Rexroth
Bosch Group

Rexroth Inline terminal
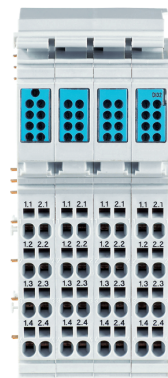# with 32 digital inputs, npn-wired

R911170578
Edition   03

Data sheet   R-IB IL 24 DI 32/HD-NPN-PAC

32 digital inputs
24 V DC
npn-wired

03 / 2018

1   Description

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

Features

- 32 digital inputs, NPN-wired
- Connection of sensors in single-wire technology

☞ This data sheet is only valid in association with the "Automation terminals of the Rexroth Inline product range" application description (DOK-CONTRL-ILSYS-INS***-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.
Rexroth Inline Terminal with 32 digital inputs; complete with accessories (plugs and labeling fields), npn-wired	R-IB IL 24 DI 32/HD-NPN-PAC	R911170405	1

Accessories	Type	MNR	Pcs./Pkt.
Rexroth Inline terminal for potential distribution GND; complete with accessories (connector and labeling field)	R-IB IL PD 24V-PAC	R911297189	1
Rexroth 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 Rexroth 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)
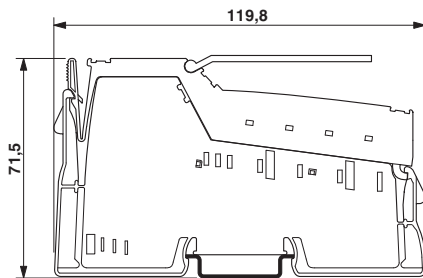
Width	48.8 mm
Height	119.8 mm
Depth	71.5 mm
Note on dimensions	Housing dimensions

General data

Color	gray
Weight	185 g (with connectors)
Operating mode	Process data operation with 2 words
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)
Degree of protection	IP20
Protection class	III, IEC 61140, EN 61140, VDE 0140-1

Connection data: Inline connector	
Connection method	Spring-cage connection
Conductor cross section solid / stranded	0.2 mm² ... 1.5 mm² / 0.2 mm² ... 1.5 mm²
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 draw	max. 90 mA
Power consumption	max. 0.675 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 draw	max. 100 mA

Power consumption	
Power consumption	max. 2.16 W (Module, complete)

Digital inputs	
Number of inputs	32 (NPN)
Connection method	Spring-cage connection
Connection technology	1-wire
Input characteristic curve	IEC 61131-2 type 1
Nominal input voltage	24 V DC
Nominal input current	typ. 2.6 mA
Input voltage range "0" signal	-30 V DC ... 5 V DC
Input voltage range "1" signal	15 V DC ... 30 V DC
Delay at signal change from 0 to 1	typ. 2 ms
Delay at signal change from 1 to 0	typ. 4 ms
Permissible conductor length to the sensor	30 m
Use of AC sensors	AC sensors in the voltage range < U_{IN} are limited in application (according to the input design)

Programming data (INTERBUS, local bus)	
ID code (hex)	BE
ID code (dec.)	190
Length code (hex)	02
Length code (dec.)	02
Process data channel	32 Bit
Input address area	4 Byte
Output address area	0 Byte

Programming data (INTERBUS, local bus)	
Parameter channel (PCP)	0 Byte
Register length (bus)	32 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
Required configuration data	4 Byte

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.
24 V supply (I/O) / functional earth ground	500 V AC, 50 Hz, 1 min.
7.5 V supply (bus logics) / 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. Connecting the supply devices in the 24 V area is not permitted (see also the "Automation terminals of the Rexroth Inline product range" application description (DOK-CONTRL-ILSYSINS***-AW..-EN-P, MNR R911317017).

Approvals

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

5   Additional tables

5.1   Input characteristic curve

Input characteristic curve	
Input voltage U [V]	**Typical input current I [mA]**
-30 < U ≤ 0.7	0
3	0.40
6	0,85
9	1.20
12	1.85
15	2.30
18	2.60
21	2.60
24	2.60
27	2.60
30	2.60

5.2   Power dissipation

Formula for calculating the power dissipation of the electronics

$$P_{EL} = 0{,}675\ W + \sum_{i=1}^{n} [U_{INi} \times I_{INi}]$$

Where:

P_{EL}	Total power dissipation in the terminal
i	Continuous index
n	Number of set inputs (n = 1 ... 32)
U_{INi}	Input voltage of input i
I_{INi}	Input current of input i according to the input characteristic curve

Power dissipation of the housing

2.8 W, maximum (within the permissible operating temperature)

5.3   Limitation of simultaneity, derating

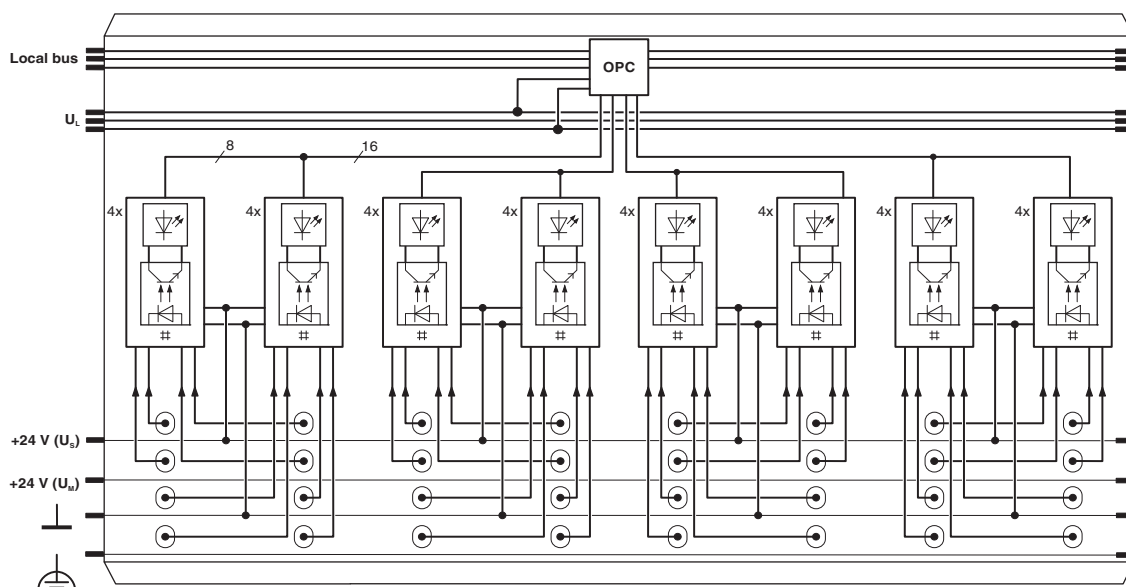No limitation of simultaneity, no derating

6   Internal circuit diagram

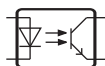*Fig. 1*   *Internal wiring of the terminal points*

Key:

OPC	Protocol chip
	LED (status indicator)
	Optocoupler
#	Digital input

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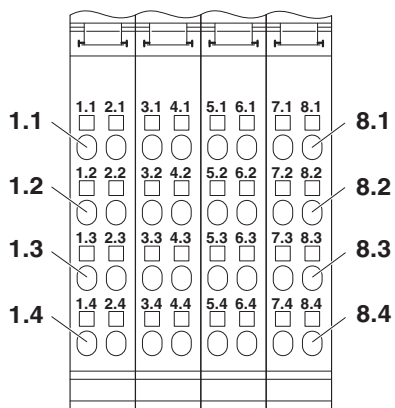
7   Terminal point assignment

Fig. 2   *Terminal point assignment*

Terminal point	Assignment
1.1 / 2.1	Signal 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)
3.1 / 4.1	Signal input (IN09 / IN10)
3.2 / 4.2	Signal input (IN11 / IN12)
3.3 / 4.3	Signal input (IN13 / IN14)
3.4 / 4.4	Signal input (IN15 / IN16)
5.1 / 6.1	Signal input (IN17 / IN18)
5.2 / 6.2	Signal input (IN19 / IN20)
5.3 / 6.3	Signal input (IN21 / IN22)
5.4 / 6.4	Signal input (IN23 / IN24)
7.1 / 8.1	Signal input (IN25 / IN26)
7.2 / 8.2	Signal input (IN27 / IN28)
7.3 / 8.3	Signal input (IN29 / IN30)
7.4 / 8.4	Signal input (IN31 / IN32)

8   Connection notes and examples

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

NOTICE   **Malfunction**

Please note that the terminal must be provided with supply voltage U_S, as it is used internally as the auxiliary voltage.

NOTICE   **Malfunction**

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

The easiest way to meet this requirement is to use the R-IB IL PD 24V-PAC terminal (four terminals for 32 sensors). Wire the 24 V sensor connections to these terminals. In this way, they are supplied from the potential jumper U_S of the Inline station.
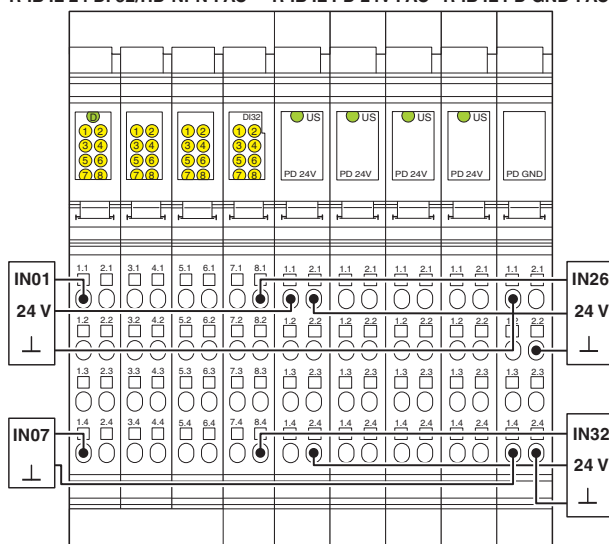

Fig. 3   *Typical connection of sensors when terminals for potential distribution are used*

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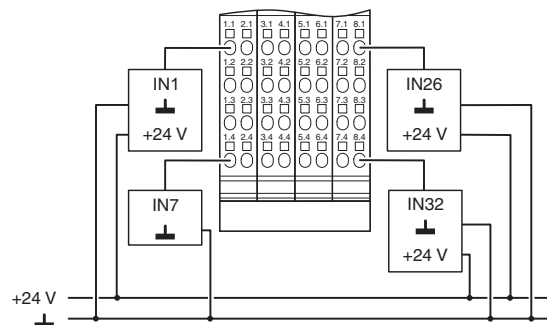

Fig. 4   *Example of a connection of sensors when using external busbars*
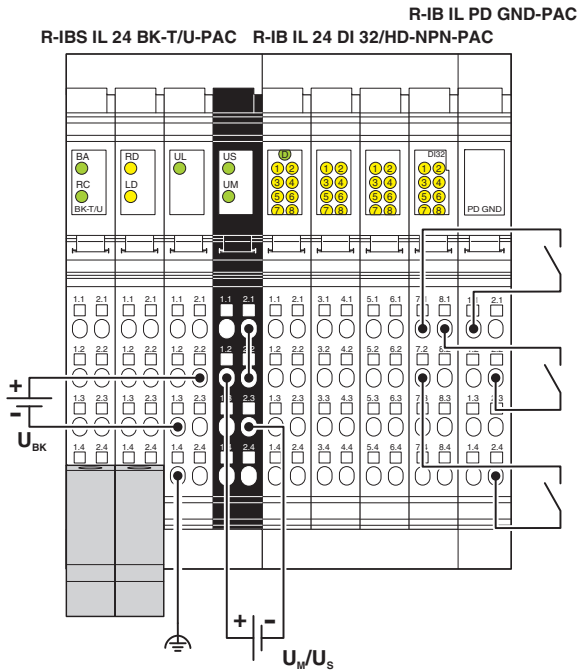
9   Application examples

Fig. 5   *Connection of sensors when using the R-IB IL PD 24V-PAC terminal*
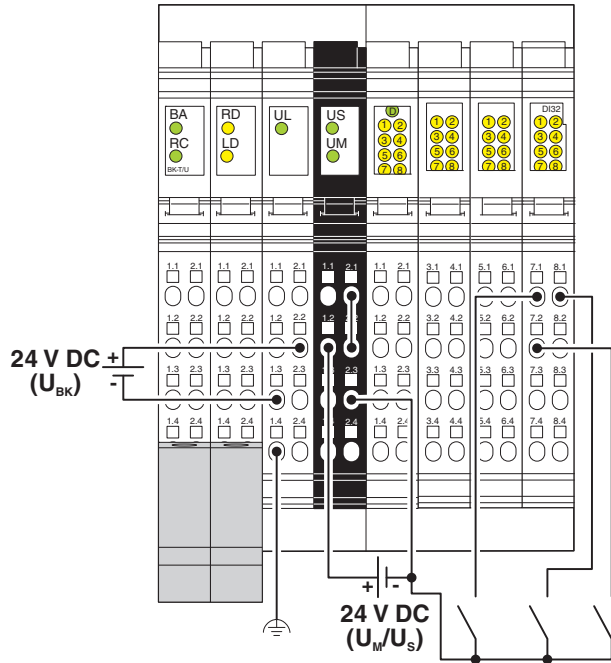

Fig. 6   *Connection of sensors when using external busbars*

10   Local diagnostic and status indicators
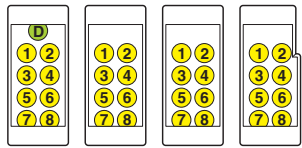
Fig. 7   *Local diagnostic and status indicators*

Designa-tion	Color	Meaning
D	Green	Diagnostics (bus and logic volt-age)
For each connector		
1 ... 8	Yellow	Status of the inputs

Function identification

Light blue

11   Process data

Assignment of the terminal points to IN process data

(Byte.Bit) view	Byte	Byte 0								Byte 1							
	Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Assignment	Slot	1								2							
	Signal	IN08	IN07	IN06	IN05	IN04	IN03	IN02	IN01	IN16	IN15	IN14	IN13	IN12	IN11	IN10	IN09
	Terminal point (signal)	2.4	1.4	2.3	1.3	2.2	1.2	2.1	1.1	4.4	3.4	4.3	3.3	4.2	3.2	4.1	3.1
Status indicator	LED	8	7	6	5	4	3	2	1	8	7	6	5	4	3	2	1

(Byte.Bit) view	Byte	Byte 2								Byte 3							
	Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Assignment	Slot	3								4							
	Signal	IN24	IN23	IN22	IN21	IN20	IN19	IN18	IN17	IN32	IN31	IN30	IN29	IN28	IN27	IN26	IN25
	Terminal point (signal)	6.4	5.4	6.3	5.3	6.2	5.2	6.1	5.1	8.4	7.4	8.3	7.3	8.2	7.2	8.1	7.1
Status indicator	LED	8	7	6	5	4	3	2	1	8	7	6	5	4	3	2	1