

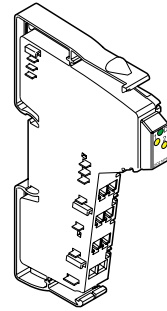
# IB IL 24 DO 2-NPN

## INTERBUS Inline Terminal With Two Digital Outputs With Negative Logic

Data Sheet 6224A

12/2000

6224A001



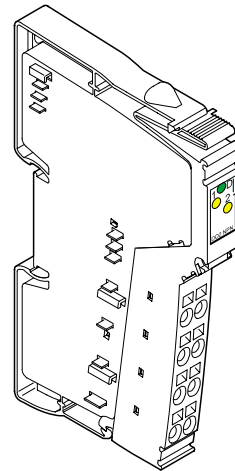
This data sheet is only valid in association with the IB IL SYS PRO UM E "Configuring and Installing the INTERBUS Inline Product Range" User Manual.

### Function

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

### Features

- Connections for two digital actuators with negative logic (NPN)
- Connection of actuators in 2-, 3-, and 4-wire technology
- Nominal current per output: 500 mA
- Total current of the terminal: 1 A
- Short circuit and overload protected outputs
- Diagnostic and status indicators



6224A002

Figure 1

IB IL 24 DO 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 10 to order the appropriate connectors for your application.

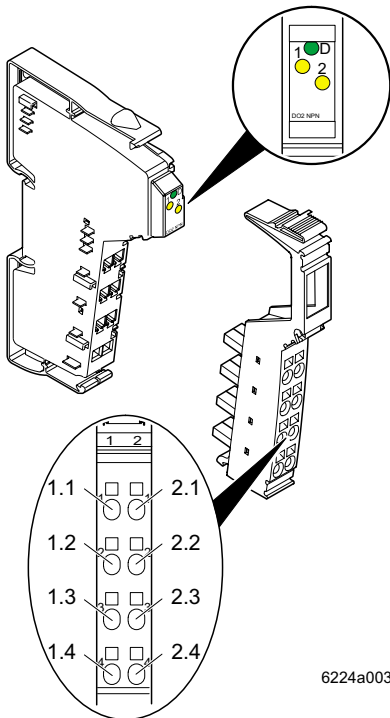


Figure 2 IB IL 24 DO 2-NPN with appropriate connector

### Local Diagnostic and Status Indicators

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

### Terminal Assignment

Terminal Points	Assignment
1.1, 2.1	Signal output (OUT)
1.2, 2.2	Segment voltage $U_S$ for 2-, 3-, and 4-wire termination  Measuring point for the supply voltage
1.3, 2.3	Ground contact (GND) for 4-wire termination
1.4, 2.4	FE connection for 3- and 4-wire termination



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

# Internal Circuit Diagram

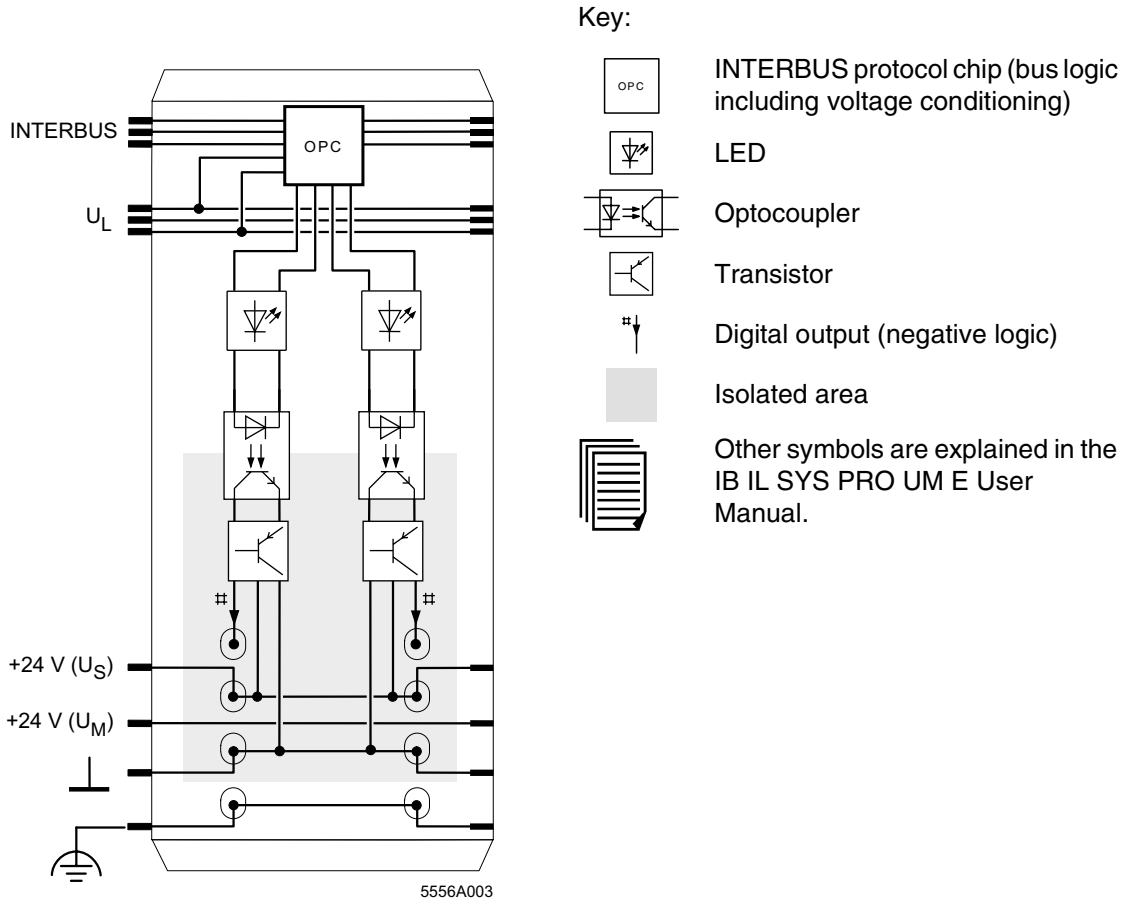
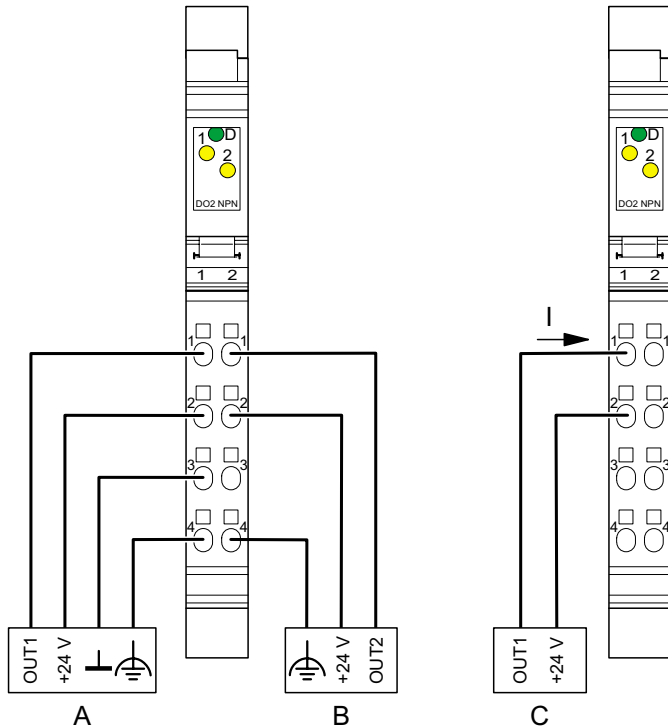


Figure 3 Internal wiring of the terminal points

## Connection Example



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



6224A004

Figure 4 Typical actuator 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	BD <sub>hex</sub> (189 <sub>dec</sub> )
Length code	C2 <sub>hex</sub>
Process data channel	2 bits
Input address area	0 bits
Output address area	2 bits
Parameter channel (PCP)	0 bits
Register length (bus)	2 bits

## INTERBUS Process Data



IN process data is not available.



### Assignment of Terminal Points to OUT 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.

## 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	42 g (without connector)
Operating mode	Process data operation with 2 bits
Connection method of the actuators	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	32 mA, maximum
Power consumption from the local bus	0.24 W, maximum
Segment supply voltage $U_S$	24 V DC (nominal value)
Nominal current consumption at $U_S$	1 A (2 x 0.5 A), maximum
Supply of the Module Electronics and I/O Through Bus Terminal/Power Terminal	
Connection method	Through potential routing

<b>Digital Outputs</b>	
Number	2
Nominal output voltage $U_{OUT}$	24 V DC
Differential voltage for $I_{nom}$	$\leq 1$ V
Nominal current $I_{nom}$ per channel	0.5 A
Tolerance of the nominal current	+10%
Total current	1 A
Protection	Short circuit; overload
Nominal load	
Ohmic	48 $\Omega$ / 12 W
Lamp	12 W
Inductive	12 VA (1.2 H, 50 $\Omega$ )
Signal delay upon power up of	
- Ohmic nominal load	Approximately 200 $\mu$ s
- Lamp nominal load	200 ms, typical (with switching frequencies up to 8 Hz; above this frequency the lamp load responds like an ohmic load)
- Inductive nominal load	Approximately 250 ms (1.2 H, 12 $\Omega$ )
Signal delay upon power down of	
- Ohmic nominal load	Approximately 200 $\mu$ s
- Lamp nominal load	Approximately 200 $\mu$ s
- Inductive nominal load	Approximately 250 ms (1.2 H, 12 $\Omega$ )
Switching frequency with	
- Ohmic nominal load	300 Hz, maximum
 This switching frequency is limited by the selected data rate, the number of bus devices, the bus structure, the software and the control or computer system used.	
- Lamp nominal load	300 Hz, maximum
 This switching frequency is limited by the selected data rate, the number of bus devices, the bus structure, the software and the control or computer system used.	
- Inductive nominal load	0.5 Hz (1.2 H, 50 $\Omega$ ), maximum
Overload response	Auto restart
Response time with ohmic overload (2 $\Omega$ )	3 s, maximum

<b>Digital Outputs (Continued)</b>	
Restart frequency with ohmic overload (6 $\Omega$ )	Approximately 2 Hz
Restart frequency with lamp overload	Approximately 2 Hz
Inductive overload response	Output may be damaged
Reverse voltage endurance against short pulses	Protected against reverse voltages
Strength against permanently applied surge voltages	No
Validity of output data after connection of 24 V voltage supply (power up)	5 ms, typical
Response upon power down	The output follows the supply voltage without delay.
Limitation of the demagnetization voltage induced on circuit interruption	Approximately -8 V
Single maximum energy in free running	200 mJ
Protective circuit type	Integrated Zener diode in output chip
Overcurrent shutdown	Minimum at 3.5 A
Output current when switched off	70 $\mu$ A, maximum
Output voltage when switched off	2 V, maximum
Output current with ground connection interrupted	180 mA, maximum
Switching power with ground connection interrupted	3.25 mW at 100 $\Omega$ load resistance, typical


<b>Output Characteristic When Switched On (Typical)</b>	
<b>Output Current (A)</b>	<b>Differential Output Voltage (V)</b>
0	0
0.3	0.06
0.4	0.078
0.5	0.097
0.8	0.154



Power Dissipation	
<b>Formula to Calculate the Power Dissipation of the Electronics</b>	
$P_{\text{tot}} = 0.18 \text{ W} + \sum_{n=1}^2 (200 \text{ mW} + I_{L_n}^2 \times 0.2 \Omega)$	
Where P <sub>tot</sub> Total power dissipation of the terminal n Index of the number of set outputs n = 1 to 2 I <sub>L<sub>n</sub></sub> Load current of the output n	
<b>Power Dissipation of the Housing P<sub>HOU</sub></b>	0.7 W (within the permissible operating temperature)


Concurrent Channel Derating	
None	

Safety Devices	
Overload/short circuit in segment circuit	Electronic
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 output terminal described here using 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	
Short circuit/overload of an output	Yes
 An error message is generated when an output is shorted and switched on. In addition, the diagnostic LED (D) flashes on the terminal at 2 Hz (medium) under these conditions.	
Operating voltage out of range	No


## Ordering Data

Description	Order Designation	Order No.
Terminal with two digital outputs with negative logic	IB IL 24 DO 2-NPN	27 40 11 9
 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](http://www.phoenixcontact.com)