# IB IL 24 PWR IN/R-XC-PAC

## Inline power/boost terminal version for extreme conditions, 24 V DC, without fuse

Data sheet
8499_en_01



## 1 Description

The terminal is designed for use within an Inline station.

If the maximum load of the bus coupler for the communications power ($U_L$) or the supply voltage for the analog terminals ($U_{ANA}$) is reached, this terminal can be used to provide these voltages again.
To this end, a 24 V DC voltage ($U_{24V}$) is applied to the terminal from which the communications power ($U_L$) and the supply voltage for the analog terminals ($U_{ANA}$) is generated.

The terminal also allows the 24 V DC main voltage ($U_M$) and the 24 V DC segment voltage ($U_S$) to be supplied.

Thanks to special engineering measures and tests, the terminal can be used under extreme ambient conditions.

### Features

- Supply of all 24 V voltages required for the low-level signal of an Inline station
- Diagnostic indicators
- Can be used under extreme ambient conditions
- Extended temperature range of -40°C ... +70°C (see “Tested successfully: use under extreme ambient conditions”)
- Painted PCBs

| |
|---|
| This data sheet is only valid in association with the IL SYS INST UM E user manual. |

| |
|---|
| Make sure you always use the latest documentation.<br>It can be downloaded from the product at phoenixcontact.net/products. |

## 2 Table of contents

# 3 Ordering data

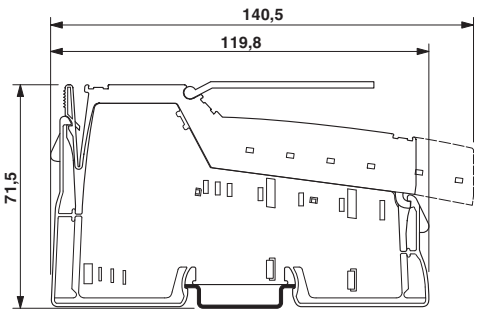
| Description | Type | Order No. | Pcs. / Pkt. |
|---|---|---|---|
| Inline power terminal or boost terminal, version for extreme conditions, complete with accessories (connector connector and labeling field), 24 V DC, without fuse | IB IL 24 PWR IN/R-XC-PAC | 2701298 | 1 |

| Accessories | Type | Order No. | Pcs. / Pkt. |
|---|---|---|---|
| Connector set, for power terminal block, copper, colored identification. (Connector/Adapter) | IB IL PWR IN/R-PLSET | 2860620 | 1 |
| Labeling field, width: 12.2 mm (Marking) | IB IL FIELD 2 | 2727501 | 10 |
| Labeling field, width: 48.8 mm (Marking) | IB IL FIELD 8 | 2727515 | 10 |
| Insert strip, Sheet, white, unlabeled, can be labeled with: Office printing systems, Plotter: Laser printer, Mounting type: Insert, Lettering field: 62 x 10 mm (Marking) | ESL 62X10 | 0809492 | 1 |

| Documentation | Type | Order No. | Pcs. / Pkt. |
|---|---|---|---|
| User manual, English, Automation terminals of the Inline product range | IL SYS INST UM E | - | - |

# 4 Technical data

## Dimensions (nominal sizes in mm)




| | |
|---|---|
| Width | 48.8 mm |
| Height | 119.8 mm |
| Depth | 71.5 mm |

## General data

| | |
|---|---|
| Color | green |
| Weight | 192 g (with connectors) |
| Mounting type | DIN rail |
| Ambient temperature (operation) | -25 °C ... 55 °C |
| Ambient temperature (operation) | -40 °C ... 70 °C (See “Tested successfully: use under extreme ambient conditions” in the data sheet.) |
| Ambient temperature (storage/transport) | -40 °C ... 85 °C |
| Permissible humidity (operation) | 10 % ... 95 % (according to DIN EN 61131-2) |
| Permissible humidity (storage/transport) | 10 % ... 95 % (according to DIN EN 61131-2) |
| Air pressure (operation) | 70 kPa ... 106 kPa (up to 3000 m above sea level) |

## General data

| | |
|---|---|
| Air pressure (storage/transport) | 70 kPa ... 106 kPa (up to 3000 m above sea level) |
| Degree of protection | IP20 |
| Protection class | III, IEC 61140, EN 61140, VDE 0140-1 |

## Connection data

| | |
|---|---|
| Designation | Inline connector |
| Connection method | Spring-cage connection |
| Conductor cross section solid / stranded | 0.08 mm² ... 1.5 mm² / 0.08 mm² ... 1.5 mm² |
| Conductor cross section [AWG] | 28 ... 16 |
| Stripping length | 8 mm |

## Connection data for UL approvals

| | |
|---|---|
| Designation | Inline connector |
| Connection method | Spring-cage connection |
| Conductor cross section solid / stranded | 0.2 mm² ... 1.5 mm² / 0.2 mm² ... 1.5 mm² |
| Conductor cross section [AWG] | 24 ... 16 |
| Stripping length | 8 mm |

## Interface Inline local bus

| | |
|---|---|
| Connection method | Inline data jumper |
| Transmission speed | 500 kBit/s / 2 MBit/s (Can be used in Inline stations with these transmission speeds) |

## Power consumption

**NOTE: Electronics may be damaged when overloaded**

Provide external fuses for each 24 V area.

The power supply unit must be able to supply four times the nominal current of the external fuse, to ensure that it blows in the event of an error.

When supply voltages $U_M/U_S$ are supplied separately from the supply voltage $U_{24V}$, they are electrically isolated from one another. This is only ensured if two separate power supply units are used.

| | |
|---|---|
| 24 V supply ($U_{24V}$) for generating $U_L$ and $U_{ANA}$ | 24 V DC |
| Supply voltage range $U_{24V}$ | 19.2 V DC ... 30 V DC (including all tolerances, including ripple) |
| Current consumption | min. 12 mA DC (from $U_{24V}$, at nominal voltage)<br>max. 1.25 A DC (from $U_{24V}$, at nominal voltage; consisting of: 0.75 A DC for the communications power and 0.5 A DC for the analog voltage supply) |
| Main circuit supply $U_M$ | 24 V DC |
| Supply voltage range $U_M$ | 19.2 V DC ... 30 V DC (including all tolerances, including ripple) |
| Power supply at $U_M$ | max. 8 A (Sum of $U_M + U_S$) |
| Segment supply voltage $U_S$ | 24 V DC |
| Supply voltage range $U_S$ | 19.2 V DC ... 30 V DC (including all tolerances, including ripple) |
| Power supply at $U_S$ | max. 8 A DC (Sum of $U_M + U_S$) |
| Communications power $U_L$ | 7.5 V DC ±5 % (via voltage jumper) |
| Power supply at $U_L$ | max. 2 A DC |
| I/O supply voltage $U_{ANA}$ | 24 V DC |
| Supply voltage range $U_{ANA}$ | 19.2 V DC ... 30 V DC (including all tolerances, including ripple) |
| Power supply at $U_{ANA}$ | max. 0.5 A DC |

## Power loss

| | |
|---|---|
| Power loss | max. 2.55 W (entire device) |

| Configuration and parameter data in a PROFIBUS system | |
|---|---|
| Required parameter data | 0 Byte |
| Need for configuration data | 0 Byte |

| Electrical isolation/isolation of the voltage areas | |
|---|---|
| **Test section** | **Test voltage** |
| 7.5 V logics supply, 24 V analog supply/functional earth ground | 500 V AC , 50 Hz , 1 min |
| 7.5 V logics supply, 24 V analog supply, 24 V main supply, 24 V segment supply | 500 V AC , 50 Hz , 1 min |
| 24 V main supply, 24 V segment supply / functional earth ground | 500 V AC , 50 Hz , 1 min |

**Error messages to the higher level control or computer system**

None

| Protective circuit | |
|---|---|
| Surge protection (segment supply, main supply, 24 V supply) | Input protective diodes (can be destroyed by permanent overload)<br>Pulse loads up to 1500 W are short circuited by the input protective diode. |
| Polarity reversal (segment supply/main supply) | Parallel diodes for protection against polarity reversal; in the event of an error the high current flowing through the diodes causes the fuse connected upstream to blow. |
| Polarity reversal (24 V supply) | Serial diode in the lead path of the power supply unit; in the event of an error only a low current flows. In the event of an error, no fuse trips within the external power supply unit.<br>If you want to protect the 24 V supply, use a 2 A medium-blow fuse. |

**Approvals**

For the latest approvals, please visit phoenixcontact.net/products.

# 5 Electrical isolation/isolation of the voltage areas

| Common potentials | |
|---|---|
| When providing the 24 V supply for generating $U_L$ and $U_{ANA}$ separately from the 24 V main supply/24 V segment supply | Main and segment supply have the same potential. From the power terminal onwards, common ground is led through the potential jumper to the devices as reference ground GND. |
| | 24 V supply for generating $U_L$ and $U_{ANA}$, 24 V analog supply $U_{ANA}$, and 7.5 V communications power $U_L$ have the same potential. From the bus coupler onwards, common ground is led through the potential jumper to the devices as the reference ground "Logical GND" ($U_L$-). |
| When providing the 24 V supply for generating $U_L$ and $U_{ANA}$ by jumpering the 24 V main supply/24 V segment supply | Main supply, segment supply, 24 V analog supply, and 7.5 V communications power have the same potential. From the power terminal onwards, common ground is led through the potential jumper to the devices as the reference ground "Logical GND" ($U_L$-) for the communications power and analog supply and separately as reference ground GND for the supply and segment level. |
| **Separate potentials** | |
| When providing the 24 V supply for generating $U_L$ and $U_{ANA}$ separately from the 24 V main supply/24 V segment supply | The 24 V supply for generating $U_L$ and $U_{ANA}$ is physically and therefore electrically<br>isolated from the main supply and the segment supply. |
| When providing the 24 V supply for generating $U_L$ and $U_{ANA}$ by jumpering the 24 V main supply/24 V segment supply | None |

# 6 Tested successfully: Use under extreme ambient conditions

The terminal has been tested successfully over 250 temperature change cycles in accordance with IEC 61131-2 in the range from -40°C to +70°C.

The following conditions were observed:

– The Inline devices for all connecting cables were connected with a minimum conductor cross section of 0.5 mm²
– The Inline station was assembled on a wall-mounted horizontal DIN rail
– Fans were used to ensure continuous movement of air in the control cabinet
– The Inline station was not exposed to vibration or shock
– The Inline station was operated with a maximum of 24.5 V (ensured by using regulated power supply units)

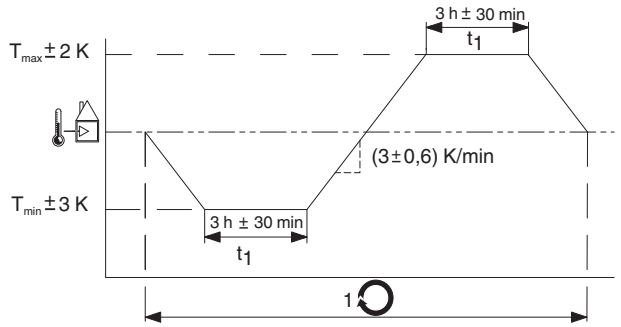



Figure 1 Temperature change cycle

Temperature in the control cabinet/ambient temperature

Cycle

**WARNING:**

The terminal is not approved for use in potentially explosive areas.

The terminal is not approved for use in safety technology.

# 7 Internal circuit diagram

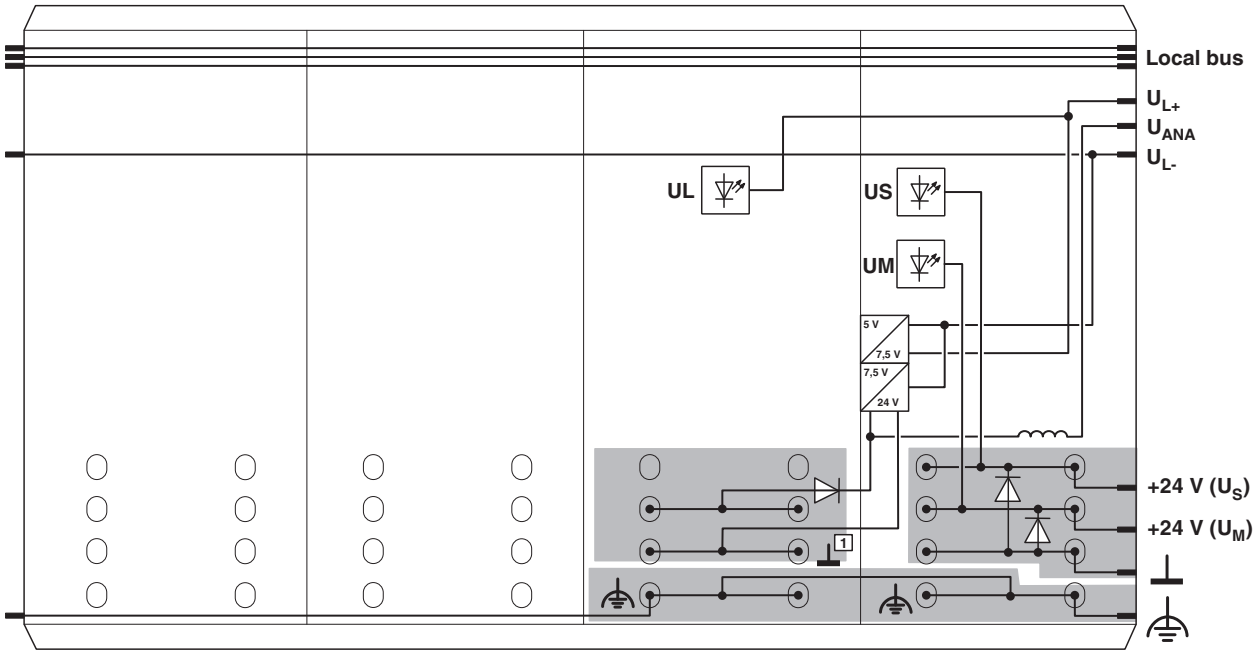



Figure 2 Internal wiring of the terminal points

Key:

LED

Electrically isolated area

Power supply unit

Diode

Reference potential GND (24 V supply)

Explanation for other used symbols has been provided in the IL SYS INST UM E user manual.

# 8 Terminal point assignment

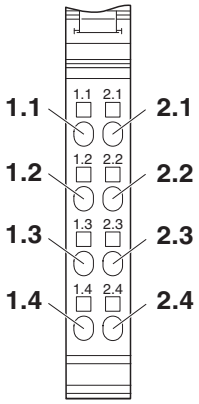



Figure 3 Terminal point assignment

| Terminal point | Designation | Assignment | |
|---|---|---|---|
| **Connector 1** | **Not used** | | |
| **Connector 2** | **Not used** | | |
| **Connector 3** | **Voltage supply for generating the communications power and analog voltage** | | |
| 1.1 / 2.1 | Not used | | |
| 1.2 / 2.2 | 24 V DC | For generating $U_L$ and $U_{ANA}$ | |
| 1.3 / 2.3 | GND | Ground | Ground of the 24 V supply |
| 1.4 / 2.4 | FE | Functional earth ground | Functional earth ground of the power terminal and, therefore, of the Inline station.<br>The contacts are directly connected to the potential jumper and the FE spring on the bottom of the housing. |
| **Connector 4** | **Voltage supply for the main circuit and segment circuit** | | |
| 1.1 / 2.1 | 24 V DC | $U_S$ | 24 V supply for segment circuit |
| 1.2 / 2.2 | 24 V DC | $U_M$ | 24 V supply for main circuit |
| 1.3 / 2.3 | GND | Reference potential of the I/O supply | The reference potential is routed directly to the potential jumper and simultaneously functions as reference ground for the main and segment supplies. |
| 1.4 / 2.4 | FE | Functional earth ground | Functional earth ground of the power terminal and, therefore, of the Inline station.<br>The contacts are directly connected to the potential jumper and the FE spring on the bottom of the housing. |

Functional earth ground is only used to discharge interference.

**NOTE: Electronics may be damaged when overloaded**

Ensure that the maximum permissible current of 8 A flowing through potential jumpers $U_M$ and $U_S$ (total current) is not exceeded.

**NOTE: Malfunction**

Connect the power terminal to the functional earth ground (FE) via one of the FE connections of connector 3 or connector 4. To do so, connect the corresponding contact to a grounding terminal block.

### 24 V segment supply/24 V main supply

The segment supply and main supply must have the same reference potential. Therefore, an electrically isolated voltage area on the I/O side cannot be created.

The main supply and the segment supply are protected against polarity reversal and surge voltage.

**NOTE: Module can become damaged**

The main supply and segment supply do not have short-circuit protection.

The user must provide short-circuit protection. Measure the rating of the fuse connected upstream such that the maximum permissible load current is not exceeded.

### 24 V segment supply

You can provide the segment voltage at this terminal or one of the supply terminals.

There are several ways of providing the segment voltage at the terminal (connector 4):

1. The segment voltage can be supplied separately at terminal points 1.1 (or 2.1) and 1.3 (or 2.3) (GND) of the power connector.
2. Connections 1.1 (or 2.1) and 1.2 (or 2.2) can be jumpered to tap the supply for the segment circuit from the main circuit.
3. A switch can be inserted between terminal points 1.1 (or 2.1) and 1.2 (or 2.2) to create a switched segment circuit (e.g., an emergency stop circuit).

### 24 V supply for generating $U_L$ and $U_{ANA}$

The 24 V supply has protection against polarity reversal and surge voltage. These protective elements are only used to protect the power supply unit.

**NOTE: Module can become damaged**

The 24 V supply does not have short-circuit protection.

The user must provide short-circuit protection. Measure the rating of the fuse connected upstream such that the maximum permissible load current is not exceeded.

## 9 Local diagnostic indicators

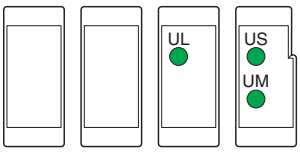



Figure 4 Local diagnostic indicators

| LED | Color | Meaning |
|---|---|---|
| UL | Green | 7.5 V communications power |
| US | Green | 24 V supply for segment circuit |
| UM | Green | 24 V supply for main circuit |

### Function identification

Black

## 10 Connection example

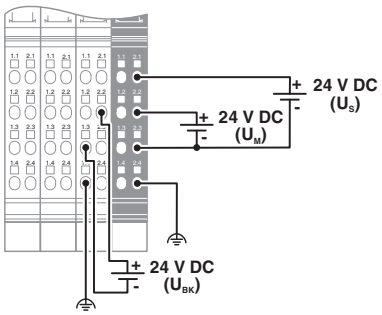



Figure 5 Typical connection of the supply voltage

Стандарт Электрон Связь

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