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. It can be downloaded from the product at phoenixcontact.net/products.

2 Table of contents

3 Ordering data

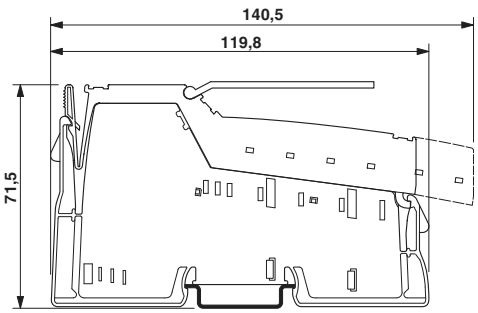
Description	Type	Order No.	Pcs. / Pkt.
Inline power terminal or boost terminal, version for extreme conditions, complete with accessories (connector connector and labeling field), 24 V DC, without fuse	IB IL 24 PWR IN/R-XC-PAC	2701298	1

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) 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) 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. 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 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)

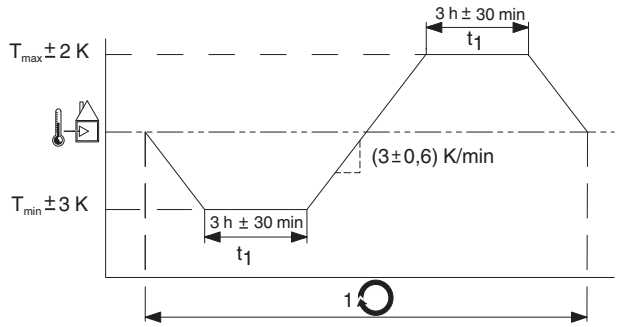


Figure 1 Temperature change cycle

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

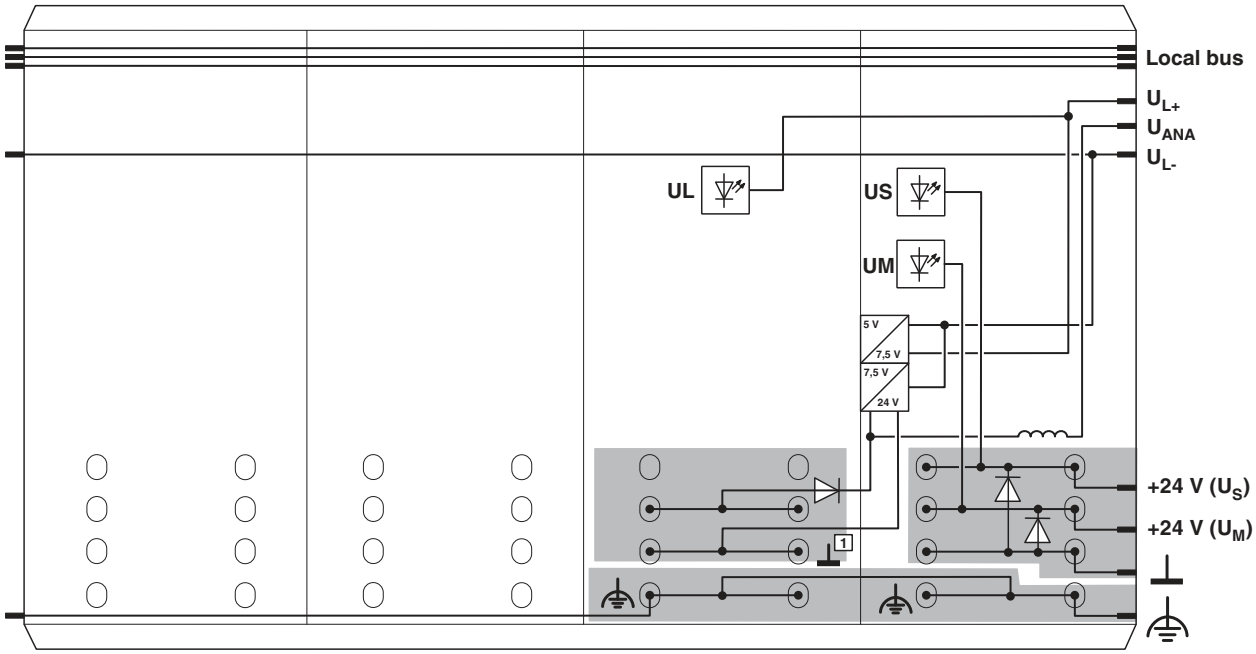


Figure 2 Internal wiring of the terminal points

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

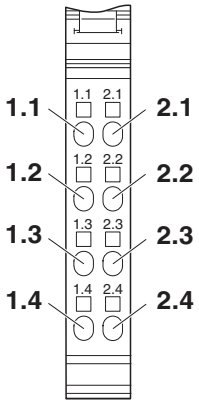


Figure 3 Terminal point assignment

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. 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. 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

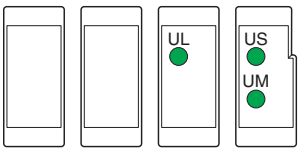


Figure 4 Local diagnostic indicators

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

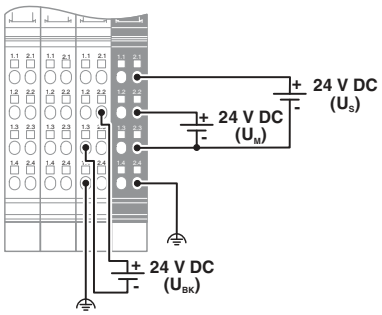


Figure 5 Typical connection of the supply voltage