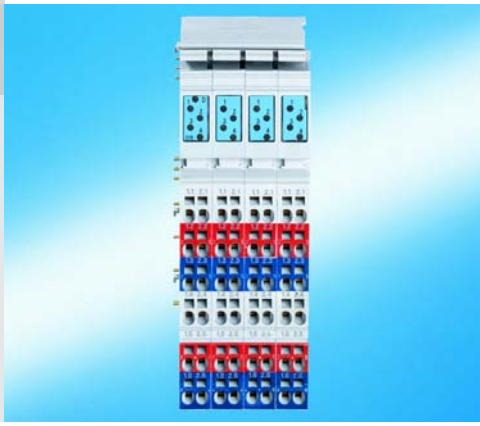
Rexroth Inline terminal with 16 digital inputs; npn-wired

R911170570
Edition 01

R-IB IL 24 DI 16-NPN-PAC



16 digital inputs
24 V DC
npn-wired

09/2008

Description

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

Features

- Connections for 16 digital sensors, npn-wired
- Connection of sensors in 2 and 3-wire technology
- Maximum permissible load current per sensor: 250 mA
- Maximum permissible load current from the terminal: 4.0 A
- Diagnostic and status indicators

This data sheet is only valid in association with the application descriptions for the Rexroth Inline system (see "Documentation" on page 2).

Make sure you always use the latest documentation.
It can be downloaded at www.boschrexroth.com.

Ordering data

Product

Description	Type	MNR	Pcs./Pkt.
Terminal with 16 digital inputs; npn-wired; including accessories (connectors and labeling fields)	R-IB IL 24 DI 16-NPN-PAC	R911170404	1

Documentation

Description	Type	MNR	Pcs./Pkt.
"Automation terminals of the Rexroth Inline product range" application description	DOK-CONTRL-ILSYSINS***-AW..-EN-P	R911317021	1
"Configuring and installing the Rexroth Inline product range for INTERBUS" application description	DOK-CONTRL-ILSYSPRO***-AW..-EN-P	R911317023	1

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

Technical data

General data	
Housing dimensions (width x height x depth)	48.8 mm x 120 mm x 72 mm
Weight	210 g (with connectors)
Operating mode	Process data mode with 2 bytes
Transmission speed	500 kbps
Connection method for sensors	2 and 3-wire technology
Ambient temperature (operation)	-25°C to +55°C
Ambient temperature (storage/transport)	-25°C to +85°C
Permissible humidity (operation/storage/transport)	10% to 95% according to DIN EN 61131-2
Permissible air pressure (storage/transport)	70 kPa to 106 kPa (up to 3000 m above sea level)
Degree of protection	IP20 according to IEC 60529
Class of protection	Class 3 according to VDE 0106, IEC 60536
Connection data for Inline connector	
Connection method	Spring-cage terminals
Conductor cross-section	0.08 mm^2 to 1.5 mm^2 (solid or stranded), 28 - 16 AWG
Interface	
Local bus	Through data routing
Power consumption	
Communications power	7.5 V DC
Current consumption from the local bus	60 mA, maximum
Power consumption from the local bus	0.45 W, maximum
Segment supply voltage U_S	24 V DC (nominal value)
Nominal current consumption at U_S	4 A, maximum (16 x 0.25 A)
Supply of the module electronics and I/O through bus coupler/power terminal	
Connection method	Through potential routing
Digital inputs	
Number	16
Input design	According to EN 61131-2 Type 1
Definition of switching thresholds	
Maximum low-level voltage	U_{Lmax} < 5 V
Minimum high-level voltage	U_{Hmin} > 15 V
Common potentials	Segment supply, ground, digital inputs
Nominal input voltage U_{IN}	24 V DC

Digital inputs	
Permissible range	-30 V < U_{IN} < +30 V DC
Nominal input current for U_{IN}	3 mA, minimum
Delay time	None
Permissible cable length to the sensor	30 m (to ensure conformance with EMC directive 89/336/EEC)
Use of AC sensors	AC sensors in the voltage range < U_{IN} are limited in application (according to the input design)

Characteristic curve: Current depending on the input voltage and the ambient temperature T_A

Supply voltage	Input current	Input current for t >= 20 s	
		For T_A = 25°C	For T_A = 55°C
18 V	3.0 mA	2.9 mA	2.5 mA
24 V	3.9 mA	3.8 mA	3.5 mA
30 V	4.5 mA	4.2 mA	3.0 mA

The current is reduced depending on the ambient temperature T_A and the number of inputs that are switched on (internal module temperature).

Power dissipation

Formula to calculate the power dissipation of the electronics

$$P_{TOT} = 0.525\ W + \sum_{i=1}^{n} [\ U_{INi} \times 0.003\ A\ ]$$

Where

P_{TOT}	Total power dissipation in the terminal
n	Number of set inputs (n = 1 to 16)
i	Index
U_{INi}	Input voltage of input i

Power dissipation of the housing P_{HOU}

2.8 W, maximum (within the permissible operating temperature)

Limitation of simultaneity, derating

Derating	No limitation of simultaneity, no derating

Safety equipment

Overload in the segment circuit	No
Surge voltage	Protective elements in the power terminal
Polarity reversal	Protective elements in the power terminal

Electrical isolation/isolation of the voltage areas

CAUTION

To provide electrical isolation between the logic level and the I/O area it is necessary to supply the station bus coupler and the digital input terminal described here via the bus coupler or a power terminal from separate power supply units. Interconnection of the power supply units in the 24 V area is not permitted.

Common potentials

The 24 V main voltage, 24 V segment voltage, and GND have the same potential.
FE is a separate potential area.

Separate potentials in the system consisting of bus coupler/power terminal and I/O terminal

- Test distance	- Test voltage
5 V supply incoming remote bus/7.5 V supply (bus logic)	500 V AC, 50 Hz, 1 min.
5 V supply outgoing remote bus/7.5 V supply (bus logic)	500 V AC, 50 Hz, 1 min.
7.5 V supply (bus logic)/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.

Error messages to the higher-level control or computer system

None

Approvals

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

Internal basic circuit diagram

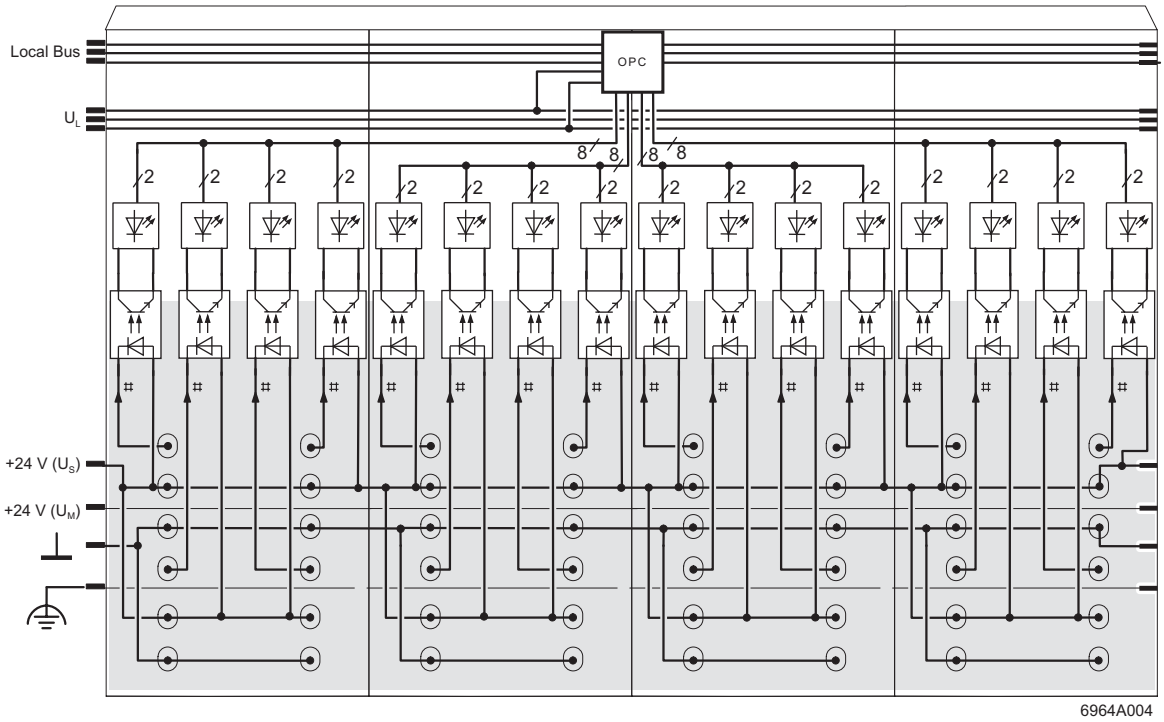


Fig. 1 Internal wiring of the terminal points

Key:

OPC	Protocol chip (bus logic including voltage conditioning)
	LED
	Optocoupler
	Digital input (npn-wired)
	Electrically isolated area

Other symbols used are explained in the application descriptions for the Rexroth Inline system (see "Documentation" on page 2) or the application description for your bus system.

Local diagnostic and status indicators and terminal point assignment

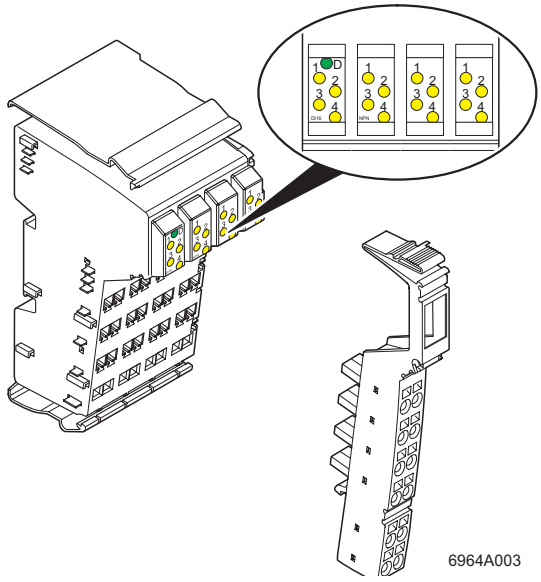


Fig. 2 *Terminal with one of the appropriate connectors*

Local diagnostic and status indicators

Des.	Color	Meaning
D	Green	Diagnostics
For each connector		
1, 2, 3, 4	Yellow	Status indicators for the inputs

Function identification

Light blue

Terminal point assignment for each connector

Terminal point	Assignment
x.1	Signal input (IN)
x.2	Segment voltage U_S for 3-wire termination
x.3	Ground contact (GND) for 2 and 3-wire termination
x.4	Signal input (IN)
x.5	Segment voltage U_S for 3-wire termination
x.6	Ground contact (GND) for 2 and 3-wire termination

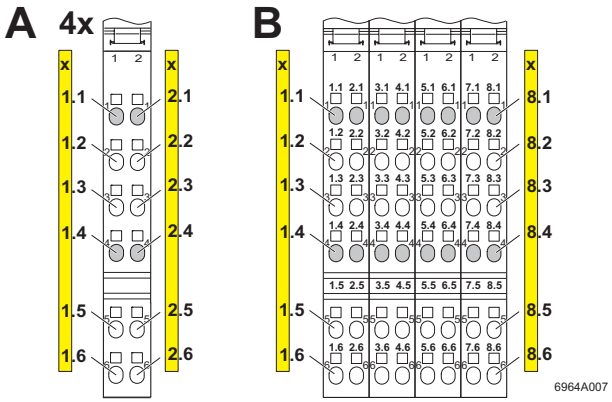


Fig. 3 *Terminal point numbering when using individual connectors (**A**) and when using a connector set (**B**)*

Connection notes and connection example

CAUTION

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

CAUTION

When connecting the sensors observe the assignment of the terminal points to the process data (see "Process data" on page 8).

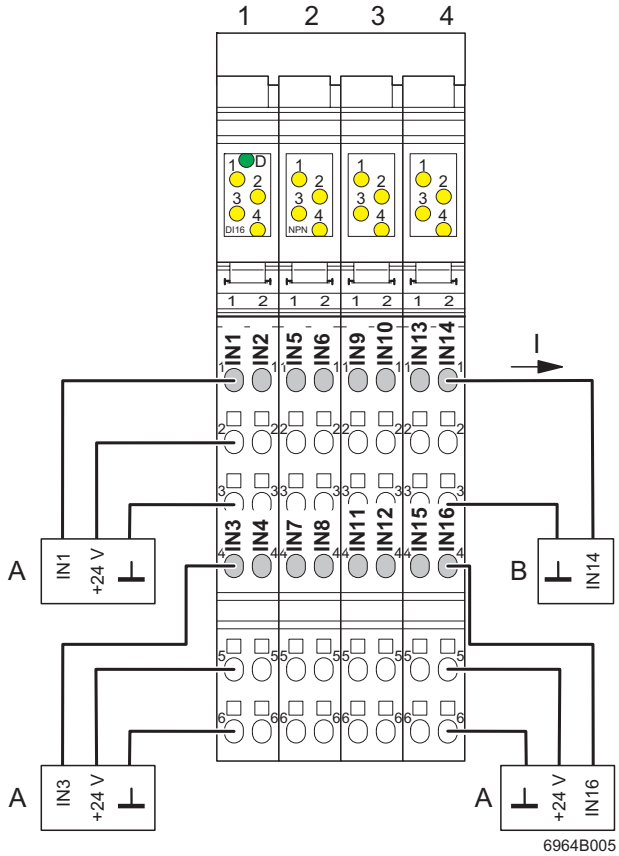


Fig. 4 Typical connection of sensors

A: 3-wire termination

B: 2-wire termination

The numbers above the terminal illustration indicate the connector slots.

The example for 2-wire technology shows the direction of the current flow for npn logic.

Programming data/configuration data

Local bus

ID code	BE_{hex} (190_{dec})
Length code	01_{hex}
Process data channel	16 bits
Input address area	2 bytes
Output address area	0 bytes
Parameter channel (PCP)	0 bytes
Register length (bus)	2 bytes

Other bus systems

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

Process data

Assignment of the terminal points to the IN process data

The following table applies to the R-IB IL 24 DI 16-NPN-PAC with the original connector set (see also Fig. 2 on page 6, detail B).

(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
Module	Slot	2				1				4				3			
	Terminal point (signal)	**4.4**	**3.4**	**4.1**	**3.1**	**2.4**	**1.4**	**2.1**	**1.1**	**8.4**	**7.4**	**8.1**	**7.1**	**6.4**	**5.4**	**6.1**	**5.1**
	Terminal point (+24 V)	4.5	3.5	4.2	3.2	2.5	1.5	2.2	1.1	8.5	7.5	8.2	7.2	6.5	5.5	6.2	5.2
	Terminal point (GND)	4.6	3.6	4.3	3.3	2.6	1.6	2.3	1.2	8.6	7.6	8.3	7.3	6.6	5.6	6.3	5.3
Status indicator	Slot	2				1				4				3			
	LED	4	3	2	1	4	3	2	1	4	3	2	1	4	3	2	1

The following table applies when using the R-IB IL SCN-12-ICP connector (see also Fig. 2 on page 6, detail A).

(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
Module	Slot	2				1				4				3			
	Terminal point (signal)	**2.4**	**1.4**	**2.1**	**1.1**	**2.4**	**1.4**	**2.1**	**1.1**	**2.4**	**1.4**	**2.1**	**1.1**	**2.4**	**1.4**	**2.1**	**1.1**
	Terminal point (+24 V)	2.5	1.5	2.2	1.2	2.5	1.5	2.2	1.2	2.5	1.5	2.2	1.2	2.5	1.5	2.2	1.2
	Terminal point (GND)	2.6	1.6	2.3	1.3	2.6	1.6	2.3	1.3	2.6	1.6	2.3	1.3	2.6	1.6	2.3	1.3
Status indicator	Slot	2				1				4				3			
	LED	4	3	2	1	4	3	2	1	4	3	2	1	4	3	2	1

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