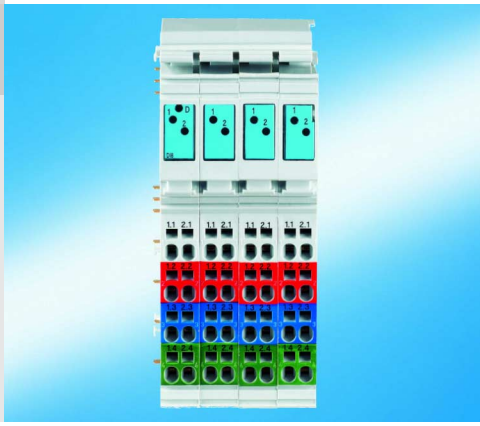
Rexroth Inline Terminal With Eight Digital Inputs

R911170526
Edition 01

R-IB IL 24 DI 8(-2MBD)-PAC



8 Digital Inputs
24 V DC

01/2007

Description

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

Features

- Connections for eight digital sensors
- Connection of sensors in 2, 3, and 4-wire technology
- Maximum permissible load current per sensor: 250 mA
- Maximum permissible load current from the terminal: 2.0 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

Products

Description	Type	MNR	Pcs./Pck.
Rexroth Inline terminal with eight digital inputs; complete with accessories (connector and labeling field); transmission speed of 500 kbps	R-IB IL 24 DI 8-PAC	R911170751	1
Rexroth Inline terminal with eight digital inputs; complete with accessories (connector and labeling field); transmission speed of 2 Mbps	R-IB IL 24 DI 8-2MBD-PAC	R911170407	1

Documentation

Description	Type	MNR	Pcs./Pck.
"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 71.5 mm
Weight	178 g (with connectors)
Operating mode	Process data mode with 1 byte
Connection method for sensors	2, 3, and 4-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 (operation/storage/transport)	70 kPa to 106 kPa (up to 3000 m above sea level)
Degree of protection	IP20 according to IEC 60529
Protection class	Class 3 according to VDE 0106, IEC 60536
Connection data for Inline connector	
Connection method	Spring-cage terminals
Conductor cross section	0.2 mm^2 to 1.5 mm^2 (solid or stranded), 24 - 16 AWG

Interface	
Local bus	Through data routing

Transmission Speed	
R-IB IL 24 DI 8-PAC	500 kbps
R-IB IL 24 DI 8-2MBD-PAC	2 Mbps

Power Consumption	500 kbps	2 Mbps
Communications power	7.5 V DC	7.5 V DC
Current consumption at U_L	50 mA, maximum	85 mA, maximum
Power consumption at U_L	0.375 W, maximum	0.638 W, maximum
Segment supply voltage U_S	24 V DC	24 V DC
Nominal current consumption at U_S	2 A, maximum	2 A, maximum

Supply of the Module Electronics and I/O Through the Bus Coupler/Power Terminal	
Connection method	Through potential routing

Digital Inputs	
Number	8
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
Nominal input voltage U_{IN}	24 V DC
Permissible range	-30 V < U_{IN} < +30 V DC
Nominal input current for U_{IN}	5 mA
Current flow	Linear in the range 1 V < U_{IN} < 30 V
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)

Input Characteristic Curve	
(500 kbps and 2 Mbps)	
Input Voltage (V)	Typical Input Current (mA)
-30 < U_{IN} < 0.7	0
3	0.4
6	1.0
9	1.7
12	2.3
15	3.0
18	3.7
21	4.4
24	5.0
27	5.7
30	6.4

Power Dissipation	
500 kbps	**2 Mbps**
Formula to Calculate the Power Dissipation of the Electronics	
$P_{TOT} = 0.375\ W + \sum_{i=1}^{n} [\ U_{INi} \times \frac{U_{INi} - 1{,}8\ V}{4400\ \Omega}\ ]$	$P_{TOT} = 0.638\ W + \sum_{i=1}^{n} [\ U_{INi} \times \frac{U_{INi} - 1{,}8\ V}{4400\ \Omega}\ ]$
Where P_{TOT} = Total power dissipation in the terminal i = index n = Number of set inputs (n = 1 to 8) 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 segment circuit	No
Surge voltage	Protective elements of the power terminal
Polarity reversal	Protective elements of 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.
(See also application description.)

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.

Local Diagnostic and Status Indicators and Terminal Point Assignment

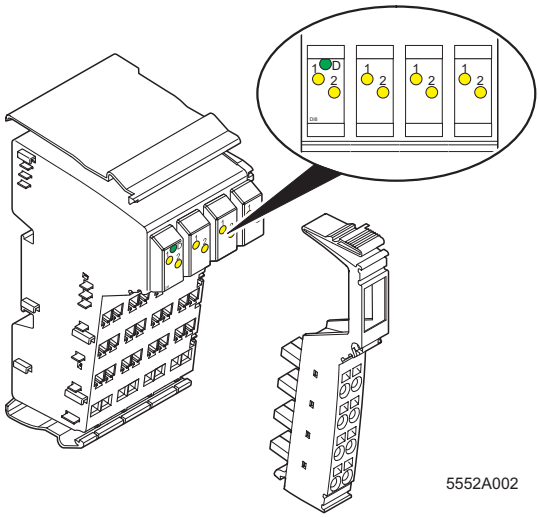


Fig. 1 Terminal with one of the appropriate connectors

Local Diagnostic and Status Indicators

Des.	Color	Meaning
D	Green	Diagnostics
For Each Connector		
1, 2	Yellow	Status indicators of the inputs

Function Identification

Light blue

2 Mbps: White stripe in the vicinity of the D LED

Terminal Point Assignment for Each Connector

Terminal Point	Assignment
1.1	Signal input (IN1)
2.1	Signal input (IN2)
1.2, 2.2	Segment voltage U_S for 2, 3, and 4-wire termination
1.3, 2.3	Ground contact (GND) for 3 and 4-wire termination
1.4, 2.4	FE connection for 4-wire termination

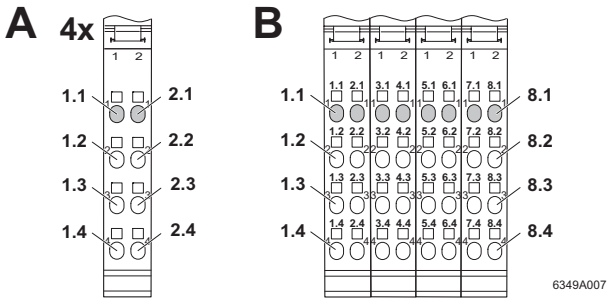


*Fig. 2 Terminal point numbering when using individual connectors (**A**) and when using a connector set (**B**)*

Internal Circuit Diagram

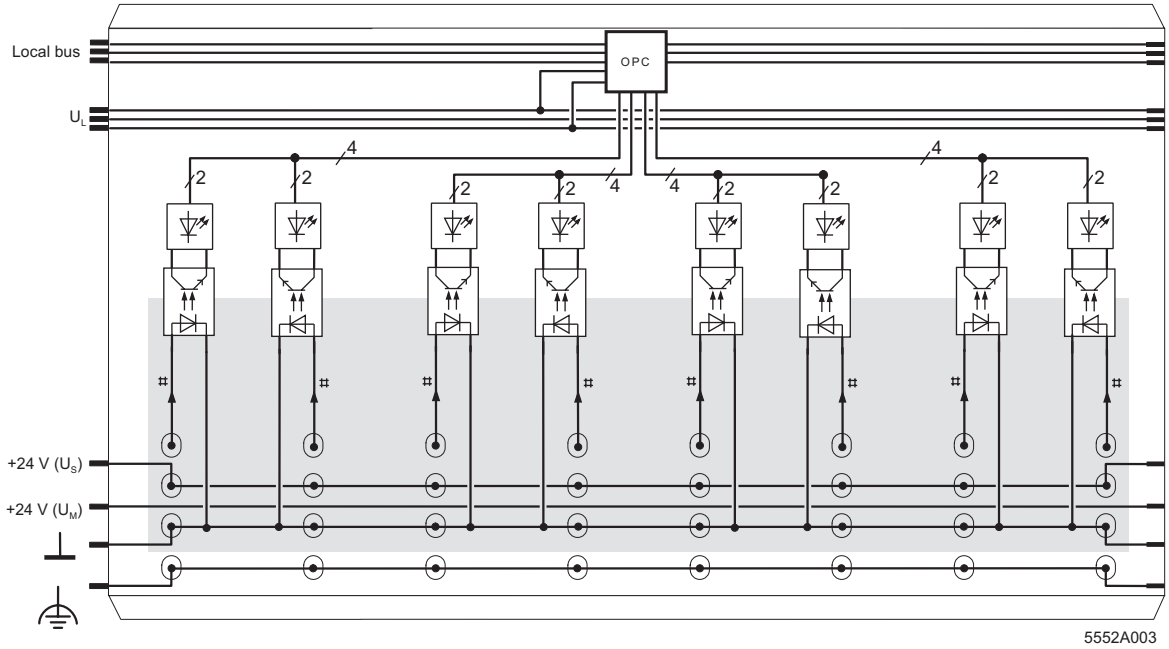


Fig. 3 Internal wiring of the terminal points

Key:

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

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

Connection Example

CAUTION

When connecting the sensors observe the assignment of the terminal points to the process data (see page 7).

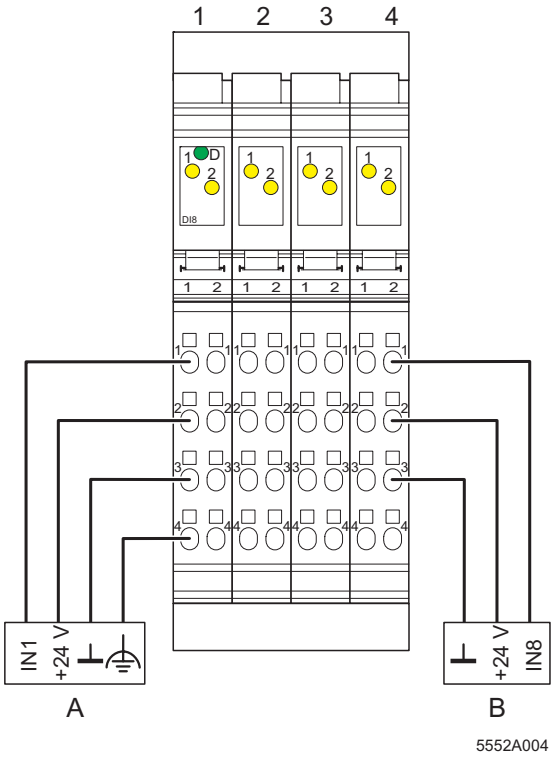


Fig. 4 Typical sensor connections

A: 4-wire termination

B: 3-wire termination

The numbers above the module illustration indicate the connector slots.

Programming Data

ID code	BE_{hex} (190_{dec})
Length code	81_{hex}
Process data channel	8 bits
Input address area	1 byte
Output address area	0 bytes
Parameter channel (PCP)	0 bytes
Register length (bus)	1 byte

Process Data

The following table applies to a PAC version with the original connector set (see also Fig. 2 on page 5, Figure B).

Assignment of the Terminal Points to the IN Process Data

(Byte.bit) view	Byte	Byte 0							
	Bit	7	6	5	4	3	2	1	0
Assign-ment	Slot	4		3		2		1	
	Terminal point (signal)	**8.1**	**7.1**	**6.1**	**5.1**	**4.1**	**3.1**	**2.1**	**1.1**
	Terminal point (+24 V)	8.2	7.2	6.2	5.2	4.2	3.2	2.2	1.2
	Terminal point (GND)	8.3	7.3	6.3	5.3	4.3	3.3	2.3	1.3
	Terminal point (FE)	8.4	7.4	6.4	5.4	4.4	3.4	2.4	1.4
Status indicator	Slot	4		3		2		1	
	LED	2	1	2	1	2	1	2	1

The following table applies when using the R-IB IL SCN-8 or R-IB IL SCN-8-CP connectors (see also Fig. 2 on page 5, A).

(Byte.bit) view	Byte	Byte 0							
	Bit	7	6	5	4	3	2	1	0
Assign-ment	Slot	4		3		2		1	
	Terminal point (signal)	**2.1**	**1.1**	**2.1**	**1.1**	**2.1**	**1.1**	**2.1**	**1.1**
	Terminal point (+24 V)	2.2	1.2	2.2	1.2	2.2	1.2	2.2	1.2
	Terminal point (GND)	2.3	1.3	2.3	1.3	2.3	1.3	2.3	1.3
	Terminal point (FE)	2.4	1.4	2.4	1.4	2.4	1.4	2.4	1.4
Status indicator	Slot	4		3		2		1	
	LED	2	1	2	1	2	1	2	1

Notes:

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