

# Add-On Instructions to Read and Write IO-Link Parameters

Studio 5000  
EtherNet/IP

## Introduction

Add-On instructions are easy-to-use function blocks designed for Studio 5000®. With these instructions, IO-Link parameters can be easily read or written.

## Available Instructions

Instruction	Description
<b>PF_IOLink_Param_ReadWrite3</b>	Reads a single Index/Subindex from an IO-Link device via any IO-Link master listed below
<b>PF_IOLink_Param_ICE2</b>	Reads a single Index/Subindex from an IO-Link device via an ICE2... IO-Link master ( <i>Smaller code if the only IO-Link master you are using</i> )

## Supported IO-Link Masters

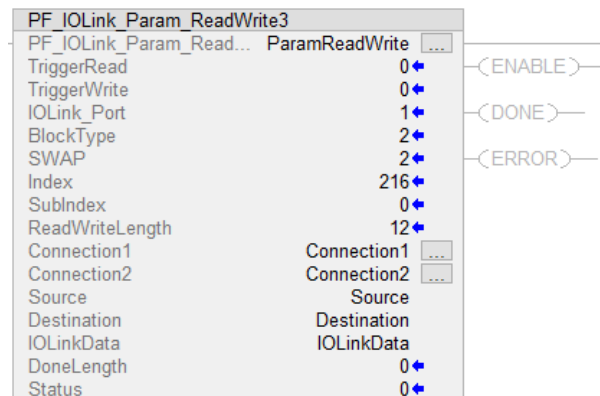
IO-Link Master	Description
<b>ICE1-8IOL-G60L-V1D</b>	8-port Pepperl+Fuchs IO-Link master in metal housing, Class A/B ports
<b>ICE11-8IOL-G60L-V1D</b>	8-port Pepperl+Fuchs IO-Link master in metal housing. Class A ports
<b>ICE1-8IOL-G30L-V1D</b>	8-port Pepperl+Fuchs IO-Link master in compact metal housing
<b>ICE2-8IOL-G65L-V1D</b>	8-port Pepperl+Fuchs IO-Link master in plastic housing
<b>ICE2-8IOL-K45P-RJ45</b>	8-port Pepperl+Fuchs Panel mount IO-Link master, spring terminals
<b>ICE2-8IOL-K45S-RJ45</b>	8-port Pepperl+Fuchs Panel mount IO-Link master, screw terminals
<b>1734-4IOL</b>	Allen-Bradley® Point-IO IO-Link master
<b>1732E-8IOLM12R</b>	Allen-Bradley ArmorBlock® IO-Link master

## Version

All Add-Ons were created in Studio 5000 V32.

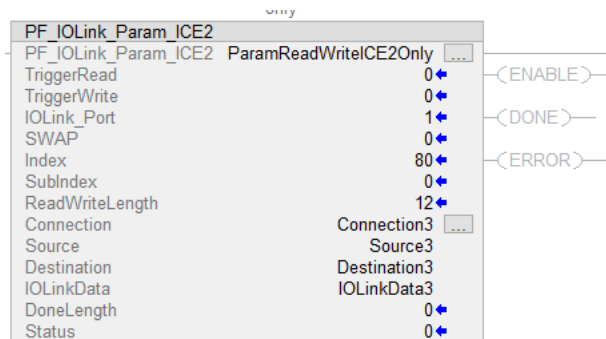
## PF\_IOLink\_Param\_ReadWrite3

With this instruction you can read or write a single IO-Link parameter from any IO-Link master listed in this manual.



## PF\_IOLink\_Param\_ICE2

With this instruction you can read or write a single IO-Link parameter from the ICE2... IO-Link master only. The reason this instruction exists is for those that will only ever use the ICE2... IO-Link master and want a very streamlined, smaller code instruction. Read below how to set the various parameters.



## Trigger Reading and Writing of IO-Link Parameters

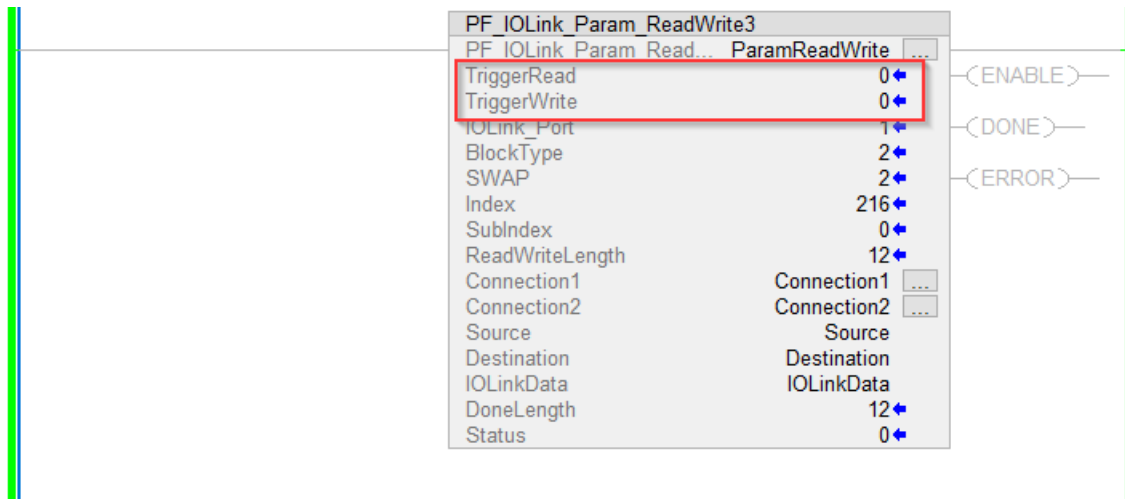


Figure 1: Trigger commands to read or write parameters

When all triggers are low, the “Busy, Done, and Error” bits will go low. Only one trigger can be issued at a time. The command is executed in the off-to-on transition and is completed when either a DONE or ERROR bit turns on. Upon completion, the parameters are read/written to an array called IOLinkData.

Suggested order of operations for changing parameters:

1. Read parameters
2. Make changes
3. Write parameters (If supported by the IO-Link device)

## Port Number and Module Type

The port number, `IOLink_Port`, indicates the port to which the sensor is connected. The Pepperl+Fuchs modules have ports numbered 1–8, and the Allen-Bradley master has ports labeled 0–3 or 1–8, depending on the version.

The 'BlockType' defines the type of IO-Link master used. *This parameter is not supported by the PF\_IOLink\_Param\_ICE2 Add-On.*

BlockType = 0 > ICE1... IO-Link master  
BlockType = 1 > Allen-Bradley IO-Link master  
BlockType = 2 > ICE2... IO-Link master  
BlockType = 11 > ICE11... IO-Link master

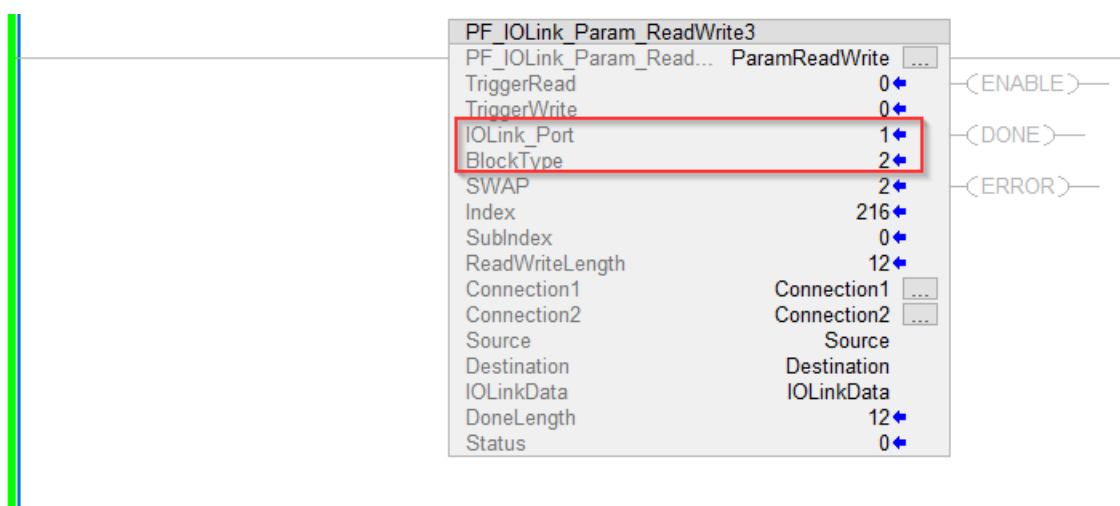


Figure 2: IOLink\_Port and BlockType configuration

## Byte Swapping

Byte swapping is only supported by the ICE2... IO-Link masters. All bytes in the array are swapped as specified. *Note: Old firmware versions can only swap bytes while reading. Writing requires that the data be swapped outside the instruction after execution.*

0 = No byte swapping

1 = 16bit (INT) swapping

2 = 32bit (DINT) swapping

### Example:

INT Swapping of IOLinkData: before swap 121212121212 after swap 212121212121

DINT Swapping of IOLinkData: before swap 123412341234 after swap 432143214321

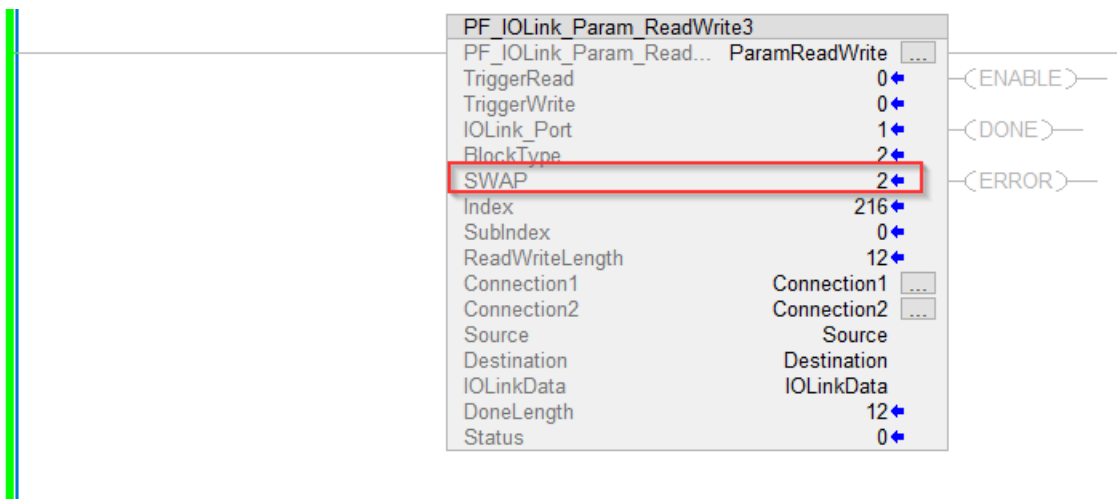


Figure 3: Byte Swapping supported on ICE2 IO-Link masters

## Connections

These are the connection messages used to read and write the parameters. Only four parameters need to be set. The service code will depend on what BlockType is used.

Connection 1 > Service Code 4b for BlockType 0, 1, and 2 (ICE1, ICE2, ICE11)  
 Service Code 4d for BlockType 1 (Allen-Bradley)  
*Always 4b for PF\_IOLink\_Param\_ICE2*

Connection 2 > Service Code 4c for BlockType 0, and 2 (ICE1, ICE2, ICE11)  
 Service Code 4c (subindex access) or 4e (index access) for BlockType 1 (AB)  
*This parameter is not supported by the PF\_IOLink\_Param\_ICE2 Add-On.*

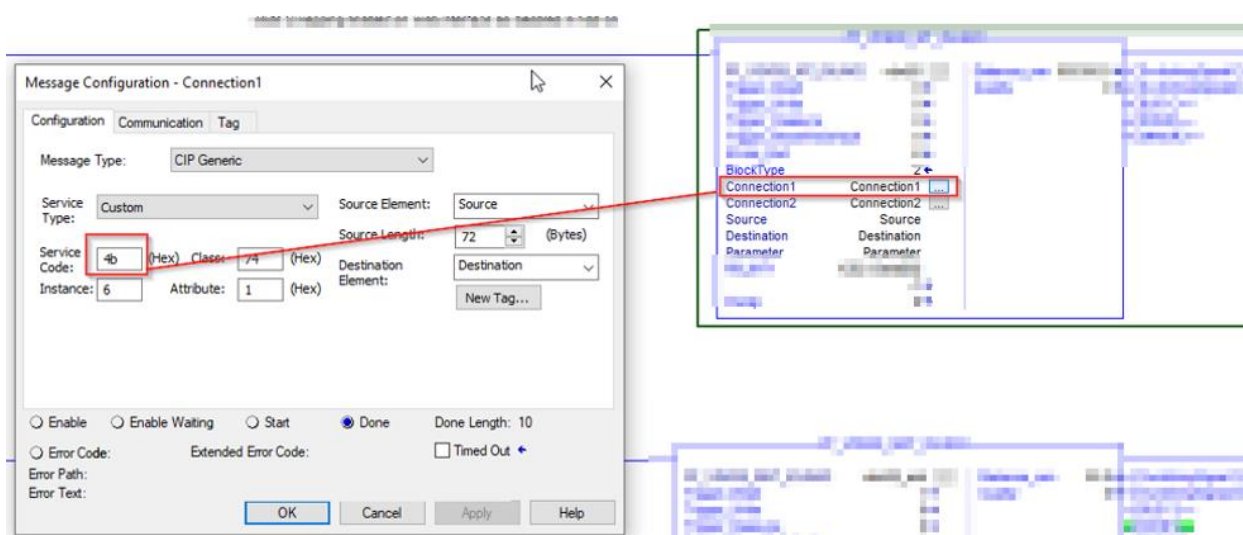


Figure 4: Connection 1 Service Code

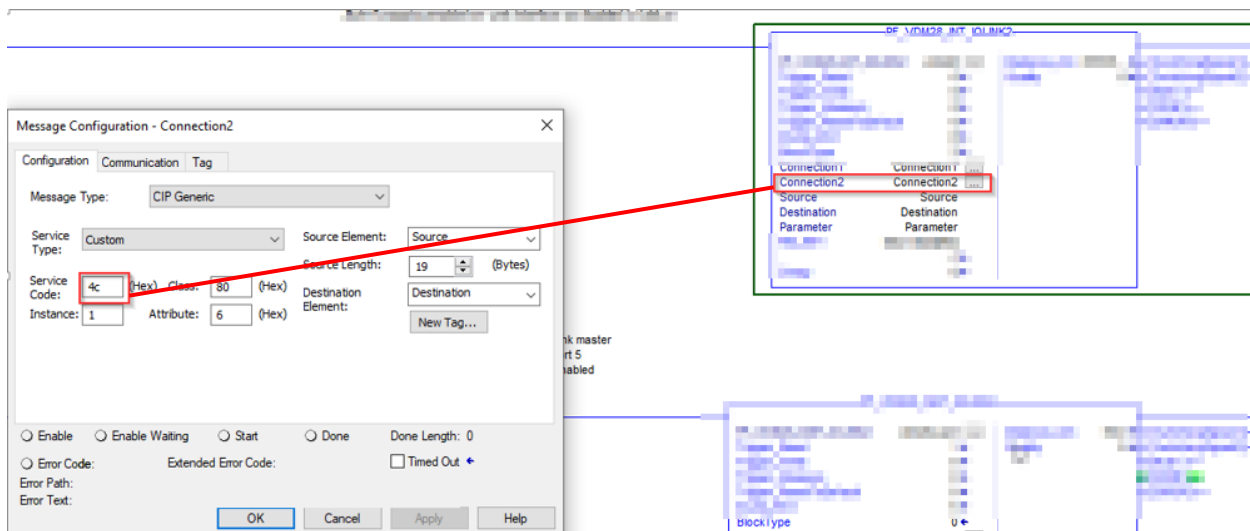


Figure 5: Connection 2 Service Code

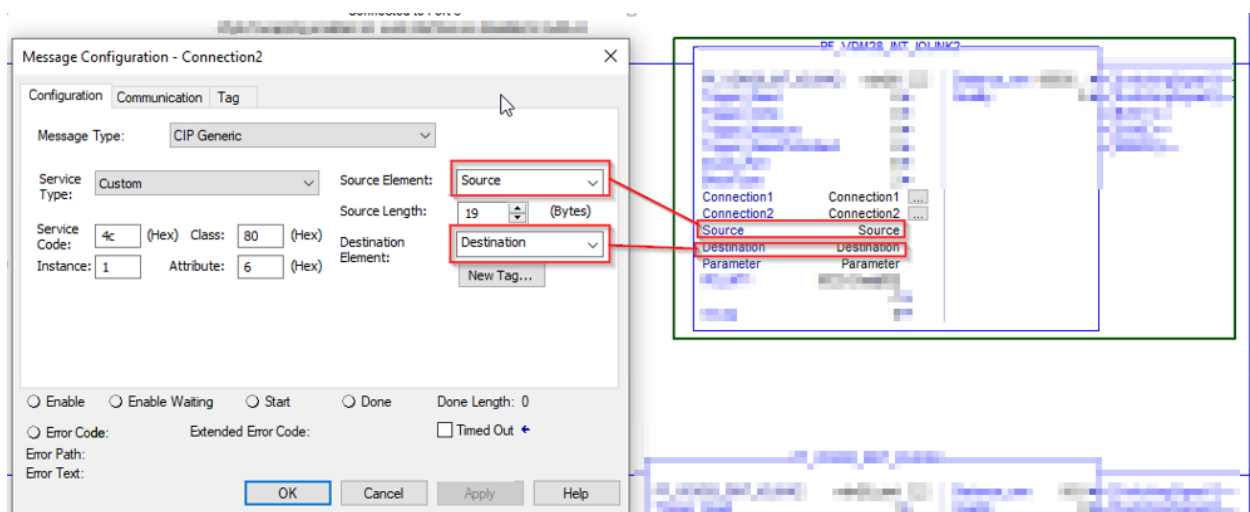


Figure 6: The source and target variables must have the size sint[100] and must match the source and target variables in the Add-On

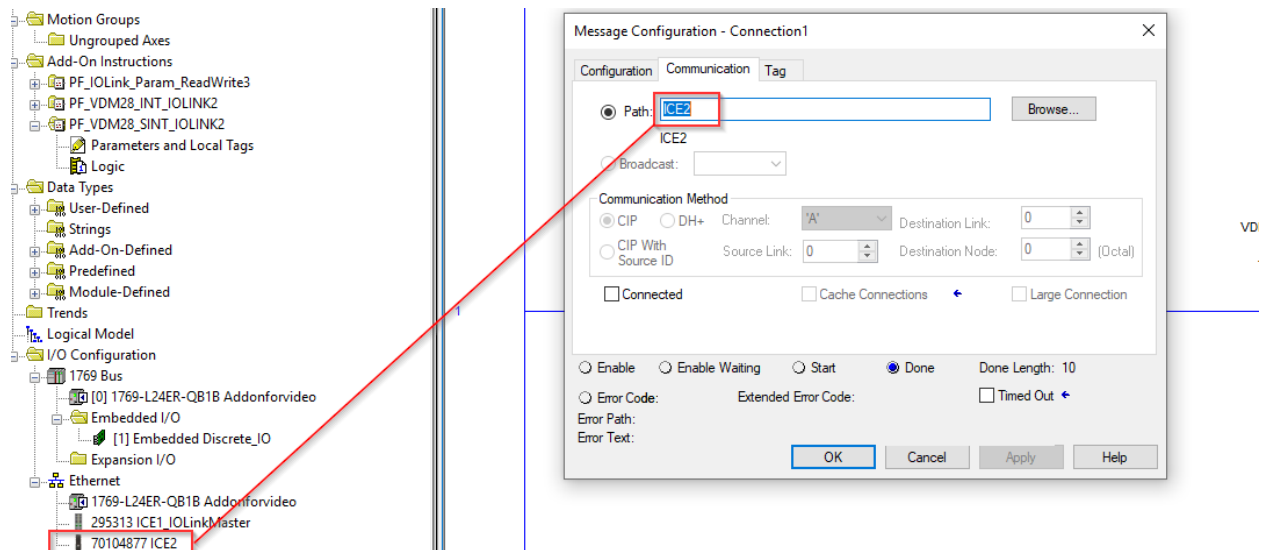


Figure 7: The path must point to the IO-Link block in both connections

## Index, Subindex, and Length

The Index and Subindex of the parameter to be read or written can be found in the HTML file associated with the IODD file. Some parameters are read-only, read/write, or write-only only, so do be careful. Also, some indexes, although they have subindexes, are not accessible as subindexes.

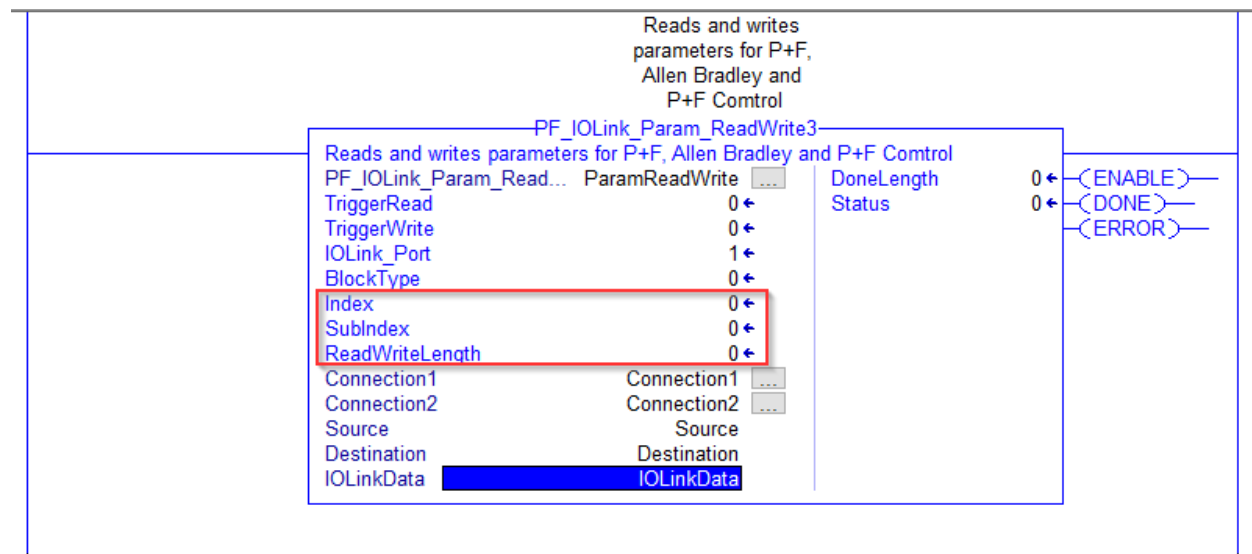


Figure 8: Index and subindex and length selection

## Variable "MCC1 Operation Monitor" index=216 id=V\_PFA\_MCC1\_Diag\_OperMon

description: Shows the motor operation information since last maintenance reset.

data type: 96-bit Record (subindex access not supported)

access rights: ro

subindex	bit offset	data type	allowed values	default value	acc. restr.	mod. other var.	excl. from DS	name	description
1	64	32-bit UInteger	0..1073741823					Runtime	Shows the runtime in hours since the last maintenance reset for this motor port.
2	32	32-bit UInteger	0..4294967295					Run Cycles	Shows the run cycles since the last maintenance reset for this motor port.
3	0	32-bit UInteger	0..4294967295					Error Count	Shows the count of errors since the last maintenance reset for this motor port.

octet	0	1	2	3	4	5	6	7
bit offset	95 - 88	87 - 80	79 - 72	71 - 64	63 - 56	55 - 48	47 - 40	39 - 32
subindex	1	1	1	1	2	2	2	2
element bit	31 - 24	23 - 16	15 - 8	7 - 0	31 - 24	23 - 16	15 - 8	7 - 0

octet	8	9	10	11
bit offset	31 - 24	23 - 16	15 - 8	7 - 0
subindex	3	3	3	3
element bit	31 - 24	23 - 16	15 - 8	7 - 0

Figure 9: Index/subindex example

The ReadWriteLength is the number of bytes to read or write. In Figure 9 the Index is 216, the Subindex is 0 (subindex access is not supported) and the length is 12 (96bits/8bits/byte=12bytes).

## Compilation

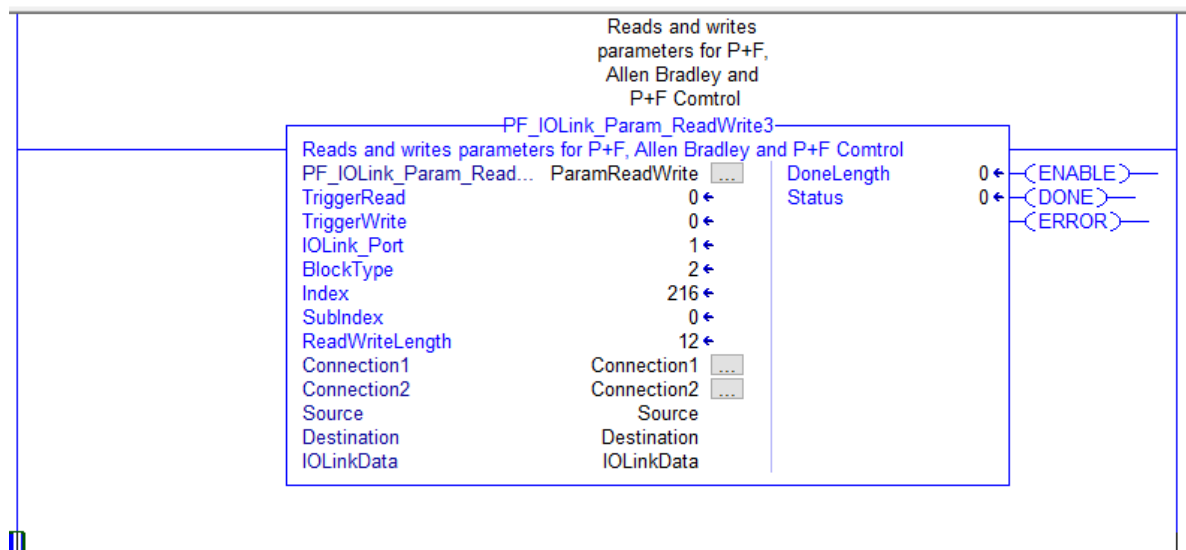


Figure 10: All Parameters combined



In Figure 10, a parameter is read from an ICE2 IO-Link master (BlockType=2) and 12 bytes are read from Index 216. The data is stored in an array named IOLinkData.

Trigger the read by setting a 1 in TriggerRead and the Add-on will be activated. See Figure 11.

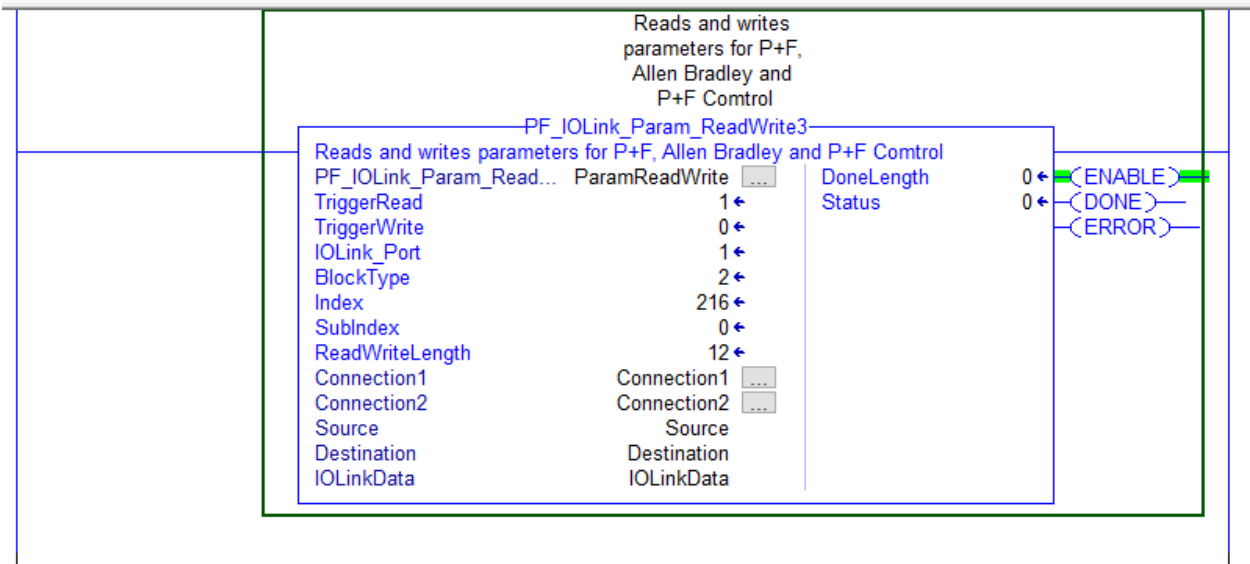


Figure 11: Read triggered

The reading was performed without errors. See figure 12.

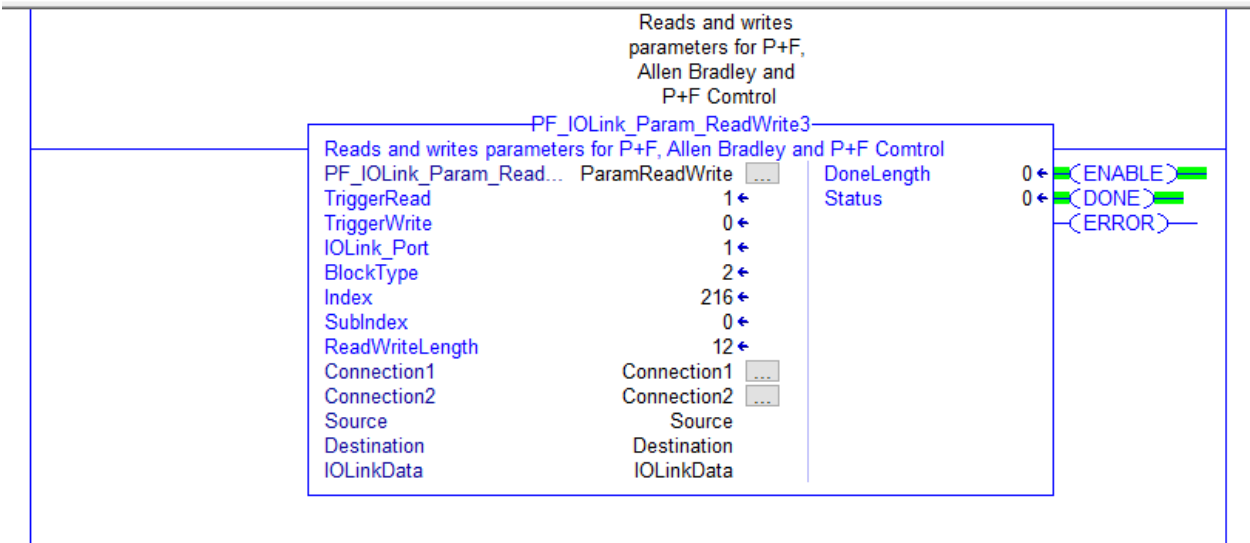


Figure 12: Reading completed