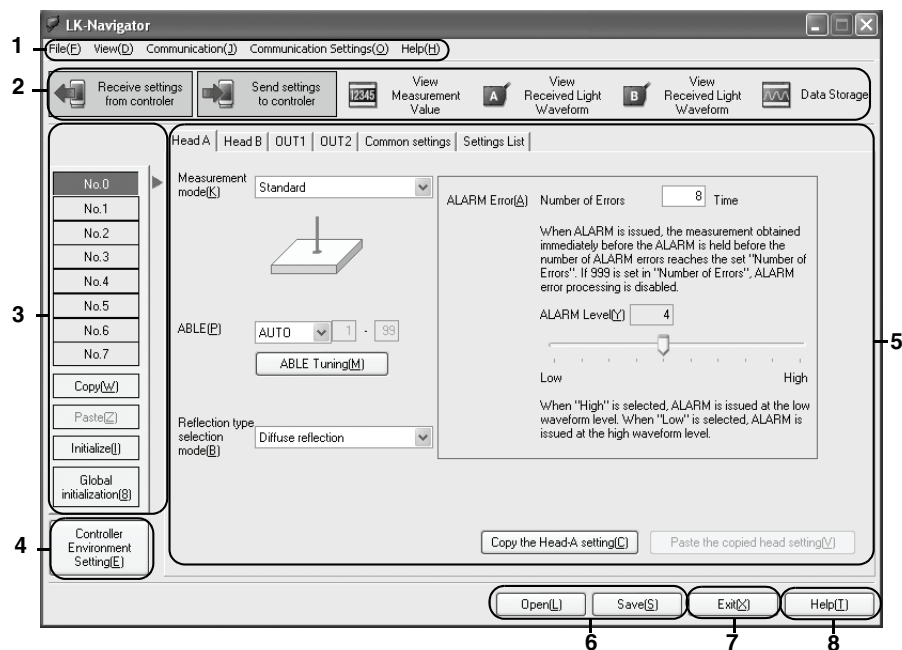
Operations and Functions of Software

3

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Identifying Part Names and Functions of the Main Screen

The part names and functions on the main screen of "LK-Navigator" are described as follows.



1. Menu bar

Shows the operation menu of "LK-Navigator".

2. Tool bar

Shows the frequently used tools of the menu bar in the form of buttons.

- For the operating method of the respective tools, refer to "View Measurement Value" (page 3-29) to "Data Storage Setting" (page 3-34).


3. Program Settings

Used to select the desired Program No., to copy it and to initialize it.

- For the method of setting the programs, refer to "Setting the Programs" (page 3-26).

4. Controller Environment Setting

Sets the operating environment settings of the controller.

 For the method of setting the environment settings, refer to "Environment Setting" (page 3-22).


5. Setting Window

Sets the respective heads and their outputs.

 For the method of setting the respective tabs, refer to "Basic Settings" (page 3-6).

6. Open or Saving the Setting File

Used to read the settings that are made by "LK-Navigator", and save them.

 For the method of reading and saving the setting file, refer to "Reading and Saving the Setting File" (page 3-42).

7. Quit

Quits the "LK-Navigator".

 For the method of quitting the LK-Navigator, refer to "Start and Quit" (page 2-11).

8. Help

Opens the Help file of the "LK-Navigator".

Flow of Operations

The procedure to set the Head-A signal to be output from OUT1 when the "LK-Navigator" is started up for the first time after purchase, is described below.

Connect the controller to a PC using the RS-232C cable or USB cable.

Refer to "Connecting the Controller to a PC" (page 2-2).



Start up the controller first, then start up the PC.



Start up LK-Navigator.

Refer to "Start and Quit" (page 2-11).



Select [Start up with the default values] from the [Select the settings to be displayed at startup] window.

Refer to "Start and Quit" (page 2-11).



Select the Program No.

Refer to "Setting the Programs" (page 3-26).



Set the [Common Settings].

Refer to "Common Settings" (page 3-17).



Set [Head-A].

Refer to "Head-A/Head-B" (page 3-6).

**Set [OUT 1].**

Refer to "OUT1/OUT2" (page 3-10).

**Confirm contents of the settings on [Settings List].**

Refer to "Settings List" (page 3-20).

**Set the method to communicate with the controller using [Controller Environment Setting].**

Refer to "Environment Setting" (page 3-22).

**Send the settings to the controller.**

Refer to "Sending/Receiving the Settings" (page 3-21).

**Confirm the operations using the tools.**

Refer to "View Measurement Value" (page 3-29) to "Data Storage Setting" (page 3-34).

**Save the setting file in a PC.**

Refer to "Reading and Saving the Setting File" (page 3-42).



End

Basic Settings

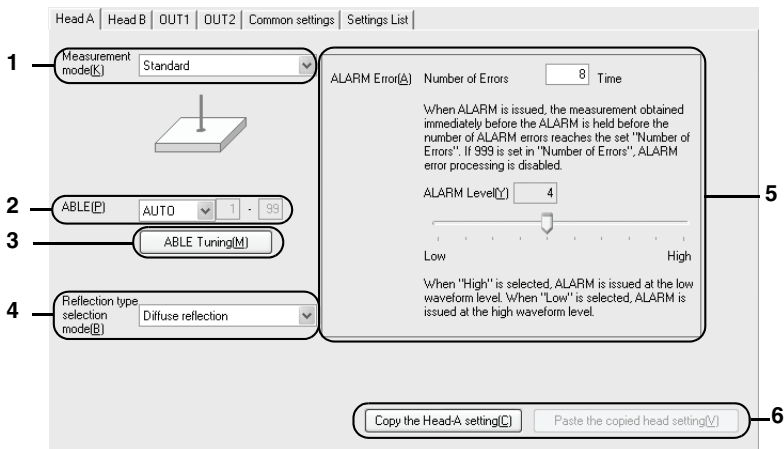
Basic settings of "LK-Navigator" are described below.

Head-A/Head-B

The screen and functions of the Head-A tab and those of the Head-B tab are described below.

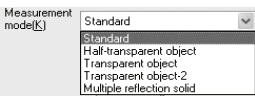
The heads that are connected to the controller can be set using this function. The items required to be set are identical in Head-A and Head-B. The settings should be made in accordance with the environment in use.

Click the [Head A] tab or the [Head B] tab on the setting window.



1. Measurement mode

Select the measurement mode.



2. ABLE

Select either automatic (AUTO) or the manual (MANUAL) control of the light intensity.



Reference

- Select [AUTO] for normal operation.
- When [MANUAL] is selected, the upper limit and the lower limit of the light intensity control are set.
Setting range: 1 to 99

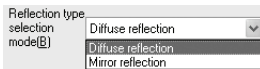
3. ABLE Tuning

Calibrate the settable range of the [MANUAL] mode using the [ABLE] function for optimum performance in accordance with the actual work-piece.

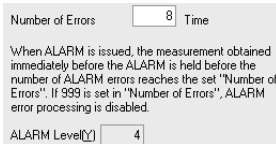
Refer to "Setting Procedure of ABLE Calibration" (page 3-8).

**4. Reflection type selection mode**

Select the reflection type.

**5. Alarm Error****Number of Errors**

Set the number of times of the normal measurement obtained before the error is held while an error is occurring.

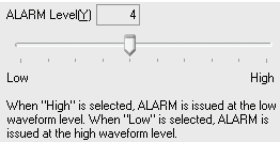
**Reference**

Setting range: 0 to 999

| Number of errors | Error processing |
|------------------|--|
| 0 | Immediate processing of the ALARM error |
| 1 to 998 | The normal value immediately before occurrence of the error is HELD. |
| 999 | ALARM error processing is not performed. |

ALARM Level

Set the alarm threshold level.



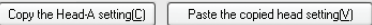
Setting range: Low (0) to High (9)

- Low (0): When "Low" is selected, ALARM is issued at the high waveform level, i.e., is not issued easily.
- High (9): When "High" is selected, ALARM is issued at the low waveform level, i.e., is issued easily.

6. Copy the Head-A setting. Paste the copied head setting.

This function is used to copy the already established setting of a specific head, to another head (including the head setting of other program No.)

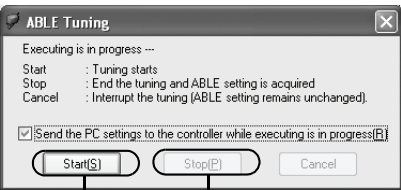
Refer to "Procedure to Copy the Setting of a Head to Another Head" (page 3-9).



■ Setting Procedure of ABLE Calibration

1 Click the [ABLE Tuning] button.

The [Head Setting] window appears.



2

3

► Note

- If you do not want to send the head setting to the controller at the time when calibration starts, turn OFF the check box [Send the PC setting to the controller while executing is in progress].
- While executing the [ABLE Tuning], the controller enters the "Communication mode".

2 Click the [Start] button to start calibration.

Then both the [Stop] button and the [Cancel] button become active.

3 Click the [Stop] button. The calibration ends and the optimal values are set automatically.

► Note

If the [Cancel] button is clicked, the calibration is cancelled so that the settings are not changed.

■ Procedure to Copy the Setting of a Head to Another Head

The procedure of copying the [Head-A] setting to [Head-B] is described below as an example.

First, complete all settings of [Head-A].

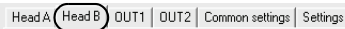
1 Click the [Copy the Head-A setting] button.



The [Paste the copied head setting] button becomes active.



2 Click the [Head-B] tab.



■ Reference

You can paste the setting to the head setting of other Program No. To paste the setting to the head setting of other Program No., select first the desired Program No., then select the head.

3 Click the [Paste the copied head setting] button.

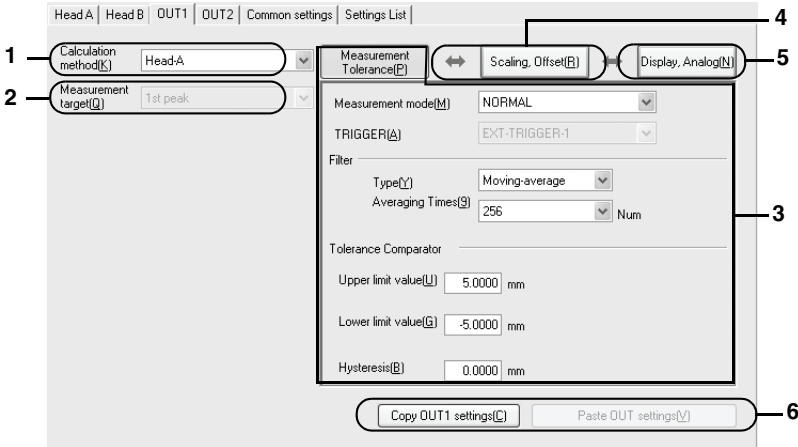


OUT1/OUT2

Functions and screens of the OUT1/OUT2 tab are described below.

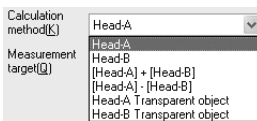
Use this function to set the processing method that is best suited for the specific measured value. The items required to be set are identical in OUT1 and OUT2.

Click the [OUT1] tab or the [OUT2] tab of the setting window.



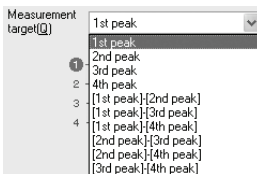
1. Calculation method

Set the calculation method that is best suited for the selected method of measurement and for the specific measurement target.



2. Measurement target

When [Head-A transparent object] or [Head-B transparent object] is selected by [Calculation method], the [Measurement target] is required to be set.



3. Measurement, Tolerance

The method to set the Measurement and to set the Tolerance Comparator is described below.

| | | | | |
|-----------------------------|----------------|--------------------|---|--------------------|
| Measurement Tolerance[P] | ↔ | Scaling, Offset[R] | ↔ | Display, Analog[N] |
| Measurement mode(M) | NORMAL | | | |
| TRIGGER(A) | EXT-TRIGGER-1 | | | |
| Filter | | | | |
| Type(Y) | Moving-average | | | |
| Averaging Times(G) | 256 Num | | | |
| Tolerance Comparator | | | | |
| Upper limit value(U) | 5.0000 mm | | | |
| Lower limit value(G) | -5.0000 mm | | | |
| Hysteresis(B) | 0.0000 mm | | | |

Measurement mode

Set the measurement mode.

| | |
|---------------------|-------------------|
| Measurement mode(M) | NORMAL |
| TRIGGER(A) | NORMAL |
| Filter | PEAK HOLD |
| Type(Y) | BOTTOM HOLD |
| Averaging Times(G) | PEAK-TO-PEAK HOLD |
| | SAMPLE HOLD |
| | AVERAGE HOLD |

TRIGGER

When any item other than [NORMAL] is selected by the [Measurement mode], trigger is requested to be set.

| | |
|------------|---------------|
| TRIGGER(A) | EXT-TRIGGER-1 |
| Filter | EXT-TRIGGER-1 |
| | EXT-TRIGGER-2 |

Filter

• Type

Use this function to set the filter processing that is best suited for the measured value.

| | |
|--------------------|------------------|
| Type(Y) | Moving-average |
| Averaging Times(G) | Moving-average |
| | LOW-PASS FILTER |
| | HIGH-PASS FILTER |

• Averaging Times

Set the number of the Averaging Times when [Moving-average] is selected by [Type].

| | |
|----------------------|------------|
| Averaging Times(G) | 256 |
| Tolerance Comparator | 1 |
| | 4 |
| | 16 |
| | 64 |
| Upper limit value(U) | 5.0 256 |
| | 1024 |
| | 4096 |
| Lower limit value(G) | -5.0 16384 |
| | 65536 |
| | 262144 |

Reference

As the number of Averaging Times decreases, response speed of measured value increases. As the number of Averaging Times increases, a more stable measurement value can be obtained.

- Cut-off frequency

When either [LOW-PASS FILTER] or [HIGH-PASS FILTER] is selected by [Type], its cut-off frequency is requested to be set.

3

Type(L)LOW-PASS FILTER

\Cut-off frequency(G)100

ence Comparator1000300100

er limit value(U)5.030103

er limit value(G)-5.010.30.1

Tolerance Comparator

- Upper limit value

Sets the upper limit value of the Tolerance.

Upper limit value(U)5.0000 mm

- Lower limit value

Sets the lower limit value of the Tolerance.

Lower limit value(G)-5.0000 mm

- Hysteresis

Sets hysteresis of the Tolerance Comparator.

Hysteresis(B)0.0000 mm

4. Scaling, Offset

Set the Scaling and Offset.

Measurement Tolerance(P) ↔ Scaling, Offset(R) ↔ Display, Analog(N)

Scaling Setting

Head-A(A) Input10.0000 mm → Displayed10.0000 mm

Input21.0000 mm → Displayed21.0000 mm

Head-B(B) Input10.0000 mm → Displayed10.0000 mm

Input21.0000 mm → Displayed21.0000 mm

Set from measured data(G)

Offset(M)0.0000 mm

Scaling Setting

- Head-A input value-1/Display value-1, Head-A input value-2/Display value-2

The method to display the Head-A input value on the display can be set using the Scaling function at the two measurement points as follows.

| | | | | | | |
|------------------|--------|----|---|------------|--------|----|
| Head-A(A) Input1 | 0.0000 | mm | ⇒ | Displayed1 | 0.0000 | mm |
| Input2 | 1.0000 | mm | ⇒ | Displayed2 | 1.0000 | mm |

- Head-B input value-1/Display value-1, Head-B input value-2/Display value-2

The method to display the Head-B input value on the display can be set using the Scaling function at the two measurement points as follows.

| | | | | | | |
|------------------|--------|----|---|------------|--------|----|
| Head-B(B) Input1 | 0.0000 | mm | ⇒ | Displayed1 | 0.0000 | mm |
| Input2 | 1.0000 | mm | ⇒ | Displayed2 | 1.0000 | mm |

- Setting from the Measurement Data

Set the Scaling while confirming the actual measurement data.

 Refer to "Procedure to Implement Setting from the Measurement Data" (page 3-15).

Offset

Set the offset.

Offset(M) mm

5. Display, Analog

Set the measurement value display and the analog output.

| | | | | |
|---|---|--------------------|--------------------|--|
| Measurement Tolerance(P) | ↔ | Scaling, Offset(B) | ↔ | Display, Analog(N) |
| Minimum display unit(Y) <input type="text" value="0.0001(mm)"/> | | | | |
| Analog output | | | | |
| Analog through(A) <input type="text" value="OFF"/> | | | | |
| Analog output scaling | | | | |
| Measurement value1(B) | <input type="text" value="1.0000"/> mm | ⇒ | Output voltage1(G) | <input type="text" value="10.000"/> V |
| Measurement value2(G) | <input type="text" value="-1.0000"/> mm | ⇒ | Output voltage2(M) | <input type="text" value="-10.000"/> V |

Minimum display unit

Set the decimal point position of the measurement and setting values, and set the number of digits to display.

| | |
|-------------------------|--|
| Minimum display unit(Y) | <input type="text" value="0.0001(mm)"/> |
| Analog output | <input type="text" value="0.01(mm)"/> |
| Analog through(A) | <input type="text" value="OFF"/> |
| | <input type="text" value="0.0001(mm)"/> |
| | <input type="text" value="0.00001(mm)"/> |
| | <input type="text" value="0.1(μm)"/> |
| | <input type="text" value="1(n)11(mm)"/> |

Reference

The digits that are not displayed below decimal point will be rounded off.

► **Note**

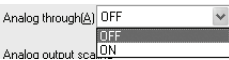
When the setting [Minimum display unit] is changed, settings of the following items are initialized.

Scaling/Offset/Tolerance Setting/Analog Output Scaling/Auto Zero Reference Value

Analog output

- Analog through

Set whether the measurement value is output to the Analog output with or without processing, regardless of the setting of [Measurement Mode].



- Analog output scaling

Set the Scaling on the Analog output with respect to the measurement value.



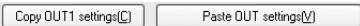
Reference

Scaling can be applied to the Analog output in the range of ± 10.5 V.

6. Copy OUT-1 settings. Past OUT settings.

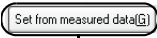
This function is used to copy the already established OUT-1's setting to the other OUT's settings (including the OUT setting of other program No.)

📖 Refer to "The procedure to copy the OUT's setting to the other OUT's setting" (page 3-16).



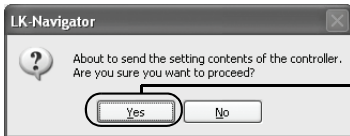
■ Procedure to Implement Setting from the Measurement Data

1 Click the [Set from measured data] button.



1

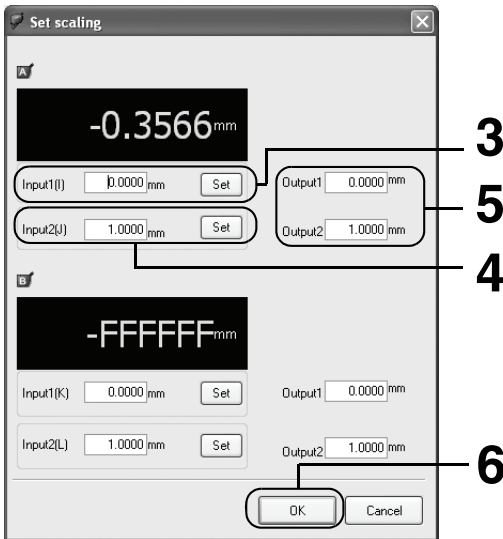
The window prompting you to confirm the send transmission appears.



2

2 Click the [Yes] button.

The [Set scaling] window appears.



3

5

4

6

► Note

While executing [Set scaling], the controller enters the "Communication mode".

3 Click the [Set] button of [Input 1] when measuring the reference surface.

The measured value at the reference surface is entered in [Input 1].

4 Place the Master Work-piece below sensor for measurement, and click the [Set] button of [Input 2].

The measured value obtained from the Master Work-piece is entered in [Input 2].

5 Set the Scaling on [Output 1] and [Output 2].

6 Click the [OK] button.

3

■ The procedure to copy the OUT's setting to the other OUT's setting

Copying the OUT1 setting to OUT2 is described as an example.

Complete all settings of [OUT1].

1 Click the [Copy the OUT1 settings] button.



The [Paste OUT settings] button becomes active.



2 Select the [OUT2] tab.



Reference

You can copy the OUT's setting to the OUT of any other program No. To paste the OUT's setting to that of other Program No., select first the desired Program No., then select the desired OUT.

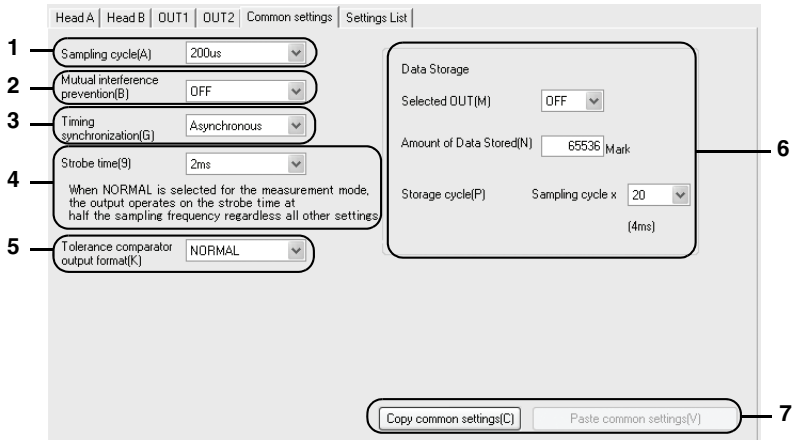
3 Click the [Paste OUT settings] button.



Common Settings

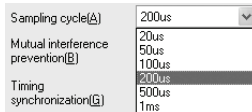
Functions and screen of the Common Settings tab are described below.

Click the [Common Settings] tab of the Setting window.



1. Sampling cycle

Set the sampling cycle of measurements.



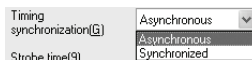
2. Mutual interference prevention

This function is used to prevent mutual interference between two heads when the two heads are connected to the same controller.



3. Timing synchronization

This function is used whether to synchronize the timin inputs of OUT1 and OUT2, or not to synchronize them.



4. Strobe time

When any measurement mode other than NORMAL is selected, the strobe time can be set.

| | | |
|---|------|---|
| Strobe time(S) | 2ms | ▼ |
| When NORMAL is selected, the output operates at half the sampling frequency. In other measurement modes, the output operates at the same frequency as the sampling frequency. | | |
| | 2ms | |
| | 5ms | |
| | 10ms | |
| | 20ms | |

5. Tolerance comparator output format

This function is used to set the operation of the Tolerance Comparator Output when result of the Tolerance Comparator judgment changes from ON to OFF.

| | | |
|---------------------------------------|-----------|---|
| Tolerance comparator output format(K) | NORMAL | ▼ |
| | NORMAL | |
| | HOLD | |
| | OFF-DELAY | |

6. Data Storage

Selected OUT

Set the OUT that becomes the target of data storage.

| | | |
|-----------------|------|---|
| Selected OUT(M) | OFF | ▼ |
| | OFF | |
| | OUT1 | |
| | OUT2 | |
| | BOTH | |

Amount of Data Stored

Set the number of data to be stored.

| | | |
|--------------------------|-------|------|
| Amount of Data Stored(N) | 65536 | Mark |
|--------------------------|-------|------|

Storage cycle

Set the interval at which the data is stored.

| | | | |
|------------------|------------------|------|---|
| Storage cycle(P) | Sampling cycle x | 20 | ▼ |
| | | 1 | |
| | | 2 | |
| | | 5 | |
| | | 10 | |
| | | 20 | |
| | | 50 | |
| | | 100 | |
| | | 200 | |
| | | 500 | |
| | | 1000 | |

Reference

Data is stored at the interval (in units of milli second or micro second) of the storage cycle that is displayed under the set value.

7. Copy common settings, Paste common settings

This function is used to copy the already established setting of a program to the Common Settings of the other program No.

Refer to "Procedure of Copying the Settings of the Common Settings to Other Programs" (page 3-19).

| | |
|-------------------------|--------------------------|
| Copy common settings(C) | Paste common settings(V) |
|-------------------------|--------------------------|

■ Procedure of Copying the Settings of the Common Settings to Other Programs

Copying the setting of program No. 0 to [Common Settings] of program No. 1 is described as an example.

Complete all settings of [Common Settings].

1 Click the [Copy common settings] button of program No. 0.



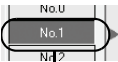
1

3

The [Paste common settings] button becomes active.



2 Select the program No.1.



2

3 Click the [Paste common settings] button.

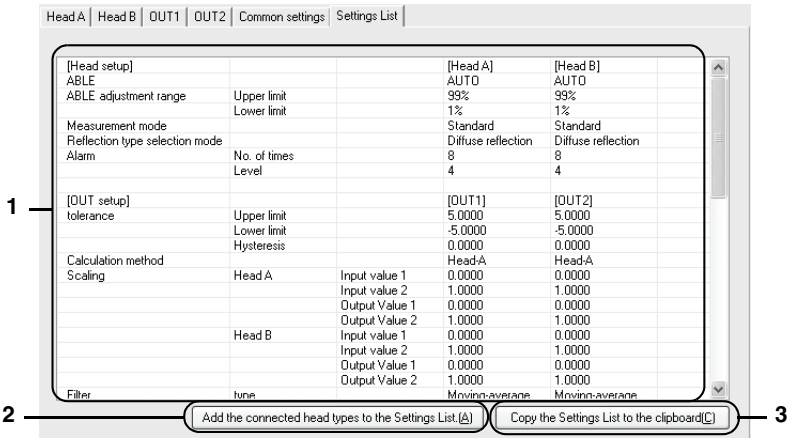


3

Settings List

You can confirm the items that have been set, within the program.

Click the [Settings List] tab of the Setting window.



1. Settings List

The Settings List of the selected program is displayed.

2. Adding the connected head to types the Settings List

Model of head that is connected to the controller can be added to the Settings List by using this function.

3. Copy the Settings List to the clipboard

This function is used to copy the setting to the clipboard. It is useful when pasting the settings to other applications.

Reference

- The setting that is copied to the clipboard will become the tab-delimited format when it is pasted to other applications.
- If any setting is changed after any of the following operations is made, the changed portion is displayed in blue.
 - Start of LK-Navigator
 - Sending/receiving the setting to/from Controller
 - Open/Save the Setting File

Sending/Receiving the Settings

The procedure to send or to receive the setting to or from the controller is described below.

■ Receiving the Settings

Click the [Receive settings from controller] button of the tool bar.



Reference

The same operation is obtained by selecting [Receive Settings from Controller] from [Communication] menu bar.

■ Sending the Settings

Click the [Send settings to controller] button of the tool bar.



Reference

The same operation is obtained by selecting [Send settings to controller] from [Communication] menu bar.

► Note

- The communication is disabled when the controller is in the "Setting mode", "Program Change mode", and "Tolerance Setting mode".
- When the controller is connected to a PC with RS-232C, and when the RS-232C setting is changed by using [Controller Environment Setting], [PC Communication Setting] of "LK-Navigator" is also changed automatically when the setting is sent to the controller.
- While executing sending/receiving setting, the controller enters the "Communication mode".

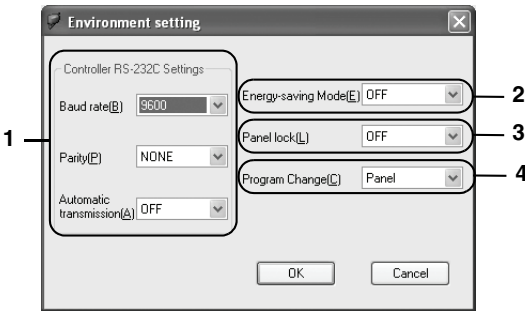
Environment Setting

The method to set the operating environment of the controller is described below.

From the main screen, click the [Controller Environment Setting] button.



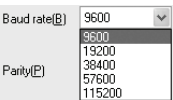
The [Environment Setting] window appears.



1. Controller RS-232C Settings

Baud rate

Set the communication speed of the controller.



Parity

Set the type of parity.



Automatic Transmission

Set OUT that executes the automatic transmission to the RS-232C interface.

| | |
|---------------------------|------|
| Automatic transmission(A) | OFF |
| | OFF |
| | OUT1 |
| | OUT2 |
| | BOTH |

► Note

When the controller is connected to a PC with RS-232C, and when the RS-232C setting is changed by using [Controller Environment Setting], [PC Communication Setting] of "LK-Navigator" is also changed automatically after the setting is sent to the controller.

2. Energy-saving Mode

Set the energy-saving mode of the controller.

| | |
|-----------------------|----------|
| Energy-saving Mode(E) | OFF |
| | OFF |
| | Eco Hall |
| | Eco All |

3. Panel lock

Set whether to lock the display panel that is connected to the controller.

| | |
|---------------|-----|
| Panel lock(L) | OFF |
| | OFF |
| | ON |

4. Program Change

Set the method of switching the programs.

| | |
|-------------------|----------|
| Program Change(C) | Panel |
| | Panel |
| | Terminal |

Reference

When [Terminal] is selected by [Program Change] and the setting is completed by sending/receiving the setting, the operation of "LK-Navigator" follows the Program No. that is specified by the LK-G terminal wiring.

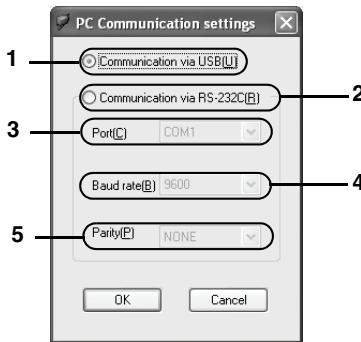
Communication Settings

The method to set the communication between the controller and a PC is described below.

Select [PC Communication Setting] from [Communication Settings] of the menu bar.



The [PC Communication settings] window appears.



1. Communication via USB

This function is used to set the communication when the USB interface is used to connect the controller to a PC.



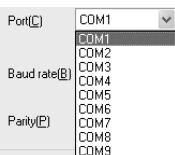
2. Communication via RS-232C

This function is used to set the communication when the RS-232C interface is used to connect the controller to a PC.



3. Port

This function is used to set the port that connects the controller to a PC when [Communication via RS-232C] is selected.



4. Baud rate

This function is used to set the baud rate in accordance with the communication speed of the controller when [Communication via RS-232C] is selected.

| | |
|--------------|------|
| Baud rate(B) | 9600 |
| Parity(P) | |

9600

19200

38400

57600

115200

5. Parity

This function is used to set the method of parity check when [Communication via RS-232C] is selected.

| | |
|-----------|------|
| Parity(P) | NONE |
|-----------|------|

NONE

EVEN

ODD

NONE

Setting the Programs

The method to copy and to initialize the program that is registered in the controller is described below.

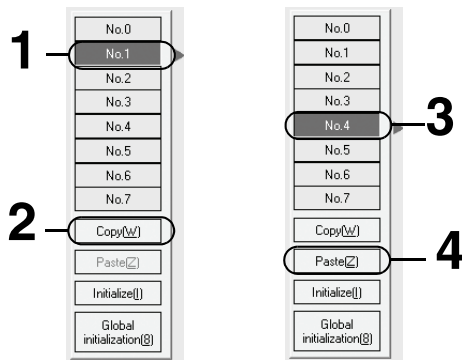
Copy Program

3

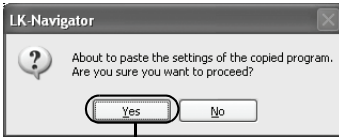
Settings can be copied to the other program No. so that the nuisance to create the settings repeatedly can be avoided.

Reference

Settings of the program where settings are being copied to will be overwritten.



- 1 Select the desired copy source program No. from the main screen.**
Program No. 1 is selected in this example.
- 2 Click the [Copy] button.**
- 3 Confirm that the [Paste] button becomes active. Then select the program No. that is selected as the copy target.**
Program No. 4 is selected in this example.
- 4 Click the [Paste] button.**
The window prompting your confirmation appears.



5

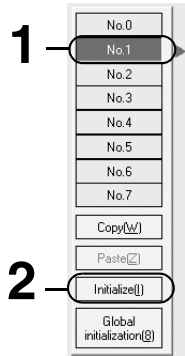
- 5 Click the [Yes] button.**
The setting is copied.

3

Initializing Program

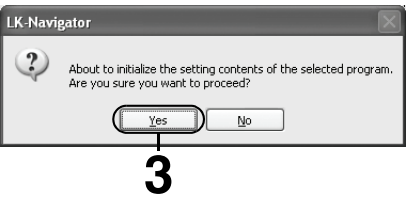
Programs can be returned to the default settings when shipped from the factory by clicking [Initialize]. When a setting is initialized, the previous setting will be deleted.

3



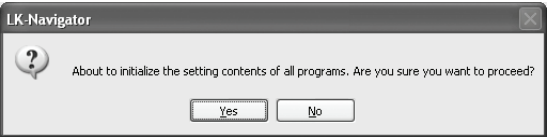
1 Select a program No. that you want to initialize from the main screen.
Program No. 1 is selected in this example.

2 Click the [Initialize] button.
The window prompting your confirmation appears.



Reference

When you want to initialize settings of all program Nos., click the [Global initialization] button. When you click the [Global initialization] button, the following window prompting your confirmation appears.



3 Click the [Yes] button.
The settings are initialized.

View Measurement Value

The [View Measurement Value] function that allows you to view the measured values on a PC is described below.

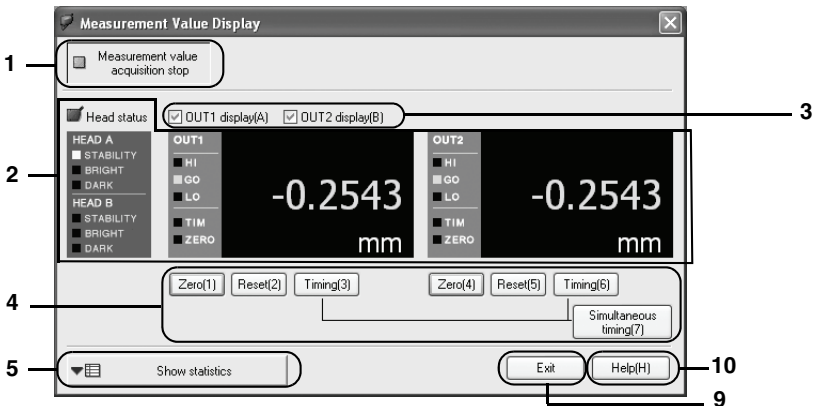
Click the [View Measurement Value] button of the tool bar.



Reference

The same operation is executed by selecting [View Measurement Value] from [View] on the tool bar.

The [View Measurement Value] window appears.



1. Measurement value acquisition start

Start acquisition of the measurement values from the controller.

When you click the [Measurement value acquisition start] button, it changes to the [Measurement value acquisition stop] button.

Reference

Until you click the [Measurement value acquisition start] button, any of the [Zero]/[Reset]/[Timing]/[Simultaneous Timing]/[Update Statistical Values]/[Clear Statistical Values] buttons cannot be clicked.

2. Status display

Displays the measured value/comparator output/head status.

For viewing the display, refer to "LK-G Series User's Manual" refer to "Chapter 2 Operations and Functions during Measurement" (2-1 page).

3. Display OUT1/Display OUT2

The following three types of display are available.

- OUT1 independent display : Turn ON the [Display OUT1] check box.
- OUT2 independent display : Turn ON the [Display OUT2] check box.
- OUT1 and OUT2 simultaneous display : Turn ON both of the [Display OUT1] and [Display OUT2] check boxes.

Reference

Both of the [Display OUT1] and [Display OUT2] check boxes cannot be turned OFF at the same time.

4. Displaying the measured values after auto zero, reset, and timing processing are applied.

Zero

The measured values are displayed after the present measured value is set to the reference value (zero).

- For the auto zero function, refer to "LK-G Series User's Manual" refer to "Chapter 2 Operations and Functions during Measurement" (2-1 page).

Reset

The measured values displayed after the processing in a Measurement Mode are cleared.

- For the Measurement Value Reset function, refer to "LK-G Series User's Manual" refer to "Chapter 3 Function Settings" (3-1 page).

Timing

Timing ON and OFF are toggled.

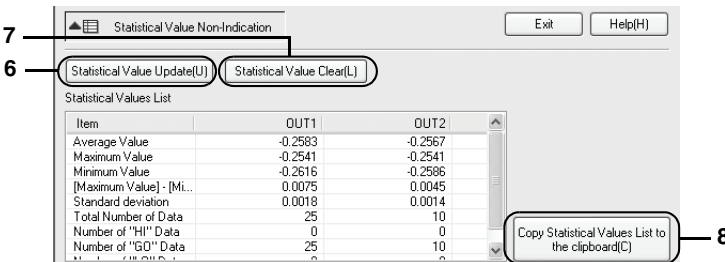
- For the timing function, "LK-G Series User's Manual" refer to "LK-G Series User's Manual" refer to "Chapter 3 Function Settings" (3-1 page).

Simultaneous Timing

When OUT1 and OUT2 are displayed at the same time, the timing inputs to OUT1 and OUT2 should also be input at the same time.

5. Statistical Value Indication

When you click the [Statistical Value Indication] button, [Statistical Values List] is displayed.



6. Statistical Value Update

The statistical values are updated to the newest values.

7. Statistical Value Clear

The present statistical values are cleared.

Reference

When you click the [Statistical Value Clear] button, the statistical values of the controller are also deleted.

8. Copying the Statistical Values List to the Clipboard

This function is used to copy the Statistical Values List on display to the clipboard. It is useful when pasting the statistical value to other applications.

Reference

The statistical value that is copied to the clipboard will become the tab-delimited format when it is pasted to other applications.

9. Exit

Closes the [View Measurement Value] window.

10. Help

Opens the Help file of "LK-Navigator".

View Received Light Waveform

The [View Received Light Waveform] function allows you to view the measured light intensity on a PC as described below.

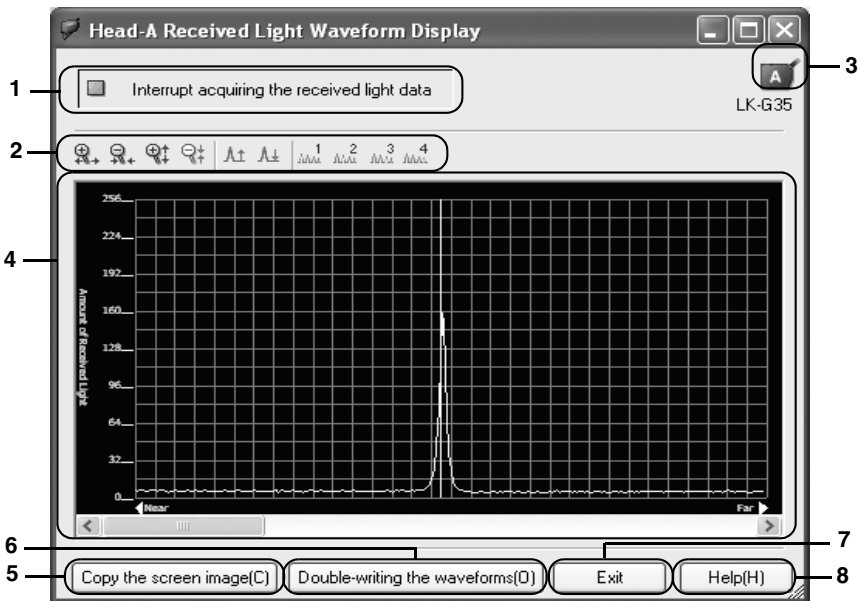
Click the [View Received Light Waveform] button of the tool bar. The [Head-A Received Light Waveform Display] button is clicked in this example.



Reference

The same operation as above is executed by selecting [Head-A Received Light Waveform Display] from [View] of tool bar.

The [Head-A Received Light Waveform Display] window appears.



Reference

Size of the [Head-A Received Light Waveform Display] window can be changed.
Size of the [Head-A Received Light Waveform Display] window cannot be reduced smaller than the original size of the window.

1. Start acquiring the received light data

Starts acquiring the received light data from the controller and starts displaying the newest waveform.

When you click the [Start acquiring the received light data] button, it changes to [Interrupt acquiring the received light data].

2. Waveform display change bar

Enlarge/Reduce


Waveform can be displayed after it is enlarged/reduced of its size in the vertical and horizontal directions.

Moving the display position

Waveform display position can be moved up/down.

ABLE

When [Transparent object-2] is selected by [Measurement Mode], the ABLE processing is applied to the waveforms 1 through 4, and the resultant waveforms after the processing are displayed.

 For ABLE, refer to "LK-G Series User's Manual" refer to "LK-G Series User's Manual" refer to "Chapter 3 Function Settings" (3-1 page)..

3. Model display

Models of the heads that are showing their waveforms are indicated.

4. View Received Light Waveform

Displays waveform of the received light data. The white vertical line on the waveform indicates the present measuring position. The method to read the waveform is explained below.

- Horizontal axis : It indicates position of the received light waveform. As it is positioned closer to the left end, it indicates that the received light is positioned closer to the head.
- Vertical axis : It indicates intensity of the received light. As it goes higher, it indicates that the received light is more intense.
- Waveform display : Waveform after the controller applies the ABLE processing is displayed.

5. Copying the screen image

The present waveform is copied to the clipboard.

6. Double-writing the waveforms

While the waveform that is obtained at the time of clicking is kept displayed, double-writing of the present waveform over the above-mentioned waveform is executed so that the double-writing waveforms are displayed.

7. Exit

Closes the [Head-A Received Light Waveform Display] window.

8. Help

Opens the Help file of "LK-Navigator".

Data Storage Setting

The [Data Storage] function that can display the measurement result or change of data storage setting, is described below.

■ Identifying names and functions of the data storage setting window.

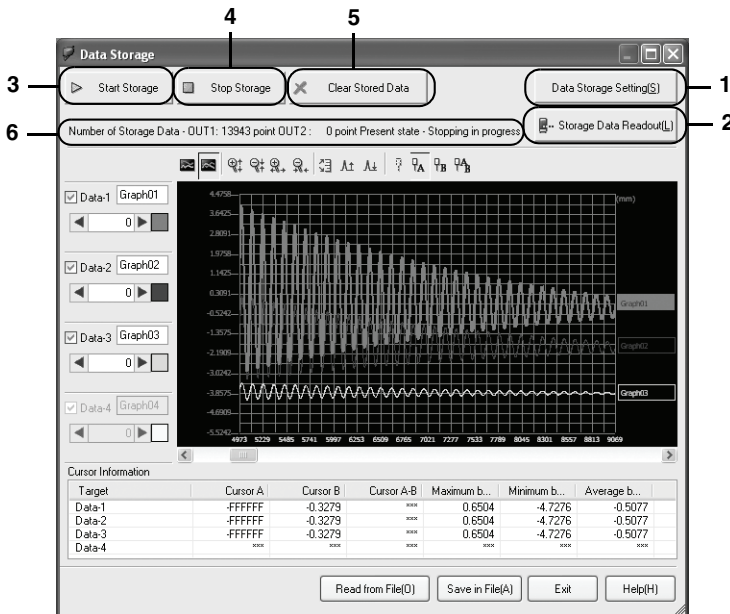
Click the [Data Storage] button of the tool bar.



Reference

The same operation as above is executed by selecting [Data Storage] from [View] on the tool bar.

The [Data Storage] window appears.



A maximum of the following four data can be displayed as the waveforms on the [Data Storage] window. The data listed below can be displayed.

- The storage data that is read out from the main unit.
- The storage data that has been stored in a PC.

Reference

Size of the [Data Storage] window can be changed.

Size of the [Data Storage] window cannot be reduced smaller than the original size of the window.


1. Data Storage Setting

Set the method to store the measured data.

 Refer to "Data Storage Setting" (page 3-34).

2. Storage Data Readout

Reads out the storage data from the controller.

 Refer to "Read Storage Data" (page 3-41).

3. Start Storage

The controller starts storing the data.

4. Stop Storage

The controller stops storing the data.

5. Clear Stored Data

The data that is stored in the controller is cleared.

► Note

Clear Stored Data clears all data that is stored in the controller.

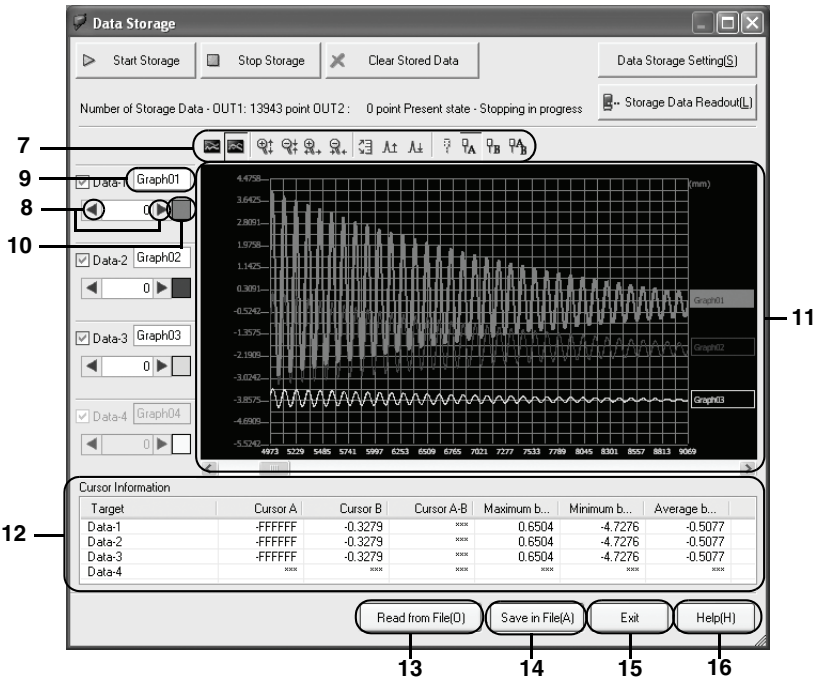
6. Status Display

The data storage status of the controller is displayed.

Reference

The statuses listed below can be displayed.

| Status | Status on display | Number of storage data display |
|-----------------------------------|----------------------|---|
| Not connected | Not connected | ***** |
| NORMAL mode: Storage in progress | Storage in progress | Number of data that are being stored at present |
| NORMAL mode: Stopping in progress | Stopping in progress | Number of data that are being stored at present |
| When communication error occurs | ***** | ***** |
| When another system error occurs | System error | ***** |



7. Waveform display change bar

Display data side by side/Display waveforms by overlapping

Set whether the waveforms of the measurement values are displayed side by side or by overlapping

Enlarge/Reduce

Waveform can be displayed after it is enlarged/reduced of its size in the vertical and horizontal directions.

Automatic reduction

Reduction scale in the vertical direction is adjusted automatically and then displayed.

Moving the display position

Waveform display position can be moved up/down.

Non-display of the cursor

Set the cursor to non-display.

Selection of the cursor

Select the cursor to display.

8. Display Position Change

Move the display position of waveform.

► Note

The waveform display position can be moved only when waveform is being displayed.

9. Waveform Name

Give an arbitrary name to the waveform.

► Note

- A maximum of 16 alphanumeric characters (excluding "," (comma) and "." (period)) can be used in a name of waveform.
- Name can be given to waveform only when waveform is being displayed.

10. Change the Waveform Color

Waveform color can be set.

► Note

Waveform color can be set only when waveform is being displayed.

11. Display of Measured Value Waveform

Waveform of the readout measurement value is displayed.

12. Cursor Information

List of cursor information is displayed.

13. Read from File

Reads out the storage data from file.

14. Save in File

The stored data is saved in file.

Reference

The stored data is saved in file in the CSV format.

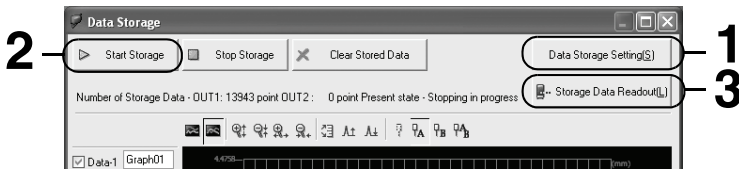
15. Exit

Closes the [Data Storage] window.

16. Help

Opens the Help file of "LK-Navigator".

■ Basic data storage procedure



1 Click [Data Storage Setting].

The Target OUT, the Number of storages and the Storage cycle should be set beforehand.

For the procedure of [Data Storage Setting], refer to "Data Storage Setting" (page 3-39).

2 Click the [Start Storage] button.

The controller starts storing the measurement data.

When the number of data reaches the set number that is specified by [Number of storages], the storage stops automatically.

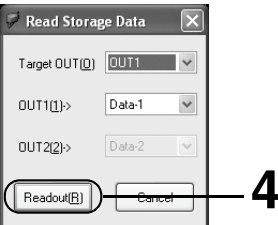
Reference

- If you want to stop the data storage in the middle of storage, click the [Stop Storage] button.
- When you click the [Start Storage] button again after the storage is stopped once, the storage is resumed from the point where the storage was stopped.

3 Click the [Read Storage Data] button.

For the method to set [Read Storage Data], refer to "Read Storage Data" (page 3-41).

The [Read Storage Data] window appears.



4 Click the [Readout] button.

The data that are accumulated in the controller are transferred to the PC.

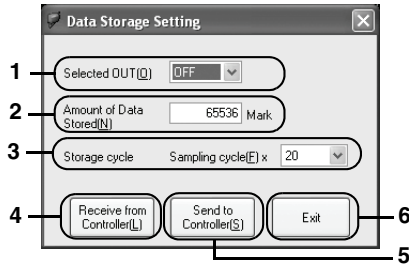
When the bar graph indicating the transfer status reaches the right-most end, reception of the data is complete.

■ Data Storage Setting

Click the [Data Storage Setting] button.

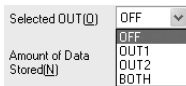


The [Data Storage Setting] window appears.



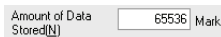
1. Selected OUT

Set the OUT that becomes the target of data storage.



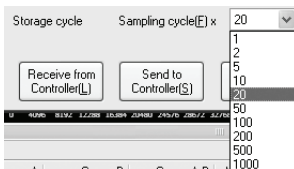
2. Amount of Data Stored

Set the amount of data to be stored.



3. Storage cycle

Set the interval at which the data is stored.



4. Receive from Controller

Receive the setting from the controller.



5. Send to Controller

Send the settings to the controller.



► Note

While executing sending or receiving the data, the controller enters the "Communication mode".

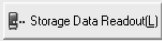
6. Exit

Closes the [Data Storage Setting] window.

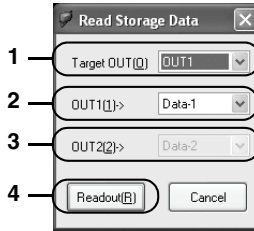


■ Read Storage Data

Click the [Storage Data Readout] button.

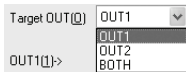


The [Read Storage Data] window appears.



1. Target OUT

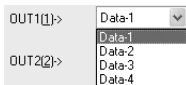
Set the OUT that becomes the target of data readout.



2. OUT1

When either [OUT1] or [OUT1/OUT2] is selected by [Target OUT], the data to read out from OUT1 is selected as described below.

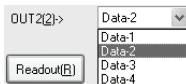
A waveform is displayed on the [Data Storage] window by specifying the data number that corresponds to the already set data number.



3. OUT2

When either [OUT2] or [OUT1/OUT2] is selected by [Target OUT], the data to read out from OUT2 is selected as described below.

A waveform is displayed on the [Data Storage] window by specifying the data number that corresponds to the already set data number.



4. Readout

Readout of the storage data starts.



► Note

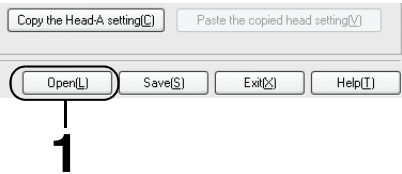
While [Readout] is being executed, the controller enters "Communication mode".

Reading and Saving the Setting File

The method to read the setting and to save it in a PC is described below.

Reading the Setting File

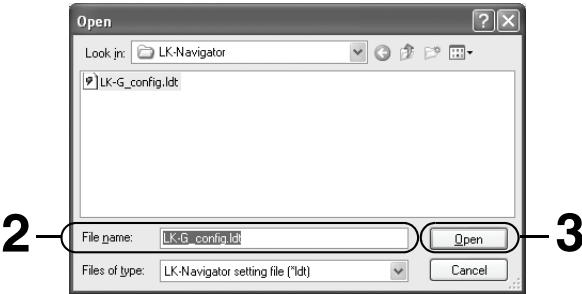
- 3
- 1
- Click the [Open] button of the main screen.



Reference

The same operation is executed by selecting [Open Setting File] from [File] of the menu bar.

The [Open] window appears.



- 2
- Select the setting file you want to read.
- LK-G_Config.ltd is selected in this example.
- 3
- Click the [Open] button.

Saving the Setting File

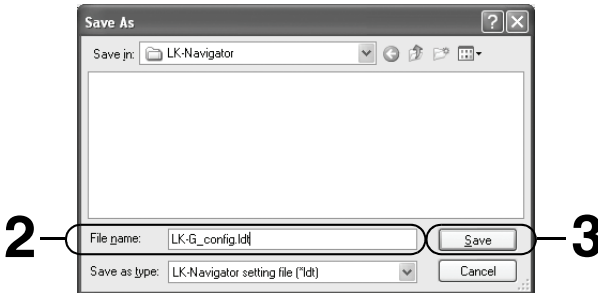
1 Click the [Save] button of the main screen.



Reference

The same operation is executed by selecting [Save Setting File] from [File] on the menu bar.

The [Save As] window is displayed.



2 Open the folder where you want to save the setting file, and enter the filename to be used for saving, in [File name].

[LK-G_config.ldt] is entered in this example.

Reference

The extension ".ldt" is automatically added to the saved file to indicate that the file is the setting file of the controller.

3 Click the [Save] button.

MEMO

3

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Error Messages and Countermeasures

List of error messages and countermeasures are shown below when error occurs in "LK-Navigator".

During running

During data communication

| Error message | Cause | Remedy |
|---|--|---|
| Failed to (communicate). * The indication in parenthesis () varies depending on the contents of errors. | The controller cannot start communication. The controller is in the setting mode from the display panel or via RS-232C. The controller is communicating with other PC using LK-Navigator. A communication error occurs. | Set the controller in the measurement mode. Exit the other LK-Navigator being used for communication with other PC. Check the cable connection and the communication settings. Then repeat the communication operation again. If the communication cable happens to be disconnected by mistake, restart "LK-Navigator". |
| System error occurs. | An abnormality occurs in the controller. | Confirm the displays of the controller, and implement the correct settings of the controller.  For the operation method and display contents of the controller, refer to the User's Manual of LK-G Series. If this error occurs repeatedly, contact your nearest KEYENCE office. |

While the controller is running

| Error message | Cause | Remedy |
|---|---|---|
| Head cannot be recognized. Check the connection with the sensor head. | Head is not connected. | After confirming that heads are connected and the normal operations are executed, restart LK-Navigator. |
| Error occurs in the Head-A (-B). | An abnormality occurs in head. | Confirm that the head is connected correctly. If the normal operation cannot be resumed, contact your nearest KEYENCE office. |
| Error occurs in the Head-A and -B. | | |
| Memory error occurs. Initialize the controller. | There is an abnormality in the controller memory. | Initialize the controller. Perform operations following the directions given on the screen. This window cannot be canceled. |

During setting

Head Settings

| Error message | Cause | Remedy |
|---|--|--|
| ABLE Calibration | | |
| The settable range is from 1 to 99. | ABLE is left blank or 0 is set. | Enter a value into ABLE in the range of 1 to 99. |
| Implement the setting so that the lower limit value is equal to or smaller than the upper limit value. | A value that is larger than the upper limit value is set in the lower limit value of ABLE. | Implement the setting so that the lower limit value is equal to or smaller than the upper limit value. |
| Number of alarm warnings | | |
| Sets the number of alarm warnings. The settable range is from 0 to 999. | The Number of alarm warnings column is left blank. | Enter a value in the range of 0 to 999 in the column of Number of alarm warnings. |
| Measurement mode | | |
| The measurement mode of the head whose calculation method is set to transparent object, is not set to the measurement mode of either "Transparent object" or "Transparent object-2". There is a possibility that correct measurement cannot be made. Are you sure you want to make measurement? | The measurement mode of the head whose calculation method is set to transparent object, is not set to the measurement mode of either "Transparent object" or "Transparent object-2". | This message appears when inappropriate setting is made. If you want to implement the measurement as it is, select OK. If you want to change the setting, select NO. |

OUT settings

| Error message | Cause | Remedy |
|--|--|--|
| Scaling input value | | |
| Illegal entry. Enter a value in the range of (–99.9999 to 99.9999). | The scaling setting input column is left blank. Or any character other than numerical value, or a value exceeding the settable range is set in the scaling setting input column | In the scaling setting input column, enter a number within the displayed range. |
| The identical value cannot be set for the Input values | The identical value is set in both of the Input value-1 column and Input value-2 column of scaling. | Enter different values in the Input value-1 column and Input value-2 column of scaling. |
| Scaling indication value | | |
| Illegal entry. Enter a value in the range of (–99.9999 to 99.9999). | The scaling setting indication value column is left blank. Or any character other than numerical value, or a value exceeding the settable range is set in the scaling setting output column. | In the scaling setting indication value column, enter a number within the displayed range. |

| Error message | Cause | Remedy |
|--|--|--|
| Overall scaling | | |
| Implement the scaling setting so that span value of the scaling setting is 9.999 or less. | Inclination of the scaling setting exceeds 9.999. | Set the input/output values of scaling setting so that inclination of the scaling setting is 9.999 or less. |
| Offset | | |
| Illegal entry. Enter a value in the range of (–99.9999 to 99.9999). | The offset setting input column is left blank. Or any character other than numerical value, or a value exceeding the settable range is set in the offset setting input column. | Enter a value from –99.9999 to 99.9999 as an offset. |
| Upper limit and lower limit of tolerance | | |
| Illegal entry. Enter a value in the range of (–99.9999 to 99.9999). | The tolerance upper limit/lower limit column is left blank. Or any character other than numerical value, or a value exceeding the settable range is set in the tolerance upper limit/lower limit input column. | Enter a value from –99.9999 to 99.9999 for the upper and lower limit values. |
| Set the value in the way that the lower limit value is smaller than the upper limit value. | A value that is larger than the upper limit value is set in the tolerance lower limit value column. | Enter a value that is smaller than the upper limit value in the tolerance lower limit column. |
| Tolerance hysteresis | | |
| Illegal entry. Enter a value in the range of (0 to 99.9999). | The tolerance hysteresis column is left blank. Or any character other than numerical value, or a value exceeding the settable range is set in the tolerance hysteresis input column | Enter a value from 0 to 99.9999 for the tolerance hysteresis. |
| A tolerance hysteresis value that exceeds [Upper limit value] – (minus) [Lower limit value] cannot be set. | A value that exceeds the tolerance measurement range ([Upper limit value] – (minus) [Lower limit value]) is set in the tolerance hysteresis. | Enter a positive value that is smaller than the tolerance [Upper limit value] – (minus) [Lower limit value] in the tolerance hysteresis. |
| Analog scaling measured value | | |
| Illegal entry. Enter a value in the range of (–99.9999 to 99.9999). | The analog scaling measured value is left blank. Or any character other than numerical value, or a value exceeding the settable range is set in the column of analog scaling measured value. | Enter a value from –99.9999 to 99.9999 for the analog scaling input. |
| The identical value cannot be set for the Input values. | The identical value is set in both of the Input value-1 column and Input value-2 column of the analog scaling measured value. | Enter different values in the Input value-1 column and Input value-2 column of the analog scaling measured value. |

* () The value within the parenthesis differs depending on the setting specified in [Minimum display unit].

| Error message | Cause | Remedy |
|--|---|---|
| Analog scaling output voltage | | |
| Illegal entry. Enter a value in the range of -10.500 V to +10.500 V. | The analog scaling output voltage column is left blank. Or any character other than numerical value, or a value exceeding the settable range is set in the column of analog scaling output voltage. | Enter a value in the range of -10.5 V to +10.5 V, for the analog scaling output voltage. |
| Overall analog scaling | | |
| Implement the scaling setting so that inclination of the scaling setting is (9.999) or less per 1 V. | Inclination of the analog scaling setting exceeds the setting value. | Set the measured value and output voltage so that inclination of the analog scaling setting becomes smaller than the displayed value. |

* The value in parenthesis () varies depending on the value specified for [Minimum display unit].

Common Settings

| Error message | Cause | Remedy |
|--|---|--|
| Number of data stored | | |
| The settable range is from 1 to 65536. | The Number of data stored field is left blank or a value of 0 or larger than 65536 is set in the field. | Enter a value in the range of 1 to 65536 in the field for Number of data stored. |



Shortcut Keys List

List of shortcut keys that can be used in LK-Navigator is described.

| Shortcut Keys List | | | |
|---------------------------|-------------------------------------|---------------|--|
| Menu | Submenu | Key Operation | Operation |
| File (F) | Save Setting File (S) | Ctrl + S | Save Setting in File. |
| | Open Setting File (o) | Ctrl + O | Open Saved Setting File. |
| View (D) | View Measurement Value (D) | F5 | Toggle between Display and Non-display of the Measurement Value Window. |
| | Head-A Received Light Waveform (A) | F6 | Toggle between Display and Non-display of the Head-A Received Light Waveform Window. |
| | Head-B Received Light Waveform (B) | F7 | Toggle between Display and Non-display of the Head-B Received Light Waveform Window. |
| | Data Storage (S) | F8 | Open Data Storage Window. |
| Communication (J) | Send Setting from Controller (S) | F3 | Send the Setting of LK-Navigator to controller. |
| | Receive Setting from Controller (L) | F4 | Read Setting of Controller into LK-Navigator. |
| Communication Setting (O) | PC Communication Setting (C) | | Start Communication Setting Window. |
| Help (H) | View Help (H) | F1 | Start Help. |
| | Version Information (A) | | Shows version number of the LK-Navigator software. |
| Overall | Copy Program | Alt+W | Copy the Selected Program No. |
| | Paste Program | Alt+Z | Paste to the Selected Program No. |
| | Initialize Program | Alt+I | Initialize the Selected Program No. |
| | Global Initialization | Alt+8 | Initializes all the program Nos. |

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Revision history

| Date of printing | Version | Revision contents |
|------------------|------------------|--------------------------|
| March, 2005 | Official release | |
| December, 2007 | 2nd edition | Windows Vista supported. |
| December, 2008 | 3rd edition | |
| January, 2011 | 1st revision | Windows 7 supported. |
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Specifications are subject to change without notice.

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