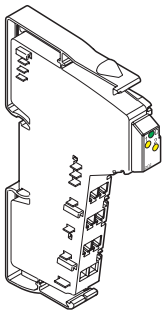
IB IL 24 DO 2-2A
IB IL 24 DO 2-2A-PAC

Inline Terminal With Two Digital Outputs



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Data Sheet 5556B 08/2002

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.

The item versions only differ with regard to the scope of supply (see "Ordering Data" on page 11). Function and technical data are identical.

Please observe the notes on Page 3 when using the terminals within a safety segment circuit.

Function

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

Features

- Connections for two digital actuators
- Connection of actuators in 2-, 3-, and 4-wire technology
- Nominal current of each output: 2 A
- Total current of the terminal:4 A
- Short-circuit and overload protected outputs
- LED diagnostic and status indicators
- Approved for the use within a safety segment circuit

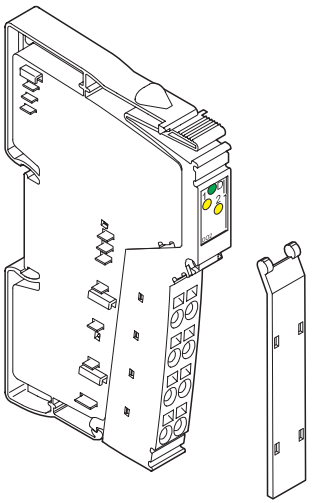

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Figure 1 IB IL 24 DO 2-2A-PAC terminal

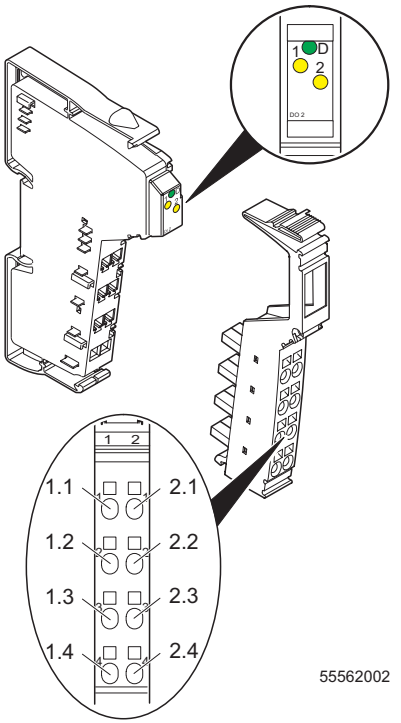


Figure 2 IB IL 24 DO 2-2A (-PAC) with appropriate connector

Function Identification

Pink

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 4-wire termination Measuring point for the supply voltage
1.3, 2.3	Ground contact (GND) for 2-, 3-, and 4-wire termination
1.4, 2.4	FE connection for 3- and 4-wire termination

Notes on Using the Terminals Within a Safety Segment Circuit

Both terminals of the following hardware version and later are approved for the use within a safety segment circuit.

Order No.	Order Designation	Hardware Version
27 26 24 3	IB IL 24 DO 2-2A	05
28 61 26 3	IB IL 24 DO 2-2A-PAC	05

The hardware version is imprinted on the side of the housing of every terminal (1 in Figure 3).

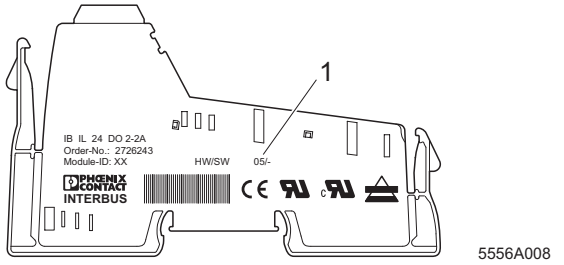
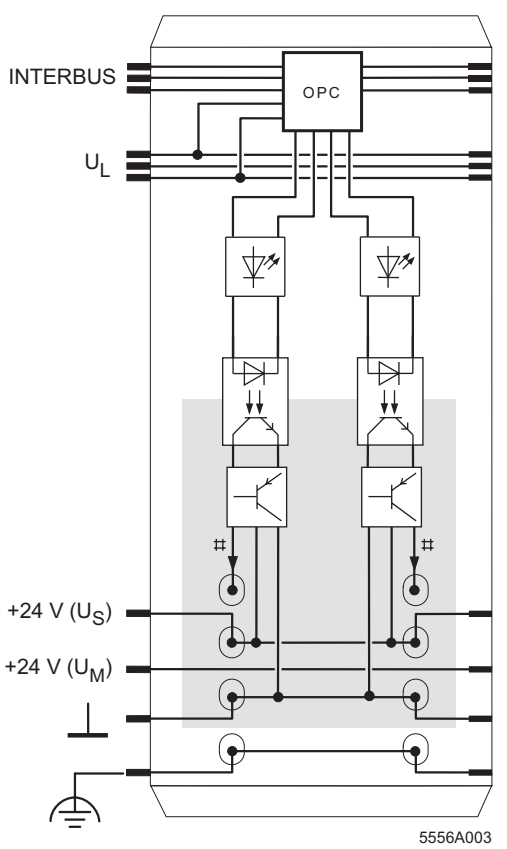


Figure 3 Imprinting on an Inline terminal

The instructions of the current IB IL 24 SAFE 1 safety terminal data sheet must be followed to ensure that the function of the safety segment cirucuit is not affected!

Up-to-date documentation is available at www.phoenixcontact.com. It can be downloaded free of charge.

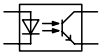
Internal Circuit Diagram



Key:

INTERBUS protocol chip (bus logic including voltage conditioning)

LED



Optocoupler

Transistor

Digital output

Electrically isolated area

Other symbols are explained in the IB IL SYS PRO UM E user manual.

Figure 4 Internal wiring of the terminal points

Connection Example

When connecting the actuators observe the assignment of the terminal points to the INTERBUS process data.

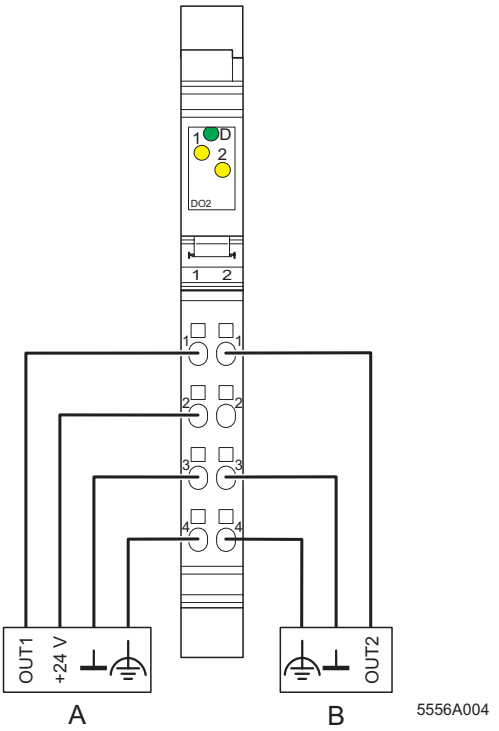


Figure 5 Actuator connection example

A 4-wire termination

B 3-wire termination

Programming Data

ID code	BD_{hex} (189_{dec})
Length code	$C2_{hex}$
Input address area	0 bits
Output address area	2 bits
Parameter channel (PCP)	0 bits
Register length (bus)	2 bits

INTERBUS Process Data

Assignment of the Output Process Data

(Byte.bit) view		0.1	0.0
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

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

Technical Data

General Data	
Designation (order no.)	IB IL 24 DO 2-2A (27 26 24 3) IB IL 24 DO 2-2A-PAC (28 61 26 3)
Housing dimensions (width x height x depth)	12.2 mm x 120 mm x 71.5 mm (0.480 x 4.724 x 2.815 in.)
Weight	46 g (without connectors)
Operating mode	Process data operation with 2 bits
Transmission speed	500 kbps
Type of actuator 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	
INTERBUS interface	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	4 A (2 x 2 A), maximum

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

Digital Outputs	
Number	2
Nominal output voltage U_{OUT}	24 V DC
Differential voltage for I_{nom}	≤ 1 V
Nominal current I_{nom} per channel	2 A
Tolerance of the nominal current	+10 %
Total current	4 A
Protection	Short circuit; overload
Nominal load	
Ohmic	12 Ω/48 W
Lamp	48 W
Inductive	48 VA (1.2 H, 50 Ω)
Signal delay upon power up of	
- Ohmic nominal load	200 µs, approximately
- 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	250 ms, approximately (1.2 H, 12 Ω)
Signal delay upon power down of	
- Ohmic nominal load	200 µs, approximately
- Lamp nominal load	200 µs, approximately
- Inductive nominal load	250 ms, approximately (1.2 H, 12 Ω)

Digital Outputs (Continued)	
Switching frequency with	
- Ohmic nominal load	300 Hz, maximum
This switching frequency is limited by the selected data rate, the number of 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 devices, the bus structure, the software, and the control or computer system used.	
- Inductive nominal load	0.5 Hz (1.2 H, 12 Ω), maximum
Overload response	Auto restart
Inductive overload response	Output may be damaged
Reverse voltage endurance against short pulses	Protected against reverse voltages
Resistance to permanently applied reverse voltages	Up to 2 A DC
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 voltage induced on circuit interruption	-0.7 V, approximately
Maximum inductive breaking energy/channel	1500 W (pulse 8/20 µs)
Type of external protective circuit	Free-wheeling diode per channel

Output Characteristic When Switched On (Typical)	
Output Current (A)	**Differential Output Voltage (V)**
0	0
0.2	0.02
0.4	0.04
0.6	0.06
0.8	0.08
1.0	0.10
1.2	0.12
1.4	0.14
1.6	0.16
1.8	0.18
2.0	0.20
2.2	0.22

Power Dissipation

Formula to Calculate the Power Dissipation of the Electronics

$$P_{TOT} = 0.18\ W + \sum_{n=1}^{2} (200\ mW + I_{Ln}^2 \times 0.1\ \Omega)$$

Where

P_{TOT}	Total power dissipation of the terminal
n	Index of the number of set outputs n = 1 to 2
I_{Ln}	Load current of the output n

Power Dissipation of the Housing Depending on the Ambient Temperature

$$P_{HOU} = 2.4\ W \qquad -25°C < T_A \leq -5°C$$

$$P_{HOU} = 2.4\ W - \frac{T_A - (-5°C)}{37.5\ K/W} \qquad -5°C < T_A \leq +55°C$$

Where

P_{HOU}	Permissible power dissipation of the housing
T_A	Ambient temperature

-25.0°C	=	-13.0°F
5.0°C	=	23.0°F
+55.0°C	=	131.0°F

Limitation of Simultaneity, Derating		
Ambient Temperature (TA)	**Maximum Load Current at 100% Simultaneity**	**Maximum Load Current at 50% Simultaneity**
55°C (131°F)	1 A	2 A
40°C (104°F)	2 A	2 A

With an ambient temperature of 55°C (131°F) and 100% simultaneity, a load current of 1 A per channel is permissible. If only one channel is used (50% simultaneity), a load current of 2 A can be tapped.

If both channels are used you must define the permissible working point according to the above formulas. An example can be found in the "Configuring and Installing the INTERBUS Inline Product Range" User Manual.

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 permitted.

Common Potentials

The 24 V main voltage supply, 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 including connectors and labeling field	IB IL 24 DO 2-2A-PAC	28 61 26 3
Terminal with two digital outputs	IB IL 24 DO 2-2A	27 26 24 3
One of the listed connectors is needed for the complete fitting of the IB IL 24 DO 2-2A terminal.		
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
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
Data sheet for the IB IL 24 SAFE 1 safety terminal.	DB GB IB IL 24 SAFE 1	90 04 91 3

Up-to-date documentation is available at www.phoenixcontact.com. It can be downloaded free of charge.

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