BALLUFF

BNI IOL-309-002-Z019

IO-Link 1.1 sensor/actuator hub with extension port

User's Guide

Contents

1 User Instructions 4
1.1. About This Manual 4
1.2. Structure of the Manual 4
1.3. Typographical Conventions 4
Enumerations 4
Actions 4
Syntax 4
Cross-references 4
1.4. Symbols 4
1.5. Abbreviations 4
1.6. Differing views 4

2 Safety 5
2.1. Intended use 5
2.2. Installation and Startup 5
2.3. General Safety Notes 5
2.4. Resistance to Aggressive Substances 5
Dangerous voltage 5

3 First Steps 6
3.1. Connection Overview 6
3.2. Mechanical Connection 7
3.3. Electrical Connection 7
Functional ground 7
IO-Link connection 7
Connecting the sensor hub 8
Module variants 8
Sensor/actuator interface 8
Extension port 8

4 General Configuration 9
4.1. Extension port 9
Extension port configuration 55_{hex} 9
Setting the serial number 54_{hex} 9

5 Configuration: "Extension Off" 10
5.1. IO-Link Data 10
5.2. Process Data Input 10
5.3. Process Data Ouput 10
5.4. Parameter Data/Demand Data 11
Parameter Data/Demand Data 11
Inversion of the inputs 40_{hex} 12
Configuration In-Outputs 41_{hex} 12
Safe state of Outputs 42_{hex} 12
Voltage monitoring 44_{hex} 14
Monitoring the outputs 45_{hex} 14

6 Configuration: extended with BNI IOL-102-002-Z019 15
6.1. IO-Link Data 15
6.2. Process Data/Input Data 15
6.3. Process Data/ Output Data 16
6.4. Parameter Data/Demand Data 17
Parameter Data/Demand Data 17
Inversion of the inputs 40_{hex} 18
Configuration In-/Output 41_{hex} 18
Safe state of Outputs 42_{hex} 19
Safe state of the outputs on Pin 4 42_{hex} 19
Voltage monitoring 44_{hex} 20
Monitoring the outputs 45_{hex} 20
Setting the serial number 54_{hex} 20

7 Diagnosis **21**
7.1. Error Codes/ Errors **21**
7.2. Events **21**

8 IO-Link Functions **22**
8.1. IO-Link Version 1.0 / 1.1 **22**
8.2. Data Storage **22**
8.3. Block Configuration **22**
8.4. Resetting to Factory Settings **22**

9 Technical Data **23**
9.1. Dimensions **23**
9.2. Mechanical Data **23**
9.3. Electrical Data **23**
9.4. Operating conditions **23**

10 Function Indicators **24**
10.1. Function Indicators **24**
LED-Indicators module status 24
Digital LED indicators for inputs/outputs 25
Extension port 25

11 Appendix **26**
11.1. Type Code **26**
11.2. Ordering Information **26**

1 User Instructions

1.1. About This Manual

This manual describes the Balluff IO-Link I/O module, also called a sensor/actuator hub. The IO-Link protocol is used to link to the higher-level master module.
In terms of function, this compact, cost-effective module is similar to a passive splitter box; it records digital and analog sensor signals and transmits them over the IO-Link interface. It passes control signals coming over IO-Link to the connected actuators.

1.2. Structure of the Manual

The manual is organized so that the sections build on one another.
Chapter 2: Basic Safety Information.
……..

1.3. Typographical Conventions

The following typographical conventions are used in this manual.

Enumerations

Enumerations are shown as a list with an dash.

- 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.
  - ↳ Action result.
- ➢ Action instruction 2.

Syntax

Numbers:
Decimal numbers are shown without additional indicators (e.g. 123).
Hexadecimal numbers are shown with the additional indicator hex (e.g. 00_{hex}).

Cross-references

Cross-references indicate where additional information on the topic can be found.

1.4. Symbols

Attention!
This symbol indicates a safety instruction that must be followed without exception

Note
This symbol indicates general notes.

1.5. Abbreviations

BNI	Balluff Network Interface
DPP	Direct Parameter Page
I/O port	Digital input/output port
EMC	Electromagnetic compatibility
FE	Function Earth
IOL	IO-Link
LSB	Least Significant Bit
MSB	Most Significant Bit
SPDU	Service Protocol Data Unit

1.6. Differing views

Product views and images in this manual may differ from the product described. They are intended to serve only as illustrations.

2 Safety

2.1. Intended use

The BNI IOL-… acts as a decentralized input/output sensor module, which is connected to a higher-level IO-Link master module through an IO-Link interface.

2.2. Installation and Startup

Attention!
Installation and startup must only be carried out by trained technical personnel. Qualified personnel are people who are familiar with installation and operation of the product and have the necessary qualifications for these tasks. Any damage resulting from unauthorized tampering or improper use voids the manufacturer's guarantee and warranty. The operator must ensure that appropriate safety and accident prevention regulations are observed.

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 is dependent upon proper functioning of the device.
Authorized personnel
Installation and startup must only be carried out by trained technical personnel.
Intended use
Warranty and liability claims against the manufacturer are rendered void by:

- Unauthorized tampering
- Improper use
- Use, installation or handling contrary to the instructions provided in this user's guide

Obligations of the operating company
The device is a piece of equipment in accordance with EMC Class A. This device can produce RF noise. The operator must take appropriate precautionary measures. The device may only be used with an approved power supply. Use only approved cables.
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 maintenance, disconnect the device from the power supply.

Note
In the interests of product improvement, Balluff GmbH reserves the right to change the technical data of the product and the content of this manual at any time without notice.

3 First Steps

3.1. Connection Overview

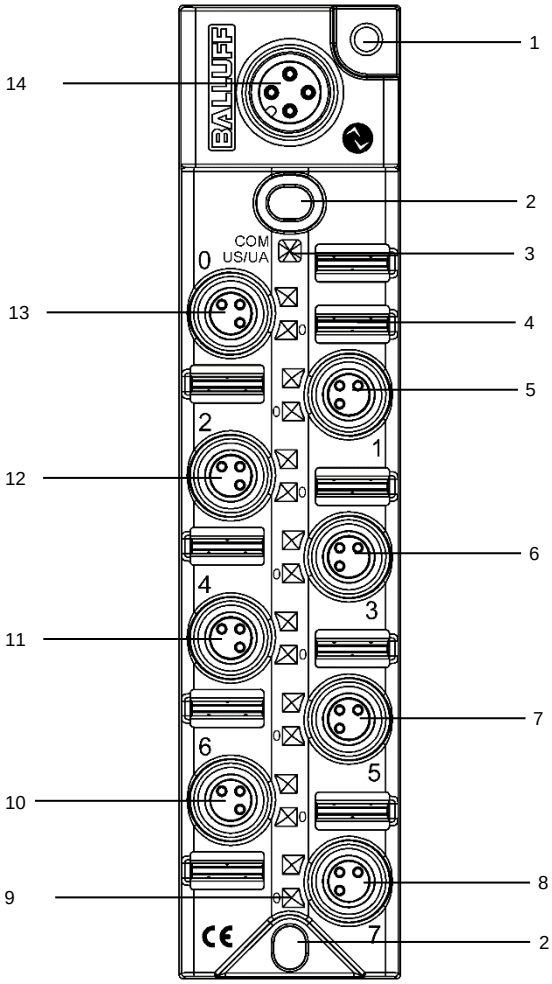


Figure 3-1: Connection overview BNI IOL-309-002-Z019

1 Ground connection
2 Mounting hole
3 Status LED: communication
4 Label
5 Port 1
6 Port 3
7 Port 5
8 Port 7, extension port
9 Pin/Port LED: signal status
10 Port 6
11 Port 4
12 Port 2
13 Port 0
14 IO-Link interface

3.2. Mechanical Connection

The BNI IOL modules are attached using 2 max. M4 screws and 2 washers.

3.3. Electrical Connection

The BNI IOL-309-002-Z019 modules do not require a separate supply voltage connection. Supply voltage is provided via the IO-Link interface and the higher-level IO-Link master module.

Functional ground

The modules are equipped with a ground connection.

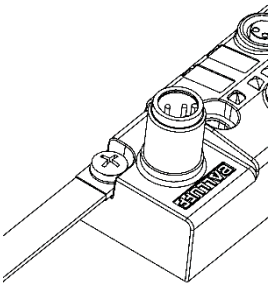


Figure 3-3: BNI ground connection IOL-309...

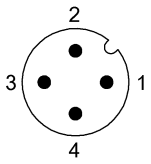
- Connect the sensor hub module to the ground connection.

Note
The functional ground connection from the housing to the machine must have low-impedance and be kept as short as possible.

IO-Link connection

The IO-Link connection is established via an M12 connector (A-coded, male).

IO-Link (M12, A-coded, male)



Pin	Function
1	Supply voltage for controller US, +24 V
2	Supply voltage actuator UA, +24 V
3	GND, reference potential
4	C/Q, IO-Link data transmission channel

3 First Steps

Connecting the sensor hub

- Connect ground conductor to the functional ground connection, if available.
- Connect the incoming IO-Link cable to the sensor hub.

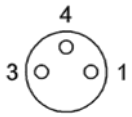
Note
A standardized sensor cable is used to connect to the higher-level IO-Link master module. Maximum length of 20 m.

Module variants

Sensor hub variants	Digital port
BNI IOL-309-002-Z019	IN / OUT

Sensor/actuator interface

Standardl input/output port M8



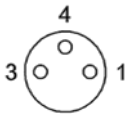
Pin	Function IN / OUT
1	+24V
4	In /Out
3	0V

Note
For the digital inputs, the input guideline specified in EN 61131-2, Type 3 applies

Note
Unused input port sockets must be fitted with blind caps to ensure the IP67 degree of protection.

Extension port

Extension port (M8, female)
The port acts like a sensor/actuator interface if the extension function is disabled.



Pin	Function IN / OUT
1	+24V
4	Communication
3	0V

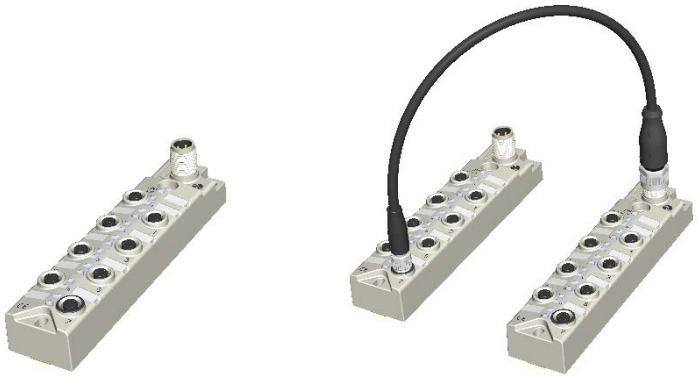
Note
A standardized sensor cable is used to connect to the device/sensor to be expanded. Maximum length of 20 m.

4 General Configuration

4.1. Extension port

The BNI IOL-309-002-Z019 module gives you the ability to use the No. 7 slot in various ways. By default, it is used as a digital I/O slot, where pin 4 can be used as a digital input or output.
This slot can be used as an extension port by making a corresponding entry in the parameter with an index of 55hex. This makes it possible to operate one of the following modules using the No. 7 slot.

- BNI IOL-102-002-Z019



Extension port configuration 55_{hex}

Configuration	Index 0x55 value
BNI IOL-309-002-Z019	0
BNI IOL-309-002-Z019 with BNI IOL-102-002-Z019	1

Note
The "Factory reset" command does not affect the configuration of the extension port in any way.

Note
The process data length depends on the configuration.

The extension port can be configured using parameter 0x55 (table). If data storage or validation is used, validation (identical) must be used for configuring. Depending on the system, the Device ID has to be entered (parameter data table) or the Device ID is read out from the IODD.

Setting the serial number 54_{hex}

The serial number has a default value of $16x00_{hex}$.
In order to use the "Identity" master validation mode, a serial number can be set using this parameter.
This prevents a device from connecting to the wrong master port.

5 Configuration: "Extension Off"

5.1. IO-Link Data

BNI IOL-309-002-Z019 extension off	
Transmission rate	COM2 (38.4 kbaud)
Minimum cycle time	3.5 ms
Process data length	1 byte input, 1 byte output

5.2. Process Data Input

Byte	0							
Bit	7	6	5	4	3	2	1	0
Description	Input Port 7 Pin 4	Input Port 6 Pin 4	Input Port 5 Pin 4	Input Port 4 Pin 4	Input Port 3 Pin 4	Input Port 2 Pin 4	Input Port 1 Pin 4	Input Port 0 Pin 4

5.3. Process Data Ouput

Byte	0							
Bit	7	6	5	4	3	2	1	0
Description	Output Port 7 Pin 4	Output Port 6 Pin 4	Output Port 5 Pin 4	Output Port 4 Pin 4	Output Port 3 Pin 4	Output Port 2 Pin 4	Output Port 1 Pin 4	Output Port 0 Pin 4

5 Configuration: "Extension Off"

5.4. Parameter Data/Demand Data

	DPP	SPDU		Parameter	Data width	Access rights	Default value
	Index	Index	Sub-index				
Identification data	07hex			Vendor ID	2 bytes	Read only	0378hex
	08hex						
	09hex			Device ID	3 bytes		0x05 0B 10
	0Ahex						
	0Bhex						
		10hex	0	Vendor name	8 bytes		BALLUFF
		11hex	0	Vendor text	16 bytes		www.balluff.com
		12hex	0	Product name	20/24 bytes		BNI IOL-309-002-Z019
		13hex	0	Product ID	7 bytes		BNI0093
		14hex	0	Product text	16 bytes		sensor/actuator hub M8
		15hex	0	Serial number	16 bytes		0hex
		16hex	0	Hardware revision			
		17hex	0	Firmware revision			
		18hex	0	Application-specific tag	32 bytes		0hex

Parameter Data/Demand Data

	DPP	SPDU		Parameter	Data width	Access rights	Default Value
	Index	Index	Subindex				
Parameter data		40hex 64	0 1-8	Inversion of the inputs	1 byte	Read/write	0hex
		41hex 65	0 1-8	Config. In-/Output	1 byte	Read / Write	0hex
		42hex 66	0 1-8	Safe state on Pin 4	2 bytes	Read/write	0hex
		44hex 68	0 1-16	Voltage monitoring	2 bytes	Read	-
		45hex 69	0 1-8	Output monitoring	1 byte	Read	-
		54hex 84	0	Serial number	16 bytes	Read/write	16x00hex
		55hex 85	0	Extension port	1 byte	Read/write	-

5 Configuration: "Extension Off"

Inversion of the inputs 40_{hex}

Byte	0							
Bit	7	6	5	4	3	2	1	0
Sub-index	8	7	6	5	4	3	2	1
Description	Inversion Port 7 Pin 4	Inversion Port 6 Pin 4	Inversion Port 5 Pin 4	Inversion Port 4 Pin 4	Inversion Port 3 Pin 4	Inversion Port 2 Pin 4	Inversion Port 1 Pin 4	Inversion Port 0 Pin 4

Inversion port (x):
0 – Normal
1 – Inverted.

Configuration In-Outputs 41_{hex}

Byte	0							
Bit	7	6	5	4	3	2	1	0
Sub Index	8	7	6	5	4	3	2	1
Description	Direction Port 7 Pin 4	Direction Port 6 Pin 4	Direction Port 5 Pin 4	Direction Port 4 Pin 4	Direction Port 3 Pin 4	Direction Port 2 Pin 4	Direction Port 1 Pin 4	Direction Port 0 Pin 4

Direction port (x):
0 – Input
1 – Output

Safe state of Outputs 42_{hex}

The safe state parameter makes it possible to configure the outputs in case of a fault. If no IO-Link communication is possible or the "valid flag" of the output process data has not been set by the master, then each output adopts the configured status. The following statuses can be configured for each pin.

Byte	0								1							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Sub-index		4		3		2		1		8		7		6		5
Description	Safe state Port 3 Pin 4		Safe state Port 2 Pin 4		Safe state Port 1 Pin 4		Safe state Port 0 Pin 4		Safe state Port 7 Pin 4		Safe state Port 6 Pin 4		Safe state Port 5 Pin 4		Safe state Port 4 Pin 4	

5 Configuration: "Extension Off"

Value		Output state
bin	dec	
00	0	Output is 0V
01	1	Output is 24V
10	2	Current status is maintained
11	3	Not defined

5 Configuration: "Extension Off"

Voltage monitoring 44_{hex}

Byte	0								1							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Sub-index	8	7	6	5	4	3	2	1	16					11		9
Description	Short-circuit Port 7 Pin 1	Short-circuit Port 6 Pin 1	Short-circuit Port 5 Pin 1	Short-circuit Port 4 Pin 1	Short-circuit Port 3 Pin 1	Short-circuit Port 2 Pin 1	Short-circuit Port 1 Pin 1	Short-circuit Port 0 Pin 1	-	-	-	-	Outputs off (UA too low)	Undervoltage UA	-	Undervoltage US

Monitoring the outputs 45_{hex}

Byte	0							
Bit	7	6	5	4	3	2	1	0
Sub-index	8	7	6	5	4	3	2	1
Description	Short-circuit Port 7 Pin 4	Short-circuit Port 6 Pin 4	Short-circuit Port 5 Pin 4	Short-circuit Port 4 Pin 4	Short-circuit Port 3 Pin 4	Short-circuit Port 2 Pin 4	Short-circuit Port 1 Pin 4	Short-circuit Port 0 Pin 4

6 Configuration: extended with BNI IOL-102-002-Z019

6.1. IO-Link Data

BNI IOL-309-002-Z019 extended with BNI IOL-102-002-Z019	
Transmission rate	COM2 (38.4 kbaud)
Minimum cycle time	4.0 ms
Process data length	2 byte input, 1 byte output

6.2. Process Data/Input Data

Byte	0							
Bit	7	6	5	4	3	2	1	0
Description	-	Input Port 6 Pin 4	Input Port 5 Pin 4	Input Port 4 Pin 4	Input Port 3 Pin 4	Input Port 2 Pin 4	Input Port 1 Pin 4	Input Port 0 Pin 4

Byte	1							
Bit	7	6	5	4	3	2	1	0
	Extension port							
Description	Input Port 7 Pin 4	Input Port 6 Pin 4	Input Port 5 Pin 4	Input Port 4 Pin 4	Input Port 3 Pin 4	Input Port 2 Pin 4	Input Port 1 Pin 4	Input Port 0 Pin 4

6 Configuration: extended with BNI IOL-102-002-Z019

6.3. Process Data/ Output Data

Byte	0							
Bit	7	6	5	4	3	2	1	0
Description	-	Output Port 6 Pin 4	Output Port 5 Pin 4	Output Port 4 Pin 4	Output Port 3 Pin 4	Output Port 2 Pin 4	Output Port 1 Pin 4	Output Port 0 Pin 4

6.4. Parameter Data/Demand Data

	DPP	SPDU		Parameter	Data width	Access rights	Default value
	Index	Index	Sub-index				
Identification data	07hex			Vendor ID	2 bytes	Read only	0378hex
	08hex						
	09hex			Device ID	3 bytes		0x05 0B A1
	0Ahex						
	0Bhex						
		10hex	0	Vendor name	8 bytes		BALLUFF
		11hex	0	Vendor text	16 bytes		www.balluff.com
		12hex	0	Product name	20/24 bytes		BNI IOL-309-002-Z019 with BNI IOL-102-002-Z019
		13hex	0	Product ID	7 bytes		BNI0093 with BNI0099
		14hex	0	Product text	16 bytes		M12 sensor/actuator hub
		15hex	0	Serial number	16 bytes		0hex
		16hex	0	Hardware revision			
		17hex	0	Firmware revision			
		18hex	0	Application-specific tag	32 bytes		0hex

Parameter Data/Demand Data

	DPP	SPDU		Parameter	Data width	Access rights	Default Value
	Index	Index	Sub-index				
Parameter data		40hex 64	0 1-16	Inversion of the inputs	2 bytes	Read/write	0hex
		41hex 65	0 1-16	Config. In-/Output	1 Byte	Read / Write	0hex
		42hex 66	0 1-16	Safe state on Pin 4	2 bytes	Read/write	0hex
		44hex 68	0 1-32	Voltage monitoring	4 bytes	Read	-
		45hex 69	0 1-16	Output monitoring	1 bytes	Read	-
		54hex 84	0	Serial number	16 bytes	Read/write	16x00hex
		55hex 85	0	Extension port	1 byte	Read/write	1hex

6 Configuration: extended with BNI IOL-102-002-Z019

Inversion of the inputs 40_{hex}

Byte	0							
Bit	7	6	5	4	3	2	1	0
Sub-index	8	7	6	5	4	3	2	1
Description	-	Inversion Port 6 Pin 4	Inversion Port 5 Pin 4	Inversion Port 4 Pin 4	Inversion Port 3 Pin 4	Inversion Port 2 Pin 4	Inversion Port 1 Pin 4	Inversion Port 0 Pin 4

Byte	1							
Bit	7	6	5	4	3	2	1	0
Sub-index	24	23	22	21	20	19	18	17
	Extension port							
Description	Inversion Port 7 Pin 4	Inversion Port 6 Pin 4	Inversion Port 5 Pin 4	Inversion Port 4 Pin 4	Inversion Port 3 Pin 4	Inversion Port 2 Pin 4	Inversion Port 1 Pin 4	Inversion Port 0 Pin 4

Inversion port (x):
0 - Normal
1 - Inverted

Configuration In-/Output 41_{hex}

Byte	0							
Bit	7	6	5	4	3	2	1	0
Sub Index	8	7	6	5	4	3	2	1
Description	-	Direction Port 6 Pin 4	Direction Port 5 Pin 4	Direction Port 4 Pin 4	Direction Port 3 Pin 4	Direction Port 2 Pin 4	Direction Port 1 Pin 4	Direction Port 0 Pin 4

Safe state of Outputs 42$_{hex}$

The safe state parameter makes it possible to configure the outputs in case of a fault. If no IO-Link communication is possible or the "valid flag" of the output process data has not been set by the master, then each output adopts the configured status. The following statuses can be configured for each pin.

Safe state of the outputs on Pin 4 42$_{hex}$

Byte	0								1							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Sub-index	4		3		2		1		8		7		6		5	
Description	Safe state Port 3 Pin 4		Safe state Port 2 Pin 4		Safe state Port 1 Pin 4		Safe state Port 0 Pin 4		-		Safe state Port 6 Pin 4		Safe state Port 5 Pin 4		Safe state Port 4 Pin 4	

Value		Output state
bin	dec	
00	0	Output is 0V
01	1	Output is 24V
10	2	Current status is maintained
11	3	Not permitted

6 Configuration: extended with BNI IOL-102-002-Z019

Voltage monitoring 44_{hex}

Byte	0								1							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Sub-index	8	7	6	5	4	3	2	1	16	15	14	13	12	11	10	9
Description	Short-circuit Port 7 Pin 1	Short-circuit Port 6 Pin 1	Short-circuit Port 5 Pin 1	Short-circuit Port 4 Pin 1	Short-circuit Port 3 Pin 1	Short-circuit Port 2 Pin 1	Short-circuit Port 1 Pin 1	Short-circuit Port 0 Pin 1	-	-	-	-	Outputs off (UA too low)	Undervoltage UA	-	Undervoltage US

Byte	2								3							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Sub-index	24	23	22	21	20	19	18	17	32	31	30	29	28	27	26	25
	Extension port															
Description	Short-circuit Port 7 Pin 1	Short-circuit Port 6 Pin 1	Short-circuit Port 5 Pin 1	Short-circuit Port 4 Pin 1	Short-circuit Port 3 Pin 1	Short-circuit Port 2 Pin 1	Short-circuit Port 1 Pin 1	Short-circuit Port 0 Pin 1	-	-	-	-	-	Undervoltage UA	-	Undervoltage US

Monitoring the outputs 45_{hex}

Byte	0							
Bit	7	6	5	4	3	2	1	0
Sub-index	8	7	6	5	4	3	2	1
Description	-	Short-circuit Port 6 Pin 4	Short-circuit Port 5 Pin 4	Short-circuit Port 4 Pin 4	Short-circuit Port 3 Pin 4	Short-circuit Port 2 Pin 4	Short-circuit Port 1 Pin 4	Short-circuit Port 0 Pin 4

Setting the serial number 54_{hex}

The serial number has a default value of 16x00hex.
In order to use the "Identity" master validation mode, a serial number can be set using this parameter.
This prevents a device from connecting to the wrong master port.

7 Diagnosis

7.1. Error Codes/ Errors

Error code	Description
0x8011	Index not available
0x8012	Subindex not available
0x8023	Access denied
0x8033	Parameter length overrun
0x8034	Parameter length underrun
0x8035	Function not available

7.2. Events

IO-Link Revision 1.0	
Event code	**Description**
0x5112	Low sensor voltage (US)
0x5114	Low actuator voltage (UA)
0x5410	Output stages
0x8DF0	Retry at the extension port
0x8DF1	Device lost at the extension port
0x8DF2	Wrong device at the extension port
IO-Link Revision 1.1	
Event code	**Description**
0x5111	Low sensor voltage (US)
0x5112	Low actuator voltage (UA)
0x7710	Short circuit
0x8DF0	Retry at the extension port
0x8DF1	Device lost at the extension port
0x8DF2	Wrong device at the extension port

8 IO-Link Functions

8.1. IO-Link Version 1.0 / 1.1

This device can be operated with an IO-Link master according to IO-Link version 1.0 and version 1.1. Version-specific functions such as data storage (version 1.1) are only supported in combination with a suitable IO-Link master.

8.2. Data Storage

Each IO-Link master of IO-Link version 1.1 features data storage in which an image of the IO-Link device configuration can be stored. When a device is replaced, the stored configuration is automatically transferred to the new device. This guarantees minimal downtime. Validation must be switched on in order to use the data storage. For information about the configuration of data storage and validation, please refer to the user's guide of the respective IO-Link master.

8.3. Block Configuration

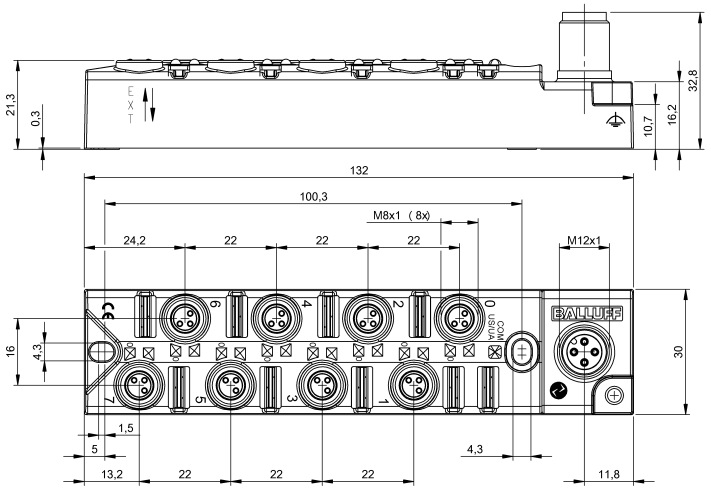
The device supports block configuration. This allows all parameters in a data block to be consistently imported from a controller or a configuration tool into the device.

8.4. Resetting to Factory Settings

The factory settings on the device can be restored by running the "restore factory settings" system command.
0x82 must be written to Index 2 Subindex 0 for the command.
The extension port setting is not reset in this process.

9 Technical Data

9.1. Dimensions



9.2. Mechanical Data

Housing material	Die-cast zinc, matte nickel plated
Weight	245 g
Dimension (L × W × H)	30 × 132 × 32.8 mm

9.3. Electrical Data

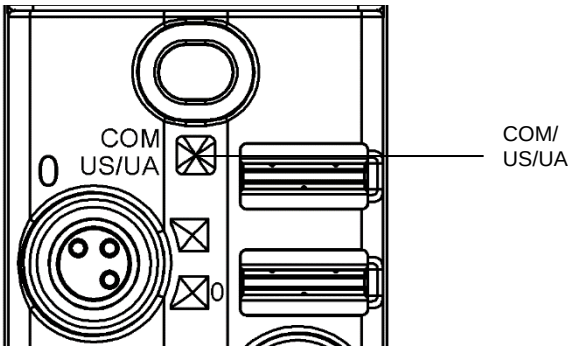
Supply voltage	18–30.2 V DC, corresponding to EN 61131-2
Ripple	< 1%
Current consumption without load (extension off)	≤ 90 mA
Load current (PIN 1)	max. 200 mA (temperature-dependent)
Load current per output (PIN 4)	max. 300 mA (temperature-dependent)
Inputs	PNP, type 3

9.4. Operating conditions

Ambient temperature	- 5 °C … +70 °C
Storage temperature	- 25 °C … +70 °C
Degree of protection	IP67 (only in plugged-in and screwed state)

10 Function Indicators

10.1. Function Indicators



LED-Indicators module status

LED	Status	Function
COM US/UA	Green	Communication error
	Green flashing	Communication ok
	Red	Undervoltage actuator
	Red fast flashing	Undervoltage module

10 Function Indicators

Digital LED indicators for inputs/outputs

LED 0, input/output on Pin 4

Indicator	Request / Signal
Yellow	Input/output signal = 1
Red	Sensor power supply short-circuit, Actuator warning Actuator short-circuit
Off	Input/output signal = 0

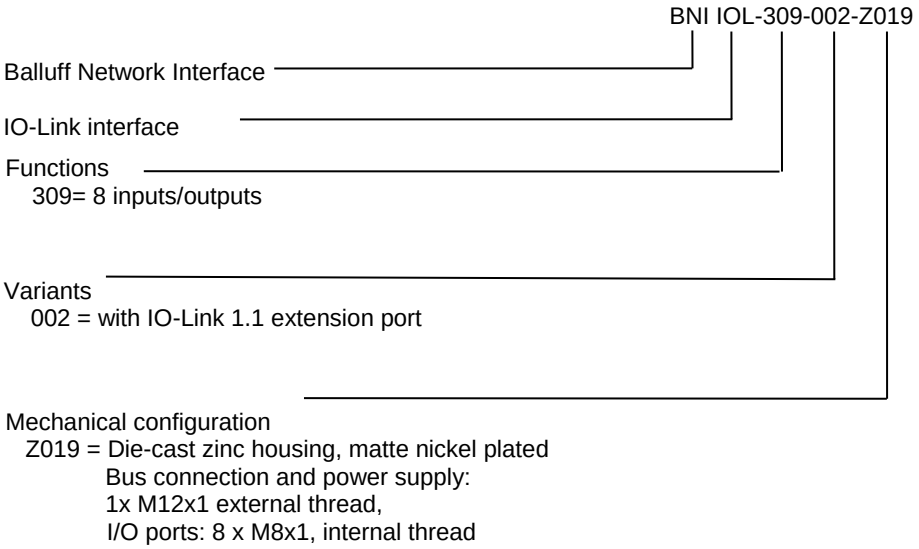
Extension port

The table is valid if the extension port is active. If the extension port is used as a standard I/O, then the description from "Digital LED indicators for inputs/outputs" can be used.

Status	Function
Green	IO-Link – connection active
Green flashing	No IO-Link connection or faulty IO-Link device
Red flashing	Incorrect IO-Link device or incorrect configuration
Red	IO-Link short-circuit on Pin 4

11 Appendix

11.1. Type Code



11.2. Ordering Information

Type code	Order code
BNI IOL-309-002-Z019	BNI0093

Notes

www.balluff.com

No. 926029-726 E • Edition I18 •Replaces Edition E16 • Subject to modification

Balluff GmbH
Schurwaldstrasse 9
73765 Neuhausen a.d.F.
Germany
Phone +49 7158 173-0
Fax +49 7158 5010
balluff@balluff.de