LEVELAB

User Guide

Contents

About LEVELAB

LEVELAB is an application for measuring the accuracy of surface plates and machine tools.

By using it together with our digital level **LEVELNIC**, you can easily measure flatness and straightness.

Even when measuring displacement with a dial gauge or similar, you can enter values using the keyboard and compute flatness or straightness.

Before Use

Application Structure & License Authentication

LEVELAB can be used as-is, but connecting our dedicated **USB dongle** to your computer unlocks restricted features and allows access to additional functions.
The USB dongle includes licenses for each measurement function.
Connecting a currently sold USB dongle unlocks **flatness** and **straightness** measurements.
In LEVELAB:

- Authenticated via USB dongle → **Full Edition**
- Not authenticated → **Trial Edition**

System Requirements

- Windows 10 (32-bit / 64-bit)
- Windows 11
- *ARM-based Windows is not supported.*

Supported Devices

LEVELAB can be used conveniently with LEVELNIC devices.
Compatible models include:

- DL-m5W
- DL-m5
- DL-m4M
- DL-mini
- DL-S2W
- DL-S3L
- DL-S3
- DL-S4W
- DL-mXY (usable by switching to 1-axis mode)
- DL-SXY (usable by switching to 1-axis mode)

Both **wired** and **wireless** connections are supported.

Installation

Download

The application can be downloaded from the LEVELAB page on our website:
https://www.niigataseiki.co.jp/software_levelab/

Download the appropriate version for your computer and extract the files after downloading.

Placing the Application in Any Folder

No installation is required.
Double-click the executable to run it.
Because settings files and folders are created on first launch, we recommend keeping the application in the **same folder** at all times.

Connecting the USB Dongle

If you have purchased a USB dongle, connect it **before launching** the application.
Only **one dongle** should be connected when starting LEVELAB.

Startup

When the application is launched, the **Start Page** appears.

You can navigate to each measurement function from this screen.

Settings

We recommend configuring settings after the first startup.

LEVELNIC Settings

Select LEVELNIC

Select the LEVELNIC device you will use for measurement from the list.

Port Settings

Select the COM port used by the LEVELNIC.

When the connection is recognized, the available ports will appear in the list upon selection.

If “Other” is selected as the LEVELNIC type, choose the correct baud rate that matches the connected device.

Data Acquisition Timing

Choose whether to acquire data by clicking a button in the application or by pressing the data output button on the LEVELNIC.

Note: Depending on the LEVELNIC model and data acquisition method, the switch settings on the LEVELNIC may need to be changed.

System Settings

Font Size

The font size can be changed in 5 levels.

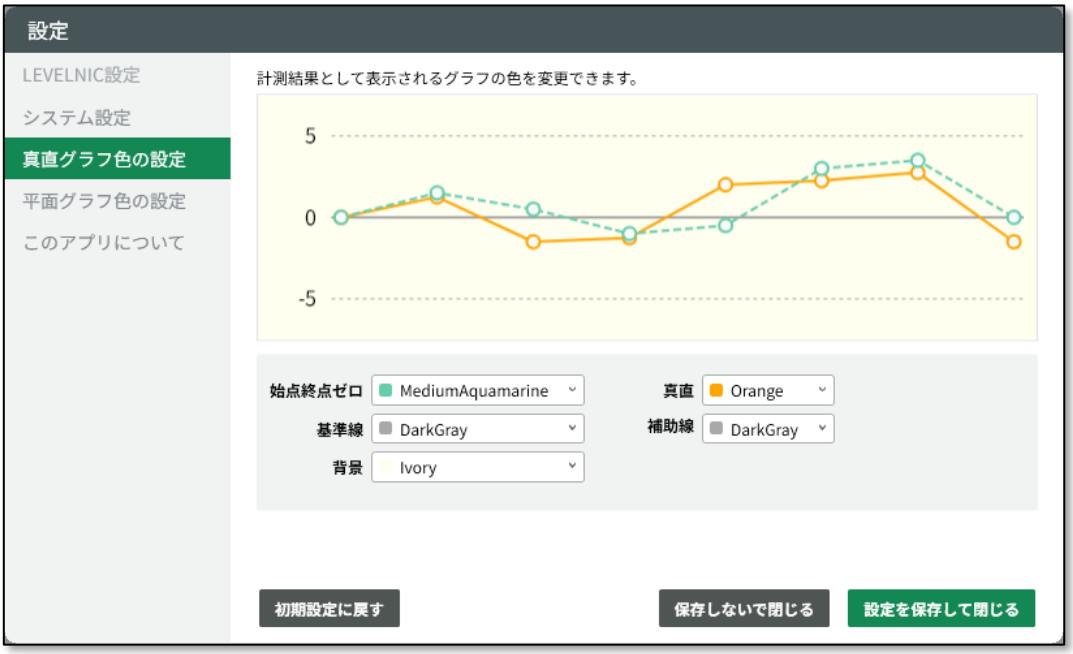
Startup Page

The default is the “Start Page.” You may change it so that a measurement screen opens immediately at startup.

Sound Settings

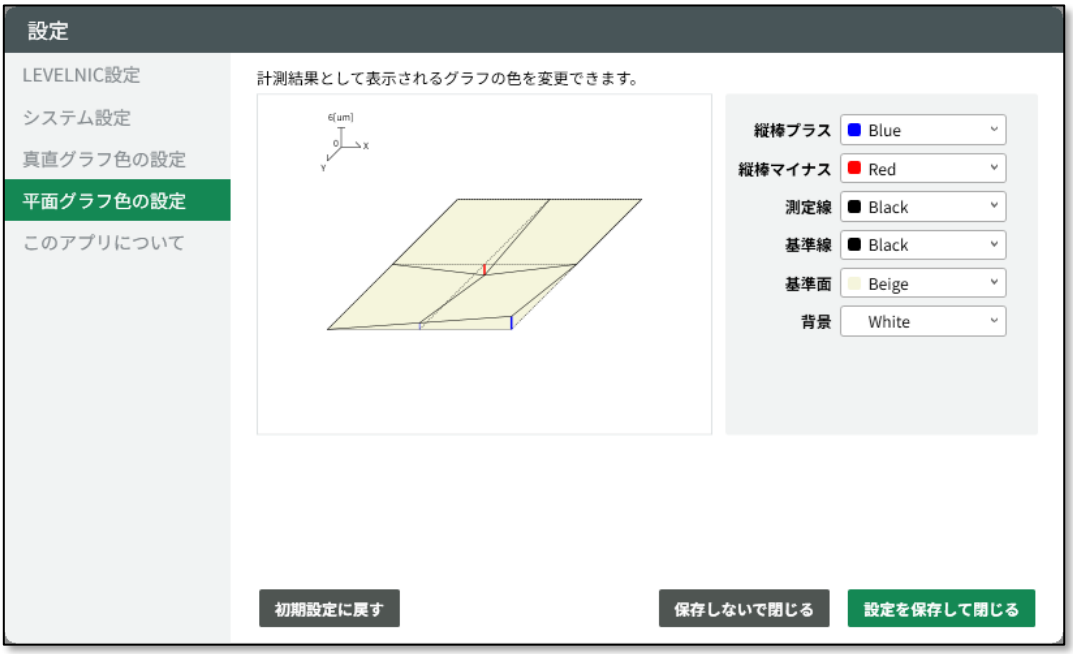
Beep sounds can be enabled for errors and data acquisition.

Straightness Graph Color Settings



You can change the color of elements displayed in the straightness result graph (straightness line, auxiliary lines, etc.).

Flatness Graph Color Settings



You can change the color of elements displayed in the flatness result graph (reference plane, measurement lines, etc.).

About This Application

You can check the current version and edition of LEVELAB.

By clicking “Check for Updates,” you can see whether an update is available.

If an update exists, a notice will appear.

Flatness Measurement

Flatness is calculated by entering tilt values measured with a level (mm/m) or displacement values measured with a dial gauge (μm).

Two input methods are available:

1. Import data from LEVELNIC
2. Enter manually from keyboard using recorded measurements

Using a level:

Two points corresponding to the measurement pitch are measured sequentially.

If the far end in the measurement direction is higher → positive value

If lower → negative value

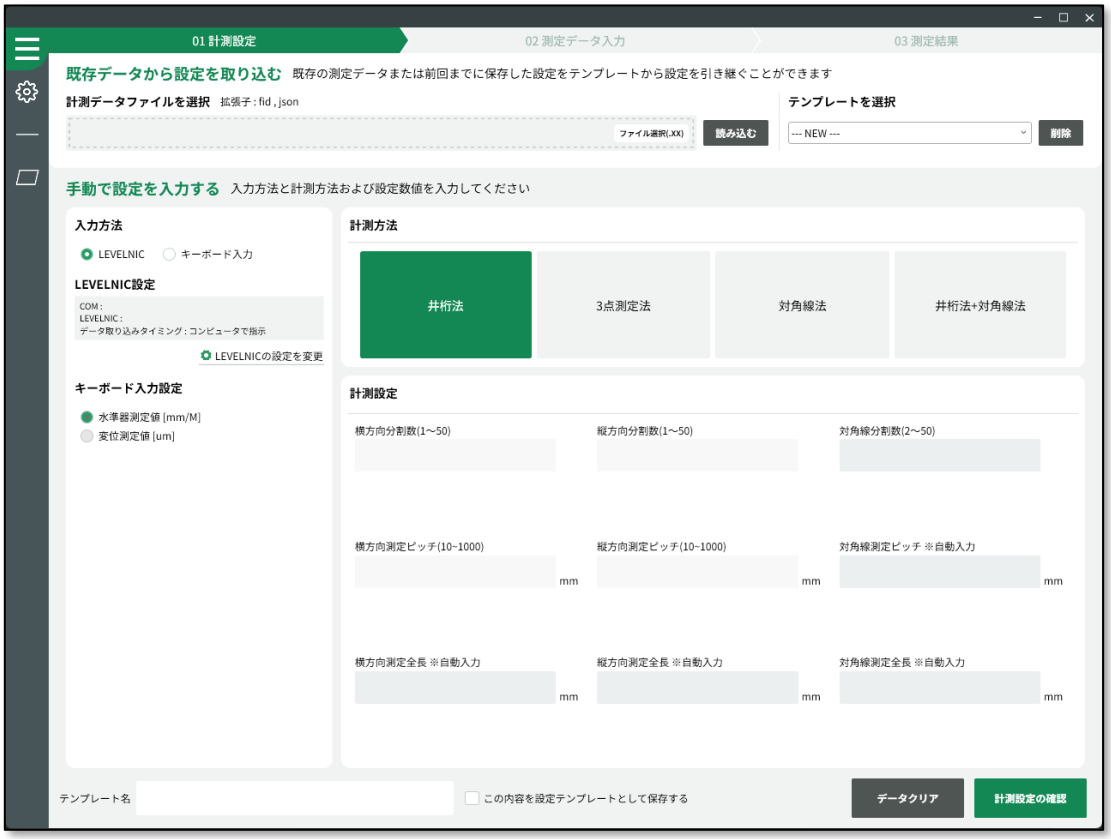
Using a displacement gauge:

A reference straightedge is assumed to be a perfect line, and displacement from it is measured.

If the probe moves upward → positive

If downward → negative

Measurement Condition Screen



Input Method

Select whether to measure using LEVELNIC or enter recorded values by keyboard.

Keyboard Input Type

If keyboard input is selected, choose whether the values are:

- Tilt values from a level
- Displacement values from a dial gauge, etc.

Measurement Method

Choose one of four methods:

- Grid Method
- 3-Point Method
- Diagonal Method
- Grid + Diagonal Method

If entering displacement values:

- Only **Diagonal** or **Grid + Diagonal** can be used.

Measurement Settings

Specify division counts and measurement pitch.

- Max divisions (horizontal/vertical/diagonal): **50** (Trial Edition: **3**)
- Measurement pitch: **10–1000 mm**

Templates

Measurement conditions (method, input type, settings, etc.) can be saved as templates.

(Templates cannot be used in Trial Edition.)

To save, check the box **"Save these conditions as a measurement template."**

Templates can be deleted with the "Delete" button.

Measurement Data File

Load previously measured data (contains measurement values).

(Not available in Trial Edition.)

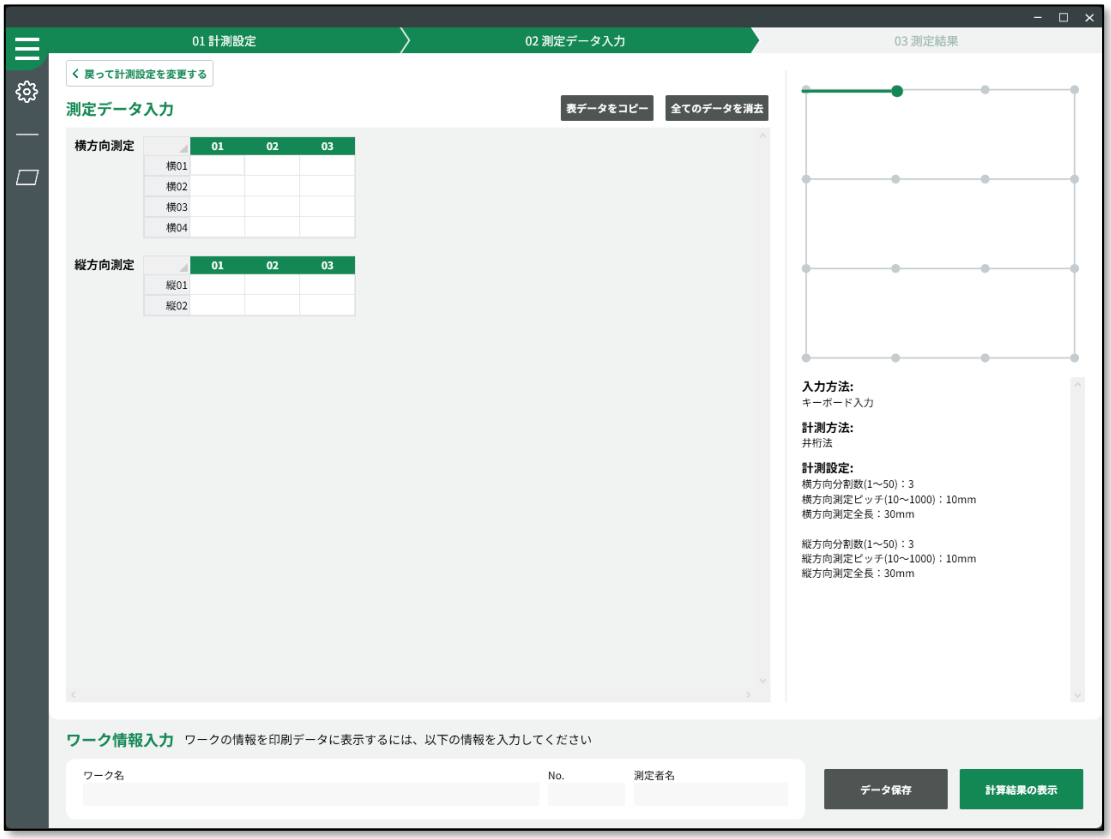
Supported extensions: **.fid**, **.json**

Loaded data is restored exactly and cannot be modified.

Clear Data

Deletes all currently entered data.

Measurement Screen



On this screen, you enter the measurement values.

- For **keyboard input**, enter values directly into the displayed cells.
- For **LEVELNIC input**, values are entered automatically when acquisition is triggered.

To record workpiece information, enter:

- Workpiece Name
- Workpiece No.
- Measurer's Name

Notes Regarding Each Measurement Method

Grid Method

- Horizontal lines: Zero adjustment is allowed at each starting point, but **not allowed during measurement**.
- Vertical lines: Zero adjustment is allowed at the left starting point, but **not allowed during measurement**.
- Right-side vertical measurement lines: Zero adjustment is **not allowed**, even at the starting

point.

Diagonal Method

- Zero adjustment is allowed at the start point of each horizontal, vertical, and diagonal line, but **not allowed during measurement**.

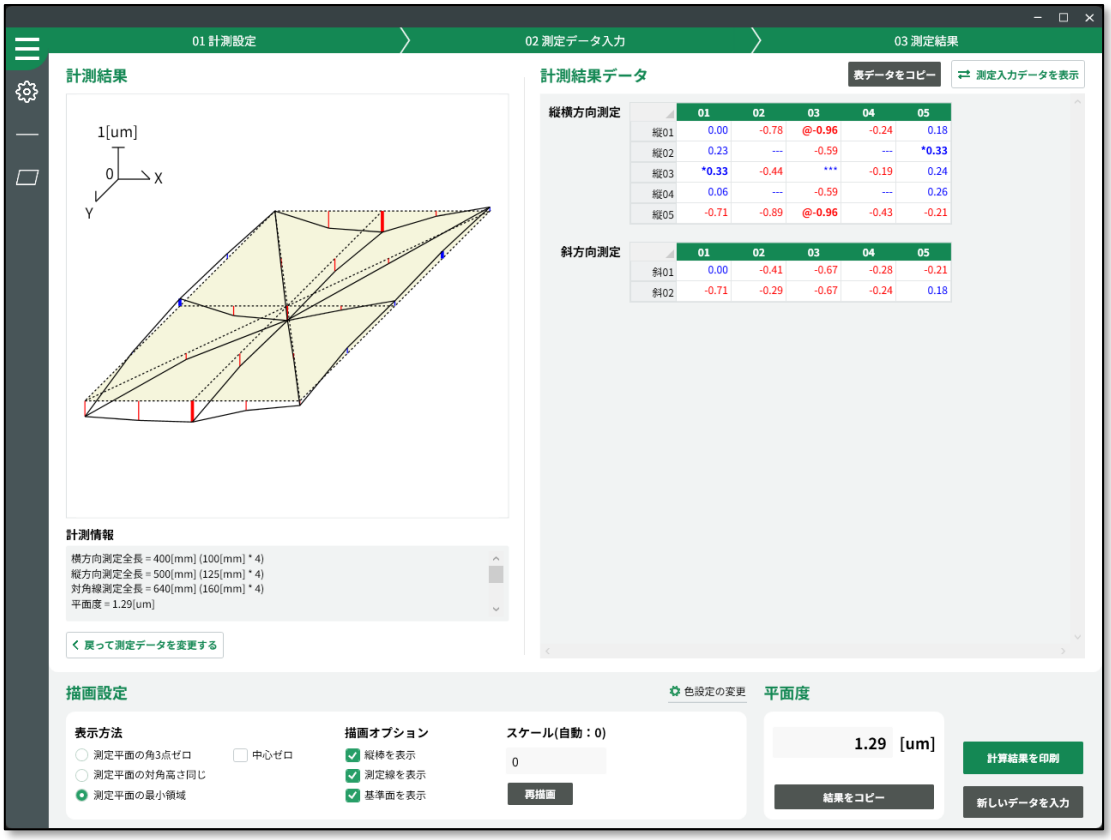
Grid + Diagonal Method

- Same rules as above: Zero allowed at start points only.

3-Point Method

- Horizontal lines: Zero adjustment is allowed **only** at the start of the first horizontal line. After that, zero must **not** be adjusted until all horizontal lines are completed.
- Vertical lines: Zero adjustment is allowed at the start point only, but not during measurement.

Measurement Result Screen



Measurement values are calculated and displayed as:

- Numerical values

- Graphs

The **maximum value** is marked with *

The **minimum value** is marked with @

These points are shown as *thicker vertical bars* in the graph.

Display Modes

Three-Point Zero Reference

The upper-left, lower-left, and upper-right corners are set to 0 μm.

Displays how other points deviate above or below these references.

Diagonal Equal-Height Reference

The upper-left and lower-right corners are set to 0 μm;

The remaining diagonal points are leveled to equal height.

The difference between max and min becomes the **maximum deviation**.

Minimum Zone Reference

The upper-left corner is set to 0 μm, and the measured plane is rotated to minimize the difference between highest and lowest values.

This minimized difference becomes the **flatness**.

(This corresponds to the minimum separation between two parallel planes.)

Center Zero (for Diagonal or Grid+Diagonal methods)

When checked, the diagonal crossing point is used as the 0 μm reference.

For Grid+Diagonal method:

Ideally, the center point derived from the cross measurement and the diagonal measurement should match.

But due to errors (probe placement, instrument precision, pitch accumulation), differences may occur, and up to **three center values** are shown.

Maximum Deviation / Flatness

Difference between max and min of the selected display mode.

"Flatness" is shown only when **Minimum Zone** is selected.

Rounding Note

Displayed values are rounded to the next lower digit.

Maximum deviation/flatness is rounded after difference computation, so a 1-digit mismatch may occur—this is normal.

Scale

You may specify the graph's full vertical scale.

"0" enables auto-scaling.

Printing

Prints the measurement results.

(Not available in the Trial Edition.)

Press "Print Calculation Results" and follow the instructions.

Straightness Measurement

Straightness is obtained by entering tilt values measured with a level (mm/m) or displacement values measured with a dial gauge (μm).

As with flatness:

- Data may be imported from LEVELNIC
- Or entered manually by keyboard

Using a level:

Two points at the measurement pitch are measured sequentially.

Positive → far end is higher

Negative → far end is lower

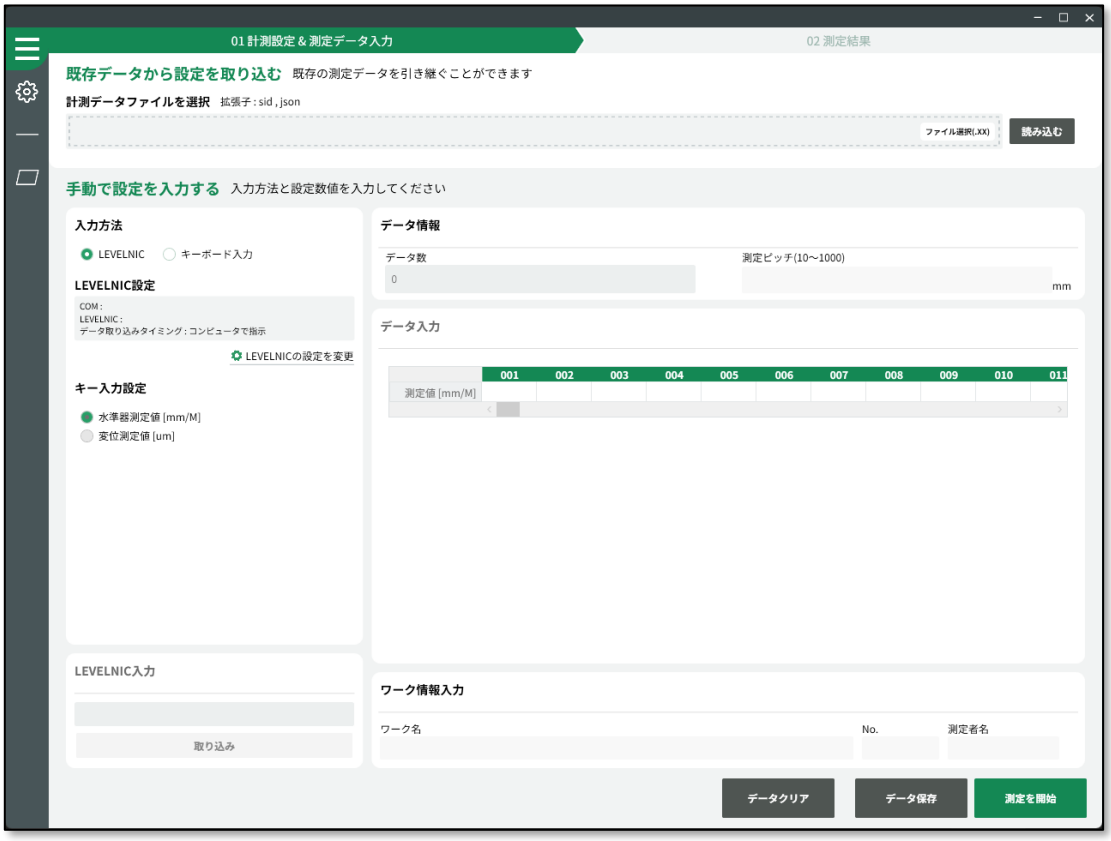
Using a displacement gauge:

A reference straightedge is treated as an ideal straight line.

Upward probe movement → positive

Downward → negative

Measurement Conditions / Measurement Screen



Input method, keyboard input settings, and workpiece information are the same as in flatness measurement.

Maximum Number of Points

- Up to **300** measurement points
- Trial Edition: **10**

Note for Displacement (µm) Input

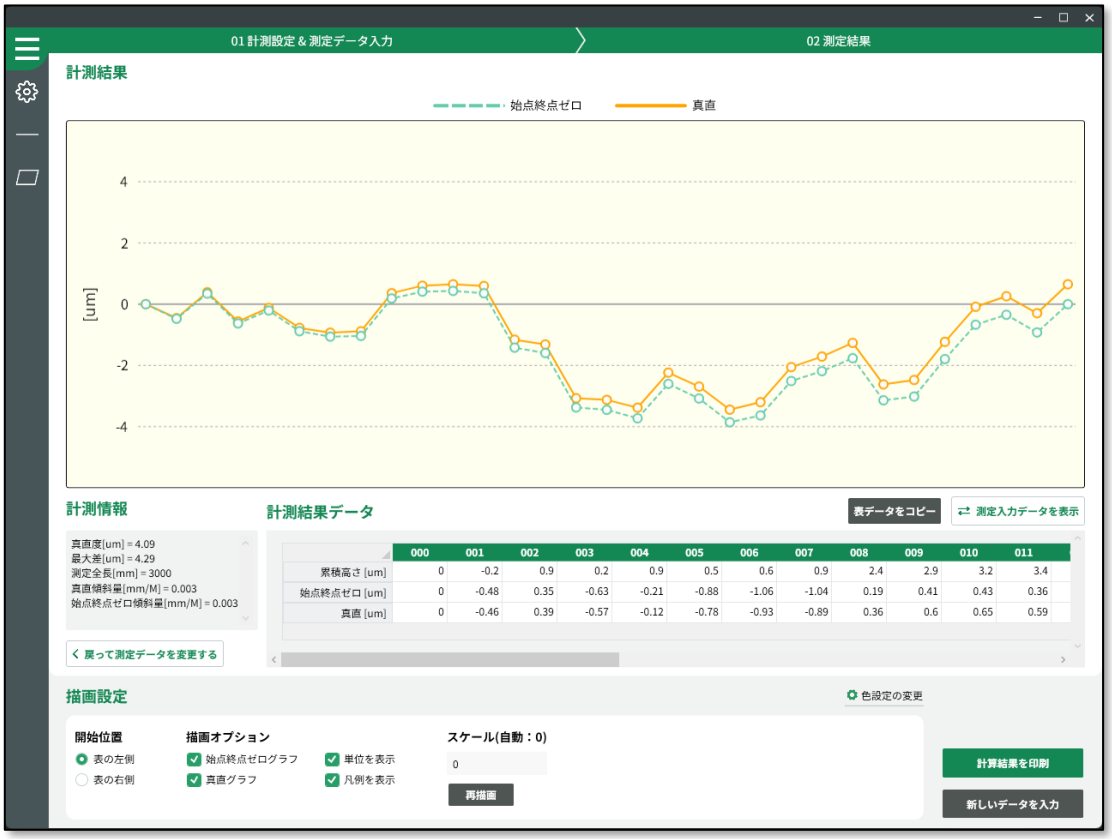
The first cell represents the displacement at the **first measurement point** a full pitch away from the starting point.

The starting point is assumed to be adjusted to **0 µm**.

Measurement Pitch

Enter an integer between **10–1000 mm**.

Measurement Result Screen



After completing measurement, results are displayed for:

- Straightness
- Start–end zero alignment

Computation Data

Cumulative Height

If LEVELNIC was zeroed to horizontal, values show heights relative to horizontal.

If zeroed at the measurement start point, values show heights relative to the extension of that slope.

If displacement gauge input is used:

- Height is inherently measured
- Cumulative height is not calculated (shown as ***)

Start–End Zero

Cumulative heights are recalculated so that the end point becomes zero.

Shows how intermediate points vary.

The difference between max and min becomes the **maximum deviation**.

Straightness

Cumulative heights are compensated (tilt-adjusted) to minimize the difference between max and min.

(This corresponds to fitting the measurement between two parallel straight lines with minimum separation.)

The difference between max and min becomes the **straightness**.

Measurement Information

Straightness

Difference between the maximum and minimum of the straightness values.

Maximum Deviation

Difference between the max and min of the start-end zero values.

Total Measurement Length

Measurement pitch × number of measurements.

Slope (Straightness Compensation)

The slope adjusted during straightness compensation.

Internally calculated with high precision, but displayed rounded to 0.001.

Slope (Start-End Zero Compensation)

The slope adjusted for start-end zero alignment (also rounded to 0.001).

Even if straightness and start-end zero values differ, the slopes may match due to rounding.