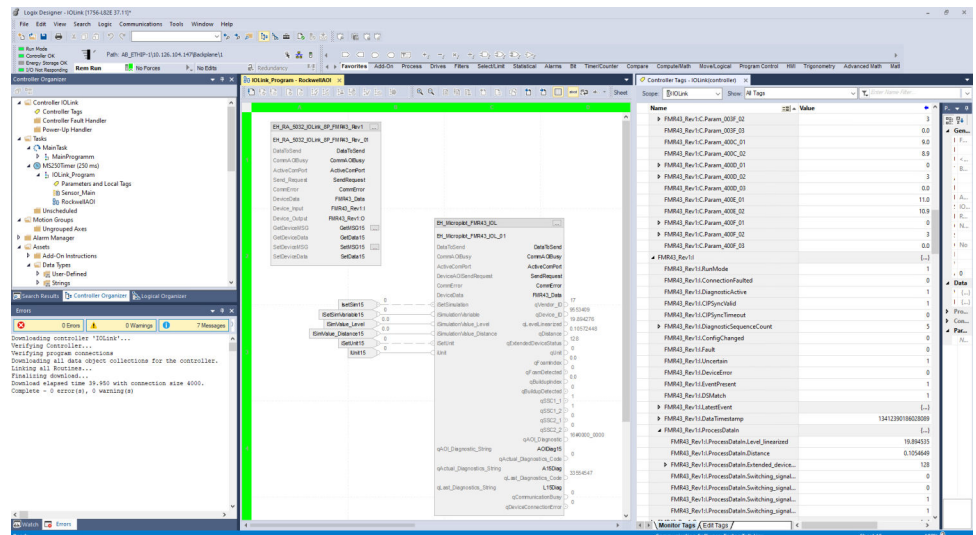


Special Documentation

Endress+Hauser IO-Link devices

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



Change history

Version	Documentation	Changes
01.00.00	SD03386S/04/EN/01.25	First version
01.01.00	SD03386S/04/EN/02.26	New Add-On Instructions: ▪ Smartec CLD18 ▪ Picomag (DMA) ▪ Picomag Insertion (DMI) ▪ Liquiphant FTL3x ▪ Liquipoint FTWx3 ▪ Liquitrend QMW43 ▪ Nivector FTI26 ▪ Cerabar PMx21 ▪ Cerabar PMP23 ▪ Ceraphant PTx3xB ▪ iTHERM CompactLine TM311 Heartbeat Verification function for Promag 10, Promass 10, Liquiphant FTL43, Micropilot FMR43 and Cerabar PMP43 added
01.01.00	SD03386S/04/EN/03.26	Corrections

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1 About this document

1.1 Document function

This Special Documentation serves as a reference work for the integration of certain IO-Link field devices into specific Rockwell Automation control systems. This document is only valid for the Endress+Hauser IO-Link devices mentioned (→  8).

The Add-On Instructions described are intended for integration into the following PLC series using the Rockwell Automation design software Studio 5000 Logix Designer®, version 35 onwards: 1756 – L8x.

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



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



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



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



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



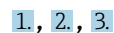
Reference to documentation



Reference to graphic



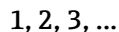
Notice or individual step to be observed



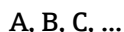
Series of steps



Result of a step



Item numbers



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 must meet the following requirements:

- ▶ 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.

2.2 Intended use

Endress+Hauser Add-On Instructions are compiled into a library and made available at regular intervals.

 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 personnel responsible for commissioning control systems with 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 preventing any malfunctions 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.

Liquid analysis

Smartec CLD18

Flow

- Dosimag
- Dosimass
- Picomag (DMA)
- Picomag Insertion (DMI)
- Promag 10
- Promass 10

Level

- Liquiphant FTL3x
- Liquiphant FTL43
- Liquipoint FTWx3
- Liquitrend QMW43
- Micropilot FMR43
- Nivector FTI26

Pressure

- Cerabar PMx21
- Cerabar PMP23
- Cerabar PMP43
- Ceraphant PTx3xB

Temperature

- iTHERM CompactLine TM311
- iTEMP 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 – L8x

3.3.2 IO-Link master

IFM
AL1323

Rockwell Automation
5032-8IOLM12M12LDR

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 planned.

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 →  16.
6. Set up communication AOI →  17.
7. Import device AOI into a project →  20.
8. Configure device AOI →  22.

Data is exchanged between the IO-Link devices and control system via an 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 5032-8IOLxxxx" IO-Link master
- Device AOI: EH_Promass10_IOL_AOI.L5X
Device AOI for a Promass 10

4.2 Downloading Add-On Instructions library

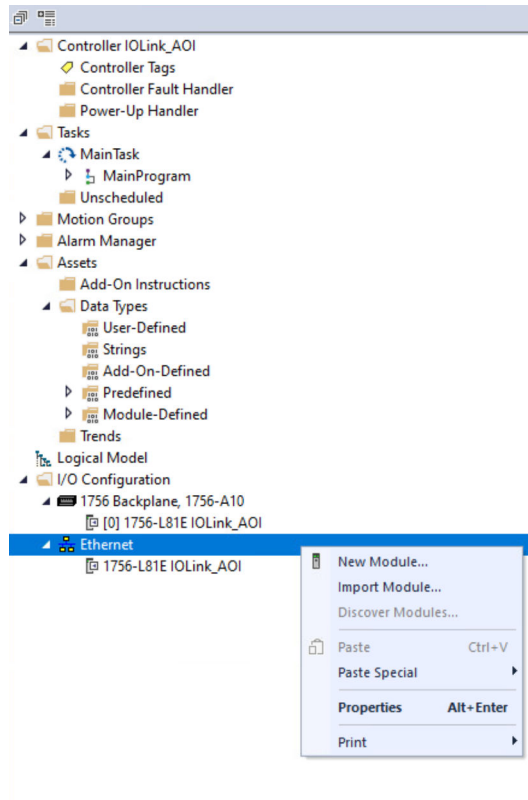
1. Open the www.endress.com page.
2. Select the product using the filters and search field.
3. Open the product page.
4. Select the **Downloads** page.
5. Select **Software**.

4.3 Rockwell Automation 5032-8IOLxxx IO-Link master

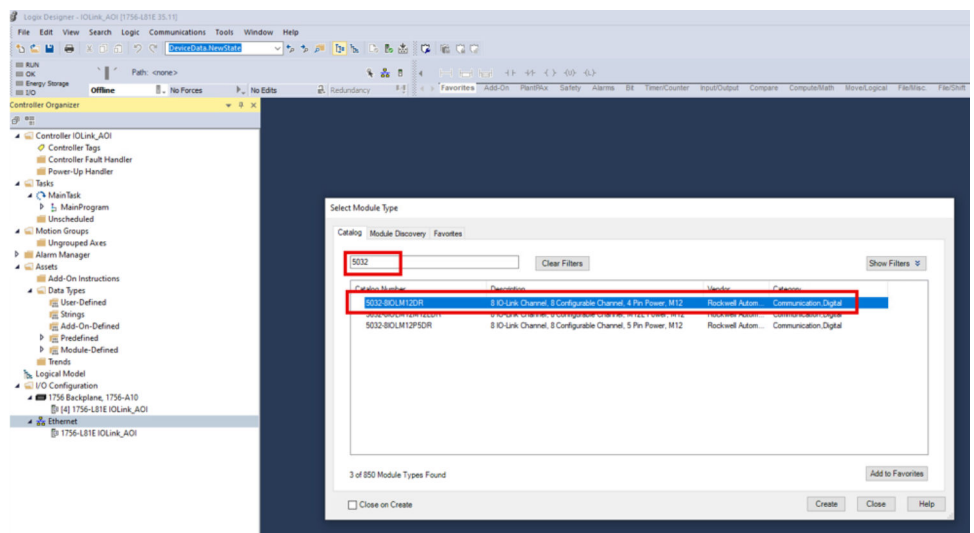
4.3.1 Integrating IO-Link master into EtherNet/IP network and configuring IO-Link master

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

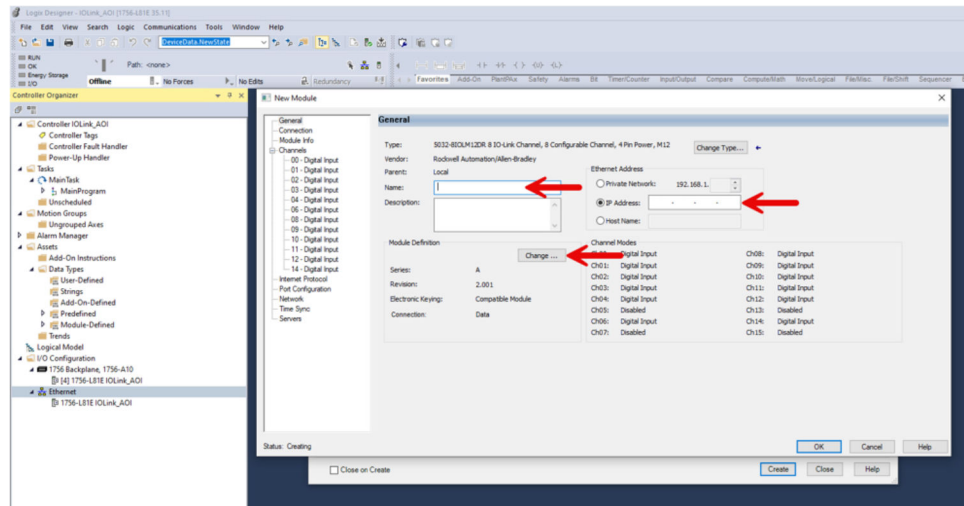
1. Open the project into which the IO-Link master is to be integrated.
2. Select the network card to which the IO-Link master is to be connected.
3. Select the **New Module** function via the context menu. If you access the controller online via the software, you can also use the **Discover Modules**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



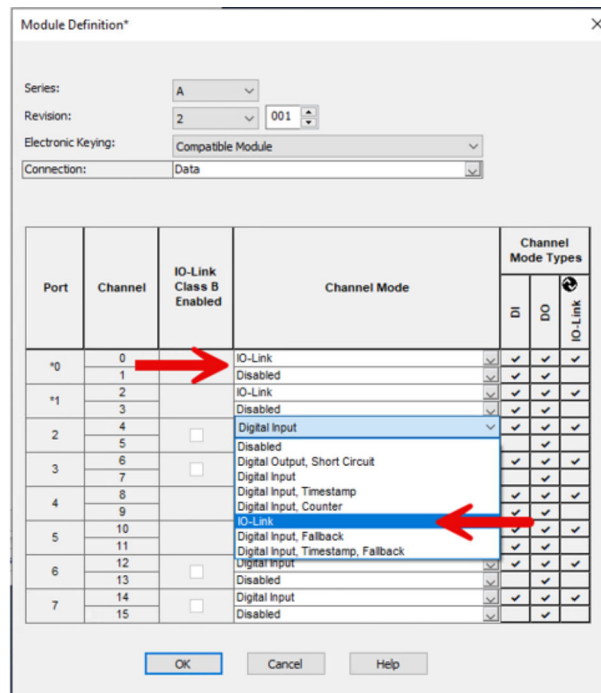
4. Select the IO-Link master via the **Select Module Type** window in the **Catalog** tab.



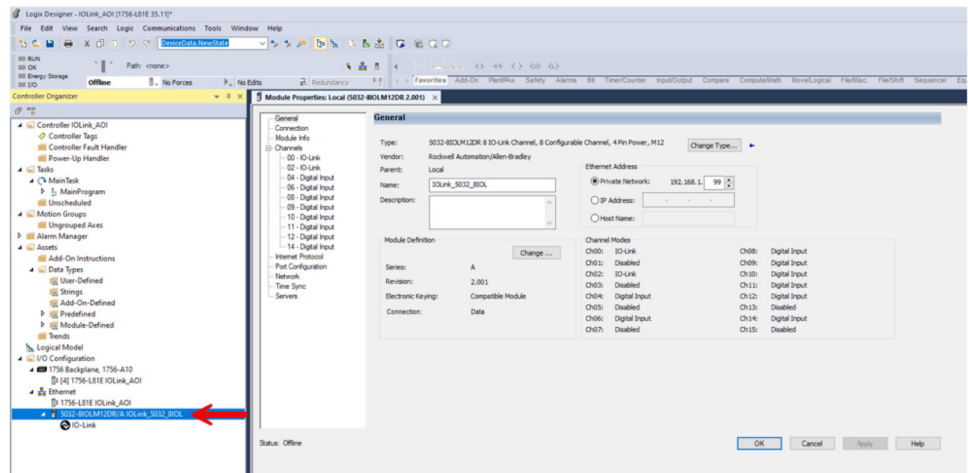
5. Click on **Create**.
↳ The **New Module** window is displayed.
6. Configure the **Name** and **IP Address** parameters.



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.

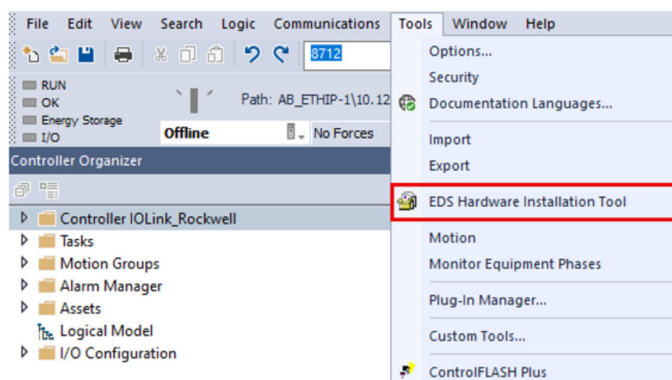


 If you double click on the IO-Link master or open the "Properties" function via the context menu, the properties of the IO-Link master are displayed.

4.3.2 Importing device IODDs into the Studio 5000 driver catalog

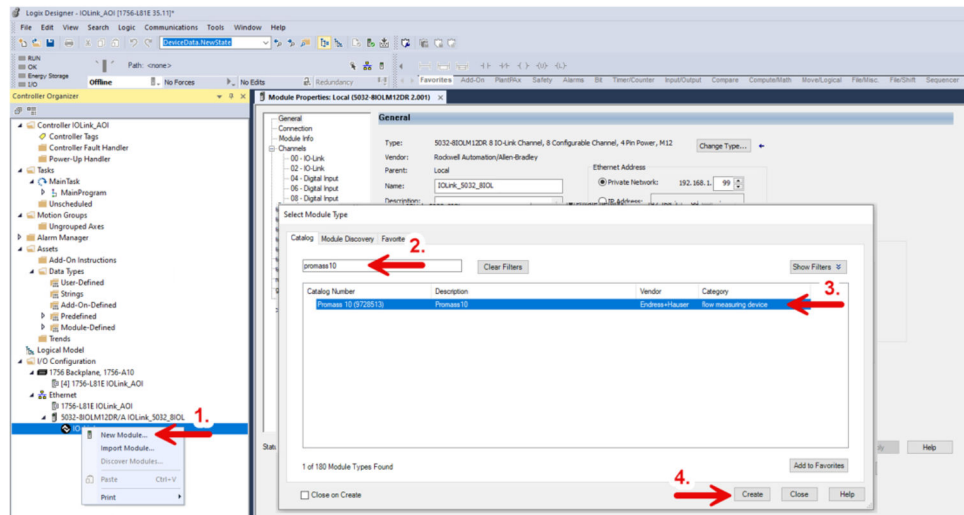
 The device IODDs are required for configuring the Rockwell Automation IO-Link master.

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



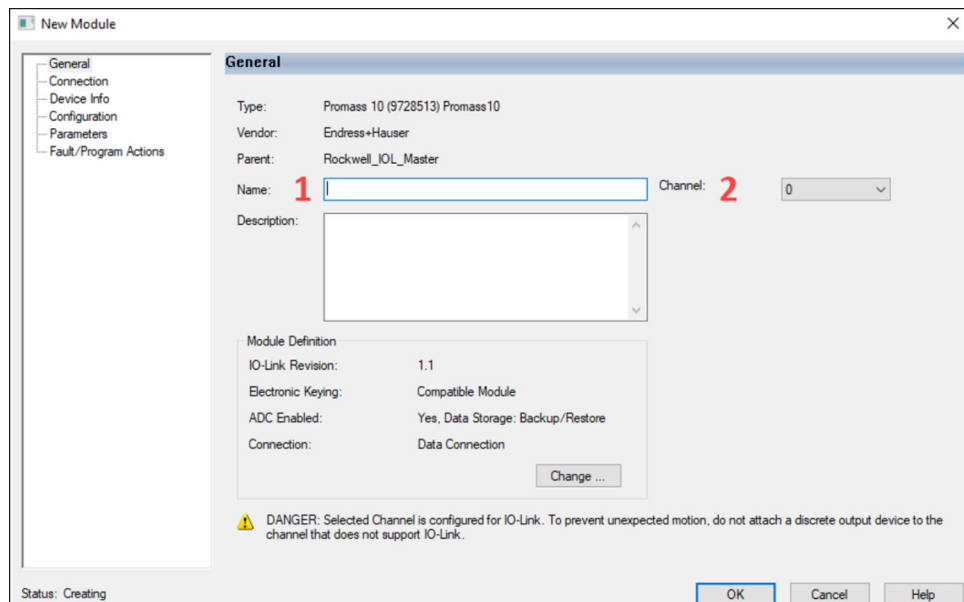
4.3.3 Assigning the IO-Link device to the IO-Link master

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**.

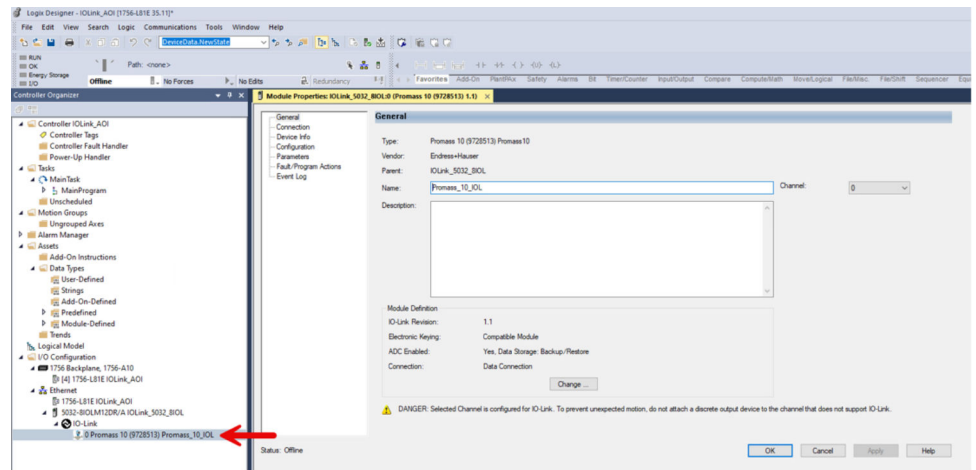
↳ The **New Module** window is displayed.



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.

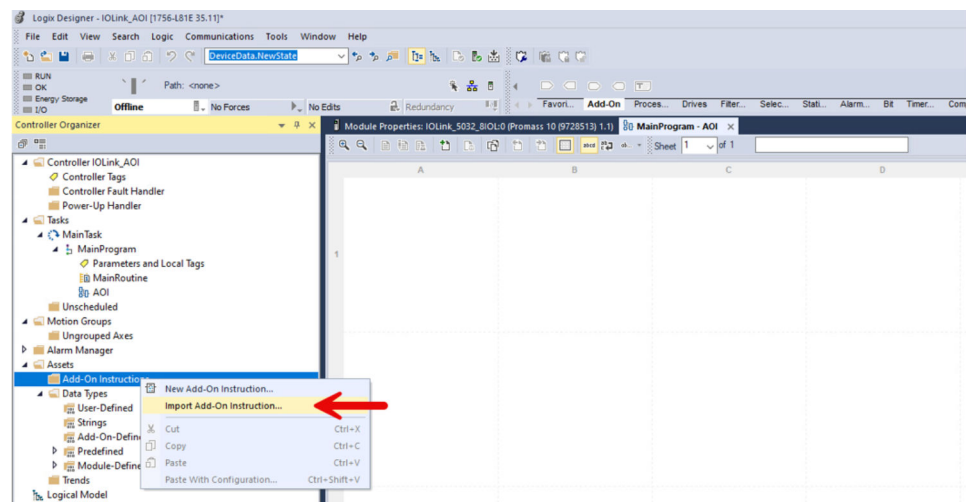
4.4 Importing the communication AOI into a project

i An error is displayed if different device IODDs were used to create the communication AOI and the driver catalogue. In this case, you must adjust the "Device Type" either during the import or later in the Device Definition.

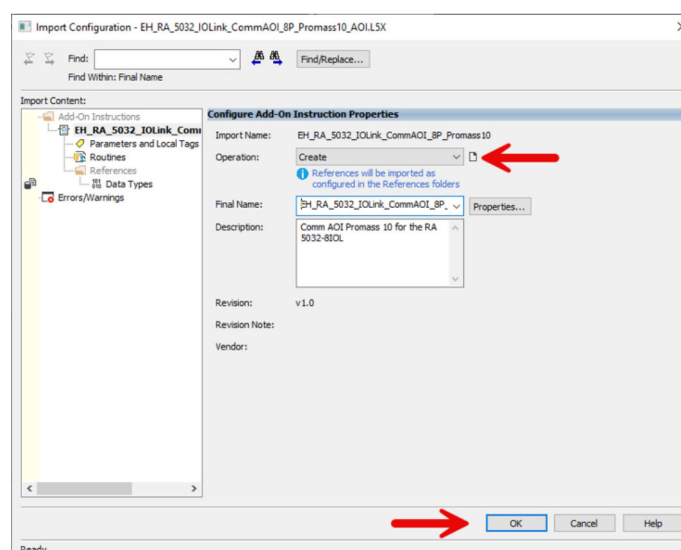
Prerequisites

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.



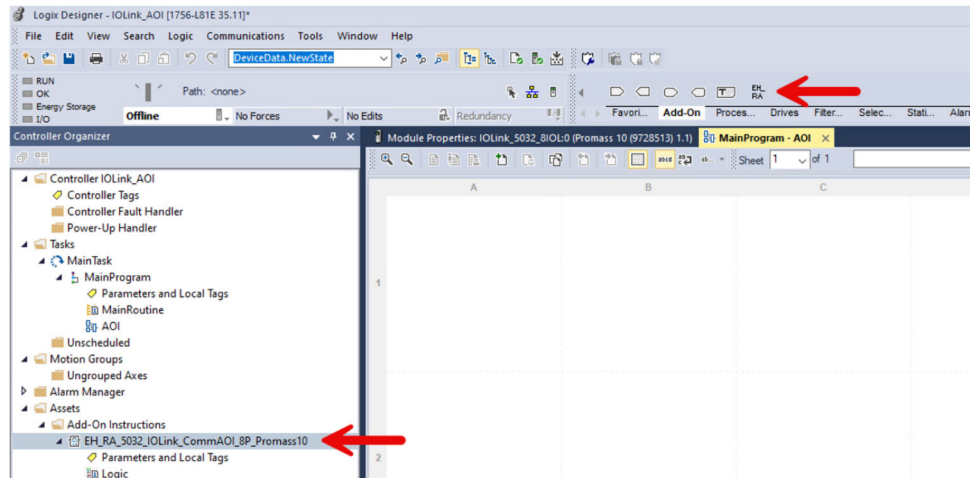
3. Select the communication AOI for the Rockwell Automation IO-Link master and the IO-Link device.
4. Click **Open**.
 - ↳ The **Import Configuration** window is displayed.



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.

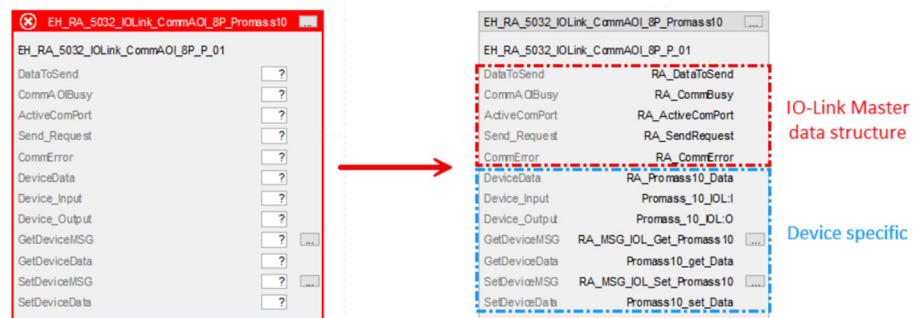
- The communication AOI is imported into the project and is available for the routine. The AOI is displayed in the **Controller Organizer** window in the **Add-On Instructions** folder and **Language Element** section under Add-On.



4.5 Setting up the communication AOI

- i** 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.

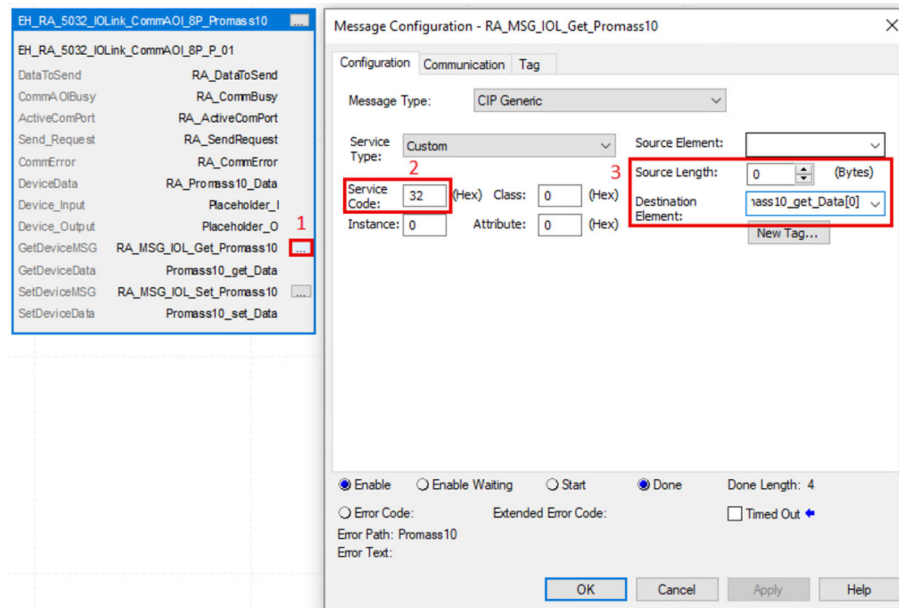
You are not required to follow any naming conventions for the tags.



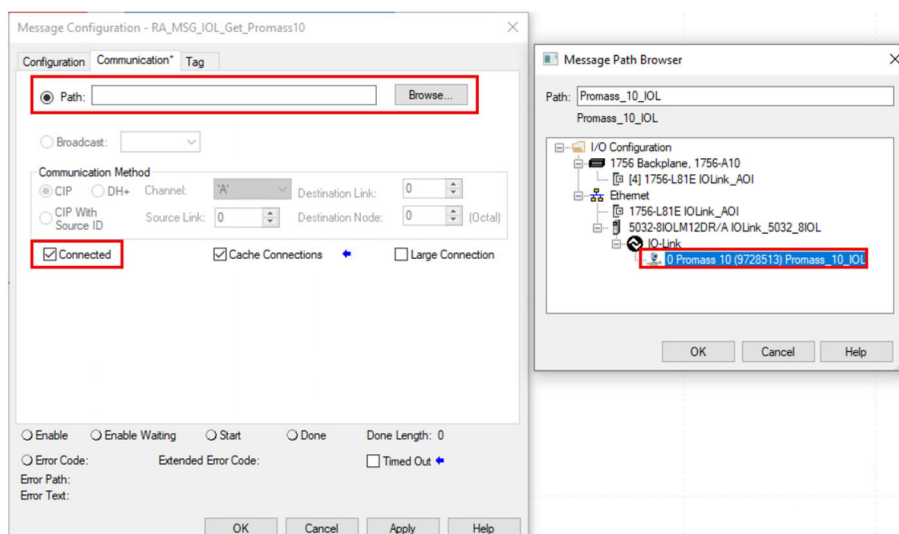
1. Create the first five tags "DataToSend", "CommAOIBusy", "ActiveComPort", "Send_Request" and "CommError". You can use these tags for all IO-Link devices that are connected to this IO-Link master.
2. Create the "DeviceData" tag.
3. Create the "Device_Input" tag and link to the input tag of the IO-Link 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. → 18
6. Generate the "SetDeviceData" tag and configure the "SetDeviceMSG" tag. → 19

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**.

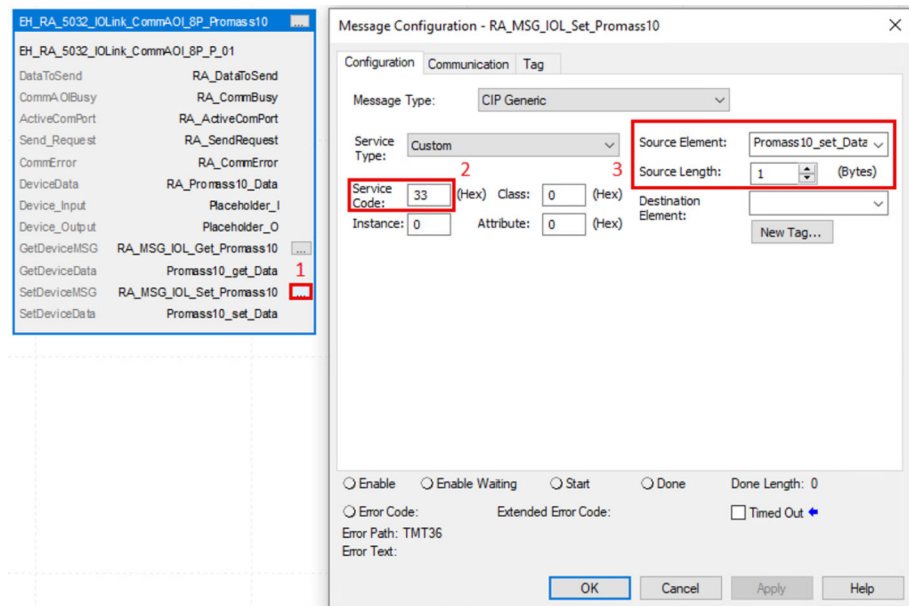


6. Select the **Communication** tab.
7. Use **Browse** to search for and select the IO-Link device.
8. Enable the **Connected** checkbox.
9. Press **OK** to confirm your entry.

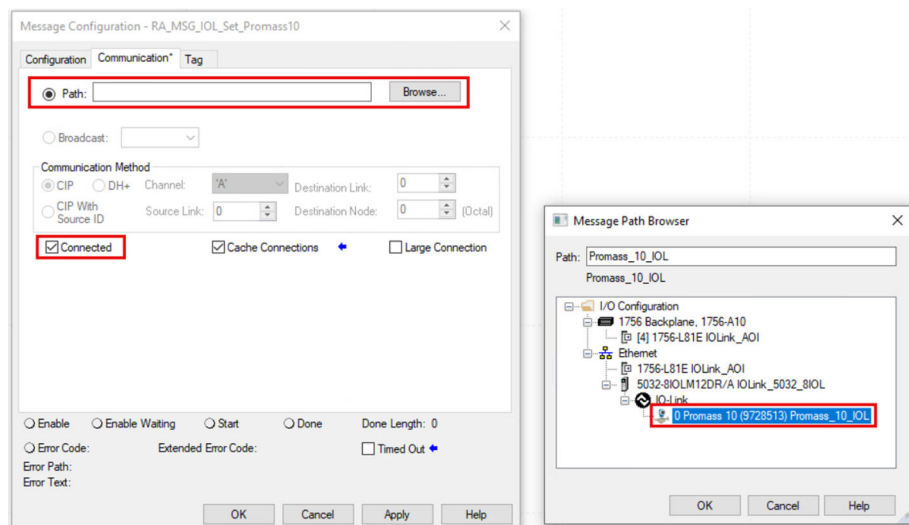


4.5.2 Configuring message for SetDeviceMSG

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**.

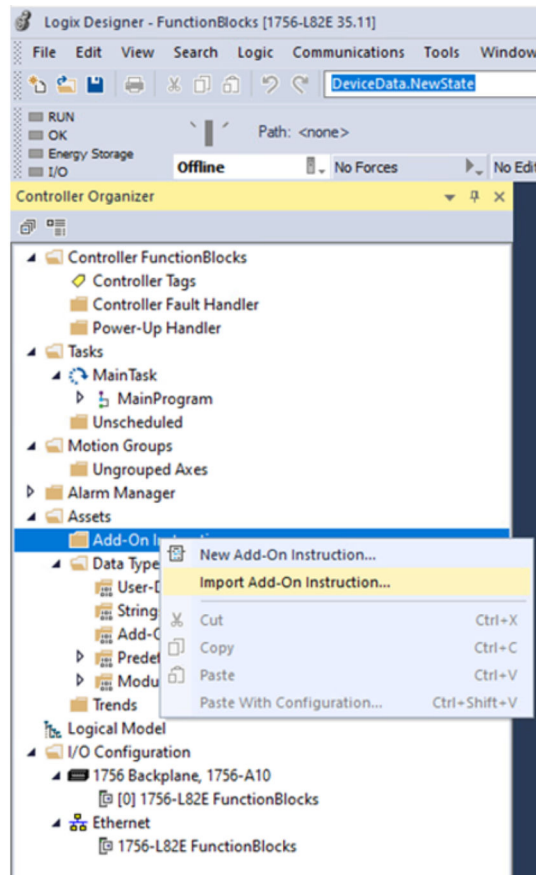


6. Select the **Communication** tab.
7. Use **Browse** to search for and select the IO-Link device.
8. Enable the **Connected** checkbox.
9. Press **OK** to confirm your entry.

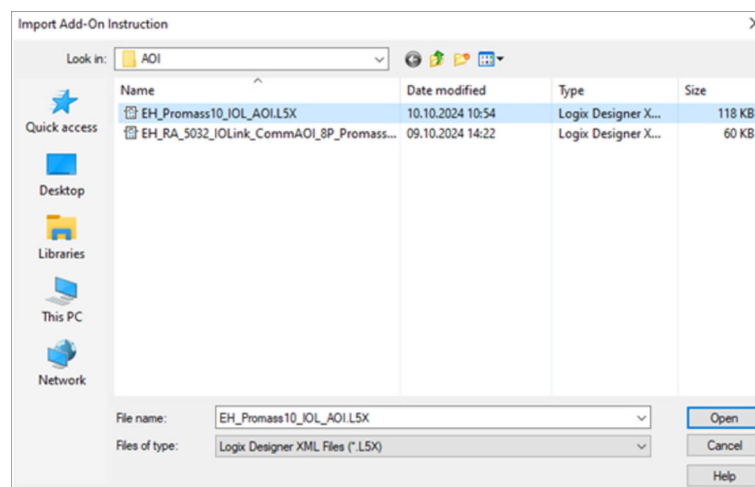


4.6 Importing device AOI into a project

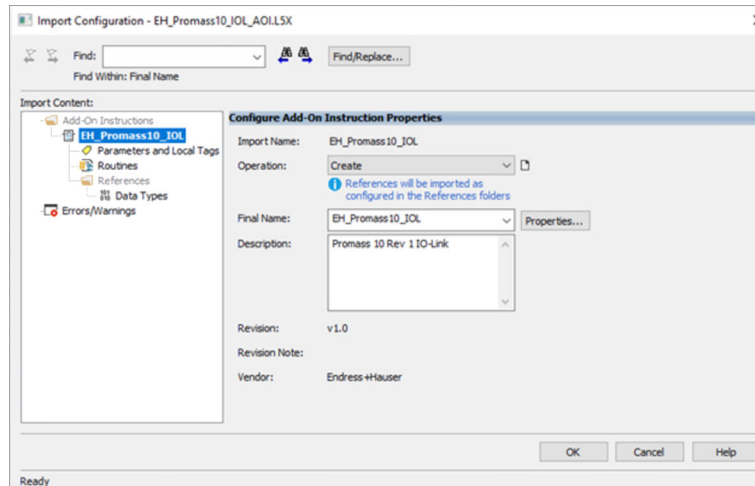
1. In the **Controller Organizer** window, select the **Add-On Instructions** folder.
2. Select the **Import Add-On Instruction ...** function via the context menu.



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

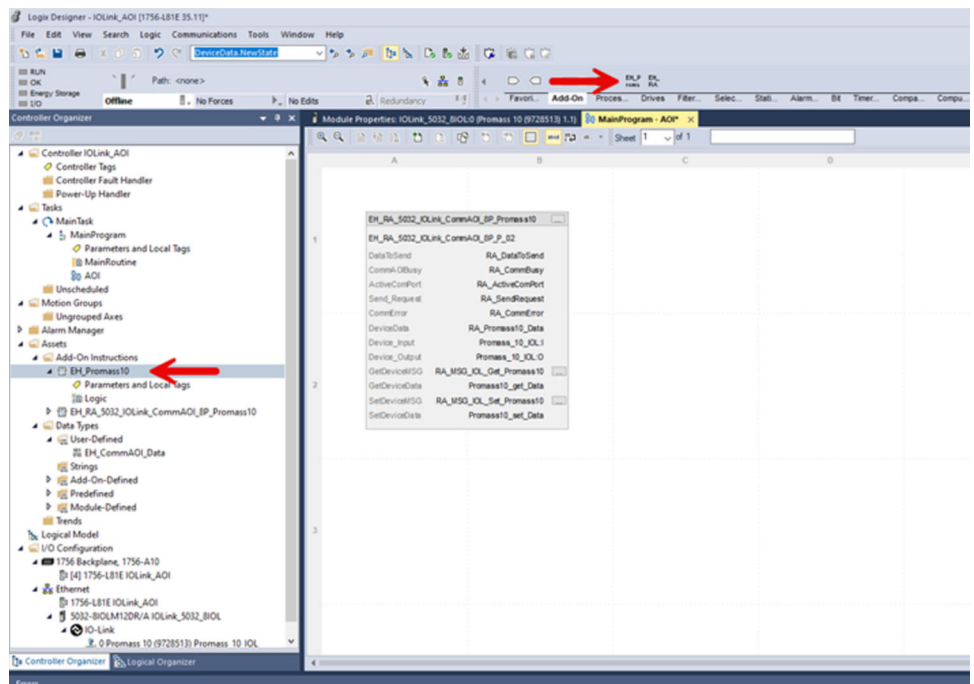


4. The **Import Configuration** window does **not** require any adjustments. If the device AOI has not yet been imported, the **Create** option is displayed for the **Operation** field.



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 in the **Language Element** area below Add-On.

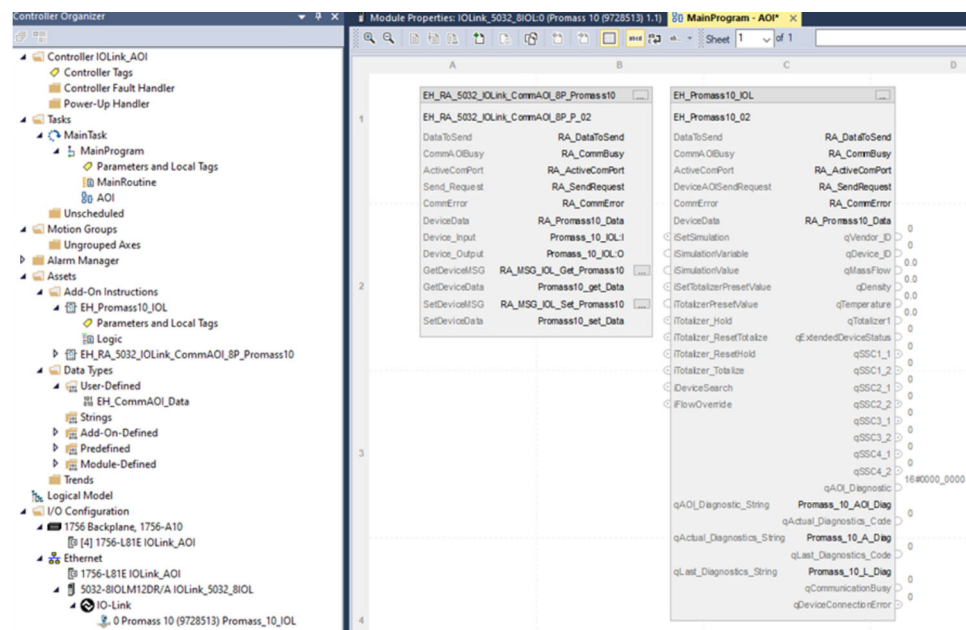
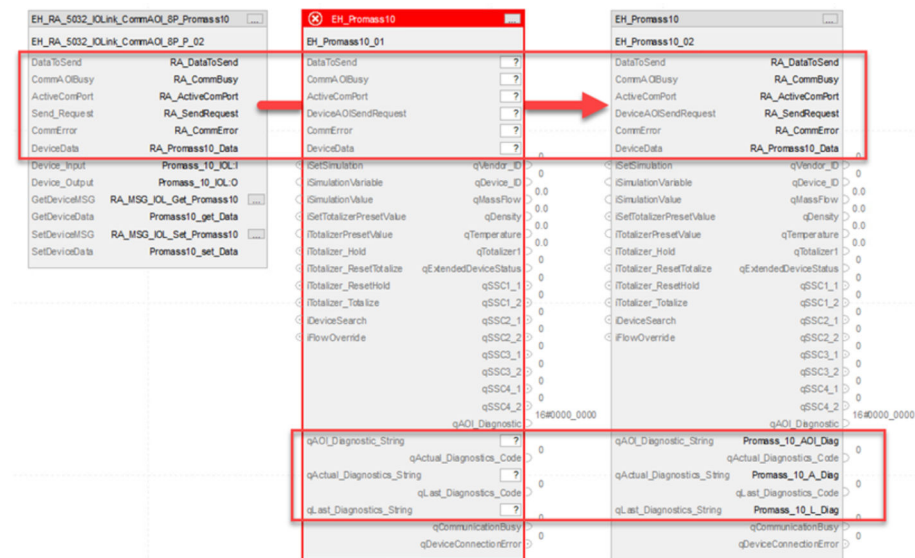


6. Add the device AOI. The device AOI must be added in the same program section of the function block where the Comm AOI is stored. To do this, either click on the **Promass IO-Link** button or drag the device AOI from the **Controller Organizer** window.

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

i The first six tags are reused by the communication AOI. The diagnostic tags must be created for each device AOI.

1. Create the 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.



i Description of device AOIs:

- Flow: → 36
- Level: → 54
- Pressure: → 68
- Temperature: → 77

5 System integration with an IFM IO-Link master

5.1 Requirements and procedure

Requirements

Hardware configuration planned.

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 →  26.
4. Set up communication AOI →  28.
5. Import device AOI into a project →  30.
6. Configure device AOI →  32.

Data is exchanged between the IO-Link devices and control system via an 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 Downloading 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

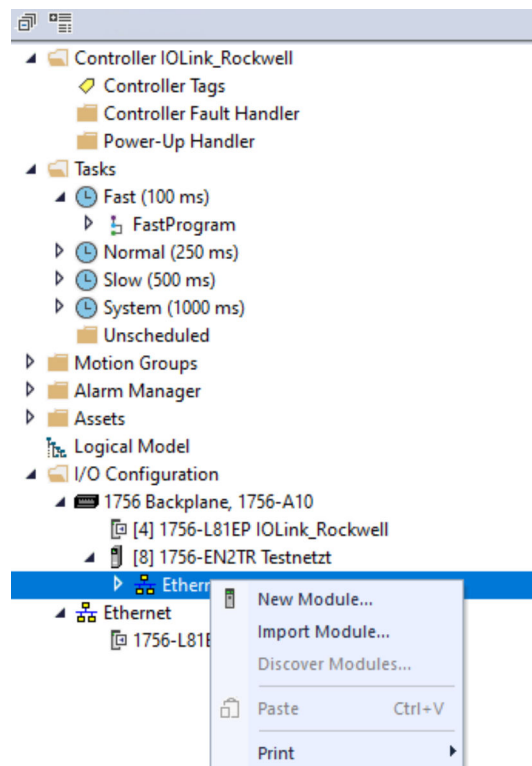
5.3.1 Integrating IO-Link master into EtherNet/IP network and configuring IO-Link master

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

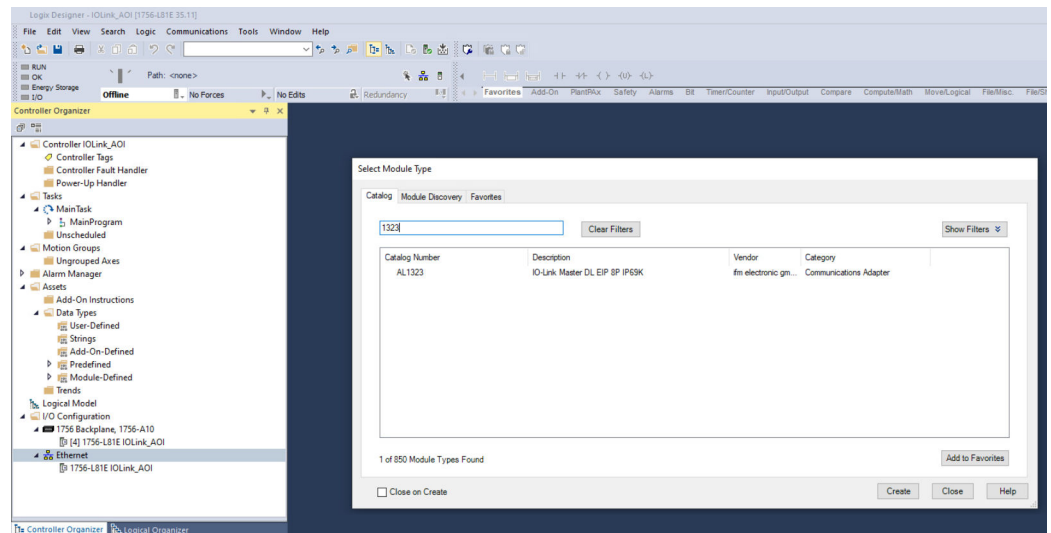
Requirements

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.



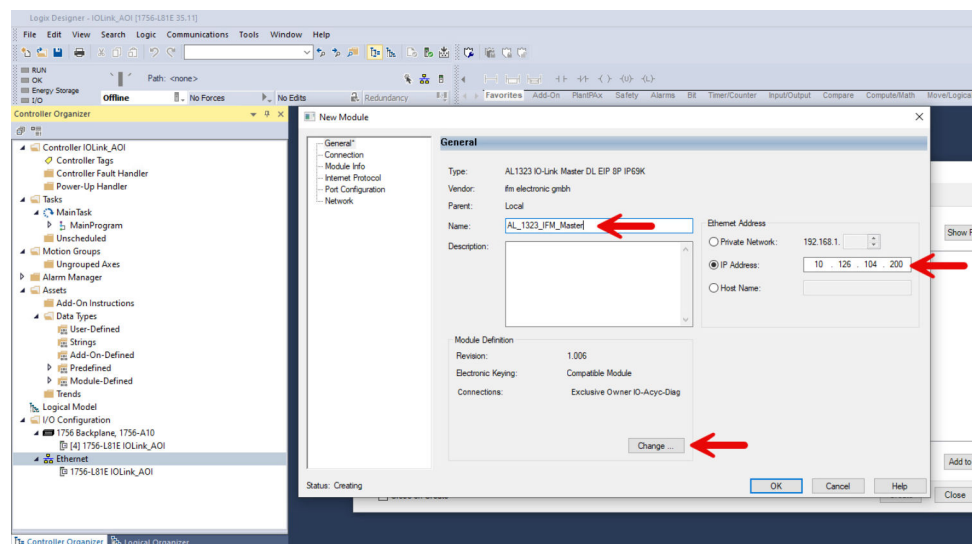
4. Select the IO-Link master via the **Select Module Type** window in the **Catalog** tab. A selection is only displayed if the EDS for the IO-Link master was installed beforehand.



5. Click on **Create**.

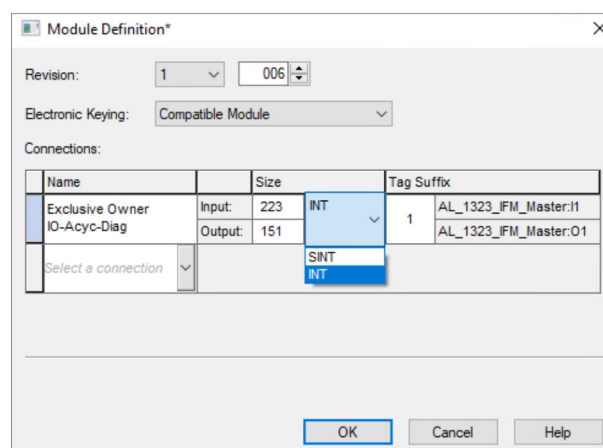
↳ The **New Module** window is displayed.

6. Configure the **Name** and **IP Address** parameters.

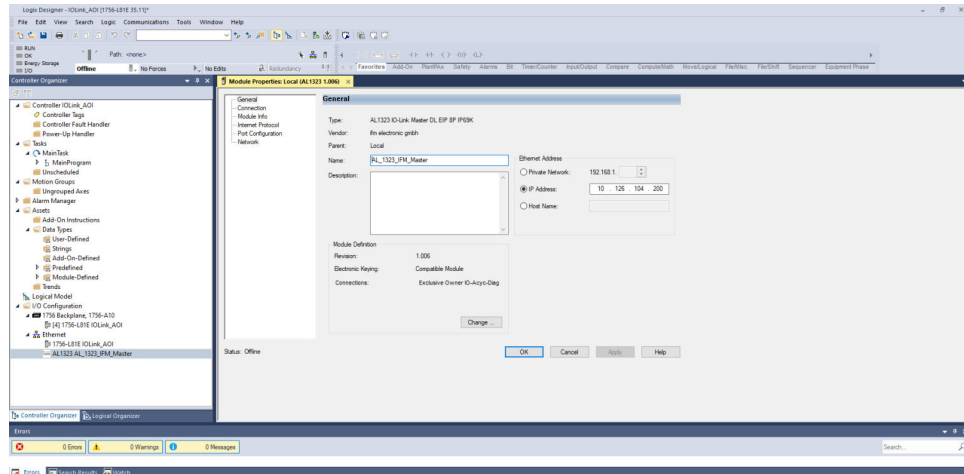


7. In the **Module Definition** section, click on **Change**.

↳ The **Module Definition** window is displayed.



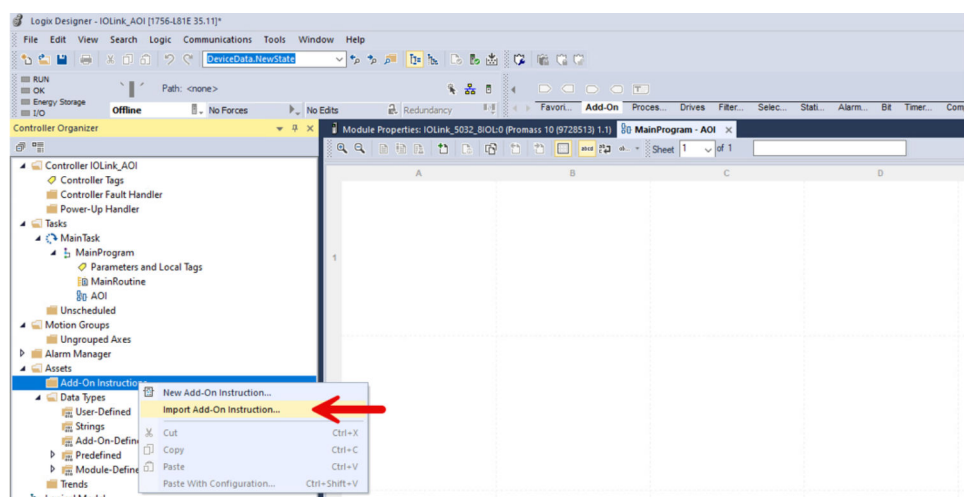
8. Select data type **INT** for **Exclusive Owner IO-Acyc-Diag**.
 9. Confirm configuration with **OK**. Close the “New Module” window and, if necessary, “Select Module Type”.
- ↳ The IO-Link master is integrated into the project. The IO-Link master is displayed in the **I/O Configuration** window in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



i 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

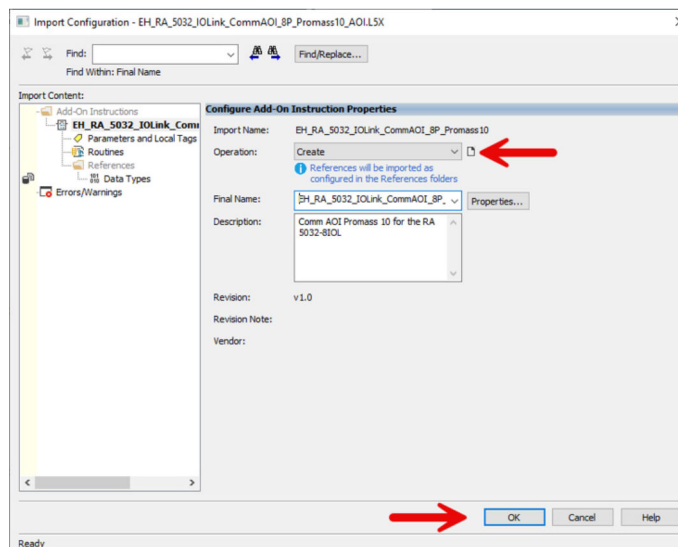
"EH_AL1323_8P_CommAOI_Array" and "EH_AL1323_8P_CommAOI" for the "IFM AL1323" IO-Link master.

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**.

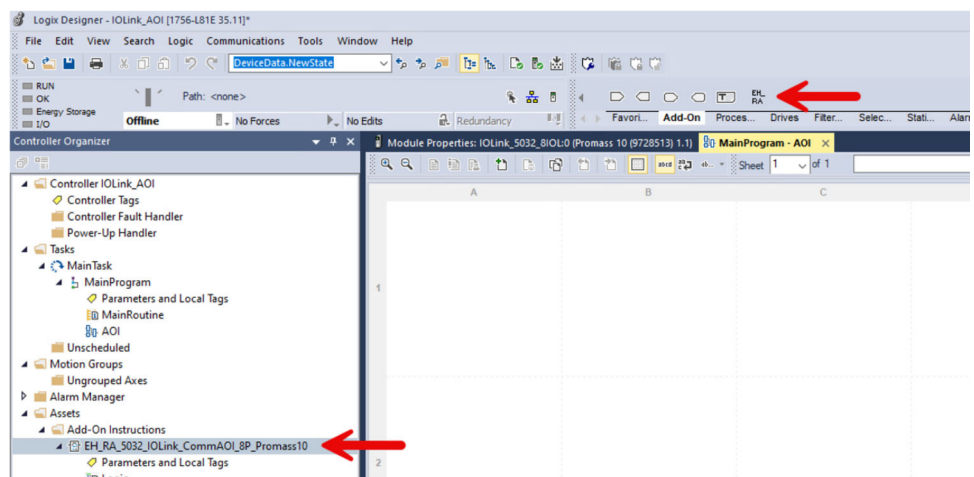
↳ The **Import Configuration** window is displayed.



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.

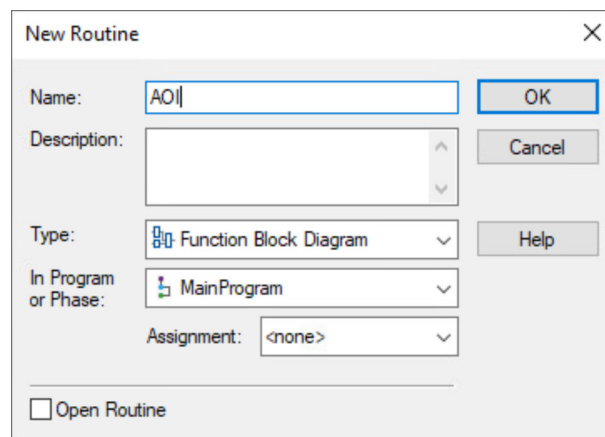
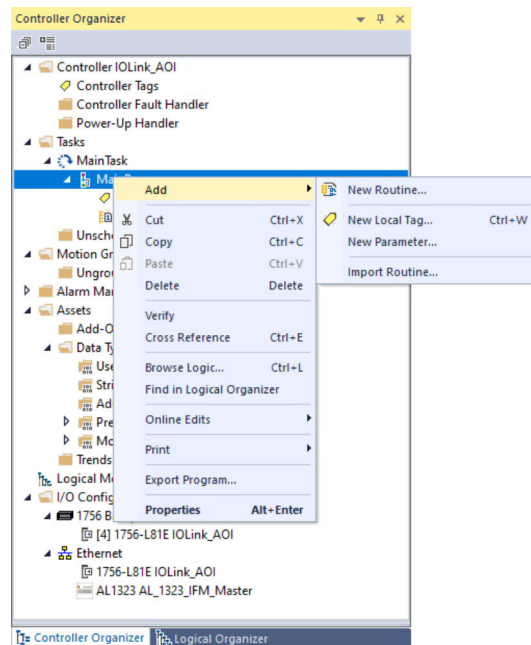
6. Click **OK**.

↳ 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.

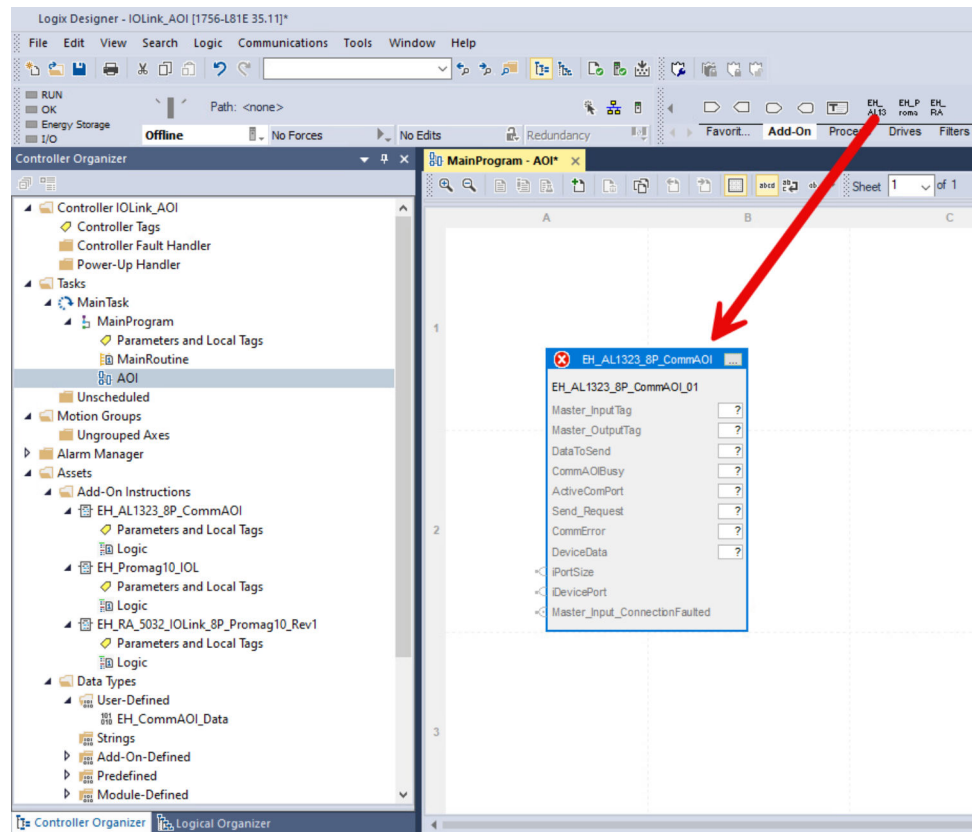


5.5 Setting up the communication AOI

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.

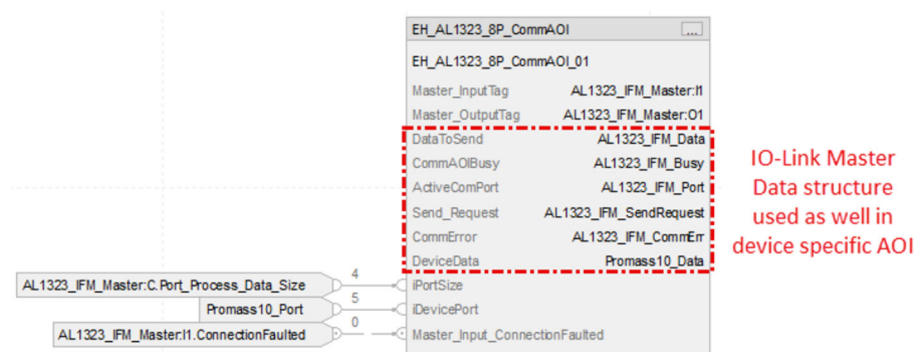


3. Assign a name.
4. For **Type** select the option **Function Block Diagram**.
5. Press **OK** to confirm your entry.
6. Add the communication AOI. To do this, click on the required AOI in the **Language Element** section.
 - ↳ The communication AOI is inserted on the sheet (Sheet).



i 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.

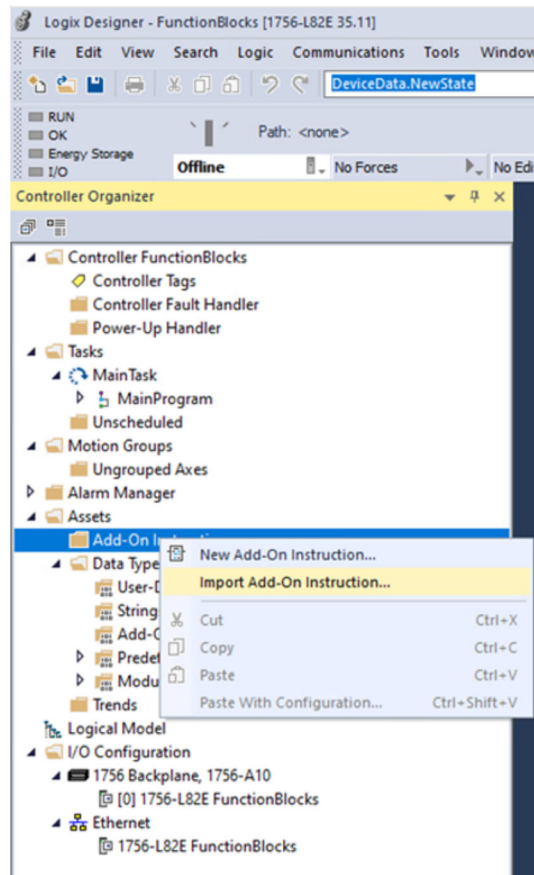
You are not required to follow any naming conventions for the tags.



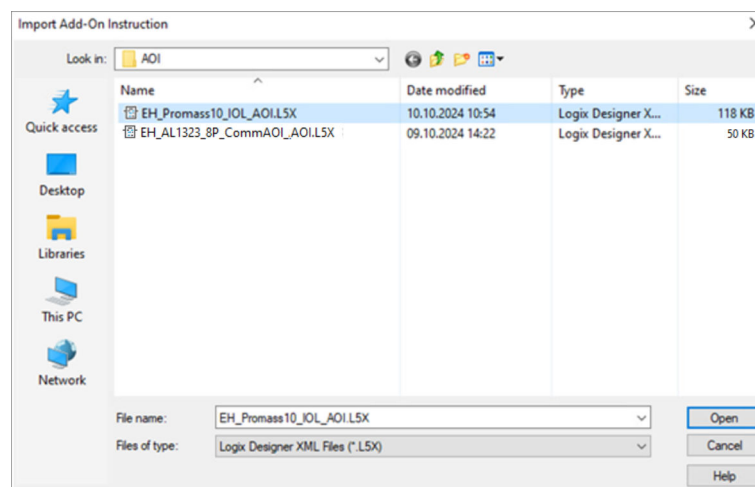
7. Create the "DataToSend", "CommAOIBusy", "ActiveComPort", "Send_Request" and "CommError" tags. You can use these tags for all IO-Link devices that are connected to this IO-Link master.
8. Create the "DeviceData" tag.
9. Create the inputs of the communication AOI "Data Size", "Device Port Number" and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

5.6 Importing device AOI into a project

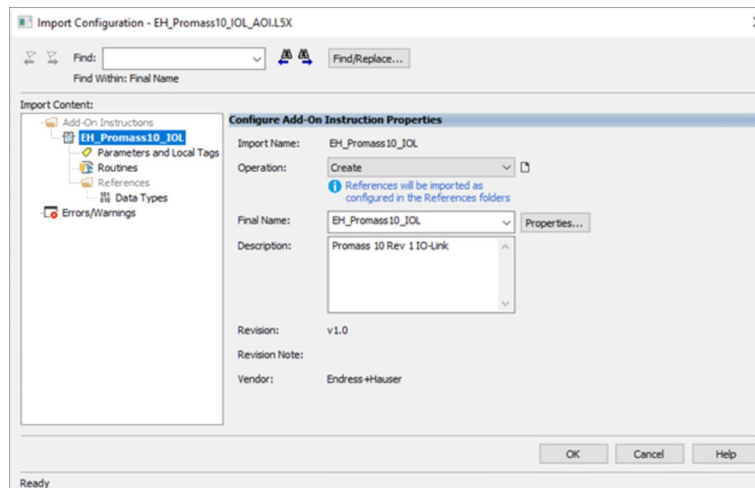
1. In the **Controller Organizer** window, select the **Add-On Instructions** folder.
2. Select the **Import Add-On Instruction ...** function via the context menu.



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

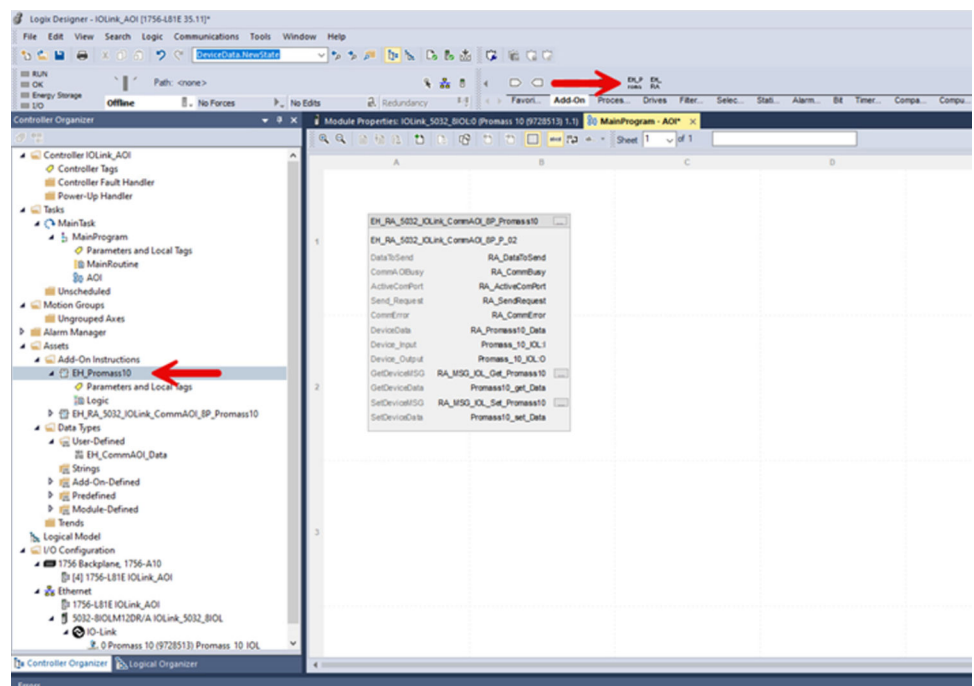


4. The **Import Configuration** window does **not** require any adjustments. If the device AOI has not yet been imported, the **Create** option is displayed for the **Operation** field.



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 in the **Language Element** area below 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.

6 Description of “Liquid analysis” Add-On Instructions

6.1 Smartec CLD18

Device AOI designation

EH_Smartec_CLD18_IOL

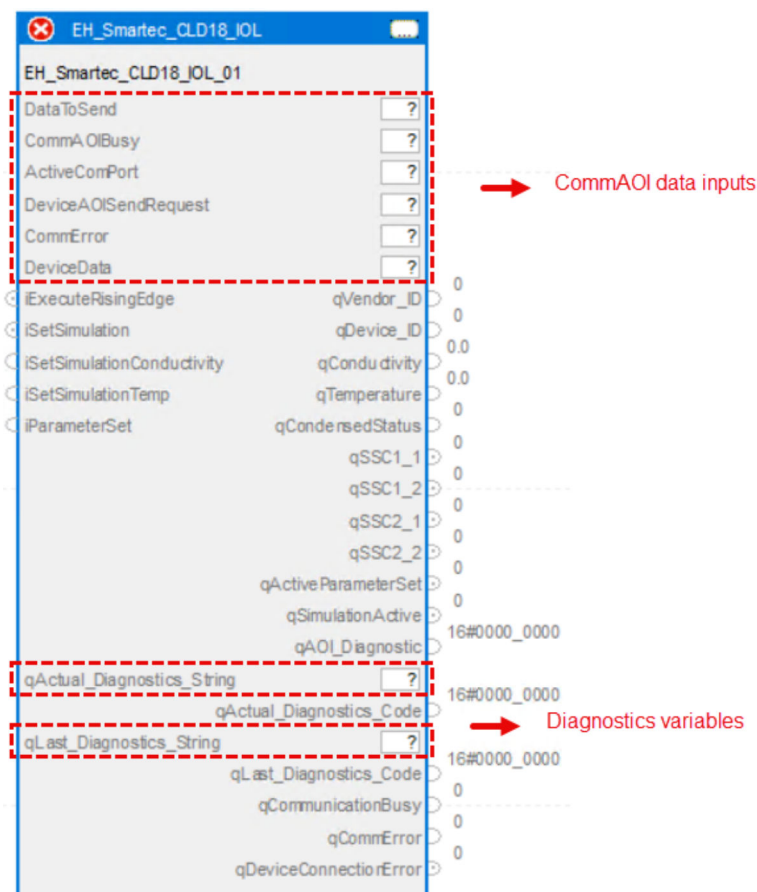
Device ID

131329

Overview of functions

- Providing the current values for the main measured variables: Conductivity and temperature
- Providing the status of switching signals
- Cyclic delivery of the summarized status signal
- Reading the diagnostic data after triggering of the input iExecute
- Simulating the main measured variables
- Selecting parameter sets

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



 1 EH_Smartec_CLD18_IOL device AOI

 The tags of the communication AOI are reused for the “CommAOI data inputs”. The “Diagnostics variables” must be created for each device AOI.

Parameters of EH_Smartec_CLD18_IOL

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
iExecuteRisingEdge	IN	Bool	Trigger to execute the acyclic routine for parametrization and read out diagnostics
iSetSimulation	IN	Bool	Process value simulation ■ 0: Off ■ 1: On
iSetSimulationConductivity	IN	Real	Conductivity value to be simulated
iSetSimulationTemp	IN	Real	Temperature value to be simulated
iParameterSet	IN	Sint	Set active parameter set ■ 0: Set 1 ■ 1: Set 2
qVendor_ID	OUT	Dint	Vendor ID
qDevice_ID	OUT	DInt	Device ID
qConductivity	OUT	Real	Process value conductivity
qTemperature	OUT	Real	Process value temperature
qCondensedStatus	OUT	Int	■ 0: Not specified ■ 36: Failure ■ 60: Functional check ■ 120: Out of specification ■ 128: Good ■ 129: Good - Simulation ■ 164: Maintenance required
qSSC1_1	OUT	Bool	Switch output 1.1
qSSC1_2	OUT	Bool	Switch output 1.2
qSSC2_1	OUT	Bool	Switch output 2.1
qSSC2_2	OUT	Bool	Switch output 2.2
qActiveParameterSet	OUT	Bool	Process value parameter set ■ FALSE: Set 1 ■ TRUE: Set 2
qSimulationActive	OUT	Bool	■ TRUE: Simulation mode enabled ■ FALSE: Simulation mode disabled
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
qActual_Diagnostics_String	IN/OUT	String	Current diagnostic text See product documentation
qActual_Diagnostics_Code	OUT	DInt	Current diagnostic code See product documentation

Name	P Type	Data Type	Comment
qLast_Diagnostics_String	IN/OUT	String	Previous diagnostic text See product documentation
qLast_Diagnostics_Code	OUT	DInt	Previous diagnostic code See product documentation
qCommunicationBusy	OUT	DInt	IO-Link master communication busy state
qCommError	OUT	Int	Comm AOI error
qDeviceConnectionError	OUT	Bool	■ TRUE: Device disconnected ■ FALSE: Device connected

7 Description of “Flow” Add-On Instructions

7.1 Dosimag

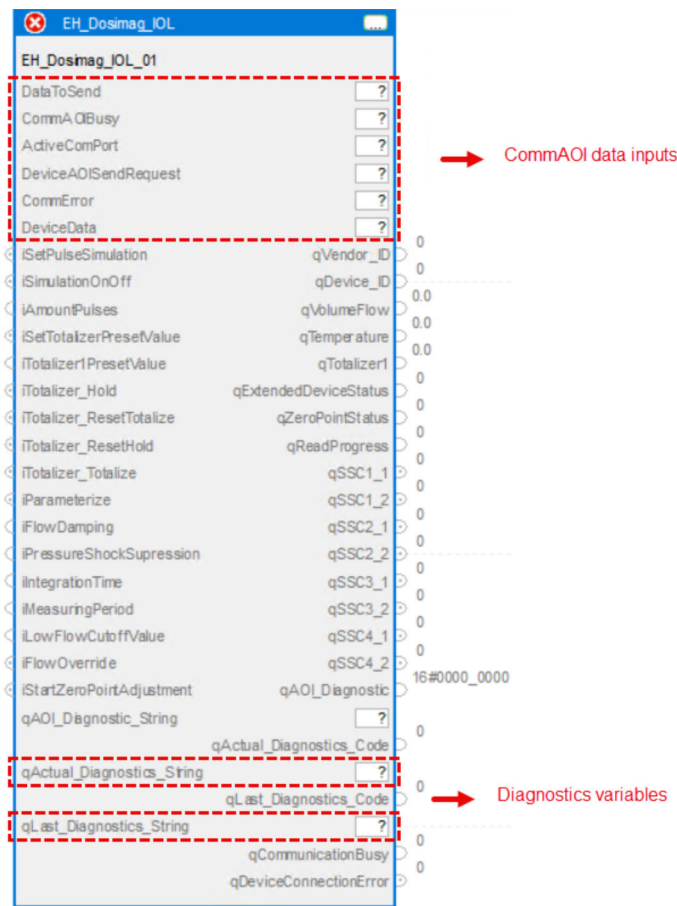
Device AOI designation
EH_Dosimag_IOL

Device ID
9729281

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 status signal
- Starting the zero adjustment
- Control of pulses
- Control of the totalizer

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



 2 EH_Dosimag_IOL device AOI

 The tags of the communication AOI are reused for the "CommAOI data inputs". The "Diagnostics variables" must be created for each device AOI.

Parameters of EH_Dosimag_IOL

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
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 %

Name	P Type	Data Type	Comment
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
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

7.2 Dosimass

Device AOI designation

EH_Dosimass_IOL

Device ID

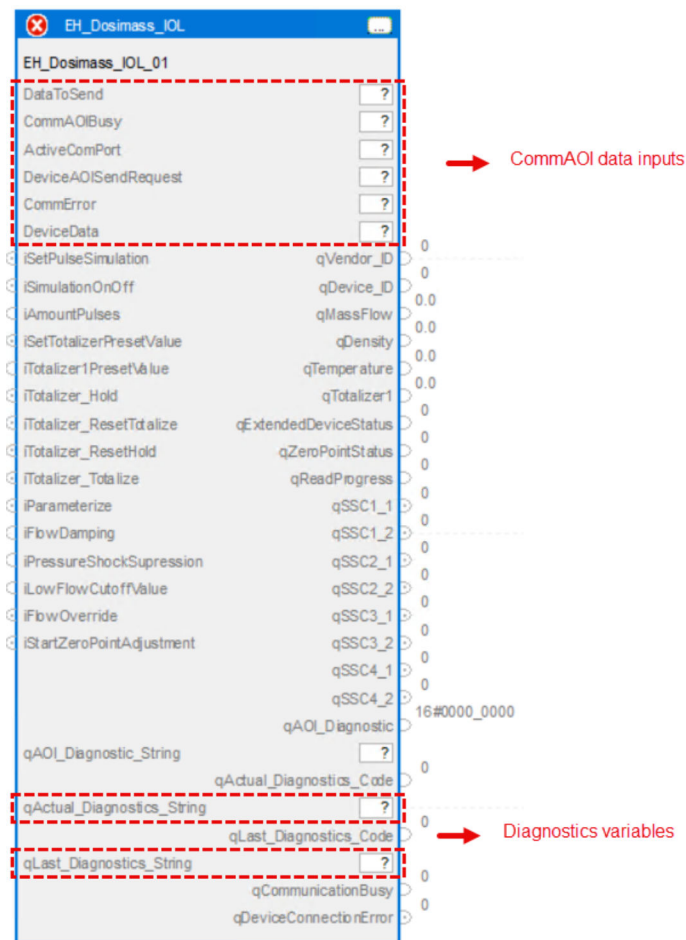
9729025

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 status signal
- Starting the zero adjustment
- Control of pulses
- Control of the totalizer



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



3 EH_Dosimass_IOL device AOI



The tags of the communication AOI are reused for the "CommAOI data inputs". The "Diagnostics variables" must be created for each device AOI.

Parameters of EH_Dosimass_IOL

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
iPressureShockSuppression	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

Name	P Type	Data Type	Comment
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

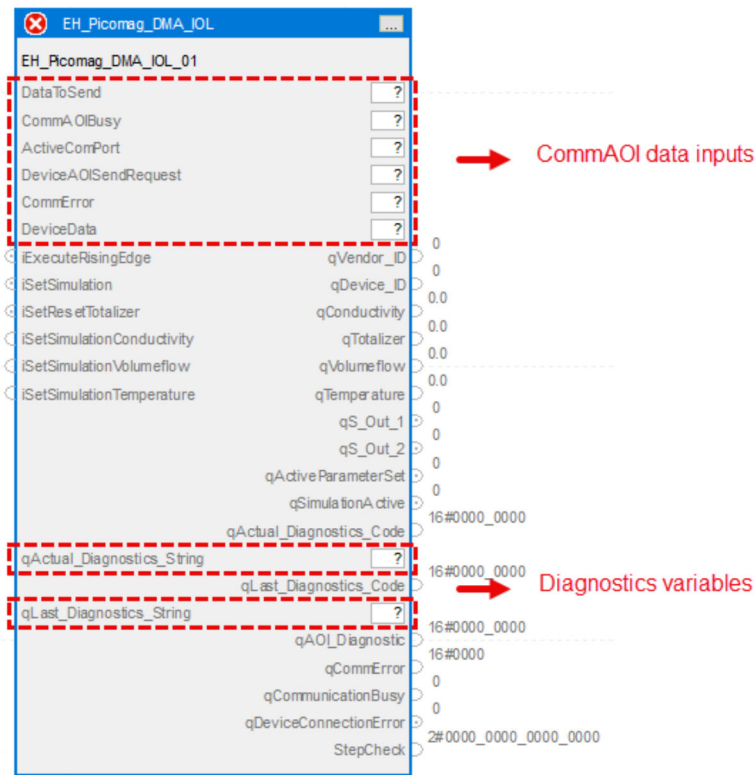
7.3 Picomag (DMA)

Device AOI designation
EH_Picomag_DMA_IOL

Device ID
65792, 65793

- Overview of functions
- Providing the current values for the main measured variables: Volume flow, temperature, totalizer and conductivity
 - Providing the status of switching signals
 - Reading the diagnostic data after triggering of the input iExecute
 - Simulating the main measured variables
 - Resetting the totalizer

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



 4 EH_Picomag_DMA_IOL device AOI

 The tags of the communication AOI are reused for the “CommAOI data inputs”. The “Diagnostics variables” must be created for each device AOI.

Parameters of EH_Picomag_DMA_IOL

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
iExecuteRisingEdge	IN	Bool	Trigger to execute the acyclic routine for parametrization and read out diagnostics
iSetSimulation	IN	Bool	Signal to set device into simulation mode ■ TRUE: Simulation ON ■ FALSE: Simulation OFF
iSetResetTotalizer	IN	Bool	Signal to reset totalizer ■ TRUE: Reset totalizer ■ FALSE: No action
iSetSimulationConductivity	IN	Real	Conductivity value to be simulated
iSetSimulationVolumeFlow	IN	Real	Volume flow value to be simulated
iSetSimulationTemperature	IN	Real	Temperature value to be simulated
qVendor_ID	OUT	DInt	Vendor ID
qDevice_ID	OUT	DInt	Device ID
qConductivity	OUT	Real	Process value conductivity
qTotalizer	OUT	Real	Process value totalizer
qVolumeFlow	OUT	Real	Process value volume flow
qTemperature	OUT	Real	Process value temperature
qS_Out_1	OUT	Bool	Signal switching signal 1
qS_Out_2	OUT	Bool	Signal switching signal 2
qSimulationActive	OUT	Bool	■ TRUE: Simulation mode enabled ■ FALSE: Simulation mode disabled
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
qActual_Diagnostics_String	IN/OUT	String	Current diagnostic text See product documentation
qActual_Diagnostics_Code	OUT	DInt	Current diagnostic code See product documentation
qLast_Diagnostics_String	IN/OUT	String	Previous diagnostic text See product documentation
qLast_Diagnostics_Code	OUT	DInt	Previous diagnostic code See product documentation
qCommunicationBusy	OUT	DInt	IO-Link master communication busy state
qCommError	OUT	Int	Comm AOI error
qDeviceConnectionError	OUT	Bool	■ TRUE: Device disconnected ■ FALSE: Device connected

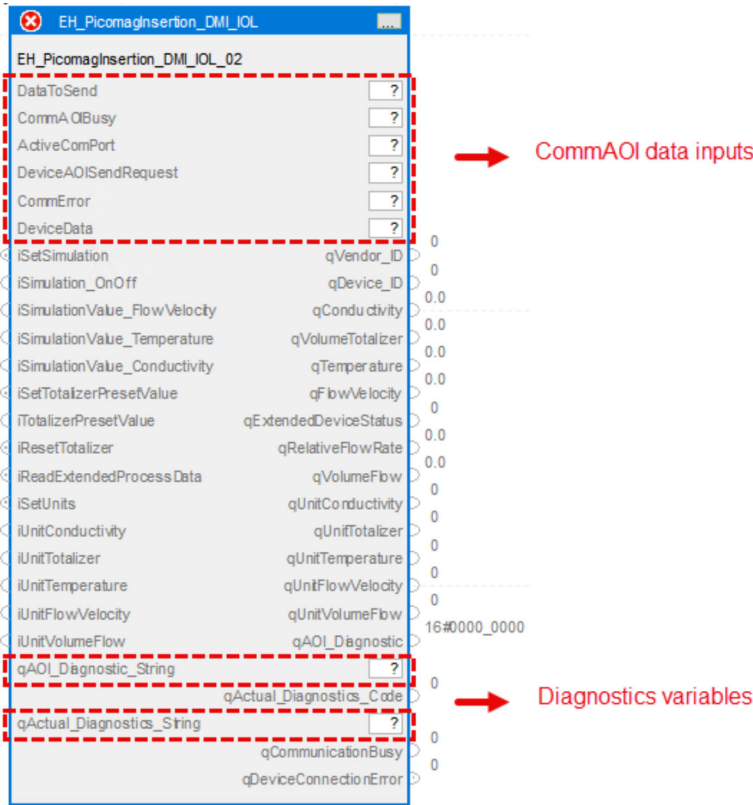
7.4 Picomag Insertion (DMI)

Device AOI designation
EH_PicomagInsertion_DMI_IOL device AOI

Device ID
9728001

- Overview of functions
- Providing the current values for the main measured variables: Conductivity, totalizer, flow velocity and temperature
 - Providing the status of switching signals
 - Reading out the diagnostic data
 - Selecting the units for the main measured variables
 - Simulating the main measured variables
 - Providing the advanced process data “Relative flow rate” and “Volume flow”
 - Controlling the totalizer

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



 5 EH_PicomagInsertion_DMI_IOL device AOI

 The tags of the communication AOI are reused for the “CommAOI data inputs”. The “Diagnostics variables” must be created for each device AOI.

Parameters of EH_PicomagInsertion_DMI_IOL device AOI

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 set device into simulation mode
iSimulation_OnOff	IN	SInt	Simulation state ■ TRUE: Simulation ON ■ FALSE: Simulation Off
iSimulationValue_FlowVelocity	IN	Real	Simulated value flow velocity (–20.0 to 20.0)
iSimulationValue_Temperature	IN	Real	Simulated value temperature
iSimulationValue_Conductivity	IN	Real	Simulated value conductivity
iSetTotalizerPresetValue	IN	Bool	Trigger to set totalizer preset value
iTotalizerPresetValue	IN	Real	Totalizer preset value
iResetTotalizer	IN	Bool	Trigger to reset totalizer
iReadExtendedProcessData	IN	Bool	Trigger to read extended process data
iSetUnits	IN	Bool	Trigger to set units
iUnitConductivity	IN	SInt	Unit for conductivity value ■ 3: S/m ■ 6: mS/cm ■ 8: uS/cm
iUnitTotalizer	IN	Int	Unit for the totalizer value ■ 2: m³ ■ 4: l ■ 10: fl oz (us) ■ 11: gal (us) ■ 22: kgal (us) ■ 150: kl
iUnitTemperature	IN	SInt	Unit for temperature value ■ 32: °C ■ 33: °F
iUnitFlowVelocity	IN	Int	Unit for flow velocity value ■ 21: m/s ■ 22: ft/s ■ 50: ft/h ■ 114: in/s ■ 115: in/min ■ 116: ft/min ■ 120: m/h ■ 240: in/h
iUnitVolumeFlow	IN	SInt	Unit for volume flow value ■ 16: gal/min (us) ■ 17: l/min ■ 18: l/h ■ 19: m³/h ■ 24: l/s ■ 41: fl oz/min
qConductivity	OUT	Real	Process value conductivity
qVolumeTotalizer	OUT	Real	Process value volume totalizer
qTemperature	OUT	Real	Process value temperature
qFlowVelocity	OUT	Real	Process value flow velocity

Name	P Type	Data Type	Comment
qExtendedDeviceStatus	OUT	Int	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
qRelativeFlowRate	OUT	Real	Relative flow rate (Extended process data)
qVolumeFlow	OUT	Real	Volume flow (Extended process data)
qUnitConductivity	OUT	SInt	Selected unit for conductivity value 3: S/m 6: mS/cm 8: uS/cm
iUnitTotalizer	OUT	Int	Selected unit for the totalizer value 2: m³ 4: l 10: fl oz (us) 11: gal (us) 22: kgal (us) 150: kl
iUnitTemperature	OUT	SInt	Selected unit for temperature value 32: °C 33: °F
iUnitFlowVelocity	OUT	Int	Selected unit for flow velocity value 21: m/s 22: ft/s 50: ft/h 114: in/s 115: in/min 116: ft/min 120: m/h 240: in/h
iUnitVolumeFlow	OUT	SInt	Selected unit for volume flow value [??] 16: gal/min (us) 17: l/min 18: l/h 19: m³/h 24: l/s 41: fl oz/min
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
qActual_Diagnostics_String	IN/OUT	String	Current diagnostic text See product documentation
qActual_Diagnostics_Code	OUT	DInt	Current diagnostic code See product documentation
qLast_Diagnostics_String	IN/OUT	String	Previous diagnostic text See product documentation
qLast_Diagnostics_Code	OUT	DInt	Previous diagnostic code See product documentation
qCommunicationBusy	OUT	DInt	IO-Link master communication busy state

Name	P Type	Data Type	Comment
qCommError	OUT	Int	Comm AOI error
qDeviceConnectionError	OUT	Bool	■ TRUE: Device disconnected ■ FALSE: Device connected

7.5 Promag 10

Device AOI designation

EH_Promag10_IOL

Device ID

9728257

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 status signal
- Simulating the main measured variables and other measured variables
- Controlling the totalizer
- Additional functions such as device search and positive zero return
- Starting the Heartbeat Verification and providing the results



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



6 EH_Promag10_IOL device AOI



The tags of the communication AOI are reused for the “CommAOI data inputs”. The “Diagnostics variables” must be created for each device AOI.

Parameters of EH_Promag10_IOL

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: 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
iStart_HeartbeatVerification	IN	Bool	Trigger to start Heartbeat Verification
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

Name	P Type	Data Type	Comment
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
qSSC4_1	OUT	Bool	Status switching signal 4.1
qSSC4_2	OUT	Bool	Status switching signal 4.2
qProgress	OUT	Byte	Progress of the Heartbeat Verification
qVerificationID	OUT	Int	Verification ID
qPassed	OUT	Bool	TRUE: Heartbeat Verification passed
qFailed	OUT	Bool	TRUE: Heartbeat Verification failed
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

7.6 Promass 10

Device AOI designation

EH_Promass10_IOL

Device ID

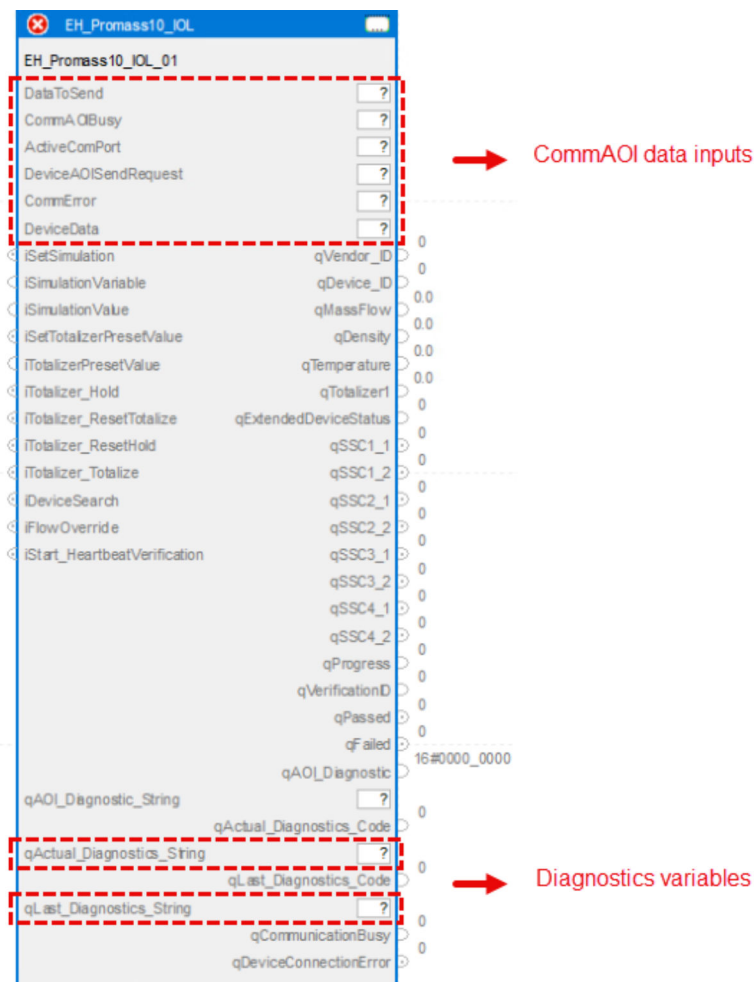
9728513

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 status signal
- Simulating the main measured variables and other measured variables
- Controlling the totalizer
- Additional functions such as device search and positive zero return
- Starting the Heartbeat Verification and providing the results



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



7 EH_Promass10_IOL device AOI



The tags of the communication AOI are reused for the “CommAOI data inputs”. The “Diagnostics variables” must be created for each device AOI.

Parameters of EH_Promass10_IOL

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: 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
iStart_HeartbeatVerification	IN	Bool	Trigger to start Heartbeat Verification
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

Name	P Type	Data Type	Comment
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
qSSC4_1	OUT	Bool	Status switching signal 4.1
qSSC4_2	OUT	Bool	Status switching signal 4.2
qProgress	OUT	Byte	Progress of the Heartbeat Verification
qVerificationID	OUT	Int	Verification ID
qPassed	OUT	Bool	TRUE: Heartbeat Verification passed
qFailed	OUT	Bool	TRUE: Heartbeat Verification failed
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

8 Description of “Level” Add-On Instructions

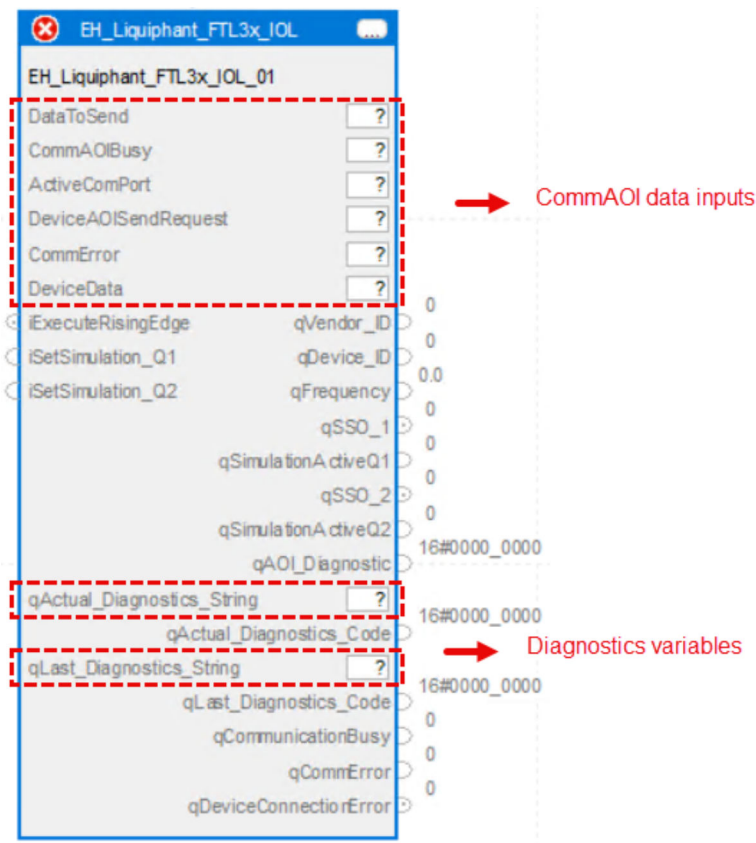
8.1 Liquiphant FTL3x

Device AOI designation
EH_Liquiphant_FTL3x_IOL

Device ID
1024

- Overview of functions**
- Providing the current value for the main measured variable: frequency in percentage
 - Providing the status of switching signals
 - Reading the diagnostic data after triggering of the input iExecute
 - Simulating switching signals

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



 8 Devices-AOI EH_Liquiphant_FTL3x_IOL

 The tags of the communication AOI are reused for the "CommAOI data inputs". The "Diagnostics variables" must be created for each device AOI.

Parameters of EH_Liquiphant_FTL3x_IOL

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
iExecuteRisingEdge	IN	Bool	Trigger to execute the acyclic routine for parametrization and read out diagnostics
iSetSimulation_Q1	IN	Sint	1: Simulate switching signal 1 0: No simulation of switching signal 1
iSetSimulation_Q2	IN	Sint	1: Simulate switching signal 2 0: No simulation of switching signal 2
qVendor_ID	OUT	Dint	Vendor ID
qDevice_ID	OUT	DInt	Device ID
qFrequency	OUT	Real	Process value frequency
qSSO_1	OUT	Bool	Status switching signal 1
qSimulationActiveQ1	OUT	Sint	Simulation Switch Output 1 value 0: Off 1: High 2: Low
qSSO_2	OUT	Bool	Status switching signal 2
qSimulationActiveQ2	OUT	Sint	Simulation Switch Output 2 value 0: Off 1: High 2: Low
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
qActual_Diagnostics_String	IN/OUT	String	Current diagnostic text See product documentation
qActual_Diagnostics_Code	OUT	DInt	Current diagnostic code See product documentation
qLast_Diagnostics_String	IN/OUT	String	Previous diagnostic text See product documentation
qLast_Diagnostics_Code	OUT	DInt	Previous diagnostic code See product documentation
qCommunicationBusy	OUT	DInt	IO-Link master communication busy state
qCommError	OUT	Int	Comm AOI error
qDeviceConnectionError	OUT	Bool	- TRUE: Device disconnected - FALSE: Device connected

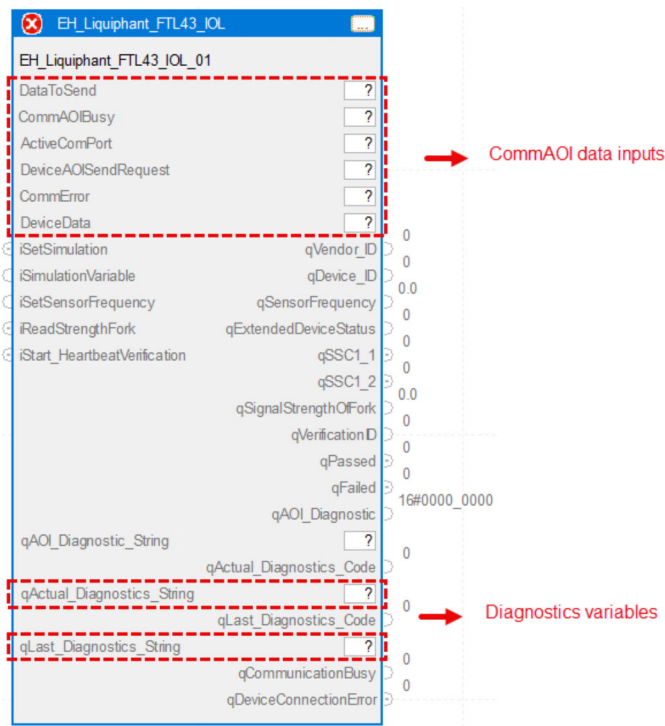
8.2 Liquiphant FTL43

Device AOI designation
EH_Liquiphant_FTL43_IOL

Device ID
9559809

- 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 status signal
 - Providing the strength of the received signal from the vibrating fork
 - Simulating the main measured variable
 - Starting the Heartbeat Verification and providing the results

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



 9 EH_Liquiphant_FTL43_IOL device AOI

 The tags of the communication AOI are reused for the “CommAOI data inputs”. The “Diagnostics variables” must be created for each device AOI.

Parameters of EH_Liquiphant_FTL43_IOL

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
iSimulationVariable	IN	Byte	Variable for simulation mode 0: Off 1: Sensor frequency
iSetSensorFrequency	IN	Real	Frequency value to be simulated
iReadStrengthFork	IN	Bool	Trigger to read the receiving signal strength of the fork
iStart_HeartbeatVerification	IN	Bool	Trigger to start Heartbeat Verification
qVendor_ID	OUT	Dint	Vendor ID
qDevice_ID	OUT	DInt	Device ID
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
qSSC1_1	OUT	Bool	Status switching signal 1.1
qSSC1_2	OUT	Bool	Status switching signal 1.2
qSignalStrengthOfFork	OUT	Real	Oscillation energy coming back from the vibrating fork
qVerificationID	OUT	Int	Verification ID
qPassed	OUT	Bool	TRUE: Heartbeat Verification passed
qFailed	OUT	Bool	TRUE: Heartbeat Verification failed
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

Name	P Type	Data Type	Comment
qCommunicationBusy	OUT	DInt	IO-Link master communication busy state
qDeviceConnectionError	OUT	Bool	■ TRUE: Device disconnected ■ FALSE: Device connected

8.3 Liquipoint FTWx3

Device AOI designation

EH_Liquipoint_FTWx3_IOL

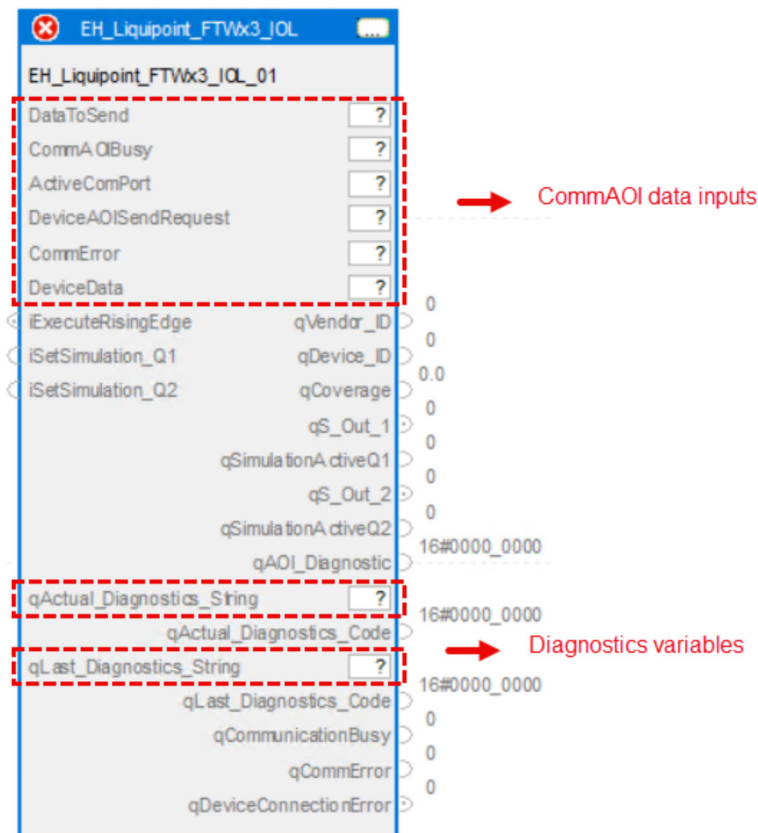
Device ID

512, 1280

Overview of functions

- Providing the current value for the main measured variable: coverage in percent
- Providing the status of switching signals
- Reading the diagnostic data after triggering of the input iExecute
- Simulating switching signals

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



 10 Devices-AOI EH_Liquipoint_FTWx3_IOL

 The tags of the communication AOI are reused for the "CommAOI data inputs". The "Diagnostics variables" must be created for each device AOI.

Parameters of EH_Liquipoint_FTWx3_IOL

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
iExecuteRisingEdge	IN	Bool	Trigger to execute the acyclic routine for parametrization and read out diagnostics
iSetSimulation_Q1	IN	Sint	1: Simulate switching signal 1 0: No simulation of switching signal 1
iSetSimulation_Q2	IN	Sint	1: Simulate switching signal 2 0: No simulation of switching signal 2
qVendor_ID	OUT	Dint	Vendor ID
qDevice_ID	OUT	DInt	Device ID
qCoverage	OUT	Real	Process value coverage
qS_Out_1	OUT	Bool	Status switching signal 1
qSimulationActiveQ1	OUT	Sint	Simulation Switch Output 1 value 0: Off 1: High 2: Low
qS_Out_2	OUT	Bool	Status switching signal 2
qSimulationActiveQ2	OUT	Sint	Simulation Switch Output 2 value 0: Off 1: High 2: Low
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
qActual_Diagnostics_String	IN/OUT	String	Current diagnostic text See product documentation
qActual_Diagnostics_Code	OUT	DInt	Current diagnostic code See product documentation
qLast_Diagnostics_String	IN/OUT	String	Previous diagnostic text See product documentation
qLast_Diagnostics_Code	OUT	DInt	Previous diagnostic code See product documentation
qCommunicationBusy	OUT	DInt	IO-Link master communication busy state
qCommError	OUT	Int	Comm AOI error
qDeviceConnectionError	OUT	Bool	- TRUE: Device disconnected - FALSE: Device connected

8.4 Liquitrend QMW43

Device AOI designation

EH_Liquitrend_QMW43

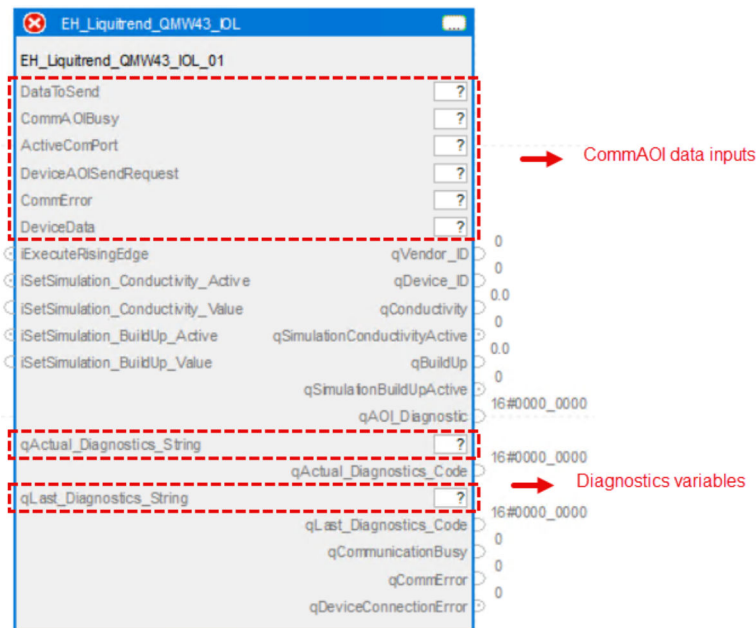
Device ID

1536

Overview of functions

- Providing the current values for the main measured variables: conductivity and coverage
- Reading the diagnostic data after triggering of the input iExecute
- Simulating the main measured variables

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



 11 Devices-AOI EH_Liquitrend_QMW43_IOL

 The tags of the communication AOI are reused for the "CommAOI data inputs". The "Diagnostics variables" must be created for each device AOI.

Parameters of EH_Liquitrend_QMW43

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
iExecuteRisingEdge	IN	Bool	Trigger to execute the acyclic routine for parametrization and read out diagnostics
iSetSimulation_Conductivity_Active	IN	Bool	Signal to simulate the entered conductivity value ■ 1: Simulation ON ■ 0: Simulation OFF

Name	P Type	Data Type	Comment
iSetSimulation_Conductivity_Value	IN	Dint	Conductivity value to be simulated
iSetSimulation_BuildUp_Active	IN	Bool	Signal to simulate the entered buildup value 1: Simulation ON 0: Simulation OFF
iSetSimulation_BuildUp_Value	IN	Dint	Buildup value to be simulated
qVendor_ID	OUT	Dint	Vendor ID
qDevice_ID	OUT	DInt	Device ID
qConductivity	OUT	Real	Process value conductivity
qSimulationConductivityActive	OUT	Bool	Simulation conductivity value 1: Simulation ON 0: Simulation OFF
qBuildUp	OUT	Real	Process value buildup
qSimulationBuildupActive	Out	Bool	Simulation buildup value 1: Simulation ON 0: Simulation OFF
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
qActual_Diagnostics_String	IN/OUT	String	Current diagnostic text See product documentation
qActual_Diagnostics_Code	OUT	DInt	Current diagnostic code See product documentation
qLast_Diagnostics_String	IN/OUT	String	Previous diagnostic text See product documentation
qLast_Diagnostics_Code	OUT	DInt	Previous diagnostic code See product documentation
qCommunicationBusy	OUT	DInt	IO-Link master communication busy state
qCommError	OUT	Int	Comm AOI error
qDeviceConnectionError	OUT	Bool	- TRUE: Device disconnected - FALSE: Device connected

8.5 Micropilot FMR43

Device AOI designation

EH_Micropilot_FMR43_IOL

Device ID

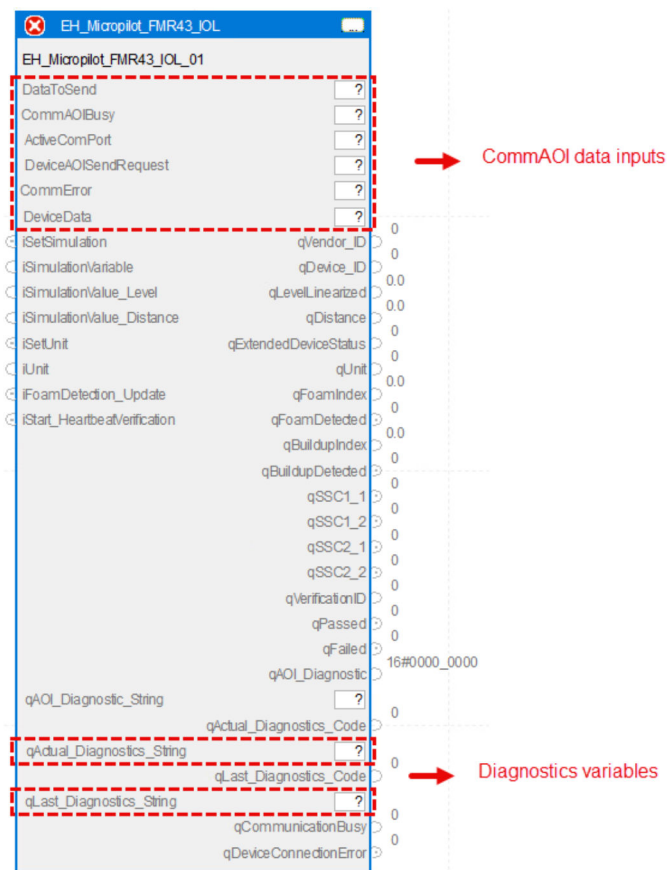
9553409

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 status signal
- Selecting 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)
- Providing Heartbeat Diagnostics
- Starting the Heartbeat Verification and providing the results



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



12 EH_Micropilot_FMR43_IOL device AOI



The tags of the communication AOI are reused for the “CommAOI data inputs”. The “Diagnostics variables” must be created for each device AOI.

Parameters of EH_Micropilot_FMR43_IOL

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
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
iFoamDetection_Update	IN	Bool	Trigger to read Foam detections values while corresponding diagnostic is active Do not set it permanently to TRUE.
iStart_HeartbeatVerification	IN	Bool	Trigger to start Heartbeat Verification
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

Name	P Type	Data Type	Comment
qVerificationID	OUT	Int	Verification ID
qPassed	OUT	Bool	TRUE: Heartbeat Verification passed
qFailed	OUT	Bool	TRUE: Heartbeat Verification failed
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
qCommError	OUT	Int	Comm AOI error
qDeviceConnectionError	OUT	Bool	▪ TRUE: Device disconnected ▪ FALSE: Device connected

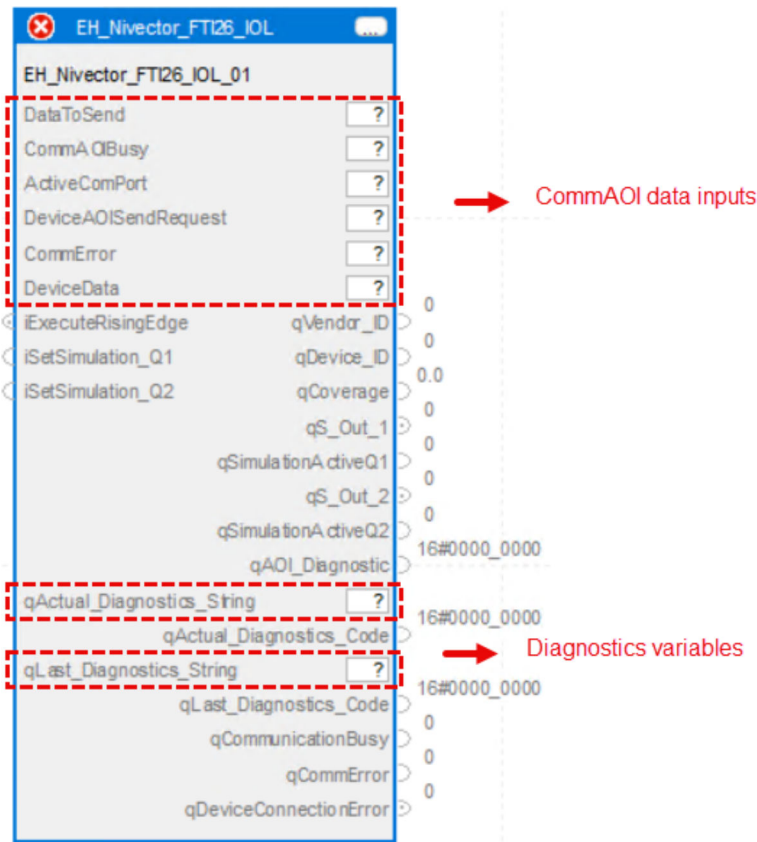
8.6 Nivector FTI26

Device AOI designation
EH_Nivector_FT126_IOL

Device ID
768, 769

- Overview of functions**
- Providing the current value for the main measured variable: Coverage in percent
 - Providing the status of switching signals
 - Reading the diagnostic data after triggering of the input iExecute
 - Simulating switching signals

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



 13 EH_Nivector_FT126_IOL device AOI

 The tags of the communication AOI are reused for the “CommAOI data inputs”. The “Diagnostics variables” must be created for each device AOI.

Parameters of EH_Nivector_FT126_IOL

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
iExecuteRisingEdge	IN	Bool	Trigger to execute the acyclic routine for parametrization and read out diagnostics
iSetSimulation_Q1	IN	Sint	1: Simulate switching signal 1 0: No simulation of switching signal 1
iSetSimulation_Q2	IN	Sint	1: Simulate switching signal 2 0: No simulation of switching signal 2
qVendor_ID	OUT	Dint	Vendor ID
qDevice_ID	OUT	DInt	Device ID
qCoverage	OUT	Real	Process value coverage
qS_Out_1	OUT	Bool	Status switching signal 1
qSimulationActiveQ1	OUT	Sint	Simulation Switch Output 1 value 0: Off 1: High 2: Low
qS_Out_2	OUT	Bool	Status switching signal 2
qSimulationActiveQ2	OUT	Sint	Simulation Switch Output 2 value 0: Off 1: High 2: Low
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
qActual_Diagnostics_String	IN/OUT	String	Current diagnostic text See product documentation
qActual_Diagnostics_Code	OUT	DInt	Current diagnostic code See product documentation
qLast_Diagnostics_String	IN/OUT	String	Previous diagnostic text See product documentation
qLast_Diagnostics_Code	OUT	DInt	Previous diagnostic code See product documentation
qCommunicationBusy	OUT	DInt	IO-Link master communication busy state
qCommError	OUT	Int	Comm AOI error
qDeviceConnectionError	OUT	Bool	- TRUE: Device disconnected - FALSE: Device connected

9 Description of “Pressure” Add-On Instructions

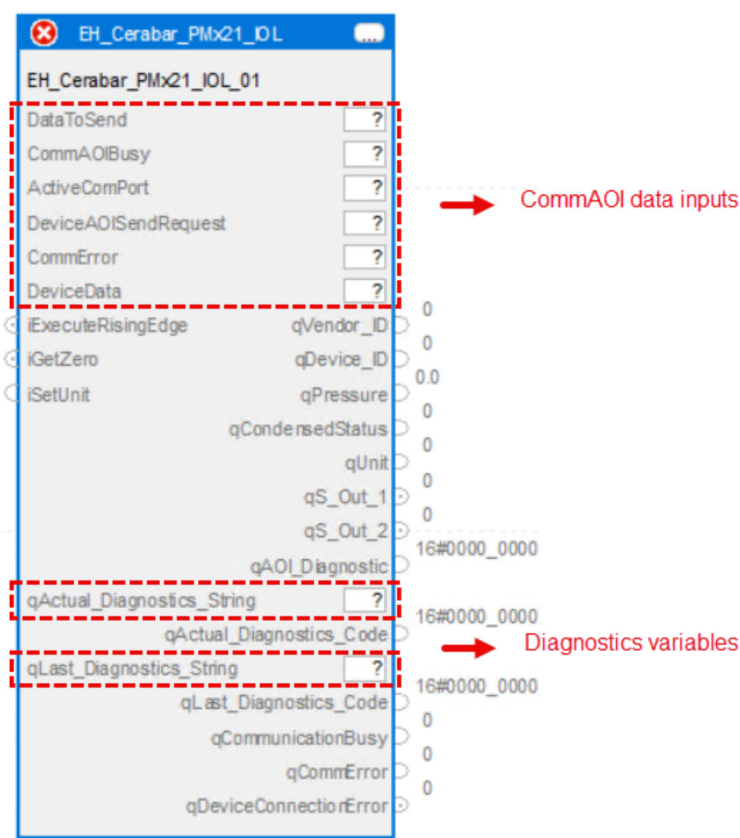
9.1 Cerabar PMx21

Device AOI designation
EH_Cerabar_PMPx21_IOL

Device ID
3841

- Overview of functions
- Providing the current value for the main measured variable: pressure
 - Providing the status of the switching signal
 - Reading the diagnostic data after triggering of the input iExecute
 - Selection of the unit for the pressure value
 - Adopting the applied pressure as the zero point

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



 14 Devices-AOI EH_Cerabar_PMPx21_IOL

 The tags of the communication AOI are reused for the "CommAOI data inputs". The "Diagnostics variables" must be created for each device AOI.

Parameters of EH_Cerabar_PMPx21_IOL

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
iExecuteRisingEdge	IN	Bool	Trigger to execute the acyclic routine for parametrization and read out diagnostics
iGetZero	IN	Bool	- TRUE: Adopt the applied pressure as zero - FALSE: No action
iUnit	IN	DInt	Unit for pressure value 0: bar 1: kPa 2: psi 3: MPa
qVendor_ID	OUT	DInt	Vendor ID
qDevice_ID	OUT	DInt	Device ID
qPressure	OUT	Real	Process value pressure
qCondensedStatus	OUT	Int	0: Not specified 36: Failure 60: Functional check 120: Out of specification 128: Good 129: Simulation 164: Maintenance required
qUnit	OUT	DInt	Selected unit for pressure value 0: bar 6: psi 8: mbar 11: Pa 12: kPa 237: MPa
qS_Out_1	OUT	Bool	Switch output 1
qS_Out_2	OUT	Bool	Switch output 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
qActual_Diagnostics_String	IN/OUT	String	Current diagnostic text See product documentation
qActual_Diagnostics_Code	OUT	DInt	Current diagnostic code See product documentation
qLast_Diagnostics_String	IN/OUT	String	Previous diagnostic text See product documentation
qLast_Diagnostics_Code	OUT	DInt	Previous diagnostic code See product documentation
qCommunicationBusy	OUT	DInt	IO-Link master communication busy state
qCommError	OUT	Int	Comm AOI error
qDeviceConnectionError	OUT	Bool	- TRUE: Device disconnected - FALSE: Device connected

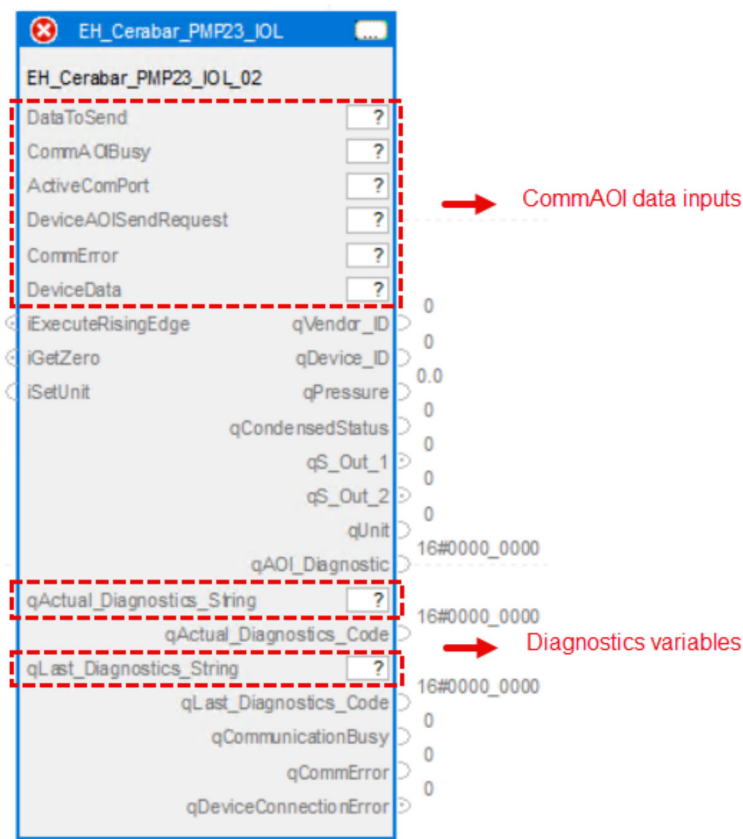
9.2 Cerabar PMP23

Device AOI designation
EH_Cerabar_PMP23_IOL

Device ID
256, 257, 258

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

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



 15 EH_Cerabar_PMP23_IOL device AOI

 The tags of the communication AOI are reused for the "CommAOI data inputs". The "Diagnostics variables" must be created for each device AOI.

Parameters of EH_Cerabar_PMP23_IOL

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
iExecuteRisingEdge	IN	Bool	Trigger to execute the acyclic routine for parametrization and read out diagnostics
iGetZero	IN	Bool	- TRUE: Adopt the applied pressure as zero - FALSE: No action
iUnit	IN	DInt	Unit for pressure value 0: bar 1: kPa 2: psi 3: MPa
qVendor_ID	OUT	Dint	Vendor ID
qDevice_ID	OUT	DInt	Device ID
qPressure	OUT	Real	Process value pressure
qCondensedStatus	OUT	Int	0: Not specified 36: Failure 60: Functional check 120: Out of specification 128: Good 129: Simulation 164: Maintenance required
qUnit	OUT	Dint	Selected unit for pressure value 0: bar 6: psi 8: mbar 11: Pa 12: kPa 237: MPa
qS_Out_1	OUT	Bool	Switch output 1
qS_Out_2	OUT	Bool	Switch output 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
qActual_Diagnostics_String	IN/OUT	String	Current diagnostic text See product documentation
qActual_Diagnostics_Code	OUT	DInt	Current diagnostic code See product documentation
qLast_Diagnostics_String	IN/OUT	String	Previous diagnostic text See product documentation
qLast_Diagnostics_Code	OUT	DInt	Previous diagnostic code See product documentation
qCommunicationBusy	OUT	DInt	IO-Link master communication busy state
qCommError	OUT	Int	Comm AOI error
qDeviceConnectionError	OUT	Bool	- TRUE: Device disconnected - FALSE: Device connected

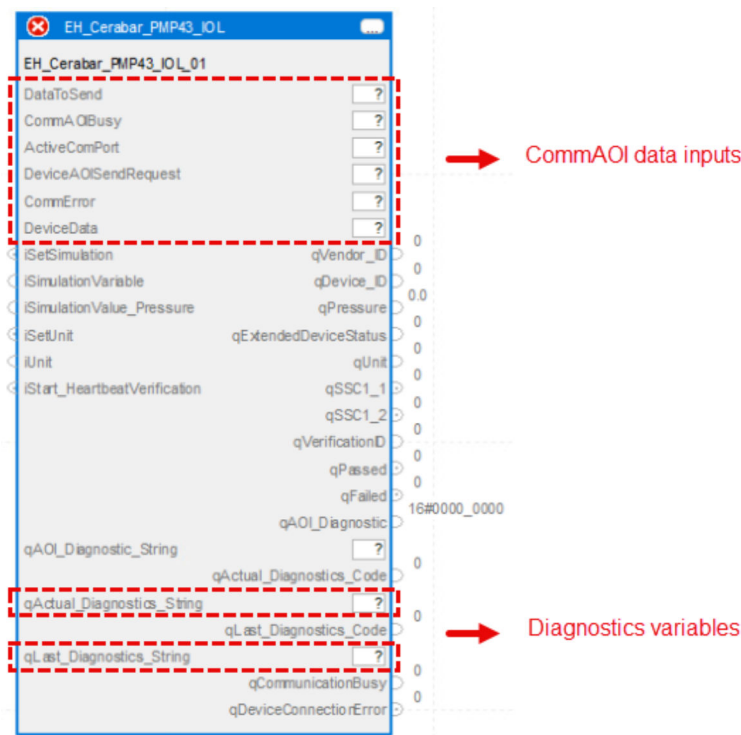
9.3 Cerabar PMP43

Device AOI designation
EH_Cerabar_PMP43_IOL

Device ID
9618689

- Overview of functions
- Providing the current value for the main measured variable: Pressure
 - Providing the status of switching signals
 - Providing the extended status signal
 - Selecting the unit for the pressure value
 - Simulating the main measured variable
 - Starting the Heartbeat Verification and providing the results

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



 16 EH_Cerabar_PMP43_IOL device AOI

 The tags of the communication AOI are reused for the “CommAOI data inputs”. The “Diagnostics variables” must be created for each device AOI.

Parameters of EH_Cerabar_PMP43_IOL

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
iSimulationVariable	IN	Int	Variable for simulation mode ■ 0: Off ■ 1: Pressure
iSetSimulationValue_Pressure	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
iStart_HeartbeatVerification	IN	Bool	Trigger to start Heartbeat Verification
qVendor_ID	OUT	Dint	Vendor ID
qDevice_ID	OUT	DInt	Device ID
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 pressure ■ 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
qVerificationID	OUT	Int	Verification ID
qPassed	OUT	Bool	TRUE: Heartbeat Verification passed
qFailed	OUT	Bool	TRUE: Heartbeat Verification failed
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

Name	P Type	Data Type	Comment
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

9.4 Ceraphant PTx3xB

Device AOI designation

EH_Ceraphant_PTx3xB_IOL

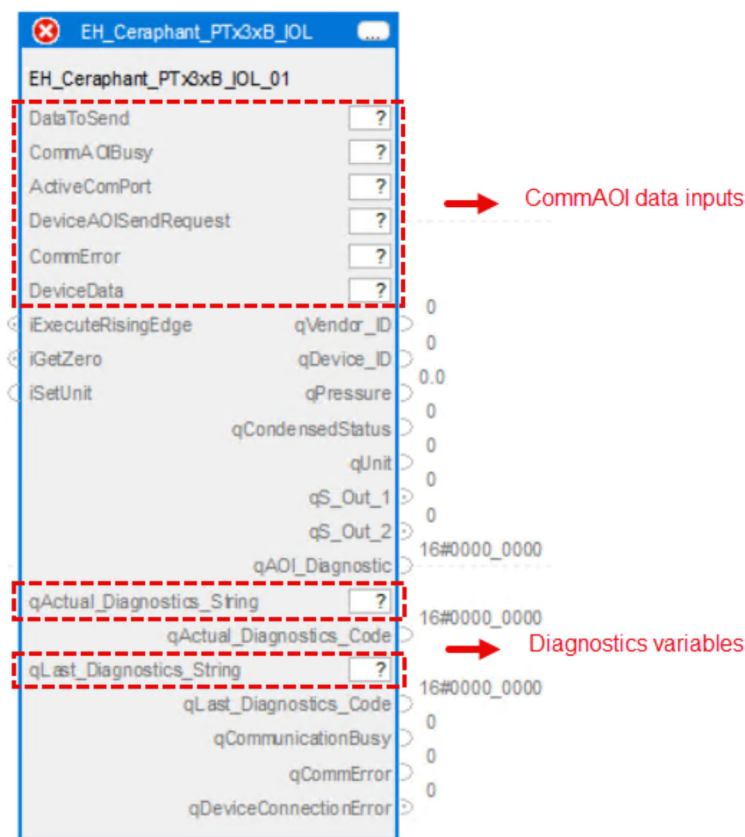
Device ID

1792, 1793

Overview of functions

- Providing the current value for the main measured variable: pressure
- Providing the status of switching signals
- Reading the diagnostic data after triggering of the input iExecute
- Selection of the unit for the pressure value
- Adopting the applied pressure as the zero point

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



 17 Devices-AOI EH_Ceraphant_PTx3xB_IOL

 The tags of the communication AOI are reused for the "CommAOI data inputs". The "Diagnostics variables" must be created for each device AOI.

Parameters of EH_Ceraphant_PTx3xB_IOL

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
iExecuteRisingEdge	IN	Bool	Trigger to execute the acyclic routine for parametrization and read out diagnostics
iGetZero	IN	Bool	- TRUE: Adopt the applied pressure as zero - FALSE: No action
iUnit	IN	DInt	Unit for pressure value 0: bar 1: kPa 2: psi 3: MPa
qVendor_ID	OUT	Dint	Vendor ID
qDevice_ID	OUT	DInt	Device ID
qPressure	OUT	Real	Process value pressure
qCondensedStatus	OUT	Int	0: Not specified 36: Failure 60: Functional check 120: Out of specification 128: Good 129: Simulation 164: Maintenance required
qUnit	OUT	Dint	Selected unit for pressure value 0: bar 6: psi 8: mbar 11: Pa 12: kPa 237: MPa
qS_Out_1	OUT	Bool	Switch output 1
qS_Out_2	OUT	Bool	Switch output 2
qPressure	OUT	Real	Process value pressure
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
qActual_Diagnostics_String	IN/OUT	String	Current diagnostic text See product documentation
qActual_Diagnostics_Code	OUT	DInt	Current diagnostic code See product documentation
qLast_Diagnostics_String	IN/OUT	String	Previous diagnostic text See product documentation
qLast_Diagnostics_Code	OUT	DInt	Previous diagnostic code See product documentation
qCommunicationBusy	OUT	DInt	IO-Link master communication busy state
qCommError	OUT	Int	Comm AOI error
qDeviceConnectionError	OUT	Bool	- TRUE: Device disconnected - FALSE: Device connected

10 Description of “Temperature” Add-On Instructions

10.1 iTHERM CompactLine TM311

Device AOI designation

EH_iTherm_TM311_IOL

Device ID

196864, 8585472

Overview of functions

- Providing the current value for the main measured variable: Temperature
- Providing the status of the switching signal
- Cyclic delivery of the summarized status signal
- Reading the diagnostic data after triggering of the input iExecute
- Selecting the unit for the temperature value
- Simulating the main measured variable

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



 18 EH_iTherm_TM311_IOL device AOI

 The tags of the communication AOI are reused for the “CommAOI data inputs”. The “Diagnostics variables” must be created for each device AOI.

Parameters of EH_iTherm_TM311_IOL

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
iExecuteRisingEdge	IN	Bool	Trigger to execute the acyclic routine for parametrization and read out diagnostics
iSetSimulation	IN	Bool	Signal to set device into simulation mode ■ TRUE: Simulation ON ■ FALSE: Simulation OFF
iSetSimulationTemperature	IN	Real	Temperature value to be simulated
iSetUnit	IN	Dint	Unit for temperature value ■ 32: °Celsius ■ 33: °Fahrenheit ■ 35: Kelvin
qVendor_ID	OUT	Dint	Vendor ID
qDevice_ID	OUT	DInt	Device ID
qTemperature	OUT	Real	Process value temperature
qNegativOutOfRange	OUT	Bool	■ TRUE: Out of range (–) active ■ FALSE: Out of range (–) inactive
qPositivOutOfRange	OUT	Bool	■ TRUE: Out of range (+) active ■ FALSE: Out of range (+) inactive
qNoMeasurementData	OUT	Bool	■ TRUE: No measurement data active ■ FALSE: No measurement data inactive
qSensorStatus	OUT	Sint	Sensor status value ■ 0: Bad, not limited ■ 1: Bad, low limited ■ 2: Bad, high limited ■ 3: Bad, constant ■ 4: Uncertain, not limited ■ 5: Uncertain, low limited ■ 6: Uncertain, high limited ■ 7: Uncertain, constant ■ 8: Manual, fixed, not limited ■ 9: Manual, fixed, low limited ■ 10: Manual, fixed, high limited ■ 11: Manual, fixed, constant ■ 12: Good, not limited ■ 13: Good, low limited ■ 14: Good, high limited ■ 15: Good, constant
qS_Out_1	OUT	Bool	Switch output 1
qSimulation	OUT	Bool	Simulated value
qUnit	OUT	Dint	Selected unit for temperature value

Name	P Type	Data Type	Comment
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
qActual_Diagnostics_String	IN/OUT	String	Current diagnostic text See product documentation
qActual_Diagnostics_Code	OUT	DInt	Current diagnostic code See product documentation
qLast_Diagnostics_String	IN/OUT	String	Previous diagnostic text See product documentation
qLast_Diagnostics_Code	OUT	DInt	Previous diagnostic code See product documentation
qCommunicationBusy	OUT	DInt	IO-Link master communication busy state
qCommError	OUT	Int	Comm AOI error
qDeviceConnectionError	OUT	Bool	▪ TRUE: Device disconnected ▪ FALSE: Device connected

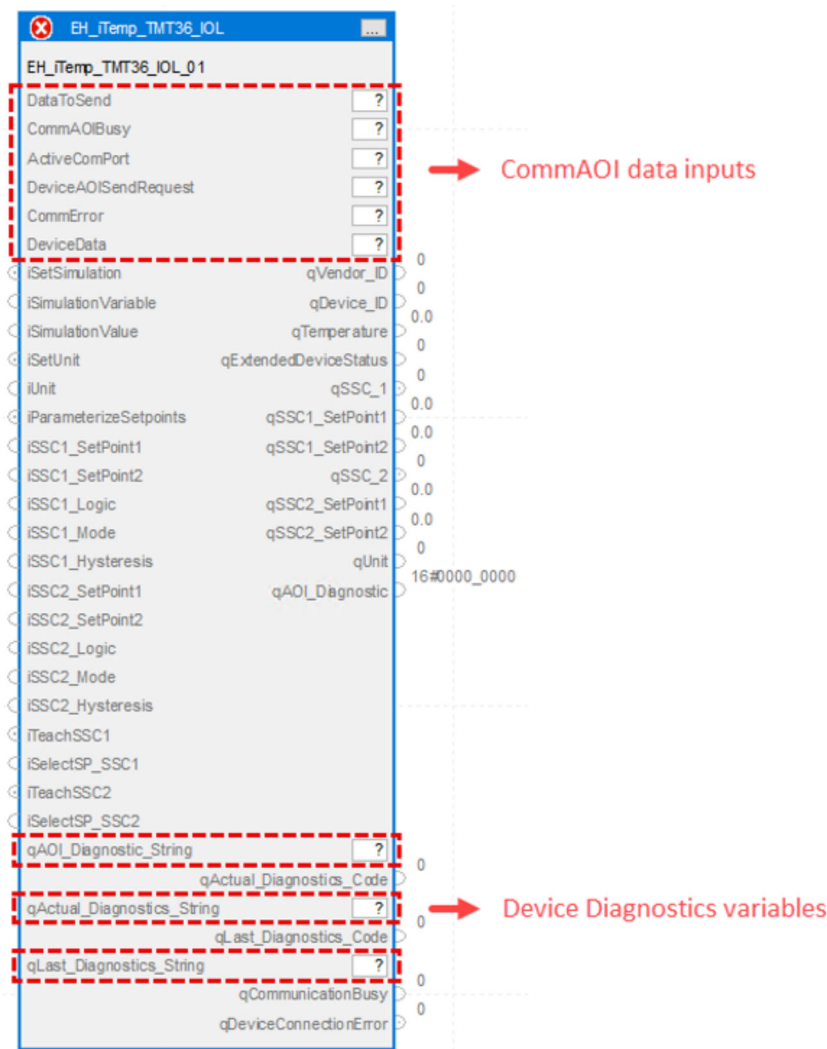
10.2 iTEMP TMT36

Device AOI designation
EH_iTEMP_TMT36_IOL

Device ID
9698817

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

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



 19 EH_iTEMP_TMT36_IOL device AOI

 The tags of the communication AOI are reused for the “CommAOI data inputs”. The “Diagnostics variables” must be created for each device AOI.

Parameters of EH_iTEMP_TMT36_IOL

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	Real	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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