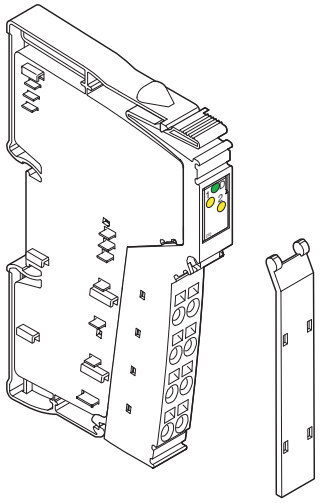
IB IL 24 DI 2 ...

Inline Terminal With Two Digital Inputs



AUTOMATIONWORX

Data Sheet
5549_en_03

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.

A conversion table is available on the Internet at
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^2 to 1.5 mm^2 (solid or stranded)

Interface	
Local bus	Through data routing

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

Digital Inputs	
Number	2
Input design	According to EN 61131-2 Type 1
Definition of switching thresholds	
Maximum low-level voltage	U_{Lmax} < 5 V
Minimum high-level voltage	U_{Hmin} > 15 V
Common potentials	Segment supply, ground
Nominal input voltage U_{IN}	24 V DC
Permissible range	-3 V < U_{IN} < +30 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 V < U_{IN} < 30 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 >= 20 s	
		for T_A = 25°C	for T_A = 55°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

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

2 Mbps

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

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	- Test Voltage
5 V supply incoming remote bus / 7.5 V supply (bus logic)	500 V AC, 50 Hz, 1 min
5 V supply outgoing remote bus / 7.5 V supply (bus logic)	500 V AC, 50 Hz, 1 min
7.5 V supply (bus logic) / 24 V supply (I/O)	500 V AC, 50 Hz, 1 min
24 V supply (I/O) / functional earth ground	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.

Local Diagnostic and Status Indicators and Terminal Point Assignment

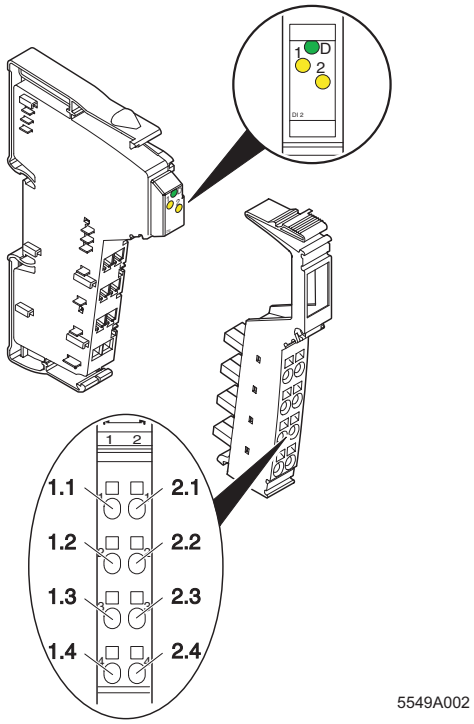


Figure 1 Terminal with appropriate connectors

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

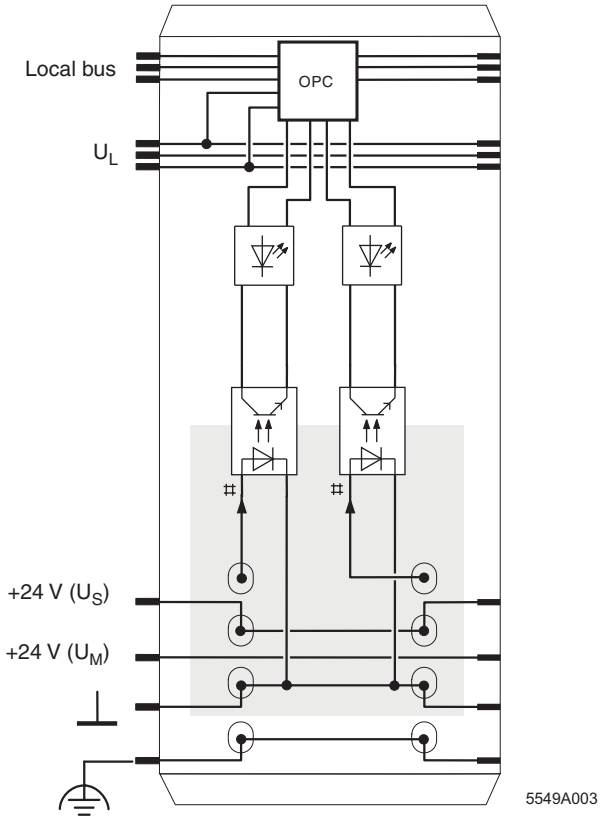


Figure 2 Internal wiring of the terminal points

Key:

OPC — 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).

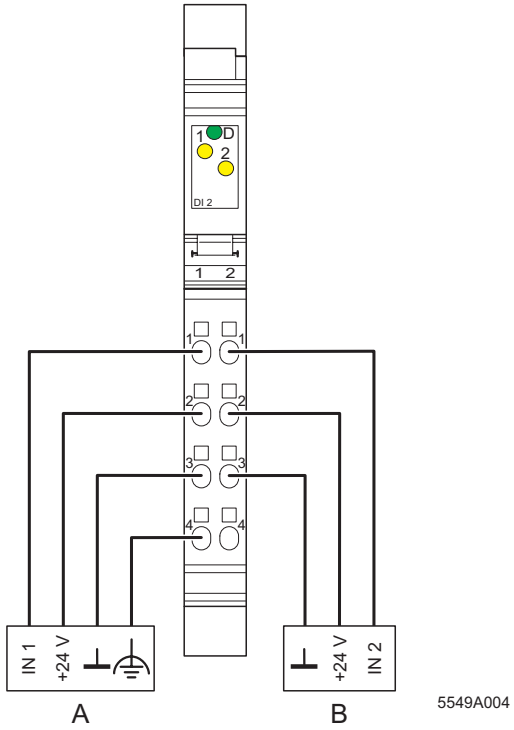


Figure 3 Typical sensor connections

A 4-wire termination
B 3-wire termination

Programming Data/Configuration Data

INTERBUS

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

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.

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