IB IL 24 DO8/HD-XC-PAC

**Inline digital output terminal,
version for extreme conditions,
8 outputs, 24 V DC, 500 mA**

Data sheet
8462_en_00

1 Description

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

Thanks to special engineering measures and tests, the terminal can be used under extreme ambient conditions.

Features

- Connections for eight digital actuators
- Connection of actuators in 1-wire technology
- Nominal current per output: 0.5 A
- Total current of the terminal: 4 A
- Short-circuit and overload protected outputs
- Diagnostic and status indicators
- Can be used under extreme ambient conditions
- Painted PCBs
- Extended temperature range T2 (-40°C … +55°C)

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 from the product at www.phoenixcontact.net/catalog.

2 Table of contents

3 Ordering data

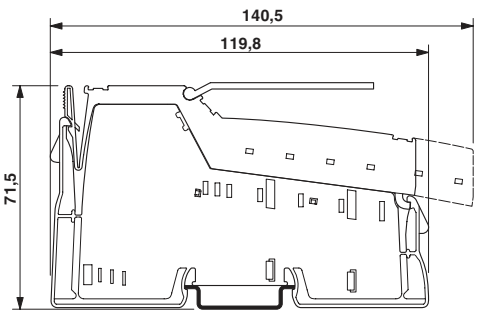
Description	Type	Order No.	Pcs. / Pkt.
Inline digital output terminal, version for extreme conditions, complete with accessories (connector plug and labeling field), 8 outputs, 24 V DC, 500 mA, 1-wire connection technology	IB IL 24 DO8/HD-XC-PAC	2701213	1

Accessories	Type	Order No.	Pcs. / Pkt.
Connector, for digital 1, 2 or 8-channel Inline terminals (Plug/Adapter)	IB IL SCN-8	2726337	10
Labeling field, width: 12.2 mm (Marking)	IB IL FIELD 2	2727501	10

Documentation	Type	Order No.	Pcs. / Pkt.
User manual, English, Automation terminals of the Inline product range	IL SYS INST UM E	-	-
Data sheet, English, INTERBUS addressing	DB GB IBS SYS ADDRESS	-	-

4 Technical data

Dimensions (nominal sizes in mm)



Width	12.2 mm
Height	119.8 mm
Depth	71.5 mm
Note on dimensions	Housing dimensions

General data

Color	green
Weight	60 g (With connector)
Operating mode	Process data mode with one byte
Ambient temperature (operation)	-40 °C ... 55 °C (See also the "Tested successfully: Use under extreme ambient conditions" section of the data sheet.)
Ambient temperature (operation)	-40 °C ... 60 °C (At U_S < 24.5 V; see also the "Tested successfully: Use under extreme ambient conditions" section of the data sheet.)
Ambient temperature (storage/transport)	-40 °C ... 85 °C
Temperature class	T2 (-40°C ... 55°C, EN 50155)
Permissible humidity (operation)	10 % ... 95 % (according to DIN EN 61131-2)
Permissible humidity (storage/transport)	10 % ... 95 % (according to DIN EN 61131-2)
Air pressure (operation)	70 kPa ... 106 kPa (up to 3000 m above sea level)

General data	
Air pressure (storage/transport)	70 kPa ... 106 kPa (up to 3000 m above sea level)
Degree of protection	IP20
Protection class	III, IEC 61140, EN 61140, VDE 0140-1

Connection data	
Name	Inline connectors
Connection method	Spring-cage connection
Conductor cross section solid / stranded	0.08 mm² ... 1.5 mm²
Conductor cross section [AWG]	28 ... 16

Interface Inline local bus	
Connection method	Inline data jumper
Transmission speed	500 kBit/s

Power consumption	
Segment supply voltage U_S	24 V DC (nominal value)
Current consumption from U_S	max. 4 A DC
Communications power U_L	7.5 V DC
Current consumption from U_L	max. 45 mA
Power loss	max. 0.62 W

Digital outputs	
Number of outputs	8
Connection method	Spring-cage connection
Connection method	1-wire
Output voltage	24 V (U_S - 1 V)
Maximum output current per channel	500 mA
Maximum output current per device	4 A
Nominal load, ohmic	12 W (48 Ω)
Nominal load, inductive	12 VA (1.2 H; 50 Ω)
Nominal load, lamp	12 W
Signal delay when switching on an ohmic nominal load	Typ. 500 µs
Signal delay when switching on an inductive nominal load	Typ. 100 ms (1.2 H; 50 Ω)
Signal delay when switching on a lamp nominal load	Typ. 100 ms
Signal delay when switching off an ohmic nominal load	Typ. 1 ms
Signal delay when switching off an inductive nominal load	Typ. 50 ms (1.2 H; 50 Ω)
Signal delay when switching off a lamp nominal load	Typ. 1 ms
Maximum operating frequency with ohmic nominal load	max. 300 Hz (this switching frequency is limited by the data rate selected, the number of bus devices, the structure of the bus, the software used and the control or computer system used)
Maximum operating frequency with inductive nominal load	max. 0.5 Hz
Maximum operating frequency with lamp nominal load	max. 8 Hz (this switching frequency is limited by the data rate selected, the number of bus devices, the structure of the bus, the software used and the control or computer system used)
Reaction time with short-circuit	ca. 1 s
Reaction time with ohmic overload	ca. 3 s
Behavior at voltage switch-off	The output follows the power supply without delay
One-time unsolicited energy	300 mJ
Limitation of the voltage induced on circuit interruption	-15 V ≤ U_{demag} ≤ -45.8 V (U_{demag} = demagnetization voltage)
Output voltage when switched off	max. 1 V
Output current when switched off	max. 300 µA
Behavior with overload	Auto restart

Digital outputs

Restart frequency with ohmic overload	400 Hz
Restart frequency with lamp overload	400 Hz
Behavior with inductive overload	Output can be destroyed
Reverse voltage resistance to short pulses	Reverse voltage proof
Resistance to permanent reverse voltage	max. 500 mA
Overcurrent shut-down	min. 0.7 A
Overload protection, short-circuit protection of outputs	Zener diode in output chip

Programming Data

ID code (hex)	BD
ID code (dec.)	189
Length code (hex)	81
Length code (dec.)	129
Process data channel	8 Bit
Input address area	0 Bit
Output address area	8 Bit
Parameter channel (PCP)	0 Bit
Register length (bus)	8 Bit

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

PROFIBUS telegram data

Required parameter data	3 Byte
Need for configuration data	4 Byte

Error messages to the higher level control or computer system

Short-circuit / overload of the digital outputs	Error message in the diagnostic code (bus) and display (2 Hz) via the LED (D) on the module

Electrical isolation/isolation of the voltage areas

5 V supply, incoming remote bus/7.5 V supply (bus logics)	500 V AC , 50 Hz , 1 min
5 V supply, outgoing remote bus/7.5 V supply (bus logics)	500 V AC , 50 Hz , 1 min
7.5 V supply (bus logics)/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

To achieve electrical isolation between the logic level and the I/O area, supply these areas from separate power supply units. Interconnection of the power supply units in the 24 V area is not permitted (see also user manual).

Approvals

For the latest approvals, please visit www.phoenixcontact.net/catalog.

5 Additional tables

Output characteristic curve when switched on (typical)	
Output current (A)	**Differential output voltage (V)**
0	0
0.1	0.02
0.2	0.03
0.3	0.04
0.4	0.06
0.5	0.07

6 Tested successfully: Use under extreme ambient conditions

The terminal has been tested successfully over 250 temperature change cycles in accordance with IEC 61131-2 in the range from -40°C to +70°C.

The following conditions were observed:

– The Inline devices for all connecting cables were connected with a minimum conductor cross section of 0.5 mm²
– The Inline station was assembled on a wall-mounted horizontal DIN rail
– Fans were used to ensure continuous movement of air in the control cabinet
– The Inline station was not exposed to vibration or shock
– The Inline station was operated with a maximum of 24.5 V (ensured by using regulated power supply units)

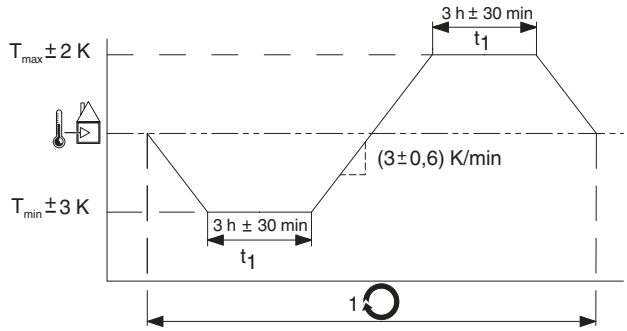


Figure 1 Temperature change cycle

Temperature in the control cabinet/ambient temperature

Cycle

WARNING:

The terminal is not approved for use in potentially explosive areas.

The terminal is not approved for use in safety technology.

7 Internal circuit diagram

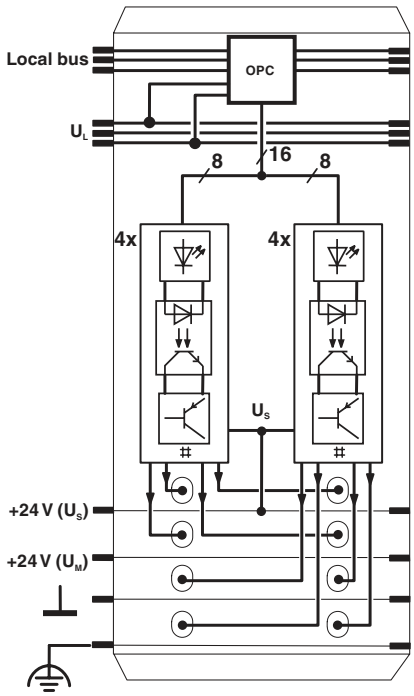


Figure 2 Internal wiring of the terminal points

Key:

Explanation for other used symbols has been provided in the IL SYS INST UM E user manual.

OPC — Protocol chip
(Bus logic including voltage conditioning)

LED (status indicator)

Optocoupler

Transistor

Digital output

Explanation for other used symbols has been provided in the IL SYS INST UM E user manual.

8 Local status and diagnostic indicators

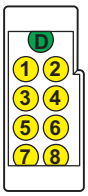


Figure 3 Local status and diagnostic indicators

Designation	Color	Meaning
D	green	Diagnostics (bus and logic voltage)
1 to 8	Yellow	Status of the outputs

Function identification

Pink

9 Terminal point assignment

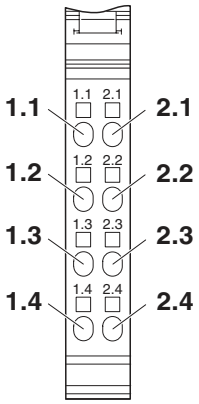


Figure 4 Terminal point assignment

Terminal point	Assignment
1.1 / 2.1	Signal output (OUT 1 / OUT 2)
1.2 / 2.2	Signal output (OUT 3 / OUT 4)
1.3 / 2.3	Signal output (OUT 5 / OUT 6)
1.4 / 2.4	Signal output (OUT 7 / OUT 8)

10 Connection notes and examples

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

NOTE: Malfunction

GND of the actuators and GND of the supply voltage U_S, which supply the actuators, must have the same potential.

If you connect the actuators via external busbars, make sure that the GND of the actuators and the GND for U_S have the same potential.

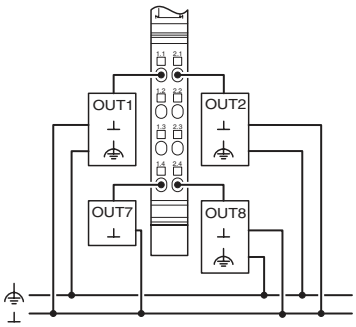


Figure 5 Typical connection of actuators when using external busbars

11 Process data

Assignment of the terminal points to the output process data

(Byte.Bit) view	Byte	Byte 0							
	Bit	7	6	5	4	3	2	1	0
Assignment	Terminal point (signal)	2.4	1.4	2.3	1.3	2.2	1.2	2.1	1.1
Status indicator	LED	8	7	6	5	4	3	2	1

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.