PCH Network Portal

Quick Start Guide

Add-On Instruction (AOI)

IO-Link Parameter Data

using acyclic communications

Rockwell PLC with Ethernet/IP

PREFACE

This Quick Start Guide (QSG) is designed to help integrate Parker Hannifin's PCH Portal module into an Allen-Bradley (AB) PLC environment. For the sake of this document, the PCH Network Portal will also be referred to as PCH Portal. The QSG assumes that you are using a PCH Portal module that is communicating to the AB PLC via an Ethernet/IP network.

You can find this AOI and instructions on how to implement it here:
http://solutions.parker.com/PDN_softwarefiles

The PCH Portal is configurable, from the factory, with IO-Link Class A or Class B modules installed in the three module positions. This QSG is agnostic to IO-Link Device Classification, such that it shall function the same whether you are controlling Class A or Class B modules. The guide will walk the user through obtaining the necessary files, importing/configuring the AOI, and 'configuring' the PCH ports.

The "PCH1xEABC_AB_PD_Rx" AOI facilitates communication and handling of configuration data, process data, and diagnostic data between the PLC and the PCH Portal module and the IO-Link slave devices that are connected to it.

There are 4 Ethernet/IP connection definitions available for the PCH Portal module.
The "PCH1xEABC_AB_IOL_PRM_Rx" AOI is designed to be used with the "CONNECTION 1" definition.
Refer to the PCH Portal's User Manual for connection definitions.

You can download resources such as this QSG, a sample RSLogix5000 project and the PCH Portal user manual here:

http://solutions.parker.com/PDN_softwarefiles

PCH Portal - IO-Link Parameter Data through Acyclic communications Add-On Instruction (AOI)

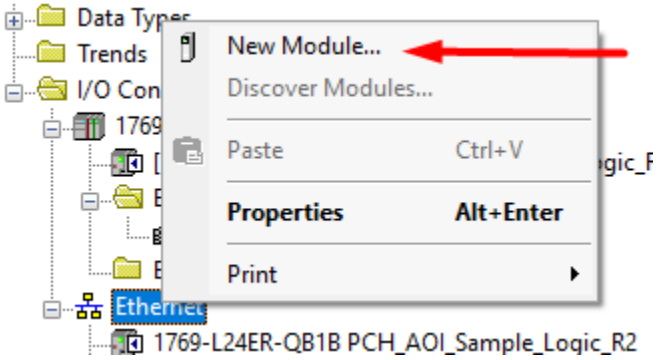
The “PCH1xEABC_AB_IOL_PRM_Rx” AOI simplifies the interface to ‘Read’ and ‘Write’ PARAMETER DATA to IO-Link devices with Allen-Bradley CompactLogix, ControlLogix and GuardLogix PLCs.
This Quick Start Guide assumes the use of an Ethernet/IP fieldbus. Data is mapped to user-friendly tags on the PLC side.

There are sample rungs at the end of this Quick Start Guide that show how simple it is to setup, configure and execute logic to both READ and WRITE Parameter Data to a connected IO-Link device once the AOI is configured.

NOTE: This AOI will READ and WRITE Parameter Data to/from any manufacturer’s IO-Link device.

Instructions for configuring the Parker PCH Portal IO-Link Parameter Data Add-On Instruction (AOI)

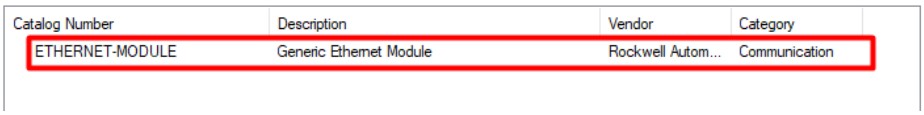
1. Add the PCH Portal module to the Controller Organizer's "I/O Configuration".
2.



This can be done using a "Generic Ethernet Module" or by using the correct EDS file.

NOTE: There is a separate Add-On Instruction (AOI) available for the PCH Portal's Configuration, Process Data, and Diagnostic Data (PCH Portal AOI). Contact Parker if you need assistance obtaining this AOI. If the PCH Portal AOI is used a "Generic Ethernet Module" must be used to configure the PCH Portal. It will not work with the EDS file.

a. If the Generic Ethernet Module is used for configuring the PCH Portal in the I/O Configuration, follow these steps:

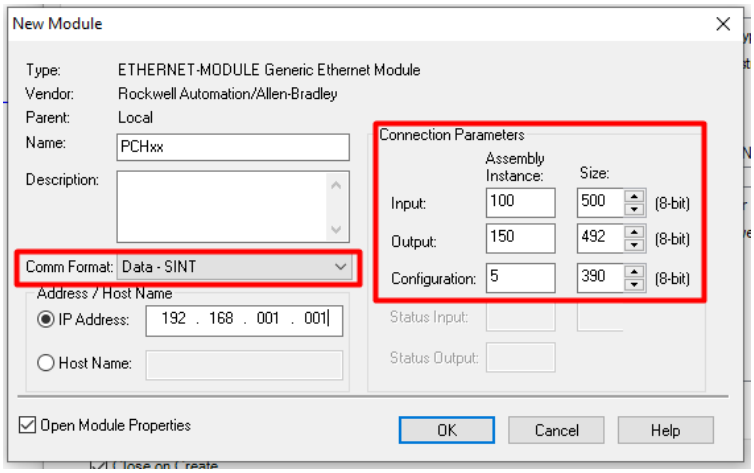


Catalog Number	Description	Vendor	Category
ETHERNET-MODULE	Generic Ethernet Module	Rockwell Autom...	Communication

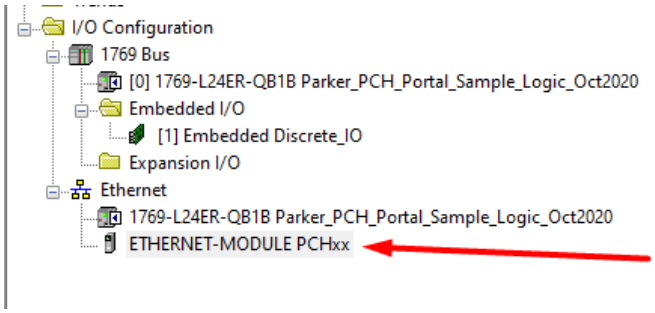
Per the PCH Portal's user manual, configure the I/O module as follows:

Connection 1: This is fixed map, all the process data supported by the device is mapped into fixed locations. It is easier to locate and map the process data, as map remains fixed irrespective of the device port configurations. Connection 1 will be used whenever the PCH configuration to be done via PLC/controller.

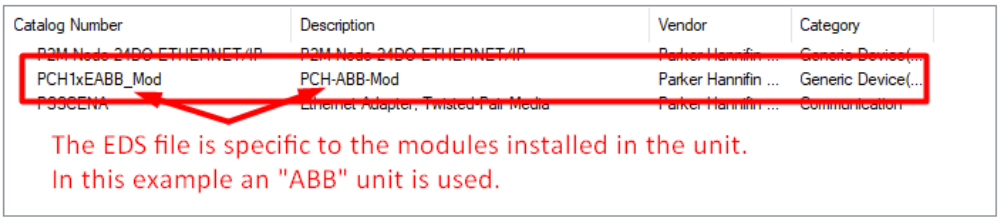
Mode	Instance ID	Data Length (Max. Bytes)
Input	100	500
Output	150	492
Configuration	5	390

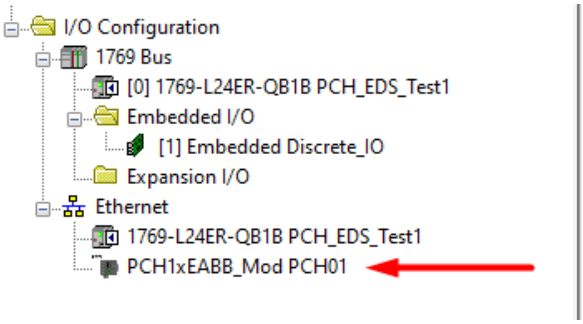


Note: Make sure you configure the "Comm Format" as **Data – SINT**

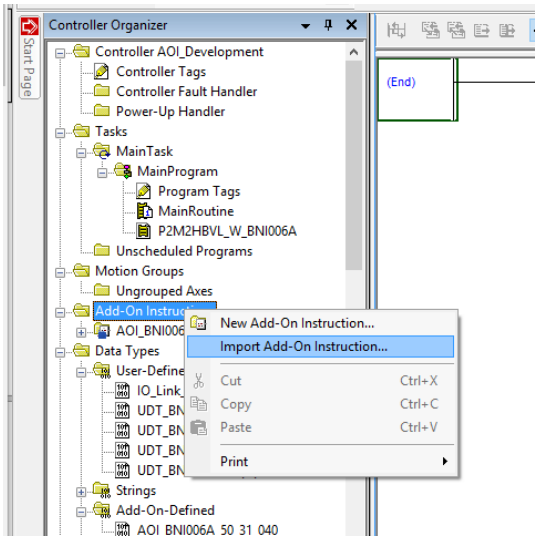


b. If the EDS file is used for configuring the PCH Portal in the I/O Configuration, follow these steps:
    a. Read the label on the side of your PCH Portal unit and correlate the part number to the naming convention of the EDS file. The PCH Portal EDS files are very specific to the physical build of the module.
    b. Register the correct EDS file in RSLogix.

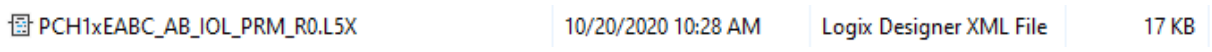




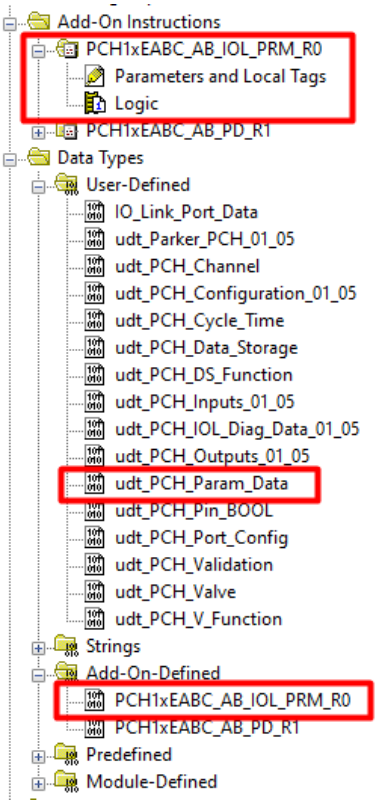
3. Right click **Add-On Instruction** in Controller Organizer and select **"Import Add-On Instruction…"**



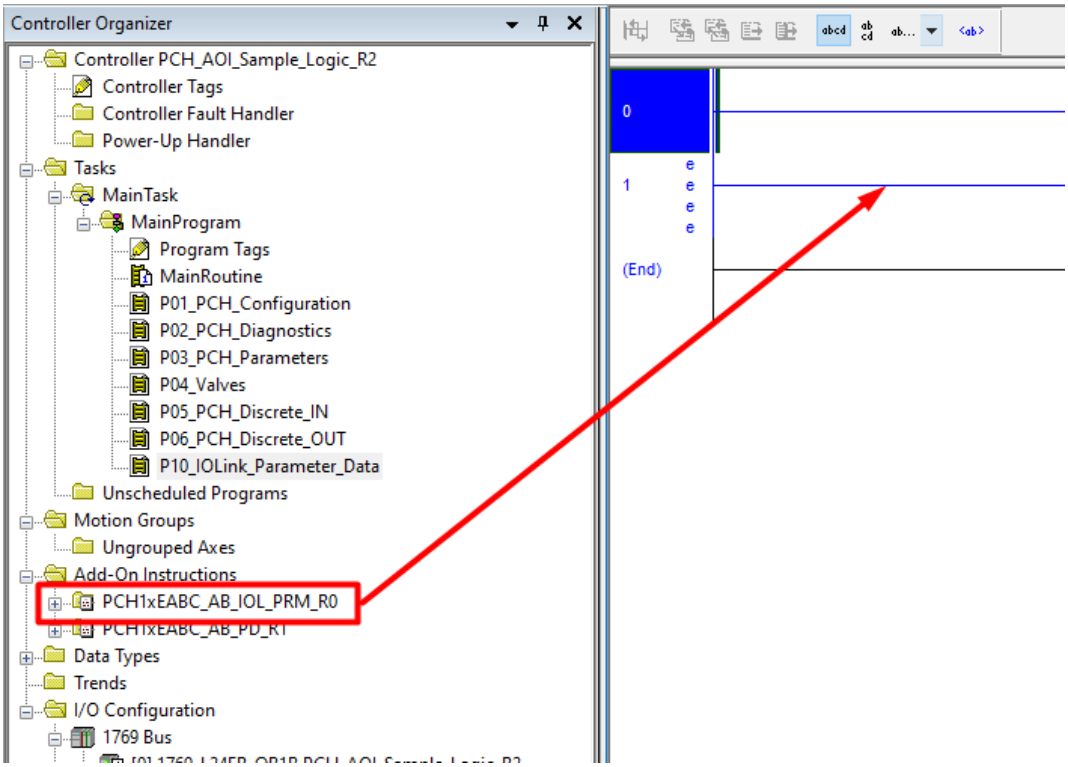
4. Select the "PCH1xEABC_AB_IOL_PRM_Rx" where _Rx is the revision of AOI.

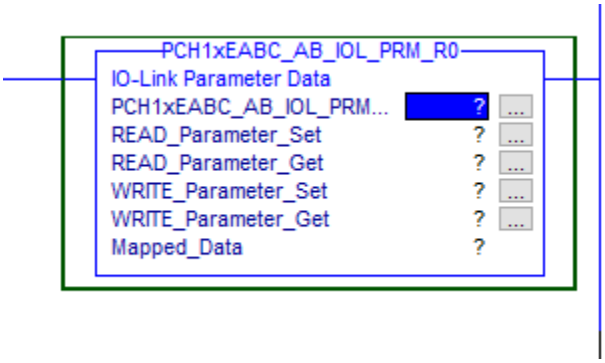


Choose OK on Import Configuration Window and you should then see the new AOI instance along with User-Defined and Add-On Defined data types created in the controller organizer.



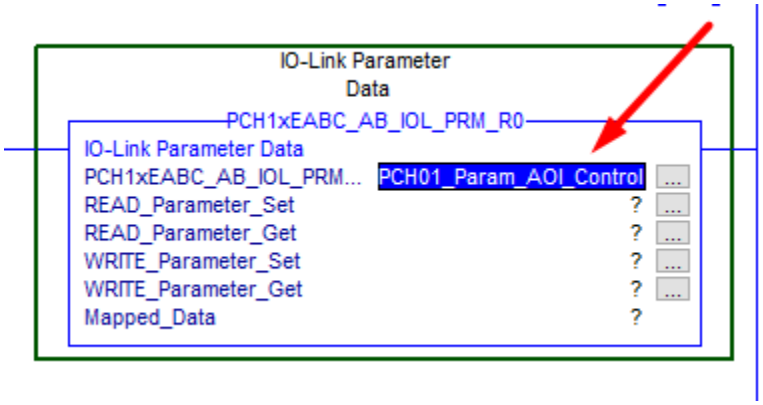
5. Add an instance of the instruction by dragging the AOI onto an empty rung of ladder. The instruction will drop onto the selected rung.

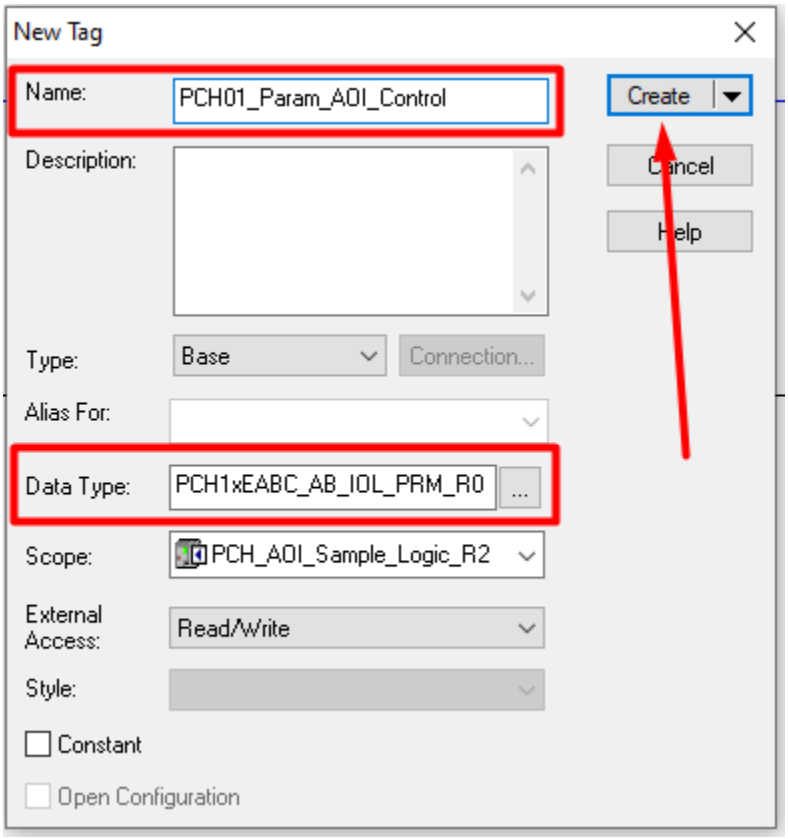




6. Create a tag for the “PCH1xEABC_AB_PD_Rx” AOI control.

   The best method for this is to type in your ‘tag name’ and then right click on the tag field and select “NEW “tag-name””. This way the correct data type is automatically assigned to the tag.





General information

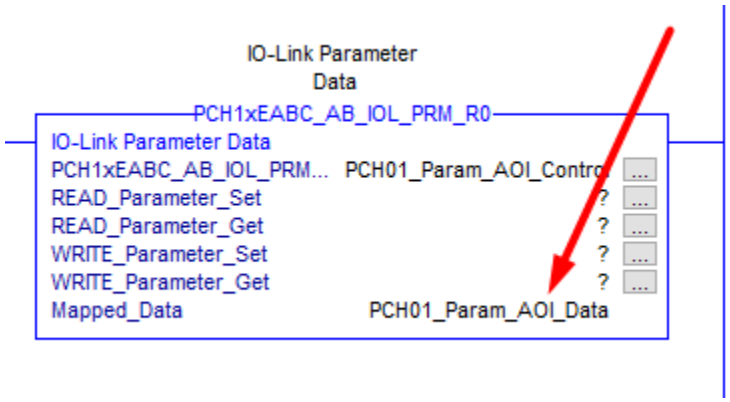
The PCH Portal unit uses a “Two-Step” process to Read or Write Parameter Data to connected IO-Link devices. First, there is a “SET ATTRIBUTE SINGLE” command followed by a “GET ATTRIBUTE SINGLE” command. These are executed through Message (MSG) Instructions. The MSG instructions have to be created and configured initially when the AOI is configured. After they are created they are used within the AOI, there is no further use of them to the user after this.

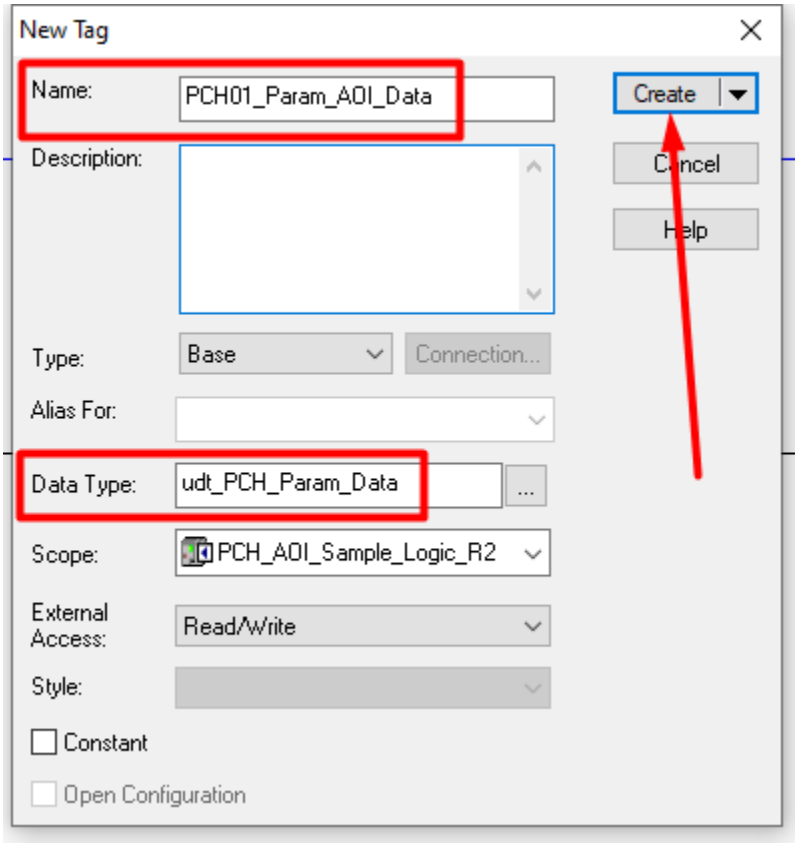
There are sample rungs at the end of this Quick Start Guide that show how simple it is to setup, configure and execute logic to both READ and WRITE Parameter Data to a connected IO-Link device once the AOI is configured.

NOTE: This AOI will READ and WRITE Parameter Data to/from any manufacturer’s IO-Link device.

7. Create a tag for the **“Mapped_Data”** element of the AOI.

   The best method for this is to type in your ‘tag name’ and then right click on the tag field and select “NEW “tag-name””. This way the correct data type is automatically assigned to the tag.





The ‘Mapped_Data’ tag contains many of the tags you will need to configure the Message (MSG) instructions. Also, if you look at, or monitor, the ‘Mapped_Data’ tag that was just created, you will see it contains everything you need to READ and/or WRITE Parameter Data to IO-Link devices.

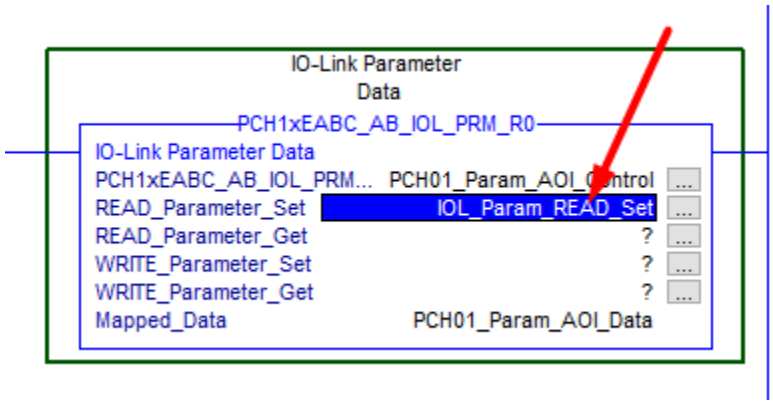
Refer to the sample rungs of logic in Section 12 as to how they are used to READ and/or WRITE Parameter Data to IO-Link devices.

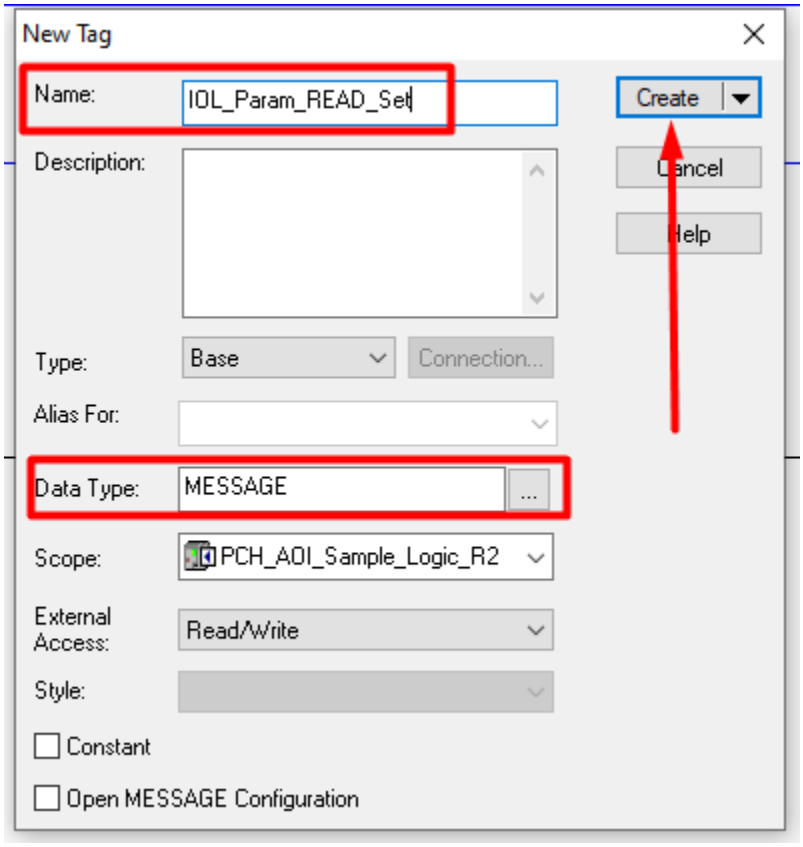
Name	Data Type	Description
PCH01_Param_AOI_Data	udt_PCH_Param_Data	
PCH01_Param_AOI_Data.PCH_PortNumber	DINT	PCH Portal Port Number (00-11)
PCH01_Param_AOI_Data.Param_Index	DINT	IO-Link Parameter - INDEX number
PCH01_Param_AOI_Data.Param_SubIndex	DINT	IO-Link Parameter - SUB-INDEX number
PCH01_Param_AOI_Data.READ_Parameter	BOOL	READ Parameter Toggle Bit
PCH01_Param_AOI_Data.READ_Complete	BOOL	READ Completed Bit
PCH01_Param_AOI_Data.Param_Read_Result	SINT[32]	READ Parameter - Result Data
PCH01_Param_AOI_Data.READ_Error	BOOL	READ Parameter - Error
PCH01_Param_AOI_Data.READ_Error_Code1	INT	READ Parameter Error Code 1
PCH01_Param_AOI_Data.READ_Error_Code2	INT	READ Parameter Error Code 2
PCH01_Param_AOI_Data.WRITE_Parameter_Data	SINT[32]	WRITE Parameter Data
PCH01_Param_AOI_Data.WRITE_Parameter_Length	DINT	WRITE Parameter - Data Length
PCH01_Param_AOI_Data.WRITE_Parameter	BOOL	WRITE Parameter - Toggle Bit
PCH01_Param_AOI_Data.WRITE_Complete	BOOL	WRITE Complete Bit
PCH01_Param_AOI_Data.WRITE_Error	BOOL	WRITE Parameter - Error
PCH01_Param_AOI_Data.WRITE_Error_Code1	INT	WRITE Parameter Error Code 1
PCH01_Param_AOI_Data.WRITE_Error_Code2	INT	WRITE Parameter Error Code 2
PCH01_Param_AOI_Data.Read_Param_Source	SINT[32]	READ MSG Source tag
PCH01_Param_AOI_Data.Read_Param_Destination	SINT[255]	READ MSG Destination tag
PCH01_Param_AOI_Data.Write_Param_Source	SINT[70]	WRITE MSG Source tag
PCH01_Param_AOI_Data.Write_Param_Destination	SINT[255]	WRITE MSG Destination tag
PCH01_Param_AOI_Data.AOI_Busy	BOOL	AOI is actively Reading/Writing
PCH01_Param_AOI_Data.AOI_NAK_Response	BOOL	NAK response returned - check setuip

8. Create a tag for the **“READ_Parameter_Set”** message instruction.

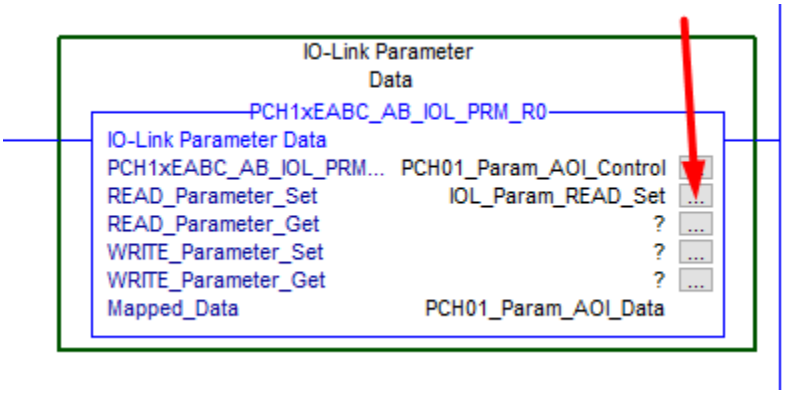
   This tag must be created as a ‘controller scope’ tag.

   This tag will be used to execute the “SET ATTRIBUTE SINGLE” command within the AOI.

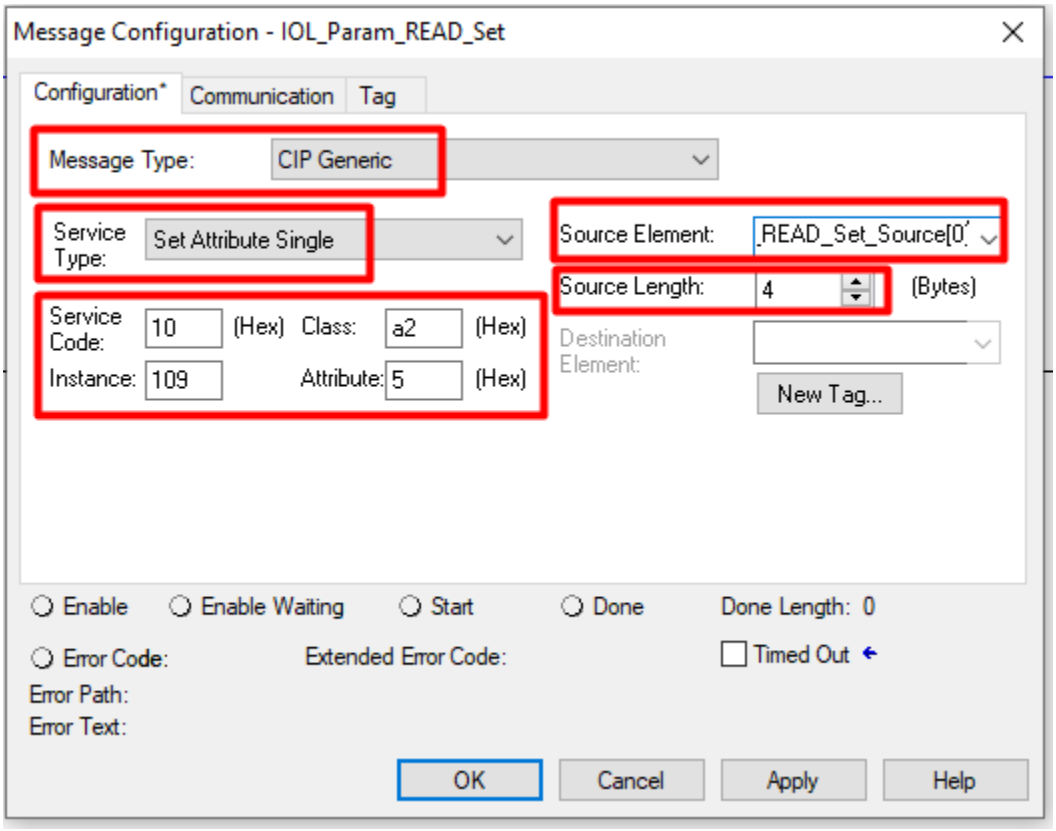




a. Configure the MESSAGE instruction as follows:

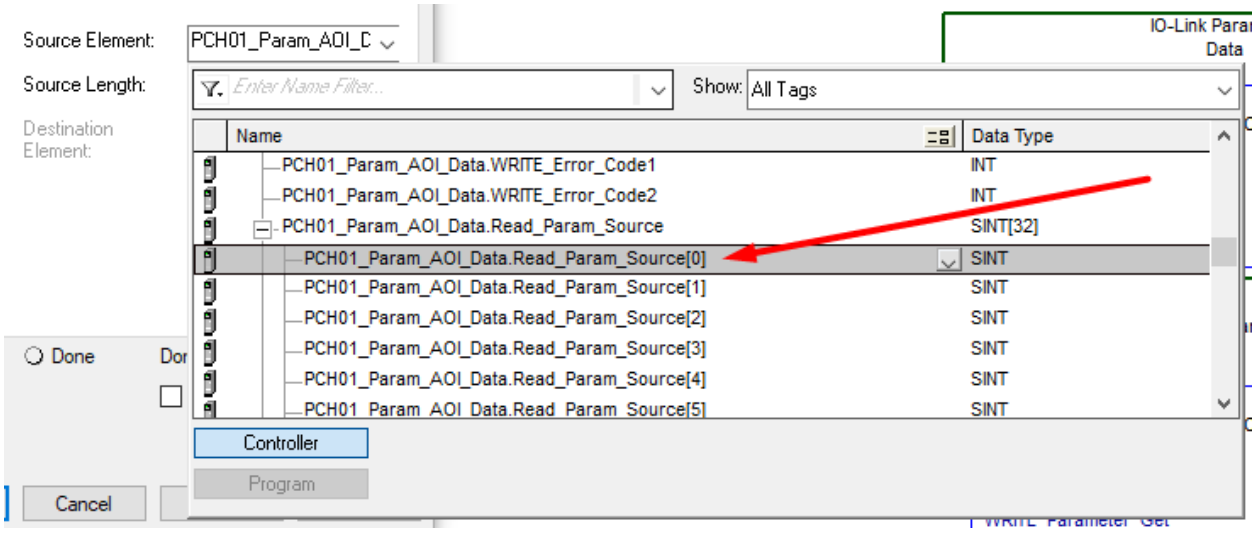


i. Configure the **CONFIGURATION tab** of the MSG instruction as follows:

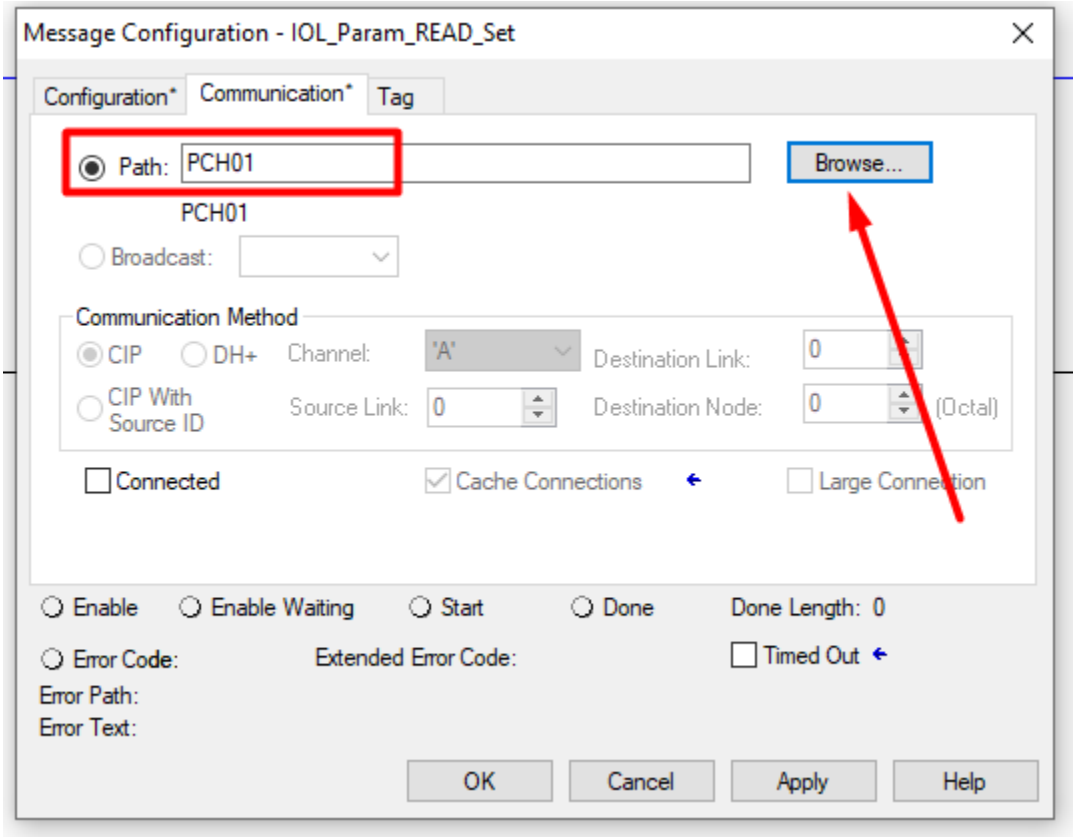


1. Message Type = CIP Generic
2. Source Type = Set Attribute Single
3. Service Code will default to 10
4. Class = a2
5. Attribute = 5
6. Instance = 109
7. Source Length = 4
8. Source Element tag was created when the 'Mapped_Data' tag was created in Step 7. Click on the arrow on the right side of the field. Find the tag 'PCH01_Param_AOI_Data.Read_Param_Source[0]' and select it.

Make sure you select the first element of the array



ii. Configure the **COMMUNICATION tab** of the MSG instruction by clicking on BROWSE and selecting the PCH Portal module from the I/O Configuration.

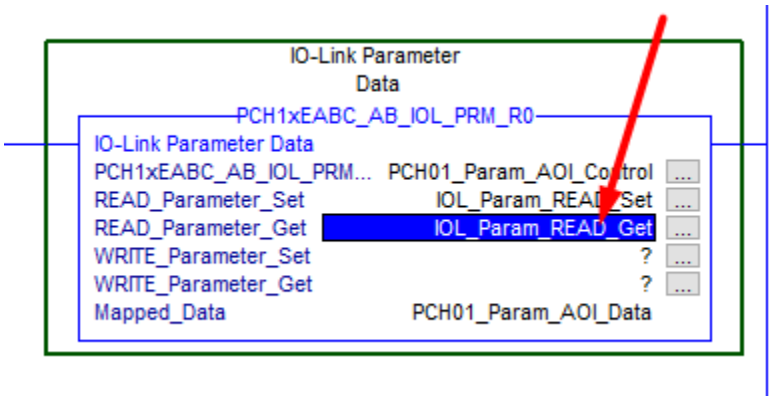


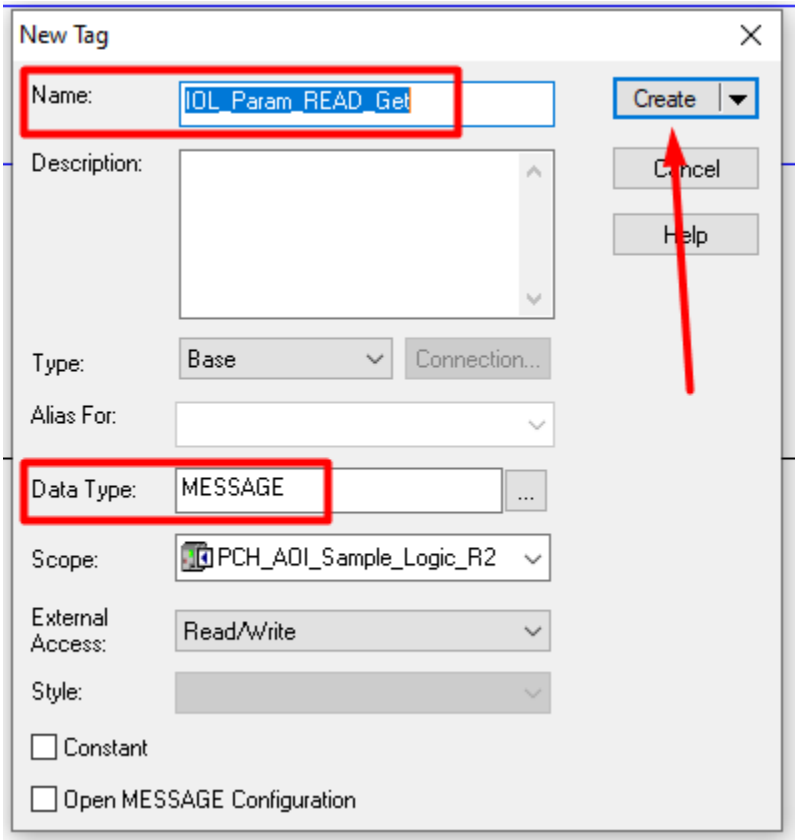
At this point the **READ_Parameter_Set** MSG instruction is fully configured. **Press OK.**

9. Create a tag for **“READ_Parameter_Get”** message instruction.

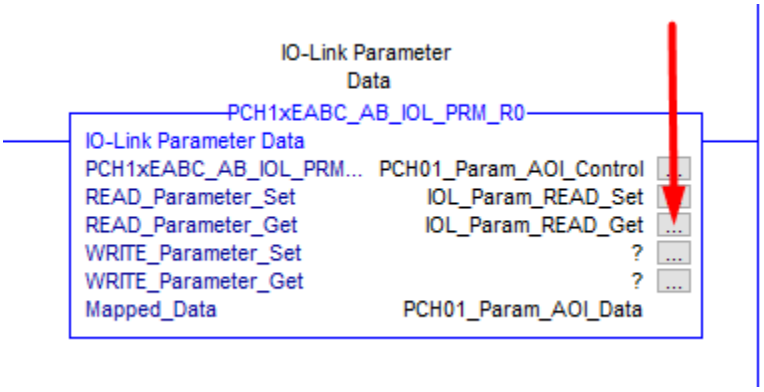
   This tag must be created as a ‘controller scope’ tag.

   This tag will be used to execute the “GET ATTRIBUTE SINGLE” command within the AOI.

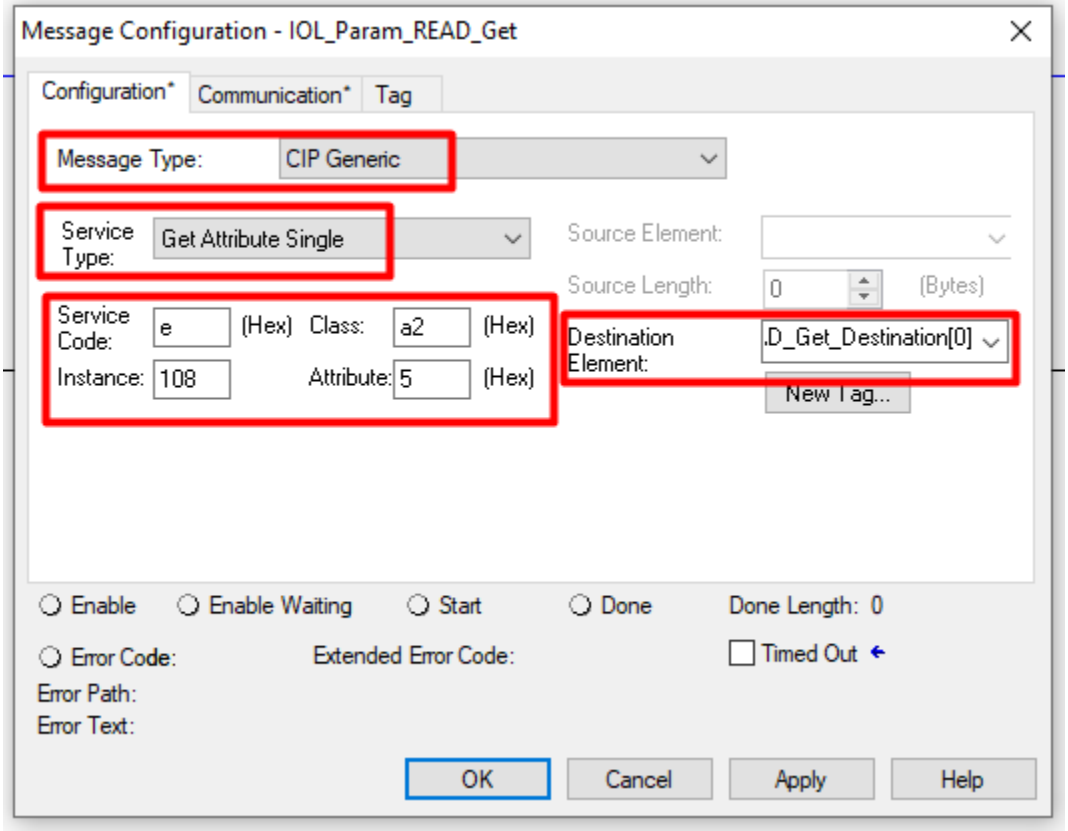




a. Configure the MESSAGE instruction as follows:

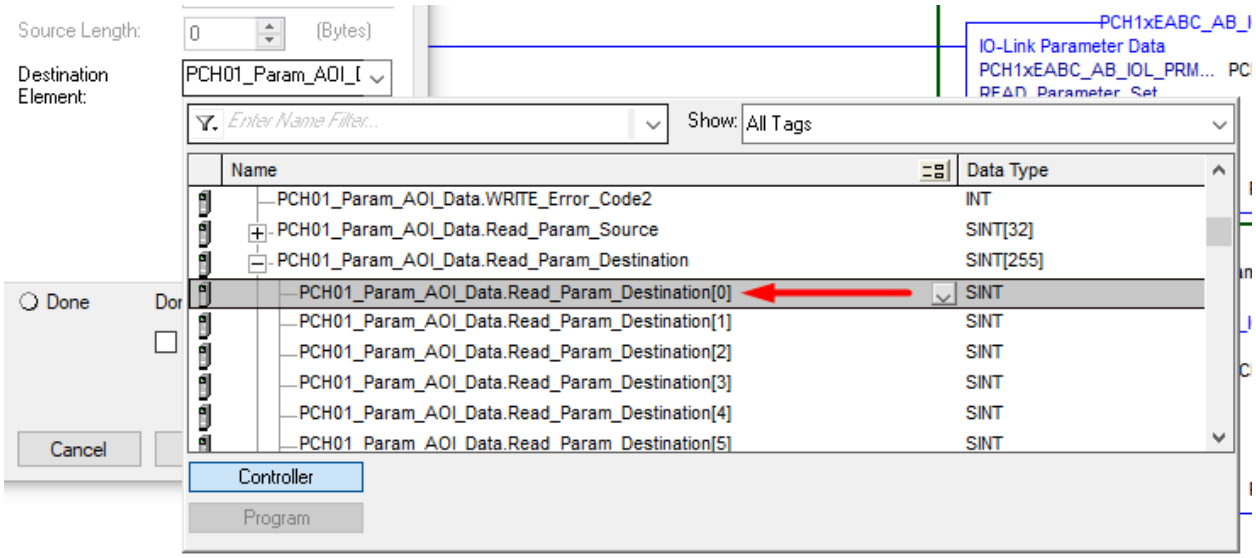


i. Configure the **CONFIGURATION tab** of the MSG instruction as follows:

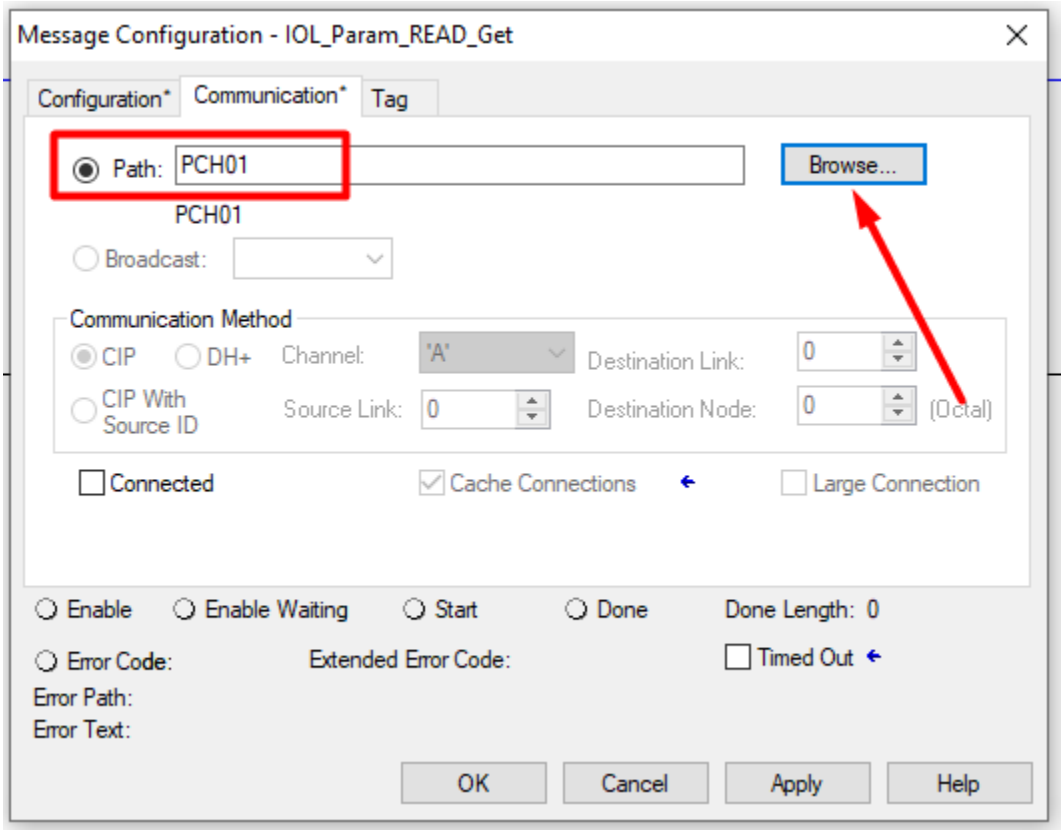


1. Message Type = CIP Generic
2. Source Type = Get Attribute Single
3. Service Code will default to ‘e’
4. Class = a2
5. Attribute = 5
6. Instance = 108
7. Source Element is not configured here
8. Source Length is not configured here

9. Destination Element tag was created when the 'Mapped_Data' tag was created in Step 7. Click on the arrow on the right side of the field. Find the tag 'PCH01_Param_AOI_Data.Read_Param_Destination[0]' and select it. **Make sure you select the first element of the array**.



ii. Configure the **COMMUNICATION tab** of the MSG instruction by clicking on BROWSE and selecting the PCH Portal module from the I/O Configuration.

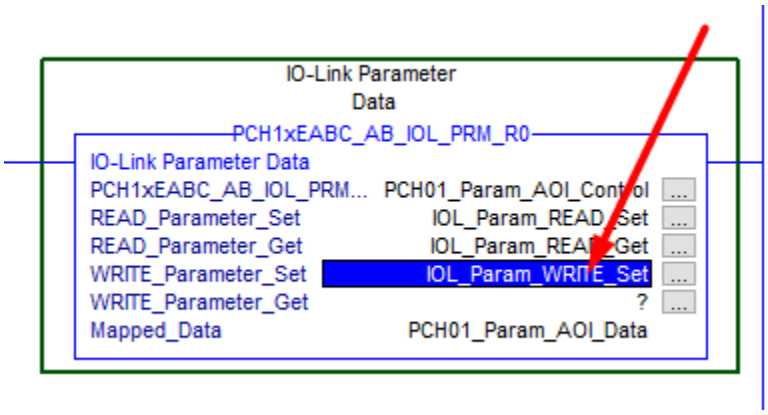


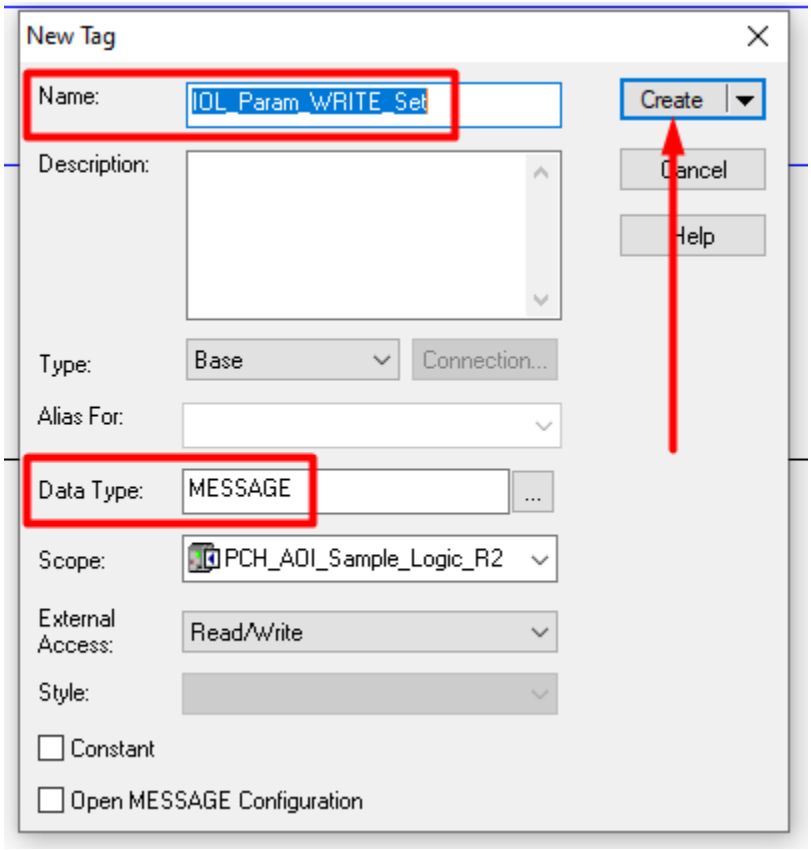
At this point the **READ_Parameter_Get** MSG instruction is fully configured. **Press OK.**

10. Create a tag for the **“WRITE_Parameter_Set”** message instruction.

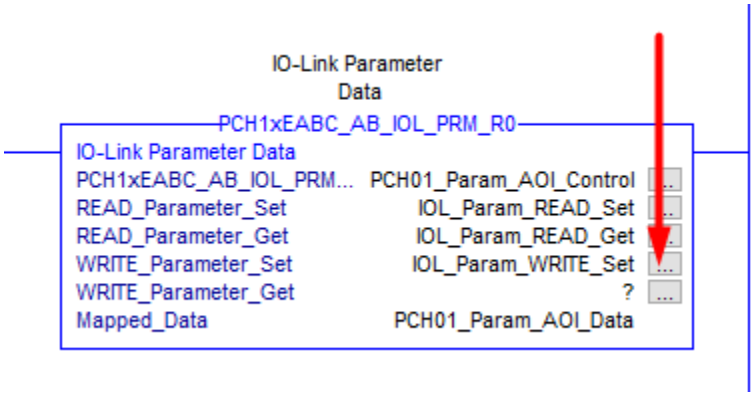
    This tag must be created as a ‘controller scope’ tag.

    This tag will be used to execute the “SET ATTRIBUTE SINGLE” command within the AOI.

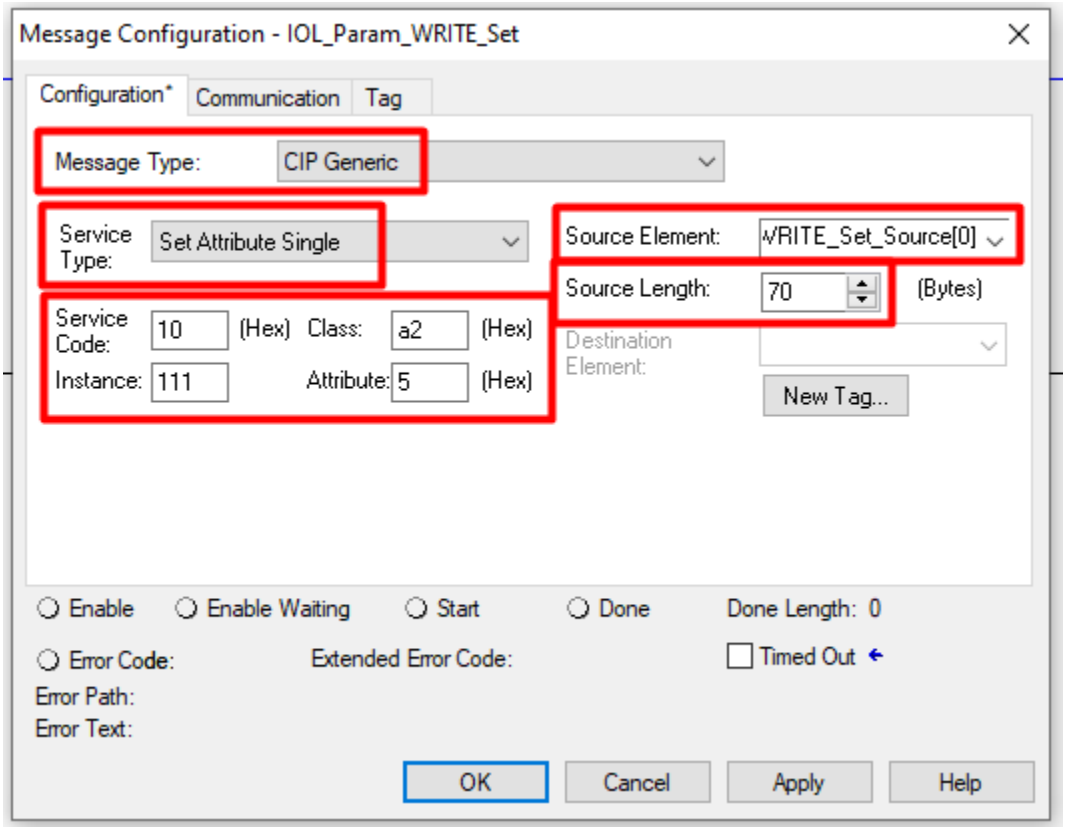




b. Configure the MESSAGE instruction as follows:

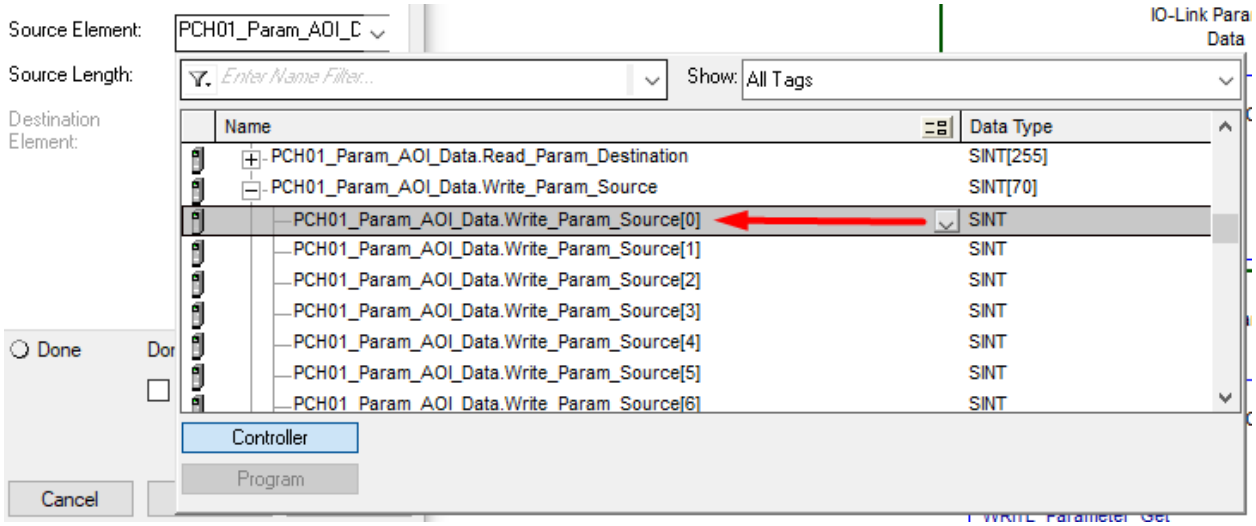


i. Configure the **CONFIGURATION tab** of the MSG instruction as follows:

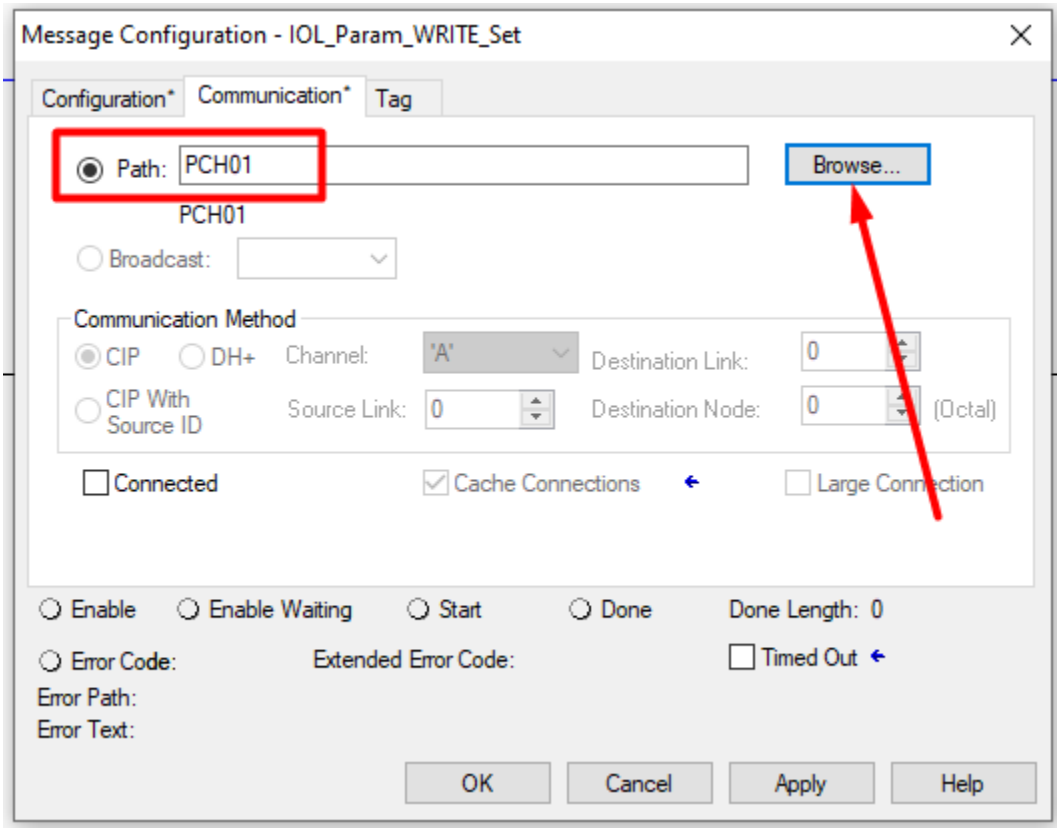


1. Message Type = CIP Generic
2. Source Type = Set Attribute Single
3. Service Code will default to 10
4. Class = a2
5. Attribute = 5
6. Instance = 111
7. Source Length = 70

8. Source Element was created when the 'Mapped_Data' tag was created in Step 7. Click on the arrow on the right side of the field. Find the tag 'PCH01_Param_AOI_Data.Write_Param_Source[0]' and select it. **Make sure you select the first element of the array**.



ii. Configure the **COMMUNICATION tab** of the MSG instruction by clicking on BROWSE and selecting the PCH Portal module from the I/O Configuration.

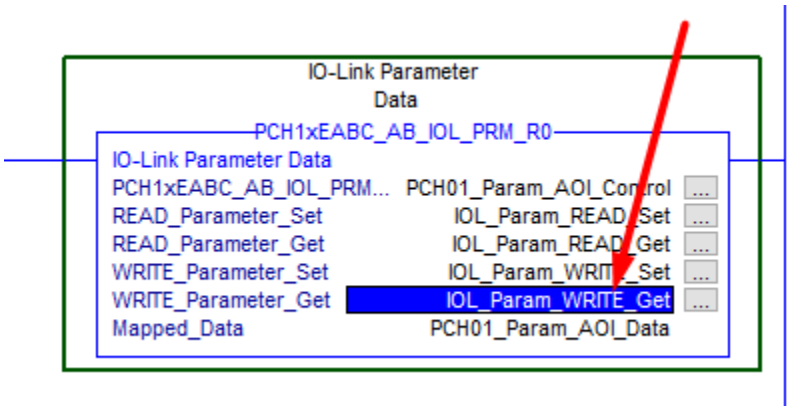


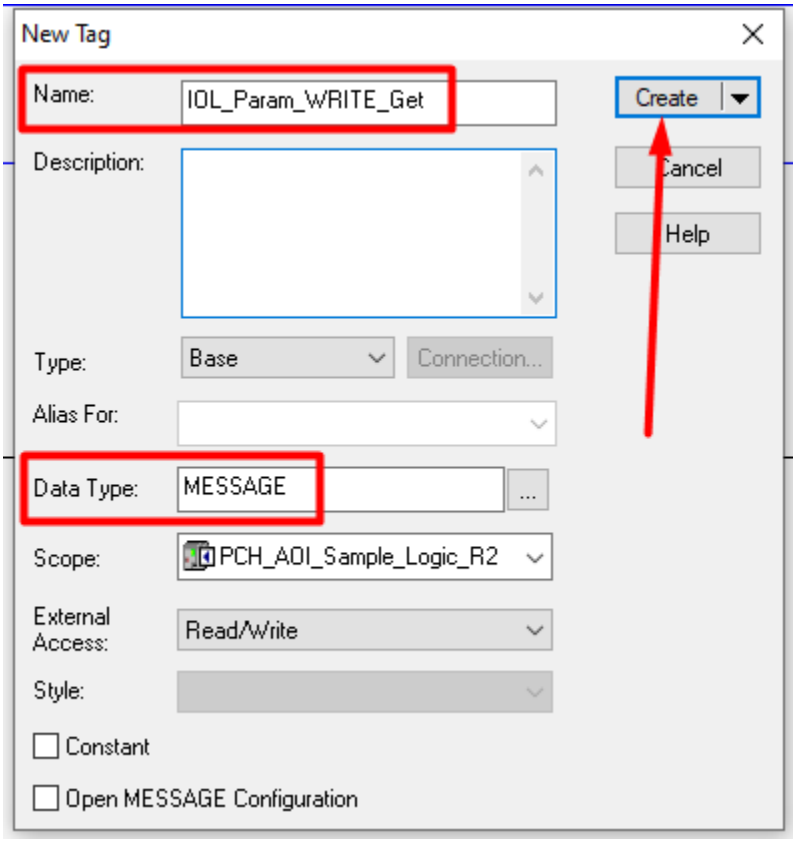
At this point the **WRITE_Parameter_Set** MSG instruction is fully configured. **Press OK.**

11. Create a tag for **“WRITE_Parameter_Get”** message instruction.

    This tag must be created as a ‘controller scope’ tag.

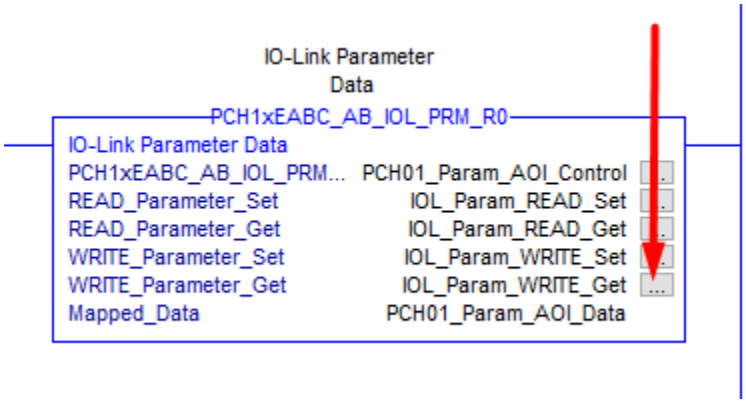
    This tag will be used to execute the “GET ATTRIBUTE SINGLE” command within the AOI.



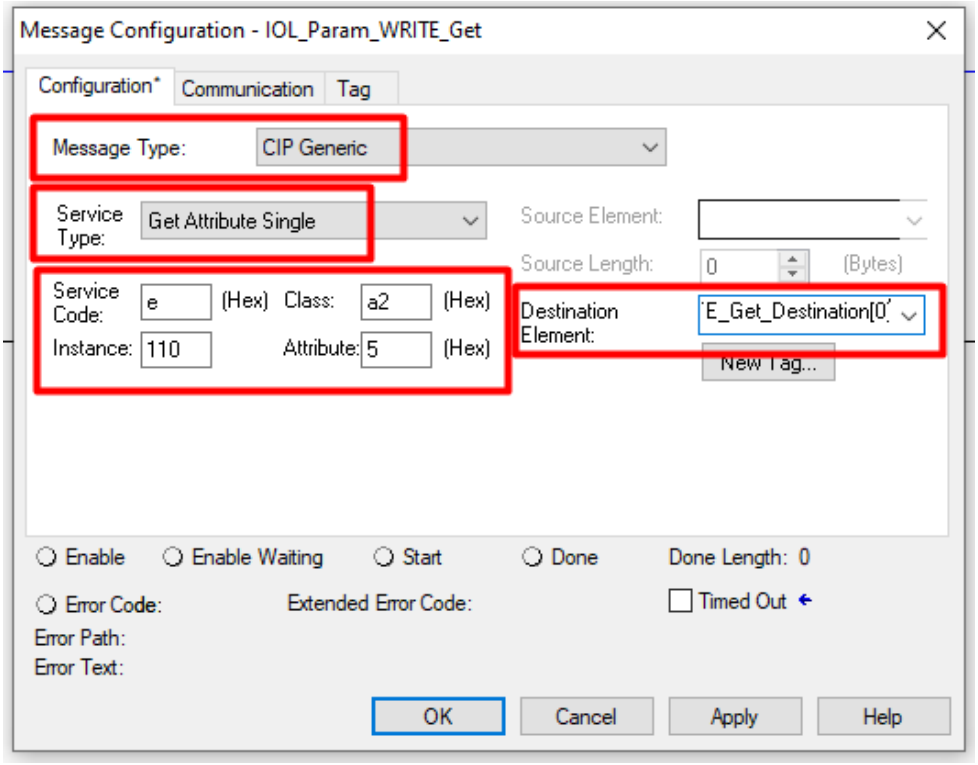


a. Configure the MESSAGE instruction as follows:

b.

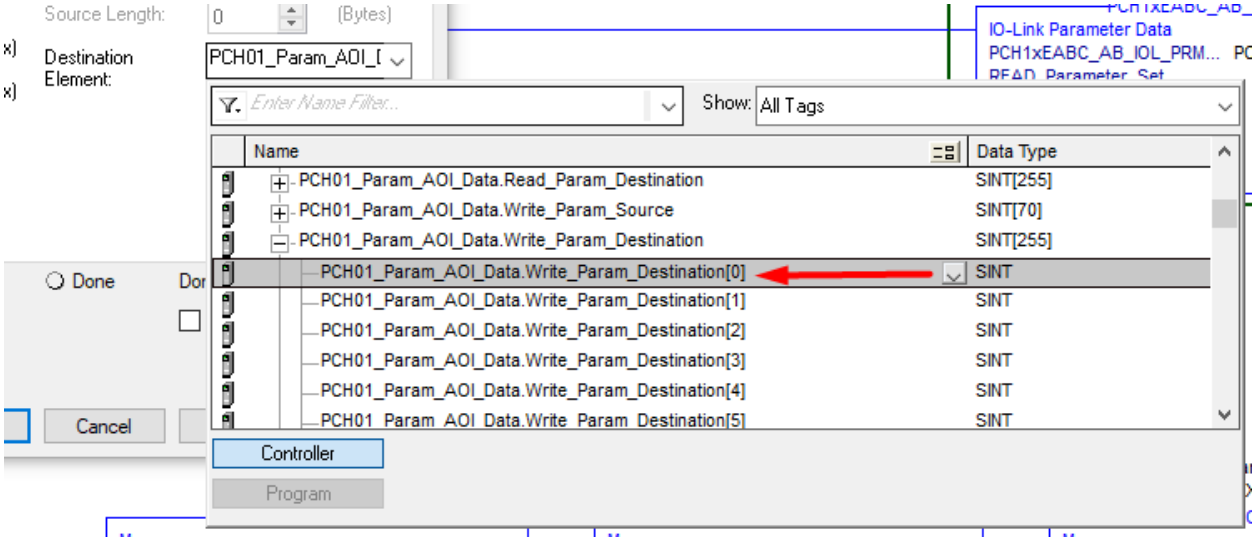


i. Configure the **CONFIGURATION tab** of the MSG instruction as follows:

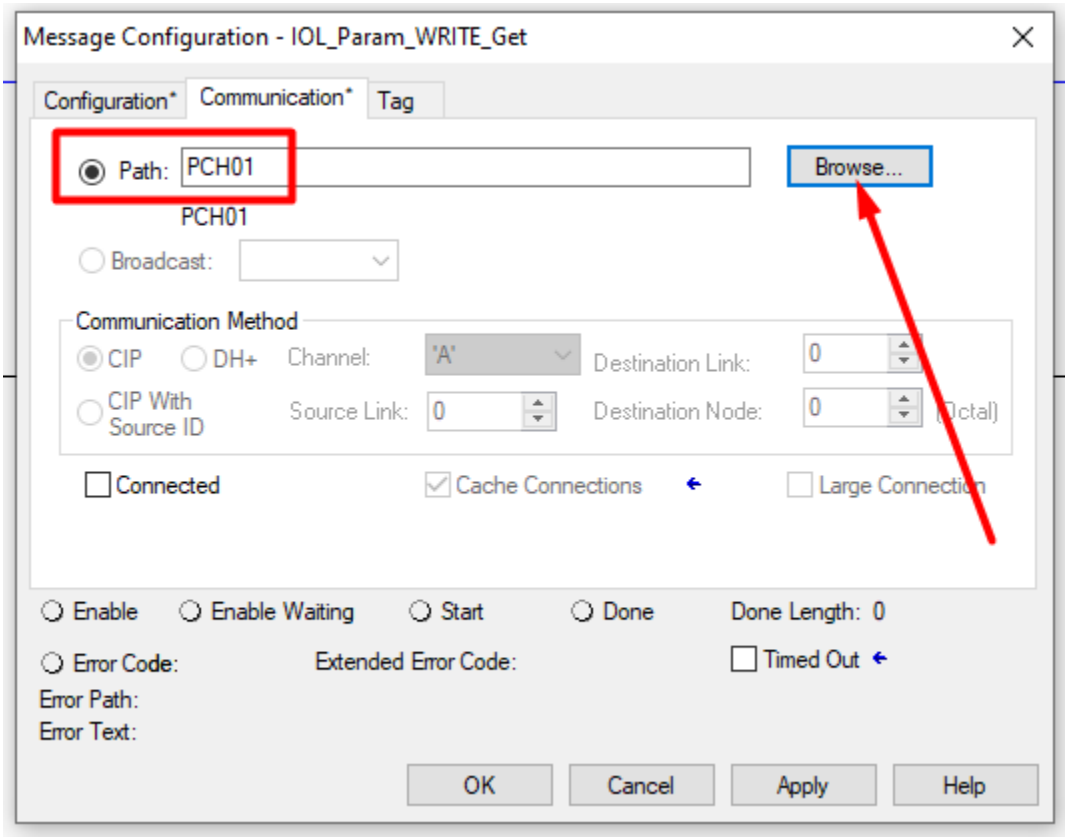


1. Message Type = CIP Generic
2. Source Type = Get Attribute Single
3. Service Code will default to ‘e’
4. Class = a2
5. Attribute = 5
6. Instance = 110
7. Source Element is not configured here
8. Source Length is not configured here

9. The Destination Element tag was created when the 'Mapped_Data' tag was created in Step 7. Click on the arrow on the right side of the field. Find the tag 'PCH01_Param_AOI_Data.Write_Param_Destination[0]' and select it. **Make sure you select the first element of the array.**



ii. Configure the **COMMUNICATION tab** of the MSG instruction by clicking on BROWSE and selecting the PCH Portal module from the I/O Configuration.

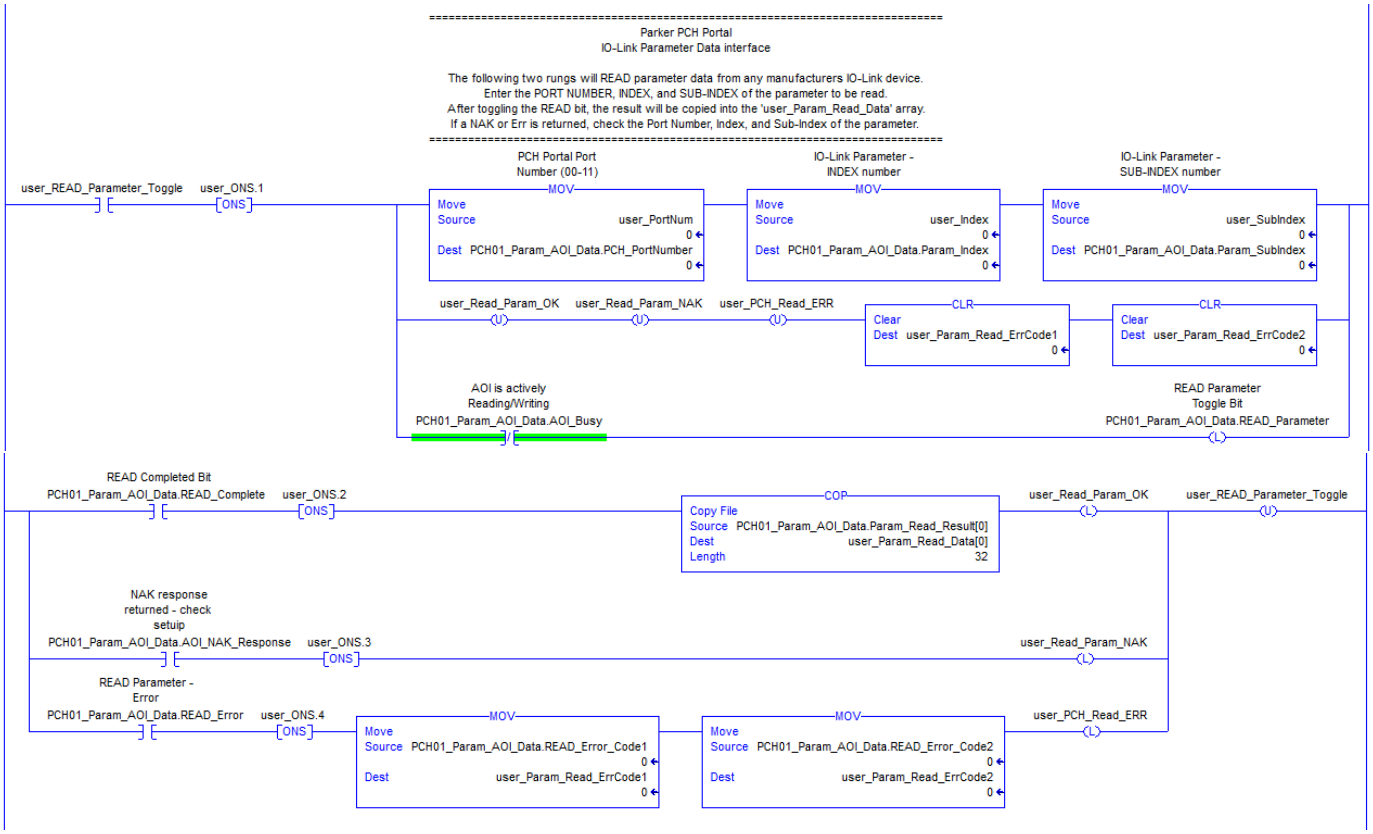


At this point the **WRITE_Parameter_Get** MSG instruction is fully configured. **Press OK.**

12. **Sample logic for READING Parameter Data from a connected IO-Link device.**

NOTE: This AOI will READ Parameter Data from any manufacturer's IO-Link device.

Following are two rungs of logic that utilize the AOI to READ Parameter Data from an IO-Link device. Any tag beginning with "user" is a tag that has to be created by the user to conform to the users logic nomenclature and format.



Follow these steps to READ Parameter Data from the IO-Link device:

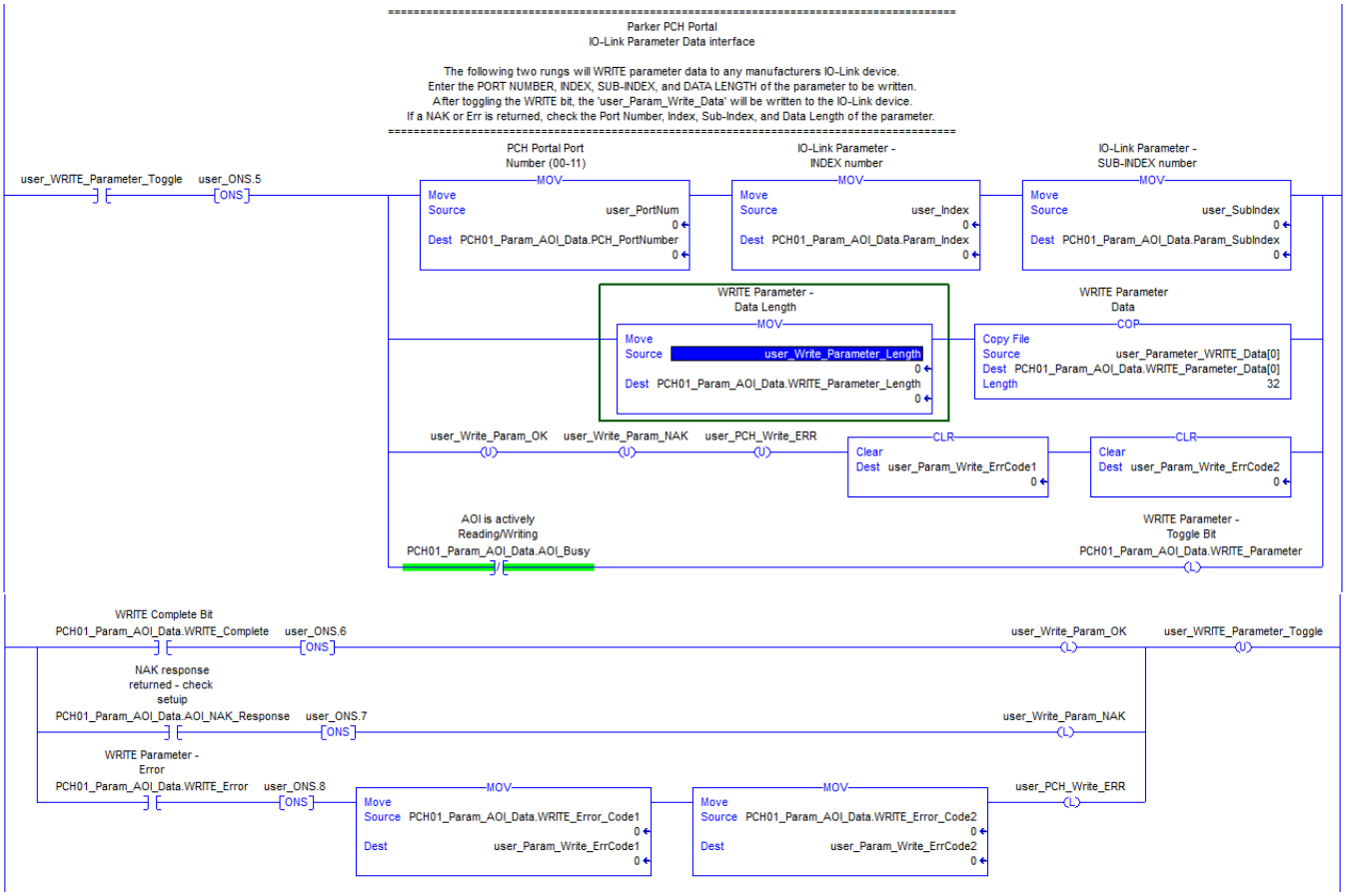
1. Populate the 'user_PortNum' tag with the port number on the PCH Portal unit that the IO-Link device in connected to. This value will be between 0 and 11.
2. Populate the 'user_Index' tag with the Index of the parameter to be read. This will be the 'decimal' value of the Index. Refer to the manufacture's manuals for this information.
3. Populate the 'user_SubIndex' tag with the Sub-Index of the parameter to be read. This will be the decimal value of the Sub-Index. Refer to the manufacture's manuals for this information.
4. Toggle the 'user_READ_Parameter_Toggle' bit to execute the rung.
5. **If the 'READ_Complete' bit goes high the 'user_Param_Read_Data' tag will contain the READ result.**

6. If the ‘AOI_NAK_Response’ bit goes high check the following:
    a. The IO-Link device is connected and communicating in the proper port.
    b. The Index is the correct decimal value.
    c. The Sub-Index is the correct decimal value.
7. If the ‘READ_Error’ bit goes high, the error code will be populated.
   If the ‘READ_Error_Code1’ tag is populated the error occurred in the SET Command.
   If the ‘READ_Error_Code2’ tag is populated the error occurred in the GET Command.
   These error codes are Rockwell error codes, refer to Rockwell documentation.

13. **Sample logic for WRITING Parameter Data to a connected IO-Link device**.

NOTE: This AOI will READ Parameter Data from any manufacturer's IO-Link device.

Following are two rungs of logic that utilize the AOI to WRITE Parameter Data to an IO-Link device. Any tag beginning with "user" is a tag that has to be created by the user to conform to the users logic nomenclature and format.



Follow these steps to WRITE Parameter Data to the IO-Link device:

1. Populate the 'user_PortNum' tag with the port number on the PCH Portal unit that the IO-Link device in connected to. This value will be between 0 and 11.
2. Populate the 'user_Index' tag with the Index of the parameter to be written. This will be the 'decimal' value of the Index.
   Refer to the manufacture's manuals for this information.
3. Populate the 'user_SubIndex' tag with the Sub-Index of the parameter to be written. This will be the decimal value of the Sub-Index.
   Refer to the manufacture's manuals for this information.
4. Populate the 'user_Write_Parameter_Length' tag with the decimal value of the number of bytes of the data being written. Refer to the manufacturer's manuals for this information.
5. Toggle the 'user_WRITE_Parameter_Toggle' bit to execute the rung.
6. **It the 'WRITE_Complete' bit goes high the parameter was successfully written to the IO-Link device.**

7. If the ‘AOI_NAK_Response’ bit goes high check the following:
    a. The IO-Link device is connected and communicating in the proper port.
    b. The Index is the correct decimal value.
    c. The Sub-Index is the correct decimal value.
8. If the ‘WRITE_Error’ bit goes high, the error code will be displayed.
   If the ‘WRITE_Error_Code1’ tag is populated the error occurred in the SET Command.
   If the ‘WRITE_Error_Code2’ tag is populated the error occurred in the GET Command.
   These error codes are Rockwell error codes, refer to Rockwell documentation.