

Rexroth Inline Terminal With Two Digital Outputs

R911170530
Edition 02

R-IB IL 24 DO 2-2A-PAC

2 Digital Outputs
24 V DC

06/2011



1 Description

This terminal is designed for use within an Inline station.

It is used to output digital signals.

Features

- Connections for two digital actuators
- Connection of actuators in 2, 3, and 4-wire technology
- Nominal current of each output: 2 A
- Total current of the terminal: 4 A
- Short-circuit and overload protected outputs
- Diagnostic and status indicators
- Approved for use within a safety-related segment circuit (observe the notes on [page 7](#))



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



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

2 Ordering Data

Products

Description	Type	MNR	Pcs. / Pkt.
Rexroth Inline terminal with two digital outputs; complete with accessories (connector and labeling field); transmission speed of 500 kbps	R-IB IL 24 DO 2-2A-PAC	R911170754	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
"Safety-Related Segment Circuit" application description	DOK-CONTRL-ILSAFE*SEG*-AP..-EN-P	R911335486	1



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

3 Technical Data

General data	
Housing dimensions (width x height x depth)	12.2 mm x 119.8 mm x 71.5 mm
Weight	61 g (with connector)
Operating mode	Process data mode with 2 bits
Transmission speed	500 kbps
Connection method for actuators	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
Class of protection	Class III according to EN 61131-2, IEC 61131-2
Connection data for Inline connectors	
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	Via data routing
Supply of the module electronics and I/O through bus coupler/power terminal	
Connection method	Through potential routing
Power consumption	
Communications power	7.5 V DC
Current consumption at U _L	35 mA, maximum
Power consumption at U _L	0.27 W, maximum
Segment supply voltage U _S	24 V DC (nominal value)
Nominal current consumption at U _S	4 A (2 x 2 A), maximum
Digital outputs	
Number	2
Nominal output voltage U _{OUT}	24 V DC
Differential voltage for I _{nom}	≤ 1 V
Nominal current I _{nom} per channel	2 A
Tolerance of the nominal current	+10%
Total current	4 A

Digital outputs (continued)	
Protection	Short circuit; overload
Nominal load	
Ohmic	12 Ω /48 W
Lamp	48 W
Inductive	48 VA (1.2 H, 50 Ω)
Signal delay upon power up of:	
Nominal ohmic load	200 μ s, typical
Nominal lamp load	200 ms, typical (with switching frequencies up to 8 Hz; above this frequency the lamp load responds like an ohmic load)
Nominal inductive load	250 ms, typical (1.2 H, 12 Ω)
Signal delay upon power down of:	
Nominal ohmic load	200 μ s, approximately
Nominal lamp load	200 μ s, approximately
Nominal inductive load	250 ms, typical (1.2 H, 12 Ω)
Switching frequency with:	
Nominal ohmic load	300 Hz, maximum
	This switching frequency is limited by the selected data rate, the number of bus devices, the bus structure, the software and the control or computer system used.
Nominal lamp load	300 Hz, maximum
	This switching frequency is limited by the selected data rate, the number of bus devices, the bus structure, the software and the control or computer system used.
Nominal inductive load	0.5 Hz, maximum (1.2 H, 48 Ω)
Overload response	Auto restart
Response with inductive overload	Output may be damaged
Reverse voltage protection against short pulses	Protected against reverse voltages
Resistance to permanently applied reverse voltages	Up to 2 A DC
Validity of output data after connecting the 24 V voltage supply (power up)	5 ms, typical
Response upon power down	The output follows the supply voltage without delay.
Limitation of the voltage induced on circuit interruption	0.8 V, approximately
Maximum inductive breaking energy/channel	1500 W (8/20 μ s pulse)
Protective circuit type	Free-wheeling diode per channel

Output characteristic curve when switched on (typical)

Output current (A)	Differential output voltage (V)
0	0
0.2	0.02
0.4	0.04
0.6	0.06
0.8	0.08
1.0	0.10
1.2	0.12
1.4	0.14
1.6	0.16
1.8	0.18
2.0	0.20
2.2	0.22

Power dissipation

Formula to calculate the power dissipation of the electronics

$$P_{EL} = 0.18 \text{ W} + \sum_{i=1}^n (200 \text{ mW} + I_{Li}^2 \times 0.1 \Omega)$$

Where:

P_{EL} = Total power dissipation in the terminal

i = Index

n = Number of set outputs ($n = 1$ to 2)

I_{Li} = Load current of output i

Power dissipation of the housing depending on the ambient temperature

$$P_{HOU} = 2.4 \text{ W} \quad -25^\circ\text{C} < T_A \leq -5^\circ\text{C}$$

$$P_{HOU} = 2.4 \text{ W} - \frac{T_A - (-5^\circ\text{C})}{37.5 \text{ K/W}} \quad -5^\circ\text{C} < T_A \leq +55^\circ\text{C}$$

Where:

P_{HOU} Permissible power dissipation of the housing

T_A Ambient temperature

Limitation of simultaneity, derating

Ambient temperature (TA)	Maximum load current at 100% simultaneity	Maximum load current at 50% simultaneity
55°C	1 A	2 A
40°C	2 A	2 A

With an ambient operating temperature of 55°C and 100% simultaneity, a load current of 1 A per channel is permissible. If only one channel is used (50% simultaneity), a load current of 2 A can be tapped. If both channels are used, the permissible working point must be defined according to the above formulas. For an example, please refer to the "Configuring and Installing the Rexroth-Inline Product Range" application description.



WARNING

Loss of safety function in case of power feedback

When wiring Rexroth Inline terminals in the safety applications, ensure that errors are prevented in terms of feedback for:

- All connected cables supplying the device with actuator voltage, and
- The connecting cables of the actuators.

Please also take all connected loads into consideration.

Protective equipment

Overload/short circuit in the segment circuit	Electronic
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 output 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**

5 V supply incoming remote bus/7.5 V supply (bus logic)
5 V supply outgoing remote bus/7.5 V supply (bus logic)
7.5 V supply (bus logic)/24 V supply (I/O)
24 V supply (I/O)/functional earth ground

- Test voltage

500 V AC, 50 Hz, 1 min.
500 V AC, 50 Hz, 1 min.
500 V AC, 50 Hz, 1 min.
500 V AC, 50 Hz, 1 min.

Error messages to the higher-level control or computer system

Short circuit/overload of an output	Yes
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An error message is generated when an output is short circuited and switched on. In addition, the diagnostic LED (D) flashes on the terminal at 2 Hz (medium) under these conditions.

Operating voltage out of range	No
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Approvals

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

4 Internal Basic Circuit Diagram

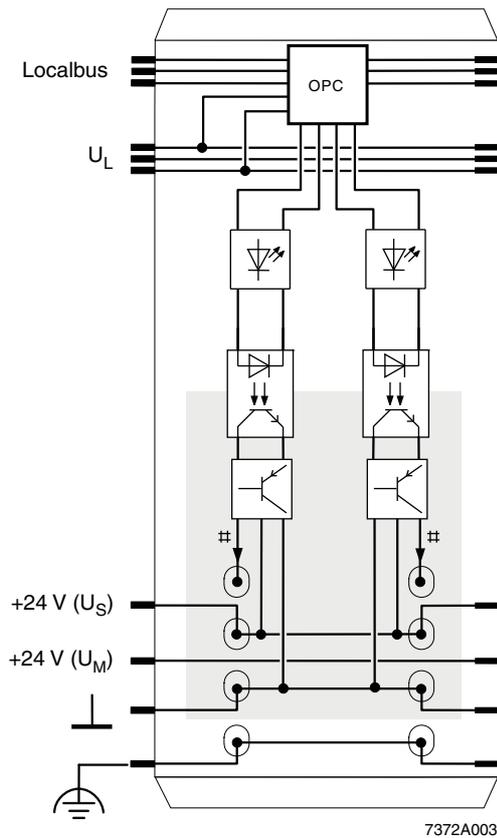


Fig. 1 Internal wiring of the terminal points

Key:

-  Protocol chip (bus logic including voltage conditioning)
-  LED
-  Optocoupler
-  Transistor
-  Digital output
-  Electrically isolated area



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

5 Local Diagnostic and Status Indicators and Terminal Point Assignment

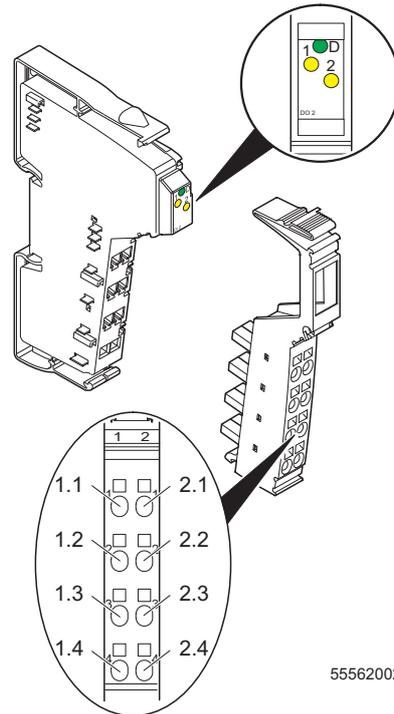


Fig. 2 Terminal with appropriate connector

5.1 Local Diagnostic and Status Indicators

Des.	Color	Meaning
D	Green	Diagnostics
1, 2	Yellow	Status indicators for the outputs

5.2 Function Identification

Pink

5.3 Terminal Point Assignment

Terminal points	Assignment
1.1, 2.1	Signal output (OUT)
1.2, 2.2	Segment voltage U_S for 4-wire termination Measuring point for the supply voltage
1.3, 2.3	Ground contact (GND) for 2, 3, and 4-wire termination
1.4, 2.4	FE connection for 3 and 4-wire termination

6 Connection Example



When connecting the actuators observe the assignment of the terminal points to the process data (see [page 8](#)).

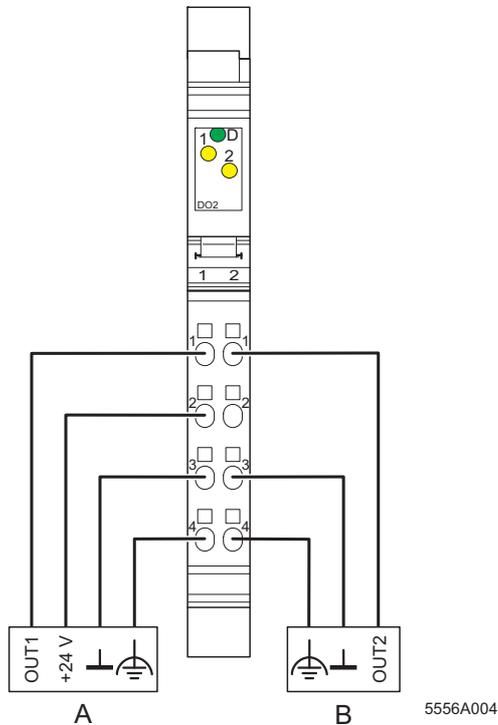


Fig. 3 Typical connection of actuators

A: 4-wire termination

B: 3-wire termination

7 Notes on Using the Terminals Within a Safety-Related Segment Circuit

The terminal of the following revision index and later is approved for use within a safety-related segment circuit.

MNR	Type	Revision index:
R911170754	R-IB IL 24 DO 2-2A-PAC	GA1



The revision index is marked on the side of the housing of every terminal (1 in [Fig. 4](#)).

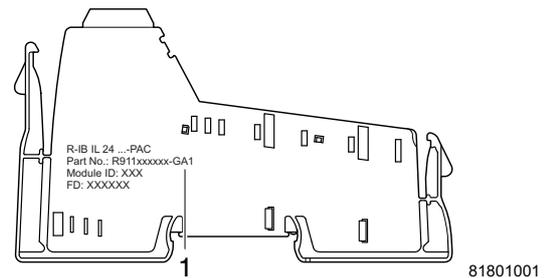


Fig. 4 Labeling on an Inline terminal



The instructions in the current documentation for the safety terminal used and from the DOK-CONTRL-IL-SAFE*SEG*-AP...-EN-P application description must be observed to ensure that operation of the safety-related segment circuit is not adversely affected. The current documentation is available for download at www.boschrexroth.com.

8 Programming Data/ Configuration Data

8.1 Local Bus

ID code	BD _{hex} (189 _{dec})
Length code	C2 _{hex}
Input address area	0 bits
Output address area	2 bits
Parameter channel (PCP)	0 bits
Register length (bus)	2 bits

8.2 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, SDDML, ...).

9 Process Data

Assignment of the terminal points to OUT process data

(Byte.bit) view		0.1	0.0
Module	Terminal point (signal)	2.1	1.1
	Terminal point (+24 V)	2.2	1.2
	Terminal point (GND)	2.3	1.3
	Terminal point (FE)	2.4	1.4
Status indicator	LED	2	1