# Inline terminal with 8 digital outputs

**Data sheet   R-IB IL 24 DO 8/HD-PAC**

8 digital outputs
24 V DC

03 / 2022

## 1      Description

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

**Features**

- 8 digital outputs
- Connection of actuators in 1-conductor technology
- Nominal current per output: 500 mA
- Total current of the terminal: 4 A
- Short-circuit and overload-protected outputs

☞   This data sheet is only valid in association with the "Automation terminals of the Inline product range" application description (DOK-CONTRL-ILSYSINS***-AW..-EN-P, MNR R911317021).

☞   Make sure you always use the latest documentation.

It can be downloaded under
www.boschrexroth.com/electrics.

## 2　Table of contents

## 3      Ordering data

| Description | Type | MNR | Pcs./Pkt. |
|---|---|---|---|
| Inline terminal with eight digital outputs; complete with accessories (plugs and labeling fields) | R-IB IL 24 DO 8/HD-PAC | R911171973 | 1 |

| Accessories | Type | MNR | Pcs./Pkt. |
|---|---|---|---|
| Inline terminal for potential distribution GND; complete with accessories (connector and labeling field) | R-IB IL PD GND-PAC | R911297193 | 1 |

| Documentation | Type | MNR | Pcs./Pkt. |
|---|---|---|---|
| Application description Automation terminals of the Inline product range | DOK-CONTRL-ILSYSINS***-AW..-EN-P | R911317021 | 1 |

**Additional ordering data**

For additional ordering data (accessories), please refer to the product catalog at www.boschrexroth.com/electrics.

## 4      Technical data

**Dimensions (nominal sizes in mm)**
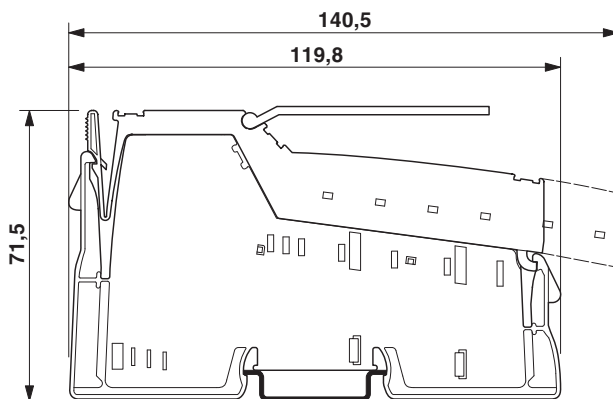


| | |
|---|---|
| Width | 12.2 mm |
| Height | 119.8 mm |
| Depth | 71.5 mm |
| Note on dimensions | Housing dimensions |

**General data**

| | |
|---|---|
| Color | light grey  RAL 7035 |
| 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 % (non-condensing) |
| Permissible humidity (storage/transport) | 10 % ... 95 % (non-condensing) |
| 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) |

**General data**

| | |
|---|---|
| Degree of protection | IP20 |
| Protection class | III (IEC 61140, EN 61140, VDE 0140-1) |
| Mounting type | DIN rail mounting |

**Connection data: Inline connector**

| | |
|---|---|
| Connection method | Spring-cage connection |
| Conductor cross section, rigid | 0.2 mm$^2$ ... 1.5 mm$^2$ |
| Conductor cross section, flexible | 0.2 mm$^2$ ... 1.5 mm$^2$ |
| Conductor cross section [AWG] | 24 ... 16 |
| Stripping length | 8 mm |

**Interface: Inline local bus**

| | |
|---|---|
| Number | 2 |
| Connection method | Inline data jumper |
| Transmission speed | 500 kbps |

**Communications power ($U_L$)**

| | |
|---|---|
| Supply voltage | 7.5 V DC (via voltage jumper) |
| Current consumption | max. 30 mA |
| Power consumption | max. 0.225 W |

**Segment circuit supply ($U_S$)**

| | |
|---|---|
| Supply voltage | 24 V DC (via voltage jumper) |
| Supply voltage range | 19.2 V DC ... 30 V DC (including all tolerances, including ripple) |
| Current consumption | max. 4 A |

**Power consumption**

| | |
|---|---|
| Power consumption | max. 0.85 W (Module, complete) |

**Digital outputs**

| | |
|---|---|
| Number of outputs | 8 |
| Connection method | Spring-cage connection |
| Connection technology | 1-conductor |
| Nominal output voltage | 24 V DC |
| Maximum output current per channel | 500 mA |
| Output current of the device | 4 A |
| Nominal load, ohmic | 12 W (48 Ω) |
| Nominal load, inductive | 12 VA (1.2 H, 48 Ω) |
| Nominal load, lamp | 12 W |
| Signal delay when switching on an ohmic nominal load | typ. 500 µs |
| Signal delay when switching on an inductive nominal load | typ. 100 ms (1.2 H, 48 Ω) |
| Signal delay when switching on a lamp nominal load | typ. 100 ms |
| Signal delay when switching off an ohmic nominal load | typ. 1 ms |
| Signal delay when switching off an inductive nominal load | typ. 50 ms (1.2 H, 48 Ω) |
| Signal delay when switching off a lamp nominal load | typ. 1 ms |

## Digital outputs

| | |
|---|---|
| Maximum operating frequency with ohmic nominal load | max. 300 Hz (this switching frequency is limited by the number of bus devices, the structure of the bus, the software used and the control or computer system used) |
| Maximum operating frequency with inductive nominal load | max. 0.5 Hz (1.2 H, 48 Ω) |
| Maximum operating frequency with lamp nominal load | max. 8 Hz (this switching frequency is limited by the number of bus devices, the structure of the bus, the software used and the control or computer system used) |
| Reaction time with short-circuit | ca. 1 s |
| Reaction time with ohmic overload | ca. 3 s |
| Behavior at voltage switch-off | The output follows the power supply without delay |
| One-time unsolicited energy | 300 mJ |
| Limitation of the voltage induced on circuit interruption | -45.8 V ... -15 V |
| Output voltage when switched off | max. 1 V |
| Output current when switched off | max. 300 µA |
| Behavior with overload | Auto restart |
| Behavior with inductive overload | Output can be destroyed |
| Restart frequency with ohmic overload | 400 Hz |
| Restart frequency with lamp overload | 400 Hz |
| Reverse voltage resistance to short pulses | Reverse voltage proof |
| Resistance to permanent reverse voltage | max. 500 mA |
| Overcurrent shut-down | min. 0.7 A |
| Overload protection, short-circuit protection of outputs | Zener diode in output chip |

## Programming data (INTERBUS, local bus)

| | |
|---|---|
| ID code (hex) | BD |
| ID code (dec.) | 189 |
| Length code (hex) | 81 |
| Length code (dec) | 129 |
| Process data channel | 8 Bit |
| Input address area | 0 Byte |
| Output address area | 1 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 | 3 Byte |
| Required configuration data | 4 Byte |

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

| | |
|---|---|
| Short-circuit or overload of the digital outputs | Error message in the diagnostic code (bus) and display (2 Hz) via the LED (D) on the module |

**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 logic)/functional ground | 500 V AC, 50 Hz, 1 min. |
| 24 V supply (I/O) / functional 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. Connecting the supply devices in the 24 V area is not permitted (see also the "Automation terminals of the Inline product range" application description (DOK-CONTRL-ILSYSINS***-AW..-EN-P, MNR R911317021).

**Approvals**

For the latest approvals, please visit www.boschrexroth.com/electrics.

# 5    Additional tables

| Output characteristic curve when switched on (typical) | |
|---|---|
| **Output current (A)** | **Differential output voltage (V)** |
| 0 | 0 |
| 0.1 | 0.02 |
| 0.2 | 0.03 |
| 0.3 | 0.04 |
| 0.4 | 0.06 |
| 0.5 | 0.07 |
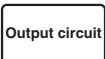
# 6    Internal circuit diagram

*Fig. 1          Internal wiring of the terminal points*
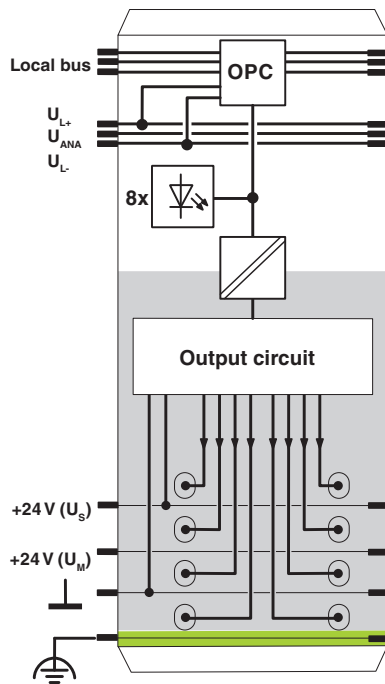


Key:


Protocol chip
(Bus logic including voltage conditioning)


LED (status indicator)


Electrical isolation


Output configuration


Digital output


Electrically isolated areas


For an explanation of the other symbols used, please refer to the "Automation terminals of the Inline product range" application description (DOK-CONTRL-ILSYSINS***-AW..-EN-P, MNR R911317021).

# 7    Terminal point assignment

*Fig. 2          Terminal point assignment*
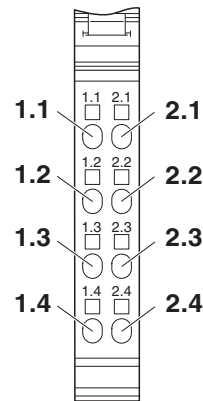


| Terminal point | Assignment |
|---|---|
| 1.1 / 2.1 | Signal output (OUT01 / OUT02) |
| 1.2 / 2.2 | Signal output (OUT03 / OUT04) |
| 1.3 / 2.3 | Signal output (OUT05 / OUT06) |
| 1.4 / 2.4 | Signal output (OUT07 / OUT08) |

## 8    Connection notes and examples

☞ When connecting the actuators, observe the assignment of the terminal points to the process data.

### *NOTICE*    **Malfunction**

GND of the actuators and GND of the supply voltage $U_S$, which supply the actuators, must have the same potential.

The simplest way to meet this requirement is to use the R-IB IL PD GND-PAC terminal. Wire the GND connections for the actuators to these terminals. In this way, they are connected with the potential jumper GND of the Inline station.

*Fig. 3*       *Typical connection of actuators when using the R-IB IL PD GND-PAC terminal*



**R-IB IL 24 DO8/HD-PAC  R-IB IL PD GND-PAC**
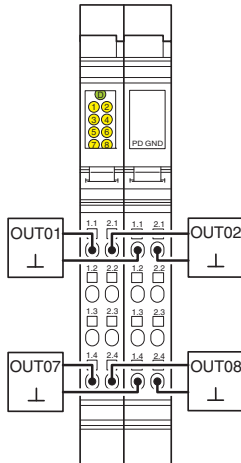
The actuators can also be connected via external busbars. Ensure that GND of the actuators and GND for $U_S$ have the same potential.

*Fig. 4*       *Typical connection of actuators when using external busbars*
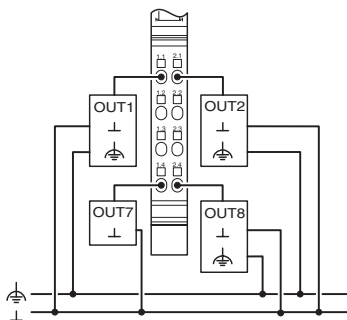


## 9    Application examples

*Fig. 5*       *Connection of contactors when using the R-IB IL PD GND-PAC terminal*
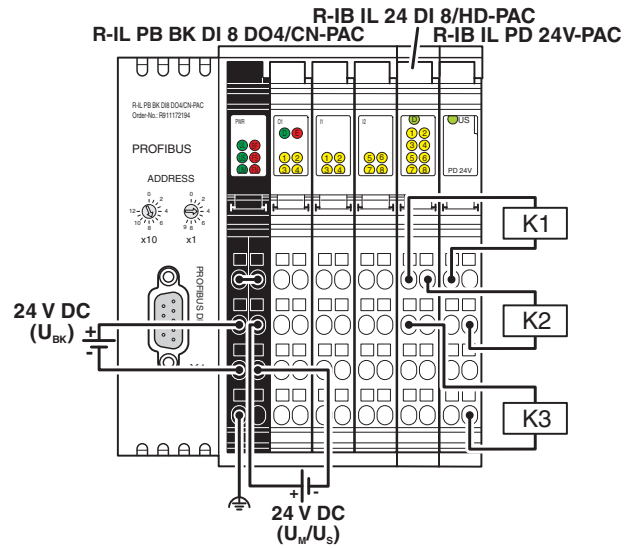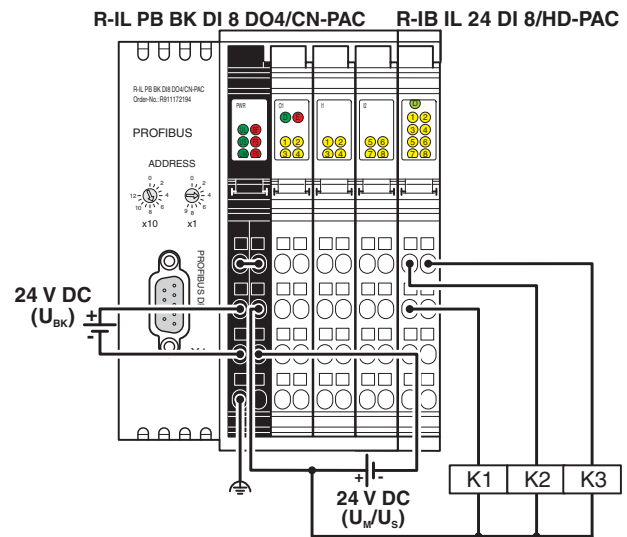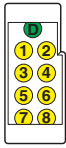


*Fig. 6*       *Connection of contactors when using external busbars*

## 10    Local diagnostic and status indicators

*Fig. 7          Local diagnostic and status indicators*

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

**Function identification**

Pink

## 11    Process data

**Assignment of the terminal points to the output process data**

| (Byte.Bit) view | Byte | Byte 0 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Bit | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Assignment | Signal | OUT08 | OUT07 | OUT06 | OUT05 | OUT04 | OUT03 | OUT02 | OUT01 |
| | 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 |