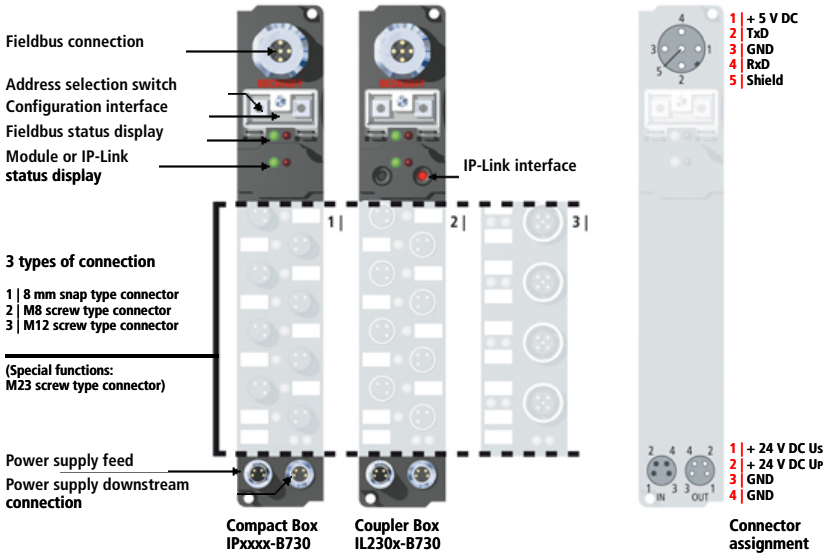

IPxxxx-, IL230x-B730 | Fieldbus Box modules for Modbus

Modbus is an open, serial communications protocol based on the master/slave architecture. Since it is easy to implement on all kinds of serial interfaces, it has gained wide acceptance. The Modbus protocol was originally developed in order to link controllers into a network. However, it has been frequently applied for connecting input/output modules. Because of the low transmission rate, which has a maximum of 38.4 kbaud, Modbus is best employed in applications with less numbers of devices and low demands on response time.

The bus consists of a master station and a number of slave stations. The communication is controlled entirely by the master.

Modbus offers two basic communication mechanisms:

– Question/answer (polling): The master sends an inquiry telegram to any one of the stations and waits for the answer telegram.
– Broadcast: The master sends a command to all the stations on the network. These stations execute the command without providing feedback.
The telegrams allow process data (input/output data) to be written and read, either individually or in groups. The data can be transmitted either in ASCII code or packed into RTU format.

Modbus is used on a variety of transmission media. An implementation based physically on the RS485 bus, with a twisted screened two-wire cable and termination resistors, as in PROFIBUS, is widespread.

Configuration
The node address is set in the range from 1 to 69 using two decimally coded rotary switches. The transmission rate and other system parameters can be set by the address selection switch or by using the KS2000 software tool through the serial configuration interface on the Fieldbus Box.

Diagnostics
The Beckhoff Modbus nodes support the diagnostic functions of the Modbus protocol. The diagnostic messages are transmitted over the bus and collated in the master. The status of the network connection, the device status, the status of the inputs and outputs and of the power supply are displayed by LEDs.

Compact Box
Compact Box modules for Modbus 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 Modbus 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.

System data	Modbus | IPxxxx-B730, IL230x-B730
Number of I/O stations	69 (with repeater)
Number of I/O points	depending on controller
Data transfer medium	screened, twisted copper cable 2 x 0.25 mm² (RS485)
Distance between stations	max. 1,200 m (depending on baud rate)
Data transfer rates	150…38,400 baud
I/O communication types	read/write access, optionally bit oriented or word oriented

Technical data	IPxxxx-B730	IL230x-B730
Extension modules	–	max. 120 with max. 512 byte input and 512 byte output data
Digital peripheral signals	according to I/O type	max. 960 inputs and 960 outputs
Analog peripheral signals	according to I/O type	max. 255 inputs and 255 outputs
Protocol	RTU/ASCII	
Configuration possibility	by means of address selection switch or KS2000	
Data transfer rates	150, 300, 600, 1,200, 2,400, 4,800, 9,600, 19,200, 38,400 baud	
Bus interface	1 x M12 socket, 5-pin, B-coded	
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	45 mA + current consumption of sensors, max. 0.5 A	
Auxiliary power current	according to I/O type	
Electrical isolation	control voltage/fieldbus: yes, control voltage/inputs or outputs: according to I/O type	
Weight	approx. 210 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
Cordsets	cordsets and connectors

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

Compact Box

The Compact Box modules for Modbus offer a wide range of I/O functionality. 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 connectors, or screw type M12 connectors. For analog signals the M12 version is used.

IPxxxx-B730	Compact Box for Modbus systems	Plug
Digital input		
IP1000-B730	Compact Box, 8 digital inputs 24 V DC, 3.0 ms filter	8 mm
IP1001-B730	Compact Box, 8 digital inputs 24 V DC, 3.0 ms filter	M8
IP1002-B730	Compact Box, 8 digital inputs 24 V DC, 3.0 ms filter	M12
IP1010-B730	Compact Box, 8 digital inputs 24 V DC, 0.2 ms filter	8 mm
IP1011-B730	Compact Box, 8 digital inputs 24 V DC, 0.2 ms filter	M8
IP1012-B730	Compact Box, 8 digital inputs 24 V DC, 0.2 ms filter	M12
IP1502-B730	Compact Box, 2 up/down counter, 24 V DC, 100 kHz	M12
Digital output		
IP2000-B730	Compact Box, 8 digital outputs 24 V DC, I_{MAX} = 0.5 A	8 mm
IP2001-B730	Compact Box, 8 digital outputs 24 V DC, I_{MAX} = 0.5 A	M8
IP2002-B730	Compact Box, 8 digital outputs 24 V DC, I_{MAX} = 0.5 A	M12
IP2020-B730	Compact Box, 8 digital outputs 24 V DC, I_{MAX} = 2 A ($\sum$ 4 A)	8 mm
IP2021-B730	Compact Box, 8 digital outputs 24 V DC, I_{MAX} = 2 A ($\sum$ 4 A)	M8
IP2022-B730	Compact Box, 8 digital outputs 24 V DC, I_{MAX} = 2 A ($\sum$ 4 A)	M12
IP2040-B730	Compact Box, 8 digital outputs 24 V DC, I_{MAX} = 2 A ($\sum$ 12 A)	8 mm
IP2041-B730	Compact Box, 8 digital outputs 24 V DC, I_{MAX} = 2 A ($\sum$ 12 A)	M8
IP2042-B730	Compact Box, 8 digital outputs 24 V DC, I_{MAX} = 2 A ($\sum$ 12 A)	M12
IP2512-B730	Compact Box, 2 digital pulse width outputs 24 V DC, I_{MAX} = 2.5 A	M12
Digital combi		
IP2300-B730	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-B730	Compact Box, 4 digital inputs 24 V DC, 3 ms filter, 4 digital outputs 24 V DC, I_{MAX} = 0.5 A	M8
IP2302-B730	Compact Box, 4 digital inputs 24 V DC, 3 ms filter, 4 digital outputs 24 V DC, I_{MAX} = 0.5 A	M12
IP2310-B730	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-B730	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-B730	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-B730	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-B730	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-B730	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-B730	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-B730	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-B730	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-B730	Compact Box, 16 digital combination inputs/outputs 24 V DC, 3 ms filter, I_{MAX} = 0.5 A	8 mm
IP2401-B730	Compact Box, 16 digital combination inputs/outputs 24 V DC, 3 ms filter, I_{MAX} = 0.5 A	M8
Analog input		
IP3102-B730	Compact Box, 4 differential analog inputs ±10 V, 16 bit	M12
IP3112-B730	Compact Box, 4 differential analog inputs 0/4…20 mA, 16 bit	M12
IP3202-B730	Compact Box, 4 analog inputs for resistance thermometer (RTD), PT100…1000, Ni100, 16 bit	M12
IP3312-B730	Compact Box, 4 analog inputs for thermocouple, types J, K, L, B, E, N, R, S, T, U, 16 bit	M12
Analog output		
IP4112-B730	Compact Box, 4 analog outputs 0/4…20 mA, 16 bit	M12
IP4132-B730	Compact Box, 4 analog outputs ±10 V, 16 bit	M12
Special functions		
IP5009-B730	Compact Box, 1 SSI encoder interface	M23
IP5109-B730	Compact Box, 1 incremental encoder interface with complementary inputs, 1 MHz	M23
IP5209-B730	Compact Box, 1 SinCos encoder interface, 1 V_{SS}	M23
IP6002-B730	Compact Box, 1 serial interface RS232C	M12
IP6012-B730	Compact Box, 1 serial interface, 0…20 mA (TTY)	M12
IP6022-B730	Compact Box, 1 serial interface, RS422, RS485	M12

Coupler Box

The Coupler Box for Modbus 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-B730	Coupler Box for Modbus systems	Plug
Digital combi		
IL2300-B730	Coupler Box, 4 digital inputs 24 V, 3 ms filter, 4 digital outputs 24 V, 0.5 A	8 mm
IL2301-B730	Coupler Box, 4 digital inputs 24 V, 3 ms filter, 4 digital outputs 24 V, 0.5 A	M8
IL2302-B730	Coupler Box, 4 digital inputs 24 V, 3 ms filter, 4 digital outputs 24 V, 0.5 A	M12

System overview