

# 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.



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](http://www.boschrexroth.com).

## 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

## 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](http://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 <sup>2</sup> to 1.5 mm <sup>2</sup> (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 $\Omega$ .

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.

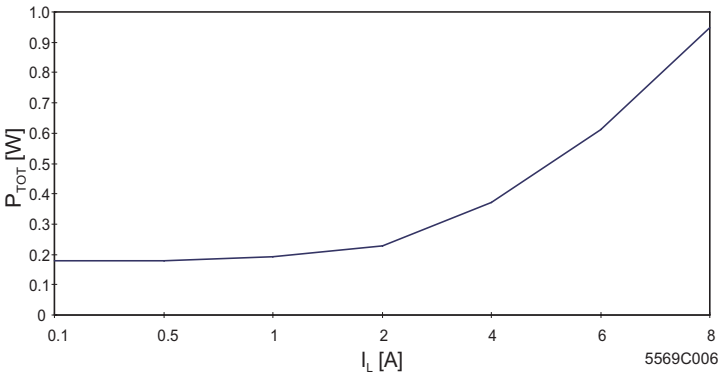
The power dissipation of the electronics for a theoretical maximum current of 5.4 A (nominal current = 4.0 A) is calculated as follows:

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

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.



**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.  
 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**

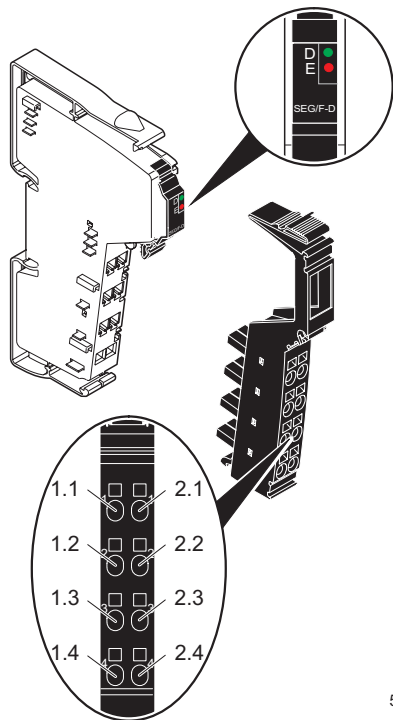
I/O error message if fuse has blown or is missing

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

**Approvals**

For the latest approvals, please visit [www.boschrexroth.com](http://www.boschrexroth.com).

Local Diagnostic and Status Indicators  
and Terminal Point Assignment



5658A003

Fig. 1 Terminal with appropriate connector

Local Diagnostic Indicators

Des.	Color	Meaning
D	Green	<b>Diagnostics</b>
		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	<b>Fuse in segment circuit <math>U_S</math></b>
		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.



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)

Internal Circuit Diagram

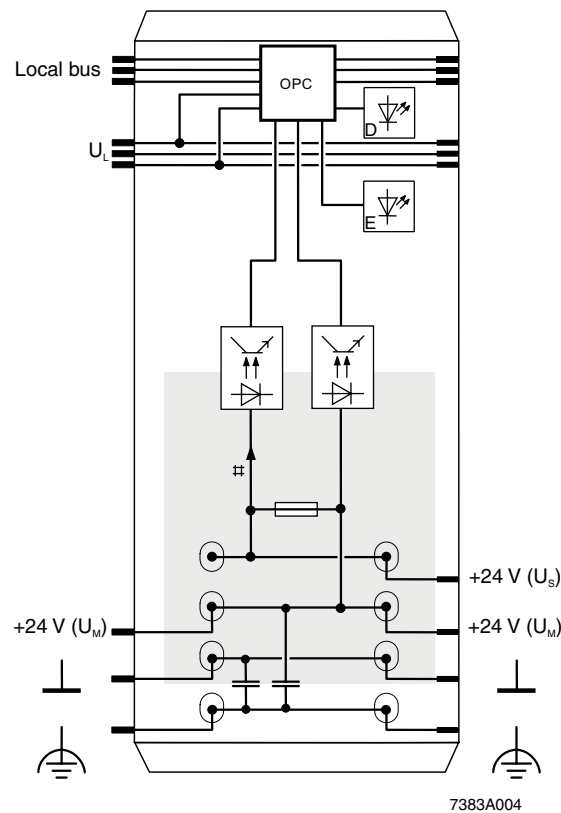


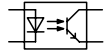






Fig. 2 Internal wiring of the terminal points

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 <sub>hex</sub> (190 <sub>dec</sub> )
Length code	C2 <sub>hex</sub>
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 <sub>M</sub> present, fuse OK	1	1
	Main voltage U <sub>M</sub> present, fuse blown or missing	1	0
	Main voltage U <sub>M</sub> not present	0	0

**Notes:**

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

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