

Rexroth Inline Segment Terminal

R911170550
Edition 01

R-IB IL 24 SEG/F-D(-2MBD)-PAC

Segment Terminal
Fuse
Diagnostics

10/2006



Description

The terminal is designed for use within an Inline station.

The segment terminal is used to create a protected partial circuit (segment circuit) within the main circuit.

The terminal is not used to supply power and has no elements for protection against polarity reversal and surge voltage.

This terminal has an LED for diagnostics and occupies two input data bits, which are used to indicate the presence of the supply voltage and the state of the fuse.

Features

- Automatic creation of a segment circuit within the main circuit
- Segment circuit protected by an internal fuse
- Diagnostic indicators
- Mapping of the status of the internal fuse and the main voltage to the local bus input data



This data sheet is only valid in association with the application description 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.
Segment terminal with fuse and diagnostics; complete with accessories (connector and labeling field); transmission speed of 500 kbps	R-IB IL 24 SEG/F-D-PAC	R911170710	1
Segment terminal with fuse and diagnostics; complete with accessories (connector and labeling field); transmission speed of 2 Mbps	R-IB IL 24 SEG/F-D-2MBD-PAC	R911170448	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)	12.2 mm x 120 mm x 71.5 mm
Weight	59 g (with connector)
Operating mode	Process data mode with 2 bits
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
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
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Transmission speed

R-IB IL 24 SEG/F-D-PAC	500 kbps
R-IB IL 24 SEG/F-D-2MBD-PAC	2 Mbps

Power Consumption

	500 kbps	2 Mbps
Communications power U_L	7.5 V DC	7.5 V DC
Current consumption at U_L	25 mA, maximum	45 mA, maximum
Power consumption at U_L	0.19 W, maximum	0.34 W, maximum
Main voltage U_M	24 V DC (nominal value)	24 V DC (nominal value)
Nominal current consumption at U_M	4.0 A (nominal value)	4.0 A (nominal value)

Supply of the Module Electronics and the I/O Through the Bus Coupler/Power Terminal (U_L , U_M)

Connection method	Through potential routing
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24 V I/O Supply (U_M , U_S)

The main voltage U_M is supplied in the bus coupler or in a power terminal. The segment voltage U_S is provided automatically at this segment terminal and protected by the internal fuse.

Connections for a supply voltage are not provided on the segment terminal. The terminal points are **only** provided for measuring purposes.

Permissible Total Current in the Potential Jumpers of the Main and Segment Circuit/Nominal Current of the Terminal	500 kbps	2 Mbps
Permissible total current in the potential jumpers	6.3 A	5.4 A
Nominal current of the terminal	4.0 A	4.0 A
Tolerance	+10%	+10%



The terminal is supplied with a 6.3 A slow-blow fuse.

Power Dissipation (500 kbps)**Formula to Calculate the Power Dissipation of the Electronics**

$$P_{TOT} = 0.180 \text{ W} + I_L^2 \times R_F$$

Where

P_{TOT} Total power dissipation in the terminal

I_L Load current in the segment circuit

R_F Resistance of the fuse

The resistance of the fuse R_F for a 6.3 AT fuse is approximately 12 m Ω .

The power dissipation of the electronics for a theoretical maximum current of 6.3 A (nominal current = 4.0 A) is calculated as follows:

$$P_{TOT} = 0.18 \text{ W} + 39.69 \text{ A}^2 \times 0.012 \text{ } \Omega = 0.66 \text{ W}$$

Power Dissipation (2 Mbps)

Formula to Calculate the Power Dissipation of the Electronics

$$P_{TOT} = 0.34 \text{ W} + I_L^2 \times R_F$$

Where

P_{TOT} Total power dissipation in the terminal

I_L Load current in the segment circuit

R_F Resistance of the fuse

The resistance of the fuse R_F for a 6.3 AT fuse is approximately 12 mΩ.

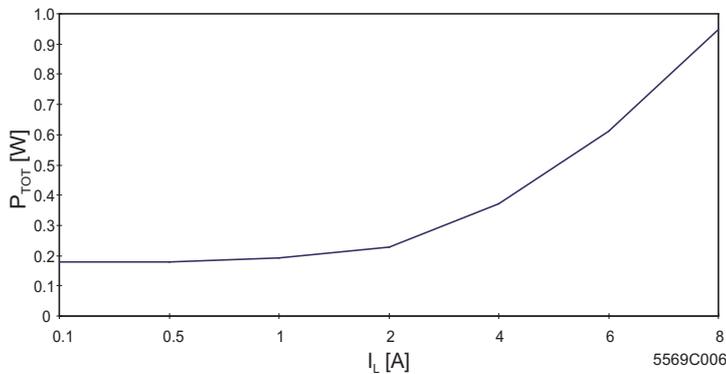
The power dissipation of the electronics for a theoretical maximum current of 5.4 A (nominal current = 4.0 A) is calculated as follows:

$$P_{TOT} = 0.34 \text{ W} + 29.16 \text{ A}^2 \times 0.012 \text{ } \Omega = 0.68 \text{ W}$$

Power Dissipation of the Housing (P_{HOU}) (500 kbps and 2 Mbps)

$P_{HOU} = 0.7 \text{ W}$ in the total permissible ambient temperature range

Typical Power Dissipation of the Electronics Depending on the Load Current in the Segment Circuit



P [W] Power dissipation in W

I_L [A] Load current in the segment circuit in A

This test was carried out with a 6.3 AT fuse.

Derating of the Load Current in the Segment Circuit

No derating

Safeguards

Overload/short circuit in the segment circuit

Fuse 5 x 20 with 6.3 A slow-blow



Fuses with other values can also be used. The maximum fuse value must not exceed 6.3 A.



CAUTION

Note for the selection of fuses:

For fuses with a value greater than 2 A, only slow-blow fuses may be used.

Surge voltage

Protective elements in the power terminal or the bus coupler

Protection against polarity reversal

Protective elements in the power terminal or the bus coupler

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 these areas via the bus coupler or via the bus coupler and a power terminal from separate power supply units. Interconnection of the power supply units in the 24 V area is not permitted. Please also observe the GND/PE connections on the power supply units (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.

Error Messages to the Higher-Level Control or Computer System

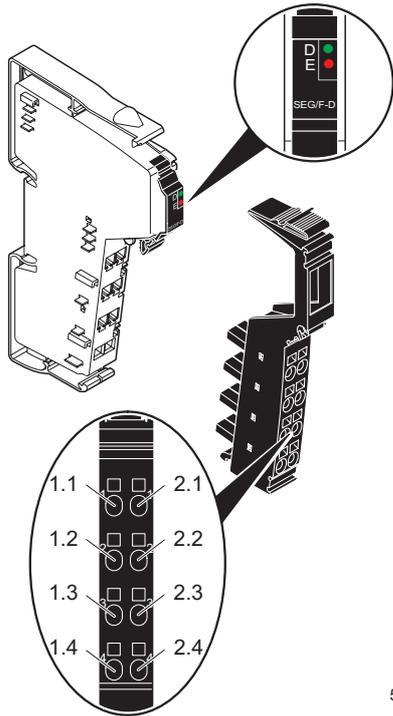
I/O error message if fuse has blown or is missing

I/O error message if supply voltage U_M is not present

Approvals

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

Local Diagnostic and Status Indicators and Terminal Point Assignment



5658A003

Fig. 1 Terminal with appropriate connector



A blown or missing fuse is indicated by both diagnostic indicators. The red E LED lights up and the green D LED flashes at 2 Hz.

Terminal Point Assignment



CAUTION

The terminal points are **only** provided for measuring purposes.

Terminal Point	Assignment
1.1, 2.1	Segment voltage U_S (after the fuse)
1.2, 2.2	Main voltage U_M
1.3, 2.3	GND of the supply voltages
1.4, 2.4	Functional earth ground (FE)

Local Diagnostic Indicators

Des.	Color	Meaning
D	Green	Diagnostics
	ON:	Local bus active
	Flashing:	
	0.5 Hz:	Communications power present, local bus not active
	2 Hz:	Communications power present, supply voltage U_M not present or fuse has blown.
	4 Hz:	Communications power present, local bus error
OFF:	Communications power not present, local bus not active	
E	Red	Fuse in segment circuit U_S
	OFF:	Fuse OK
	ON:	Fuse has blown

Function Identification

Black



If supply voltage U_M is not present and the fuse has blown or is missing, an I/O error message is generated on the higher-level control or computer system.

Internal Circuit Diagram

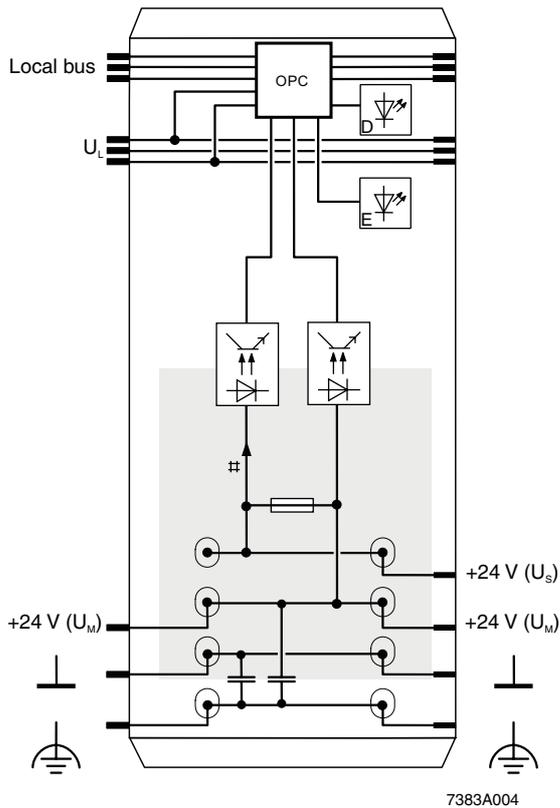


Fig. 2 Internal wiring of the terminal points

Key:

-  Local bus protocol chip (bus logic including voltage conditioning)
-  LED with details of the indicator designation "D" or "E" (see page 6)
-  Optocoupler
-  Fuse
-  Capacitive connection to functional earth ground (FE)
-  Electrically isolated area



Other symbols used are explained in the DOK-CONTRL-ILSYSPRO***-AW..-EN-P application description.

Programming Data

ID code	BE _{hex} (190 _{dec})
Length code	C2 _{hex}
Process data channel	2 bits
Input address area	2 bits
Output address area	0 bits
Parameter channel (PCP)	0 bits
Register length (bus)	2 bits

Process Data

Assignment of IN Process Data



The IN process data only maps the status of the fuse and the main voltage.

(Byte.bit) view		0.1	0.0
Assignment	Main voltage U_M present, fuse OK	1	1
	Main voltage U_M present, fuse blown or missing	1	0
	Main voltage U_M not present	0	0

Notes:

DOK-CONTRL-ILSEG/
F*D**-KB01-EN-P

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