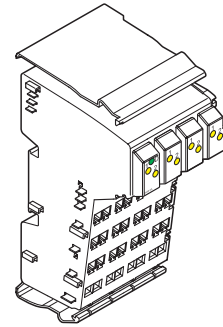


IB IL 24 DO 8-2A

IB IL 24 DO 8-2A-PAC

Inline Terminal With Eight Digital Outputs



6349B001

Data Sheet 634902

06/2003



This data sheet is only valid in association with the IB IL SYS PRO UM E User Manual or the Inline System Manual for your bus system.



The item versions IB IL 24 DO 8-2A and IB IL 24 DO 8-2A-PAC only differ with regard to the standard supplied with the module (see "Ordering Data" on page 13). Function and technical data are identical.

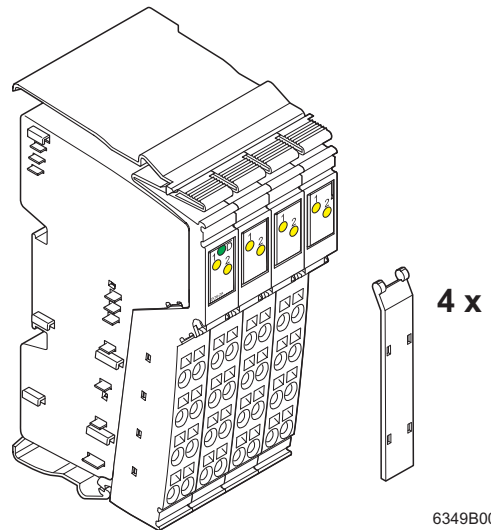
In the following, for greater clarity, we will only use the item designation IB IL 24 DO 8-2A.

Function

The 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 per output: 2 A
- Total current of the terminal: 8 A at 50% simultaneity (up to 45°C [113°F])
- Short circuit and overload protected outputs
- Diagnostic and status indicators



6349B002

Figure 1 IB IL 24 DO 8-2A-PAC terminal

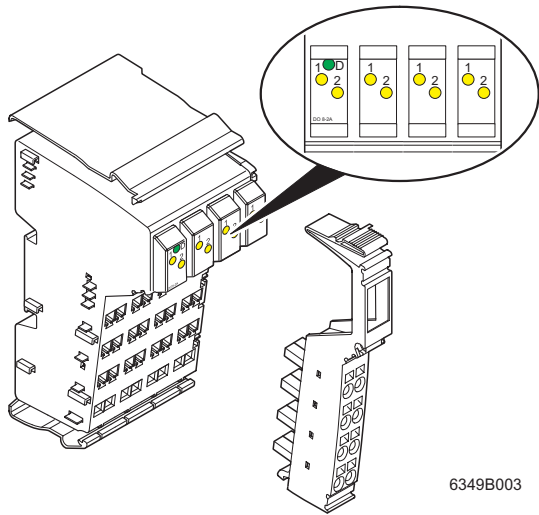


Figure 2 IB IL 24 DO 8-2A terminal with an appropriate connector

Local Diagnostic and Status Indicators

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

Terminal Assignment for Each Connector

Terminal Point	Assignment
1.1	Signal output (OUT1)
2.1	Signal output (OUT2)
1.2, 2.2	Segment voltage U_S for 4-wire termination Measuring points 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 2 and 3-wire termination

Function Identification

Pink

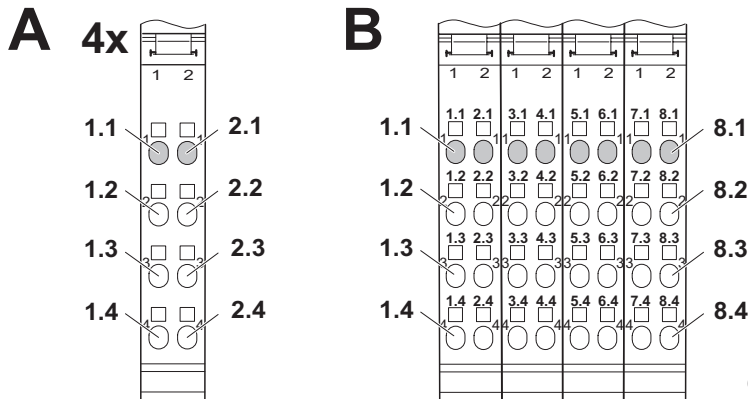
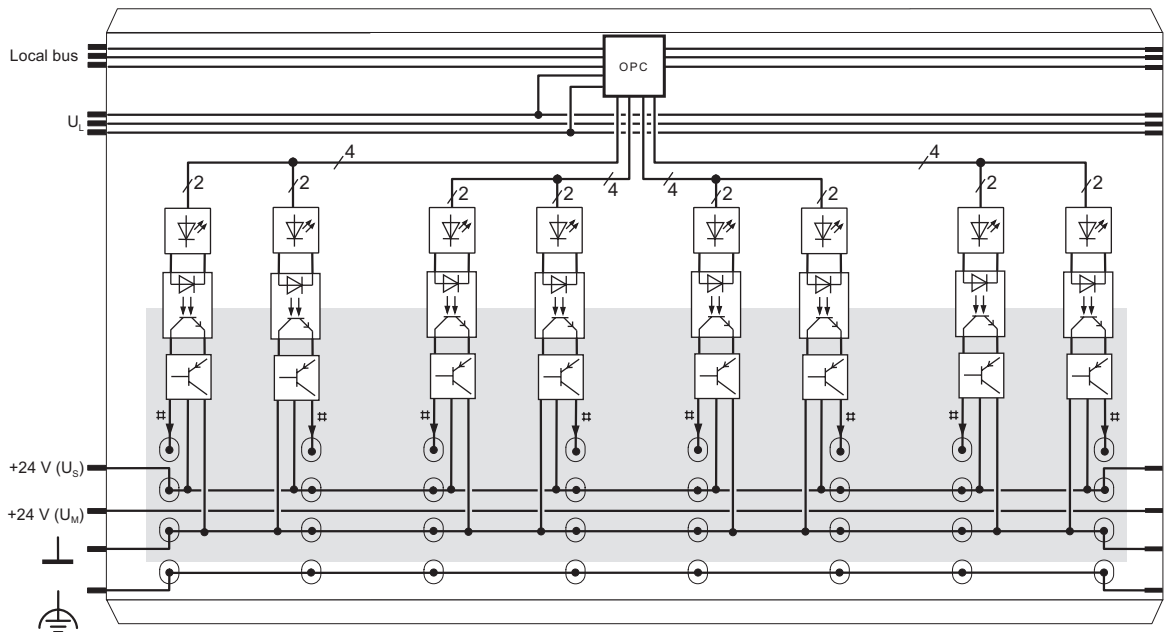


Figure 3 Terminal point numbering when using individual connectors (A) and when using a connector set (B)








Internal Circuit Diagram



6349A008

Figure 4 Internal wiring of the terminal points

Key:

-  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 or in the Inline System Manual for your bus system.

Connection Example

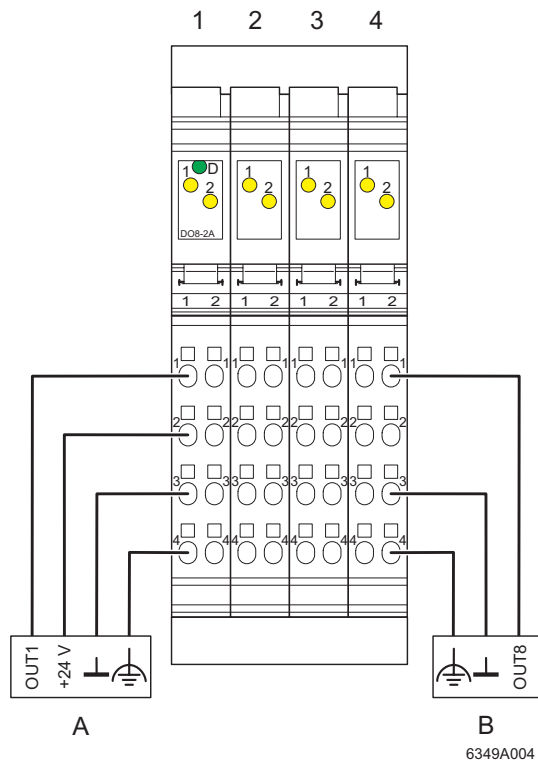


Observe the Current Carrying Capacity

The maximum current carrying capacity of the potential jumpers U_M and U_S is 8 A. Simultaneous full load operation of all outputs is therefore not permitted. Additional restrictions may apply when using certain supply terminals. Please refer to the information in the terminal-specific data sheets.



When connecting the actuators, observe the assignment of the terminal points to the process data (see page 5).



A 4-wire termination

B 3-wire termination

The numbers shown above the module indicate the connector slots.

Figure 5 Typical actuator connections

Programming Data/Configuration Data

INTERBUS

ID code	BD _{hex} (189 _{dec})
Length code	81 _{hex}
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

Other bus systems



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

Process Data



Please refer to the data sheet DB GB IBS SYS ADDRESS, Part No. 90 00 99 0, for the assignment of the shown (byte.bit) view to your **INTERBUS** control or computer system.

Assignment of the Terminal Points to the OUT Process Data



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



(Byte.bit) view	Byte	Byte 0							
	Bit	7	6	5	4	3	2	1	0
Terminal	Slot	4		3		2		1	
	Terminal point (signal)	8.1	7.1	6.1	5.1	4.1	3.1	2.1	1.1
	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 indication	Slot	4		3		2		1	
	LED	2	1	2	1	2	1	2	1



The following table applies when using the connectors IB IL SCN-8 or IB IL SCN-8-CP (see also Figure 3 on page 2, part A).



(Byte.bit) view	Byte	Byte 0							
	Bit	7	6	5	4	3	2	1	0
Terminal	Slot	4		3		2		1	
	Terminal point (signal)	2.1	1.1	2.1	1.1	2.1	1.1	2.1	1.1
	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 indication	Slot	4		3		2		1	
	LED	2	1	2	1	2	1	2	1



Technical Data

General Data	
Order designation (Order No.)	IB IL 24 DO 8-2A (27 42 11 7) IB IL 24 DO 8-2A-PAC (28 61 60 3)
Housing dimensions (width x height x depth)	48.8 mm x 120 mm x 71.5 mm (1.921 x 4.724 x 2.815 in.)
Weight	130 g (without connectors)
Operating mode	Process data operation with 1 byte
Transmission speed	500 kBaud
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 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	
Local bus	Through data routing

Power Consumption	
Communications power	7.5 V DC
Current consumption from the local bus	60 mA, maximum
Power consumption from the local bus	0.45 W, maximum
Segment supply voltage U_S	24 V DC (nominal value)
Nominal current consumption at U_S	8 A, maximum, as the maximum current carrying capacity of the potential jumpers must not be exceeded (theoretically: $8 \times 2 \text{ A} = 16 \text{ A}$)

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

Digital Outputs	
Number	8
Nominal output voltage U_{OUT}	24 V DC
Differential voltage for I_{nom}	$\leq 1 \text{ V}$
Nominal current I_{nom} per channel	2 A
Tolerance of the nominal current	+10%
Total current	8 A (at 50% simultaneity)
Possible output current during short circuit	28 A, maximum for 150 μs
 Please take this value into account when selecting the power supply unit.	
Protection	Short circuit; overload
 Single chip structure, i.e., all channels are thermally isolated.	
Nominal load	
Ohmic	48 W
Lamp	48 W
Inductive	48 VA (1.2 H, 12 Ω)

Digital Outputs (Continued)	
Signal delay upon power up of	
- Ohmic nominal load	Approximately 50 μ s, typical
- Lamp nominal load	75 ms, typical (with switching frequencies up to 8 Hz; above this frequency the lamp load responds like an ohmic load)
- Inductive nominal load	50 ms, approximately (1.2 H, 12 Ω)
Signal delay upon power down of	
- Ohmic nominal load	500 μ s, approximately
- Lamp nominal load	500 μ s, approximately
- Inductive nominal load	150 ms, approximately (1.2 H, 12 Ω)
Switching frequency with	
- Ohmic nominal load	500 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.
- Lamp nominal load	500 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.
- Inductive nominal load	0.3 Hz, maximum (1.2 H, 12 Ω)
Overload response	Auto restart
Response time with ohmic overload (2 Ω)	3 s, approximately
Restart frequency with ohmic overload	33 Hz, approximately
Restart frequency with lamp overload	33 Hz, approximately
Inductive overload response	Output may be damaged
Response time after short circuit	400 ms, approximately
Reverse voltage endurance 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 the power terminal
Resistance to permanently applied surge voltage	No

Digital Outputs (Continued)	
Validity of output data after connection of 24 V voltage supply (power up)	1 ms, typical
Response upon power down	The output follows the supply voltage without delay.
Limitation of the voltage induced on circuit interruption	-8.5 V, approximately
Single maximum energy in free running	1500 W
Protective circuit type	Integrated free-wheeling diode for each channel
Overcurrent shutdown	At 3 A, minimum
Output current when switched off	1 μ A, maximum
Output voltage when switched off	1 V at 1 M Ω , maximum
Output current with ground connection interrupted	1 μ A, maximum
Switching power with ground connection interrupted	0.95 μ W at 1 k Ω load resistance, typical
Inrush current with lamp load	1.5 A for 20 ms, maximum

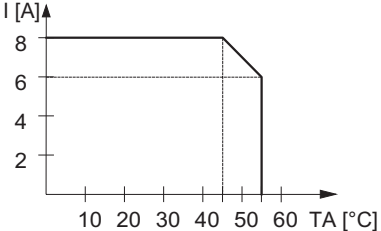
Output Characteristic When Switched On (Typical)	
Output Current (A)	Differential Output Voltage (V)
0	0
0.2	0.04
0.4	0.08
0.6	0.13
0.8	0.17
1.0	0.21
1.2	0.26
1.4	0.30
1.6	0.35
1.8	0.39
2.0	0.44

Power Dissipation	
Formula to Calculate the Power Dissipation of the Electronics	
$P_{\text{tot}} = 0.20 \text{ W} + \sum_{n=1}^8 (0.06 \text{ W} + I_{L_n}^2 \times 0.125 \ \Omega)$	
Where	
P_{tot}	Total power dissipation of the module
n	Index of the number of set outputs $n = 1$ to 8
I_{L_n}	Load current of the output n
Power dissipation of the housing P_{HOu}	2.7 W, maximum (within the permissible operating temperature)

Limitation of Simultaneity, Derating		
Ambient Temperature (TA)	Maximum Load Current (I) at 100% Simultaneity	Maximum Load Current (I) at 50% Simultaneity
45°C (113°F)	1 A	2 A
55°C (131°F)	0.75 A	1.5 A

With an ambient temperature of up to 45°C (113°F) and 100% simultaneity, a load current of 1 A per channel is permissible. If only four channels are used (50% simultaneity), a load current of 2 A can be tapped.

If all eight channels are used, the permissible working point must be defined according to the above formula. An example can be found in the "Configuring and Installing the INTERBUS Inline Product Range" User Manual IB IL SYS PRO UM E.



6349A006

Safety Equipment	
Overload/short circuit in segment circuit	Electronic
Surge voltage	Protective elements of the power terminal
Polarity reversal of voltage supply	Protective elements of the power terminal It is necessary to protect the voltage supply. The power supply unit should be able to supply 4 times (400%) the nominal current of the fuse.
Reverse voltage	Protection 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 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. (See also the User Manual).

Common Potentials

The 24 V main power 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 eight digital outputs including connectors and labeling fields	IB IL 24 DO 8-2A-PAC	28 61 60 3
Terminal with eight digital outputs	IB IL 24 DO 8-2A	27 42 11 7
 <div style="background-color: yellow; padding: 5px;"> Four of the listed connectors or one connector set are/is needed for the complete fitting of the terminal IB IL 24 DO 8-2A. </div>		
Connector with eight terminals using the spring-cage method (green, without color print); pack of 10	IB IL SCN-8	27 26 33 7
Connector with eight terminals using the spring-cage method (green, with color print); pack of 10	IB IL SCN-8-CP	27 27 60 8
Connector set with 32 terminals using the spring-cage method (green, without color print)	IB IL DI/DO 8-PLSET	28 60 95 0
Connector set with 32 terminals using the spring-cage method (green, with color print)	IB IL DI/DO 8-PLSET/CP	28 60 96 3
“Configuring and Installing the INTERBUS In-line Product Range” User Manual	IB IL SYS PRO UM E	27 43 04 8



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