

## **BNI IOL-302-002-K006** **IO-Link 1.1 sensor/actuator hub** **with extension port** **User's Guide**





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**1 User Instructions**

- 1.1. Structure of the Manual** The manual is organized so that the sections build on one another. Chapter 2: Basic safety information.  
.....
- 1.2. Typographical Conventions** The following typographical conventions are used in this manual.
- Enumerations** Enumerations are shown as a list with an en-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. `00hex`).
- Cross-references** Cross-references indicate where additional information on the topic can be found.
- 
- 1.3. Symbols**
-  **Attention!**  
 This symbol indicates a safety instruction that must be followed without exception.
- 
-  **Note, tip**  
 This symbol indicates general notes.
- 
- 1.4. Abbreviations**
- |          |                               |
|----------|-------------------------------|
| BNI      | Balluff Network Interface     |
| DPP      | Direct Parameter Page         |
| I/O port | Digital input/output port     |
| IOL      | IO-Link                       |
| ISDU     | Indexed Service Data Unit     |
| EMC      | Electromagnetic compatibility |
| FE       | Function ground               |
| LSB      | Least Significant Bit         |
| MSB      | Most Significant Bit          |
- 1.5. Divergent views** Product views and images can differ from the specified product in this manual. They serve only as an illustration.

## 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 Instructions

#### 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. Only use 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 generally have a good chemical and oil resistance. When used in aggressive media (eg chemicals, oils, lubricants and coolants each in high concentration (ie, low water content)) must be checked prior application-related material compatibility. In the event of failure or damage to the BNI modules due to such aggressive media are no claims for defects.

### Hazardous 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**

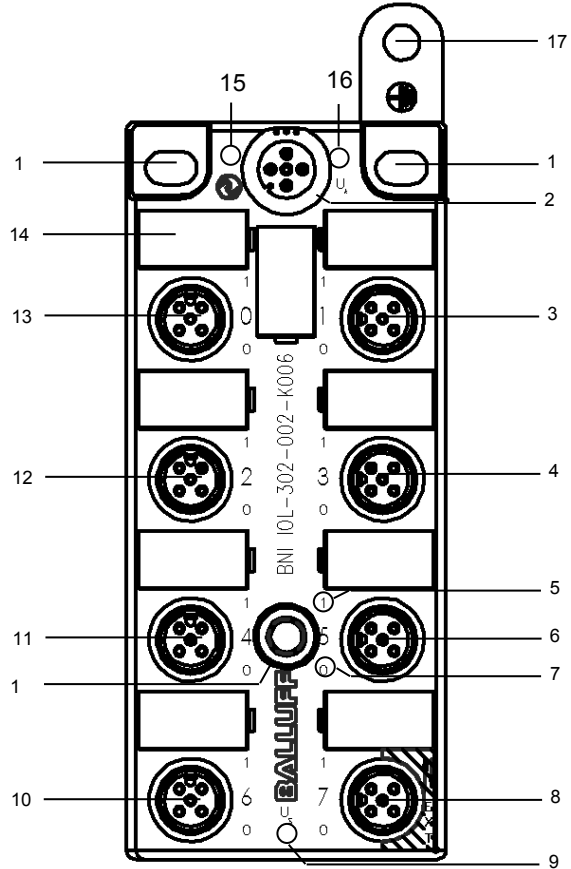


Figure 3-1: Connection overview BNI IOL-302-002-K006

- |   |  |
|---|--|
| 1 Mounting hole                           | 9 Status LED: Power supply for sensors   |
| 2 IO-Link interface                       | 10 Standard I/O port 6                   |
| 3 Standard I/O port 1                     | 11 Standard I/O port 4                   |
| 4 Standard I/O port 3                     | 12 Standard I/O port 2                   |
| 5 Status LED: Standard I/O port 5 (pin 2) | 13 Standard I/O port 0                   |
| 6 Standard I/O port 5                     | 14 Label                                 |
| 7 Status LED: Standard I/O port 5 (pin 4) | 15 Status LED IO-Link                    |
| 8 Extension port or standard I/O port 7   | 16 Status LED power supply for actuators |
|   | 17 Ground connection                     |

### 3 First Steps

#### 3.2. Mechanical Connection

The BNI IOL modules are fastened with 3 M4 screws (position 1, Fig. 3-1/3-2).

#### 3.3. Electrical Connection

The BNI IOL-302-xxx-K006 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.

#### Function ground

The modules are equipped with a ground connection.

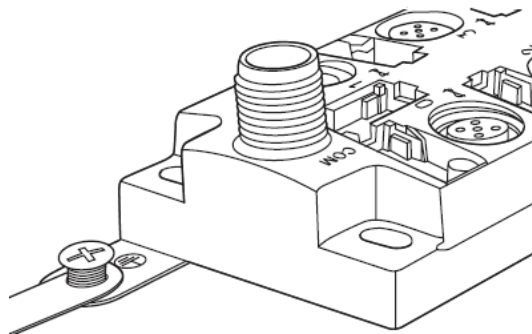


Figure 3-3: BNI ground connection IOL-302...

- Connect the sensor hub module to the ground connection.



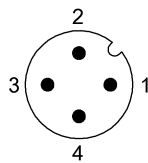
#### Note

The FE 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	Requirement
1	Supply voltage for controller US +24 V
2	Supply voltage for actuators 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 FE terminal, if available.
- Connect the incoming IO-Link cable to the sensor hub.

---

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

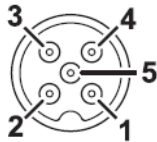
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**Module variants**

Sensor hub variants	Digital port
BNI IOL-302-002-K006	16 inputs/outputs, freely configurable

**Digital sensors**

Digital input/output port (M12, A-coded, female)



Pin	Requirement
1	+24 V
2	Input 2/output 2
3	0 V, GND
4	Input 1/output 1
5	FE

---

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

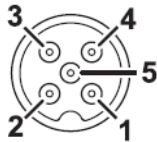
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**i Note**  
Unused input port sockets must be fitted with blind caps to ensure the IP67 protection rating.

---

**Extension port**

Digital input/output port (M12, A-coded, female)



Pin	Requirement
1	+24 V
2	Extension port for actuator power supply
3	0 V, GND
4	Communication
5	FE

---

**i Note**  
A standardized sensor cable is used to connect to the device to be extended. Maximum length of 20 m.

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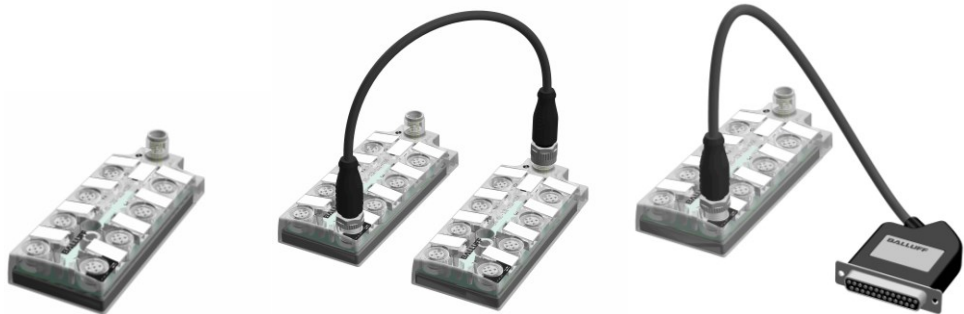


**Extension port**

The BNI IOL-302-002-K006 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 both pin 2 and 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-302-002-K006
- BNI IOL-751-V08-K007
- BNI IOL-751-V10-K007
- BNI IOL-751-V13-K007



**Extension port configuration**

Configuration	Index 55hex value
BNI IOL-302-002-K006	0
BNI IOL-302-002-K006 with BNI IOL-302-002-K006	1
BNI IOL-302-002-K006 with BNI IOL-751-V08-K007	2
BNI IOL-302-002-K006 with BNI IOL-751-V10-K007	3
BNI IOL-302-002-K006 with BNI IOL-751-V13-K007	4



**Note**

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

4 Configuration: "Extension Off"



4.1. IO-Link Data

BNI IOL-302-002-K006 Extension off	
Transfer rate	COM2 (38.4 kbaud)
Minimum cycle time	3.5 ms
Process data length	2 byte input, 2 byte output

4.2. Process Data/  
Input Data

**BNI IOL-302-000-K006**  
Process data length of 2 bytes:

Byte	0								1							
	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

4.3. Process Data/  
Output Data

**BNI IOL-302-000-K006**  
Process data length of 2 bytes

Byte	0								1							
	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

## 4 Configuration: "Extension Off"

### 4.4. Parameter Data/ Demand Data

	DPP	ISDU		Parameter	Data width	Access rights	Default value
	Index	Index	Subindex				
Identification data	07hex			Vendor ID	2 bytes	Read only	0378hex
	08hex						
	09hex			Device ID	3 bytes		05 0B 00hex
	0Ahex						
	0Bhex						
		10hex	0	Vendor name	7 bytes		BALLUFF
		11hex	0	Vendor text	15 bytes		www.balluff.com
		12hex	0	Product name			BNI IOL-302-002-K006
		13hex	0	Product ID	7 bytes		BNI007Z
		14hex	0	Product text			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	

	DPP	ISDU		Parameter	Data width	Access rights	Default Value
	Index	Index	Subindex				
Parameter data		40hex 64	0 1-16	Inversion of the inputs	2 bytes	Read/write	0hex
		41hex 65	0 1-16	Config. inputs/outputs	2 bytes	Read/write	0hex
		42hex 66	0 1-8	Pin 4 safe state	2 bytes	Read/write	0hex
		43hex 67	0 1-8	Pin 2 safe state	2 bytes	Read/write	0hex
		44hex 68	0 1-16	Voltage monitoring	2 bytes	Read	-
		45hex 69	0 1-16	Output monitoring	2 bytes	Read	-
		46hex 70	0 1-16	Actuator warning	2 bytes	Read	-
		54hex 84	0	Serial number	16 bytes	Read/write	16x00hex
		55hex 85	0	Extension port	1 byte	Read/write	0hex

**4 Configuration: "Extension Off"**

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

Byte	0								1							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Subindex	8	7	6	5	4	3	2	1	16	15	14	13	12	11	10	9
Description	Inversion of Port 7 Pin 4	Inversion of Port 6 Pin 4	Inversion of Port 5 Pin 4	Inversion of Port 4 Pin 4	Inversion of Port 3 Pin 4	Inversion of Port 2 Pin 4	Inversion of Port 1 Pin 4	Inversion of Port 0 Pin 4	Inversion of Port 7 Pin 2	Inversion of Port 6 Pin 2	Inversion of Port 5 Pin 2	Inversion of Port 4 Pin 2	Inversion of Port 3 Pin 2	Inversion of Port 2 Pin 2	Inversion of Port 1 Pin 2	Inversion of Port 0 Pin 2

**Inversion of port (x):**

- 0 – Normal
- 1 - Inverted.

**Configuration of inputs /outputs 41<sub>hex</sub>**

Byte	0								1							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Subindex	8	7	6	5	4	3	2	1	16	15	14	13	12	11	10	9
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 of port (x):**

- 0 – Input
- 1 – Output

## 4 Configuration: "Extension Off"

### Safe state of outputs 42<sub>hex</sub>

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<sub>hex</sub>

Byte	0								1							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Subindex		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	

**4 Configuration: "Extension Off"**

Safe state of the outputs on Pin 2  
43hex

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 2		Safe state Port 2 Pin 2		Safe state Port 1 Pin 2		Safe state Port 0 Pin 2		Safe state Port 7 Pin 2		Safe state Port 6 Pin 2		Safe state Port 5 Pin 2		Safe state Port 4 Pin 2	

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

**4 Configuration: "Extension Off"**

**Voltage monitoring**  
44<sub>hex</sub>

Byte	0								1							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Subindex	8	7	6	5	4	3	2	1	16				12	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	-	-	-	-	Output off (UA too low)	Undervoltage UA	-	Undervoltage US

**Monitoring the outputs**  
45<sub>hex</sub>

Byte	0								1							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Subindex	8	7	6	5	4	3	2	1	16	15	14	13	12	11	10	9
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
Subindex	8	7	6	5	4	3	2	1	16	15	14	13	12	11	10	9
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 Configuration: "Extension Off"**


**Setting the serial number 54<sub>hex</sub>**

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.

**Configuration of the extension port 55<sub>hex</sub>**

Configuration	Index 55 <sub>hex</sub> value
BNI IOL-302-002-K006	0
BNI IOL-302-002-K006 with BNI IOL-302-002-K006	1
BNI IOL-302-002-K006 with BNI IOL-751-V08-K007	2
BNI IOL-302-002-K006 with BNI IOL-751-V10-K007	3
BNI IOL-302-002-K006 with BNI IOL-751-V13-K007	4

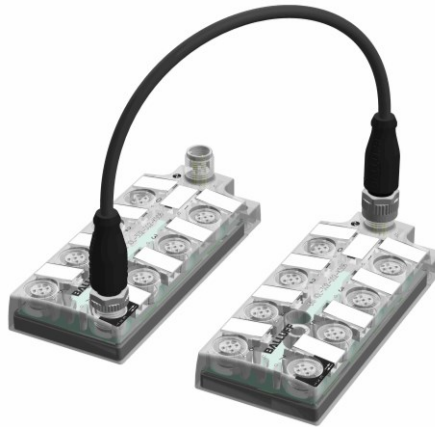
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**Note**  
 The "Factory reset" command does not affect the configuration of the extension port in any way.

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**5 Configuration: Extended with BNI IOL-302-002-K006**



**5.1. IO-Link Data**

<b>BNI IOL-302-002-K006 extended with BNI IOL-302-002-K006</b>	
Transfer rate	COM2 (38.4 kbaud)
Minimum cycle time	4.5 ms
Process data length	4 byte input, 4 byte output

**5.2. Process Data/  
Input Data**

Process data length of 4 bytes:

Byte	0								1							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
<b>Description</b>	-	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 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
	<b>Extension port</b>															
<b>Description</b>	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

**5 Configuration: Extended with BNI IOL-302-002-K006**

**5.3. Process Data/  
Output Data**

Process data length of 4 bytes

Byte	0								1							
Bit	7	6	5	4	3	2	1	0	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	-	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

Byte	2								3							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
	Extension port															
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

**5 Configuration: Extended with BNI IOL-302-002-K006**

**5.4. Parameter Data/  
Demand Data**

	DPP	ISDU		Parameter	Data width	Access rights	Default value
	Index	Index	Sub-index				
<b>Identification data</b>	07hex			Vendor ID	2 bytes	Read only	0378hex
	08hex						
	09hex			Device ID	3 bytes		05 0B 01hex
	0Ahex						
	0Bhex						
		10hex	0	Vendor Name	7 bytes		BALLUFF
		11hex	0	Vendor text	15 bytes		www.balluff.com
		12hex	0	Product Name			BNI IOL-302-002-K006 with BNI IOL-302-002-K006
		13hex	0	Product ID	7 bytes		BNI007Z with BNI007Z
		14hex	0	Product text			Sensor/Actor hub M12 extenden with Sensor/Actor hub M12
		15hex	0	Serial number	16 bytes		0hex
		16hex	0	Hardware revision			
		17hex	0	Firmware revision			
	18hex	0	Application-specific tag	32 bytes	0hex		

	DPP	ISDU		Parameter	Data width	Access rights	Default Value
	Index	Index	Subindex				
<b>Parameter data</b>		40hex 64	0 1-32	Inversion of the inputs	4 bytes	Read/write	0hex
		41hex 65	0 1-32	Config. inputs/outputs	4 bytes	Read/write	0hex
		42hex 66	0 1-16	Safe state Pin 4	4 bytes	Read/write	0hex
		43hex 67	0 1-16	Safe state Pin 2	4 bytes	Read/write	0hex
		44hex 68	0 1-32	Voltage monitoring	4 bytes	Read	-
		45hex 69	0 1-32	Output monitoring	4 bytes	Read	-
		46hex 70	0 1-32	Actuator warning	4 bytes	Read	-
		54hex 84	0	Serial number	16 bytes	Read/write	16x00hex
		55hex 85	0	Extension port	1 byte	Read/write	1hex

**5 Configuration: Extended with BNI IOL-302-002-K006**

Inversion of the inputs 40<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	8	7	6	5	4	3	2	1	16	15	14	13	12	11	10	9
Description	-	Inversion of Port 6 Pin 4	Inversion of Port 5 Pin 4	Inversion of Port 4 Pin 4	Inversion of Port 3 Pin 4	Inversion of Port 2 Pin 4	Inversion of Port 1 Pin 4	Inversion of Port 0 Pin 4	-	Inversion of Port 6 Pin 2	Inversion of Port 5 Pin 2	Inversion of Port 4 Pin 2	Inversion of Port 3 Pin 2	Inversion of Port 2 Pin 2	Inversion of Port 1 Pin 2	Inversion of Port 0 Pin 2

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
<b>Extension port</b>																
Description	Inversion of Port 7 Pin 4	Inversion of Port 6 Pin 4	Inversion of Port 5 Pin 4	Inversion of Port 4 Pin 4	Inversion of Port 3 Pin 4	Inversion of Port 2 Pin 4	Inversion of Port 1 Pin 4	Inversion of Port 0 Pin 4	Inversion of Port 7 Pin 2	Inversion of Port 6 Pin 2	Inversion of Port 5 Pin 2	Inversion of Port 4 Pin 2	Inversion of Port 3 Pin 2	Inversion of Port 2 Pin 2	Inversion of Port 1 Pin 2	Inversion of Port 0 Pin 2

**Inversion of port (x):**  
 0 – Normal  
 1 - Inverted

**5 Configuration: Extended with BNI IOL-302-002-K006**

**Configuration of inputs /outputs 41<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	8	7	6	5	4	3	2	1	16	15	14	13	12	11	10	9
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	-	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

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
	<b>Extension port</b>															
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 of port (x):**  
 0 - Input  
 1 - Output

**5 Configuration: Extended with BNI IOL-302-002-K006**

**Safe state of outputs 42<sub>hex</sub>**

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<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	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	

Byte	2								3							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Sub-index	12		11		10		9		16		15		14		13	
	<b>Extension port</b>															
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: Extended with BNI IOL-302-002-K006**

Safe state of the outputs on Pin 2  
43<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	4		3		2		1		8		7		6		5	
Description	Safe state Port 3 Pin 2		Safe state Port 2 Pin 2		Safe state Port 1 Pin 2		Safe state Port 0 Pin 2		-		Safe state Port 6 Pin 2		Safe state Port 5 Pin 2		Safe state Port 4 Pin 2	

Byte	2								3							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Sub-index	12		11		10		9		16		15		14		13	
	Extension port															
Description	Safe state Port 3 Pin 2		Safe state Port 2 Pin 2		Safe state Port 1 Pin 2		Safe state Port 0 Pin 2		Safe state Port 7 Pin 2		Safe state Port 6 Pin 2		Safe state Port 5 Pin 2		Safe state Port 4 Pin 2	

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: Extended with BNI IOL-302-002-K006**

**Voltage monitoring**  
44<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	8	7	6	5	4	3	2	1					12	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	-	-	-	-	Output 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					28	27		25
<b>Extension port</b>																
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	-	-	-	-	Output off (UA too low)	Undervoltage UA	-	Undervoltage US

**Monitoring the outputs** 45<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	8	7	6	5	4	3	2	1	16	15	14	13	12	11	10	9
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	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



**5 Configuration: Extended with BNI IOL-302-002-K006**

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
	<b>Extension port</b>															
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	8	7	6	5	4	3	2	1	16	15	14	13	12	11	10	9
Description	-	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 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

Byte	2								3							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Subindex	24	23	22	21	20	19	18	17	32	31	30	29	28	27	26	25
	<b>Extension port</b>															
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

**5 Configuration: Extended with BNI IOL-302-002-K006**


**Setting the serial number 54<sub>hex</sub>**

The serial number has a default value of 16x00<sub>hex</sub>.  
 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.

**Configuration of the Extension port 55<sub>hex</sub>**

Configuration	Index 55 <sub>hex</sub> value
BNI IOL-302-002-K006	0
BNI IOL-302-002-K006 with BNI IOL-302-002-K006	1
BNI IOL-302-002-K006 with BNI IOL-751-V08-K007	2
BNI IOL-302-002-K006 with BNI IOL-751-V10-K007	3
BNI IOL-302-002-K006 with BNI IOL-751-V13-K007	4

---

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

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## 6 Configuration extended with Valve Terminal Connector with 22/24 Valves



### 6.1. IO-Link Data

BNI IOL-302-002-K006, extended with valve terminal connector with 22/24 valves	
Transfer rate	COM2 (38.4 kbaud)
Minimum cycle time	4.5 ms
Process data length	2 byte input, 6 byte output

### 6.2. Process Data/ Input Data

Process data length of 2 bytes:

Byte	0								1							
Bit	7	6	5	4	3	2	1	0	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	-	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

### 6.3. Process Data/ Output Data

Process data length of 6 bytes

Byte	0								1							
Bit	7	6	5	4	3	2	1	0	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	-	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

**6 Configuration extended with Valve Terminal Connector with 22/24 Valves**

Byte	2								3							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
	<b>Valve terminal on the Extension port</b>															
<b>Description</b>	-	-	-	-	* Valve 12 – Coil A	Valve 11 – Coil A	Valve 10 – Coil A	Valve 09 – Coil A	Valve 08 – Coil A	Valve 07 – Coil A	Valve 06 – Coil A	Valve 05 – Coil A	Valve 04 – Coil A	Valve 03 – Coil A	Valve 02 – Coil A	Valve 01 – Coil A

\* No function for V013

Byte	4								5							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
	<b>Valve terminal on the Extension port</b>															
<b>Description</b>	-	-	-	-	* Valve 12 – Coil B	Valve 11 – Coil B	Valve 10 – Coil B	Valve 09 – Coil B	Valve 08 – Coil B	Valve 07 – Coil B	Valve 06 – Coil B	Valve 05 – Coil B	Valve 04 – Coil B	Valve 03 – Coil B	Valve 02 – Coil B	Valve 01 – Coil B

\* No function for V013

**6 Configuration extended with Valve Terminal Connector with 22/24 Valves**

**6.4. Parameter Data / Demand Data**

	DPP	ISDU		Parameter	Data width	Access rights	Default value
	Index	Index	Subindex				
<b>Identification data</b>	07hex			Vendor ID	2 bytes	Read only	0378hex
	08hex						
	09hex			Device ID	3 bytes		05 0B 02hex
	0Ahex						05 0B 03hex
	0Bhex						05 0B 04hex
		10hex	0	Vendor Name	7 bytes		BALLUFF
		11hex	0	Vendor text	15 bytes		www.balluff.com
		12hex	0	Product name			BNI IOL-302-002-K006 with BNI IOL-751-V08-K007 BNI IOL-302-002-K006 with BNI IOL-751-V10-K007 BNI IOL-302-002-K006 with BNI IOL-751-V13-K007
		13hex	0	Product ID	20 bytes		BNI007Z with BNI006N BNI007Z with BNI006P BNI007Z with BNI006R
		14hex	0	Product text			Sensor/Actor hub M12 extended with Valve plug CG25 24 2-3 Sensor/Actor hub M12 extended with Valve plug CG13 24 2-3 Sensor/Actor hub M12 extended with Valve plug CG22-23 22 2-3
		15hex	0	Serial number	16 bytes		0hex
		16hex	0	Hardware revision			
		17hex	0	Firmware revision			
	18hex	0	Application-specific tag	32 bytes	0hex		

	DPP	ISDU		Parameter	Data width	Access rights	Default Value
	Index	Index	Subindex				
<b>Parameter data</b>		40hex 64	0 1-16	Inversion of the inputs	2 bytes	Read/write	0hex
		41hex 65	0 1-16	Config. inputs/outputs	2 bytes	Read/write	0hex
		42hex 66	0 1-32	Safe state on Pin 4	10 bytes	Read/write	0hex
		43hex 67	0 1-8	Safe state on Pin 2	2 bytes	Read/write	0hex
		44hex 68	0 1-23	Voltage monitoring	3 bytes	Read	-
		45hex 69	0 1-40	Output monitoring	6 bytes	Read	-
		46hex 70	0 1-16	Actuator warning	2 bytes	Read	-
		54hex 84	0	Serial number	16 bytes	Read/write	16x00hex
		55hex 85	0	Extension port	1 byte	Read/write	2, 3, 4hex

**6 Configuration extended with Valve Terminal Connector with 22/24 Valves**

**Inversion of the inputs 40<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	8	7	6	5	4	3	2	1	16	15	14	13	12	11	10	9
Description	-	Inversion of Port 6 Pin 4	Inversion of Port 5 Pin 4	Inversion of Port 4 Pin 4	Inversion of Port 3 Pin 4	Inversion of Port 2 Pin 4	Inversion of Port 1 Pin 4	Inversion of Port 0 Pin 4	-	Inversion of Port 6 Pin 2	Inversion of Port 5 Pin 2	Inversion of Port 4 Pin 2	Inversion of Port 3 Pin 2	Inversion of Port 2 Pin 2	Inversion of Port 1 Pin 2	Inversion of Port 0 Pin 2

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

**Configuration of inputs/outputs 41<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	8	7	6	5	4	3	2	1	16	15	14	13	12	11	10	9
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	-	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 of port (x):**  
 0 - Input  
 1 - Output

## 6 Configuration extended with Valve Terminal Connector with 22/24 Valves

### Safe state of Outputs 42<sub>hex</sub>

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 Pin 4, 42<sub>hex</sub>

Byte	0								1							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Subindex	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	

Byte	2								3							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Subindex									31		29		27		25	
Description	Valve terminal on the extension port															
Description	-		-		-		-		* Valve 12 – Coil A		Valve 11 – Coil A		Valve 10 – Coil A		Valve 09 – Coil A	

\* No function for V013

Byte	4								5							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Subindex	23		21		19		17		15		13		11		9	
Description	Valve terminal on the extension port															
Description	Valve 08 – Coil A		Valve 07 – Coil A		Valve 06 – Coil A		Valve 05 – Coil A		Valve 04 – Coil A		Valve 03 – Coil A		Valve 02 – Coil A		Valve 01 – Coil A	

**6 Configuration extended with Valve Terminal Connector with 22/24 Valves**

Byte	6								7							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Subindex									32		30		28		26	
	Valve terminal on the extension port															
Description									* Valve 12 – Coil B		Valve 11 – Coil B		Valve 10 – Coil B		Valve 09 – Coil B	

\* No function for V013

Byte	8								9							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Subindex	24		22		20		18		16		14		12		10	
	Valve terminal on the extension port															
Description	Valve 08 – Coil B		Valve 07 – Coil B		Valve 06 – Coil B		Valve 05 – Coil B		Valve 04 – Coil B		Valve 03 – Coil B		Valve 02 – Coil B		Valve 01 – Coil B	

Safe state of the outputs on Pin 2 43<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	4		3		2		1		8		7		6		5	
Description	Safe state Port 3 Pin 2		Safe state Port 2 Pin 2		Safe state Port 1 Pin 2		Safe state Port 0 Pin 2		-		Safe state Port 6 Pin 2		Safe state Port 5 Pin 2		Safe state Port 4 Pin 2	

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



**6 Configuration extended with Valve Terminal Connector with 22/24 Valves**

Voltage monitoring  
44<sub>hex</sub>

Byte	0								1							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Subindex	8	7	6	5	4	3	2	1	16				12	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	-	-	-	-	Output off (UA too low)	Undervoltage UA	-	Undervoltage US

Byte	2							
Bit	7	6	5	4	3	2	1	0
Subindex		23				19		17
Valve terminal on the extension port								
Description	-	Overload UA	-	-	-	Undervoltage UA	-	Undervoltage US

**6 Configuration extended with Valve Terminal Connector with 22/24 Valves**

**Monitoring the outputs**  
45<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	8	7	6	5	4	3	2	1	16	15	14	13	12	11	10	9
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	2								3							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Sub-index					39	37	35	33	31	29	27	25	23	21	19	17
Extension port																
Description	-	-	-	-	* Valve 12 – Coil A	Valve 11 – Coil A	Valve 10 – Coil A	Valve 09 – Coil A	Valve 08 – Coil A	Valve 07 – Coil A	Valve 06 – Coil A	Valve 05 – Coil A	Valve 04 – Coil A	Valve 03 – Coil A	Valve 02 – Coil A	Valve 01 – Coil A

\* No function for V013

Byte	4								5							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Sub-index					40	38	36	34	32	30	28	26	24	22	20	18
Extension port																
Description	-	-	-	-	* Valve 12 – Coil B	Valve 11 – Coil B	Valve 10 – Coil B	Valve 09 – Coil B	Valve 08 – Coil B	Valve 07 – Coil B	Valve 06 – Coil B	Valve 05 – Coil B	Valve 04 – Coil B	Valve 03 – Coil B	Valve 02 – Coil B	Valve 01 – Coil B

\* No function for V013

**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	8	7	6	5	4	3	2	1	16	15	14	13	12	11	10	9
Description	-	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 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

## 6 Configuration extended with Valve Terminal Connector with 22/24 Valves

### Setting the serial number 54<sub>hex</sub>

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.

### Configuration of the extension port 55<sub>hex</sub>

Configuration	Index 55 <sub>hex</sub> value
BNI IOL-302-002-K006	0
BNI IOL-302-002-K006 with BNI IOL-302-002-K006	1
BNI IOL-302-002-K006 with BNI IOL-751-V08-K007	2
BNI IOL-302-002-K006 with BNI IOL-751-V10-K007	3
BNI IOL-302-002-K006 with BNI IOL-751-V13-K007	4



#### Note

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

**6 Configuration extended with Valve Terminal Connector with 22/24 Valves**

**6.5. 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

**6.6. Events**

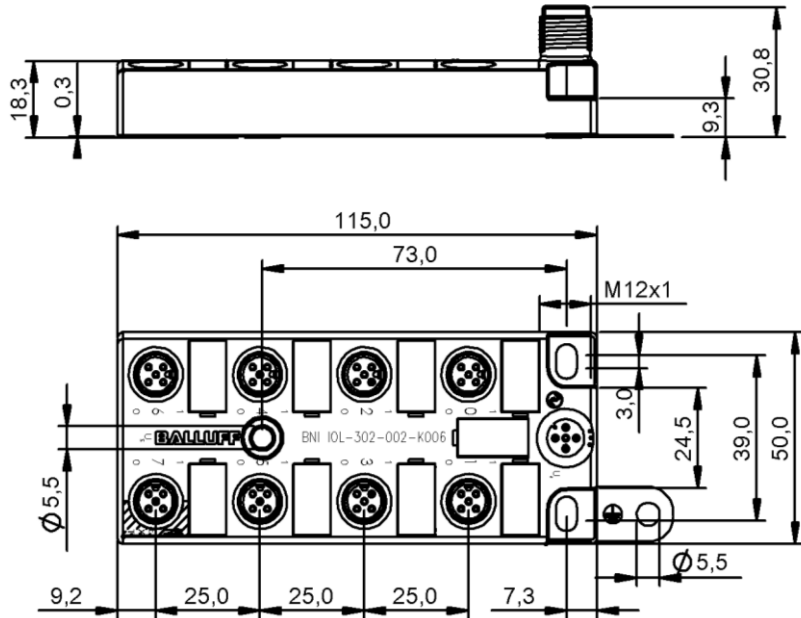
IO-Link Revision 1.0	
Event code	Description
0x5112	Low sensor voltage (US)
0x5114	Low actuator voltage (UA)
0x5410	Output stages
0x8DF0	Retry at the extension port
0x8DF1	Device lost at the extension port
0x8DF2	Wrong device at the extension port
IO-Link Revision 1.1	
Event code	Description
0x5111	Low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

## 7 IO-Link Functions

- 7.1. 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.
- 7.2. 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 operating manual of the respective IO-Link master.
- 7.3. 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.
- 7.4. Restoring the Factory Settings** The factory settings on the device can be restored by carrying out the "restore factory settings" system command.  
82<sub>hex</sub> must be written to Index 2 Subindex 0 for the command.

**8 Technical Data**

**8.1. Dimensions**



**8.2. Mechanical Data**

Housing material	Plastic, transparent
IO-Link port	IO-Link port M12, A-coded, male
I/O ports	M12x1, A-coded, female (8 piece)
Weight	90 g
Dimension (L × W × H, without connector)	115 × 50 × 30.8 mm

**8.3. Electrical Data**

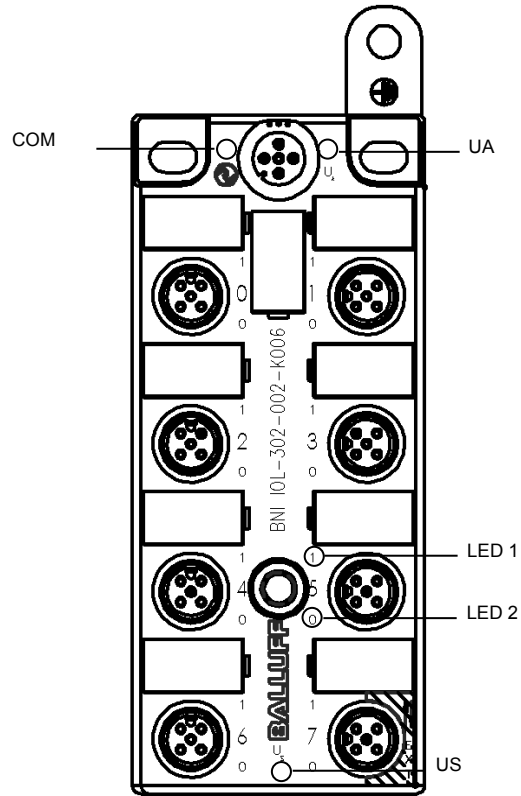
Supply voltage	18–30.2 V DC, corresponding to EN 61131-2
Ripple	< 1%
Current consumption without load	≤ 65 mA
Load current (PIN 1)	Max. 200 mA (temperature-dependent)
Load current per output (PIN 2.4)	Max. 300 mA (temperature-dependent)
Inputs	PNP, type 3

**8.4. Operating conditions**

Operating temperature	–5 °C ... +55 °C
Storage temperature	–25 °C ... +70 °C
EMC Immunity tests: Emission tests:	EN 61000-6-2:2005 AC:2005 EN 61000-6-4:2007 A1:2011
Degree of protection	IP67 (only in plugged-in and screwed state)
Vibration/shock	EN 60068 Part 2-6/27

## 9 Function Indicators

### 9.1. Function Indicators



#### LED indicator module status

	Indicator	Function
<b>IO-Link communication</b>	Green	No communication
	Green, negatively pulsed	Communication OK
	Red	Communication overload
	Off	Module is without voltage
<b>US LED</b>	Green	Sensor power supply is OK
	Green, flashing quickly	Undervoltage < 18 V
	Off	Module is without voltage
<b>UA LED</b>	Green	Actuator power supply is OK
	Green, flashing quickly	Undervoltage < 18 V
	Off	No actuator power supply

**9 Function Indicators**

**Digital LED indicators for inputs/outputs**

**LED 2, input/output on Pin 4 and LED 1, input/output on Pin 2**

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**

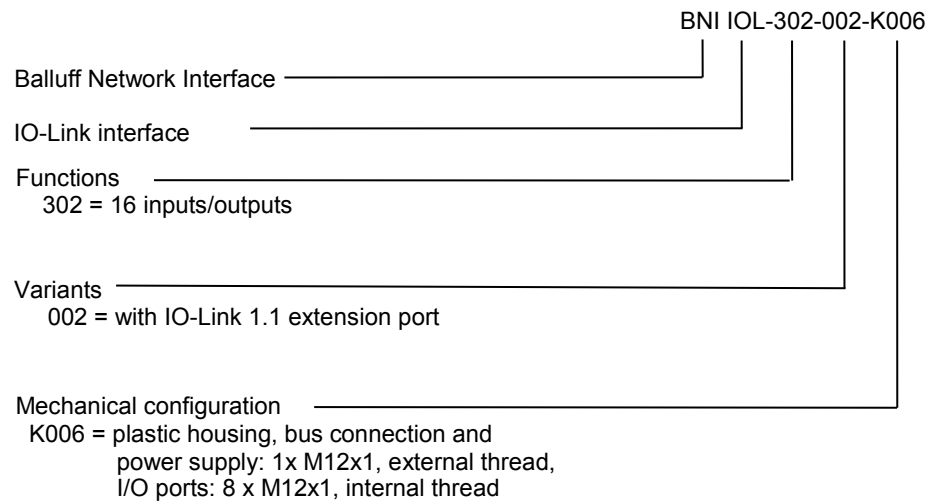
The table is valid if the extension port is active. If the extension port is used as a standard I/O, then the description from "Digital LED indicators for inputs/outputs" can be used.

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
Yellow	Actuator power supply active



## 10 Appendix

### 10.1. Type Code



### 10.2. Ordering Information

Type code	Ordering code
BNI IOL-302-002-K006	BNI007Z

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