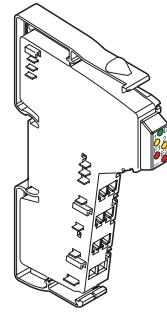


# IB IL 24 EDO 2

## IB IL 24 EDO 2-PAC

### Inline Terminal With two Digital Outputs and Extended Diagnostics



6528A001

Data Sheet 6528B

06/2002



The item versions only differ with regard to the scope of supply (see "Ordering Data" on page 12). Function and technical data are identical.



This data sheet is only valid in association with the "Configuring and Installing the INTERBUS Inline product range" User Manual IB IL SYS PRO UM E

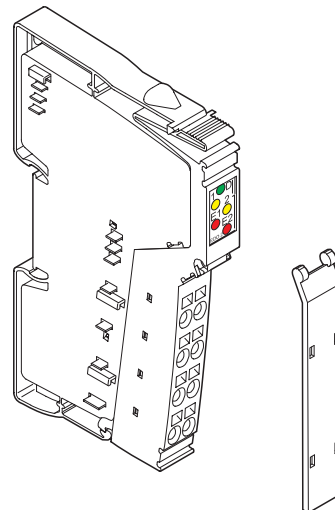
- Parameterizable behavior of outputs during an INTERBUS reset

#### Function

The terminal is designed for use within an Inline station. It is used for the output of digital signals and offers the possibility of extended diagnostics on every single channel for errors such as overload, short circuit or open circuit (see "Terminal Behavior in the Event of an Error" on page 4).

#### Features

- Connections for two digital actuators
- Connection of actuators in 2, 3, and 4-wire technology
- Nominal current per output: 500 mA
- Total current of the terminal: 1 A
- Short-circuit and overload protected outputs
- Open circuit detection
- Diagnostic and status indicators
- Single channel diagnostics



6528B002

Figure 1 IB IL 24 EDO 2-PAC terminal

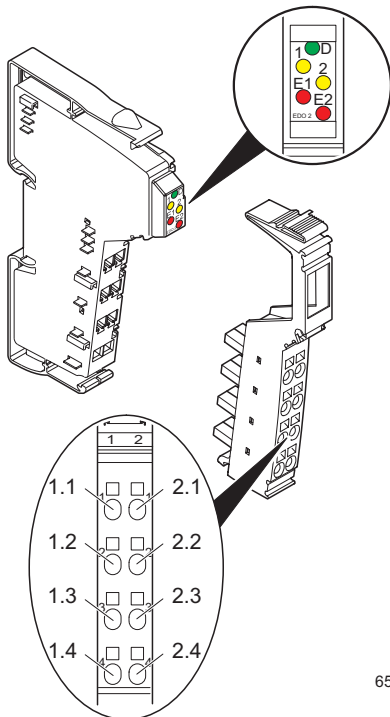


Figure 2 IB IL 24 EDO 2 (-PAC) with appropriate connector

6528A003

### Local LED Diagnostic and Status Indicators

Des.	Color	Meaning
<b>D</b>	Green	Bus diagnostics
<b>1, 2</b>	Yellow	Status indicators of the outputs
<b>E1, E2</b>	Red	Error Message (Overload/short circuit/ open circuit at the output 1/2)

### Terminal Assignment

Terminal Points	Assignment
<b>1.1</b>	Signal output (OUT1)
<b>2.1</b>	Signal output (OUT2)
<b>1.2, 2.2</b>	Segment voltage $U_S$ for 4-wire termination  Measuring points for the supply voltage
<b>1.3, 2.3</b>	Ground contact (GND) for 2, 3, and 4-wire termination
<b>1.4, 2.4</b>	Connection for functional earth ground (FE) for 3 and 4-wire termination

# Internal Circuit Diagram

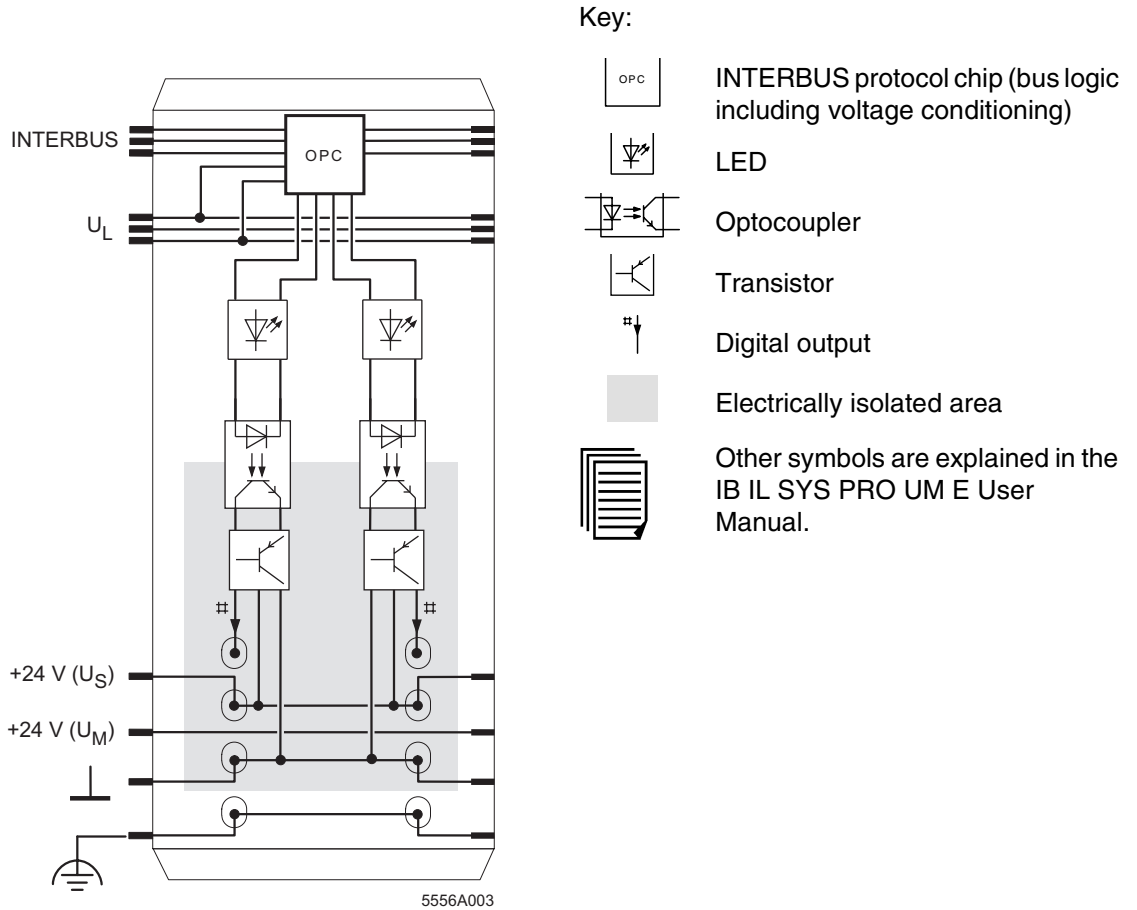


Figure 3 Internal wiring of the terminal points

## Connection Example



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

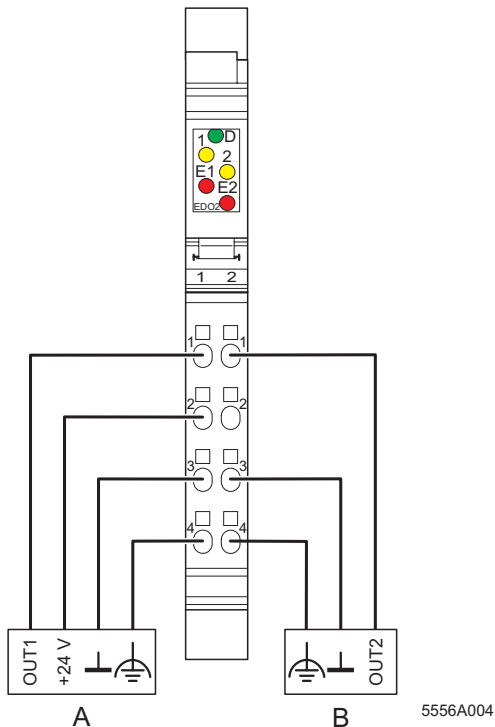


Figure 4 Actuator connection example

- A 4-wire termination
- B 3-wire termination

## Programming Data

ID code	BF <sub>hex</sub> (191 <sub>dec</sub> )
Length code	41 <sub>hex</sub>
Process data channel	4 bits
Input address area	4 bits
Output address area	4 bits
Parameter channel (PCP)	0 bits
Register length (bus)	4 bits

## Terminal Behavior in the Event of an Error

In the event of an error (short circuit, overload or open circuit) the terminal signals the errors as follows:

- On the terminal the red LED (E1, E2) indicates the error
- In the input process data a status bit is set,
- In the terminal an error message is generated and sent to the INTERBUS master.

As soon as the error does not exist anymore, it will automatically not be indicated anymore.

Output errors are not saved and need not to be acknowledged.

## INTERBUS Process Data



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.

### Assignment of the Input Process Data (Status Bits)

(Byte.bit) view		0.3	0.2	0.1	0.0
Error		Short circuit/ overload channel 2	Open circuit channel 2	Short circuit/ overload channel 1	Open circuit channel 1
Status indicator	LED	I2		I1	

### Assignment of the Output Process Data

(Byte.bit) view		0.3	0.2	0.1	0.0
Module	<b>Terminal point (signal)</b>	See table "Behavior of Outputs During an INTERBUS Reset" on page 6		<b>2.1</b>	<b>1.1</b>
	Terminal point (+24 V)			2.2	1.2
	Terminal point (GND)			2.3	1.3
	Terminal point (FE)			2.4	1.4
Status indicator	LED			2	1

**Behavior of Outputs During an INTERBUS Reset**

In the bits 0.3 and 0.2 you can preset the state of both outputs during an INTERBUS reset:

(Byte.bit) view	0.3	0.2	States of the outputs
Assignment	0	0	Disabling the outputs; bit 0.1 and 0.0 are ignored
	0	1	"0"
	1	0	Holding last state
	1	1	"1"



Please take into account that one of the bits 0.3 and 0.2 must be set so that the outputs can be set.



If the bits 0.3 and 0.2 of the output process data are set to "0", the bits 0.1 and 0.0 are ignored. The outputs cannot be called (disabled).

Background:

At no-load operation the INTERBUS automatically sets all outputs to "0". No-load operation means that after a reset INTERBUS will run again but that the control program will not yet be active.



Thus the outputs of this terminal are disabled because also bits 0.3 and 0.2 are set to "0". After an INTERBUS reset, automatically written default values cannot set the outputs to "0" by mistake because the outputs are disabled.

## Technical Data

General Data	
Designation (order no.)	IB IL 24 EDO 2 (27 42 59 9) IB IL 24 EDO 2-PAC (28 61 61 6)
Housing dimensions (width x height x depth)	12.2 mm x 120 mm x 71.5 mm (0.480 x 4.724 x 2.815 in.)
Weight	41 g (without connector)
Operating mode	Process data operation with 4 bits
Transmission speed	500 kbps
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 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
Class of protection	Class 3 according to VDE 0106, IEC 60536
Interface	
INTERBUS local bus	Through data routing
Power Consumption	
Communications power	7.5 V
Current consumption from the local bus	40 mA, typical

Power Consumption	
Power consumption from the local bus	0.3 W, typical
Segment supply voltage $U_S$	24 V DC (nominal value)
Nominal current consumption at $U_S$	1 A (2 x 0.5 A), maximum

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

Digital Outputs	
Number	2
Nominal output voltage $U_{OUT}$	24 V DC
Differential voltage for $I_{nom}$	$\leq 1$ V
Nominal current $I_{nom}$ per channel	0.5 A
Total current	1 A
Protection	Short circuit; overload
Nominal load	
Ohmic	48 $\Omega$ /12 W
Lamps	12 W
Inductive	12 VA (1.2 H, 50 $\Omega$ )
Switching frequency with	
- Ohmic nominal 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.	
- Lamp nominal 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.	
- Inductive nominal load	12 Hz (1.2 H, 48 $\Omega$ ), maximum
Overload response	Auto restart
Restart frequency with ohmic overload (2 $\Omega$ )	Approximately 127 Hz
Restart frequency at lamp overload	Approximately 127 Hz
Inductive overload response	Output may be damaged
Reverse voltage endurance against short pulses	Protected against reverse voltages



Digital Outputs (Continued)	
Strength against permanently applied surge voltages	Yes
Validity of output data after connection of 24 V voltage supply (power up)	5 ms, typical
Response upon power down	The output follows the supply voltage without delay.
Limitation of the demagnetization voltage induced on circuit interruption	-10 V, approximately
Single maximum energy in free running	70 mJ
Protective circuit type	External free-wheeling diode and suppressor diode
Overcurrent shutdown	At 1.4 A, minimum
Error message "open circuit" can be indicated is indicated	A load resistance of $R_L > 4.8 \text{ k}\Omega$ A load resistance of $R_L > 17.9 \text{ k}\Omega$
<p>"Open circuit" indication depending on the load resistance (<math>R_L</math> in <math>\text{k}\Omega</math>) and on the segment voltage (<math>U_S</math> in V)</p> <p>A "Open circuit" indication            B Transition area, error message can appear but does not appear necessarily.            C No error message</p> <p style="text-align: right;">6528B007</p>	
Output current when switched off	500 $\mu\text{A}$ , maximum (to guarantee open circuit detection)
Output voltage when switched off	$U_S$ , maximum (to guarantee open circuit detection)

Digital Outputs (Continued)	
Output current with ground connection interrupted	In the event of ground connection interrupt the outputs can be set as usual. Detection of open circuit and of short circuit is functioning correctly.
Switching power with ground connection interrupted	
Inrush current	1.5 A for 20 ms, maximum (typical)

Output Characteristic Curve When Switched On (Typical)	
Output Current (A)	Differential Output Voltage (V)
0	0
0.2	0.047
0.3	0.069
0.5	0.114
0.7	0.159

Power Dissipation	
<b>Formula to Calculate the Power Dissipation of the Electronics</b>  $P_{EL} = 0,3 \text{ W} + \sum_{n=1}^2 (150 \text{ mW} + I_{Ln}^2 \times 0,15 \Omega)$	
Where P <sub>TOT</sub> Total power dissipation of the terminal n Index of the number of set outputs n = 1 to 2 I <sub>Ln</sub> Load current of the output n	
<b>Power dissipation of the housing P<sub>HOU</sub></b>	0.7 W (within the permissible operating temperature)

Limitation of Simultaneity, Derating
None

Safety Measures	
Overload/short circuit in segment circuit	Electronic
Surge voltage	Protective circuits of the power terminal
Polarity reversal	Protective circuits of the power terminal

**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.


**Common Potentials**

The 24 V main voltage 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 a status bit is set in the input process data (see Page 5) and on the terminal block the diagnose LED (D) flashes at 2 Hz (medium).	
Open circuit	Yes; In addition a status bit is set in the input process data (see Page 5) and on the terminal block the diagnose LED (D) flashes at 2 Hz (medium).
Operating voltage out of range	No

## Ordering Data

Description	Order Designation	Order No.
Inline terminal with two digital outputs and extended diagnostics including connectors and labeling field	IB IL 24 EDO 2-PAC	28 61 61 6
Inline terminal with two digital outputs and extended diagnostics	IB IL 24 EDO 2	27 42 59 9
 One of the listed connectors is needed for the complete fitting of the IB IL 24 EDO 2 terminal.		
I/O connector with eight terminals, spring-clamp connection (green, w/o color print); pack of 10	IB IL SCN-8	27 26 33 7
I/O connector with eight terminals, spring-clamp connection (green, with color print); pack of 10	IB IL SCN-8-CP	27 27 60 8
"Configuring and Installing the INTERBUS Inline Product Range" User Manual	IB IL SYS PRO UM E	27 45 55 4



The documentation can be downloaded free of charge at the following address:  
[www.phoenixcontact.com](http://www.phoenixcontact.com).

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