

# IB IL 24 DI8/HD-PAC

Inline, digital input terminal,  
digital inputs: 8, 24 V DC

Data sheet  
7984\_en\_03

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## 1 Description

The terminal is designed for use within an Inline station.  
It is used to acquire digital signals.

### Features

- 8 digital inputs
- Connection of sensors in single-wire technology
- Diagnostic and status indicators



This data sheet is only valid in association with the IL SYS INST UM E user manual.



Make sure you always use the latest documentation.  
It can be downloaded from the product at [phoenixcontact.net/products](http://phoenixcontact.net/products).

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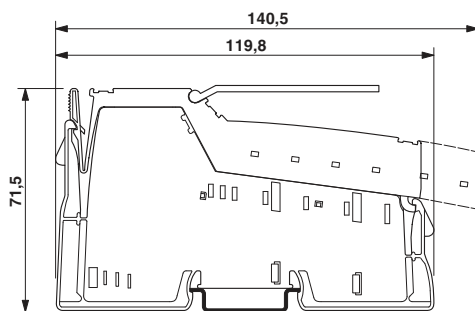
|          |  |    |
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### 3 Ordering data

| Description   | Type                   | Order No. | Pcs./Pkt. |
|---|------------------------|-----------|-----------|
| Inline, Digital input terminal, Digital inputs: 8, 24 V DC, Connection method: 1-wire, Transmission speed in the local bus 500 kbps, Degree of protection IP20, including Inline connector and labeling field | IB IL 24 DI8/HD-PAC    | 2700173   | 1         |
| Accessories   | Type                   | Order No. | Pcs./Pkt. |
| Connector, for digital 1, 2 or 8-channel Inline terminals (Connector/Adapter)   | IB IL SCN-8            | 2726337   | 10        |
| Labeling field, width: 12.2 mm (Marking)  | IB IL FIELD 2          | 2727501   | 10        |
| Inline terminal for power distribution (24 V), complete with accessories, (connector and labeling field) 24 V supply voltage is fed out from the segment circuit (US)   | IB IL PD 24V-PAC       | 2862987   | 1         |
| Inline terminal for power distribution (GND), complete with accessories, (connector and labeling field) connections for GND   | IB IL PD GND-PAC       | 2862990   | 1         |
| VARIOFACE front adapter for Inline HD modules, for transferring 8 digital signals. (Connector/Adapter)  | FLKM 14-PA-INLINE/DIO8 | 2900889   | 1         |
| Documentation   | Type                   | Order No. | Pcs./Pkt. |
| User manual, English, Automation terminals of the Inline product range  | IL SYS INST UM E       | -         | -         |
| Data sheet, English, INTERBUS addressing  | DB GB IBS SYS ADDRESS  | -         | -         |

### 4 Technical data

#### Dimensions (nominal sizes in mm)



|        |          |
|--------|----------|
| Width  | 12.2 mm  |
| Height | 119.8 mm |
| Depth  | 71.5 mm  |

| <b>General data</b>                      |   |
|--|---|
| Color                                    | green   |
| Weight                                   | 60 g (with connector)   |
| Operating mode                           | Process data mode with one byte   |
| Ambient temperature (operation)          | -25 °C ... 55 °C  |
| Ambient temperature (storage/transport)  | -25 °C ... 85 °C  |
| Permissible humidity (operation)         | 10 % ... 95 % (according to DIN EN 61131-2)   |
| Permissible humidity (storage/transport) | 10 % ... 95 % (according to DIN EN 61131-2)   |
| Air pressure (operation)                 | 70 kPa ... 106 kPa (up to 3000 m above sea level)   |
| Air pressure (storage/transport)         | 70 kPa ... 106 kPa (up to 3000 m above sea level)   |
| Degree of protection                     | IP20  |
| Protection class                         | III, IEC 61140, EN 61140, VDE 0140-1  |
| <b>Connection data</b>                   |   |
| Designation                              | Inline connector  |
| Connection method                        | Spring-cage connection  |
| Conductor cross section solid / stranded | 0.08 mm <sup>2</sup> ... 1.5 mm <sup>2</sup> / 0.08 mm <sup>2</sup> ... 1.5 mm <sup>2</sup> |
| Conductor cross section [AWG]            | 28 ... 16   |
| Stripping length                         | 8 mm  |
| <b>Connection data for UL approvals</b>  |   |
| Designation                              | Inline connector  |
| Connection method                        | Spring-cage connection  |
| Conductor cross section solid / stranded | 0.2 mm <sup>2</sup> ... 1.5 mm <sup>2</sup> / 0.2 mm <sup>2</sup> ... 1.5 mm <sup>2</sup>   |
| Conductor cross section [AWG]            | 24 ... 16   |
| <b>Interface Inline local bus</b>        |   |
| Connection method                        | Inline data jumper  |
| Transmission speed                       | 500 kbps  |
| <b>Power consumption</b>                 |   |
| Segment circuit supply $U_S$             | 24 V DC (nominal value)   |
| Current consumption from $U_S$           | max. 5.5 mA DC  |
| Communications power $U_L$               | 7.5 V DC (via voltage jumper)   |
| Current consumption from $U_L$           | max. 30 mA DC   |
| Power consumption                        | max. 0.25 W (at $U_L$ )   |
| <b>Digital inputs</b>                    |   |
| Number of inputs                         | 8   |
| Connection method                        | Spring-cage connection  |
| Connection method                        | 1-wire  |
| Description of the input                 | EN 61131-2 types 1 and 3  |
| Nominal input voltage                    | 24 V DC   |
| Nominal input current                    | typ. 2.4 mA   |
| Input voltage range "0" signal           | -3 V DC ... 5 V DC  |

**Digital inputs**

|  |                     |
|--|---------------------|
| Input voltage range "1" signal             | 11 V DC ... 30 V DC |
| Delay at signal change from 0 to 1         | typ. 1 ms           |
| Delay at signal change from 1 to 0         | typ. 1 ms           |
| Permissible conductor length to the sensor | 30 m                |

**Programming data (INTERBUS, local bus)**

|                         |        |
|-------------------------|--------|
| ID code (hex)           | BE     |
| ID code (dec.)          | 190    |
| Length code (hex)       | 81     |
| Length code (dec.)      | 129    |
| Process data channel    | 8 Bit  |
| Input address area      | 1 Byte |
| Output address area     | 0 Byte |
| Parameter channel (PCP) | 0 Byte |
| Register length (bus)   | 8 Bit  |



For the programming data/configuration data of other bus systems, please refer to the corresponding electronic device data sheet (e.g., GSD, EDS).

**Configuration and parameter data in a PROFIBUS system**

|                             |        |
|-----------------------------|--------|
| Required parameter data     | 1 Byte |
| Need for configuration data | 4 Byte |

**Error messages to the higher level control or computer system**

None

**Electrical isolation/isolation of the voltage areas**

| Test section  | Test voltage            |
|---|-------------------------|
| 7.5 V supply (bus logics)/24 V supply (I/O)         | 500 V AC, 50 Hz, 1 min. |
| 7.5 V supply (bus logics) / functional earth ground | 500 V AC, 50 Hz, 1 min. |
| 24 V supply (I/O) / functional earth ground         | 500 V AC, 50 Hz, 1 min. |



To achieve electrical isolation between the logic level and the I/O area, supply these areas from separate power supply units. Interconnection of the power supply units in the 24 V area is not permitted (see IL SYS INST UM E user manual).

**Approvals**

For the latest approvals, please visit [phoenixcontact.net/products](http://phoenixcontact.net/products).

## 5 Additional tables

| Input characteristic curve |                              |
|----------------------------|------------------------------|
| Input voltage U [V]        | Typical input current I [mA] |
| $-30 < U \leq 0.7$         | 0                            |
| 3                          | 0.12                         |
| 6                          | 1.32                         |
| 9                          | 2.32                         |
| 12                         | 2.36                         |
| 15                         | 2.36                         |
| 18                         | 2.36                         |
| 21                         | 2.36                         |
| 24                         | 2.40                         |
| 27                         | 2.40                         |
| 30                         | 2.40                         |

### 6 Internal circuit diagram

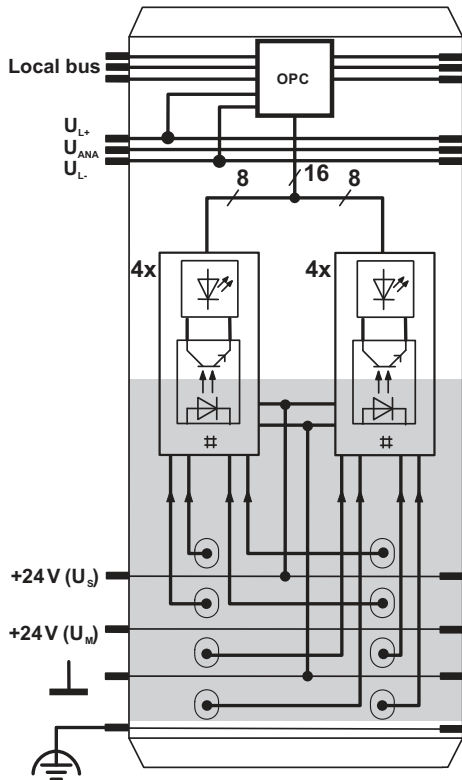





Figure 1 Internal wiring of the terminal points


Key:


 Protocol chip  
(Bus logic including voltage conditioning)

 LED (status indicator)

 Optocoupler

 Digital input

 Electrically isolated area

 Explanation for other used symbols has been provided in the IL SYS INST UM E user manual.

### 7 Terminal point assignment

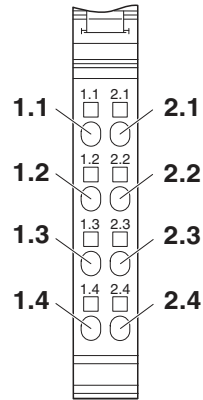


Figure 2 Terminal point assignment

| Terminal point | Assignment                 |
|----------------|----------------------------|
| 1.1 / 2.1      | Signal input (IN01 / IN02) |
| 1.2 / 2.2      | Signal input (IN03 / IN04) |
| 1.3 / 2.3      | Signal input (IN05 / IN06) |
| 1.4 / 2.4      | Signal input (IN07 / IN08) |

## 8 Connection notes and examples



When connecting the sensors observe the assignment of the terminal points to the process data.



**NOTE: Malfunction**

The supply voltage  $U_S$  is used internally as the auxiliary supply. If it is not present, the terminal will not operate properly. Make sure that the supply voltage  $U_S$  is available.



**NOTE: Malfunction**

The sensors and  $U_S$  must be supplied from the same voltage supply.

The simplest way to meet this requirement is to use the IB IL PD 24V-PAC terminal. Wire the 24 V sensor connections to this terminal. In this way, they are supplied from the potential jumper  $U_S$  of the Inline station.

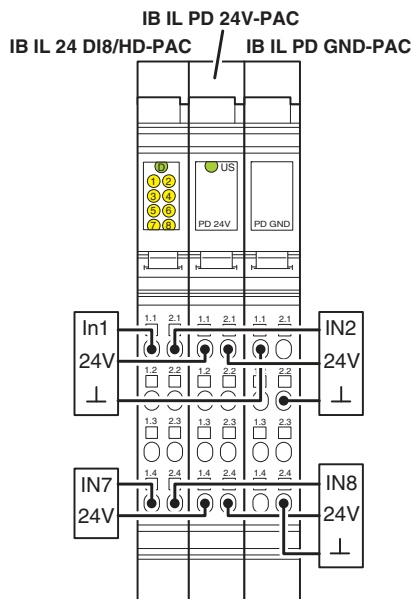


Figure 3 Typical connection of sensors when terminals for potential distribution are used

The sensors can also be connected via external busbars. Ensure that the sensors and  $U_S$  are supplied from the same voltage supply.

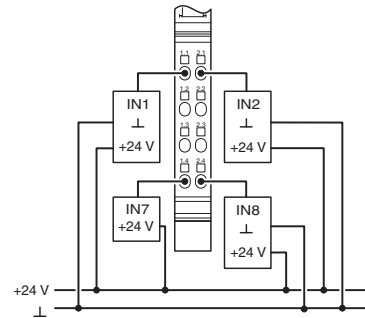


Figure 4 Example of a connection of sensors when using external busbars



## 9 Application examples

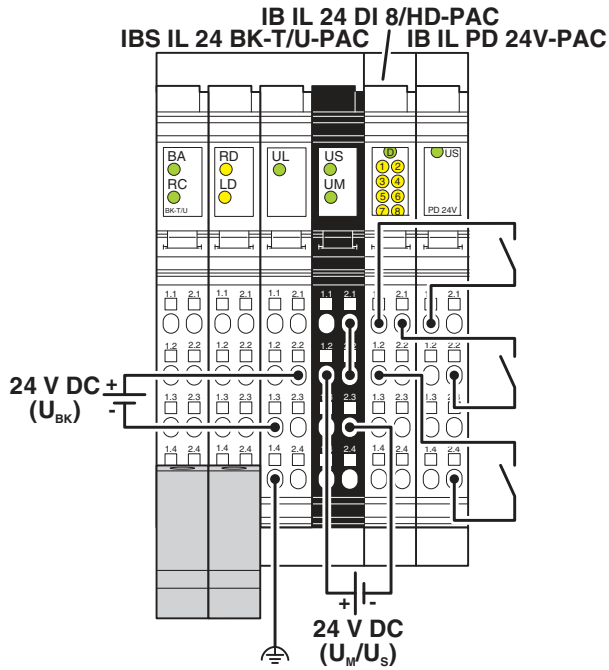


Figure 5 Connection of sensors when using the IB IL PD 24V-PAC terminal

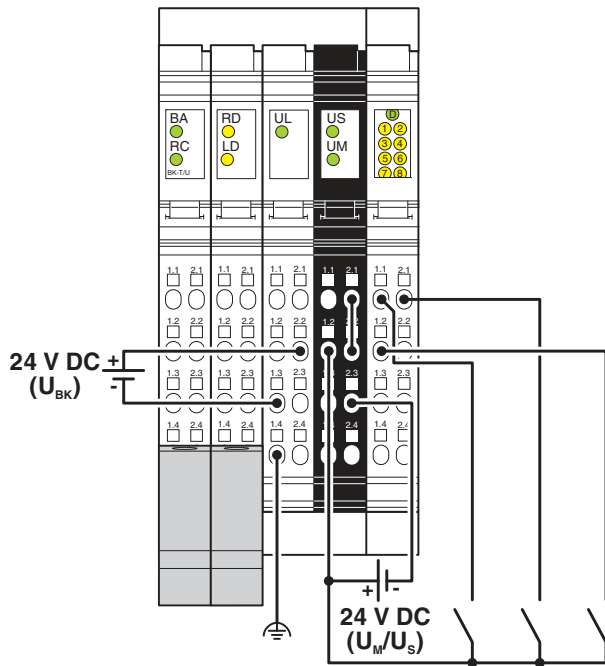


Figure 6 Connection of sensors when using external busbars

## 10 Local diagnostic and status indicators

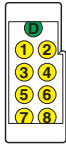


Figure 7 Local diagnostic and status indicators

| Designation | Color  | Meaning                             |
|-------------|--------|-------------------------------------|
| D           | Green  | Diagnostics (bus and logic voltage) |
| 1 ... 8     | Yellow | Status of the inputs                |

### Function identification

Light blue

2 Mbps: White stripe in the vicinity of the D LED

## 11 Process data

### Assignment of the terminal points to IN process data

| (Byte.Bit) view  | Byte                    | Byte 0 |      |      |      |      |      |      |      |
|------------------|-------------------------|--------|------|------|------|------|------|------|------|
|                  | Bit                     | 7      | 6    | 5    | 4    | 3    | 2    | 1    | 0    |
| Assignment       | Signal                  | IN08   | IN07 | IN06 | IN05 | IN04 | IN03 | IN02 | IN01 |
|                  | Terminal point (signal) | 2.4    | 1.4  | 2.3  | 1.3  | 2.2  | 1.2  | 2.1  | 1.1  |
| Status indicator | LED                     | 8      | 7    | 6    | 5    | 4    | 3    | 2    | 1    |



For the assignment of the illustrated (byte.bit) view to your INTERBUS control or computer system, please refer to the DB GB IBS SYS ADDRESS data sheet.