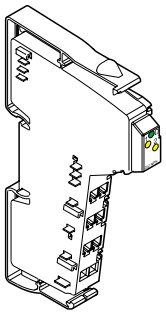
IB IL 24 DI 2-NPN

INTERBUS Inline Terminal
With Two Digital Inputs With Negative Logic



6223A001

Data Sheet 6223A 12/2000

This data sheet is only valid in association with the IB IL SYS PRO UM E "Configuring and Installing the INTERBUS Inline Product Range“ User Manual.

Function

This terminal is used to detect digital input signals. It is designed for use within an INTERBUS Inline station.

Features

- Connections for two digital sensors with negative logic (NPN)
- 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

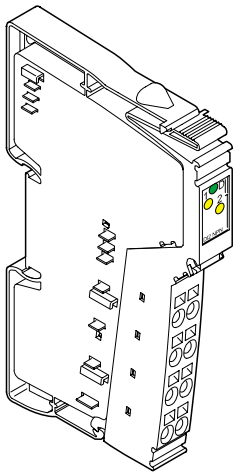


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Figure 1 IB IL 24 DI 2-NPN terminal with connector

Please note that the connector is not supplied as standard with the terminal. Please refer to the ordering data on page 9 to order the appropriate connectors for your application.

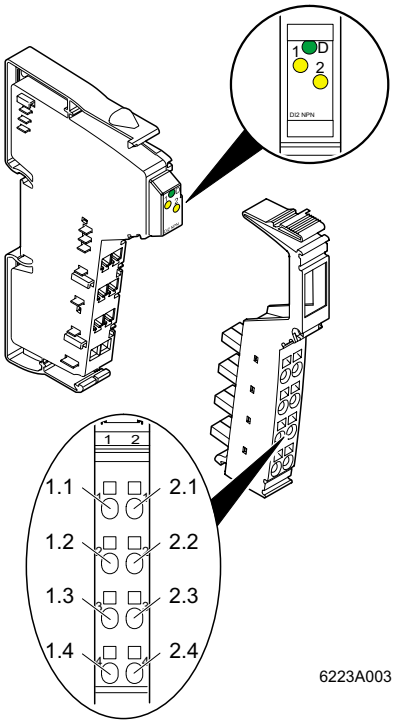


Figure 2 IB IL 24 DI 2-NPN with appropriate connector

Local Diagnostic and Status Indicators

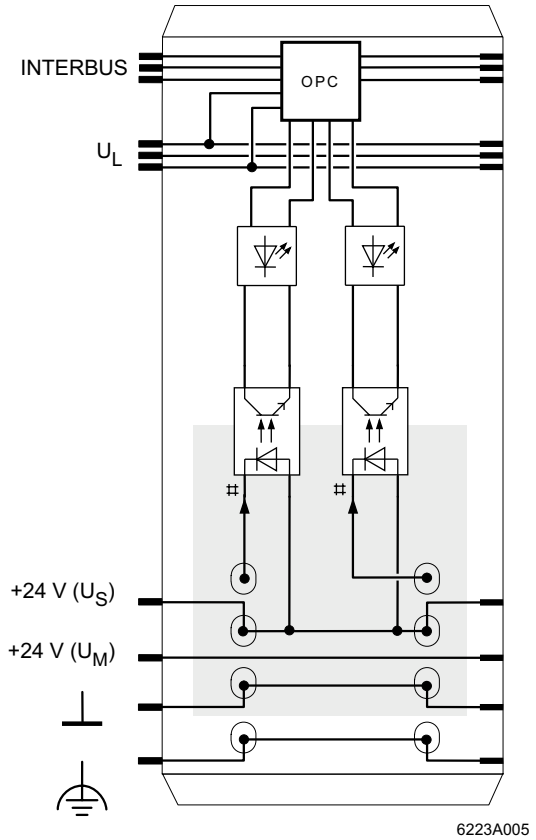
Des.	Color	Meaning
D	Green	Bus diagnostics
1, 2	Yellow	Status indicators of the inputs

Terminal Assignment

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

Please note the negative logic for the IB IL 24 DI 2-NPN terminal.

Internal Circuit Diagram



Key:

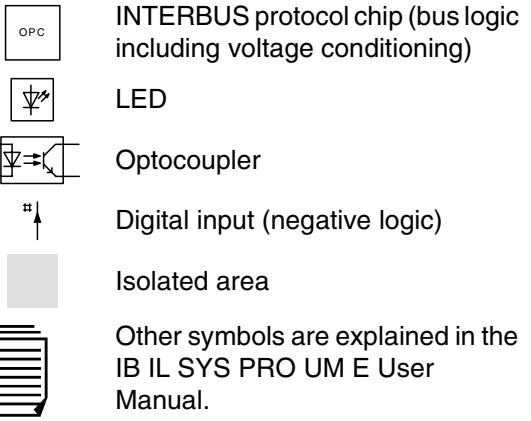


Figure 3 Internal wiring of the terminal points

Connection Example

When connecting the sensors, observe the assignment of the terminal points to the INTERBUS process data (see page 5).

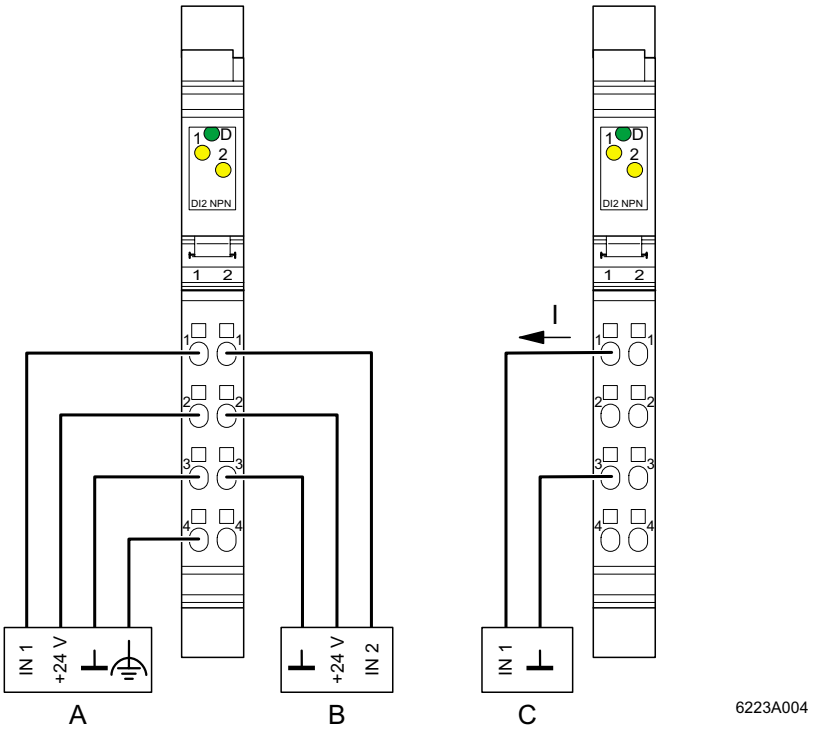


Figure 4 Typical sensor connections

A 4-wire termination

B 3-wire termination

C 2-wire termination

The example for 2-wire technology shows the direction of the current flow for negative logic.

Programming Data

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

INTERBUS Process Data

Assignment of the Terminal Points for the IN Process Data

"Bit" view	Bit	1	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

The two bits can be at any position within a byte due to automatic addressing.

OUT process data is not available.

Technical Data

General Data	
Housing dimensions (width x height x depth)	12.2 mm x 120 mm x 71.5 mm (0.480 in. x 4.724 in. x 2.815 in.)
Weight	41 g (without connector)
Operating mode	Process data operation with 2 bits
Connection method of the sensors	2-, 3-, and 4-wire technology
Permissible temperature (operation)	-25°C to +55°C (-13°F to +131°F)
Permissible temperature (storage/transport)	-25°C to +85°C (-13°F to +185°F)
Permissible humidity (operation)	75%, on average, 85%, occasionally
In the range from -25°C to +55°C (-13°F to +131°F) appropriate measures against increased humidity (> 85%) must be taken.	
Permissible humidity (storage/transport)	75%, on average, 85%, occasionally
For a short period, slight condensation may appear on the housing if, for example, the terminal is brought into a closed room from a vehicle.	
Permissible air pressure (operation)	80 kPa to 106 kPa (up to 2000 m [6562 ft.] above sea level)
Permissible air pressure (storage/transport)	70 kPa to 106 kPa (up to 3000 m [9843 ft.] above sea level)
Degree of protection	IP 20 according to IEC 60529
Class of protection	Class 3 according to VDE 0106, IEC 60536

Interface	
INTERBUS local bus	Through data routing

Power Consumption	
Communications power	7.5 V
Current consumption from the local bus	35 mA, maximum
Power consumption from the local bus	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

Supply of the Module Electronics and I/O Through Bus Terminal/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	-30 V < U_{IN} < +30 V DC
Nominal input current for U_{IN}	5 mA
Characteristic curve of the current	Linear in the range 1 V < U_{IN} < 30 V
Delay time	None
Permissible cable length to the sensor	30 m (98.425 ft.)
Use of AC sensors	AC sensors in the voltage range < U_{IN} are limited in application

Input Characteristic Curve	
Input Voltage (V)	**Typical Input Current (mA)**
-30 < 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

Power Dissipation	
Formula to Calculate the Power Dissipation of the Electronics	
$P_{tot} = 0.21\ W + \sum_{n=0}^{2} [\ U_{INn} \times \frac{U_{INn} - 1.8\ V}{4400\ \Omega}]$	
Where P_{tot} Total power dissipation of 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)

Concurrent Channel Derating	
Derating	No limitation of the channel simultaneity, no derating

Safety Devices	
Overload in segment circuit	No
Surge voltage	Protective circuits of the power terminal
Polarity reversal	Protective circuits 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 bus terminal and the digital input terminal via the bus terminal or a power terminal from separate power supply units. Interconnection of the 24 V power supplies is not allowed.	
Common Potentials	
24 V main power, 24 V segment voltage, and GND have the same potential. FE is a separate potential area.	
Separate Potentials in the System Consisting of Bus Terminal/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	

Ordering Data

Description	Order Designation	Order No.
Terminal with two digital inputs with negative logic	IB IL 24 DI 2-NPN	27 40 11 2
One of the listed connectors is required to connect the cables.		
I/O connector with eight terminals using the spring-clamp method (green, w/o color print); pack of 10	IB IL SCN-8	27 26 33 7
I/O connector with eight terminals using the spring-clamp method (green, with color print); pack of 10	IB IL SCN-8-CP	27 27 60 8
"Configuring and Installing the INTERBUS Inline Product Range" User Manual	IB IL SYS PRO UM E	27 43 04 8

Phoenix Contact GmbH & Co
Flachsmarktstr. 8
32825 Blomberg
Germany

 + 49 - 52 35 - 3 00

 + 49 - 52 35 - 34 12 00

 www.phoenixcontact.com