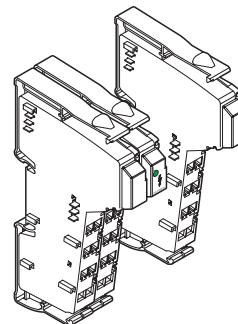


IB IL 230 PWR IN IB IL 230 PWR IN-PAC

Inline Power Terminal for the 230 V AC Voltage Area



Data Sheet 6221B

01/2003

6221B001



The item versions IB IL 230 PWR IN and IB IL 230 PWR IN-PAC only differ with regard to the standard supplied with the module (see "Ordering Data" on page 15). Function and technical data are identical. In the following, for greater clarity, we will only use the item designation IB IL 230 PWR IN.



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

Function

The terminal is designed for use within an Inline station. It supplies 230 V AC supply voltage in a 230 V AC area of an Inline station.

The end terminal (IB IL AC END), with which the 230 V AC area must be terminated, is also supplied as standard with the power terminal.



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.



This terminal does not have a protocol chip and therefore is not a bus device.

Features

- Supply of phase L (230 V AC)
- Diagnostic indicators

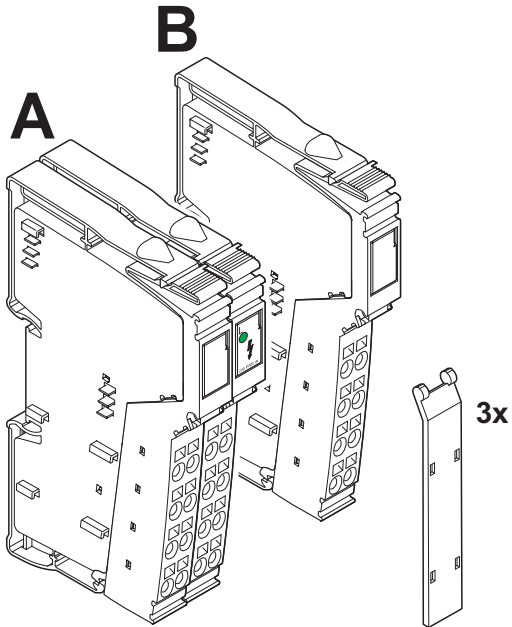


Figure 1 IB IL 230 PWR IN-PAC
(power terminal (A) and
end terminal (B))

Safety Instructions



Safety Instructions for Inline Terminals for Installation in Areas Outside the SELV (Low Voltage Area, AC 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 Inline the Inline System Manual for your bus system. Phoenix Contact accepts no liability if the device is used for anything other than its designated use.

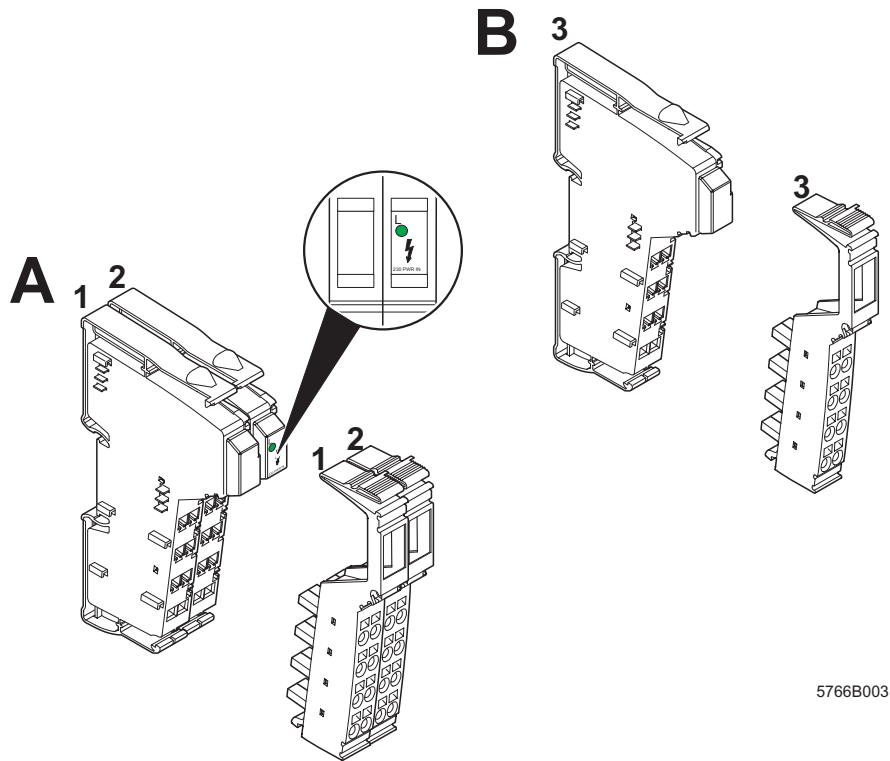


This data sheet describes the module-specific features of the IB IL 230 PWR IN terminal.



For general information on the Inline product family, please refer to the User Manual IB IL SYS PRO UM E or the Inline System Manual for your bus system.

General Description



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Figure 2 IB IL 230 PWR IN and IB IL AC END with appropriate connectors

- A Power terminal IB IL 230 PWR IN
 B End terminal IB IL AC END

Local Diagnostic and Status Indicators

| Des. | Color | Meaning |
|------|-------|---------------------------------|
| L | Green | 230 V AC supply voltage present |

Function Identification

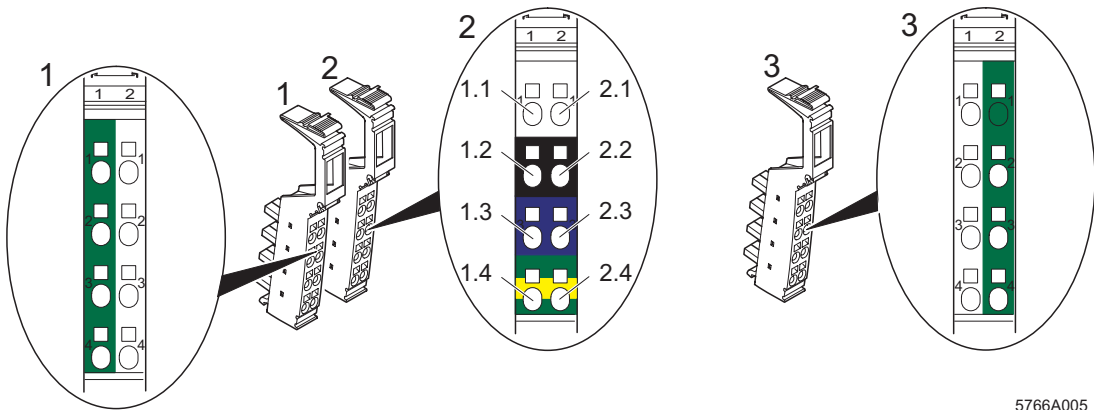
White with lightning bolt

Housing/Connector Color

Gray housing

Gray connector, color-coded according to function

Terminal Assignment

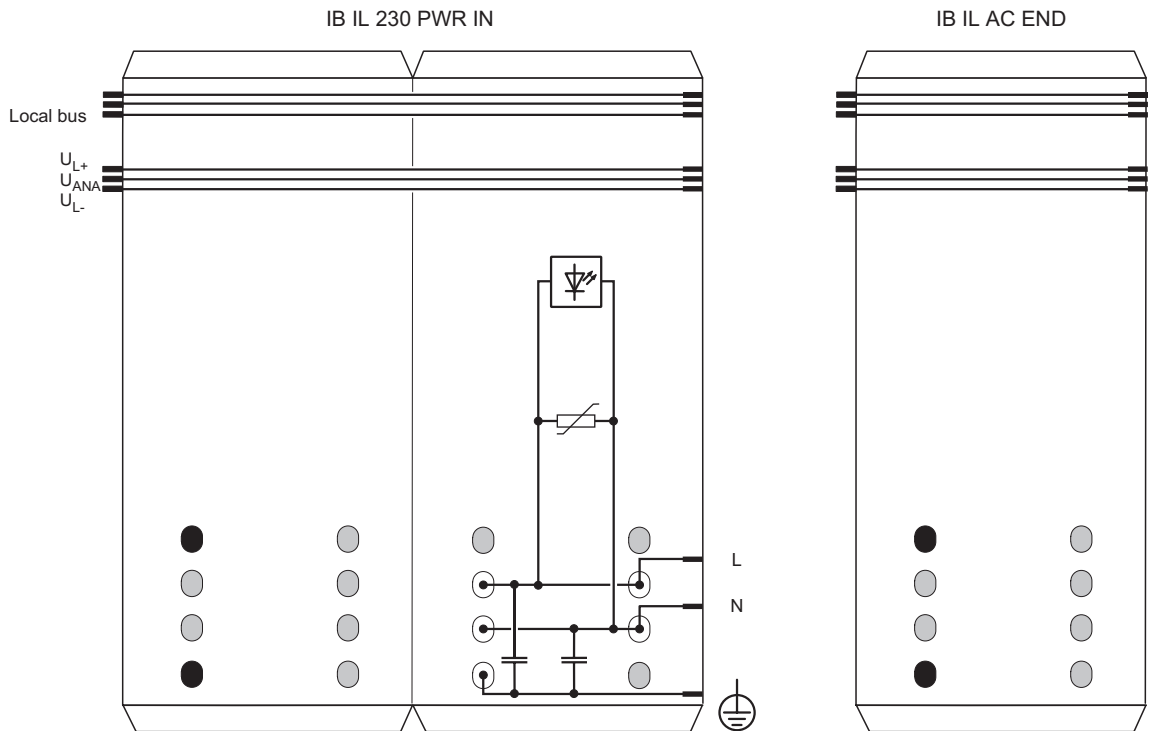


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Figure 3 Terminal assignment

| Terminal Point | Des. | Assignment | Marking |
|--|------|--|--------------|
| Power Terminal (A in Figure 2) | | | |
| Connector 1 | | | |
| All | | Not used | Left: green |
| Connector 2 (color-coded according to function) | | | |
| 1.1, 2.1 | | Not used | |
| 1.2, 2.2 | L | Supply points for the phase of the L supply; terminal points jumpered internally | Black |
| 1.3, 2.3 | N | Neutral conductor connection; terminal points jumpered internally | Blue |
| 1.4 | PE | Protective conductor connection | Green/yellow |
| | | The contact is directly connected with the PE voltage jumper. Ground the terminal with the PE connection. The correct structure of the 230 V AC area ensures that all the terminals in this area are connected to the protective earth ground. | |
| 2.4 | | Not used | |
| End Terminal (B in Figure 2) | | | |
| Connector 3 | | | |
| All | | Not used | Right: green |

Internal Circuit Diagram



6221B006

Figure 4 Internal wiring of the terminal points

Key:



LED



Overvoltage protection



Capacitor



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 or in the Inline System Manual for your bus system.

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 with their connectors must be installed
- The station must be terminated with the end plate and the two end clamps.

Installation Instructions and Notes for a Low Voltage Area (230 V AC; 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 230 V AC voltage area is only permitted 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.



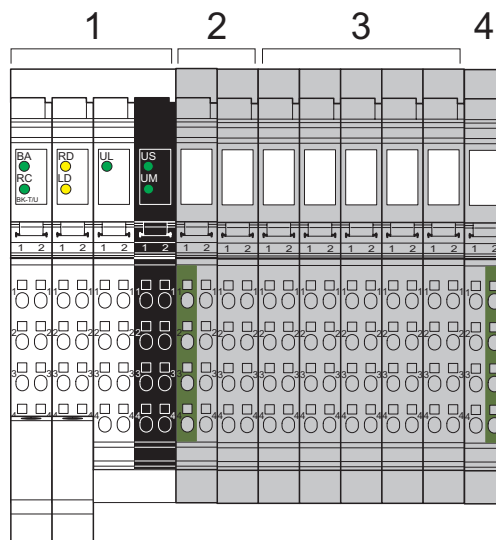
Please use grounded AC networks

Inline terminals for the 230 V AC voltage area should only be operated in grounded AC networks.

Structure of an AC Area

A 230 V AC area **must** have a 230 V 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 bus and the Inline system restrictions (see the Inline System Manual for your bus system).



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Figure 5 Example of an Inline AC area

- 1 Bus terminal
- 2 230 V AC power terminal
- 3 Various AC input/output terminals
- 4 AC end terminal

Fusing an AC Area

Each AC area must be protected with its own fuse. Select the value of the fuse corresponding to the cable diameter.



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 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.

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

Terminals and Connectors of an AC and SELV Area



When an AC area is referred to in this section, the descriptions apply to both the 120 V AC and the 230 V AC area. An SELV area is an area with Safety Extra-Low Voltage and is referred to here as a 24 V area.

AC terminals and the corresponding connectors can be distinguished from the terminals and connectors of the 24 V area by their color:

| Area | Terminal | Connector |
|----------|----------|----------------|
| 24 V DC | Green | Green or black |
| 120 V AC | Gray | Gray |
| 230 V AC | Gray | Gray |

Protection Against Inserting 24 V Terminals in an AC Area

24 V terminals cannot be snapped onto the AC terminals because there is no keyway on the right-hand side of the AC terminals.

Exception: The power terminals of the 24 V area can be inserted in an AC area. In this case, the minimum isolation distance is the distance between two adjacent connectors.

Protection Against Connecting Connectors of the 24 V Area to AC Terminals

Two terminal points of the AC I/O terminals are closed by filler plugs. Therefore the connectors of the 24 V terminals do not fit on the AC terminals.

Exception 1: The connectors for terminals of the 24 V area can be inserted on AC power terminals.



This exchange has no dangerous effect on the electrical components, however it can lead to malfunctions in the system.

Therefore only insert the connectors that are designed for AC power terminals.

Exception 2: The connectors for terminals of the 24 V area can be inserted on relay terminals. Since relay outputs are electrically isolated, this exchange is permitted.

Protection Against Connecting Live AC Connectors in the 24 V Area



If the I/O terminal connectors are wired according to the installation instructions, they are disconnected from the power when removed.


The following connectors may be live in the AC area:

- 1 Power terminal connectors for the AC area IB IL 120 PWR IN and IB IL 230 PWR IN
- 2 Connector for the IB IL 24/230 DOR 1/W relay module

These connectors are closed by filler plugs at some points and therefore do not fit on the terminals of the 24 V area.

Response When Inserting an AC Terminal in the 24 V Area

An AC terminal can be inserted in the 24 V area but no 24 V terminal can be connected to the AC terminal since no keyway is present on the right-hand side of the AC terminal on which the 24 V terminal would have to be mounted.

| AC Terminal in the 24 V Area | Description/Effect |
|--|---|
| AC power terminal in the 24 V DC area | <p>Specific interface between AC and SELV area.</p> <p>The AC power terminal consists of two function parts.</p> <ul style="list-style-type: none"> – the left part interrupts the jumpering of U_S, U_M, GND, and FE – the connections for the voltage supply and the jumper contacts for L, N, and PE are on the right-hand part |
| Digital AC output terminal in the 24 V DC area | <p>No direct danger to people.</p> <p>If the output is switched on, the Triac output may force tripping and no longer switch off because the supply voltage does not pass through zero.</p> <div style="display: flex; align-items: center;">  <div style="border: 1px solid black; background-color: yellow; padding: 5px;"> <p>This is likely to cause a malfunction of the relevant actuator.</p> </div> </div> |
| Digital AC input terminal in the 24 V DC area | <p>No danger to people or machines.</p> <p>The input does not function because it has no ground.</p> |
| Relay terminal in the 24 V DC area | <p>No direct danger to people.</p> <p>The module does not have diagonal routing so there is no direct danger from the terminal even when using a connector, which supplies 230 V. This means that the shortest isolating distance is the distance from one connector to the next.</p> |
| AC end terminal in the 24 V DC area | <p>No danger to people or machines.</p> <p>The terminal offers neither diagonal routing nor connector connection.</p> |

Connection Example

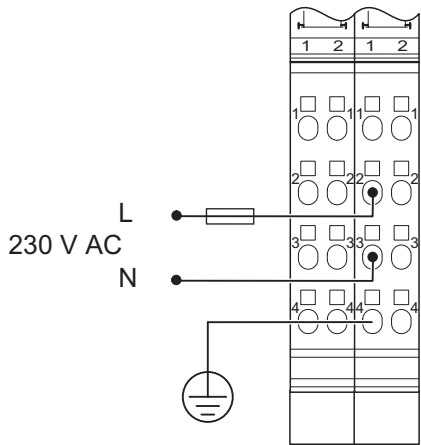


Protect the 230 V AC supply with an external fuse.



Ensure complete current carrying capacity

Use the appropriate power connector to supply the voltage. Complete current carrying capacity is ensured by the internal jumpering of the terminal points (see Table on page 5).



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Observe the current carrying capacity

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






If you want to construct another voltage area behind the 230 V AC voltage area, the 230 V area must be terminated with an end terminal and the new voltage area must begin with a new power terminal.



Figure 6 Typical connection of the supply voltage

Key:

 Fuse

Technical Data

| General Data | | |
|---|---|--|
| Power terminal housing dimensions (width x height x depth) | 24.4 mm x 120 mm x 66.6 mm (0.961 in. x 4.724 in. x 2.622 in.) | |
| End terminal 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 (power terminal/end terminal) | 80 g/35 g (without connector) | |
| 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 | |
| 230 V I/O Supply | | |
| Connection | L phase N | Terminal points 1.2 and 2.2 (connector 2) Terminal points 1.3 and 2.3 (connector 2) |
| Rated value | 230 V AC | |
| Tolerance | -15%/+20% | |
| Permissible range | 12 V AC to 253 V AC | |
|  | When the voltage is < 230 V AC the L LED does not light up, even if the voltage is present. | |
| Permissible current | 8 A, maximum | |


| Safety Devices | |
|---|---|
|  | Protect the supply externally! |
| Permissible fuses | 10 A T, maximum |
| Short-circuit protection of the semiconductor outputs | Very fast acting fuse with a maximum fusible element of 4.5 A ² s |
| Overvoltage | Yes; VAR 275 V |
|  | In case of surge voltage, the protective element will automatically short circuit the supply, thus protecting the subsequent terminals and the I/Os. Replace the power terminal after the surge voltage protection element has responded! |

| Electrical Isolation/Isolation of the Voltage Areas | |
|--|--------------------------|
| Common Isolated Groups | |
| Phase and neutral conductors have the same potential. PE is a separate potential area. | |
| Separate Potentials in the System Consisting of Bus Terminal/Power Terminal in the 24 V DC Area and Supply Terminals/I/O Terminals in the 230 V 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)/230 V AC I/O area | 2500 V AC, 50 Hz, 1 min. |
| Tested | 1500 V AC, 50 Hz, 1 min. |
| 230 V AC/PE I/O area | 500 V AC, 50 Hz, 1 min. |
| Output/phase | 500 V AC, 50 Hz, 1 min. |

| Air and Creepage Distances (According to EN 50178, VDE 0109, VDE 0110) | | | |
|--|--------------------|--------------------|---------------------------------|
| Isolating Distance | Air Distance | Creepage Distance | Impulse Voltage Withstand Level |
| Technology for 230 V AC Area Single-Phase (up to 253 V AC) | | | |
| Safe Isolation According to EN 50178 | | | |
| Bus logic/I/O devices | 5.5 mm (0.217 in.) | 5.5 mm (0.217 in.) | 4 kV |
| I/O devices/PE | 3.2 mm (0.126 in.) | 3.2 mm (0.126 in.) | 4 kV |

| Error Messages to the Higher-Level Control or Computer System |
|---|
| None |

Ordering Data

| Description | Order Designation | Order No. |
|--|------------------------|------------|
| Power terminal; End terminal, Stecker und Beschriftungsfelder inklusive | IB IL 230 PWR IN-PAC | 28 61 53 5 |
| Power terminal (End terminal inklusive) | IB IL 230 PWR IN | 27 40 33 9 |
|  <p>To connect the power terminal and end terminal IB IL 230 PWR IN, you need either the connector set or one of each of the connectors listed.</p> | | |
| Connector set 1 set consisting of one of each of the connectors listed below. | IB IL AC-PWR-IN-PLSET | 27 40 18 0 |
| Connector for the voltage supply (connector 2 in Figure 2) pack of 10 | IB IL SCN-PWR-IN-AC-CP | 27 40 20 3 |
| Connector (power terminal; connector 1 in Figure 2) pack of 10 | IB IL SCN-AC-IN | 27 40 19 3 |
| Connector (end terminal; connector 3 in Figure 2) pack of 10 | IB IL SCN-AC-OUT | 27 40 28 7 |
| “Configuring and Installing the INTERBUS Inline Product Range” User Manual | IB IL SYS PRO UM E | 27 43 04 8 |



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