

PixMetro Inline User Manual

For production lines

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1. Introduction

PixMetro Inline is vision measurement software that measures part dimensions from camera images, built to be used on production lines. Place a part, press **Measure**, and PixMetro matches the image to a model you created beforehand, finds features such as lines, circles, arcs and points, calculates distances, angles and diameters between them, and shows a pass/fail result against your tolerances.

1.1 Features

- Keeps the measurement history in a **MySQL database**.
- Links with a **Mitsubishi PLC**.

2. Installation

2.1 Requirements

- Windows 10 (64-bit) or later
- Camera: a UVC/WDM camera
- License: its own dongle must be plugged in to run.
- **MySQL 5.7** and the MySQL connector must be installed on the same PC.
- .NET Framework 4.8 is installed automatically if it is missing.

2.2 Installing

1. Run the installer `PixMetroInlineSetup.exe`.
2. Follow the prompts. The default location is `C:\Program Files\Next AOI\PixMetro Inline`.
3. Shortcuts are created on the desktop and in the Start menu.

To uninstall, use Windows "Apps & features" or the "Uninstall" shortcut in the Start menu. Your measurement data (models, calibrations, reports) is not deleted.

2.3 Where data is stored

Data is stored in `Documents\Next AOI\MesenA`. The folder contains models (`Model`), calibrations, reports (`Report`), logs (`Log`) and DXF files (`Dxf`). Copy this folder to back up or move your data to another PC. The measurement history is kept in the MySQL database.

2.4 MySQL

PixMetro assumes MySQL is installed on the PC. On first launch it creates the account and schema it needs by itself. If necessary you can change the account and schema name under **File > DB connection settings**. If the connection fails, the reason is shown on screen.

3. Getting started

1. When the application starts, the camera image appears.
 - If several cameras are connected and none has been chosen yet, the **Select camera** window appears first. The camera you choose becomes the default.
2. If there is no calibration, a message appears. Press **OK** to go straight to the calibration screen. Calibration tells the software how many millimeters one image pixel represents (Chapter 5).
3. After calibrating, create a model (Chapter 6) and measure (Chapter 7).

4. The screen

4.1 Menus

Menu	Main items
File (F)	Config CAD, DB connection settings, Exit
View (V)	Zoom In, Zoom Out, Zoom Fit, Show Crosshair, Focus Indicator
Model (M)	Show Semitransparent Model, Edit Model, Change Model Name, Design Part Model, Show XY reference axis when editing model, Manage Models, Config Image Sensitivity, Config Detection Sensitivity
Report (R)	Excel Report, Statistics Report
Calibrate (C)	Manage Calibration, Per-model calibration, Show ruler
Camera (K)	Select camera, Camera settings, Capture format
Help (H)	User manual, PixMetro Tip, About PixMetro

4.2 Measurement tools

Turn on **Edit Model** and the **Measurement tools** appear on the left.

Tool	Use
Select	Pick, move and resize tools you already created
Point	The position of a single point
Line	A straight edge
Circle	A circle or hole
Arc	A circular arc
Screw, Gear, Lead	Composite tools for screw threads, gears and IC leads

4.3 Right-hand panel

- Top: name and photo of the model to be measured, and the **Manage Models** button
- Middle: the list of measured values with name, value, pass/fail and a tolerance ruler
- Bottom: the **Measure** button

5. Camera and calibration

5.1 Camera

Use the **Camera** menu.

- **Select camera:** choose which camera to use when several are connected. Once chosen, only that camera is opened.
- **Camera settings:** opens the manufacturer's settings window. It may not open for cameras that do not provide one.
- **Capture format:** choose resolution and format.

Brightness and image orientation: the camera's exposure and image-orientation settings are the ones **stored in the current calibration**. If you change the lighting or the camera settings, create the calibration again.

If the camera will not open: restart the application and check the camera connection, the driver, and whether another program is using it.

5.2 Calibration

Calibration determines how many millimeters one pixel of the camera image represents. Redo it whenever you change the lens or the working distance. You need a reference object of known length (a gauge block, a standard specimen, etc.).

1. Open **Calibrate > Manage Calibration**.
2. Press **Add** and, on the image, mark the two faces of the reference object.
 - Press the mouse button at the start point, drag to the end point and release; or click the start point once and then click the end point.
 - You can zoom and pan, so enlarge the image to mark the position accurately.
3. PixMetro finds the two opposite edges in the marked span and draws them on the image.
 - **Yellow line**: the detected edge line.
 - The distance between the two lines is shown with arrows.
 - If the correct edges were found, press **Yes**.
4. In the **Measured length** box at the lower right, enter the real length of the reference in mm and press **OK**. The calibration is created.
5. If you have several calibrations, select one in the list and press **Set as current calibration**.
Double-clicking a calibration does the same.
6. Use **Rename** to change a calibration's name.
7. Calibrations are specific to a camera resolution. If the resolution does not match, a message tells you to use a matching calibration.

Ruler: turn on **Calibrate > Show ruler** to display rulers along the top and left edges of the image, drawn from the calibration value. It is a quick way to check that the calibration is right.

5.3 Per-model calibration

Even models that share one calibration can be slightly off in length depending on the part and the environment. **Calibrate > Per-model calibration** fine-tunes the pixel magnification for one model.

- At the top you see the **photo and name of the model** the adjustment applies to, and below it the name and resolution of the current calibration.
- **Calibration value**: the pixel magnification obtained from calibration. It cannot be edited.
- **Model value**: the magnification this model uses. Type a value, or press the $\uparrow$ $\downarrow$ keys to move by the smallest unit. A typed value is rounded to the nearest smallest unit.
- **Adjustment** and **Change** show the difference from the calibration value. The lines below show how much a length equal to half the screen width and a length equal to the screen width would change compared with the calibration value, in your output unit (mm or μm).
- **To calibration value** resets the adjustment to zero.
- **OK** saves the value to the model and closes the window. **Cancel** discards the change.

6. Creating models

A model stores what to measure on a part and how.

6.1 Creating a new model

1. Place a part and press **Measure**. If no model matches, it is recognized as a "New model".

2. Press **Edit Model** to enter edit mode. The measurement tools appear.
3. Choose a tool and draw it on an edge in the image. After drawing, use the Select tool to drag the control handles to adjust position, size and angle (start and end for arcs).
 - **Line**: fit it to a straight edge.
 - **Circle**: fit it to a hole or round edge.
 - **Arc**: fit it to an arc edge. Large-radius arcs that are almost straight can be unstable; use a line or a circle instead.
 - **Point**: capture the position of a point such as a corner.
4. When you select a tool, the items it can measure (length, diameter, angle, etc.) appear in the edit area. Check an item to add it to the measured-value list.
5. If you select two tools together, items between them (distance, angle, etc.) appear. For example, selecting a point and a line lets you add the minimum distance between them.
6. When you are done, press **Edit Model** again to leave edit mode. The model is saved automatically.

6.2 Modifying a model, partial models

- Load an existing model and use **Edit Model** to add, move or delete tools.
- **Design Part Model**: when the whole part does not fit the screen or you only want to measure part of it, define the model for just a region of the part.
- **XY reference axis**: while editing, you can show the XY reference axis and use it to measure things such as thickness.

6.3 Managing models

Open the model list from **Model > Manage Models** or the **Manage Models** button at the top right.

- **Move to top**: make this model the first one to be measured.
- **Delete, Rename, Tolerance, Detection**: to prevent accidents, these are enabled only in **edit mode**.

6.4 Detection sensitivity and image sensitivity

- **Model > Config Detection Sensitivity**: sets how closely a part must match a model to be recognized. Too high and parts are not found; too low and the wrong place may be matched.
- **Model > Config Image Sensitivity**: sets the image sensitivity used to find edges.

7. Measuring

1. Place the part and press **Measure**. The best-matching model is chosen automatically.
2. Measured values appear in the list. A value inside tolerance is shown in green, one outside in red.
3. **Measuring several parts at once**: if there are several parts in view, all of them are found and measured individually.

4. **Auto measure:** a mode that keeps measuring whenever a part is placed.
5. **Semitransparent model:** overlays the model to be measured on the image in semitransparent form.

7.1 Editing a measured value (attribute)

Double-click an item in the measured-value list, or right-click it and choose **Edit attribute...**, to change the following in one window. It opens only in edit mode.

- **Name:** the name of the measured value. The **Default name** button restores the standard name.
- **Design value:** the value on the drawing, entered in the display unit (mm or μm).
- **Tolerance type:** **Absolute** ($\pm$ value) or **Percent**. Turn on **Set upper and lower tolerance separately** to give the upper and lower limits different values.

The right-click menu also has the unit (mm/ μm), the number of decimals, deleting a value, setting the current measured value as the design value, showing tolerance only, and more. You can drag items to change their order.

7.2 mm, μm and precision

Measured values can be shown in mm or μm , and the number of decimals is set from the right-click menu. The number of displayed digits does not affect the pass/fail judgement, which compares values exactly down to 0.1 μm .

8. Reports and statistics

- **Report > Excel Report:** shows the current measured values in an Excel template. Excel must be installed.
- **Report > Statistics Report:** shows measurement statistics for a period you choose.

9. CAD (DXF)

Use **File > Config CAD** to:

- **Export the measured outline to a DXF file:** the measured outline is saved by date in the `Dxf` folder.
- **Import a drawing DXF and overlay it on the image:** differences between the drawing and the real part are shown in color. AutoCAD 2000 or newer DXF files are recommended. Closed polylines, lines, arcs, circles and points are read. A calibration is required.

10. Licensing

- The PixMetro Inline dongle must be plugged in to run.
- The application does not run without a dongle. Keep it plugged in while the application is running.

11. Inline: PLC link

Inline links with a Mitsubishi PLC. The PLC connection program (`MesenMitsubishPlc`) runs alongside, and the station number in its connection settings must match the number registered in the PLC. Consult your site engineer about connection settings.

12. Troubleshooting

Symptom	What to check
No camera image	Use Select camera in the Camera menu to choose another camera. Check that no other program is using the camera.
Image is upside down	The image orientation follows the settings stored in the current calibration. Contact your support contact.
Image is too dark	Check that the lighting is the same as when the calibration was made. If you changed the lighting, create the calibration again.
"No calibration" message	Create a calibration as described in 5.2.
Measurements do not match reality	Check that the calibration matches the current camera resolution and that the reference length was measured accurately. Turn on the ruler to check visually. You can also fine-tune with per-model calibration.
Part is not recognized as a model	Adjust Config Detection Sensitivity , and check lighting and part position.
An arc is detected sometimes but not always	A nearly straight arc has an unstable radius. If it is a full circle, use the Circle tool.
A model cannot be deleted	Deleting is enabled only while Edit Model is on.
Help videos do not open after installation	Check that the <code>help</code> folder in the installation folder contains the videos. Korean and English videos are provided; other languages show the English ones.

If a problem persists, send the log file (`trace_date.log`) in `Documents\Next AOI\<product folder>\Log` to your support contact.

13. Help videos

Open the list of video help from **Help > PixMetro Tip**. The videos are in `help\en` (English) and `help\ko` (Korean) in the installation folder.

No.	Title
1.1	Defining a New Model
1.2	Modifying an Existing Model
1.3	Defining a Partial Model
1.4	Tolerance setting
2.1	Measuring
2.2	Selecting a measurement model
2.3	Showing/hiding the semitransparent model
2.4	mm, μm and precision
2.5	Measuring several parts at once
2.6	Viewing the Excel report of current values
2.7	Viewing statistics by period
2.8	Measuring the distance between lines
2.9	Measuring distance using intersection points
2.10	Changing the display order of measured values
2.11	Exporting a CAD file (dxf)
2.12	Image sensitivity
2.13	Measuring thickness with the XY reference axis
2.14	Fine-tuning pixel magnification (now called "Per-model calibration")
2.15	Detection sensitivity
3.1 – 3.7	Using the Line, Circle, Arc, Point, Screw, Gear and Lead tools

Some videos show a previous version of the screens. For the renamed menu (Fine-tune pixel magnification → Per-model calibration) and for the calibration screen, follow this manual.

PixMetro is a product of Next AOI.