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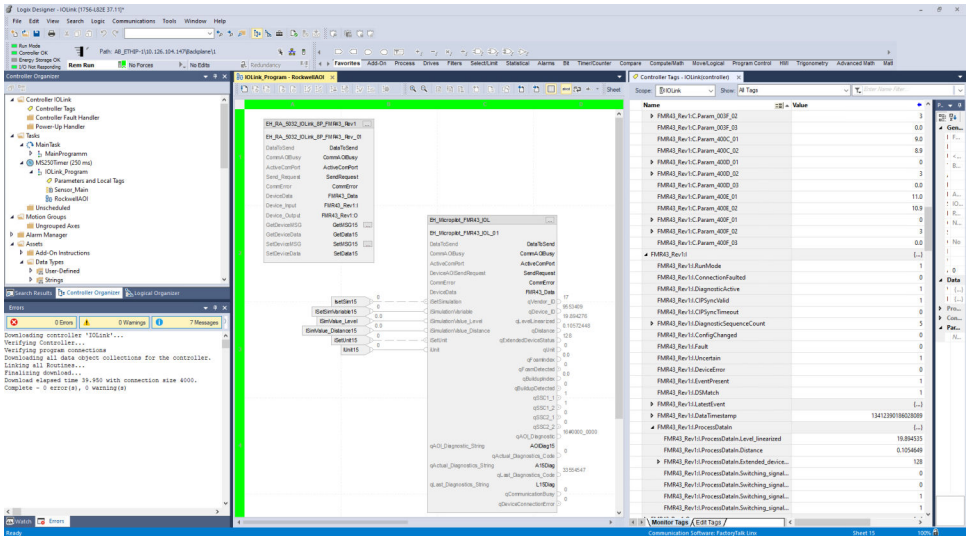
Special Documentation
Endress+Hauser IO-Link devices

Endress+Hauser IO-Link Add-On Instructions for Rockwell Automation Studio 5000®



Endress+Hauser
People for Process Automation

Revision history

Version	Documentation	Changes
1.00	SD03386S/04/EN/01.25	First version

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1 About this document

1.1 Document function

For each IO-Link device from Endress+Hauser, Endress+Hauser develops an Add-On Instruction for integration into specific Rockwell PLCs. These Add-On Instructions are compiled as a library at regular intervals and made available.

This documentation provides the following information:
- Descriptions of the Add-On Instructions for IO-Link devices from Endress+Hauser
- Notes for integration into Rockwell Automation Studio 5000 Logix Designer® design software, from version 35 for specific IO-Link masters

This document applies in addition to the accompanying product documentation for the relevant IO-Link device, such as Operating Instructions, Technical Information and ATEX Safety Instructions. The accompanying product documentation must be observed throughout the entire product life cycle.

1.2 Symbols

1.2.1 Safety symbols

⚠ DANGER
This symbol alerts you to a dangerous situation. Failure to avoid this situation will result in serious or fatal injury.

⚠ WARNING
This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in serious or fatal injury.

⚠ CAUTION
This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in minor or medium injury.

NOTICE
This symbol contains information on procedures and other facts which do not result in personal injury.

1.2.2 Symbols for certain types of information and graphics

Tip
Indicates additional information

Reference to documentation

Reference to graphic

▶
Notice or individual step to be observed

1., 2., 3.
Series of steps

Result of a step

1, 2, 3, ...
Item numbers

A, B, C, ...
Views

1.3 Documentation

1.3.1 Further applicable documents

An overview of the associated documentation is provided in the following:
- *Device Viewer*: Enter serial number from nameplate
  www.endress.com/deviceviewer
- The download area of the Endress+Hauser website
  www.endress.com/downloads

1.3.2 Purpose and content of the document types

Technical Information (TI)

Planning aid
This document contains all the technical data on the product and provides an overview of everything that can be ordered with the product.

Brief Operating Instructions (KA)

Quick guide to obtaining the first measured value
The Brief Operating Instructions contain all the essential information from incoming acceptance to initial commissioning.

Operating Instructions (BA)

Your reference guide
The Operating Instructions contain all the information that is required in various phases of the life cycle of the product: from product identification, incoming acceptance and storage, to mounting, electrical connection, operation and commissioning through to troubleshooting, maintenance and disposal.

Safety instructions (XA)

Safety Instructions (XA) are supplied with the product depending on the approval. They are an integral part of the Operating Instructions.

The nameplate indicates the Safety Instructions (XA) that are relevant to the product.

Special Documentation (SD)

Additional information
Special Documentation provides additional information on the product. Additional information can include graphical representation of commissioning, for example, or information on an app.

1.4 List of abbreviations

Abbreviation	Description
AOI	Add-On Instruction

1.5 Registered trademarks

IO-Link® is a registered trademark of the IO-Link Community c/o PROFIBUS User Organization, (PNO) Karlsruhe/Germany - www.io-link.com

Studio 5000 Logix Designer® is a registered trademark of Rockwell Automation Inc., USA

All other brand and product names are trademarks or registered trademarks of the companies and organizations in question.

2 Basic safety instructions

2.1 Requirements for the personnel

This document is intended for commissioning personnel of control systems who possess the following qualifications:
- Technicians or engineers
- Knowledge of Rockwell Automation Studio 5000 Logix Designer® design software
- Knowledge of the components in use, such as the IO-Link masters and IO-Link devices

The personnel responsible for installation, commissioning, diagnostics, and maintenance must meet the following conditions:
- Trained, qualified specialists must have a relevant qualification for this specific function and task.
- They must be authorized by the plant owner/operator.
- They must be familiar with federal/national regulations.
- Before starting work, personnel must read and understand the instructions in the manual and supplementary documentation as well as the certificates (depending on the application).
- They must follow instructions and comply with general policies.

The operating personnel must meet the following conditions:
- Personnel must be instructed and authorized according to the requirements of the task by the facility's owner/operator.
- Personnel must follow the instructions in this manual.

2.2 Intended use

For each IO-Link device from Endress+Hauser, Endress+Hauser develops Add-On Instructions for integration into specific Rockwell PLCs. These Add-On Instructions are compiled as a library at regular intervals and made available.

Supported IO-Link devices: → 8

The Add-On Instructions library was tested with specific PLCs, IO-Link masters and the Studio 5000 Logix Designer® design software.

For proper use of the IO-Link devices, refer to the accompanying operating instructions for the device → 5.

The Add-On Instructions are intended to support the commissioning personnel of control systems using Endress+Hauser IO-Link devices. The Add-On Instructions make no claim to completeness or functionality for every configuration and system. The user of the Add-On Instructions is responsible for correct and safe operation in their system and for implementing any necessary adjustments. The user is also responsible for excluding errors that could lead to material damage and/or personal injury.

IT security (cybersecurity)

Each IO-Link device has individually implemented security mechanisms. For details about the implemented security mechanisms, refer to the product documentation of the IO-Link device.

The operator is responsible for protecting their system, system components, and networks against attacks and, in accordance with their requirements (security level), implementing and updating a comprehensive security concept.

Endress+Hauser provides information on cybersecurity at the following website: https://www.endress.com/cybersecurity

3 Product description

3.1 Function

The Add-On Instructions library support commissioning personnel in the integration into the Rockwell Automation Studio 5000 Logix Designer® design software.

Furthermore, the function blocks perform the following tasks:
- Writing acyclic data to an IO-Link device
- Reading acyclic data from an IO-Link device
- Configuring an IO-Link device
- Displaying process values directly at the output parameters of each function block without requiring further decoding

The Add-On Instructions are designed to work with generic input and output modules to provide greater flexibility in selecting the desired hardware.

3.2 Supported Endress+Hauser IO-Link devices

The library contains Add-On Instructions for the following Endress+Hauser IO-Link devices.

Flow
- Dosimag
- Dosimass
- Promag 10
- Promass 10

Level
- Liquiphant FTL43
- Micropilot FMR43

Pressure
Cerabar PMP43

Temperature
iTHEMP TMT36

3.3 System requirements

The Add-On Instructions library was tested with specific PLCs, IO-Link masters and Studio 5000 Logix Designer®.

3.3.1 PLC

Rockwell PLC:
- 1756 controller
- 1769 controller
- 5069 controller

3.3.2 IO-Link master

Rockwell Automation
5032-8IOLxxxx FW 2.012

IFM
AL1323 8-Port

3.3.3 Software

Rockwell Automation Studio 5000 Logix Designer from version 35

4 System integration with a Rockwell IO-Link master

4.1 Requirements and procedure

Requirements
Hardware configuration engineered.

1. Download Add-On Instructions library → 10.
2. Integrate IO-Link master into EtherNet/IP network and configure → 10.
3. Import device IODDs into the Studio 5000 driver catalog → 13.
4. Integrate IO-Link devices into the IO-Link master → 13.
5. Import communication AOI into a project → 15.
6. Set up communication AOI → 16
7. Import device AOI into a project → 19.
8. Configure device AOI → 21

Data exchange between the IO-Link devices and control system is via a IO-Link master. The IO-Link master communicates with the control system via EtherNet/IP.

The IO-Link master is integrated into the Rockwell Automation control system as an EtherNet/IP device. The configuration procedure for the IO-Link master depends on the manufacturer.

4.1.1 Communication AOI and device AOI

The device AOI and communication AOI are required for integrating an IO-Link device. The communication AOI always applies only to one IO-Link master and one IO-Link device.

For example, you need the following AOIs to integrate a Promass 10 flowmeter into a system with a "Rockwell Automation 5032-8IOLxxxx" IO-Link master:
- Communication AOI: EH_RA_5032_IOLink_CommAOI_8P.L5X
  Communication AOI for a Promass 10 with a "Rockwell Automation 5032-8IOLxxx" IO-Link master
- Device AOI: EH_Promass10_IOL_AOI.L5X
  Device AOI for a Promass 10

4.2 Download Add-on Instructions library

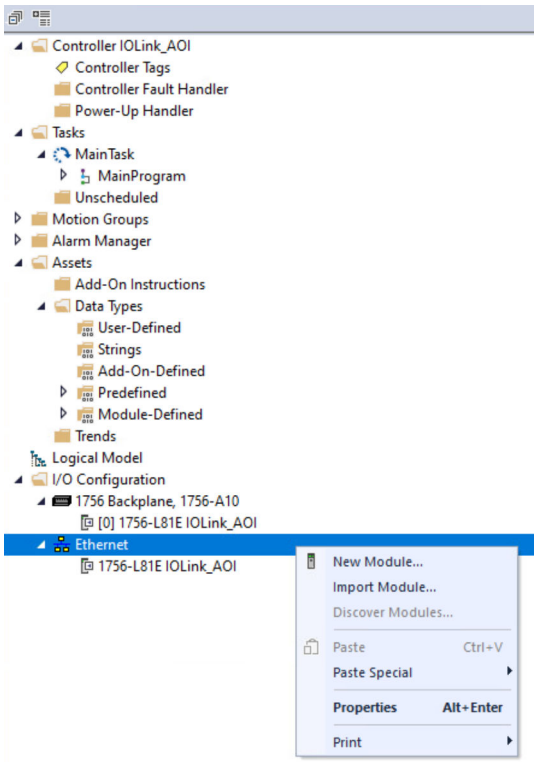
1. Open the www.endress.com page.
2. Select the product using the filters and search field.
3. Open the product page.
4. Select the**Downloads** page.
5. Select **Software**.

4.3 Rockwell Automation 5032-8IOLxxx IO-Link master

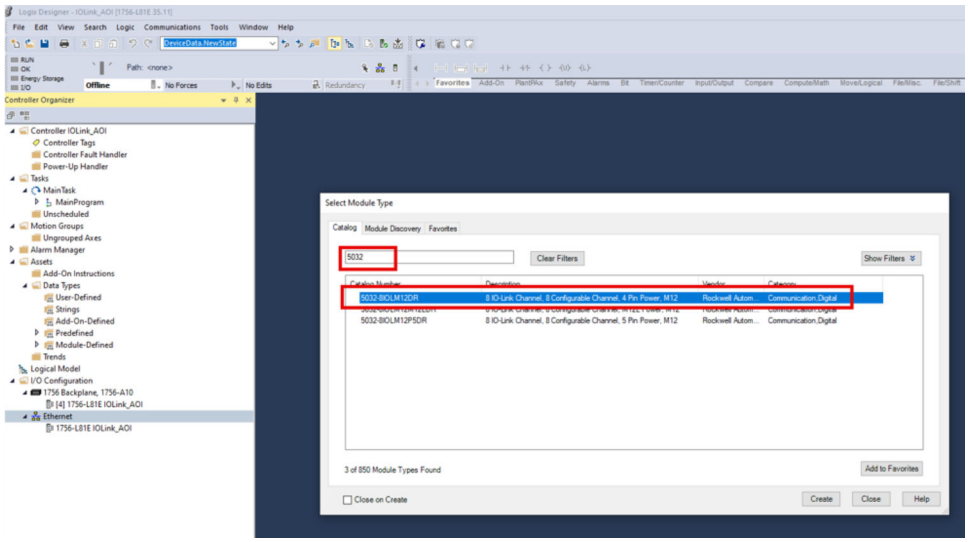
4.3.1 Integrating IO-Link master into EtherNet/IP network and configuring IO-Link master

The IO-Link master is integrated into the Rockwell Automation control system as an EtherNet/IP device.

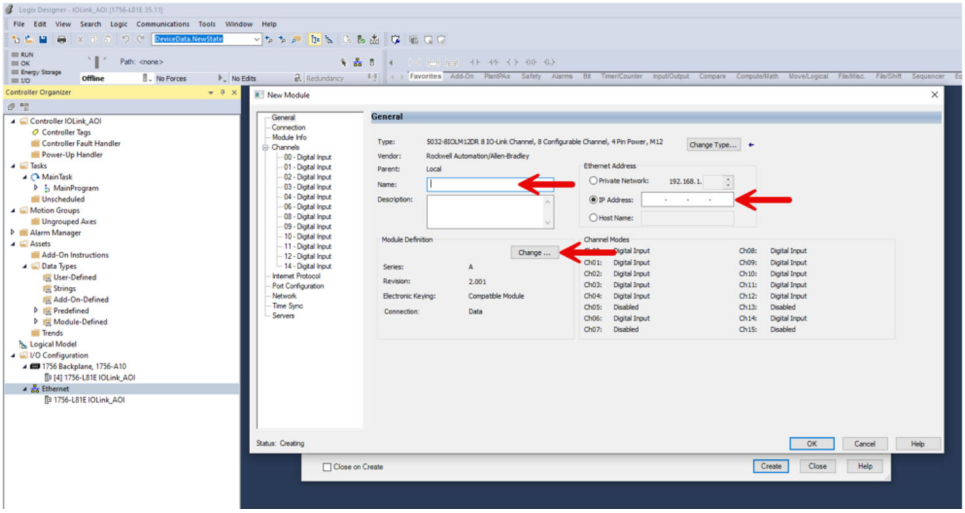
1. Open the project into which the IO-Link master is to be integrated.
2. Select the network card to which the IO-Link master is to be connected.
3. Select the **New Module** function via the context menu. If you access the controller online via the software, you can also use the **Discover Modules** function.



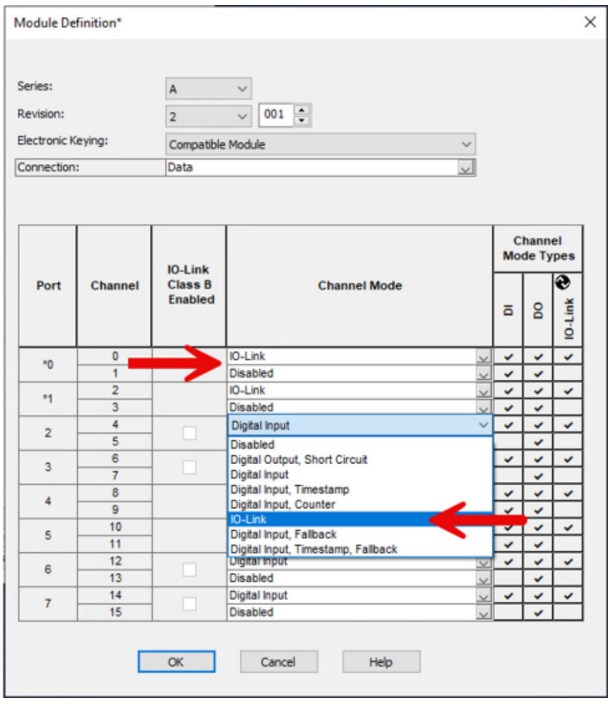
4. Select the IO-Link master via the **Select Module Type** window in the **Catalog** tab.



5. Click on **Create**.
   ↳ The **New Module** window is displayed.
6. Configure the **Name** and **IP Address** parameters.

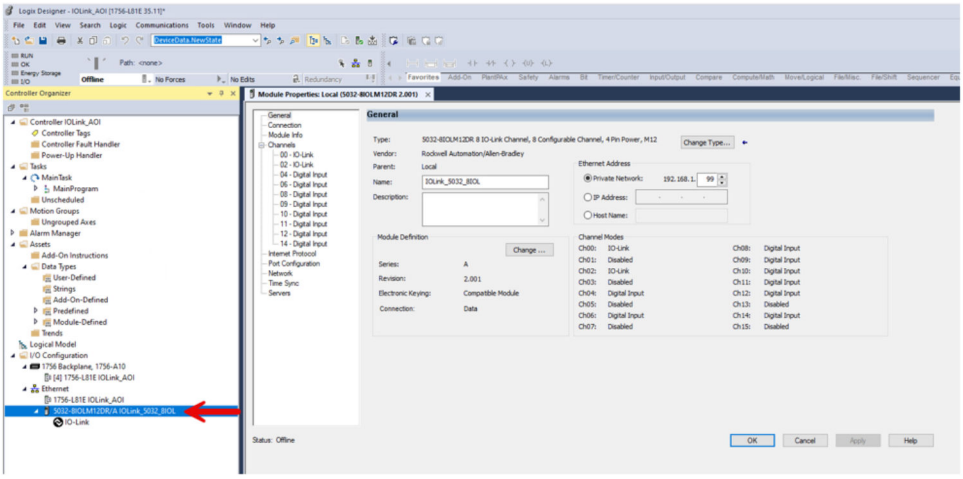


7. In the **Module Definition** section, click on **Change**.
   ↳ The **Module Definition** window is displayed.



8. Configure the following settings for all ports that are to be operated as IO-Link: Set “First” channel such as “Channel 0” or “Channel 2” to “IO-Link”. Set "Second" channel, for example, "Channel 1" and "Channel 3", to "Disabled".

9. Confirm configuration with **OK**. Close the "New Module" window and, if necessary, the "Select Module Type" window.
   ↳ The IO-Link master is integrated into the project. The IO-Link master is displayed in the **I/O Configuration** window in the **Controller Organizer** folder.

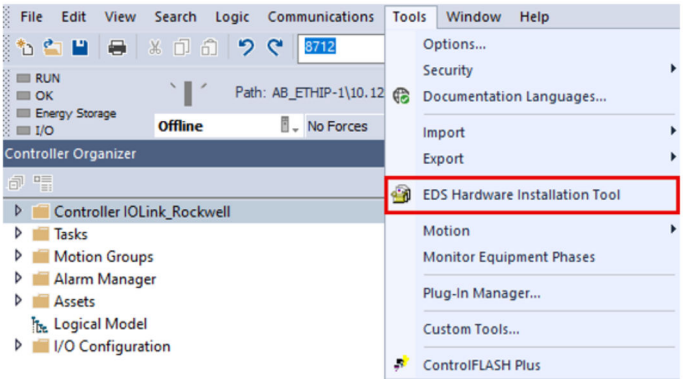


If you double click on the IO-Link master or open the "Properties" function via the context menu, the properties of the IO-Link master are displayed.

4.3.2 Importing device IODDs into the Studio 5000 driver catalog

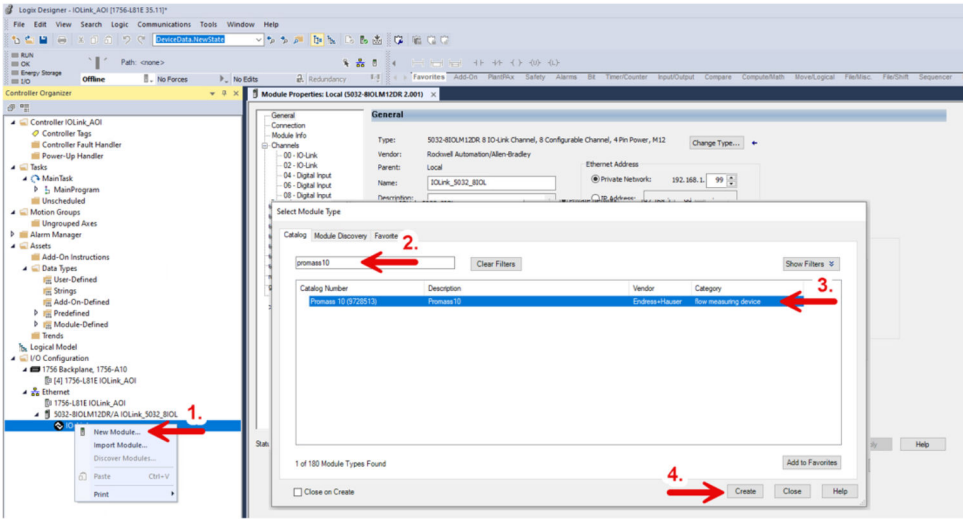
The device IODDs are required for configuring the Rockwell Automation IO-Link master.

- Use the **EDS Hardware Installation Tool** tool to import the Endress+Hauser device IODDs into the driver catalog. Path: Tools > EDS Hardware Installation Tool

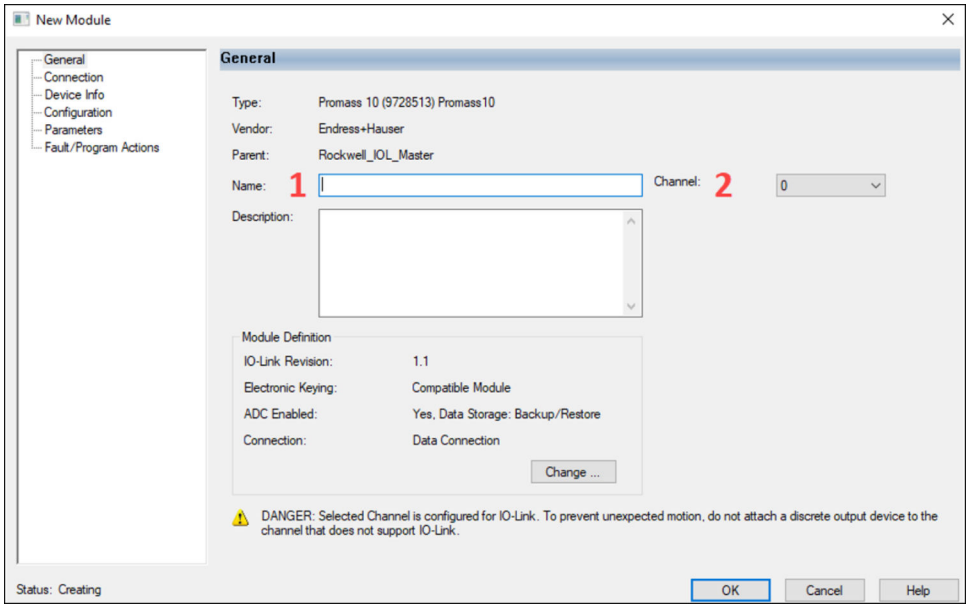


4.3.3 Assigning the IO-Link device to the IO-Link master

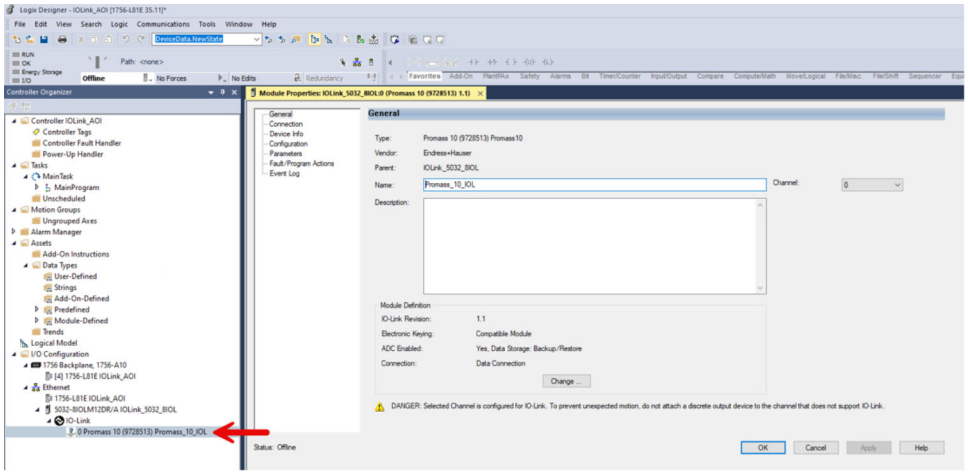
1. Select the IO-Link master and select the **New Module** function via the context menu.
2. Select the desired IO-Link device, e.g. Promass10 in this case, in the **Catalog** tab.



3. Click on **Create**.
   ↳ The **New Module** window is displayed.



4. Configure the **Name** and **Channel** parameters.
5. Confirm configuration with **OK**.
   ↳ The IO-Link device is assigned to the IO-Link master. The IO-Link device is displayed in the **Controller Organizer** window in the **I/O Configuration** folder under the IO-Link master.

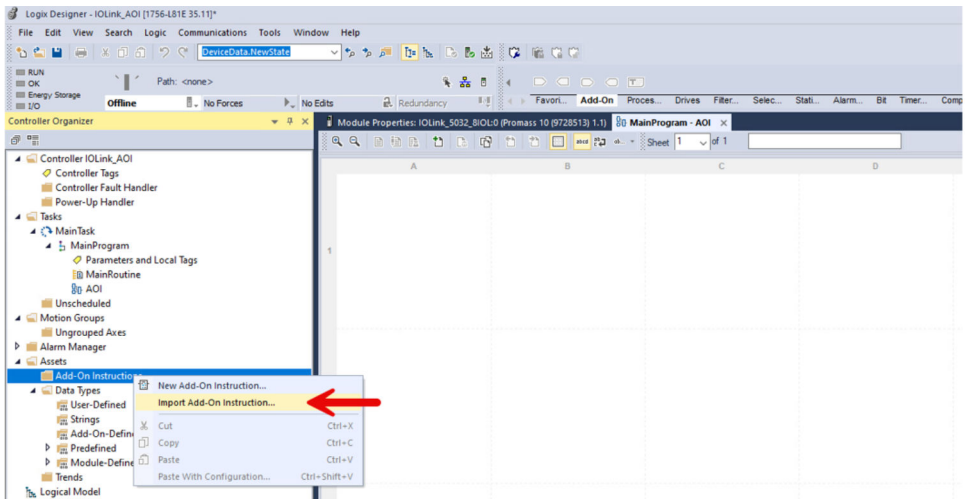


If you double click on the IO-Link master or open the "Properties" function via the context menu, the properties of the IO-Link master are displayed.

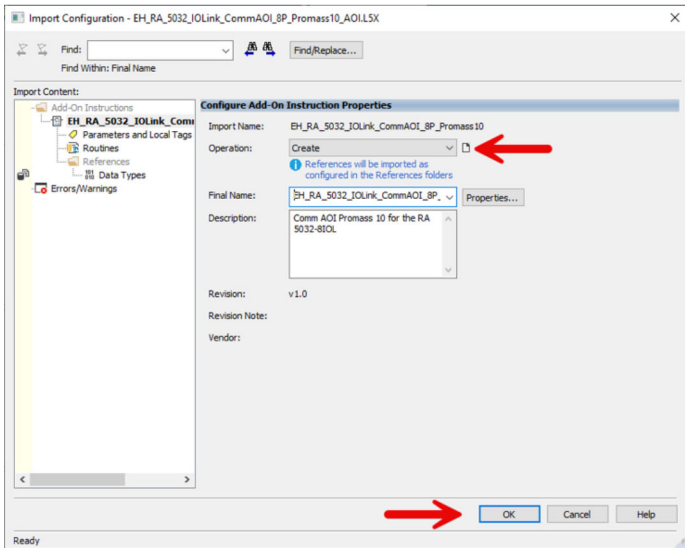
4.4 Importing the communication AOI into a project

Requirements
The IO-Link devices are added to the project.

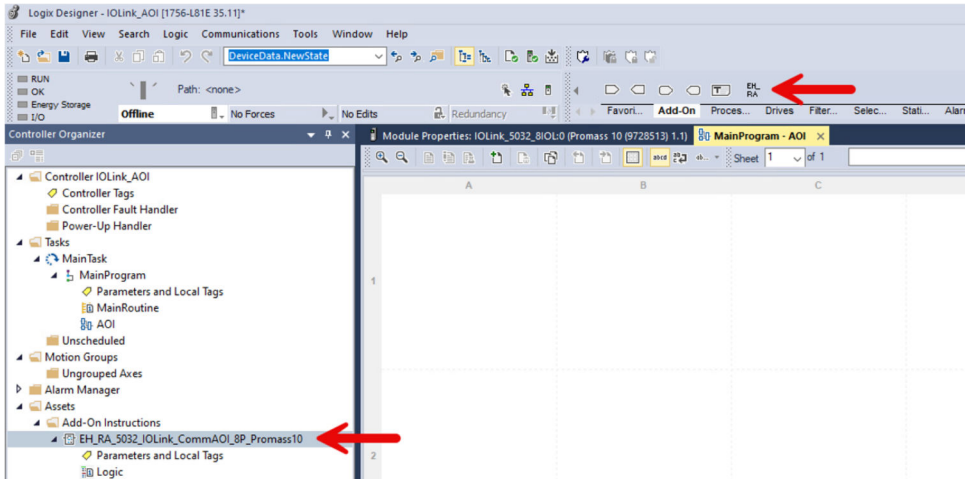
1. In the **Controller Organizer** window, select the **Add-On Instruction** folder. **Assets** folder > **Add-On Instruction** folder
2. Select the **Import Add-On Instruction ...** function via the context menu.
   ↳ The **Import Add-On Instructions** window is displayed.



3. Select the communication AOI for the Rockwell Automation IO-Link master and the IO-Link device.
4. Click **Open**.
   ↳ The **Import Configuration** window is displayed.



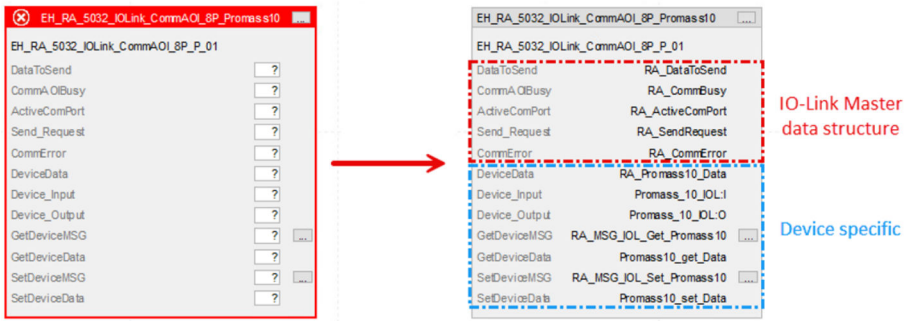
5. If the communication AOI has not yet been imported, the **Create** option is displayed for the **Operation** field. If the communication AOI has already been imported or the name is already assigned, a warning is displayed. The **Import Configuration** window does **not** require any adjustments.
6. Click **OK**.
   ↳ The communication AOI is imported into the project and is available for the routine. The AOI is displayed in the **Controller Organizer** window in the **Add-On Instructions** folder and **Language Element** section under Add-On.



4.5 Setting up the communication AOI

To set up the communication AOI, you create and link tags. The first five tags of the communication AOI make up the "IO-Link master data structure". You only need to create these tags once for each IO-Link master within a project. You can then use these tags for all IO-Link devices connected to the same IO-Link master. The remaining tags are device specific. You must generate and link these tags for every IO-Link device.

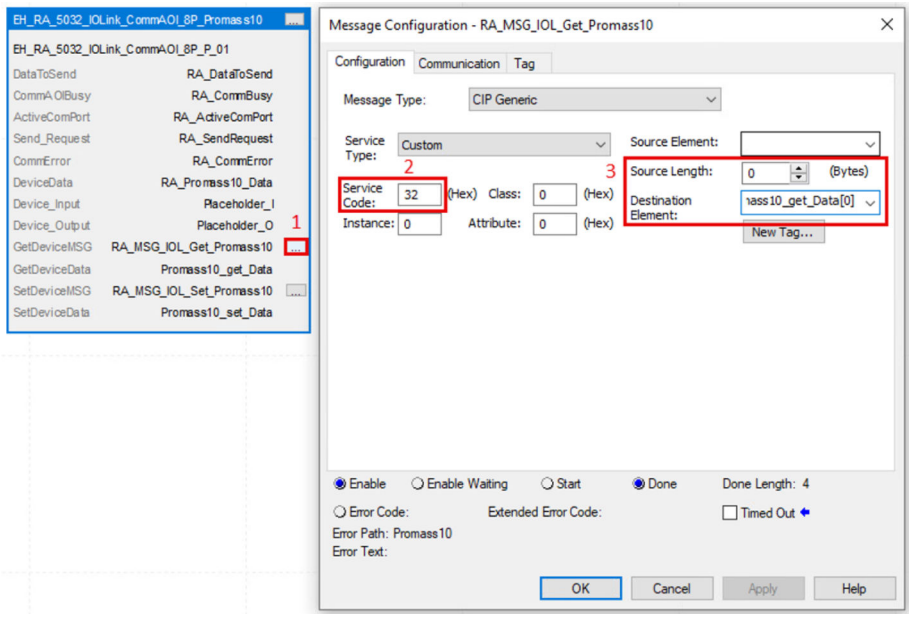
You are not required to follow any naming conventions for the tags.



1. Create the first five tags "DataToSend", "CommAOIBusy", "ActiveComPort", "Send_Request" and "CommError". You can use these tags for all IO-Link devices that are connected to this IO-Link master.
2. Create the "DeviceData" tag.
3. Create the "Device_Input" tag and link to the input tag of the IO-Link device.
4. Create the "Device_Output" tag and link to the output tag of the IO-Link device.
5. Generate the "GetDeviceData tag and configure the "GetDeviceMSG tag. → 17
6. Generate the "SetDeviceData tag and configure the "SetDeviceMSG tag. → 18

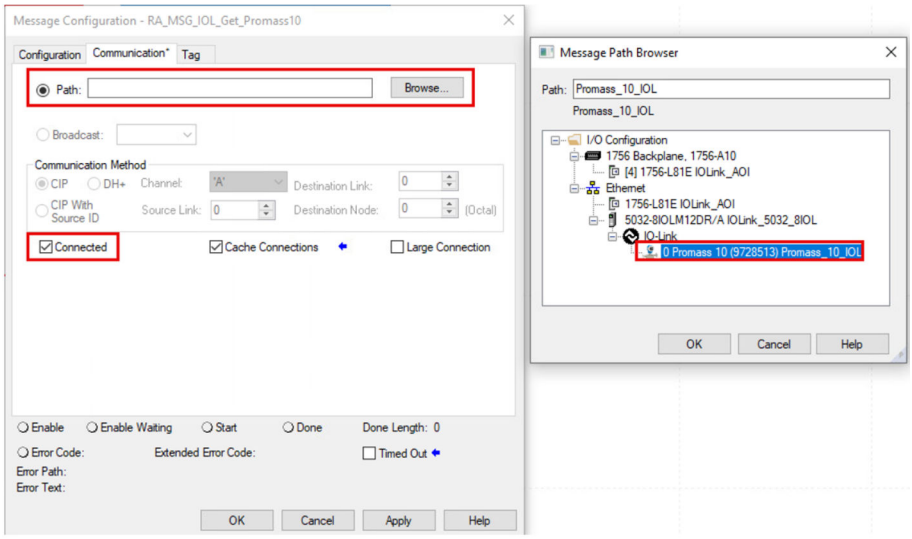
4.5.1 Configuring message for GetDeviceMSG

1. Click on **...** to the right of the **GetDeviceMSG** tag.
   ↳ The **Message Configuration** window is displayed.
2. Select the **Configuration** tab.
3. In the **Service Code** field, enter the value **32**.
4. Use the **Destination Element** field to select the previously created “GetDeviceData” tag with [0] at the end.
5. In the **Source Length** field, select the value **0**.



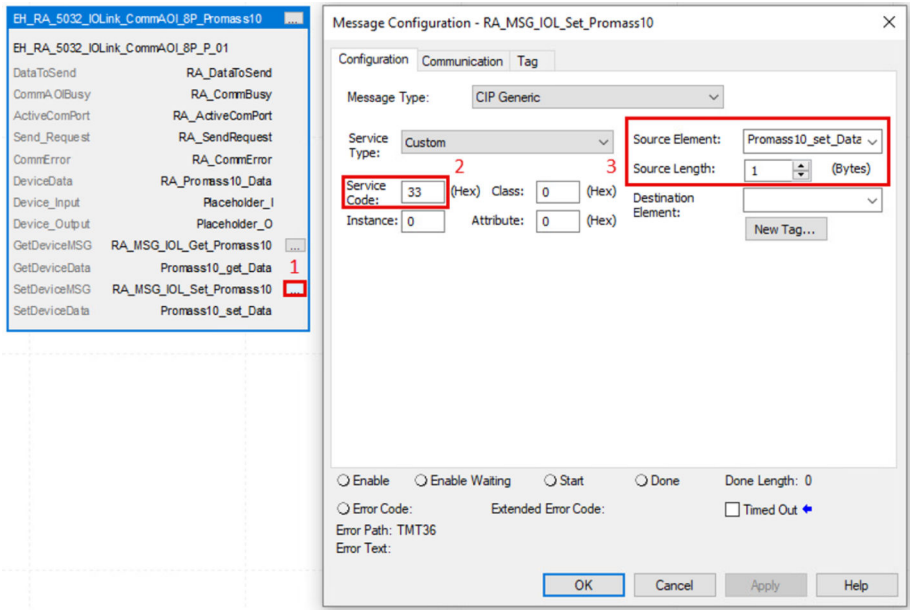
6. Select the **Communication** tab.
7. Use **Browse** to search for and select the IO-Link device.

8. Enable the **Connected** checkbox.
9. Press **OK** to confirm your entry.



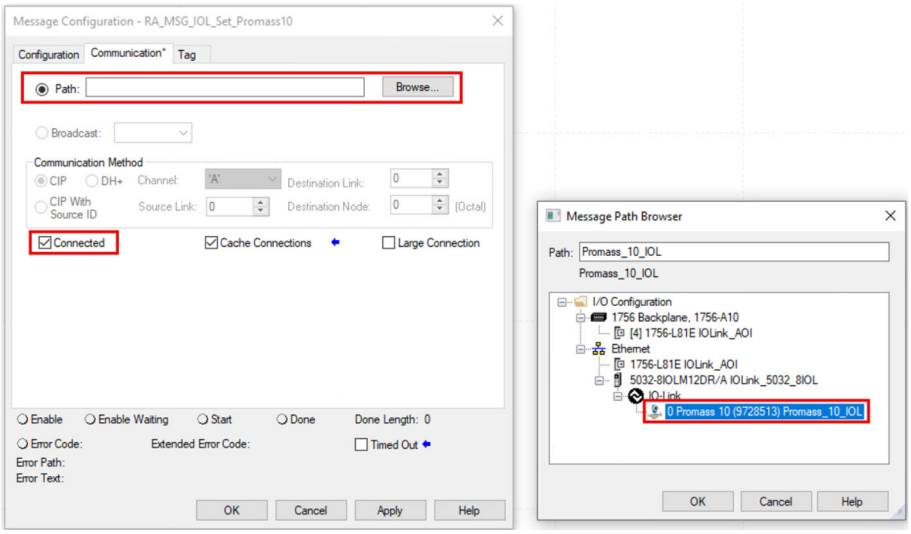
4.5.2 Configuring message for SetDeviceMSG

1. Click on **...** to the right of the **SetDeviceMSG** tag.
   ↳ The **Message Configuration** window is displayed.
2. Select the **Configuration** tab.
3. In the **Service Code** field, enter the value **33**.
4. Use the **Destination Element** field to select the previously generated "SetDeviceData" tag with [0] at the end.
5. In the **Source Length** field, select the value **1**.



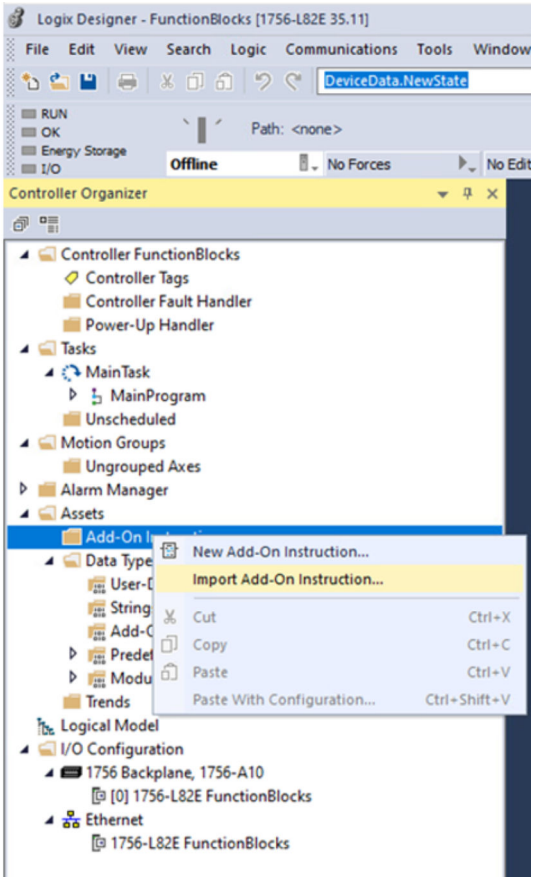
6. Select the **Communication** tab.
7. Use **Browse** to search for and select the IO-Link device.
8. Enable the **Connected** checkbox.

9. Press **OK** to confirm your entry.

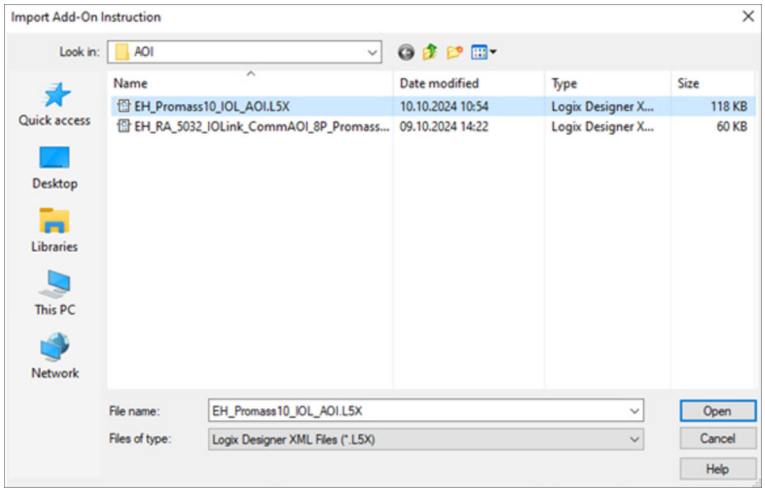


4.6 Importing device AOI into a project

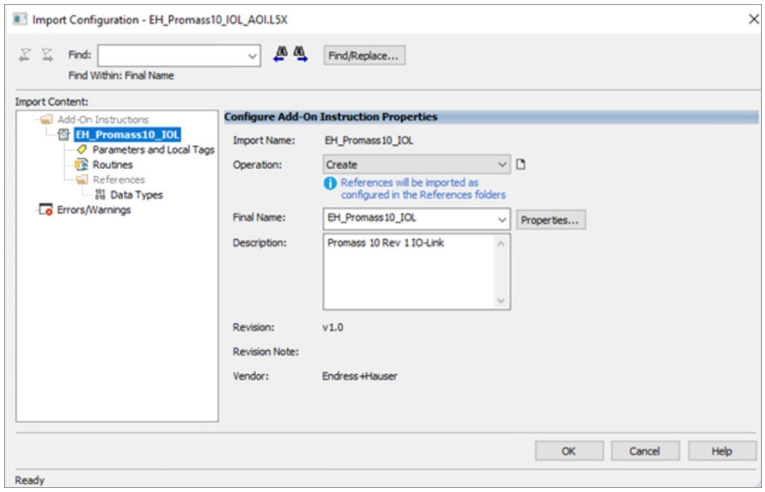
1. In the **Controller Organizer** window, select the **Add-On Instructions** folder.
2. Select the **Import Add-On Instruction ...** function via the context menu.



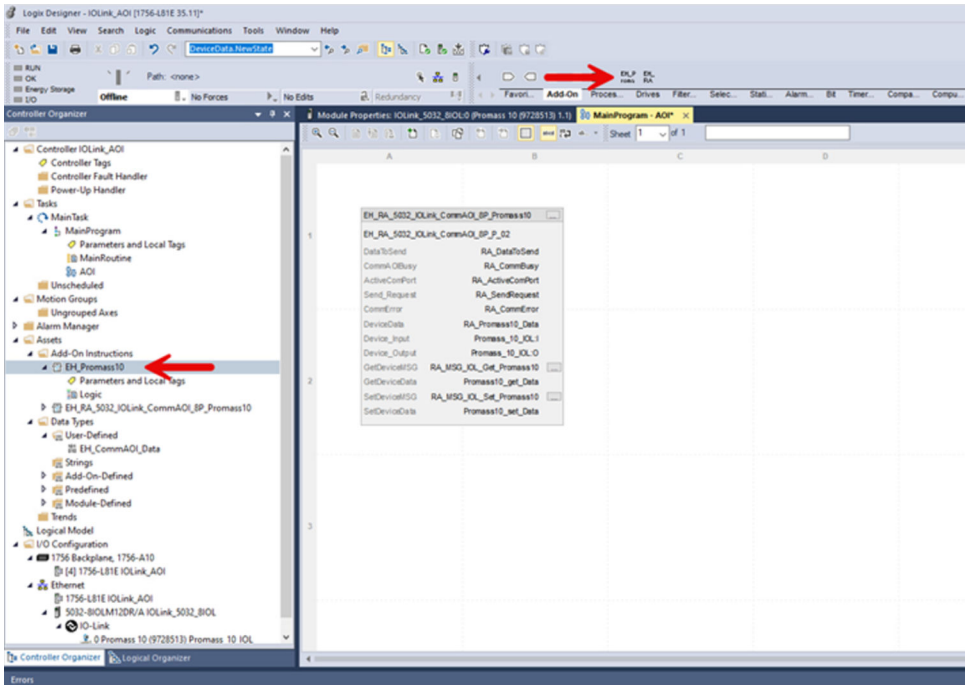
3. Select the device AOI to be imported. In this example, the Promass 10 is used in combination with a 5032-8IOL master.



4. The **Import Configuration** window does **not** require any adjustments.If the device AOI has not yet been imported, the **Create** option is displayed for the **Operation** field.



5. Click **OK**.
   ↳ The device AOI is imported into the project. The device AOI is displayed in the **Controller Organizer** window in the **Add-On Instructions** folder and **Language Elemen** section under Add-On.

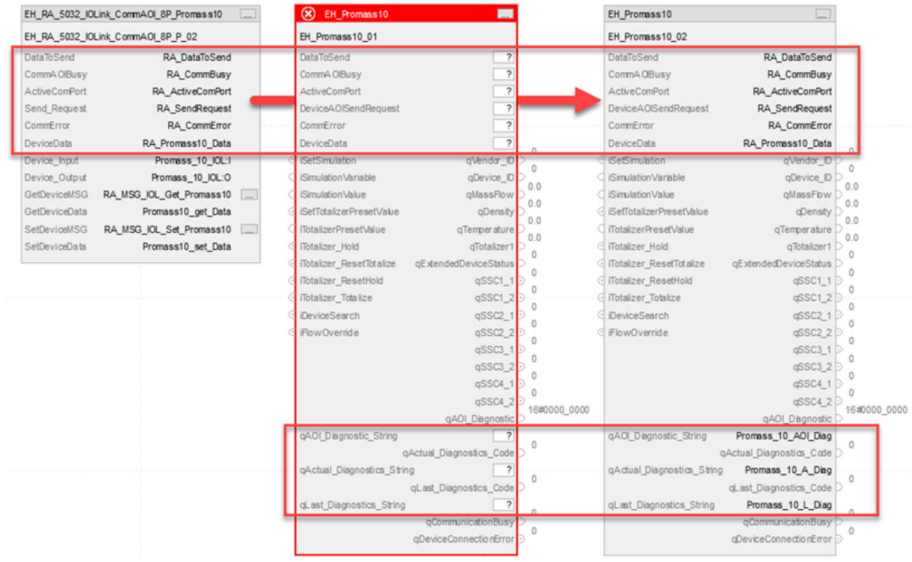


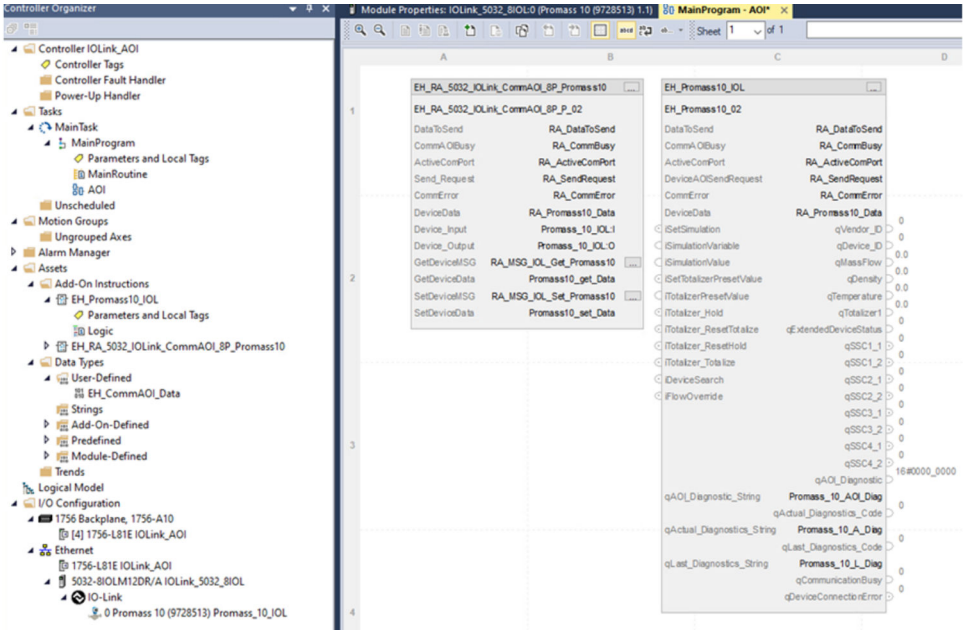
6. Add the device AOI. The device AOI must be added in the same program section of the function block where the Comm AOI is stored. To do this, either click on the **Promass IO-Link** button or drag the device AOI from the **Controller Organizer** window.

4.7 Configuring the device AOI (Rockwell 5032-8IOL)

The first six tags are reused by the communication AOI. The three diagnostic tags must be generated for every device AOI.

1. Generate the three diagnostic tags. These tags are the string data type.
2. Set up all the remaining tags.
   ↳ The color of the device AOI header changes from red to gray. The corresponding IO-Link master and corresponding IO-Link device can communicate.





Description of device AOIs:

- Flow: → 📄 33
- Level: → 📄 45
- Pressure: → 📄 50
- Temperature: → 📄 52

5 System integration with an IFM IO-Link master

5.1 Requirements and procedure

Requirements
Hardware configuration engineered.

1. Download Add-On Instructions library → 10.
2. Integrate IO-Link master into EtherNet/IP network and configure → 24.
3. Import communication AOI into a project → 30.
4. Set up communication AOI → 28
5. Import device AOI into a project → 30.
6. Configure device AOI → 31

Data exchange between the IO-Link devices and control system is via a IO-Link master. The IO-Link master communicates with the control system via EtherNet/IP.

The IO-Link master is integrated into the Rockwell Automation control system as an EtherNet/IP device. The configuration procedure for the IO-Link master depends on the manufacturer.

5.1.1 Communication AOI and device AOI

The device AOI and communication AOI are required for integrating an IO-Link device. The communication AOI always applies only to one IO-Link master and one IO-Link device.

For example, you need the following AOIs to integrate a Promass 10 flowmeter into a system with an "IFM AL1323" IO-Link master:
- Communication AOI: EH_AL1323_8P_CommAOI.L5X oder EH_AL1323_8P_CommAOI_Array.L5x
  Communication AOI for a Promass 10 with an "IFM AL1323" IO-Link master
- Device AOI: EH_ Promass10_IOL_AOI.L5X
  Device AOI for a Promass 10

The library contains the two communication AOIs "EH_AL1323_8P_CommAOI_Array" and "EH_AL1323_8P_CommAOI" for the "IFM AL1323" IO-Link master.

The difference between the two AOIs is the EDS version of the IFM AL1323.
- In the older version “EH_AL1323_8P_CommAOI_Array”, the implicit input data type is defined as “Array of Integer”.
- In the latest version “EH_AL1323_8P_CommAOI”, the implicit input data type is defined as “Integer”.

5.2 Download Add-on Instructions library

1. Open the www.endress.com page.
2. Select the product using the filters and search field.
3. Open the product page.
4. Select the**Downloads** page.
5. Select **Software**.

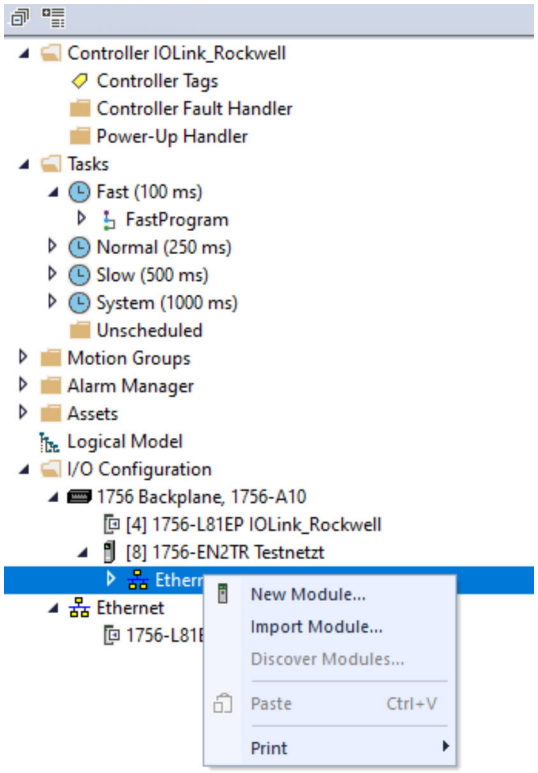
5.3 IFM AL1323 IO-Link master

5.3.1 Integrating IO-Link master into EtherNet/IP network and configuring IO-Link master

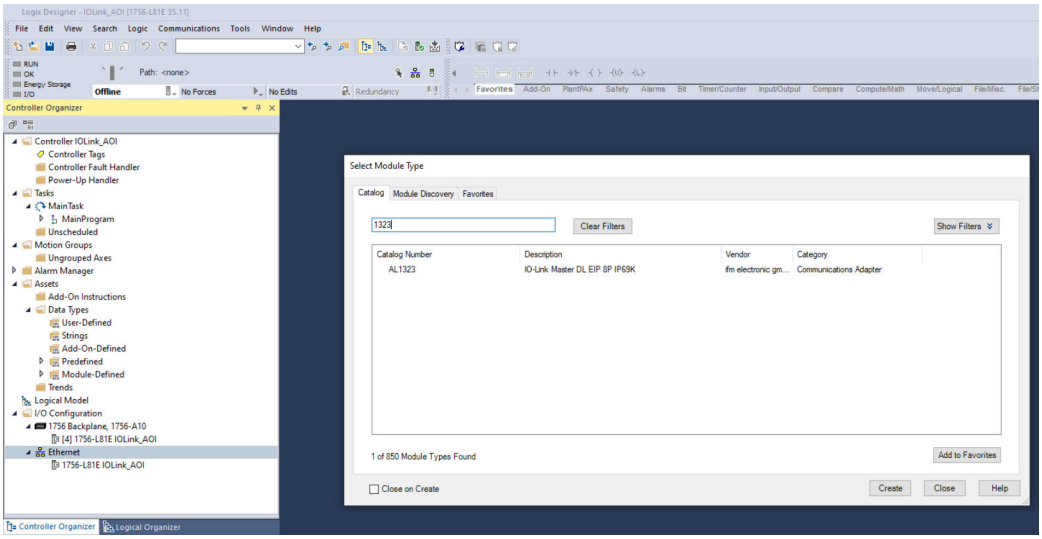
The IO-Link master is integrated into the Rockwell Automation control system as an EtherNet/IP device.

Requirements
The EDS for the IO-Link master is installed.

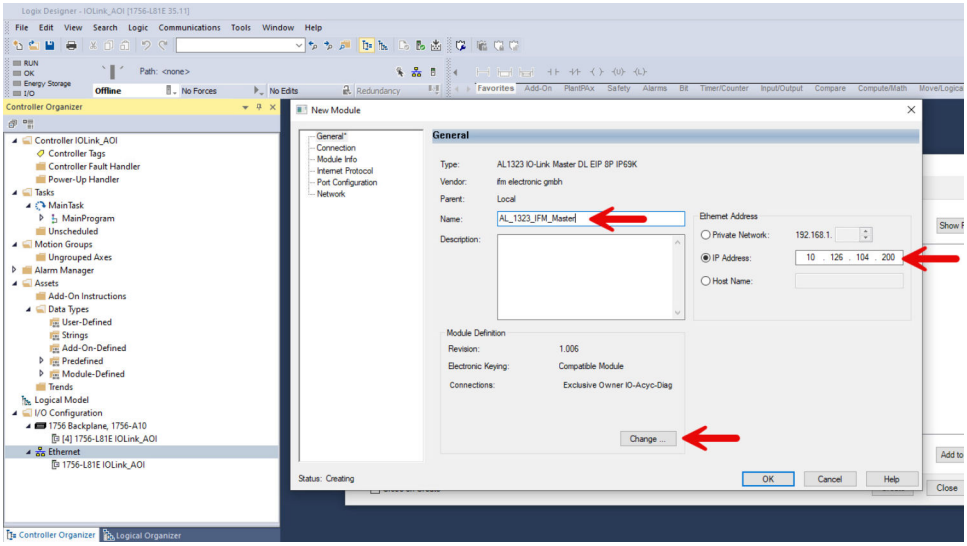
1. Open the project into which the IO-Link master is to be integrated.
2. Select the network card with which the IO-Link master is to be assigned.
3. Select the **New Module** function via the context menu. If you access the controller online via the software, you can also use the **Discover Modules**function.



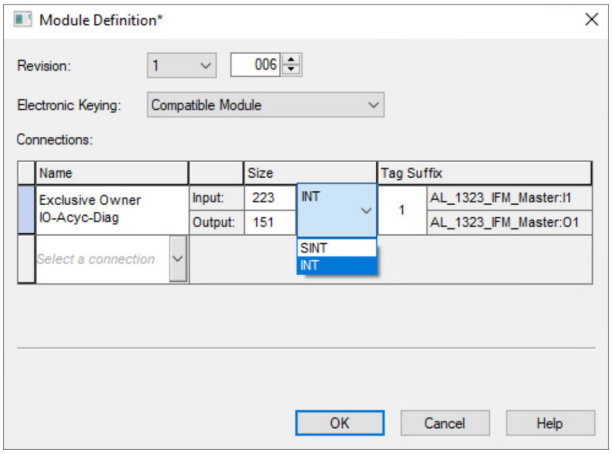
4. Select the IO-Link master via the **Select Module Type** window in the **Catalog** tab. A selection is only displayed if the EDS for the IO-Link master was installed beforehand.



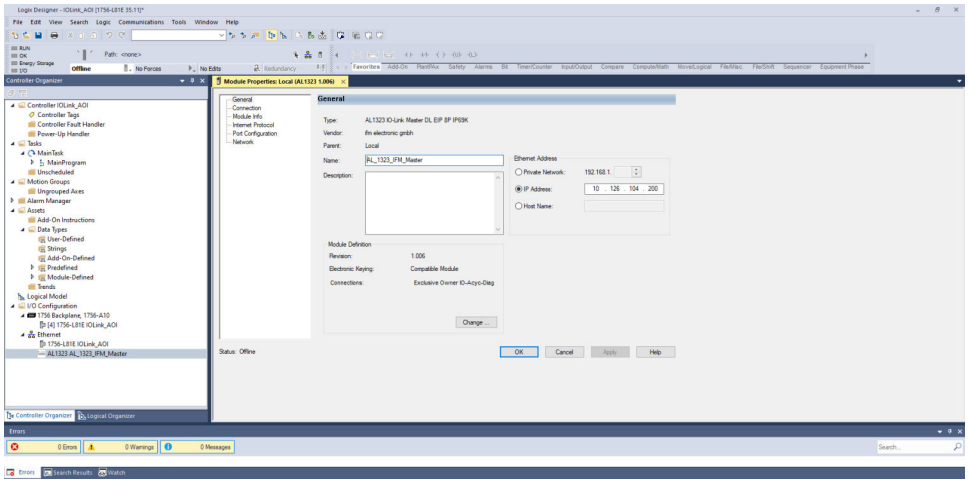
5. Click on **Create**.
   ↳ The **New Module** window is displayed.
6. Configure the **Name** and **IP Address** parameters.



7. In the **Module Definition** section, click on **Change**.
   ↳ The **Module Definition** window is displayed.



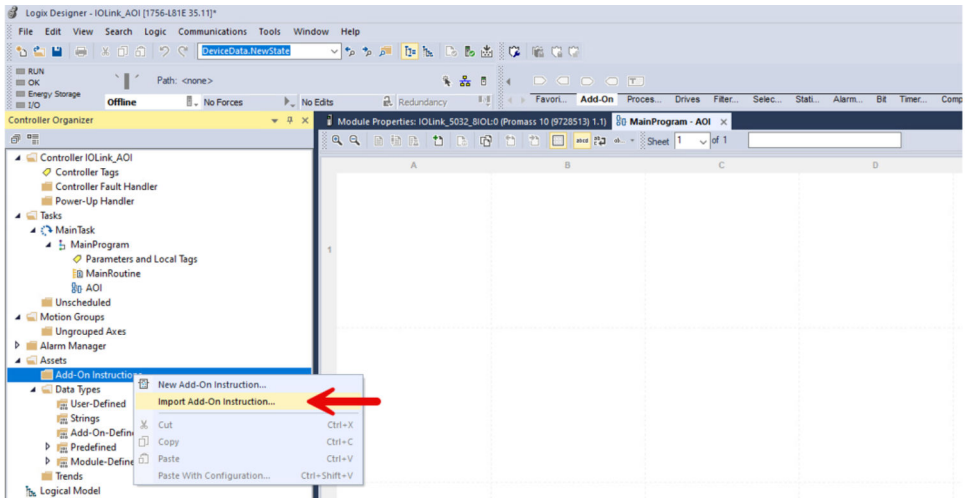
8. Select data type **INT** for **Exclusive Owner IO-Acyc-Diag**.
9. Confirm configuration with **OK**. Close the "New Module" window and, if necessary, "Select Module Type".
   ↳ The IO-Link master is integrated into the project. The IO-Link master is displayed in the **I/O Configuration** window in the **Controller Organizer** folder.



If you double click on the IO-Link master or open the "Properties" function via the context menu, the properties of the IO-Link master are displayed.

5.4 Importing the communication AOI into a project

1. In the **Controller Organizer** window, select the **Add-On Instruction** folder. **Assets** folder > **Add-On Instruction** folder
2. Select the **Import Add-On Instruction ...** function via the context menu.
   ↳ The **Import Add-On Instructions** window is displayed.

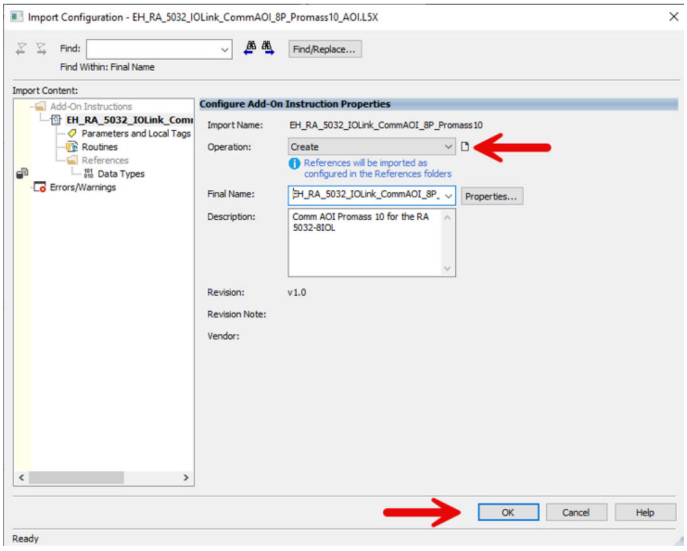


3. Select the communication AOI for the IFM IO-Link master and the IO-Link device.

The library contains the two communication AOIs "EH_AL1323_8P_CommAOI_Array" and "EH_AL1323_8P_CommAOI" for the "IFM AL1323" IO-Link master.

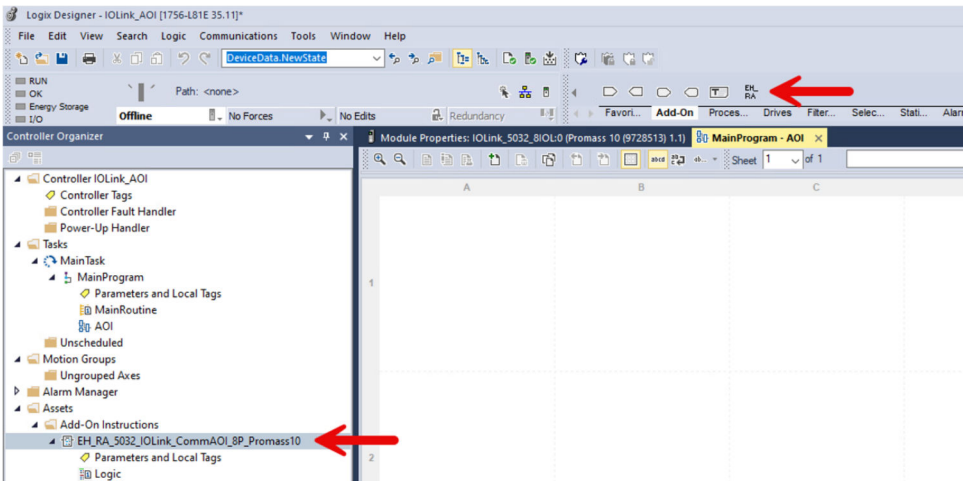
The difference between the two AOIs is the EDS version of the IFM AL1323.
- In the older version “EH_AL1323_8P_CommAOI_Array”, the implicit input data type is defined as “Array of Integer”.
- In the latest version “EH_AL1323_8P_CommAOI”, the implicit input data type is defined as “Integer”.

4. Click **Open**.
   ↳ The **Import Configuration** window is displayed.



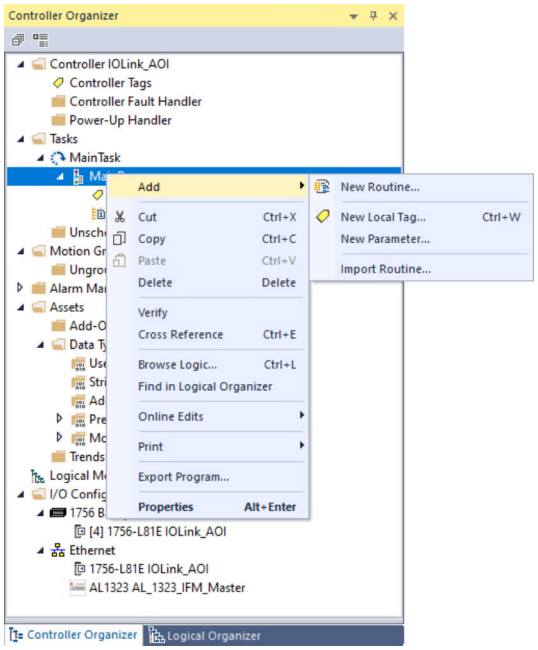
5. If the communication AOI has not yet been imported, the **Create** option is displayed for the **Operation** field. If the communication AOI has already been imported or the name is already assigned, a warning is displayed. The **Import Configuration** window does **not** require any adjustments.

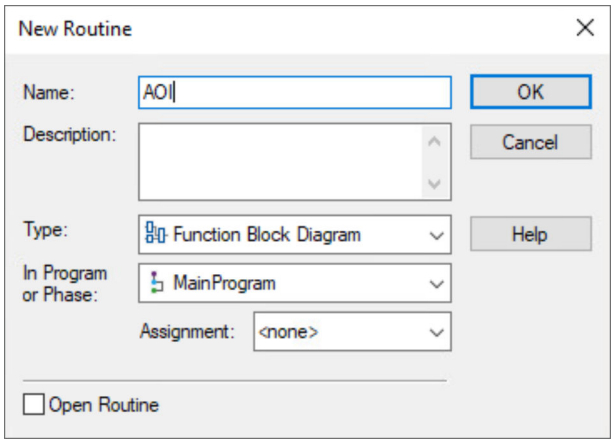
6. Click **OK**.
   ↳ The communication AOI is imported into the project and is available for the routine. The AOI is displayed in the **Controller Organizer** window in the **Add-On Instructions** folder and **Language Element** section under Add-On.



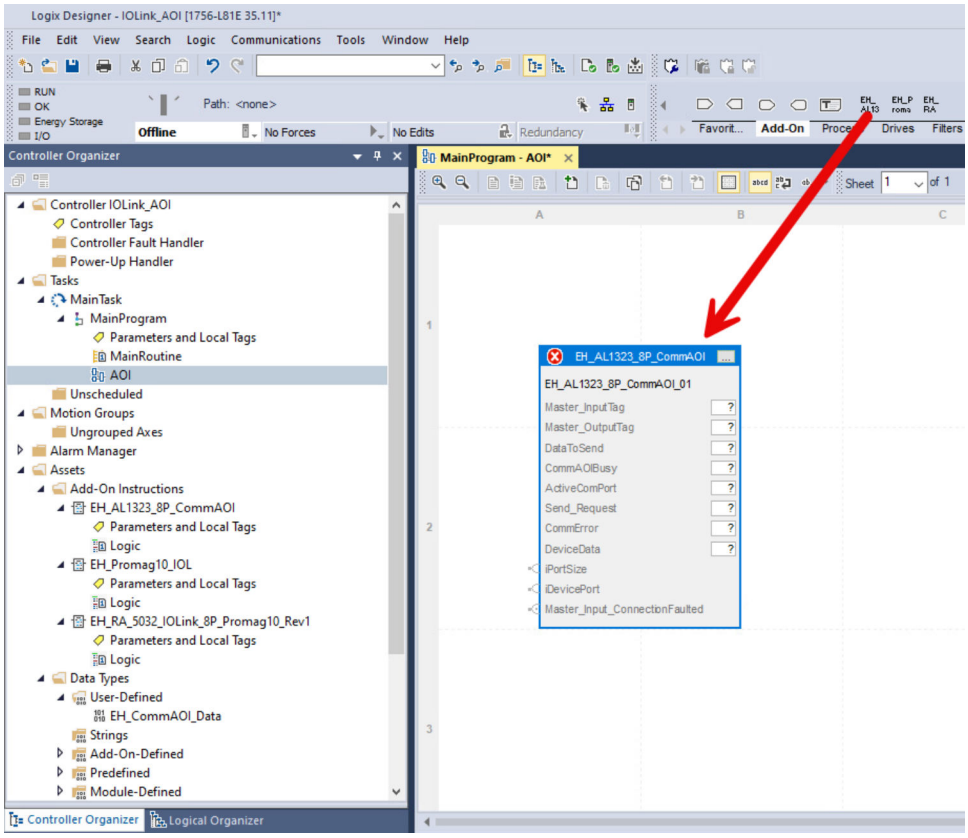
5.5 Setting up the communication AOI

1. Select the **MainProgram** task in the **Controller Organizer** window in the **Tasks** folder.
2. Select the **Add > New Routine** function via the context menu.
   ↳ The **New Routine** window is displayed.



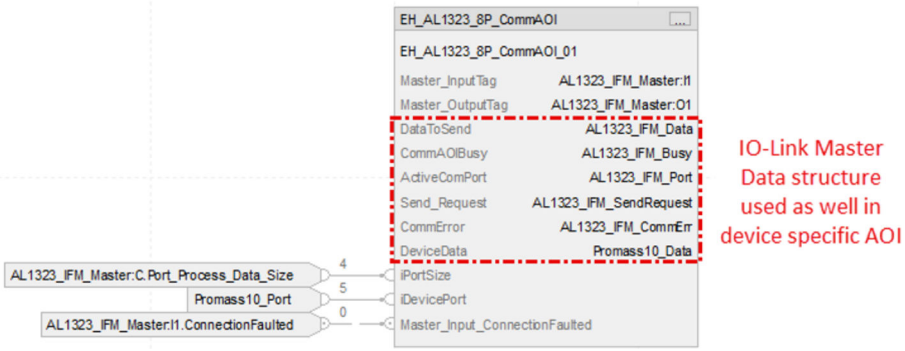


3. Assign a name.
4. For **Type** select the option **Function Block Diagram**.
5. Press **OK** to confirm your entry.
6. Add the communication AOI. To do this, click on the required AOI in the **Language Element** section.
   ↳ The communication AOI is inserted on the sheet (Sheet).



To set up the communication AOI, you create and link tags. The "DataToSend", "CommAOIBusy", "ActiveComPort", "Send_Request" and "CommError" tags of the communication AOI make up the "IO-Link master data structure". You only need to create these tags once for each IO-Link master within a project. You can then use these tags for all IO-Link devices connected to the same IO-Link master. The remaining tags are device specific. You must generate and link these tags for every IO-Link device.

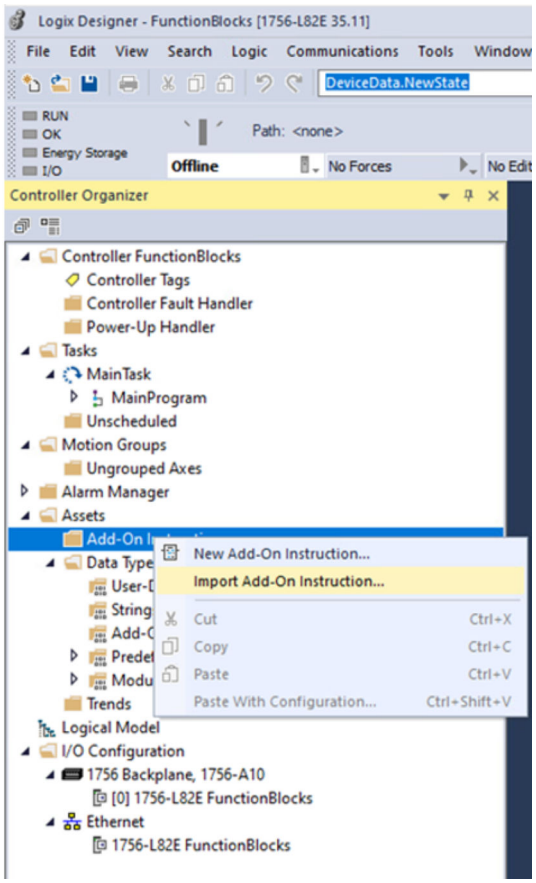
You are not required to follow any naming conventions for the tags.



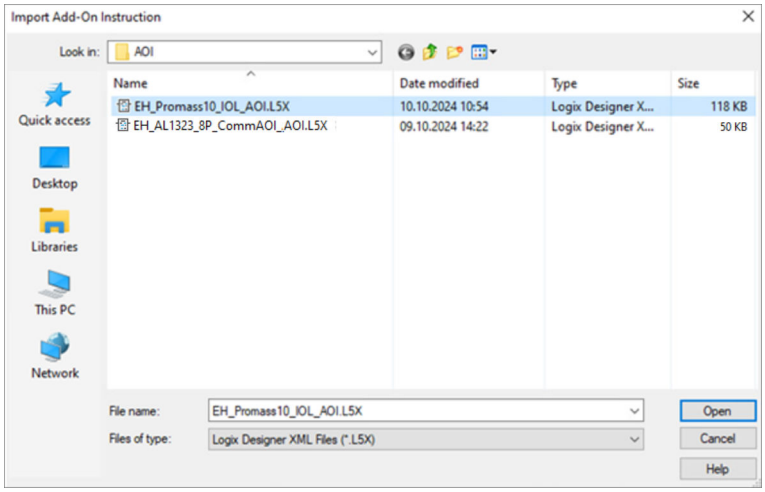
7. Create the "DataToSend", "CommAOIBusy", "ActiveComPort", "Send_Request" and "CommError" tags. You can use these tags for all IO-Link devices that are connected to this IO-Link master.
8. Create the "DeviceData" tag.
9. Create the inputs of the communication AOI “Data Size”, “Device Port Number” and “Connection Fault” [bit].

5.6 Importing device AOI into a project

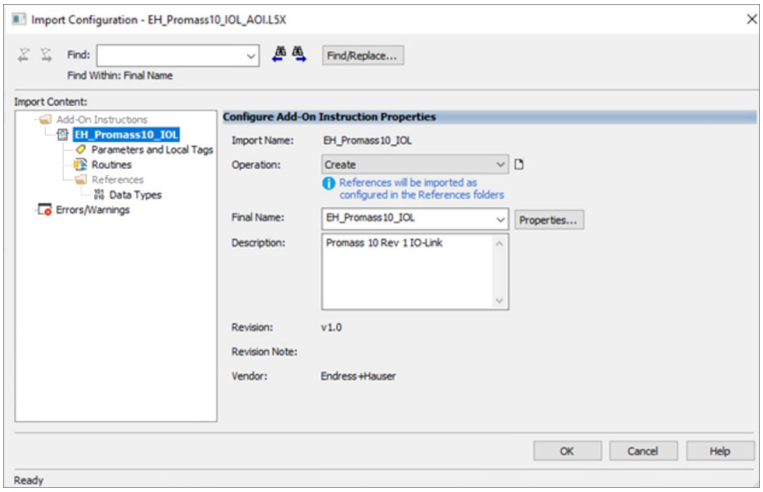
1. In the **Controller Organizer** window, select the **Add-On Instructions** folder.
2. Select the **Import Add-On Instruction ...** function via the context menu.



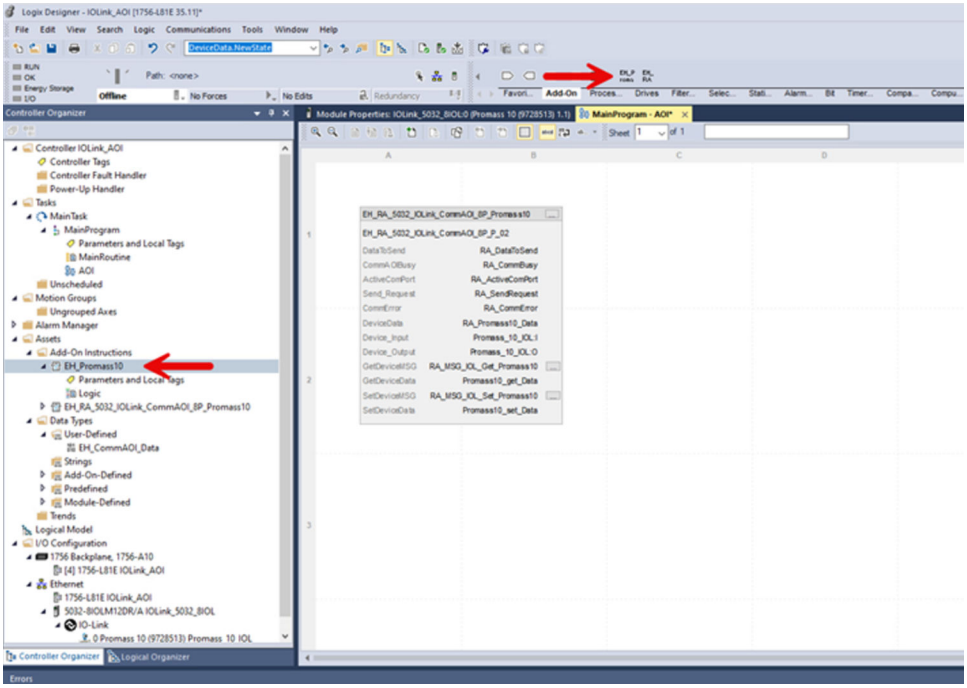
3. Select the device AOI to be imported. In this example, the Promass 10 is used in combination with an AL1323_8P master.



4. The **Import Configuration** window does **not** require any adjustments. If the device AOI has not yet been imported, the **Create** option is displayed for the **Operation** field.



5. Click **OK**.
   ↳ The device AOI is imported into the project. The device AOI is displayed in the **Controller Organizer** window in the **Add-On Instructions** folder and **Language Elemen** section under Add-On.



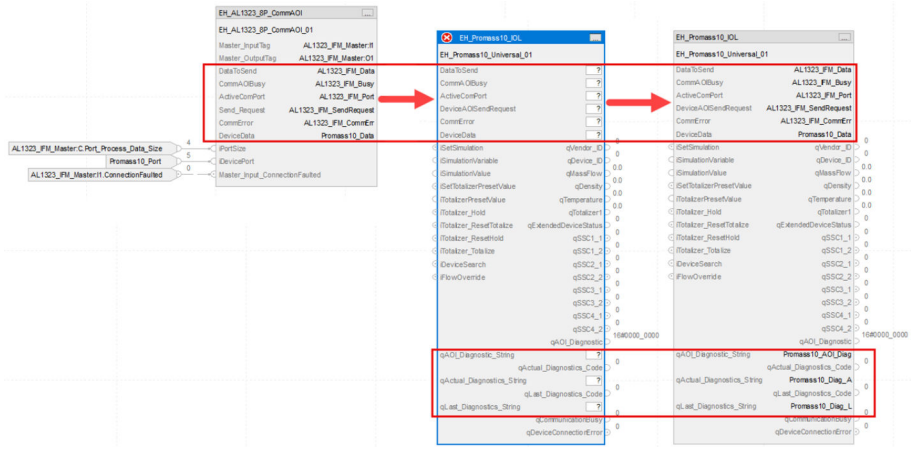
6. Add the device AOI. The device AOI must be added in the same program section of the function block where the Comm AOI is stored. To do this, either click on the **Promass IO-Link** button or drag the device AOI from the **Controller Organizer** window.

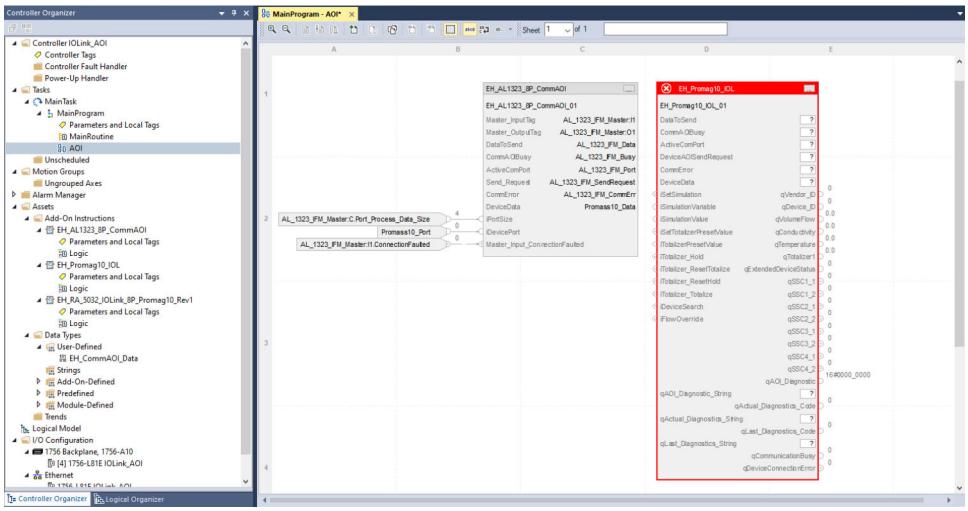
5.7 Configuring device AOI (IFM AL1323)

The first six tags are reused by the communication AOI. The three diagnostic tags must be generated for every device AOI.

1. Generate the three diagnostic tags. These tags are the string data type.

2. Set up all the remaining tags.
   ↳ The color of the device AOI header changes from red to gray. The corresponding IO-Link master and corresponding IO-Link device can communicate.





Description of device AOIs:
- Flow: → 📄 33
- Level: → 📄 45
- Pressure: → 📄 50
- Temperature: → 📄 52

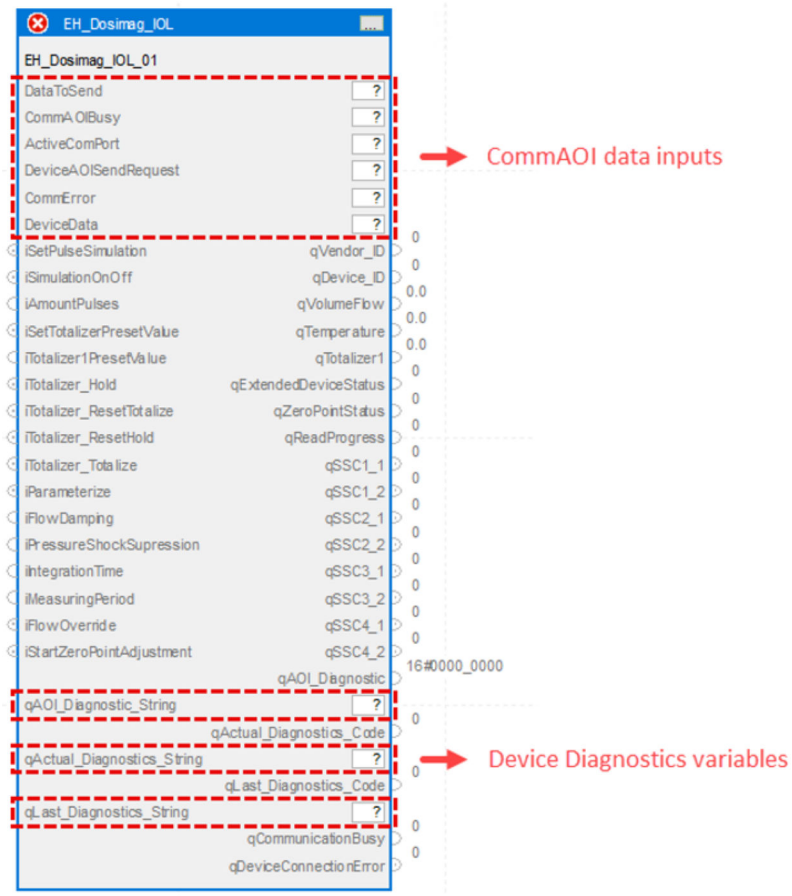
6 Description of "Flow" Add-On Instructions

6.1 Dosimag

Device AOI designation
EH_Dosimag_IOL

Overview of functions
- Providing the current values for the main measured variables: volume flow, temperature and totalizer
- Providing the status of switching signals
- Providing the extended diagnostic status
- Starting the zero adjustment
- Control of pulses
- Control of the totalizer

For detailed information on the device, see the product documentation → 5.



1 *EH_Dosimag_IOL device AOI*

The tags of the communication AOI are reused for the "CommAOI data inputs". The three "Device Diagnostics variables" must be generated for every device AOI.

EH_Dosimag_IOL parameters

Name	P Type	Data Type	Comment
DataToSend	IN	Int[10]	IO-Link master acyclic sending frame
ComAOIBusy	IN	DInt	IO-Link master communication busy state

Name	P Type	Data Type	Comment
ActiveComPort	IN	DInt	Active IO-Link master communication port
DeviceAOISendRequest	IN	DInt	Device request for sending data to IO-Link master
CommError	IN	Int	IO-Link master communication error
DeviceData	IN	EH_ CommAOI _Data	Internal device data model
iSetPulseSimulation	IN	Bool	Trigger to start pulse simulation
iPulseSimulationOnOff	IN	Bool	▪ TRUE: Pulse simulation ON ▪ FALSE: Pulse simulation OFF
iAmountPulses	IN	Int	Amount of pulses to be executed
iSetTotalizerPresetValue	IN	Bool	Trigger to set totalizer preset value
iTotalizer1PresetValue	IN	Real	Start value for the totalizer. The totalizer starts totalizing with this value.
iTotalizer_Hold	IN	Bool	Totalizer hold
iTotalizer_ResetTotalize	IN	Bool	Reset totalizer and totalize
iTotalizer_ResetHold	IN	Bool	Reset totalizer and hold
iTotalizer_Totalize	IN	Bool	Totalizer totalize
iParameterize	IN	Bool	Trigger to start parameterization
iFlowDamping	IN	Real	Flow damping value
iPressureShockSupression	IN	Real	Pressure shock suppression value
iIntegrationTime	IN	Real	Integration time value
iMeasuringPeriod	IN	Real	Measuring period value
iFlowOverride	IN	Bool	Flow override
iStartZeroPointAdjustment	IN	Bool	Trigger to start zero point adjustment
qVendor_ID	OUT	DInt	Vendor ID
qDevice_ID	OUT	DInt	Device ID
qVolumeFlow	OUT	Real	Process value volume flow
qTemperature	OUT	Real	Process value temperature
qTotalizer1	OUT	Real	Process value totalizer
qExtendedDeviceStatus	OUT	USInt	▪ 0: Not specified ▪ 36: Failure ▪ 37: Failure - simulation ▪ 60: Functional check ▪ 61: Functional check - simulation ▪ 120: Out of specification ▪ 121: Out of specification - simulation ▪ 128: Good ▪ 129: Good - simulation ▪ 164: Maintenance required ▪ 165: Maintenance required - simulation
qZeroPointStatus	OUT	SInt	Status of the zero point adjustment ▪ 2: Failed ▪ 5: Done ▪ 8: Busy
qReadProgress	OUT	SInt	Progress of the zero point adjustment 0 to 100 %
qSSC1_1	OUT	Bool	Status switching signal 1.1
qSSC1_2	OUT	Bool	Status switching signal 1.2
qSSC2_1	OUT	Bool	Status switching signal 2.1

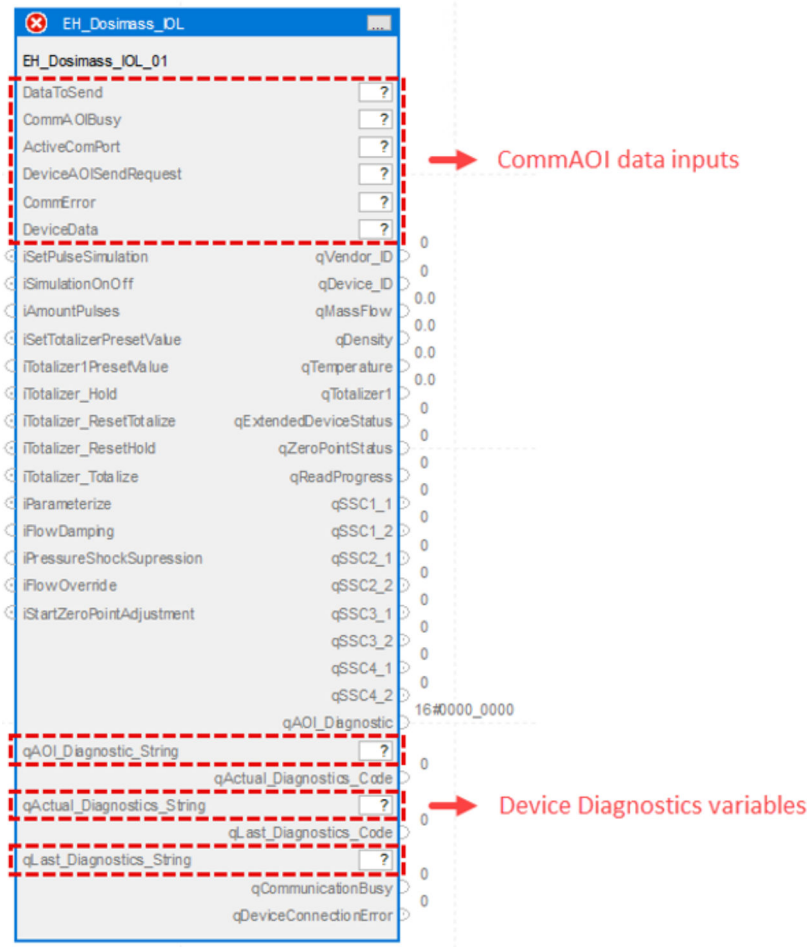
Name	P Type	Data Type	Comment
qSSC2_2	OUT	Bool	Status switching signal 2.2
qSSC3_1	OUT	Bool	Status switching signal 3.1
qSSC3_2	OUT	Bool	Status switching signal 3.2
qSSC4_1	OUT	Bool	Status switching signal 4.1
qSSC4_2	OUT	Bool	Status switching signal 4.2
qAOI_Diagnostic	OUT	DInt	Diagnostic for device AOI state machine steps ▪ 1: qAOI_Diagnostic.1: Device port is zero ▪ 0: qAOI_Diagnostic.1: No error ▪ 1: qAOI_Diagnostic.2: Wrong device ID ▪ 0: qAOI_Diagnostic.2: No error ▪ 1: qAOI_Diagnostic.8: Error Step ▪ 0: qAOI_Diagnostic.8: No error ▪ 1: qAOI_Diagnostic.8+n: Error Step n ▪ 0: qAOI_Diagnostic.8+n: No error
qAOI_Diagnostic_String	OUT	String	Diagnostic for device AOI state machine steps
qActual_Diagnostics_Code	OUT	DInt	Current diagnostic code See product documentation
qActual_Diagnostics_String	OUT	String	Current diagnostic text See product documentation
qLast_Diagnostics_Code	OUT	DInt	Previous diagnostic code See product documentation
qLast_Diagnostics_String	OUT	String	Previous diagnostic text See product documentation
qCommunicationBusy	OUT	DInt	IO-Link master communication busy state
qDeviceConnectionError	OUT	Bool	▪ TRUE: Device disconnected ▪ FALSE: Device connected

6.2 Dosimass

Device AOI designation
EH_Dosimass_IOL

Overview of functions
- Providing the current values for the main measured variables: mass flow, density, temperature and totalizer
- Providing the status of switching signals
- Providing the extended diagnostic status
- Starting the zero adjustment
- Control of pulses
- Control of the totalizer

For detailed information on the device, see the product documentation → 5.



2 *EH_Dosimass_IOL device AOI*

The tags of the communication AOI are reused for the "CommAOI data inputs". The three "Device Diagnostics variables" must be generated for every device AOI.

EH_Dosimass_IOL parameters

Name	P Type	Data Type	Comment
DataToSend	IN	Int[10]	IO-Link master acyclic sending frame
ComAOIBusy	IN	DInt	IO-Link master communication busy state
ActiveComPort	IN	DInt	Active IO-Link master communication port

Name	P Type	Data Type	Comment
DeviceAOISendRequest	IN	DInt	Device request for sending data to IO-Link master
CommError	IN	Int	IO-Link master communication error
DeviceData	IN	EH_ CommAOI _Data	Internal device data model
iSetPulseSimulation	IN	Bool	Trigger to start pulse simulation
iPulseSimulationOnOff	IN	Bool	▪ TRUE: Pulse simulation ON ▪ FALSE: Pulse simulation OFF
iAmountPulses	IN	Int	Amount of pulses to be executed
iSetTotalizerPresetValue	IN	Bool	Trigger to set totalizer preset value
iTotalizer1PresetValue	IN	Real	Start value for the totalizer. The totalizer starts totalizi
iTotalizer_Hold	IN	Bool	Totalizer hold
iTotalizer_ResetTotalize	IN	Bool	Reset totalizer and totalize
iTotalizer_ResetHold	IN	Bool	Reset totalizer and hold
iTotalizer_Totalize	IN	Bool	Totalizer totalize
iParameterize	IN	Bool	Trigger to start parameterization
iFlowDamping	IN	Real	Flow damping value
iPressureShockSupression	IN	Real	Pressure shock suppression value
iStartZeroPointAdjustment	IN	Bool	Trigger to start zero point adjustment
qVendor_ID	OUT	DInt	Vendor ID
qDevice_ID	OUT	DInt	Device ID
qMassFlow	OUT	Real	Process value mass flow
qDensity	OUT	Real	Process value density
qTemperature	OUT	Real	Process value temperature
qTotalizer1	OUT	Real	Process value totalizer
qExtendedDeviceStatus	OUT	USInt	▪ 0: Not specified ▪ 36: Failure ▪ 37: Failure - simulation ▪ 60: Functional check ▪ 61: Functional check - simulation ▪ 120: Out of specification ▪ 121: Out of specification - simulation ▪ 128: Good ▪ 129: Good - simulation ▪ 164: Maintenance required ▪ 165: Maintenance required - simulation
qZeroPointStatus	OUT	Int	Status of the zero point adjustment ▪ 2: Failed ▪ 5: Done ▪ 8: Busy
qReadProgress	OUT	SInt	Progress of the zero point adjustment 0 to 100 %
qSSC1_1	OUT	Bool	Status switching signal 1.1
qSSC1_2	OUT	Bool	Status switching signal 1.2
qSSC2_1	OUT	Bool	Status switching signal 2.1
qSSC2_2	OUT	Bool	Status switching signal 2.2
qSSC3_1	OUT	Bool	Status switching signal 3.1
qSSC3_2	OUT	Bool	Status switching signal 3.2

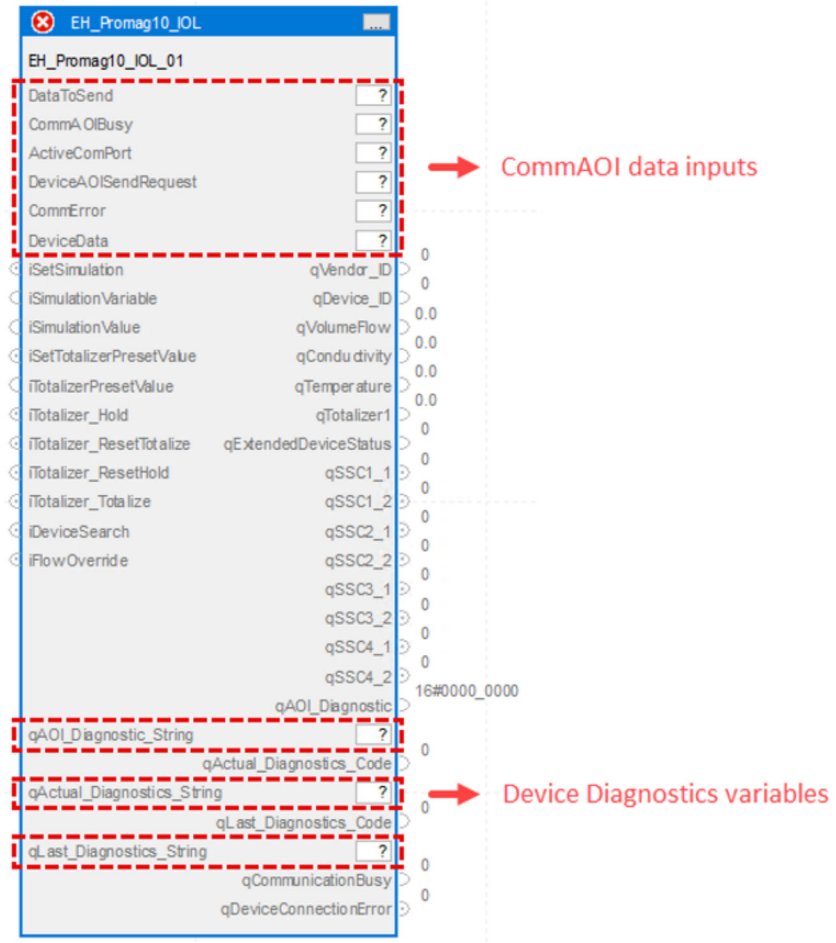
Name	P Type	Data Type	Comment
qSSC4_1	OUT	Bool	Status switching signal 4.1
qSSC4_2	OUT	Bool	Status switching signal 4.2
qAOI_Diagnostic	OUT	DInt	Diagnostic for device AOI state machine steps ▪ 1: qAOI_Diagnostic.1: Device port is zero ▪ 0: qAOI_Diagnostic.1: No error ▪ 1: qAOI_Diagnostic.2: Wrong device ID ▪ 0: qAOI_Diagnostic.2: No error ▪ 1: qAOI_Diagnostic.8: Error Step ▪ 0: qAOI_Diagnostic.8: No error ▪ 1: qAOI_Diagnostic.8+n: Error Step n ▪ 0: qAOI_Diagnostic.8+n: No error
qAOI_Diagnostic_String	OUT	String	Diagnostic for device AOI state machine steps
qActual_Diagnostics_Code	OUT	DInt	Current diagnostic code See product documentation
qActual_Diagnostics_String	OUT	String	Current diagnostic text See product documentation
qLast_Diagnostics_Code	OUT	DInt	Previous diagnostic code See product documentation
qLast_Diagnostics_String	OUT	String	Previous diagnostic text See product documentation
qCommunicationBusy	OUT	DInt	IO-Link master communication busy state
qDeviceConnectionError	OUT	Bool	▪ TRUE: Device disconnected ▪ FALSE: Device connected

6.3 Promag 10

Device AOI designation
EH_Promag10_IOL

Overview of functions
- Providing the current values for the main measured variables: volume flow, conductivity, temperature and totalizer
- Providing the status of switching signals
- Providing the extended diagnostic status
- Simulating the main measured variables and other measured variables
- Control of the totalizer
- Additional functions such as device search and positive zero return

For detailed information on the device, see the product documentation → 5.



3 *EH_Promag10_IOL device AOI*

The tags of the communication AOI are reused for the "CommAOI data inputs". The three "Device Diagnostics variables" must be generated for every device AOI.

EH_Promag10_IOL parameters

Name	P Type	Data Type	Comment
DataToSend	IN	Int[10]	IO-Link master acyclic sending frame
ComAOIBusy	IN	DInt	IO-Link master communication busy state
ActiveComPort	IN	DInt	Active IO-Link master communication port

Name	P Type	Data Type	Comment
DeviceAOISendRequest	IN	DInt	Device request for sending data to IO-Link master
CommError	IN	Int	IO-Link master communication error
DeviceData	IN	EH_ CommAOI _Data	Internal device data model
iSetSimulation	IN	Bool	Signal to set device into simulation mode ▪ TRUE: Simulation ON ▪ FALSE: Simulation OFF
iSimulationVariable	IN	Int	Variable for simulation mode ▪ 0: Off ▪ 1: Volume flow ▪ 4: Conductivity ▪ 7: Temperature ▪ 11: Mass flow ▪ 13: Corrected conductivity
iSimulationValue	IN	Int	Value to be simulated
iSetTotalizerPresetValue	IN	Bool	Trigger to set totalizer preset value
iTotalizerPresetValue	IN	Real	Start value for the totalizer. The totalizer starts totalizing with this value.
iTotalizer_Hold	IN	Bool	Totalizer hold
iTotalizer_ResetTotalize	IN	Bool	Reset totalizer and totalize
iTotalizer_ResetHold	IN	Bool	Reset totalizer and hold
iTotalizer_Totalize	IN	Bool	Totalizer totalize
iDeviceSearch	IN	Bool	Device search. Display is flashing. Activate the device search to locate the device in the application. When the function is activated, the device emits visual signals e.g. a flashing LED or local display.
iFlowOverride	IN	Bool	Flow override
qVendor_ID	OUT	DInt	Vendor ID
qDevice_ID	OUT	DInt	Device ID
qVolumeFlow	OUT	Real	Process value volume flow
qConductivity	OUT	Real	Process value conductivity
qTemperature	OUT	Real	Process value temperature
qTotalizer1	OUT	Real	Process value totalizer
qExtendedDeviceStatus	OUT	USInt	▪ 0: Not specified ▪ 36: Failure ▪ 37: Failure - simulation ▪ 60: Functional check ▪ 61: Functional check - simulation ▪ 120: Out of specification ▪ 121: Out of specification - simulation ▪ 128: Good ▪ 129: Good - simulation ▪ 164: Maintenance required ▪ 165: Maintenance required - simulation
qSSC1_1	OUT	Bool	Status switching signal 1.1
qSSC1_2	OUT	Bool	Status switching signal 1.2
qSSC2_1	OUT	Bool	Status switching signal 2.1
qSSC2_2	OUT	Bool	Status switching signal 2.2
qSSC3_1	OUT	Bool	Status switching signal 3.1
qSSC3_2	OUT	Bool	Status switching signal 3.2

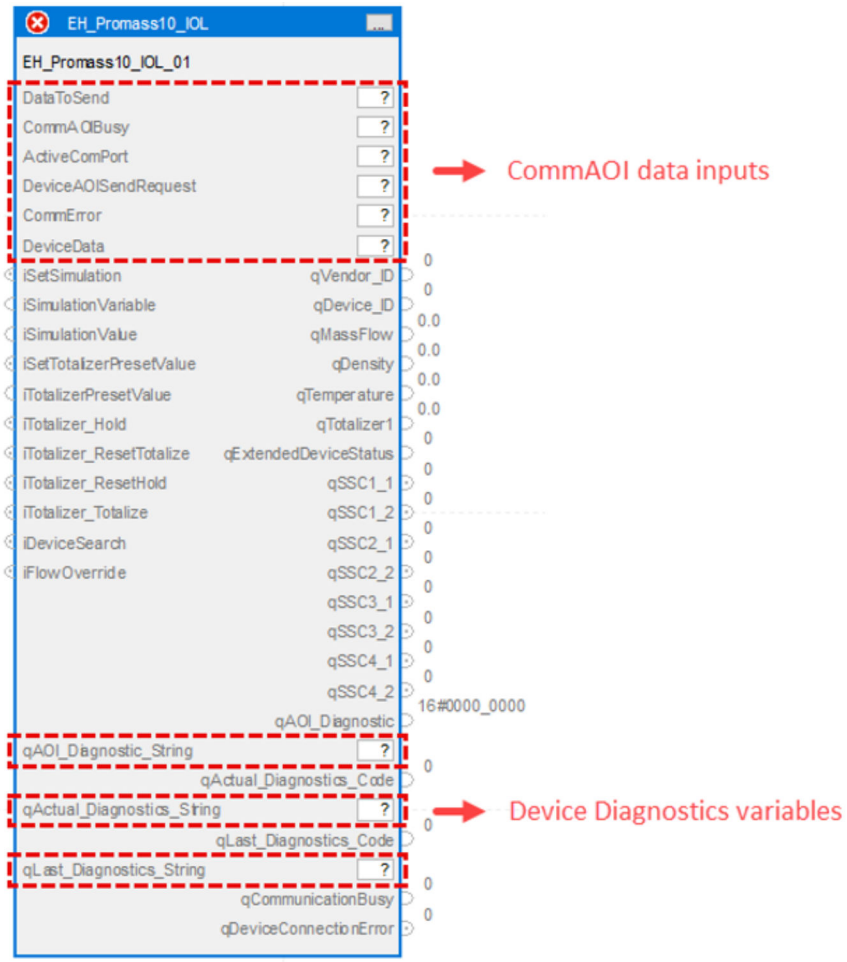
Name	P Type	Data Type	Comment
qSSC4_1	OUT	Bool	Status switching signal 4.1
qSSC4_2	OUT	Bool	Status switching signal 4.2
qAOI_Diagnostic	OUT	DInt	Diagnostic for device AOI state machine steps ▪ 1: qAOI_Diagnostic.1: Device port is zero ▪ 0: qAOI_Diagnostic.1: No error ▪ 1: qAOI_Diagnostic.2: Wrong device ID ▪ 0: qAOI_Diagnostic.2: No error ▪ 1: qAOI_Diagnostic.8: Error Step ▪ 0: qAOI_Diagnostic.8: No error ▪ 1: qAOI_Diagnostic.8+n: Error Step n ▪ 0: qAOI_Diagnostic.8+n: No error
qAOI_Diagnostic_String	OUT	String	Diagnostic for device AOI state machine steps
qActual_Diagnostics_Code	OUT	DInt	Current diagnostic code See product documentation
qActual_Diagnostics_String	OUT	String	Current diagnostic text See product documentation
qLast_Diagnosticcs_Code	OUT	DInt	Previous diagnostic code See product documentation
qLast_Diagnostics_String	OUT	String	Previous diagnostic text See product documentation
qCommunicationBusy	OUT	DInt	IO-Link master communication busy state
qDeviceConnectionError	OUT	Bool	▪ TRUE: Device disconnected ▪ FALSE: Device connected

6.4 Promass 10

Device AOI designation
EH_Promass10_IOL

Overview of functions
- Providing the current values for the main measured variables: mass flow, density, temperature and totalizer
- Providing the status of switching signals
- Providing the extended diagnostic status
- Simulating the main measured variables and other measured variables
- Control of the totalizer
- Additional functions such as device search and positive zero return

For detailed information on the device, see the product documentation → 5.



4 *EH_Promass10_IOL device AOI*

The tags of the communication AOI are reused for the "CommAOI data inputs". The three "Device Diagnostics variables" must be generated for every device AOI.

EH_Promass10_IOL parameters

Name	Usagepe	Data Type	Comment
DataToSend	IN	Int[10]	IO-Link master acyclic sending frame
ComAOIBusy	IN	DInt	IO-Link master communication busy state
ActiveComPort	IN	DInt	Active IO-Link master communication port

Name	Usagepe	Data Type	Comment
DeviceAOISendRequest	IN	DInt	Device request for sending data to IO-Link master
CommError	IN	Int	IO-Link master communication error
DeviceData	IN	EH_ CommAOI _Data	Internal device data model
iSetSimulation	IN	Bool	Signal to set device into simulation mode ▪ TRUE: Simulation ON ▪ FALSE: Simulation OFF
iSimulationVariable	IN	Int	Variable for simulation mode ▪ 0: Off ▪ 1: Mass flow ▪ 2: Volume flow ▪ 3: Corrected volume flow ▪ 4: Density ▪ 7: Temperature
iSimulationValue	IN	Real	Value to be simulated
iSetTotalizerPresetValue	IN	Bool	Trigger to set totalizer preset value
iTotalizerPresetValue	IN	Real	Start value for the totalizer. The totalizer starts totalizing with this value.
iTotalizer_Hold	IN	Bool	Totalizer hold
iTotalizer_ResetTotalize	IN	Bool	Reset totalizer and totalize
iTotalizer_ResetHold	IN	Bool	Reset totalizer and hold
iTotalizer_Totalize	IN	Bool	Totalizer totalize
iDeviceSearch	IN	Bool	Device search. Display is flashing. Activate the device search to locate the device in the application. When the function is activated, the device emits visual signals e.g. a flashing LED or local display.
iFlowOverride	IN	Bool	Flow override
qVendor_ID	OUT	DInt	Vendor ID
qDevice_ID	OUT	DInt	Device ID
qMassFlow	OUT	Real	Process value mass flow
qDensity	OUT	Real	Process value density
qTemperature	OUT	Real	Process value temperature
qTotalizer1	OUT	Real	Process value totalizer
qExtendedDeviceStatus	OUT	USInt	▪ 0: Not specified ▪ 36: Failure ▪ 37: Failure - simulation ▪ 60: Functional check ▪ 61: Functional check - simulation ▪ 120: Out of specification ▪ 121: Out of specification - simulation ▪ 128: Good ▪ 129: Good - simulation ▪ 164: Maintenance required ▪ 165: Maintenance required - simulation
qSSC1_1	OUT	Bool	Status switching signal 1.1
qSSC1_2	OUT	Bool	Status switching signal 1.2
qSSC2_1	OUT	Bool	Status switching signal 2.1
qSSC2_2	OUT	Bool	Status switching signal 2.2
qSSC3_1	OUT	Bool	Status switching signal 3.1
qSSC3_2	OUT	Bool	Status switching signal 3.2

Name	Usagepe	Data Type	Comment
qSSC4_1	OUT	Bool	Status switching signal 4.1
qSSC4_2	OUT	Bool	Status switching signal 4.2
qAOI_Diagnostic	OUT	DInt	Diagnostic for device AOI state machine steps ▪ 1: qAOI_Diagnostic.1: Device port is zero ▪ 0: qAOI_Diagnostic.1: No error ▪ 1: qAOI_Diagnostic.2: Wrong device ID ▪ 0: qAOI_Diagnostic.2: No error ▪ 1: qAOI_Diagnostic.8: Error Step ▪ 0: qAOI_Diagnostic.8: No error ▪ 1: qAOI_Diagnostic.8+n: Error Step n ▪ 0: qAOI_Diagnostic.8+n: No error
qAOI_Diagnostic_String	OUT	String	Diagnostic for device AOI state machine steps
qActual_Diagnostics_Code	OUT	DInt	Current diagnostic code See product documentation
qActual_Diagnostics_String	OUT	String	Current diagnostic text See product documentation
qLast_Diagnosticcs_Code	OUT	DInt	Previous diagnostic code See product documentation
qLast_Diagnostics_String	OUT	String	Previous diagnostic text See product documentation
qCommunicationBusy	OUT	DInt	IO-Link master communication busy state
qDeviceConnection Error	OUT	Bool	▪ TRUE: Device disconnected ▪ FALSE: Device connected

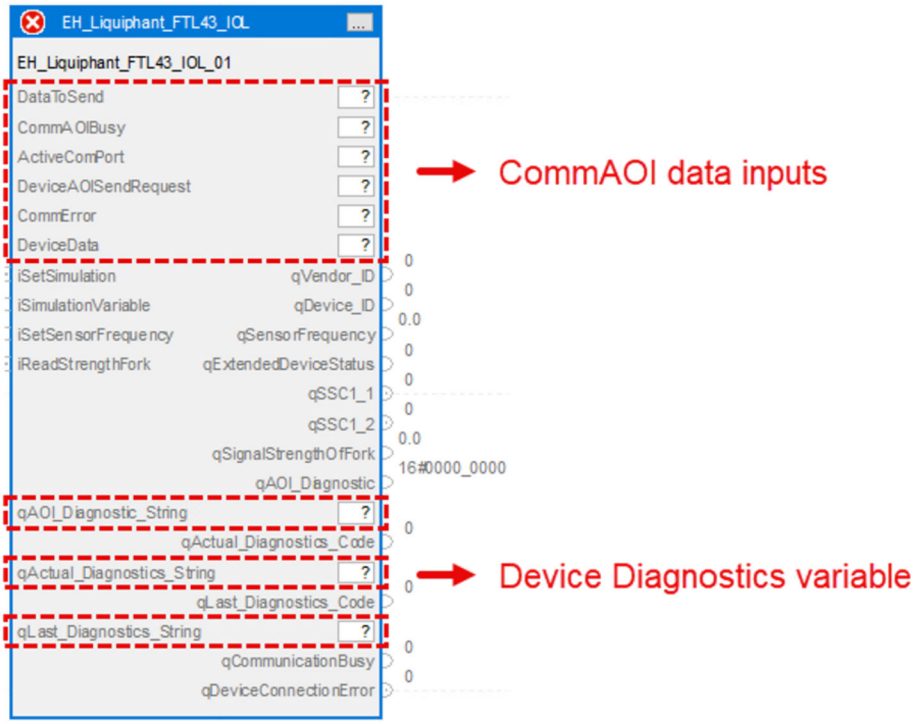
7 Description of "Level" Add-On Instructions

7.1 Liquiphant FTL43

Device AOI designation
EH_Liquiphant_FTL43_IOL

Overview of functions
- Providing the current value for the main measured variable: frequency of the vibrating fork
- Providing the status of switching signals
- Providing the extended diagnostic status
- Providing the strength of the received signal from the vibrating fork
- Simulating the main measured variable

For detailed information on the device, see the product documentation → 5.



5 *EH_Liquiphant_FTL43_IOL device AOI*

The tags of the communication AOI are reused for the "CommAOI data inputs". The three "Device Diagnostics variables" must be generated for every device AOI.

EH_Liquiphant_FTL43_IOL parameters

Name	P Type	Data Type	Comment
DataToSend	IN	Int[10]	IO-Link master acyclic sending frame
ComAOIBusy	IN	DInt	IO-Link master communication busy state
ActiveComPort	IN	DInt	Active IO-Link master communication port
DeviceAOISendRequest	IN	DInt	Device request for sending data to IO-Link master
CommError	IN	Int	IO-Link master communication error

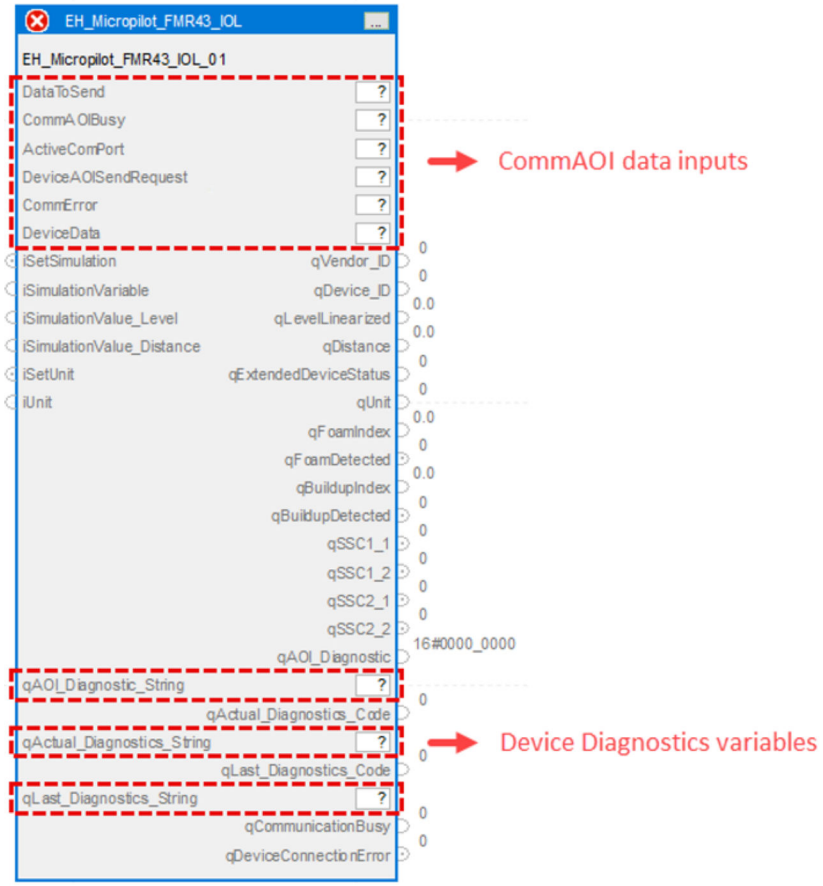
Name	P Type	Data Type	Comment
DeviceData	IN	EH_ CommAOI _Data	Internal device data model
iSetSimulation	IN	Bool	Signal to set device into simulation mode ▪ TRUE: Simulation ON ▪ FALSE: Simulation OFF
iSimulation_Variable	IN	Byte	Variable for simulation mode ▪ 0: Off ▪ 1: Sensor frequency
iSimulationValue_Freqeuency	IN	Real	Frequency value to be simulated
iRead_ReceivingSignal StrengthOfFork	IN	Bool	Trigger to read the receiving signal strength of the fork
qSensorFrequency	OUT	Real	Process value sensor frequency
qExtendedDeviceStatus	OUT	Byte	▪ 0: Not specified ▪ 36: Failure ▪ 37: Failure - simulation ▪ 60: Functional check ▪ 61: Functional check - simulation ▪ 120: Out of specification ▪ 121: Out of specification - simulation ▪ 128: Good ▪ 129: Good - simulation ▪ 164: Maintenance required ▪ 165: Maintenance required - simulation
qAOI_Diagnostic	OUT	DInt	Diagnostic for device AOI state machine steps ▪ 1: qAOI_Diagnostic.1: Device port is zero ▪ 0: qAOI_Diagnostic.1: No error ▪ 1: qAOI_Diagnostic.2: Wrong device ID ▪ 0: qAOI_Diagnostic.2: No error ▪ 1: qAOI_Diagnostic.8: Error Step ▪ 0: qAOI_Diagnostic.8: No error ▪ 1: qAOI_Diagnostic.8+n: Error Step n ▪ 0: qAOI_Diagnostic.8+n: No error
qAOI_Diagnostic_String	OUT	String	Diagnostic for device AOI state machine steps
qBusy	OUT	Bool	Busy signal of the function block ▪ TRUE: parametrization and acyclic communication ongoing ▪ FALSE: No action
qSSC1_1	OUT	Bool	Status switching signal 1.1
qSSC1_2	OUT	Bool	Status switching signal 1.2
qReceivingSignal-StrengthOfFork	OUT	Real	Receiving signal strength of fork
qAOI_Diagnostic	OUT	DInt	Diagnostic code of the communication AOI
qAOI_Diagnostic_String	OUT	String	Diagnostic text of the communication AOI
qActual_Diagnostics_Code	OUT	DInt	Current diagnostic code See product documentation
qActual_Diagnostics_String	OUT	String	Current diagnostic text See product documentation
qLast_Diagnostics_Code	OUT	DInt	Previous diagnostic code See product documentation
qLast_Diagnostics_String	OUT	String	Previous diagnostic text See product documentation
qCommunicationBusy	OUT	DInt	IO-Link master communication busy state
qDeviceConnectionError	OUT	Bool	▪ TRUE: Device disconnected ▪ FALSE: Device connected

7.2 Micropilot FMR43

Device AOI designation
EH_Micropilot_FMR43_IOL

Overview of functions
- Providing the current values for the main measured variables: linearized level and distance
- Providing the status of switching signals
- Providing the extended diagnostic status
- Selection of the unit for the distance value
- Simulating the main measured variables
- Providing Heartbeat Diagnostics Data such as buildup on sensor (buildup detected), buildup index, foam index and foam formation detected (foam detected)

For detailed information on the device, see the product documentation → 5.



6 *EH_Micropilot_FMR43_IOL device AOI*

The tags of the communication AOI are reused for the "CommAOI data inputs". The three "Device Diagnostics variables" must be generated for every device AOI.

EH_Micropilot_FMR43_IOL parameters

Name	P Type	Data Type	Comment
DataToSend	IN	Int[10]	IO-Link master acyclic sending frame
ComAOIBusy	IN	DInt	IO-Link master communication busy state
ActiveComPort	IN	DInt	Active IO-Link master communication port
DeviceAOISendRequest	IN	DInt	Device request for sending data to IO-Link master

Name	P Type	Data Type	Comment
CommError	IN	Int	IO-Link master communication error
DeviceData	IN	EH_ CommAOI _Data	Internal device data model
iSetSimulation	IN	Bool	Trigger to start simulation of the device
iSetSimulation_Variable	IN	Int	Variable for simulation mode ▪ 1: Level ▪ 3: Distance
iSimulationValue_Level	IN	Real	Level value to be simulated
iSimulationValue_Distance	IN	Real	Distance value to be simulated
iSetUnit	IN	Bool	Trigger to set the unit for the distance value
iUnit	IN	Int	Unit for distance value ▪ 45: m ▪ 47: inch ▪ 49: mm
qVendor_ID	OUT	DInt	Vendor ID
qDevice_ID	OUT	DInt	Device ID
qLevelLinearized	OUT	Real	Process value level linearized
qDistance	OUT	Real	Process value distance
qExtendedDeviceStatus	OUT	USInt	▪ 0: Not specified ▪ 36: Failure ▪ 37: Failure - simulation ▪ 60: Functional check ▪ 61: Functional check - simulation ▪ 120: Out of specification ▪ 121: Out of specification - simulation ▪ 128: Good ▪ 129: Good - simulation ▪ 164: Maintenance required ▪ 165: Maintenance required - simulation
qUnit	OUT	Int	Selected unit for distance ▪ 45: m ▪ 47: inch ▪ 49: mm
qFoamIndex	OUT	Real	Foam index
qFoamDetected	OUT	Bool	Foam detection ▪ TRUE: Foam detected ▪ FALSE: No foam detected
qBuildupIndex	OUT	Real	Buildup index
qBuildupDetected	OUT	Bool	Buildup detection ▪ TRUE: Buildup detected ▪ FALSE: No buildup detected
qSSC1_1	OUT	Bool	Status switching signal 1.1
qSSC1_2	OUT	Bool	Status switching signal 1.2
qSSC2_1	OUT	Bool	Status switching signal 2.1
qSSC2_2	OUT	Bool	Status switching signal 2.2
qAOI_Diagnostic	OUT	DInt	Diagnostic for device AOI state machine steps ▪ 1: qAOI_Diagnostic.1: Device port is zero ▪ 0: qAOI_Diagnostic.1: No error ▪ 1: qAOI_Diagnostic.2: Wrong device ID ▪ 0: qAOI_Diagnostic.2: No error ▪ 1: qAOI_Diagnostic.8: Error Step ▪ 0: qAOI_Diagnostic.8: No error ▪ 1: qAOI_Diagnostic.8+n: Error Step n ▪ 0: qAOI_Diagnostic.8+n: No error

Name	P Type	Data Type	Comment
qAOI_Diagnostic_String	OUT	String	Diagnostic for device AOI state machine steps
qActual_Diagnostics_Code	OUT	DInt	Current diagnostic code See product documentation
qActual_Diagnostics_String	OUT	String	Current diagnostic text See product documentation
qLast_Diagnostics_Code	OUT	DInt	Previous diagnostic code See product documentation
qLast_Diagnostics_String	OUT	String	Previous diagnostic text See product documentation
qCommunicationBusy	OUT	DInt	IO-Link master communication busy state
qDeviceConnectionError	OUT	Bool	▪ TRUE: Device disconnected ▪ FALSE: Device connected

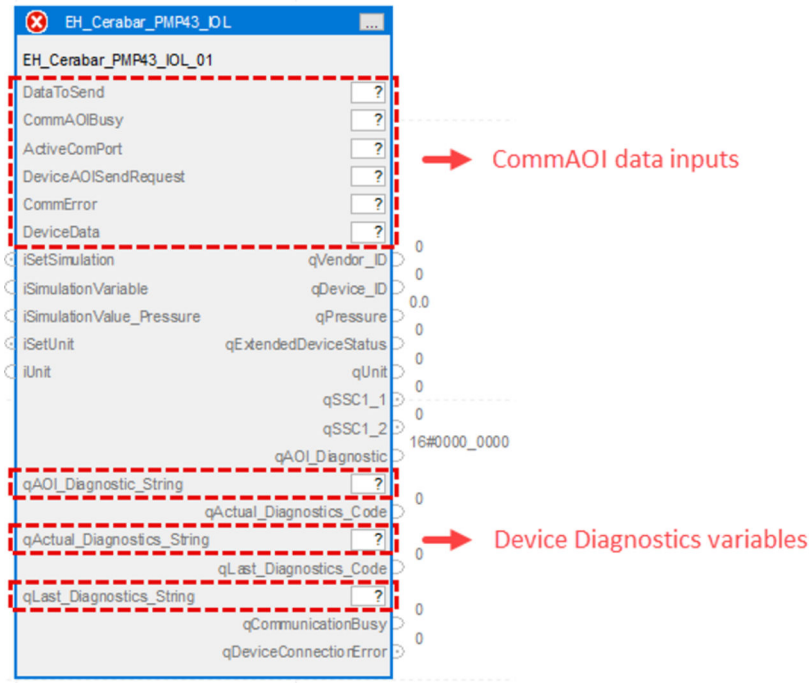
8 Description of "Pressure" Add-On Instructions

8.1 Cerabar PMP43

Device AOI designation
EH_Cerabar_PMP43_IOL

Overview of functions
- Providing the current value for the main measured variable: pressure
- Providing the status of switching signals
- Providing the extended diagnostic status
- Selection of the unit for the pressure value
- Simulating the main measured variable

For detailed information on the product, see the product documentation → 5.



7 *EH_Cerabar_PMP43_IOL device AOI*

The tags of the communication AOI are reused for the "CommAOI data inputs". The three "Device Diagnostics variables" must be generated for every device AOI.

EH_EH_Cerabar_PMP43_IOL parameters

Name	P Type	Data Type	Comment
DataToSend	IN	Int[10]	IO-Link master acyclic sending frame
ComAOIBusy	IN	DInt	IO-Link master communication busy state
ActiveComPort	IN	DInt	Active IO-Link master communication port
DeviceAOISendRequest	IN	DInt	Device request for sending data to IO-Link master
CommError	IN	Int	IO-Link master communication error
DeviceData	IN	EH_ CommAOI _Data	Internal device data model

Name	P Type	Data Type	Comment
iSetSimulation	IN	Bool	Signal to set device into simulation mode ▪ TRUE: Simulation ON ▪ FALSE: Simulation OFF
iSimulation_Variable	IN	Int	Variable for simulation mode ▪ 0: Off ▪ 1: Pressure
iSetSimulationPressure	IN	Real	Pressure value to be simulated
iSetUnit	IN	Bool	Trigger to set the unit for the pressure value
iUnit	IN	Byte	Unit for pressure value ▪ 0: bar ▪ 6: psi ▪ 8: mbar ▪ 11: Pa ▪ 12: kPa ▪ 237: MPa
qPressure	OUT	Real	Process value pressure
qExtendedDeviceStatus	OUT	USInt	▪ 0: Not specified ▪ 36: Failure ▪ 37: Failure - simulation ▪ 60: Functional check ▪ 61: Functional check - simulation ▪ 120: Out of specification ▪ 121: Out of specification - simulation ▪ 128: Good ▪ 129: Good - simulation ▪ 164: Maintenance required ▪ 165: Maintenance required - simulation
qUnit	OUT	Int	Selected unit for distance ▪ 0: bar ▪ 6: psi ▪ 8: mbar ▪ 11: Pa ▪ 12: kPa ▪ 237: MPa
qSSC1_1	OUT	Bool	Status switching signal 1.1
qSSC1_2	OUT	Bool	Status switching signal 1.2
qAOI_Diagnostic	OUT	DInt	Diagnostic for device AOI state machine steps ▪ 1: qAOI_Diagnostic.1: Device port is zero ▪ 0: qAOI_Diagnostic.1: No error ▪ 1: qAOI_Diagnostic.2: Wrong device ID ▪ 0: qAOI_Diagnostic.2: No error ▪ 1: qAOI_Diagnostic.8: Error Step ▪ 0: qAOI_Diagnostic.8: No error ▪ 1: qAOI_Diagnostic.8+n: Error Step n ▪ 0: qAOI_Diagnostic.8+n: No error
qAOI_Diagnostic_String	OUT	String	Diagnostic for device AOI state machine steps
qActual_Diagnostics_Code	OUT	DInt	Current diagnostic code See product documentation
qActual_Diagnostics_String	OUT	String	Current diagnostic text See product documentation
qLast_Diagnostics_Code	OUT	DInt	Previous diagnostic code See product documentation
qLast_Diagnostics_String	OUT	String	Previous diagnostic text See product documentation
qCommunicationBusy	OUT	DInt	IO-Link master communication busy state
qDeviceConnectionError	OUT	Bool	▪ TRUE: Device disconnected ▪ FALSE: Device connected

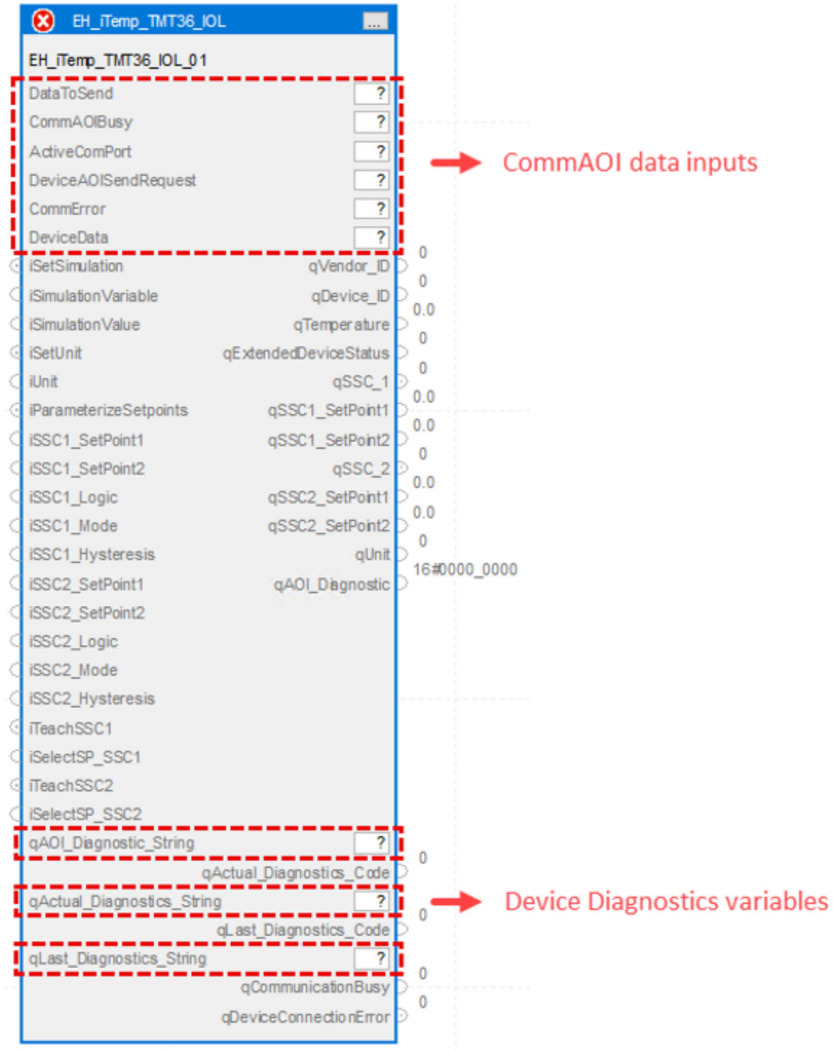
9 Description of "Temperature" Add-On Instructions

9.1 iTHEMP TMT36

Device AOI designation
EH_iTHEMP_TMT36_IOL

Overview of functions
- Providing the current value for the main measured variable: temperature
- Providing the status of switching signals
- Providing the extended diagnostic status
- Selection of the unit for the temperature value
- Simulating the main measured variable
- Programming the switch points via the inputs iTeachSSC1 and iTeachSSC2
- Starting the configuration of the switch points via the input iParameterizeSetpoints

For detailed information on the product, see the product documentation → 5.



8 *EH_iTHEMP_TMT36_IOL device AOI*

The tags of the communication AOI are reused for the "CommAOI data inputs". The three "Device Diagnostics variables" must be generated for every device AOI.

EH_iTHEMP_TMT36_IOL parameters

Name	P Type	Data Type	Comment
DataToSend	IN	Int[10]	IO-Link master acyclic sending frame
ComAOIBusy	IN	DInt	IO-Link master communication busy state
ActiveComPort	IN	DInt	Active IO-Link master communication port
DeviceAOISendRequest	IN	DInt	Device request for sending data to IO-Link master
CommError	IN	Int	IO-Link master communication error
DeviceData	IN	EH_ CommAOI _Data	Internal device data model
iSetSimulation	IN	Bool	Signal to set device into simulation mode ▪ TRUE: Simulation ON ▪ FALSE: Simulation OFF
iSimulationVariable	IN	Int	Variable for simulation mode ▪ 0: Off ▪ 1: Temperature
iSimulationValue	IN	Real	Value to be simulated
iSetUnit	IN	Bool	TRUE: Trigger to set the unit for the temperature value
iUnit	IN	SInt	Unit for temperature value ▪ 32: °Celsius ▪ 33: °Fahrenheit ▪ 35: Kelvin
iParameterizeSetpoints	IN	Bool	Trigger to start switch point configuration
iSSC1_SetPoint1	IN	Real	Set point 1 of SSC1
iSSC1_SetPoint2	IN	Real	Set point 2 of SSC1
iSSC1_Logic	IN	SInt	Logic of the switching signal 1 ▪ 0: High active ▪ 1: Low active
iSSC1_Mode	IN	SInt	Mode of the switching signal 1 ▪ 0: Deactivated ▪ 1: Single point ▪ 2: Window ▪ 3: Two point
iSSC1_Hysteresis	IN	Real	Hysteresis of the switching signal 1
iSSC2_SetPoint1	IN	Real	Set point 1 of SSC2
iSSC2_SetPoint2	IN	Real	Set point 2 of SSC2
iSSC2_Logic	IN	SInt	Logic of the switching signal 2 ▪ 0: High active ▪ 1: Low active
iSSC2_Mode	IN	SInt	Mode of the switching signal 2 ▪ 0: Deactivated ▪ 1: Single point ▪ 2: Window ▪ 3: Two point
iSSC2_Hysteresis	IN	SInt	Hysteresis of the switching signal 2
iTeachSSC1	IN	Bool	Trigger to teach SSC1
iSelectSP_SSC1	IN	SInt	Selection of the set point of SSC1 ▪ 1: Set point 1 ▪ 2: Set point 2
iTeachSSC2	IN	Bool	Trigger to teach SSC2

Name	P Type	Data Type	Comment
iSelectSP_SSC2	IN	SInt	Selection of the set point of SSC2 ▪ 1: Set point 1 ▪ 2: Set point 2
qVendor_ID	OUT	DInt	Vendor ID
qDevice_ID	OUT	DInt	Device ID
qTemperature	OUT	Real	Process value temperature
qExtendedDeviceStatus	OUT	USInt	▪ 0: Not specified ▪ 36: Failure ▪ 37: Failure - simulation ▪ 60: Functional check ▪ 61: Functional check - simulation ▪ 120: Out of specification ▪ 121: Out of specification - simulation ▪ 128: Good ▪ 129: Good - simulation ▪ 164: Maintenance required ▪ 165: Maintenance required - simulation
qSSC1	OUT	Bool	Status switching signal 1
qSSC1_SetPoint1	OUT	Real	Set point 1 of SSC1
qSSC1_SetPoint2	OUT	Real	Set point 2 of SSC1
qSSC2	OUT	Bool	Status switching signal 2
qSSC2_SetPoint1	OUT	Real	Set point 1 of SSC2
qSSC2_SetPoint2	OUT	Real	Set point 2 of SSC2
qAOI_Diagnostic	OUT	DInt	Diagnostic for device AOI state machine steps ▪ 1: qAOI_Diagnostic.1: Device port is zero ▪ 0: qAOI_Diagnostic.1: No error ▪ 1: qAOI_Diagnostic.2: Wrong device ID ▪ 0: qAOI_Diagnostic.2: No error ▪ 1: qAOI_Diagnostic.8: Error Step ▪ 0: qAOI_Diagnostic.8: No error ▪ 1: qAOI_Diagnostic.8+n: Error Step n ▪ 0: qAOI_Diagnostic.8+n: No error
qAOI_Diagnostic_String	OUT	String	Diagnostic for device AOI state machine steps
qActual_Diagnostics_Code	OUT	DInt	Current diagnostic code See product documentation
qActual_Diagnostics_String	OUT	String	Current diagnostic text See product documentation
qLast_Diagnostics_Code	OUT	DInt	Previous diagnostic code See product documentation
qLast_Diagnostics_String	OUT	String	Previous diagnostic text See product documentation
qCommunicationBusy	OUT	DInt	IO-Link master communication busy state
qDeviceConnectionError	OUT	Bool	▪ TRUE: Device disconnected ▪ FALSE: Device connected

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