

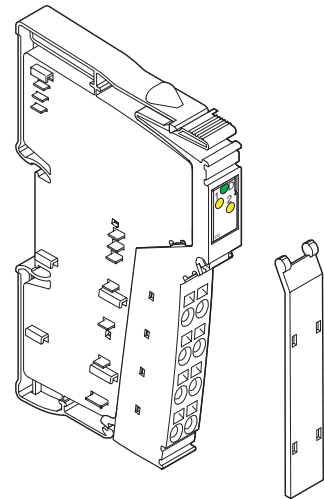
# IB IL 24 DI 2 ...

## Inline Terminal With Two Digital Inputs

### AUTOMATIONWORX

Data Sheet  
5549\_en\_03

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### Description

The terminal is designed for use within an Inline station. It is used to acquire digital input signals.

### Features

- Connections for two digital sensors
- Connection of sensors in 2, 3, and 4-wire technology
- Maximum permissible load current per sensor: 250 mA
- Maximum permissible load current from the terminal: 0.5 A
- Diagnostic and status indicators



This data sheet is only valid in association with the IB IL SYS PRO UM E user manual or the Inline system manual for your bus system.



Make sure you always use the latest documentation.  
It can be downloaded at [www.download.phoenixcontact.com](http://www.download.phoenixcontact.com).  
A conversion table is available on the Internet at  
[www.download.phoenixcontact.com/general/7000\\_en\\_00.pdf](http://www.download.phoenixcontact.com/general/7000_en_00.pdf).



This data sheet is valid for the products listed on the following page:

## Ordering Data

### Products

Description	Type	Order No.	Pcs./Pck.
Inline terminal with two digital inputs; including accessories (connectors and labeling field); transmission speed 500 kbps	IB IL 24 DI 2-PAC	2861221	1
Inline terminal with two digital inputs; without accessories transmission speed 500 kbps	IB IL 24 DI 2	2726201	1
Inline terminal with two digital inputs; without accessories; transmission speed 2 Mbps	IB IL 24 DI 2-2MBD	2819066	1
Inline terminal with two digital inputs; including accessories (connectors and labeling field); transmission speed 2 Mbps	IB IL 24 DI 2-2MBD-PAC	2861713	1



One of the listed connectors is needed for the complete fitting of the IB IL 24 DI 2 and IB IL 24 DI 2-2MBD terminals.

### Accessories

Description	Type	Order No.	Pcs./Pck.
Connector with eight spring-cage connections (green, w/o color print)	IB IL SCN-8	2726337	10
Connector with eight spring-cage connections (green, with color print)	IB IL SCN-8-CP	2727608	10

### Documentation

Description	Type	Order No.	Pcs./Pck.
"Configuring and Installing the INTERBUS Inline Product Range" user manual	IB IL SYS PRO UM E	2743048	1
"Automation Terminals of the Inline Product Range" user manual	IL SYS INST UM E	2698737	1

## Technical Data

### General Data

Housing dimensions (width x height x depth)	12.2 mm x 120 mm x 71.5 mm
Weight	53 g (with connector); 38 g (without connector)
Mode of operation	Process data mode with 2 bits
Connection method for sensors	2, 3, and 4-wire technology
Permissible temperature (operation)	-25°C to +55°C
Permissible temperature (storage/transport)	-25°C to +85°C
Permissible humidity (operation/storage/transport)	10% / 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 VDE 0106, IEC 60536
Connection data for Inline Connectors	
Connection type	Spring-cage terminals
Conductor cross section	0.2 mm <sup>2</sup> to 1.5 mm <sup>2</sup> (solid or stranded)

### Interface

Local bus	Through data routing
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### Transmission Speed

IB IL 24 DI 2, IB IL 24 DI 2-PAC	500 kbps
IB IL 24 DI 2-2MBD, IB IL 24 DI 2-2MBD-PAC	2 Mbps

**Power Consumption (500 kbps)**

Communications power	7.5 V
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 $U_S$	0.5 A (2 x 0.25 A), maximum

**Power Consumption (2 Mbps)**

Communications power	7.5 V
Current consumption at $U_L$	50 mA, maximum
Power consumption at $U_L$	0.375 W, maximum
Segment supply voltage $U_S$	24 V DC (nominal value)
Nominal current consumption at $U_S$	0.5 A (2 x 0.25 A), maximum

**Supply of the Module Electronics and I/O Through the Bus Coupler/Power Terminal**

Connection method	Through potential routing
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**Digital Inputs**

Number	2
Input design	According to EN 61131-2 Type 1
Definition of switching thresholds	
Maximum low-level voltage	$U_{Lmax} < 5 \text{ V}$
Minimum high-level voltage	$U_{Hmin} > 15 \text{ V}$
Common potentials	Segment supply, ground
Nominal input voltage $U_{IN}$	24 V DC
Permissible range	$-3 \text{ V} < U_{IN} < +30 \text{ V DC}$
Nominal input current for $U_{IN}$ (at 500 kbps)	5 mA
Nominal input current for $U_{IN}$ (at 2 Mbps)	3 mA, minimum
Current flow (500 kbps)	Linear in range $1 \text{ V} < U_{IN} < 30 \text{ V}$
Current flow (2 Mbps)	See table "Characteristic Curve (at 2 Mbps): Current Depending on the Input Voltage and the Ambient Temperature $T_A$ " on page 4
Delay time	None
Permissible cable length to the sensor	30 m
Use of AC sensors	AC sensors in the voltage range $< U_{IN}$ are limited in application

**Input Characteristic Curve (500 kbps)**

Input Voltage (V)	Typical Input Current (mA)
$-3 < U_{IN} < 0.7$	0
3	0.4
6	1.0
9	1.7
12	2.3
15	3.0
18	3.7
21	4.4
24	5.0
27	5.7
30	6.4

Characteristic Curve (at 2 Mbps): Current Depending on the Input Voltage and the Ambient Temperature $T_A$			
Supply Voltage	Input Current	Input Current acc. to $t \geq 20$ s	
		for $T_A = 25^\circ\text{C}$	for $T_A = 55^\circ\text{C}$
18 V	3.0 mA	2.9 mA	2.5 mA
24 V	3.9 mA	3.8 mA	3.5 mA
30 V	4.5 mA	4.2 mA	3.0 mA

The current is reduced depending on the ambient temperature  $T_A$  and the number of inputs that are switched on (module internal temperature).

### Power Dissipation

#### Formula to Calculate the Power Dissipation of the Electronics

##### 500 kbps

$$P_{EL} = 0.21 \text{ W} + \sum_{n=1}^2 \left[ U_{INn} \times \frac{U_{INn} - 1.8 \text{ V}}{4400 \Omega} \right]$$

##### 2 Mbps

$$P_{EL} = 0.375 \text{ W} + \sum_{n=1}^2 \left[ U_{INn} \times 0.003 \text{ A} \right]$$

Where

$P_{EL}$  Total power dissipation in the terminal  
 $n$  Index of the number of set inputs  $n = 1$  to 2  
 $U_{INn}$  Input voltage of the input  $n$

#### Power Dissipation of the Housing $P_{HOU}$

0.6 W (within the permissible operating temperature)

### Limitation of Simultaneity, Derating

Derating

No limitation of simultaneity, no derating

### Safety Equipment

Overload in segment circuit

No

Surge voltage

Protective elements of the power terminal

Polarity reversal

Protective elements of the power terminal

### Electrical Isolation/Isolation of the Voltage Areas



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 input terminal 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 user manual.)

### 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

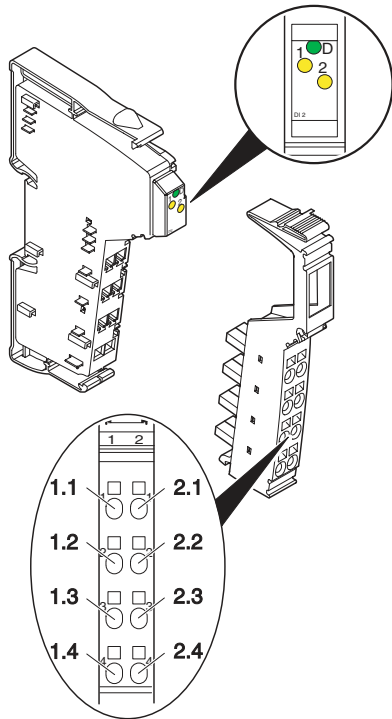
### Error Messages to the Higher-Level Control or Computer System

None

### Approvals

Information on current approvals can be found on the Internet at [www.download.phoenixcontact.com](http://www.download.phoenixcontact.com).

### Local Diagnostic and Status Indicators and Terminal Point Assignment



5549A002

Figure 1 Terminal with appropriate connectors

#### Local Diagnostic and Status Indicators

Desig.	Color	Meaning
D	Green	Diagnostics
1, 2	Yellow	Status indicators of the inputs

#### Function identification

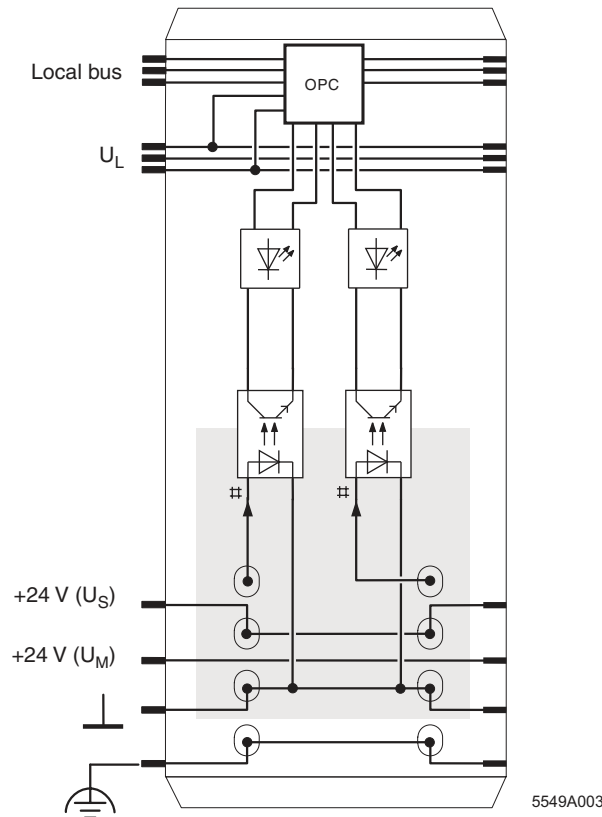
Light blue

2 Mbps: white stripe in the vicinity of the D LED

#### Terminal Point Assignment

Terminal Point	Assignment
1.1, 2.1	Signal input (IN)
1.2, 2.2	Segment voltage $U_S$ for 2, 3, and 4-wire termination
1.3, 2.3	Ground contact (GND) for 3 and 4-wire termination
1.4, 2.4	FE connection for 4-wire termination






### Internal Circuit Diagram



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Figure 2 Internal wiring of the terminal points

Key:

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

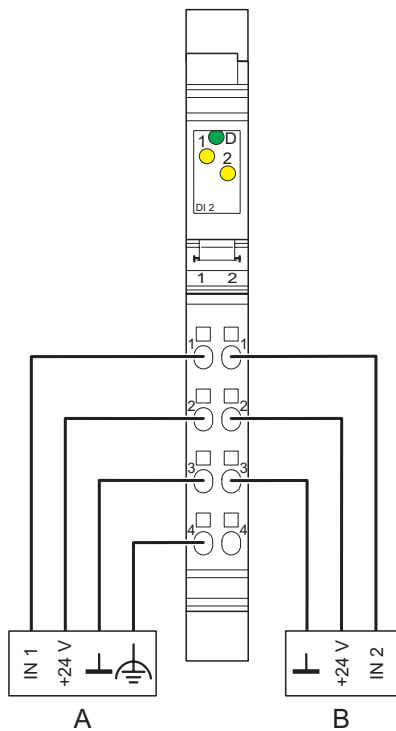


Other symbols used are explained in the IB IL SYS PRO UM E user manual or in the Inline system manual for your bus system.

### Connection Example



When connecting the sensors observe the assignment of the terminal points to the process data (see page 6).



5549A004

Figure 3 Typical sensor connections

- A 4-wire termination
- B 3-wire termination

### Programming Data/Configuration Data

#### INTERBUS

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

#### 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).

### Process Data

#### Assignment of the Terminal Points to the IN Process Data

(Byte.bit) view	Byte.bit	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



For the assignment of the illustrated (byte.bit) view to your INTERBUS control or computer system, please refer to the DB GB IBS SYS ADDRESS data sheet, Order No. 9000990.