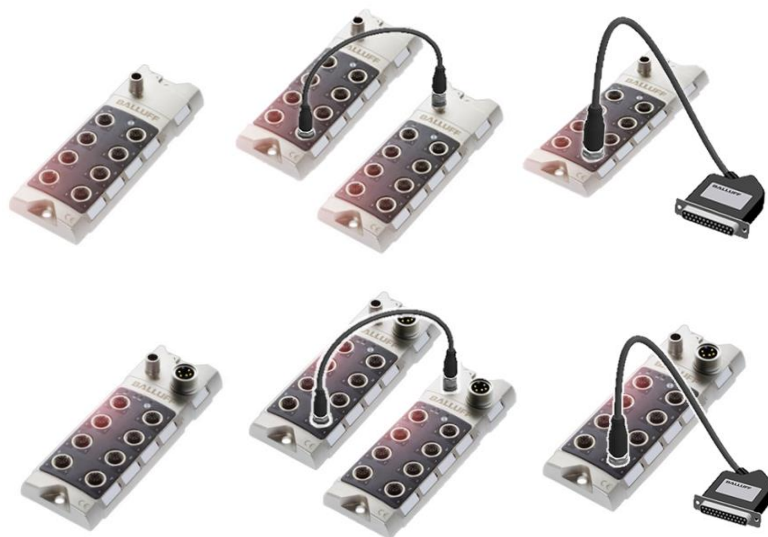


BNI IOL-302-S02-Z012-C11 **IO-Link 1.1 Sensor/Actuator Hub** **with Extension Port** **User's Guide**





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1 Notes to the user

- 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. Functionally this compact, cost-effective module is similar to a passive splitter box; it records digital 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** This guide is arranged so that one chapter builds upon the other.
Chapter 2: Basic safety instructions
.....
- 1.3. 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.
-
- 1.4. Symbols**
-  **Attention!**
This symbol represents a safety instruction which must absolutely be followed.
-
-  **Note**
This symbol indicates general notes.
-
- 1.5. Abbreviations**
- | | |
|----------|---|
| BNI | Balluff Network Interface |
| DPP | Direct Parameter Page |
| GND | Ground |
| I/O port | Digital input/output port |
| IOL | IO-Link |
| ISDU | Indexed Service Data Unit (formerly SPDU) |
| EMC | Electromagnetic compatibility |
| FE | Function earth |
| LSB | Least Significant Bit |
| MSB | Most Significant Bit |
| SC | Short-circuit |
| UA | Actuator supply |
| US | Sensor supply |
- 1.6. Differing representations** Product views and illustrations in this guide may differ from the actual product. These serve for illustration only.

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 persons 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

This device meets the specifications for EMC, Category A. It may cause HF noise.

The owner/operator must take appropriate precautionary measures against this for its use.

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 using an aggressive medium (e.g. chemicals, oils, lubricants and coolants in high concentration (such as with low water content)), the compatibility of the material with the respective medium must first be tested. No warranty claims will be honored for faults or damage to the BNI modules caused by the use of 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

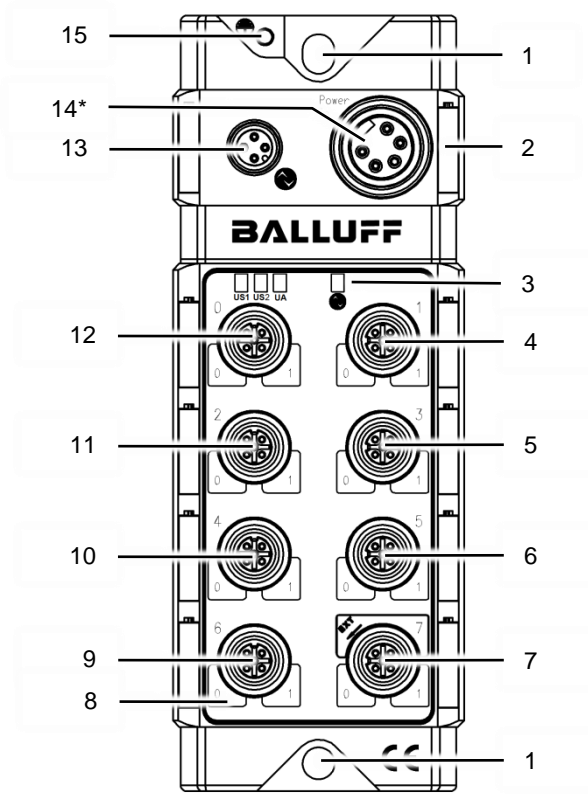


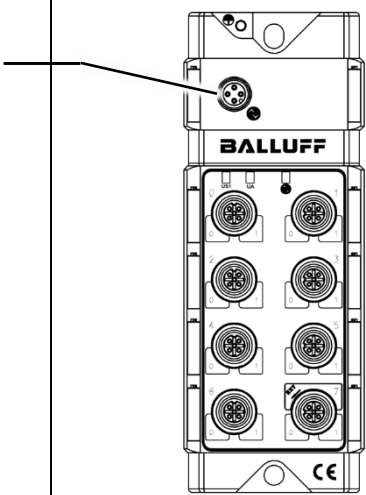
Fig. 3.1: Connections

- | | | | |
|---|-----------------------------|-----|---|
| 1 | Mounting hole | 9 | Port 6 |
| 2 | Label | 10 | Port 4 |
| 3 | Communication status | 11 | Port 2 |
| 4 | Port 1 | 12 | Port 0 |
| 5 | Port 3 | 13 | IO-Link interface |
| 6 | Port 5 | 14* | Additional power connection
(Depends on device version,
see "Power Supply") |
| 7 | Port 7 / extension port | 15 | FE connection |
| 8 | Pin/port LED: signal status | | |

3 First steps

3.2. Power supply Three different types of connection are used for supplying the module (US1), the sensors (US2) and the actuators (UA). The following connections are available depending on the device type:

BNI IOL-302-S02-Z012-C11



M12 ———→

Type	Connection used
US1 (module and sensors)	M12
US2 (sensors)	-
UA (actuators)	M12

3 First steps

3.3. Mechanical connection

The BNI IOL modules are attached using 2 M6 screws and 2 washers.

3.4. Electrical connection

The BNI IOL-... modules do not require their own supply voltage. Supply voltage is provided via the IO-Link interface and the higher-level IO-Link master module. You can however use an additional AUX terminal for supplying the sensors and actuators connected to the module. The connections are described in the previous section.

Function ground

The modules are equipped with a ground connection (FE).

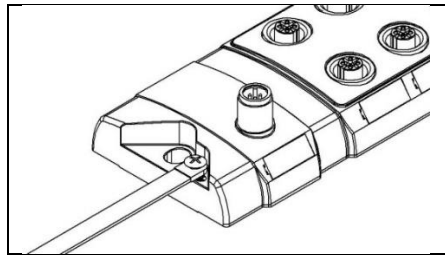


Fig. 3.2: FE connection

- Connect the sensor hub module to the ground connection.



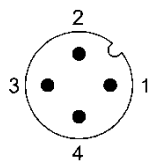
Note

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

IO-Link connection

The IO-Link connection is established via an M12 connector (A-coded, male). This connection is used for supplying the module. For some devices this terminal is also used for powering the sensors and/or actuators connected to the module.

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



Pin	Requirements
1	Supply voltage for module (US1), +24 V, max. 4 A
2	Supply voltage for actuators (UA), +24 V, max. 4 A
3	GND, reference potential
4	C/Q, IO-Link data transmission channel



Attention!

Overcurrent. Defective or missing fuses in the voltage supply for the sensor and actuator will result in damage to them. Use a fuse or an intelligent power supply (current monitoring designed for maximum 4 A) which turns off power when overcurrent is present.

Connecting the sensor hub

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



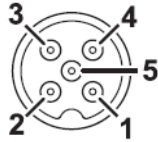
Note

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

3 First steps

Digital sensors / actuators

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



Pin	Requirements
1	+24 V, 200 mA
2	PNP-Input 2 / PNP-Output 2
3	0 V, GND
4	PNP-Input 1 / PNP-Output 1
5	FE



Note

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

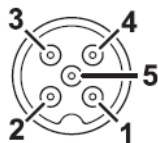


Note

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

Extension port

Port 7 (M12, A-coded, female) when extension port function is enabled



Pin	Requirements
1	+24 V, 2 A (power supply for sensor/module)
2	+24 V, 2 A (power supply for actuator)
3	0 V, GND
4	Communication
5	FE



Note

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

3 First steps

3.5. Device version

Device versions	Functionality
BNI IOL-302-S02-Z012-C11	16 digital inputs/outputs with single-channel monitoring, IO-Link V1.1 with extension port

3.6. Extension port

These modules use port 7 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 use port 7 for one of the following connected modules:

- Device only
- With identical device version
- With 22/24 valve interface



4 Configuration overview

4.1. Introduction

The module can be configured using the extension port in one of five modes, resulting in 20 different configuration possibilities. The following provides detailed technical data preceded by a summary of the essential functions and properties.

4.2. Input process data

The following table shows the contents and structure of the incoming process data. A detailed description can be found in the next sections.

	Digital input status		Diagnostics info			
	Pin4	Pin2	Voltage monitoring	Output port monitoring		
				Short-circuit		
Device version	Byte 0	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5
BNI IOL-302-S02-Z012-C11	●	●	●	●	●	●

● = available

4.3. Output process data

The following table shows the contents and structure of the outgoing process data. Availability and contents depend on which device version is used. A detailed description can be found in the next sections.




	Status digital output	
	Pin4	Pin2
Device version	Byte 0	Byte 1
BNI IOL-302-S02-Z012-C11	●	●

● = available

4 Configuration overview

4.4. Configuration of the extension port

The following devices may be connected to the extension port:

Configuration	Application
Device only (extension port not active)	
Device with identical device	
Device with BNI IOL-751-V08-K007	
Device with BNI IOL-751-V10-K007	
Device with BNI IOL-751-V13-K007	

The device connected to the extension port is referred to in the user's guide as the "second device".

i Note
The command for resetting to factory defaults (Factory reset) has no effect on the configuration of the extension port.

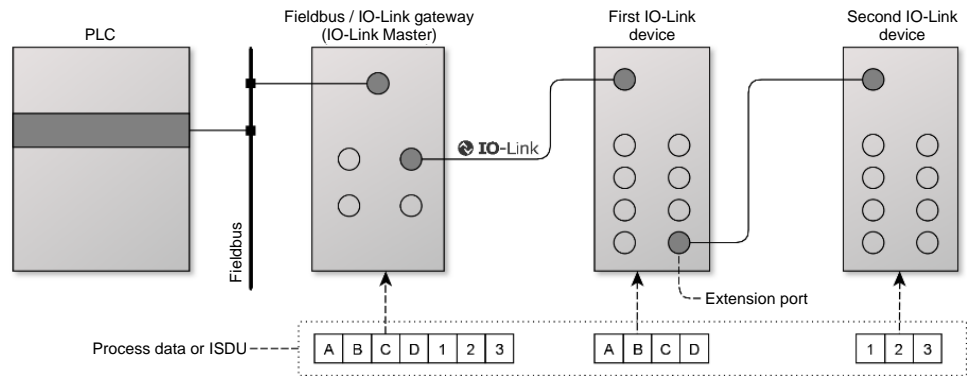
i Note
The process data length depends on the configuration.

The extension port can be configured using parameter 0x55. If data storage or validation is used, configuration for validation must follow (compatible). Depending on the system the device code may need to be entered (parameter data table) or the device code read from the IODD.

4 Configuration overview

4.5. Data handling with extension port

If the extension port is enabled, the contents and length of the process data (or ISDU) are calculated as a unification of the process data (or ISDU) provided by both parties.
 PD result = PD of the first device + PD of the second device
 ISDU result = ISDU of the first device + ISDU of the second device
 The + operation adds the second device.



5 Configuration: Device alone, extension port inactive

5.1. Device version This section describes the following device versions.
The extension port is not activated.



5.2. Configuration of the extension port The factory default is extension port inactive.

Configuration	Value of IDSU-Index 55 _{hex} (85)
Device alone (extension port not active)	0
Device with identical device	1
Device with BNI IOL-751-V08-K007	2
Device with BNI IOL-751-V10-K007	3
Device with BNI IOL-751-V13-K007	4

5.3. IO-Link Data

Device version	Length (bytes)		Minimum cycle time	Transmission rate
	PD ON	PD OFF		
BNI IOL-302-S02-Z012-C11	6	2	5.6 ms	COM2

COM2 = 38.4 kBaud

5 Configuration: Device alone, extension port inactive

5.4. Process Data/Input Data

The following table shows which types of data are available:

- The first two bytes always indicate the input status for all device versions.
- The following bytes contain the diagnostic information. The order of these bytes is determined, but availability is optional.

● BNI IOL-302-S02-Z012-C11	Byte	0								1							
	Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
	Input status of ...	Port 7 pin 4	Port 6 pin 4	Port 5 pin 4	Port 4 pin 4	Port 3 pin 4	Port 2 pin 4	Port 1 pin 4	Port 0 pin 4	Port 7 pin 2	Port 6 pin 2	Port 5 pin 2	Port 4 pin 2	Port 3 pin 2	Port 2 pin 2	Port 1 pin 2	Port 0 pin 2
●	Byte	2								3							
	Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
	Volt. monitoring	SC-Port 7 Pin 1	SC-Port 6 Pin 1	SC-Port 5 Pin 1	SC-Port 4 Pin 1	SC-Port 3 Pin 1	SC-Port 2 Pin 1	SC-Port 1 Pin 1	SC-Port 0 Pin 1	-	-	-	-	Outputs off (UA too low)	Undervoltage UA	-	Undervoltage US1
●	Byte	4								5							
	Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
	Short circuit on ...	Port 7 pin 4	Port 6 pin 4	Port 5 pin 4	Port 4 pin 4	Port 3 pin 4	Port 2 pin 4	Port 1 pin 4	Port 0 pin 4	Port 7 pin 2	Port 6 pin 2	Port 5 pin 2	Port 4 pin 2	Port 3 pin 2	Port 2 pin 2	Port 1 pin 2	Port 0 pin 2

● = available

5 Configuration: Device alone, extension port inactive

5.5. Process Data/
Output Data

Outgoing process data are the output status for the device version.

● BNI IOL-302-S02-Z012-C11	Byte	0								1							
	Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
	Output status of ...	Port 7 pin 4	Port 6 pin 4	Port 5 pin 4	Port 4 pin 4	Port 3 pin 4	Port 2 pin 4	Port 1 pin 4	Port 0 pin 4	Port 7 pin 2	Port 6 pin 2	Port 5 pin 2	Port 4 pin 2	Port 3 pin 2	Port 2 pin 2	Port 1 pin 2	Port 0 pin 2

● = available

5.6. Parameter data/
identification data and
device parameters

	DPP	ISDU		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		05 0E 70hex
	0Ahex						
	0Bhex						
		10hex 16	0	Manufacturer name	7 bytes		BALLUFF
		11hex 17	0	Manufacturer text	15 bytes		www.balluff.com
		12hex 18	0	Product name			BNI IOL-302-S02-Z012-C11
		13hex 19	0	Product ID	7 bytes		BNI00F4
		14hex 20	0	Product text			Sensor Hub / Actuator Hub M12
	15hex 21	0	Serial number	16 bytes	various		
	16hex 22	0	Hardware Revision				
	17hex 23	0	Firmware Revision				
	18hex 24	0	Application-specific tag	32 bytes	Reading/writing	0hex	
Device		0Chex 12	0	Access blocks Data block	2 bytes	Reading/writing	0hex

5 Configuration: Device alone, extension port inactive

5.7. Parameter data – device configuration – overview

BNI IOL-302-S02-Z012-C11	ISDU		Parameter	Data width	Access rights	Standard Value
	Index	Subindex				
	● 40 _{hex} 64	0 1-16	Inversion of the inputs	2 bytes	Reading/writing	0 _{hex}
	● 42 _{hex} 66	0 1-8	Safe state on Pin 4	2 bytes	Reading/writing	0 _{hex}
	● 43 _{hex} 67	0 1-8	Safe state on Pin 2	2 bytes	Reading/writing	0 _{hex}
	● 44 _{hex} 68	0 1-16	Voltage monitoring	2 bytes	Read	-
	● 45 _{hex} 69	0 1-16	Output monitoring	2 bytes	Read	-
	● 54 _{hex} 84	0	Serial number	16 bytes	Reading/writing	16x00 _{hex}
	● 55 _{hex} 85	0	Extension port	1 byte	Reading/writing	0 _{hex}

● = Parameter available

5.8. Parameter data – details

Inversion of the inputs 40_{hex}

Byte	0								1							
	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
Inversion of...	Port 7 pin 4	Port 6 pin 4	Port 5 pin 4	Port 4 pin 4	Port 3 pin 4	Port 2 pin 4	Port 1 pin 4	Port 0 pin 4	Port 7 pin 2	Port 6 pin 2	Port 5 pin 2	Port 4 pin 2	Port 3 pin 2	Port 2 pin 2	Port 1 pin 2	Port 0 pin 2

Inversion of port (x):

- 0 – Normal
- 1 - Inverted

5 Configuration: Device alone, extension port inactive

Safe state of the outputs
42hex, 43hex

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 states can be configured for each output pin.

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

Safe state of the outputs on pin 4
42hex

Byte	0								1							
	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	
Safe state of ...	Port 3 pin 4		Port 2 pin 4		Port 1 pin 4		Port 0 pin 4		Port 7 pin 4		Port 6 pin 4		Port 5 pin 4		Port 4 pin 4	

Safe state of the outputs on pin 2
43hex\

Byte	0								1							
	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	
Safe state of ...	Port 3 pin 2		Port 2 pin 2		Port 1 pin 2		Port 0 pin 2		Port 7 pin 2		Port 6 pin 2		Port 5 pin 2		Port 4 pin 2	

5 Configuration: Device alone, extension port inactive

Voltage monitoring
44hex

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	10	9
Volt. monitoring	SC-Port 7 Pin 1	SC-Port 6 Pin 1	SC-Port 5 Pin 1	SC-Port 4 Pin 1	SC-Port 3 Pin 1	SC-Port 2 Pin 1	SC-Port 1 Pin 1	SC-Port 0 Pin 1	-	-	-	-	Outputs off (UA too low)	Undervoltage UA	-	Undervoltage US1

Output monitoring
45hex

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
Short circuit on...	Port 7 pin 4	Port 6 pin 4	Port 5 pin 4	Port 4 pin 4	Port 3 pin 4	Port 2 pin 4	Port 1 pin 4	Port 0 pin 4	Port 7 pin 2	Port 6 pin 2	Port 5 pin 2	Port 4 pin 2	Port 3 pin 2	Port 2 pin 2	Port 1 pin 2	Port 0 pin 2

Setting the serial number
54hex

The serial number has a factory set value consisting of 16 ASCII characters, e.g. 0E-G550389-1D-26. The serial number of the unit cannot be changed. For reasons of compatibility this parameter can be used to assign a custom serial number.



Note

The command for resetting to factory defaults (Factory reset) resets the serial number to the factory set value.

Configuration of the extension port
55hex

Configuration	Value of IDSU-Index 55hex
Device alone (extension port not active)	0
Device with identical device	1
Device with BNI IOL-751-V08-K007	2
Device with BNI IOL-751-V10-K007	3
Device with BNI IOL-751-V13-K007	4



Note

The command for resetting to factory defaults (Factory reset) has no effect on the configuration of the extension port.

6 Configuration: BNI IOL-302-S02-Z012-C11 extended with the same device

BNI IOL-302-S02-Z012-C11 with
- BNI IOL-302-S02-Z012-C11



6.1. Configuration of the extension port

Configuration	Value of IDSU-Index 55 _{hex}
Device alone (extension port not active)	0
Device with identical device	1
Device with BNI IOL-751-V08-K007	2
Device with BNI IOL-751-V10-K007	3
Device with BNI IOL-751-V13-K007	4

6.2. IO-Link Data

BNI IOL-302-S02-Z012-C11 with identical device	
Transmission rate	COM2 (38.4 kBaud)
Minimum cycle time	8.0 ms
Process data length	12 bytes input / 4 bytes output

6 Configuration: BNI IOL-302-S02-Z012-C11 extended with the same device

6.3. Process Data/Input Data

Byte	0								1							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Input status of ...	Extension port Connection status	Port 6 pin 4	Port 5 pin 4	Port 4 pin 4	Port 3 pin 4	Port 2 pin 4	Port 1 pin 4	Port 0 pin 4	Extension port Validation status	Port 6 pin 2	Port 5 pin 2	Port 4 pin 2	Port 3 pin 2	Port 2 pin 2	Port 1 pin 2	Port 0 pin 2

Byte	2								3							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Volt. monitoring	SC-Port 7 Pin 1	SC-Port 6 Pin 1	SC-Port 5 Pin 1	SC-Port 4 Pin 1	SC-Port 3 Pin 1	SC-Port 2 Pin 1	SC-Port 1 Pin 1	SC-Port 0 Pin 1	-	-	-	-	Outputs off (UA too low)	Undervoltage UA	-	Undervoltage US1

Byte	4								5							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Short circuit on...	Port 7 pin 4	Port 6 pin 4	Port 5 pin 4	Port 4 pin 4	Port 3 pin 4	Port 2 pin 4	Port 1 pin 4	Port 0 pin 4	Port 7 pin 2	Port 6 pin 2	Port 5 pin 2	Port 4 pin 2	Port 3 pin 2	Port 2 pin 2	Port 1 pin 2	Port 0 pin 2

6 Configuration: BNI IOL-302-S02-Z012-C11 extended with the same device

Byte	6								7							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
	Extension port															
Input status of ...	Port 7 pin 4	Port 6 pin 4	Port 5 pin 4	Port 4 pin 4	Port 3 pin 4	Port 2 pin 4	Port 1 pin 4	Port 0 pin 4	Port 7 pin 2	Port 6 pin 2	Port 5 pin 2	Port 4 pin 2	Port 3 pin 2	Port 2 pin 2	Port 1 pin 2	Port 0 pin 2

Byte	8								9							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
	Extension port															
Volt. monitoring	SC-Port 7 Pin 1	SC-Port 6 Pin 1	SC-Port 5 Pin 1	SC-Port 4 Pin 1	SC-Port 3 Pin 1	SC-Port 2 Pin 1	SC-Port 1 Pin 1	SC-Port 0 Pin 1	-	-	-	-	Outputs off (UA too low)	Undervoltage UA	-	Undervoltage US1

Byte	10								11							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
	Extension port															
Short-circuit	Port 7 pin 4	Port 6 pin 4	Port 5 pin 4	Port 4 pin 4	Port 3 pin 4	Port 2 pin 4	Port 1 pin 4	Port 0 pin 4	Port 7 pin 2	Port 6 pin 2	Port 5 pin 2	Port 4 pin 2	Port 3 pin 2	Port 2 pin 2	Port 1 pin 2	Port 0 pin 2

6 Configuration: BNI IOL-302-S02-Z012-C11 extended with the same device

6.4. Process Data/
Output Data

Byte	0								1							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Output status of ...	-	Port 6 pin 4	Port 5 pin 4	Port 4 pin 4	Port 3 pin 4	Port 2 pin 4	Port 1 pin 4	Port 0 pin 4	-	Port 6 pin 2	Port 5 pin 2	Port 4 pin 2	Port 3 pin 2	Port 2 pin 2	Port 1 pin 2	Port 0 pin 2

Byte	2								3							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Output status of ...	Extension port															
	Port 7 pin 4	Port 6 pin 4	Port 5 pin 4	Port 4 pin 4	Port 3 pin 4	Port 2 pin 4	Port 1 pin 4	Port 0 pin 4	Port 7 pin 2	Port 6 pin 2	Port 5 pin 2	Port 4 pin 2	Port 3 pin 2	Port 2 pin 2	Port 1 pin 2	Port 0 pin 2

6 Configuration: BNI IOL-302-S02-Z012-C11 extended with the same device

6.5. Parameter data/ identification data and device parameters

	DPP	ISDU		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		05 0E 71hex
	0Ahex						
	0Bhex						
		10hex 16	0	Manufacturer name	7 bytes		BALLUFF
		11hex 17	0	Manufacturer text	15 bytes		www.balluff.com
		12hex 18	0	Product name			BNI IOL-302-S02-Z012-C11 with BNI IOL-302-S02-Z012-C11
		13hex 19	0	Product ID			BNI00F4 with BNI00F4
		14hex 20	0	Product text			Sensor Hub / Actuator Hub M12 extended with Sensor Hub / Actuator Hub M12
		15hex 21	0	Serial number	16 bytes		
		16hex 22	0	Hardware Revision			
		17hex 23	0	Firmware Revision			
	18hex 24	0	Application-specific tag	32 bytes	Reading/writing	0hex	
Device param.		0Chex 12	0	Access block Data block	2 bytes	Reading/writing	0hex

6.6. Parameter data/ device configuration

	ISDU		Parameter	Data width	Access rights	Standard Value
	Index	Subindex				
Parameter data	40hex 64	0 1-32	Inversion of the inputs	4 bytes	Reading/writing	0hex
	42hex 66	0 1-16	Safe state on Pin 4	4 bytes	Reading/writing	0hex
	43hex 67	0 1-16	Safe state on Pin 2	4 bytes	Reading/writing	0hex
	44hex 68	0 1-32	Volt. monitoring	4 bytes	Read	-
	45hex 69	0 1-32	Output monitoring	4 bytes	Read	-
	54hex 84	0	Serial number	16 bytes	Reading/writing	0hex
	55hex 85	0	Extension port	1 byte	Reading/writing	0hex

6 Configuration: BNI IOL-302-S02-Z012-C11 extended with the same device

Inversion of the inputs
40hex

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
Inversion of...	.	Port 6 pin 4	Port 5 pin 4	Port 4 pin 4	Port 3 pin 4	Port 2 pin 4	Port 1 pin 4	Port 0 pin 4	.	Port 6 pin 2	Port 5 pin 2	Port 4 pin 2	Port 3 pin 2	Port 2 pin 2	Port 1 pin 2	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
	Extension port															
Inversion of...	Port 7 pin 4	Port 6 pin 4	Port 5 pin 4	Port 4 pin 4	Port 3 pin 4	Port 2 pin 4	Port 1 pin 4	Port 0 pin 4	Port 7 pin 2	Port 6 pin 2	Port 5 pin 2	Port 4 pin 2	Port 3 pin 2	Port 2 pin 2	Port 1 pin 2	Port 0 pin 2

Inversion of port (x):

- 0 - Normal
- 1 - Inverted

6 Configuration: BNI IOL-302-S02-Z012-C11 extended with the same device

Safe state of the outputs on pin 4
42hex

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 states can be configured for each output pin.

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

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	
Safe state of ...	Port 3 pin 4		Port 2 pin 4		Port 1 pin 4		Port 0 pin 4		.		Port 6 pin 4		Port 5 pin 4		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	
	Extension port															
Safe state of ...	Port 3 pin 4		Port 2 pin 4		Port 1 pin 4		Port 0 pin 4		Port 7 pin 4		Port 6 pin 4		Port 5 pin 4		Port 4 pin 4	

6 Configuration: BNI IOL-302-S02-Z012-C11 extended with the same device

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	
Safe state of ...	Port 3 pin 2		Port 2 pin 2		Port 1 pin 2		Port 0 pin 2		-		Port 6 pin 2		Port 5 pin 2		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															
Safe state of ...	Port 3 pin 2		Port 2 pin 2		Port 1 pin 2		Port 0 pin 2		Port 7 pin 2		Port 6 pin 2		Port 5 pin 2		Port 4 pin 2	

6 Configuration: BNI IOL-302-S02-Z012-C11 extended with the same device

Voltage monitoring
44hex

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	10	9
Volt. monitoring	SC-Port 7 Pin 1	SC-Port 6 Pin 1	SC-Port 5 Pin 1	SC-Port 4 Pin 1	SC-Port 3 Pin 1	SC-Port 2 Pin 1	SC-Port 1 Pin 1	SC-Port 0 Pin 1	-	-	-	-	Outputs off (UA too low)	Undervoltage UA	-	Undervoltage US1

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	26	25
Extension port																
Volt. monitoring	SC-Port 7 Pin 1	SC-Port 6 Pin 1	SC-Port 5 Pin 1	SC-Port 4 Pin 1	SC-Port 3 Pin 1	SC-Port 2 Pin 1	SC-Port 1 Pin 1	SC-Port 0 Pin 1	-	-	-	-	Outputs off (UA too low)	Undervoltage UA	-	Undervoltage US1

Output monitoring
45hex

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
Short circuit on...	-	Port 6 pin 4	Port 5 pin 4	Port 4 pin 4	Port 3 pin 4	Port 2 pin 4	Port 1 pin 4	Port 0 pin 4	Port 7 pin 2	Port 6 pin 2	Port 5 pin 2	Port 4 pin 2	Port 3 pin 2	Port 2 pin 2	Port 1 pin 2	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
Extension port																
Short circuit on...	Port 7 pin 4	Port 6 pin 4	Port 5 pin 4	Port 4 pin 4	Port 3 pin 4	Port 2 pin 4	Port 1 pin 4	Port 0 pin 4	Port 7 pin 2	Port 6 pin 2	Port 5 pin 2	Port 4 pin 2	Port 3 pin 2	Port 2 pin 2	Port 1 pin 2	Port 0 pin 2

6 Configuration: BNI IOL-302-S02-Z012-C11 extended with the same device

Setting the serial number
54hex

The serial number has a factory set value consisting of 16 ASCII characters, e.g. 0E-G550389-1D-26. The serial number of the unit cannot be changed. For reasons of compatibility this parameter can be used to assign a custom serial number.

Configuration of the extension port
55hex

Configuration	Value of IDSU-Index 55hex
Device alone (extension port not active)	0
Device with identical device	1
Device with BNI IOL-751-V08-K007	2
Device with BNI IOL-751-V10-K007	3
Device with BNI IOL-751-V13-K007	4

7 Configuration: BNI IOL-302-S02-Z012-C11 extended with 22/24 valve terminal

Preface: Devices having the following configuration are covered.
 All these device versions have diagnostics information in the incoming process data.
 The only difference is in the max. digital output voltage
 (200 mA vs. 2 A).

BNI IOL-302-S02-Z012-C11 with
 - BNI IOL-751-V08-K007
 - BNI IOL-751-V10-K007
 - BNI IOL-751-V13-K007



7.1. Configuration of the extension port

Configuration	Value of IDSU-Index 55 _{hex}
Device alone (extension port not active)	0
Device with identical device	1
Device with BNI IOL-751-V08-K007	2
Device with BNI IOL-751-V10-K007	3
Device with BNI IOL-751-V13-K007	4

7.2. IO-Link Data

BNI IOL-302-S02-Z012-C11 with 22/24 valve terminal	
Transmission rate	COM2 (38.4 kBaud)
Minimum cycle time	6.8 ms
Process data length	6 bytes input / 6 bytes output

7 Configuration: BNI IOL-302-S02-Z012-C11 extended with 22/24 valve terminal

7.3. Process Data/Input Data

Byte	0								1							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Input status of ...	Extension port connection status								Extension port validation status							
	Port 6 pin 4	Port 5 pin 4	Port 4 pin 4	Port 3 pin 4	Port 2 pin 4	Port 1 pin 4	Port 0 pin 4	Port 6 pin 2	Port 5 pin 2	Port 4 pin 2	Port 3 pin 2	Port 2 pin 2	Port 1 pin 2	Port 0 pin 2		

Byte	2								3							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Volt. monitoring	SC-Port 7 Pin 1	SC-Port 6 Pin 1	SC-Port 5 Pin 1	SC-Port 4 Pin 1	SC-Port 3 Pin 1	SC-Port 2 Pin 1	SC-Port 1 Pin 1	SC-Port 0 Pin 1	-	-	-	-	Outputs off (UA too low)	Undervoltage UA	-	Undervoltage US1

Byte	4								5							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Short circuit on...	Port 7 pin 4	Port 6 pin 4	Port 5 pin 4	Port 4 pin 4	Port 3 pin 4	Port 2 pin 4	Port 1 pin 4	Port 0 pin 4	Port 7 pin 2	Port 6 pin 2	Port 5 pin 2	Port 4 pin 2	Port 3 pin 2	Port 2 pin 2	Port 1 pin 2	Port 0 pin 2

7 Configuration: BNI IOL-302-S02-Z012-C11 extended with 22/24 valve terminal

7.4. Process Data/
Output Data

Byte	0								1							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Output status of ...	-	Port 6 pin 4	Port 5 pin 4	Port 4 pin 4	Port 3 pin 4	Port 2 pin 4	Port 1 pin 4	Port 0 pin 4	-	Port 6 pin 2	Port 5 pin 2	Port 4 pin 2	Port 3 pin 2	Port 2 pin 2	Port 1 pin 2	Port 0 pin 2

Byte	2								3							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
	Valve terminal on the extension port															
Output status of ...	-	-	-	-	* 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 with BNI IOL-751-V13-K007

Byte	4								5							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
	Valve terminal on the extension port															
Output status of ...	-	-	-	-	* 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 with BNI IOL-751-V13-K007

7 Configuration: BNI IOL-302-S02-Z012-C11 extended with 22/24 valve terminal

7.5. Parameter data/ identification data and device parameters

	DPP	ISDU		Parameter	Data width	Access rights	Default Value	
	Index	Index	Sub-index					
Identification data	07 _{hex}			Vendor ID	2 bytes	Read-only	0378 _{hex}	
	08 _{hex}						Device ID	3 bytes
	09 _{hex}			BALLUFF				
	0A _{hex}				www.balluff.com			
	0B _{hex}							
	10 _{hex} 16	0	Manufacturer name	7 bytes			BNI00F4 with - BNI006N - BNI006P - BNI006R	
	11 _{hex} 17	0	Manufacturer text	15 bytes	Sensor Hub / Actuator Hub M12 extended with - Valve connector CG25 24 2-3 - Valve connector CG13 24 2-3 - Valve connector CG13 24 2-3			
	12 _{hex} 18	0	Product name				various	
	13 _{hex} 19	0	Product ID					
	14 _{hex} 20	0	Product text					
	15 _{hex} 21	0	Serial number	16 bytes				
	16 _{hex} 22	0	Hardware Revision					
	17 _{hex} 23	0	Firmware Revision					
18 _{hex} 24	0	Application-specific tag	32 bytes	Reading/ writing	0 _{hex}			
Device param.		0C _{hex} 12	0	Access block Data storage block	2 bytes	Reading/ writing	0 _{hex}	

7 Configuration: BNI IOL-302-S02-Z012-C11 extended with 22/24 valve terminal

7.6. Parameter data/
Device
configuration

	ISDU		Parameter	Data width	Access rights	Standard Value
	Index	Subindex				
Parameter data	40hex 64	0 1-16	Inversion of the inputs	2 bytes	Reading/writing	0hex
	42hex 66	0 1-40	Safe state on Pin 4	10 bytes	Reading/writing	0hex
	43hex 67	0 1-8	Safe state on Pin 2	2 bytes	Reading/writing	0hex
	44hex 68	0 1-24	Volt. monitoring	3 bytes	Read	-
	45hex 69	0 1-48	Output monitoring	6 bytes	Read	-
	54hex 84	0	Serial number	16 bytes	Reading/writing	0hex
	55hex 85	0	Extension port	1 byte	Reading/writing	2, 3, 4hex

Inversion of the
inputs
40hex

Byte	0								1							
	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
Inversion of...	.	Port 6 pin 4	Port 5 pin 4	Port 4 pin 4	Port 3 pin 4	Port 2 pin 4	Port 1 pin 4	Port 0 pin 4	.	Port 6 pin 2	Port 5 pin 2	Port 4 pin 2	Port 3 pin 2	Port 2 pin 2	Port 1 pin 2	Port 0 pin 2

Inversion of port (x):

- 0 – Normal
- 1 - Inverted

7 Configuration: BNI IOL-302-S02-Z012-C11 extended with 22/24 valve terminal

Safe state of the outputs
42hex

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 states can be configured for each output pin.

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

Byte	0								1							
	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	
Safe state of ...	Port 3 pin 4		Port 2 pin 4		Port 1 pin 4		Port 0 pin 4		.	Port 6 pin 4		Port 5 pin 4		Port 4 pin 4		

Byte	2								3							
	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Sub-index									31		29		27		25	
	Valve terminal on the extension port															
Safe state of ...									* Valve 12 – Coil A		Valve 11 – Coil A		Valve 10 – Coil A		Valve 09 – Coil A	

* No function with BNI IOL-751-V13-K007

7 Configuration: BNI IOL-302-S02-Z012-C11 extended with 22/24 valve terminal

Byte	4								5							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Sub-Index	23		21		19		17		15		13		11		9	
	Valve terminal on the extension port															
Safe state of ...	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	

Byte	6								7							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Sub-Index									32		30		28		26	
	Valve terminal on the extension port															
Safe state of		* Valve 12 – Coil B		Valve 11 – Coil B		Valve 10 – Coil B		Valve 09 – Coil B	

* No function with BNI IOL-751-V13-K007

Byte	8								9							
Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Sub-Index	24		22		20		18		16		14		12		10	
	Valve terminal on the extension port															
Safe state of ...	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	

7 Configuration: BNI IOL-302-S02-Z012-C11 extended with 22/24 valve terminal

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	
Safe state of ...	Port 3 pin 2		Port 2 pin 2		Port 1 pin 2		Port 0 pin 2		-		Port 6 pin 2		Port 5 pin 2		Port 4 pin 2	

Voltage monitoring
44hex

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
Volt. monitoring	SC-Port 7 Pin 1	SC-Port 6 Pin 1	SC-Port 5 Pin 1	SC-Port 4 Pin 1	SC-Port 3 Pin 1	SC-Port 2 Pin 1	SC-Port 1 Pin 1	SC-Port 0 Pin 1	-	-	-	-	Outputs off (UA too low)	Undervoltage UA	-	Undervoltage US1

Byte	2							
Bit	7	6	5	4	3	2	1	0
Sub-index	23					19		17
Valve terminal on the extension port								
Volt. monitoring	-	Overload UA	-	-	-	Undervoltage UA	-	Undervoltage US

7 Configuration: BNI IOL-302-S02-Z012-C11 extended with 22/24 valve terminal

Output monitoring
45hex

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
Short circuit on...	.	Port 6 pin 4	Port 5 pin 4	Port 4 pin 4	Port 3 pin 4	Port 2 pin 4	Port 1 pin 4	Port 0 pin 4	Port 7 pin 2	Port 6 pin 2	Port 5 pin 2	Port 4 pin 2	Port 3 pin 2	Port 2 pin 2	Port 1 pin 2	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
Valve terminal on the extension port																
Short circuit on...	* 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 with BNI IOL-751-V13-K007

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
Valve terminal on the extension port																
Short circuit on...	* 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 with BNI IOL-751-V13-K007

7 Configuration: BNI IOL-302-S02-Z012-C11 extended with 22/24 valve terminal

Setting the serial number
54_{hex}

The serial number has a factory set value consisting of 16 ASCII characters, e.g. 0E-G550389-1D-26. The serial number of the unit cannot be changed. For reasons of compatibility this parameter can be used to assign a custom serial number.

Configuration of the extension port
55_{hex}

Configuration	Value of IDSU-Index 55 _{hex}
Device alone (extension port not active)	0
Device with identical device	1
Device with BNI IOL-751-V08-K007	2
Device with BNI IOL-751-V10-K007	3
Device with BNI IOL-751-V13-K007	4

8 Error codes and events

8.1. Error codes/ errors

Error code	Description
0x8011	Index not available
0x8012	Subindex not available
0x8023	Access rejected
0x8033	Parameter value too long
0x8034	Parameter value too short
0x8035	Function not available
0x8036	Function temporarily unavailable

8.2. Events

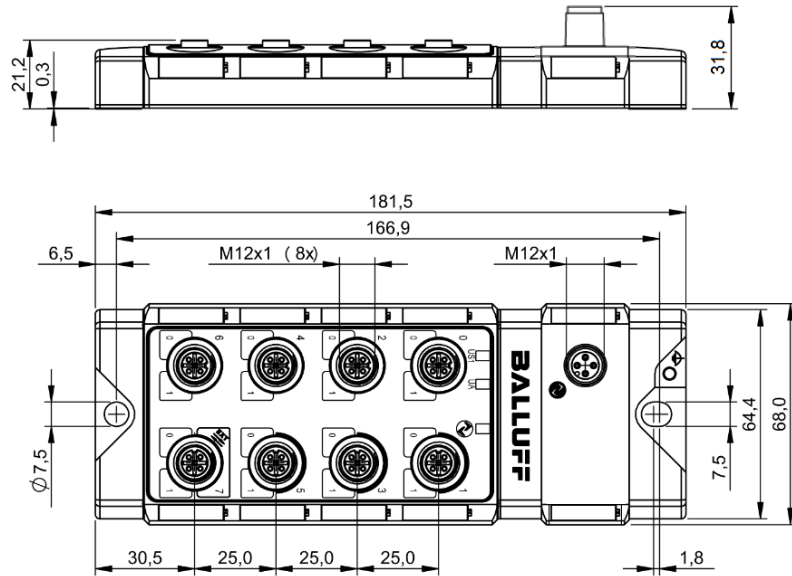
IO-Link Revision 1.0	
Event code	Description
0x5112	Low sensor voltage (US)
0x5114	Low actuator voltage (UA)
0x5410	Output stages
0x8DF0	Repetition on extension port
0x8DF1	Device on extension port lost
0x8DF2	Wrong device on extension port
IO-Link Revision 1.1	
Event code	Description
0x5111	Low sensor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

9 IO-Link functions

- 9.1. 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.
- 9.2. 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 parameters can be automatically transmitted to the new device. This guarantees minimal downtimes. Validation must be switched on in order to use 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.
- 9.3. Block configuration** The device supports block configuration. This allows all the parameters in a data block to be imported consistently from a controller or a configuration tool.
- 9.4. Resetting to factory settings** The device can be reset to the factory default settings by executing the corresponding system command. 0x82 must be written to Index 2 Subindex 0 for the command.

10 Technical data

10.1. Dimensions



10.2. Mechanical data

Housing material	Die-cast zinc
IO-Link Port	IO-Link port M12, A-coded, male
PNP-I/O ports	M12x1, A-coded, female (8 piece)
Weight	Approx. 530 g
Dimensions (H x W x D), without connector	68 x 181.5 x 31.8 (mm)

10.3. Electrical data

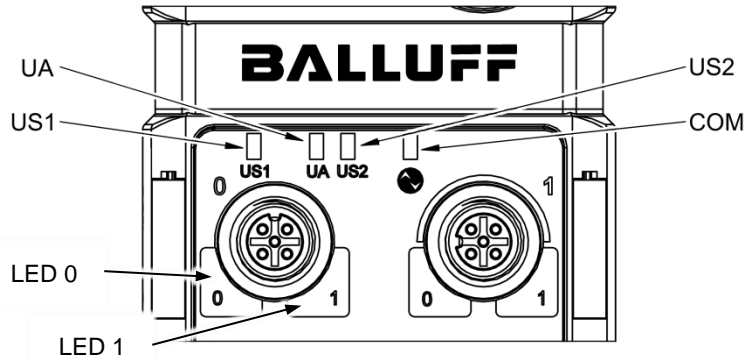
Supply voltage	18 – 30.2 V DC, per EN 61131-2
Power supply on M12 terminal	4 A
Ripple	< 1%
Current consumption without load	≤ 50 mA
Load current (Pin 1)	max. 200 mA
Load current per output (Pin 2, Pin 4)	max. 200 mA for BNI IOL-302-S02-Z012-C11
Load current extension port (Pin 2)	max. 2 A
Inputs	PNP, type 3

10.4. Operating conditions

Ambient temperature	-5 °C ... +55 °C
Storage temperature	-25 °C ... +70 °C
Degree of protection	IP67 (only when plugged-in and screwed together)

11 Function indicators

11.1. Function indicators



LED indicator module status

LED Name	Indicator	Function
COM	Green	No communication
	Green, flashing	IO-Link communication OK
US1	Green	Module power OK
	Red	Undervoltage < 18 V
	Off	Module is without voltage
UA	Green	Actuator power OK
	Red	Undervoltage < 18 V

Digital LED indicators for inputs/outputs

LED 0 = input/output on Pin 4, LED 1 = input/output on Pin 2

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

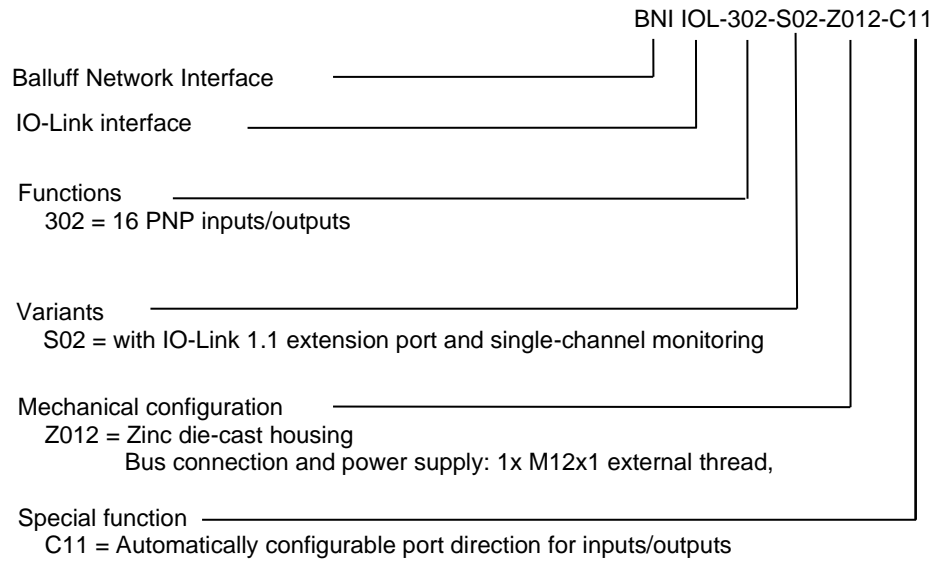
Extension port

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
Flashing red rapidly	Incorrect IO-Link device or incorrect configuration
Red	IO-Link short-circuit on Pin 4

12 Appendix

12.1. Type code



12.2. Ordering Information

Type code	Order code
BNI IOL-302-S02-Z012-C11	BNI00F4

Notes

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