NXR Series Remote IO with IO-LINK

OMRON Automation Americas

Outline

- NXR Portfolio Summary
- NXR EtherCAT®
- NXR EtherNet/IP™
- Product Specs

EtherNet/IP

EtherCAT®

NXR Series Portfolio

IO-Link Masters

EtherCAT

EtherNet/IP

NEW

IO-Link Hubs

Input/Output

Input Only

- Hubs connect to the master via one cable.
- Up to 8 Hubs can be connected to one Master.
- Hubs used to expand digital IO at a lower cost

NXR-ILM08C-ECT

The NXR EtherCAT® is the go-to remote IO product to complement Sysmac, because it is one product that is easy to configure and maintain and can support multiple different OT or IT applications.

Problem

IO-Link Master has to be configured manually with a PC, by a trained technician

Challenge: Skilled Labor shortage

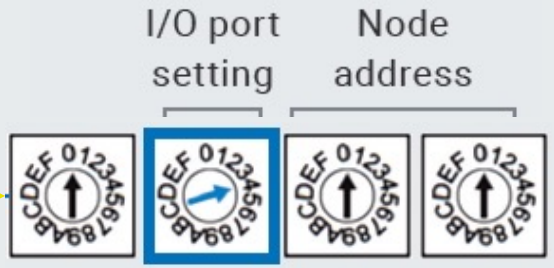
IO-Link Master Configuration

- Causing increased downtime because maintenance requires trained engineers to be onsite with a PC and Software.

- Setup/installation of IO-Link masters requires trained engineers to be onsite with a PC and software

Solution: Quick Switch Feature

Reduce costly downtime by performing maintenance without a PC



Setting all I/O ports at once

Port setting is completed by setting the switches to a pre-set pattern for each port.

Port setting table of NXR-ILM08C-ECT

Port	Pin No.	Set switches 0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
1	4																
	2																
2	4																
	2																
3	4																
	2																
4	4																
	2																
5	4																
	2																
6	4																
	2																
7	4																
	2																
8	4																
	2																

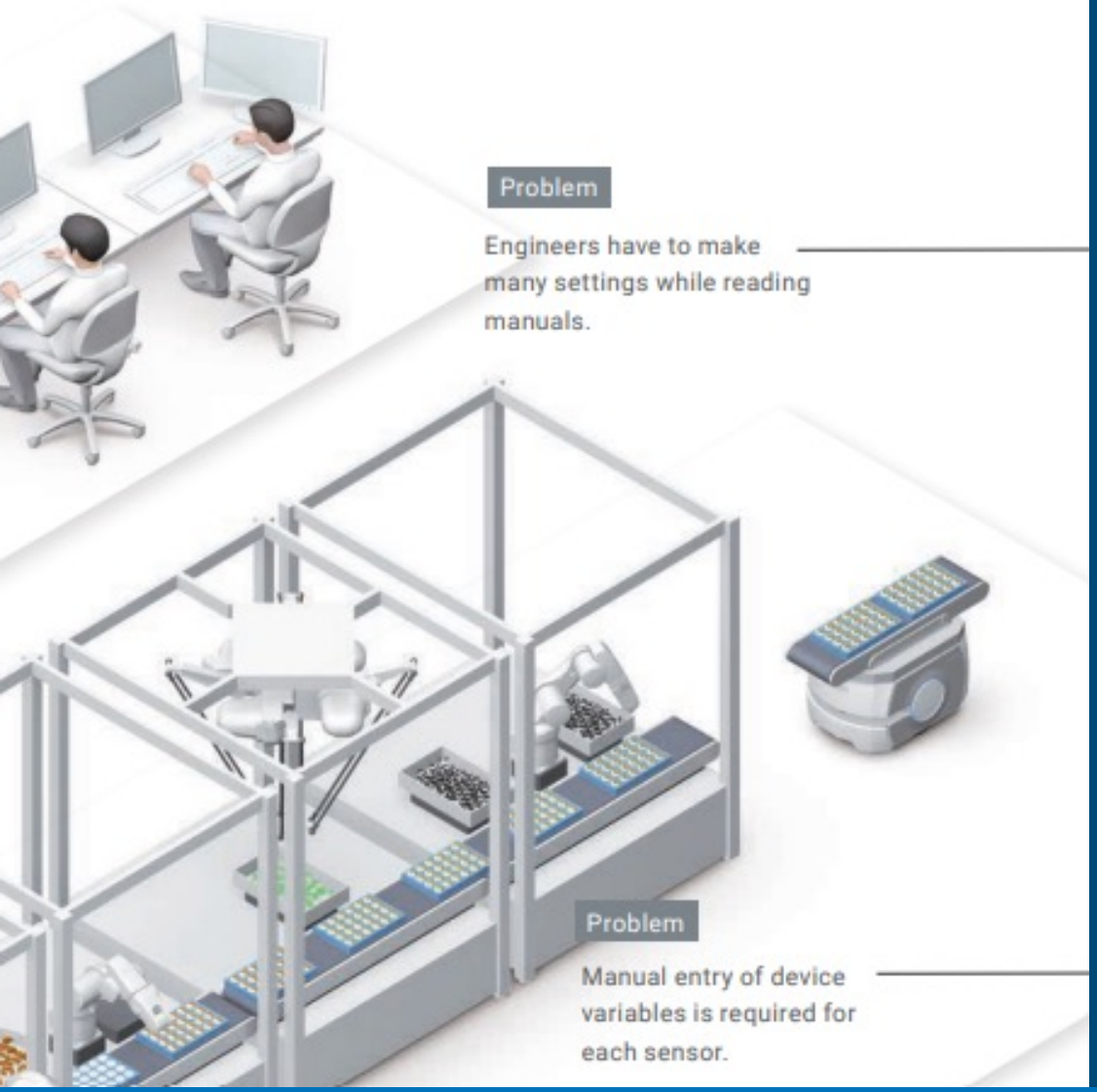
Digital input Digital output IO-Link Set using software

Maintenance Time	Cost of Downtime
2 hours *	$800K*

Maintenance Time	Cost of Downtime
15 Minutes *	$100K*

*Estimated

Challenge: Labor Shortage



IO-Link Device Configuration

- Each IO-Link Device needs to be added manually one by one
- Multiple settings in the software need to be set before use
- Human errors caused by manual data entry

Solution: Simple and fast IO-Link configuration with Sysmac Studio

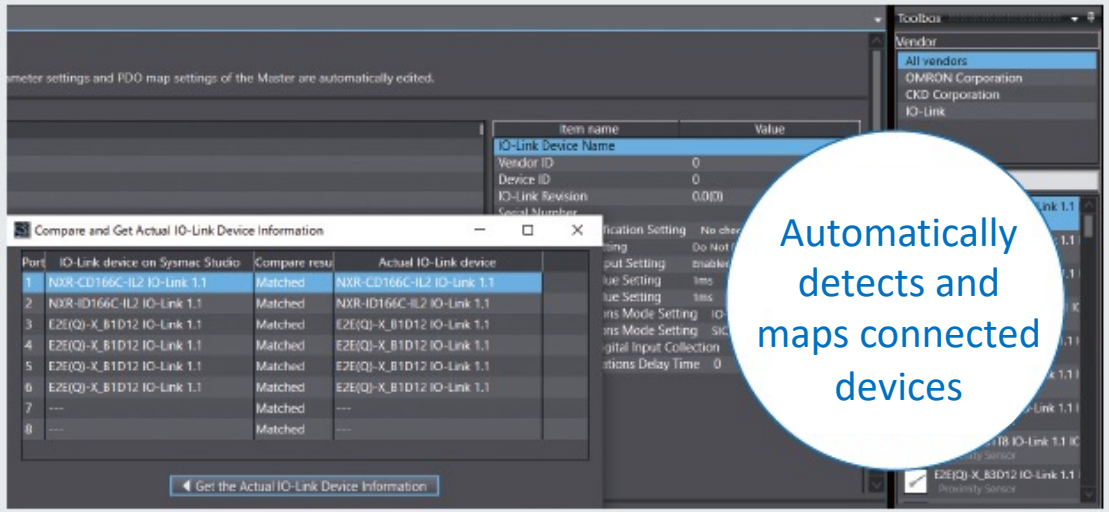
Before

- Go online with the PLC (Master Connected)
- Add each device to master **one by one**
- Reference Device manual for PDO I/O Data map
- Fill in I/O Map **one by one**
- Map PDO Data **One by one**
- Set backup parameters **one by one**
- Transfer settings to device

After

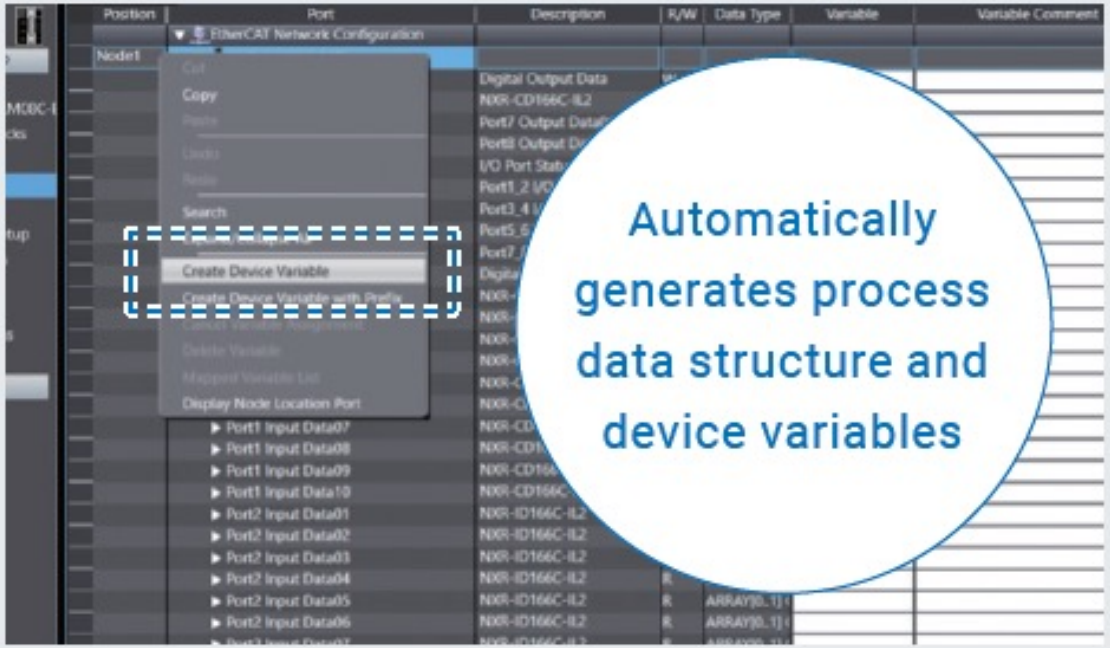
- Go online with the PLC (Master Connected)
- Click “Compare connected devices” Then Click OK!

Automatic!

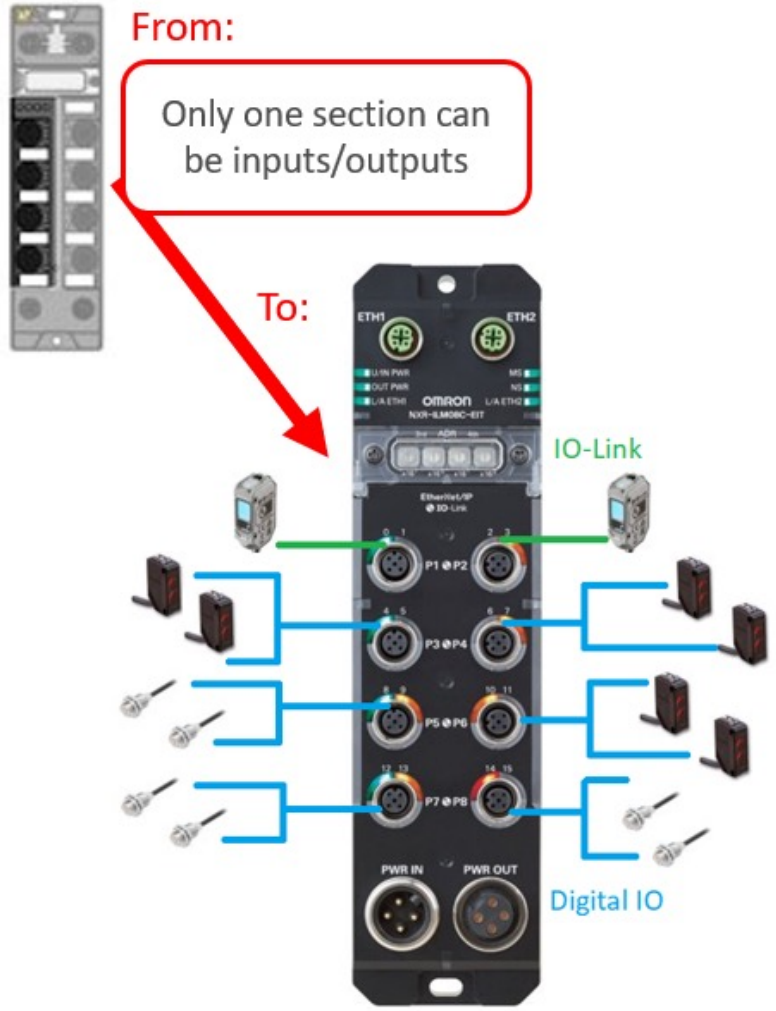


Automatically detects and maps connected devices

Port	Description	R/W	Data Type	Variable
▼ Port1 Input Data01	E2E(Q)-X_B1D12	R	ARRAY[0..1]	001_Port1_Input_Data01
Port1 Monitor Output	Port1 Monitor Output	R	USINT	001_Port1_Monitor_Output
Port1 Control Output1	Port1 Control Output1	R	BOOL	001_Port1_Control_Output1
Port1 Instability Detection Alarm	Port1 Instability Detection /	R	BOOL	001_Port1_Instability_Detection_Alarm
Port1 Target too Close Alarm	Port1 Target too Close Alar	R	BOOL	001_Port1_Target_too_Close_Alarm
Port1 Warning	Port1 Warning	R	BOOL	001_Port1_Warning
Port1 Error	Port1 Error	R	BOOL	001_Port1_Error



Automatically generates process data structure and device variables



Each Port: Up to 1 IO-Link, 2 Digital Inputs, 2 Digital Outputs, or a mix

Challenge: Configurability restrictions

There is often a need to mix standard digital and IO-Link on one block

- Causing: multiple different models for different application needs
- Causing: the need to stock multiple different models

Solution:

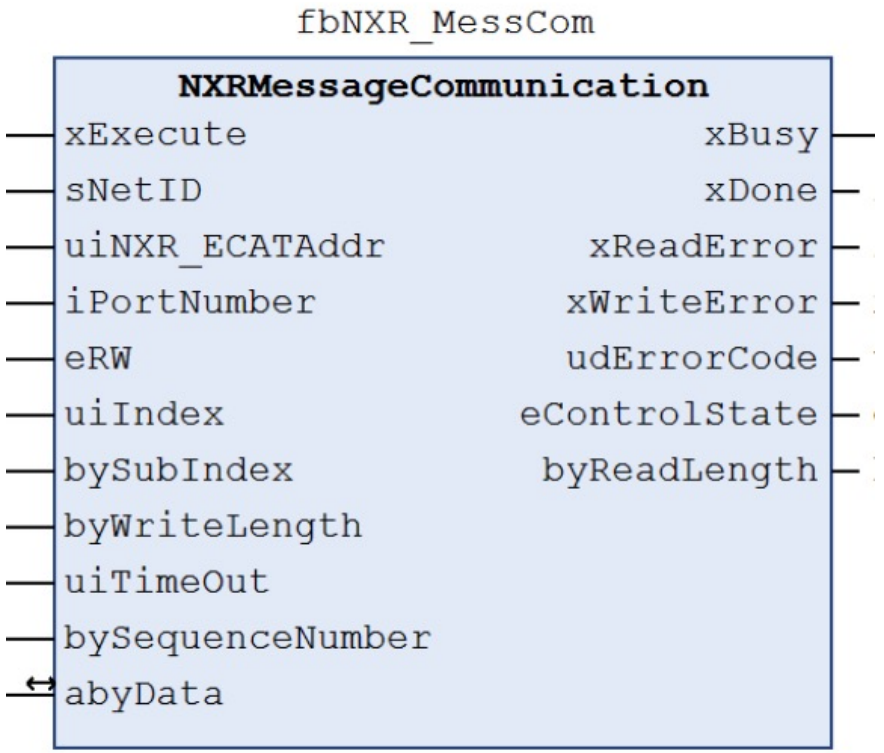
Full port flexibility makes it easier to implement IO-Link

Available on both EtherCAT® and EtherNet/IP™ Models

NXR EtherCAT® Value – With Beckhoff Function Block

Configure IO-Link Devices in TwinCAT easily without needing separate software

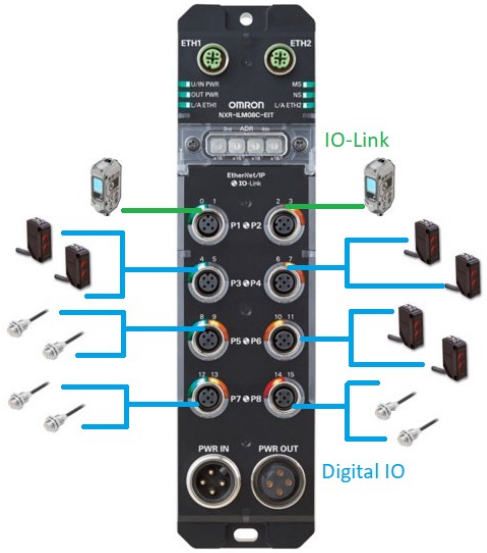
- Reduces configuration time when using the NXR EtherCAT® with a Beckhoff Controller
- Allows users to configure on the fly and automate configuration
- Non-Cyclic Communication (CoE)
- Read and Write to IO-Link Devices



EtherCAT®

Contact your OMRON Account Manager or Field Application Engineer for details

NXR-ILM08C-ECT Value Summary



Fully configurable Ports

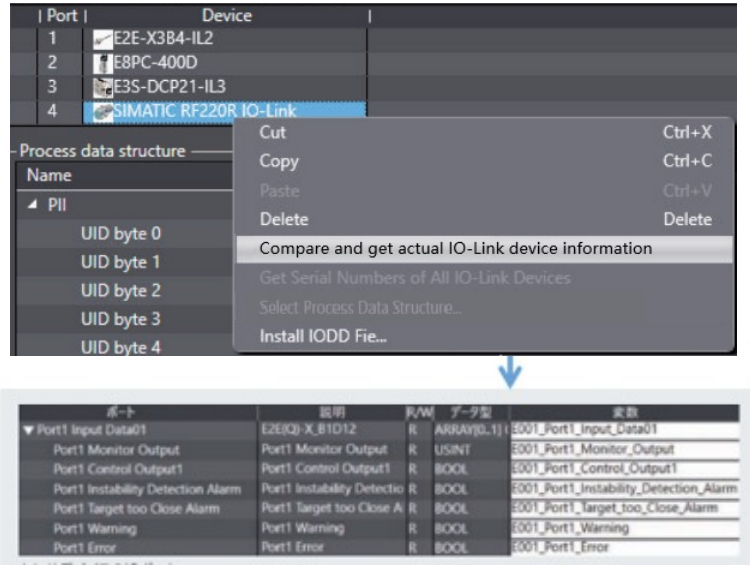
- No restrictions on #IO
- 16 Digital IO or 8 IO-Link

EtherCAT EtherNet/IP

PC-Less maintenance and setup

- No PC or special tools required
- **Engineers not needed onsite to setup or maintain**

EtherCAT



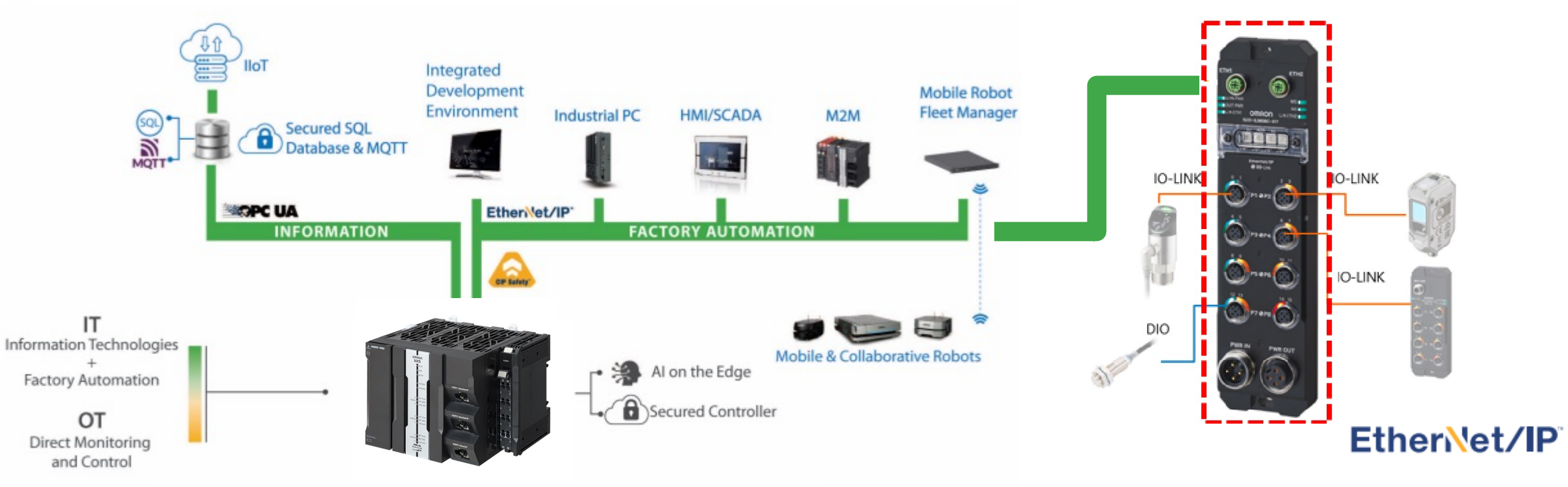
Easiest to configure IO-Link on the market!

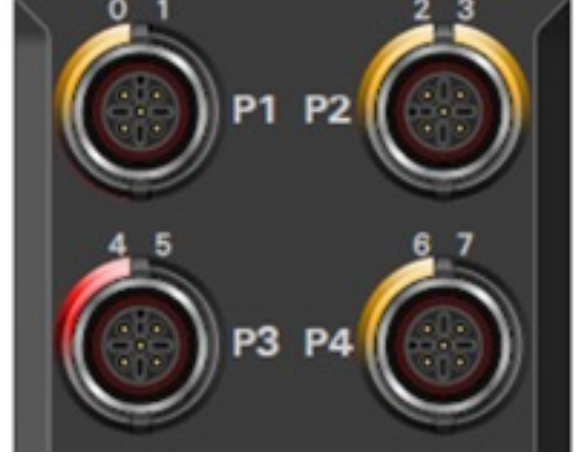
- Automatic IO-Link device scanning
- Automatic IO-Link IO and PDO mapping (saves engineering time!)

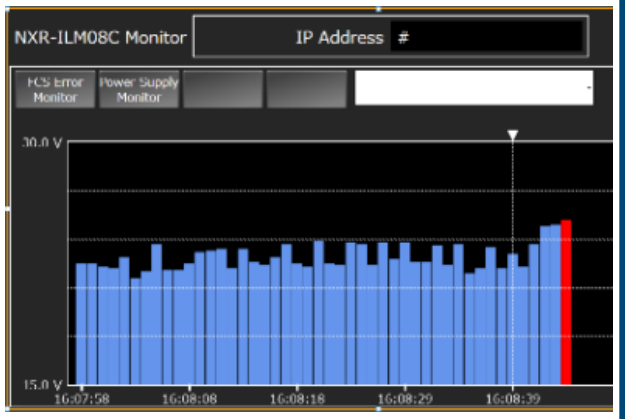
EtherCAT

NXR-ILM08C-EIT

The NXR EtherNet/IP™ is perfect for applications with large data requirements, or for third party connectivity. The NXR EtherNet/IP™ compliments OMRON's IT solution from the cloud down the field device.







Benefit: Diagnostic Information

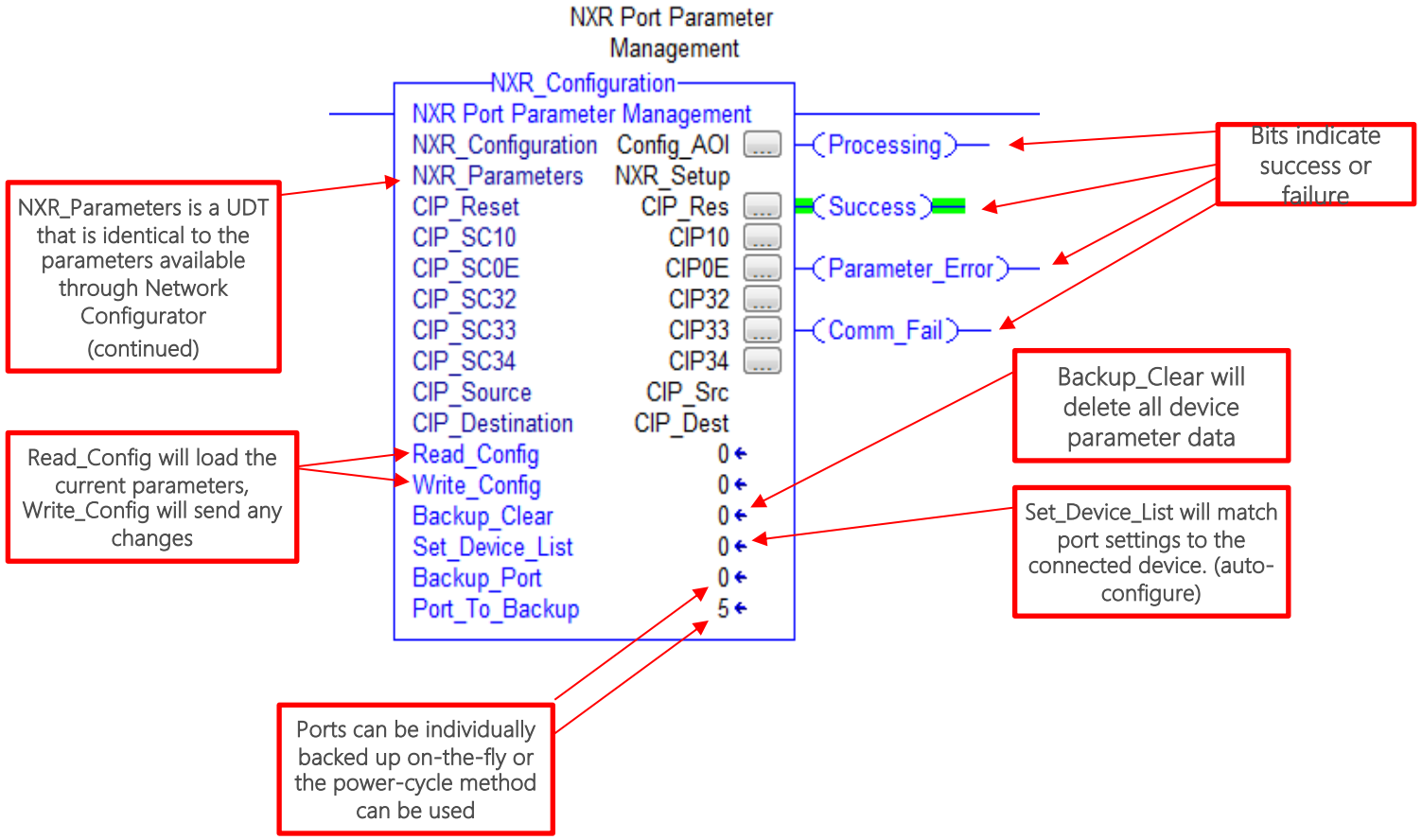
Available on both EtherNet/IP™ and EtherCAT® NXR models

- Short Circuit Detection
- Wire break location detection
- Open Wire detection
- LED indicators for quick status identification
- Input/Output Voltage Monitoring
- Network quality monitoring
- EtherNet/IP™ Ring Network Support for redundancy

- IP Address field settable via dip switches

NXR EtherNet/IP™ Value – With Rockwell AOI (Function Block)

The NXR EtherNet/IP™ can be easily setup in Rockwell with an automatic configuration feature



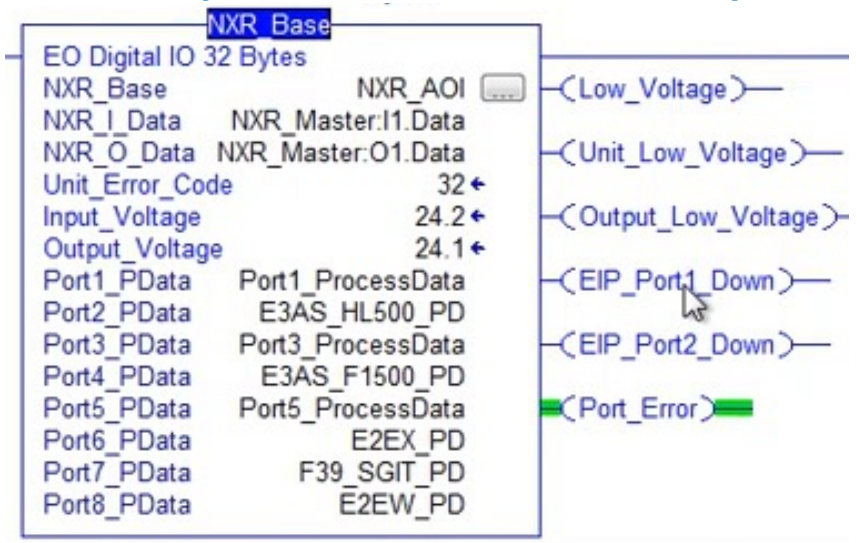
EtherNet/IP

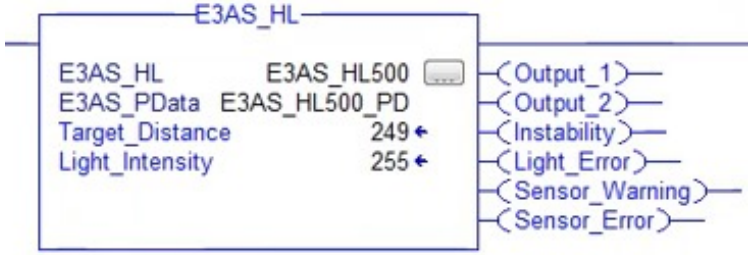
Contact your OMRON Account Manager or Field Application Engineer for details

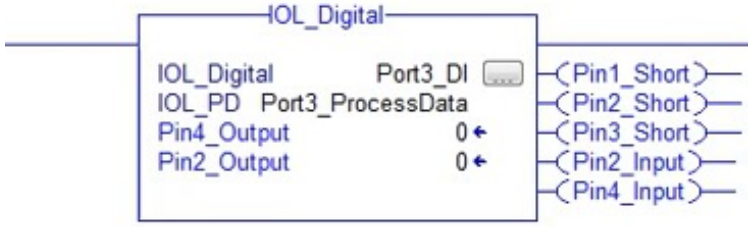
NXR EtherNet/IP™ Value – With Rockwell AOI (Function Block)

Showing the AOI for:

- NXR IO-Link Master
- E3AS sensors
- Digital Device AOI







EtherNet/IP

NXR EtherNet/IP™ Value – With Rockwell AOI (Function Block)

F3SG-SR Safety Light Curtain preventative maintenance data via IO-Link

IO-Link

Controller Tags - CL_PLC(controller)

Scope: CL_PLC Show: All Tags Enter Name Filter...

Name	Value	Force Mas	Style	Data Type	Description
+ F3SG_Beams[3]	71		Decimal	INT	Beam Strength 0-255 (0-1
+ F3SG_Beams[4]	56		Decimal	INT	Beam Strength 0-255 (0-1
+ F3SG_Beams[5]	64		Decimal	INT	Beam Strength 0-255 (0-1
+ F3SG_Beams[6]	62		Decimal	INT	Beam Strength 0-255 (0-1
+ F3SG_Beams[7]	71		Decimal	INT	Beam Strength 0-255 (0-1
+ F3SG_Beams[8]	65		Decimal	INT	Beam Strength 0-255 (0-1
+ F3SG_Beams[9]	211		Decimal	INT	Beam Strength 0-255 (0-1
+ F3SG_Beams[10]	211		Decimal	INT	Beam Strength 0-255 (0-1
+ F3SG_Beams[11]	210		Decimal	INT	Beam Strength 0-255 (0-1
+ F3SG_Beams[12]	210		Decimal	INT	Beam Strength 0-255 (0-1
+ F3SG_Beams[13]	210		Decimal	INT	Beam Strength 0-255 (0-1
+ F3SG_Beams[14]	211		Decimal	INT	Beam Strength 0-255 (0-1
+ F3SG_Beams[15]	210		Decimal	INT	Beam Strength 0-255 (0-1
+ F3SG_Beams[16]	210		Decimal	INT	Beam Strength 0-255 (0-1
+ F3SG_Beams[17]	0		Decimal	INT	Beam Strength 0-255 (0-1

Monitor Tags | Edit Tags

Properties

Extended Properties...

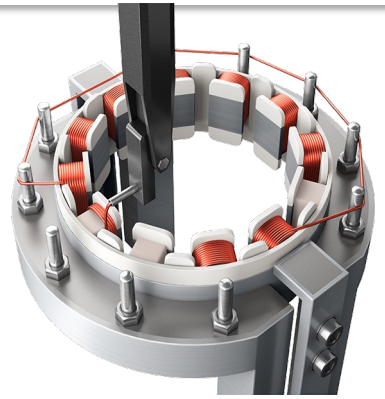
General

Name	F3SG_Beams
Description	Beam Strength 0-255 (0-100%)
Usage	<controller>
Type	Base
Alias For	
Base Tag	
Data Type	INT[232]
Scope	CL_PLC
External Access	Read/Write
Style	Decimal
Constant	No
Required	

Industries

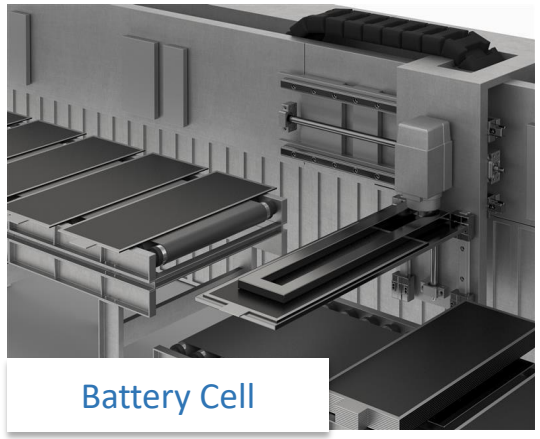
Automotive

EV Main Parts



Motor winding/assembly

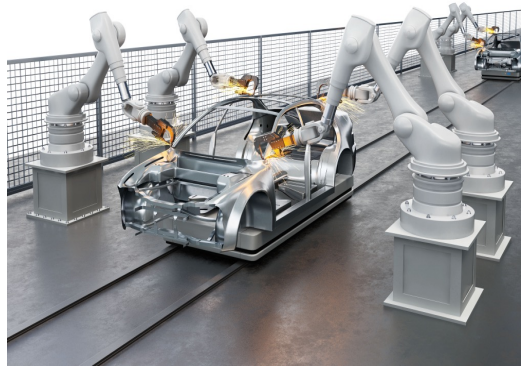
Secondary Battery



Battery Cell

EV Assembly

Welding



Industries - Continued

- High Density I/O
- I/O spread over long distances
- Skilled Labor Shortages
- Machine Changeovers
- Increased data collection requirements
- Less expensive to apply IP67 than remote panels

Food & Beverage

Robot Cells

Conveyors – Automotive, F&C and Logistics

Material Handling & Logistics

Master Key Specifications

Item	NXR-ILM08C-ECT	NXR-ILM08C-EIT
Network Protocol	EtherCAT®	EtherNet/IP™
Protection	IP67	IP67
Standard Bus Connection	M12 (IN/OUT)	M12 (IN/OUT)
IO-Link Ports	8 ports (ClassA ： P1 – P8) (**Field Configurable**)	8 ports (ClassA ： P1 – P8)
Digital IO	16 Inputs/16 Outputs	16 Inputs/16 Outputs
Power port	Standard 7/8 (IN/OUT)	Standard 7/8 (IN/OUT)
Output Power	2A/Port	2A/Port
Output Power Total	9A at one time	9A at one time
NXR-HUB Support	Yes	Yes
Size	240(w)×24.2(H)×62(D)	240(w)×24.2(H)×62(D)

Ordering Information

Unit	Model
EtherCAT® IO-Link Master	NXR-ILM08C-ECT
EtherNet/IP™ IO-Link Master	NXR-ILM08C-EIT
IO-Link Hub	NXR-ID166C-IL2
	NXR-CD166C-IL2

Accessories

Unit	Description	Model
Y Cable Splitter	For connecting two devices to one port	XS5R-D426-1

Communication Cables are available by Omron

We have loaner power and communication cables available for testing

Competitive Analysis - EtherCAT®

Value vs Competition	OC NXR-ILM08C-ECAT	Beckhoff EP6228-0042	Balluff BNI00HA	Turck TBEC-LL-8IOL	IFM AL1332	Wago 765-4201/100-000	Keyence NQ-EC8L
Port Flexibility	○	×	○	×	×	○	×
	16 SI/SO 8 IO-Link	8 SI/SO 8 IO-Link	16 SI/SO 8 IO-Link	16 SI,8 SO 8 IO-Link	16 SI, 8 SO 8 IO-Link	16 SI/SO 8 IO-Link	16 SI, 8 SO 8 IO-Link
PC-Less Maintenance and Setup	○	×	×	×	×	△	×
	PC-Less Dip Switch Setup	PC Setup No Dials	PC Setup No Dials	PC Setup Dials (for Node Address)	PC Setup No Dials	*Bluetooth, but each port at a time	PC Setup Dials (for Node Address)
Quick IO-Link Device Setup	○	○	×	×	×	×	×
	Sysmac Auto Configure Feature And TwinCAT	With TwinCAT device setting is simple	No EtherCAT Function blocks	No EtherCAT Function blocks	No EtherCAT Function blocks	No EtherCAT Function blocks	No EtherCAT Function blocks

Best | Good | Bad

EtherNet/IP™ Success Story

OEM chose OMRON for the NXR EtherNet/IP™ connected to Rockwell

Customer Description:
A global OEM for metal roll forming machines chose OMRON for their remote IO-link needs due to OMRON's Engineering Support and Rockwell Function Block advantages

- **Description: Safety & NXR IO-Link**
  - **Application**: Metal Roll Forming – Safety Light Curtains with IO-Link
  - **Industrty**: Machine Tool
  - **End Customer**: Metal Roll Forming producers – Roofing, siding, etc
- **Challenge and Pain Points**
  - Customer needed a Safety Light Curtain solution
  - Customer needed to reduce machine downtime due to misaligned or dirty light curtains
    - The customer wanted to provide visual diagnostics for their end customers on the HMI Screen
  - Three separate vendors caused difficulty to configure the Light Curtain IO-Link data (Rockwell - Turck - OMRON)
- **Solution**
  - OMRON FAE developed Rockwell AOI for OMRON's IO-Link Master, Light Curtains, and Sensors – saving the customer's configuration time
  - Proposed a complete IO-Link solution with F3SG-SRA Light Curtains, Intelligent Tap, and NXR IO-Link master

Thank You

Name
@omron.com