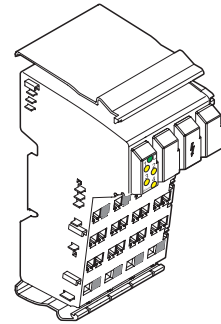


IB IL DO 4 AC-1A

INTERBUS InlineTerminal with Four Digital Outputs for the Voltage Range from 12 V AC to 253 V AC

Data Sheet 6513A

08/2002



5761A001



This data sheet is only valid in association with the "Configuring and Installing the INTERBUS Inline Product Range" 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

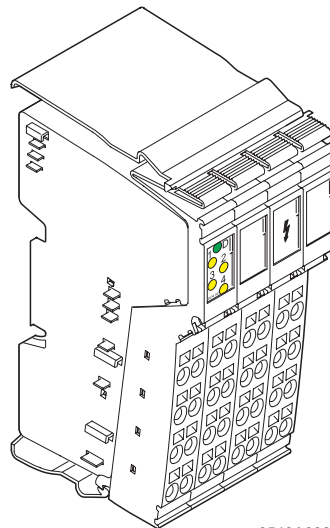
Connecting and disconnecting the terminal is only allowed if the **power supply is disconnected**.

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 four digital actuators
- Diagnostic and status indicators



6513A002

Figure 1 IB IL DO 4 AC-1A terminal with connectors



Please note that the connectors are not supplied as standard with the terminal. Please refer to the Ordering Data on page 14 to order the appropriate connectors for your application.



Safety Instructions for Inline Terminals for Installation in Areas Outside the SELV (Low Voltage Area)

Only qualified personnel may work on low voltage area 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 in the "Configuring and Installing the INTERBUS Inline Product Range" User Manual. Phoenix Contact accepts no liability if the device is used for anything other than its designated use.

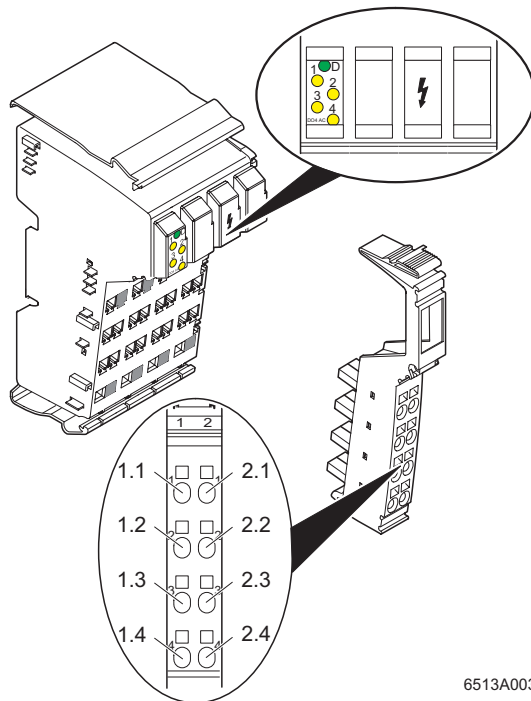


This data sheet describes the terminal-specific features of the IB IL DO 4 AC-1A terminal.



For general information on the INTERBUS Inline product family, please refer to the "Configuring and Installing the INTERBUS Inline Product Range" User Manual IB IL SYS PRO UM E.

General Description



6513A003

Figure 2 IB IL DO 4 AC-1A
with an appropriate connector

Function Identification

Dark red with lightning bolt

Housing/Connector Color


Gray housing

Gray connector, color-coded according to function

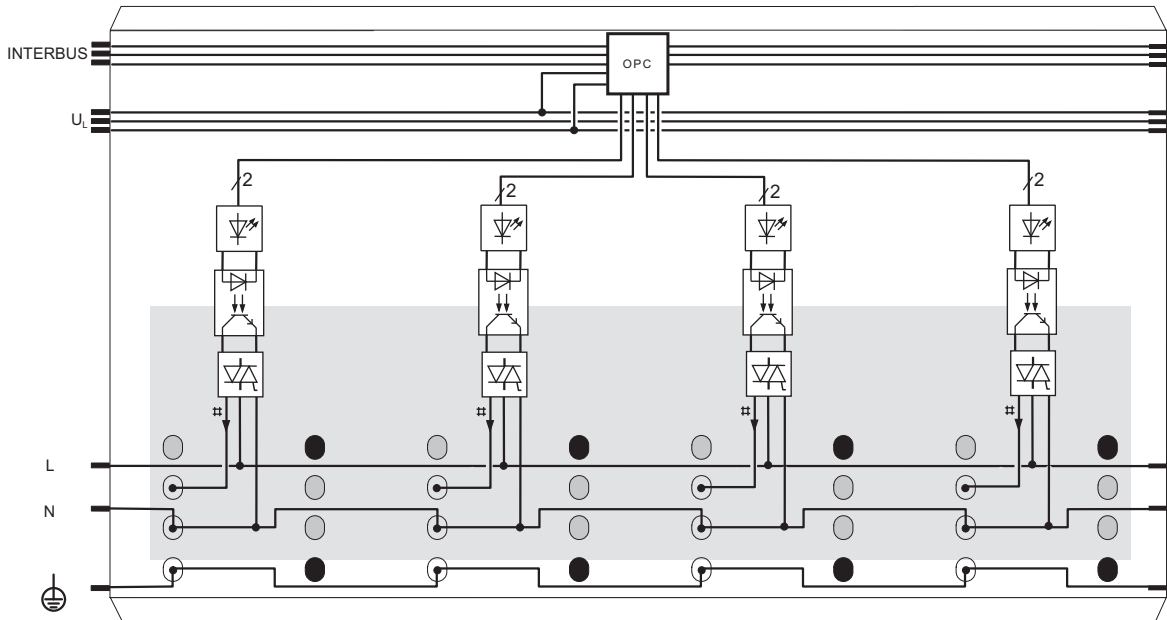
Local Diagnostic and Status Indicators

Des.	Color	Meaning
D	Green	Bus diagnostics
1, 2, 3, 4	Yellow	Status indicator of the outputs

Terminal Assignment for Each Connector

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










Internal Circuit Diagram



6513A004

Figure 3 Internal wiring of the terminal points

Key:

	INTERBUS protocol chip (bus logic including voltage conditioning)		Electrically isolated area
	LED		Terminal point, without metal contact
	Optocoupler		Terminal point, without metal contact, with filler plugs
	Triac		Other symbols are explained in the IB IL SYS PRO UM E User Manual.
	Digital output		

General Installation Instructions and Notes

Installing the System



Install the system according to the requirements of EN 50178.

Starting Up an Inline Station

An Inline station is only to be operated when it is completely 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 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 24 V DC terminals and connectors are listed in the user manual and in the data sheets for the power terminals for AC areas.

Installation Instructions and Notes 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 voltage 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.



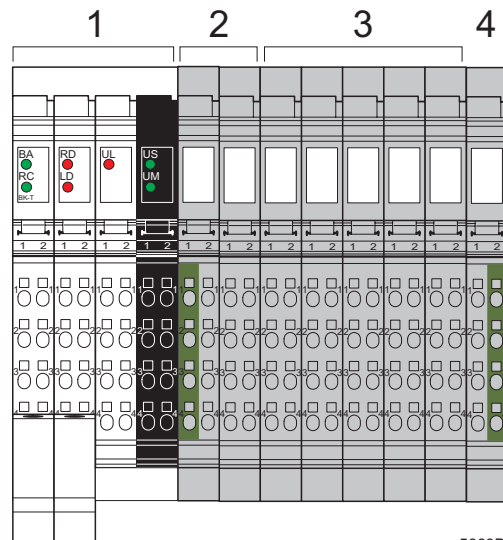
Please use Grounded AC Networks

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 (2 in Figure 4) and one AC end terminal (4) at the other.

I/O terminals (3) 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 module
- 2 AC power terminal
- 3 Various I/O terminals for the AC area
- 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 supplied to the power terminal for which it is meant.

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

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.

As long as the installation instructions are followed, all subsequent terminals will be disconnected.

Connection Example

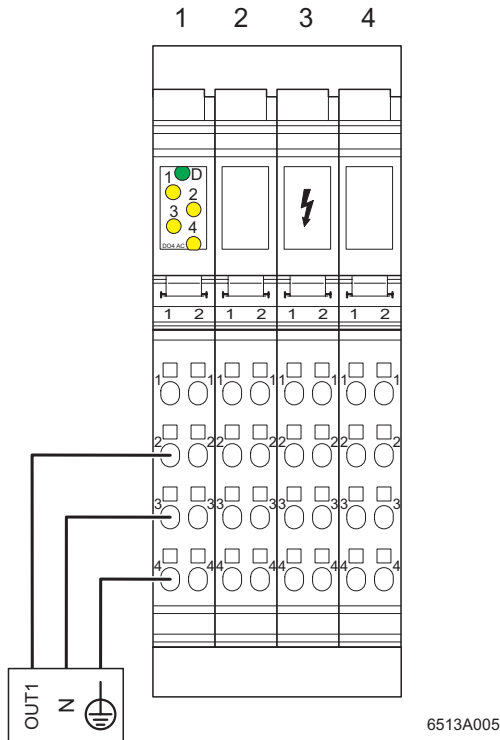


Figure 5 Connecting an actuator

The numbers above the module display indicate the mounting locations of the connectors.



Observe the current carrying capacity

The maximum total current through the potential jumpers L and N is 8 A.

Programming Data

ID code	BD _{hex} (189 _{dec})
Length code	41 _{hex}
Process data channel	4 bits
Input address area	0 bits
Output address area	4 bits
Parameter channel (PCP)	0 bits
Register length (bus)	4 bits

INTERBUS Process Data



Assignment of Terminal Points to INTERBUS Output Data

(Byte.bit) view	Bit	0.3	0.2	0.1	0.0
Assignment	Slot	4	3	2	1
	Terminal point (signal)	1.2	1.2	1.2	1.2
	Terminal Point (N)	1.3	1.3	1.3	1.3
	Terminal Point	1.4	1.4	1.4	1.4
Status indicator	LED	4	3	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	
Order Designation	IB IL DO 4 AC-1A
Order No.	27 42 69 6
Housing dimensions (width x height x depth)	48.8 mm x 120.0 mm x 66.6 mm (1.921 in. x 4.724 in. x 2.622 in.)
Weight	130 g (without connectors)
Operating mode	Process data operation with 4 bits
Connection method for actuators	3-wire
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

Interface	
INTERBUS interface	Through data routing

Power Consumption	
Communications power	7.5 V
Current consumption from the local bus	45 mA, maximum
Power consumption from the local bus	0.34 W, maximum
Power consumption on the I/O supply voltage	4.0 W, maximum
Total power consumption	4.34 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 Outputs	
Number	4
Output type	Triac output with zero voltage switch
Nominal output voltage U_{OUT}	$12 \text{ V AC} \leq U_{OUT} \leq 253 \text{ V AC}$, 50 Hz to 60 Hz
Maximum differential voltage for I_{nom}	1.5 V
Nominal current I_{nom} per channel	1 A
Maximum permissible current	see Derating on page 13
I^2t value (one half wave) for short-circuit protection	120 A ² s
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 $\Delta I/\Delta t$	20 A/ μ s
Switching frequency	Maximum network frequency, depending on bus length, data rate, and ambient conditions
Nominal load Ohmic	$12 \text{ W} \leq P_N \leq 230 \text{ W}$
Total current	4 A
Minimum holding current	100 mA at 0°C (32°F) < $T_A \leq 55^\circ\text{C}$ (131°F) 200 mA at -25°C (-13°F) < $T_A < 0^\circ\text{C}$ (32°F) (incl. snubber element)
Type of external protective circuit	RC snubber element 47 nF/100 Ω
 When the output is switched off (off), it is not electrically isolated due to the RC protective circuit (see Figure 7 on page 12).	

Output Characteristic When Switched On (Typical)

Output Current (Load Current) (A)	Differential Output Voltage (V)	Power Dissipation (mW)
0	0	0
0.1	1.15	0.12
0.2	1.00	0.20
0.4	0.90	0.36
0.6	0.90	0.54
0.8	0.90	0.72
1.0	0.90	0.90

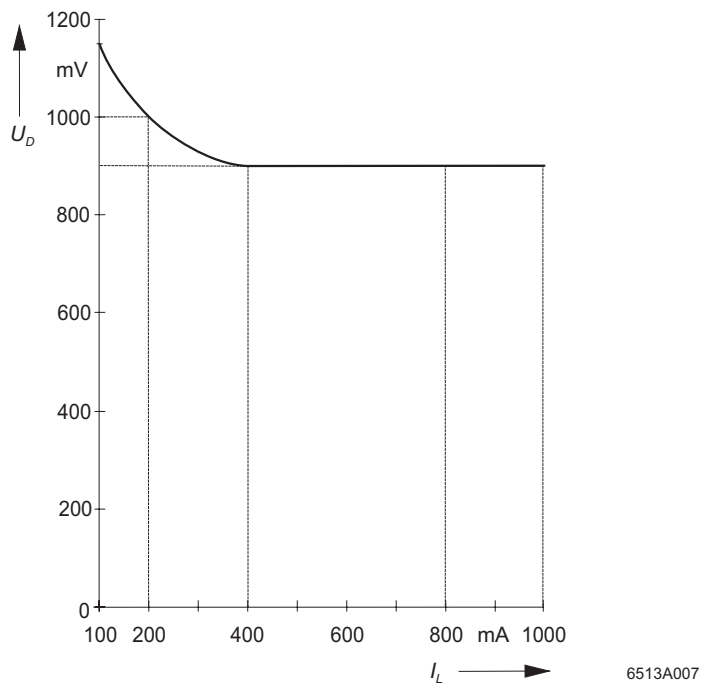


Figure 6 Typical differential output voltage when switched on (U_D [mV]) as a function of the load current (I_L [mA])

Output Characteristic when Switched off at 230 V

Load Resistance (Ω)	Output Voltage (V) at 50 Hz	Output Voltage (V) at 60 Hz
1 000 000	230	230
100 000	190	200
10 000	35	40
1 000	3,5	4
230	1	1

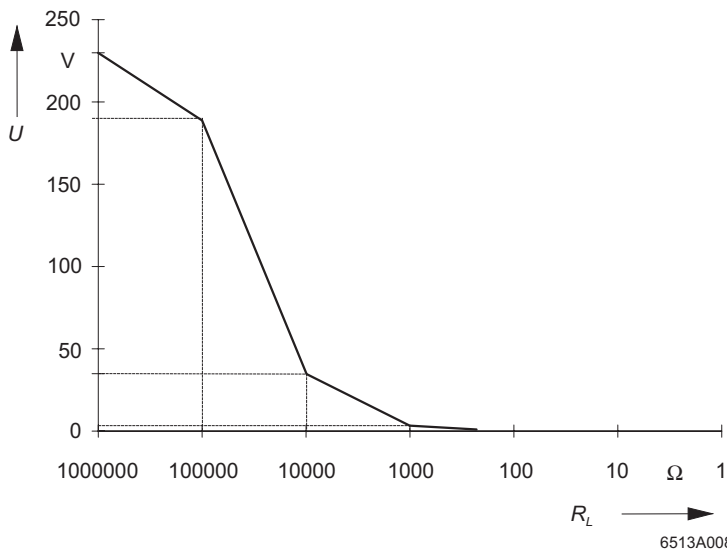


Figure 7 Typical output voltage when switched off U [V] (at 50 Hz) as a function of the load resistance R_L [Ω]

Power Dissipation

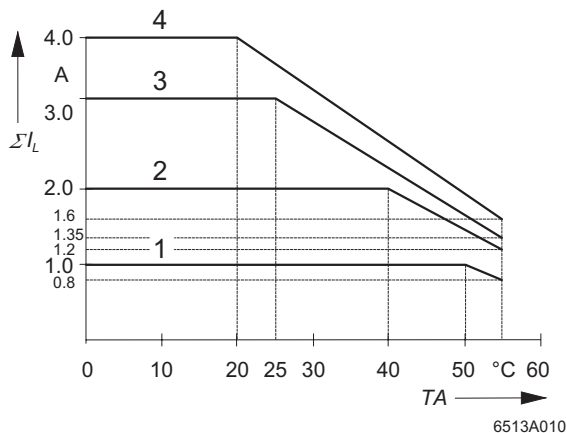
Formula to Calculate the Power Dissipation of the Electronics

$$P_{TOT} = 0.340 \text{ W} + \sum_{n=1}^4 [I_{Ln} \times 1 \text{ V}]$$

Where

- P_{TOT} Total power dissipation of the terminal
- n Index of the number of set outputs $n = 1$ to 4
- I_{Ln} Load current of the output n

Limitation of Simultaneity, Derating



Meaning of the curves:

- 1** One output set
- 2** Two outputs set simultaneously (50% simultaneity)
- 3** Three outputs set simultaneously (75% simultaneity)
- 4** Four outputs set simultaneously (100% simultaneity)


Figure 8 Derating:
Permissible total load current ΣI_L [A] depending on the number of simultaneously set outputs and the ambient temperature TA [°C]

Safety Devices	
Surge voltage	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
Tested	1200 V AC, 50 Hz, 1 min
I/O area AC/PE	2500 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 four digital outputs for the voltage range from 12 V AC to 253 V AC	IB IL DO 4 AC-1A	27 42 69 6
 Four connectors are required for the complete fitting of the terminal.		
I/O connector with three connections using the spring-cage method (gray, with color print) pack of 10	IB IL SCN-8-AC-OCP	27 40 27 4
"Configuring and Installing the INTERBUS Inline Product Range" User Manual	IB IL SYS PRO UM E	27 43 04 8

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