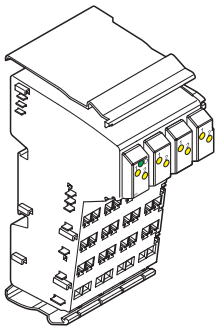
IB IL 24 DI 8-2MBD

INTERBUS Inline Terminal
With Eight Digital Inputs



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Data Sheet 649402 07/2003

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

Function

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

Features

- Connections for eight 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: 2.0 A
- Diagnostics and status indicators

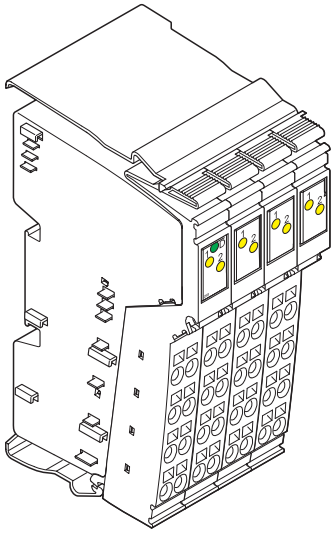

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Figure 1 IB IL 24 DI 8-2MBD terminal with connectors

Please note that the connectors are not supplied with the terminal. Please refer to the Ordering Data on page 10 to order the appropriate connectors for your application.

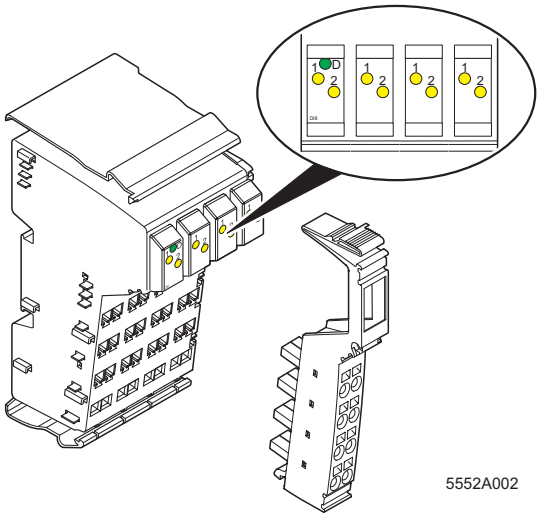

Figure 2 IB IL 24 DI 8-2MBD terminal with an appropriate connector

Local Diagnostic and Status Indicators

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

Terminal Assignment for Each Connector

Terminal Point	Assignment
1.1	Signal input (IN1)
2.1	Signal input (IN2)
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

Function Identification

Light blue

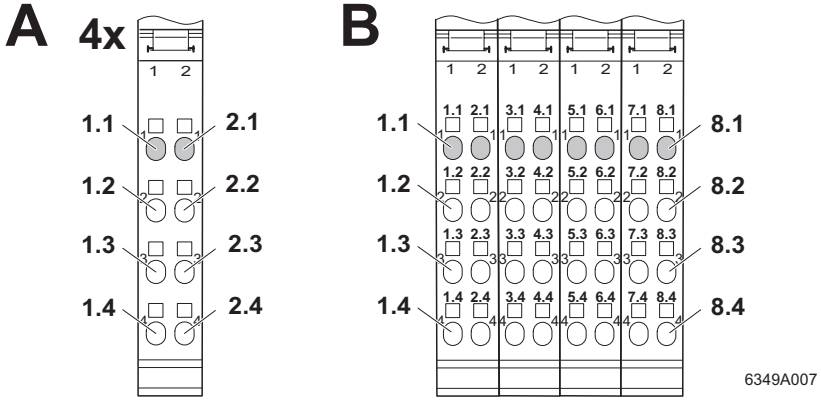

Figure 3 Terminal point numbering when using individual connectors (**A**) and when using a connector set (**B**)

Internal Circuit Diagram

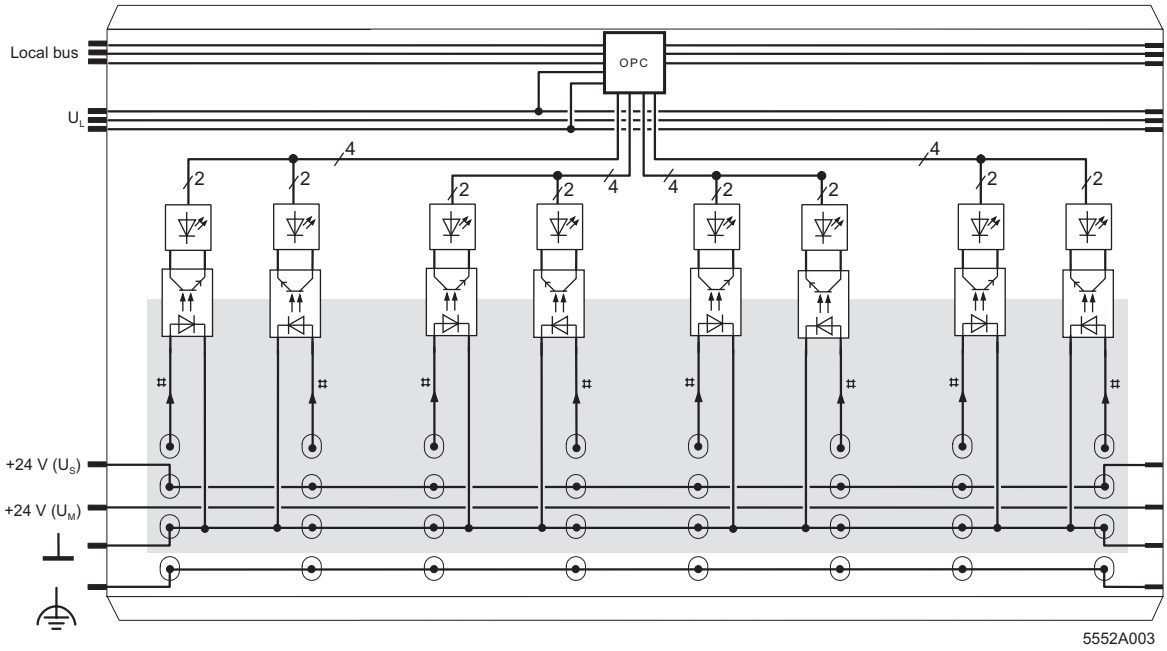

Figure 4 Internal wiring of the terminal points

Key:

OPC — Protocol chip (bus logic including voltage conditioning)

LED

Optocoupler

Digital input

Electrically isolated area

Other symbols are explained in the IB IL SYS PRO UM E User Manual.

Connection Example

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

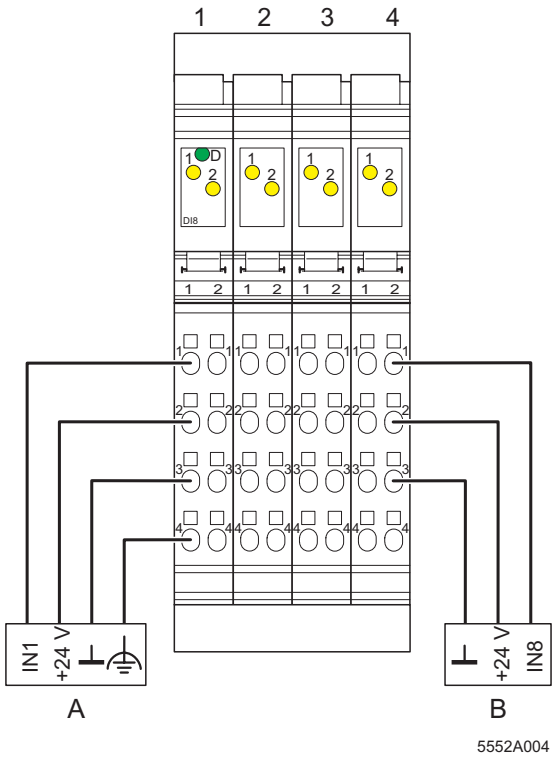

Figure 5 Typical sensor connections

A 4-wire termination

B 3-wire termination

The numbers shown above the module indicate the connector slots.

Programming Data

ID code	BE_{hex} (190_{dec})
Length code	81_{hex}
Process data channel	8 bits
Input address area	1 byte
Output address area	0 bytes
Parameter channel (PCP)	0 bytes
Register length (bus)	1 byte

Process Data

For the assignment of the illustrated (byte.bit) view to your control or computer system, please refer to data sheet DB GB IBS SYS ADDRESS, Order No. 90 00 99 0.

Assignment of the Terminal Points to the IN Process Data

The following table applies when using the connector sets IB IL DI/DO 8-PLSET or IB IL DI/DO 8-PLSET/CP (see also Figure 3 on page 2, B).

(Byte.bit) view	Byte	Byte 0							
	Bit	7	6	5	4	3	2	1	0
Assignment	Slot	4		3		2		1	
	Terminal point (signal)	**8.1**	**7.1**	**6.1**	**5.1**	**4.1**	**3.1**	**2.1**	**1.1**
	Terminal point (+24 V)	8.2	7.2	6.2	5.2	4.2	3.2	2.2	1.2
	Terminal point (GND)	8.3	7.3	6.3	5.3	4.3	3.3	2.3	1.3
	Terminal point (FE)	8.4	7.4	6.4	5.4	4.4	3.4	2.4	1.4
Status indicator	Slot	4		3		2		1	
	LED	2	1	2	1	2	1	2	1

The following table applies when using the connectors IB IL SCN-8 or IB IL SCN-8-CP (see also Figure 3 on page 2, A).

(Byte.bit) view	Byte	Byte 0							
	Bit	7	6	5	4	3	2	1	0
Assignment	Slot	4		3		2		1	
	Terminal point (signal)	**2.1**	**1.1**	**2.1**	**1.1**	**2.1**	**1.1**	**2.1**	**1.1**
	Terminal point (+24 V)	2.2	1.2	2.2	1.2	2.2	1.2	2.2	1.2
	Terminal point (GND)	2.3	1.3	2.3	1.3	2.3	1.3	2.3	1.3
	Terminal point (FE)	2.4	1.4	2.4	1.4	2.4	1.4	2.4	1.4
Status indicator	Slot	4		3		2		1	
	LED	2	1	2	1	2	1	2	1

Technical Data

General Data	
Order designation	IB IL 24 DI 8-2MBD
Order no.	28 19 04 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	118 g (without connectors)
Operating mode	Process data mode with 1 byte
Transmission speed	2 Mbaud
Type of sensor connection	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 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	85 mA, maximum
Power consumption from the local bus	0.638 W, maximum
Segment supply voltage U_S	24 V DC (nominal value)
Nominal current consumption at U_S	2 A, maximum

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

Digital Inputs	
Number	8
Input design	According to EN 61131-2 Type 1
Definition of switching thresholds Maximum low level voltage Minimum high level voltage	 U_{Lmax} < 5 V 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
Current flow	Linear in the range 1 V < U_{IN} < 30 V
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)

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

$$P_{tot} = 0.638\ W + \sum_{n=1}^{8} \left[U_{INn} \times \frac{U_{INn} - 1.8\ V}{4400\ \Omega} \right]$$

Where

P_{tot}	Total power dissipation of the terminal
n	Index of the number of set inputs n = 1 to 8
U_{INn}	Input voltage of the input n

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

Limitation of Simultaneity, 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 the digital input terminal via the bus terminal 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 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 eight digital inputs	IB IL 24 DI 8-2MBD	28 19 04 0
Four of the listed connectors or one connector set are needed for the complete fitting of the terminal.		
Connector with eight spring-cage connections (green, w/o color print); pack of 10	IB IL SCN-8	27 26 33 7
Connector with eight spring-cage connections (green, with color print); pack of 10	IB IL SCN-8-CP	27 27 60 8
Connector set with 32 spring-cage connections (green, w/o color print)	IB IL DI/DO 8-PLSET	28 60 95 0
Connector set with 32 spring-cage connections (green, with color print)	IB IL DI/DO 8-PLSET/CP	28 60 96 3
"Configuring and Installing the INTERBUS Inline Product Range" User Manual	IB IL SYS PRO UM E	27 43 04 8

Ensure that you are always working with the latest documentation published.
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