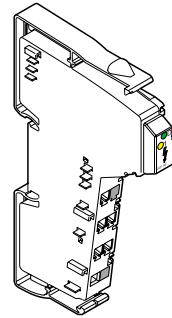# IB IL DO 1 AC

INTERBUS Inline Terminal With One Digital Output for the Voltage Range from 12 V AC to 253 V AC

Data Sheet 5761A   08/2000

5761A001

👉 This data sheet is intended to be used in conjunction with the INTERBUS Inline System Manual IB IL SYS PRO UM E.

Function

The terminal is designed for use within an INTERBUS Inline station. It is used to output digital output signals in the AC voltage range.

⚠️ **Dangerous voltage**
Connecting and disconnecting the terminal is only allowed if the **power supply is disconnected**.
When working on the module and wiring, always switch off the supply voltage and ensure it cannot be switched on again.
If these instructions are not followed, there is a danger of damage to health, or even of a life-threatening injury.

Features

– Connections for one digital actuator
– Diagnostic and status indicators
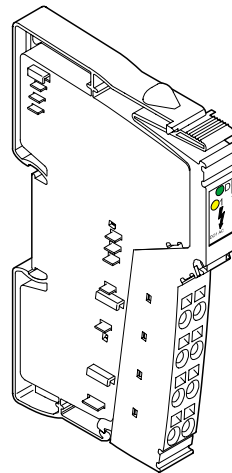
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Figure 1   IB IL DO 1 AC terminal with connector

👉 Please note that the connector is not supplied with the terminal. Please refer to Ordering Data on page 14 to order the appropriate connectors for your application.

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⚠ Safety Instructions for Inline Terminals for Installation in Voltage Ranges Outside the SELV (Low Voltage Range)

Only qualified personnel may work on low voltage range Inline terminals.

Qualified personnel are people who, because of their education, experience and instruction, and their knowledge of relevant standards, regulations, accident prevention and service conditions, have been authorized by those responsible for the safety of the plant to carry out any required operations, and who are able to recognize and avoid any possible dangers.
(Definitions for skilled workers according to EN 50110-1:1996.)

The instructions given in this data sheet must be followed during installation and startup.

Technical modifications reserved.

Correct Usage

The terminal is only to be used within an Inline station as specified in this data sheet and the INTERBUS Inline System Manual. Phoenix Contact accepts no liability if the device is used for anything other than its designated use.
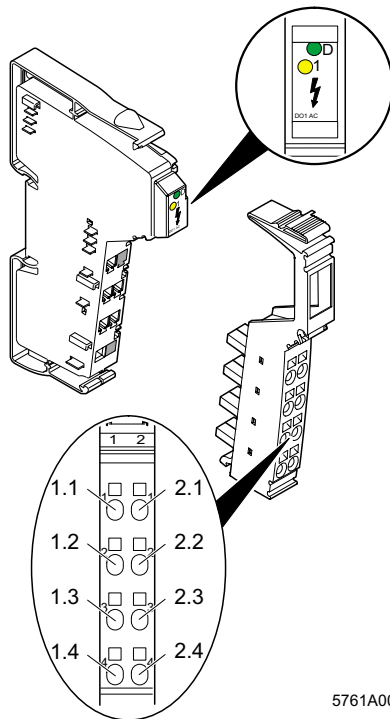
☞ This data sheet describes the module-specific features of the IB IL DO 1 AC terminal.

📄 For general information on the INTERBUS Inline product family, please refer to the Interbus Inline System Manual IB IL SYS PRO UM E.

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General Description

Figure 2   IB IL DO 1 AC
with appropriate connector

Function Identification

Dark red with lightning bolt

Housing/Connector Color

Gray housing

Gray connector, color-coded according to function

Local Diagnostic and Status Indicators

Des.	Color	Meaning
D	Green	Bus diagnostics
1	Yellow	Output status

Terminal Assignment

Terminal Points	Assignment
1.1	Not used
1.2	Digital output
1.3	PEN conductor connection (N)
1.4	Protective earth conductor connection (PE)
2.1, 2.2, 2.3, 2.4	Not used

Internal Circuit Diagram

Key:

OPC	INTERBUS protocol chip (bus logic including voltage conditioning)
	LED
	Optocoupler
	Triac
	Digital output
	Isolated area
	Terminal point, without metal contact
	Terminal point, without metal contact, with filler plugs

Other symbols are explained in the IB IL SYS PRO UM E user manual.
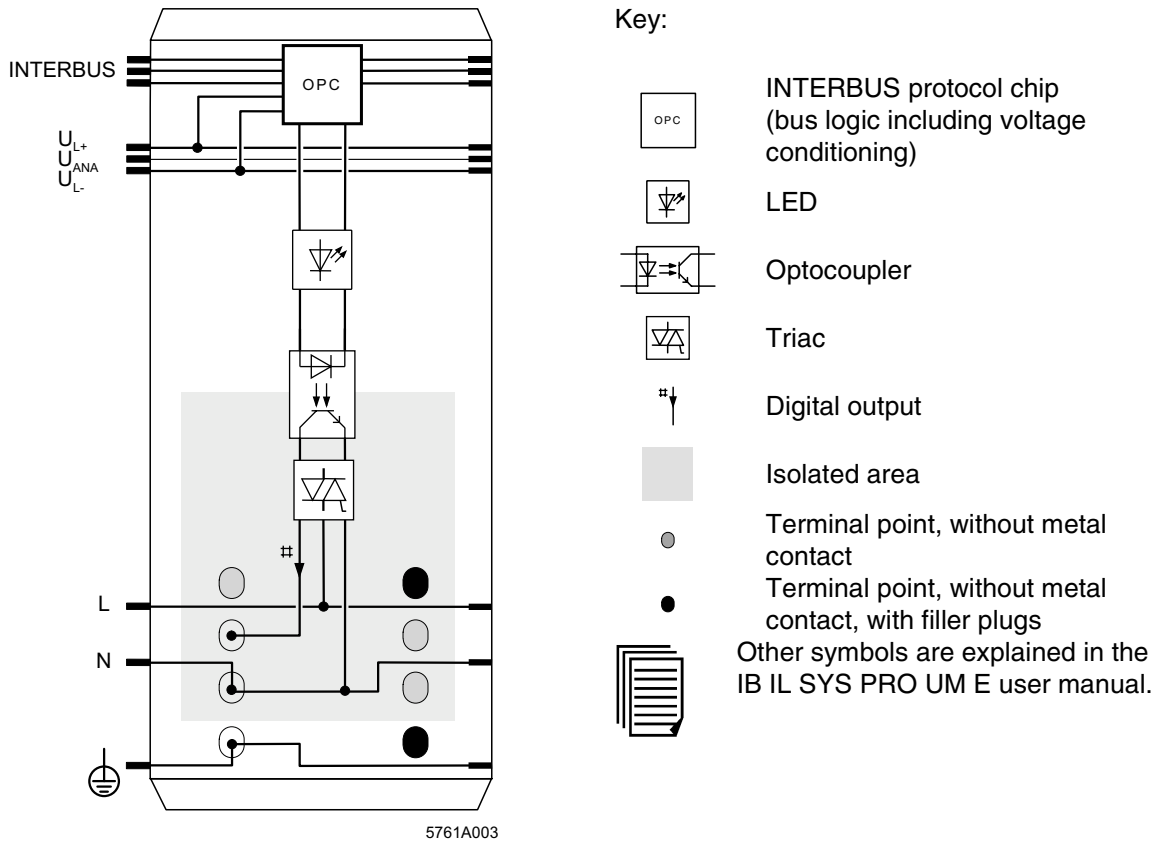
5761A003

Figure 3   Internal wiring of the terminal points

General Installation Instructions

Installing the System

Install the system according to the requirements of EN 50178.

Starting Up an Inline Station

An Inline station can only be started up if it has been properly installed. This means:

– all terminals must be installed with their connectors

– the station must be terminated with the end plate and the two end clamps.

Avoiding malfunctions
The AC terminal must **only** be connected to the Inline station through an appropriate INLINE power terminal! The voltage should only be switched on when the AC area has been terminated with the end terminal and all the connectors are connected.

The special features of the AC and SELV terminals and connectors are listed in the user manual and in the data sheets for the power terminals for AC areas.

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Installation Instructions for a Low Voltage Area (AC Area)

⚠️ **Dangerous voltage**

Please note that there are dangerous voltages when working on circuits that do not meet SELV requirements.

Connecting and disconnecting terminals for the AC area is only allowed if the power supply is disconnected.

When working on terminals and wiring, always switch off the supply voltage and ensure it cannot be switched on again.

⚠️ **Please use grounded AC networks**

Inline terminals for the AC voltage area should only be operated in grounded AC networks.

Structure of an AC Area

An AC area **must** have an AC power terminal at one end and an AC end terminal at the other.

I/O terminals that are suitable for this area can be used between these terminals. They are limited in number by the INTERBUS/INTERBUS Inline system restrictions (see IB IL SYS PRO UM E User Manual).
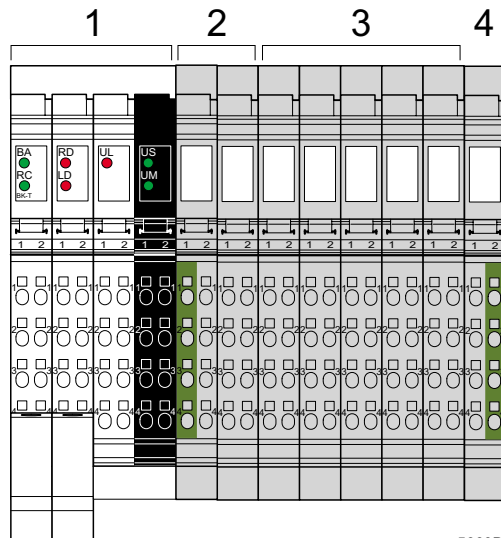
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Figure 4   Example of an Inline AC area

1   Bus terminal
2   AC power terminal
3   Various I/O terminals
4   AC end terminal

Fusing an AC Area

Each AC area must be protected with its own fuse.

Please note that the fuse required depends on the specific application.

Connecting the Supply and the I/O in the AC Area

Multiple supplies are not permitted

The supply voltage must **only** be provided for the appropriate power.

The connecting cables of all actuators and sensors should only be connected to the Inline AC terminals. The use of external bus bars for group voltages is **not permitted**.

Interrupting PE Jumpering in the AC Area

The PE jumper begins at the power terminal of the AC area and, in a complete AC area, ends at the end terminal.

If a terminal is removed from this area, the PE jumper is interrupted.

If the installation instructions have been followed, all subsequent terminals will be disconnected.
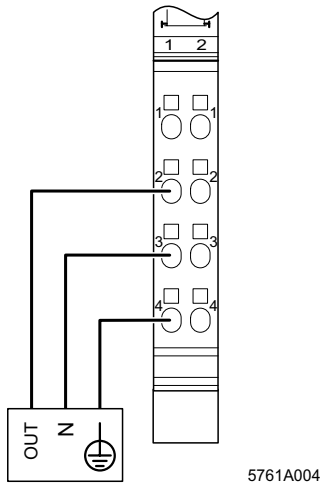
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Connection Example

5761A004

Figure 5　Connecting an actuator

⚠ **Observe the current carrying capacity**

The maximum total current flowing through the potential jumpers is 8 A.

Programming Data

ID code	BD_{hex} (189_{dez})
Length code	$C2_{hex}$
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

Assignment of Terminal Points to INTERBUS Output Data

Bit View	Bit	1	0
Module	Terminal point (signal)	–	1.2
	Terminal point (N)	–	1.3
	Terminal point (PE)	–	1.4
Status indication	LED		1

☞ Set the unused bit (bit 1) to 0.

☞ The two bits can be at any position within a byte due to automatic addressing.

📄 For the assignment of the shown bit view to your control or computer system, please refer to data sheet DB GB IBS SYS ADDRESS, Part No. 90 00 99 0.

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Technical Data

General Data	
Housing dimensions (width x height x depth)	12.2 mm x 120 mm x 66.6 mm (0.480 in. x 4.724 in. x 2.622 in.)
Weight	45 g (without connector)
Operating mode	Process data operation with 2 bits
Connection method for actuators	3-wire
Permissible temperature (operation)	-25°C to +55 °C (-13°C to +131°C)
Permissible temperature (storage/transport)	-25°C to +85°C (-13°C to +185°C)
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

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	0.26 W, maximum
Power consumption on the I/O supply voltage	0.5 W, maximum
Total power consumption	0.75 W, maximum

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

Digital Output	
Number	1
Output type	Triac output with zero voltage switch
Nominal output voltage U_{OUT}	12 V AC $\leq U_{OUT} \leq$ 253 V AC
Maximum differential voltage for I_{nom}	1.5 V
Nominal current I_{nom}	0.5 A
Maximum permissible current	0.6 A; observe derating
I^2t value (one half wave) for short-circuit protection	4.5 A^2s
Protection	No integrated protection against short-circuit and overload
Behavior in the event of an error without external protection	Output is damaged

☞ Short-circuit protection can be achieved by means of a pre-connected fuse with an appropriate fusible element.

Signal delay	One half wave, maximum
Starting torque of the output	At voltage zero
Triac	600 V
Maximum coefficient $\Delta I/\Delta t$	10 A/µs
Switching frequency	Network frequency, maximum, depending on bus length, data rate, and ambient conditions
Nominal load Ohmic	6 W $\leq P_N \leq$ 125 W
Total current	0.5 A
Minimum holding current	15 mA (incl. snubber element)
Type of protective circuit	RC snubber element 33 nF/100 Ω

⚠ When the output is switched off (off), it is not electrically isolated due to the RC protective circuit.

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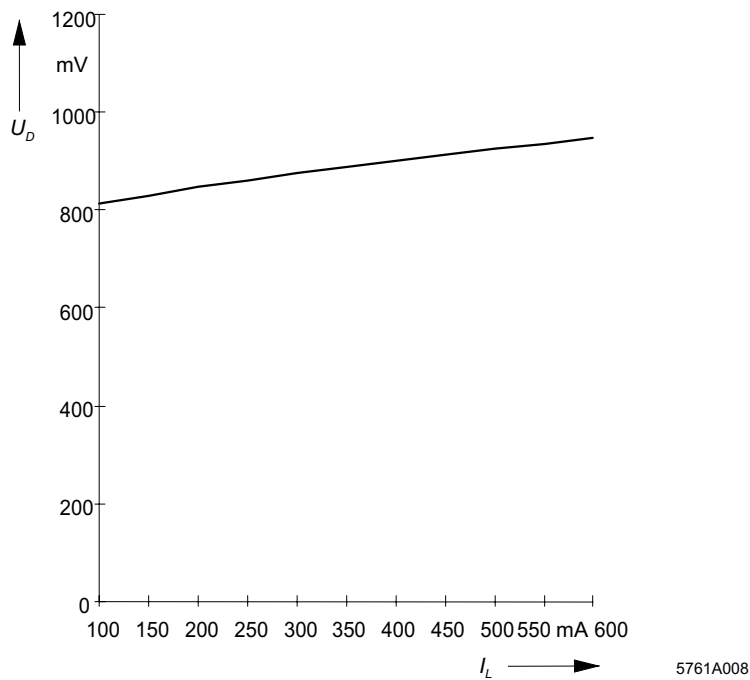| Output Characteristic When Switched On (Typical)		
Output current (load current) (A)	Differential Output Voltage (V)	Power dissipation (mW)
0	0	0
0.2	0.85	0.17
0.4	0.90	0.36
0.6	0.95	0.57

Figure 6   Typical differential output voltage when switched on (U_D [mV]) as a function of the load current (I_L [mA])

Output Characteristic When Switched Off	
Load resistance (Ω)	**Output voltage (V)**
1 000 000	226
100 000	188.6
10 000	32.2
1 000	3.4
100	0.34
10	0.03
1	0.03
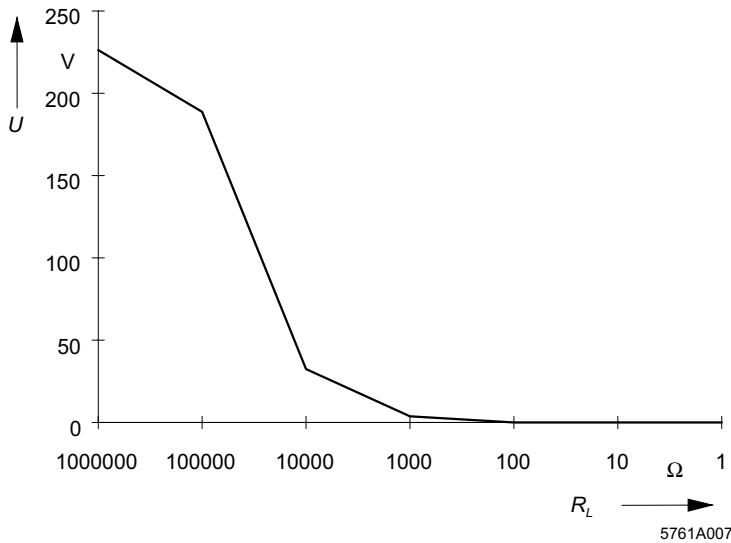
Figure 7   Typical output voltage when switched off (U [V]) as a function of the load resistance (R_L [Ω])

Power Dissipation
Formula to calculate the power dissipation of the electronics
P_{EL} = 250 mW + I_L x 1 V Where P_{EL} Total power dissipation of the terminal I_L Load current of the output n
Power dissipation of the housing depending on the ambient temperature P_{HOU} = 2.4 W   -25°C (-13°F) < T_U $\leq$ -5°C (23°F) $P_{HOU} = 2.4\ W - \dfrac{T_U - (-5°C\ [23°F])}{37.5\ K/W}$ -5°C (23°F) < T_U $\leq$ +55°C (131°F)   Where P_{HOU} Permissible power dissipation of the housing T_U Ambient temperature

Concurrent Channel Derating
None

Safety Devices	
Overvoltage	275 V varistor

Electrical Isolation/Isolation of the Voltage Areas	
Common isolated groups	
Phase and PEN conductor have the same potential. PE is a separate potential area.	
Separate system potentials consisting of bus terminal/power terminal in the 24 V DC area and supply terminals/I/O terminals in the AC area	
- 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) / I/O area	2500 V AC, 50 Hz, 1 min
Routine test	1200 V AC, 50 Hz, 1 min
I/O area/PE	500 V AC, 50 Hz, 1 min
Output/phase	500 V AC, 50 Hz, 1 min

Error Messages to the Higher-Level Control or Computer System	
Short-circuit of an output	No
Overload of an output	No

Ordering Data

Description	Order Designation	Order No.
Terminal with one digital output for the voltage range from 12 V AC to 253 V AC	IB IL DO 1 AC	28 36 74 8
A connector is needed for the complete fitting of the terminal.		
I/O connector with 8 terminals using the spring-clamp method (gray, with color print) pack of 10	IB IL SCN-8-AC-OCP	27 40 27 4
INTERBUS Inline System Manual	IB IL SYS PRO UM E	27 43 04 8

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