G2 Protective Cover
User Manual

LMI TECHNOLOGIES

G2 Protective Cover Quick Start Guide

The G2 protective cover is used on certain Gocator 2500 and Gocator 2600 sensors (see the list below) to prevent scratches or breakage to the sensor's laser and camera windows. The protective cover features replaceable windows and gaskets to provide secure and reliable protection.

For applications that rely on absolute measurements, LMI recommends applying scaling values to the measurement outputs. For information, see *Calculating and Applying a Measurement Scale* on the next page.

	The protective cover's windows reduce light transmission by up to roughly 16%. If you are adding a cover to an existing application, you may need to adjust the sensor's exposure.

The following table lists the supported sensors and available protective covers:

Description	Part Number
Protective Cover for 2629, 2630	301275
Protective Cover for 2540, 2550, 2640	301276
Protective Cover for 2650, 2670, 2690	301277
Window service kit for Protective cover, qty. 5	301278

For detailed information on installing and configuring Gocator sensors, see the sensor user manual.

For information on reordering windows and gaskets, contact LMI.

Installing the Protective Cover

The protective cover is pre-assembled (cover, gaskets, and windows). Make sure that the sensor windows and housing face are clean before installing the protective cover.

To install the cover on the sensor, use the provided screws. (The number of screws is model-dependent.)

M4 x 10mm
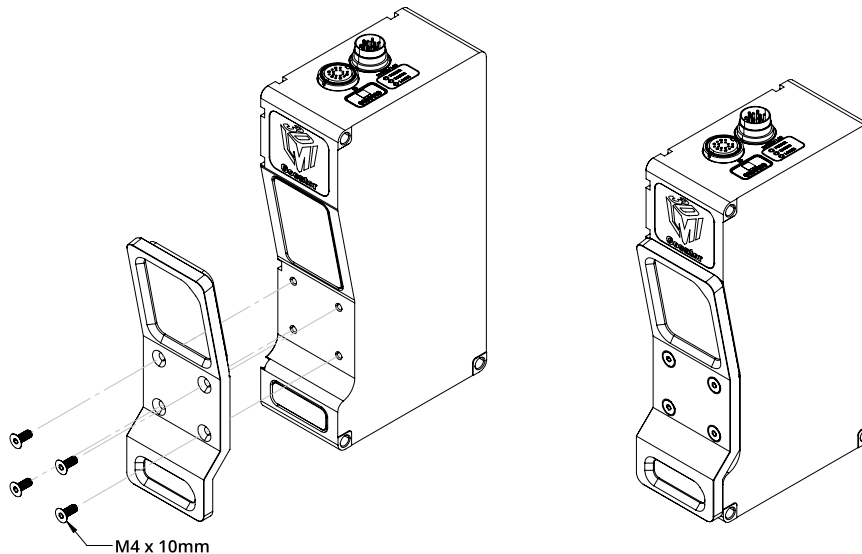
Calculating and Applying a Measurement Scale

Use the information in the following sections if you need to calculate and apply a scale to your measurements.

Target and Mounting

LMI recommends purchasing or manufacturing a gauge block for the procedure. The target's height should be 50% to 75% of the sensor's measurement range. The width of the target should be less than the sensor's FOV at mid-range. To determine an appropriate size for the target, see your sensor's specifications in the sensor user manual.

You must securely mount the sensor above a stable surface. Because you must take two sets of measurements, if the sensor moves between measurements, the results will be inaccurate. Mount the sensor so that the surface you will scan (target or table surface) is in the upper half of the sensor's measurement range.

Gocator 2630

205

Gauge block

Surface under
target
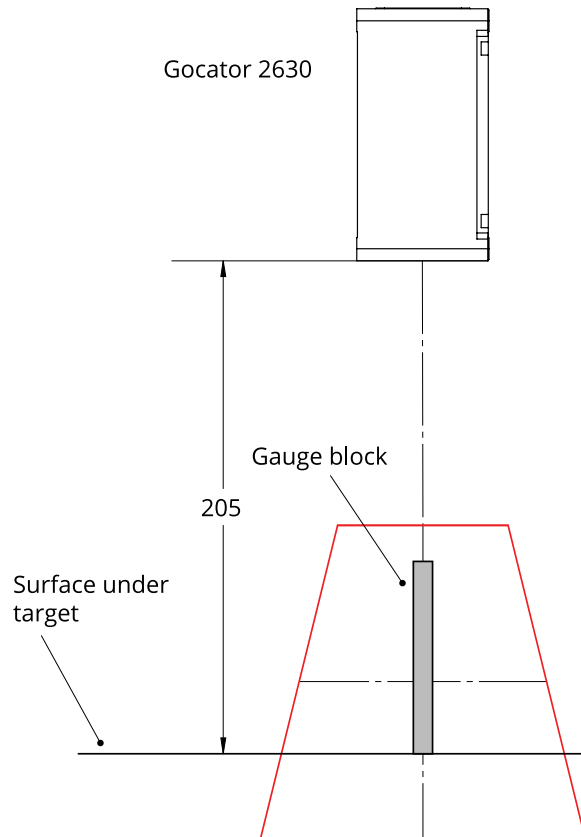
You should install the protective cover without unmounting the sensor.

Collecting Height Measurements

You must collect measurements twice: *before* installing the protective cover and *after* installing the protective cover. Do not change the sensor height between measurements.

To perform measurements for scaling calculation

1. Mount the sensor above a flat surface.

    The sensor should be mounted so that the top of the target will be in the upper part of the sensor's measurement range.

    For more information, see *Target and Mounting* on the previous page.

2. Align the sensor to the flat surface under the sensor.

Gocator 6.x

On the **Scan** page, in the **Alignment** panel, click **Align**.

GoPxL

On the **Alignment** page, in the **Alignment** section, click **Align Sensor...** and follow the steps in the alignment wizard.
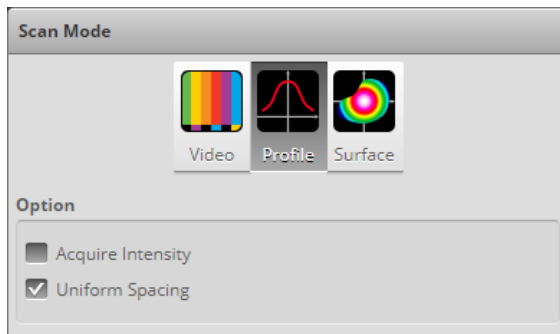
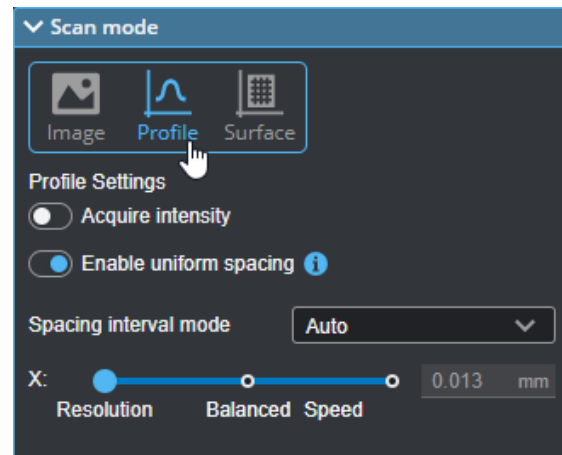

3. Place the target in the sensor's field of view.

For important information on the target and its position in the sensor scan area, see *Target and Mounting* on page 3.

4. On the **Scan** page, set the sensor to Profile mode.

Gocator 6.x

GoPxL

5. Capture a profile to make sure the target is in the sensor's field of view.
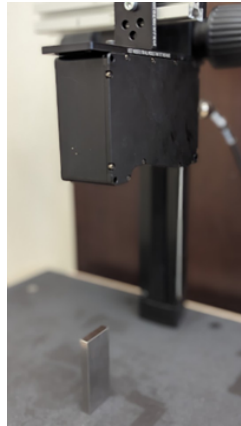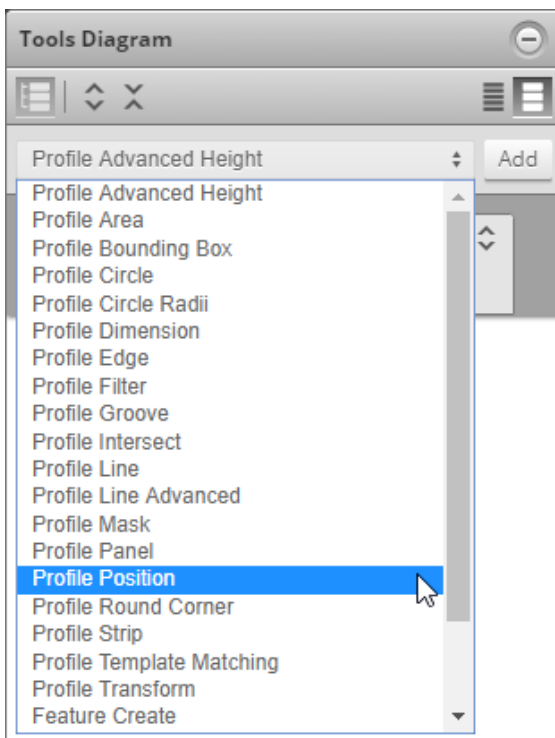
The Gocator 6.x interface is shown here.

Sensor profile:
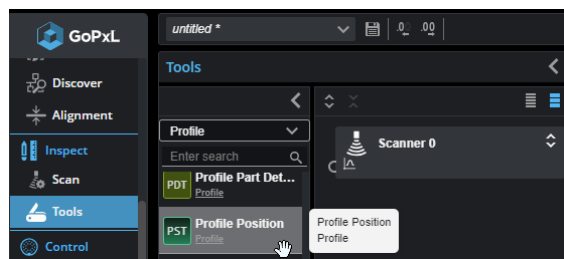

Target producing the profile:

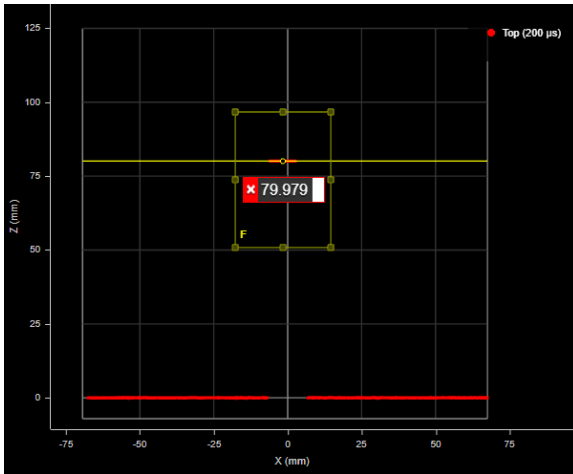6. On the **Measure** page, add a Profile Position tool.

Gocator 6.x

GoPxL

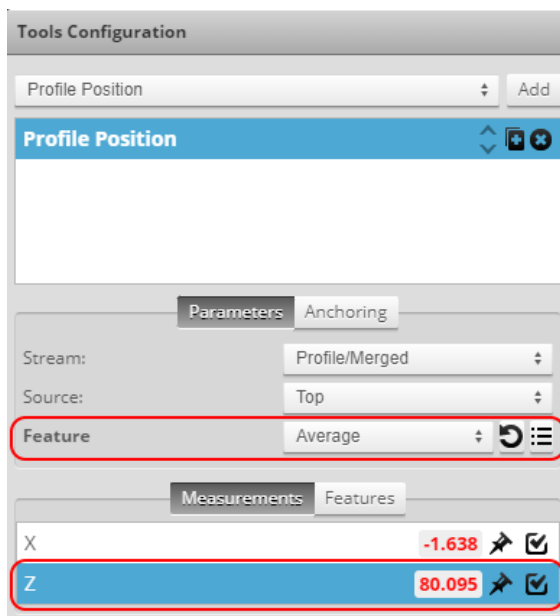Double-click the tool or drag and drop it to the space to the right.

7. Place the tool's region on the top of the target's profile, resizing it if necessary to include only the top. The Gocator 6.x interface is shown below.
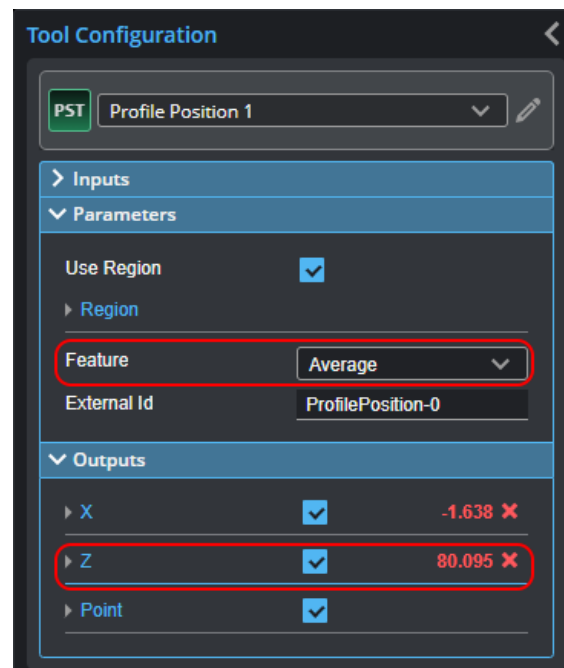

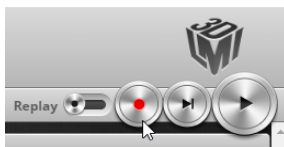8. Set the feature to Average and enable the Z measurement.

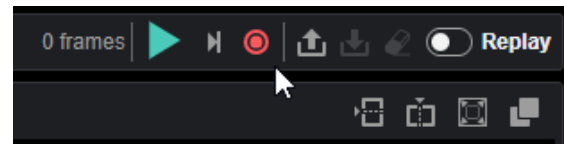**Gocator 6.x**   **GoPxL**

9. Enable recording.

Gocator 6.x   **GoPxL**

10. Acquire 10 or more profiles, and on the Dashboard page (Report > Health page in GoPxL), make note of the resulting average measurement for the Z measurement.

Gocator 6.x

GoPxL

11. Install the protective cover.

    Be sure not to change the height of the sensor or otherwise move it.

    For information on installing the cover, see *Installing the Protective Cover* on page 3.

12. Re-align the sensor.

    For instructions, see step 2.

13. Acquire 10 or more profiles and make note of the resulting average measurement for the Z measurement.

    You should acquire roughly the same number of profiles as in step 10.

Collecting Width Measurements

You must collect measurements twice: *before* installing the protective cover and *after* installing the protective cover. Do not change the sensor height between measurements.

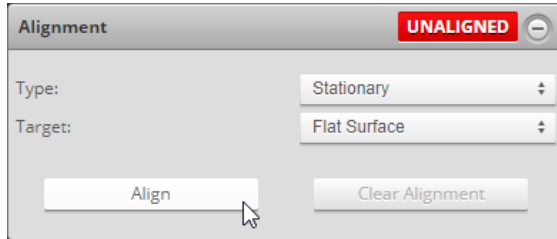*To perform measurements for scaling calculation*

1. Mount the sensor above a flat surface.

    The surface should be roughly at the mid-point of the sensor's measurement range.

    For more information, see *Target and Mounting* on page 3.

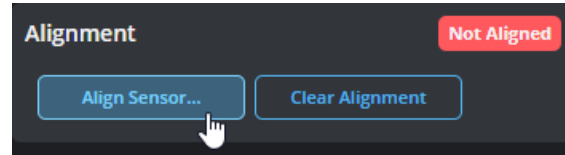2. Align the sensor to the flat surface under the sensor.

Gocator 6.x

On the **Scan** page, in the **Alignment** panel, click **Align**.

GoPxL

On the **Alignment** page, in the **Alignment** section, click **Align Sensor...** and follow the steps in the alignment wizard.
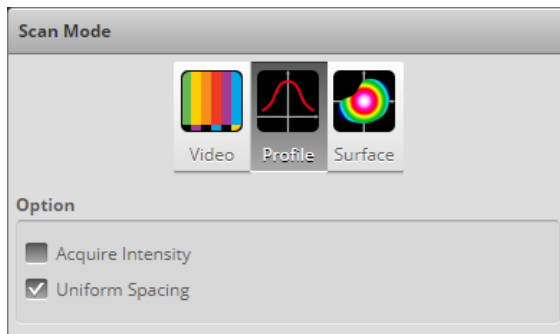

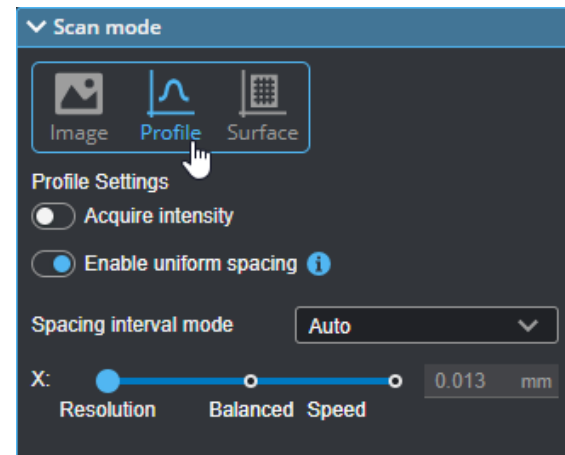3. Place the target in the sensor's field of view.

For important information on the target and its position in the sensor scan area, see *Target and Mounting* on page 3.

4. On the **Scan** page, set the sensor to Profile mode.
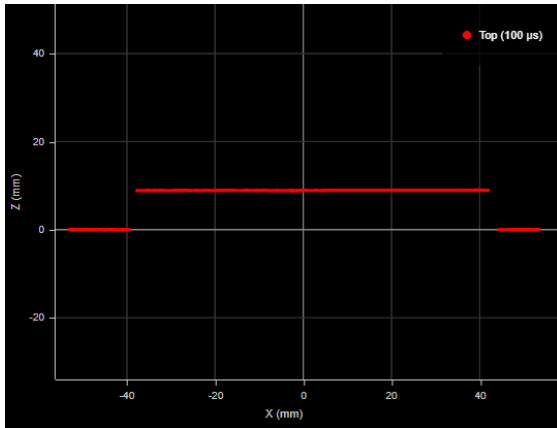
Gocator 6.x

GoPxL

5. Capture a profile to make sure the target is in the sensor's field of view.

The Gocator 6.x interface is shown here.
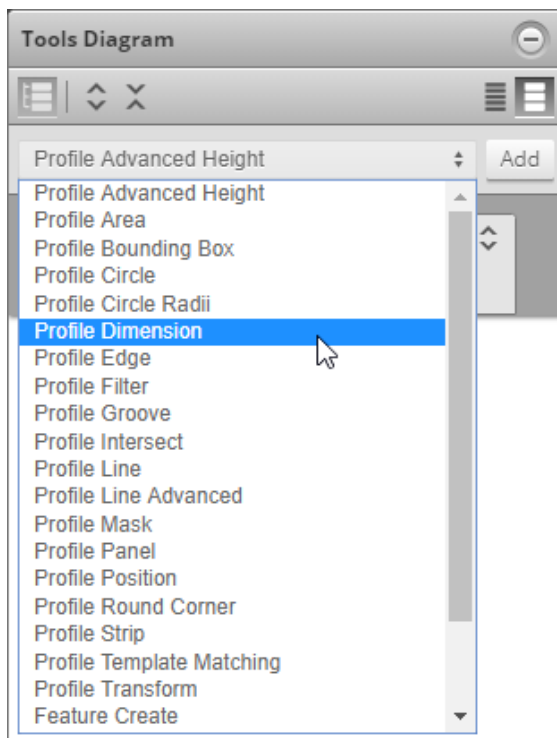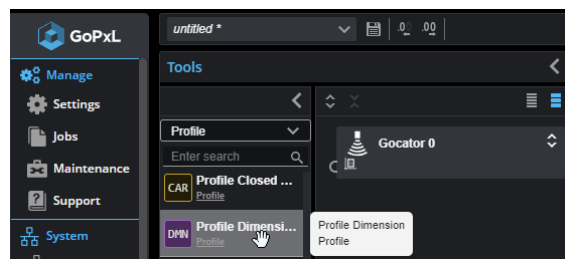
Sensor profile:

Target producing the profile:

6. On the **Measure** page, add a Profile Dimension tool.
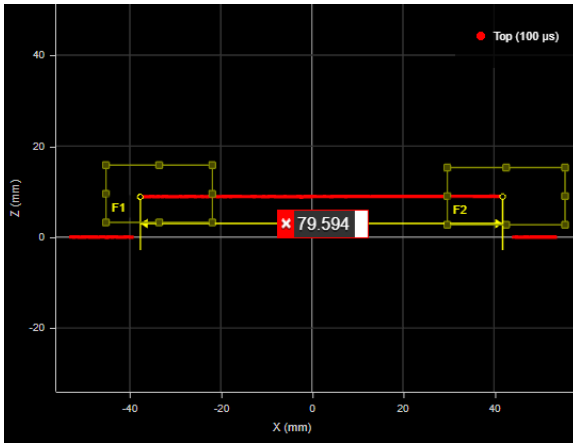
Gocator 6.x

GoPxL

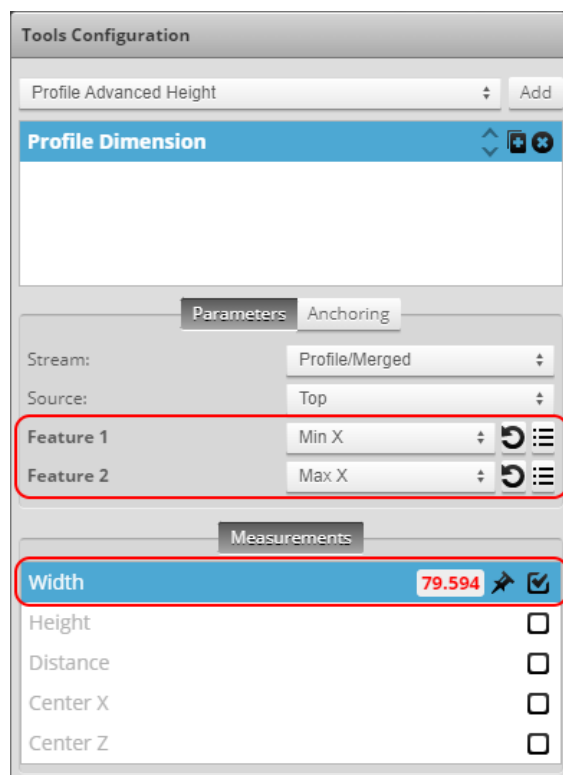Double-click the tool or drag and drop it to the space to the right.

7. Place the tool's regions on the left and right edge of the target.

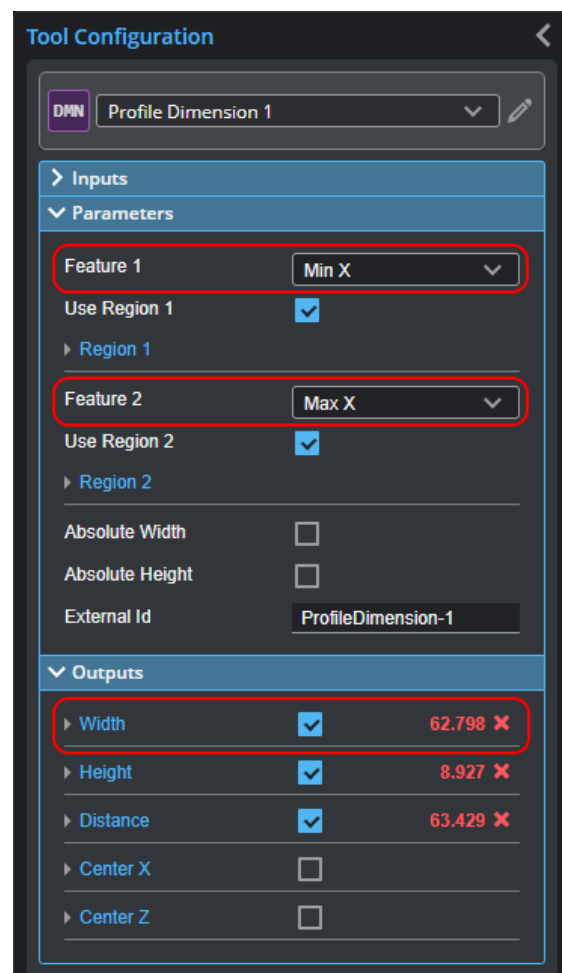   The Gocator 6.x interface is shown below.

8. Set Feature 1 to MinX and Feature 2 to Max X, enable the Width measurement output.
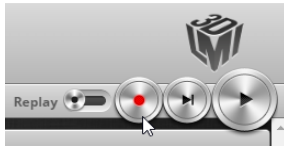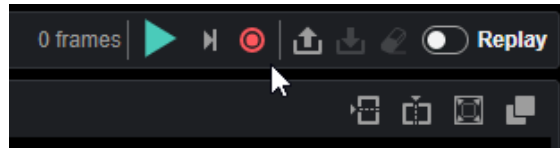
Gocator 6.x   **GoPxL**

9. Enable recording.
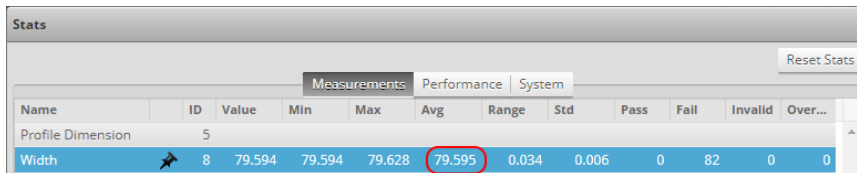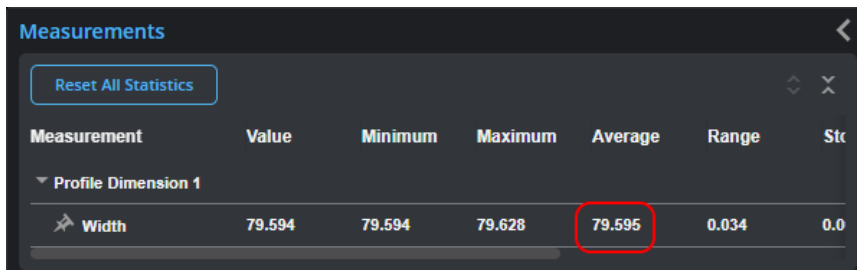
Gocator 6.x

GoPxL

10. Acquire 10 or more profiles, and on the Dashboard page (Report > Health page in GoPxL), make note of the resulting average measurement for the Width measurement.

Gocator 6.x

GoPxL

11. Install the protective cover.

    Be sure not to change the height of the sensor or otherwise move it.

    For information on installing the cover, see *Installing the Protective Cover* on page 3.

12. Re-align the sensor.

    For instructions, see step 2.

13. Acquire 10 or more profiles and make note of the resulting average measurement for the Width measurement.

    You should acquire roughly the same number of profiles as in step 10.

You are now ready to calculate the measurement scales. For more information, see *Calculating a Measurement Scale* below.

Calculating a Measurement Scale

Once you have averages of the measurement with and without the protective cover (see *Collecting Height Measurements* on page 4), you can calculate the measurement scale you need to apply in the measurements you use in your application.

Use one (or both) of the following:

To calculate the Z measurement scale

1. Calculate the error introduced by the protective cover.

Use the following formula:

$$error_{measurement} = Z_{averageWithCover} - Z_{averageWithoutCover}$$

Using the numbers from our example:

$$error_{measurement} = 80.091 - 79.976 = 0.115$$

2. Calculate the scaling.

   Use the following formula:

   $$scaling = 1 - (error_{measurement} / \text{height of target})$$

   For our example, using an 80 mm gauge block:

   $$scaling = 1 - (0.115 / 80) = 0.9985625$$

To calculate the X measurement scale

1. Calculate the error introduced by the protective cover.

   Use the following formula:

   $$error_{measurement} = Width_{averageWithCover} - Width_{averageWithoutCover}$$

   Using the numbers from our example:

   $$error_{measurement} = 79.814 - 79.595 = 0.219$$

2. Calculate the scaling.

   Use the following formula:

   $$scaling = 1 - (error_{measurement} / \text{width of target})$$

   For our example, using an 80 mm gauge block:

   $$scaling = 1 - (0.219 / 80) = 0.9972625$$

You can now use the resulting scaling value to correct the measurements in your application. For more information, see *Applying the Scaling in Measurements* below.

Applying the Scaling in Measurements

Follow the steps below to apply the scaling to your measurement tools.

For height or Z measurements, use the scaling you calculated in *To calculate the Z measurement scale* on the previous page.

For width or X measurements, use the scaling you calculated in *To calculate the X measurement scale* above.

The following shows how to add scaling to a Z measurement.

To add scaling in Gocator firmware 6.x

1. Add a tool with a height (Z) measurement.

2. In the **Tools** panel, in your tool, enable and select the measurement you want to correct.

3. Expand the **Filters** section in the **Output** tab and enter the scale you calculated in *Calculating a Measurement Scale* on the previous page.
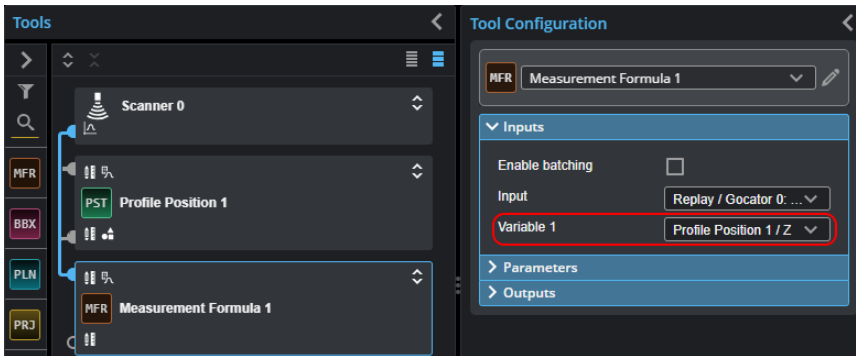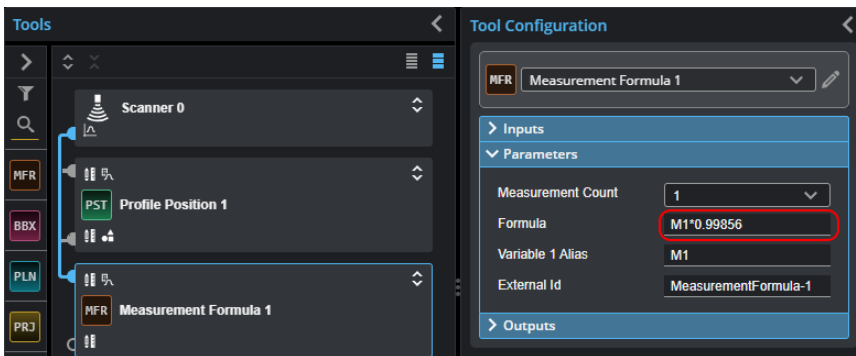
To add scaling in GoPxL

1. Add a tool with a height (Z) measurement.

   We will use a Profile Position tool.
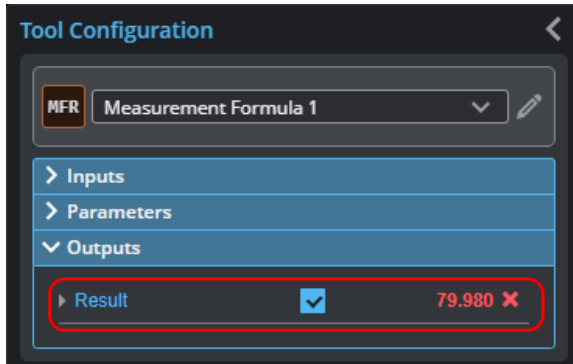
2. Add a Measurement Formula tool.
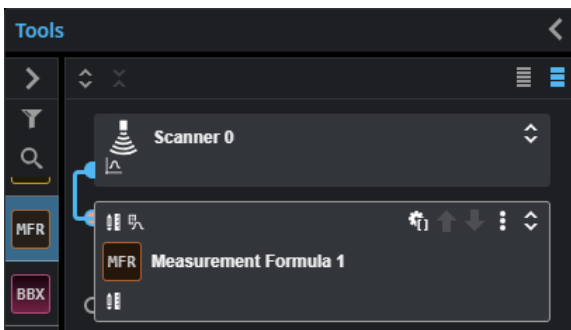
3. In the **Inputs** section, set the Measurement Formula's **Variable 1** input to the output of the measurement you need to scale.

4. In the **Parameters** section, in the **Formula** field, multiply the variable's alias (here, M1) by the scaling value.

5. Use the Measurement Formula's Result output for the adjusted height measurement output.

Cleaning the Windows

If the cover's windows become dirty, start by using clean air to remove dust or other debris. If necessary, use the provided wipes. Otherwise, use warm, soapy water to clean the windows carefully. Wipe the windows dry with a soft, lint-free cloth. Ensure that no residue is left on the windows after cleaning.

Replacing the Windows

	You should wear gloves when replacing the windows.

To replace a window and gasket

1. Place the protective cover face down.

2. Remove the plastic film from the outer, target-facing side of a window and place it into the cover.

   The windows are keyed to ensure the proper orientation.

3. Remove the plastic film from the inner, sensor-facing side of the window.

4. Remove the paper backing from the gasket to expose the adhesive.

5. Carefully position the gasket onto the cover around the window.

6. If necessary, repeat steps 1 to 5 for the second window.

If you are using a measurement scaling value, be sure to re-do the steps described in *Calculating and Applying a Measurement Scale* on page 3 before re-installing the cover.