BNI EIP-508-005-Z015-013

EtherNet/IP™ IP67 modules

User's Guide

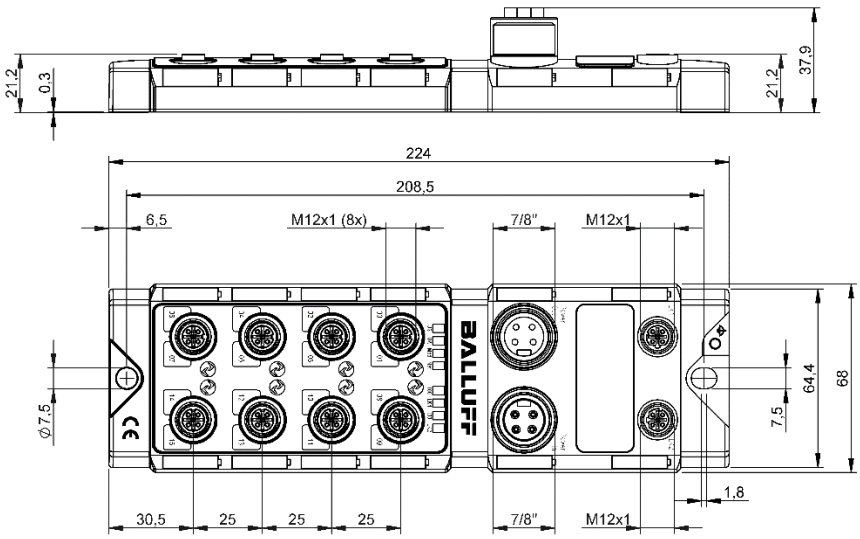


Table of Contents

1 General

1.1. Structure of the guide

This guide is arranged so that one chapter builds upon the other.
Chapter 2: Basic safety instructions
Chapter 3: Main steps for installing the device
……

1.2. Typographical Conventions

The following typographical conventions are used in this manual.

Enumerations

Enumeration is shown in the form of bulleted lists.

- Entry 1,
- Entry 2

Actions

Action instructions are indicated by a preceding triangle. The result of an action is indicated by an arrow.

➢ Action instruction 1.
↳ Result of action.
➢ Action instruction 2.

Actions can also be indicated as numbers in parentheses.

(1) Step 1
(2) Step 2

Syntax

Numbers:
Decimal numbers are shown without additional information (e.g. 123),
Hexadecimal numbers are shown with the additional indicator hex (e.g., 00_{hex}) or the prefix "0x" (e.g., 0x00).

Cross-references

Cross-references indicate where additional information on the topic is located.

1.3. Symbols

Note
This symbol indicates general notes.

Attention!
This symbol indicates a security notice which most be observed.

1.4. Abbreviations

BNI	Balluff Network Interface
I	Standard input port
EIP	EtherNet/IP™
EMC	Electromagnetic compatibility
FE	Function earth
O	Standard output port

1.5. Deviating views

Product views and illustrations in this manual may differ from the actual product. They are intended only as illustrative material.

2 Safety

2.1. Intended Use

The BNI EIP-… is a decentralized IO-Link, input and output module for connecting to the EtherNet/IP™ network.

2.2. Installation and Startup

Attention!
Installation and startup are to be performed by trained technical personnel only. Skilled specialists are people who are familiar with the work such as installation and the operation of the product and have the necessary qualifications for these tasks. Any damage resulting from unauthorized tampering or improper use shall void warranty and liability claims against the manufacturer. The operator is responsible for ensuring that the valid safety and accident prevention regulations are observed in specific individual cases.

2.3. General Safety Notes

Commissioning and inspection
Before commissioning, carefully read the User's Guide.
The system must not be used in applications in which the safety of persons depends on the function of the device.
Intended use
Warranty and liability claims against the manufacturer shall be rendered void by damage from:

- Unauthorized tampering
- Improper use
- Use, installation or handling contrary to the instructions provided in this User's Guide.

Obligations of the owner/operator
The device is a piece of equipment in accordance with EMC Class A. This device can produce RF noise. The owner/operator must take appropriate precautionary measures against this for its use. The device may be used only with a power supply approved for this. Only approved cables may be connected.
Malfunctions
In the event of defects and device malfunctions that cannot be rectified, the device must be taken out of operation and protected against unauthorized use.
Intended use is ensured only when the housing is fully installed.

2.4. Resistance to Aggressive Substances

Attention!
The BNI modules always have good chemical and oil resistance. When used in aggressive media (such as chemicals, oils, lubricants and coolants, each in a high concentration (i.e. too little water content)), the material must first be checked for resistance in the particular application. No defect claims may be asserted in the event of a failure or damage to the BNI modules caused by such aggressive media.

Dangerous Voltage

Attention!
Before working on the device, switch off its power supply.

Note
In the interest of continuous improvement of the product,
Balluff GmbH reserves the right to change the technical data of the product and the content of these instructions at any time without notice.

3 First Steps

3.1. Module Overview

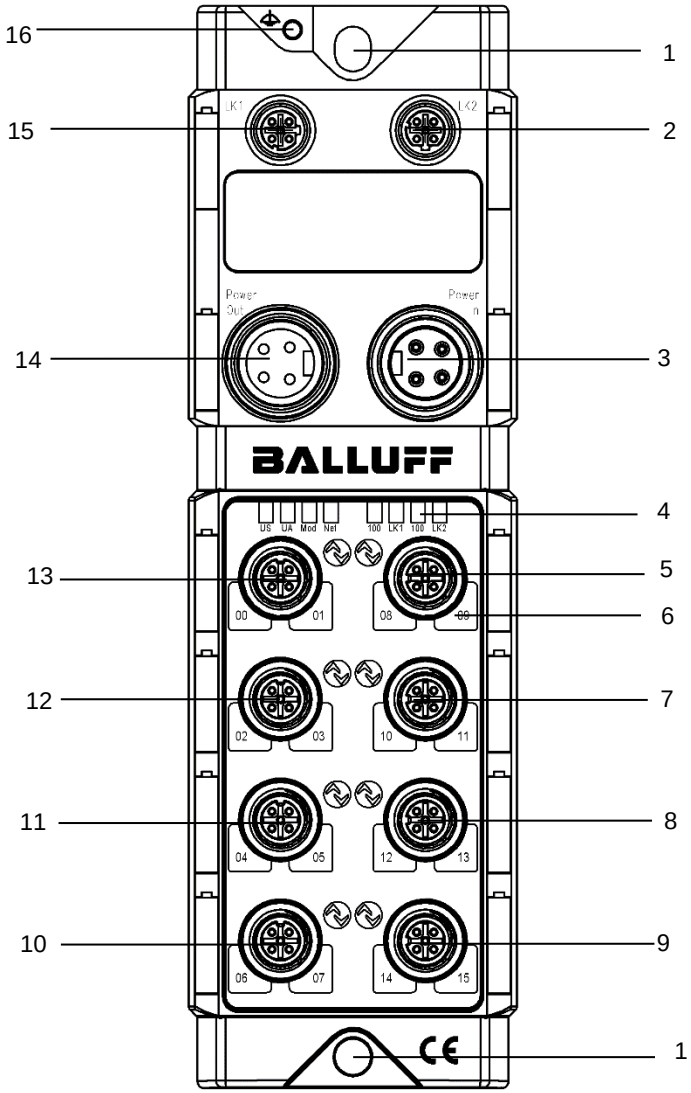


Figure – Overview: BNI EIP-508-005-Z015-013

1	Mounting hole	9	Port 7
2	EtherNet/IP™ port	10	Port 3
3	Power In	11	Port 2
4	Status LED: communication / module	12	Port 1
5	Port 4	13	Port 0
6	Pin/port LED: signal status	14	Power Out
7	Port 5	15	EtherNet/IP™ port
8	Port 6	16	Ground connection

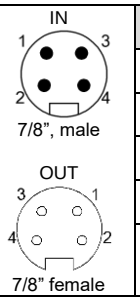
3 First Steps

3.2. Mechanical Connection

The module is secured by means of two M6 screws and two washers.
Insulation support is available separately.

3.3. Electrical Connection

Power Supply

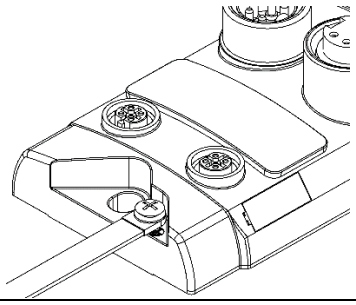


Pin	Function	Description
1	+24 V	Actuator supply
2	+24 V	Module / sensor supply
3	0 V	GND module / sensor and actuator supply
4		

Note
Where possible, use a separate power source to supply the sensor/bus and actuator with power.
Total current < 9 A The total current of all modules must not exceed 9 A even in the case of series connection of the actuator supply.

Attention!
Do not separate supply voltages
Non-separate voltage supply circuits for sensor and actuator can result in undesired voltage drops in the sensor supply when switching actuators.
► Therefore always use separately protected voltage supplies for sensors and actuators.
Also be sure to sufficiently dimension the voltage supply of the device in order to cover startup and peak currents. Design the fusing concept accordingly.

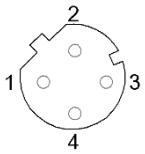
Grounding



Note
The functional ground connection between housing and machine must have a low impedance and be as short as possible.

Ethernet IP Interface

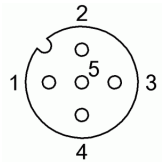
M12, D-coded, female



Pin	Function	
1	Tx+	Transmit Data +
2	Rx+	Receive Data +
3	Tx-	Transmit Data -
4	Rx-	Receive Data -

3 First Steps

Port M12, A-coded, female



Pin	Function
1	+24 V, 1.6A
2	Input / output
3	GND
4	Input / output / IO-Link
5	n.c.

Note
For the digital sensor inputs, refer to guideline on inputs EN 61131-2, Type 3.

Note
Each output delivers a maximum of 2 A.

Note
The IO-Link output is supplied via the sensor supply.

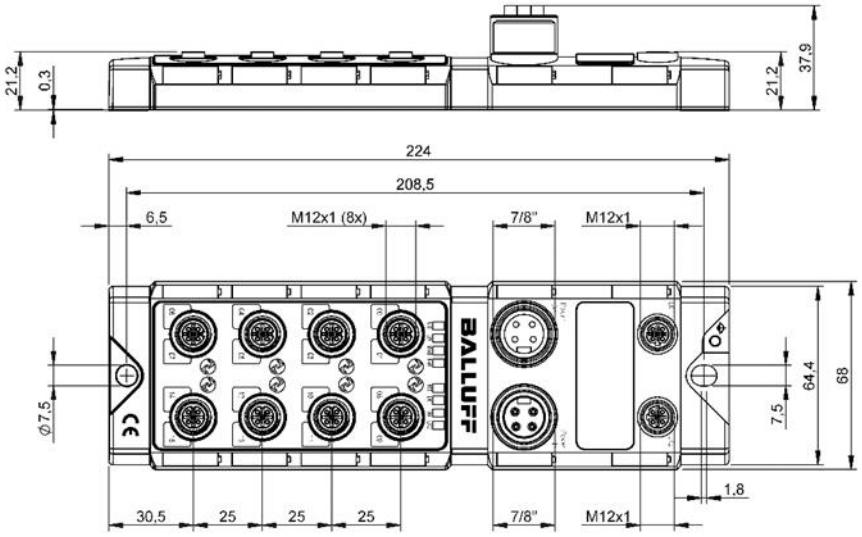
Note
Unused I/O ports must be provided with cover caps to comply with degree of protection IP67.

Port

	Port
	0 - 7
BNI EIP-508-005-Z015-013	IN / OUT / IO-Link

4 Technical Data

4.1. Dimensions



4.2. Mechanical Data

Housing material	Die case zinc, matt nickel plated
Enclosure rating per IEC 60529	IP 67 (only when plugged-in and threaded-in)
Supply voltage	7/8" 4-pin, connector / female
Input ports / output ports	M12, A-coded (8x female)
Dimensions (W x H x D in mm)	68 x 224 x 37.9
Type of mounting	Screw mounting with 2 mounting holes
Ground strap installation	M4
Weight	Approx. 670 g

4.3. Operating Conditions

Ambient temperature Storage temperature	-5 °C ... 70 °C -25 °C ... 70 °C

4.4. Electrical Data

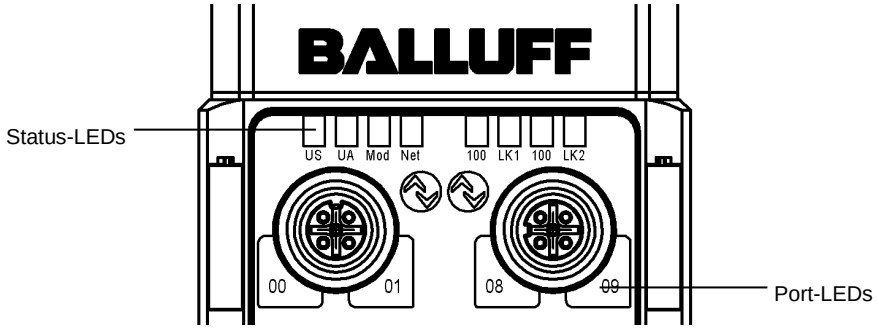
Supply voltage	18...30.2 V DC, in accordance with EN 61131-2
Ripple	< 1%
Input current at 24 V	130 mA

4 Technical Data

4.5. Ethernet

Ethernet IP port	2 x 10Base/100Base Tx
Connection for Ethernet IP port	M12, D-coded, female
Cable types in accordance with IEEE 802.3	Shielded, twisted pair min. STP CAT 5/ STP CAT 5e
Data transmission rate	10/100 Mbps
Max. cable length	100 m
Flow control	Half-duplex/full-duplex (IEEE 802.33x pause)

4.6. Function Indicators



Module Status

LED	Display	Description
UA	Green	Output voltage OK
	Off	Output voltage low (< 18 V) or no output voltage present (< 11 V)
US	Green	Input voltage OK
	Red, flashing	Input voltage low (< 18V)
Mod	Green, flashing	Wrong or no configuration
	Green	Module is working
	Red, flashing	Fixed bus clock is not possible
	Red-green, flashing	Initial sequence
NET	Off	Module has no IP address
	Green, flashing	Module has IP, but no connection established
	Green	Connection established
	Red, flashing	Connection timeout
	Red-green, flashing	Initial sequence
100	Off	Transfer rate: 10 Mbps
	Yellow	Transfer rate: 100 Mbps
LK1/2	Green, flashing	Data transfer

4 Technical Data

Port

Each port has two bicolored LEDs for displaying the I/O statuses.

Standard Port

Status	Function
off	State of the input or output pin is 0
yellow	State of the input or output pin is 1

IO-Link Port

Status	Function
green	IO-Link connection established
green flashing	No active IO-Link communication
green, fast flashing	IO-Link pre-operate during data management
red, fast flashing	Wrong IO-Link data length, or validation failed, or data storage failed
red	IO-Link short circuit, pin 4 against pin 3

All Modes

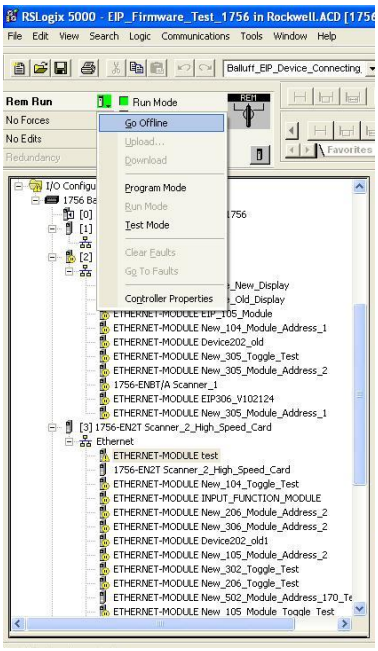
Status	Function
Both LEDs red flashing	Short circuit at sensor supply between pin 1 and pin 3

5 Integration

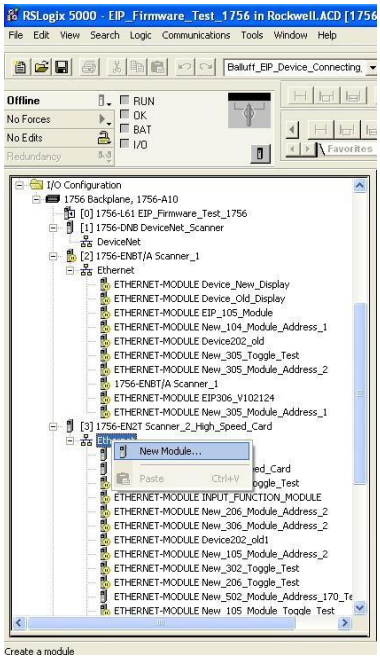
5.1. Integration in Rockwell RS Logix 5000

Here you see an example of how the module can be integrated into a Rockwell RS Logix 5000:

First go offline

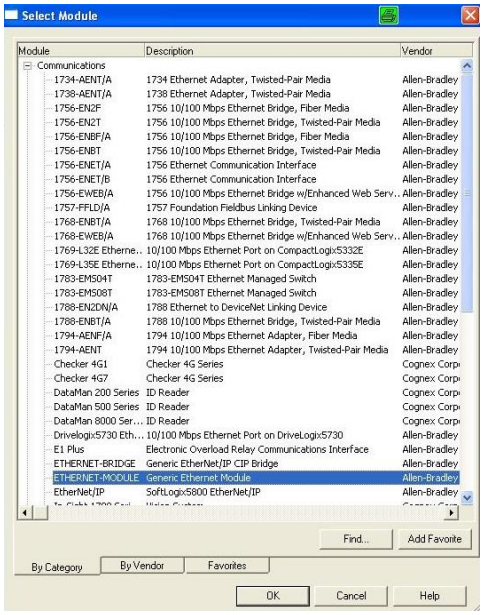


Right-click Ethernet (on the correct scanner card)
Select a new module

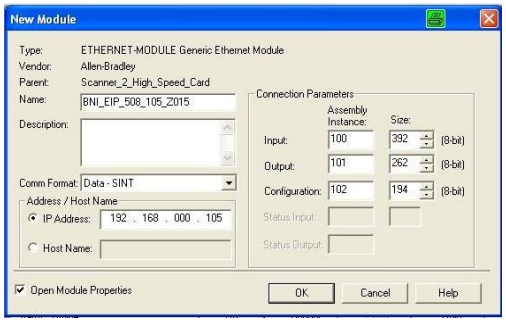


5 Integration

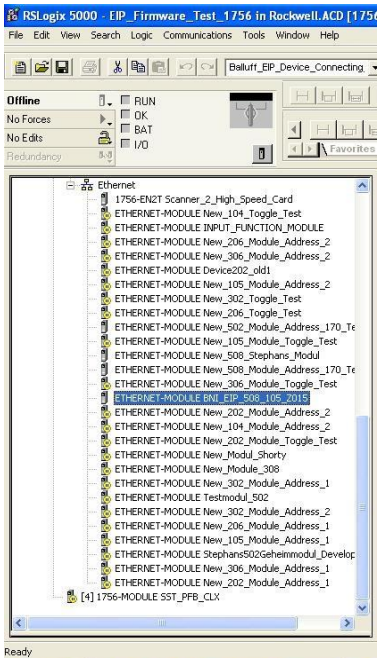
Then select the general Ethernet module as the ETHERNET module in the communication path



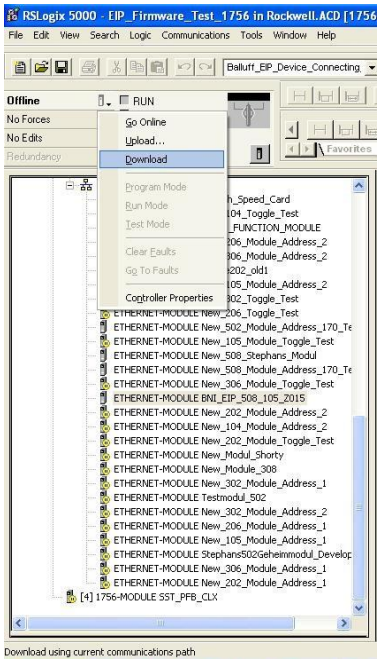
Now enter a user-defined tag name to select the general format Data-SINT, to enter the IP address of the module and to enter the correct connection parameters.



The new module and corresponding controller tags are generated automatically.



Then download the configuration

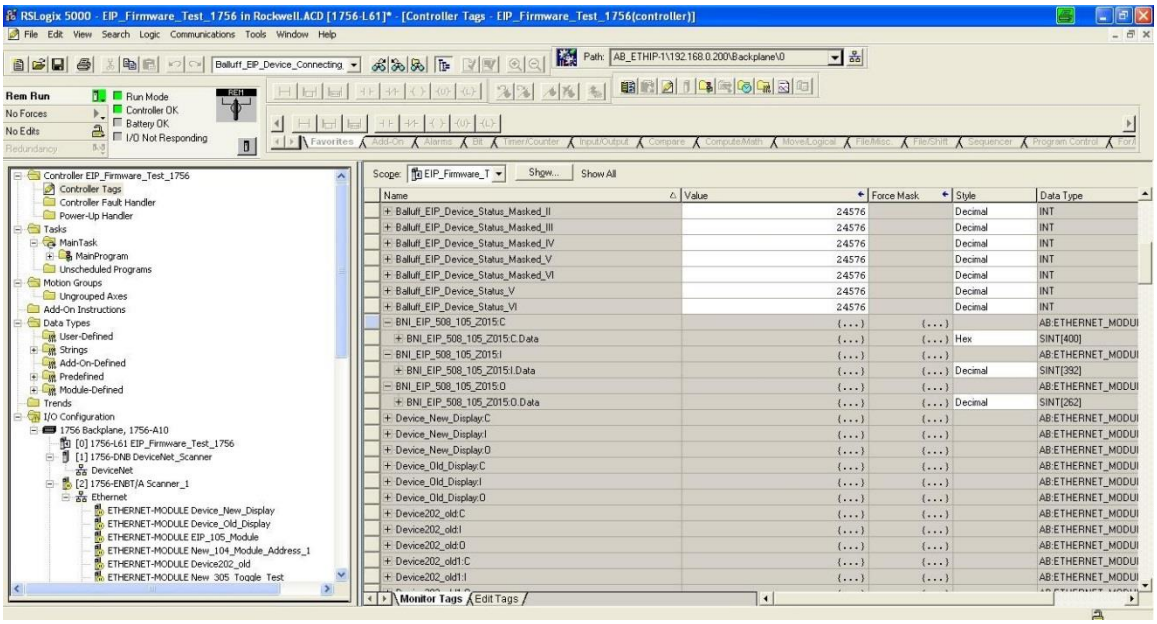


5 Integration

When the download is done, you can observe and control the tags using the Controller Tags option. Make sure you select the correct tag name, which you configured beforehand.

The input, output and configuration data for this is described on the following pages.

You can use these tags for the programming, too.



5.2. Address Specifications

These settings are factory-set.

IP-Adresse: 192.168.1.1
Subnetmaske: 255.255.255.0
Gatewayadresse: 192.168.1.1

5.3. Data Configuration

Please enter the following values in the control system. They describe the data sizes of the input, output and configuration data.

	Instanc ID	Data length
		508
Input	100	392
Output	101	262
CONFIG	102	194

5.4. Configuration Data

The following tables show an allocation of the configuration data sequence. The standard values specified below describe a configuration with the IO-Link function at Pin 4 and standard I/O functions at Pin 2 and 4 of each port. The input and output functions of the configured standard I/O ports are set via the process data.

Byte	Slot	Module part	Description
0…1	1	Module	General configuration for the entire module
2…25	2	IO-Link port 0	Configuration of IO-Link port 0
26…49	3	IO-Link port 1	Configuration of IO-Link port 1
50…73	4	IO-Link port 2	Configuration of IO-Link port 2
74…97	5	IO-Link port 3	Configuration of IO-Link port 3

Byte	Slot	Module part	Description
0…1	1	Module	General configuration for the entire module
2…25	2	IO-Link port 0	Configuration of IO-Link port 0
26…49	3	IO-Link port 1	Configuration of IO-Link port 1
50…73	4	IO-Link port 2	Configuration of IO-Link port 2
74…97	5	IO-Link port 3	Configuration of IO-Link port 3
98…121	6	IO-Link port 4	Configuration of IO-Link port 4
122…145	7	IO-Link port 5	Configuration of IO-Link port 5
146…169	8	IO-Link port 6	Configuration of IO-Link port 6
170…193	9	IO-Link port 7	Configuration of IO-Link port 7

Module Configuration BNI EIP-508-005-Z015-013

Byte	Bit								Description
	7	6	5	4	3	2	1	0	
0	P3		P2		P1		P0		Port function *0x00: Standard I/O* *0x01: IO-Link*
1	P7		P6		P5		P4		

5 Integration

IO-Link Port Configuration

Byte	Bit								Description
	7	6	5	4	3	2	1	0	
2	Basic		Time						Cycle time
3	Validation type								Validation type *0 No validation* *1 compatible (VID + DID)*
4	Vendor ID 1								Vendor ID
5	Vendor ID 2								
6	Device ID 1								Device ID
7	Device ID 2								
8	Device ID 3								
9	Reserved Byte 1								Reserved
…	…								
24	Reserved Byte 16								
25	Parameter server								Parameter server *0x00 Disable* *0x82 Download* *0x83 Upload and Download*

Cycle Settings

This parameter can be used to influence the IO-Link communication speed. Calculated using the multiplier and the time base, the IO-Link cycle time can be increased.
The time base is described in Table B3. The multiplier is entered in decimal form from 0…63.

Bit								Description
7	6	5	4	3	2	1	0	
Time base		Multiplier						**Bit 0 to 5: Multiplier** These bits contain a 6-bit multiplier for the calculation of MasterCycleTime or MinCycle Time. Permissible values for the multiplier are 0 to 63. **Bit 6 to 7: Time Base** These bits specify the time base for the calculation of MasterCycleTime or MinCycleTime.

Possible values of MasterCycleTime and MiniCycleTime

Time base encoding	Time base value	Calculation	Cycle time
00	0.1 ms	Multiplier x time base	0.4 ms to 6.3 ms
01	0.4 ms	6.4 ms + multiplier x time base	6.4 ms to 31.6 ms
10	1.6 ms	32.0 ms + multiplier x time base	32.0 ms to 132.8 ms
11	Reserved	Reserved	Reserved
NOTE: The value 0.4 results from the minimum possible transmission time according to A.3.7.			

Validation Settings

No validation: validation deactivated, every device will be accepted.
Compatibility: manufacturer ID and device ID are compared to the IO-Link device data.

5 Integration

Parameter Server

Disable: data management functions disabled, stored parameter data and identification data of the IO-Link device remain stored.
Download:
If only the download is enabled, the master always starts a download of the parameter data. In this case, the download is likewise independent of the upload flag of the IO-Link device. If no data is stored in the Master Port, however, an upload takes place first. (e.g. after deleting the data or before the first data upload)
Upload and Download:
If the upload and download are enabled, different parameter sets are distinguished depending on the upload flag of the IO-Link device.
If no parameter data is stored in the IO-Link master port, an initial upload takes place. (e.g. after deleting the data or before the first data upload)
If the upload flag is set on the IO-Link device, an upload of the parameter data always takes place.
If no upload flag is set and parameter data has already been stored, a download of the parameter data always takes place.

Note
After the upload of the parameter data, the vendor ID and device ID of the connected IO-Link device are also still saved until the data records are deleted.
When the connected IO-Link device is started, a validation takes place. Thus, only an IO-Link device of the same type can be used for the data management.
If an IO-Link device of a different type is to be used, the contents of the parameter server must be deleted.
The data storage is supported only by IO-Link devices with IO-Link Revision 1.1.

Upload Flag on the IO-Link Device

The upload flag is needed to overwrite already saved data in the parameter server with new parameter data of the same IO-Link device.

To enable the upload flag of an IO-Link device,
the data value 0x05 must be entered in the index 0x02, subindex 0.
(For information about configuration via IO-Link, refer to the "Web Server" chapter under "Device Properties" or the "Configuration via Explicit Messages" chapter under "IO-Link Device Parameterization")

QuickConnect

The QuickConnect function makes it faster to boot up and integrate the BNI EIP-50x-005-X015-013 modules.

Enabling QuickConnect automatically takes over all necessary port properties on the module:

- Static IP address
- Ports at 100 Mbps full-duplex
- Auto-negotiation disabled
- Auto MDI-X disabled
- Prepared for linear topology

You can configure **QuickConnect** via the following class instance attribute of the explicit messages:

Class	Instance	Attribute	Value
245 (0xF5)	1 (0x01)	12 (0x0C)	0: disabled (default) **1: enabled**

Note
For QuickConnect to be enabled, ACD (Address Conflict Detection) must also be enabled. This is switched on by default.

The **ACD** can be reviewed and changed using the following class instance attributes of the explicit messages:

Class	Instance	Attribute	Value
245 (0xF5)	1 (0x01)	10 (0x0A)	0: disabled **1: enabled**(default)

6 Configuration via Explicit Messages

Rockwell Automation Products that are Compatible with QuickConnect

Component	Supported Rockwell Automation Products
Controller	ControlLogix® controllers: • 1756-L6*x* • 1756-L7*x* GuardLogix controllers: • 1756-L6*x*S • 1756-L7*x*S All controllers require firmware revision 20.001 or later.
EtherNet/IP managed switch on the controller side	Stratix 6000 switches: • 1783-EMS04T • 1783-EMS08T Stratix 8000 switches: • 1783-MS06T or 1783-MS10T • 1783-RMS06T or 1783-RMS10T • 1783-MX08T or 1783-MX08F
EtherNet/IP communication modules	ControlLogix communication modules: • 1756-EN2T with firmware revision 4.003 • 1756-ENBT with firmware revision 6.002
Application logic that uses generic CIP Messages to inhibit and uninhibit I/O modules	Studio 5000 Logix Designer application, version 21.00.00 or later or RSLogix 5000 software, version 20.01.02

Source:
Allen-Bradley Ethernet/IP QuickConnect Application Technique
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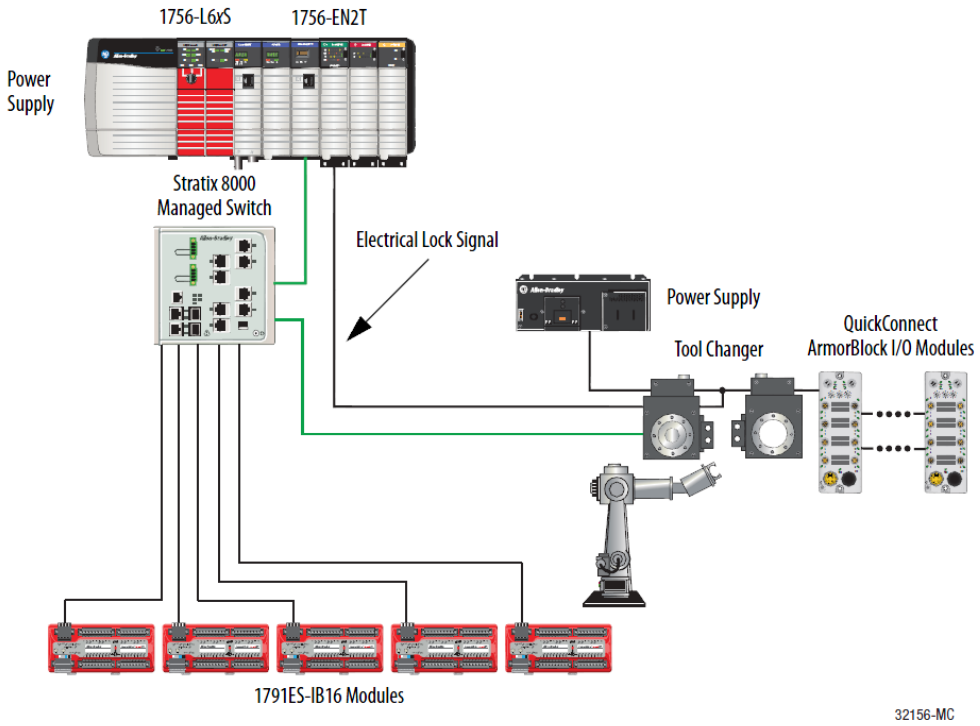
Example with Rockwell Components

Figure 3 - Example System Components



Source:
Allen-Bradley Ethernet/IP QuickConnect Application Technique, Page 12

Please also note the following:

- Direct connection between PLC and QuickConnect slave with crossover cable
- Slave-to-slave connection using patch cable
- For setting up the topology, only the linear topology with a maximum of 20 modules on the tool side is permitted.
- If needed, only one managed switch may be used between the PLC and Ethernet/IP slave.
- To trigger the QuickConnect sequence, an electrical lock signal is required that reads in the supply voltage of the QuickConnect slaves via the controller.

6 Configuration via Explicit Messages

PLC Program

Add Application Logic

Add ladder logic to inhibit and uninhibit QuickConnect I/O modules:

- Run this logic in a periodic task with a recommended 10 ms update rate.
- The logic examples shown configure two ArmorBlock I/O modules. Modify the code as needed to configure as many as 20 ArmorBlock I/O modules.

IMPORTANT A connection time of 500 ms with 20 QuickConnect modules is supported with only a ControlLogix 1756-L7*x* controller and 1756-EN2T communication module. For average connection times per number of modules, see Average Timing with Rockwell Automation Products on page 50.

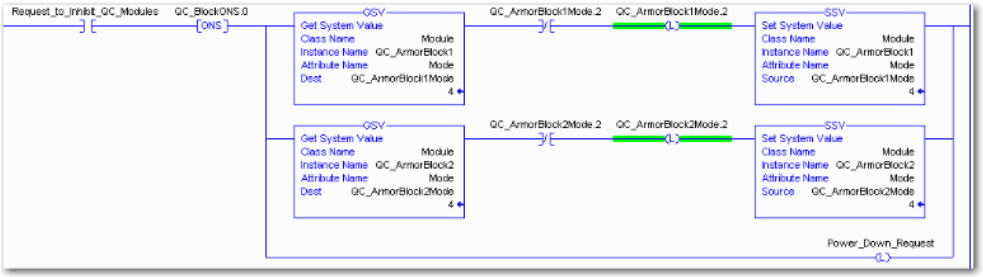
Inhibit and Power Down

Add this logic to inhibit and power down the QuickConnect modules.

1. Rung 0: Inhibit the modules.

   Before making a tool change, you must uninhibit the QuickConnect ArmorBlock I/O modules mounted to the tool before powering down. Use a GSV (Mode) instruction to monitor the present state of the modules and one SSV (Mode) instruction per module to inhibit the modules.

   The input condition to start the inhibit process must come from an external input. For example, as the robot is traveling back to change out the tool, this input condition must be enabled. By the time the tool is being changed, the modules are inhibited and can proceed to powering down the tool and modules.



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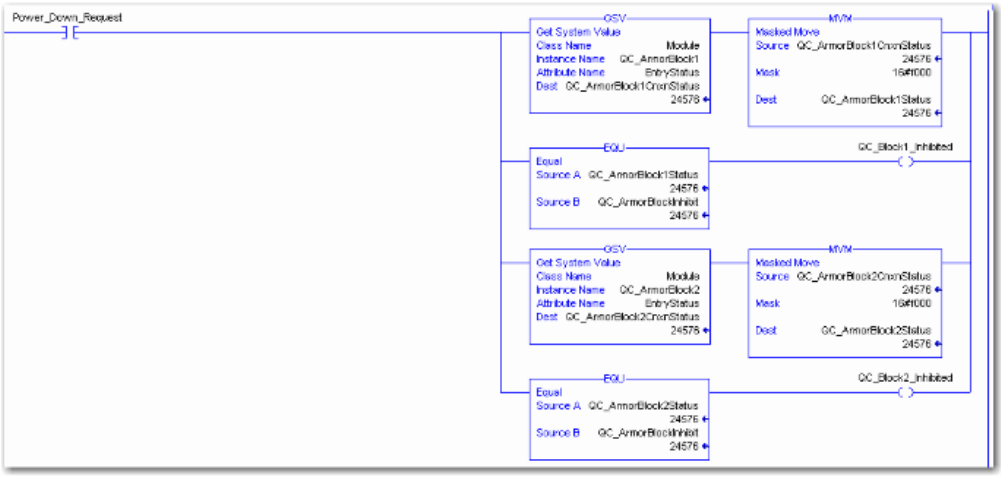
Allen-Bradley Ethernet/IP QuickConnect Application Technique, Page 29

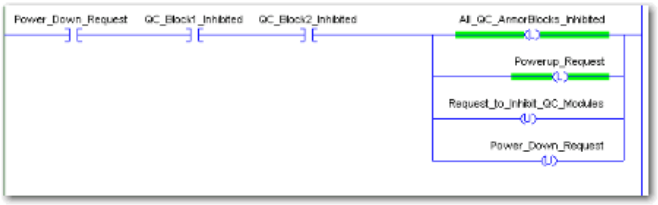
2. Rung 1: Verify the modules are inhibited.

   After the modules have been inhibited, verify that the modules have indeed been inhibited. Use one GSV (Entry Status) instruction per module. When the Entry Status value equals a decimal value of 24576, the module can be disconnected from the robotic arm and powered down.



3. Rung 2: Power down the modules.

   This rung verifies that all the modules have been inhibited and powered down. The tool and modules can be physically disconnected from the robotic arm.



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Allen-Bradley Ethernet/IP QuickConnect Application Technique, Page 30

6 Configuration via Explicit Messages

Uninhibit and Power Up

Add this logic to uninhibit and power up the QuickConnect I/O modules.

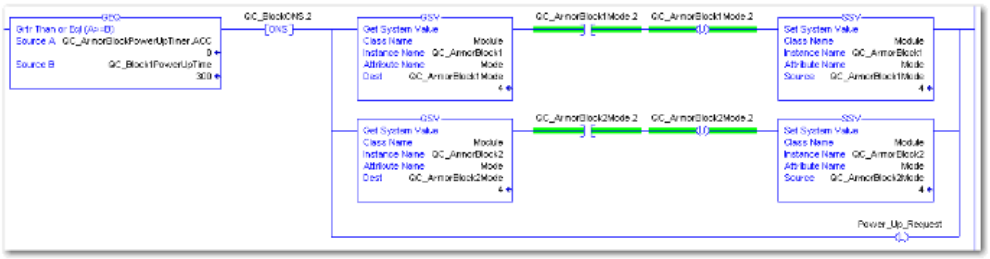
1. Rung 3: Power up the modules.

   Once the tool and module is connected, an external input module sends an electrical lock input signal. On receipt of the signal, start a timer to keep track of how long the tool and modules have been connected.

   Every QuickConnect ArmorBlock I/O module has a delay time embedded in its electronic data sheet (EDS) file. This delay time is the amount of time the module takes to power up. The module takes about 300 ms to fully power up before establishing a connection to the controller.

2. Rung 4: Uninhibit the modules.

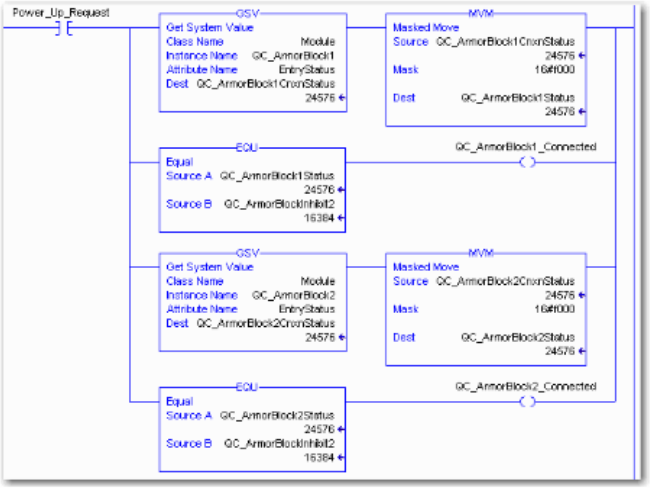
   When the Timer. Acc is greater then or equal to the module delay time (300 ms), use an SSV (Mode) instruction to uninhibit the module. Use a GSV (Mode) instruction to verify the mode of the module at powerup.



Source:
Allen-Bradley Ethernet/IP QuickConnect Application Technique, Page 31

3. (Optional) Rung 5: Verify the modules are uninhibited.

   After the modules have been uninhibited, verify that the modules have indeed been uninhibited. Use one GSV (Entry Status) instruction per module. When the Entry Status value equals a decimal value of 16384, the module has been uninhibited.



Source:
Allen-Bradley Ethernet/IP QuickConnect Application Technique, Page 32

Fault State

A safe state that the port is to take on in the case of a loss of bus communication can be predefined for each output on the port pins.

The fault state settings can be configured using the following class instance attributes of the explicit messages.

Enable/Disable Fault State

Class	Instance	Attribute	Value
9 (0x09)	1 - m	6	0: Fault state disabled 1: Fault state enabled

Fault State Action

Class	Instance	Attribute	Value
9 (0x09)	1 - m	5	0: Output on 1: Hold last state

m: Number of outputs

Note
The fault state settings are stored only temporarily in the module. They are deleted after a power reset.
To ensure a long-term fault state configuration, the configuration has to be programmed via the PLC so that the settings are transferred to the module again when the system is restarted.

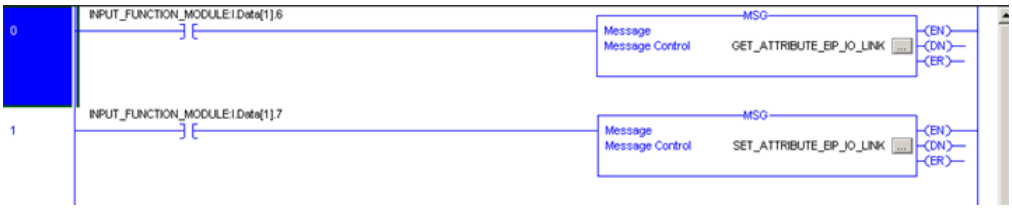
6 Configuration via Explicit Messages

IO-Link Device Para-meterization

There are two options for configuring an IO-Link device connected to the IO-Link port.

- Configuration via the web server
  refer to the "Web Server" chapter under "Device Properties"
- Configuration via explicit messages

The following example describes how Rockwell RSLogix 5000 devices can be used to configure an IO-Link device via explicit messages.
For this purpose, the "MSG" components in the PLC program are used.



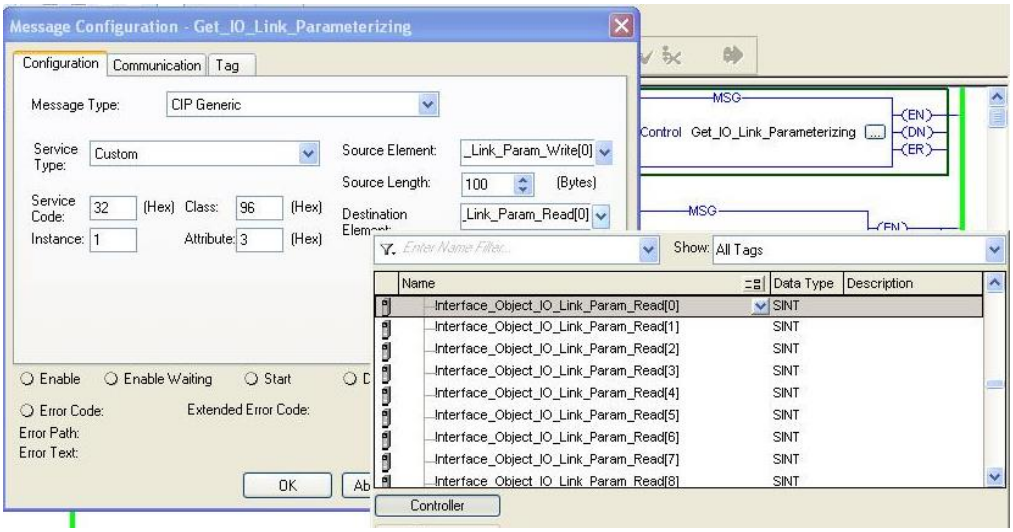
Read IO-Link Parameter

Service Code	Class	Instance	Attribute
0x32	0x96	1 - n	0x03 (Read Parameter)

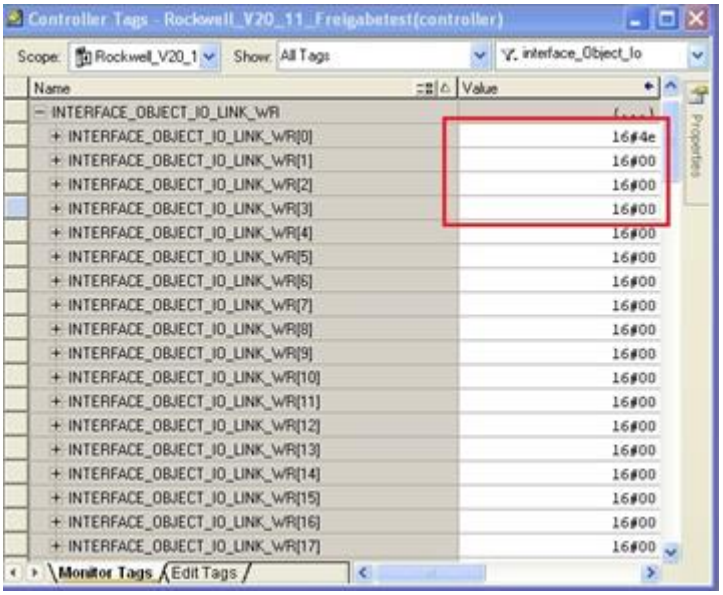
n: Number of ports

Source Length must correspond to at least the read parameters, but a larger value can also be entered. (In this example, 100 bytes)

As the Source Element (Write) and as the Destination Element (Read),
create one SINT[100] array each and select the first line[0].

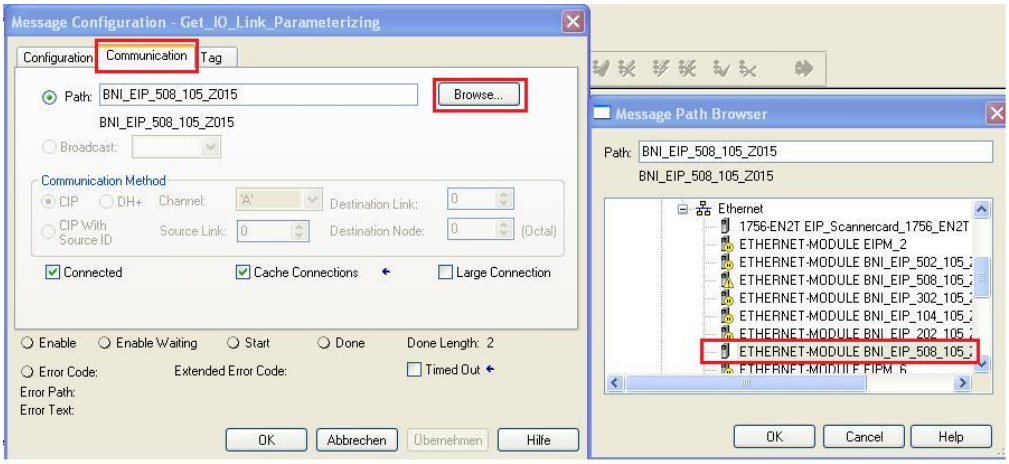


In the Source Element Array (Write), enter which index is to be read.
In this example, this is index 0x4E.



Destination Array (Read) shows the read-out value.
In case of a configuration error, the error code is likewise displayed there.

In the "Communication" window, you have to select the Ethernet module on which the configuration is to take place.



6 Configuration via Explicit Messages

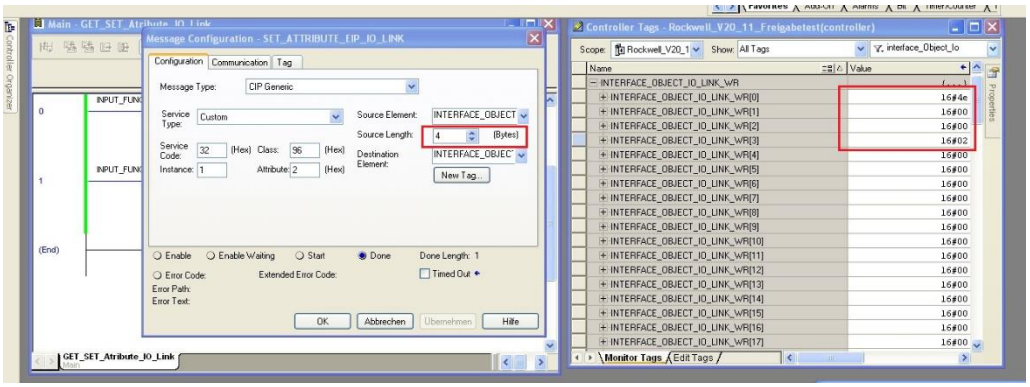
Write IO-Link Parameter

Service Code	Class	Instance	Attribute
0x32	0x96	1 - n	0x02 (Write Parameter)

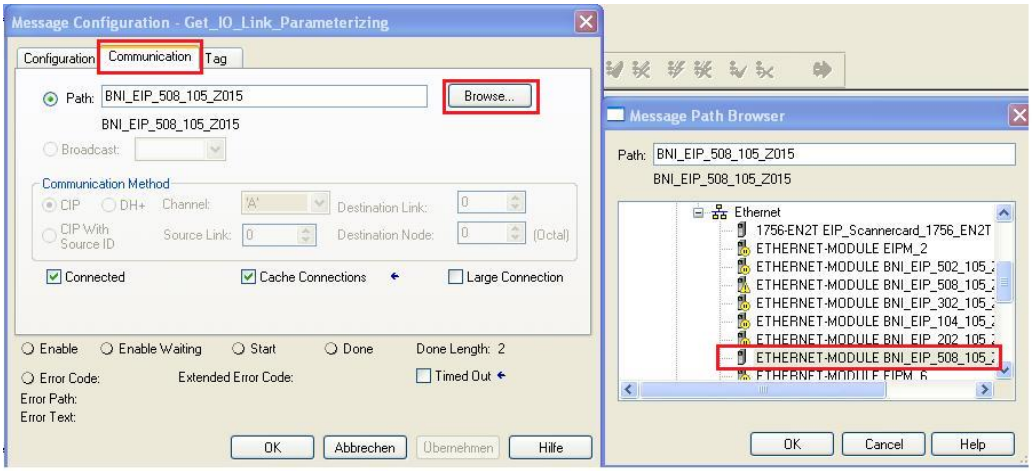
n: Number of ports

Source Element and Destination Element are to be selected so they are identical to the previous example, "Read IO-Link parameter".
The Source Length must be exactly the same length as the parameter data to be written.

In this example, index 0x4E, subindex 0,
value 0x02 is written in Source Element Array (Write).
In case of a configuration error, an error code appears in Destination Element Array (Read).



In the "Communication" window, you likewise have to select the Ethernet module on which the configuration is to take place.



Note
The explicit messages functions are implemented in accordance with the Volume 1: Common Industrial Protocol Specification and Volume 2: Ethernet/IP Adaption of CIP.

7 Process Data

7.1. Process Data Inputs

The input data size is 392 bytes. Take a look at the tables below for the allocation of the process data inputs.

Byte	Module part	Description
0…7	Standard I/O ports	Process data inputs at the standard inputs
8…55	IO-Link Port 0	Process data inputs at IO-Link port 0
56…103	IO-Link port 1	Process data inputs at IO-Link port 1
104…151	IO-Link port 2	Process data inputs at IO-Link port 2
152…199	IO-Link port 3	Process data inputs at IO-Link port 3
200…247	IO-Link port 4	Process data inputs at IO-Link port 4
248…295	IO-Link port 5	Process data inputs at IO-Link port 5
296…343	IO-Link port 6	Process data inputs at IO-Link port 6
344…391	IO-Link port 7	Process data inputs at IO-Link port 7

Standard Input Data

Byte	Bit								Description
	7	6	5	4	3	2	1	0	
0	I32	I34	I22	I24	I12	I14	I02	I04	Input data *I04 → Input at port 0, pin 4* *The result is 0 only if the port is configured as an IO-Link port.*
1	I72	I74	I62	I64	I52	I54	I42	I44	
2	S3		S2		S1		S0		Short-circuit status *Short-circuit between pin 1 and 3 at the registered port*
3	S7		S6		S5		S4		
4	O32	O34	O22	O24	O12	O14	O02	O04	Overload status *O04 → Overload at port 0, pin 4* *Only if the port is configured as an output.*
5	O72	O74	O62	O64	O52	O54	O42	O44	
6	0	0	0	0	0	NA	PS	PA	Status of the power supply *NA: Actuator supply under 10V* *PS: Sensor supply under 18V* *PA: Actuator supply under 18V*
7	0	0	0	0	0	0	0	0	*Reserved*

7 Process Data

IO-Link Input Data

Byte	Bit 7	6	5	4	3	2	1	0	Description	
8 … 39									IO-Link port 0 input data	
40	0	0	0	0	0	0	DC	IOL	IO-Link status *IOL: Port in IO-Link mode* *DC: Device connected* *0: Reserved*	
41	SC	0	0	0	0	PDI	DF	VF	IO-Link error *VF: Validation failed* *SC: IO-Link short-circuit* *DF: Data storage validation failed* *PDI: Process data invalid*	
42	Vendor ID 1								Vendor ID	
43	Vendor ID 2									
44	Device ID 1								Device ID	
45	Device ID 2									
46	Device ID 3									
47	Mode		Type		0				Event 1	*Mode:* *0: Reserved* *1: Event single shot* *2: Event disappears* *3: Event appears* *Type:* *0: Reserved* *1: Notification* *2: Warning* *3: Error*
48	Event code high									
49	Event code low									
50	Mode		Type		0				Event 2	
51	Event code high									
52	Event code low									
53	Mode		Type		0				Event 3	
54	Event code high									
55	Event code low									
…	The data of the other IO-Link ports are structured identically and described in the following.									

7.2. Process Data Outputs

The output data size is 262 bytes. Take a look at the tables below for the allocation of the process data outputs.

Byte	Module part	Description
0…5	Standard I/O ports	Process data outputs at the standard inputs
6…37	IO-Link Port 0	Process data output at IO-Link port 0
38…69	IO-Link port 1	Process data output at IO-Link port 1
70…101	IO-Link port 2	Process data output at IO-Link port 2
102…133	IO-Link port 3	Process data output at IO-Link port 3
134…165	IO-Link port 4	Process data output at IO-Link port 4
166…197	IO-Link port 5	Process data output at IO-Link port 5
198…229	IO-Link port 6	Process data output at IO-Link port 6
230…261	IO-Link port 7	Process data output at IO-Link port 7

Standard Output Data

Byte	Bit								Description
	7	6	5	4	3	2	1	0	
0	O32	O34	O22	O24	O12	O14	O02	O04	Output data *O04 → Output at port 0, pin 4* *To use this function at an IO-Link port, the port has to be configured as an output.*
1	O72	O74	O62	O64	O52	O54	O42	O44	
2	R32	R34	R22	R24	R12	R14	R02	R04	Restart *Restart of the output after a short-circuit is detected*
3	R72	R74	R62	R64	R52	R54	R42	R44	
4	0	0	0	0	0	0	0	0	*Reserved*
5	0	0	0	0	0	DL	GO	RO	Display control system *DL: Display disabled / PLC lock* *GO: Green display LED illuminates* *RO: Red display LED illuminates*

IO-Link Output Data

Byte	Bit								Description
	7	6	5	4	3	2	1	0	
6…37									IO-Link port 0 output data
…	The data of the other IO-Link ports are structured identically and described in the following.								

8 Web interface

8.1. General

The IO-Link master includes an integrated web interface for accessing detailed device information and for configuration.

8.2. Prerequisites

To use this web interface, it must be ensured that the module has been integrated in the network correctly. To do this, the IP subnet of the IO-Link master must be accessible from the PC on which the browser is being operated.

8.3. Browser

The web interface is compatible with newer versions of Google Chrome, Firefox or MS Edge. For more detailed version information, see the data sheet at www.balluff.com on the product page.

8.4. Connection setup

To establish a connection with the web interface, enter the IP address of the BNI module in the browser's address bar.

The default settings are:

IP address: 192.168.1.1

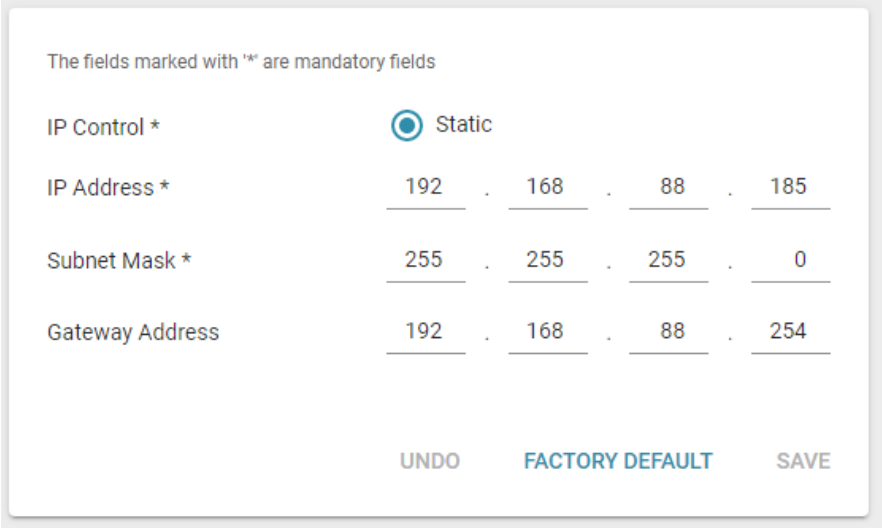
Subnet mask: 255.255.255.0

Gateway address: 192.168.1.1

User name: „admin“

Password: „BNIEIP“

WebUI starts with the network settings. When logged in, the settings can be carried out.



9 Appendix

9.1. Scope of Delivery

The BNI EIP comprises the following elements:

- IO-Link block
- 4x M12 dummy plugs
- Ground strap
- M4x6 screw
- 20 informational signs

9.2. Order Number

BNI EIP-508-005-Z015-013

Balluff Network Interface

Ethernet IP

Functions
508 = IP 67 IO-Link master module, 8 IO-Link ports

Versions
005 = no display version, 2-port switch

Mechanical version
Z015 = Die cast zinc housing
Data transmission: 2 x M12x1 internal thread
Power supply: 7/8" external thread, 7/8" internal thread
Sensor connections: 8 x M12x1 internal thread

Core Update

9.3. Ordering Information

Product order code	Order code
BNI EIP-508-005-Z015-013	BNI00HM

Notes

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