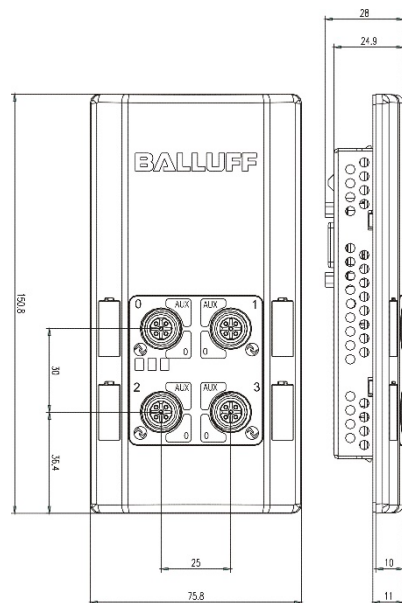




## BNI PBS-504-001-K008 BNI PBS-504-002-K008 Profibus IO-Link Panelmaster User's Guide



## Table of Contents

<b>1</b>	<b>Notes for the user</b>	<b>2</b>
1.1.	Structure of the guide	2
1.2.	Typographical conventions	2
	Enumerations	2
	Actions	2
	Syntax	2
	Cross references	2
1.3.	Symbols	2
1.4.	Abbreviations	2
1.5.	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
	Hazardous voltage	3
<b>3</b>	<b>Basic Knowledge</b>	<b>4</b>
3.1.	Product description	4
3.2.	Profibus	4
3.3.	IO-Link	4
3.4.	Communication mode	5
	Standard IO-modes (SIO-mode)	5
3.5.	Replacing modules	5
<b>4</b>	<b>Getting started</b>	<b>6</b>
4.1.	Connection overview BNI PBS-504-00x..	6
4.2.	Mechanical connection	7
4.3.	Electrical connection	8
	Power supply	8
	Function earth	8
	Profibus Interface	9
	Addressing	9
4.4.	Conneting sensors / actuators	10
	IO-Link port	10
<b>5</b>	<b>Technical Data</b>	<b>11</b>
5.1.	Dimensions Front side	11
5.2.	Dimensions Cutout Backside	11
5.3.	Mechanical data	11
	Electrical Data	12
	Operating conditions	12
5.4.	Function indicators LED	13
	Module status	13
	I/O- und IO-Link ports	13
<b>6</b>	<b>Appendix</b>	<b>14</b>
6.1.	Included material	14
6.2.	Ordercode	14
6.3.	Order information	14

## 1 Notes for the user

- 1.1. Structure of the guide** The guide is organized so that the sections build on one another.  
Section 2: Basic safety information.  
Section 3: Getting started.  
.....
- 1.2. Typographical conventions** The following typographical conventions are used in this Guide.
- Enumerations** Enumerations are shown in list form with indent.  
– 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 security notice which must be observed.
- 
-  **Note**  
This symbol indicates general notes..
- 
- 1.4. Abbreviations**
- |             |   |
|-------------|---|
| AUX         | AUX power (auxiliary power)                 |
| O-Port      | Digital output port                         |
| BCD         | Binär coded switch                          |
| BNI         | Balluff Network Interface                   |
| EMC         | Electromagnetic compatibility               |
| I-Port      | Digital input port                          |
| FE          | Functions earth                             |
| GSD         | Generic Station Description                 |
| LSB         | Least Significant Bit                       |
| MSB         | Most Significant Bit                        |
| SELV        | Safety Extra Low Voltage                    |
| PLC         | Process logic control                       |
| PELV        | Protective Extra Low Voltage -              |
| Profibus DP | Profibus DP: Profibus dezentrale peripherie |
| IOL         | IO-Link                                     |
- 1.5. Deviating views** Product views and illustrations in this guide may differ from the actual product. They are intended only as illustrative material.

### 2.1. Intended use

This guide describes The BNI PBS-... serves as a decentralized input/output module for connecting to a Profibus network. The integrated IO-Link ports enable simple linking of IO-Link capable sensors, actuators and sensor / actuator hubs. The module may be used only for this purpose in an industrial environment corresponding to Class A of the EMC Law. Via PIN 2/5 Power Aux (Auxiliary power) function provides 24V DC power supply for actuators.

### 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 fulfills 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 of safety and accident prevention regulations are complied with.

### 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 manual

#### 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!

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 Basic Knowledge

### 3.1. Product description

Balluff Network Interface BNI PBS-...:

- Used for connecting sensors/actuators to a Profibus-DP network.
- Sensors/actuators can be connected through 4 standard I/O ports.

Connection options:

A total of 8 ports are available which can be freely configured. If for example 4 IO-Link ports are configured, 4 standard I/O ports can be used.

BNI PBS-504-...: Max. 8 standard I/O-ports and/or max.4 IO-Link ports, freely configurable.

The main areas of application are:

- In the industrial area as an interface between sensors/actuators and a Profibus.
- When using "intelligent" sensors and actuators which process information in addition to the actual process signal (e.g. diagnostics information).
- Shall not be used in Profibus networks where repeater-modules are used. BNI PBS 504-002-K008 should be used in these networks instead.

### 3.2. Profibus

Open bus system for process and field communication in cell networks with a low number of stations as well as for data communication per IEC 61158/EN 50170. Automation devices such as PLC's, PC's, control and monitoring devices, sensors or actuators can communicate over this bus system.

Variants:

- Profibus DP for fast, cyclical data exchange with field devices,
- Profibus PA for applications in process automation in the intrinsically safe area,
- Profibus FMS for data communication between automation devices and field devices.

### 3.3. IO-Link

IO-Link is defined as a standardized point-to-point connection between sensors/actuators and the I/O module. An IO-Link sensor/actuator can send additional communication data (e.g. diagnostics signals) in addition to the binary process signals over the IO-Link interface.

Compatibility with standard I/O:

- IO-Link sensors/actuators can be connected to existing I/O modules.
- Sensors/actuators which are not IO-Link capable can be connected to an IO-Link module.
- Standard sensor/actuator cable can be used.

Key technical data:

- Serial point-to-point connection,
- Communication as add-on to standard I/O.
- Standard I/O connection technique, unshielded, 20m cable length.
- Communication using 24V pulse modulation, standard UART protocol.
- Maximum current draw: per sensor 200 mA/per actuator 1,6 A.

### 3.4. Communication mode

Process data (cyclical):

The GSD file provides different data modules for representing the sensor map:

- Inputs: 1 byte – 32 bytes
- Outputs: 1 byte – 32 bytes
- Or combined input/output modules

Deterministic time behavior:

- Typically 2 ms cycle time 16 bits of process data and 38.4 Kbaud transmission rate.

Service data (diagnostics, parameters):

- parallel and reactionless process data

#### Standard IO-modes (SIO-mode)

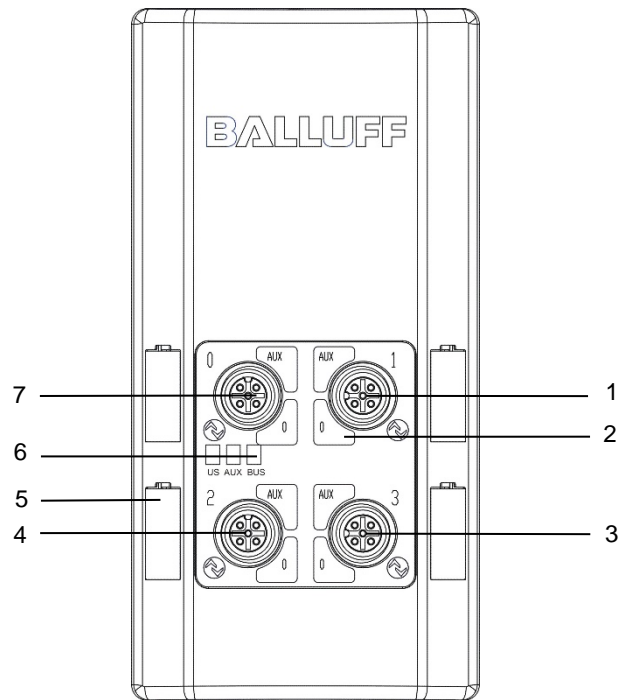
- Startup parameter setting possible using communication, then
- binary switching signal

### 3.5. Replacing modules

The BNI PBS-... modules are upward compatible. A defective module can be replaced with a module which has a greater or at least the same functionality.

4 Getting started

4.1. Connection  
overview BNI  
PBS-504-00x..

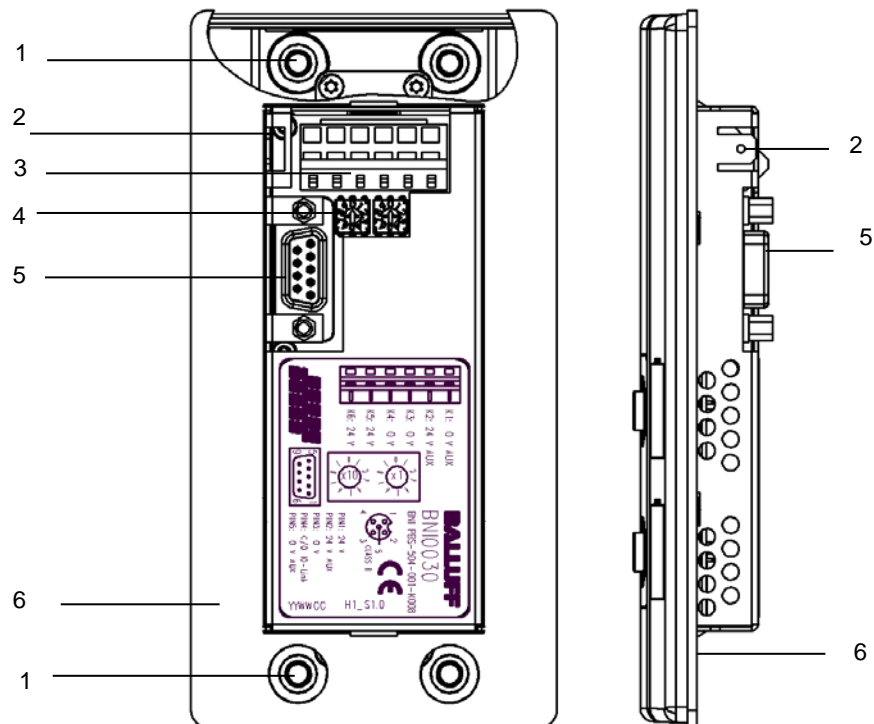


- 1 Input / Output / IO-Link port 1
- 2 LED: Input / Output / IO-Link port
- 3 Input / Output / IO-Link port 3
- 4 IO-Link logo
- 5 Input / Output / IO-Link port 2
- 6 Label
- 7 Status LEDs Module and bus communication
- 8 Input / Output / IO-Link port 0

## 4 Getting started

### 4.2. Mechanical connection

The module BNI PBS-504... is attached using 4 M5x10. The thread insert for mounting the module is 8mm.



- 1 Mounting holes with 8mm thread insert
- 2 Ground connection
- 3 Power supply interface, terminal plugs
- 4 Address switches
- 5 Profibus interface Sub D 9 pole
- 6 Grommet

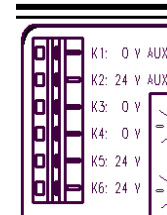
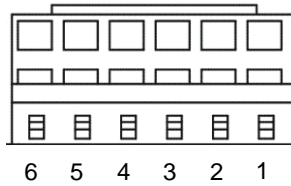


4 Getting started

4.3. Electrical connection

Power supply

The power supply is connected to terminal plugs, spring type on the back side of the unit.



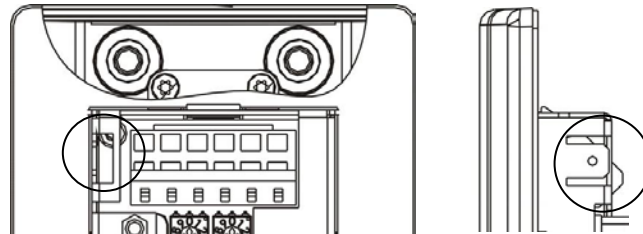
Pin	Function	Description
6	24V	Bus communication / Sensor supply
5		
4	0V	Bus communication / Sensor supply
3		
2	+24 V DC, max. 12 A, AUX	AUX Power
1	0V, AUX	GND AUX Power
Pin 1 and 2: internal bended		
Pin 3 and 4: internal bended		
Pin 1 and 5: no fuse inside, external protection requested		



Note

Pin 5 power supply, external protection (fuse) requested.

Function earth

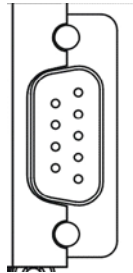


Note

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

**Profibus Interface** The bus connection is made using the SUBD 9-Pin female connector. The address is set on the address switch.

**Profibus (SUB-D 9, female)**



Pin	Function
1	Protection ground
2	Not connected
3	A line
4	Not connected
5	GND Data
6	5V power for bus terminator
7	Not connected
8	B line
9	Not connected

---

**i Note** Continuation of the Profibus by SUB-D9 Pin connectors.

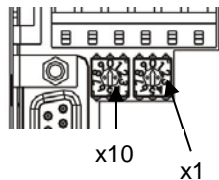
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**i Note** Each Profibus segment end must be installed with a termination resistor. Unused sockets must be fitted with over caps to ensure IP54 protecting rating.

---

**Addressing**

The Profibus address is set directly on the BNI PBS-504... using two BCD switches



Permissible address range: 0 ... 99.

Each Profibus node must have a unique address assigned to it.

Any change to the address does not become effective until power is reset on the modules.

4 Getting started

4.4. Connecting sensors / actuators

Four I/O ports are provided for connecting the actuators / sensors for Standard I/O and/or IO-Link

IO-Link port

M12, A-coded, female



Pin	Function
1	+24 V DC, 1,4 A
2	AUX Power, 24 V
3	0 V
4	IO-Link / Eingang /Ausgang (max.1.4 A)
5	AUX Power GND, 0V

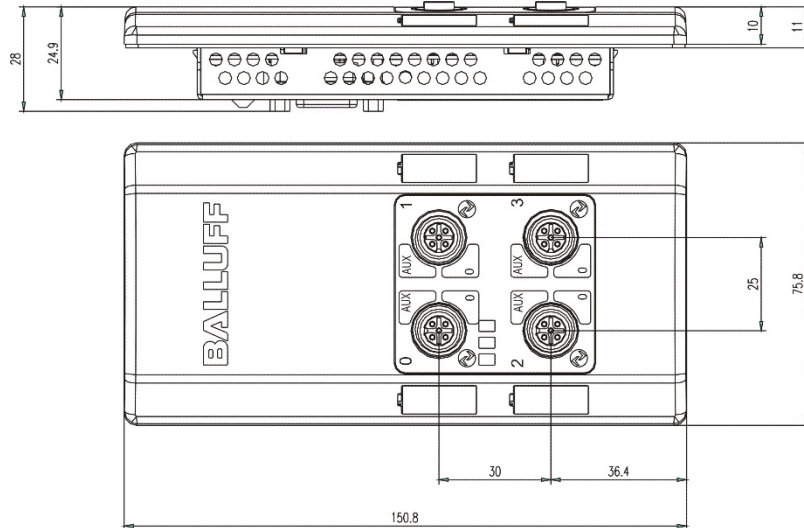


**Note**

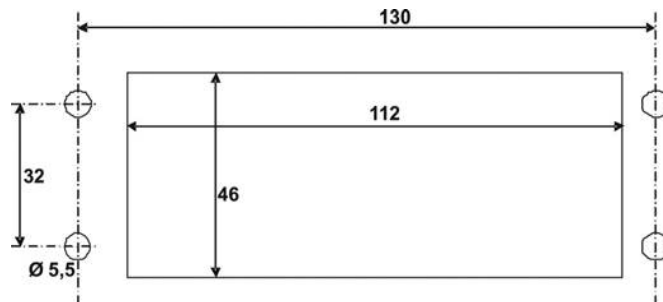
Unused I/O port socket must be fitted with cover caps to ensure IP54 protection rating.

## 5 Technical Data

### 5.1. Dimensions Front side



### 5.2. Dimensions Cutout Backside



### 5.3. Mechanical data

Housing material	Plastic
Fieldbus	Profibus: SUB-D 9 Pin (female)
Supply power	Terminal plugs, spring type (on the backside)
AUX power supply	Terminal plugs, spring type (on the backside)
I/O Ports	M12, A coded (4 x female)
Enclosure rating	Front side: IP54 (only when installed, plugged-in and threaded-in) Back side: IP20
Weight	ca.: 355 g

5 Technical Data

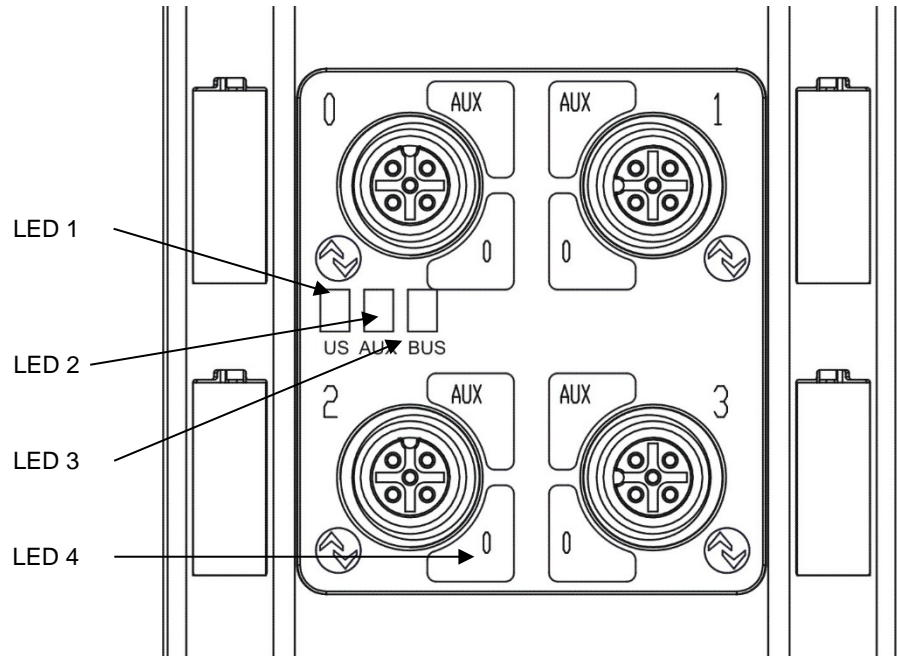
**Electrical  
Data**

Operating voltage	18 ... 30 V DC
Operation voltage AUXPower	18 ... 30 V DC, 12A
Ripple	< 1 %
Current draw without load	≤ 200 mA

**Operating  
conditions**

Ambient temperature	-5 °C ... 55°C
Storage temperature	-25 °C ... 70°C

5.4. Function indicators LED



Module status

LED	Indicator	Function
LED 1	Green	US Power supply sensors / Bus communication ok
	Red	US Power supply sensors / Bus communication under voltage
LED 2	Green	AUX power supply connected
LED 3	Green, solid	BUS Data transmission active
	Green, blinking	BUS Data transmission inactive

I/O- und IO-Link ports

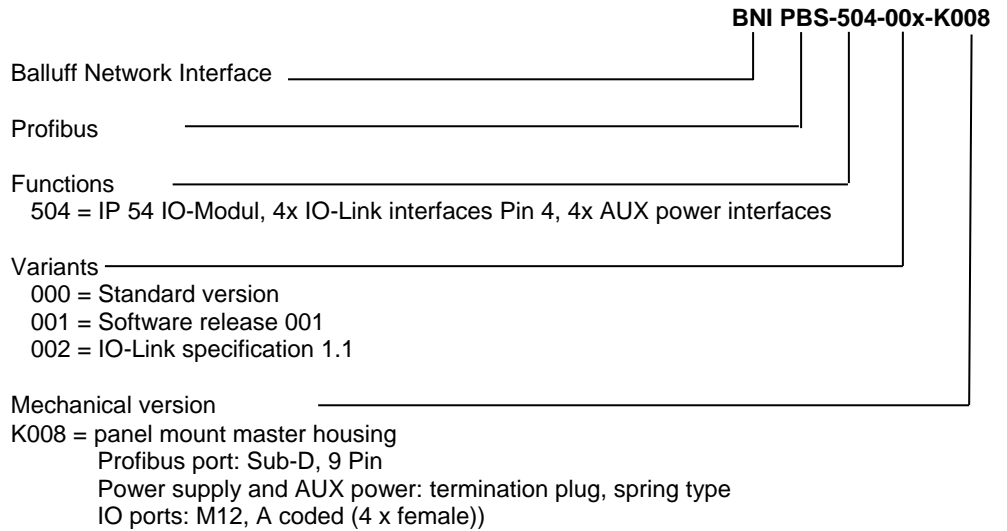
Jedem M12-Port (IO-Link, E/A-Schnittstelle) sind LEDs zugeordnet um die Betriebszustände anzuzeigen.

Anzeige	LED 4 (PIN 4)		
Aus	Ausgang = 0	Eingang = 0	
Gelb	Ausgang = 1	Eingang = 1	
Grün			IO-Link: Kommunikation
Grün blinkend			IO-Link: keine Kommunikation
Rot	I Ausgang > I <sub>max</sub>	Eingang: KS*	IO-Link: Kommunikationsfehler

**6 Appendix**

- 6.1. Included material** The BNI PBS ... consists of the following components:
- IO-block
  - 2 blind plugs M12
  - 20 labels
  - 1 grommet

**6.2. Ordercode**



**6.3. Order information**

Product ordering code	Order code
BNI PBS-504-001-K008	BNI0030
BNI PBS-504-002-K008	BNI004P

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