IO-Link Labs

LAB ACTIVITY M1: MONEO SETUP

Name	Class/Period	Date

1. Overview

In this lab activity, you will set up your IO-Link smart sensor environment for monitoring with the Moneo monitoring and analysis software.

2. Performance Objectives

After completing this lab activity, you will be able to:

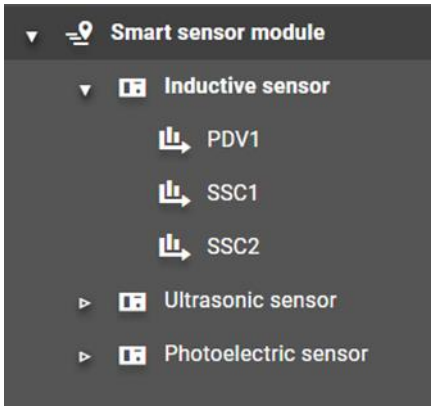
- Enable communication between Moneo and your IO-Link devices.
- Create a monitoring navigator.
- Create a custom dashboard for monitoring sensor values.

3. Background

3.1. The Moneo App

Moneo RTM is a state-of-the-art condition monitoring system. The software enables you to set up your own custom dashboards, giving you the option of having plant status at a glance and the opportunity to acquire important process information.

Another key feature of Moneo is the **navigator**. The navigator is a hierarchically organized tree where specific areas of a factory can be monitored in isolation.



Elements of the navigator are called **nodes**. Device nodes, such as sensors, contain **info points**. An info point is a process value or piece of data that is being monitored, such as the distance reading an ultrasonic sensor. Moneo cannot poll acyclic data from sensors, so info points are only for cyclic data.

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4. Required Materials

You need these materials to complete the lab activity:

- IO-Link laboratory package level 1 and level 2 materials
- Computer
- Small wrench

5. Required Software

The following software is required for this lab activity. See the Resource List document for links to the software.

- LR Device software
- Ethernet Configuration Tool (Hilscher)
- Moneo monitoring software

6. Inventory and Safety

Before beginning the lab activity, review this checklist and mark off each item as you complete it.

- ☐ All hardware components are available for this lab activity.
- ☐ Hands, hair, and clothing are securely away from the work area.
- ☐ The work area is clean and devoid of food or drink.
- ☐ All required software is installed in your computer.

7. Lab Activity

7.1. Hardware Setup

In this task, you will physically the IO-Link master to a power supply and to your PC. You will also connect slave devices to the master.

Perform these steps:

1. Connect the M12 end of the M12-Ethernet cable to the **IoT port** of the master. Connect the Ethernet end of the cable to your computer or Ethernet switch.
2. Using the power cable, connect the master's **Power IN** port to your power supply (a wall socket, for example).
3. Connect the following slave devices to ports 1 to 4 of the master.
   - Inductive sensor (For the purposes of this exercise, connect the sensor to port 1.)
   - Ultrasonic sensor (Port 2)
   - Photelectric sensor (Port 3)
   - Stack light (Port 4)

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7.2. Moneo Setup

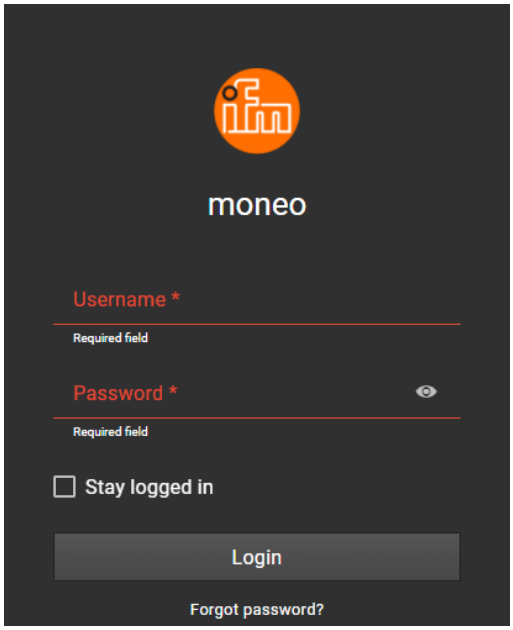
In this task, you will set up the Moneo software and configure the IO-Link master.

Perform these steps:

1. Launch the **ifm moneo** application.



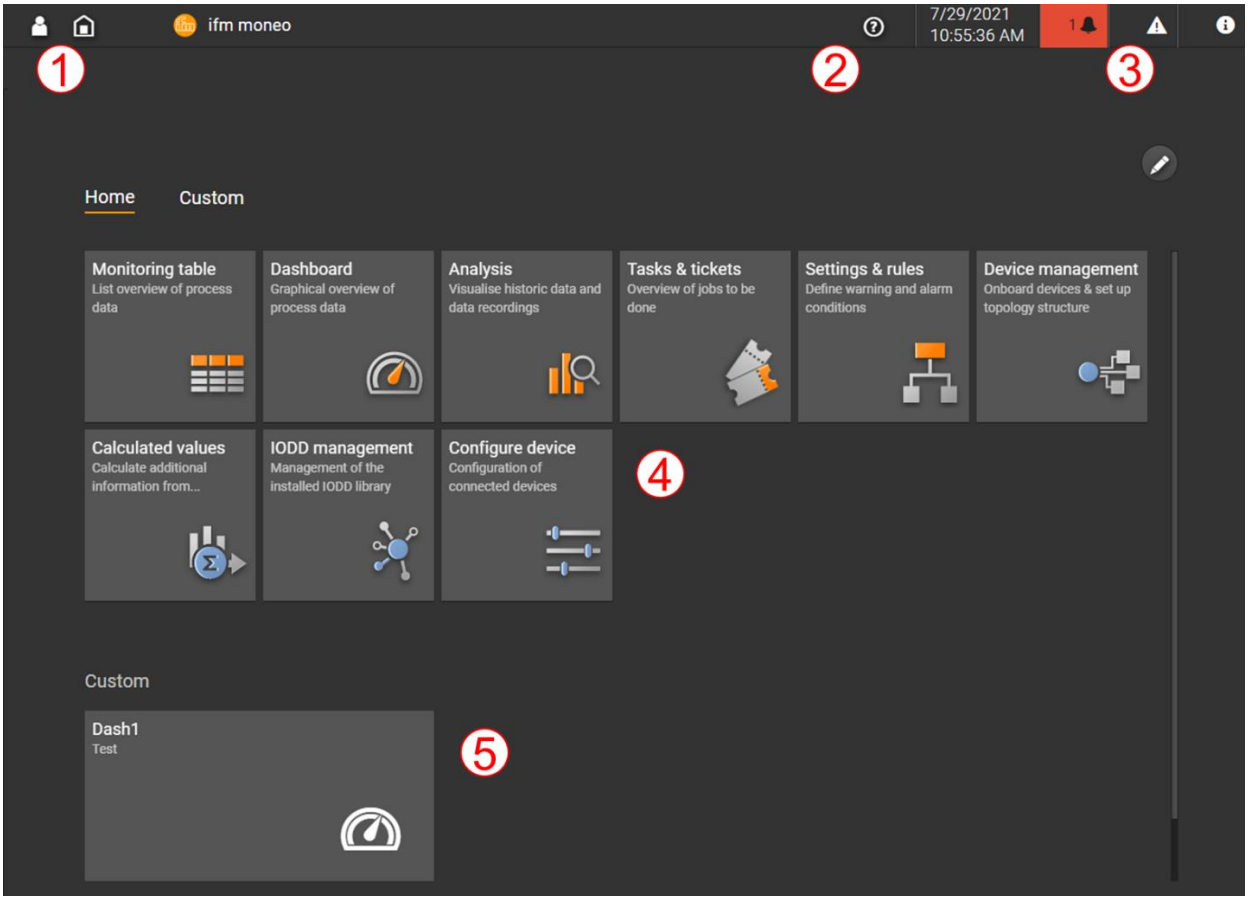
2. Log in to your account.



ⓘ ***Note:*** *In order to complete the exercises in this series of lab activities, you must have administrator privileges for the Moneo application.*

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The Moneo home screen is displayed.

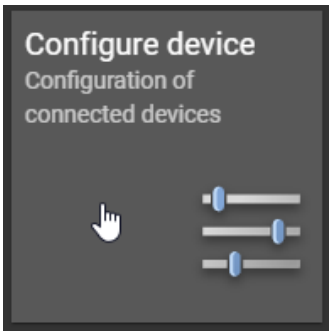


Label	Area	Description
1	Profile and home buttons	Click the profile button to access profile options. Click the home button to return to the home screen.
2	Help	Click this button to access Moneo documentation and video tutorials.
3	Notifications and alerts	Access notifications and alerts from this area.
4	Features	This section contains all of the Moneo monitoring features
5	Custom area	Custom dashboards are added to this area.

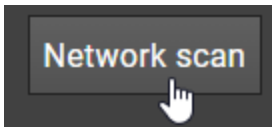
Table 1. The Moneo home screen.

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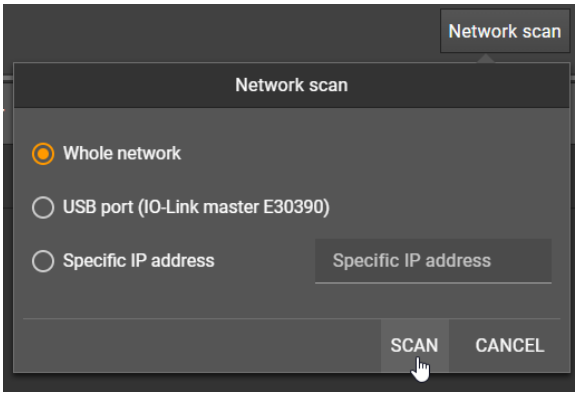
3. Click **Configure device**.



4. In the top-right corner of the Configure device screen, click **Network scan** to scan for devices on the network.



5. In the Network scan popup window, check **Whole network** and then click **SCAN**.



The table displays the scanned devices

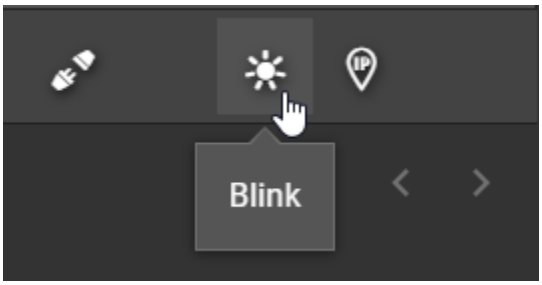
Product name	Custom name	Location	Vendor	Family	Actions
ifm IO-Link Master AL1300 IoT Port	al1300	192.168.1.12	–	–	

6. Click your IO-Link master.

Product name	Custom name	Location	Vendor	Family	Actions
ifm IO-Link Master AL1300 IoT Port	al1300	192.168.1.12	–	–	

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ⓘ ***Note:*** *You can use the* ***Blink*** *option to flash the master's IoT LED and identify the device.*



Moneo scans the master and discovers the slave devices connected to it.

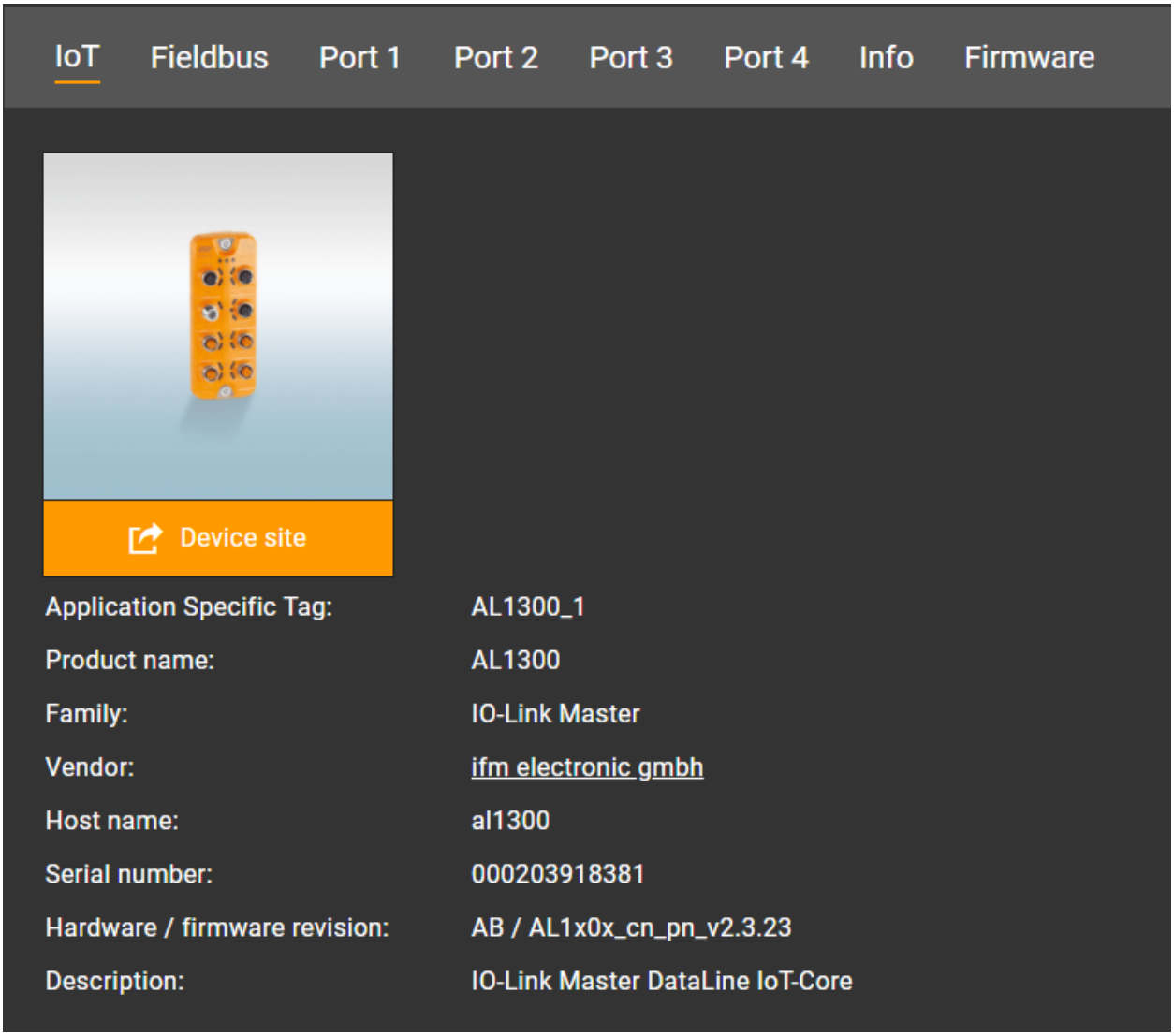
Product name	Custom name	Location	Vendor	Family	Actions
▼ AL1300	al1300	192.168.1.12	ifm electronic gmbh	IO-Link Master	
IG6615	–	Port 1	ifm electronic gmbh	–	
UGT212	–	Port 2	ifm electronic gmbh	–	
O8H273	–	Port 3	ifm electronic gmbh	–	
DV2130	–	Port 4	ifm electronic gmbh	–	

7. Click the master's row to open the master's parameter settings screen.

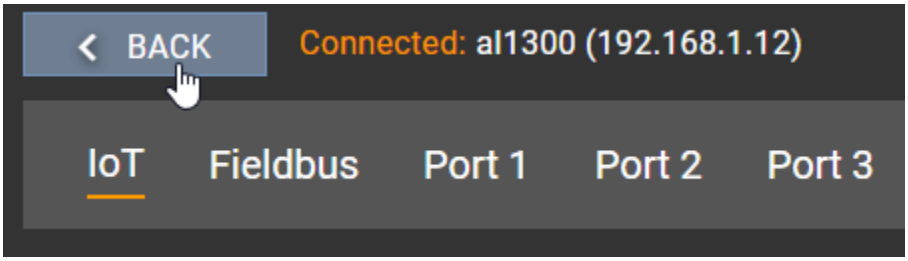
Product name	Custom name	Location	Vendor	Family
▼ AL1300	al1300	192.168.1.12	ifm electronic gmbh	IO-Link Master
IG6615	–	Port 1	ifm electronic gmbh	–
UGT212	–	Port 2	ifm electronic gmbh	–
O8H273	–	Port 3	ifm electronic gmbh	–
DV2130	–	Port 4	ifm electronic gmbh	–

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The parameter settings of this screen are nearly identical to those of LR device. You can access the various sections by scrolling down the page or by clicking the links (IoT, Fieldbus, Port 1, etc.) at the top. Clicking the device image takes you to the device screen on the IFM website.



8. Click **Back** to return to the Connected devices screen.

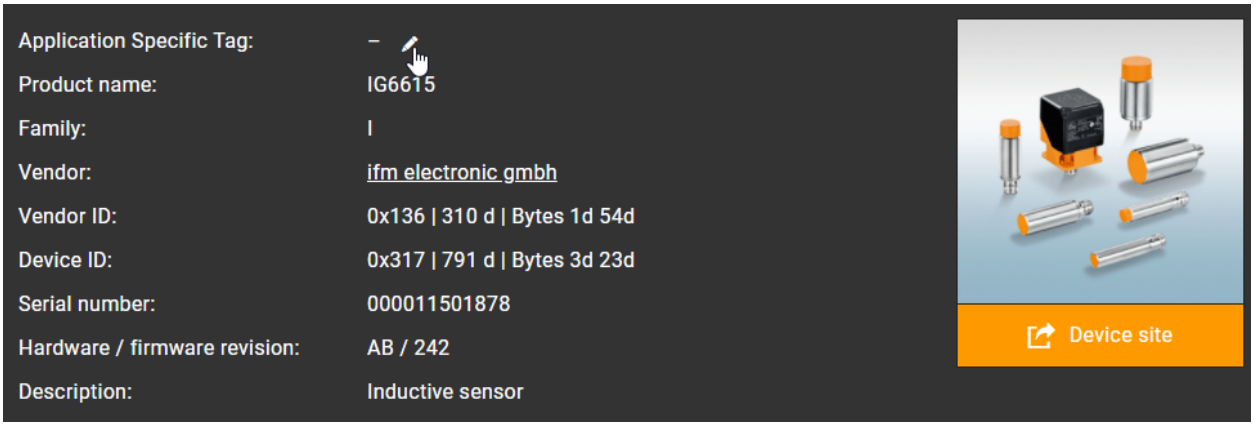


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9. Click the device connected to Port 1, which is the inductive sensor.

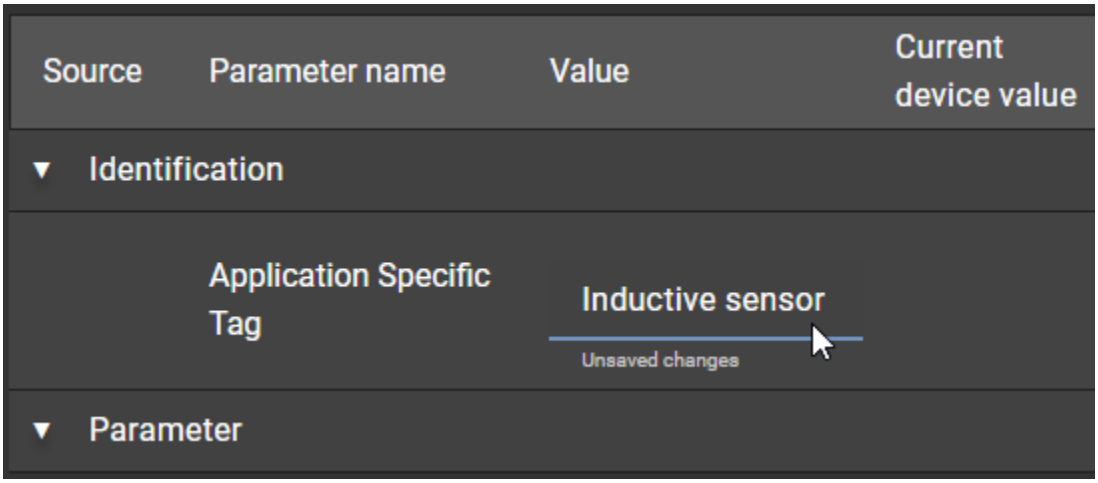
Product name	Custom name	Location	Vendor	Family
▼ AL1300	al1300	192.168.1.12	ifm electronic gmbh	IO-Link Master
IG6615	–	Port 1	ifm electronic gmbh	–
UGT212	–	Port 2	ifm electronic gmbh	–
O8H273	–	Port 3	ifm electronic gmbh	–
DV2130	–	Port 4	ifm electronic gmbh	–

10. Click the pencil icon next to **Application Specific Tag**.



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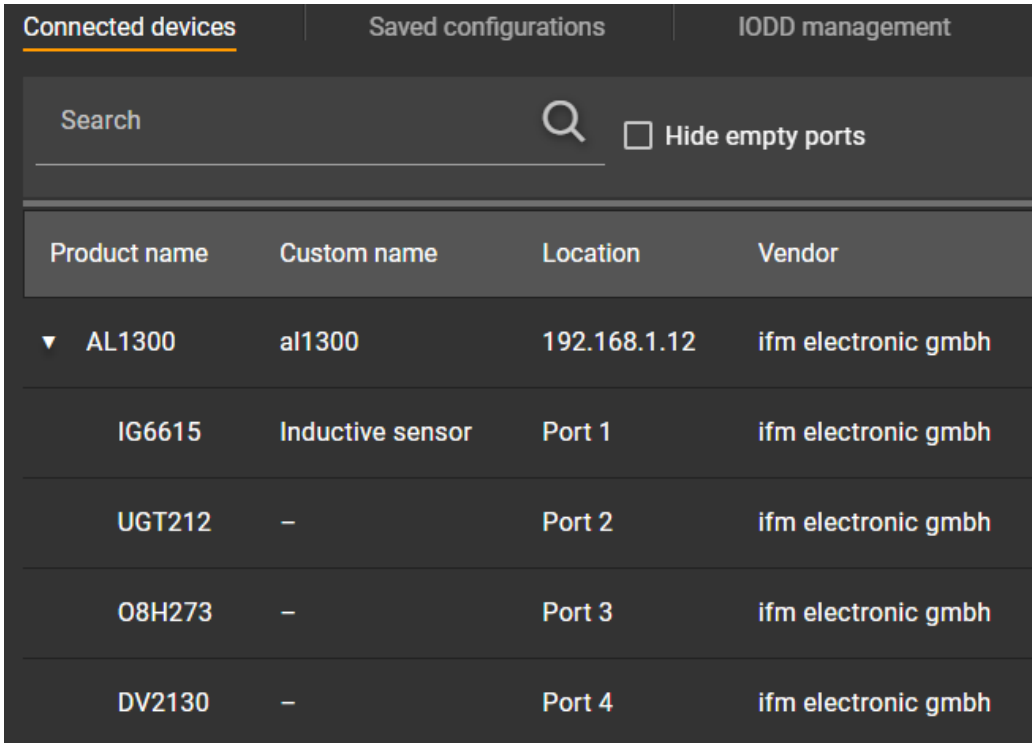
11. The settings screen automatically scrolls down to the Identification section. In the **Application Specific Tag** field, enter the name of the sensor.



12. At the bottom-right corner of the screen, click **WRITE TO DEVICE**.



13. Your changes are saved. Click **Back** to return to the Connected devices screen.

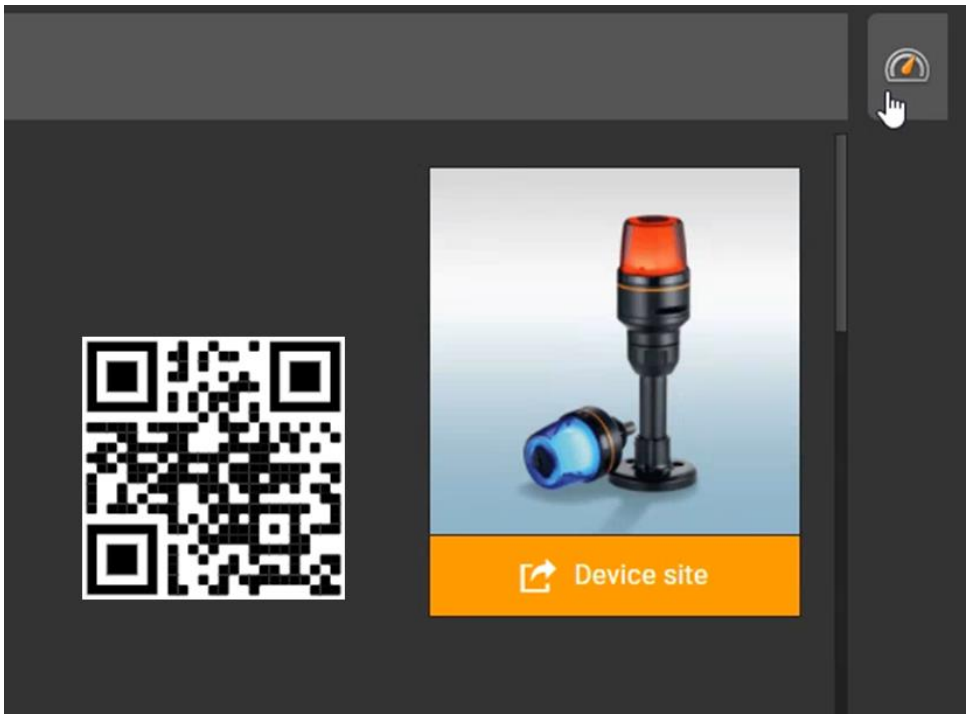


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14. Repeat steps 9 – 13 to provide an application specific tag to the devices connected to the other ports.

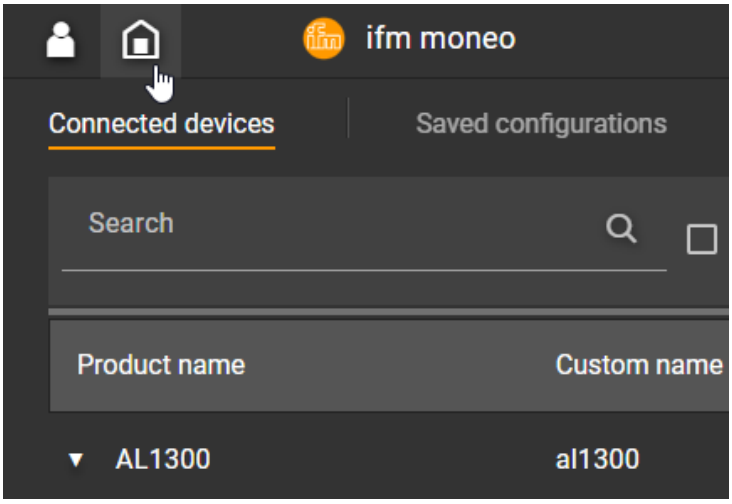
Product name	Custom name	Location
▼ AL1300	al1300	192.168.1.12
IG6615	Inductive sensor	Port 1
UGT212	Ultrasonic sensor	Port 2
O8H273	Photoelectric sensor	Port 3
DV2130	Stack light	Port 4

ⓘ ***Did you know?*** *In addition to parameter settings, the device configuration screens have a cockpit similar to that of LR device. This cockpit also contains information on the process data structure of each slave device. Output devices such as the stack light can be operated from this cockpit. Scan the QR code or Ctrl + click the image below to watch an example.*



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15. Click the home button to return to the home screen.



7.3. Building a Navigator

In this task, you will build a hierarchical production structure, also known as a **navigator**. The navigator organizes the components of production and allows you to more easily find the production component that you want to monitor.

Perform these steps:

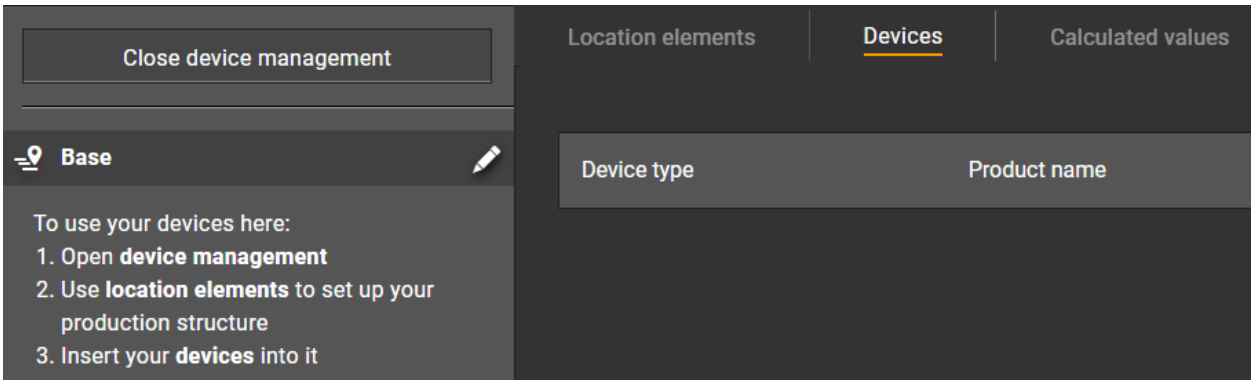
1. From the home screen, click **Device management**.



2. The Device management screen is shown. The left side of the Device management screen contains your navigator (which is currently empty), while the right side of the screen has location

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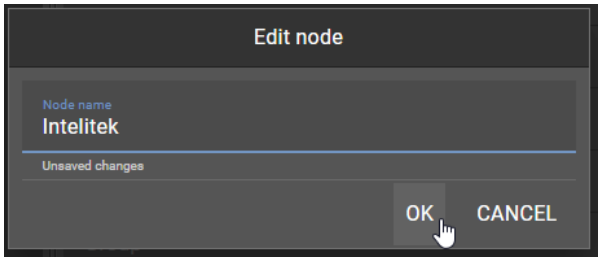
elements and devices that can be added to the navigator. Elements added to the navigator are collectively known as **nodes**.



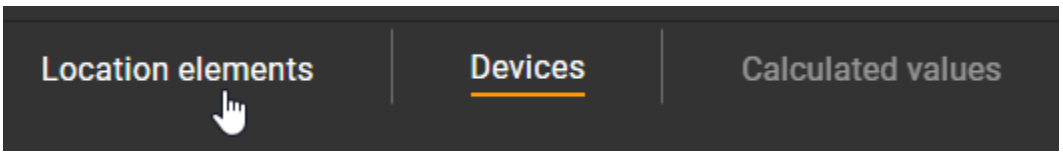
3. In the navigator, click the pencil icon next to **Base**.



4. Give the node a name, such as your personal name or business's name, and then click **OK**.

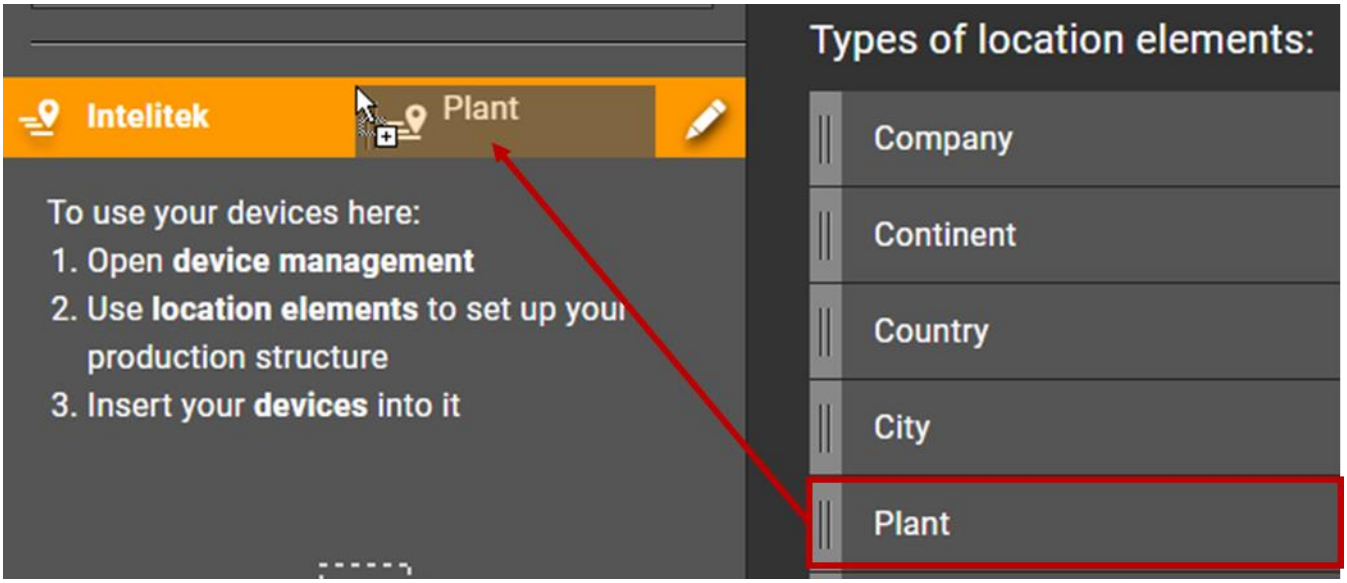


5. In the top menu, click **Location elements**.

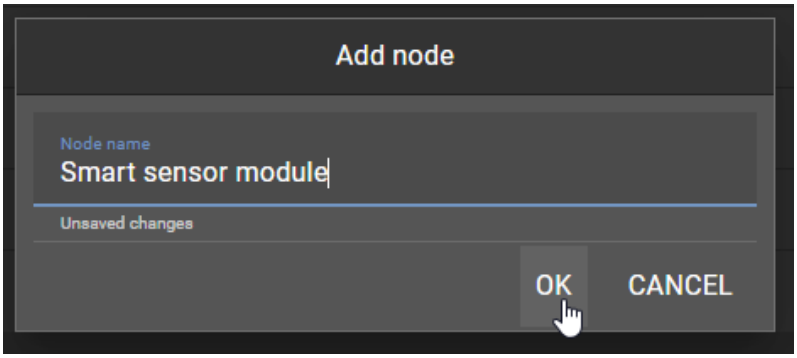


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6. Drag any location element to the base node of the navigator.



7. Give the location element a name and then click **OK**.



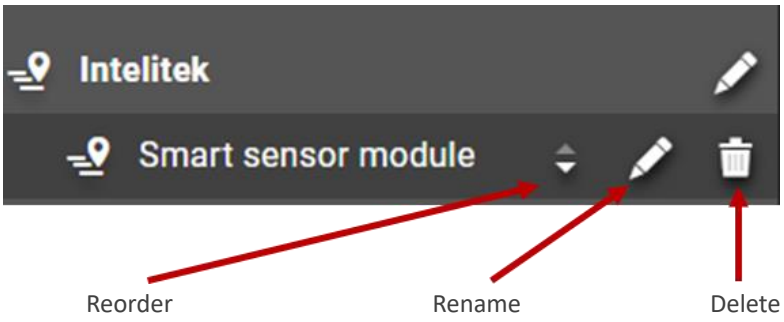
ⓘ ***Note:*** *Only location elements and devices with a grey*  *can be dragged.*

ⓘ ***Note:*** *The types of location elements have no meaning. The layout on the right side of the screen is simply a suggested hierarchy for setting up the navigator. Location elements can be renamed and dragged up and down within the hierarchy.*

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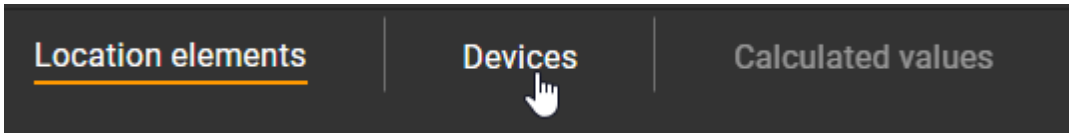
Click or scan this QR code to watch a short video of a location element being dragged into the base node of the navigator.

Nodes can be deleted, renamed, and reordered within the navigator. Only nodes at the same hierarchical level can be reordered.

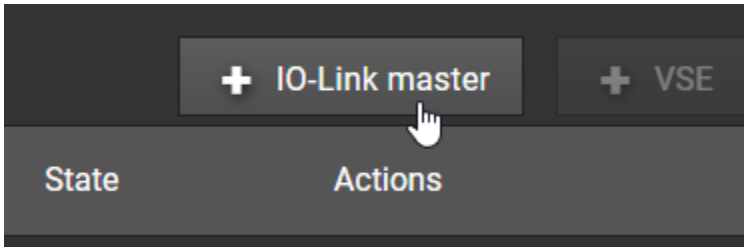


ⓘ ***Note:*** *Deleting a node deletes all nodes within that node.*

8. In the top menu, click **Devices**.

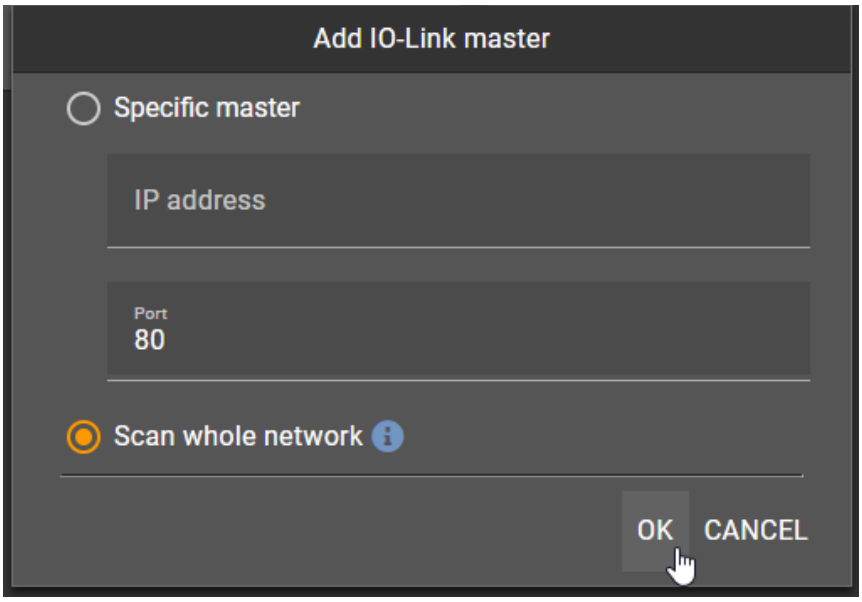


9. On the right side of the Devices screen, click **+ IO-Link master**.



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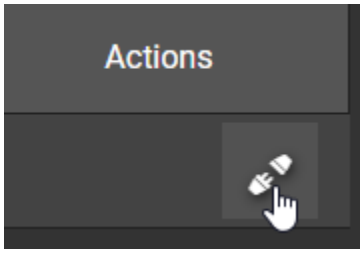
10. In the Add IO-Link master popup window, check **Scan whole network** and then click **OK**.



Your IO-Link master is added to the list of devices.

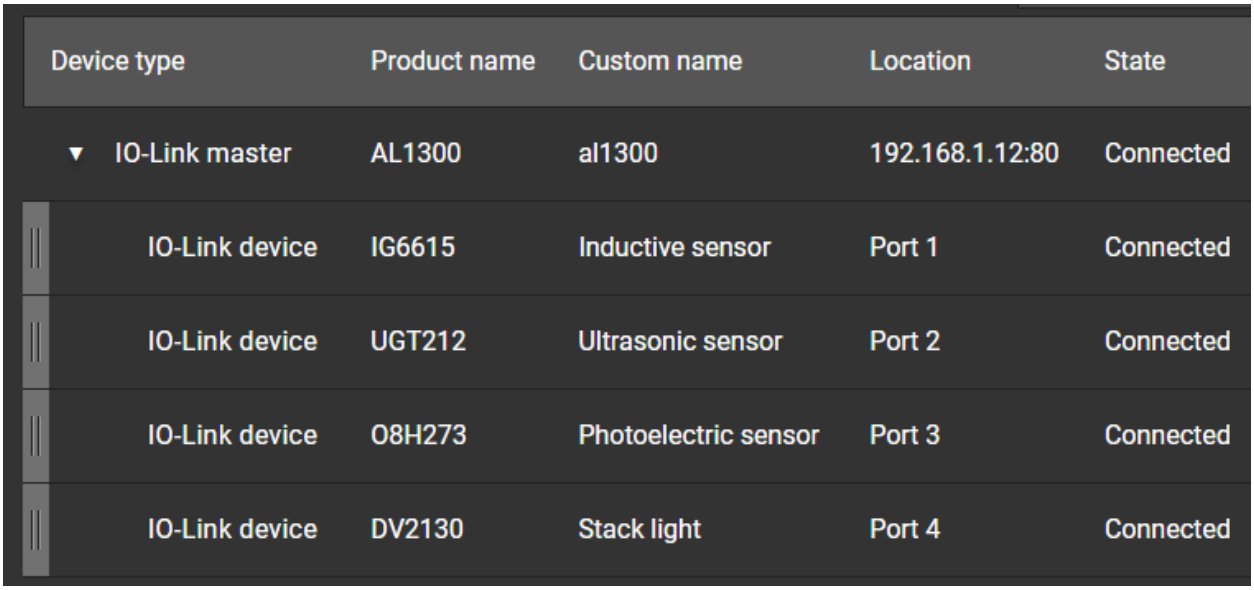


11. In the **Actions** section on the right side of the IO-Link master row, click the connect (plug) icon.

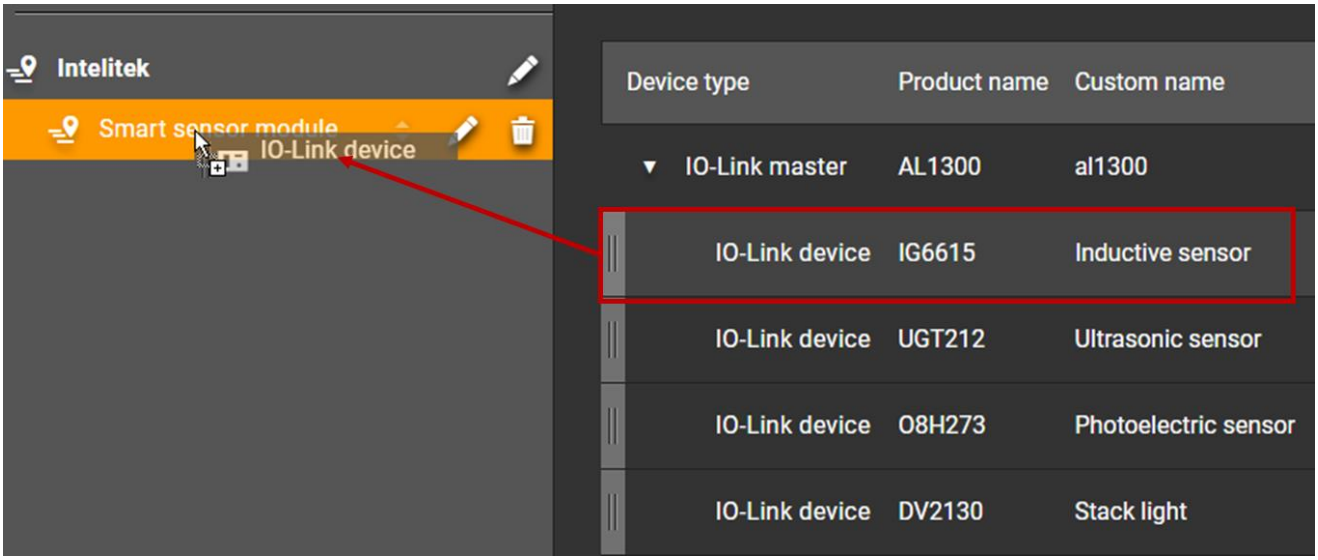


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All slave devices connected to the master are displayed. Note that the slave devices can be dragged to the navigator, but the master cannot.

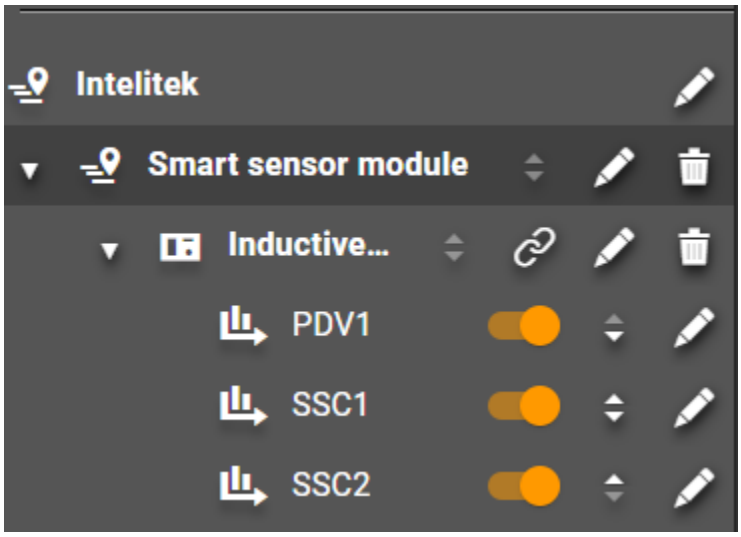


12. Drag the Inductive sensor row to the node you created in steps 6 and 7 .



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The inductive sensor is displayed in the navigator. The device has three info points that can be monitored.

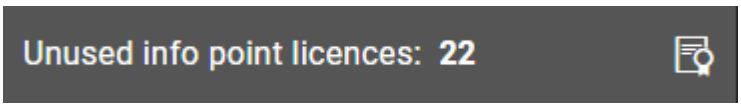


Info points can be toggled on or off using the  switch. They can also be reordered or renamed.

ⓘ ***Note:*** *Nodes can be collapsed or expanded by clicking*  *or*  *respectively.*

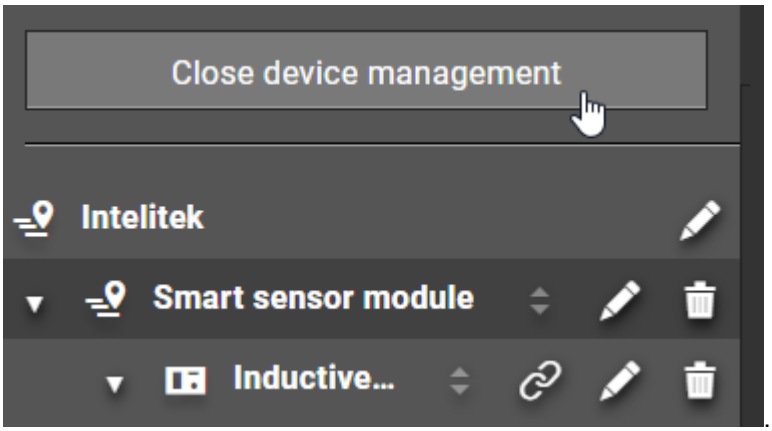


ⓘ ***Note:*** *The bottom-left corner of the Device management screen displays the number of licenses remaining for info points. Additional licenses can be purchased from IFM. Info points that are turned off do not use licenses.*



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13. Click **Close device management** or the home button to return to the home screen.



7.4. Monitoring an Info Point

In this task, you will monitor the inductive sensor's info points using several of Moneo's monitoring tools.

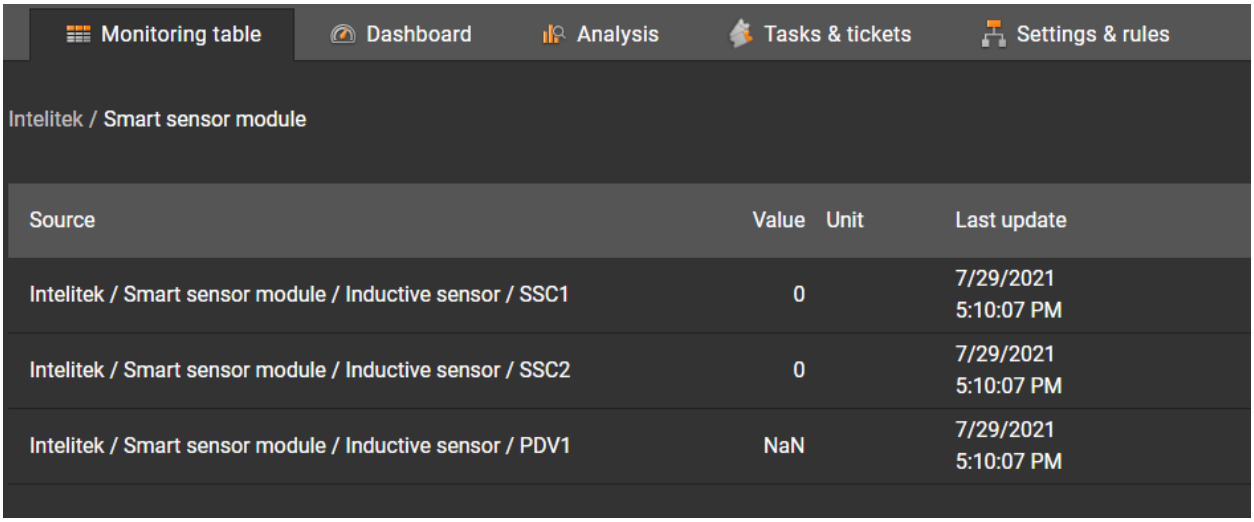
Perform the following:

1. From the home screen, click **Monitoring table**.



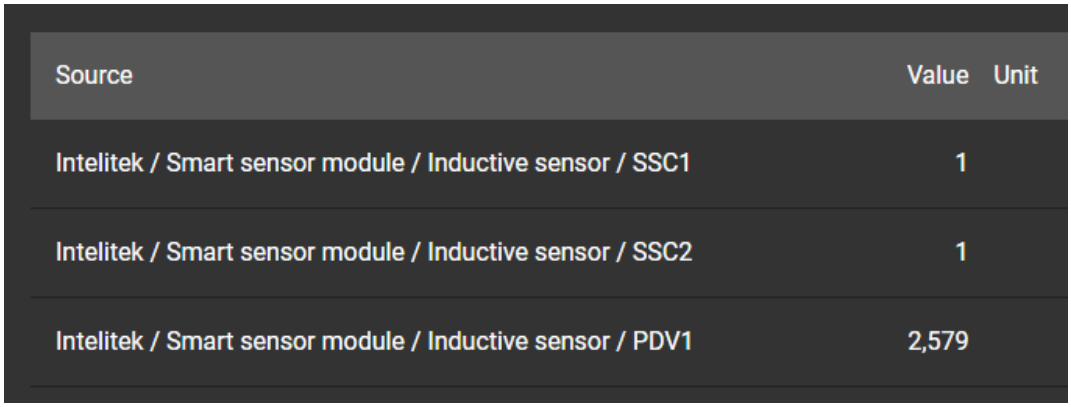
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All info points that are currently ON are displayed in the monitoring table on the right side.



ⓘ ***Note:*** *Selecting a node in the navigator displays the info points (and other information) that are relevant to that node. This also holds true for all of the other tabs on this screen (Dashboard, Analysis, etc.).*

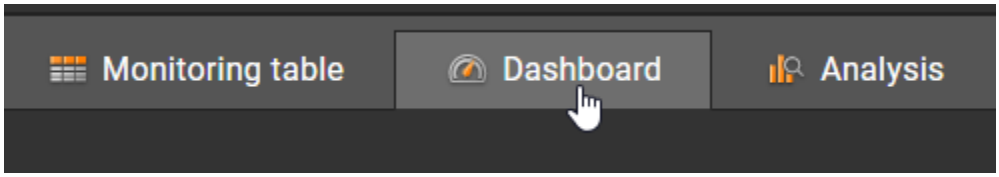
2. Place the magnet in range of the inductive sensor. Note the change in info point values.



ⓘ ***Note:*** *There may be a delay of several seconds before Moneo displays changes in info point values.*

3. Take the magnet out of range of the sensor.

4. Click the **Dashboard** tab.

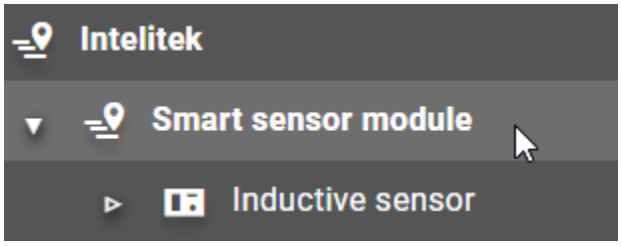


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ⓘ ***Note:*** *The screens that are accessed via the tabs at the top of the screen can also be accessed via the home screen.*

ⓘ ***Note:*** *The dashboard is created for the selected node only. Dashboards can be created for different nodes, and nodes can contain multiple dashboards.*

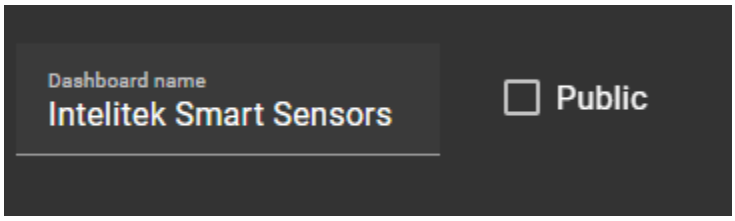
5. In the navigator, select the second level node.



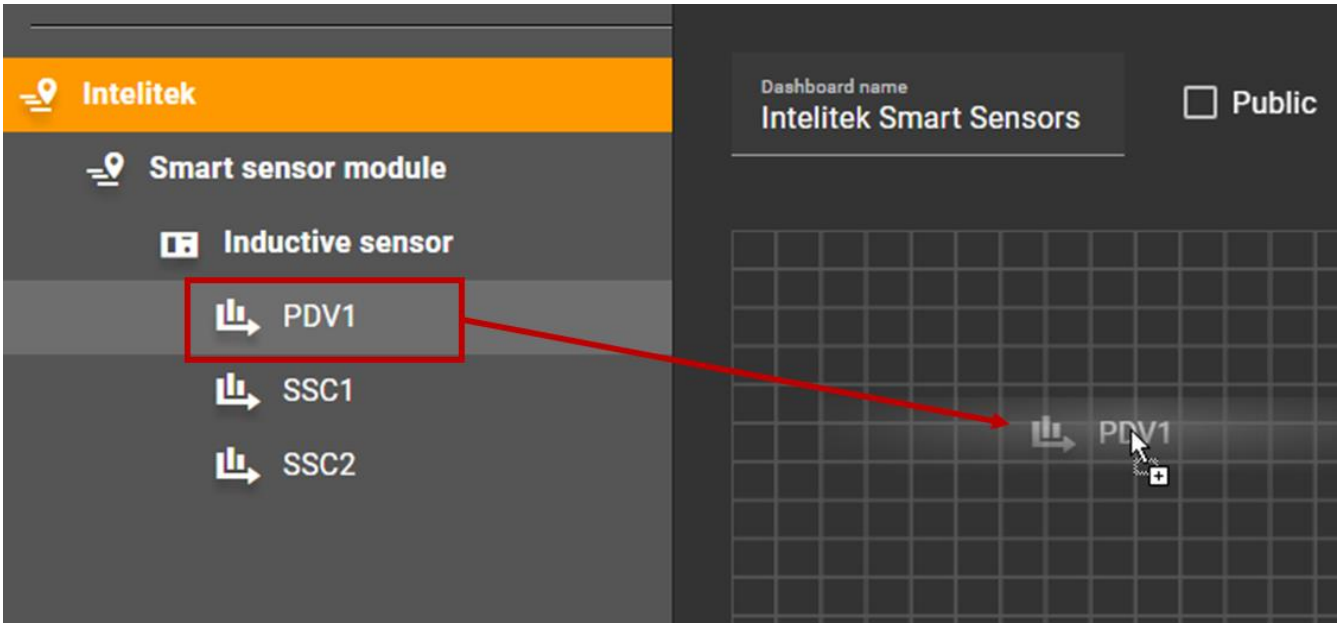
6. In the top-right corner, click the + button.



7. A new dashboard is displayed. Give the dashboard a name.

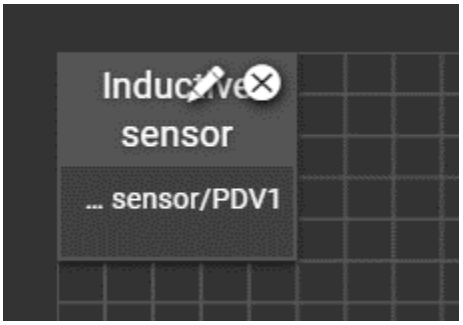


8. Drag the PDV1 info point into the grid.

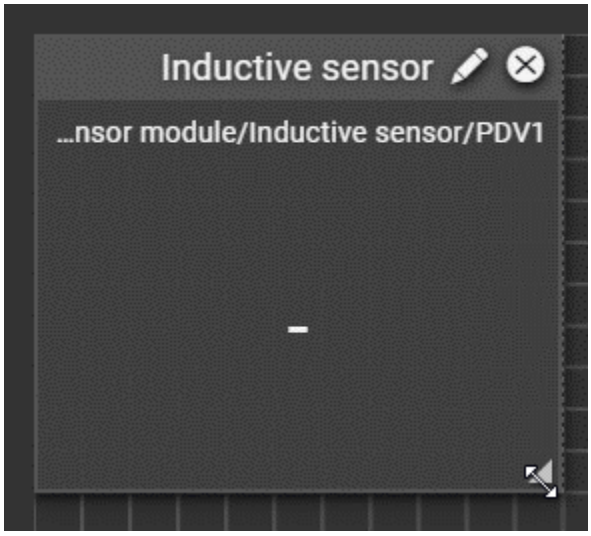


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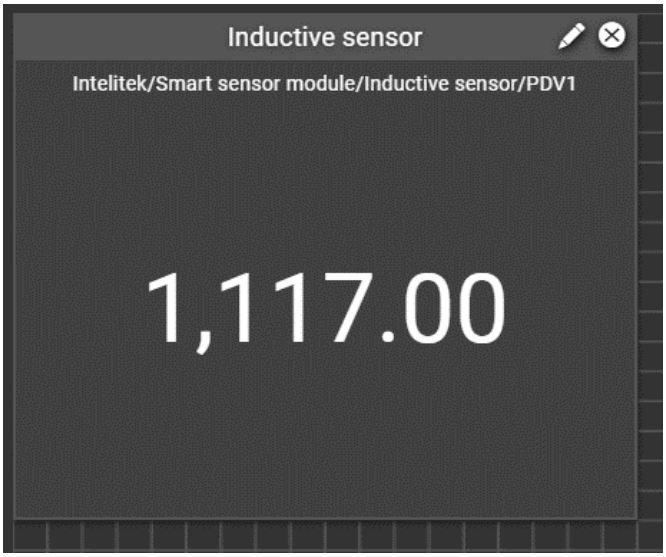
9. A PDV1 widget is displayed in the dashboard. The widget can be modified in size, location, and appearance.



10. Hover your cursor over the widget. An arrow appears in the widget's bottom-right corner. Drag the arrow to expand the widget.



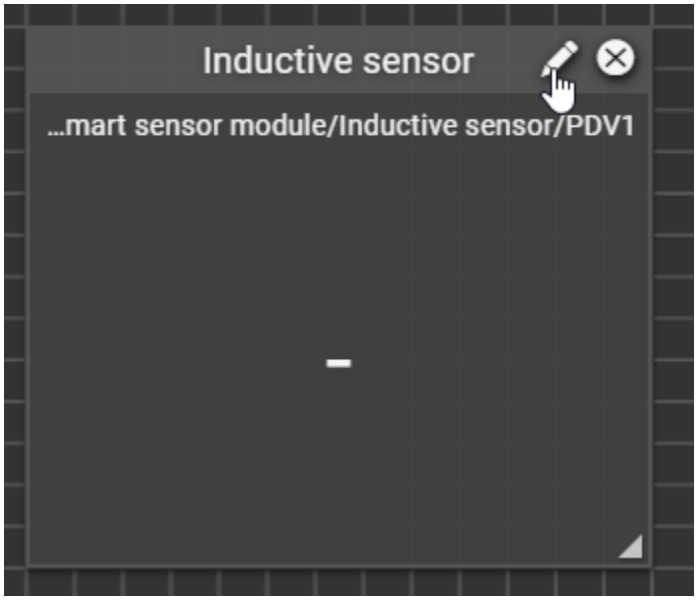
11. Place the magnet in range of the sensor. Observe the distance values in the widget.



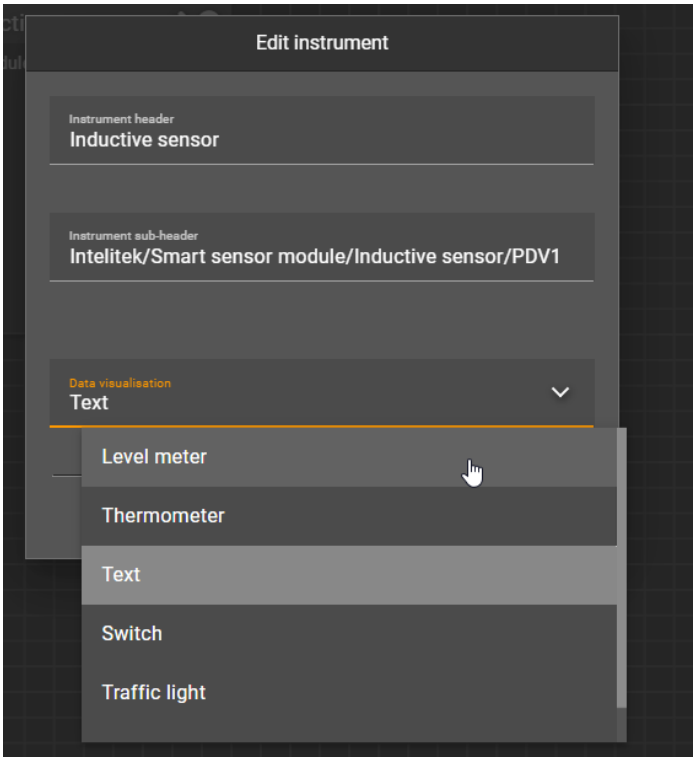
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12. Take the magnet out of sensor range.

13. Click the widget's pencil icon to open the editor.

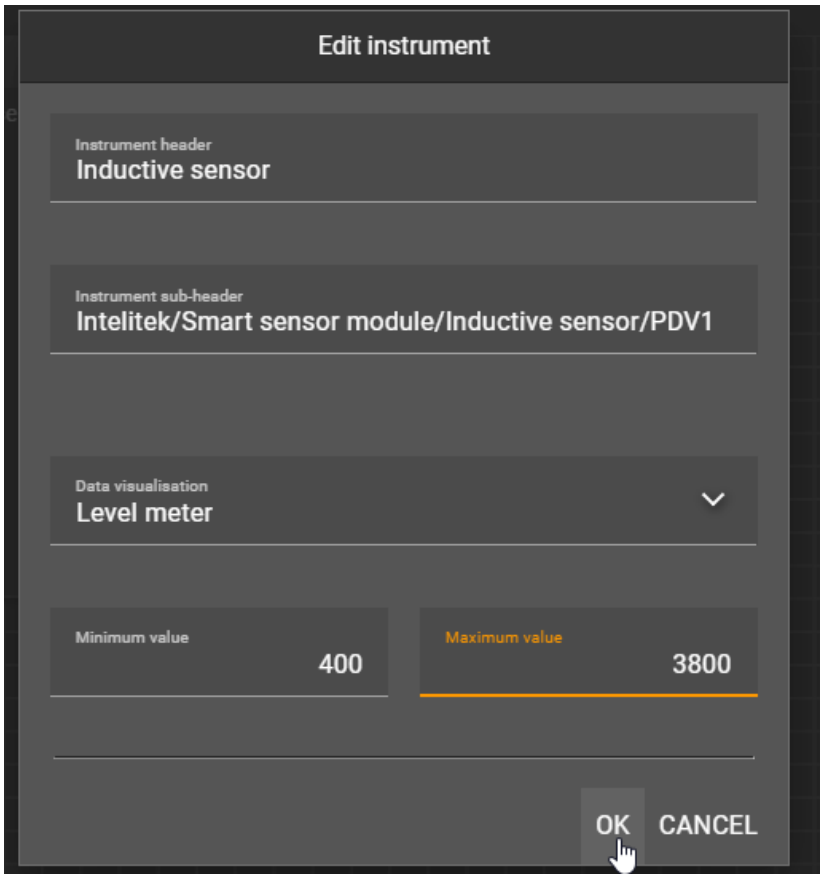


14. In the Edit instrument popup window, note that **Text** is the default data visualization mode. However, there are other visualization modes. In the Data visualization dropdown menu, select **Level meter**.



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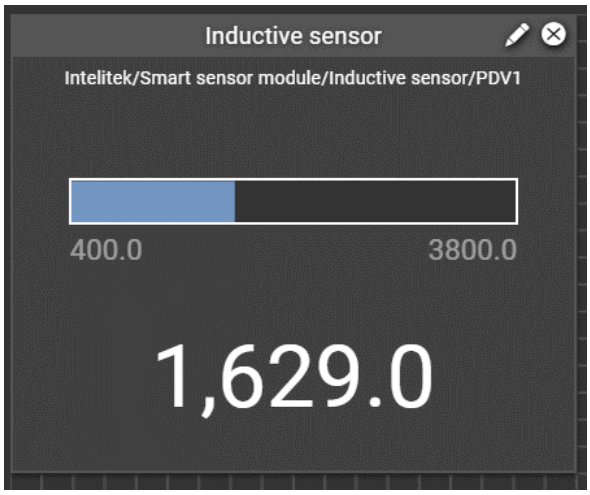
15. For the range settings, in the Minimum value field, enter **400**, and in the Maximum value field, enter **3800**. Click **OK** to confirm and close the editing window.



ⓘ ***Note:*** *The values for this sensor are in micrometers.*

ⓘ ***Note:*** *Change the Instrument header and Instrument sub-header if desired.*

16. Place the magnet in range of the sensor and observe the values in the widget.

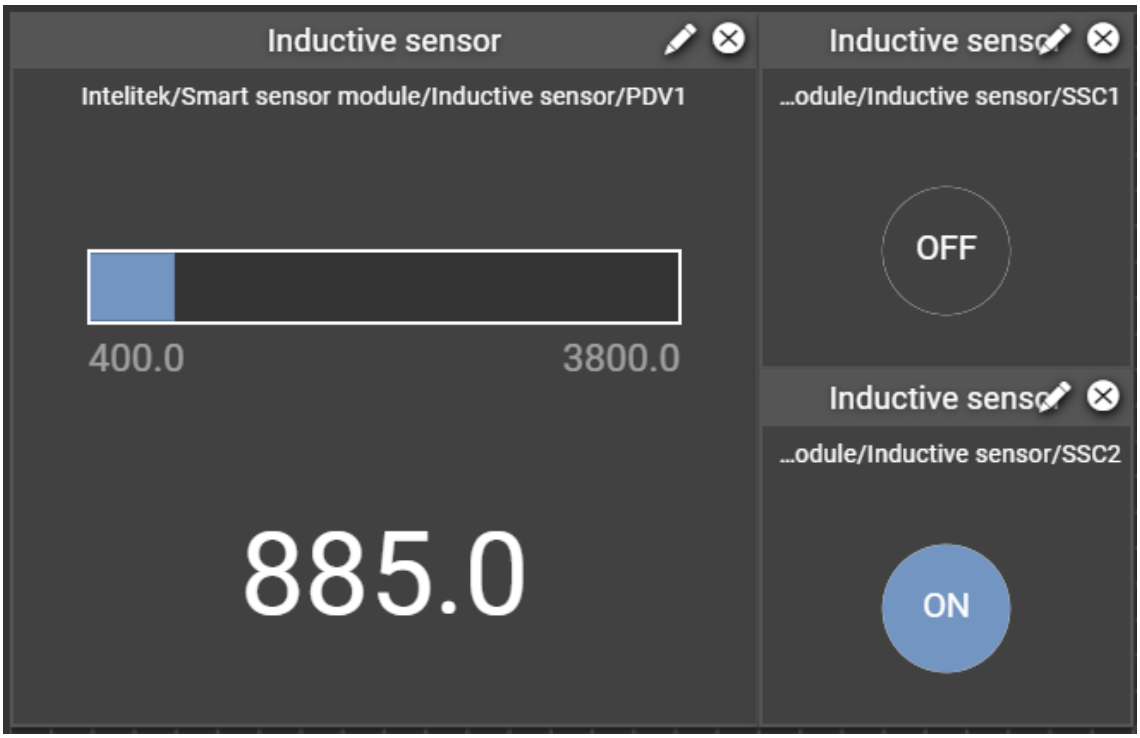


17. Take the magnet out of sensor range.

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18. Experiment with the other data visualization modes. Which are relevant for the PDV1 distance value?

19. Add a widget for the SSC1 and SSC2 info points. Note that these widgets should have a Boolean data visualization mode, such as the **Switch** option.



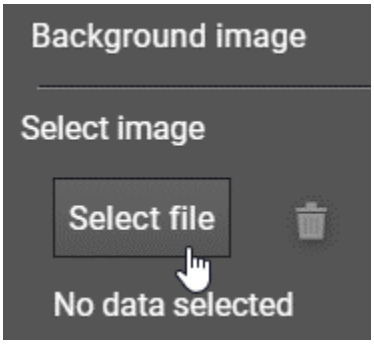
20. Open and download this image. You will use it as the background of your dashboard.

21. In the top-right corner of the screen, click the Add background image button.

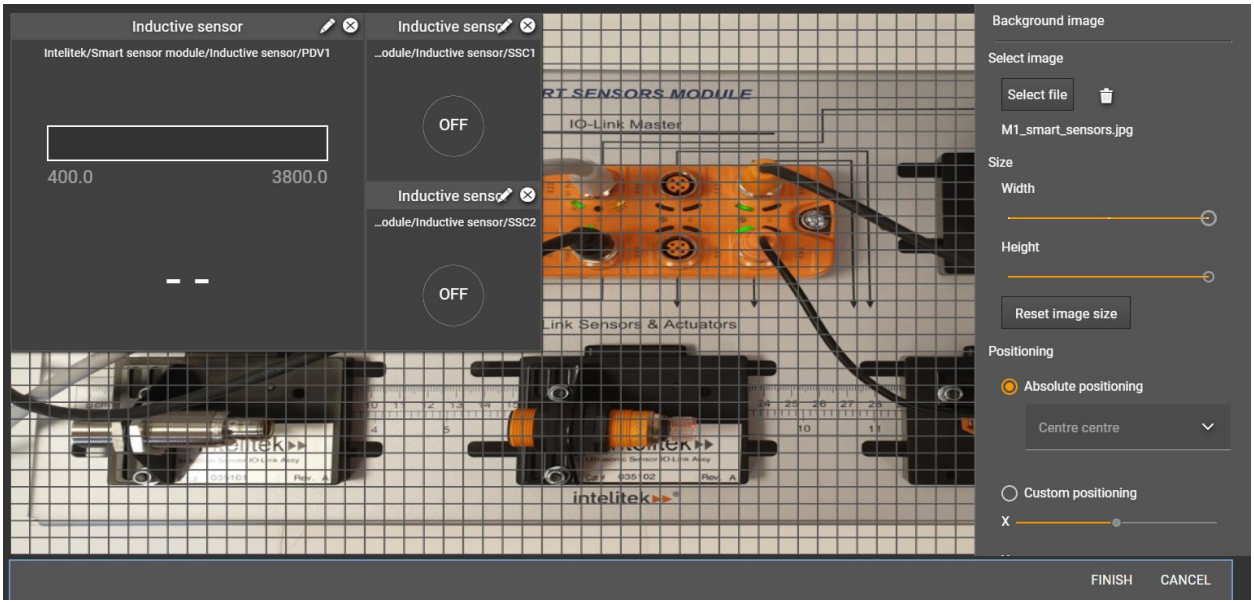


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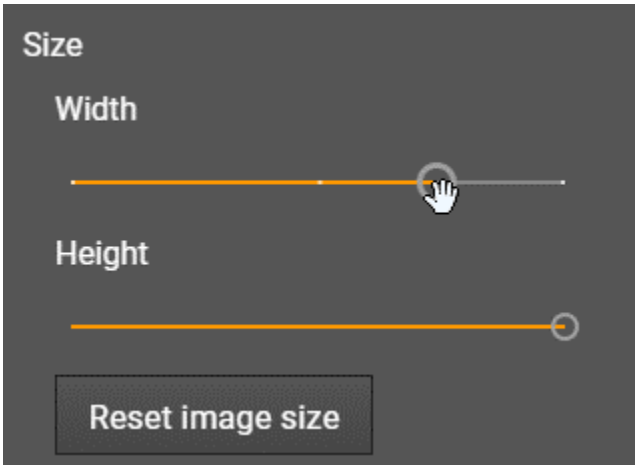
22. Click Select file. Browse to the image you downloaded.



The image is added to the background.

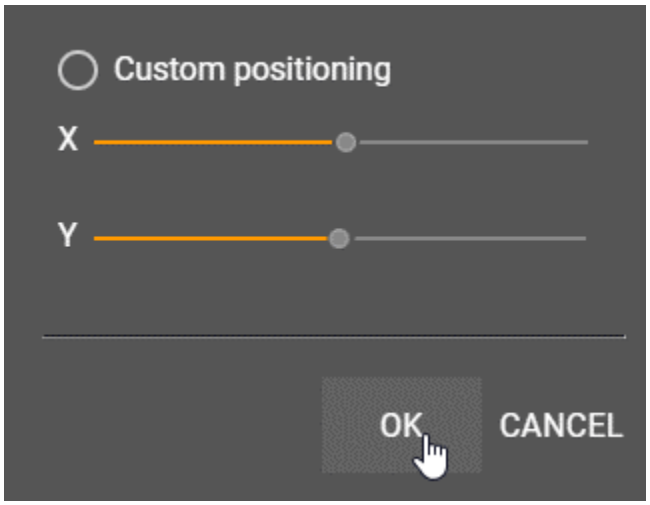


23. Shorten the width of the image.

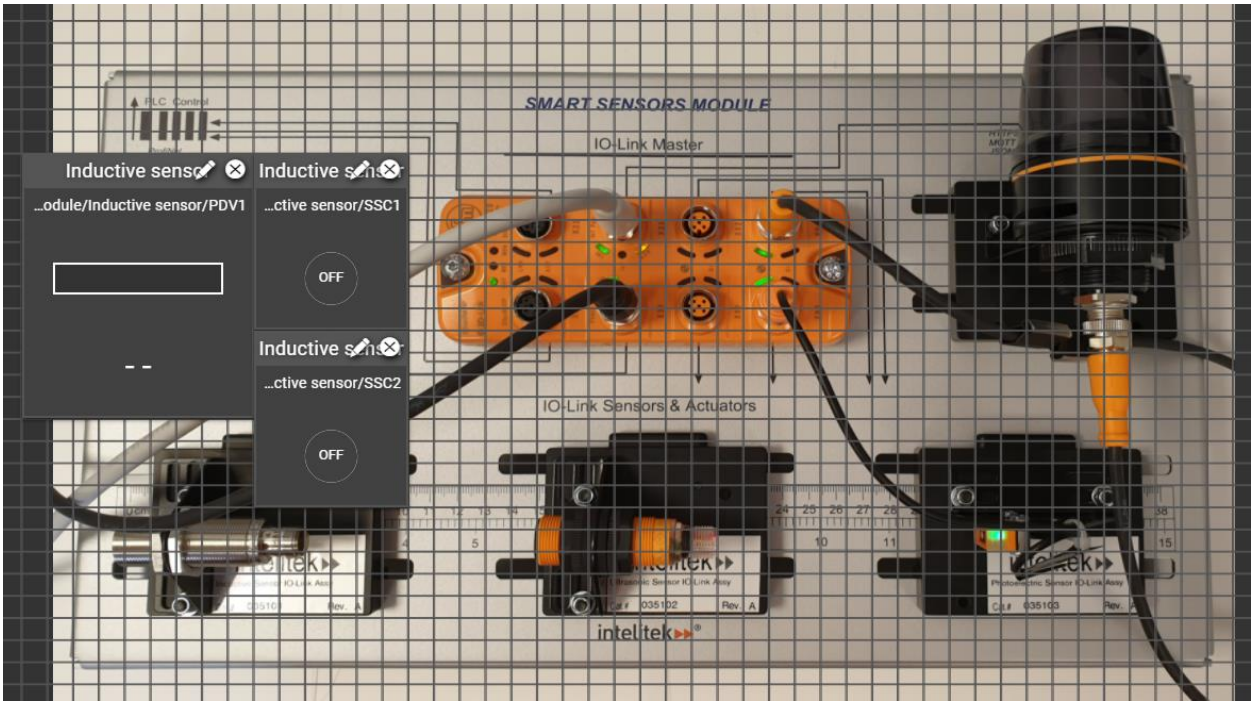


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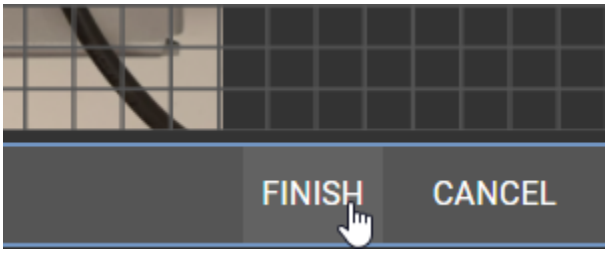
24. Scroll down to the bottom of the image settings and click OK.



25. The image of the smart sensor module is now in the background. Drag and adjust the size of the widgets so that they are above the inductive sensor in the image.

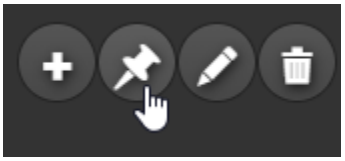


26. On the bottom-right corner of the screen, click **FINISH**.

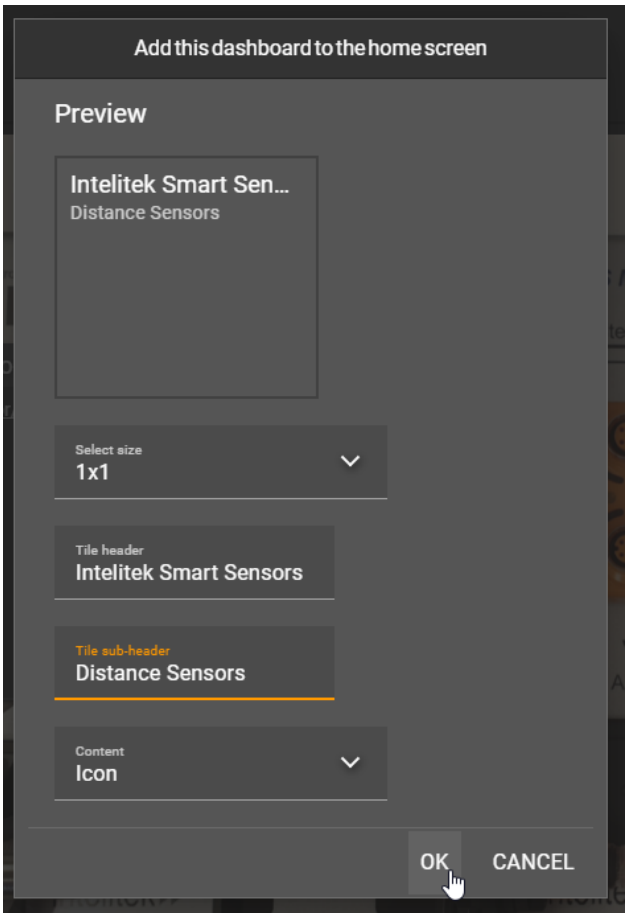


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27. The dashboard is saved. Click the pin button to add the dashboard to the home screen.

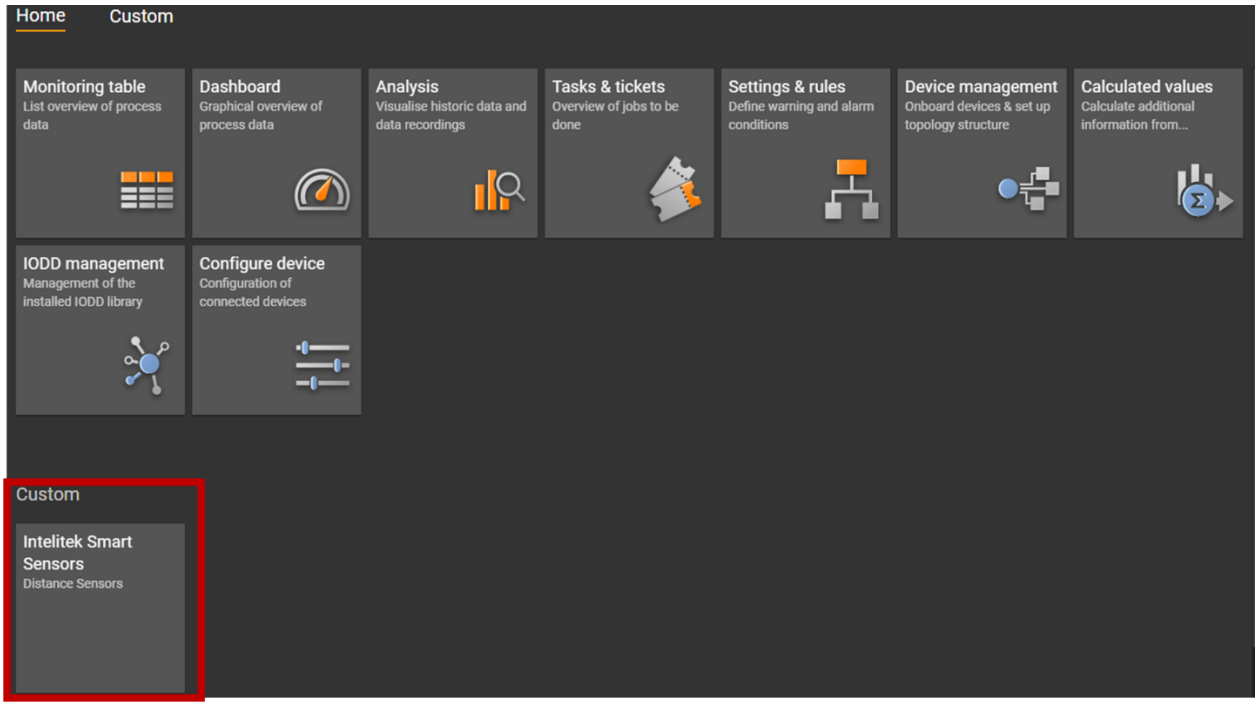


28. Complete the fields, and then click **OK**.

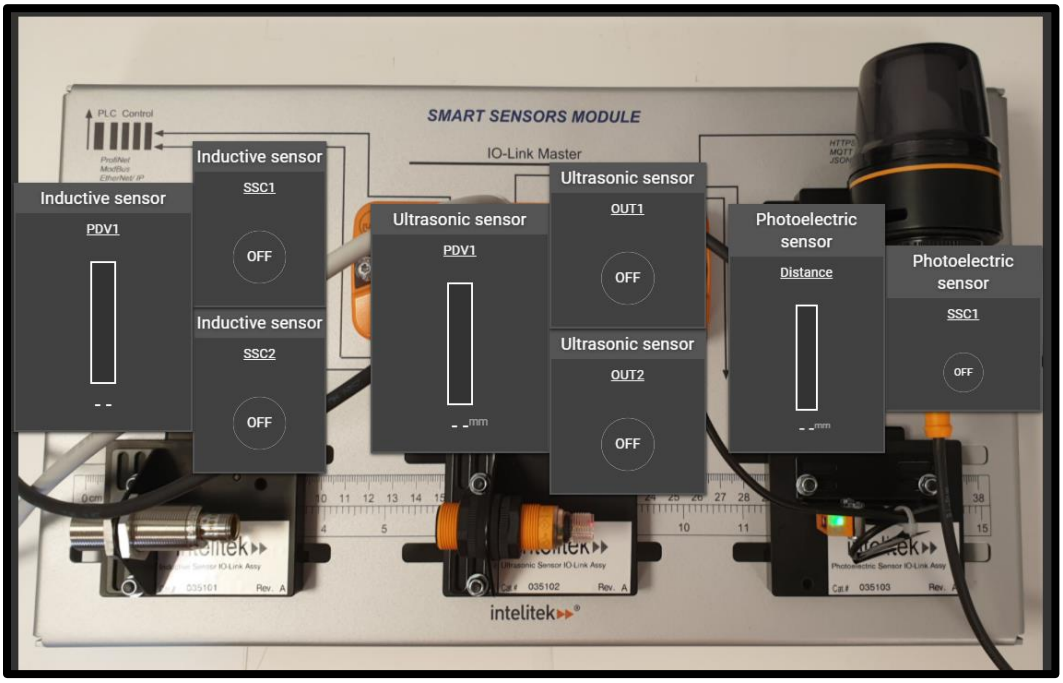


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29. Return to the home page. The dashboard is displayed at the bottom.



30. Add additional widgets for the ultrasonic and photoelectric sensors' data points to the dashboard. You must first return to the Device management screen and add the data points to the navigator.



31. Test your dashboard by moving items into and out of range of the sensors.

32. Show your completed dashboard to at least one classmate and your instructor.

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8. Authentic Skill Assessment

Have your instructor verify that your work meets the requirements in the performance objectives and sign below. Keep this lab activity sheet for future reference.

Instructor Signature	Date

9. Shutdown

Unless instructed otherwise by your instructor, review and complete each of the items on the checklist below.

- ☐ If other users will be performing this lab activity after you with the same profile, **delete the navigator and all device information**.
- ☐ The IO-link master is disconnected and stowed away.
- ☐ The connecting cables are stowed away. A small wrench may be required to disconnect the cables from the master.

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