

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.

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.

Technical data

General data	
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 ² to 1.5 mm ² (solid or stranded), 28 - 16 AWG
Interface	
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
Transmission speed	
Can be used in Inline stations with the following transmission speed	500 kbps or 2 Mbps
Common data for 24 V supplies	
Nominal value	24 V DC
Tolerance	-15%/+20% (according to EN 61131-2)
Ripple	±5%
Permissible range	19.2 V to 30 V
24 V main supply/24 V segment supply	
Connection	Via power connector; for terminal point assignment, see page 8
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
	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.
CAUTION	

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

Connection	Via power connector; for terminal point assignment, see page 8
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)**

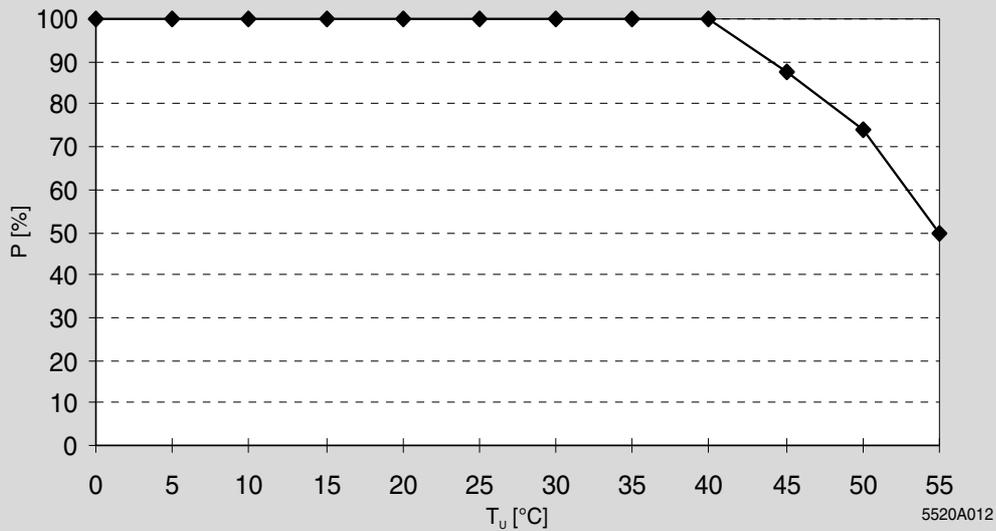
Nominal value	7.5 V DC
Tolerance	$\pm 5\%$
Ripple	$\pm 1.5\%$
Maximum output current	2 A DC (observe derating)
Safety equipment	Electronic short-circuit protection

Analog supply (potential jumper)

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

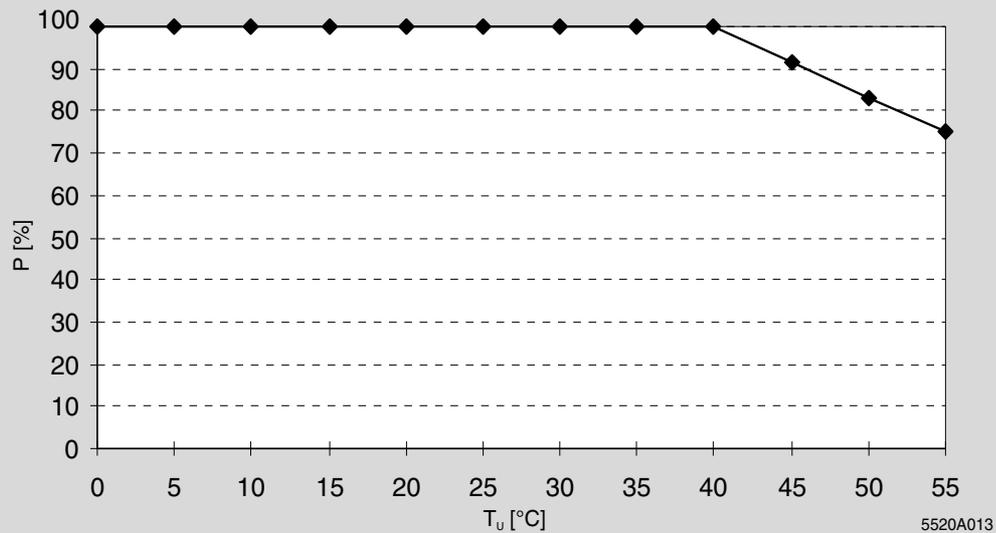
Derating of the communications power and the analog terminal supply

- 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 supply	Main 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 supply	The 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.

Internal basic circuit diagram

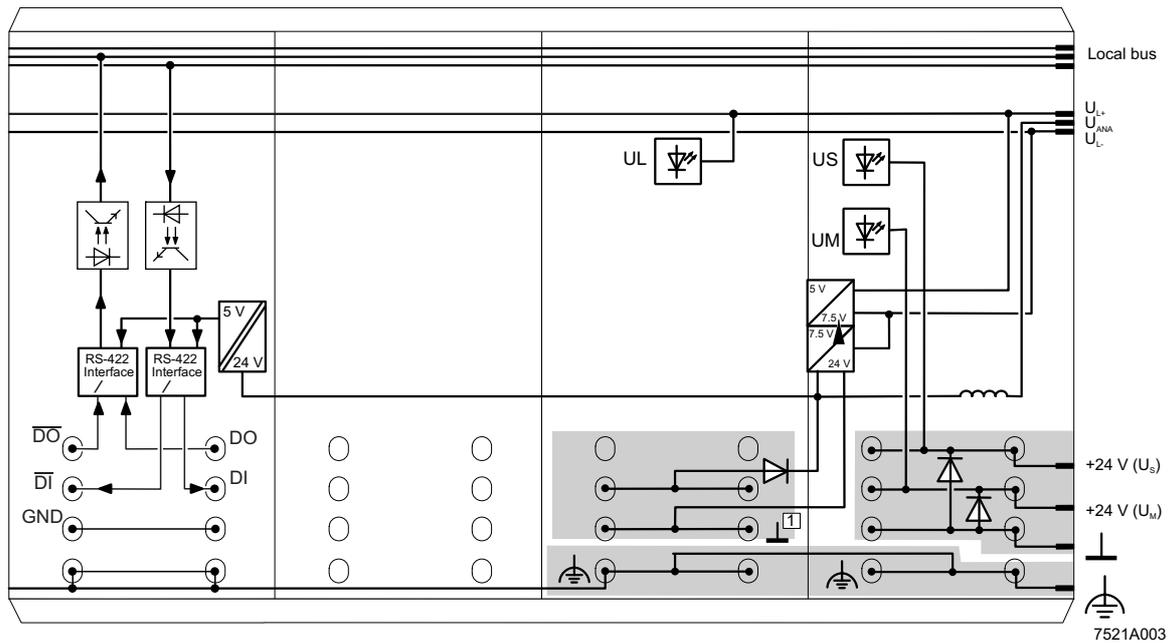


Fig. 1 Internal wiring of the terminal points

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

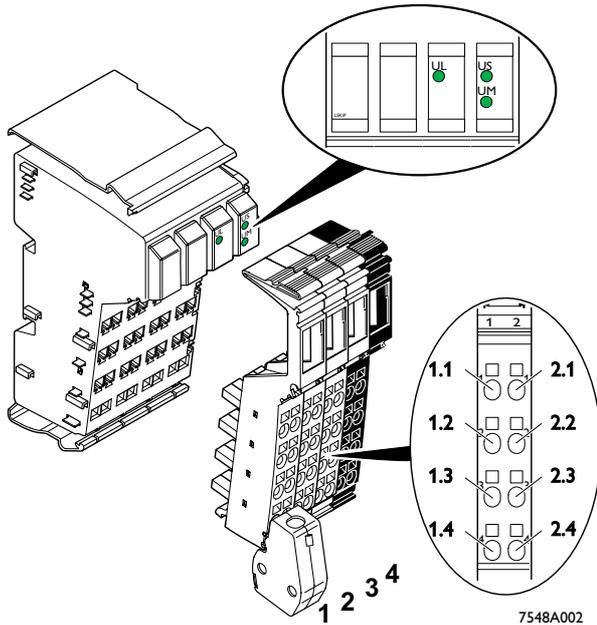


Fig. 2 Terminal with appropriate connectors

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.	



Do not mix up the connectors

CAUTION

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



Observe the current carrying capacity

CAUTION

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



Ground the local bus extension terminal

CAUTION

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

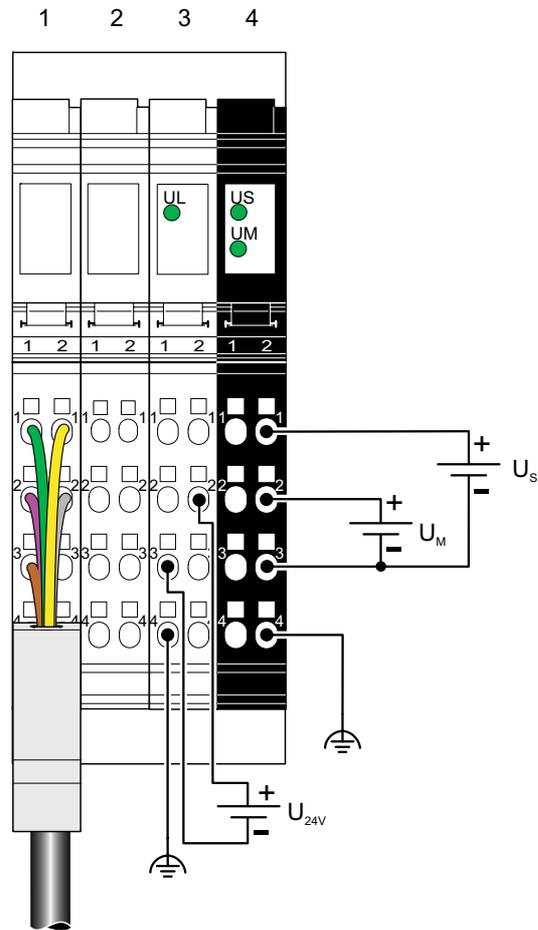
Ensure short-circuit protection

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

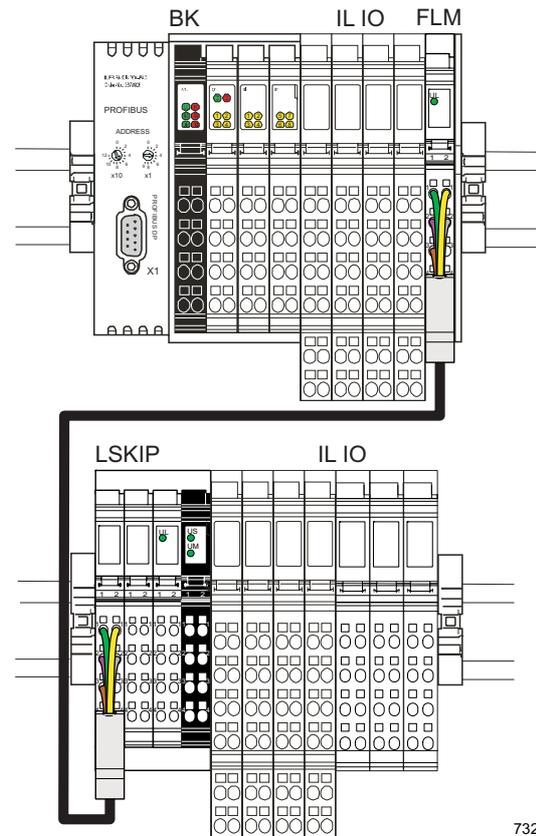


Fig. 4 Example: Jumping between two rows within an Inline station

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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