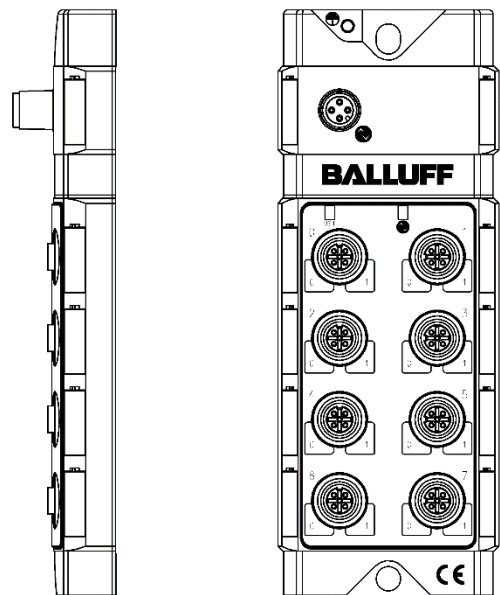




BNI IOL-102-000-Z012  
BNI IOL-104-000-Z012  
BNI IOL-104-S01-Z012  
BNI IOL-104-S01-Z012-C01  
BNI IOL-104-S01-Z012-C02  
BNI IOL-302-000-Z012  
BNI IOL-302-S01-Z012  
BNI IOL-302-000-Z042

User's Guide



<b>1</b>	<b>Notes for the user</b>	<b>2</b>
1.1.	About this guide	2
1.2.	Structure of the guide	2
1.3.	Typographical Conventions	2
	Enumerations	2
	Actions	2
	Syntax	2
	Cross references	2
1.4.	Symbols	2
1.5.	Abbreviations	2
1.6.	Deviating views	2
<b>2</b>	<b>Safety</b>	<b>3</b>
2.1.	Intended use	3
2.2.	Installation and startup	3
2.3.	General safety instructions	3
2.4.	Resistance to Aggressive Substances	3
	Dangerous Voltage	3
<b>3</b>	<b>Getting Started</b>	<b>4</b>
3.1.	Connection overview	4
3.2.	Mechanical connection	5
3.3.	Electrical connection	5
	IO-Link Interface	5
	Connecting the sensor hub	5
	Function earth	5
	Module versions	5
3.4.	Sensor Interface	6
<b>4</b>	<b>IO-Link Interface</b>	<b>7</b>
4.1.	IO-Link Data	7
4.2.	Prozess data/ Input data	9
4.3.	Prozess data / Output data	13
	Parameter data / Request data	14
	Inversion of the inputs 40 <sub>hex</sub>	16
	Port Direction 41 <sub>hex</sub>	16
	Fault State of the outputs Pin 4, 42 <sub>hex</sub>	17
	Fault State of the outputs Pin 2, 43 <sub>hex</sub>	17
	Voltage Monitoring 44 <sub>hex</sub>	18
	Actuator short 45 <sub>hex</sub>	18
	Actuator warning 46 <sub>hex</sub>	18
	Identification 60 <sub>hex</sub>	19
4.4.	Errors	19
4.5.	Events	19
<b>5</b>	<b>Technical Data</b>	<b>20</b>
5.1.	Dimensions	20
5.2.	Mechanical Data	20
5.3.	Electrical Data	20
5.4.	Operating conditions	20
5.5.	LED indicators	21
	Status LEDs	21
	LED I/O-Ports	21
<b>6</b>	<b>Appendix</b>	<b>22</b>
6.1.	Product ordering code	22
6.2.	Order information	22
	Included material	22

## 1 Notes for the user

- 1.1. About this guide** This guide describes the Balluff Network Interface BNI IOL-...-Z0xx for the application as peripheral output module to establish connection of binary actuators. Hereby it is about an IO-Link device which communicates by means of IO-Link protocol with the superordinate IO-Link master assembly.
- 1.2. Structure of the guide** The guide is organized so that the sections build on one another.  
Section 2: Basic safety information.  
.....
- 1.3. Typographical Conventions** The following typographical conventions are used in this guide.
- Enumerations** Enumerations are shown in list form with bullet points.
- 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` (z. B. `00hex`).
- Cross references** Cross references indicate where additional information on the topic can be found.
- 
- 1.4. Symbols**
-  **Attention!**  
This symbol indicates a security notice which must be observed.
- 
-  **Note**  
This symbol indicates general notes
- 
- 1.5. Abbreviations**
- |      |                               |
|------|-------------------------------|
| BNI  | Balluff Network Interface     |
| DPP  | Direct Parameter Page         |
| EMV  | Electromagnetic Compatibility |
| FE   | Function earth                |
| IOL  | IO-Link                       |
| SPDU | Service Protocol Data Unit    |
- 1.6. Deviating views** Product views and illustrations in this manual may differ from the actual product. They are intended only as illustrative material.

### 2.1. Intended use

This guide describes the Balluff Network Interface BNI IOL-..... for the application as peripheral output module to establish connection of binary actuators. Hereby it is about an IO-Link device which communicates by means of IO-Link protocol with the superordinate IO-Link master assembly.

### 2.2. Installation and startup



#### Attention!

Installation and startup are to be performed only by trained specialists. Qualified personnel are persons who are familiar with the installation and operation of the product, and who fulfill the qualifications required for this activity. Any damage resulting from unauthorized manipulation or improper use voids the manufacturer's guarantee and warranty. The Operator is responsible for ensuring that applicable safety and accident prevention regulations are complied with.

### 2.3. General safety instructions

#### Commissioning and inspection

Before commissioning, carefully read the operating manual.

The system must not be used in applications in which the safety of persons is dependent on the function of the device.

#### Authorized Personnel

Installation and commissioning may only be performed by trained specialist 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 operating manual

#### Obligations of the Operating Company

The device is a piece of equipment from EMC Class A. Such equipment may generate RF noise. The operator must take appropriate precautionary measures. The device may only be used with an approved power supply. Only approved cables may be used.

#### 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!

Disconnect all power before servicing equipment.



#### Note

In the interest of product improvement, the Balluff GmbH reserves the right to change the specifications of the product and the contents of this manual at any time without notice.

3 Getting Started

3.1. Connection overview

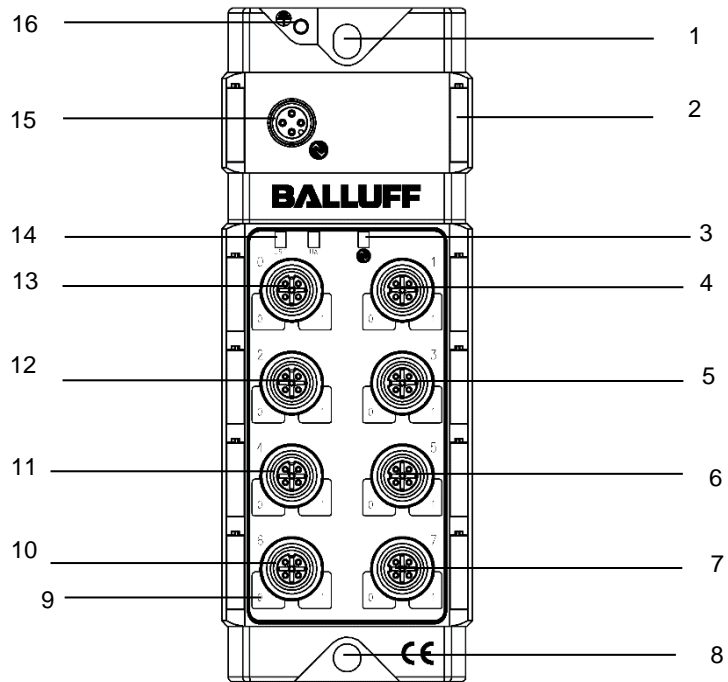


Fig. 3-1: BNI IOL-.....-Z0xx

- |   |                                    |    |                            |
|---|------------------------------------|----|----------------------------|
| 1 | Mounting hole                      | 9  | Pin/Port LED: Signalstatus |
| 2 | Label                              | 10 | Standard I/O port 6        |
| 3 | Status LED: Communication / module | 11 | Standard I/O port 4        |
| 4 | Standard I/O port 1                | 12 | Standard I/O port 2        |
| 5 | Standard I/O port 3                | 13 | Standard I/O port 0        |
| 6 | Standard I/O port 5                | 14 | Status LED: Module supply  |
| 7 | Standard I/O port 7                | 15 | IO-Link Interface          |
| 8 | Mounting hole                      | 16 | FE connection              |

### 3 Getting Started

#### 3.2. Mechanical connection

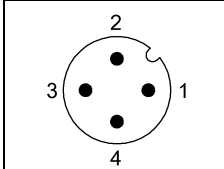
The BNI IOL-.....-Z0xx modules are attached by using 2 M6 screws and 2 spacers.

#### 3.3. Electrical connection

The BNI IOL-...-Z0xx modules require no separate supply voltage connection. Power is provided through the IO-Link interface by the host IO-Link Master.

#### IO-Link Interface

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

	Pin	Function
	1	Power supply controller, +24V, max 1.1A
	2	Power supply actuator, +24V, max 1.6A* (4A**)
	3	GND, reference potential
	4	C/Q, IO-Link Data transmission channel

\* Only for BNI IOL-302-xxx-Z012

\*\* Only for BNI IOL-302-xxx-Z042

#### Connecting the sensor hub

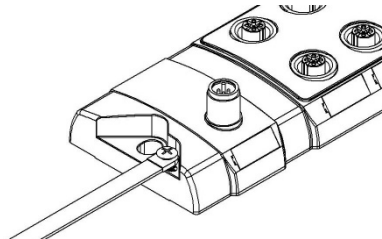
- Connection protection ground to FE terminal, if present.
- Connect the incoming IO-Link line to the sensor hub.

#### Note



For BNI IOL-10x-xxx-Z012 a standard 3 wire sensor cable is used for connection to the host IO-Link master. For BNI IOL-302-xxx-Z0xx a 4 wire sensor cable is necessary.

#### Function earth



#### Note


The FE connection from the housing to the machine must be low-impedance and kept as short as possible.

#### Module versions

Sensor Hub Version	Digital Port
BNI IOL-102-000-Z012	8 Inputs
BNI IOL-104-000-Z012	16 Inputs
BNI IOL-104-S01-Z012	16 Inputs with single channel monitoring
BNI IOL-104-S01-Z012-C01	16 Inputs with single channel monitoring 2 Identification bytes
BNI IOL-104-S01-Z012-C02	16 Inputs with single channel monitoring 4 Identification bytes
BNI IOL-302-000-Z012	16 Inputs and Outputs configurable
BNI IOL-302-S01-Z012	16 Inputs and Outputs configurable, with single channel monitoring
BNI IOL-302-000-Z042	16 Inputs and Outputs configurable

3 Getting Started

3.4. Sensor Interface Standard I/O port (M12, A-coded, female)

 <p>M12 A-coded female</p>	Pin	Function			
		Input pin4	Input pin4/pin2	Output	In / Out
	1	+24V 0.1 A	+24V 0.1 A	n.c.	+24V 0.1 A
	2	n. c.	Input	Output 500 mA / 2A**	In / Out 500 mA / 2A**
	3	0V	0V	0V	0V
	4	Input	Input	Ouput 500 mA / 2A**	In / Out 500 mA / 2A**
5	FE	FE*	FE	FE	

\*BNI IOL-106-xxx-Z012 not used

\*\* For BNI IOL-302-xxx-Z042



**Note**

For the digital inputs follow the input guideline per EN 61131-2, Type.



**Note**

Unused I/O port socked must be fitted with cover caps to ensure IP67 protection rating.



**Note**

Outputs: Maximum 500mA per output (BNI IOL-302-000-Z042 2A).  
Total current of actuator supply is maximum 1.6A

## 4.1. IO-Link Data

<b>BNI IOL-102-000-Z012</b>	
Data transmission rate	COM2 (38,4 kBaud)
Minimal cycle time	3 ms
Process data length	1 Byte input
IO-Link Revision	1.0
Process data cycle time	3 ms, minimal cycle time

<b>BNI IOL-104-000-Z012</b>	
Data transmission rate	COM2 (38,4 kBaud)
Minimal cycle time	3 ms
Process data length	2 Byte input
IO-Link Revision	1.0
Process data cycle time	3 ms, minimal cycle time

<b>BNI IOL-104-S01-Z012</b>	
Data transmission rate	COM2 (38,4 kBaud)
Minimal cycle time	3 ms
Process data length	4 Byte input
IO-Link Revision	1.0
Process data cycle time	12 ms, minimal cycle time

<b>BNI IOL-104-S01-Z012-C01</b>	
Data transmission rate	COM2 (38,4 kBaud)
Minimal cycle time	3 ms
Process data length	6 Byte input
IO-Link Revision	1.0
Process data cycle time	18 ms, minimal cycle time

<b>BNI IOL-104-S01-Z012-C02</b>	
Data transmission rate	COM2 (38,4 kBaud)
Minimal cycle time	3 ms
Process data length	8 Byte input
IO-Link Revision	1.0
Process data cycle time	24 ms, minimal cycle time



4 IO-Link Interface

<b>BNI IOL-302-000-Z012</b>	
Data transmission rate	COM2 (38,4 kBaud)
Minimal cycle time	3 ms
Process data length	2 Byte input, 2 Byte output
IO-Link Revision	1.0
Process data cycle time	12 ms, minimal cycle time

<b>BNI IOL-302-S01-Z012</b>	
Übertragungsrate	COM2 (38,4 kBaud)
Minimal cycle time	3 ms
Process data length	8 Byte input, 2 Byte output
IO-Link Revision	1.0
Process data cycle time	30 ms, minimal cycle time

<b>BNI IOL-302-000-Z042</b>	
Data transmission rate	COM2 (38,4 kBaud)
Minimal cycle time	3 ms
Process data length	2 Byte input, 2 Byte output
IO-Link Revision	1.0
Process data cycle time	12 ms, minimal cycle time

4.2. Prozess data/  
Input data

**BNI IOL-102-000-Z012**

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

**BNI IOL-104-000-Z012**

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

4 IO-Link Interface

BNI IOL-104-S01-Z012

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

Byte	2								3							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Description	Short circuit Port 7	Short circuit Port 6	Short circuit Port 5	Short circuit Port 4	Short circuit Port 3	Short circuit Port 2	Short circuit Port 1	Short circuit Port 0	-	-	-	-	-	-	-	Undervoltage US

**BNI IOL-104-S01-Z012-C01**  
**BNI IOL-104-S01-Z012-C02\***

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

Byte	2								3							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Description	Short circuit Port 7	Short circuit Port 6	Short circuit Port 5	Short circuit Port 4	Short circuit Port 3	Short circuit Port 2	Short circuit Port 1	Short circuit Port 0	.	.	.	.	.	.	.	Undervoltage US

Byte	4								5							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Description	Identification byte 0								Identification byte 1							

Byte	6								7							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Description	Identification byte 2*								Identification byte 3*							

**BNI IOL-302-000-Z0xx**

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

4 IO-Link Interface

BNI IOL-302-S01-Z012

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

Byte	2								3							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Description	Short Circuit Port 7	Short Circuit Port 6	Short Circuit Port 5	Short Circuit Port 4	Short Circuit Port 3	Short Circuit Port 2	Short Circuit Port 1	Short Circuit Port 0	.	.	.	.	.	Undervoltage UA	.	Undervoltage US1

Short Circuit at Port x between Pin 1 and Pin 3  
 Short Circuit Port x = 1

Where x = 0.....7

Byte	4								5							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
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	Short Circuit Port 7 Pin 2	Short Circuit Port 6 Pin 2	Short Circuit Port 5 Pin 2	Short Circuit Port 4 Pin 2	Short Circuit Port 3 Pin 2	Short Circuit Port 2 Pin 2	Short Circuit Port 1 Pin 2	Short Circuit Port 0 Pin 2

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



**Note**

Actuator short circuit: overload or short circuit in the main against 0V  
 Actuator warning: short circuit of the output signal against +24V

4.3. Prozess data /  
Output data

**BNI IOL-302-xxx-Z0xx**

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

**No output data for:**  
 BNI IOL-104-xxx-Z012  
 BNI IOL-104-S01-Z012-C01  
 BNI IOL-104-S01-Z012-C02

4 IO-Link Interface

Parameter data  
/ Request data

DPP	SPDU		Object name	Length	Range	Default value
	Index	Sub-index				
07hex			Vendor ID	2 Byte	Read only	0378hex
08hex			Device ID	3 Byte		050702hex 050701hex 050704hex 050709hex 050711hex 050706hex 050707hex 050715hex
09hex						
0Ahex						
0Bhex						
Identification Data	10hex	0	Vendor Name	7 Byte		BALLUFF
	11hex	0	Vendor text	15 Byte		www.balluff.com
	12hex	0	Product name	20-24 Byte		BNI IOL-102-000-Z012 BNI IOL-104-000-Z012 BNI IOL-104-S01-Z012 BNI IOL-104-S01-Z012-C01 BNI IOL-104-S01-Z012-C02 BNI IOL-302-000-Z012 BNI IOL-302-S01-Z012 BNI IOL-302-000-Z042
	13hex	0	Product ID	7 Byte		BNI0031 BNI0032 BNI0039 BNI003T BNI005P BNI003U BNI003C BNI0080
	14hex	0	Product text	22-31 Byte		Sensor hub metal 8 inputs Sensor hub metal 16 inputs Sensor hub metal 16 inputs Sensor hub metal 16 inputs + ID Sensor hub metal 16 inputs + ID Sensor/Actor hub metal Sensor/Actor hub metal Sensor/Actor hub metal
	16hex	0	Hardware Revision	1 Byte		
	17hex	0	Firmware Revision	23 Byte		

	DPP	SPDU		Object name	Length	Range	Default value
	Index	Index	Sub-index				
Parameter Data		40hex	0 1-16	Inversion	2 Byte	0hex...FFFFhex	0000hex
		41hex	0 1-16	Port Direction*	2 Byte	0hex ... FFFFhex	0000hex
		42hex	0 1-8	Fault State Pin4*	2 Byte	0hex ... FFFFhex	0000hex
		43hex	0 1-8	Fault State Pin2*	2 Byte	0hex ... FFFFhex	0000hex
		44hex	0 1-16	Sp. Monitoring	2 Byte	0hex ... FFFFhex	-
		45hex	0 1-16	Actuator short*	2 Byte	0hex ... FFFFhex	-
		46hex	0 1-16	Actuator warning***	2 Byte	0hex ... FFFFhex	-
		60hex	-	Identification**	2 Byte	0hex ... FFFFhex	0000hex
		60hex	-	Identification***	4 Byte	0hex ... FFFFFFFFhex	00000000hex

\* Only in case BNI IOL-302-xxx-Z0xx

\*\* Only in case BNI IOL-104-S01-Z012-C01

\*\*\* Only in case BNI IOL-104-S01-Z012-C02



4 IO-Link Interface

Inversion of the inputs 40<sub>hex</sub>

BNI IOL-10x-xxx-Z012  
 BNI IOL-104-S01-Z012-C0x  
 BNI IOL-302-xxx-Z0xx

Byte	0								1							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Sub Index	16	15	14	13	12	11	10	9	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 7 Pin 2	Inversion Port 6 Pin 2	Inversion Port 5 Pin 2	Inversion Port 4 Pin 2	Inversion Port 3 Pin 2	Inversion Port 2 Pin 2	Inversion Port 1 Pin 2	Inversion Port 0 Pin 2

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

Port Direction 41<sub>hex</sub>

BNI IOL-302-xxx-Z0xx

Byte	0								1							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Sub Index	16	15	14	13	12	11	10	9	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 7 Pin 2	Direction Port 6 Pin 2	Direction Port 5 Pin 2	Direction Port 4 Pin 2	Direction Port 3 Pin 2	Direction Port 2 Pin 2	Direction Port 1 Pin 2	Direction Port 0 Pin 2

Direction  
 0: Input  
 1: Output

**Fault State of the outputs  
Pin 4, 42<sub>hex</sub>**

**BNI IOL-302-xxx-Z0xx**

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	Fault State Port 3 Pin 4		Fault State Port 2 Pin 4		Fault State Port 1 Pin 4		Fault State Port 0 Pin 4		Fault State Port 7 Pin 4		Fault State Port 6 Pin 4		Fault State Port 5 Pin 4		Fault State Port 4 Pin 4	

**Fault State Port (x)**

- 00 - 0
- 01 - 1
- 10 - Last state
- 11 - Not defined

**Fault State of the outputs  
Pin 2, 43<sub>hex</sub>**

**BNI IOL-302-xxx-Z0xx**

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	Fault State Port 3 Pin 2		Fault State Port 2 Pin 2		Fault State Port 1 Pin 2		Fault State Port 0 Pin 2		Fault State Port 7 Pin 2		Fault State Port 6 Pin 2		Fault State Port 5 Pin 2		Fault State Port 4 Pin 2	

**Fault State Port (x)**

- 00 - 0
- 01 - 1
- 10 - Last State
- 11 - Not defined

4 IO-Link Interface

Voltage  
Monitoring  
44<sub>hex</sub>

BNI IOL-x0x-xxx-Z012  
BNI IOL-104-S01-Z012-C0x

Byte	0								1							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Sub Index	16	15	14	13	12	11	10	9						3		1
Description	Short circuit Port 7	Short circuit Port 6	Short circuit Port 5	Short circuit Port 4	Short circuit Port 3	Short circuit Port 2	Short circuit Port 1	Short circuit Port 0	-	-	-	-	-	Undervoltage UA*	-	Undervoltage US1

\*only for "302".

Short circuit at Port x between Pin 1 and Pin 3  
Short circuit port x = 1  
Where x = 0...7

Actuator  
short 45<sub>hex</sub>

BNI IOL-302-xxx-Z0xx

Byte	0								1							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Sub Index	16	15	14	13	12	11	10	9	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	Short circuit Port 7 Pin 2	Short circuit Port 6 Pin 2	Short circuit Port 5 Pin 2	Short circuit Port 4 Pin 2	Short circuit Port 3 Pin 2	Short circuit Port 2 Pin 2	Short circuit Port 1 Pin 2	Short circuit Port 0 Pin 2

Actuator  
warning 46<sub>hex</sub>

Byte	0								1							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Sub Index	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
Description	Warning Port 7 Pin 4	Warning Port 6 Pin 4	Warning Port 5 Pin 4	Warning Port 4 Pin 4	Warning Port 3 Pin 4	Warning Port 2 Pin 4	Warning Port 1 Pin 4	Warning Port 0 Pin 4	Warning Port 7 Pin 2	Warning Port 6 Pin 2	Warning Port 5 Pin 2	Warning Port 4 Pin 2	Warning Port 3 Pin 2	Warning Port 2 Pin 2	Warning Port 1 Pin 2	Warning Port 0 Pin 2

## 4 IO-Link Interface

### Identification 60<sub>hex</sub>

Byte	0								1							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Description	Identification byte 0*								Identification byte 1*							
Byte	2								3							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Description	Identification byte 2**								Identification byte 3**							

\*Only in case of BNI IOL-104-S01-Z012-C01 and BNI IOL-104-S01-Z012-C02

\*\*Only in case of BNI IOL-104-S01-Z012-C02

#### 4.4. Errors

Error Code	Description
0x8011	Index not available
0x8012	Subindex not available
0x8030	Parameter Value out of Range

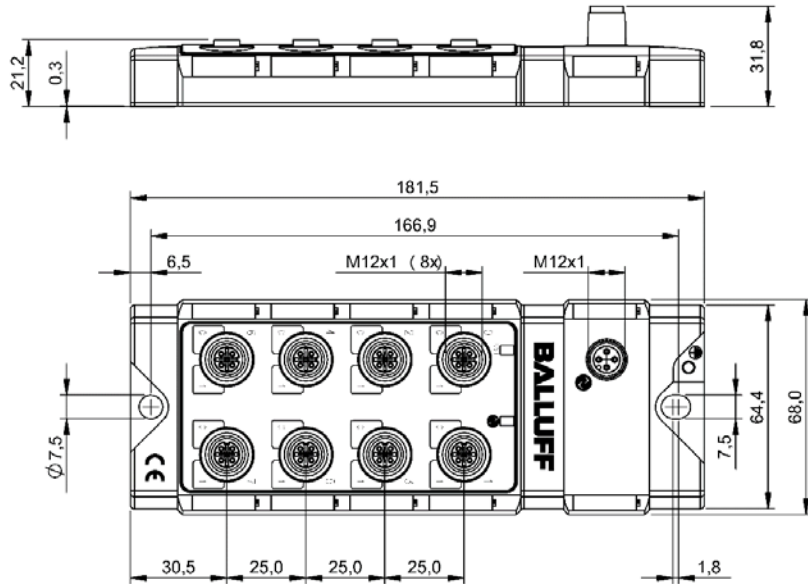
#### 4.5. Events

IO-Link Revision 1.0	
Event Code	Description
0x5112	Low sensor voltage (US)
0x5114	Low actuator voltage
0x5160	Short circuit sensor supply
0x5410*	Short circuit actuator supply / actuator warning

\*Only in case of BNI IOL-302-xxx-Z0xx

5 Technical Data

5.1. Dimensions



5.2. Mechanical Data

Housing material	Die-cast zinc housing
IO-Link-Port	M12, A-coded, male
I/O-Ports	M12, female, 5-poles
Enclosure rating per IEC 60529	IP67 (only when plugged in and threaded in)
Weight	ca. 500 g
Dimensions (B x H x T in mm)	68 x 181,5 x 31,8

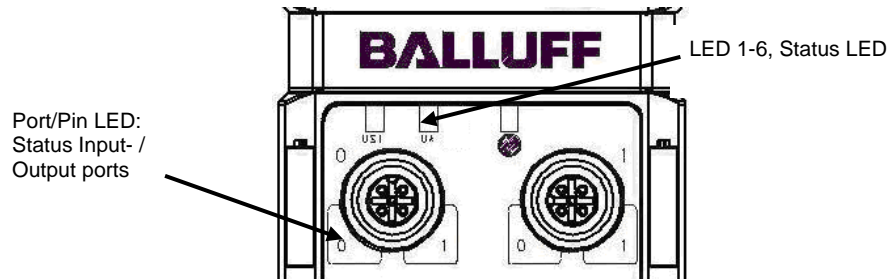
5.3. Electrical Data

Operating conditions	18 ... 30.2 V DC, per EN 61131-2
Ripple	< 1 %
Current draw without load	≤ 90 mA

5.4. Operating conditions

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

5.5. LED indicators



Status LEDs

**BNI IOL-10x-xxx-Z012**

LED	Indicator	Function
LED 1	Green / Red	Supply Sensors & Module ok / Undervoltage
LED 6	Green / Green flashing	Communication error / communication ok

**BNI IOL-302-xxx-Z0xx**

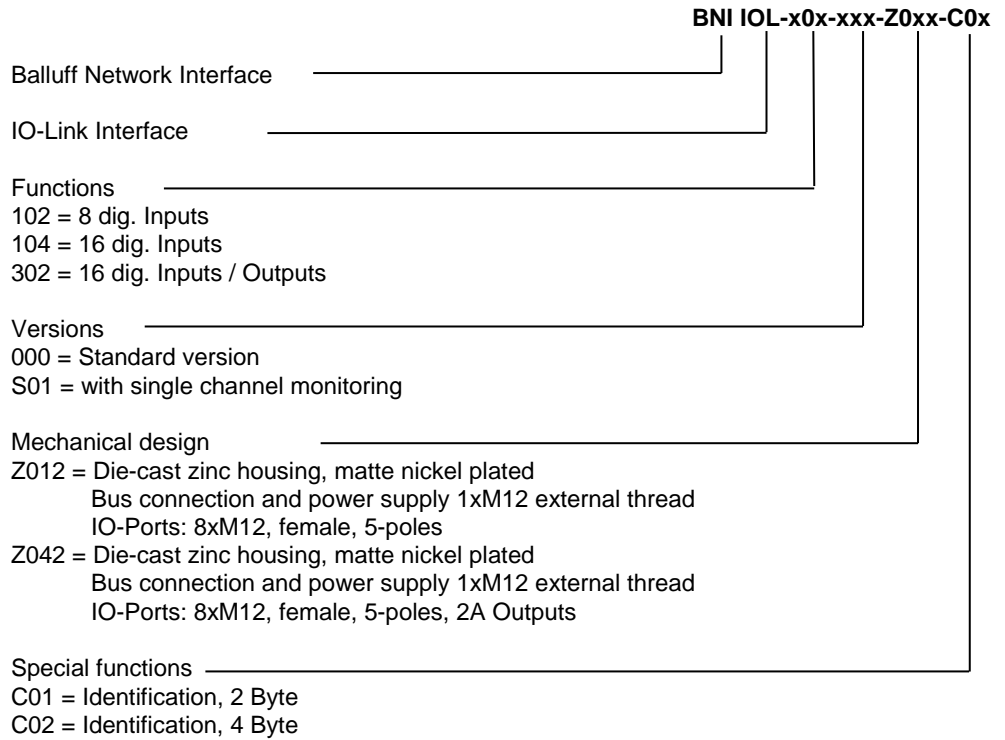
LED	Indicator	Function
LED 1	Green / Red	Supply Module ok / Undervoltage
LED 3	Green / Red	Supply actuators ok / Undervoltage
LED 6	Green / Green flashing	Communication error / communication ok

LED I/O-Ports

Indicator	Function LED Pin 2 / Pin 4
Off	Input signal / output signal = 0
Yellow static	Input signal / output signal = 1
Red	Input port : SC, short circuit Output port: I <sub>max</sub> , over-current, short circuit, actuator warning

6 Appendix

6.1. Product ordering code



6.2. Order information

Product ordering code	Order code
BNI IOL-102-000-Z012	BNI0031
BNI IOL-104-000-Z012	BNI0032
BNI IOL-104-S01-Z012	BNI0039
BNI IOL-104-S01-Z012-C01	BNI003T
BNI IOL-104-S01-Z012-C02	BNI005P
BNI IOL-302-000-Z012	BNI003U
BNI IOL-302-S01-Z012	BNI003C
BNI IOL-302-000-Z042	BNI0080

Included material

BNI IOL... consists of the following components:

- IO-Modul
- 4 filler plugs M12
- Ground connection-band
- Screw M4x6
- 20 Labels

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