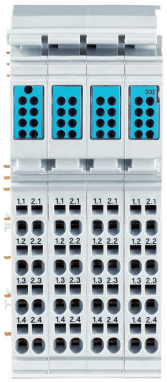
Inline terminal with 32 digital inputs

R911170554
Edition 04

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



32 digital inputs
24 V DC

08 / 2021

1 Description

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

Features

- 32 digital inputs
- Connection of sensors in 1-conductor technology

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 32 digital inputs; complete with accessories (plugs and labeling fields)	R-IB IL 24 DI 32/HD-PAC	R911170753	1

Accessories	Type	MNR	Pcs./Pkt.
Inline terminal for potential distribution GND; complete with accessories (connector and labeling field)	R-IB IL PD 24V-PAC	R911297189	1
Inline terminal for potential distribution GND; complete with accessories (connector and labeling field)	R-IB IL PD GND-PAC	R911297193	1

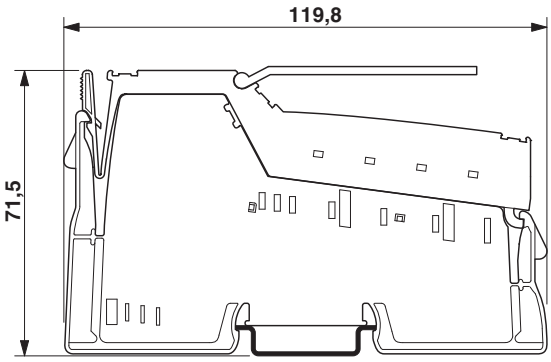
Documentation	Type	MNR	Pcs./Pkt.
Application description Automation terminals of the Inline product range	DOK-CONTRL-ILSYSINS***-AW..-EN-P	R911317021	1

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	48.8 mm
Height	119.8 mm
Depth	71.5 mm
Note on dimensions	Housing dimensions

General data	
Color	light grey RAL 7035
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)

General data	
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, rigid	0.2 mm² ... 1.5 mm²
Conductor cross section, flexible	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 consumption	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 consumption	max. 50 mA

Power consumption	
Power consumption	max. 3.3 W (Module, complete)

Digital inputs	
Number of inputs	32
Connection method	Spring-cage connection ()
Connection technology	1-conductor
Description of the input	IEC 61131-2 type 1
Nominal input voltage	24 V DC
Nominal input current	typ. 2.8 mA
Input voltage range "0" signal	-3 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
Short-circuit and overload protection	yes

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
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.
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

5.1 Input characteristic curve

Input characteristic curve	
Input voltage U [V]	**Typical input current I [mA]**
-30 < U ≤ 0.7	0
3	0.46
6	1.87
9	2.66
12	2.70
15	2.73
18	2.76
21	2.78
24	2.81
27	2.83
30	2.86

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

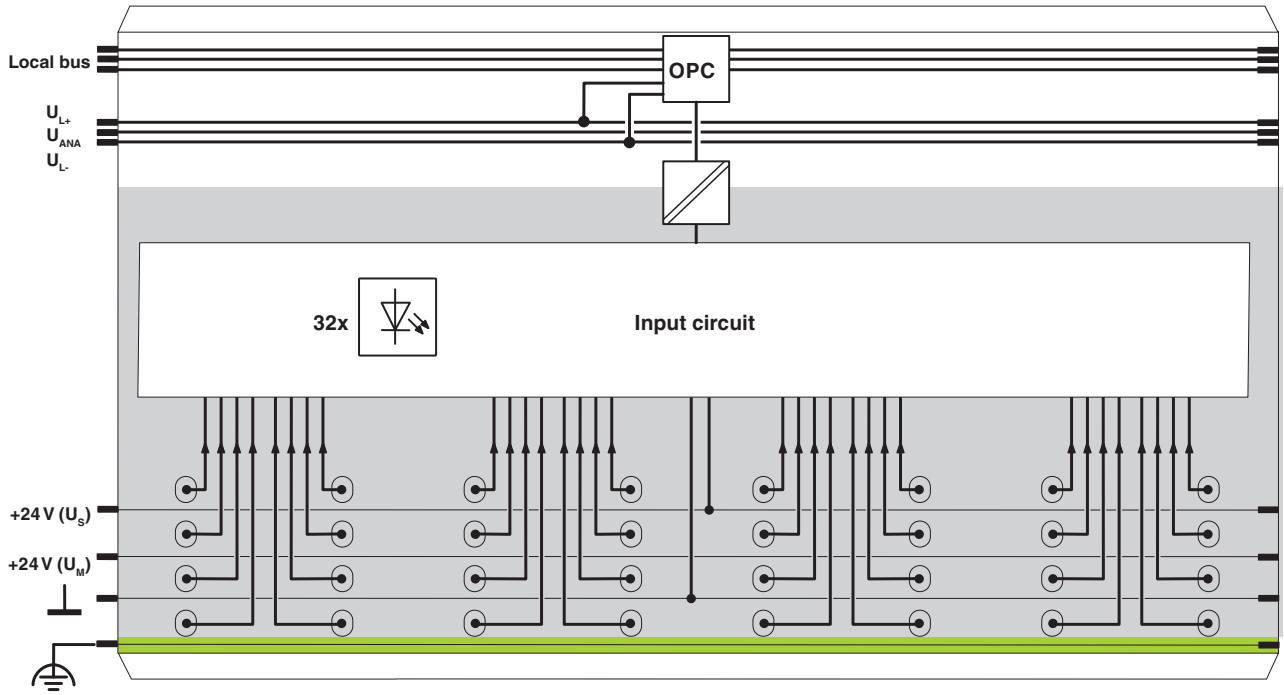
2.8 W, maximum (within the permissible operating temperature)

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
(Bus logic including voltage conditioning)

Electrical isolation

LED (status indicator)

Input circuit — Input circuit

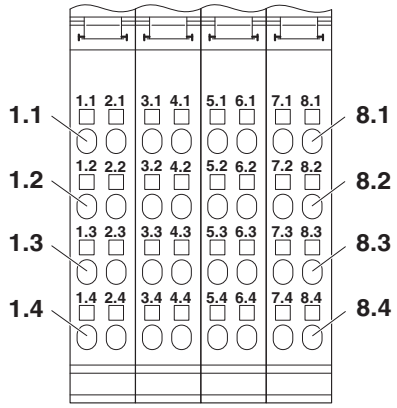
Digital input

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 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

NOTICE **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.

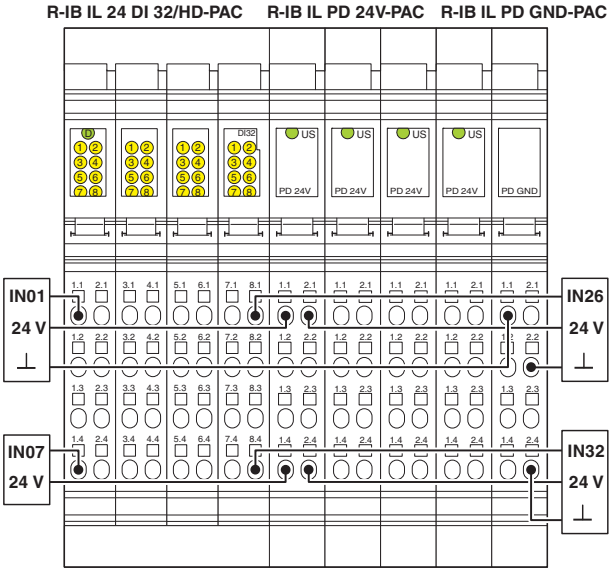
NOTICE **Malfunction**

Supply the sensors and U_S from the same power supply.

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

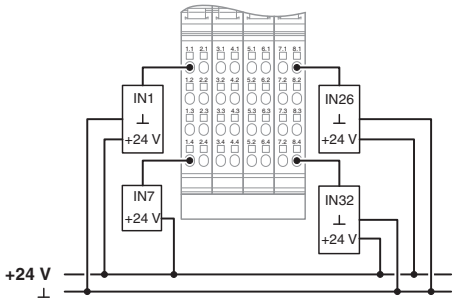
The easiest way to meet this requirement is to use the R-IB IL PD 24V-PAC terminal (four terminals for 32 sensors). Wire the 24 V sensor connections to these terminals. In this way, they are supplied from the potential jumper U_S of the Inline station.

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

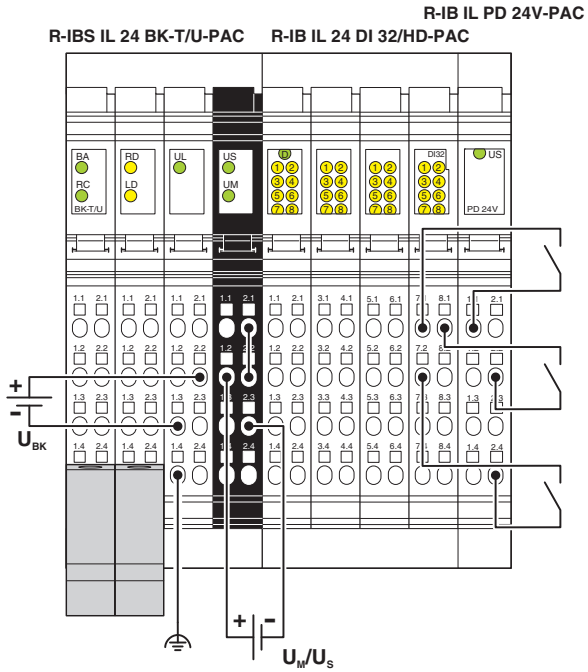
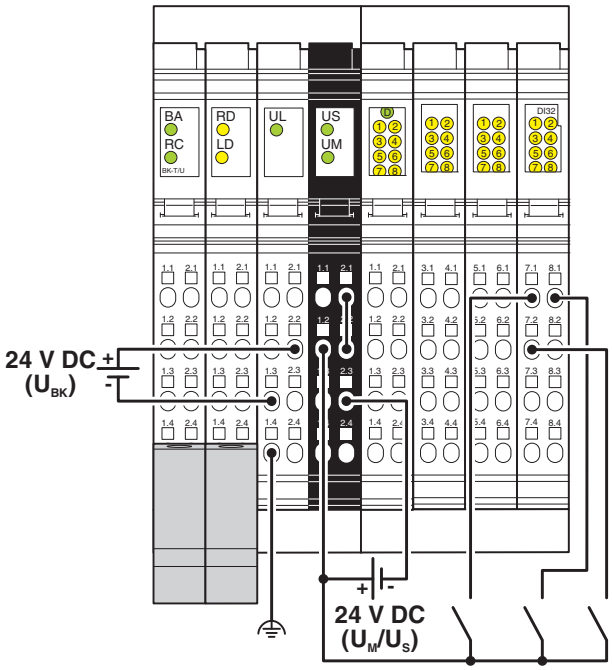
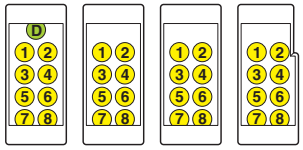


Fig. 6 Connection of sensors when using external busbars



10 Local diagnostic and status indicators

Fig. 7 Local diagnostic and status indicators



Designation	Color	Meaning
D	Green	Diagnostics (bus and logic voltage)
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

DOK-CONTRL-ILDI32/
HD**-KB04-EN-P

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