

Lab Manual

KEYENCE LASER SENSOR DISPLACEMENT

Laser Head LK-H020 / Controller LK-G5001 / LK-Navigator 2



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1. Objectives

- 1.1 This manual will introduce you how to setup to measure vibration at micrometer scale using laser displacement sensor.
- 1.2 Understanding the control parameters of monitoring software LK-Navigator 2, so you can measure vibration even for transparent materials, at ultrasonic speed, in different unit scales (mm, μm).

2. Instruments

2.1 Laser head LK-H020



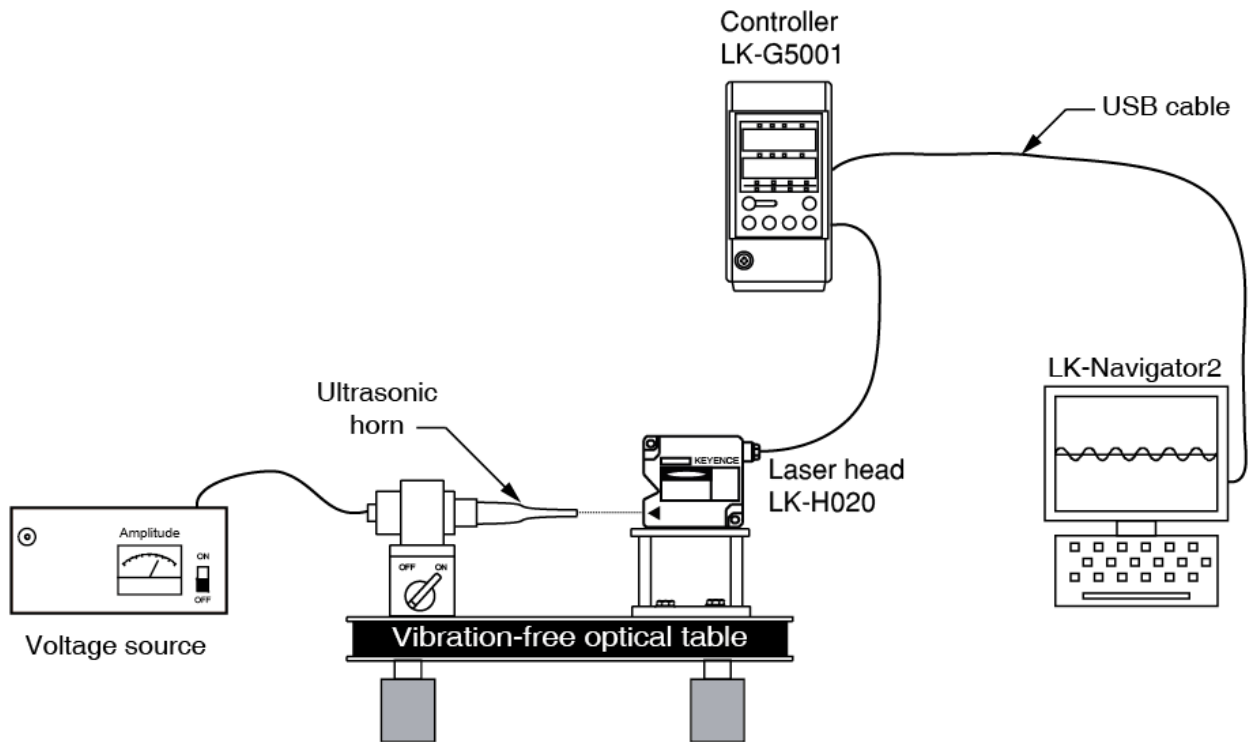
2.2 Controller LK-G5001



2.3 Monitoring software LK-Navigator 2



3. System



An example setup of ultrasonic horn experiment.

The object (the horn) and the laser head must be fixed steadily on the vibration-free optical table to eliminate any noise during measurement time.

Measurement value is monitored from the computer by LK-Navigator 2 software.

4. Overview of LK-Navigator 2

LK-Navigator 2 is software for configuring parameters and monitoring the LK-G5000 series controller. It is used by connecting a PC and the controller to configure parameters and monitor operating status.

Operation settings

4.1 LK-Navigator 2 allows you to upload the settings in the controller to the PC for viewing and editing. It features copy and paste functions for configuring

multiple controllers and setting programs in a short amount of time.

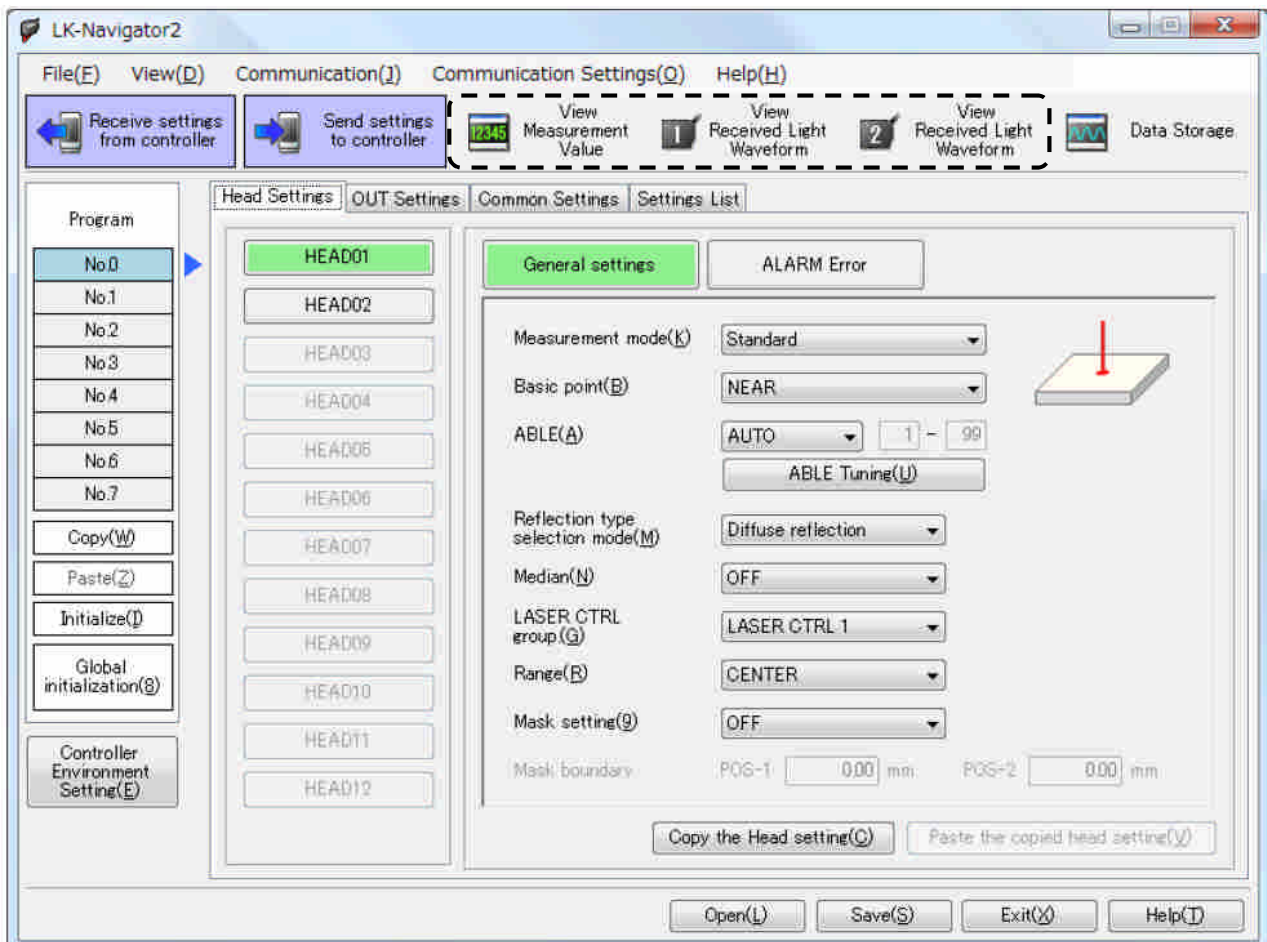
4.2 The settings on the PC can be downloaded and reflected in the controller.

LK-Navigator 2 communicates with the controller at the simple press of a button.

4.3 Settings can be loaded from and saved on the PC. Settings saved on the PC can be used to restore the settings in the controller in the event the settings are erased.

The following items can be set from the PC.

1. Head settings: measurement modes (standard, transparent, translucent,...), reflection type, range, etc.
2. OUT settings: calculation method, tolerance, offset, display unit,...
3. Common settings: sampling cycle, data storage, analog output,...
4. Environment settings: number of used heads, RS-232 settings, ethernet,...

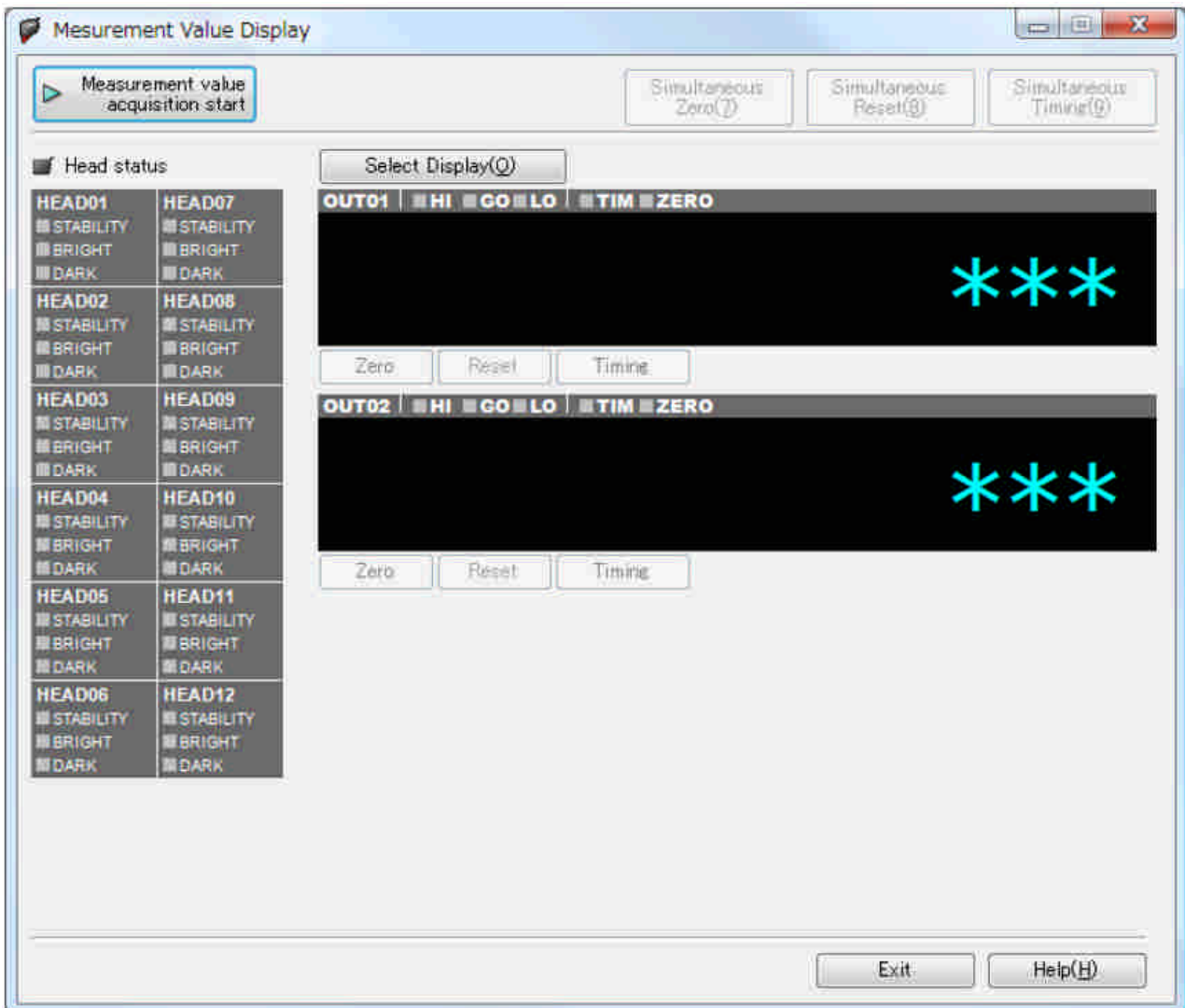


Monitoring functions

These two items can be monitored.

1. Measurement value.
2. Received light waveform.

The screen shown below is a display example of the "Measurement value display".



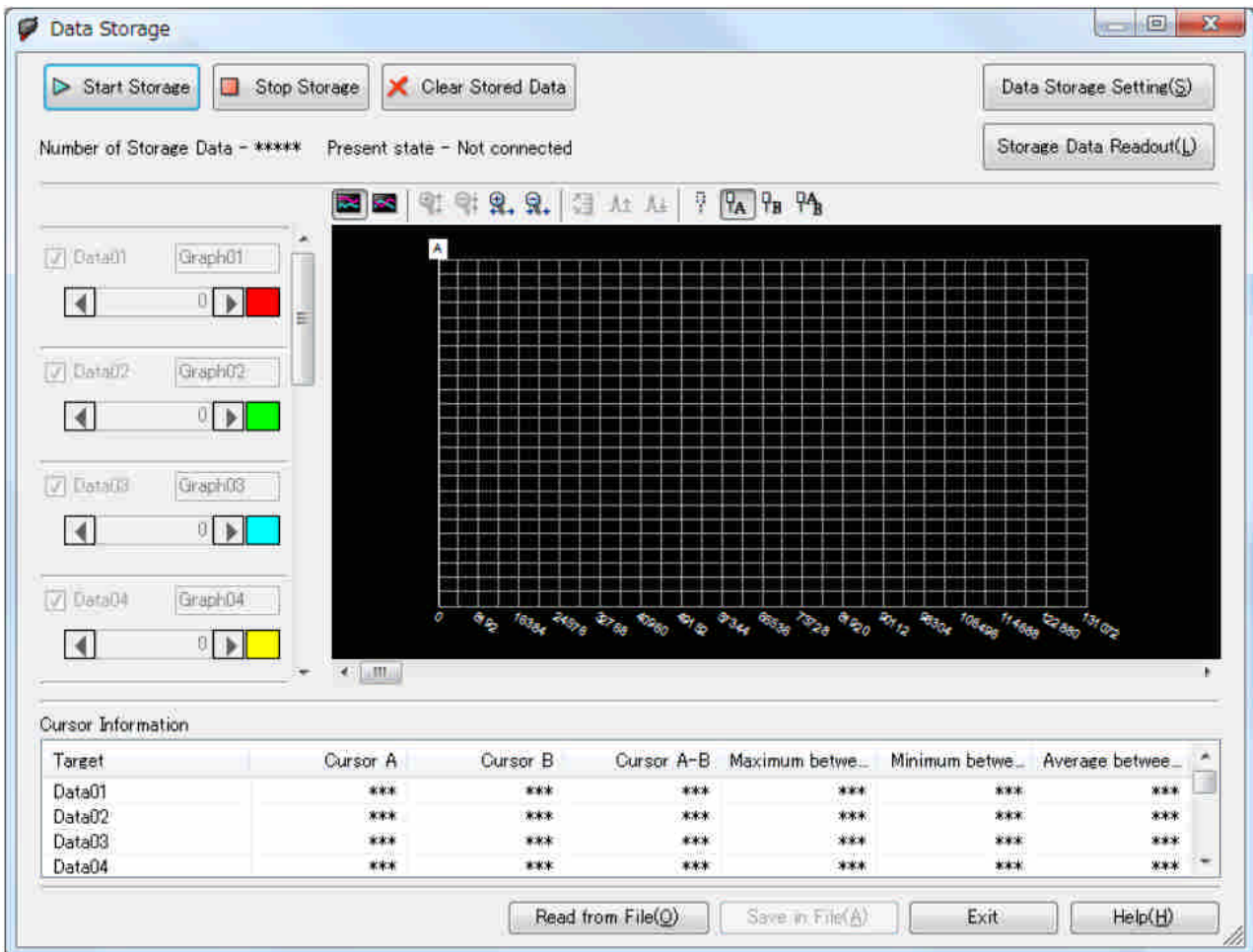
Data storage

The controller has a data storage function for storing measurement values.

The PC can be used to control these functions:

1. Start/stop/clear the data storage.
2. Configure the data storage method.

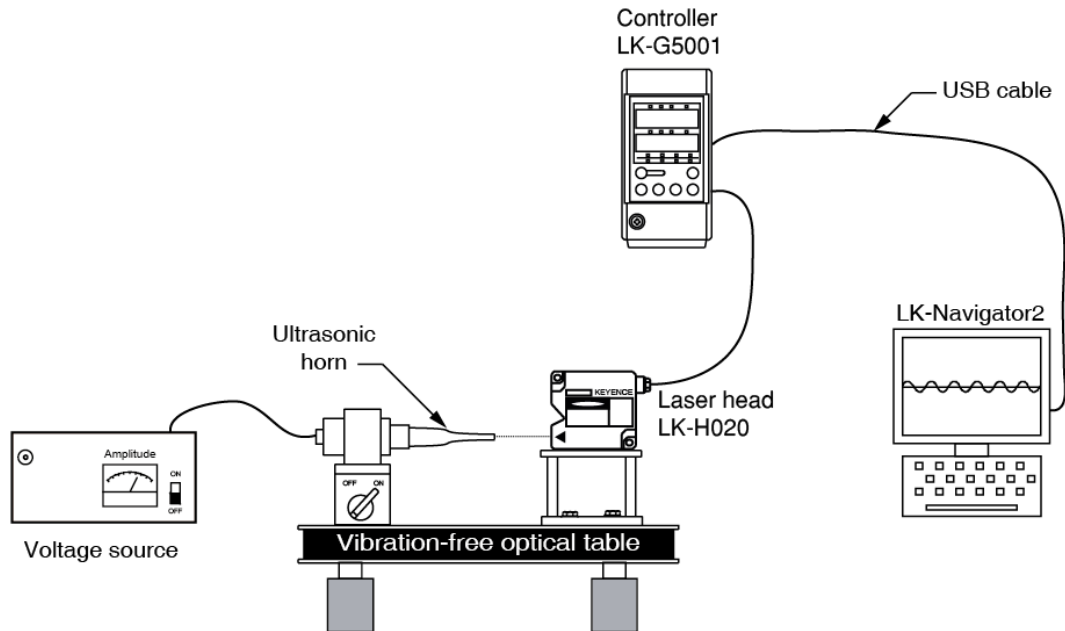
3. Upload/download settings between the controller and PC.
4. Upload storage data from the controller.
5. Read and save storage data on the PC.
6. Display waveform of up to 12 data series downloaded from the controller.
7. Display calculations on data between user-set cursors.



Note: for more information, please read the ‘LK-Navigator 2 User’s manual’ book of Keyence Corp. (file “LK-H2-M-E.pdf” in the installation source).

5. Procedure

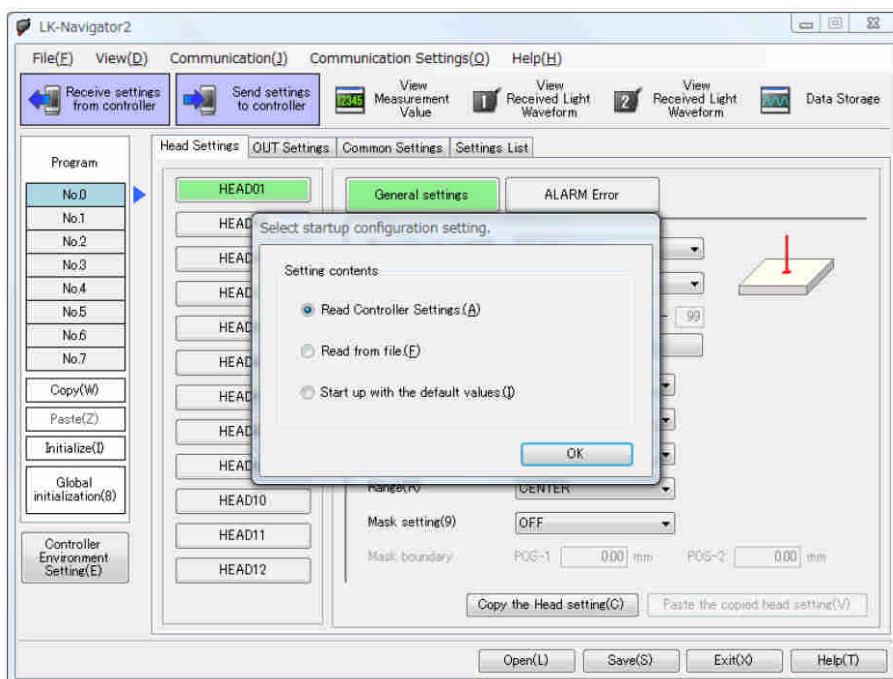
1. Setup the instruments as the following figure:



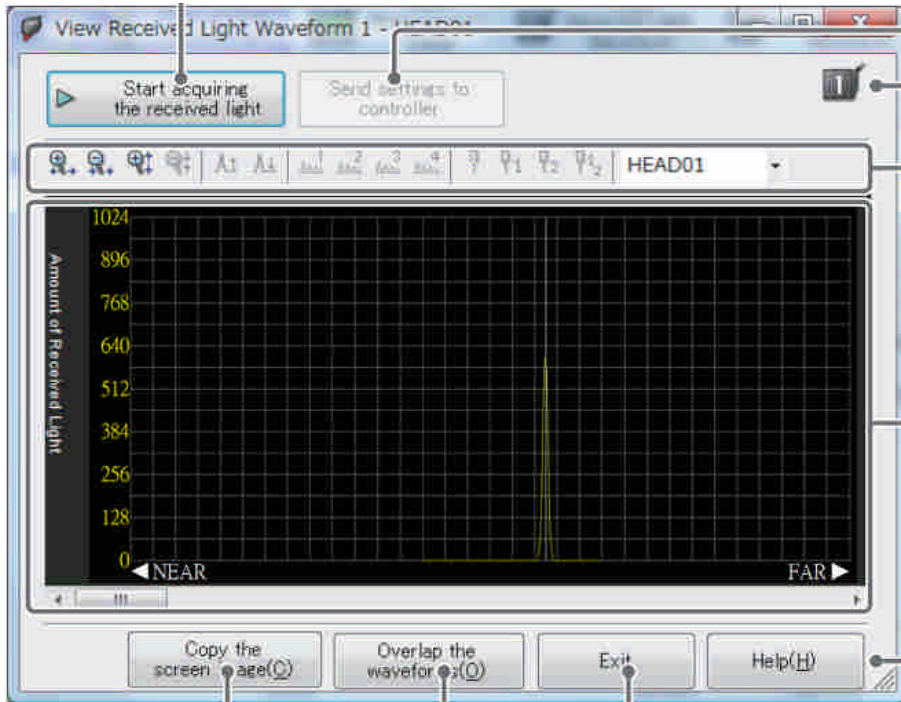
2. Start LK-Navigator on the computer.



3. Select 'Read Controller Settings' (default) and click OK.

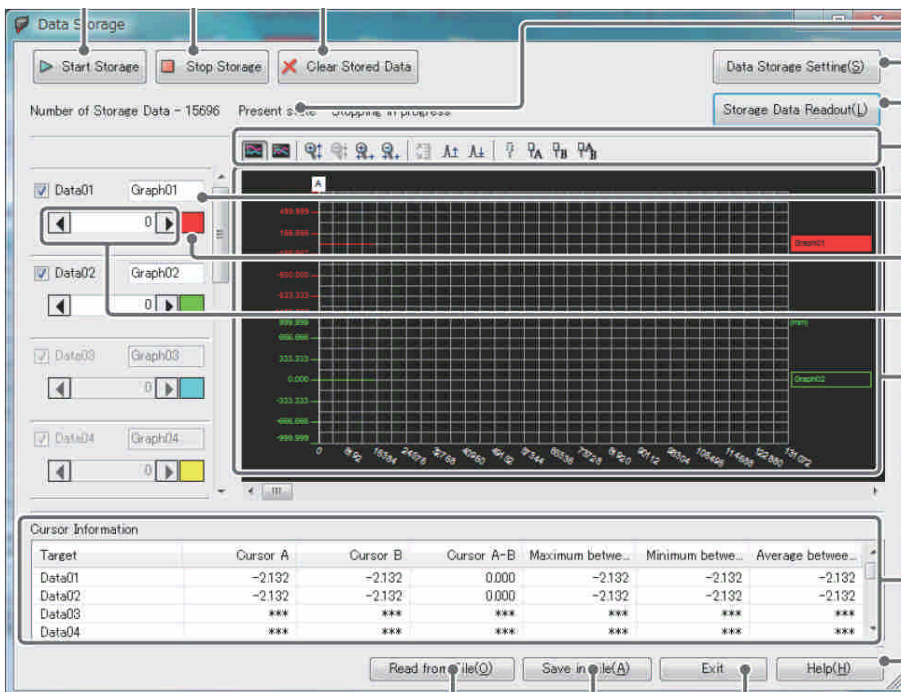


4. Check the reading signal by selecting 'View Received Light Waveform'.



Tip: Adjust the laser beam to the object until the signal is higher than 512.

5. Go to 'Data Storage' function for displaying measurement results.



The "Data Storage" window can display up to 12 waveforms.

This window can display the following data:

1. Storage data read from the controller.
2. Storage data saved on the PC.

There are function buttons:

Data Storage Setting: sets the method for storing measurement data (amount of data stored, sampling cycle).

Storage Data Readout: loads storage data from the controller.

Start Storage: starts storing data on the controller.

Stop Storage: stops storing data on the controller.

Clear Stored Data: clears the data stored on the controller.

Save in file: saves the storage data to a file (*.csv file).

Read from file: loads storage data from a file (*.csv file).

A basic data storage flow:

