

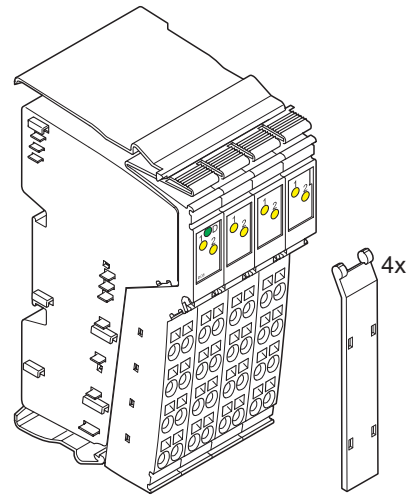
# IB IL 24 DO 8 ...

## Inline terminal with eight digital outputs

### AUTOMATION

Data sheet  
5558\_en\_08

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## 1 Description

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

### Features

- Connections for eight digital actuators
- Connection of actuators in 2, 3, and 4-wire technology
- Nominal current of each output: 0.5 A
- Total current of the terminal: 4 A
- Short-circuit and overload protected outputs
- Diagnostic and status indicators
- Approved for use within a safety-related segment circuit (observe the notes on page 8)



This data sheet is only valid in association with the IL SYS INST UM E user manual.



Make sure you always use the latest documentation.  
It can be downloaded at [www.phoenixcontact.net/catalog](http://www.phoenixcontact.net/catalog).



This data sheet is valid for all products listed on the following page:

## 2 Ordering data

### Products

Description	Type	Order No.	Pcs./Pkt.
Terminal with eight digital outputs; complete with accessories (connectors consecutively numbered and labeling fields); transmission speed of 500 kbps	IB IL 24 DO 8-PAC	2861289	1
Terminal with eight digital outputs; complete with accessories (connectors not consecutively numbered and labeling fields); transmission speed of 500 kbps	IB IL 24 DO 8-PAC/SN	2862945	1
Terminal with eight digital outputs; without accessories; transmission speed of 500 kbps	IB IL 24 DO 8	2726269	1
Terminal with eight digital outputs; complete with accessories (connectors consecutively numbered and labeling fields); transmission speed of 2 Mbps	IB IL 24 DO 8-2MBD-PAC	2861687	1
Terminal with eight digital outputs; complete with accessories (connectors not consecutively numbered and labeling fields); transmission speed of 2 Mbps	IB IL 24 DO 8-2MBD-PAC/SN	2878227	1
Terminal with eight digital outputs; without accessories; transmission speed of 2 Mbps	IB IL 24 DO 8-2MBD	2819037	1



One of the listed connectors is needed for the complete fitting of the IB IL 24 DO 8 and IB IL 24 DO 8-2MBD terminals.

### Accessories

Description	Type	Order No.	Pcs./Pkt.
Connector with eight spring-cage connections (green, w/o color print)	IB IL SCN-8	2726337	10
Connector with eight spring-cage connections (green, with color print)	IB IL SCN-8-CP	2727608	10
Connector set with 32 spring-cage connections (green, w/o color print)	IB IL DI/DO 8-PLSET	2860950	1
Connector set with 32 spring-cage connections (green, with color print)	IB IL DI/DO 8-PLSET/CP	2860963	1

### Documentation

Description	Type	Order No.	Pcs./Pkt.
"Configuring and installing the INTERBUS Inline product range" user manual	IB IL SYS PRO UM E	2743048	1
"Automation terminals of the Inline product range" user manual	IL SYS INST UM E	2698737	1
"INTERBUS addressing" data sheet	DB GB IBS SYS ADDRESS	-	-
"Safety-related segment circuit" application note	AH EN IL SAFE	-	-



**Digital outputs (continued)**

Signal delay upon power up of:

Nominal ohmic load	100 $\mu$ s, typical
Nominal lamp load	100 ms, typical (with switching frequencies up to 8Hz; above this frequency the lamp load responds like an ohmic load)
Nominal inductive load	100 ms, typical (1.2 H, 50 $\Omega$ )

Signal delay upon power down of:

Nominal ohmic load	1 ms, typical
Nominal lamp load	1 ms, typical
Nominal inductive load	50 ms, typical (1.2 H, 50 $\Omega$ )

Switching frequency with:

Nominal ohmic 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.

Nominal lamp 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.

Nominal inductive load	0.5 Hz, maximum (1.2 H, 48 $\Omega$ )
Overload response:	Auto restart
Response time with ohmic overload (12 $\Omega$ )	3 s, approximately
Restart frequency with ohmic overload	400 Hz, approximately
Restart frequency with lamp overload	400 Hz, approximately
Response with inductive overload	Output may be damaged
Response time in the event of a short circuit	400 ms, approximately
Reverse voltage protection against short pulses	Protected against reverse voltages
Resistance to permanently applied reverse voltages	Up to 2 A DC
Resistance to polarity reversal of the supply voltage	Protective elements in the bus terminal or power terminal
Resistance to permanently applied surge voltage	No
Validity of output data after connecting the 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	-15 V $\leq$ U <sub>demag</sub> $\leq$ -46 V (U <sub>demag</sub> = demagnetization voltage)
Single maximum energy in free running	400 mJ, maximum
Protective circuit type	Integrated 45 V Zener diode in the output chip
Overcurrent shutdown	0.7 A, minimum
Output current when switched off	300 $\mu$ A, maximum
Output voltage when switched off	2 V, maximum
Output current with ground connection interrupt	25 mA, maximum
Switching power with ground connection interrupt	100 mW at 1 k $\Omega$ load resistance, typical
Inrush current with lamp load	1.5 A for 20 ms, maximum

**Output characteristic curve when switched on (typical)**

Output current (A)	Differential output voltage (V)
0	0
0.1	0.04
0.2	0.08
0.3	0.12
0.4	0.16
0.5	0.20

**Power dissipation****Formula to calculate the power dissipation of the electronics**

500 kbps

$$P_{EL} = 0.19 \text{ W} + \sum_{n=1}^8 (0.10 \text{ W} + I_{Ln}^2 \times 0.40 \Omega)$$

2 Mbps

$$P_{EL} = 0.46 \text{ W} + \sum_{n=1}^8 (0.10 \text{ W} + I_{Ln}^2 \times 0.40 \Omega)$$

Where:

$P_{EL}$  Total power dissipation in the terminal  
 $n$  Index of the number of set outputs  $n = 1$  to 8  
 $I_{Ln}$  load current of output  $n$

**Power dissipation of the housing  $P_{HOU}$** 

2.7 W, maximum  
 (within the permissible operating temperature)

**Limitation of simultaneity, derating**

Derating

No limitation of simultaneity, no derating

**Protective equipment**

Overload/short circuit in the segment circuit

Electronic; with two 4-channel drivers

Surge voltage

Protective elements of the power terminal  
 Protection up to 33 V DC

Polarity reversal of the supply voltage

Protective elements of the power terminal  
 The supply voltage must be protected. The power supply unit should be able to supply four times (400%) the nominal current of the fuse.

Reverse voltage

Protected against reverse voltages up to 2 A DC

**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 coupler and the digital output terminal described here via the bus coupler 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**

5 V supply incoming remote bus/7.5 V supply (bus logic)

**Test voltage**

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 2Hz (medium) under these conditions.

Operating voltage out of range

No

**Approvals**

For the latest approvals, please visit [www.phoenixcontact.net/catalog](http://www.phoenixcontact.net/catalog).

## 4 Internal basic circuit diagram

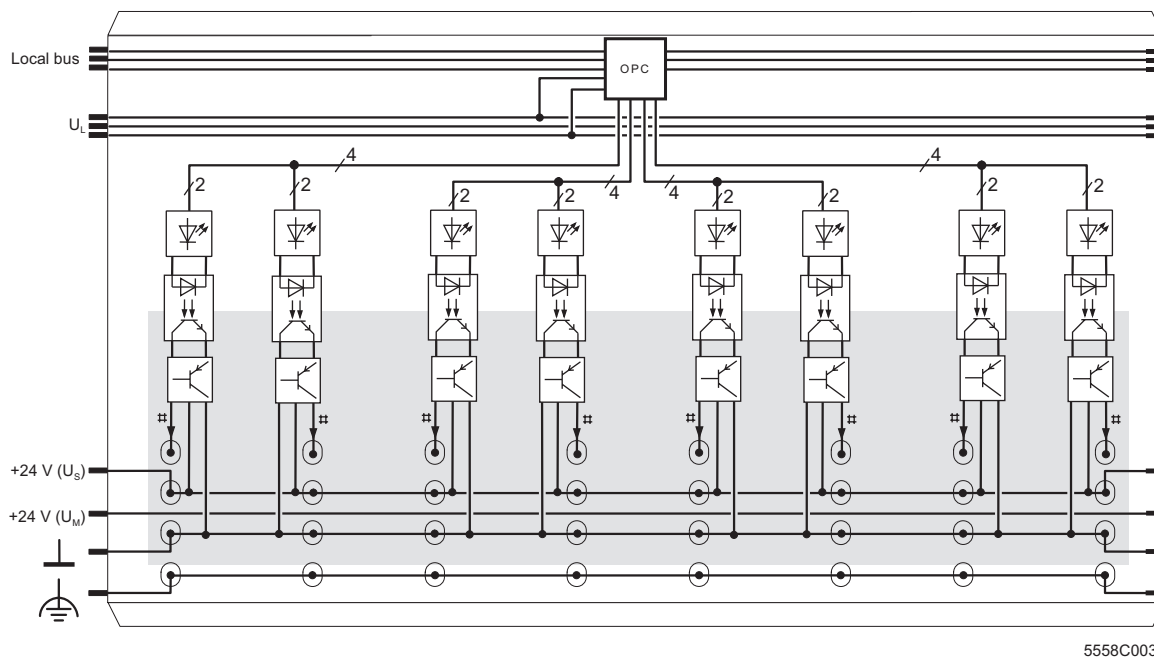




Figure 1 Internal wiring of the terminal points

Key:

 Protocol chip  
(bus logic including voltage conditioning)


 LED

 Optocoupler

 Transistor

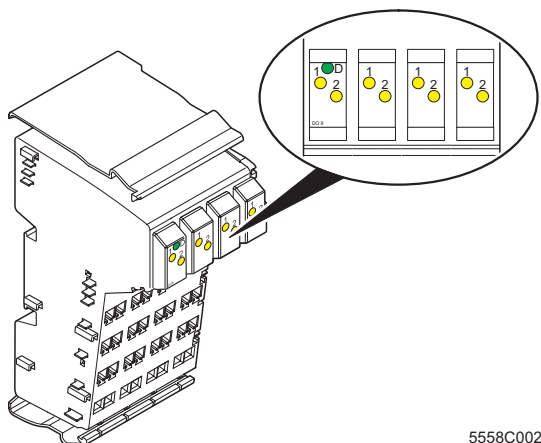
 Digital output

 Electrically isolated area

 Other symbols used are explained in the  
IL SYS INST UM E user manual.

## 5 Local diagnostic and status indicators and terminal point assignment

### 5.1 Local diagnostic and status indicators



5558C002

Figure 2 Local diagnostic and status indicators

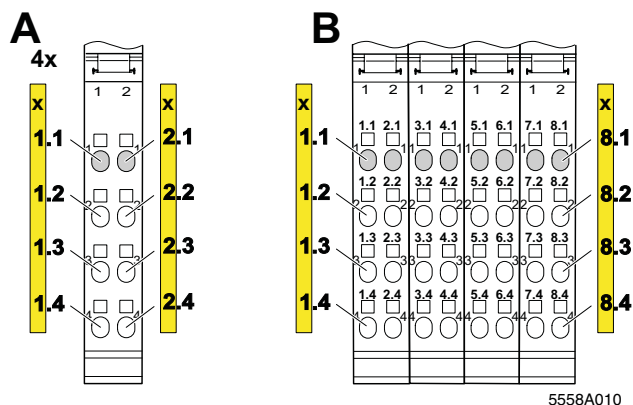
Des.	Color	Meaning
D	Green	Diagnostics
1, 2	Yellow	Status indicators for the outputs

### 5.2 Function identification

Pink

2 Mbps: white stripe in the vicinity of the D LED

### 5.3 Terminal point assignment for each connector



5558A010

Figure 3 Terminal point numbering: individual connectors (A) and connector sets (B)

- A**
  - Using the IB IL 24 DO 8-PAC/SN or IB IL 24 DO 8-2MBD-PAC/SN with the supplied connectors
  - Using individual connectors (IB IL SCN-8 or IB IL SCN-8-CP)
- B**
  - Using the IB IL 24 DO 8-PAC or IB IL 24 DO 8-2MBD-PAC with the original connector set
  - Using a connector set (IB IL DI/DO 8-PLSET or IB IL DI/DO 8-PLSET/CP)

Terminal point	Assignment
x.1	Signal output (OUT)
x.2	Segment voltage $U_S$ for 4-wire termination Measuring points for the supply voltage
x.3	Ground contact (GND) for 2, 3, and 4-wire termination
x.4	FE connection for 3 and 4-wire termination

## 6 Connection example



When connecting the actuators observe the assignment of the terminal points to the process data (see page 9).

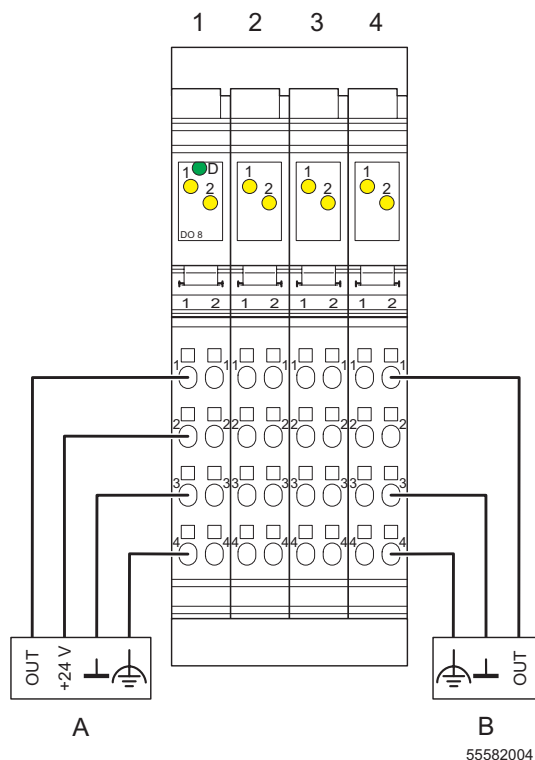


Figure 4 Typical connection of actuators

A 4-wire termination

B 3-wire termination

The numbers above the module illustration identify the connector slots.

## 7 Notes on using the terminals within a safety-related segment circuit

The terminals of the following hardware version and later (listed below) are approved for use within a safety-related segment circuit.

Order No.	Order designation	Hardware version
2861289	IB IL 24 DO 8-PAC	05
2862945	IB IL 24 DO 8-PAC/SN	07
2726269	IB IL 24 DO 8	05
2861687	IB IL 24 DO 8-2MBD-PAC	04
2878227	IB IL 24 DO 8-2MBD-PAC/SN	04
2819037	IB IL DO 8-2MBD	04



The hardware version is marked on the side of the housing of every terminal (1 in Figure 5).

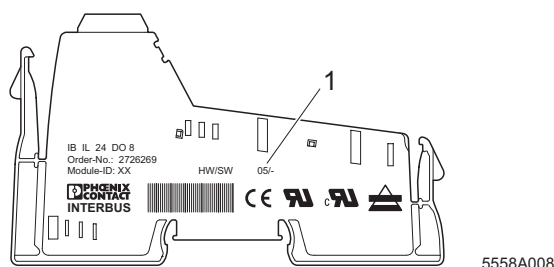


Figure 5 Labeling on an Inline terminal



The instructions in the current documentation for the safety terminal used and from the AH EN IL SAFE application note must be observed to ensure that operation of the safety-related segment circuit is not adversely affected. The latest documentation can be downloaded at [www.phoenixcontact.net/catalog](http://www.phoenixcontact.net/catalog).

## 8 Programming data/ configuration data

### 8.1 Local bus (INTERBUS)

ID code	BD <sub>hex</sub> (189 <sub>dec</sub> )
Length code	81 <sub>hex</sub>
Process data channel	8 bits
Input address area	0 bytes
Output address area	1 byte
Parameter channel (PCP)	0 bytes
Register length (bus)	1 byte

### 8.2 Other bus systems



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

## 9 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.

### Assignment of the terminal points to OUT process data

The following table applies to the IB IL 24 DO 8-PAC and IB IL 24 DO 8-2MBD-PAC terminals with the original connector set and when using the IB IL DI/DO 8-PLSET and IB IL DI/DO 8-PLSET/CP connector sets (see also Figure 3 on page 7, detail B).

(Byte.bit) view	Byte	Byte 0							
		7	6	5	4	3	2	1	0
Assign- ment	Slot	4	3	2	1				
	<b>Terminal point (signal)</b>	<b>8.1</b>	<b>7.1</b>	<b>6.1</b>	<b>5.1</b>	<b>4.1</b>	<b>3.1</b>	<b>2.1</b>	<b>1.1</b>
	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 in- dicator	Slot	4	3	2	1				
	LED	2	1	2	1	2	1	2	1

The following table applies to the IB IL 24 DO 8-PAC/SN and IB IL 24 DO 8-2MBD-PAC/SN terminals with the original connector set and when using the IB IL SCN-8 or IB IL SCN-8-CP connectors (see also Figure 3 on page 7, detail A).

(Byte.bit) view	Byte	Byte 0							
		7	6	5	4	3	2	1	0
Assign- ment	Slot	4	3	2	1				
	<b>Terminal point (signal)</b>	<b>2.1</b>	<b>1.1</b>	<b>2.1</b>	<b>1.1</b>	<b>2.1</b>	<b>1.1</b>	<b>2.1</b>	<b>1.1</b>
	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 in- dicator	Slot	4	3	2	1				
	LED	2	1	2	1	2	1	2	1



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