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BNI EIP-502-105-Z015 BNI EIP-508-105-Z015 EtherNet/IP[™] IP67 modules Users Guide

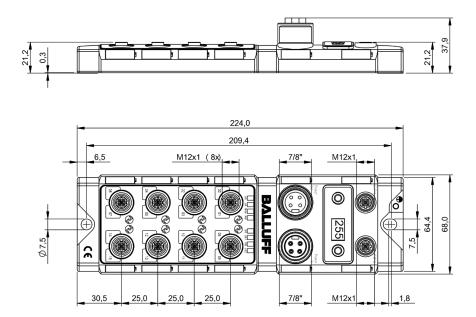


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1 Notes

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.
	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	BNIBalluff Network InterfaceIStandard input portEIPEtherNet/IP™EMCElectromagnetic compatibilityFEFunction earthOStandard 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		EIP is a decentralized IO-Link, input and output module for connecting to the /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 thi 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. 	
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.
	Dangorous		
	Dangerous Voltage		Attention! Before working on the device, switch off its power supply.
			Note
		i	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

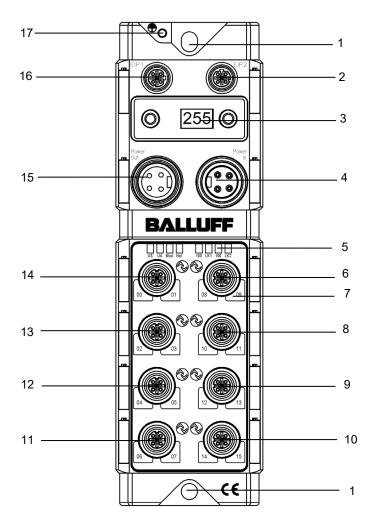


Figure - Overview: BNI EIP-508-105-Z015

- 1
- Mounting hole EtherNet/IP™ port 2
- 2 3 Display
- 4 Power supply, input
- 5 Status LED: communication / module
- Port 08 / 09 (IO-Link, standard I/O) 6
- 7 Pin/port LED: signal status
- 8 Port 10 / 11 (IO-Link, standard I/O)
- Port 12 / 13 (IO-Link, standard I/O) 9
- Port 14 / 15 (IO-Link, standard I/O) 10
- 11
- Port 06 / 07 (IO-Link, standard I/O) Port 04 / 05 (IO-Link, standard I/O) 12
- Port 02 / 03 (IO-Link, standard I/O) 13
- Port 00 / 01 (IO-Link, standard I/O) 14
- 15 Power supply, output
- 16 EtherNet/IP[™] port 1
- 17 Ground connection

3 First Steps

- 3.2. Mechanical Connection
- 3.3. Electrical Connection

Power Supply

IN 1 3	Pin	Function	Description
	1	+24 V	Actuator supply
24 7/8", male	2	+24 V	Module / sensor supply
OUT	3	0 V	GND module / sensor and actuator supply
3 0 0	4	0 V	
4 0 0 2			
7/8" female			

The module is secured by means of two M6 screws and two washers.

Insulation support is available separately.

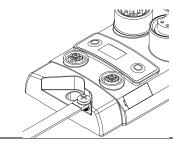
Note

i

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.

Grounding





Note

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

Ethernet IP Interface

1112		fomolo
IVII∠,	D-coded,	lemale

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

3 First Steps

I/O Port M12.

M12, A-coded, female

10	2(0500)	•	3
	4		

Pin	Function
1	+24 V, 200 mA
2	Input/output 2A
3	GND
4	Input/output 2A
5	FE



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

•		

Note
The total current of the module must not exceed 9 A.



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

IO-Link Port

M12, A-coded, female

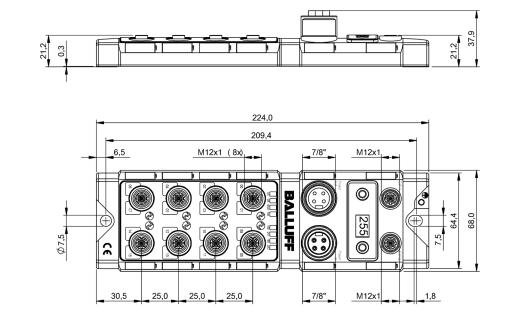
2	Pin	Function
20	1	+24 V, 1.6 A
$1(0 0^{5} 0)3$	2	Input/output 2A
10003	3	GND
0	4	IO-Link/input/output 2A
4	5	n.a.

Port

	Port		
	00/01, 02/03, 08/09, 10/11	04/05, 06/07, 12/13, 14/15	
BNI EIP-502-105-Z015	IN / OUT	IN / OUT / IO-Link	
BNI EIP-508-105-Z015	IN / OUT /	/ IO-Link	

4 Technical Data

4.1. Dimensions



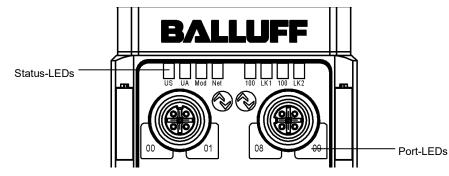
4.2. Mechanical Data	Housing material	Die case zinc, matt nickel plated
	Enclosure rating per IEC 60529	IP 67 (only when plugged-in and threaded-in)
	Supply voltage	7/8" 4-pin, connector / female
	Input ports / output ports	M12, A-coded (8x female)
	Dimensions (W x H x D in mm)	68 x 224 x 37.9
	Type of mounting	Screw mounting with 2 mounting holes
	Ground strap installation	M4
	Weight	Approx. 670 g
	A 1. 11	F * 0 70 * 0
4.3. Operating Conditions	Ambient temperature Storage temperature	-5 °C 70 °C -25 °C 70 °C
4.4. Electrical Data	Supply voltage	1830.2 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



s	LED	Display	Description
		Green	Output power OK
	UA	Red, flashing	Low output power (< 18V)
		Red	No output power (< 11V)
	US	Green	Input power OK
	03	Red, flashing	Low input power (< 18V)
		Green, flashing	Incorrect or no configuration of the module
	Mod	Green	Module is working
	wou	Red, flashing	Fixed bus clock is not possible
		Red-green, flashing	Initial sequence
		Off	Module has no IP address
	Netw	Green, flashing	Module has IP, but no connection established
	ork	Green	Connection established
	OIK	Red, flashing	Connection timeout
		Red-green, flashing	Initial sequence
	100	Off	Bus clock: 10 Mbps
	100	Yellow	Bus clock: 100 Mbps
	LNK	Green	Data transfer

Module Status

4 Technical Data

Port

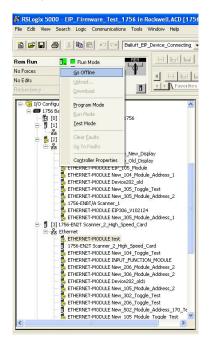
Each port has two bicolored LEDs for displaying the I/O statuses.

-			
	Display	Status	Description
	Off	I/O status	The status of the input or output pins is 0
port	Yellow	I/O status	The status of the input or output pins is 1
d O/I	Red, flashing	Short-circuit	Short-circuit between pin 1 and 3
	Red	Short-circuit	Short-circuit at dedicated pin
	Green	IO-Link	IO-Link communication active
	Green, flashing	IO-Link	No IO-Link communication
O-Link port	Green, rapidly flashing	IO-Link	IO-Link pre-operate during data storage
Q	Red	Short-circuit	Short-circuit at pin 4
	Red, flashing quickly	IO-Link	Validation failed / Data storage failed / Wrong device for data storage

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

File Edit View S	iearch Logic Communications Tools Window Help
B 2 B B	Balluff_EIP_Device_Connecting
Offline Io Forces Io Edits Tedundancy	
😑 🔂 I/O Configu	ration
	ackplane, 1756-A10
	1756-L61 EIP_Firmware_Test_1756
	1756-DNB DeviceNet_Scanner
	DeviceNet
	1756-ENBT/A Scanner_1 Ethernet
- T	Ethernet
	ETHERNET-MODULE Device_Old_Display
	ETHERNET-MODULE EIP_105_Module
	ETHERNET-MODULE New_104_Module_Address_1
	ETHERNET-MODULE Device202_old
	ETHERNET-MODULE New_305_Toggle_Test
	ETHERNET-MODULE New_305_Module_Address_2
-	5 1756-ENBT/A Scanner_1
	ETHERNET-MODULE EIP306_V102124
	B ETHERNET-MODULE New_305_Module_Address_1
	1756-EN2T Scanner_2_High_Speed_Card
⊟ 器	A P New Module
	ed Card
	Paste Ctrl+V oggle Test
	ETHERNET-MODULE INPUT FUNCTION MODULE
	ETHERNET-MODULE New 206 Module Address 2
	ETHERNET-MODULE New_306_Module_Address_2
-	B ETHERNET-MODULE Device202_old1
	ETHERNET-MODULE New_105_Module_Address_2
	ETHERNET-MODULE New_302_Toggle_Test
1	b ETHERNET-MODULE New_206_Toggle_Test
	ETHERNET-MODULE New_502_Module_Address_170_Te
2	ETHERNET-MODULE New 105 Module Toggle Test

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

Module		Description Vendor	
E Com	munications		
	1734-AENT/A	1734 Ethernet Adapter, Twisted-Pair Media Allen-Bradle	y
	1738-AENT/A	1738 Ethernet Adapter, Twisted-Pair Media Allen-Bradle	ÿ
	1756-EN2F	1756 10/100 Mbps Ethernet Bridge, Fiber Media Allen-Bradle	ÿ
	1756-EN2T	1756 10/100 Mbps Ethernet Bridge, Twisted-Pair Media Allen-Bradle	ŷ.
	1756-ENBF/A	1756 10/100 Mbps Ethernet Bridge, Fiber Media Allen-Bradle	ý
	1756-ENBT	1756 10/100 Mbps Ethernet Bridge, Twisted-Pair Media Allen-Bradle	ÿ
	1756-ENET/A	1756 Ethernet Communication Interface Allen-Bradle	ÿ
	1756-ENET/B	1756 Ethernet Communication Interface Allen-Bradle	ÿ
	1756-EWEB/A	1756 10/100 Mbps Ethernet Bridge w/Enhanced Web Serv., Allen-Bradle	ÿ
	1757-FFLD/A	1757 Foundation Fieldbus Linking Device Allen-Bradle	ý
	1768-ENBT/A	1768 10/100 Mbps Ethernet Bridge, Twisted-Pair Media Allen-Bradle	ÿ
	1768-EWEB/A	1768 10/100 Mbps Ethernet Bridge w/Enhanced Web Serv., Allen-Bradle	ÿ
	1769-L32E Etherne	10/100 Mbps Ethernet Port on CompactLogix5332E Allen-Bradle	ý
	1769-L35E Etherne	10/100 Mbps Ethernet Port on CompactLogix5335E Allen-Bradle	ÿ
	1783-EM504T	1783-EM504T Ethernet Managed Switch Allen-Bradle	ÿ
	1783-EM508T	1783-EM508T Ethernet Managed Switch Allen-Bradle	ÿ
	1788-EN2DN/A	1788 Ethernet to DeviceNet Linking Device Allen-Bradle	ÿ
	1788-ENBT/A	1788 10/100 Mbps Ethernet Bridge, Twisted-Pair Media Allen-Bradle	ò
	1794-AENF/A	1794 10/100 Mbps Ethernet Adapter, Fiber Media Allen-Bradle	ÿ
	1794-AENT	1794 10/100 Mbps Ethernet Adapter, Twisted-Pair Media Allen-Bradle	ÿ
	Checker 4G1	Checker 4G Series Cognex Cor	þ
	Checker 4G7	Checker 4G Series Cognex Cor	b
	DataMan 200 Series	ID Reader Cognex Cor	ò
1	DataMan 500 Series	ID Reader Cognex Cor	b
-	DataMan 8000 Ser	ID Reader Cognex Cor	b
	Drivelogix5730 Eth	10/100 Mbps Ethernet Port on DriveLogix5730 Allen-Bradle	
	E1 Plus	Electronic Overload Relay Communications Interface Allen-Bradle	
-	ETHERNET-BRIDGE	Generic EtherNet/IP CIP Bridge Allen-Bradle	ÿ
	ETHERNET-MODULE	Generic Ethernet Module Allen-Bradle	ý
	EtherNet/IP	SoftLogix5800 EtherNet/IP Allen-Bradle	ÿ
	to make strong caus	Malas Products Products	ĥ
-			
		Find. Add Favor	h
			2
11	ETHERNET-BRIDGE ETHERNET-MODULE EtherNet/IP	Generic EtherNet/IP CIP Bridge Allen-Brad Graneric Ethernet Module Allen-Brad SoftLogisS800 EtherNet/IP Allen-Brad	e e

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.

Type: Vendor:	ETHERNET-MODULE Gener Allen-Bradley	ric Ethernet Module			
Parent:	Scanner_2_High_Speed_Car	d Connection Para	ameters		
Name: Description:	BNI_EIP_508_105_2015		Assembly Instance:	Size:	
/ coonpilore		Input	100	392	(8-bit)
		Output:	101	262	(8-bit)
	t Data - SINT	Configuration:	102	194 -	(8-bit)
Address / I IP Add		105 Status Input:			
C Host N	ame:	Status Output.			

	@ X B	Balluf	[_EIP_Device_Co	nnecting
Offline	🛛 🗸 🔲 RUN			ol he
No Forces	🕨 🗖 ок	-4		
No Edits	BAT	-		
Redundancy	E 1/0			Favori
reconcency	5.5			
8	器 Ethernet 웹 1756-EN2T S	canner_2_High_Spe	ed Card	
		ODULE New 104 T		
		ODULE INPUT FUN		
	ETHERNET-M	ODULE New_206_N	odule_Address_	2
	ETHERNET-M	ODULE New_306_N	iodule_Address_	2
		ODULE Device202_		
		ODULE New_105_N		2
		ODULE New_302_T		
		ODULE New_206_T		
		ODULE New_502_N		
		ODULE New_105_N ODULE New 508_S		est
		ODULE New 508 N		170 Te
		ODULE New 306 N		
		ODULE BNI EIP 50		
	ETHERNET-M	ODULE New_202_N	odule_Address_	2
	ETHERNET-M	ODULE New_104_N	iodule_Address_	2
		ODULE New_202_N		est
		ODULE New_Modul		
		ODULE New_Modul		
		ODULE New_302_N		1
		ODULE Testmodul_		
		ODULE New_302_N ODULE New 206 N		
		ODULE New 205 N ODULE New 105 N		
		ODULE New_105_N ODULE Stephans50		
		ODULE New 306 N		
		ODULE New 202 N		
	[4] 1756-MODULE SS		2002 CO	
	2020-20	65 E		

The new module and corresponding controller tags are generated automatically.

Then download the configuration

		Balluff_EIP_Device_Connecting
In Forces		
lo Edits	<u>G</u> o Online	
	Upload	Favorit
ledundancy	Download	
- &	Program Mode	
		h_Speed_Card
	Run Mode	104 Toggle Test
	Test Mode	FUNCTION MODULE
		206_Module_Address_2
	Clear <u>E</u> aults	306_Module_Address_2
	Gg To Faults	202_old1
		105_Module_Address_2
	Controller Properties	302_Toggle_Test
	ETHERNET-MODULE New	_206_Toggle_Test
- 1		_502_Module_Address_170_Te
	ETHERNET-MODULE New	
	ETHERNET-MODULE New	
B		_508_Module_Address_170_Te
	ETHERNET-MODULE New	
- 1	ETHERNET-MODULE BNI_	
	ETHERNET-MODULE New	
	ETHERNET-MODULE New	
		_202_Module_Toggle_Test
	ETHERNET-MODULE New	
	ETHERNET-MODULE New	
	ETHERNET-MODULE New	
	ETHERNET-MODULE Test	
	ETHERNET-MODULE New, ETHERNET-MODULE New,	
	ETHERNET-MODULE New	
		_105_Module_Address_1 hans502Geheimmodul Develoc
	ETHERNET-MODULE Scep	
	ETHERNET-MODULE New	
	56-MODULE SST_PFB_CLX	_cocgooge_wool.coo_t
14] I/	SS HODOLE SSI _FI 8_CEX	~
		>

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.

Rum Controller OK Batery OK ILO Not Responding Controller Tays Controller Cault Controller Controller Controller Controller Controller Tays Controller Cault Controller Contro		ETHIP-11/32 158.0.2000/Backplane10	♥ 85	vlisc. 🔏 File/Shif Force Mask	t 🔏 Sequence	r & Program Control & FotA
Controler Tay: Controler Controler Controle	4% (W) (W) Cn A fairing (E) (Free/Counter A free/Counter get []]EIP_Firmware_T	🕻 Compare 🔏 Compute/Math 🔏 Move/Lo		Misc. 🗶 File/Shif		
Controler Tags Controler Tags Controler Tags Controler Tags Controler Tags Controler Tags Tags Tags Tags	me Balluff_EIP_Device_Status_Masked_II Balluff_EIP_Device_Status_Masked_III	∆ Value		Force Mask		
Controller Fault Handler	Balluff_EIP_Device_Status_Masked_II Balluff_EIP_Device_Status_Masked_III	C Yaue		OICE Mask		
Task The second seco	Balluff_EIP_Device_Status_Masked_III		24570			
🖻 🤯 MainTask			24576		Decimal	INT
	Balluff_EIP_Device_Status_Masked_IV		24576		Decimal	INT
	Balluff EIP Device Status Masked V		24576		Decimal	INT
	Balluff_EIP_Device_Status_Masked_V Balluff_EIP_Device_Status_Masked_VI		24576		Decimal	INT
Motion Groups	Balluff EIP Device Status V		24576		Decimal	INT
						INT
	Balluff_EIP_Device_Status_VI BNI_EIP_508_105_Z015:C		24576		Decimal	
			{}	(AB:ETHERNET_MOD
Colores Colores	+ BNI_EIP_508_105_Z015.C.Data		{}	(SINT[400]
Add on Defined	BNI_EIP_508_105_2015;1		{}	{		AB:ETHERNET_MOD
+ Lig Predefined	+ BNI_EIP_508_105_Z015:I.Data		{}) Decimal	SINT[392]
	BNI_EIP_508_105_2015.0		{}	{		AB:ETHERNET_MOD
	H BNI_EIP_508_105_2015:0.Data		{}		} Decimal	SINT[262]
	Device_New_Display:C		{}	{		AB:ETHERNET_MOD
Pa [0] 1756 161 510 Elementer Tech 1756	Device_New_Display:1		{}	{		AB:ETHERNET_MOD
II 111756-DNB DeviceNet Scapper	Device_New_Display.0		{}	{		AB:ETHERNET_MOD
쁆 DeviceNet	Device_Old_Display.C		{}	{	}	AB:ETHERNET_MOD
	Device_Old_Display:1		{}	(}	AB:ETHERNET_MOD
	Device_Old_Display:0		()	()	AB:ETHERNET_MOD
	Device202_old:C		{}	(}	AB:ETHERNET_MOD
ETHERNET-MODULE Device_Old_Display ETHERNET-MODULE EIP 105 Module	Device202_old:1		{}	{)	AB:ETHERNET_MOD
ETHERNET-MODULE New_104_Module_Address_1	Device202_old:0		{}	(}	AB:ETHERNET_MODI
ETHERNET-MODULE Device202_old	Device202_old1:C		{}	{	}	AB:ETHERNET_MOD
🕂 ETHERNET-MODULE New 305 Toggle Test 🛛 🕙 📃 +	Device202_old1:1		{}	{	}	AB:ETHERNET_MOD

5.2. Address These settings are factory-set. Specifications

IP-Adresse:	192.168.1.1
Subnetmaske:	255.255.255.0
Gatewayadresse:	192.168.1.1

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

	Instanc ID	Data length						
	Instanc ID	502	508	507	527	508-C06		
Input	100	200	392	196	196	128		
Output	101	134	262	130	128	86		
CONFIG	102	98	194	98	98	0		

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.

BNI EIP-502-105-XXXX, BNI EIP-507-005-Z040, BNI EIP-527-005-Z040

Byte	Slot	Module part	Description			
01	1	Module	General configuration for the entire module			
225	2 IO-Link port 0		Configuration of IO-Link port 0			
2649	3	IO-Link port 1	Configuration of IO-Link port 1			
5073	5073 4 IO-Link port 2		Configuration of IO-Link port 2			
7497	5	IO-Link port 3	Configuration of IO-Link port 3			

BNI EIP-508-105-XXXX

Byte	Slot	Module part	Description
01	1	Module	General configuration for the entire module
225	2	IO-Link port 0	Configuration of IO-Link port 0
2649	3	IO-Link port 1	Configuration of IO-Link port 1
5073	4	IO-Link port 2	Configuration of IO-Link port 2
7497	5	IO-Link port 3	Configuration of IO-Link port 3
98121	6	IO-Link port 4	Configuration of IO-Link port 4
122145	7	IO-Link port 5	Configuration of IO-Link port 5
146169	8	IO-Link port 6	Configuration of IO-Link port 6
170193	9	IO-Link port 7	Configuration of IO-Link port 7



Note

The BNI EIP-508-XXX-XXX-C06 has no configuration data. These are fixed and can not be changed.

Module Configuration	Byte		Bit							Description
BNI EIP-502-105-	â	7	6	5	4	3	2	1	0	
XXX	0	Р	3	P	2		-		-	Port function
	1	Р	7	Р	6		-		-	0x00: Standard I/O 0x01: IO-Link
Module Configuration	Byte		Bit						Description	
BNI EIP-508-105-	B	7	6	5	4	3	2	1	0	•
XXX	0	P3		P2		P1		P0		Port function 0x00: Standard I/O
	1	P7		P6		P5		P4		0x01: IO-Link
Module Configuration	yte				В	lit	Description			
BNI EIP-507-005-	ίΩ΄	7	6	5	4	3	2	1	0	
Z040, BNI EIP- 527-005-Z040	0	Р	3	P	2	F	P1	F	° 0	Port function
	1				Rese	erved				0x00: Standard I/O 0x01: IO-Link

Module Configuration BNI EIP-508-XXX-XXXX-C06

The IO-Link ports are always activated.

IO-Link Port Configuration	Byte	Bit								Description	
	8	7	6	5	4	3	2	1		0	•
	2	Ba	Basic Time Validation type				Cycle time				
	3						Validation type 0 No validation 1 compatible (VID + DID) 2 Identical (VID + DID + SerNum)				
	4				Vend	or ID 1					Vender ID
	5				Vend	or ID 2					Vendor ID
	6				Devid	e ID 1					Device ID
	7				Devid	e ID 2					
	8				Devid	e ID 3					
	9				Serial r	umber	1				
											Serial number
	24			5	Serial n	umber 1	6				
	25			Parameter server				Parameter server 0x8X Enable 0x0X Disable 0x40 Delete 0xX1 Enable upload 0xX2 Disable download			
		The d	ata of t	he oth	er IO-Li	nk ports	is stru	ctured	ider	ntica	lly and described in the following.

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				1	0	
	ne se			Multi	plier			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. **Identity**: manufacturer ID and device ID and serial number are compared to the IO-Link device data. The IO-Link communication is only started if there is a match.

Parameter Server Enable: data management functions enabled, parameter data and identification data of the IO-Link device are stored permanently. Disable: data management functions disabled, stored parameter data and identification data of the IO-Link device remain stored. Deleted: data management functions disabled, stored parameter data and identification data of the IO-Link device are deleted. Enable upload: If only the upload is enabled, the master always starts an upload of the parameter data. In this case, the upload is independent of the upload flag of the IO-Link device. If no data is stored in the Master Port, an upload likewise takes place. (e.g. after deleting the data or before the first data upload) Enable 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) Enable 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 i 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 upload flag is needed to overwrite already saved data in the parameter server with new the IO-Link Device 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-105-X015 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
Ī	245 (0xF5)	1 (0x01)	12 (0x0C)	0: disabled (default)
				1: enabled



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:

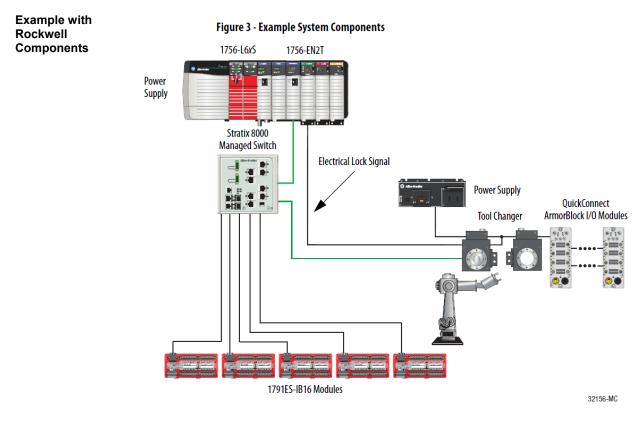
Class	Instance	Attribute	Value
245 (0xF5)	1 (0x01)	10 (0x0A)	0: disabled
			1: enabled(default)

Rockwell Automation Products that are Compatible with QuickConnect

Component	Supported Rockwell Automation Products
Controller	ControlLogix® controllers: • 1756-L6x • 1756-L7x GuardLogix controllers: • 1756-L6xS • 1756-L7xS 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 Page 13



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.

PLC Program	Add Application Logic	Run this logicThe logic example.	o inhibit and uninhibit QuickConnect I/O modules: ic in a periodic task with a recommended 10 ms update rate. amples shown configure two ArmorBlock I/O modules. code as needed to configure as many as 20 ArmorBlock I/O		
		IMPORTANT		•	
		Inhibit and Powe Add this logic to inh	r Down nibit and power down the Quid	ckConnect modules.	
		1. Rung 0: Inhib	oit the modules.		
		ArmorBlock Use a GSV (M	g a tool change, you must unin I/O modules mounted to the t Iode) instruction to monitor th (Mode) instruction per modul	ool before powering down. he present state of the modules	
		external input tool, this inpu	ndition to start the inhibit prod . For example, as the robot is tr It condition must be enabled. I nodules are inhibited and can p ules.	aveling back to change out the By the time the tool is being	
	Request_to_inhibt_CC_Modules CC_BlockONS.0	Get System Value Class Name Module Instance Name GC_ArmorElsokt Attribute Name Mode Dest QC_ArmorBlock1Mode 4 €	aC_ArmorBlock1Mode 2 OC_ArmorBlock1Mode 2	Set System Value Class Name Module Instance Name GC_ArmorBlock1 Attribute Name Mode Source GC_ArmorBlock1Mode 4 •	
	-	GSV Get System Vaue Class Name Module Instance Name QC_ArmorElock2 Attribute Name Mode Dest QC_ArmorBlock2Mode 4	2C_ArmorBlock2Mode 2QC_ArmorBlock2Mode 2QC_ 	StV Set System Value Chas Nome Module historice Name GO_AmocBiocl2 Attribute Name Mode Source GC_AmocBiocl2Mode 4 4	

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

#8 4 •

Power_Down_R

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.

Power_Down_Request	OSV	MIVIN .
	Get System Value	Masked Move
	Class Name Module	Source QC_ArmorBlock1CnonStatus
	Instance Name GC_AnnorBlock1	24576 €
	Attribute None EntryStatus	Mosk 16#r000
	Dest GC_ArmorBlock1CrosnStatus 24578 +	Dest QC_ArmorBlock1Status
	24570	24576 4
	EQU-	GC_Block1_inhibited
	Equal	GC_BIOCK1_Innibled
	Source AQC_AnnorBlock/1Status	
	24576 •	
	Source B QC_ArmorBlackInhibit	
	24576 🗧	
	GEV-	MV/M-
	Oct System Volue	Masked Nove
	Class Name Module	Source QC_ArmorBlock2CremStatus
	Instance Name _ QC_ArmorBlock2	24576 •
	Attribute Name EntryStatus	Meisk 16#1000
	Dest GC_AnnorBlock2CrearStatus 24578 •	Dest GC_ArmorBlock2Status
	24576	Dest GC_ArmorBlock2Status 24576 +
		21010
		00.00.00.00.00.00.00.00
	EQU-	QC_Block2_Inhibited
	Source A GC_AnnorBlock2Status	
	24576 €	
	Source B QC_ArmorBlockInhibit	
	24576 •	

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.

Powerup_Request
Lto_Inhibit_QC_Modules
Power_Down_Request

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

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.

Bectrical_Lock_Input	Powerup_Request	том	1	l
		Timer On Delay -(EN) Timer OC_ArnorBlackPowerUpTimer Preset 40000 -(DN)-		
		Accum 0.4	Π	ł

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.

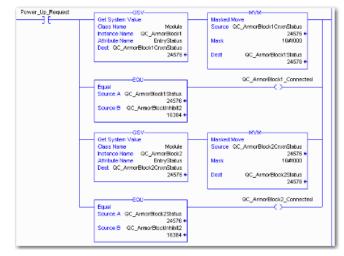
Ort: Then or Dol (Auto) OC_Block OC_Block Source A: OC_WinedDol/PowerUpTiner ACC_ O O Source B: OC_Block/Forward/of Time: 300 e		6C_AnocBickt Mode 2 Set System Value Class Name Mode Class Name Mode Protocol Name CC_AnocBickt Arbitude Name Mode Scaree CC_AnocHickt Mode 4
	Cell System Viais Cass Sterre Mode National Cass Sterre Mode National Cass Sterre Mode National Sterre Coll, America Sterre Altivuo Nene Octamendo La Dest Gol_Arma Biost2Mode Le	CC_Anactibe12Mode2 Set System Via.c Up and Net And

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	Class	Instance	Attribute	Value
Fault State	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 ou	tputs		
		•		

--

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.

IO-Link Device Para-	There are two options for configuring an IO-Link device connected to the IO-Link port.
meterization	Configuration via the web server

- 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.

D	NFUT_FUNCTION_MODULE1.Dedia(1).6	Message Message Control	MSC	4
1	NFUT_FUNCTION_MODULE1.Date(1)7	Message Message Control	MSO	

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].

Message Configuration - Get_10_Link_Para Configuration Communication Tag	neterizing		k 🕪			
Message Type: CIP Generic Service Custom Service 32 (Hex) Class: 96 (Hex)	Source Length: 10 Destination Lir	ink_Param_Write[0] 🗸	MSG	Parameteriz		
Instance: 1 Attribute: 3 (Hex)	1 _Interfac	e_Object_IO_Link_Param_Read	[0] <u>×</u> [1]	Data Type SINT SINT SINT	1	~
C Enable	OC U Interfac U Interfac U Interfac	e_Object_O_Link_Param_Read e_Object_O_Link_Param_Read e_Object_O_Link_Param_Read e_Object_O_Link_Param_Read e_Object_O_Link_Param_Read e_Object_IO_Link_Param_Read	3] 4] 5] 6] 7]	SINT SINT SINT SINT SINT SINT		>

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

cope: BRockwel_V20_1 Show: All Tags	V, interface_Object_Io
Name	=≘ △ Value + △
- INTERFACE_OBJECT_IO_LINK_WR	lund
+ INTERFACE_OBJECT_IO_LINK_WR[0]	16#4e
+ INTERFACE_OBJECT_IO_LINK_WR[1]	16#00
+ INTERFACE_OBJECT_IO_LINK_WR[2]	16#00
+ INTERFACE_OBJECT_IO_LINK_WR[3]	16#00
INTERFACE_OBJECT_I0_LINK_WR[4]	16#00
+ INTERFACE_OBJECT_IO_LINK_WR[5]	16#00
+ INTERFACE_OBJECT_IO_LINK_WR[6]	16#00
+ INTERFACE_OBJECT_IO_LINK_WR[7]	16#00
+ INTERFACE_OBJECT_IO_LINK_WR(8)	16#00
INTERFACE_OBJECT_IO_LINK_WR(9)	16#00
+ INTERFACE_OBJECT_IO_LINK_WR[10]	16#00
+ INTERFACE_OBJECT_IO_LINK_WR[11]	16#00
+ INTERFACE_OBJECT_IO_LINK_WR[12]	16#00
+ INTERFACE_OBJECT_IO_LINK_WR[13]	16#00
+ INTERFACE_OBJECT_IO_LINK_WR[14]	16#00
+ INTERFACE_OBJECT_IO_LINK_WR[15]	16#00
+ INTERFACE_OBJECT_IO_LINK_WR[16]	16#00
+ INTERFACE_OBJECT_IO_LINK_WR[17]	16#00 🥪
Monitor Tags Edit Tags	< >

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.

Configuration Communication Tag O Path: BNI_EIP_508_105_2015 Browse	V % V % V % •
BNI_EIP_508_105_2015 Broadcast: Communication Method CIP OH+ Channet: A Destination Link: CIP With Source Link: O O Destination Node: O O (Octal)	Message Path Browser Path: BNI_EIP_508_105_2015 BNI_EIP_508_105 BNI_EIP_508
Connected Cache Connection Cache Connection Cache Connection Cache Connection Cache Connection Cache Connection Cache Cache Connection Cache Cache Connection Cache Cac	-

 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).

Main · GET_SET_A	tribute IO Link Message Configuration - SET_ATTRIBUTE_EIP_IO_LINK	×	Controller Tags - Rockwell_V20_11_Freigabetest(contro	
	Configuration Communication Tag		Scope: BRockwel_V20_1 Show: All Tags	V V, interface_Object_Io
0 INPUT_FU	Metsage Type: CIP Breneic Service Cuttom Source Lement: [NTERFACE_0BJECT w Type: Source Length Service 32 (Hee) Class: 96 (Hee) Destination INTERFACE_0BJECT w		None 581c HINTERFACE_OBJECT_JO_LINK_WR HINTERFACE_OBJECT_JO_LINK_WR[0) HINTERFACE_OBJECT_JO_LINK_WR[0] HINTERFACE_OBJECT_JO_LINK_WR[0] HINTERFACE_OBJECT_JO_LINK_WR[3] HINTERFACE_OBJECT_JO_LINK_WR[3] HINTERFACE_OBJECT_JO_LINK_WR[5] HINTERFACE_OBJECT_JO_LINK_WR[5] HINTERFACE_OBJECT_JO_LINK_WR[6] HINTERFACE_OBJECT_JO_LINK_WR[6] HINTERFACE_OBJECT_JO_LINK_WR[8] HINTERFACE_OBJECT_JO_LINK_WR[8]	Volue • • • • • • • • • • • • • • • • • • •
(End)	C Enable C Enable Walling C Start Done Length: 1 C Eno Code: Extended Eno Code: Tried Out Eno Park Eno Text OK Abbrechen Utbernehmen Hille		HINTERPACE_OBJECT_JO_LINK_WR[10] HINTERPACE_OBJECT_JO_LINK_WR[11] HINTERPACE_OBJECT_JO_LINK_WR[12] HINTERPACE_OBJECT_JO_LINK_WR[13] HINTERPACE_OBJECT_JO_LINK_WR[14] HINTERPACE_OBJECT_JO_LINK_WR[19] HINTERPACE_OBJECT_JO_LINK_WR[19]	16800 16800 16800 16800 16800 16800 16800
GET_SET_Atribut	e_l0_Link		+ INTERFACE_OBJECT_IO_LINK_WR[17]	16#00 🗸

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

Message Path Browser
Path: BNI_EIP_508_105_2015
BNI_EIP_508_105_2015
ETHERNET-MODULE BNL EIP 202 105 ; ETHERNET-MODULE DNL EIP 508 105 ; ETHERNET-MODULE FILM 6



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 200 bytes. Take a look at the tables below for the allocation of the process data inputs.

BNI EIP-502-105-Z015

Byte	Module part	Description				
07	Standard I/O ports	Process data inputs at the standard inputs				
855	IO-Link port 1	Process data inputs at IO-Link port 1				
56103	IO-Link port 2	Process data inputs at IO-Link port 2				
104151	IO-Link port 3	Process data inputs at IO-Link port 3				
152199	IO-Link port 4	Process data inputs at IO-Link port 4				

BNI EIP-508-105-Z015

Byte	Module part	Description
07	Standard I/O ports	Process data inputs at the standard inputs
855	IO-Link Port 0	Process data inputs at IO-Link port 0
56103	IO-Link port 1	Process data inputs at IO-Link port 1
104151	IO-Link port 2	Process data inputs at IO-Link port 2
152199	IO-Link port 3	Process data inputs at IO-Link port 3
200247	IO-Link port 4	Process data inputs at IO-Link port 4
248295	IO-Link port 5	Process data inputs at IO-Link port 5
296343	IO-Link port 6	Process data inputs at IO-Link port 6
344391	IO-Link port 7	Process data inputs at IO-Link port 7

Standard Input Data

BNI EIP-502-105-Z015 and BNI EIP-508-105-Z015

Byte	Bit								Description
B	7	6	5	4	3	2	1	0	Description
0	132	134	122	124	I12	114	102	104	Input data $104 \rightarrow Input at port 0, pin 4$
1	172	174	162	164	152	154	142	144	The result is 0 only if the port is configured as an IO-Link port.
2	S	3	S2 S1 S0		S1		S0		Short-circuit status
3	S	7	S	6	S	5	S	4	Short-circuit between pin 1 and 3 at the registered port
4	O32	O34	O22	O24	012	014	O02	O04	Overload status
5	072	074	O62	O64	O52	O54	O42	O44	O04 → Overload at port 0, pin 4 Only if the port is configured as an output.
6	0	0	0	0	0	NA	PS	PA	Status of the power supply NV: No actuator power supply PS: Power supply for sensor PA: Power supply for actuator
7	0	0	0	0	0	0	0	0	Reserved

7 Process Data

Byte	Bit								D	escription		
	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 IC DC: Device co 0: Reserved			
41	SC	SC 0 0 0 0 PDI DF VF				VF	IO-Link error VF: Validation SC: IO-Link sh DF: Data stora PDI: Process of	nort-circuit age validation failed				
42				Vend	or ID 1				Vendor ID			
43				Vend	or ID 2							
44				Devic	e ID 1							
45				Devic	e ID 2				Device ID			
46			-	Devic	e ID 3							
47	N	lode		Туре			0			Mode:		
48				Event c					Event 1	0: Reserved		
49				Event of	ode lov	N				1: Event single sho		
50							l	2: Event disappear				
51	Event code high						Event 2	3: Event appears Type:				
52	Event code low							0: Reserved				
53	N	lode		Туре	<u> </u>		0		4	1: Notification		
54				Event c	ode hig	jn			Event 3	2: Warning		
55				Event of	ode lov	N				3: Error		
	The	data of	the oth	er IO-L	ink port	s are s	tructure	ed ident	ically and descri	bed in the following.		

IO-Link Input Data BNI EIP-502-105-Z015 and BNI EIP-508-105-Z015

7 Process Data

7.2. Process Data Outputs

The output data size is 134 bytes. Take a look at the tables below for the allocation of the process data outputs.

BNI EIP-502-105-Z015

Byte	Module part	Description					
05	Standard I/O ports	Process data outputs at the standard inputs					
637	IO-Link port 1	Process data outputs at IO-Link port 1					
3869	IO-Link port 2	Process data outputs at IO-Link port 2					
70101	IO-Link port 3	Process data outputs at IO-Link port 3					
102133	IO-Link port 4	Process data outputs at IO-Link port 4					

BNI EIP-508-105-Z015

Byte	Module part	Description
05	Standard I/O ports	Process data outputs at the standard inputs
637	IO-Link Port 0	Process data output at IO-Link port 0
3869	IO-Link port 1	Process data output at IO-Link port 1
70101	IO-Link port 2	Process data output at IO-Link port 2
102133	IO-Link port 3	Process data output at IO-Link port 3
134165	IO-Link port 4	Process data output at IO-Link port 4
166197	IO-Link port 5	Process data output at IO-Link port 5
198229	IO-Link port 6	Process data output at IO-Link port 6
230261	IO-Link port 7	Process data output at IO-Link port 7

Standard Output Data

Byte				В	Description				
Byte	7	6	5	4	3	2	1	0	Description
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-
1	072	074	O62	O64	O52	O54	O42	O44	Link port, the port has to be configured as an output.
2	R32	R34	R22	R24	R12	R14	R02	R04	Restart
3	R72	R74	R62	R64	R52	R54	R42	R44	Restart of the output after a short-circuit is detected
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				В	Description				
Буге	7	6	5	4	3	2	1	0	Description
637									IO-Link port 0 output data
	The data of the other IO-Link ports are structured identically and described in the following.								

8 Display

8.1. General

With the implemented display, the address is output directly to the devices BNI EIP... The following address types are possible:

IP address

•

6

- Subnet mask
- Gateway address
- Each address is composed of 4 octets.

The display also shows information about the hardware and firmware update. The display has a locking function that can be enabled from the control panel. If the lock is set, no more editing can be done (see bit layout, Chapter 6.2 Standard output data).

8.2. Address Specifications
 IP address:
 192.168.1.1

 Subnet mask:
 255.255.255.0

 Gateway address:
 192.168.1.1

8.3. Control and Display

8.4. Display

Information

IP 5 SN 1 GW 3 2 1 0 1 Display 4 Address type cursor 2 Arrow key 5 "Set" key 6 LED 3 Octet cursor Cursor for selecting the address type IP SN G٧ 3 2 1 0

Cursor for selecting the octet

- IP: IP address SN: Subnet address GW: Gateway address
- 3: First octet 2: Second octet 1: Third octet 0: Fourth octet

1

2

3

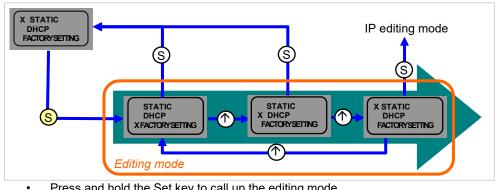
8 Display

8.5. Design and	In the following flow charts, some symbols are used	to describe the display functionality:						
Symbols	Current status							
	Switch							
	S Condition: Briefly press the Set ke	Condition: Briefly press the Set key						
	S Condition: Press and hold the Set	t key (at least 3 seconds)						
	Condition: Briefly press the arrow	key						
8.6. Startup	C							
	BALLUFF	ALLUFF						
	Module name	BNI EIP-508- 105-Z015						
	Hardware and firmware update	VERSION H W : 1.0 S W : 1.0						
	Current IP	IP 192.168. 015.005						
	Current subnet mask	Subnet 255.255. 255.000						
	Current gateway address	Gateway 000 . 000 . 000 . 000						
8.7. Main Menu	Standard view 4th octet of the IP address	007						
	Menu: Network Config	Network Config						
	Menu: IP Setup	IP SETUP						
	Menu: Module Information	MODULE INFO						
	 Press the Set key briefly to scroll through the Press the arrow key to open the menu 	ne main menu.						

• Press the arrow key to open the menu.

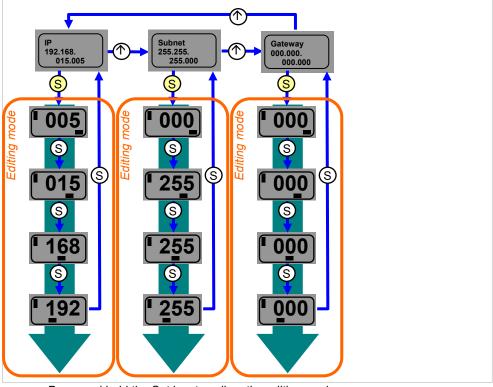
8 Display

8.8. IP Setup



Press and hold the Set key to call up the editing mode. The preferred value is configured by briefly pressing the arrow key.

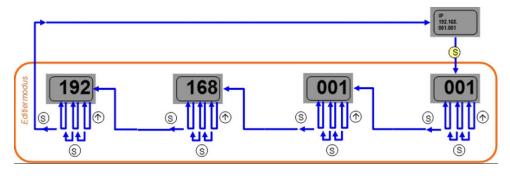




- Press and hold the Set key to call up the editing mode.
- The preferred value is configured by briefly pressing the arrow key.
 - Press and hold the arrow key to call up the fast program mode.
 - Briefly pressing the Set key saves the entered value and scrolls to the next octet. The 4th octet represents the beginning of the editing process.
 - The completely entered address is saved by briefly pressing the Set key when editing the first octet. The entered value appears right afterwards in the IP overview display.
 - Manual changes to IP, subnet or gateway lead to an automatic change of the IP setup to "static".

8 Display

8.10. Edit mode



In the Network Configuration menu, select IP / Subnet or Gateway Address. Press the set button long to switch to edit mode. •

- •
- Press the arrow key briefly to change the number. ٠
- Press the Set button briefly to move to the next position. •
- After the last digit, press the set button briefly to move to the next octet of the address or to accept the new number after the last octet.

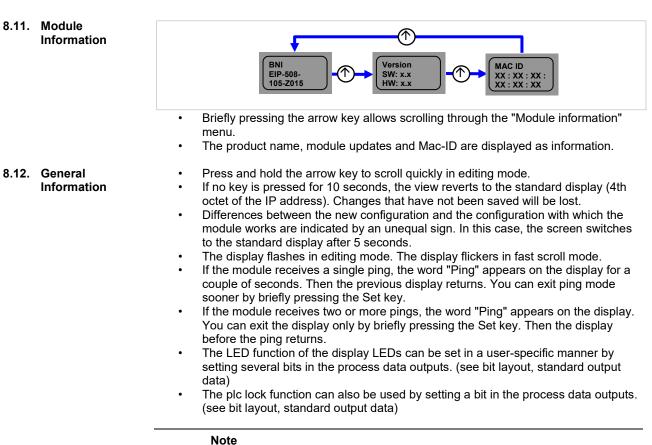


•

Note

The module has to be restarted to work with the new configuration.

8 Display



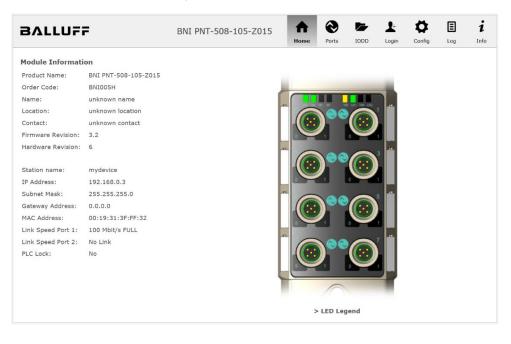
i

You cannot select editing mode in the display if the plc lock is set in the process data inputs by a bit (see bit layout, standard output data)

9.1. General The BNI fieldbus module contains an integrated web server for retrieving detailed device information and for configuring the device.

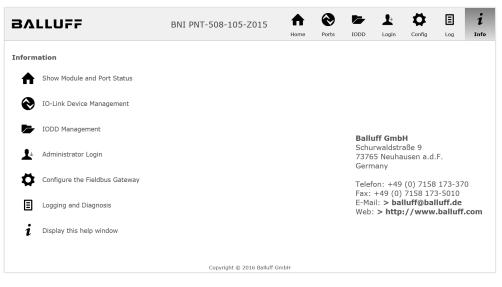
To use the web interface you must first ensure that the module has been correctly integrated into your network. In addition the IP subnet of the BNI module must be accessible from the PC on which the browser is running. For the supported web browsers, please refer to the corresponding data sheet.

For open a connection with the web server, enter the IP address of the module in the address line of the browser. The homepage then appears with the essential device information.



9.2. Navigation / Info The navigation bar is located in the upper area of the window, which allows you to switch between the various dialogs of the web interface. To do this click on the corresponding icon.

When the "Info" tab is selected the following overview appears:



The "BALLUFF" logo at upper right links to the international Balluff homepage.

9.3. Login/Logout To make configuration settings on the fieldbus module using the web interface, you must first log in. Functionalities which cannot be used without logging in are indicated by the grayed out buttons.

The default password is:		
BNI PNT-XXX-XXX-XXXX	"BNIPNT"	
BNI EIP-XXX-XXX-XXXX	"BNIEIP"	
BNI ECT-XXX-XXX-XXXX	"BNIECT"	

The password cannot be changed!



After successfully logging in the dialogs are shown as follows:

BALLUFF	BNI PNT-508-105-Z015	h Home	Ports	IODD	Logout	Config	E	i Info
User Login	Logout Successfully logged in.							

Use the "Logout" button to log out again. After 5 minutes of no interaction with the Webserver the user is automatically logged out.



For security reasons the fieldbus module shows only one login at a time with configuration access. Reading (without logging in) is however possible from multiple PCs at the same time on the fieldbus module.

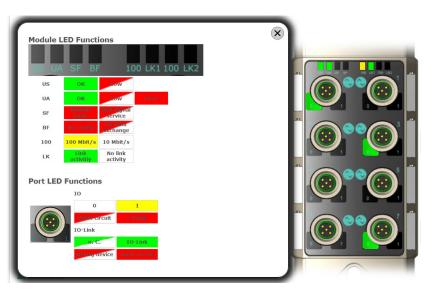
9.4. "Home" dialog Under "Home" you are given the essential information about the fieldbus itself and its network activity. You are also shown whether the configuration block was enabled by the controller (PLC).

Information is also shown about the current process data and the status of the module via the corresponding LEDs. After selecting "LED Legend" a Help dialog appears which explains the meaning of the LEDs.

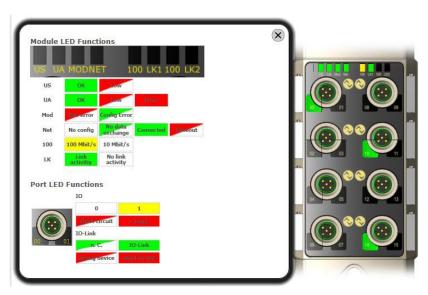
If an IO-Link device is connected to one of the configured IO-Link terminals, some of the device data will be displayed in addition to the module data in the form of a link. After selecting one of these links the corresponding device dialog is opened.



PNT:



EIP:



9.5. "Ports" dialog

The "Ports" dialog displays information and process data for the connected IO-Link devices. Select the desired IO-Link Port in the image of the fieldbus module on the right side to see the device data.



Note The IO-Link device data are only displayed if the port is also configured as an IO-Link port!

No appropriate IODD uploaded It is possible to read and write the configuration parameters of the IO-Link device via the "Parameters" option. The parameter indexes and subindexes of the IO-Link device are described in the corresponding separate user's guide (and follow the IO-Link conventions).

Under "Events" you can see whether a diagnostic event from the IO-Link device exists.

Under "Parameter Server Content" you can view the content of the parameter server if parameter data is stored on the parameter server.

BALLUF	F	BNI P	NT-508-105-Z015	And Home	Ports	IODD	Logout	Config	E	i Info
IO-Link Device Pro Identification Data Vendor ID:	operties (Port 0)									
Device ID: Vendor Name: Vendor Text: Product Name: Product ID: Product Text: Serial Number: Hardware Revision: Firmware Revision:	0x050D20 BALLUFF www.balluff.com BNI 10L-302-002-2046 BNI00AU Sensor/Actor hub M8 7A 69 68 67 6A 68 73 0 1 1.0 2016/03/08 09:05:	5C 66 61 6A 6	8 F6 64 6C 75							
Application specific tag: Process Data Inputs (hex): Outputs (hex):	20 00 00 00									
Parameters Index: Subindex: Data (hex): Result:	Read Write	Apply	Clear							
Events Current Event:	Secondary supply volta	ige fault (Port	: Class B) - Check tolerance	2						
Parameter server of Vendor ID (hex): Device ID (hex): Checksum (hex): Content (hex):	ontent 00 00 00 00 00 00 00 00 (none)									

"Ports" dialog with direct parameter access

Appropriate IODD If an IODD appropriate to the IO-Link device connected to the currently selected port has been uploaded (see "Dialog "IODD"), the normal dialog for "Process Data" and "Parameters" is not displayed, but rather an expanded dialog. Information from the IODD of the device is used so that the data can be better understood.

Thus in the following screenshot not only are the input data of the distance sensor displayed as a hex number, but also interpreted and labeled under "Input". Since the sensor has no parameters, none are displayed.

BALLUF	F	BNI PNT-508-105-Z015	Home	Ports		Logout	Config	E	i Info
IO-Link Device Pr Identification Data Vendor ID: Device ID: Vendor Name: Vendor Text: Product Name: Product ID: Product Text: Serial Number: Hardware Revision	0x0378 0x020101 BALLUFF www.balluff.com BAW M18MI-BLC50B-5040 153938 Inductive distance sensor		Home	Ports	1000	(
Firmware Revision: Application specific tag: Process Data Inputs (hex): Outputs (hex): Input	1.01 00 03 FF no outputs)
Distance absolute Reserved bits Events						1023 0			
Current Event: Parameter server Vendor ID (hex): Device ID (hex): Checksum (hex): Content (hex):	no Event content 00 00 00 00 00 00 00 00 00 (none)								

Dialog "Ports": IODD interpretation and device image

i

If the IODD of the IO-Link device on the currently selected port has parameters, these are shown in table format (see following screenshot). In this example the parameters for the Balluff Smart Light are shown.

The Smart Light is a signal light which can be used in three different modes. These modes can be set using an IO-Link parameter. The parameter values and associated texts are stored in the IODD.

This means "Operation Mode" can be read out and displayed ("Read" and "Read All" buttons) or written to the device ("Write" button).

If subindexes have no buttons they cannot be individually processed but rather only the entire index at once.

Note Each changed value must be individually written by clicking on the "Write" button!

Paramo	eters			
				Read All
64 (0)	Operating mode (rw)	Segment mode 🔻	Write	Read
65 (0)	Number of segments (rw)	One segment 👻	Write	Read
66 (0)	Type of level indicator (rw)	Bottom-up 👻	Write	Read
67 (0)	Resolution of level indicator (rw)	8 bit 🝷	Write	Read
68 (0)	Level mode, segment 1 (rw)	See child elements		
68 (1)	Level mode, segment 1 color	Off •	Write	Read
68 (2)	Level mode, segment 1 dominance	$\ensuremath{\mathbb O}$ Color is not dominant $\ensuremath{\mathbb O}$ Color is dominant	Write	Read
69 (0)	Level mode, segment 2 (rw)	See child elements		
69 (1)	Level mode, segment 2 color	Off •	Write	Read
69 (2)	Level mode, segment 2 dominance	$\ensuremath{\mathbb O}$ Color is not dominant $\ensuremath{\mathbb O}$ Color is dominant	Write	Read
70 (0)	Level mode, segment 3 (rw)	See child elements		
70 (1)	Level mode, segment 3 color	Off •	Write	Read
70 (2)	Level mode, segment 3 dominance	$\ensuremath{\mathbb O}$ Color is not dominant $\ensuremath{\mathbb O}$ Color is dominant	Write	Read
71 (0)	Level mode, segment 4 (rw)	See child elements		
71 (1)	Level mode, segment 4 color	Off •	Write	Read
71 (2)	Level mode, segment 4 dominance	Color is not dominant Color is dominant	Write	Read

"Ports" dialog: Parameter list of an IO-Link device with uploaded IODD

9.6. "IODD" dialog Using this dialog you can transfer IODDs (device description files for IO-Link devices) and the associated device images to the fieldbus module, so that a detailed representation of the connected IO-Link devices in the "Ports" dialog is possible.

When IO-Link devices are connected and IO-Link ports are activated, the dialog shows a table with information about the IO-Link devices.

The fieldbus module file system supports only device names in "8+3" format, i.e. with a restricted name length. Since IODD files are generally published with a long file name, these must be renamed and given a shorter naming scheme on the PC before uploading to the fieldbus module.

For this a help setting is provided in the dialog, with the associated required IODD file name for the currently connected IO-Link devices shown in the bottom section of the list (column IODD Filename).

Image files without IODD can also be uploaded; the images are still displayed in the "Ports" dialog.

BALL	UFF		BNI	PNT-508-	105-Z01	5	\odot		1	₽	∃	i
						Home	Ports	IODD	Logout	Config	Log	Info
IODD Mana	igement				Inf	ormation						
Device	Picture	Picture This module										
BA050A01.xi	mI X	Delete	names in 8.3 convention. Please rename your IODDs a the suggested filename in the table below.						accordin	ig to		
BA020101.xr	ml X	Delete			The	suggested filena	me is ge	nerated a	cording to	following	rule:	
BA050D20.x	ml X	Delete				The first two	characte	rs of the fi	le name a	re the first	two lett	ers of
Choose the IODD to upload: Choose the IODD to upload: Durchsuchen						DeviceI						
Upload					Not	e that the filenar	ne must	contain th	e DeviceID	that is in	the IODE	file!
Currently c	onnected	I IO - Link Device	es:									
Currently c Vendor Nan				Vendor ID	Device ID	IODD Filename	9					
-	ne Produc		Product ID	Vendor ID 0000	Device ID 050D20	IODD Filename BA050D20.xml	•					
Vendor Nan	ne Produc BNI IO	t Name	Product ID BNI00AU				9					

Using the "Delete" button you can delete IODDs and device images from the fieldbus when needed.



Note

Before selecting the IODD it must be renamed on the PC to the file name which is shown in the table in the "IODD Filename" column!

9.7. "Config" dialog The configuration page enables configuration of the module. You can change both the module information texts and the port configuration. The "Set Ports" action is not permanently stored in the device and is lost after the next reboot

or reset.

PNT / ECT:



EIP:

BALLUFF	BNI EIP-508-105-Z015	♠ Home	Ports	IODD	Logout	Config		i Info
Module Configuration	Port Configuration							
Balluff GmbH		-	_		-			
Location:	Pin		Alar Int 12	UCT 105. LK2		Pin		
Schurwaldstraße 9	Mode IO Link V				4	Digital Inpu		Mode
Contact:)			Digital Inpu		~
+49 (0) 7158 173			01	08	9	Digital Inpu	VOutput	~
O DHCP Client Static IP	Digital Input/Output					IO Link Digital Inpu	t/Output	>
IP Address: 192	Digital Input/Output					Digital Inpu	t/Output	~
255 .255 .255 .0		2				Digital Inpu		~
Gateway Address:		CH C	65	12	3			
		-			-			
	Digital Inpat Satpat	4) 🗠 🗠			IO Link		~
O Factory IP	Digital Input/Output 🗸			U	2	Digital Inpu	t/Output	~
IP Address: 192.168.1.1				-				
Subnet Mask: 255.255.255.0			0					
Gateway Address: 192.168.1.1								
In order to change the IP adress, it's necessary to reboot the module after saving the configuration.								
Save Configuration								
Reboot Factory Reset	Set Ports							

The parameter set "Module Configuration" on the left side is used by clicking "Save Configuration" and permanently stored in the device. The "Reboot" button reboots the device as if the power to the module had been turned off

and on again.

Clicking on "Factory Reset" deletes the configuration and log files saved in the device and then performs a reboot, so that the device is restored to the default factory configuration as on delivery.

9.8. "Log" dialog

This dialog provides general service information about the device as well as a logging function.

The upper table (see screenshot below) contains important information for all service inquiries.



If you have a detailed question about a specific situation, send us a screenshot of this Website or print the site as a PDF.

Logging shows events which have occurred in chronological order. This provides a tool for detailed troubleshooting in equipment.

ЯЛL	LUFF		BNI PI	NT-508-105-	Z015	h Home	Ports	IODD	Logout	Config	E	1 In
Inform	nation											
Produ	ct name:	BNI PNT-508-105-Z015	Bi	rowser time:	2016-12-3	16 10:26:	29.495					
Firmw	are revision:	3.2	S	stem uptime:	50 secs 29	91 msecs						
MAC a	address:	00:19:31:3F:FF:02	Fr	ee flash space:	1720 KB							
IP add	Iress:	192.168.0.10	W	eb version	2.0.113							
Brows	ser version:	Firefox 50.0										
Log							Set mod	ule time	Clea	r Log	Update I	Loa
9									0.00	209	opuller	209
No.	Severity	Date		Origin				Messag	le			
0	Notice	2000-01-01 00:0	0:00.404	SYS	Syster	m startup	(Oct 6 2	016, 11:54	:01)			
1	Notice	2000-01-01 00:0	0:00.437	SYS	Set M/	AC addres	s: 00:19	:31:3F:FF:	02			
2	Notice	2000-01-01 00:0	0:00.493	IOL_MASTE	R IO-Lin	k Master :	started					
3	Informatio	nal 2000-01-01 00:0	0:00.501	IOL_MASTE	R FW ve	rsion 1.2.	.8					
4	Notice	2000-01-01 00:0	0:01.999	ETH	Port 1	: Link Up	(100 MBi	t/s, full du	olex)			
5	Notice	2000-01-01 00:0	0:37.926	WEB_IF	Login	successfu	ıl, IP addr	ess: 192.1	68.0.50			
6	Error	2000-01-01 00:0	0:41.902	IOL_MASTE	R Port 0	: Device d	lisconnec	ted				
7	Error	2000-01-01 00:0	0:42.272	IOL_MASTE	R Port 1	: Device d	lisconnec	ted				
8	Error	2000-01-01 00:0	0:42.981	IOL_MASTE	R Port 3	: Device d	lisconnec	ted				
9	Notice	2000-01-01 00:0	0:43.169	IOL_MASTE	R Port 2	: ISDU re	ad error:	Error code	80 Addit	ional Code	e 11	
10	Notice	2000-01-01 00:0	0:43.347	IOL_MASTE	R Port 2	: ISDU re	ad error:	Error code	80 Addit	ional Code	e 11	
11	Warning	2000-01-01 00:0	0:43.347	IOL_MASTE	R Port 2	: BNI IOL-	-101-S01	-K018 con	nected			
12	Notice	2000-01-01 00:0	0:44.145	IOL_MASTE	R Port 4	: ISDU re	ad error:	Error code	80 Addit	ional Cod	e 11	
13	Error	2000-01-01 00:0	0:44.183	IOL_MASTE	R Port 5	: Device d	lisconnec	ted				
14	Warning	2000-01-01 00:0	0:44.499	IOL_MASTE	R Port 4	: BNI IOL-	-801-000	-Z036 con	nected			
15	Error	2000-01-01 00:0	0:44.830	IOL_MASTE	R Port 6	: Device d	lisconnec	ted				
16	Error	2000-01-01 00:0	0:45.200	IOL_MASTE	R Port 7	: Device d	lisconnec	ted				

Events are classified using the "Severity" column:

Internal Error (Emergency, Alert, Critical)

→ The fieldbus module has detected a fault in itself (hardware or software) which should not occur during normal operation. If this happens, the module must be serviced or replaced.

External Error (Error, Warning)

→ The fieldbus module has detected what may be a non-permissible event which is affecting the module from the outside. The system may require troubleshooting.

Event (Informational, Notice)

The fieldbus module has detected an important normal operating event and reports it. These may include for example configuration actions over the web interface and other configuration interfaces which are also recorded.

Clicking on "Set Module Time" sends the current browser time to the fieldbus module but does not permanently store it. After a reset, reboot or loss of power the time begins to run again from the year 2000.

Clicking on "Update Log" refreshes the display, and "Clear Log" deletes all entries. The log entries are stored in a ring buffer.

10 Appendix

10.1. Scope of Delivery	 The BNI EIP comprises the following element IO-Link block 4x M12 dummy plugs Ground strap M4x6 screw 20 informational signs 	nts:
10.2. Order Number	Balluff Network Interface	BNI EIP-50x-105-Z015
	Ethernet IP ———————————————————————————————————	
	502 = IP 67 IO-Link master module, 4 IO-L 508 = IP 67 IO-Link master module, 8 IO-L	
	Versions 105 = display version, 2-port switch	
	Mechanical version Z015 = Die cast zinc housing Data transmission: 2 x M12x1 inte Power supply: 7/8" external thread Sensor connections: 8 x M12x1 in	l, 7/8" internal thread
10.3. Ordering	Product order code	Order code
Information	BNI EIP-502-105-Z015 BNI EIP-508-105-Z015	BNI004A BNI006A
		Diffeoort

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