ICE1 / ICE11 comparison

Your automation, our passion.

PEPPERL+FUCHS

Models

	Old	New
Model Number	ICE1-8IOL-G60L-V1D	ICE11-8IOL-G60L-V1D
Part Number	295313	70146527

Difference

	Old	New
Model Number	ICE1-8IOL-G60L-V1D	ICE11-8IOL-G60L-V1D
Power Supply	Us and Uaux (Uaux for auxiliary and DO supply on Class B ports galvanic isolated)	Us and UL (UL for digital outputs when configured for currents > 500mA, no galvanic isolation inside module between Us and UL
IO-Ports	4 x Class A + 4 x Class B IO-Link Ports	8 x Class A IO-Link Ports
Default-Config GSDML	8 x Digital Input Channel A, 4 x Digital Input Channel B + 4 x Auxiliary Output	8 x IO-Link with 32 Byte Input + PQI and 32 Byte Output
Slot 1.1 Status/Control Module		
Parameter	General Parameter and Parameter for Digital I/O Mode for Ports X1 - X8	Only General Parameter settings and mapping for Digital I/O data
IO-Data	**Input**: 2 Byte Digital Input status + 1 Byte IOL-COM state + 1 Byte IOL-PD valid **Output**: 2 Byte Digital Output control + 1 Byte IOL COM mode + 1 Byte reserved	**Input** : 2 Byte Digital Input status **Output**: 2 Byte Digital Output control

Difference

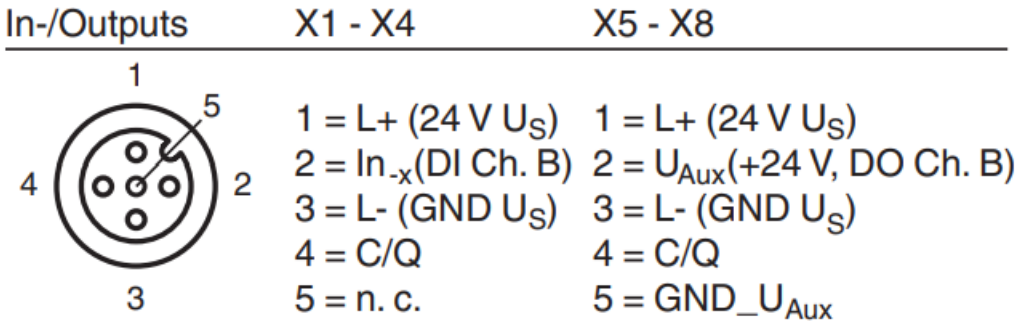
	Old	New
Model Number	ICE1-8IOL-G60L-V1D	ICE11-8IOL-G60L-V1D
Slot 1.2 -1.9 (IO-Port X1-X8)		
Parameter	Some Parameter settings for IO-Link Mode when slot configured in IO-Link Mode	All IO-Port related Parameters for Digital and IO-Link mode for Channel A and B
IO-Data	**Input**: 1-32 Byte **Output**: 1-32 Byte	**Input:** 1-32 Byte + 1 Byte PQI (Port Qualifier Information) **Output:** 1-32 Byte
PQI	not available	Bit 0-3: reserved or not supported yet Bit 4: PortActive (Port operation) Bit 5: DevCom (Device communication) Bit 6: DevErr (Port/Device error indication) Bit 7: PQ (Device Process Data Validity)

Protocols

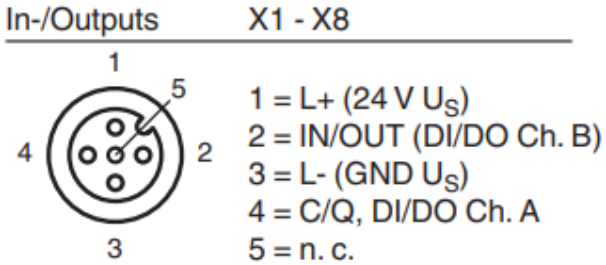
	Old	New
Model Number	ICE1-8IOL-G60L-V1D	ICE11-8IOL-G60L-V1D
EtherNet/IP	Yes	Yes
PROFINET	Yes	Yes
CC-Link IE	No	Yes
EtherCAT	No	Yes
Modbus/TCP	No	Yes

Ports

	Old	New
Model Number	ICE1-8IOL-G60L-V1D	ICE11-8IOL-G60L-V1D
IO-Link Class A	4	8
IO-Link Class B	4	0
Max Digital In	12	16
Max Digital Out	12	16



ICE1 Class A and B ports



ICE11 Class A ports

Electrical

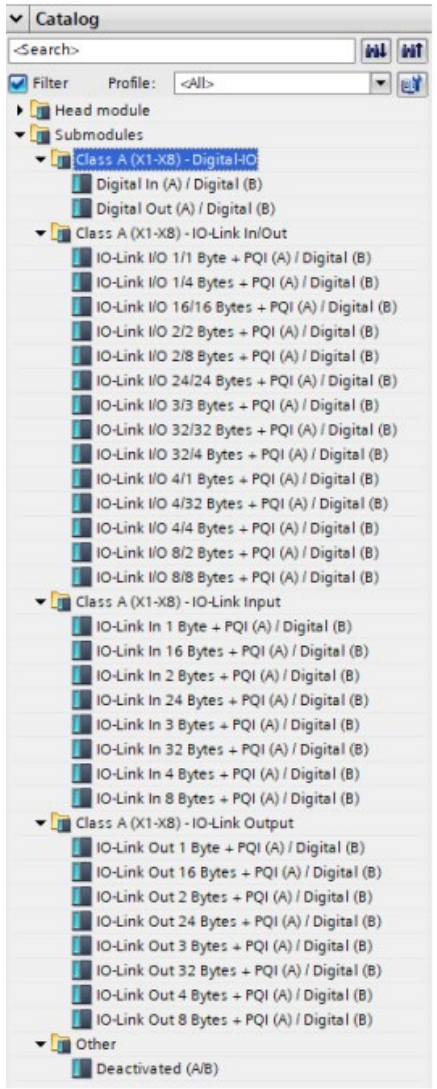
	Old	New
Model Number	ICE1-8IOL-G60L-V1D	ICE11-8IOL-G60L-V1D
Sensor Supply	**500mA/port**	**4A/port**
Digital Outputs (Class A)	**500mA/port**	**2A/port**
Digital Outputs (Class B)	**2A/port**	**-**

PROFINET

TIA Portal Integration

Creating an IO-Link channel configuration

The Submodules folder of the I/O device inside the Hardware catalog shows all configurable options that can be selected:



NEW:

Each IO-Link submodule comes with an additional *+PQI* attached.

This **Port Qualifier Information** Byte contains additional information regarding the current port state. See details in slide 10

PQI replaces the previous port information found in the „Status/Control“ Module.

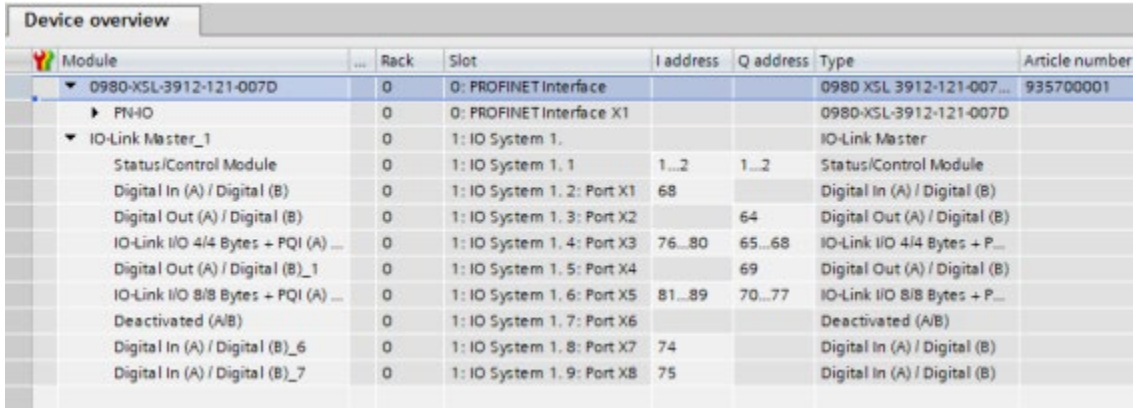
PQI is a new requirement introduced in IO-Link Spec. V1.1.3

PROFINET

TIA Portal Integration

IO-Link channel configuration

Select the desired option, click and hold down the left mouse button to drag the configuration to a free IO-Link sub-slot:



Module	...	Rack	Slot	I address	Q address	Type	Article number
0980-XSL-3912-121-007D		0	0: PROFINET Interface			0980 XSL 3912-121-007...	935700001
PN-IO		0	0: PROFINET Interface X1			0980-XSL-3912-121-007D	
IO-Link Master_1		0	1: IO System 1.			IO-Link Master	
Status/Control Module		0	1: IO System 1. 1	1...2	1...2	Status/Control Module	
Digital In (A) / Digital (B)		0	1: IO System 1. 2: Port X1	68		Digital In (A) / Digital (B)	
Digital Out (A) / Digital (B)		0	1: IO System 1. 3: Port X2		64	Digital Out (A) / Digital (B)	
IO-Link I/O 4/4 Bytes + PQI (A) ...		0	1: IO System 1. 4: Port X3	76...80	65...68	IO-Link I/O 4/4 Bytes + P...	
Digital Out (A) / Digital (B)_1		0	1: IO System 1. 5: Port X4		69	Digital Out (A) / Digital (B)	
IO-Link I/O 8/8 Bytes + PQI (A) ...		0	1: IO System 1. 6: Port X5	81...89	70...77	IO-Link I/O 8/8 Bytes + P...	
Deactivated (A/B)		0	1: IO System 1. 7: Port X6			Deactivated (A/B)	
Digital In (A) / Digital (B)_6		0	1: IO System 1. 8: Port X7	74		Digital In (A) / Digital (B)	
Digital In (A) / Digital (B)_7		0	1: IO System 1. 9: Port X8	75		Digital In (A) / Digital (B)	

PROFINET

TIA Portal Integration

The following options are available for the IO-Link C/Q channel (Ch. A/Pin 4):

1. Digital In (DI) - In this mode the channel operates as a digital input.
2. Digital Out (DO) - In this mode, the channel operates as a digital output.
3. Deactivated - This mode should be selected if the I/O port (ports X1-X8) is not used. The L+ power supply (pin 1) of the port is disabled in this case.
4. IO-Link + PQI (see next slide) – IO-Link communication

PROFINET

TIA Portal Integration

IO-Link + PQI:

Process data from or to the device are exchanged over a communication link. Depending on the port configuration, the IO-Link Master automatically starts communicating with the connected IO-Link Device, taking into account the baud rate. This mode offers the option of parameterizing the IO-Link Device. Configuration modules with data lengths of 1-32 bytes for physical inputs and 1-32 bytes for physical outputs are available. If no suitable configuration module is available for the device, the next larger data length must be selected. Port configuration will be stored non-volatile on the IO-Link Master. This allows also Stand-Alone operation, w/o PLC connected. Sensor supply (I/O port Pin 1) and the auxiliary supply (I/O port Pin 2) will be powered up directly depending on the last active configuration.

PROFINET

TIA Portal Integration

PQI: Port Qualifier Information

Is added to each port

Bit	Acronym	Short Description	Value	Description
0	–	Reserved	0	Reserved
			–	–
1	–	Reserved	0	Reserved
			–	–
2	NewParam	New parameter	0	*Not supported yet, don't evaluate this bit!*
			1	*Not supported yet, don't evaluate this bit!*
3	SubstDev	Substitute Device detection	0	*Not supported yet, don't evaluate this bit!*
			1	*Not supported yet, don't evaluate this bit!*
4	PortActive	Port operation	0	port deactivated via port function
			1	port activated (default)
5	DevCom	Device communication	0	no IOL-Device available
			1	IOL-Device detected and is in PREOPERATE or OPERATE state
6	DevErr	Port/Device error indication	0	no error/warning occured
			1	error/warning assigned to IOL-Device or IOL-Master port occured
7	PQ	Device Process Data validity	0	invalid I/O process data from IOL-Device
			1	valid I/O process data from device

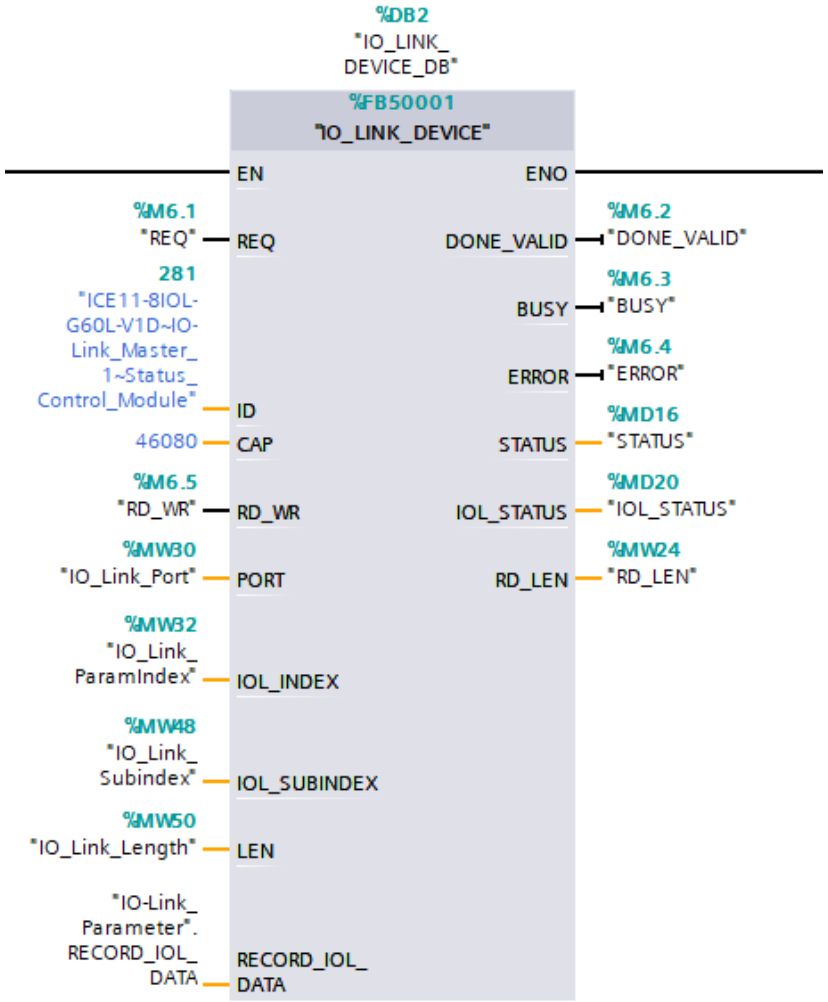
PROFINET

Read/Write ISDU during runtime with SIEMENS function block

SIEMENS - IO_LINK_DEVICE (FB5001)

In order to read/write IO-Link ISDU, FB50001 can still be used

Input „CAP“ must be adjusted:



<u>ICE11-8IOL:</u>

ID = HW_IO of Status/Control Module

CAP = 46080

<u>ICE1-8IOL:</u>

ID = HW_IO of Status/Control Module

CAP = 255

EtherNet/IP

	Old	New
Model Number	ICE1-8IOL-G60L-V1D	ICE11-8IOL-G60L-V1D
Byte Swap Possible	No	Yes
IO-Link Cycle Time Change	No	Yes
Input Data Size (default)	430	446
Output Data Size (default)	260	260
Configuration Size	260	292

Ethernet/IP

Diagnostic Data Remapped

ICE1:I1.Data[0]	Digital inputs, ports 1- 4 (mode #1)
ICE1:I1.Data[1]	Digital inputs, ports 5 - 8 (mode #1)
ICE1:I1.Data[2]	Status of IO-Link communication
ICE1:I1.Data[3]	Status of IO-Link process data validity
ICE1:I1.Data[4]	Status of module diagnostics - 1
ICE1:I1.Data[5]	Status of module diagnostics - 2
ICE1:I1.Data[6]	Status of sensor power supply(Us pin 1) diagnostics, ports 1 - 8
ICE1:I1.Data[7]	
ICE1:I1.Data[8]	Status of digital output diagnostics for channels X1A - X8A
ICE1:I1.Data[9]	Status of digital output diagnostics for channels X5B - X8B
ICE1:I1.Data[10]	Status of IO-Link device errrors
ICE1:I1.Data[11]	Status of IO-Link device warnings
ICE1:I1.Data[12]	Status of IO-Link device notifications
ICE1:I1.Data[13]	IO-Link master validation error

Old ICE1

ICE11:I.Data[0]	Digital inputs, ports 1- 4
ICE11:I.Data[1]	Digital inputs, ports 5 - 8
ICE11:I.Data[2]	General Diagnostics Byte 1
ICE11:I.Data[3]	General Diagnostics Byte 2
ICE11:I.Data[4]	Sensor Diagnostics (Short Circuit)
ICE11:I.Data[5]	
ICE11:I.Data[6]	Status of UL / Uaux Channels 1 - 8
ICE11:I.Data[7]	Status of UL / Uaux Channels 9-16
ICE11:I.Data[8]	IO-Link Port COM Error (device missing, broken wire, short circu...
ICE11:I.Data[9]	
ICE11:I.Data[10]	IO-Link Port Validation Error
ICE11:I.Data[11]	IO-Link Port Device Error
ICE11:I.Data[12]	IO-Link Port Device Warning
ICE11:I.Data[13]	IO-Link Port Device Notification

New ICE11

Ethernet/IP

Port Specific data extended

Port Qualifier data added to each port's diagnostics

Port Qualifier Information (PQI):

PQI (Port Qualifier Information)	Bit	7	6	5	4	3	2	1	0
General Bit	Byte 0	PQ	DevErr	DevCom	PortActive	SubstDev	NewPar	0	0
	Byte 1	0	0	0	0	0	0	0	0

NewPar – Update of device Param. detected
SubstDev – Substitute device detected
PortActive – Port activated
DevCom – Device in preoperate or operate state
DevErr – Error/Warning at device/Port
PQ – Valid I/O Process Data

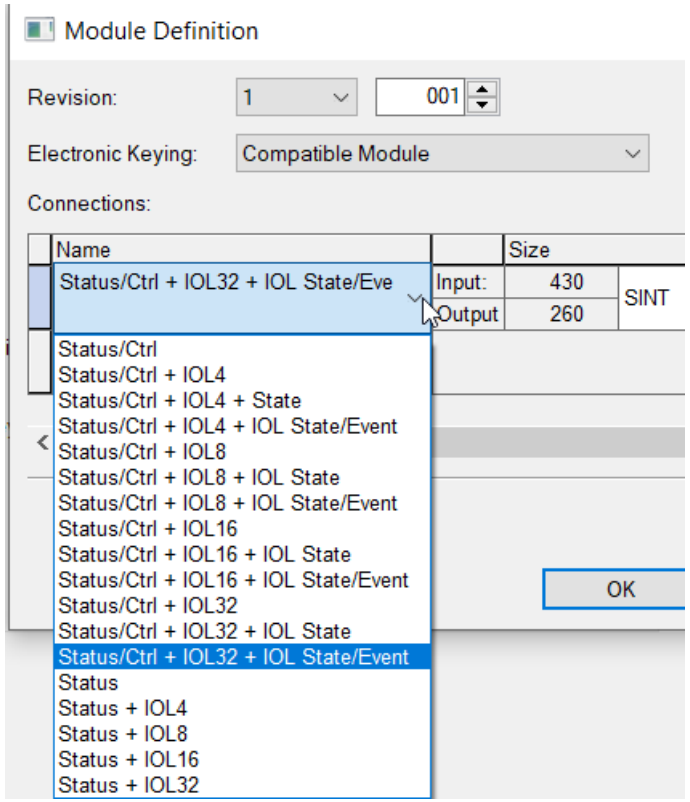
ICE1:I1.Data[46]	Extended IO-Link status - X1
ICE1:I1.Data[47]	Extended IO-Link status - X1
ICE1:I1.Data[48]	Vendor ID (LSB) - X1
ICE1:I1.Data[49]	Vendor ID (MSB) - X1
ICE1:I1.Data[50]	Device ID (LSB) - X1
ICE1:I1.Data[51]	Device ID - X1
ICE1:I1.Data[52]	Device ID (MSB) - X1
ICE1:I1.Data[53]	
ICE1:I1.Data[54]	Event 1 qualifier - 1 - X1
ICE1:I1.Data[55]	Event 1 code 1 (LSB) - X1
ICE1:I1.Data[56]	Event 1 code 2 (MSB) - X1
ICE1:I1.Data[57]	
ICE1:I1.Data[58]	Event 2 qualifier - 2 - X1
ICE1:I1.Data[59]	Event 2 code 1 (LSB) - X1
ICE1:I1.Data[60]	Event 2 code 2 (MSB) - X1
ICE1:I1.Data[61]	
ICE1:I1.Data[62]	Event 3 qualifier - 2 - X1
ICE1:I1.Data[63]	Event 3 code 1 (LSB) - X1
ICE1:I1.Data[64]	Event 3 code 2 (MSB) - X1
ICE1:I1.Data[65]	

ICE11:I.Data[46]	Port Qualifier Information (PQI) X1 - 1
ICE11:I.Data[47]	
ICE11:I.Data[48]	Extended Diagnostics X1
ICE11:I.Data[49]	
ICE11:I.Data[50]	Vendor ID LSB -X1
ICE11:I.Data[51]	Vendor ID MSB -X1
ICE11:I.Data[52]	Device ID LSB -X1
ICE11:I.Data[53]	Device ID -X1
ICE11:I.Data[54]	Device ID MSB -X1
ICE11:I.Data[55]	
ICE11:I.Data[56]	Event Qualifier 1 -X1
ICE11:I.Data[57]	
ICE11:I.Data[58]	Event 1 code (LSB) -X1
ICE11:I.Data[59]	Event 1 code (MSB) -X1
ICE11:I.Data[60]	Event Qualifier 2 -X1
ICE11:I.Data[61]	
ICE11:I.Data[62]	Event 2 code (LSB) - X1
ICE11:I.Data[63]	Event 2 code (MSB) - X1
ICE11:I.Data[64]	Event Qualifier 3 -X1
ICE11:I.Data[65]	
ICE11:I.Data[66]	Event 3 code (LSB) - X1
ICE11:I.Data[67]	Event 3 code (MSB) - X1

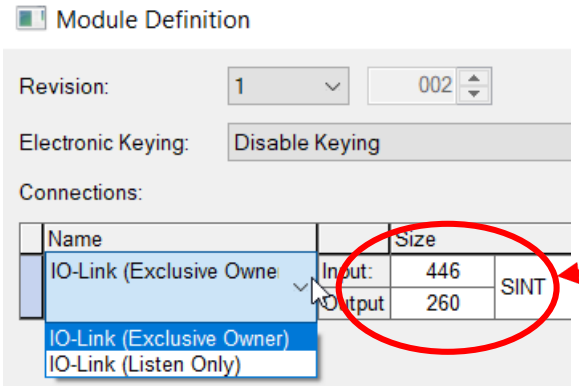
EtherNet/IP

IO Size Adjustment

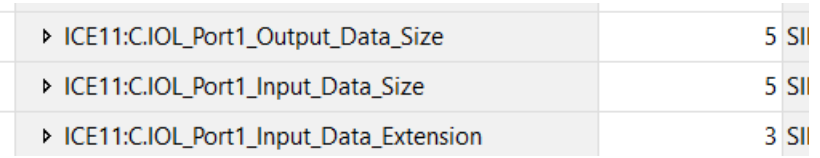
Old used assemblies to adjust size, New uses the configuration assembly



Old ICE1



Size Adjustment



New ICE11

See Next Slide

EtherNet/IP

IO Size Adjustment

Use mapping tool to determine the size of the IO

	Process Out	Size Options based on Config File	Start Array element
Max Size SINT	260		
Digital Outputs	2		0
Reserved	2		2
Port 1	32	0,2,4,8,16,32	4
Port 2	32	0,2,4,8,16,32	36
Port 3	32	0,2,4,8,16,32	68
Port 4	32	0,2,4,8,16,32	100
Port 5	32	0,2,4,8,16,32	132
Port 6	32	0,2,4,8,16,32	164
Port 7	32	0,2,4,8,16,32	196
Port 8	32	0,2,4,8,16,32	228
Total	260		

		Process In	Size Options based on	Start Array element
Max Size SINT		446		
Digital Inputs		2		0
General Diagnostics		2		2
Sensor Diagnostics		2		4
U_A Diagnostics		2		6
IO-Link Diagnostics		6	0,6	8
Port 1	Input Data	32	0,2,4,8,16,32	14
	PQI	2		46
	Extended Status	8	0,8	48
	Events	12	0,12	56
Port 2	Input Data	32	0,2,4,8,16,32	68
	PQI	2		100
	Extended Status	8	0,8	102
	Events	12	0,12	110
Port 3	Input Data	32	0,2,4,8,16,32	122
	PQI	2		154
	Extended Status	8	0,8	156
	Events	12	0,12	164
Port 4	Input Data	32	0,2,4,8,16,32	176
	PQI	2		208
	Extended Status	8	0,8	210
	Events	12	0,12	218
Port 5	Input Data	32	0,2,4,8,16,32	230
	PQI	2		262
	Extended Status	8	0,8	264
	Events	12	0,12	272
Port 6	Input Data	32	0,2,4,8,16,32	284
	PQI	2		316
	Extended Status	8	0,8	318
	Events	12	0,12	326
Port 7	Input Data	32	0,2,4,8,16,32	338
	PQI	2		370
	Extended Status	8	0,8	372
	Events	12	0,12	380
Port 8	Input Data	32	0,2,4,8,16,32	392
	PQI	2		424
	Extended Status	8	0,8	426
	Events	12	0,12	434
		446		

Configuration by port in the Configuration Assembly in the EtherNet/IP PLC

ICE11:C.IOL_Port1_Output_Data_Size	5	Decimal	SINT
ICE11:C.IOL_Port1_Input_Data_Size	5	Decimal	SINT
ICE11:C.IOL_Port1_Input_Data_Extension	3	Decimal	SINT

	Parameter	number of bytes
Input_Data_Size Output_Data_Size	0	0
	1	2
	2	4
	3	8
	4	16
	5	32

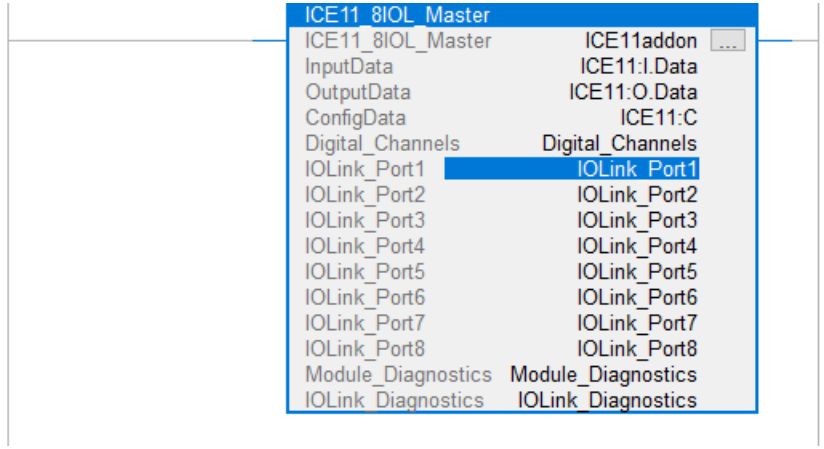
Input_Data Extension	0	No Extended Status or Events, 0 bytes
	1	Extended Status only, 8 bytes
	2	Events Only, 12 bytes
	3	Events and Status, 20 bytes

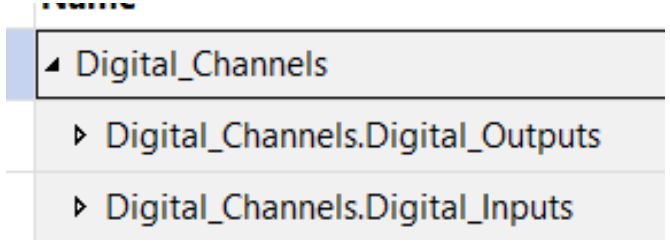
54
108
162
104
112

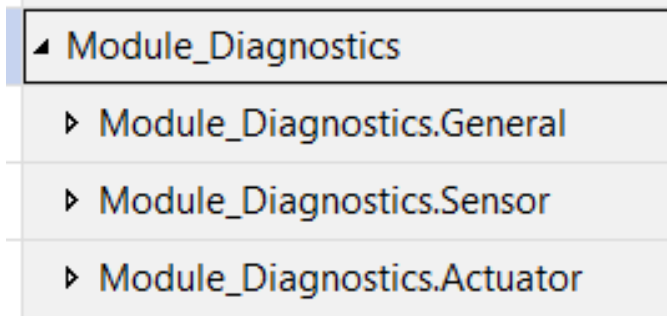
EtherNet/IP

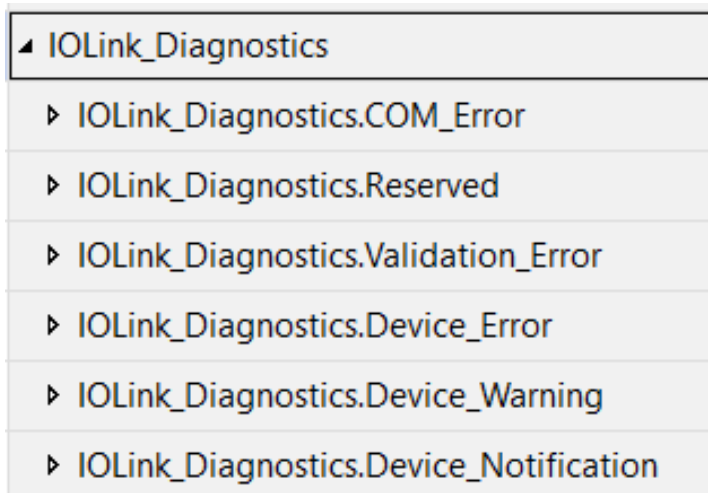
IO Size Adjustment

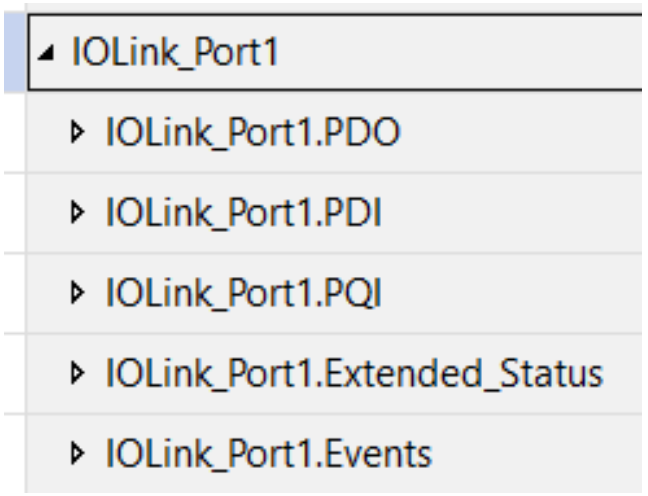
Use Add-on instruction to map all data







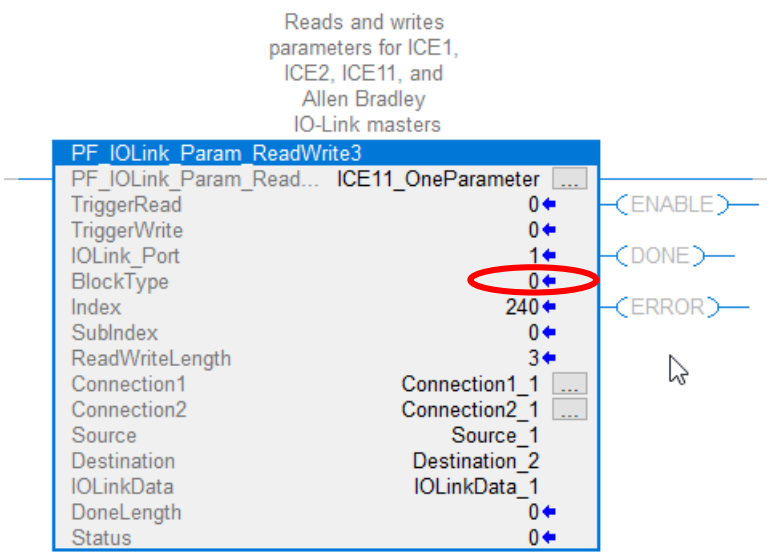




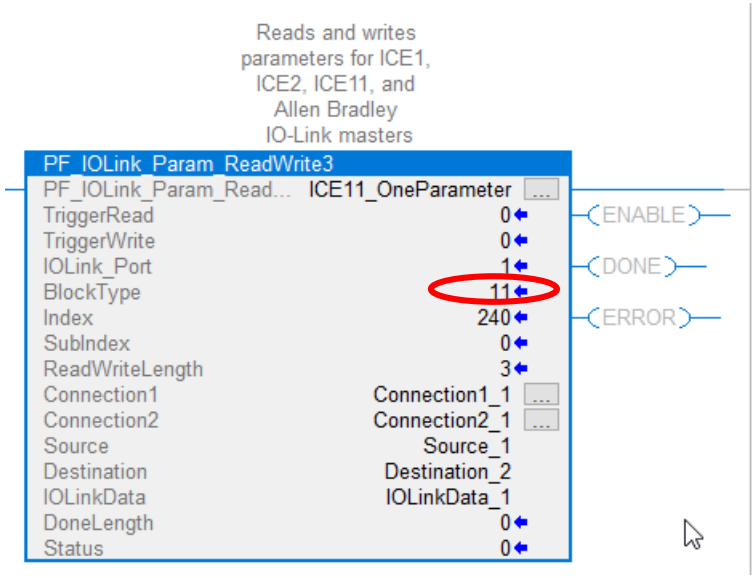
Read/Write Parameters

IO-Link Device Parameter Object Change

1. **Class: Old 0x80 and new 0xA5**
2. **Requires new function block and BlockType**



BlockType 0 for ICE1



BlockType 11 for ICE1

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