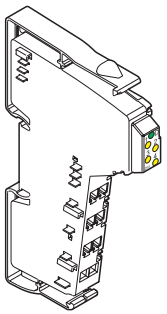
IB IL 24 DI 4

INTERBUS Inline Terminal With Four Digital Inputs



5550A001

Data Sheet 5550A 08/1999

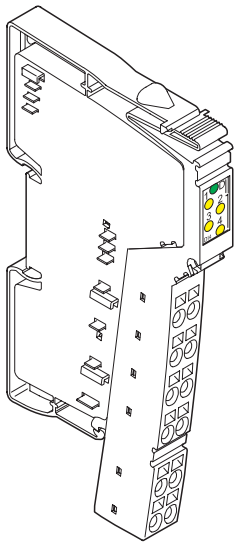
This data sheet is intended to be used in conjunction with the “INTERBUS Inline System Manual” IB IL SYS PRO UM E (Order No. 27 43 04 8).

Function

This terminal is used to accept 24 V digital input signals from sourcing devices.

Features

- Four digital sensors can be connected
- Connection of 2- and 3-wire sensors
- Maximum permissible load current per sensor: 250 mA.
- Maximum permissible load current from the terminal: 1.0 A.
- Diagnostic and status indicators



5550A006

Figure 1 IB IL 24 DI 4 terminal with the connector plugged in

Please note that the connector is not supplied with the terminal. Refer to the “Ordering Data” Table at the end of this data sheet to choose the appropriate connector for your application.

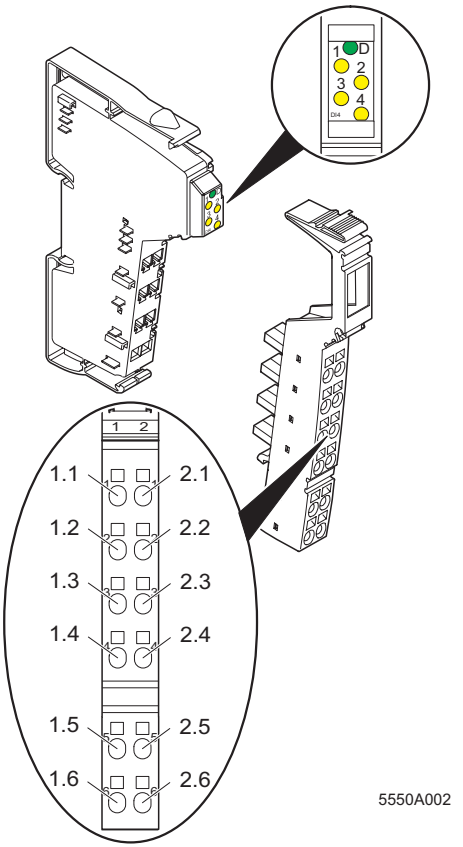


Figure 2 IB IL 24 DI 4 terminal with the appropriate connector

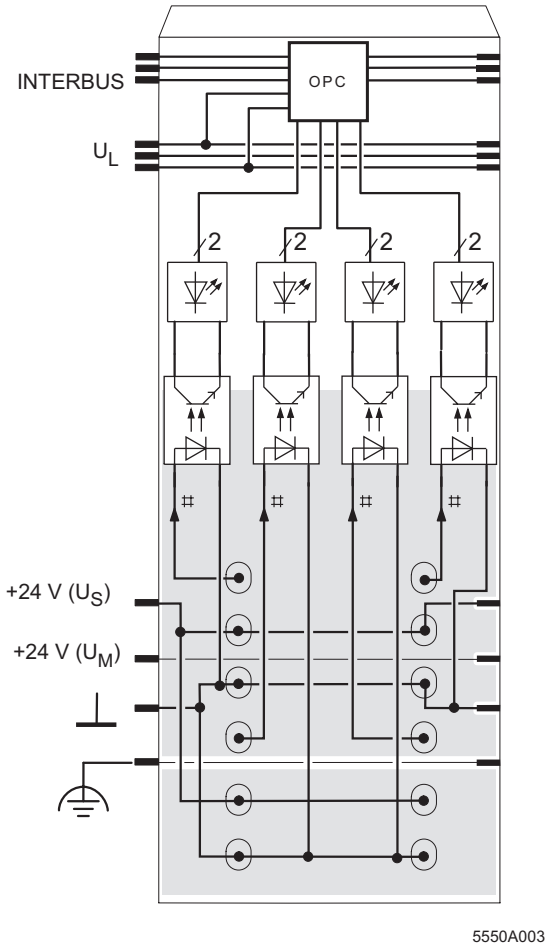
Local Diagnostic and Status Indicators

Des.	Color	Meaning
D	Green	Bus diagnostics
1, 2, 3, 4	Yellow	Status indicators of the inputs

Terminal Assignment

Terminal Point	Assignment
1.1	Signal input 1 (IN 1)
2.1	Signal input 2 (IN 2)
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	Signal input 3 (IN 3)
2.4	Signal input 4 (IN 4)
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

Internal Circuit Diagram



Key:

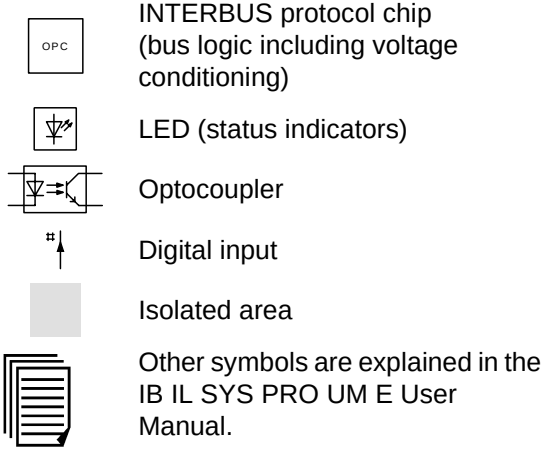


Figure 3 Internal wiring of the terminal points

Connection Example

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

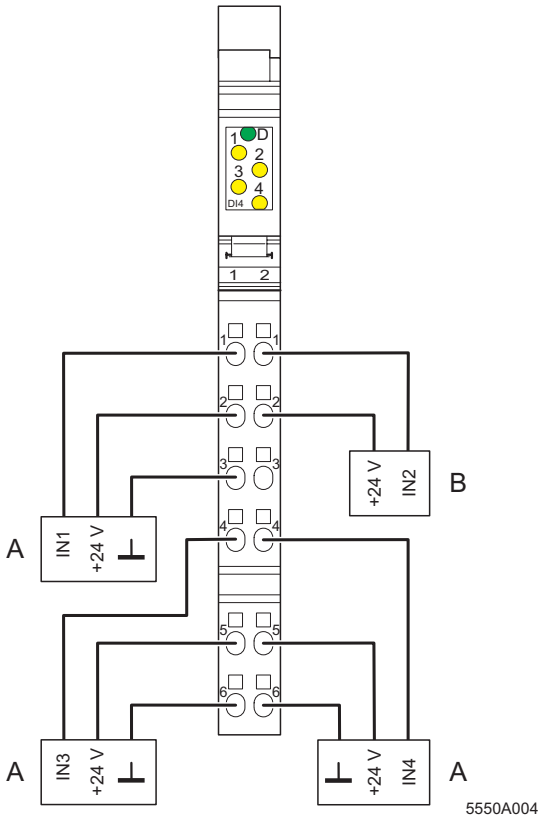


Figure 4 Typical sensor connections

A 3-wire termination

B 2-wire termination

Programming Data

ID code	BE_{hex} (190_{dec})
Length code	41_{hex}
Input address area	4 bits
Output address area	0 bits
Parameter channel (PCP)	0 bits
Register length (bus)	4 bits

INTERBUS Process Data Words

Assignment of the Terminal Points to the Process Data Input Word

INTERBUS reference	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
Terminal	Terminal point (signal)	Not used				2.4	1.4	2.1	1.1	Not used							
	Terminal point (+24 V)					2.5	1.5	2.2	1.2								
	Terminal point (GND)					2.6	1.6	2.3	1.3								
Status indication	LED					4	3	2	1								

The process data output word is not used.

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 2.795 in.)
Weight	44 g (without connector)
Operating mode	Process data operation with 4 bits (1 nibble)
Connection type of the sensors	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
Ranging 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	40 mA, maximum
Power consumption from the local bus	0.3 W, maximum
Segment supply voltage U_S	24 V DC (nominal value)
Nominal current consumption of U_S	1.0 A, maximum

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

Digital Inputs	
Number	4
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 U_{IN}	3 mA, minimum
Delay time	None
Permissible cable length to the sensor	30 m (98.4 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_U

Supply voltage	Input current	Input current according to t >= 20 s	
		At T_U = 25°C (77°F)	At T_U = 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_U and the number of inputs that are switched on (module internal temperature).			

Power Dissipation	
Formula to calculate the power dissipation of the electronics $P_{tot} = 0{,}24\ W + \sum_{n=0}^{4} [\ U_{INn} \times 0{,}003\ A\ ]$ With P_{tot} Total power dissipation of the terminal n Index of the number of set inputs n = 0 to 4 U_{INn} Input voltage of the input n	
Power dissipation of the housing P_{HOU}	0.6 W, maximum (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	
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 using the bus terminal or a power terminal from separate power supply units. Interconnection of the 24 V power supplies is not allowed! (For detailed information refer to the user manual.)	
Common potentials	
24 V main power, 24 V segment voltage, and GND have the same potential. FE (functional earth ground) 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 four digital inputs	IB IL 24 DI 4	27 26 21 4
You need one connector for the DI 4 terminal.		
Connector with 12 terminal points using the spring-clamp method (green, w/o color print); pack of 10	IB IL SCN-12	27 26 34 0
Connector with 12 terminal points using the spring-clamp method (green, with color print); pack of 10	IB IL SCN-12-ICP	27 27 61 1
“INTERBUS Inline System Manual”	IB IL SYS PRO UM E	27 43 04 8

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