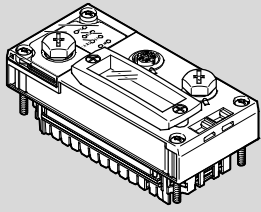


Bus node CPX-FB37

FESTO

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Brief description 8101644
Translation of the original instructions 2018-11a
[8101646]

Bus node CPX-FB37 English

For all available product documentation → www.festo.com/pk

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1 Intended use

The bus node CPX-FB37 is intended exclusively for use in CPX terminals, as a participant in the EtherCAT network and as follows:

- in excellent technical condition
- in original status, without unauthorised modifications
- within the limits of the product defined through the technical data
- in an industrial environment.

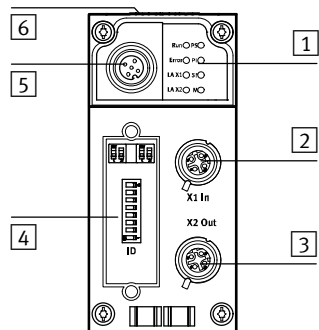
You can find detailed information in the bus node description (P.BE-CPX-FB37-...) and in the CPX system description (P.BE-CPX-SYS-...).

You can receive information on EtherCAT in the Internet: EtherCAT Technology Group → www.ethercat.org.

2 Target group

The target group of this documentation consists of trained specialists in control and automation technology.

3 Connection and display components



- | | |
|--|--|
| 1 EtherCAT-specific network status LEDs and CPX-specific LEDs | 4 Cover for DIL switches |
| 2 Network connection 1 (input “X.1 In”) | 5 Service interface for operator unit (CPX-MMI) and USB adapter for CPX-FMT |
| 3 Network connection 2 (output “X2 Out”) | 6 Rating plate |

Fig. 1

3.1 Network connections

There are two 4-pin M12 sockets (D-coded) on the bus node for connection of the bus node to the EtherCAT network.

M12 socket, D-coded	Pin	Signal	Explanation
	1	TD+	Transmitted data (Transmit Data) +
	2	RD+	Received data (Receive Data) +
	3	TD-	Transmitted data -
	4	RD-	Received data -
Housing	FE		Screening/functional earth

Fig. 2

3.2 LED displays

Behaviour of the LED indicators in normal operating status:

- The LEDs “Run”, “PS” and “PL” are illuminated.
- The LEDs “LA/X1” and “LA/X2” are illuminated or flash if the assigned network connection is used.
- The LEDs “Error” and “SF” are not illuminated.
- The LED “M” is illuminated with the setting “System start with saved parameters”.
- The LED “M” flashes if “Force” is active.

EtherCAT network status LEDs ¹⁾		CPX-specific LEDs ¹⁾	
Run (green)	Operating status	PS (green)	Power system
Error (red)	EtherCAT error	PL (green)	Power Load
LA/X1 (green)	Connection status X1 In/ X2 Out ²⁾	SF (red)	System Failure ³⁾
LA/X2 (green)		M (yellow)	Modify ⁴⁾

- 1) Detailed information: → bus node description (P.BE-CPX-FB37-...)
- 2) Network connection or data traffic at “X1 In” or “X2 Out”
- 3) Flashes in case of error, diagnostics by means of error number: → CPX system description (P.BE-CPX-SYS-...)
- 4) “System start with saved parameters” or “forcing” active

Fig. 3

4 Mounting/dismounting

Warning

Danger of injury to people, damage to the machine and system resulting from uncontrolled movements of the actuators and undefined switching states

- Switch off the operation and load voltage supplies.
- Switch off the compressed air supply.
- Exhaust the valve terminal pneumatics.

Warning

Danger of electric shock

- For the electrical power supply, use only PELV circuits in accordance with IEC/EN 60204-1 (Protective Extra-Low Voltage, PELV).
- Observe the general requirements of IEC/EN 60204-1 for PELV circuits.
- Only use voltage sources that ensure a reliable electric separation of operating voltage in accordance with IEC/EN 60204-1.

→

Note

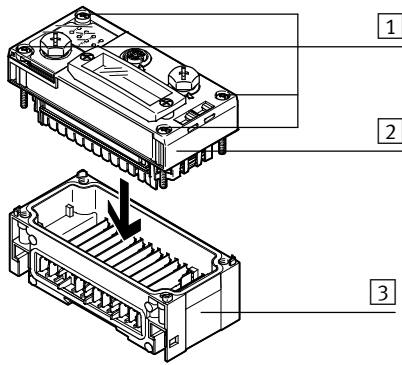
Damage to the electronics
The bus node includes electrostatically sensitive devices.

- Do not touch any components.
- Observe the handling specifications for electrostatically sensitive devices.

→ **Note**

- Only commission a CPX terminal which has been completely mounted and connected.
- Observe the specifications in the CPX system description, in the descriptions of the valve terminal used as well as in the assembly instructions of the individual components.

When built-in, the bus node is located in an interlinking block of the CPX terminal.



- 1 TORX T10 screws; tightening torque 0.9 ... 1.1 Nm
- 2 CPX bus node
- 3 Interlinking block with contact rails

Fig. 4

4.1 Dismantling

1. Unscrew screws using a TORX screwdriver (size T10).
2. Pull bus node off cautiously and without twisting.

4.2 Mounting



Note

Damage to the interlinking block

- Use appropriate screws, dependent on the material of the interlocking block:
 - **plastic** interlinking block: thread-cutting screws
 - **metal** interlinking block: screws with metric thread



Both types of screws are enclosed respectively when ordering the bus node as a single part.

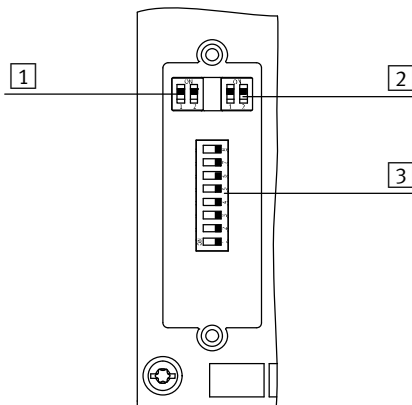
1. Check seal and seal surfaces. Replace damaged parts.
2. Push the bus node carefully and without tilting into the interlinking block up to the stop.
3. Turn the screws into the existing thread.
4. Tighten the screws in diagonally opposite sequence. Tightening torque: 0.9 ... 1.1 Nm.



Note

- Use cover caps to seal unused connections. In this way, protection class IP65/IP 67 is assured.

5 Setting the DIL switches



- 1 DIL switch 1: Operating mode, EtherCAT interface
- 2 DIL switch 2: Diagnostics mode, data field size, bootloader
- 3 DIL switch 3: EtherCAT address

Fig. 5

5.1 Removal of the DIL switch cover

To set the DIL switches, you must remove the cover:

1. Switch supply power off.
2. Unscrew the two mounting screws of the transparent cover and remove the cover.

5.2 Setting the operating mode with DIL switch 1

You can set the operating mode of the bus node with switch element 1.1 of DIL switch 1.

DIL switch 1	Setting	Operating mode
	DIL 1.1: OFF (Factory setting)	Remote I/O All functions of the CPX terminal are controlled directly by the EtherCAT I/O controller or a higher-level PLC.
	DIL 1.1: ON	Remote controller A CPX-FEC or CPX-CEC integrated into the terminal controls all functions

Fig. 6

5.3 Setting the EtherCAT interface with DIL switch 1

You set the EtherCAT interface of the bus node with switch element DIL 1.2 of DIL switch 1.

DIL switch 1	Setting	Function
	DIL 1.2: OFF (Factory setting)	Modular device profile (MDP)
	DIL 1.2: ON	Fixes I/O size (64 byte I/A), compatible with the bus node CPX-FB38

Fig. 7

5.4 Setting the diagnostics mode, I/O bytes or starting of the bootloader with DIL switch 2

The function of DIL switch 2 is dependent on the set operating mode of the CPX terminal:

- setting of the diagnostics mode in Remote I/O operating mode
- setting the data field size in the remote controller operating mode
- starting the bootloader in both operating modes.

DIL switch 2	Setting	Remote I/O	Remote controller
	DIL 2.1: OFF DIL 2.2: OFF (Factory setting)	I/O diagnostics interface and status bits switched off	8 byte I/8 byte O for communication of the bus node with the CPX-FEC or CPX-CEC
	DIL 2.1: OFF DIL 2.2: ON	Status bits are switched on + 16 I bits (only 8 bits used)	Reserved
	DIL 2.1: ON DIL 2.2: OFF	I/O diagnostics interface is switched on + 16 I/O bits	16 byte I/16 byte O for communication of the bus node with the CPX-FEC or CPX-CEC
	DIL 2.1: ON DIL 2.2: ON	Bootloader (Restore the firmware in case of loss of function)	Bootloader (Restore the firmware in case of loss of function)

Fig. 8

5.5 Setting the EtherCAT address with DIL switch 3

Assign a free EtherCAT address (device identification value) to the bus node with the switch elements DIL 3.1 ... 3.8. Setting an EtherCAT address is optional (e.g. for the Hot Connect function).

DIL switch 3	Function
	Binary-coded input of the EtherCAT address ¹⁾ Example on left in figure: EtherCAT address = 2 ¹ + 2 ² + 2 ⁵ = 2 + 4 + 32 = 38
	Binary-coded input of the EtherCAT address Example on left in figure (all switch elements are OFF): EtherCAT address = 0, the programmed EtherCAT address in the EEPROM is used (factory setting).

1) Possible EtherCAT addresses are 1 to 255.

Fig. 9

5.6 Mounting the DIL switch cover

1. Place cover on the bus node. Make sure that the seal is positioned correctly!
2. Tighten the two mounting screws with a max. torque of 0.4 Nm.

6 Connecting to the network

Use shielded Industrial Ethernet cables of category Cat 5 or higher.

6.1 Cable specification

Feature	Requirement
Cable type	Ethernet twisted pair cable, screened
Transmission class	Category Cat 5 or higher
Core cross section	0.14 ... 0.75 mm ² 22 AWG required for max. connection length between network participants
Connection length	Max. 100 m

Fig. 10

7 Power supply of the CPX terminal

The operating and load voltage supply for the CPX terminal runs over interlinking blocks. The interlinking blocks carry the operating and load voltage over contact rails to the adjacent modules (→ CPX system description P.BE-CPX-SYS...).

8 Start-up behaviour of the CPX terminal

If the LED “M” illuminates or flashes permanently after the system start, “System start with saved parameterisation and saved CPX expansion” is set or “Force” is active.

9 Note on module replacement



Note

Loss of settings

If the LED “M” of the bus node is permanently lit, parameterisation of the CPX terminal is saved locally in the bus node. In this case, parameterisation is lost if the bus node is replaced.

- Before replacement, secure required settings and make them again after replacement.

10 Parameterisation

The CPX terminal and the related bus node can be parameterised by means of the Festo operator unit (CPX-MMI), Festo Maintenance Tool (CPX-FMT) or EtherCAT (CoE). The CPX modules are made available in the configuration file (ESI file).



You can find the current configuration files (ESI files) and additional information on the Festo Internet page in the Support Portal (→ www.festo.com/sp).



Further information on parameterisation and module replacement can be found in the bus node description P.BE-CPX-FB37-... (→ www.festo.com/sp).

11 Technical data

Feature	Specification/value
General technical data	→ CPX system description P.BE-CPX-SYS-...
Degree of protection through housing in accordance with IEC/EN 60529, completely mounted, plug connector inserted or provided with cover cap	IP65/IP67
Protection against electric shock Protection against direct and indirect contact in accordance with IEC/EN 60204-1	by means of PELV power circuit
Bus node intrinsic current consumption from operating voltage supply for electronics/sensors ($U_{EL/SEN}$)	typically 100 mA at 24 V (internal electronics)
Separation EtherCAT interfaces for $U_{EL/SEN}$	galvanically separated
Module code (CPX-specific)	
Remote I/O	224/2
Remote controller	171/2
Network-specific characteristics	
Protocol	EtherCAT, based on the Ethernet protocol IEEE 802.3, optimised for process data, real-time capable
Transmission rate	100 Mbit/s
Crossover detection	Auto-MDIX

Fig. 11