IO-Link Labs

LAB ACTIVITY M2: ANALYSIS AND TICKETING

Name	Class/Period	Date

1. Overview

In this lab activity, you will establish thresholds for sensor values and analyze the tickets that are generated when the thresholds are exceeded.

2. Performance Objectives

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

- Establish warning and alarm thresholds for sensor info points.
- Identify when thresholds are exceeded by using the analysis feature.
- Open and close tickets.

3. Background

3.1. Warnings and Alerts

In industry, the values that sensors detect can give those monitoring a system information about how a process is proceeding. If a sensor value goes beyond a certain limit, IO-Link monitoring can send alerts to specified parties. In extreme cases of a sensor exceeding a threshold value, alarms can be set off.

In Moneo RTM, when specified info point thresholds are exceeded, a ticket is generated containing information about the info point. The ticket is sent to the designated individual or individuals, and the urgency of the ticket is indicated.

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

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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 connect 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. Initial Setup

In the previous lab activity, you configured the IO-Link master and its connected slave devices for communication with the Moneo software. You also generated a navigator with nodes and sensor info points, as well as a dashboard to monitor this info points.

If you were required to delete the navigator and dashboard, recreate these items now. Refer to the previous lab activity for detailed instruction.

If your navigator and dashboard are still intact, continue to the next task.

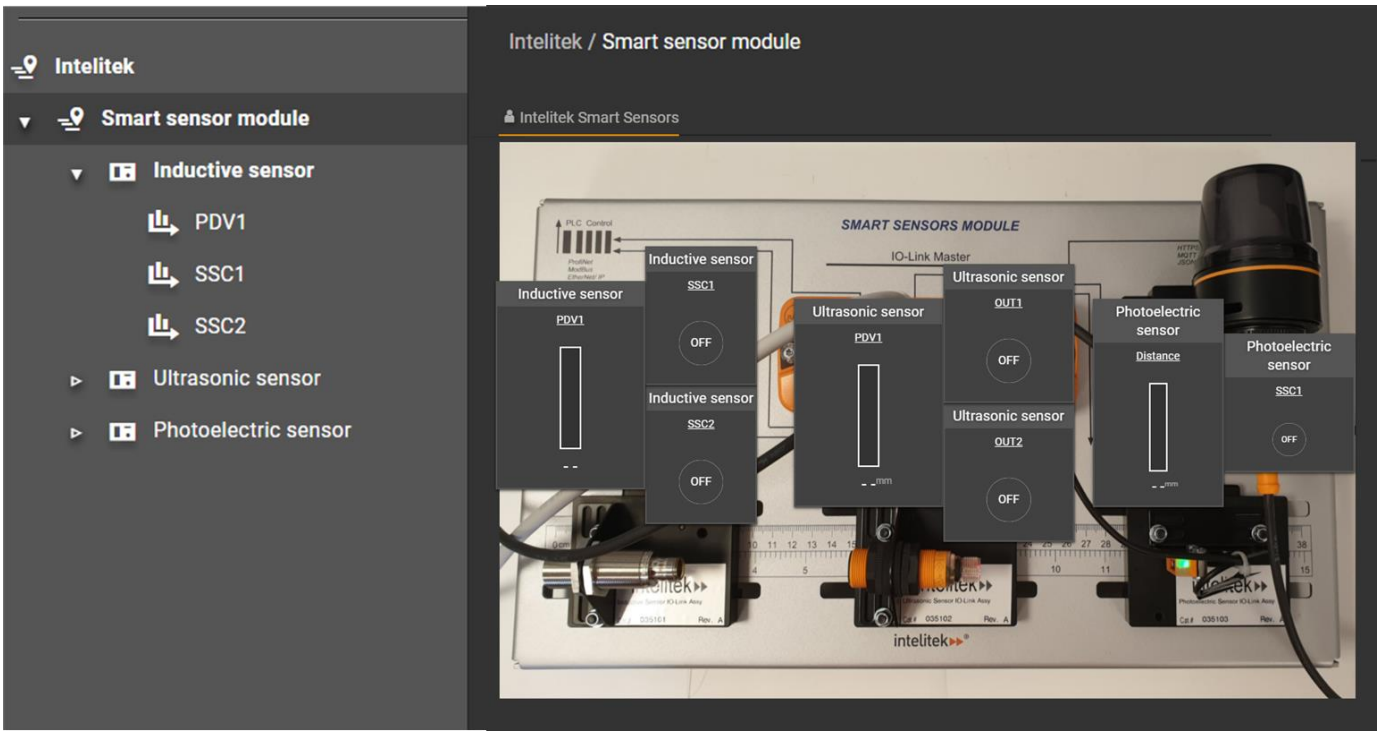
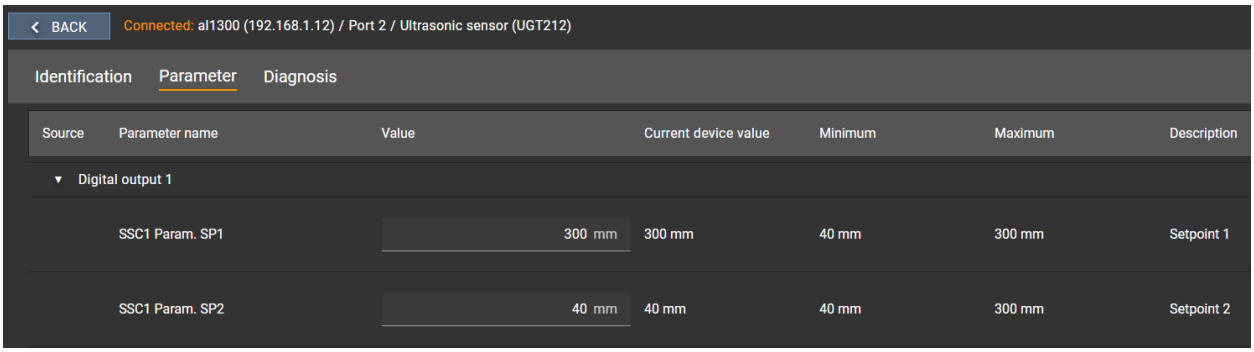


Figure 1. Navigator and Dashboard from Lab Activity M1.

7.3. Establishing Thresholds

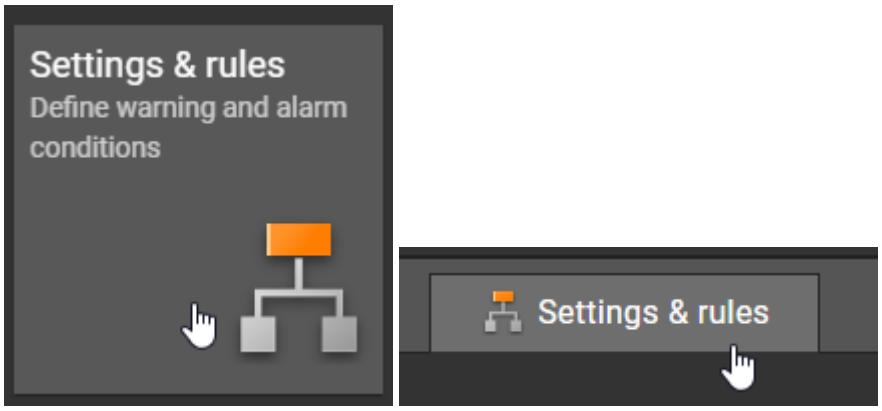
The Moneo Settings and rules allow you to define alarm warnings and conditions. In this task, you will define threshold limits for the ultrasonic sensor. Note that the normal device value limits for this sensor are between 40 mm and 300 mm. This information can be found in the Configure device screen for the ultrasonic sensor (From the home screen, navigate to the **Configure device** screen. If the IO-Link master and its connected devices are not displayed, click **Network scan**.)



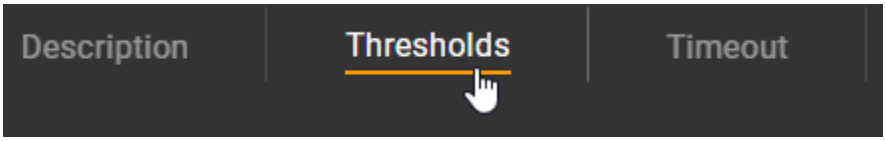
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Perform these steps:

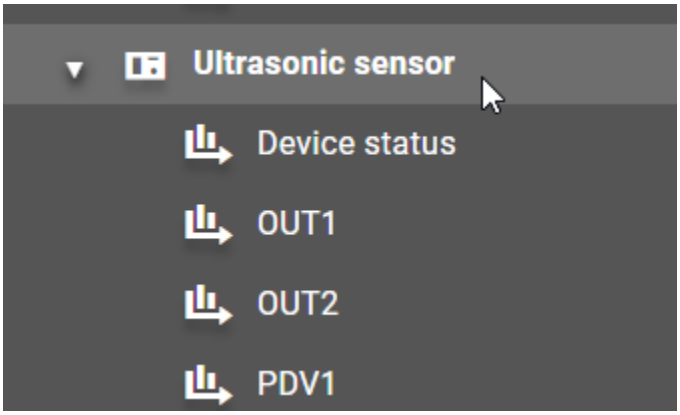
1. From the home page, click **Settings & rules**. You can also access this screen via its tab from one of the other Moneo screens.



2. Click the **Thresholds** tab.

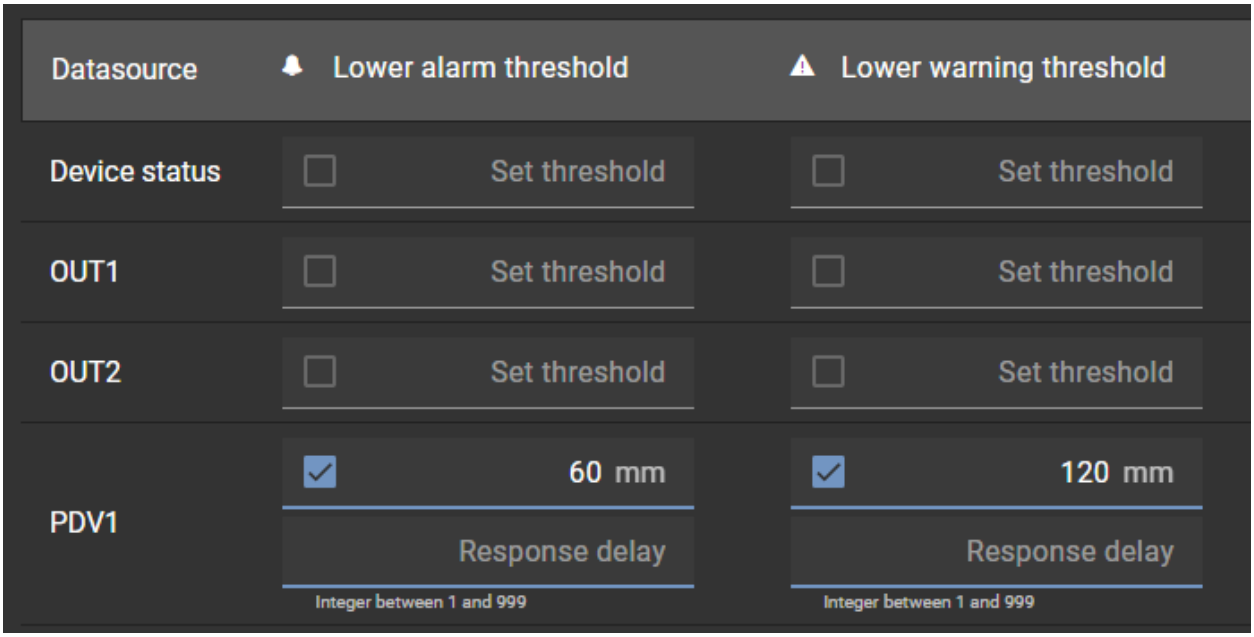


3. In the navigator, select the ultrasonic sensor.

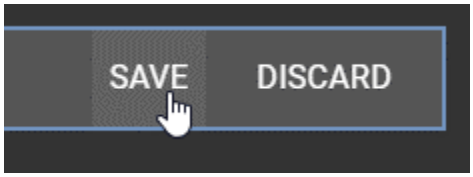


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4. For PDV1, the distance reading, set the **Lower alarm threshold to 60 mm** and the **Lower warning threshold to 120 mm**. If an object comes within 60 mm of the sensor, Moneo will issue a warning. If an object comes within 120 mm of the sensor, Moneo will issue an alarm.

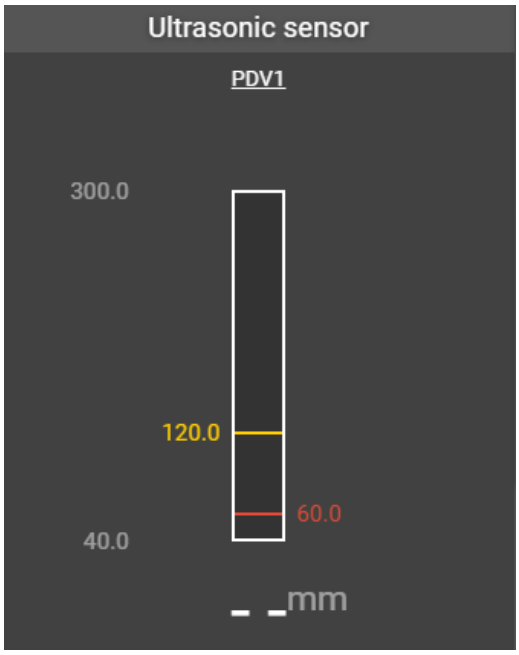


5. In the bottom-right corner, click **SAVE**.

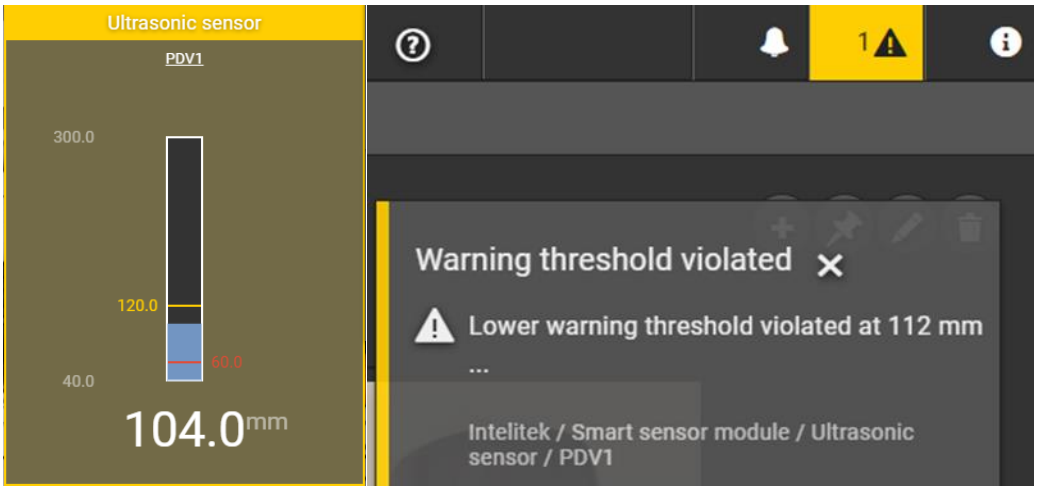


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6. Return to the dashboard. Note that the yellow and red lines in the PDV1 widget represent the lower warning threshold and lower alarm threshold, respectively.



7. Place an object about 300 mm away from the ultrasonic sensor. Slowly bring the object closer to the sensor until the yellow lower warning threshold is reached. Once the threshold is reached, the widget turns yellow, and a warning message appears in the top-right corner.



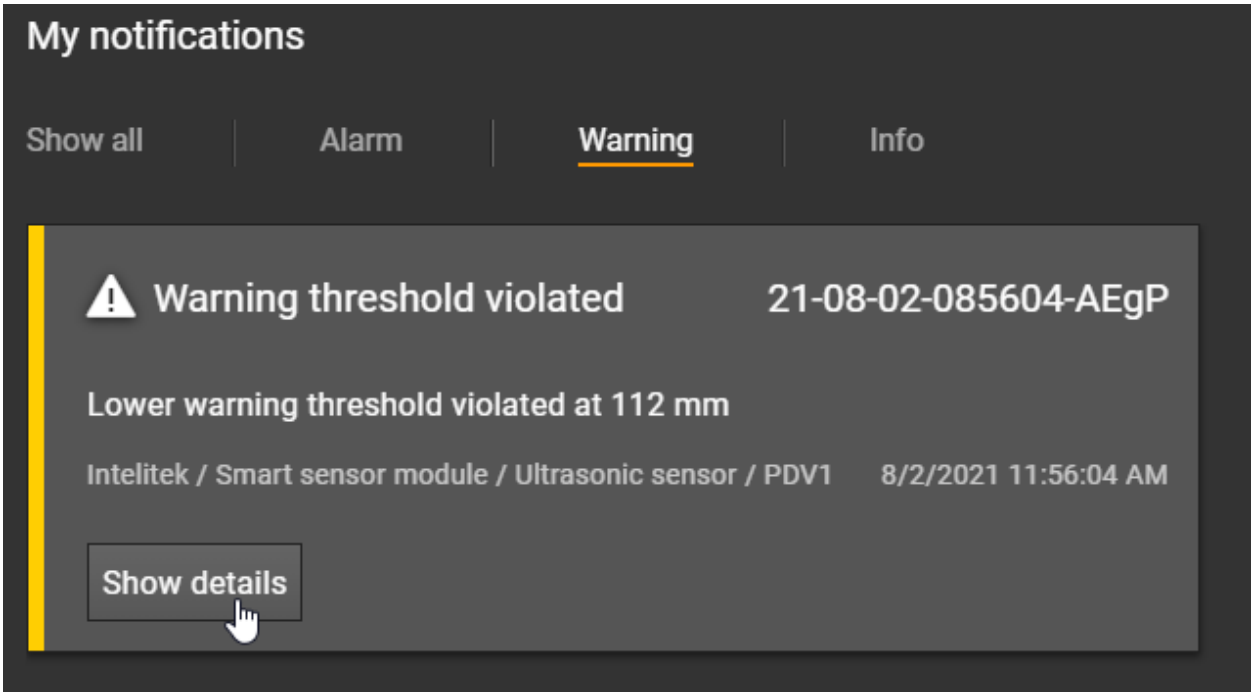
8. Remove the object from sensor range.

9. Click the highlighted warning icon.

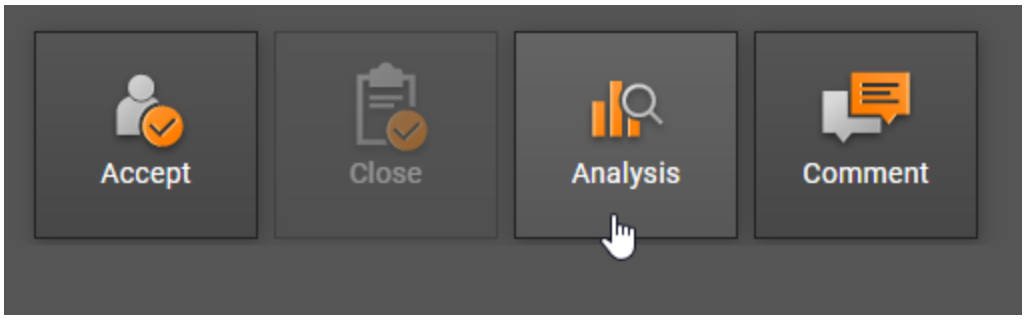


10. The **My notifications** tab opens with the warning message highlighted. Click **Show details**.

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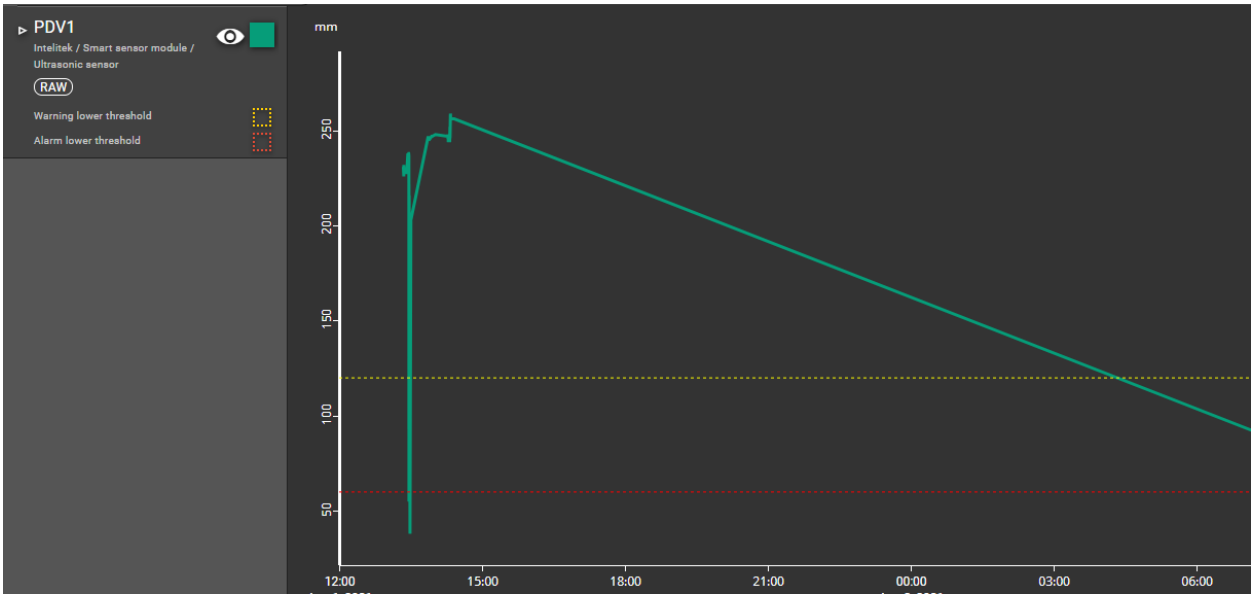


11. The warning message's ticket opens. Tickets display information of events such as warnings and alarms. They can be analyzed and commented on by engineers and technicians. Click **Analysis**.



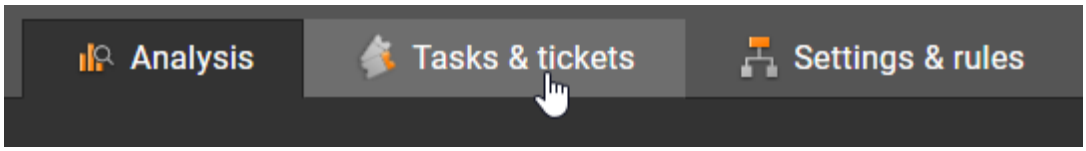
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The Analysis page for the PDV1 info point is displayed. In the graph, you can see where the sensor value exceeds the lower warning threshold.

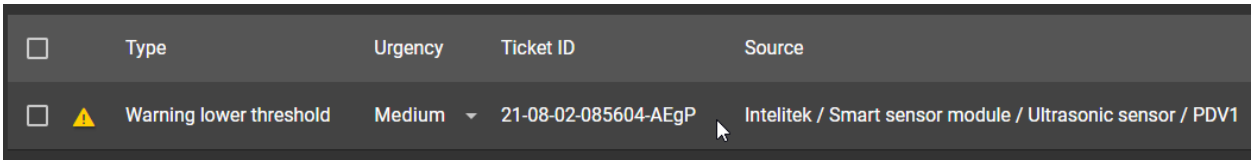


ⓘ ***Note:*** *You can click other info points in the navigator to analyze their history.*

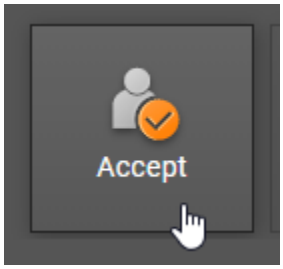
12. Click the **Tasks & tickets** tab.



13. The Tasks & tickets tab aggregates tickets such as those generated by the warning event. Click the ticket. It is the same ticket that you navigated to via the My notifications window in step 10.

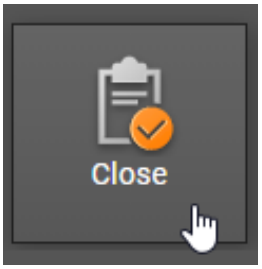


14. In the top-right corner, click **Accept**.



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15. Click **Close**.

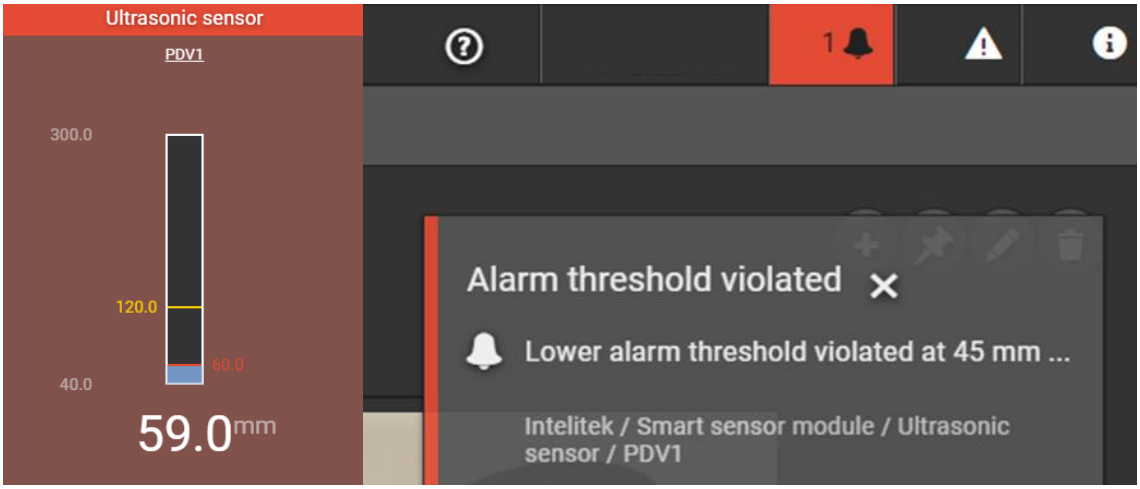


The ticket is closed, which means that it does not require attention from an engineer or technician. Commenting is disabled for the ticket, but the ticket information can still be viewed and analyzed.

ⓘ ***Note:*** *Tickets can be accepted and closed directly from the* ***Tasks & tickets*** *tab using the icons on the far-right side of the ticket. The urgency of the ticket can also be monitored. Tickets can be filtered based on urgency and status.*

16. Return to the dashboard.

17. Take the object and move it into range of the ultrasonic sensor. Move the object towards the sensor until the (red) lower alarm threshold is reached. Once the threshold is reached, the widget turns red, and an alarm message appears in the top-right corner.



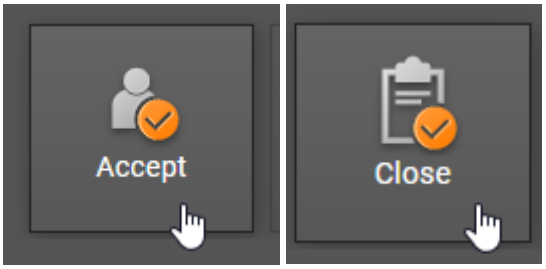
ⓘ ***Note:*** *At this point, the warning message disappears.*

18. Access the alarm's ticket from the **My notifications** tab or from the **Tasks & tickets** tab.

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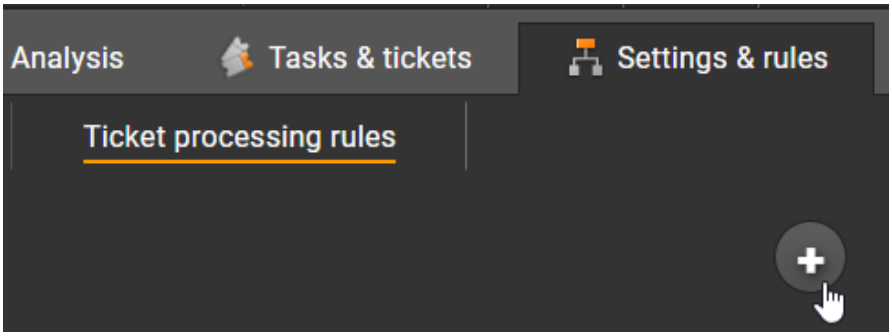
19. Review the ticket analysis. Observe the line chart and identify when the lower alarm threshold was reached.

20. Return to the Tasks & tickets tab. Accept and close the alarm.



The **Settings and rules** screen allows you to modify the ticket processing rules. Here, you can define when and to whom specific info points generate tickets and at which urgency the ticket will be listed. To create a new rule:

1. Select the navigator node to which you want to apply the rule.
2. Navigate to **Settings and rules > Ticket processing rules**.
3. Click the **+** button.



4. Follow the steps of the wizard.

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, **delete the navigator and all device information**.
- ☐ The IO-link master is disconnected and stowed away.

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- The connecting cables are stowed away. A small wrench may be required to disconnect the cables from the master.

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