Rexroth
Bosch Group

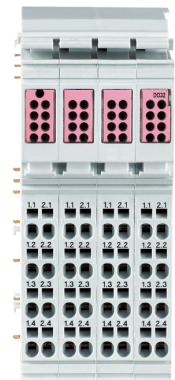# Rexroth Inline terminal with 32 digital outputs

R911170556
Edition   03

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

32 digital outputs
24 V DC

10 / 2018

1   Description

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

Features

*   32 digital outputs
*   Connection of actuators in single-wire technology
*   Nominal current per output: 500 mA
*   Total current of the terminal: 8 A
*   Short-circuit-proof and overload-protected outputs

☞ 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 outputs; complete with accessories (plugs and labeling fields)	R-IB IL 24 DO 32/HD-PAC	R911170768	1

Accessories	Type	MNR	Pcs./Pkt.
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)
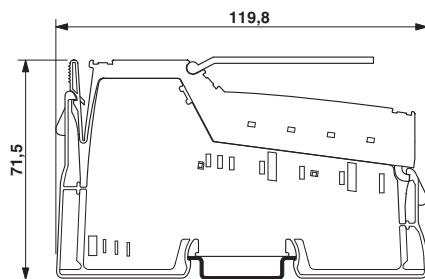
Width	48.8 mm
Height	119.8 mm
Depth	71.5 mm
Note on dimensions	Housing dimensions

General data

Color	gray
Weight	195 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. 140 mA
Power consumption	max. 1.05 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. 8 A

Power consumption	
Power consumption	max. 2.8 W (Module, complete)

Digital outputs	
Number of outputs	32
Connection method	Spring-cage connection
Connection technology	1-wire
Nominal output voltage	24 V DC
Voltage difference with nominal current	≤ 1 V
Maximum output current per channel	500 mA
Maximum output current per device	8 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 (for switching frequencies up to 8 Hz, above this frequency, the lamp load behaves like an ohmic load)
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
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)

Digital outputs

Reaction time with short-circuit	ca. 3 s
Reaction time with ohmic overload	ca. 3 s
Behavior at voltage switch-off	The output follows the power supply without delay
Output data validity	typ. 5 ms (after switching the 24 V voltage supply (power up))
One-time unsolicited energy	400 mJ
Limitation of the voltage induced on circuit interruption	-45.8 V ... -15 V
Output voltage when switched off	max. 2 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. 2 A
Overcurrent shut-down	min. 0.7 A
Output current with ground connection interrupt when switched off	max. 25 mA
Switching capacity with ground connection interrupt	typ. 100 mW (at 1 kΩ load resistance)
Inrush current	max. 1.5 A (at nominal lamp load for 20 ms)
Overload protection, short-circuit protection of outputs	Zener diode in output chip
Note on protection circuit	Channels are thermally coupled in groups of four, i.e., an error in one channel can also affect the other channels.

Programming data (INTERBUS, local bus)

ID code (hex)	BD
ID code (dec.)	189
Length code (hex)	02
Length code (dec.)	02
Process data channel	32 Bit
Input address area	0 Byte
Output address area	4 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	6 Byte
Required configuration data	4 Byte

Error messages to the higher level control or computer system

Short-circuit / 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.
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 R911317021).

Approvals

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

5　Additional tables

5.1　Output characteristic curve

Output characteristic curve when switched on (typical)	
Output current (A)	**Differential output voltage (V)**
0	0
0.1	0.04
0.2	0.08
0.3	0.12
0.4	0,16
0.5	0,20

5.2　Power dissipation

Formula for calculating the power dissipation of the electronics

$$P_{EL} = 0{,}29 \ W + \sum_{i=1}^{n} (0{,}07 \ W + I_{Li}^{2} \times 0{,}40 \ \Omega)$$

Where:

P_{EL}	Total power dissipation in the terminal
i	Continuous index
n	Number of set outputs (n = 1 ... 32)
I_{Li}	Load current of output i

Power dissipation of the housing

2.8 W, maximum (within the permissible operating temperature)

5.3　Limitation of simultaneity, derating

Limitation of simultaneity, derating	Maximum load current	
Ambient temperature T_{amb}	**100 % simultaneity**	**50 % simultaneity**
-25°C ≤ T_A < +40°C	0.25 A	0.5 A
+40°C ≤ T_A < +45°C	0.21 A	0.45 A
+45°C ≤ T_A < +50°C	0.18 A	0.40 A
+50°C < T_A ≤ +55°C	0.15 A	0.35 A

☞ An example for calculating the working point can be found in the "Automation terminals of the Rexroth Inline product range" application description (DOK-CONTRL-ILSYSINS***-AW..-EN-P, MNR R911317021).
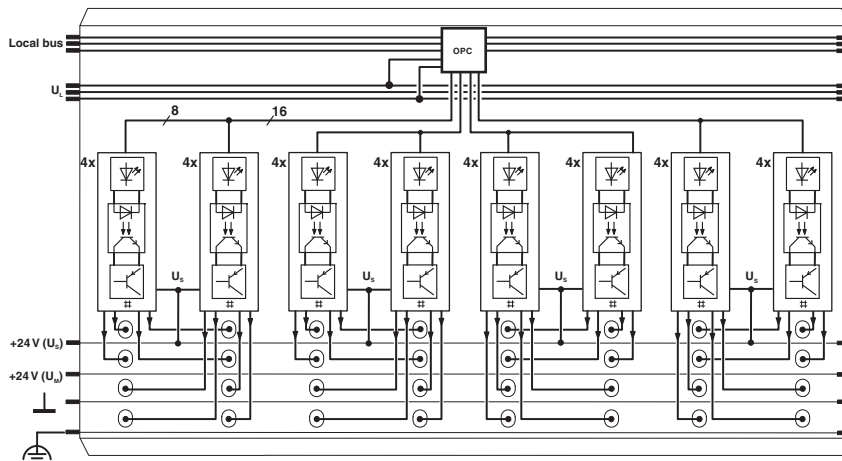
6   Internal circuit diagram

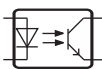*Fig. 1*   *Internal wiring of the terminal points*

Key:

OPC	Protocol chip (Bus logic including voltage conditioning)
	LED (status indicator)
	Optocoupler
	Transistor
	Digital output

☞ 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
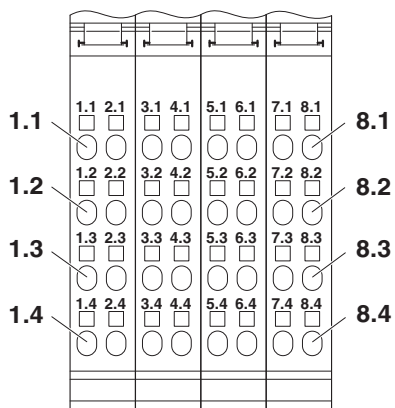
Fig. 2   *Terminal point assignment*

Terminal point	Assignment
1.1 / 2.1	Signal 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)
3.1 / 4.1	Signal output (OUT09 / OUT10)
3.2 / 4.2	Signal output (OUT11 / OUT12)
3.3 / 4.3	Signal output (OUT13 / OUT14)
3.4 / 4.4	Signal output (OUT15 / OUT16)
5.1 / 6.1	Signal output (OUT17 / OUT18)
5.2 / 6.2	Signal output (OUT19 / OUT20)
5.3 / 6.3	Signal output (OUT21 / OUT22)
5.4 / 6.4	Signal output (OUT23 / OUT24)
7.1 / 8.1	Signal output (OUT25 / OUT26)
7.2 / 8.2	Signal output (OUT27 / OUT28)
7.3 / 8.3	Signal output (OUT29 / OUT30)
7.4 / 8.4	Signal output (OUT31 / OUT32)

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 easiest way to meet this requirement is to use the R-IB IL PD GND-PAC terminal (four terminals for 32 actuators). Wire the GND connections for the actuators to these terminals. In this way, they are connected to potential jumper GND of the Inline station.

The actuators can also be connected via external busbars. Ensure that GND of the actuators and GND for U_S have the same potential.
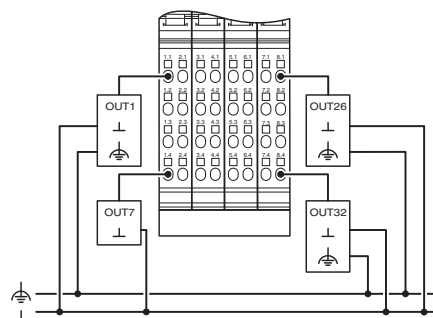
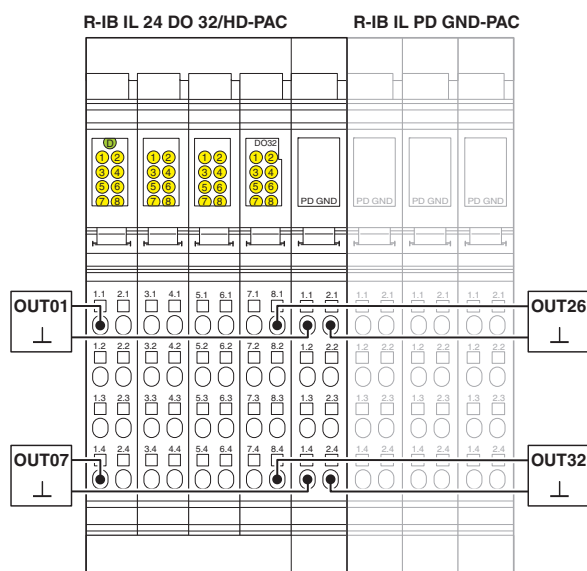*Fig. 4   Typical connection of actuators when using external busbars*

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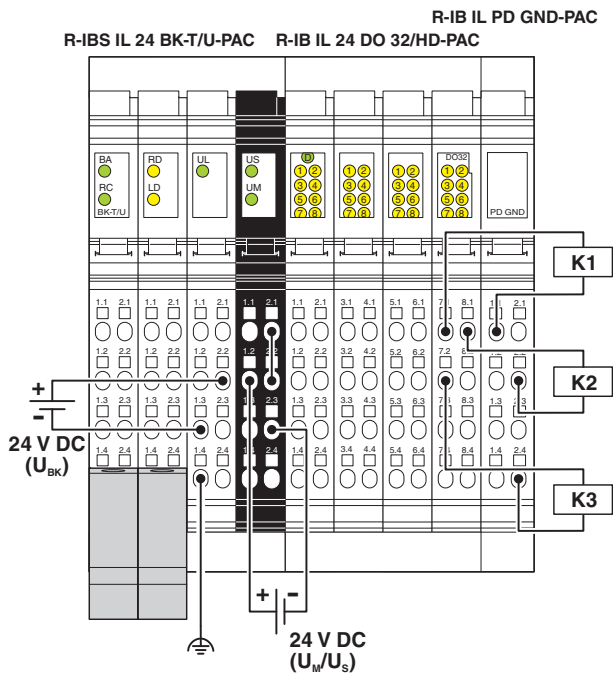
9   Application examples

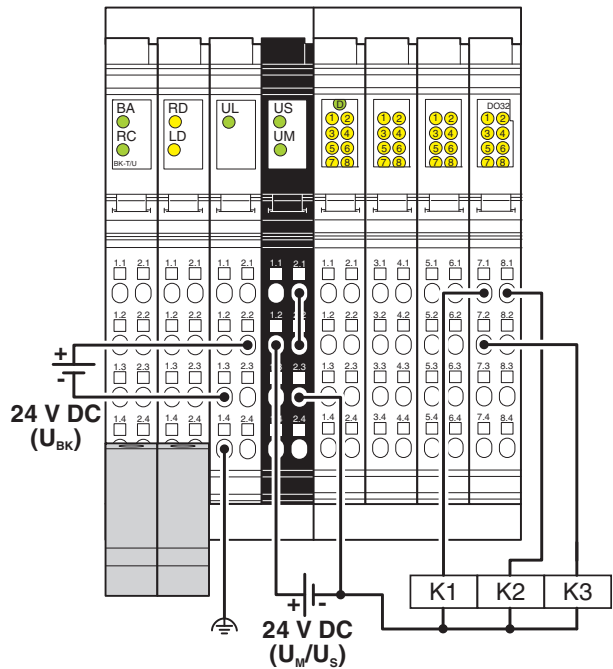*Fig. 5*   *Connection of contactors when using the IB IL PD GND-PAC terminal*

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

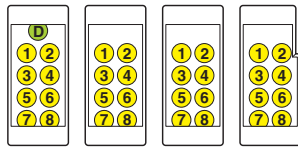## 10   Local diagnostic and status indicators

Fig. 7   *Local diagnostic and status indicators*

Designa-tion	Color	Meaning
D	Green	Diagnostics (bus and logic volt-age)
For each connector		
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								Byte 1							
	Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Assignment	Slot	1								2							
	Signal	OUT 08	OUT 07	OUT 06	OUT 05	OUT 04	OUT 03	OUT 02	OUT 01	OUT 16	OUT 15	OUT 14	OUT 13	OUT 12	OUT 11	OUT 10	OUT 09
	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	OUT 24	OUT 23	OUT 22	OUT 21	OUT 20	OUT 19	OUT 18	OUT 17	OUT 32	OUT 31	OUT 30	OUT 29	OUT 28	OUT 27	OUT 26	OUT 25
	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

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