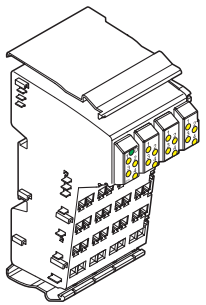
IB IL 24 DI 16
IB IL 24 DI 16-PAC

Inline Terminal With 16 Digital Inputs



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Data Sheet 555302 06/2003

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.

Items IB IL 24 DI 16 and IB IL 24 DI 16-PAC only differ in the scope of supply (see "Ordering Data" on page 11). They have the same functions and technical data.

For reasons of simplification the designation IB IL 24 DI 16 will be used in the following.

Function

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

Features

- Connections for 16 digital sensors
- Connection of sensors in 2 and 3-wire technology
- Maximum permissible load current per sensor: 250 mA
- Maximum permissible load current from the terminal: 4.0 A
- Diagnostics and status indicators

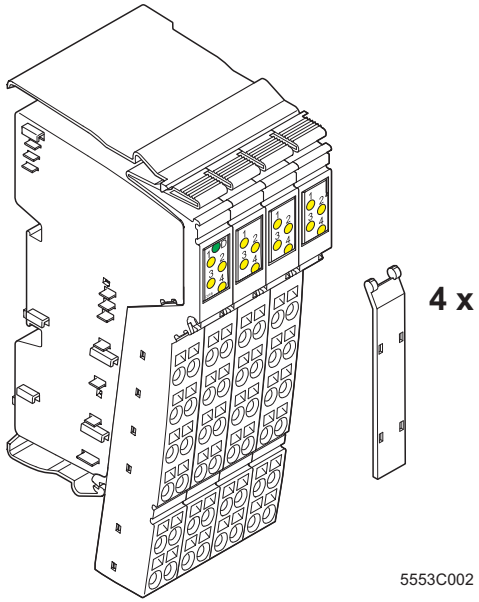

Figure 1 IB IL 24 DI 16-PAC terminal

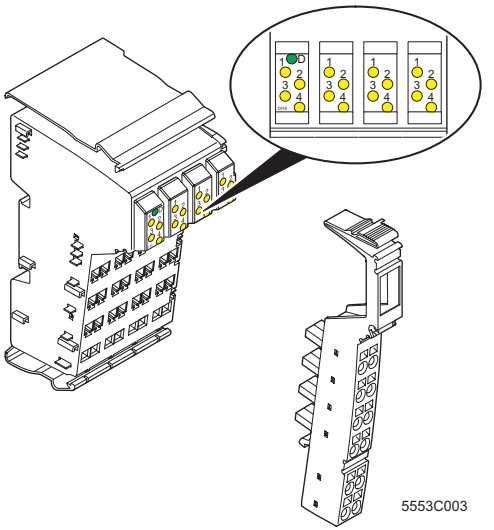

Figure 2 IB IL 24 DI 16 terminal with an appropriate connector

Function Identification

Light blue

Local Diagnostic and Status Indicators

Des.	Color	Meaning
D	Green	Diagnostics
Each connector		
1, 2, 3, 4	Yellow	Status indicators of the inputs

Terminal Assignment for Each Connector

Terminal Point	Assignment
1.1, 2.1	Signal input (IN)
1.2, 2.2	Segment voltage U_S for 2 and 3-wire termination
1.3, 2.3	Ground contact (GND) for 3-wire termination
1.4, 2.4	Signal input (IN)
1.5, 2.5	Segment voltage U_S for 2 and 3-wire termination
1.6, 2.6	Ground contact (GND) for 3-wire termination

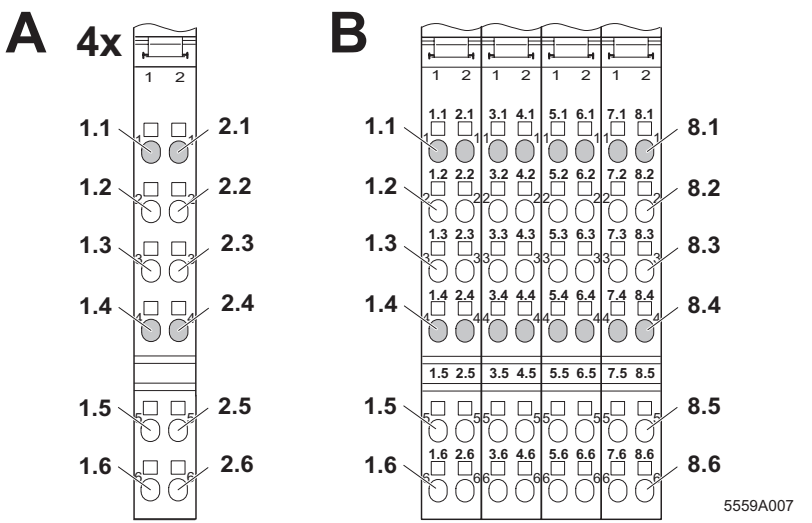

Figure 3 Terminal point numbering when using individual connectors (A) and when using a connector set (B)

Internal Circuit Diagram

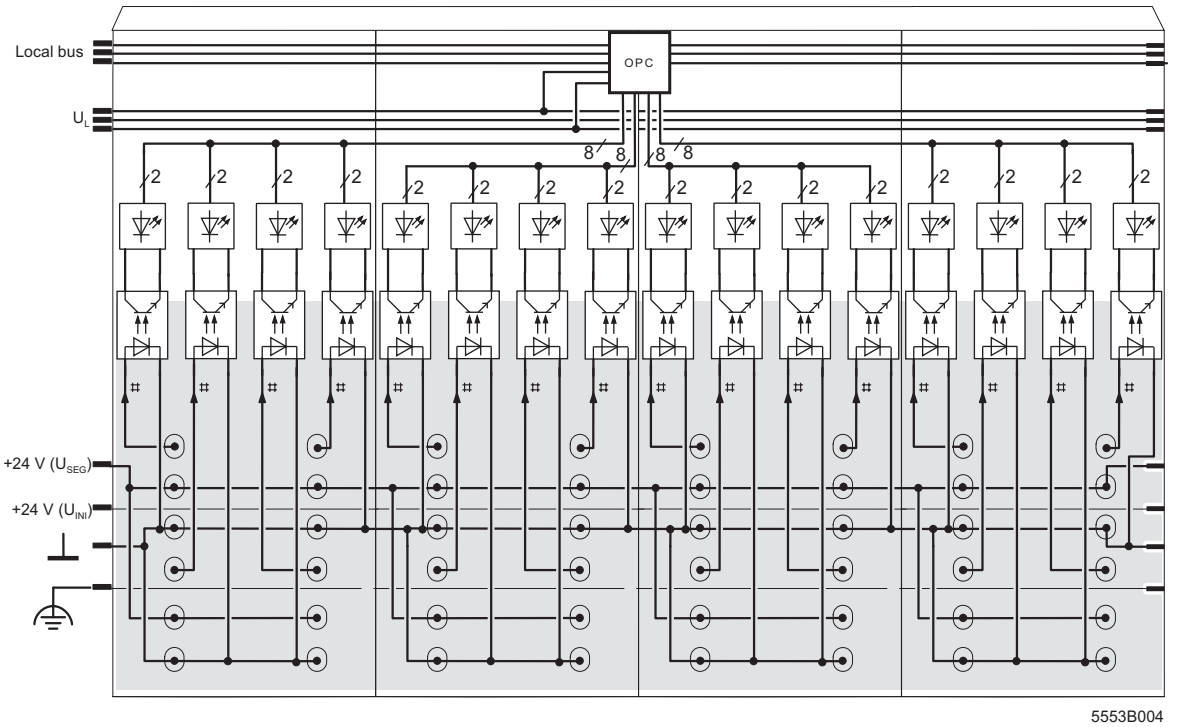

Figure 4 Internal wiring of the terminal points

Key:

OPC — Protocol chip (bus logic including voltage conditioning)

LED (status indicator)

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 Notes and Example

Please note that the terminal must be provided with supply voltage U_S , as this is used internally as the auxiliary supply.

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

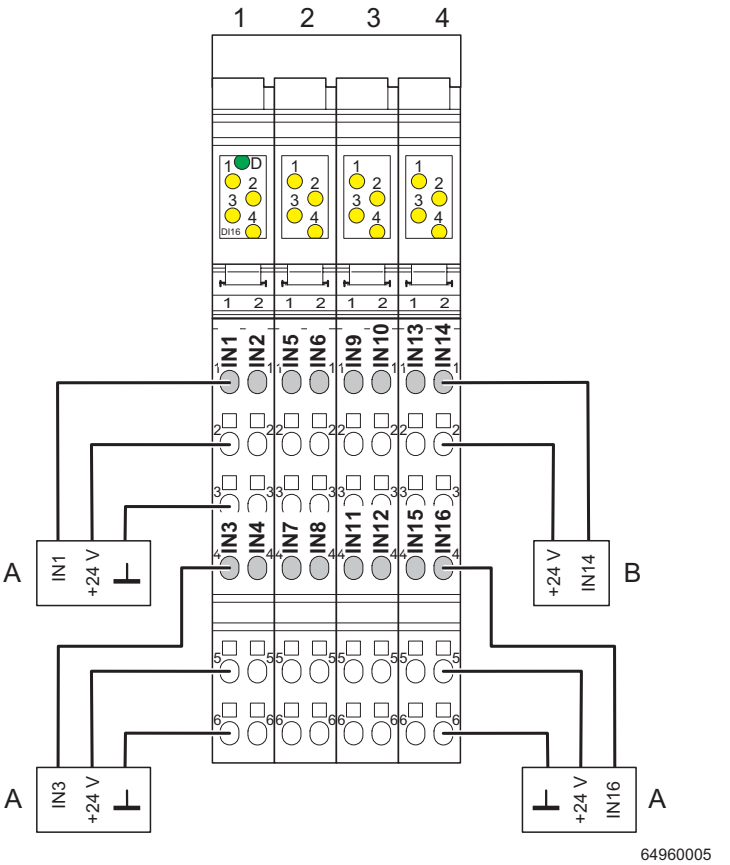

Figure 5 Sensor connection example

A 3-wire termination

B 2-wire termination

The numbers shown above the module indicate the connector slots.

Programming Data/Configuration Data

INTERBUS

ID code	BE_{hex} (190_{dec})
Length code	01_{hex}
Process data channel	16 bits
Input address area	1 word
Output address area	0 bytes
Parameter channel (PCP)	0 bytes
Register length (bus)	1 word

Other Bus Systems

For programming data / configuration data for other bus systems, please refer to the corresponding electronic device data sheet (GSD, EDS)

Process Data

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. 90 00 99 0.

For the assignment of the illustrated (byte.bit) view to control systems of **other bus systems**, please refer to the AH IB IL 24 DI/DO ADDRESS document, Order No. 90 14 12 4.

Assignment of the Terminal Points to the IN Process Data Word

The following table applies to the IB IL 24 DI 16-PAC terminal with the original connector set and when using the connector sets IB IL DI/DO 16-PLSET or IB IL DI 16-PLSET/ICP (see also Figure 3 on page 2, part B).

(Byte.bit) view	Byte	Byte 0								Byte 1							
	Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Module	Slot	4				3				2				1			
	Terminal point (signal)	**8.4**	**7.4**	**8.1**	**7.1**	**6.4**	**5.4**	**6.1**	**5.1**	**4.4**	**3.4**	**4.1**	**3.1**	**2.4**	**1.4**	**2.1**	**1.1**
	Terminal point (+24 V)	8.5	7.5	8.2	7.2	6.5	5.5	6.2	5.2	4.5	3.5	4.2	3.2	2.5	1.5	2.2	1.2
	Terminal point (GND)	8.6	7.6	8.3	7.3	6.6	5.6	6.3	5.3	4.6	3.6	4.3	3.3	2.6	1.6	2.3	1.3
Status indicator	Slot	4				3				2				1			
	LED	4	3	2	1	4	3	2	1	4	3	2	1	4	3	2	1

The following table applies when using the connectors IB IL SCN-12 or IB IL SCN-12-ICP (see also Figure 3 on page 2, part A).

(Word.bit) view	Word	Word 0															
	Bit	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
(Byte.bit) view	Byte	Byte 0								Byte 1							
	Bit	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Module	Slot	4				3				2				1			
	Terminal point (signal)	**2.4**	**1.4**	**2.1**	**1.1**	**2.4**	**1.4**	**2.1**	**1.1**	**2.4**	**1.4**	**2.1**	**1.1**	**2.4**	**1.4**	**2.1**	**1.1**
	Terminal point (+24 V)	2.5	1.5	2.2	1.2	2.5	1.5	2.2	1.2	2.5	1.5	2.2	1.2	2.5	1.5	2.2	1.2
	Terminal point (GND)	2.6	1.6	2.3	1.3	2.6	1.6	2.3	1.3	2.6	1.6	2.3	1.3	2.6	1.6	2.3	1.3
Status indicator	Slot	4				3				2				1			
	LED	4	3	2	1	4	3	2	1	4	3	2	1	4	3	2	1

Technical Data

General Data	
Order designation (Order No.)	IB IL 24 DI 16 (27 26 23 0) IB IL 24 DI 16-PAC (28 61 25 0)
Housing dimensions (width x height x depth)	48.8 mm x 120 mm x 71.5 mm (1.921 in. x 4.724 in. x 2.815 in.)
Weight	122 g (without connectors)
Operating mode	Process data operation with 1 word
Transmission speed	500 kBaud
Type of sensor connection	2 and 3-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 outside of 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	
Local bus	Through data routing

Power Consumption	
Communications power	7.5 V DC
Current consumption from the local bus	60 mA, maximum
Power consumption from the local bus	0.45 W, maximum
Segment supply voltage U_S	24 V DC (nominal value)
Nominal current consumption at U_S	4 A, maximum

Supply of the Module Electronics and I/O Through Bus Terminal/Power Terminal	
Connection method	Through potential routing

Digital Inputs	
Number	16
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}	3 mA, minimum
Delay time	None
Permissible cable length to the sensor	30 m (98.43 ft.) (to ensure conformance with EMC Directive 89/336/EEC)
Use of AC sensors	AC sensors in the voltage range < U_{IN} are limited in application (corresponding to the input design)

Characteristic Curve: Current Depending on the Input Voltage and the Ambient Temperature T_A			
Supply Voltage	**Input Current**	**Input Current According to t >= 20 s**	
		With T_A= 25°C (77°F)	**With T_A= 55°C (131°F)**
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

$$P_{tot} = 0.525\ W + \sum_{n=1}^{16} [\ U_{INn} \times 0.003\ A\ ]$$

Where

P_{tot}	Total power dissipation in the terminal
n	Index of the number of set inputs n = 1 to 16
U_{INn}	Input voltage of the input n

Power dissipation of the housing P_{HOU}	2.8 W, maximum (within the permissible operating temperature)

Concurrent Channel Derating	
Derating	None

Safety Equipment	
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 station bus terminal and this digital input terminal from separate power supply units. Interconnection of the power supply units in the 24 V area is not permitted. (See also the User Manual.)
Common Potentials
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 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 16 digital inputs with connectors and labeling fields	IB IL 24 DI 16-PAC	28 61 25 0
Terminal with 16 digital inputs	IB IL 24 DI 16	27 26 23 0
Four of the connectors listed below or one connector set are needed for the complete fitting of the IB IL 24 DI 16.		
Connector with 12 spring-cage connections (green, without color print); pack of 10	IB IL SCN-12	27 26 34 0
Connector with 12 spring-cage connections (green, with color print); pack of 10	IB IL SCN-12-ICP	27 27 61 1
Connector set with 48 spring-cage connections (green, without color print)	IB IL DI/DO 16-PLSET	28 60 97 6
Connector set with 48 spring-cage connections (green, with color print)	IB IL DI 16-PLSET/ICP	28 60 98 9
"Configuring and Installing the INTERBUS Inline Product Range" User Manual	IB IL SYS PRO UM E	27 43 04 8

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