# ADIO-EI (Studio 5000 Logix Designer Guide)

User Manual MTO-ADIOEIU1-V1.0-2202US

Thank you for purchasing an Autonics product.
This user manual contains information about the product and its proper use,
and should be kept in a place where it will be easy to access.

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# Contents

# Preface

Thank you for purchasing Autonics products.
Be sure to read and follow the **Safety Precautions** thoroughly before use.
This manual contains information about the product and how to use it properly, so keep it in a place where users can easily find it.

# Manual Guide

- Use the product after fully reading the contents of the manual.
- The manual explains the product functions in detail and does not guarantee the contents other than the manual.
- Any or all of the manual may not be edited or copied without permission.
- The manual is not provided with the product.
- Download and use from our website (www.autonics.com).
- The contents of the manual are subject to change without prior notice according to the improvement of the product's performance, and upgrade notices are provided through our website.
- We put a lot of effort to make the contents of the manual a little easier and more accurate. Nevertheless, if you have any corrections or questions, please feel free to comment through our website.

# Common Symbols in the Manual

Failure to follow instructions may result in serious injury or death.

Failure to follow instructions may result in injury or product damage.

Supplementary explanation of the function

Example of that function

Important information about the feature

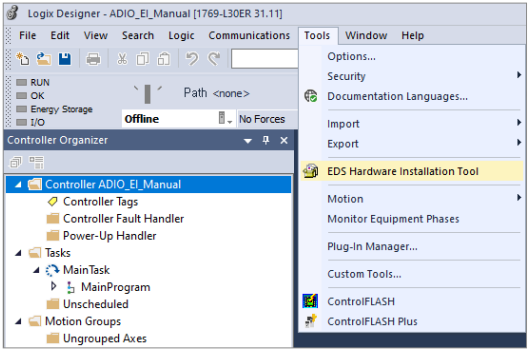
# 1. ADIO-EI (Studio 5000 Logix Designer Guide)

- Be sure to see the product manual of the ADIO-EI (EtherNet/IP) model and follow the precautions.
- This guide document describes the configuration and settings of the ADIO-EI (EtherNet/IP) model based on Studio 5000 Logix Designer which is Rockwell Automation's project planning software.
- Refer to the project configuration used in this documentation below.
  - CompactLogix™ 5370 controller: 1769-L30ER

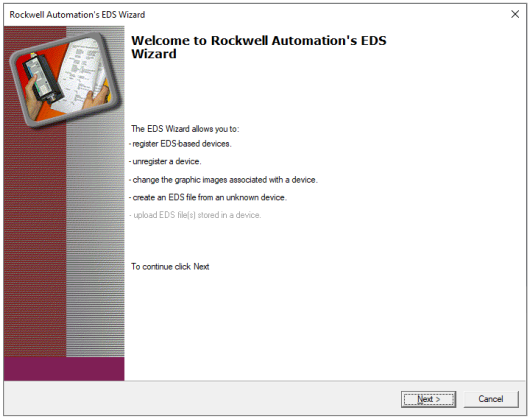
## 1.1. Install EDS File

The EDS file describes specific data information about the EtherNet/IP Slave (Adapter) required for EtherNet/IP project planning software, and defines parameters, process data and valid values for the configuration of IO-Link communication.

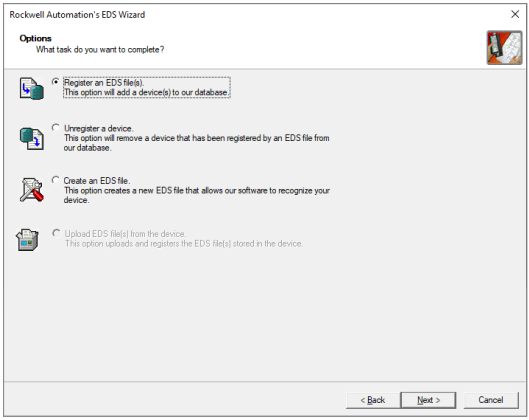
1. Download the ADIO-EI's EDS file on the Autonics website.
2. Launch Studio 5000 Logix Designer.
3. Select **Tools** » **EDS Hardware Installation Tool**.



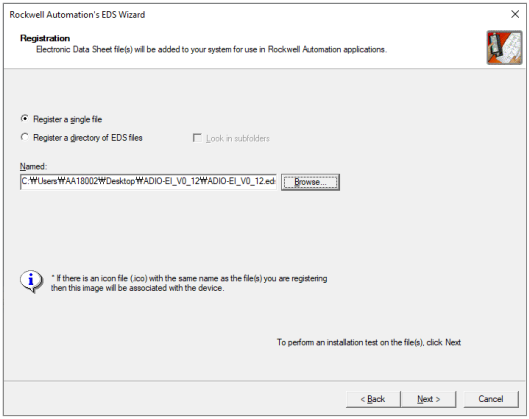
4. The EDS Wizard begins.



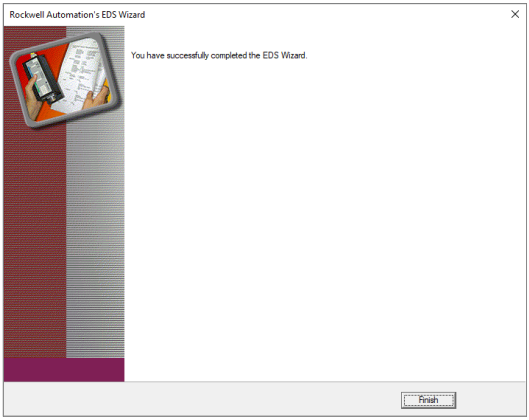

5. Select Register an EDS file(s).



6. Define a path of the EDS file.




7. Keep the EDS Wizard and register the EDS file to the project.



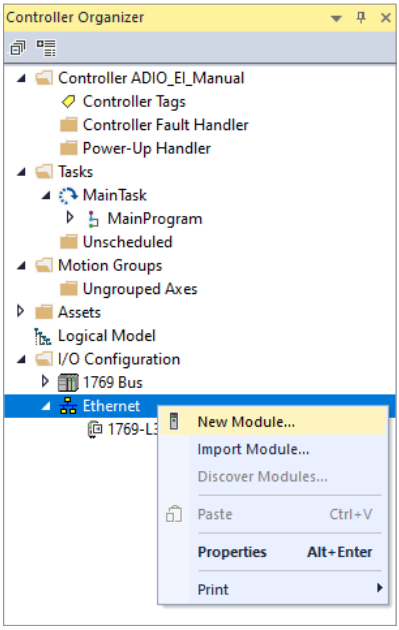
## 1.2. Configure the Ethernet Module (ADIO-EI)

**IP address settings**

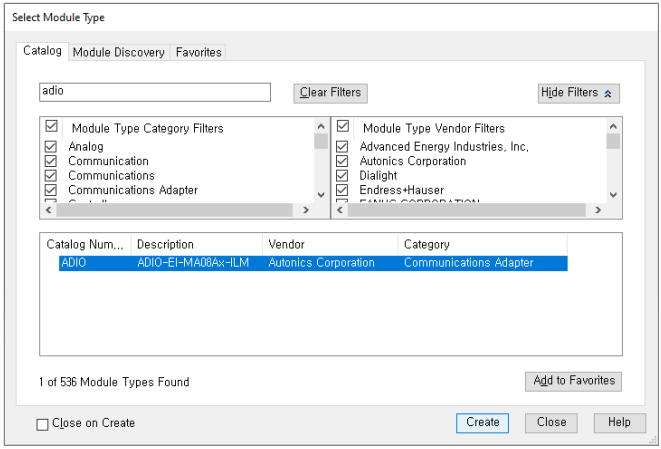
The setting method of IP address is different depending on the number of rotary switches on the ADIO-EI. See the table below and consider your environment for selecting the setting method of IP address.
The static IP address is used in this guide document.

| Setting mode | Rotary switches | Description |
|---|---|---|
| Default IP address | 000 | The IP address stored in the ADIO-EI's EEPROM. |
| Static IP address | 001 to 255 | Set the last octet of the IP address.<br>• 192.168.2.□□□ |
| BOOTP | 800 to 899 | Set the IP address in BOOTP. |
| DHCP | 900 to 999 | Set the IP address in the DHCP server. |

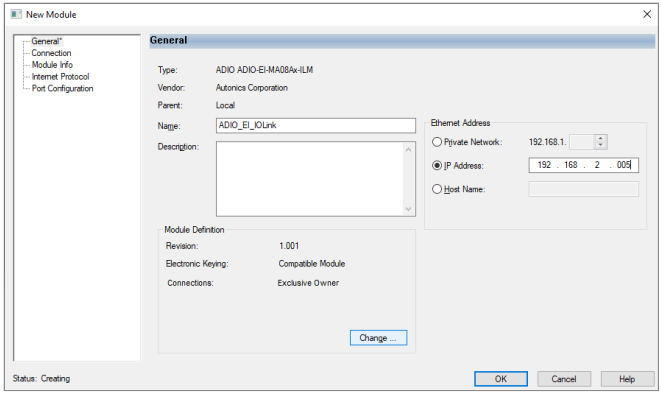
1. Right-click **Controller Organizer** » **I/O Configuration** » **Ethernet** on the left side of the screen, and select **New Module**.



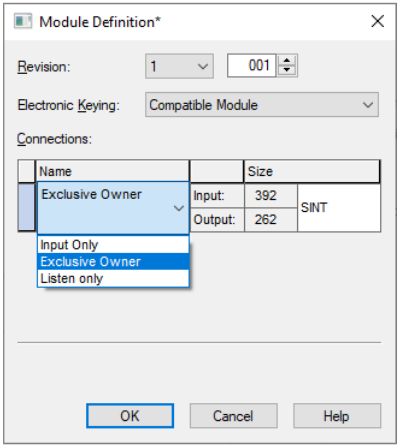
2. Enter a Series Name of IO-Link Master (e.g., ADIO), select the available module, and click **Create**.



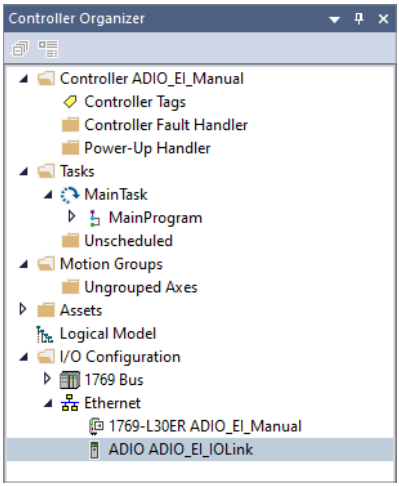

3. Assign a Name of the Ethernet module and IP address, then click **Change** to open the **Module Definition** window.



4. Select the Connections type as **Exclusive Owner** and check the size, then click **OK**.

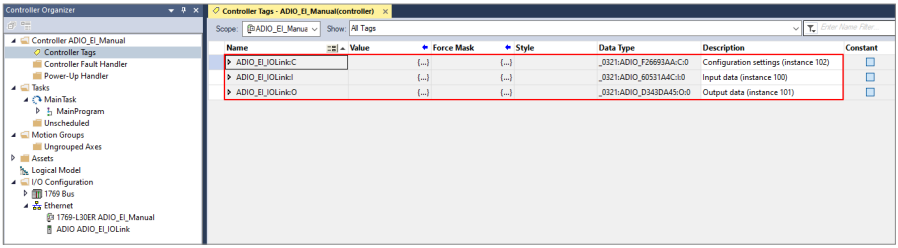



5. The ethernet module is created under the **Controller Organizer** » **I/O Configuration** » **Ethernet**.



# 1.3. Controller Tags

Controller Tags for configuring ADIO-EI are automatically created after the installation of EDS file is completed. The controller tags make you available to set input, output and configuration data or use the ladder logic. For more information about methods and examples of configuration, refer to the next chapter.




**Structure of Instance Assembly**

For detailed information on the instances, refer to  4, Instance.

- Module Name: C → Configuration Assembly (Instance 102)
- Module name: I → Input Assembly (Instance 100)
- Module Name: O → Output Assembly (Instance 101)

**Controller tags and mapping**

e.g.) module name:**C.Data[0].0~1**

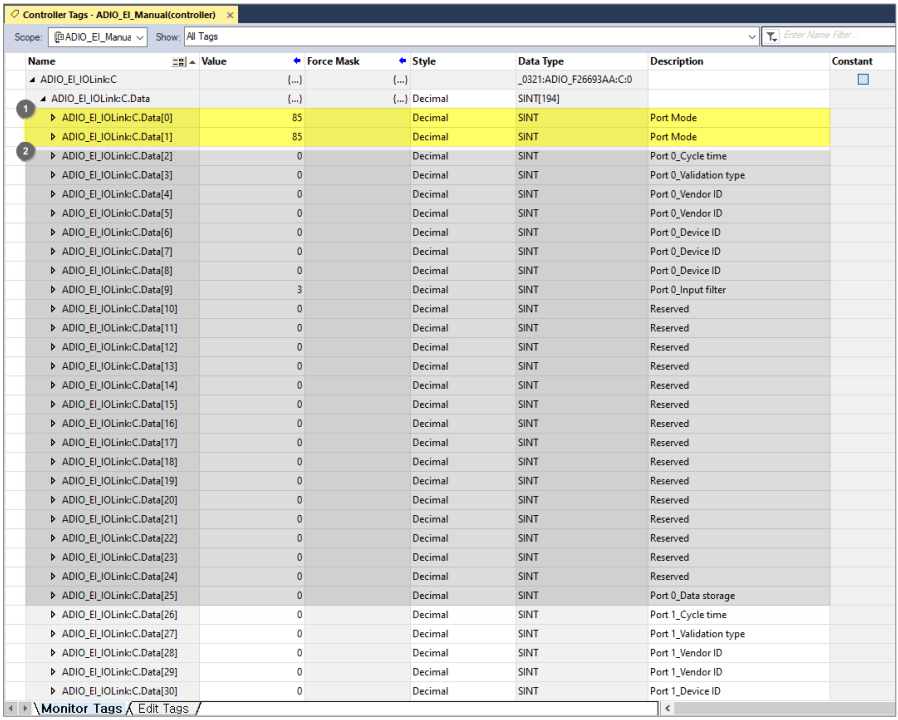
- Since the name structure of controller tag is module name:**Configuration.Data[Index].Bit number**, it means the port 0 consisted of two bits (0 to 1) in the index 0 from Configuration Assembly.

| Index | Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
|---|---|---|---|---|---|---|---|---|
| 0 | Port 3 | | Port 2 | | Port 1 | | Port 0 | |
| 1 | Port 7 | | Port 6 | | Port 5 | | Port 4 | |

# 1.4. Configure I/O Port: Instance 102

Expand **module name:C** in Controller Tags to find more tags for port configuration.
The attributes of Instance 102 is shown in the figure below and this document describes based on the index of port 0.

- For detailed information, refer to 4.1, “Instance 102: Parameter Data”.

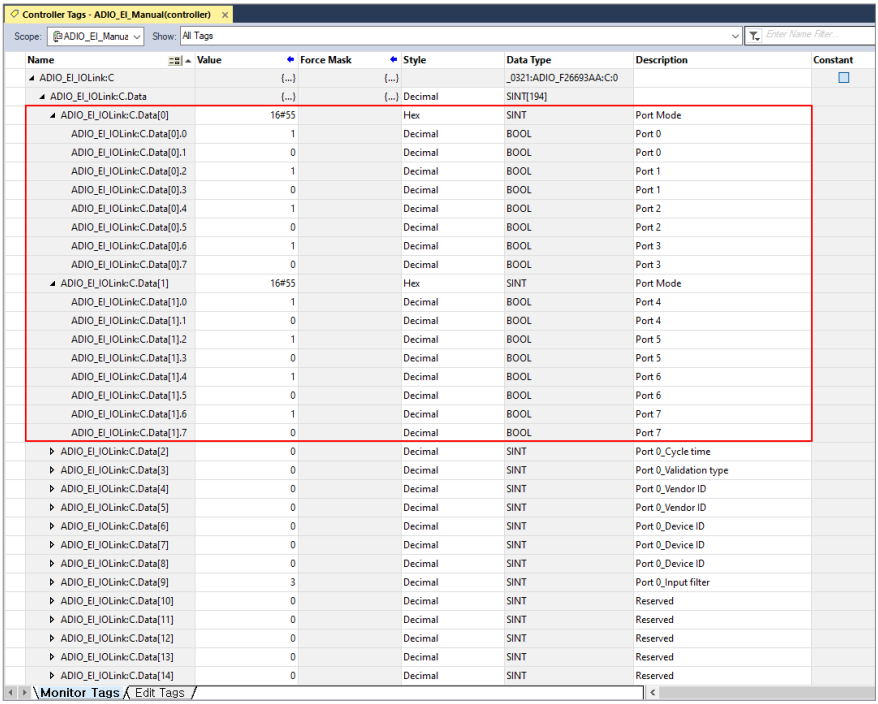


## 1.4.1. Configure Operation Mode

1. Double-click the Controller Tags on the left side of screen and expand **Module Name:C**.
2. Refer to the mapping of 4.1.2, “Port Mode” and designate the operation mode to each port.

**Configure the IO-Link mode**

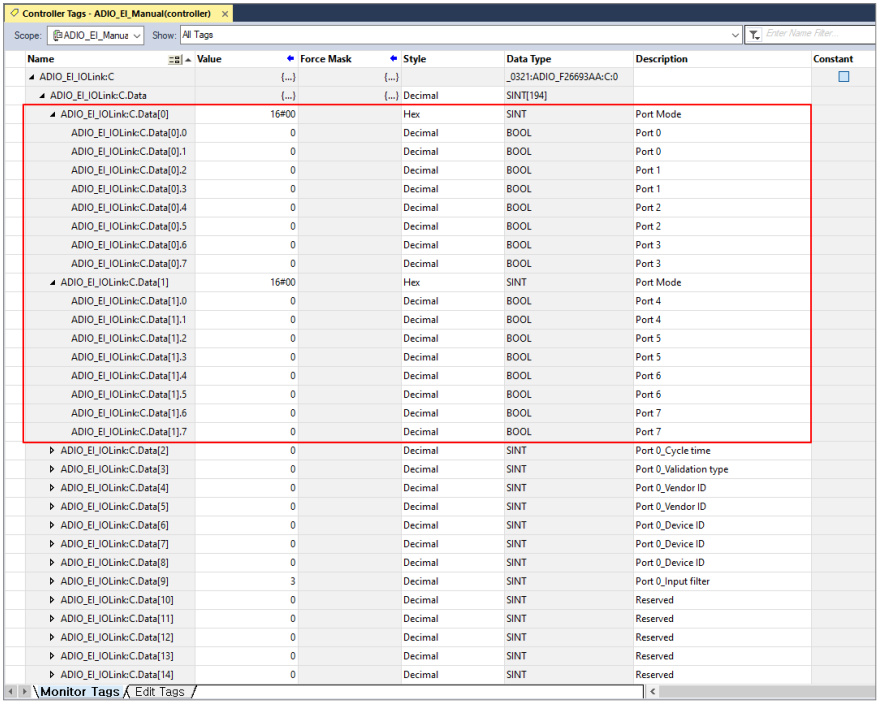
1. Enter 16#55 in the Value field of **module name:C.Data[0~1]** to designate all ports as the IO-Link mode.




| Name | Value | Force Mask | Style | Data Type | Description | Constant |
|---|---|---|---|---|---|---|
| ADIO_EI_IOLink:C | {...} | {...} | | _0321:ADIO_F26693AA:C:0 | | |
| ADIO_EI_IOLink:C.Data | {...} | {...} | Decimal | SINT[194] | | |
| ADIO_EI_IOLink:C.Data[0] | 16#55 | | Hex | SINT | Port Mode | |
| ADIO_EI_IOLink:C.Data[0].0 | 1 | | Decimal | BOOL | Port 0 | |
| ADIO_EI_IOLink:C.Data[0].1 | 0 | | Decimal | BOOL | Port 0 | |
| ADIO_EI_IOLink:C.Data[0].2 | 1 | | Decimal | BOOL | Port 1 | |
| ADIO_EI_IOLink:C.Data[0].3 | 0 | | Decimal | BOOL | Port 1 | |
| ADIO_EI_IOLink:C.Data[0].4 | 1 | | Decimal | BOOL | Port 2 | |
| ADIO_EI_IOLink:C.Data[0].5 | 0 | | Decimal | BOOL | Port 2 | |
| ADIO_EI_IOLink:C.Data[0].6 | 1 | | Decimal | BOOL | Port 3 | |
| ADIO_EI_IOLink:C.Data[0].7 | 0 | | Decimal | BOOL | Port 3 | |
| ADIO_EI_IOLink:C.Data[1] | 16#55 | | Hex | SINT | Port Mode | |
| ADIO_EI_IOLink:C.Data[1].0 | 1 | | Decimal | BOOL | Port 4 | |
| ADIO_EI_IOLink:C.Data[1].1 | 0 | | Decimal | BOOL | Port 4 | |
| ADIO_EI_IOLink:C.Data[1].2 | 1 | | Decimal | BOOL | Port 5 | |
| ADIO_EI_IOLink:C.Data[1].3 | 0 | | Decimal | BOOL | Port 5 | |
| ADIO_EI_IOLink:C.Data[1].4 | 1 | | Decimal | BOOL | Port 6 | |
| ADIO_EI_IOLink:C.Data[1].5 | 0 | | Decimal | BOOL | Port 6 | |
| ADIO_EI_IOLink:C.Data[1].6 | 1 | | Decimal | BOOL | Port 7 | |
| ADIO_EI_IOLink:C.Data[1].7 | 0 | | Decimal | BOOL | Port 7 | |
| ADIO_EI_IOLink:C.Data[2] | 0 | | Decimal | SINT | Port 0_Cycle time | |
| ADIO_EI_IOLink:C.Data[3] | 0 | | Decimal | SINT | Port 0_Validation type | |
| ADIO_EI_IOLink:C.Data[4] | 0 | | Decimal | SINT | Port 0_Vendor ID | |
| ADIO_EI_IOLink:C.Data[5] | 0 | | Decimal | SINT | Port 0_Vendor ID | |
| ADIO_EI_IOLink:C.Data[6] | 0 | | Decimal | SINT | Port 0_Device ID | |
| ADIO_EI_IOLink:C.Data[7] | 0 | | Decimal | SINT | Port 0_Device ID | |
| ADIO_EI_IOLink:C.Data[8] | 0 | | Decimal | SINT | Port 0_Device ID | |
| ADIO_EI_IOLink:C.Data[9] | 3 | | Decimal | SINT | Port 0_Input filter | |
| ADIO_EI_IOLink:C.Data[10] | 0 | | Decimal | SINT | Reserved | |
| ADIO_EI_IOLink:C.Data[11] | 0 | | Decimal | SINT | Reserved | |
| ADIO_EI_IOLink:C.Data[12] | 0 | | Decimal | SINT | Reserved | |
| ADIO_EI_IOLink:C.Data[13] | 0 | | Decimal | SINT | Reserved | |
| ADIO_EI_IOLink:C.Data[14] | 0 | | Decimal | SINT | Reserved | |

## Configure the Standard I/O (SIO) mode

1. Enter 16#00 in the Value field of **module name:C.Data[0~1]** to designate all ports as the SIO mode.




| Name | Value | Force Mask | Style | Data Type | Description | Constant |
|---|---|---|---|---|---|---|
| ADIO_EI_IOLink:C | {...} | {...} | | _0321:ADIO_F26693AA:C:0 | | |
| ADIO_EI_IOLink:C.Data | {...} | {...} | Decimal | SINT[194] | | |
| ADIO_EI_IOLink:C.Data[0] | 16#00 | | Hex | SINT | Port Mode | |
| ADIO_EI_IOLink:C.Data[0].0 | 0 | | Decimal | BOOL | Port 0 | |
| ADIO_EI_IOLink:C.Data[0].1 | 0 | | Decimal | BOOL | Port 0 | |
| ADIO_EI_IOLink:C.Data[0].2 | 0 | | Decimal | BOOL | Port 1 | |
| ADIO_EI_IOLink:C.Data[0].3 | 0 | | Decimal | BOOL | Port 1 | |
| ADIO_EI_IOLink:C.Data[0].4 | 0 | | Decimal | BOOL | Port 2 | |
| ADIO_EI_IOLink:C.Data[0].5 | 0 | | Decimal | BOOL | Port 2 | |
| ADIO_EI_IOLink:C.Data[0].6 | 0 | | Decimal | BOOL | Port 3 | |
| ADIO_EI_IOLink:C.Data[0].7 | 0 | | Decimal | BOOL | Port 3 | |
| ADIO_EI_IOLink:C.Data[1] | 16#00 | | Hex | SINT | Port Mode | |
| ADIO_EI_IOLink:C.Data[1].0 | 0 | | Decimal | BOOL | Port 4 | |
| ADIO_EI_IOLink:C.Data[1].1 | 0 | | Decimal | BOOL | Port 4 | |
| ADIO_EI_IOLink:C.Data[1].2 | 0 | | Decimal | BOOL | Port 5 | |
| ADIO_EI_IOLink:C.Data[1].3 | 0 | | Decimal | BOOL | Port 5 | |
| ADIO_EI_IOLink:C.Data[1].4 | 0 | | Decimal | BOOL | Port 6 | |
| ADIO_EI_IOLink:C.Data[1].5 | 0 | | Decimal | BOOL | Port 6 | |
| ADIO_EI_IOLink:C.Data[1].6 | 0 | | Decimal | BOOL | Port 7 | |
| ADIO_EI_IOLink:C.Data[1].7 | 0 | | Decimal | BOOL | Port 7 | |
| ADIO_EI_IOLink:C.Data[2] | 0 | | Decimal | SINT | Port 0_Cycle time | |
| ADIO_EI_IOLink:C.Data[3] | 0 | | Decimal | SINT | Port 0_Validation type | |
| ADIO_EI_IOLink:C.Data[4] | 0 | | Decimal | SINT | Port 0_Vendor ID | |
| ADIO_EI_IOLink:C.Data[5] | 0 | | Decimal | SINT | Port 0_Vendor ID | |
| ADIO_EI_IOLink:C.Data[6] | 0 | | Decimal | SINT | Port 0_Device ID | |
| ADIO_EI_IOLink:C.Data[7] | 0 | | Decimal | SINT | Port 0_Device ID | |
| ADIO_EI_IOLink:C.Data[8] | 0 | | Decimal | SINT | Port 0_Device ID | |
| ADIO_EI_IOLink:C.Data[9] | 3 | | Decimal | SINT | Port 0_Input filter | |
| ADIO_EI_IOLink:C.Data[10] | 0 | | Decimal | SINT | Reserved | |
| ADIO_EI_IOLink:C.Data[11] | 0 | | Decimal | SINT | Reserved | |
| ADIO_EI_IOLink:C.Data[12] | 0 | | Decimal | SINT | Reserved | |
| ADIO_EI_IOLink:C.Data[13] | 0 | | Decimal | SINT | Reserved | |
| ADIO_EI_IOLink:C.Data[14] | 0 | | Decimal | SINT | Reserved | |

- For detailed description of port functions based on the operation mode, refer to 4.1.3, “Port Functions: Port 0”.

## 1.4.2. Configure IO-Link Functions

**Cycle Time**

Enter a value in the Value field of **Module Name:C.Data[2]**.

**Validation for IO-Link device**

Compare and verify a connected IO-Link device with a IO-Link device information stored in the IO-Link Master.

1. Enter a Vendor ID of IO-Link device in the Value field of **Module name: C.Data[4~5]**.
2. Enter a Device ID of IO-Link device in the Value field of **Module name: C.Data[6~8]**.
3. Enter the value of 1 in the Value field of **Module Name:C.Data[3]** to complete the configuration of validation.

**Data Storage**

The whole parameters of IO-Link device are stored/uploaded in the IO-Link Master (backup), or apply/download last updated parameters to the compatible IO-Link device (restore).

1. Enter the value of 1 to configure Validation Type as compatible.
2. Parameters of the IO-Link device can be read or written via ISDU access if necessary. For detailed information, refer to 2.3, “Access ISDU Parameters”.
3. Select the data storage mode by entering the value in the Value field of **Module Name:C.Data[25]**.

## 1.4.3. Configure SIO Functions

**Digital Input Filter**

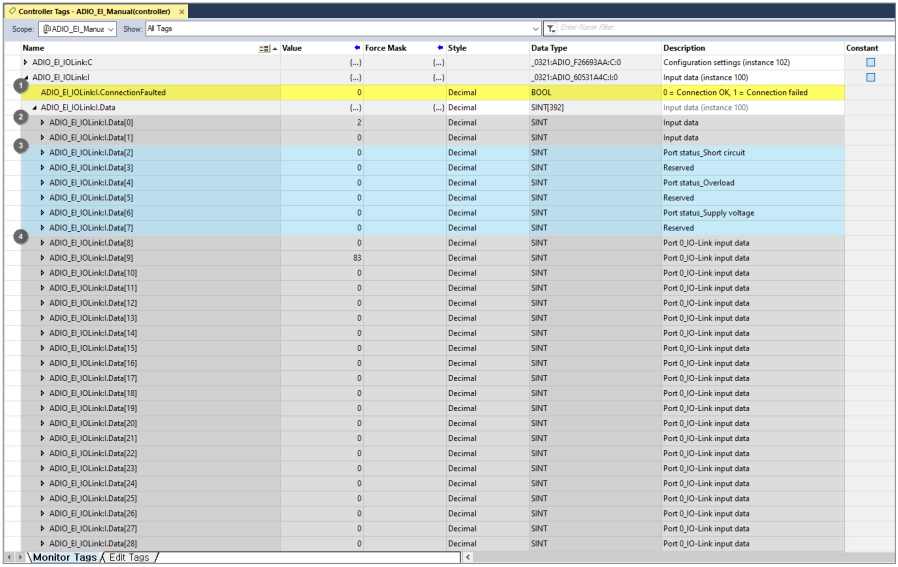
The processing time of the digital input signal can be set via this function. The digital input filtering time suppresses unwanted input signal changes or eliminates noise from input signals to prevent a data distortion or chattering. It can also be used as ON Delay/OFF Delay depending on the selected filter time.

Enter the setting value in the Value field of **Module Name:C.Data[9]**.

# 1.5. Read Input Data: Instance 100

Expand **Module Name:I** in Controller Tags to monitor the input data of the connected sensor or IO-Link device. The attributes of Instance 100 is shown in the figure below and and this document describes based on the index of port 0.

- Firstly see the value of **module name:I.ConnectionFaulted** to check whether the communication status between the PLC and IO-Link Master is in the normal state.
- For detailed information, refer to  4.2, “Instance 100: Input Process Data”.

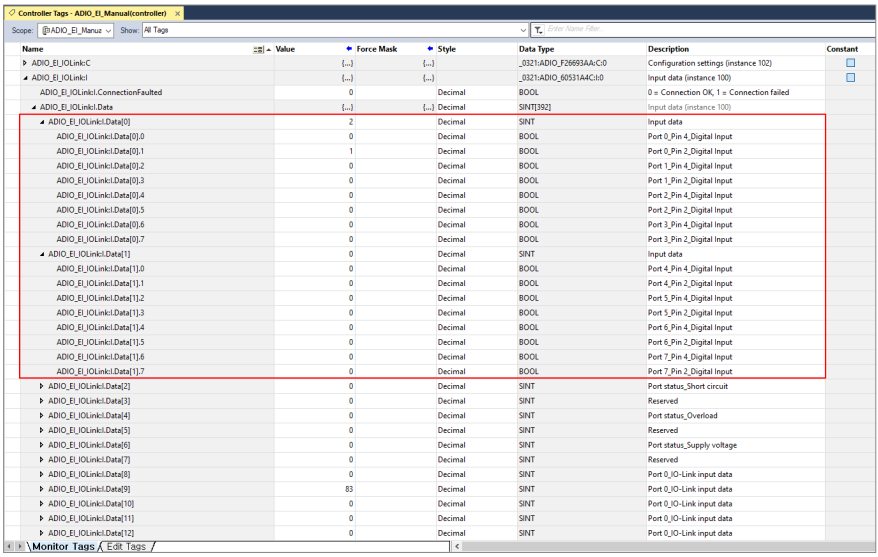


## 1.5.1. Usage Examples

**Access the standard input data**

- Refer to 4.2.4, “Mapping: Input Data”.

1. Configure the port mode as the SIO mode in **module name:C**.
2. Check a value in the Value field of **module name:I.Data[0~1]** changes.
   (A sensor is connected to port 0 in the figure below.)

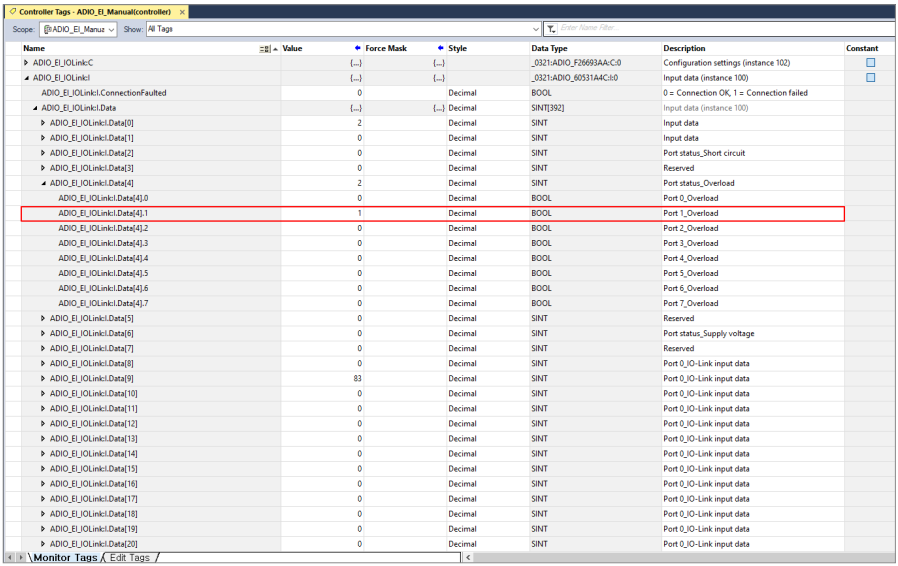



| Name | Value | Force Mask | Style | Data Type | Description | Constant |
|---|---|---|---|---|---|---|
| ADIO_EI_IOLink:C | {...} | {...} | | _0321:ADIO_F26693AA:C:0 | Configuration settings (instance 102) | |
| ADIO_EI_IOLink:I | {...} | {...} | | _0321:ADIO_60531A4C:I:0 | Input data (instance 100) | |
| ADIO_EI_IOLink:I.ConnectionFaulted | 0 | | Decimal | BOOL | 0 = Connection OK, 1 = Connection failed | |
| ADIO_EI_IOLink:I.Data | {...} | {...} | Decimal | SINT[392] | Input data (instance 100) | |
| ADIO_EI_IOLink:I.Data[0] | 2 | | Decimal | SINT | Input data | |
| ADIO_EI_IOLink:I.Data[0].0 | 0 | | Decimal | BOOL | Port 0_Pin 4_Digital Input | |
| ADIO_EI_IOLink:I.Data[0].1 | 1 | | Decimal | BOOL | Port 0_Pin 2_Digital Input | |
| ADIO_EI_IOLink:I.Data[0].2 | 0 | | Decimal | BOOL | Port 1_Pin 4_Digital Input | |
| ADIO_EI_IOLink:I.Data[0].3 | 0 | | Decimal | BOOL | Port 1_Pin 2_Digital Input | |
| ADIO_EI_IOLink:I.Data[0].4 | 0 | | Decimal | BOOL | Port 2_Pin 4_Digital Input | |
| ADIO_EI_IOLink:I.Data[0].5 | 0 | | Decimal | BOOL | Port 2_Pin 2_Digital Input | |
| ADIO_EI_IOLink:I.Data[0].6 | 0 | | Decimal | BOOL | Port 3_Pin 4_Digital Input | |
| ADIO_EI_IOLink:I.Data[0].7 | 0 | | Decimal | BOOL | Port 3_Pin 2_Digital Input | |
| ADIO_EI_IOLink:I.Data[1] | 0 | | Decimal | SINT | Input data | |
| ADIO_EI_IOLink:I.Data[1].0 | 0 | | Decimal | BOOL | Port 4_Pin 4_Digital Input | |
| ADIO_EI_IOLink:I.Data[1].1 | 0 | | Decimal | BOOL | Port 4_Pin 2_Digital Input | |
| ADIO_EI_IOLink:I.Data[1].2 | 0 | | Decimal | BOOL | Port 5_Pin 4_Digital Input | |
| ADIO_EI_IOLink:I.Data[1].3 | 0 | | Decimal | BOOL | Port 5_Pin 2_Digital Input | |
| ADIO_EI_IOLink:I.Data[1].4 | 0 | | Decimal | BOOL | Port 6_Pin 4_Digital Input | |
| ADIO_EI_IOLink:I.Data[1].5 | 0 | | Decimal | BOOL | Port 6_Pin 2_Digital Input | |
| ADIO_EI_IOLink:I.Data[1].6 | 0 | | Decimal | BOOL | Port 7_Pin 4_Digital Input | |
| ADIO_EI_IOLink:I.Data[1].7 | 0 | | Decimal | BOOL | Port 7_Pin 2_Digital Input | |
| ADIO_EI_IOLink:I.Data[2] | 0 | | Decimal | SINT | Port status_Short circuit | |
| ADIO_EI_IOLink:I.Data[3] | 0 | | Decimal | SINT | Reserved | |
| ADIO_EI_IOLink:I.Data[4] | 0 | | Decimal | SINT | Port status_Overload | |
| ADIO_EI_IOLink:I.Data[5] | 0 | | Decimal | SINT | Reserved | |
| ADIO_EI_IOLink:I.Data[6] | 0 | | Decimal | SINT | Port status_Supply voltage | |
| ADIO_EI_IOLink:I.Data[7] | 0 | | Decimal | SINT | Reserved | |
| ADIO_EI_IOLink:I.Data[8] | 0 | | Decimal | SINT | Port 0_IO-Link input data | |
| ADIO_EI_IOLink:I.Data[9] | 83 | | Decimal | SINT | Port 0_IO-Link input data | |
| ADIO_EI_IOLink:I.Data[10] | 0 | | Decimal | SINT | Port 0_IO-Link input data | |
| ADIO_EI_IOLink:I.Data[11] | 0 | | Decimal | SINT | Port 0_IO-Link input data | |
| ADIO_EI_IOLink:I.Data[12] | 0 | | Decimal | SINT | Port 0_IO-Link input data | |

**Port status information: Overload detection**

• Refer to 4.2.5, “Mapping: Port Status Information”.

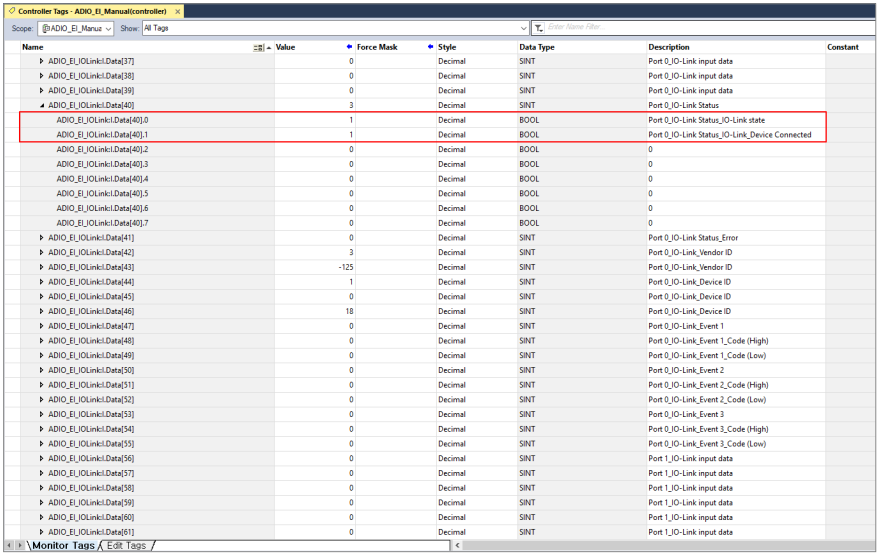
Expand **Module Name:I.Data[4]**, then the value of 1 is displayed in the Value field of port that the overload occurs. (The overload is detected on the port 1 in the figure below.)



**Monitor the IO-Link status**

• Refer to 4.2.6, “Mapping: IO-Link Status Information”.

1. Expand **ModuleName:I.Data[40]**.
2. • The value of 1 is displayed in the Value field of **Module Name:I.Data[40].0** when the port is in IO-Link communication state.
   • A value of 1 is displayed in the Value field of **module name: status[40].1** when the ADIO-EI and IO-Link device are normally connected.

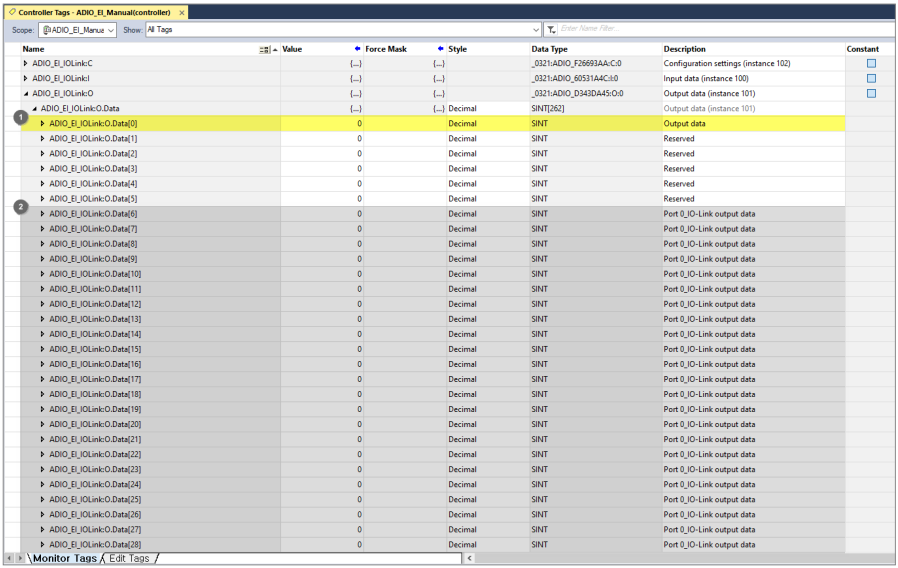



| Name | Value | Force Mask | Style | Data Type | Description | Constant |
|---|---|---|---|---|---|---|
| ADIO_EI_IOLink:I.Data[37] | 0 | | Decimal | SINT | Port 0_IO-Link input data | |
| ADIO_EI_IOLink:I.Data[38] | 0 | | Decimal | SINT | Port 0_IO-Link input data | |
| ADIO_EI_IOLink:I.Data[39] | 0 | | Decimal | SINT | Port 0_IO-Link input data | |
| ADIO_EI_IOLink:I.Data[40] | 3 | | Decimal | SINT | Port 0_IO-Link Status | |
| ADIO_EI_IOLink:I.Data[40].0 | 1 | | Decimal | BOOL | Port 0_IO-Link Status_IO-Link state | |
| ADIO_EI_IOLink:I.Data[40].1 | 1 | | Decimal | BOOL | Port 0_IO-Link Status_IO-Link_Device Connected | |
| ADIO_EI_IOLink:I.Data[40].2 | 0 | | Decimal | BOOL | 0 | |
| ADIO_EI_IOLink:I.Data[40].3 | 0 | | Decimal | BOOL | 0 | |
| ADIO_EI_IOLink:I.Data[40].4 | 0 | | Decimal | BOOL | 0 | |
| ADIO_EI_IOLink:I.Data[40].5 | 0 | | Decimal | BOOL | 0 | |
| ADIO_EI_IOLink:I.Data[40].6 | 0 | | Decimal | BOOL | 0 | |
| ADIO_EI_IOLink:I.Data[40].7 | 0 | | Decimal | BOOL | 0 | |
| ADIO_EI_IOLink:I.Data[41] | 0 | | Decimal | SINT | Port 0_IO-Link Status_Error | |
| ADIO_EI_IOLink:I.Data[42] | 3 | | Decimal | SINT | Port 0_IO-Link_Vendor ID | |
| ADIO_EI_IOLink:I.Data[43] | -125 | | Decimal | SINT | Port 0_IO-Link_Vendor ID | |
| ADIO_EI_IOLink:I.Data[44] | 1 | | Decimal | SINT | Port 0_IO-Link_Device ID | |
| ADIO_EI_IOLink:I.Data[45] | 0 | | Decimal | SINT | Port 0_IO-Link_Device ID | |
| ADIO_EI_IOLink:I.Data[46] | 18 | | Decimal | SINT | Port 0_IO-Link_Device ID | |
| ADIO_EI_IOLink:I.Data[47] | 0 | | Decimal | SINT | Port 0_IO-Link_Event 1 | |
| ADIO_EI_IOLink:I.Data[48] | 0 | | Decimal | SINT | Port 0_IO-Link_Event 1_Code (High) | |
| ADIO_EI_IOLink:I.Data[49] | 0 | | Decimal | SINT | Port 0_IO-Link_Event 1_Code (Low) | |
| ADIO_EI_IOLink:I.Data[50] | 0 | | Decimal | SINT | Port 0_IO-Link_Event 2 | |
| ADIO_EI_IOLink:I.Data[51] | 0 | | Decimal | SINT | Port 0_IO-Link_Event 2_Code (High) | |
| ADIO_EI_IOLink:I.Data[52] | 0 | | Decimal | SINT | Port 0_IO-Link_Event 2_Code (Low) | |
| ADIO_EI_IOLink:I.Data[53] | 0 | | Decimal | SINT | Port 0_IO-Link_Event 3 | |
| ADIO_EI_IOLink:I.Data[54] | 0 | | Decimal | SINT | Port 0_IO-Link_Event 3_Code (High) | |
| ADIO_EI_IOLink:I.Data[55] | 0 | | Decimal | SINT | Port 0_IO-Link_Event 3_Code (Low) | |
| ADIO_EI_IOLink:I.Data[56] | 0 | | Decimal | SINT | Port 1_IO-Link input data | |
| ADIO_EI_IOLink:I.Data[57] | 0 | | Decimal | SINT | Port 1_IO-Link input data | |
| ADIO_EI_IOLink:I.Data[58] | 0 | | Decimal | SINT | Port 1_IO-Link input data | |
| ADIO_EI_IOLink:I.Data[59] | 0 | | Decimal | SINT | Port 1_IO-Link input data | |
| ADIO_EI_IOLink:I.Data[60] | 0 | | Decimal | SINT | Port 1_IO-Link input data | |
| ADIO_EI_IOLink:I.Data[61] | 0 | | Decimal | SINT | Port 1_IO-Link input data | |

# 1.6. Write Output Data: Instance 101

Expand **Module Name:O** in Controller Tags to access the output data of the connected sensor or IO-Link device. The attributes of Instance 101 is shown in the figure below and this document describes based on the index of port 0.

- For more information, refer to 4.3, “Instance 101: Output Process Data”.

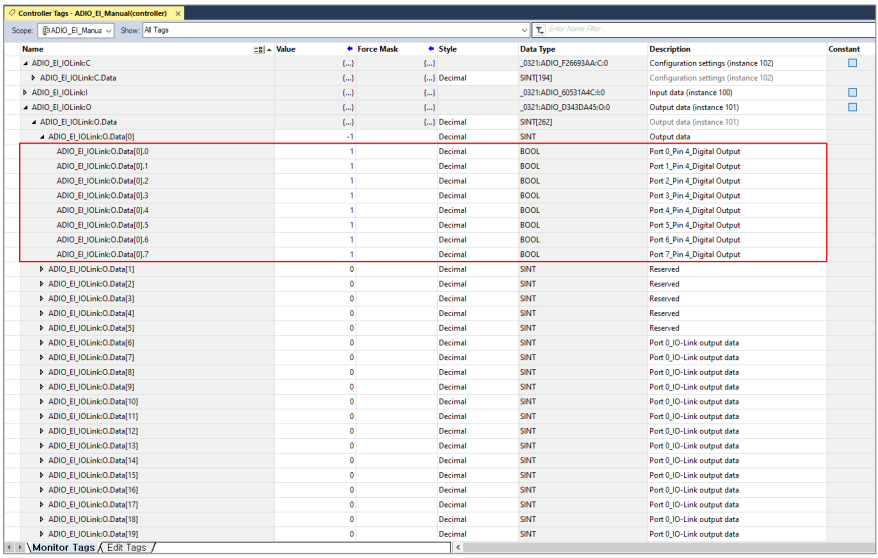


## 1.6.1. Usage Examples

**Write the standard output data**

- Refer to 4.3.4, “Mapping: Output Data”.

1. Configure the port mode as the SIO mode in **module name:C**.
2. Expand **Module Name:O.Data[0]** and enter a value of 1 in the Value field of the port to send the signal of output. (All ports are configured as the output ports in the figure below.)




| Name | Value | Force Mask | Style | Data Type | Description | Constant |
|---|---|---|---|---|---|---|
| ADIO_EI_IOLinkC | {...} | {...} | | _0321:ADIO_F26693AA:C:0 | Configuration settings (instance 102) | |
| ADIO_EI_IOLinkC.Data | {...} | {...} | Decimal | SINT[194] | Configuration settings (instance 102) | |
| ADIO_EI_IOLinkI | {...} | {...} | | _0321:ADIO_60531A4C:I:0 | Input data (instance 100) | |
| ADIO_EI_IOLinkO | {...} | {...} | | _0321:ADIO_D343DA45:O:0 | Output data (instance 101) | |
| ADIO_EI_IOLinkO.Data | {...} | {...} | Decimal | SINT[262] | Output data (instance 101) | |
| ADIO_EI_IOLinkO.Data[0] | -1 | | Decimal | SINT | Output data | |
| ADIO_EI_IOLinkO.Data[0].0 | 1 | | Decimal | BOOL | Port 0_Pin 4_Digital Output | |
| ADIO_EI_IOLinkO.Data[0].1 | 1 | | Decimal | BOOL | Port 1_Pin 4_Digital Output | |
| ADIO_EI_IOLinkO.Data[0].2 | 1 | | Decimal | BOOL | Port 2_Pin 4_Digital Output | |
| ADIO_EI_IOLinkO.Data[0].3 | 1 | | Decimal | BOOL | Port 3_Pin 4_Digital Output | |
| ADIO_EI_IOLinkO.Data[0].4 | 1 | | Decimal | BOOL | Port 4_Pin 4_Digital Output | |
| ADIO_EI_IOLinkO.Data[0].5 | 1 | | Decimal | BOOL | Port 5_Pin 4_Digital Output | |
| ADIO_EI_IOLinkO.Data[0].6 | 1 | | Decimal | BOOL | Port 6_Pin 4_Digital Output | |
| ADIO_EI_IOLinkO.Data[0].7 | 1 | | Decimal | BOOL | Port 7_Pin 4_Digital Output | |
| ADIO_EI_IOLinkO.Data[1] | 0 | | Decimal | SINT | Reserved | |
| ADIO_EI_IOLinkO.Data[2] | 0 | | Decimal | SINT | Reserved | |
| ADIO_EI_IOLinkO.Data[3] | 0 | | Decimal | SINT | Reserved | |
| ADIO_EI_IOLinkO.Data[4] | 0 | | Decimal | SINT | Reserved | |
| ADIO_EI_IOLinkO.Data[5] | 0 | | Decimal | SINT | Reserved | |
| ADIO_EI_IOLinkO.Data[6] | 0 | | Decimal | SINT | Port 0_IO-Link output data | |
| ADIO_EI_IOLinkO.Data[7] | 0 | | Decimal | SINT | Port 0_IO-Link output data | |
| ADIO_EI_IOLinkO.Data[8] | 0 | | Decimal | SINT | Port 0_IO-Link output data | |
| ADIO_EI_IOLinkO.Data[9] | 0 | | Decimal | SINT | Port 0_IO-Link output data | |
| ADIO_EI_IOLinkO.Data[10] | 0 | | Decimal | SINT | Port 0_IO-Link output data | |
| ADIO_EI_IOLinkO.Data[11] | 0 | | Decimal | SINT | Port 0_IO-Link output data | |
| ADIO_EI_IOLinkO.Data[12] | 0 | | Decimal | SINT | Port 0_IO-Link output data | |
| ADIO_EI_IOLinkO.Data[13] | 0 | | Decimal | SINT | Port 0_IO-Link output data | |
| ADIO_EI_IOLinkO.Data[14] | 0 | | Decimal | SINT | Port 0_IO-Link output data | |
| ADIO_EI_IOLinkO.Data[15] | 0 | | Decimal | SINT | Port 0_IO-Link output data | |
| ADIO_EI_IOLinkO.Data[16] | 0 | | Decimal | SINT | Port 0_IO-Link output data | |
| ADIO_EI_IOLinkO.Data[17] | 0 | | Decimal | SINT | Port 0_IO-Link output data | |
| ADIO_EI_IOLinkO.Data[18] | 0 | | Decimal | SINT | Port 0_IO-Link output data | |
| ADIO_EI_IOLinkO.Data[19] | 0 | | Decimal | SINT | Port 0_IO-Link output data | |

3. The yellow LED lights up on the I/O port indicator 0 of the output port.

# 2. Configuration with Explicit Message

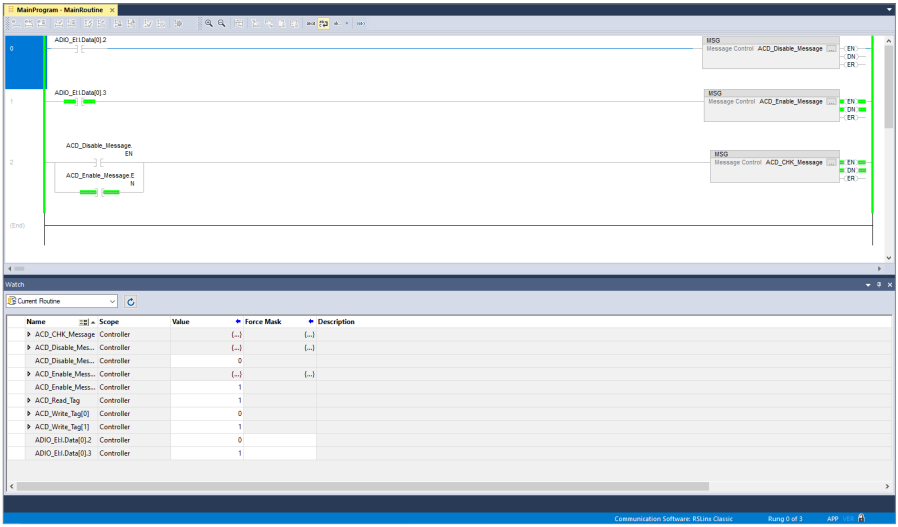
- For more information about the Ladder logic using commands and messages, refer to Rockwell Automation's **Logix 5000 Controllers General Instructions**.
- For more information on QuickConnect EtherNet/IP function, refer to Allen-Bradley's **Ethernet/IP QuickConnect Application Technique**.

## 2.1. Address Conflict Detection (ACD)

For QuickConnect function, see the class instance attributes in the table below to enable ACD function.
• Port mode: Standard I/O

| Class Code | Service Type (Code) | Instance | Attribute | Value |
|---|---|---|---|---|
| 0xF5 | Set_Attribute_Single (0x10)<br>Get_Attribute_Single (0x0E) | 1 | 0x0A | 0: Disabled<br>1: Enabled (default) |

**Example of Ladder logic screen**



## 2.2. Fault State

Define the behaviour of output on each I/O port when the communication connection is interrupted between the EtherNet/IP Master (Scanner) and Slave (Adapter).
See the class instance attributes in the table below to configure the Fault state function.
• Port mode: Standard I/O

**Fault State Settings** : Transfer the input signal.

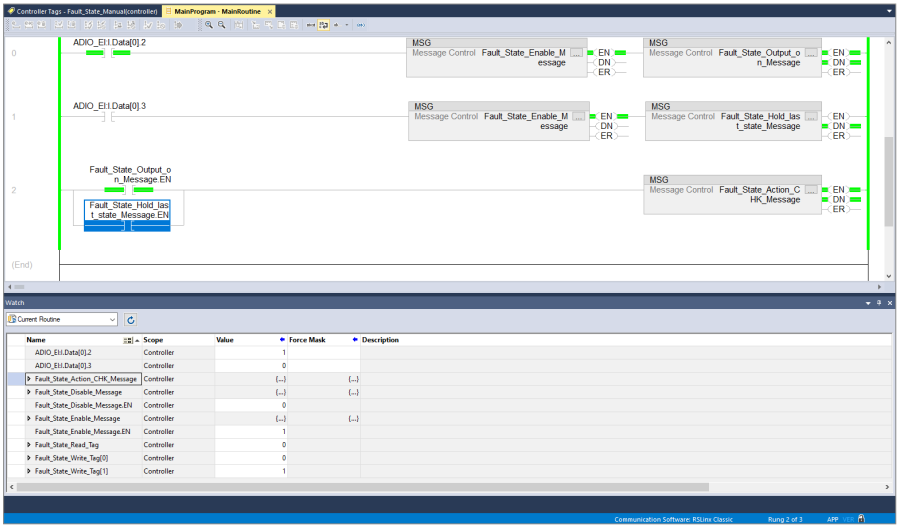
| Class Code | Service Type (Code) | Instance | Attribute | Value |
|---|---|---|---|---|
| 0x09 | Set_Attribute_Single (0x10)<br>Get_Attribute_Single (0x0E) | 1 to 8 [01)] | 0x06 | 0: Disabled<br>1: Enabled |

**Fault State Action** : Define the behaviour of output on the corresponding port.

| Class Code | Service Type (Code) | Instance | Attribute | Value |
|---|---|---|---|---|
| 0x09 | Set_Attribute_Single (0x10)<br>Get_Attribute_Single (0x0E) | 1 to 8 [01)] | 0x05 | 0: Output On<br>1: Hold Last State |

01) It is mapped from port 0 to 7.

### Example of Ladder logic screen



## 2.3. Access ISDU Parameters

You can select the following two options to access the ISDU parameters of the connected IO-Link device. Be sure to consider the environmental conditions and use the suitable configuration method.

- **atIOLink**

  atIOLink, Autonics' PDCT software, supports the read and write the ISDU parameters of IO-Link devices, data storage, and more. Refer to the atIOLink User Manual.

- **Explicit Message**

  See the class instance attributes in the table below to configure a message for reading and writing the ISDU parameters of the connected IO-Link device.
  For more information about Ladder logic, refer to 2.3.1, “Example of Ladder logic”.

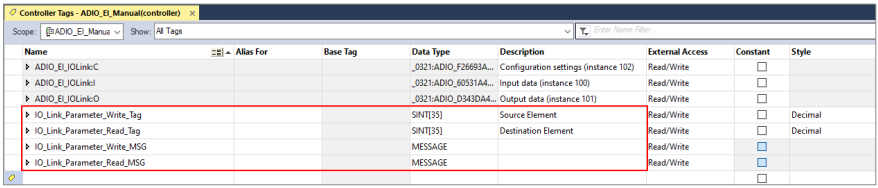
| Class Code | Service Type (Code) | Instance | Attribute | Value |
|---|---|---|---|---|
| 0x96 | Custom (0x32) | 1 to 8 [01)] | 0x03: Read<br>0x02: Write | - |

01) It is mapped from port 0 to 7.

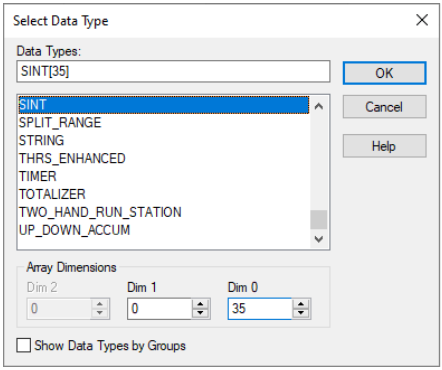
## 2.3.1. Example of Ladder logic

- Firstly check the parameter index and process data length of the IO-Link device. In general, yon can find the related information on the instructions manual of the IO-Link device.
- Port mode: IO-Link
- Parameter index of the IO-Link device: 24 (0x18, Application specific tag)
- Size of parameter data of IO-Link device: 32-byte

1. Go Offline the PLC project.
2. In **Edit Tags**, create tags and messages as shown in the figure below.

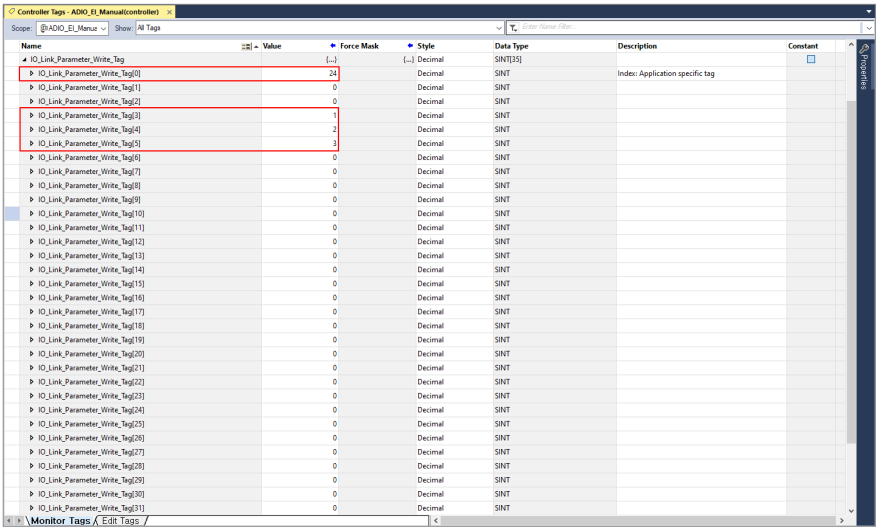



**Select data type**

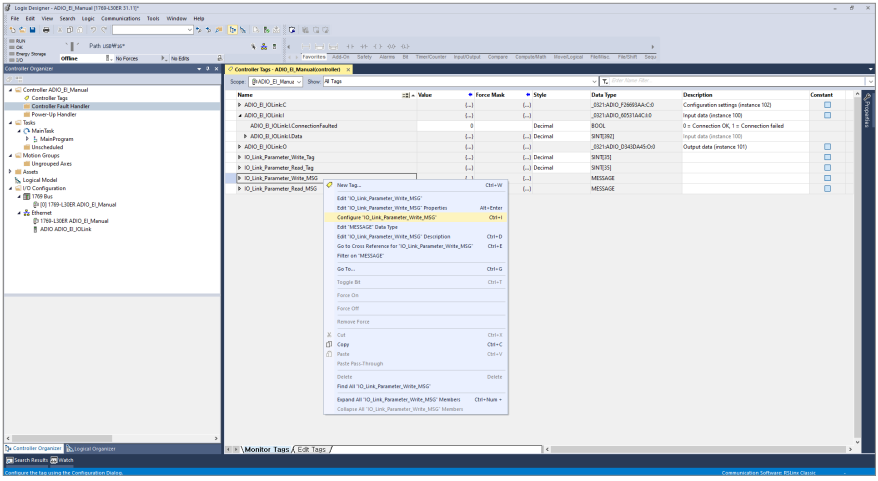



- **Source Element (Write_tag)**
  Enter the parameter index to be read and set the array size to include at least the length of parameter index and data.
- **Destination Element (Read_tag)**
  Set the array size larger than the parameter length since it shows the read-out value.

3. In **Monitor Tags**, Enter the parameter index in the Value field of **IO_Link_Parameter_Write_Tag[0]**. Enter the data to be written in the Value field of **IO_Link_Parameter_Write_Tag[3 ~ 34]**. (Enter the sub-index of parameter in the Value field of IO_Link_Parameter_Write_Tag[1 ~ 2].)



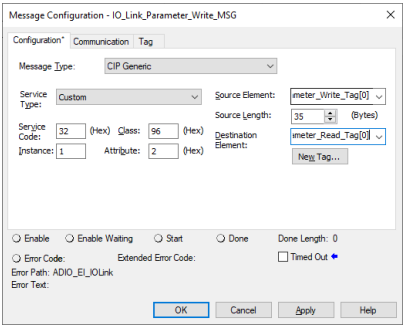

4. Right-click on the message tag in **Monitor Tags** and select **Configure "message name"**.



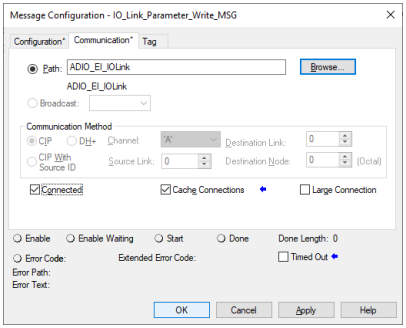
5. Configure write/read message in Configuration tab referring to the class instance attributes. Select the Ethernet module to be applied the message configuration and check the Connected/Cache Connections in Communication tab.

   - **Configuration of Write Message**

**Configuration tab**

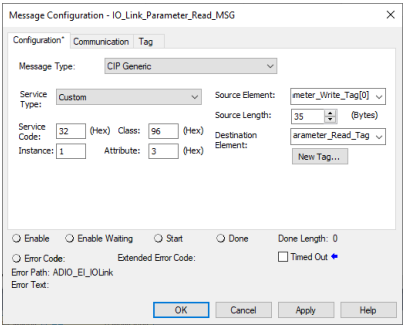



**Communication tab**

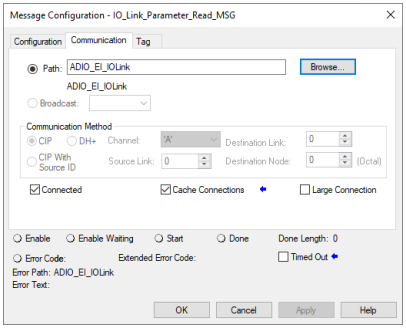



   - **Configuration of Read Message**

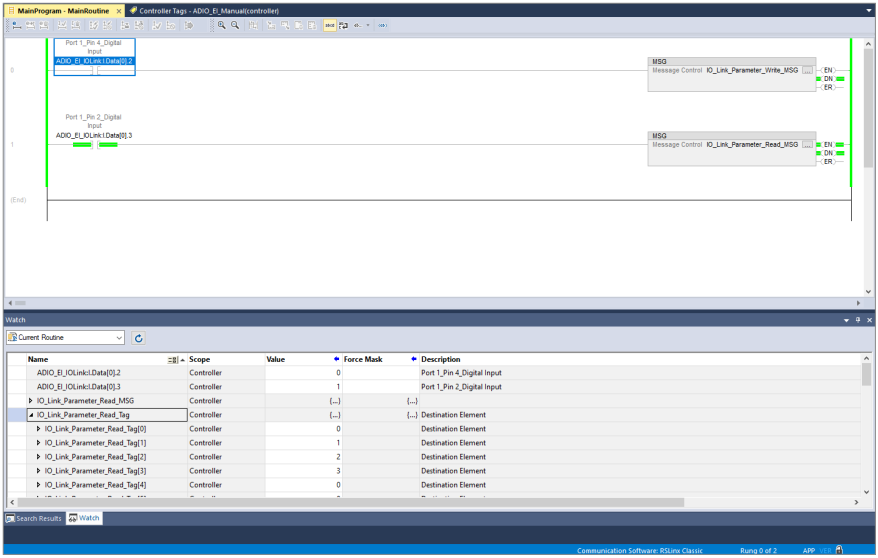
**Configuration tab**




**Communication tab**

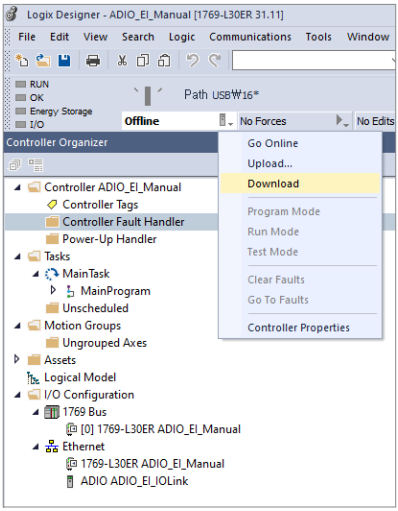


6. Example of Ladder logic screen

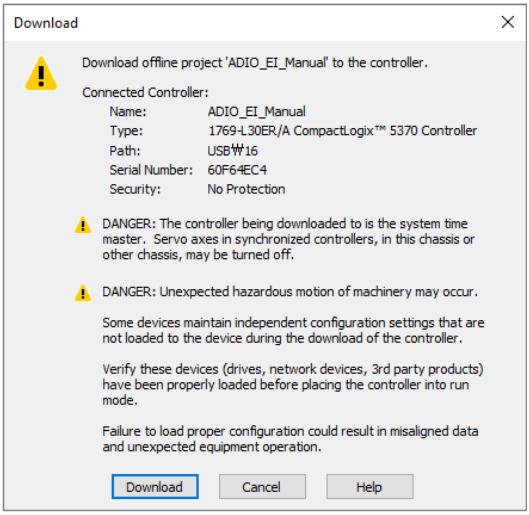


# 3. Download the Program to a Controller

1. Click **Offline** and select **Download**.




2. Select **Download**.



# 4. Instance

| Instance | Assembly | Data length | Description |
|---|---|---|---|
| 100 | Input | 392-byte | → 4.2, “Instance 100: Input Process Data” |
| 101 | Output | 262-byte | → 4.3, “Instance 101: Output Process Data” |
| 102 | Configuration | 194-byte | → 4.1, “Instance 102: Parameter Data” |

## 4.1. Instance 102: Parameter Data

### 4.1.1. Instance Attributes

| Index | Designation | Description |
|---|---|---|
| 0 to 1 | All I/O ports | Port mode |
| 2 to 25 | Port 0 | Port configuration |
| 26 to 49 | Port 1 | Port configuration |
| 50 to 73 | Port 2 | Port configuration |
| 74 to 97 | Port 3 | Port configuration |
| 98 to 121 | Port 4 | Port configuration |
| 122 to 145 | Port 5 | Port configuration |
| 146 to 169 | Port 6 | Port configuration |
| 170 to 193 | Port 7 | Port configuration |

### 4.1.2. Port Mode

| Index | Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
|---|---|---|---|---|---|---|---|---|
| 0 | Port 3 | | Port 2 | | Port 1 | | Port 0 | |
| 1 | Port 7 | | Port 6 | | Port 5 | | Port 4 | |

**Port Mode** Configure the operation mode on each I/O port
0x00: Standard Input and Output (SIO)
0x01: IO-Link

### 4.1.3. Port Functions: Port 0

| Index | Designation | Data length |
|---|---|---|
| 2 | Cycle Time | 1-byte |
| 3 | Validation Type | 1-byte |
| 4 to 5 | Vendor ID | 2-byte |
| 6 to 8 | Device ID | 3-byte |
| 9 | Input Filter | 1-byte |
| 10 to 24 | Reserved | 15-byte |
| 25 | Data Storage | 1-byte |

- From port 1 to 7: The attributes and data length are the same with the table above.

**Cycle Time**
Select the cycle time
Range: 1.6 to 132.8 ms

**Validation Type**
Configure the validation type
0: No validation
1: Compatible (Vendor ID + Device ID)

**Input Filter**
Select the digital input filtering time

| | |
|---|---|
| 0: None | 6: 8 ms |
| 1: 250 us | 7: 16 ms |
| 2: 500 us | 8: 32 ms |
| 3: 1 ms (default) | 9: 64 ms |
| 4: 2 ms | 10: 128 ms |
| 5: 4 ms | 11: 256 ms |

**Data Storage**
Select the data storage (DS) mode
0x00: DS disable + clear
0x82: DS restore
0x83: DS backup + restore

## 4.2. Instance 100: Input Process Data

### 4.2.1. Instance Attributes

| Index | Designation | Description |
|---|---|---|
| 0 to 7 | A port in the SIO mode | Input process data in the digital input mode |
| 8 to 55 | Port 0 | Input process data in the IO-Link mode |
| 56 to 103 | Port 1 | Input process data in the IO-Link mode |
| 104 to 151 | Port 2 | Input process data in the IO-Link mode |
| 152 to 199 | Port 3 | Input process data in the IO-Link mode |
| 200 to 247 | Port 4 | Input process data in the IO-Link mode |
| 248 to 295 | Port 5 | Input process data in the IO-Link mode |
| 296 to 343 | Port 6 | Input process data in the IO-Link mode |
| 344 to 391 | Port 7 | Input process data in the IO-Link mode |

## 4.2.2. Standard Input Data

| Index | Designation | Data length | Description |
|---|---|---|---|
| 0 to 1 | Inputs | 2-byte | → 4.2.4, “Mapping: Input Data” |
| 2 | Short circuit | 1-byte | → 4.2.5, “Mapping: Port Status Information” |
| 3 | Reserved | 1-byte | - |
| 4 | Overload | 1-byte | → 4.2.5, “Mapping: Port Status Information” |
| 5 | Reserved | 1-byte | - |
| 6 | Supply voltage | 1-byte | → 4.2.5, “Mapping: Port Status Information” |
| 7 | Reserved | 1-byte | - |

## 4.2.3. IO-Link Input Data: Port 0

| Index | Designation | Data length | Description |
|---|---|---|---|
| 8 to 39 | IOL input data | 32-byte | Depending on the connected device |
| 40 | IOL Status | 1-byte | → 4.2.6, “Mapping: IO-Link Status Information” |
| 41 | IOL Error | 1-byte | |
| 42 to 43 | Vendor ID | 2-byte | Depending on the connected device |
| 44 to 46 | Device ID | 3-byte | Depending on the connected device |
| 47 | IOL Event 1 | 1-byte | → 4.2.7, “Mapping: IO-Link Events” |
| 48 | IOL Event 1 Code | 1-byte (High) | |
| 49 | IOL Event 1 Code | 1-byte (Low) | |
| 50 | IOL Event 2 | 1-byte | |
| 51 | IOL Event 2 Code | 1-byte (High) | |
| 52 | IOL Event 2 Code | 1-byte (Low) | |
| 53 | IOL Event 3 | 1-byte | |
| 54 | IOL Event 3 Code | 1-byte (High) | |
| 55 | IOL Event 3 Code | 1-byte (Low) | |

- From port 1 to 7: The attributes and data length are the same with the table above.

### 4.2.4. Mapping: Input Data

| Index | Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
|---|---|---|---|---|---|---|---|---|
| 0 | DI P3<br>Pin 2 | DI P3<br>Pin 4 | DI P2<br>Pin 2 | DI P2<br>Pin 4 | DI P1<br>Pin 2 | DI P1<br>Pin 4 | DI P0<br>Pin 2 | DI P0<br>Pin 4 |
| 1 | DI P7<br>Pin 2 | DI P7<br>Pin 4 | DI P6<br>Pin 2 | DI P6<br>Pin 4 | DI P5<br>Pin 2 | DI P5<br>Pin 4 | DI P4<br>Pin 2 | DI P4<br>Pin 4 |

**DI** Digital input

**P0 to P7** Number of each I/O port

**Pin 2** Signal level of pin 2 on the I/O port
0x00: Low
0x01: High

**Pin 4** Signal level of pin 4 on the I/O port
0x00: Low
0x01: High

## 4.2.5. Mapping: Port Status Information

| Index | Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
|---|---|---|---|---|---|---|---|---|
| 2 | S P7 | S P6 | S P5 | S P4 | S P3 | S P2 | S P1 | S P0 |
| 3 | Reserved | | | | | | | |
| 4 | OL P7<br>Pin 4 | OL P6<br>Pin 4 | OL P5<br>Pin 4 | OL P4<br>Pin 4 | OL P3<br>Pin 4 | OL P2<br>Pin 4 | OL P1<br>Pin 4 | OL P0<br>Pin 4 |
| 5 | Reserved | | | | | | | |
| 6 | 0 | 0 | 0 | 0 | 0 | No UA | US PWR | UA PWR |
| 7 | Reserved | | | | | | | |

**P0 to P7** Number of each I/O port

**S** Short circuit status
0x00: Normal
0x01: Short circuit detected

**OL** Overload status
0x00: Normal
0x01: Overload detected

**No UA** No actuator supply voltage
0x00: Normal
0x01: No actuator power

**US PWR (Sensor Power)** Status of the sensor supply voltage
0x00: Normal
0x01: Low-voltage detected

**UA PWR (Actuator Power)** Status of the actuator supply voltage
0x00: Normal
0x01: Low-voltage detected

### 4.2.6. Mapping: IO-Link Status Information

| Index | Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
|---|---|---|---|---|---|---|---|---|
| 40 | 0 | 0 | 0 | 0 | 0 | 0 | DC | IOL |
| 41 | SC | 0 | 0 | 0 | 0 | PDI | DF | VF |

**DC** Connection status between ADIO-EI and IO-Link device
0x00: Not connected
0x01: Connected

**IOL** IO-Link status
0x00: Not IO-Link
0x01: Port in IO-Link mode

**SC** Short circuit status
0x00: Normal
0x01: Short circuit detected

**PDI** Status of input process data
0x00: Valid
0x01: Invalid

**DF** Status of data storage (DS) validation
0x00: Normal
0x01: Failed (invalid Vendor ID and Device ID)

**VF** Status of validation
0x00: Normal
0x01: Failed (invalid Vendor ID and Device ID)

## 4.2.7. Mapping: IO-Link Events

| Index | Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
|---|---|---|---|---|---|---|---|---|
| 47 | Event 1: Mode | | Event 1: Type | | 0 | 0 | 0 | 0 |
| 48 | Event 1: Code (High byte) | | | | | | | |
| 49 | Event 1: Code (Low byte) | | | | | | | |
| 50 | Event 2: Mode | | Event 2: Type | | 0 | 0 | 0 | 0 |
| 51 | Event 2: Code (High byte) | | | | | | | |
| 52 | Event 2: Code (Low byte) | | | | | | | |
| 53 | Event 3: Mode | | Event 3: Type | | 0 | 0 | 0 | 0 |
| 54 | Event 3: Code (High byte) | | | | | | | |
| 55 | Event 3: Code (Low byte) | | | | | | | |

**Mode** Event mode
0x00: Reserved
0x01: Event single-shot
0x02: Event disappears
0x03: Event appears

**Type** Event type
0x00: Reserved
0x01: Notification
0x02: Warning
0x03: Error

## 4.3. Instance 101: Output Process Data

### 4.3.1. Instance Attributes

| Index | Designation | Description |
|---|---|---|
| 0 to 5 | A port in the SIO mode | Output process data in the digital output mode |
| 6 to 37 | Port 0 | Output process data in the IO-Link mode |
| 38 to 69 | Port 1 | Output process data in the IO-Link mode |
| 70 to 101 | Port 2 | Output process data in the IO-Link mode |
| 102 to 133 | Port 3 | Output process data in the IO-Link mode |
| 134 to 165 | Port 4 | Output process data in the IO-Link mode |
| 166 to 197 | Port 5 | Output process data in the IO-Link mode |
| 198 to 229 | Port 6 | Output process data in the IO-Link mode |
| 230 to 261 | Port 7 | Output process data in the IO-Link mode |

## 4.3.2. Standard Output Data

| Index | Designation | Data length | Description |
|---|---|---|---|
| 0 | Outputs | 1-byte | → 4.3.4, “Mapping: Output Data” |
| 1 to 5 | Reserved | 5-byte | - |

## 4.3.3. IO-Link Output Data: Port 0

| Index | Designation | Data length | Description |
|---|---|---|---|
| 6 to 37 | IOL output data | 32-byte | Depending on the connected device |

- From port 1 to 7: The attributes and data length are the same with the table above.

## 4.3.4. Mapping: Output Data

| Index | Bit 7 | Bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
|---|---|---|---|---|---|---|---|---|
| 0 | DO P7<br>Pin 4 | DO P6<br>Pin 4 | DO P5<br>Pin 4 | DO P4<br>Pin 4 | DO P3<br>Pin 4 | DO P2<br>Pin 4 | DO P1<br>Pin 4 | DO P0<br>Pin 4 |

**DO** Digital output

**P0 to P7** Number of each I/O port

**Pin 4** Signal level of pin 4 on the I/O port
0x00: Low
0x01: High

# 5. Explicit Message

## 5.1. Supported Classes

**1. Address Conflict Detection (ACD)**

| Class Code | Service Type (Code) | Instance | Attribute | Value |
|---|---|---|---|---|
| 0xF5 | Set_Attribute_Single (0x10)<br>Get_Attribute_Single (0x0E) | 1 | 0x0A | 0: Disabled<br>1: Enabled (default) |

**2. Fault State Settings**

| Class Code | Service Type (Code) | Instance | Attribute | Value |
|---|---|---|---|---|
| 0x09 | Set_Attribute_Single (0x10)<br>Get_Attribute_Single (0x0E) | 1 to 8 [01)] | 0x06 | 0: Disabled<br>1: Enabled |

**3. Fault State Action**

| Class Code | Service Type (Code) | Instance | Attribute | Value |
|---|---|---|---|---|
| 0x09 | Set_Attribute_Single (0x10)<br>Get_Attribute_Single (0x0E) | 1 to 8 [01)] | 0x05 | 0: Output On<br>1: Hold Last State |

**4. IO-Link Parameter (ISDU_Read/Write)**

| Class Code | Service Type (Code) | Instance | Attribute | Value |
|---|---|---|---|---|
| 0x96 | Custom (0x32) | 1 to 8 [01)] | 0x03: Read<br>0x02: Write | - |

- 01) It is mapped from port 0 to 7.

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Dimensions or specifications on this manual are subject to change and some models may be discontinued without notice.

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