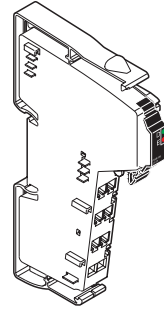


# IB IL 24 PWR IN/2-F-D IB IL 24 PWR IN/2-F-D-PAC

## Inline Power Terminal With Fuse and Diagnostics



Data Sheet 6394B

12/2002

6394A001



The IB IL 24 PWR IN/2-F-D and IB IL 24 PWR IN/2-F-D-PAC only differ in the scope of supply (see "Ordering Data" on page 11). Their function and technical data are identical.

For greater clarity, the Order Designation IB IL 24 PWR IN/2-F-D is used throughout this document.



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.

## Function

The terminal is designed for use within an Inline station.

The terminal supplies 24 V supply voltage to the main circuit ( $U_M$ ) and automatically provides the 24 V supply voltage to the segment circuit ( $U_S$ ).

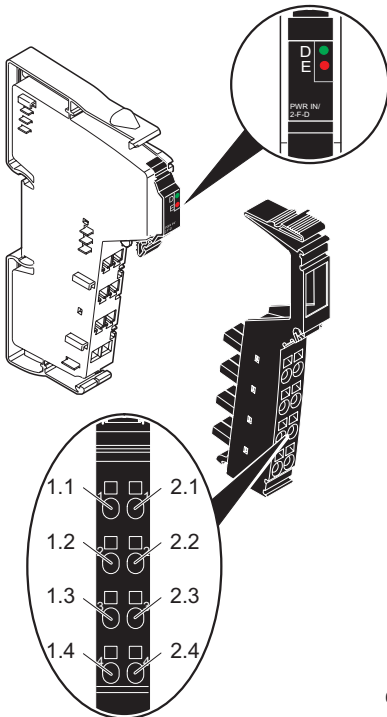
The terminal has protection against polarity reversal and surge voltage.

The internal fuse protects the main and segment circuit.

This terminal has an LED for bus diagnostics and occupies two input data bits, which are used to indicate the presence of the supply voltage and the status of the fuse.

## Features

- Supply of the 24 V main voltage  $U_M$
- Provision of the 24 V segment voltage  $U_S$
- Main and segment circuit protected by an internal fuse
- LED diagnostic indicators



6394A003

Figure 1 IB IL 24 PWR IN/2-F-D with appropriate connector

**Function Identification**

Black

**Local LED Diagnostic Indicators**

Des.	Color	Meaning
<b>D</b>	<b>Green</b>	<b>Bus diagnostics</b>
		ON: INTERBUS is active
		Flashing:
		0.5 Hz: Communications power is present, INTERBUS is not active
		2 Hz: Communications power is present, supply voltage $U_M$ is not present
		4 Hz: Communications power is present, local bus error
OFF: Communications power is not present, INTERBUS is not active		
<b>E</b>	<b>Red</b>	<b>Fuse</b>
		OFF: Fuse is OK
		ON: Fuse has blown



If the supply voltage  $U_M$  is not present and the fuse is missing or has blown, an I/O error message is sent to the higher-level control or computer system.



A blown or missing fuse is indicated by both LED diagnostic indicators. The red LED E lights up and the green LED D flashes at 2 Hz.

## Terminal Assignment

Terminal Point	Assignment
1.1, 2.1	Measuring points for the segment circuit $U_S$
1.2, 2.2	Supply points for the main circuit $U_M$ (+24 V) These terminal points are connected with each other and with the potential jumper of the main supply $U_M$ via the fuse. The potential jumpers of the main circuit $U_M$ and the segment circuit $U_S$ (both protected) have a combined current carrying capacity of 6.3 A.
1.3, 2.3	Ground contact (GND) for main and segment circuit The reference potential is directly routed to the potential jumper and is, at the same time, ground reference for the main and segment voltage.
1.4, 2.4	FE connection The contacts are directly connected with the potential jumper and the FE spring on the bottom of the housing. The terminal is grounded when it is snapped onto a grounded DIN rail.
	Terminal points 1.2 and 1.3 are connected with a capacitor to FE.



### Observe the current carrying capacity

The maximum total current flowing through the potential jumpers must not exceed 6.3 A.

## Internal Circuit Diagram

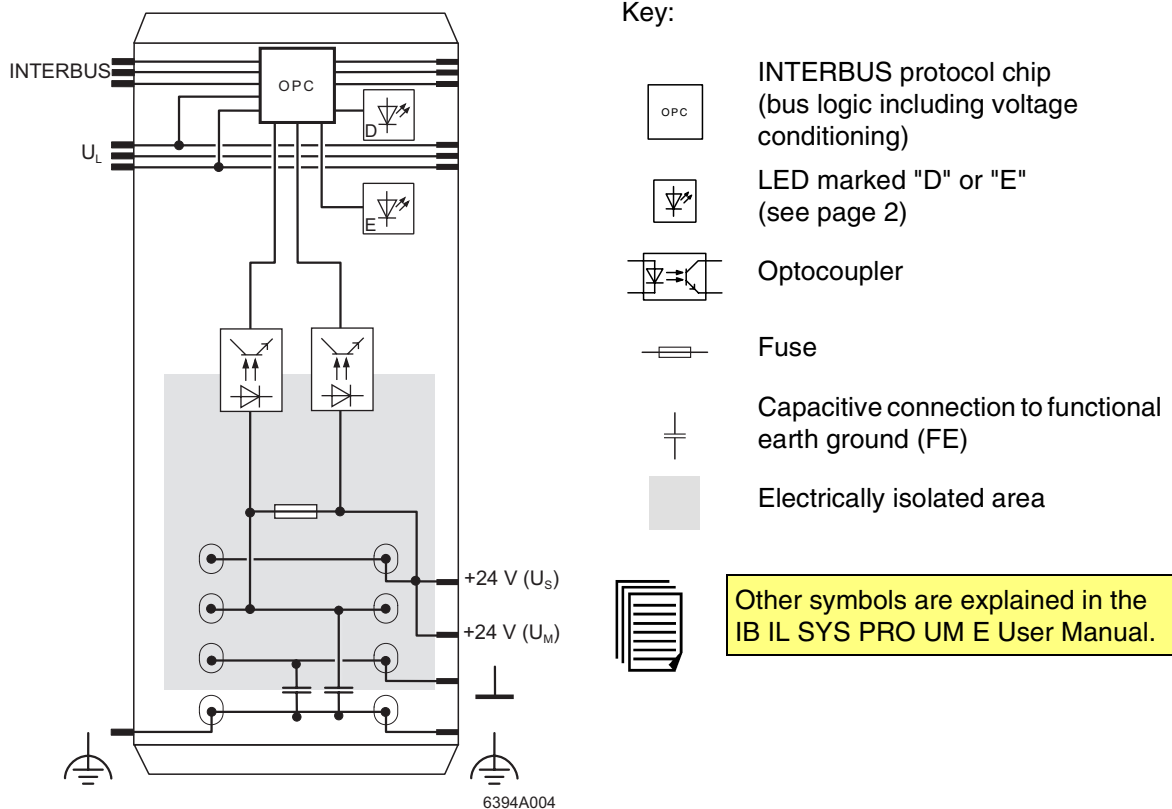


Figure 2 Internal wiring of the terminal points

## Connection Example



The 24 V supply in the main and segment circuit is protected by the internal fuse.



Most I/O terminals are supplied from the segment circuit.  
This voltage is automatically provided at the IB IL 24 PWR IN/2-F-D terminal.

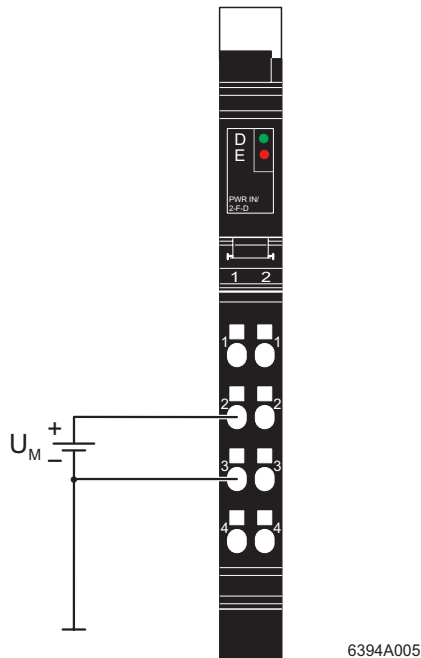


Figure 3 Typical connection of the supply voltage  $U_M$



To ensure maximum current carrying capacity, use a power connector to connect the cables (see page 11). In these connectors, the adjacent terminal points 1.2 and 2.2, and 1.3 and 2.3 are jumpered internally.

## Programming Data

ID code	BE <sub>hex</sub> (190 <sub>dec</sub> )
Length code	C2 <sub>hex</sub>
Process data channel	2 bits
Input address area	2 bits
Output address area	0 bits
Parameter channel (PCP)	0 bits
Register length (bus)	2 bits

## INTERBUS Process Data

### Assignment of IN Process Data





The IN process data only maps the status of the fuse and the main voltage.

(Byte.bit) view		0.1	0.0
Assignment	Main voltage $U_M$ is present, fuse is OK	1	1
	Main voltage $U_M$ is present, fuse has blown or is missing	1	0
	Main voltage $U_M$ is not present, fuse has blown or is missing	0	0




For the assignment of the illustrated (byte.bit) view to your control or computer system, please refer to the DB GB IBS SYS ADDRESS data sheet, Order No. 90 00 99 0.


## Technical Data

General Data	
Order Designation (Order No.)	IB IL 24 PWR IN/2-F-D (28 60 28 0) IB IL 24 PWR IN/2-F-D-PAC (28 62 15 2)
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	44 g (without connectors)
Operating mode	Process data mode with 2 bits
Transmission speed	500 kbps
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 interface	Through data routing

Power Consumption	
Communications power $U_L$	7.5 V DC
Current consumption at $U_L$	25 mA (maximum)
Power consumption at $U_L$	0.19 W (maximum)
Main voltage $U_M$	24 V DC (nominal value)
Nominal current consumption at $U_M$	4.0 A (nominal value)

Supply of the Module Electronics Through the Bus Terminal ( $U_L$ )	
Connection method	Through potential routing
24 V I/O Supply (Main Circuit $U_M$ )	
Connection	+24 V Ground (GND) Terminal points 1.2 and 2.2 Terminal points 1.3 and 2.3
Rated value	24 V DC
Tolerance	-15%/+20%
AC component	5%
Permissible range	19.2 V to 30 V
Permissible current	6.3 A, maximum
Demands on the voltage supply	The power terminal must be supplied from a new power supply unit to provide electrical isolation. Protect the 24 V area with an external fuse.
	The power supply unit must be able to supply 4 times (400%) the nominal current of the external fuse.

Permissible Total Current in the Potential Jumpers of the Main and Segment Circuit/ Nominal Current of the Terminal	
Permissible total current in the potential jumpers	6.3 A
Nominal current of the terminal	4.0 A
Tolerance	+10%
	The terminal is supplied with a 6.3 A slow-blow fuse. With an increased total current in the potential jumpers $U_M$ and $U_S$ the user must protect the circuit by using higher rated fuses. Please note the information for the selection of fuses given on page 8.



**Power Dissipation**

**Formula to Calculate the Power Dissipation of the Electronics**

$$P_{EL} = 0.180 \text{ W} + I_M^2 \times R_F$$

Where

$P_{EL}$  Total power dissipation in the terminal

$I_M$  Load current in the main circuit

$R_F$  Resistance of the fuse

The resistance of the fuse  $R_F$  for a 6.3 AT fuse is approximately 12 mΩ.

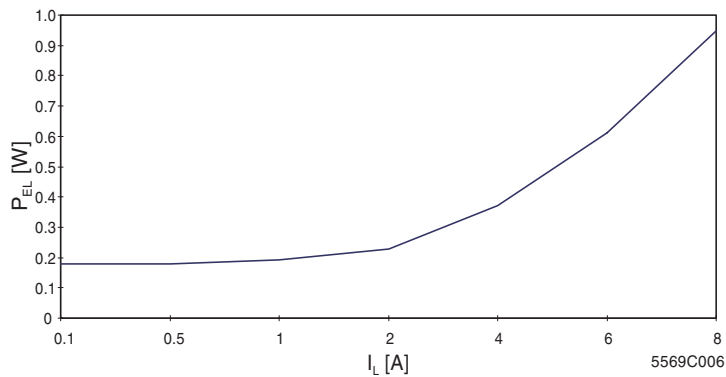
The power dissipation of the electronics for a theoretical maximum current of 6.3 A (nominal current = 4.0 A) is calculated as follows:

$$\begin{aligned} P_{EL} &= 0.18 \text{ W} + 39.69 \text{ A}^2 \times 0.012 \text{ } \Omega \\ &= 0.66 \text{ W} \end{aligned}$$

**Power Dissipation of the Housing ( $P_{HOU}$ )**

$P_{HOU} = 0.7 \text{ W}$  in the entire ambient temperature range

**Typical Power Dissipation of the Electronics Depending on the Load Current in the Main Circuit**







$P$  [W] Power dissipation in W  
 $I_L$  [A] Load current in the main circuit in A

**The test was carried out with a 6.3 AT fuse.**

**Derating of the Load Current in the Segment Circuit**

No derating


Safety Measures	
Overload/short circuit in the main and segment circuit	Fuse 5 x 20 with 6.3 A, slow-blow
	Fuses with other values can also be used. The maximum fuse value must not exceed 6.3 A.
	<b>Note for the selection of fuses:</b> Only use slow-blow fuses for currents greater than 2 A.
Surge voltage	Yes; suppressor diode for voltage limitation between terminal points 1.1 and 1.3 and terminal points 1.2 and 1.3
Polarity reversal	Yes; diode connected in parallel as protection against polarity reversal
	The power supply unit must be able to supply 4 times (400%) the nominal current of the internal fuse.

Electrical Isolation	
	To provide electrical isolation between the logic level and the I/O area, it is necessary to supply these areas via the bus terminal or via the bus terminal and a power terminal from separate power supply units. Interconnection of the 24 V power supplies is not permitted. Please pay attention to GND/PE connections on the power supply units (see also user manual).

Common Potentials	
The 24 V main voltage, 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
I/O error message if fuse blown or missing
I/O error message if supply voltage $U_M$ is not present

## Ordering Data

Description	Order Designation	Order No.
Power terminal with fuse and diagnostics; including connectors and labeling field	IB IL 24 PWR IN/2-F-D-PAC	28 62 15 2
Power terminal with fuse and diagnostics	IB IL 24 PWR IN/2-F-D	28 60 28 0
 <p>One of the listed connectors is needed for the complete fitting of the IB IL 24 PWR IN/2-F-D terminal.</p>		
Connector for power supply (black, with color print) pack of 10 pieces	IB IL SCN-PWR IN-CP	27 27 63 7
Connector for power supply (black, w/o color print) pack of 10 pieces	IB IL SCN-PWR IN	27 27 46 2
Fuse	SI 5 x20 6,300 A T	50 30 51 2
"Configuring and Installing the INTERBUS Inline Product Range" User Manual	IB IL SYS PRO UM E	27 43 04 8



Documentation is available to download free of charge at [www.phoenixcontact.com](http://www.phoenixcontact.com).

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