

# Rexroth Inline local bus extension terminal for extending the Inline local bus

**R911170590**  
Edition 01

## R-IB IL 24 LSKIP-PAC

Rexroth Inline local bus extension terminal opens a new row for an Inline station

11/2009



### Description

The terminal is designed for use within an Inline station.

The Inline local bus extension terminal is installed at the beginning of the second (and so on) row of an Inline station. This enables an Inline station to be extended by two or more rows. This connection corresponds to a local bus extension that is limited in length. The Inline local bus extension terminal operates in combination with the R-IB IL 24 FLM-PAC terminal, which is installed at the end of the previous row.

The supply voltages are supplied again at the terminal. For this purpose, the terminal is supplied with a 24 V DC voltage ( $U_{24V}$ ), from which the communications power ( $U_L$ ) and the supply voltage for the analog terminals ( $U_{ANA}$ ) are generated. In addition, the 24 V DC main voltage ( $U_M$ ) and the 24 V DC segment voltage ( $U_S$ ) can be supplied using the terminal.

### Features

- Supplies all 24 V DC voltages required for the low-level signal of an Inline station
- Data transmission between the R-IB IL 24 FLM-PAC and R-IB IL 24 LSKIP-PAC terminals via the RS-422 protocol
- Diagnostic indicators (state of the supply voltages)



This terminal does not have a protocol chip and therefore is not a bus device. The Inline system limits apply to the entire station regardless of the number of rows in the station.



**CAUTION**

Only use the local bus extension terminal as the **first** terminal in a new row of an Inline station.



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



Make sure you always use the latest documentation.  
It can be downloaded at [www.boschrexroth.com](http://www.boschrexroth.com).

## Ordering data

### Product

Description	Type	MNR	Pcs./Pkt.
Rexroth Inline local bus extension terminal for extending the Inline local bus; complete with accessories (connectors and labeling fields)	R-IB IL 24 LSKIP-PAC	R911170948	1

### Accessories

Description	Type	MNR	Pcs./Pkt.
Rexroth Inline branch terminal for extending the Inline local bus; complete with accessories (connector and labeling field)	R-IB IL 24 FLM-PAC	R911170445	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](http://www.boschrexroth.com).

## Technical data

<b>General data</b>	
Housing dimensions (width x height x depth)	48.8 mm x 120.0 mm x 72 mm
Weight	207 g (with connectors)
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 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 3 according to EN 61131-2, IEC 61131-2
Connection data for Inline connectors	
Connection method	Spring-cage terminals
Conductor cross-section	0.08 mm <sup>2</sup> to 1.5 mm <sup>2</sup> (solid or stranded), 28 - 16 AWG
<b>Interface</b>	
Incoming local bus	Via Inline connector: RS-422
Cable	Standard INTERBUS cable
Maximum cable length	20 m (total cable length between the first R-IB IL 24 FLM-PAC and the last R-IB IL 24 LSKIP-PAC of an Inline station)
Local bus	Through data routing
<b>Transmission speed</b>	
Can be used in Inline stations with the following transmission speed	500 kbps or 2 Mbps
<b>Common data for 24 V supplies</b>	
Nominal value	24 V DC
Tolerance	-15%/+20% (according to EN 61131-2)
Ripple	±5%
Permissible range	19.2 V to 30 V
<b>24 V main supply/24 V segment supply</b>	
Connection	Via power connector; for terminal point assignment, see <a href="#">page 8</a>
Connection method	Spring-cage terminals
Recommended cable lengths	30 m, maximum; do not route cable through outdoor areas
Continuation	Through potential routing
Special demands on the power supply	When supply voltages $U_M/U_S$ are supplied separately from supply voltage $U_{24V}$ , they are electrically isolated from one another. This is only possible if two separate power supply units are used.
Response in the event of voltage dips and interrupts	Voltages (main and segment supply) that are transferred from the local bus extension terminal to the potential jumpers follow the supply voltages without delay.
Nominal value	24 V DC
Current carrying capacity	8 A, maximum
Safety equipment	
Surge voltage	Yes
Polarity reversal	Yes
<div>  <p><b>Provide an external fuse for the 24 V area</b> This 24 V area must be protected externally. The power supply unit must be able to supply four times (400%) the nominal current of the external fuse, to ensure that the fuse blows in the event of an error.</p> </div>	
<b>CAUTION</b>	

**24 V supply  $U_{24V}$  for generating  $U_L$  and  $U_{ANA}$** 

Connection	Via power connector; for terminal point assignment, see <a href="#">page 8</a>
Connection method	Spring-cage terminals
Recommended cable lengths	30 m, maximum; do not route cable through outdoor areas
Special demands on the power supply	When supply voltage $U_{24V}$ is supplied separately from supply voltages $U_M/U_S$ , they are electrically isolated from one another. This is only possible if two separate power supply units are used.
Nominal value	24 V DC
Minimum current consumption at nominal voltage	0.06 A (no-load operation, i.e., incoming local bus is plugged in, no local bus devices are connected, bus inactive)
Maximum current consumption at nominal voltage	1.25 A DC Consisting of: 0.75 A DC for communications power 0.5 A DC for analog voltage supply
Safety equipment	Only for the 24 V supply
Surge voltage	Yes
Polarity reversal	Yes

**CAUTION****Provide an external fuse for the 24 V area**

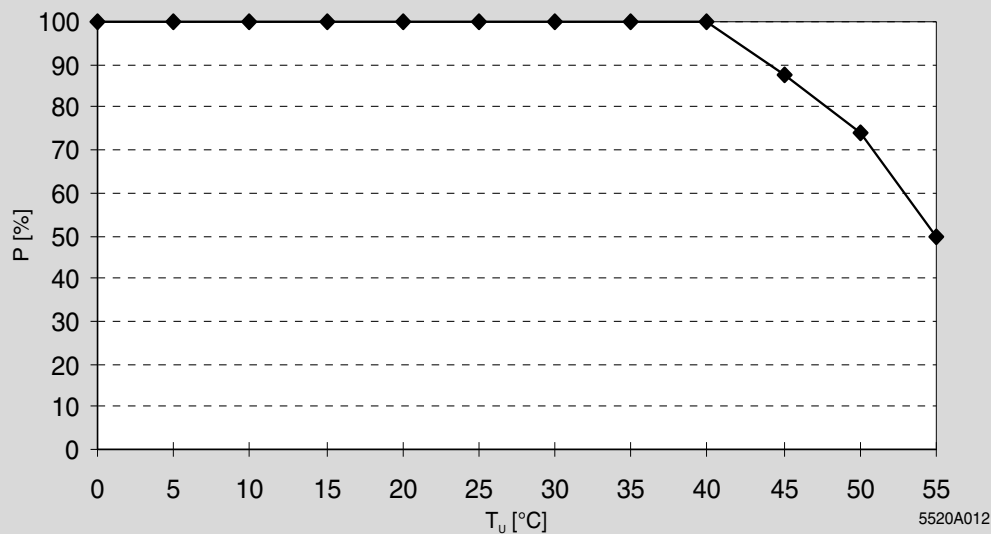
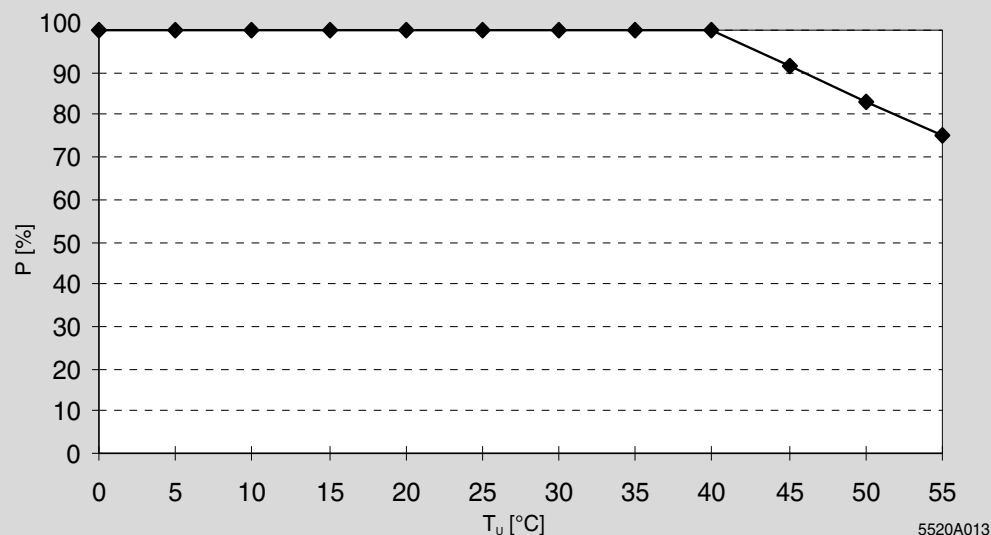
This 24 V area must be protected externally. The power supply unit must be able to supply four times (400%) the nominal current of the external fuse, to ensure that the fuse blows in the event of an error.

**24 V module supply****Communications power (potential jumper)**

Nominal value	7.5 V DC
Tolerance	±5%
Ripple	±1.5%
Maximum output current	2 A DC (observe derating)
Safety equipment	Electronic short-circuit protection

**Analog supply (potential jumper)**

Nominal value	24 V DC
Maximum output current	0.5 A DC (observe derating)
Safety equipment	Electrical short-circuit protection

**Derating of the communications power and the analog terminal supply****- I/O supply current carrying capacity at the local bus extension terminal: 8 A, maximum** $P$  [%] Current carrying capacity of the communications power ( $U_L$ ) and the analog supply ( $U_{ANA}$ ) in % $T_A$  [°C] Ambient temperature in °C**- I/O supply current carrying capacity at the local bus extension terminal: 4 A, maximum** $P$  [%] Current carrying capacity of the communications power ( $U_L$ ) and the analog supply ( $U_{ANA}$ ) in % $T_A$  [°C] Ambient temperature in °C**Error messages to the higher-level control or computer system**

None

**Safety equipment**Surge voltage  
(segment supply/main supply/24 V supply)

Input protective diodes (can be destroyed by permanent overload)

Pulse loads up to 1500 W are short circuited by the input protective diode.

**Safety equipment**Polarity reversal  
(segment supply/main supply)

Parallel diodes for protection against polarity reversal; in the event of an error the high current flowing through the diodes causes the preconnected fuse to blow.

Polarity reversal  
(24 V supply)

Serial diode in the lead path of the power supply unit; in the event of an error only a low current flows. In the event of an error, no fuse trips within the external power supply unit

If you want to protect the supply  $U_{24V}$ , use a 2 A medium blow fuse.**Electrical isolation/isolation of the voltage areas****Common potentials**When providing the 24 V supply for generating  $U_L$  and  $U_{ANA}$  separately from the 24 V main supply/24 V segment supply

Main and segment supply have the same potential. From the local bus extension terminal onwards, common ground is led through the potential jumper to the devices as reference ground GND.

24 V supply for generating  $U_L$  and  $U_{ANA}$ , 24 V analog supply and 7.5 V communications power have the same potential. From the local bus extension terminal onwards, common ground is led through the potential jumper to the devices as reference ground "logical GND" ( $U_{L-}$ ).When providing the 24 V supply for generating  $U_L$  and  $U_{ANA}$  by jumpering the 24 V main supply/24 V segment supplyMain supply, segment supply, 24 V analog supply, and 7.5 V communications power have the same potential. From the local bus extension terminal onwards, common ground is led through the potential jumper to the devices as reference ground "logical GND" ( $U_{L-}$ ) for the communications power and analog supply and separately as reference ground GND for the supply and segment level.**Separate potentials**When providing the 24 V supply for generating  $U_L$  and  $U_{ANA}$  separately from the 24 V main supply/24 V segment supplyThe 24 V supply for generating  $U_L$  and  $U_{ANA}$  is physically and therefore electrically isolated from the main supply and segment supply.When providing the 24 V supply for generating  $U_L$  and  $U_{ANA}$  by jumpering the 24 V main supply/24 V segment supply

None

**Electrical isolation/isolation of the voltage areas****Test distance****Test voltage**5 V supply incoming local bus/7.5 V communications power, 24 V analog supply, 24 V supply for generating  $U_L$  and  $U_{ANA}$ 

500 V AC, 50 Hz, 1 min.

5 V supply incoming local bus/24 V main supply, 24 V segment supply

500 V AC, 50 Hz, 1 min.

5 V supply incoming local bus/functional earth ground

500 V AC, 50 Hz, 1 min.

7.5 V communications power, 24 V analog supply, 24 V supply for generating  $U_L$  and  $U_{ANA}$ /functional earth ground

500 V AC, 50 Hz, 1 min.

7.5 V communications power, 24 V analog supply, 24 V supply for generating  $U_L$  and  $U_{ANA}$ /24 V main supply, 24 V segment supply

500 V AC, 50 Hz, 1 min.

24 V main supply, 24 V segment supply, 24 V supply for generating  $U_L$  and  $U_{ANA}$ /functional earth ground

500 V AC, 50 Hz, 1 min.

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

## Internal basic circuit diagram

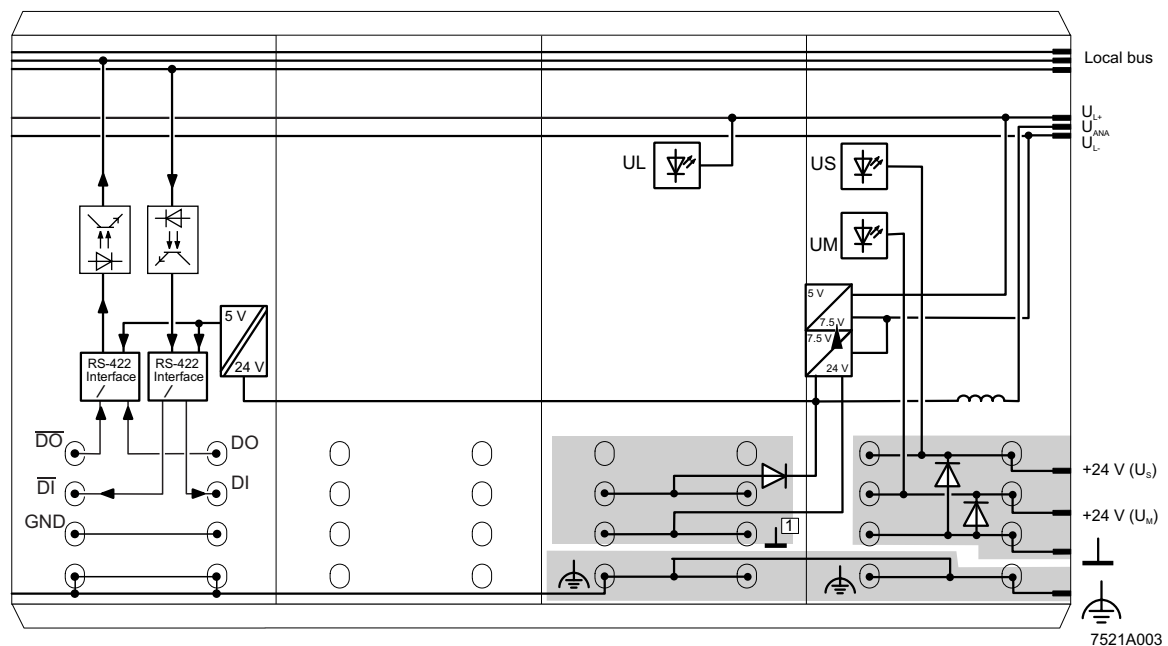










Fig. 1 Internal wiring of the terminal points

Key:

-  DC/DC converter with electrical isolation
-  Optocoupler
-  RS-422 interface
-  LED with function identification
-  Electrically isolated area
-  Converter
-  Diode
-  Reference potential GND (24 V supply)



Other symbols used are explained in the user manual for the Rexroth Inline system (see ["Documentation" on page 2](#)).

## Local diagnostic indicators and terminal point assignment

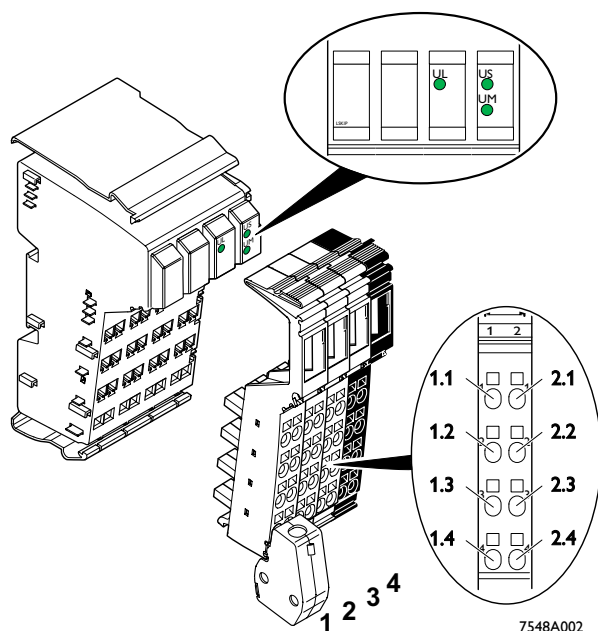


Fig. 2 Terminal with appropriate connectors

### Local diagnostic indicators

Des.	Color	Meaning
UL	Green	24 V supply for generating $U_L$ and $U_{ANA}$ /7.5 V communications power
US	Green	24 V segment supply
UM	Green	24 V main supply

### Function identification

Orange

### Terminal point assignment for connectors 1, 3, and 4



Connector 2 is not used.  
Functional earth ground is only used to discharge interference.



**CAUTION**

#### Do not mix up the connectors

Do not mix up the connectors, especially the remote bus connectors and connectors for the voltage supply, as this may damage the terminal.



**CAUTION**

#### Observe the current carrying capacity

The maximum total current flowing through the potential jumpers  $U_M$  and  $U_S$  is 8 A.



**CAUTION**

#### Ground the local bus extension terminal

Connect the local bus extension terminal to functional earth ground (FE) via one of the FE connections of connector 3 or connector 4. For this, connect the corresponding contact with a grounding terminal (see also [Fig. 3 on page 11](#)).



Terminal point	Assignment		Remark	Conductor color in the INTERBUS standard cable
Connector 1	Incoming local bus			
1.1	/DO		Local bus forward line (receive)	Green
2.1	DO		Local bus forward line (receive)	Yellow
1.2	/DI		Local bus return line (transmit)	Pink
2.2	DI		Local bus return line (transmit)	Gray
1.3	GND	GND	GND	Brown
2.3			Not used	
1.4, 2.4	FE	Functional earth ground	Grounding of the local bus extension terminal and therefore of the Inline station. The contacts are directly connected to the potential jumper and the FE spring on the bottom of the housing.	
Connector 3 24 V supply for generating $U_L$ and $U_{ANA}$				
1.1, 2.1			Not used	
1.2, 2.2	24 V DC	$U_{24V}$	24 V supply for generating $U_L$ and $U_{ANA}$	
1.3, 2.3	GND	GND	GND of the 24 V supply	
1.4, 2.4	FE	Functional earth ground	Grounding of the local bus extension terminal and therefore of the Inline station. The contacts are directly connected to the potential jumper and the FE spring on the bottom of the housing.	
Connector 4 Power connector for $U_S$ and $U_M$				
1.1, 2.1	24 V DC	$U_S$	24 V segment supply The supplied voltage is directly led to the potential jumper.	
1.2, 2.2	24 V DC	$U_M$	24 V main supply The supplied voltage is directly led to the potential jumper.	
1.3, 2.3	GND	Reference potential	The reference potential is directly led to the potential jumper and is, at the same time, reference ground for the main and segment supply.	
1.4, 2.4	FE	Functional earth ground	Grounding of the local bus extension terminal and therefore the aligned part of the Inline station. The contacts are directly connected to the potential jumper and the FE spring on the bottom of the housing.	

**CAUTION****Do not mix up the connectors**

Do not mix up the connectors, especially the bus connectors and connectors for the voltage supply, as this may damage the terminal.

**CAUTION****Observe the current carrying capacity**

The maximum total current flowing through the potential jumpers  $U_M$  and  $U_S$  is 8 A.

**CAUTION****Ground the local bus extension terminal**

Connect the local bus extension terminal to functional earth ground (FE) via one of the FE connections of connector 3 or connector 4. For this, connect the corresponding contact with a grounding terminal (see also [Fig. 3 on page 11](#)).

### 24 V segment supply/24 V main supply

The segment supply and main supply must have the same reference potential. Therefore, an electrically isolated voltage area on the I/O side cannot be created.

The main supply and the segment supply are protected against polarity reversal and surge voltage.



#### CAUTION

#### Ensure short-circuit protection

The main supply and segment supply do not have short-circuit protection.

The user must provide short-circuit protection. The rating of the preconnected fuse must be such that the maximum permissible load current is not exceeded.

### 24 V segment supply

You can provide the segment supply at the terminal or one of the supply terminals.

There are several ways of providing the segment voltage at the terminal (connector 4):

1. The segment voltage can be supplied separately at terminal points 1.1 (or 2.1) and 1.3 (or 2.3) (GND) of the power connector (see [Fig. 3 on page 11](#)).
2. Connections 1.1 (or 2.1) and 1.2 (or 2.2) can be jumpered to tap the supply for the segment circuit from the main circuit.
3. A switch can be inserted between terminal points 1.1 (or 2.1) and 1.2 (or 2.2) to create a switched segment circuit (e.g., an emergency stop circuit).

### 24 V supply for generating $U_L$ and $U_{ANA}$

The 24 V supply has protection against polarity reversal and surge voltage. These protective elements are only used to protect the power supply unit.



#### CAUTION

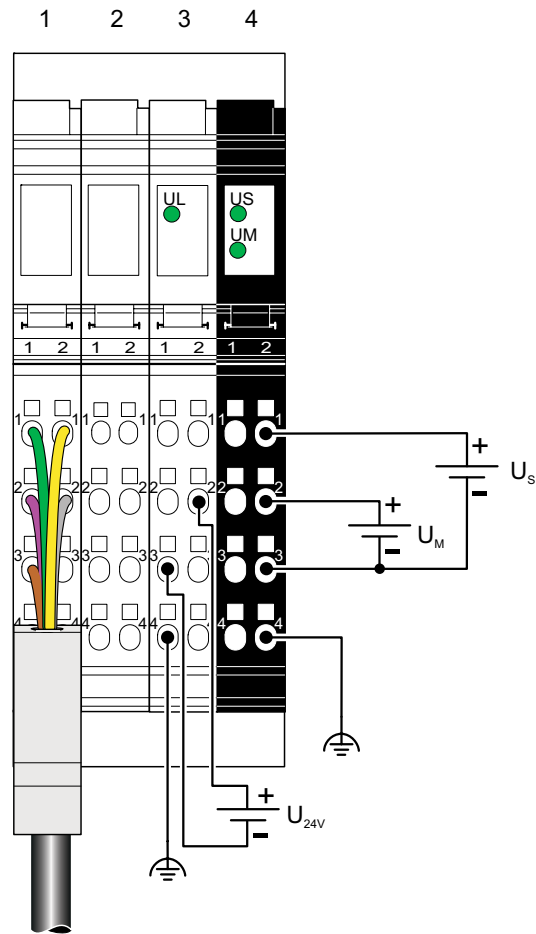
#### Ensure short-circuit protection

The 24 V supply does not have short-circuit protection.

The user must provide short-circuit protection. The rating of the preconnected fuse must be such that the maximum permissible load current is not exceeded.

## Connection examples

### Connection example for local bus and supply



BUS IN/OUT

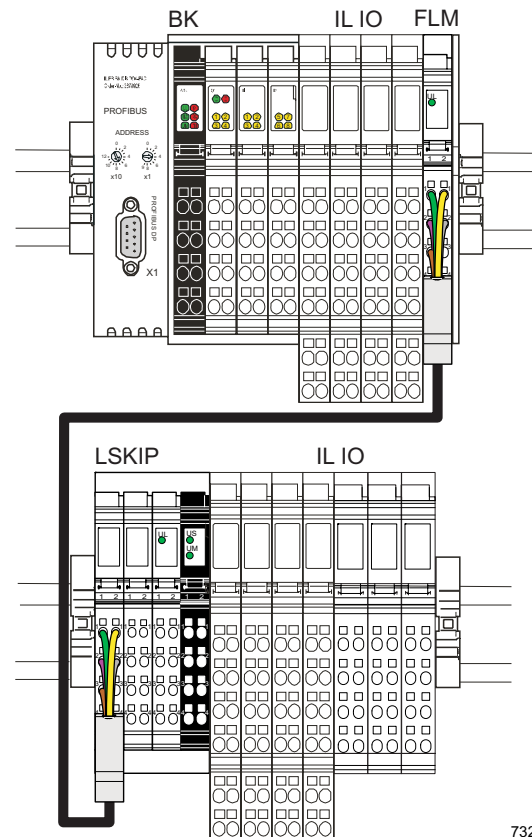
7521A004

Fig. 3 Typical connection of the cables

Key:

1, 2, 3, 4	Connector
$U_S$	Possible 24 V segment supply
$U_M$	24 V main supply
$U_{24V}$	24 V supply

### Connection example within an Inline station



7326A007

Fig. 4 Example: Jumping between two rows within an Inline station

Key

BK	Bus coupler
IL IO	Any Inline terminals
FLM	R-IB IL 24 FLM-PAC
LSKIP	R-IB IL 24 LSKIP-PAC

A bus coupler (BK) opens the Inline station. To create a branch, the R-IB IL 24 FLM-PAC terminal is installed at the end of the first row of the Inline station. The R-IB IL 24 LSKIP-PAC terminal operates in combination with this terminal and creates the beginning of the next row of the Inline station. Any Inline terminals (IL IO) can be used within the station.



For the terminal point assignment of the R-IB IL 24 FLM-PAC terminal, please refer to the corresponding data sheet.

## Notes:

DOK-CONTRL-  
ILLSKIP\*\*\*\*\*-KB01-EN-P

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