Variant with integrated tee-connector: Fieldbus connection input (plug)

Fieldbus connection output (socket)

Fieldbus connection

Address selection switch
Configuration interface
Fieldbus status display
Module or IP-Link status display

IP-Link interface

3 types of connection

1 | 8 mm snap type connector
2 | M8 screw type connector
3 | M12 screw type connector

(Special functions: M23 screw type connector)

Power supply feed
Power supply downstream connection

Compact Box IPxxxx-B310 IPxxxx-B318

Coupler Box | PLC IL230x-B310 | C310 IL230x-B318 | C318

1 | n.c.
2 | A
3 | GND
4 | B
5 | Shield

1 | + 5 V DC
2 | A
3 | GND
4 | B
5 | Shield

1 | + 24 V DC Us
2 | + 24 V DC Up
3 | GND
4 | GND

Connector assignment

IPxxxx-, IL230x-B/C31x | Fieldbus Box modules for PROFIBUS

PROFIBUS is a fast, open bus system widely used in automation technology. It is internationally standardised (IEC 61158 and EN50170) and divided into three versions:

– PROFIBUS FMS (Fieldbus Message Specification) is used primarily for communication between controllers. FMS is supported by the Beckhoff BK3100 Bus Coupler (protection class IP 20).
– PROFIBUS PA (Process Automation) is based on an intrinsically safe physical layer and is intended for process automation.
– PROFIBUS DP (Distributed Peripherals) is designed for fast data exchange at the sensor/actuator level.

The PROFIBUS devices in the Fieldbus Box series support PROFIBUS DP. Central control devices (such as IPCs or programmable logic controllers) communicate here over a fast serial connection with distributed input and output devices. Data is mainly exchanged cyclically, although acyclic services (DP V1) are also available for parameterisation and diagnosis.

The high speed of PROFIBUS DP is most impressive: with a transmission rate of 12 Mbaud, less than 2 ms are needed to exchange 512 bits of input and 512 bits of output data with 32 bus devices. This satisfies the requirement for a short system reaction time.

The Beckhoff PROFIBUS devices have a powerful implementation of the protocol and are certified by PNO, the PROFIBUS user organisation.

The fieldbus modules for PROFIBUS DP are available as standard variant (B/C310) or optionally with integrated tee-connector (B/C318). This makes the fieldbus wiring much easier. The tee-connector that used to be necessary is replaced by a second M12-type fieldbus input/output. This makes the cabling more compact. Straight or angled versions of pre-assembled plugs or field-assembled plugs can be used.

Configuration
The node address is set in the range from 1 to 99 using two decimally coded rotary switches. The transmission rate is recognised automatically by the PROFIBUS box (auto baud rate). Device database files (*.gse) for PROFIBUS configuration tools are available for download from the Beckhoff internet site www.beckhoff.com and on the Beckhoff product CDs. Special I/O parameters can be set by means of the KS2000 software or via acyclic DP V1 services.

Diagnostics
The extensive diagnostic functions of the Beckhoff PROFIBUS devices allow rapid fault localisation. The diagnostic messages are transmitted over the bus and collated by the master. The status of the network connection, the device status, the I/O status and the status of the power supply are displayed by LEDs.

Compact Box
Compact Box modules for PROFIBUS DP are available for all relevant industrial signals. In addition to digital and analog input and output modules including thermocouple and RTD inputs, there are also incremental encoder interfaces available for displacement and angle measurement in addition to serial interfaces to solve a large number of communication tasks.

Coupler Box
The PROFIBUS Coupler Box gathers the I/O data from the Extension Box modules over the interference-free IP-Link fibre optic cable. It detects the connected modules and automatically allocates the input and output data to the process image. Both data consistency and a clear separation of input and output data are ensured. The Coupler Box has four digital inputs and four digital outputs. Other kinds of signals are available in the Extension Box.

PLC Box
The PLC Box is an intelligent PROFIBUS node that can perform decentralised processing of I/O data and execute control tasks independently of the function of the PROFIBUS network. The PLC Box, like the Coupler Box, has four digital inputs and four digital outputs. Up to 120 further Extension Box modules can be connected via IP-Link. The I/O data can be made available either to the local PLC program or to the supervising controller. The PLC Box is programmed using TwinCAT over the PROFIBUS or through the configuration interface.

System data	PROFIBUS DP | IPxxxx-B31x, IL230x-B31x, IL230x-C31x				
Number of I/O stations	100 with repeater				
Number of I/O points	approx. 6,000, depending on the master				
Data transfer medium	shielded copper cable, 2 x 0.25 mm²				
Distance between stations	1,200 m	1,000 m	400 m	200 m	100 m
Data transfer rates	9.6/19.2/ 93.75 kbaud	187.5 kbaud	500 kbaud	1,500 kbaud	…3/6/12 Mbaud
Data transfer time	approx. 0.5 ms with 10 stations each with 32 bit input and output				

Technical data	IPxxxx-B310	IPxxxx-B318	IL230x-B310, -C310	IL230x-B318, -C318
Extension modules	–	–	max. 120 with max. 128 byte input and 128 byte output data	max. 120 with max. 128 byte input and 128 byte output data
Digital peripheral signals	according to I/O type	according to I/O type	max. 960 inputs and 960 outputs	max. 960 inputs and 960 outputs
Analog peripheral signals	according to I/O type	according to I/O type	max. 60 inputs and 60 outputs	max. 60 inputs and 60 outputs
Configuration possibility	via KS2000 or the controller, DP-V1 extensions are supported			
Data transfer rates	automatic detection up to 12 Mbaud			
Bus connection (B-coded)	1 x M12 socket, 5-pin	1 x M12 socket, 5-pin, 1 x M12 plug, 5-pin (tee-connector integrated)	1 x M12 socket, 5-pin	1 x M12 socket, 5-pin, 1 x M12 plug, 5-pin (tee-connector integrated)
Power supply	control voltage: 24 V DC (-15 %/+20 %); load voltage: according to I/O type			
Power supply connection	feed: 1 x M8 male socket, 4-pin; downstream connection: 1 x M8 female socket, 4-pin			
Box supply current	85 mA + current consumption of sensors, max. 0.5 A			
Auxiliary power current	according to I/O type			
Electrical isolation	control voltage/fieldbus: no, control voltage/inputs or outputs: according to I/O type			
Weight	approx. 210 g	approx. 250 g	approx. 210 g	approx. 250 g
Operating/storage temperature	0…+55 °C/-25…+85 °C			
Vibration/shock resistance	conforms to EN 60068-2-6/EN 60068-2-27			
EMC immunity/emission	conforms to EN 61000-6-2/EN 61000-6-4			
Protect. class/installation pos.	IP 65/66/67 (conforms to EN 60529)/variable			
Approvals	CE, UL			

Accessories	
KS2000	configuration software for extended parameterisation
TX1200	programming system conforms to IEC 61131-3
Cordsets	cordsets and connectors

System	
PROFIBUS	For further PROFIBUS products please see the system overview.

Compact Box

The Compact Box modules for PROFIBUS DP offer a wide range of I/O functionalities. All relevant industrial signals are supported. The digital inputs and outputs can be connected either with snap type 8 mm diameter plugs, screw type M8 or M12 connectors. For analog signals the M12 version is used.

IPxxxx-B310|B318	Compact Box for PROFIBUS DP systems (12 Mbaud)	Plug
Digital input		
IP1000-B310|B318	Compact Box, 8 digital inputs 24 V DC, 3.0 ms filter	8 mm
IP1001-B310|B318	Compact Box, 8 digital inputs 24 V DC, 3.0 ms filter	M8
IP1002-B310|B318	Compact Box, 8 digital inputs 24 V DC, 3.0 ms filter	M12
IP1010-B310|B318	Compact Box, 8 digital inputs 24 V DC, 0.2 ms filter	8 mm
IP1011-B310|B318	Compact Box, 8 digital inputs 24 V DC, 0.2 ms filter	M8
IP1012-B310|B318	Compact Box, 8 digital inputs 24 V DC, 0.2 ms filter	M12
IP1502-B310|B318	Compact Box, 2 up/down counter, 24 V DC, 100 kHz	M12
Digital output		
IP2000-B310|B318	Compact Box, 8 digital outputs 24 V DC, I_{MAX} = 0.5 A	8 mm
IP2001-B310|B318	Compact Box, 8 digital outputs 24 V DC, I_{MAX} = 0.5 A	M8
IP2002-B310|B318	Compact Box, 8 digital outputs 24 V DC, I_{MAX} = 0.5 A	M12
IP2020-B310|B318	Compact Box, 8 digital outputs 24 V DC, I_{MAX} = 2 A ($\sum$ 4 A)	8 mm
IP2021-B310|B318	Compact Box, 8 digital outputs 24 V DC, I_{MAX} = 2 A ($\sum$ 4 A)	M8
IP2022-B310|B318	Compact Box, 8 digital outputs 24 V DC, I_{MAX} = 2 A ($\sum$ 4 A)	M12
IP2040-B310|B318	Compact Box, 8 digital outputs 24 V DC, I_{MAX} = 2 A ($\sum$ 12 A)	8 mm
IP2041-B310|B318	Compact Box, 8 digital outputs 24 V DC, I_{MAX} = 2 A ($\sum$ 12 A)	M8
IP2042-B310|B318	Compact Box, 8 digital outputs 24 V DC, I_{MAX} = 2 A ($\sum$ 12 A)	M12
IP2512-B310|B318	Compact Box, 2 digital pulse width outputs 24 V DC, I_{MAX} = 2.5 A	M12
Digital combi		
IP2300-B310|B318	Compact Box, 4 digital inputs 24 V DC, 3 ms filter, 4 digital outputs 24 V DC, I_{MAX} = 0.5 A	8 mm
IP2301-B310|B318	Compact Box, 4 digital inputs 24 V DC, 3 ms filter, 4 digital outputs 24 V DC, I_{MAX} = 0.5 A	M8
IP2302-B310|B318	Compact Box, 4 digital inputs 24 V DC, 3 ms filter, 4 digital outputs 24 V DC, I_{MAX} = 0.5 A	M12
IP2310-B310|B318	Compact Box, 4 digital inputs 24 V DC, 0.2 ms filter, 4 digital outputs 24 V DC, I_{MAX} = 0.5 A	8 mm
IP2311-B310|B318	Compact Box, 4 digital inputs 24 V DC, 0.2 ms filter, 4 digital outputs 24 V DC, I_{MAX} = 0.5 A	M8
IP2312-B310|B318	Compact Box, 4 digital inputs 24 V DC, 0.2 ms filter, 4 digital outputs 24 V DC, I_{MAX} = 0.5 A	M12
IP2320-B310|B318	Compact Box, 4 digital inputs 24 V DC, 3 ms filter, 4 digital outputs 24 V DC, I_{MAX} = 2 A ($\sum$ 4 A)	8 mm
IP2321-B310|B318	Compact Box, 4 digital inputs 24 V DC, 3 ms filter, 4 digital outputs 24 V DC, I_{MAX} = 2 A ($\sum$ 4 A)	M8
IP2322-B310|B318	Compact Box, 4 digital inputs 24 V DC, 3 ms filter, 4 digital outputs 24 V DC, I_{MAX} = 2 A ($\sum$ 4 A)	M12
IP2330-B310|B318	Compact Box, 4 digital inputs 24 V DC, 0.2 ms filter, 4 digital outputs 24 V DC, I_{MAX} = 2 A ($\sum$ 4 A)	8 mm
IP2331-B310|B318	Compact Box, 4 digital inputs 24 V DC, 0.2 ms filter, 4 digital outputs 24 V DC, I_{MAX} = 2 A ($\sum$ 4 A)	M8
IP2332-B310|B318	Compact Box, 4 digital inputs 24 V DC, 0.2 ms filter, 4 digital outputs 24 V DC, I_{MAX} = 2 A ($\sum$ 4 A)	M12
IP2400-B310|B318	Compact Box, 16 digital combination inputs/outputs 24 V DC, 3 ms filter, I_{MAX} = 0.5 A	8 mm
IP2401-B310|B318	Compact Box, 16 digital combination inputs/outputs 24 V DC, 3 ms filter, I_{MAX} = 0.5 A	M8
Analog input		
IP3102-B310|B318	Compact Box, 4 differential analog inputs ±10 V, 16 bit	M12
IP3112-B310|B318	Compact Box, 4 differential analog inputs 0/4…20 mA, 16 bit	M12
IP3202-B310|B318	Compact Box, 4 analog inputs for resistance thermometer (RTD), PT100…1000, Ni100, 16 bit	M12
IP3312-B310|B318	Compact Box, 4 analog inputs for thermocouple, types J, K, L, B, E, N, R, S, T, U, 16 bit	M12
Analog output		
IP4112-B310|B318	Compact Box, 4 analog outputs 0/4…20 mA, 16 bit	M12
IP4132-B310|B318	Compact Box, 4 analog outputs ±10 V, 16 bit	M12
Special functions		
IP5009-B310|B318	Compact Box, 1 SSI encoder interface	M23
IP5109-B310|B318	Compact Box, 1 incremental encoder interface with complementary inputs, 1 MHz	M23
IP5209-B310|B318	Compact Box, 1 SinCos encoder interface, 1 V_{SS}	M23
IP6002-B310|B318	Compact Box, 1 serial interface RS232C	M12
IP6012-B310|B318	Compact Box, 1 serial interface, 0…20 mA (TTY)	M12
IP6022-B310|B318	Compact Box, 1 serial interface, RS422, RS485	M12

Coupler Box

The Coupler Box for PROFIBUS DP has four digital inputs and four digital outputs, optionally with snap type 8 mm diameter connectors, screw type M8 or M12 connectors. Up to 120 Extension Box modules can be connected via the IP-Link communication facility.

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IL230x-B310|B318	Coupler Box for PROFIBUS DP systems (12 Mbaud)	Plug
Digital combi		
IL2300-B310|B318	Coupler Box, 4 digital inputs 24 V, 3 ms filter, 4 digital outputs 24 V, 0.5 A	8 mm
IL2301-B310|B318	Coupler Box, 4 digital inputs 24 V, 3 ms filter, 4 digital outputs 24 V, 0.5 A	M8
IL2302-B310|B318	Coupler Box, 4 digital inputs 24 V, 3 ms filter, 4 digital outputs 24 V, 0.5 A	M12

PLC Box

The PLC Box for PROFIBUS DP, programmable in accordance with IEC 61131-3, has four digital inputs and four digital outputs, optionally with snap type 8 mm diameter connectors, screw type M8 or M12 connectors. Up to 120 Extension Box modules can be connected via the IP-Link communication facility.

IL230x-C310|C318	PLC Box with controller IEC 61131-3 for PROFIBUS DP systems (12 Mbaud)	Plug
Digital combi		
IL2300-C310|C318	PLC Box, 4 digital inputs 24 V, 3 ms filter, 4 digital outputs 24 V, 0.5 A	8 mm
IL2301-C310|C318	PLC Box, 4 digital inputs 24 V, 3 ms filter, 4 digital outputs 24 V, 0.5 A	M8
IL2302-C310|C318	PLC Box, 4 digital inputs 24 V, 3 ms filter, 4 digital outputs 24 V, 0.5 A	M12

System overview