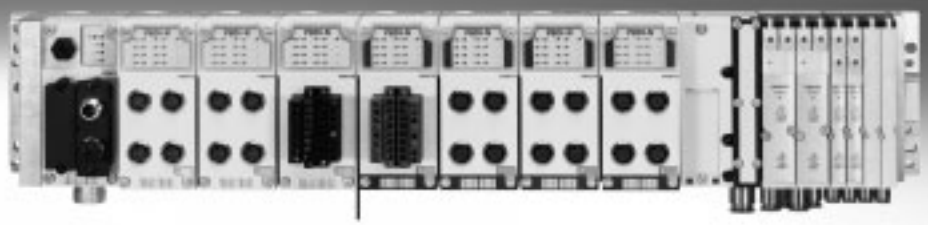
Modular electrical terminal CPX-P

FESTO



Terminal CPX-P

Key features

Key features

Installation concept	Electrics	Assembly	Operation
• Economical from the smallest configuration up to the maximum number of modules • Up to 9 electrical input/output modules plus bus node and pneumatic interface/electronics modules for valves • Extensive range of functions and connection options for the electrical modules • Choice of connection technology for technically and economically optimised connections • Can be used as a dedicated remote I/O module	• High operating voltage tolerance (±25%) • Open to all fieldbus protocols and Ethernet • IT services and TCP/IP such as remote maintenance, remote diagnostics, web server, SMS and e-mail alert • Digital inputs and outputs, 4-way/8-way/16-way, optionally available with individual channel diagnostics • Analogue inputs and outputs, 2-way/4-way • Analogue inputs and outputs with HART protocol • Input modules for connecting NAMUR sensors • Supply ports • Temperature inputs • IP65 or IP20	• Wall or H-rail mounting, also on mobile units • Conversions/extensions are possible at any time, individual linking • Modular system offering a range of configuration options • Fully assembled and tested unit • Lower costs for selection, ordering, assembly and commissioning thanks to the central CPX-P terminal • Choice of pneumatic components for optimised control chain system design	• Fast troubleshooting thanks to an extensive selection of LEDs (some of which are multi-coloured) on the bus node and on all I/O modules • Supports module and channel-oriented diagnostics • Fieldbus/Ethernet remote diagnostics • Innovative diagnostic support with integrated web server/web monitor or Festo Maintenance Tool (CPX-FMT) with USB adapter (NEFC) for PC • Optimised commissioning thanks to parameterisable functions • Reliable servicing with connection blocks and modules that are quick to replace without changing the wiring

Terminal CPX-P

Key features

Variants of the CPX-P terminal controller (with bus node, without preprocessing)

Bus node

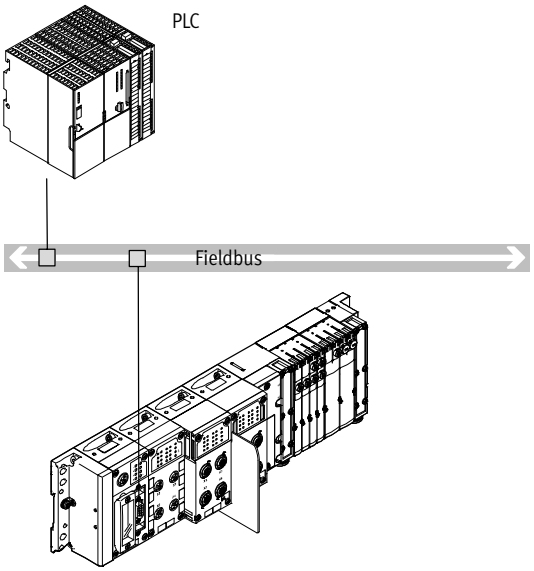
Different bus nodes are used for integration in the control systems of various manufacturers.
The CPX-P terminal can therefore be operated on commonly used fieldbus systems:

- PROFIBUS DP
- PROFINET
- DeviceNet
- CANopen

Integration in universal networks based on Ethernet opens up new possibilities. Faster data transmission, real-time capability and above all additional IT services such as file transfer, web server, as website integrated in the CPX-P terminal, text message/e-mail alerts, etc. open up a wide range of synergies.
These include standardised and universal communication technology across all areas, including operating level, management level and field level in the production environment, with protection to IP65.
The following protocols are supported:

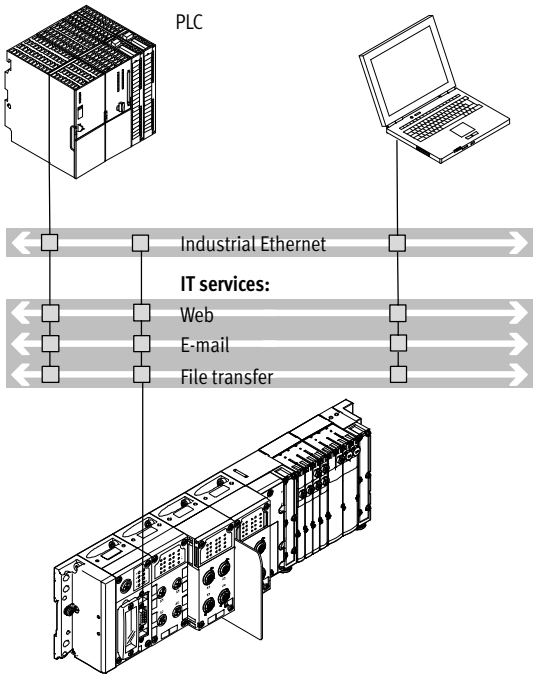
- EtherNet/IP
- Modbus/TCP
- PROFINET
- EtherCAT

Bus node



- Communication with the higher-order controller via fieldbus
- No preprocessing
- Fieldbus protocol dependent on CPX bus node used
- More than 90 I/Os, depending on bus node used

Industrial Ethernet bus node



- Connection to a higher-order controller directly via EtherNet/IP, Modbus/TCP, EtherCAT or PROFINET
- No preprocessing
- Monitoring via Ethernet and web applications
- More than 300 I/Os

Note

Every electrical connection can be combined with an appropriate number of I/O modules and/or pneumatic components, depending on its address capacity.

Likewise, every pneumatic variant of the CPX-P terminal can be operated with every electrical connection variant.

Terminal CPX-P

Key features

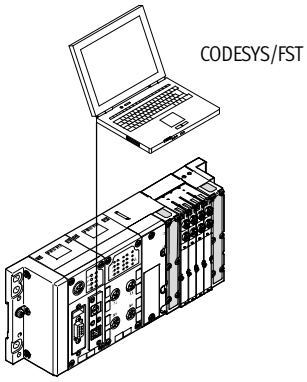
Variants of the CPX-P terminal controller (with preprocessing in the control block)

Control block

The optional front end controllers CPX-CEC enable simultaneous access via Ethernet, in parallel with a bus node, as well as autonomous preprocessing. Access via Modbus/TCP and EasyIP is also possible.

Commissioning, programming, and diagnostics using the Festo software tool FST with hardware configurator.

With control block in stand-alone mode

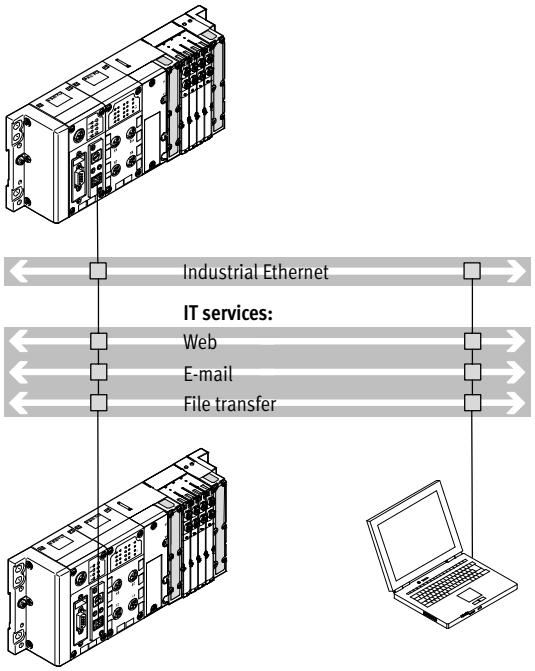


- Decentralised controller with direct machine mounting
- Downloading programs via Ethernet (or via the programming interface)
- Supports full expansion of all CPX peripherals
- More than 300 I/Os

Can be successfully used in the follow applications:

- Stand-alone individual workstations
- Interlinked, stand-alone sub-systems
- Automation using IT technology

With control block in Festo EasyIP mode



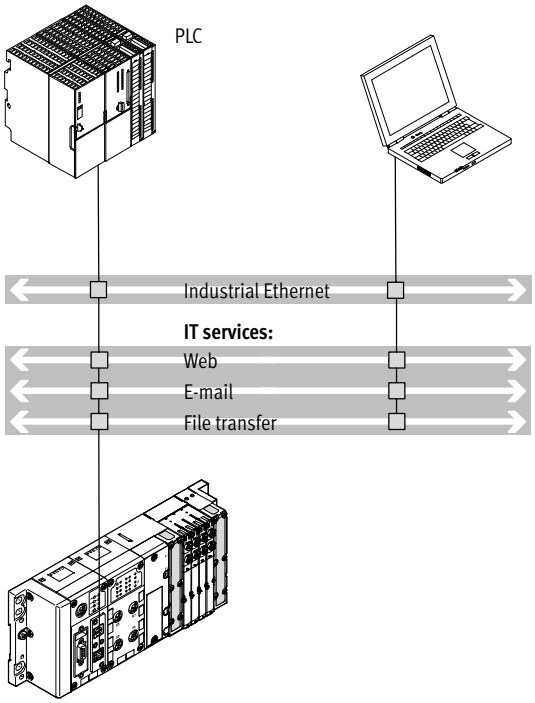
- Fast preprocessing of the CPX-P peripherals in the control block
- Exchange of any data between the control blocks via EasyIP
- Remote diagnostics

- No higher-order controller is required
- More than 300 I/Os per CPX-P control block

Variants of the CPX-P terminal controller (with preprocessing in the control block)

With control block as remote controller on Ethernet

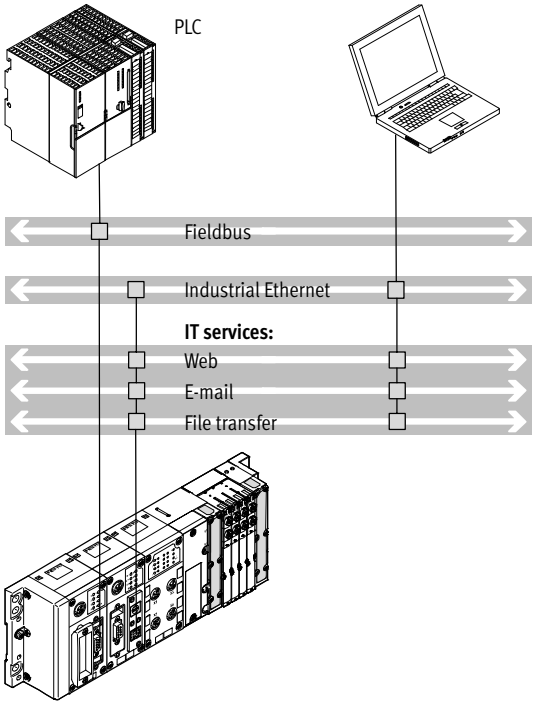
Remote controller via Ethernet as the preprocessing unit for decentralised, stand-alone sub-systems using IT technology.



- Connection to a higher-order controller via Ethernet, no further bus node is required
- Monitoring via Ethernet and web applications
- Preprocessing of the CPX-P peripherals by CPX-P control block
- More than 300 I/Os

With control block as remote controller on the fieldbus

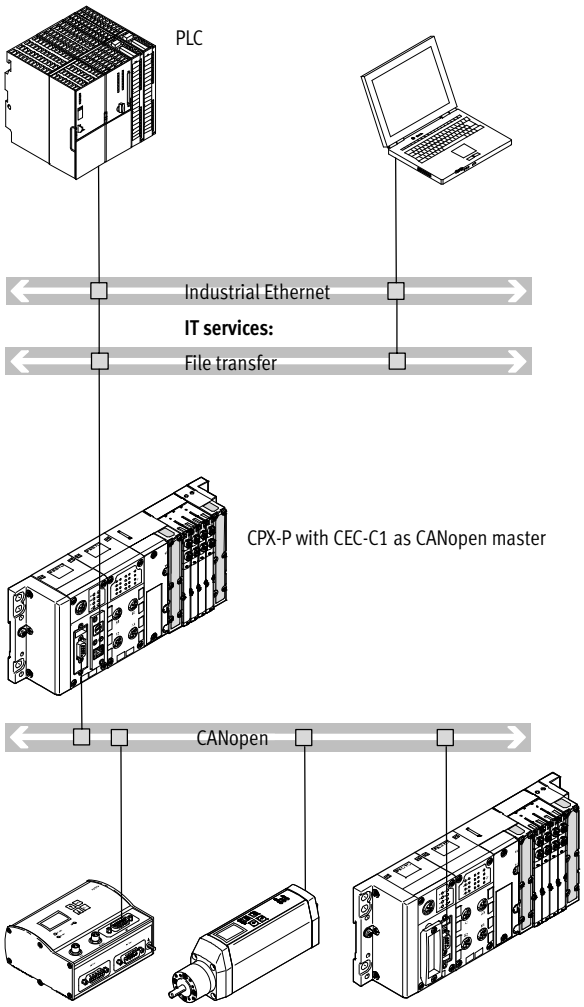
Fieldbus remote controller (combination with bus nodes for PROFIBUS DP, PROFINET, CANopen, DeviceNet or EtherCAT) as the preprocessing unit for decentralised, stand-alone subsystems.



- Fast preprocessing of the CPX-P peripherals in the control block
- Communication with the higher-order controller via fieldbus
- Optional additional monitoring via Ethernet and web applications
- Downloading programs via programming interface
- More than 300 I/Os, bus node is only used for communication with the higher-order PLC
- Option of two bus nodes for redundant communication configuration

Variants of the CPX-P terminal controller (with preprocessing in the control block)

With control block as CANopen fieldbus master



Features:

- Connection to a higher-order controller via Ethernet, no further bus node is required
- Monitoring via Ethernet
- Preprocessing of the CPX-P peripherals by CPX-P control block
- More than 300 I/Os
- Up to 128 stations with repeater technology on CANopen

Operating modes:

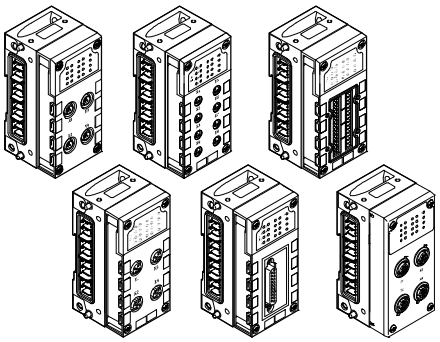
- Remote controller on Ethernet
- Control block in Festo EasyIP mode

Terminal CPX-P

Key features

Connection of inputs and outputs to the CPX-P terminal

Digital and analogue CPX-P I/O modules

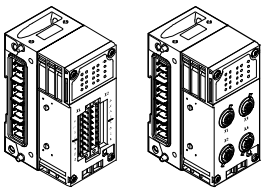


Electrical connection

The connection technology for sensors and additional actuators offers a wide range of digital and analogue input and output modules and is freely selectable – as appropriate to your standard or application.
The input/output modules can be combined as required with the connection blocks:

- M12 5-pin
- M12 5-pin, with quick lock and metal thread
- M12 8-pin
- M8 3-pin
- M8 4-pin
- Sub-D 25-pin
- Harax® 4-pin
- CageClamp®
  (with cover also to IP65/67)
- Screw terminal and spring-loaded terminal

CPX modules for NAMUR sensors

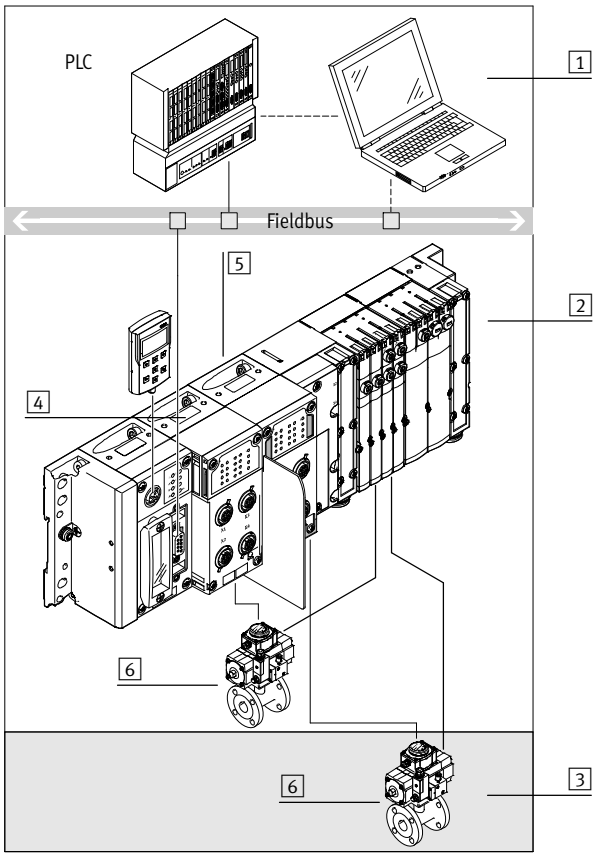


Electrical connection

The electronics modules for NAMUR sensors can only be combined with certain connection blocks.
The input modules can be combined as required with the connection blocks:

- M12 4-pin
- Screw terminal and spring-loaded terminal

CPX modules for NAMUR sensors, intrinsically safe circuits for ATEX applications



1 Higher-order controller
2 Non-ATEX zone; non-intrinsically safe circuits are permitted
3 ATEX zone; only intrinsically safe circuits are permitted
4 CPX input module for NAMUR sensors, non-intrinsically safe design
5 CPX input module for NAMUR sensors, intrinsically safe design
6 Actuator/machine component with NAMUR sensors

CPX-P modules are suitable for configuring intrinsically safe or non-intrinsically safe circuits depending on the design selected.
This enables components from both safe and potentially explosive zones to be connected to the CPX-P terminal.
The components for the intrinsically safe zone are marked in blue or entirely coloured blue to distinguish them visually.

Note

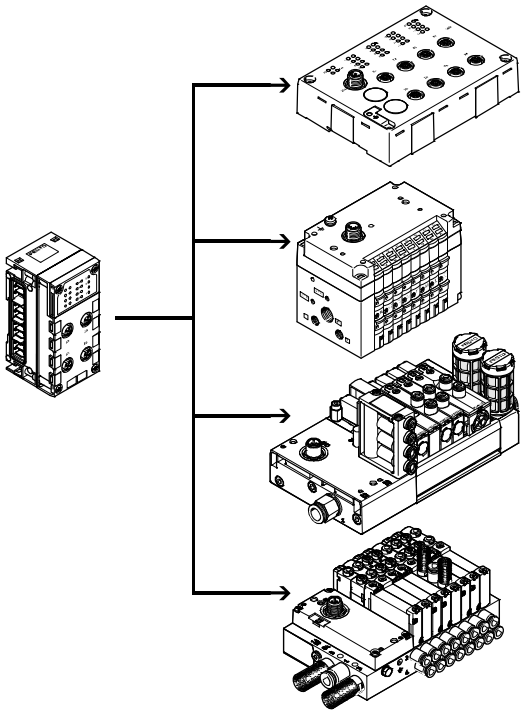
Intrinsically safe circuits are circuits which release so little energy during operation, or in the event of certain faults under specified test conditions, that no ignition can occur in a particular potentially explosive atmosphere.

Terminal CPX-P

Key features

Connection of inputs and outputs to the CPX-P terminal

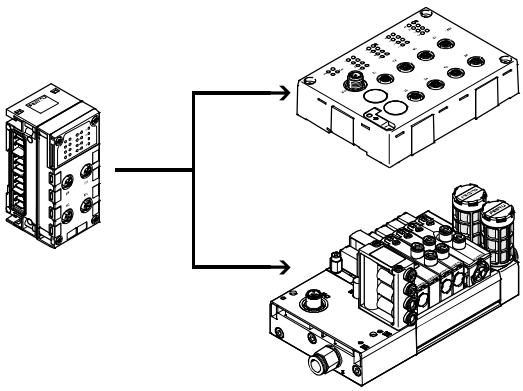
With CPX-CTEL interface



- Up to 4 devices with individual electronic protection per CPX-CTEL
- Max. 64 inputs/64 outputs per I-Port interface
- The maximum length of a string is 20 m
- Input modules with 16 digital inputs (connection technology M8 3-pin and M12 5-pin)
- Valve terminals with I-Port interface (up to 48 solenoid coils, different valve functions)

Several CPX-P CTEL masters can be combined on one CPX-P terminal (depending on the controller used). Combination of central CPX-P I/O modules and decentrally mounted I/O modules with I-Port interface.

With CPX-CTEL-2 interface



- Up to 2 IO-Link devices with individual electronic protection per CPX-CTEL-2 interface
- Max. 16-byte inputs/16-byte outputs per IO-Link device
- The maximum length of a string is 20 m

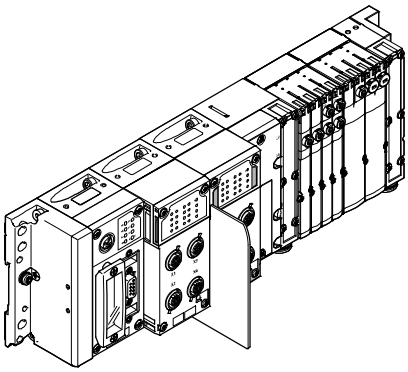
Several CPX-CTEL-2 interfaces can be combined on one CPX terminal (depending on the controller used). Combination of central CPX-P I/O modules and decentrally mounted I/O modules with IO-Link interface.

Terminal CPX-P

Key features

Pneumatic variants of the CPX-P terminal

With valve terminal MPA-S – centralised



The electrical CPX-P terminal is a modular peripheral system for valve terminals.
The system is specifically designed so that the valve terminal can be adapted to suit different applications.

The modular system design lets you configure the number of valves, inputs and additional outputs to suit the application.

Ordering

The CPX-P terminal with valve terminal is fully assembled according to your order specifications and individually tested. The finished valve terminal consists of the electrical peripherals including the desired actuation and the selected components from the MPA-S modular system.

The CPX-P terminal with valve terminal is ordered using two separate order codes. One order code defines the electrical peripherals type CPX-P, while the other specifies the pneumatic components of the valve terminal.

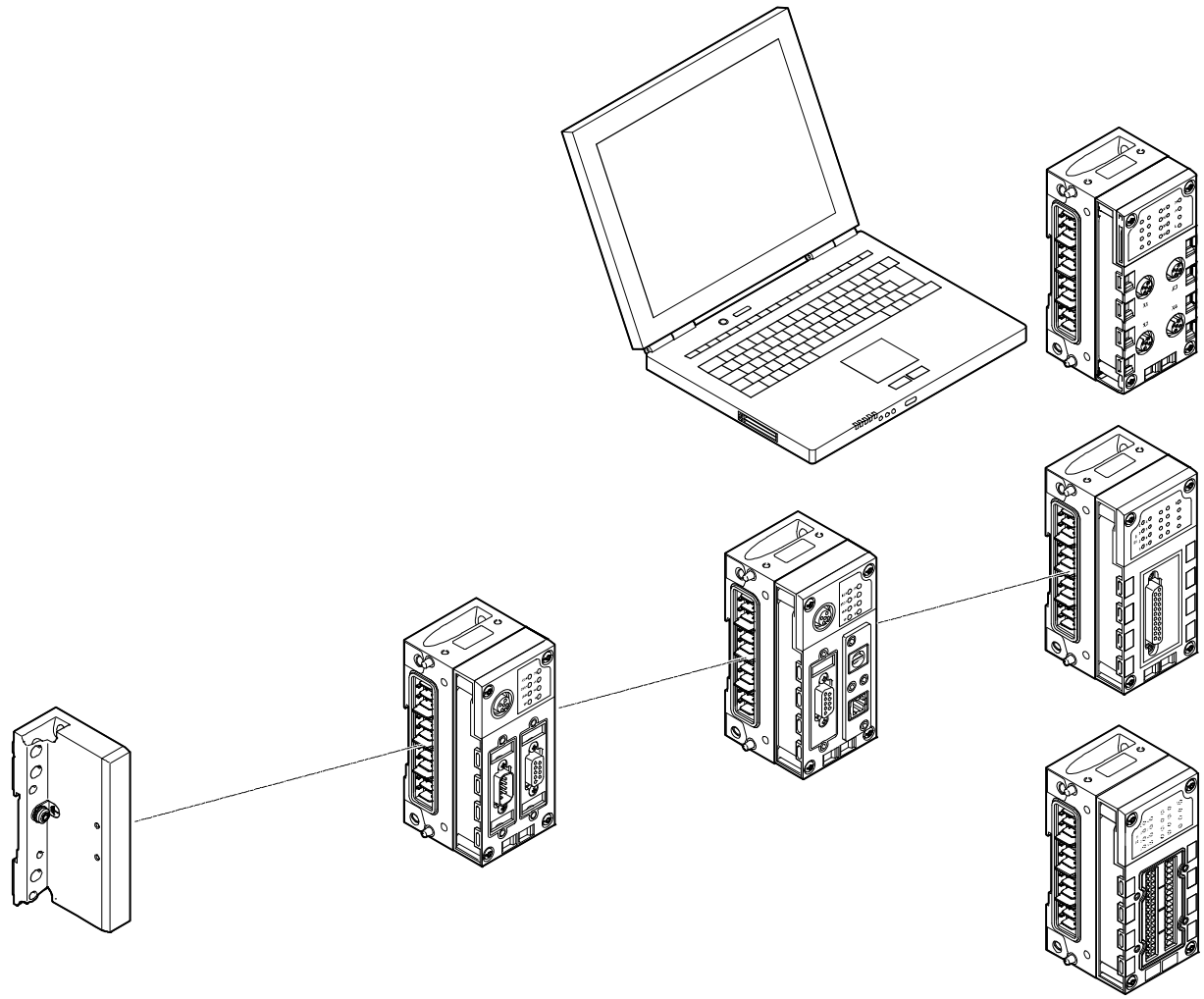
The electrical peripherals type CPX-P can also be configured without a valve terminal and can be used on a fieldbus. To order this, only the order code for the electrical peripherals is required.

The order lists for the pneumatic components can be found at
➔ Internet: mpa-s
(valve terminal MPA-S)

Terminal CPX-P

Peripherals overview

Complete overview of modules



End plate

- Mounting holes for wall mounting
- Functional earth connection

Bus node

- Fieldbus/Industrial Ethernet connection using various types of connection technology
- Setting fieldbus parameters via DIL switch
- Display of fieldbus and peripheral equipment status via LED

Control block

- Preprocessing, stand-alone controller or remote unit CPX-CEC
- Connection via Ethernet TCP/IP or Sub-D programming interface
- Setting operating modes via DIL switch and program selection via rotary switch
- CPX-CMX products for controlling axes

CTEL interface

- Interfaces for decentralised installation systems, thus optimising the pneumatic control chains (short tubes/short cycle times)
- Actuation for I/O modules and valve terminals
- Power supply and bus interface via the same cable

Web monitor

- Website integrated in the CPX terminal
- Dynamic status indication
- Online diagnostics
- SMS/e-mail alert

Input/output modules

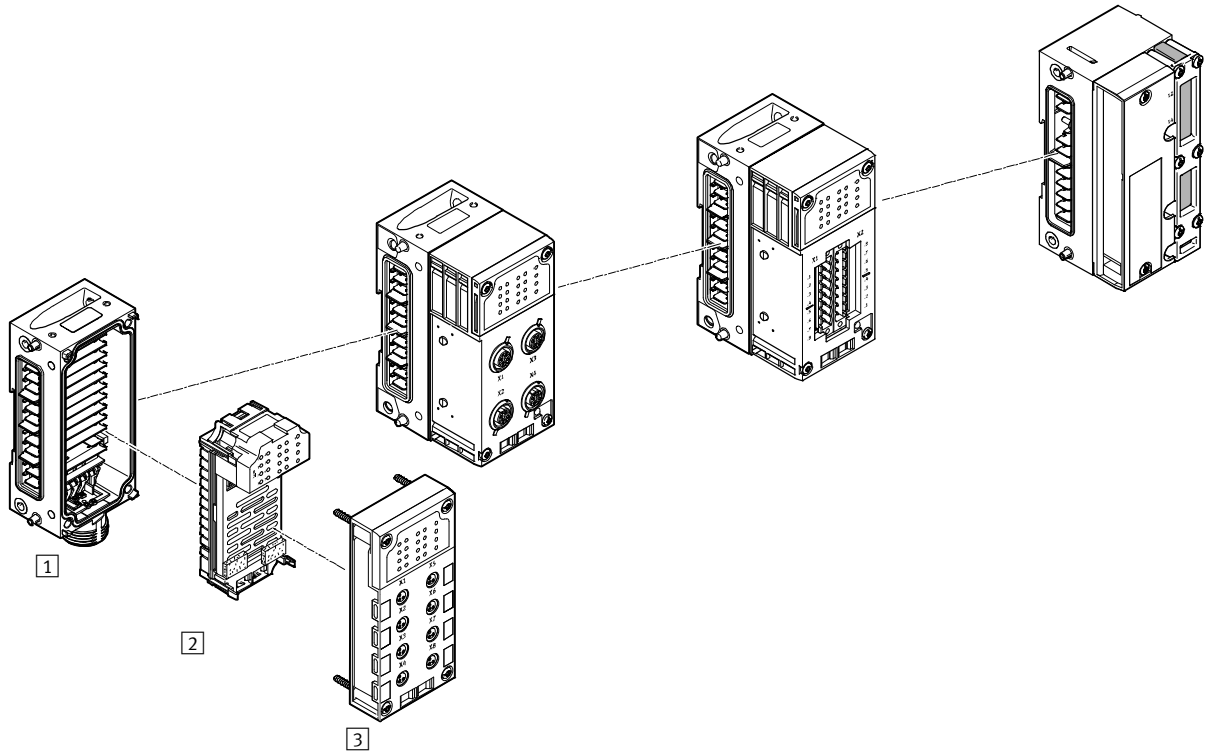
Combination of

- Interlinking block
- Electronics module
- Connection block

Terminal CPX-P

Peripherals overview

Complete overview of modules



Input/output modules

1 Interlinking block

- Internal linking of the power supply and serial communication
- External power supply for the entire system
- Additional supply for outputs
- Connection accessories for 7/8"
- Individual linking with M6 screws, individually expandable

2 Electronics module

- Digital inputs for connecting the sensors
- Digital outputs for activating additional actuators
- Analogue inputs
- Temperature inputs (analogue)
- PROFIsafe input module for safety-oriented sensor technology
- PROFIsafe shut-off module with two digital outputs for shutting off the supply voltage for valves

3 Connection block

- Choice of connection technology
- Degree of protection IP65 or IP20
- Can be combined with the electronics modules
- Connection accessories for M8/M12/Sub-D/quick connector, etc.
- M8/M12/Sub-D, etc. connecting cables
- Modular system for choice of connecting cables

Pneumatic interface

- MPA-S

Terminal CPX-P

Peripherals overview

Individual overview of modules

Bus node

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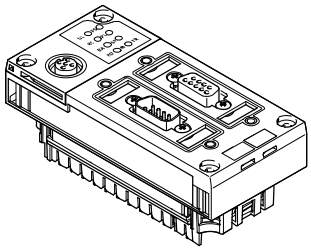

Bus node for
- PROFIBUS DP
- DeviceNet
- CANopen
- EtherNet/IP
- PROFINET
- EtherCAT

Control block

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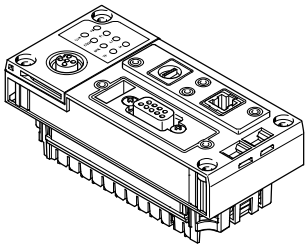

CPX-CEC
- Programming with CODESYS
- Ethernet interface
- Modbus/TCP
- EasyIP
- CANopen master

CTEL interface

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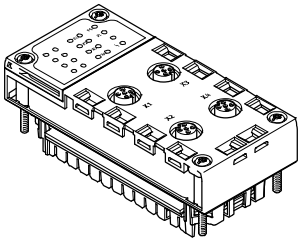

CPX-CTEL interface
- CTEL master
- Max. 4 devices with individual electronic protection
- Max. 64 inputs/64 outputs per I-Port interface
- The maximum length of a string is 20 m

Electrical interface CPX-CTEL-2

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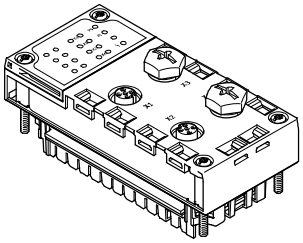

Interface CPX-CTEL-2
- Master for IO-Link
- Max. 2 devices with individual electronic protection
- Process data length of the inputs and outputs is limited to 16 bytes for inputs and 16 bytes for outputs per port
- The maximum length of a string is 20 m

Modules for controlling pneumatic drive units

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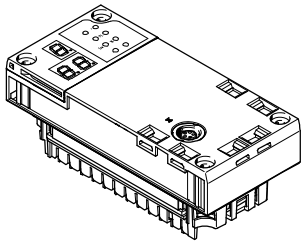
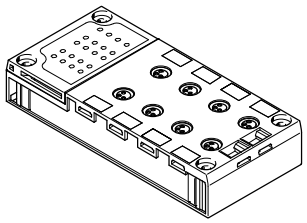


CPX-CMIX
- Measuring module
- CAN input (Festo specification) for measuring signal

- Recording the absolute position values or speed values of the connected drive

Polymer connection block

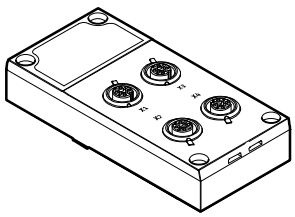


Direct machine mounting
(connection block to IP65/IP67)
- M8 3-pin
- M8 4-pin
- M12 5-pin
- M12 5-pin quick lock, shielded with metal thread
- M12 8-pin
- Sub-D 25-pin
- Quick connector
- Spring-loaded terminal with cover

Protected fitting space
(degree of protection IP20)
- Spring-loaded terminal

Screening concept
- Optional screening plate for connection block with M12 connection technology

Metal connection block



Direct machine mounting
(connection block to IP65/IP67)
- M12 5-pin

Individual overview of modules

Digital electronics module for inputs/outputs
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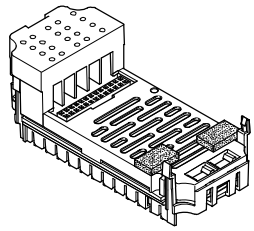

Digital inputs
- 4 digital inputs
- 8 digital inputs
- 16 digital inputs

Digital outputs
- 4 digital outputs (1 A per channel, individual channel diagnostics)
- 8 digital outputs (0.5 A per channel, individual channel diagnostics)
- 8 digital outputs (2.1 A/50 W lamp load per channel pair, individual channel diagnostics)

Multi I/O modules
- 8 digital inputs and 8 digital outputs
- 2 digital inputs (counter channels, connection to various encoders) and 2 digital outputs (directly controlled by the input values)

Analogue electronics module for inputs/outputs
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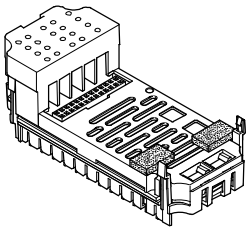

Analogue inputs
- 2 analogue inputs (0 ... 10 V DC, 0 ... 20 mA, 4 ... 20 mA)
- 4 analogue inputs (1 ... 5 V, 0 ... 10 V, −5 ... +5 V, −10 ... +10 V, 0 ... 20 mA, 4 ... 20 mA, −20 ... +20 mA)
- 4 analogue inputs with HART protocol

Analogue temperature inputs
- 4 analogue inputs for temperature measurement (Pt100, Pt200, Pt500, Pt1000, Ni100, Ni120, Ni500, Ni1000)
- 4 analogue inputs for temperature measurement (thermocoupler and PT1000 sensor for cold-junction compensation)

Analogue outputs
- 2 analogue outputs (0 ... 10 V DC, 0 ... 20 mA, 4 ... 20 mA)
- 4 analogue outputs with HART protocol

PROFIsafe input module
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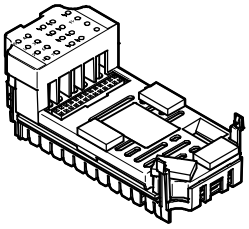

Digital inputs
- 8 digital inputs
- 11 function modes
- 5 independent clock outputs

PROFIsafe shut-off module
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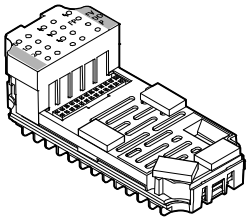
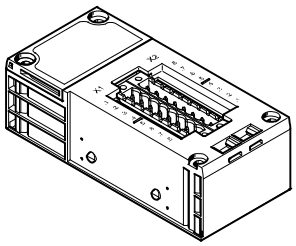


Digital outputs
- 2 digital outputs
- Supply voltage for valves can be shut off

Individual overview of modules

Connection block for NAMUR sensors and HART input/output module



Direct machine mounting
(connection block to IP65)
- M12 4-pin

Protected fitting space
(connection block to IP20)
- Screw terminal
- Spring-loaded terminal

Digital electronics module for NAMUR sensors

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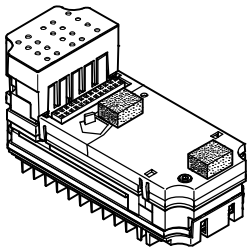
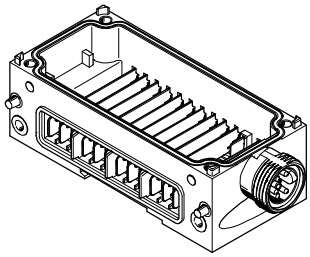


Digital inputs
- 8 digital inputs for NAMUR sensors or wired mechanical contacts
- Intrinsically safe design with additional protective measures in the event of failure

Metal interlinking block – Individual linking

➔ Page 163



System linking
- Different voltages for supplying the modules
- Serial communication between the modules

System supply
- 7/8" 5-pin

In addition to system linking, power supply for the
- electronics plus sensors (8 A)
- valves plus actuators (8 A)

Additional supply
In addition to system linking, power supply for the
- actuators (8 A per supply)

Expandability
- Can be expanded as required by up to 10 interlinking blocks

Note

The 7/8" supply is subject to the following restrictions due to the available accessories:
- 5-pin 8 A

Pneumatic interface MPA-S

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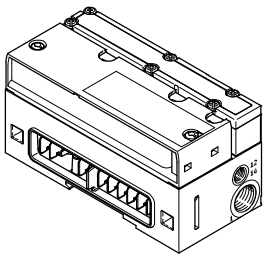
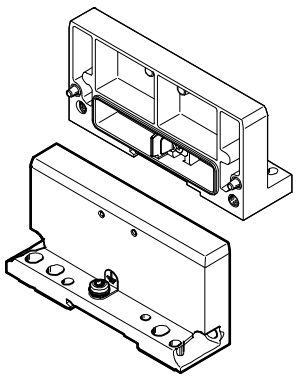


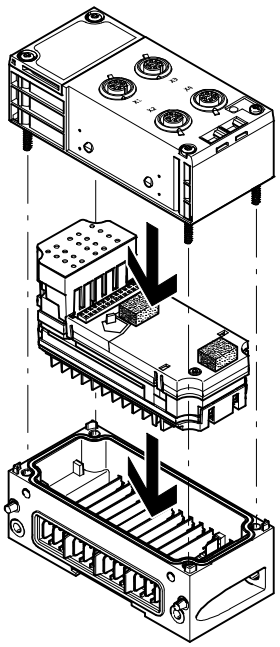
Valve terminal
- MPA1 (360 l/min)
- MPA14 (550 l/min)
- MPA2 (700 l/min)
- Up to 128 solenoid coils
- Up to 16 modules can be configured

End plate



End plate
- Left
- Right (for use without valves)

General basic data and guidelines



Max. 11 modules in total:
- One bus node and/or one control block
- Up to 9 additional input/output modules
- In addition a pneumatic interface
  - Always positioned as the last module on the right-hand side
  - 16 MPA modules can be configured
- Address capacity max. 512 inputs and 512 outputs, depending on bus node or control block
- One interlinking block with system supply
- Multiple interlinking blocks with additional supplies.
  Always positioned to the right of the interlinking block with system supply
- The connection blocks can be combined with the electronics modules for inputs/outputs, with some restrictions (➔ table below)
- The electronics modules for inputs/outputs can be combined with various interlinking blocks

Combinations of connection blocks and digital input modules

	Digital electronics modules						
	CPX-4DE	CPX-8DE	CPX-8DE-D	CPX-8NDE	CPX-F8DE-P	CPX-16DE	CPX-M-16DE-D
Connection blocks, polymer design							
CPX-AB-8-M8-3POL	■	■	■	■	–	–	–
CPX-AB-8-M8X2-4POL	–	–	–	–	–	■	–
CPX-AB-4-M12x2-5POL	■	■	■	■	–	–	–
CPX-AB-4-M12x2-5POL-R	■	■	■	■	–	–	–
CPX-P-AB-4XM12-4POL	–	–	–	–	–	–	–
CPX-P-AB-4XM12-4POL-8DE-N-IS	–	–	–	–	–	–	–
CPX-AB-4-M12-8POL	–	–	–	–	–	–	–
CPX-AB-8-KL-4POL	■	■	■	■	■	■	–
CPX-P-AB-2XKL-8POL	–	–	–	–	–	–	–
CPX-P-AB-2XKL-8POL-8DE-N-IS	–	–	–	–	–	–	–
CPX-AB-1-SUB-BU-25POL	■	■	■	■	–	■	–
CPX-AB-4-HAR-4POL	■	■	■	■	–	–	–
Connection blocks, metal design							
CPX-M-AB-4-M12X2-5POL	■	■	■	■	■	–	–
CPX-M-AB-8-M12X2-5POL	–	–	–	–	–	–	■

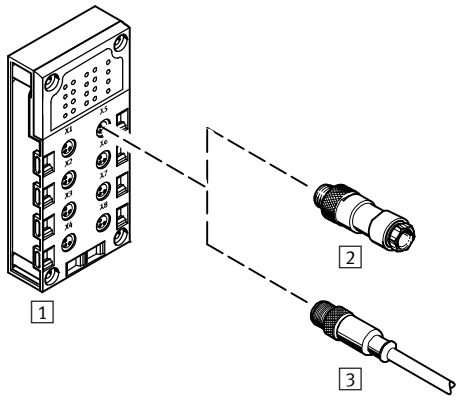
Combinations of connection blocks and digital input modules for NAMUR sensors		
	Digital electronics modules	
	CPX-P-8DE-N	CPX-P-8DE-N-IS
Connection blocks, polymer design		
CPX-AB-8-M8-3POL	–	–
CPX-AB-8-M8X2-4POL	–	–
CPX-AB-4-M12x2-5POL	–	–
CPX-AB-4-M12x2-5POL-R	–	–
CPX-P-AB-4XM12-4POL	■	–
CPX-P-AB-4XM12-4POL-8DE-N-IS	–	■
CPX-AB-4-M12-8POL	–	–
CPX-AB-8-KL-4POL	–	–
CPX-P-AB-2XKL-8POL	■	–
CPX-P-AB-2XKL-8POL-8DE-N-IS	–	■
CPX-AB-1-SUB-BU-25POL	–	–
CPX-AB-4-HAR-4POL	–	–
Connection blocks, metal design		
CPX-M-AB-4-M12X2-5POL	–	–
CPX-M-AB-8-M12X2-5POL	–	–

Combinations of connection blocks and digital output modules or multi I/O modules						
	Digital electronics modules					
	CPX-4DA	CPX-8DA	CPX-8DA-H	CPX-8DE-8DA	CPX-2ZE2DA	CPX-FVDA-P2
Connection blocks, polymer design						
CPX-AB-8-M8-3POL	■	■	–	–	–	–
CPX-AB-8-M8X2-4POL	■	■	■	–	–	–
CPX-AB-4-M12x2-5POL	■	■	–	–	–	–
CPX-AB-4-M12x2-5POL-R	■	■	■	–	–	–
CPX-P-AB-4XM12-4POL	–	–	–	–	–	–
CPX-P-AB-4XM12-4POL-8DE-N-IS	–	–	–	–	–	–
CPX-AB-4-M12-8POL	–	–	–	■	–	–
CPX-AB-8-KL-4POL	■	■	■	■	–	■
CPX-P-AB-2XKL-8POL	–	–	–	–	–	–
CPX-P-AB-2XKL-8POL-8DE-N-IS	–	–	–	–	–	–
CPX-AB-1-SUB-BU-25POL	■	■	■	■	–	–
CPX-AB-4-HAR-4POL	■	■	–	–	–	–
Connection blocks, metal design						
CPX-M-AB-4-M12X2-5POL	■	■	■	–	–	■
CPX-M-AB-8-M12X2-5POL	–	–	–	–	–	–

Combinations of connection blocks and analogue electronics modules for inputs/outputs								
	Analogue electronics modules							
	CPX-4AE-4AA-H	CPX-2AE-U-I	CPX-4AE-U-I	CPX-4AE-I	CPX-2AA-U-I	CPX-4AE-P	CPX-4AE-T	CPX-4AE-TC
Connection blocks, polymer design								
CPX-AB-8-M8-3POL	–	–	–	–	–	–	–	–
CPX-AB-8-M8X2-4POL	–	–	–	–	–	–	–	–
CPX-AB-4-M12x2-5POL	–	■	■	■	■	–	■	■
CPX-AB-4-M12x2-5POL-R	–	■	■	■	■	–	■	■
CPX-P-AB-4XM12-4POL	■	–	–	–	–	–	–	–
CPX-P-AB-4XM12-4POL-8DE-N-IS	–	–	–	–	–	–	–	–
CPX-AB-4-M12-8POL	–	–	–	–	–	–	–	–
CPX-AB-8-KL-4POL	–	■	■	■	■	–	■	■
CPX-P-AB-2XKL-8POL	■	–	–	–	–	–	–	–
CPX-P-AB-2XKL-8POL-8DE-N-IS	–	–	–	–	–	–	–	–
CPX-AB-1-SUB-BU-25POL	–	■	■	■	■	–	–	–
CPX-AB-4-HAR-4POL	–	–	–	–	–	–	■	–
Connection blocks, metal design								
CPX-M-AB-4-M12X2-5POL	–	■	■	■	■	–	■	■
CPX-M-AB-8-M12X2-5POL	–	–	–	–	–	–	–	–

Electrical connection – Connection block with M8, 3-pin connection

CPX-AB-8-M8-3POL



- Compact for pre-assembled individual connection
- 8 sockets
- 3-pin design for connecting one channel per socket

Note

Festo delivers pre-assembled M8/M12 connecting cables (NEBU modular system) on request:

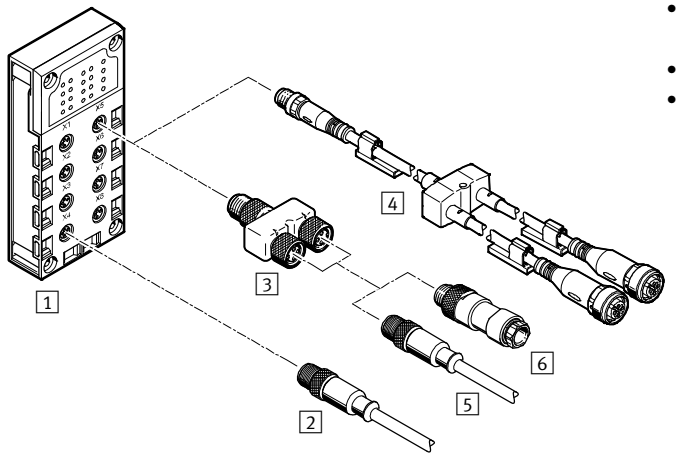
- Tailored to the application
- Perfect fit
- Easy to install

Combination of connection block and electrical connection technology

Connection block	Connection technology	Plug/connecting cable	Selectable connection technology
1 CPX-AB-8-M8-3POL	Socket, M8, 3-pin	2 SEA-GS-M8	Solder lugs
		2 SEA-3GS-M8-S	Screw terminals
		3 NEBU-...-M8G3 (modular system for choice of connecting cables)	Socket, M8, 3-pin
			Socket, M8, 4-pin
			Socket, M12, 5-pin
			Open cable end

Electrical connection – Connection block with M8, 4-pin connection

CPX-AB-8-M8X2-4POL



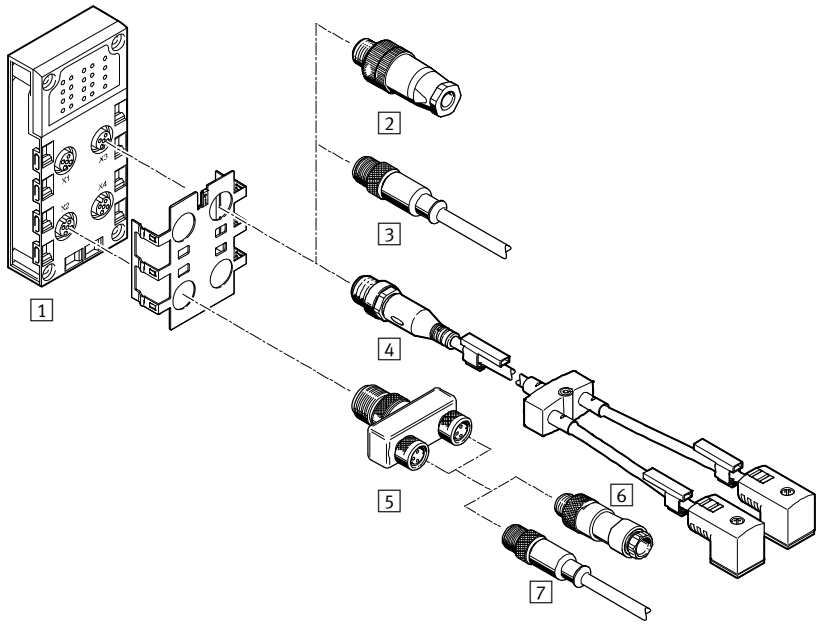
- Compact for pre-assembled individual connection
- 8 sockets
- 4-pin design for connection of 2 channels per socket

Combination of connection block and electrical connection technology

Connection block	Connection technology	Plug/connecting cable	Selectable connection technology	Plug/connecting cable	Selectable connection technology
1 CPX-AB-8-M8X2-4POL	Socket, M8, 4-pin	2 NEBU-...-M8G4 (modular system for choice of connecting cables)	Socket, M8, 3-pin	–	–
			Socket, M8, 4-pin	–	–
			Socket, M12, 5-pin	–	–
			Open cable end	–	–
		3 NEDY-L2R1-V1-M8G3-N-M8G4 (T adapter)	1x plug M8, 4-pin to 2x socket, M8, 3-pin	6 SEA-GS-M8	Solder lugs
				6 SEA-3GS-M8-S	Screw terminals
				5 NEBU-...-M8G3 (modular system for choice of connecting cables)	Socket, M8, 3-pin
					Socket, M8, 4-pin
					Socket, M12, 5-pin
					Open cable end
		4 NEDY-... (modular system for all types of sensor/ actuator distributor)	2x socket, M8, 3-pin	–	–
			2x socket, M8, 4-pin	–	–
			2x socket, M12, 5-pin	–	–
			2x socket, type A	–	–
			2x socket, type B	–	–
			2x socket, type C	–	–
			2x socket, plug pattern H	–	–
			2x socket, plug pattern ZB	–	–
			2x socket, plug pattern ZC	–	–
			2x open cable end	–	–

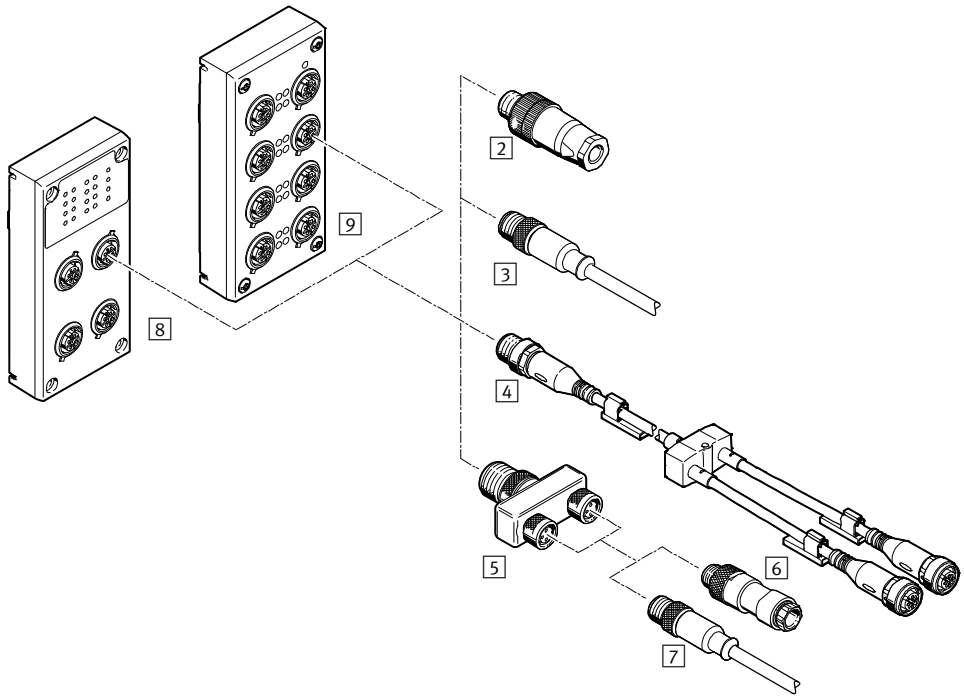
Electrical connection – Connection block with M12, 5-pin connection

CPX-AB-4-M12x2-5POL and CPX-AB-4-M12x2-5POL-R, polymer design



- Suitable for self-assembly and sturdy with 2 channels per connection
- 4 sockets
- 5-pin design per connection
- Version ...-R with quick lock technology and metal thread for shielding
- With two channels per connection, the corresponding input signals can be easily connected via a T-adapter and conventional cables with M8 connection.

CPX-M-AB-8-M12X2-5POL and CPX-M-AB-4-M12X2-5POL, metal design



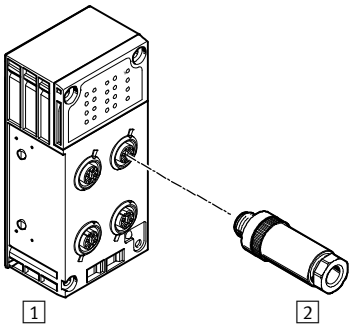
- Suitable for self-assembly and sturdy with 2 channels per connection
- 4 sockets
- 5-pin design per connection
- With two channels per connection, the corresponding input signals can be easily connected via a T-adapter and conventional cables with M8 connection.

Combination of connection block and electrical connection technology

Connection block	Connection technology	Plug/connecting cable	Connection technology	Plug/connecting cable	Connection technology
1 CPX-AB-4-M12x2-5POL CPX-AB-4-M12x2-5POL-R	Socket, M12, 5-pin	2 SEA-GS-7	Screw terminals	–	–
		2 SEA-4GS-7-2,5	Screw terminals	–	–
		2 SEA-GS-9	Screw terminals	–	–
		2 SEA-M12-5GS-PG7	Screw terminals	–	–
8 CPX-M-AB-4-M12X2-5POL		2 SEA-GS-11-DUO	Screw terminals, for two cables	–	–
9 CPX-M-AB-8-M12X2-5POL		2 SEA-5GS-11-DUO	Screw terminals, for two cables	–	–
		3 NEBU-...-M12G5 (modular system for choice of connecting cables)	Socket, M8, 4-pin	–	–
			Socket, M12, 5-pin	–	–
			Open cable end	–	–
		4 NEDY-... (modular system for all types of sensor/actuator distributor)	2x socket, M8, 3-pin	–	–
			2x socket, M8, 4-pin	–	–
			2x socket, M12, 5-pin	–	–
			2x socket, type A	–	–
			2x socket, type B	–	–
			2x socket, type C	–	–
			2x socket, plug pattern H	–	–
			2x socket, plug pattern ZB	–	–
			2x socket, plug pattern ZC	–	–
			2x open cable end	–	–
		5 NEDY-L2R1-V1-M8G3-N-M12G4 (T adapter)	Plug M12, 4-pin to 2x socket, M8, 3-pin	6 SEA-GS-M8	Solder lugs
				6 SEA-3GS-M8-S	Screw terminals
				7 NEBU-...-M8G3 (modular system for choice of connecting cables)	Socket, M8, 3-pin
					Socket, M8, 4-pin
					Socket, M12, 5-pin
					Open cable end
		5 NEDY-L2R1-V1-M12G5-N-M12G4 (T adapter)	Plug M12, 4-pin to 2x socket M12, 5-pin	6 SEA-GS-7	Screw terminals
				6 SEA-4GS-7-2,5	Screw terminals
				6 SEA-GS-9	Screw terminals
				6 SEA-M12-5GS-PG7	Screw terminals
				6 SEA-GS-11-DUO	Screw terminals, for two cables
				6 SEA-5GS-11-DUO	Screw terminals, for two cables
				7 NEBU-...-M12G5 (modular system for choice of connecting cables)	Socket, M8, 4-pin
					Socket, M12, 5-pin
					Open cable end

Electrical connection – Connection block with M12, 4-pin connection

CPX-P-AB-4XM12-4POL



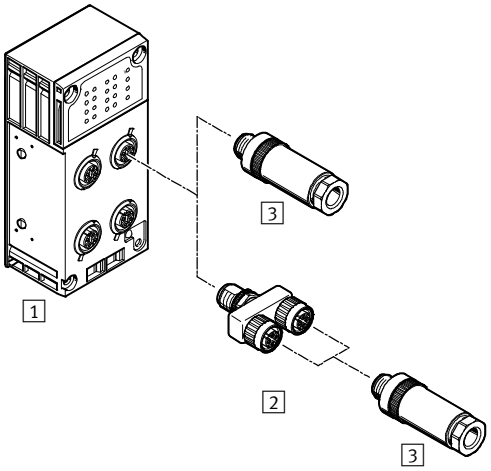
- Suitable for self-assembly and sturdy
- 4 sockets
- 4-pin design per connection

Combination of connection block and electrical connection technology

Connection block	Connection technology	Plug/connecting cable	Selectable connection technology
1 CPX-P-AB-4XM12-4POL	Socket, M12, 4-pin	2 SEA-GS-HAR-4POL	Insulation displacement connector
		2 SEA-4GS-7-2,5	Screw terminal
		2 SEA-GS-7	Screw terminal
		2 SEA-GS-9	Screw terminal

Electrical connection – Connection block with M12, 4-pin connection

CPX-P-AB-4XM12-4POL-8DE-N-IS



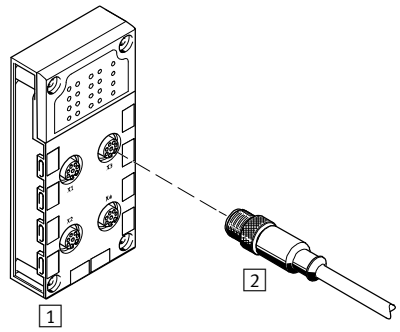
- Suitable for self-assembly and sturdy with 2 channels per connection
- 4 sockets
- 4-pin design per connection
- With two channels per connection, the corresponding input signals can be easily connected via a T-adapter.

Combination of connection block and electrical connection technology

Connection block	Connection technology	Plug/connecting cable	Selectable connection technology	Plug/connecting cable	Selectable connection technology
1 CPX-P-AB-4XM12-4POL-8DE-N-IS	Socket, M12, 4-pin	3 NECU-M-S-A12G4-IS	Plug, M12, 4-pin	–	–
		3 NECU-S-M12G4-...-IS	Plug, M12, 4-pin	–	–
		2 NEDU-M12D4-M12T4-IS (T adapter)	1x plug M12, 4-pin to 2x socket M12, 4-pin	3 NECU-S-M12G4-...-IS	Plug, M12, 4-pin

Electrical connection – Connection block with M12, 8-pin connection

CPX-AB-4-M12-8POL



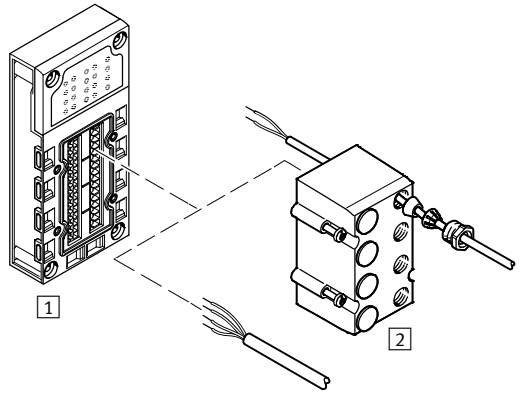
- Connection to cylinder/valve combinations with max. 3 inputs and 2 outputs
- 4 sockets
- 8-pin design per socket

Combination of connection block and electrical connection technology

Connection block	Connection technology	Plug/connecting cable	Selectable connection technology
1 CPX-AB-4-M12-8POL	Socket, M12, 8-pin	2 KM12-8GD8GS-2-PU (pre-assembled connecting cable)	Socket, M12, 8-pin

Electrical connection – Connection block with spring-loaded terminal connection

CPX-AB-8-KL-4POL



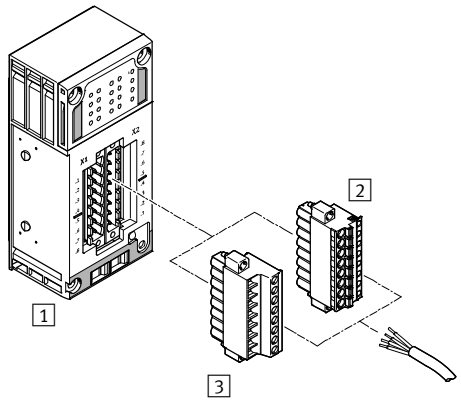
- Quick connection technology for use in control cabinets
- 32 spring-loaded terminals
- 4 spring-loaded terminals per channel
- Wire cross sections 0.05 … 1.5 mm^2
- Optional cover with fittings for IP65/67 connection
  - 8 through-holes M9
  - 1 through-hole M16
  - Blanking plugs
  - For I/O distributors, control desks or individual sensors/ actuators

Combination of connection block and electrical connection technology

Connection block	Connection technology	Plug/connecting cable	Selectable connection technology
1 CPX-AB-8-KL-4POL	Spring-loaded terminals, 32-pin	2 AK-8KL (cover)	–

Electrical connection – Connection block with clamping connector

CPX-P-AB-2XKL-8POL and CPX-P-AB-2XKL-8POL-8DE-N-IS



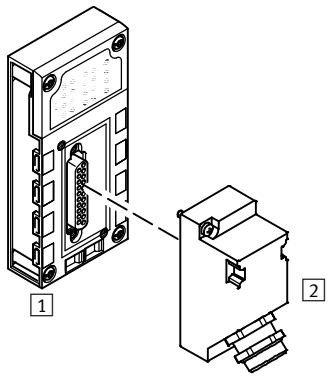
- Quick connection technology for use in control cabinets
- Spring-loaded terminals or screw terminals
- Wire cross sections 0.2 … 2.5 mm²

Combination of connection block and electrical connection technology

Connection block	Connection technology	Plug/connecting cable	Selectable connection technology
1 CPX-P-AB-2XKL-8POL	Plug, 8-pin	2 NECU-L3G8-C1	Spring-loaded terminals
		3 NECU-L3G8-C2	Screw terminals
1 CPX-P-AB-2XKL-8POL-8DE-N-IS	Plug, 8-pin	2 NECU-L3G8-C1-IS	Spring-loaded terminals
		3 NECU-L3G8-C2-IS	Screw terminals

Electrical connection – Connection block with Sub-D connection

CPX-AB-1-SUB-BU-25POL



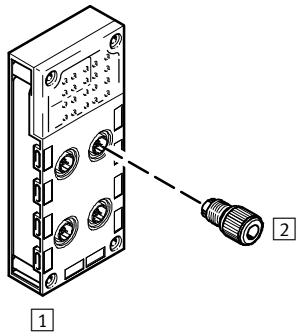
- Multi-pin connection for I/O distributor or control console
- One socket, Sub-D
- 25-pin design

Combination of connection block and electrical connection technology

Connection block	Connection technology	Plug/connecting cable	Selectable connection technology
1 CPX-AB-1-SUB-BU-25POL	Socket, Sub-D, 25-pin	2 SD-SUB-D-ST25	Crimp contacts

Electrical connection – Connection block with quick connector

CPX-AB-4-HAR-4POL

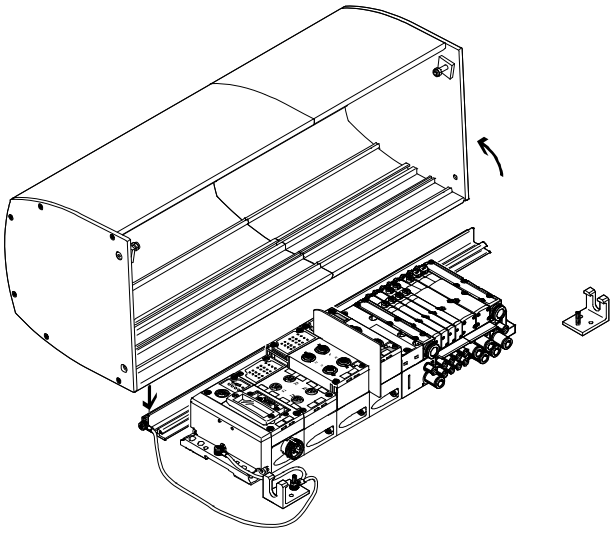


- Sturdy quick connection technology for individual connections
- 4 sockets
- 4-pin design per socket

Combination of connection block and electrical connection technology				
Connection block	Connection technology		Plug/connecting cable	Selectable connection technology
1 CPX-AB-4-HAR-4POL	Socket, quick connector, 4-pin		2 SEA-GS-HAR-4POL	Insulation displacement connectors

Hood

Description ➔ 175



The CPX hood CAFC is a space- and cost-saving alternative to a control cabinet.
It is designed as an extruded aluminium profile and is installed on a mounting plate.
The valve terminal is well protected and is quick to install without the need for complex cabinet through-feed for cables and tubing.

The rail and the two mounting brackets are mounted on a base plate. The hood is attached to the retaining rail and secured with two screws. There is also a stand-by position (detent of the hood in the open position).
The hood is locked using two side screws (which meet the requirements for a special lock in compliance with ATEX).
The CPX hood can be ordered online using the valve terminal configurator.

Advantages of the CPX hood

- Impact protection (min. 7 J) for the modules underneath in combination with a suitable mounting plate provided by the user
- Protection against electrostatic discharge by using electrically conductive materials and the option of connecting an earth wire
- Protection against disconnection of live plugs (by securing the hood with at least one special lock to EN 600079-0, 9.2 and 20)
- UV protection for the underlying CPX-P and MPA modules

Points to note when using the CPX hood

- CPX-P power supply via angled plugs, no T-plugs
- Electrical supply plate/additional supply only possible with angled plug
- No MPA vertical stacking
- Use of larger push-in fittings (for tubing O.D. larger than 12 mm) only possible with the angled design
- Ducted exhaust air only with elbow connector
- The permissible ambient temperature range of the valve terminal is reduced by 5 °C.

Note

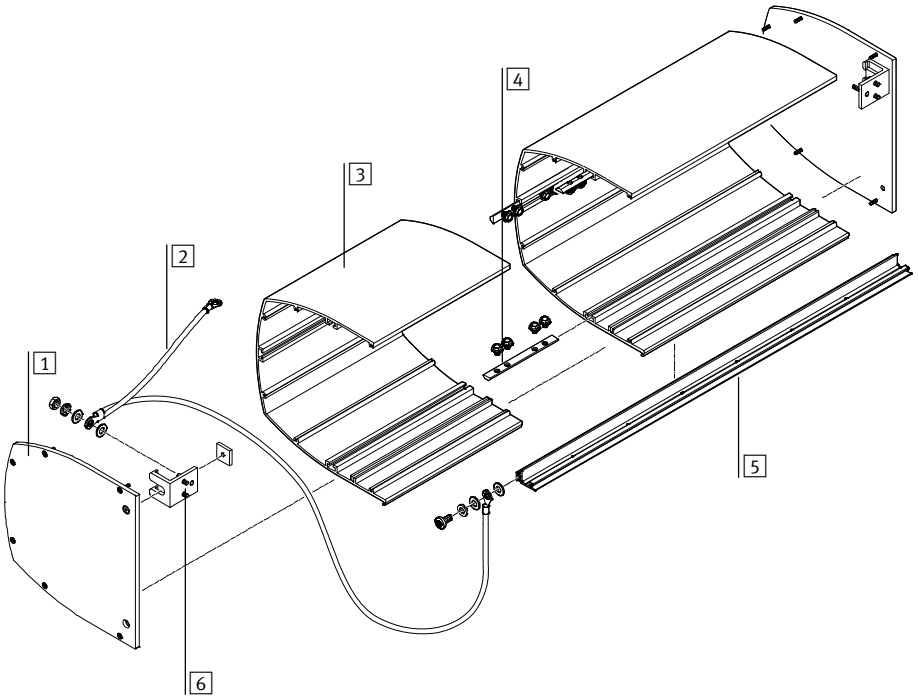
The CPX hood has no influence on the ATEX classification of the valve terminal or of the CPX-P terminal.

The CPX hood has no influence on the IP protection class of the valve terminal or of the CPX-P terminal.

The CPX hood does not protect against the effects of the weather in installations that are not in enclosed spaces.

Hood

Assembly



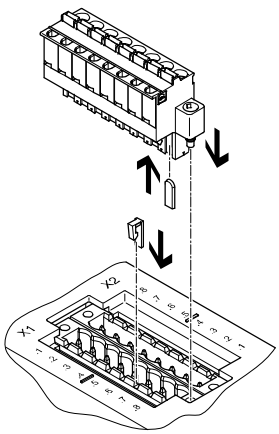
Procedure:
- Assemble the rail and mounting bracket included in the mounting kit
- Attach the earthing cable
- Assemble the hood (if applicable, screw together several hood sections and attach the side covers)
- Attach and secure the hood

1 Side cover
2 Earthing cable
3 Hood section
4 Slot nut with screws, for joining the hood sections
5 Rail
6 Mounting bracket

Technical data

Weight:
- Hood: approx. 500 g per 100 mm of length
- Mounting rail: approx. 550 g per 1000 mm of length
- Side pieces: approx. 500 g per side
- Ambient temperature –5 ... +50 °C
- RoHS-compliant

Plug coding



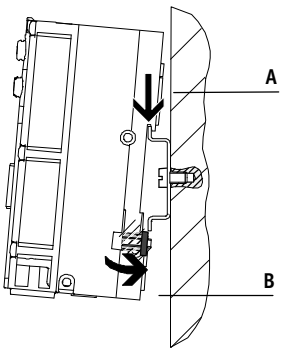
The connection blocks CPX-P-AB-2XKL-8POL and CPX-P-AB-2XKL-8POL-8DE-N-IS and the sockets NECU-L3G8 can be matched with one another using the coding elements CPX-P-KDS-AB-2XKL.

This reduces the possibility of the socket being plugged back into an incorrect slot after being disconnected from the CPX-P terminal (connection safeguard).

Mounting options

Valve terminals with CPX-P terminal support different mounting options for direct machine mounting with a high degree of protection and for control cabinet installation.

H-rail mounting

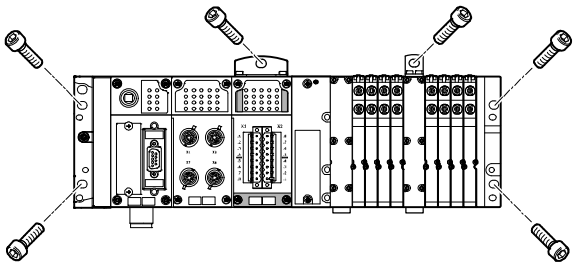


The H-rail mounting is part of the rear profile of the CPX-P interlinking blocks. The CPX-P terminal can be attached to the H-rail using the H-rail mounting kit.
The CPX-P terminal is mounted on the H-rail (see arrow A) and then swivelled onto the H-rail and secured in place with the clamping element (see arrow B).
The optional earthing plate enables a connection to be established to the machine potential/earth in one easy step.

The following mounting kit is needed for H-rail mounting:
- CPX-CPA-BG-NRH

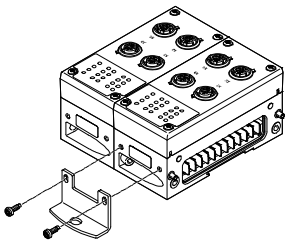
This facilitates mounting of the CPX-P terminal on H-rails to EN 60715.
An additional mounting kit may be required for combination with valve terminals.

Wall mounting



The end plates of the CPX-P terminal, the valve terminal and the pneumatic interface include mounting holes for wall mounting.
Additional mountings for the CPX-P terminal are available for longer valve terminals.

Additional mountings

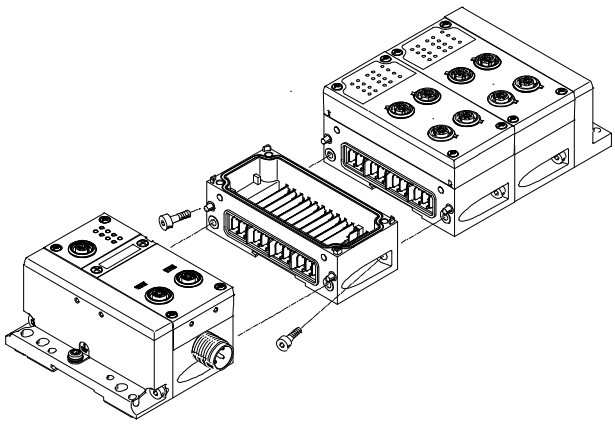


Additional mounting brackets for the CPX-P terminal that can be screwed onto the interlinking blocks are available for longer valve terminals.

- Note

For CPX-P terminals with 4 or more interlinking blocks: you will require additional mounting brackets of the type CPX-M-BG-RW approx. every 100 or 150 mm. These are supplied pre-assembled.

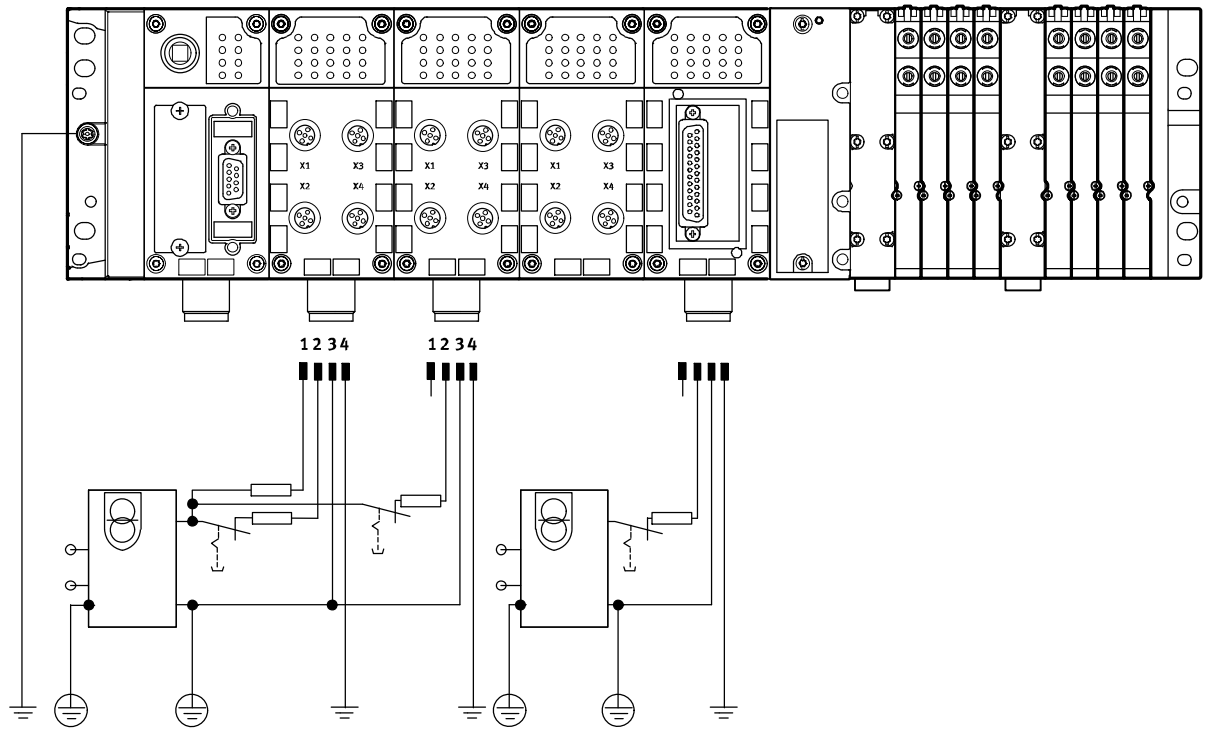
Linking with screws



The mechanical connection between the CPX-P modules is created using angled screw connectors.
The CPX-P terminal can thus be expanded at any time.

Power supply concept

General



The use of decentralised devices on the fieldbus – particularly with a high degree of protection for direct machine mounting – demands a flexible power supply concept. A valve terminal with CPX-P can, in principle, be supplied with all voltages via a single connection.

A distinction is made between supply for
- Electronics plus sensors
- Valves plus actuators

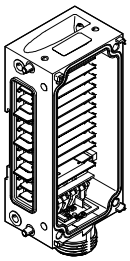
Connection technology:
- 7/8"

Interlinking blocks

Interlinking blocks represent the backbone of the CPX-P terminal with all supply lines. They provide the power supply for the modules used on them as well as their bus connections. Many applications require the CPX-P terminal to be segmented into voltage zones. This applies in particular to the separate disconnection of the outputs. The interlinking blocks provide either an easy-to-install central power supply for the entire CPX-P terminal or galvanically isolated, all-pin disconnectable potential groups/ voltage segments.

Interlinking blocks

With system supply



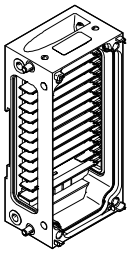
- CPX-M-GE-EV-S-7/8-5POL
- CPX-M-GE-EV-S-7/8-5POL-VL

Connection technology
- 7/8" 5-pin

- For CPX-P terminal modules and connected sensors
- For valves that are connected to the CPX-P terminal via a pneumatic interface

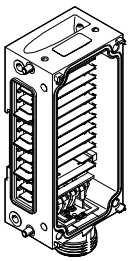
- For actuators that are connected to output modules of the CPX-P terminal

Without power supply



- CPX-M-GE-EV
- CPX-M-GE-EV-FVO

With additional supply for outputs



- CPX-M-GE-EV-Z-7/8-5POL
- CPX-M-GE-EV-Z-7/8-5POL-VL

Connection technology
- 7/8" 5-pin

- For actuators that are connected to output modules of the CPX-P terminal

Note

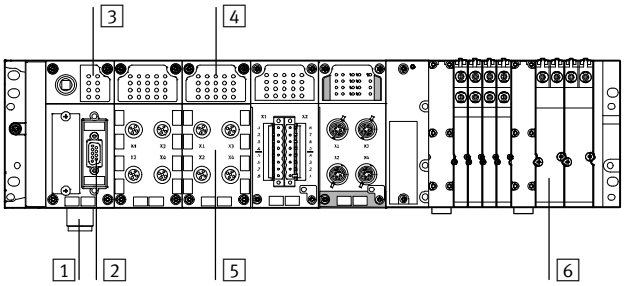
For 7/8":
- Commercially available accessories are often limited to max. 8 A

Note

The valve terminal MPA-S has either a 7/8" 5-pin, 7/8" 4-pin or M18 3-pin power supply for one or more valve voltage zones. Galvanically isolated, all pins disconnectable with voltage monitoring in the following MPA module.

Diagnostics

System performance



1 Undervoltage monitoring
2 Diagnostics via bus interface
3 Diagnostic overview LED
- Fieldbus status
- CPX-P status

4 Status and diagnostic LED for module and I/O channels
5 Module and channel-specific diagnostics
6 Valve-specific diagnostic module and solenoid coils

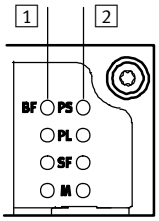
Detailed diagnostic functions are needed in order to quickly locate the causes of errors in the electrical installation and therefore reduce downtimes in production plants.
A basic distinction is made between on-the-spot diagnostics using LEDs or PC and diagnostics using a bus interface.

The CPX-P terminal supports on-the-spot diagnostics via a row of LEDs. This is separate from the connection area and therefore provides good visual access to status and diagnostic information.

Module and channel-specific diagnostics are supported, for example
- Undervoltage detection for outputs and valves
- Short circuit detection for sensors, outputs and valves
- Open-load detection for a missing solenoid coil
- Storage of the last 40 causes of errors with error start and error end

The diagnostic messages can be read out via the bus interface in the higher-order controller and visualised for the central recording and evaluation of error causes. This is done using the individual fieldbus-specific channels. The CPX-CEC also offers the option of access via the integrated Ethernet interface (remote maintenance via PC/web applications).

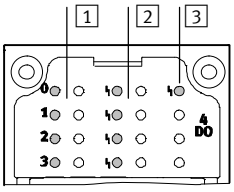
Overview of LEDs on the bus node



1 Fieldbus-specific LEDs
On each bus node, a maximum of 4 fieldbus-specific LEDs display the fieldbus communication status of the CPX-P terminal with the higher-order controller.

2 CPX-P-specific LEDs
A further 4 CPX-P-specific LEDs provide non-fieldbus-specific information about the status of the CPX-P terminal, for example
- Power system
- Power load
- System fault
- Modify parameters

Input/output module status and diagnostic LEDs



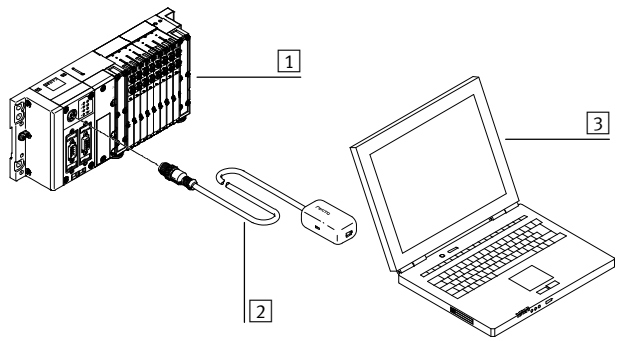
1 Status LEDs for the inputs and outputs.
Each input and output channel is assigned a status LED.

2 Channel-oriented diagnostic LEDs.
Depending on the module design, another diagnostic LED is available for each I/O channel

3 Group diagnostic LEDs.
An LED displays the group diagnostics for each module

Diagnostics

Display on a PC



1 CPX-P terminal with valve terminal
2 Adapter diagnostic interface to USB
3 Laptop/portable device with USB interface and installed CPX-P

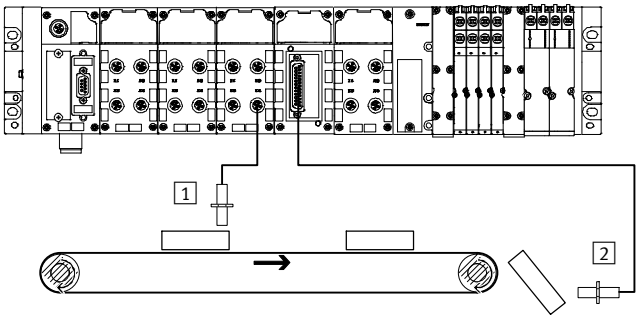
Maintenance Tool (CPX-FMT) software
- Fault location and type
- Without programming
- Storing the configuration
- Preparing screenshots

Parameterisation

Changes to the application are often required during commissioning. The parameterisable characteristics of the CPX-P modules mean that functions can be very easily changed by using configuration software. This reduces the number of modules needed and, consequently, the amount of storage space required.

It is therefore possible, for example, to reduce the input debounce time for an input module – normally 3 ms – to 0.1 ms on a "fast" input module for faster processes, or to set the response of a valve following a fieldbus interruption.

Depending on the modules used, parameterisation can be performed via the following interfaces:
- Ethernet
- Fieldbus
- Control block direct interface (programming interface)



1 Input debounce time 3 ms
2 Input debounce time 0.1 ms

Addressing

The various CPX-P modules occupy a different number of I/O addresses within the CPX-P system. The maximum address space for bus nodes depends on the performance of the fieldbus systems.

Maximum system configuration:
- 1 bus node or control block
- 9 I/O modules
- 1 pneumatic interface (e.g. pneumatic interface MPA-S with up to 16 MPA connection blocks)

The maximum system configuration can be limited in individual cases by exceeding the address space.

- Note

Please refer to the detailed description of the configuration/addressing rules in the technical data for CPX-P bus nodes.

Overview – Allocated addresses for CPX-P modules

	Inputs [bit]	Outputs [bit]
CPX-CTEL-4-M12-5POL	0, 64, 128, 192, 256[1)]	0, 64, 128, 192, 256[1)]
CPX-CTEL-2-M12-5POL-LK	64, 128, 192, 256[1)]	64, 128, 192, 256[1)]
CPX-CMIX-M1-1	48	48
CPX-4DE	4	–
CPX-8DE	8	–
CPX-8DE-D	8	–
CPX-8NDE	8	–
CPX-P-8DE-N	16	8
CPX-P-8DE-N (inputs configured as counter)	80	16
CPX-P-8DE-N-IS	16	8
CPX-P-8DE-N-IS (inputs configured as counter)	80	16
CPX-F8DE-P	48	56
CPX-16DE	16	–
CPX-M-16DE-D	16	–
CPX-4DA	–	4
CPX-8DA	–	8
CPX-8DA-H	–	8
CPX-8DE-8DA	8	8
CPX-2ZE2DA	96	96
CPX-4AE-4AA-H	0, 16, 32, 48, 64, 128, 144, 160, 176, 192[1)]	0, 16, 32, 48, 64[1)]
CPX-2AE-U-I	2 x 16	–
CPX-4AE-U-I	4 x 16	–
CPX-4AE-I	4 x 16	–
CPX-4AE-P-B2	4 x 16	–
CPX-4AE-P-D10	4 x 16	–
CPX-4AE-T	4 x 16	–
CPX-4AE-TC	4 x 16	–
CPX-2AA-U-I	–	2 x 16
CPX-FVDA-P2	48	48
VMPA1-FB-EMS-8	–	8
VMPA1-FB-EMG-8	–	8
VMPA2-FB-EMS-4	–	4
VMPA2-FB-EMG-4	–	4
VMPA1-FB-EMS-D2-8	–	8
VMPA1-FB-EMG-D2-8	–	8
VMPA2-FB-EMS-D2-4	–	4
VMPA2-FB-EMG-D2-4	–	4
VMPA-FB-PS-1	16	–
VMPA-FB-PS-3/5	16	–
VMPA-FB-PS-P1	16	–
VMPA-FB-EMG-P1	16	16

1) Dependent on the DIL switch setting on the module

Overview – Address space for CPX-P bus node and control block

	Protocol	Max. total		Max. digital		Max. analogue	
		Inputs	Outputs	Inputs	Outputs	Inputs	Outputs
CPX-CEC	• CODESYS Level 2 • TCP/IP • Easy IP • Modbus TCP©	512 bits	512 bits	512 DI	512 DO	32 AI	18 AO
CPX-FB11	DeviceNet	512 bits	512 bits	512 DI	512 DO	32 AI	18 AO
CPX-FB13	PROFIBUS	512 bits	512 bits	512 DI	512 DO	32 AI	18 AO
CPX-FB14	CANopen	256 bits	256 bits	64 DI (+ 64 DI)	64 DO (+ 64 DO)	8 AI (+ 8 AI)	8 AO (+ 8 AO)
CPX-FB33	PROFINET RT	512 bits	512 bits	512 DI	512 DO	32 AI	18 AO
CPX-M-FB34	PROFINET RT	512 bits	512 bits	512 DI	512 DO	32 AI	18 AO
CPX-M-FB35	PROFINET RT	512 bits	512 bits	512 DI	512 DO	32 AI	18 AO
CPX-FB36	EtherNet/IP	512 bits	512 bits	512 DI	512 DO	32 AI	18 AO
CPX-FB37	EtherCAT®	512 bits	512 bits	512 DI	512 DO	32 AI	18 AO

Note

The bandwidth of the bus nodes can be restricted by the choice of module and the maximum number of modules.

Terminal CPX-P

Technical data

FESTO

Module width
50 mm

Note

The data given here apply to the CPX-P system. If components that conform to lower values are used in the system, the specification for the entire system is reduced to the values of those components.

Example

Degree of protection IP65 applies only to the fully assembled system with fitted plugs or covers (which must also conform to IP65). If components with a lower protection class are used, the protection level of the entire system is reduced to the protection class of the component with the lowest protection level, for example CageClamp connection block with IP20 protection.

General technical data			
Module no.			562818
Max. no. of modules[1)]	Control block		1
	Bus node		1
	I/O modules		9
	Pneumatic interface		1
Max. address capacity	Inputs	[bytes]	64
	Outputs	[bytes]	64
Internal cycle time		[ms]	< 1
Configuration support			Fieldbus-specific
LED displays	Bus node/control block		Up to 4 LEDs, bus-specific 4 LEDs, CPX-P-specific • PS = Power system • PL = Power load • SF = System fault • M = Modify parameter/forcing active
	I/O modules		Min. one centralised diagnostic LED Channel-oriented status and diagnostic LED, depending on the module
	Pneumatic interface		One centralised diagnostic LED Valve status LED on valve
Diagnostics			• Channel and module-oriented diagnostics for inputs/outputs and valves • Detection of module undervoltage for the different potential values • Storage of the last 40 errors with timestamp (acyclic access)

1) A maximum of 11 modules in total can be combined.
(e.g. 1 control block + 9 I/O modules + 1 pneumatic interface, or 1 control block + 1 bus node + 8 I/O modules + 1 pneumatic interface)

General technical data			
Module no.			**562818**
Parameterisation			Module-specific and entire system, for example: • Diagnostic behaviour • Condition monitoring • Profile of inputs • Fail-safe response of outputs and valves
Commissioning support			Forcing of inputs and outputs
Nominal operating voltage		[V DC]	24
Operating voltage range		[V DC]	18 ... 30
Power supply	Interlinking block with system supply		
	Electronics plus sensors	[A]	8
	Actuators plus valves	[A]	8
	Additional supply		
	Actuators	[A]	8
Current consumption			Depending on system configuration
Power failure buffering (bus electronics only)		[ms]	10
Power supply connection			7/8" 5-pin
Fuse concept			Per module with electronic fuses
Tests	Vibration test to DIN IEC 68		• With wall mounting: Severity level 2 • With H-rail mounting: Severity level 1
	Shock test to DIN IEC 68		• With wall mounting: Severity level 2 • With H-rail mounting: Severity level 1
PWIS classification			PWIS-free
Resistance to interference			EN 61000-6-2 (Industry)
Emitted interference			EN 61000-6-4 (Industry)
Isolation test for galvanically isolated circuits to IEC 1131 Part 2		[V DC]	500
Galvanic isolation of electrical voltages		[V DC]	80
Protection against direct and indirect contact			PELV
Materials			End plates: Die-cast aluminium
Grid dimension		[mm]	50

Operating and environmental conditions		
Module no.		**562818**
Ambient temperature	[°C]	–5 ... +50
Storage temperature	[°C]	–20 ... +70

Certifications and approvals – Maximum values		
Module no.		**562818**
ATEX category for gas		II 3G
Type of ignition protection for gas		Ex nA IIC T4 Gc
Explosion-proof ambient temperature	[°C]	−5 ≤ Ta ≤ +50
CE marking (see declaration of conformity)		To EU Explosion Protection Directive (ATEX)
		To EU EMC Directive[1)]
Degree of protection to EN 60529		IP20, IP65
Certification		c UL us Recognized (OL)
		C-Tick
Explosion protection certification outside the EU		EPL Gc (BR)
Certificate issuing authority		DNV 15.0193 X

1) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: www.festo.com/sp ➔ Certificates.
If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.

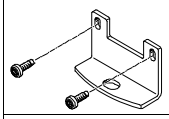
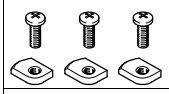
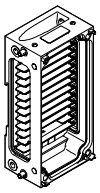
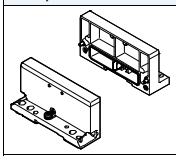
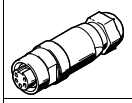
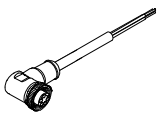
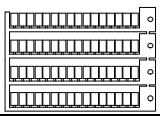
- Note

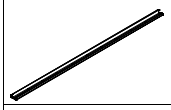
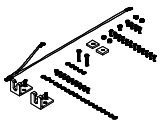
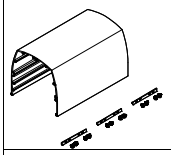
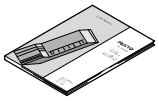
The values indicated represent the maximum performance limits that can be achieved with the fully assembled product. Depending on the individual components used, the value actually achieved for the overall product may be lower.

You can select e.g. the individual components required to achieve the ATEX category by choosing the corresponding features in the online product configurator:
➔ Internet:cpx-p

Weights [g]						
Control block	CEC...V3	135.0		Connection block	Metal	175.0
Bus node	FB11	120.0		Interlinking block, metal	Without power supply	169.0
	FB13	115.0			System supply, 7/8" 5-pin	187.0
	FB14	115.0		Tie rod	1-way	19.0 ±2.5
	FB33	280.0			2-way	32.5 ±2.5
	FB34	280.0			3-way	46.0 ±2.5
	FB35	280.0			4-way	59.5 ±2.5
	FB36	125.0			5-way	73.0 ±2.5
	FB37	125.0			6-way	86.5 ±2.5
I/O module	CPX	38.0			7-way	100.0 ±2.5
	NAMUR	100.0			8-way	113.5 ±2.5
	HART	77.4			9-way	127.0 ±2.5
CTEL interface	CTEL	110.0			10-way	140.5 ±2.5
Electrical interface	CTEL-2	110.0		End plate for metal design	Left	113.0
Counter module	2ZE2DA	130.0			Right	113.0
Measuring module	CMIX	140.0		Pneumatic interface	MPA-S	238.4

Ordering data – Accessories

Designation			Part no.	Type
Mounting				
	Attachment for wall mounting (for long valve terminals, 2 mounting brackets and 4 screws)		**550217**	**CPX-M-BG-RW-2x**
	Mounting for H-rail		**526032**	**CPX-CPA-BG-NRH**
Interlinking block				
	Without power supply	–	**550206**	**CPX-M-GE-EV**
	With system supply	7/8" – 5-pin	**550208**	**CPX-M-GE-EV-S-7/8-5POL**
		7/8" – 5-pin, for ATEX environment	**8022165**	**CPX-M-GE-EV-S-7/8-5POL-VL**
	With additional supply for outputs	7/8" – 5-pin	**550210**	**CPX-M-GE-EV-Z-7/8-5POL**
		7/8" – 5-pin, for ATEX environment	**8022158**	**CPX-M-GE-EV-Z-7/8-5POL-VL**
Mounting accessories				
	Screws for mounting the bus node/connection block on the interlinking block	Bus node/polymer connection block	**550219**	**CPX-M-M3x22-4x**
		Bus node/metal connection block	**550216**	**CPX-M-M3x22-S-4x**
End plates				
	End plate	Right	**550214**	**CPX-M-EPR-EV**
		Left	**550212**	**CPX-M-EPL-EV**
Power supply				
	Plug socket for mains connection 7/8", straight, 5-pin	0.25 … 2.0 mm^2	**543107**	**NECU-G78G5-C2**
	Plug socket for mains connection 7/8", angled, 5-pin – open cable end, 5-pin	2 m	**573855**	**NEBU-G78W5-K-2-N-LE5**
Inscription labels				
	Inscription labels 6x10 mm, 64 pieces, in frame		**18576**	**IBS-6x10**

Ordering data – Accessories				
Designation			Part no.	Type
Hood				
	Mounting rail for attaching the hood	1000 mm	**572256**	**CAFC-X1-S**
	Mounting kit for CPX hood		**572257**	**CAFC-X1-BE**
	Hood section for CPX-P terminal including mounting attachments for connecting several hood sections in series	200 mm	**572258**	**CAFC-X1-GAL-200**
		300 mm	**572259**	**CAFC-X1-GAL-300**
User documentation				
	CPX-P system manual	German	**526445**	**P.BE-CPX-SYS-DE**
		English	**526446**	**P.BE-CPX-SYS-EN**
		Spanish	**526447**	**P.BE-CPX-SYS-ES**
		French	**526448**	**P.BE-CPX-SYS-FR**
		Italian	**526449**	**P.BE-CPX-SYS-IT**

User documentation

Comprehensive user documentation is vital for the fast and reliable use of fieldbus components.
The manuals provided by Festo contain step-by-step instructions for using the CPX-P terminal:
1. Installation
2. Commissioning and parameterisation
3. Diagnostics

Application-oriented explanations are provided for integration of the CPX-P terminal in the programming and configuration software of the various controller manufacturers.
Use the order code to select the language you want.
The manual for the configuration you have ordered is supplied automatically.

Device description files and icons are provided to support the integration of the CPX-P terminal in the configuration software of the various controller manufacturers.

The documents can be downloaded quickly and easily from the Festo website.
➔ www.festo.com

Overview – User documentation

Type	Title	Description
Pneumatics		
P.BE-MPA-...	Valve terminals with MPA-S pneumatics	Instructions on assembly, installation, commissioning and diagnostics of the MPA-S pneumatic components.
Electronics		
P.BE-CPX-SYS-...	System description, installation and commissioning	Overview of the design, components and mode of operation of the CPX-P terminal; installation and commissioning instructions as well as basic principles of parameterisation.
P.BE-CPX-FVDA-P2-...	PROFIsafe shut-off module	Connection technology and assembly, installation and commissioning instructions for the PROFIsafe shut-off module of type CPX-FVDA-P2.
P.BE-CPX-EA-...	CPX-P-EA modules, digital	Connection technology and assembly, installation and commissioning instructions for digital input and output modules of type CPX-... as well as the MPA pneumatic interface.
P.BE-CPX-P-EA-...	CPX-P-EA modules, NAMUR sensors	Connection technology and assembly, installation and commissioning instructions for digital input and output modules of type CPX-P-....
P.BE-CPX-F8DE-P-...	Input module CPX-F8DE-P	Connection technology and assembly, installation and commissioning instructions for the PROFIsafe input module of type CPX-F8DE-P.
P.BE-CPX-2ZE2DA-...	I/O module CPX-2ZE2DA	Connection technology and assembly, installation and commissioning instructions for counter modules of type CPX-2ZE2DA.
P.BE-CPX-AX-...	CPX-P-EA modules, analogue	Connection technology and assembly, installation and commissioning instructions for analogue input and output modules of type CPX-...
P.BE-CPX-CTEL...	CPX CTEL interface	Instructions on assembly, installation, commissioning and diagnostics of the CTEL master.
P.BE-CPX-CTEL-LK...	Electrical interface CPX-CTEL-2	Instructions on assembly, installation, commissioning and diagnostics for the electrical interface for IO-Link.
P.BE-CPX-CMIX...	CPX measuring module	Instructions on assembly, installation, commissioning and diagnostics of the measuring module (CMIX).
P.BE-CPX-FB... CPX-FB...	CPX bus node	Instructions on assembly, installation, commissioning and diagnostics of the relevant bus node.
P.BE-CPX-PNIO...	CPX bus node for PROFINET	Instructions on assembly, installation, commissioning and diagnostics of the relevant bus node.
P.BE-CPX-CEC...	CPX CODESYS controller (control block)	Instructions on assembly, installation, commissioning and diagnostics of the relevant control block.

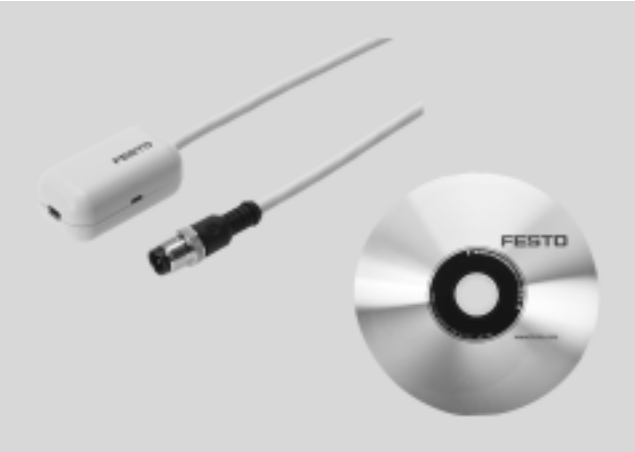
Terminal CPX-P

Technical data – CPX-P-Maintenance Tool

Function

The CPX-P Maintenance Tool (CPX-FMT) combines service software with a connecting adapter. The service software is a tool for the design, parameterisation and online diagnostics of the CPX-P terminal. The USB-to-M12 adapter features built-in galvanic isolation (between CPX-P and PC) and enables a PC to be connected to the diagnostic interface of the CPX-P terminal.

- Adapter
- Software on CD-ROM



Application

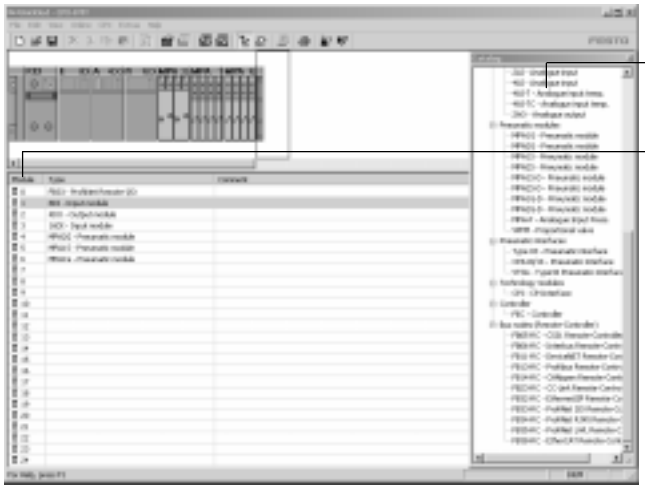
Only from Festo

The CPX-FMT software enables access to CPX valve terminals via Ethernet with the bus nodes EtherNet/IP (FB 36) and PROFINET (FB 33, FB 34, FB 35). The bus nodes or control blocks can be connected directly to a PC via a USB adapter from Festo. Diagnostic data such as the error trace or module diagnostics can be read out and parameters can be modified in plain text. The data can be used directly on a PC. There is an option, for example, to send screenshots of a configuration or the current error trace directly via e-mail. In addition, CPX configurations can also be saved and archived directly as a CPX-FMT project. Undocumented changes can subsequently be identified using the online/offline comparison function. On-site tests such as the actuation of valves or the emulation of sensor feedback (in both cases called "forcing"), for example, can be performed without an existing controller infrastructure. It must be noted that with the CPX-FMT, only local parameters on the CPX valve terminal can be changed and saved. The configuration of the networks or controller software cannot be influenced.

General technical data			
Type			**NEFC-M12G5-0.3-U1G5**
System requirements	PC		IBM-compatible
	Drive		CD-ROM
	Interfaces		USB port (specification USB 1.1 or higher)
	Operating system		Microsoft Windows 2000 or XP
Function range			• Configuration and parameterisation • Reading out of system, module, channel diagnostics and error trace • Saving of the configuration as a project • Integration of plug-ins/links to self-executing programs
Scope of delivery			• Adapter, M12, 5-pin to mini USB socket • CD-ROM with installation program
Type of mounting			Screw-in
Electrical connection			Plug M12x1, 5-pin
Adapter cable composition			4 x 0.34 mm^2
Cable length		[m]	0.3
Degree of protection to EN 60529			IP20
CE marking (see declaration of conformity)			To EU EMC Directive
Ambient temperature		[°C]	–5 ... +50
Material	Housing		ABS
	Cable sheath		PUR
	Pin contact		Gold-plated brass
Note on materials			RoHS-compliant

Display components

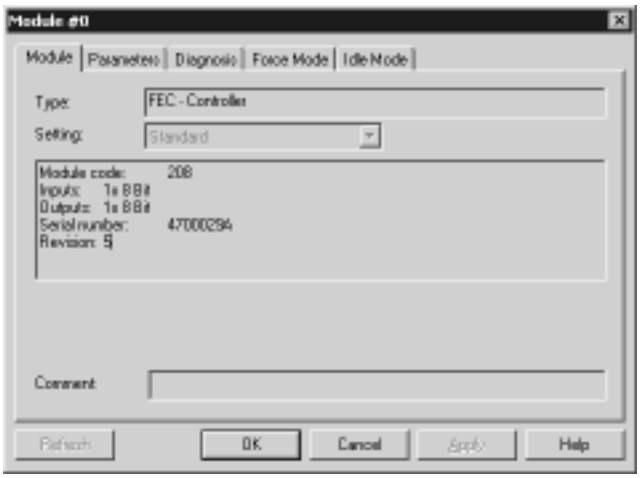
Creating a device configuration using the editor



The device configuration can be conveniently generated, parameterised and saved using the drag & drop feature. You can insert and move modules.

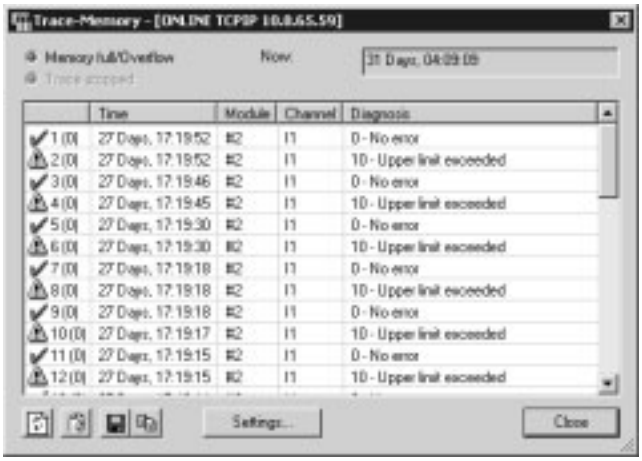
1 Module numbers from the graphic system overview
2 Catalogue for selecting required modules

Module overview for a selected module



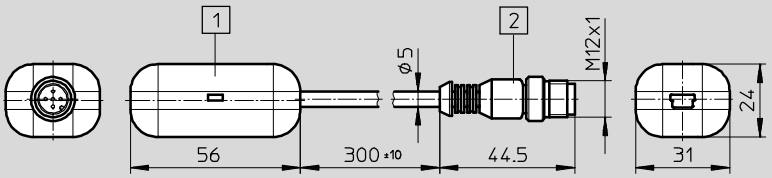
Displays important module data as well as the number of allocated inputs and outputs.

Diagnostic memory



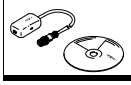
Errors which occur during operation are entered into a diagnostic memory. The first or the last 40 entries are saved, as well as the respective time measured from the moment the power supply was switched on.

Dimensions Download CAD data ➔ **www.festo.com**



1 Mini B 5P USB connection
2 Plug M12x1, 5-pin

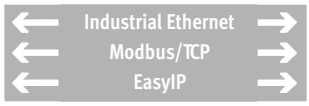
Ordering data

Designation		Part no.	Type
	CPX-P Maintenance Tool (CPX-FMT), software and USB-to-M12 adapter	**547432**	**NEFC-M12G5-0.3-U1G5**

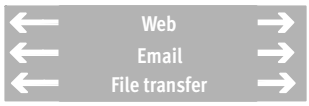
Terminal CPX-P

Technical data – Control block CPX-CEC

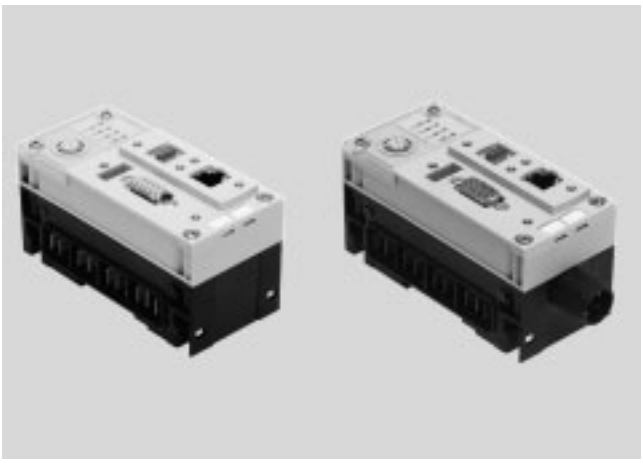
FESTO



IT services:



The CODESYS controller is a modern control system for CPX-P terminals that enables programming with CODESYS to IEC 61131-3.
The power supply to and communication with other modules takes place via the interlinking block.
In addition to network connections, LEDs are also provided for the bus status, operating status of the PLC and CPX-P peripherals information, as are switching elements and a diagnostic interface for CPX-FMT.



Application

Bus connection

The CPX-CEC is a remote controller that can be connected to a higher-order PLC via the bus nodes of the CPX-P terminal or via Ethernet. At the same time, it is possible to operate the CPX-CEC as a compact stand-alone controller directly on the machine.

Communication protocols

- Fieldbus via CPX-P bus nodes
- Modbus/TCP
- EasyIP

Operating modes

- Stand-alone
- Remote controller, fieldbus
- Remote controller, Ethernet

Setting options

The CPX-CEC has the following interfaces for monitoring, programming and commissioning:

- For the CPX-FMT
- Ethernet interface for IT applications
- Remote diagnostics

The operating mode and fieldbus protocol are set using the DIL switch on the CPX-CEC.

The integrated web server offers a convenient means of querying data saved in the CPX-CEC.

Features

- Easy actuation of valve terminal configurations with MPA, VTSA
- Diagnostics with flexible monitoring options for pressure, flow rate, cylinder operating time, air consumption
- Actuation of decentralised installation systems on the basis of CPI actuation of applications in proportional pneumatics
- AS-Interface actuation via gateway
- Connection to all fieldbuses as a remote controller and for preprocessing
- Actuation of electric drives as individual axes via CANopen (CPX-CEC-C1/-M1)
- Early warnings and visualisation options
- Closed-loop pneumatic applications

General technical data			
Protocol			CODESYS Level 2
			EasyIP
			Modbus TCP
			TCP/IP
Processing time			Approx. 200 µs/1 k instruction
Programming software			CODESYS provided by Festo
Programming language			To IEC 61131-3
			Sequential function chart (SFC)
			Instruction list (IL)
			Function chart (FCH), additional continuous function chart (CFC)
			Ladder diagram (LDR)
			Structured text (ST)
Programming	Operating language		German, English
	Support for file handling		Yes
Device-specific diagnostics			Diagnostic memory
			Channel and module-oriented diagnostics
			Undervoltage/short-circuit modules
LED indicators	Bus-specific		TP: Link/traffic
	Product-specific		RUN: PLC status
			STOP: PLC status
			ERR: PLC runtime error
			PS: Electronics supply, sensor supply
			PL: Load supply
			SF: System fault
			M: Modify/forcing active
IP address setting			DHCP
			Via CODESYS
			Via MMI
Function elements			CPX-P diagnostic status, copy CPX-P diagnostic trace, read CPX-P module diagnostics, etc.
Dimensions (incl. interlinking block) W x L x H		[mm]	50 x 107 x 55

Materials	
Housing	PA-reinforced
	PC
Note on materials	RoHS-compliant

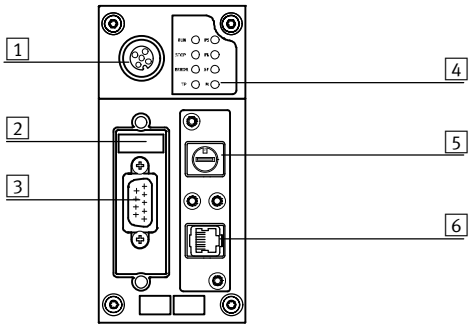
Operating and environmental conditions		
Ambient temperature	[°C]	–5 … +50
Storage temperature	[°C]	–20 … +70
Relative humidity	[%]	95, non-condensing
Corrosion resistance class CRC[1)]		2

1) Corrosion resistance class CRC 2 to Festo standard FN 940070
Moderate corrosion stress. Indoor applications in which condensation may occur. External visible parts with primarily decorative requirements for the surface and which are in direct contact with the ambient atmosphere typical for industrial applications.

Electrical data			
Nominal operating voltage		[V DC]	24
Load voltage	Nominal operating voltage	[V DC]	24
	With pneumatics of type VTSA	[V DC]	21.6 … 26.4
	With pneumatics of type MPA	[V DC]	18 … 30
	Without pneumatic components	[V DC]	18 … 30
Power failure buffering		[ms]	10
Intrinsic current consumption at nominal operating voltage		[mA]	Typically 85
Degree of protection to EN 60529			IP65, IP67

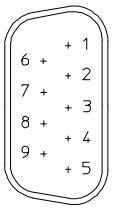
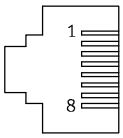
Technical data					
Type			**CPX-CEC-C1-V3**	**CPX-CEC-M1-V3**	**CPX-CEC-S1-V3**
Additional functions			Motion functions for electric drives	SoftMotion functions for electric drives	Diagnostic functions
					RS232 communication function
CPU data	Flash	[MB]	32		
	RAM	[MB]	256		
	Processor	[MHz]	800		
Control interface			CAN bus	CAN bus	–
Parameterisation			CODESYS V3		
Configuration support			CODESYS V3		
Program memory, user program		[MB]	16		
Flags			CODESYS variable concept		
	Remanent data	[kB]	28		
Control elements			DIL switch for CAN termination		–
			Rotary switch for RUN/STOP		Rotary switch for RUN/ STOP
Total number of axes			127	31	–
Ethernet	Number		1		
	Connection technology		RJ45 socket, 8-pin		
	Data transmission speed	[Mbps]	10/100		
	Supported protocols		TCP/IP, EasyIP, Modbus TCP		
Fieldbus interface	Number		1		1
	Connection technology		Sub-D plug, 9-pin		Sub-D socket, 9-pin
	Data transmission speed, can be set via software	[kbps]	125, 250, 500, 800, 1000		9.6 ... 230.4
	Supported protocols		CAN bus		RS 232 interface
	Max. cable length	[m]	–		30
	Galvanic isolation		Yes		Yes

Connection and display components CPX-CEC-C1/-M1



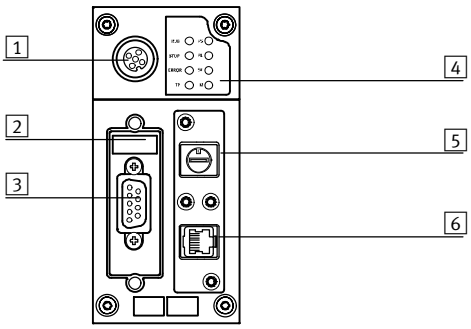
1 CPX-FMT connection
2 DIL switch
3 Fieldbus interface (Sub-D plug, 9-pin)
4 Status LEDs, bus-specific and product-specific
5 RUN/STOP rotary switch
6 Ethernet interface (RJ45 socket, 8-pin)

Pin allocation – CPX-CEC-C1/-M1

	Pin	Signal	Meaning
Fieldbus interface, Sub-D plug			
	1	n.c.	Not connected
	2	CAN_L	CAN low
	3	CAN_GND	CAN ground
	4	n.c.	Not connected
	5	CAN_SHLD	Connection to functional earth FE
	6	CAN_GND	CAN ground (optional)[1)]
	7	CAN_H	CAN high
	8	n.c.	Not connected
	9	n.c.	Not connected
	Housing	Shield	Plug housing must be connected to FE
Ethernet interface, RJ45 plug			
	1	TD+	Transmitted data+
	2	TD-	Transmitted data-
	3	RD+	Received data+
	4	n.c.	Not connected
	5	n.c.	Not connected
	6	RD-	Received data-
	7	n.c.	Not connected
	8	n.c.	Not connected
	Housing	Shield	Shield

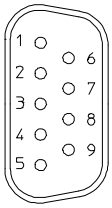
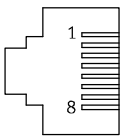
1) If a drive controller with external power supply is connected, CAN ground (optional), pin 6, on the CPX-CEC-C1/-M1 must not be used.

Connection and display components CPX-CEC-S1

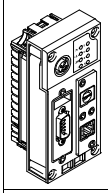
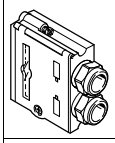
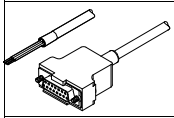
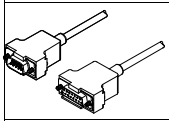
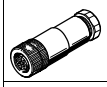
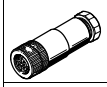
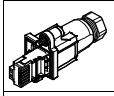
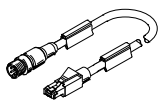
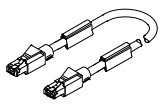


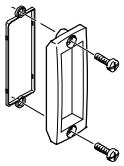
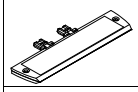
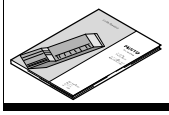
1 CPX-FMT connection
2 DIL switch
3 RS232 interface (Sub-D socket, 9-pin)
4 Status LEDs, bus-specific and product-specific
5 RUN/STOP rotary switch
6 Ethernet interface (RJ45 socket, 8-pin)

Pin allocation – CPX-CEC-S1

	Pin	Signal	Meaning
RS 232 interface, Sub-D socket			
	1	n.c.	Not connected
	2	RxD	Received data
	3	TxD	Transmitted data
	4	n.c.	Not connected
	5	GND	Data reference potential
	6	n.c.	Not connected
	7	n.c.	Not connected
	8	n.c.	Not connected
	9	n.c.	Not connected
	Shield	Shield	Connection to functional earth
Ethernet interface, RJ45 plug			
	1	TD+	Transmitted data+
	2	TD-	Transmitted data-
	3	RD+	Received data+
	4	n.c.	Not connected
	5	n.c.	Not connected
	6	RD-	Received data-
	7	n.c.	Not connected
	8	n.c.	Not connected
	Housing	Shield	Shield

Ordering data

Designation				Part no.	Type
Control block					
	Motion functions for electric drives		135 g	**3473128**	**CPX-CEC-C1-V3**
	SoftMotion functions for electric drives		135 g	**3472765**	**CPX-CEC-M1-V3**
	RS232 communication function		135 g	**3472425**	**CPX-CEC-S1-V3**
Fieldbus interface					
	Sub-D plug, 9-pin, for CANopen			**532219**	**FBS-SUB-9-BU-2x5POL-B**
	Connecting cable for RS232 interface			**539642**	**FEC-KBG7**
	Connecting cable for RS232 interface			**539643**	**FEC-KBG8**
	Micro Style bus connection, 2xM12 for DeviceNet/CANopen			**525632**	**FBA-2-M12-5POL**
	Socket for micro style connection, M12			**18324**	**FBSD-GD-9-5POL**
	Plug for micro style connection, M12			**175380**	**FBS-M12-5GS-PG9**
	Open Style bus connection for 5-pin terminal strip for DeviceNet/CANopen			**525634**	**FBA-1-SL-5POL**
	Terminal strip for open style connection, 5-pin			**525635**	**FBSD-KL-2x5POL**
Ethernet interface					
	RJ45 plug		Degree of protection IP 65, IP67	**534494**	**FBS-RJ45-8-GS**
	Cover for RJ45 connection		Degree of protection IP 65, IP67	**534496**	**AK-Rj45**
	Straight plug, RJ45, 8-pin	Straight plug, M12x1, 4-pin, D-coded	Degree of protection IP20	1 m	**8040451**	**NEBC-D12G4-ES-1-S-R3G4-ET**
				3 m	**8040452**	**NEBC-D12G4-ES-3-S-R3G4-ET**
				5 m	**8040453**	**NEBC-D12G4-ES-5-S-R3G4-ET**
				10 m	**8040454**	**NEBC-D12G4-ES-10-S-R3G4-ET**
	Straight plug, RJ45, 8-pin	Straight plug, RJ45, 8-pin	Degree of protection IP20	1 m	**8040455**	**NEBC-R3G4-ES-1-S-R3G4-ET**

Ordering data				
Designation			Part no.	Type
Covers and attachments				
	Inspection cover, transparent, for Sub-D connection		**533334**	**AK-SUB-9/15-B**
	Inscription label holder for connection block		**536593**	**CPX-ST-1**
User documentation				
	Manual for control block CPX-CEC	German	**569121**	**P.BE-CPX-CEC-DE**
		English	**569122**	**P.BE-CPX-CEC-EN**

Terminal CPX-P

Technical data – Bus node for DeviceNet, CPX-FB11

Bus node for handling communication between the electrical CPX-P terminal and a DeviceNet network.
The bus node is provided with system supply via the interlinking block and processes communication with the I/O modules.
The status of the CPX-P terminal is displayed as a common message via 4 CPX-P-specific LEDs.
The fieldbus communication status is displayed via the 3 DeviceNet-specific LEDs.

Application

Bus connection

The bus connection can be selected when ordering, either Micro Style as 2xM12 round connectors or Open-Style as a terminal strip with degree of protection IP20.

Both connection types have the function of an integrated T-distributor with incoming and outgoing bus line.

DeviceNet implementation

The CPX-FB11 operates with the "Predefined Master/Slave Connection Set" as a "Group 2 Only Server".
The polled I/O, change of state or cyclic method is used for the transmission of cyclic I/O data. The type of transmission can be selected in the network configuration.

The device diagnostics for all bus nodes CPX-FB11 is effectively gathered via strobed I/O and displayed in the input table of the controller.
In addition to cyclic data transmission, acyclic communication is supported through explicit messaging, which enables detailed device diagnostics and parameterisation.

A comprehensive EDS file supports the display of acyclic data. It is also possible to display system information and assign parameters while the controller is running via the user program or the configuration software.

An example of this is access to the integrated diagnostic memory function, i.e. storage of the last 40 errors with timestamp, module, channel and error type.
With its address capacity of 64 byte inputs and 64 byte outputs, the CPX-FB11 supports any configuration of I/O modules, including pneumatic interface.

Points to note in connection with CPX-CEC

When a bus node is combined with a control block (CPX-CEC, in the fieldbus remote controller operating mode), the connected I/Os and/or valves, sensors and actuators are controlled via the CPX-P control block.

In this case, the bus node only provides the communication interface to the PLC.
Communication between the control block and CPX-P bus node takes place by interlinking the CPX-P modules and takes up the following address capacity in the CPX-P system:

- 8 byte outputs
- 8 byte inputs

The remaining address capacity of the control block or CPX-P system for actuating the peripherals is:

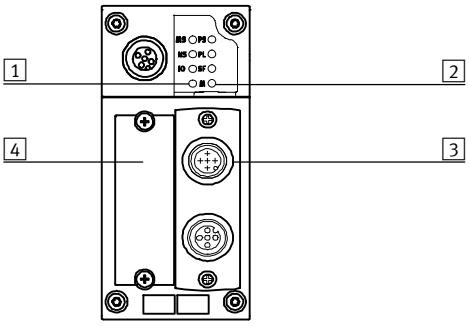
- 56 byte inputs
- 56 byte outputs

General technical data			
Type			**CPX-FB11**
Fieldbus interface			Either • Micro Style bus connection: 2xM12 with degree of protection IP65/IP67 • Open Style bus connection: 5-pin terminal strip, IP20
Baud rate		[kbps]	125, 250, 500
Addressing range			0 … 63 Set using DIL switch
Product	Type		Communication adapter (12 dec.)
	Code		4554 dec.
Communication types			Polled I/O, change of state/cyclic, strobed I/O and explicit messaging
Configuration support			EDS file and bitmaps
Max. address capacity	Inputs	[bytes]	64
	Outputs	[bytes]	64
LED displays (bus-specific)			MS = Module status NS = Network status IO = I/O status
Device-specific diagnostics			Module and channel-oriented diagnostics via manufacturer-specific diagnostic object
Parameterisation			• Module and system parameterisation via configuration interface in plain text (EDS) • Online in run or program mode
Additional functions			• Storage of the last 40 errors with timestamp (access via EDS) • 8-bit system status in process image for inputs • 2 byte inputs and 2 byte outputs, system diagnostics in process image
Control elements			DIL switch
Operating voltage	Nominal value	[V DC]	24
	Permissible range	[V DC]	18 … 30
	Power failure buffering	[ms]	10
Current consumption		[mA]	Typically 200
Degree of protection to EN 60529			IP65, IP67
Temperature range	Operation	[°C]	–5 … +50
	Storage/transport	[°C]	–20 … +70
Materials			PA reinforced, PC
Grid dimension		[mm]	50
Dimensions (incl. interlinking block) W x L x H		[mm]	50 x 107 x 50
Product weight		[g]	120

Note

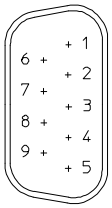
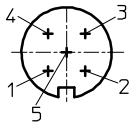
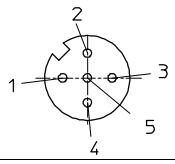
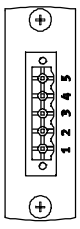
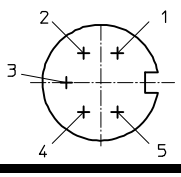
Please observe the general limits and guidelines for the system when configuring the electrical modules.

Connection and display components

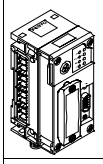
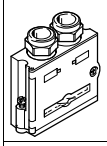
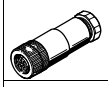
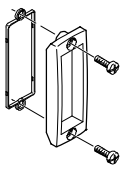
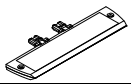
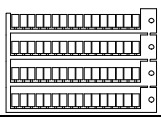


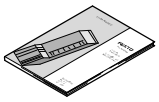
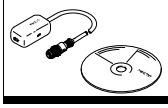
1 Bus-specific LEDs
2 CPX-P-specific status LEDs
3 Selectable fieldbus connection
Micro Style
Open Style
4 DIL switch cover

Pin allocation for the DeviceNet interface

Pin allocation	Pin	Signal-specific wire colour[1)]	Signal	Designation
Sub-D plug				
	1	–	n.c.	Not connected
	2	Blue	CAN_L	Received/transmitted data low
	3	Black	0 V bus	0 V CAN interface
	4	–	n.c.	Not connected
	5	Blank	Shield	Connection to housing
	6	–	n.c.	Not connected
	7	White	CAN_H	Received/transmitted data high
	8	–	n.c.	Not connected
	9	Red	24 V DC bus	24 V DC supply CAN interface
Micro Style bus connection (M12), incoming/outgoing				
Incoming	1	Blank	Shield	Connection to housing
	2	Red	24 V DC bus	24 V DC supply CAN interface
	3	Black	0 V bus	0 V CAN interface
	4	White	CAN_H	Received/transmitted data high
	5	Blue	CAN_L	Received/transmitted data low
Outgoing	1	Blank	Shield	Connection to housing
	2	Red	24 V DC bus	24 V DC supply CAN interface
	3	Black	0 V bus	0 V CAN interface
	4	White	CAN_H	Received/transmitted data high
	5	Blue	CAN_L	Received/transmitted data low
Open Style bus connection				
	1	Black	0 V bus	0 V CAN interface
	2	Blue	CAN_L	Received/transmitted data low
	3	Blank	Shield	Connection to housing
	4	White	CAN_H	Received/transmitted data high
	5	Red	24 V DC bus	24 V DC supply CAN interface
7/8" bus connection				
	1	Black	Shield	Connection to housing
	2	Blue	24 V DC	24 V DC supply CAN interface
	3	Blank	0 V	0 V CAN interface
	4	White	CAN_H	Received/transmitted data high
	5	Red	CAN_L	Received/transmitted data low

1) Typical for DeviceNet cables

Ordering data			
Designation		Part no.	Type
Bus node			
	DeviceNet bus node	**526172**	**CPX-FB11**
Bus connection			
	Sub-D plug	**532219**	**FBS-SUB-9-BU-2x5POL-B**
	Connection block, 9-pin Sub-D socket, 5-pin 7/8" plug	**571052**	**CPX-AB-1-7/8-DN**
	Micro Style bus connection, 2xM12	**525632**	**FBA-2-M12-5POL**
	Socket for Micro Style connection, M12	**18324**	**FBSD-GD-9-5POL**
	Plug for Micro Style connection, M12	**175380**	**FBS-M12-5GS-PG9**
	Open Style bus connection for 5-pin terminal strip	**525634**	**FBA-1-SL-5POL**
	Terminal strip for Open Style connection, 5-pin	**525635**	**FBSD-KL-2x5POL**
Covers			
	Cover cap for sealing unused M12 connections (10 pieces)	**165592**	**ISK-M12**
	Inspection cover, transparent, for Sub-D connection	**533334**	**AK-SUB-9/15-B**
Inscription label			
	Inscription label holder for connection block	**536593**	**CPX-ST-1**
	Inscription labels 6x10 mm, 64 pieces, in frame	**18576**	**IBS-6x10**

Ordering data				
Designation			Part no.	Type
User documentation				
	User documentation for bus node CPX-FB11	German	**526421**	**P.BE-CPX-FB11-DE**
		English	**526422**	**P.BE-CPX-FB11-EN**
		Spanish	**526423**	**P.BE-CPX-FB11-ES**
		French	**526424**	**P.BE-CPX-FB11-FR**
		Italian	**526425**	**P.BE-CPX-FB11-IT**
Software				
	M12 adapter, 5-pin to mini USB socket, and controller software		**547432**	**NEFC-M12G5-0.3-U1G5**

Terminal CPX-P

Technical data – Bus node for PROFIBUS-DP, CPX-FB13

Bus node for handling communication between the electrical CPX-P terminal and a higher-order master via PROFIBUS DP.
The bus node is provided with system supply via the interlinking block and processes communication with the I/O modules.
The status of the CPX-P terminal is displayed as a common message via 4 CPX-P-specific LEDs.
The fieldbus communication status is displayed via the PROFIBUS-specific error LED.

Application

Bus connection

The bus connection is established via a 9-pin Sub-D socket with a typical PROFIBUS allocation (to EN 50170).

The bus connector plug (with degree of protection IP65/IP67 from Festo or degree of protection IP20 from other manufacturers) facilitates the connection of an incoming and an outgoing bus cable.

An active bus terminal can be connected using the DIL switch integrated in the plug.

The Sub-D interface is designed for controlling network components with a fibre-optic cable connection.

PROFIBUS-DP implementation

The CPX-FB13 supports the PROFIBUS-DP protocol to EN 50170 Volume 2 for cyclic I/O exchange, parameterisation and diagnostic functions (DPV0).

In addition to DPV0, acyclic communication to the enhanced specification DPV1 is supported. DPV1 provides acyclic access to advanced system information and assigns operating parameters while the controller is running via the user program.

An example of this is access to the integrated diagnostic memory function, i.e. storage of the last 40 errors with timestamp, module, channel and error type.

With its address capacity of 64 byte inputs and 64 byte outputs, the CPX-FB13 supports any configuration of I/O modules, including pneumatic interface.

Points to note in connection with CPX-CEC

When a bus node is combined with a control block (CPX-CEC, in the fieldbus remote controller operating mode), the connected I/Os and/or valves, sensors and actuators are controlled via the CPX-P control block.

In this case, the bus node only provides the communication interface to the PLC.
Communication between the control block and CPX-P bus node takes place by interlinking the CPX-P modules and takes up the following address capacity in the CPX-P system:

- 8 byte outputs
- 8 byte inputs

The remaining address capacity of the control block or CPX-P system for actuating the peripherals is:

- 56 byte inputs
- 56 byte outputs

Terminal CPX-P

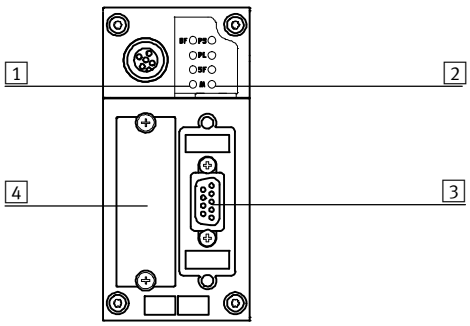
Technical data – Bus node for PROFIBUS-DP, CPX-FB13

General technical data			
Type			**CPX-FB13**
Fieldbus interface			Sub-D socket, 9-pin (EN 50170) Galvanically isolated 5 V
Baud rate		[Mbps]	0.0096 ... 12
Addressing range			1 ... 125 Set using DIL switch
Product range			4: Valves
Ident. number			0x059E
Communication types			DPV0: Cyclic communication DPV1: Acyclic communication
Configuration support			GSD file and bitmaps
Max. address capacity	Inputs	[bytes]	64
	Outputs	[bytes]	64
LED displays (bus-specific)			BF: Bus fault
Device-specific diagnostics			Identifier and channel-oriented diagnostics to EN 50170 (PROFIBUS standard)
Parameterisation			• Start-up parameterisation via configuration interface in plain text (GSD) • Acyclic parameterisation via DPV1
Additional functions			• Storage of the last 40 errors with timestamp (access via DPV1) • 8-bit system status in process image for inputs • 2 byte inputs and 2 byte outputs, system diagnostics in process image
Control elements			DIL switch
Operating voltage	Nominal value	[V DC]	24
	Permissible range	[V DC]	18 ... 30
	Power failure buffering	[ms]	10
Current consumption		[mA]	Typically 200
Degree of protection to EN 60529			IP65, IP67
Temperature range	Operation	[°C]	–5 ... +50
	Storage/transport	[°C]	–20 ... +70
Materials			PA reinforced, PC
RoHS status			RoHS-compliant according to EU directive
Grid dimension		[mm]	50
Dimensions (incl. interlinking block) W x L x H		[mm]	50 x 107 x 50
Product weight		[g]	115

- - Note

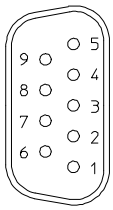
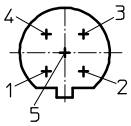
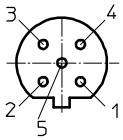
Please observe the general limits and guidelines for the system when configuring the electrical modules.

Connection and display components

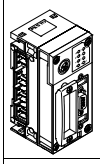
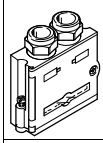
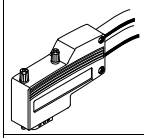
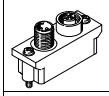
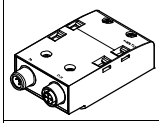
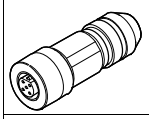
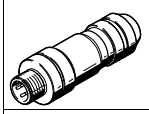
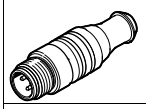
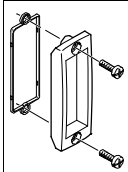
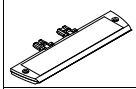
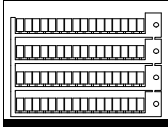


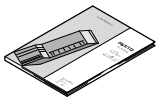
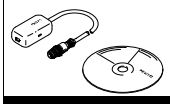
1 Bus status LEDs/bus fault
2 CPX-P-specific status LEDs
3 Fieldbus connection (Sub-D socket, 9-pin)
4 DIL switch cover

Pin allocation for PROFIBUS-DP interface

Pin allocation	Pin	Signal	Designation
Sub-D socket			
	1	n.c.	Not connected
	2	n.c.	Not connected
	3	RxD/TxD-P	Received/transmitted data P
	4	CNTR-P[1]	Repeater control signal
	5	DGND	Data reference potential (M5V)
	6	VP	Supply voltage (P5V)
	7	n.c.	Not connected
	8	RxD/TxD-N	Received/transmitted data N
	9	n.c.	Not connected
	Housing	Shield	Connection to housing
Bus connection M12 adapter (B-coded)			
Incoming 	1	n.c.	Not connected
	2	RxD/TxD-N	Received/transmitted data N
	3	n.c.	Not connected
	4	RxD/TxD-P	Received/transmitted data P
	5 and M12	Shield	Connection to FE
Outgoing 	1	VP	Supply voltage (P5V)
	2	RxD/TxD-N	Received/transmitted data N
	3	DGND	Data reference potential (M5V)
	4	RxD/TxD-P	Received/transmitted data P
	5 and M12	Shield	Connection to FE

1) The repeater control signal CNTR-P is a TTL signal.

Ordering data			
Designation		Part no.	Type
Bus node			
	PROFIBUS bus node	**195740**	**CPX-FB13**
Bus connection			
	Sub-D plug, straight	**532216**	**FBS-SUB-9-GS-DP-B**
	Sub-D plug, angled	**533780**	**FBS-SUB-9-WS-PB-K**
	Bus connection, adapter from 9-pin Sub-D plug to 5-pin M12 plug/socket, B-coded	**533118**	**FBA-2-M12-5POL-RK**
	Connection block, adapter from 9-pin Sub-D plug to 5-pin M12 plug/socket, B-coded	**541519**	**CPX-AB-2-M12-RK-DP**
	Socket M12x1, 5-pin, straight, for self-assembly of a connecting cable compatible with FBA-2-M12-5POL-RK and CPX-AB-2-M12-RK-DP	**1067905**	**NECU-M-B12G5-C2-PB**
	Plug M12x1, 5-pin, straight, for self-assembly of a connecting cable compatible with FBA-2-M12-5POL-RK and CPX-AB-2-M12-RK-DP	**1066354**	**NECU-M-S-B12G5-C2-PB**
	Terminating resistor, M12, B-coded for PROFIBUS	**1072128**	**CACR-S-B12G5-220-PB**
Covers			
	Cover cap for sealing unused M12 connections (10 pieces)	**165592**	**ISK-M12**
	Inspection cover, transparent, for Sub-D connection	**533334**	**AK-SUB-9/15-B**
Inscription label			
	Inscription label holder for connection block	**536593**	**CPX-ST-1**
	Inscription labels 6x10 mm, 64 pieces, in frame	**18576**	**IBS-6x10**

Ordering data				
Designation			Part no.	Type
User documentation				
	User documentation for bus node CPX-FB13	German	**526427**	**P.BE-CPX-FB13-DE**
		English	**526428**	**P.BE-CPX-FB13-EN**
		Spanish	**526429**	**P.BE-CPX-FB13-ES**
		French	**526430**	**P.BE-CPX-FB13-FR**
		Italian	**526431**	**P.BE-CPX-FB13-IT**
Software				
	M12 adapter, 5-pin to mini USB socket, and controller software		**547432**	**NEFC-M12G5-0.3-U1G5**

Terminal CPX-P

Technical data – Bus node for CANopen, CPX-FB14

Bus node for handling communication between the electrical CPX-P terminal and a CANopen network master or CANopen network.
The bus node is provided with system supply via the interlinking block and processes communication with the I/O modules.
The status of the CPX-P terminal is displayed as a common message via 4 CPX-P-specific LEDs.
The different CANopen statuses and the fieldbus communication status are displayed via 3 additional LEDs.

Application

Bus connection

The bus connection is established via a 9-pin Sub-D plug (pin) as per the CAN in Automation (CiA) specification DS 102 with additional 24 V CAN transceiver supply (option as per DS 102).

The bus connector plug (with IP65/IP67 from Festo or degree of protection IP20 from other manufacturers) facilitates the connection of an incoming and an outgoing bus cable.

There are 4 contacts available for the 4 wires (CAN_L, CAN_H, 24 V, 0 V) of the incoming and outgoing bus cables.

CANopen implementation

The CPX-FB14 supports the CANopen protocol in accordance with the specifications DS 301 V4.01 and DS 401 V2.0.
Implementation is based on the CiA Predefined Connection Set.
There are 4 PDOs available for fast I/O data exchange.

Enhanced system information can also be accessed using SDO communication. SDO communication also facilitates parameterisation before network startup or while the controller is running via the user program.
An example of this is access to the integrated diagnostic memory function, i.e. storage of the last 40 errors with timestamp, module, channel and error type.

With its address capacity, the CPX-FB14 supports a large number of I/O module configurations, including pneumatic interface.
By default, 8 byte digital inputs and 8 byte digital outputs can be addressed via PDO 1.

8 analogue input channels and 8 analogue output channels can be addressed via PDO 2 and 3. Status and diagnostic information can be evaluated via PDO 4.
Additional 8 byte digital inputs and outputs as well as 8 analogue input and output channels can be addressed via mapping.

Points to note in connection with CPX-CEC

When a bus node is combined with a control block (CPX-CEC, in the fieldbus remote controller operating mode), the connected I/Os and/or valves, sensors and actuators are controlled via the CPX-P control block.

In this case, the bus node only provides the communication interface to the PLC.
Communication between the control block and CPX-P bus node takes place by interlinking the CPX-P modules and takes up the following address capacity in the CPX-P system:

- 8 byte outputs
- 8 byte inputs

The remaining address capacity of the control block or CPX-P system for actuating the peripherals is:

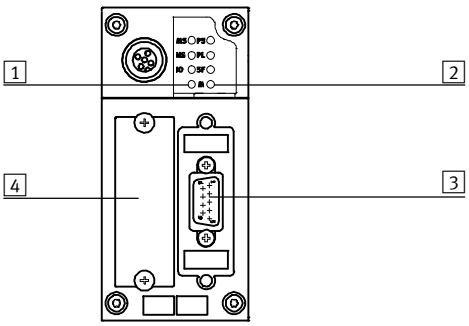
- 56 byte inputs
- 56 byte outputs

General technical data			
Type			**CPX-FB14**
Fieldbus interface			Sub-D plug, 9-pin (to DS 102) Bus interface galvanically isolated via optocoupler 24 V supply for CAN interface via bus
Baud rate		[kbps]	125, 250, 500 and 1000 can be set via DIL switch
Addressing range			Node ID 1 ... 127 Set using DIL switch
Product family			Digital inputs and outputs
Communication profile			DS 301, V4.01
Device profile			DS 401, V2.0
Number	PDO		4 Tx/4 Rx
	SDO		1 server SDO
Configuration support			EDS file and bitmaps
Max. address capacity	Inputs	[bytes]	16 digital, 16 analogue channels
	Outputs	[bytes]	16 digital, 16 analogue channels
LED displays (bus-specific)			MS= Module status NS = Network status IO= I/O status
Device-specific diagnostics			Via emergency message Object 1001, 1002 and 1003
Parameterisation			Via SDO
Additional functions			• Storage of the last 40 errors with timestamp (access via SDO) • 8-bit system status via transmit PDO 4 (default) • 2 byte inputs and 2 byte outputs, system diagnostics via PDO 4 • Minimum boot-up • Variable PDO mapping • Emergency message • Node guarding • Heart beat
Control elements			DIL switch
Operating voltage	Nominal value	[V DC]	24
	Permissible range	[V DC]	18 ... 30
	Power failure buffering	[ms]	10
Current consumption		[mA]	Typically 200
Degree of protection to EN 60529			IP65, IP67
Temperature range	Operation	[°C]	–5 ... +50
	Storage/transport	[°C]	–20 ... +70
Materials			PA reinforced, PC
Grid dimension		[mm]	50
Dimensions (incl. interlinking block) W x L x H		[mm]	50 x 107 x 50
Product weight		[g]	115

Note

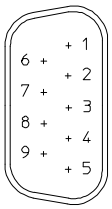
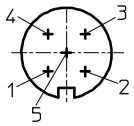
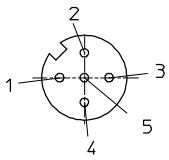
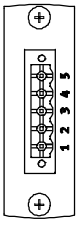
Please observe the general limits and guidelines for the system when configuring the electric modules.

Connection and display components

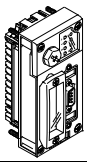
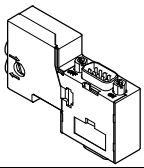
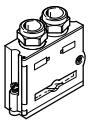
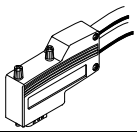
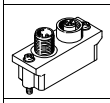
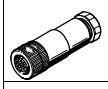
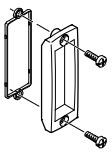
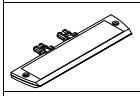
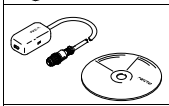
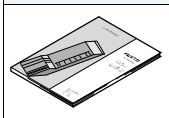


1 Bus-specific LEDs
2 CPX-P-specific status LEDs
3 Fieldbus interface (Sub-D plug, 9-pin)
4 DIL switch cover

Pin allocation of the CANopen interface

Pin allocation	Pin	Signal	Designation
Sub-D plug			
	1	n.c.	Not connected
	2	CAN_L	Received/transmitted data low
	3	CAN_GND	0 V CAN interface
	4	n.c.	Not connected
	5	CAN_Shld	Optional shielded connection
	6	GND	Ground[1)]
	7	CAN_H	Received/transmitted data high
	8	n.c.	Not connected
	9	CAN_V+	24 V DC supply CAN interface
	Housing	Shield	Connection to FE
Micro Style bus connection (M12)			
Incoming 	1	Shield	Connection to FE
	2	CAN_V+	24 V DC supply CAN interface
	3	CAN_GND	0 V CAN interface
	4	CAN_H	Received/transmitted data high
	5	CAN_L	Received/transmitted data low
Outgoing 	1	Shield	Connection to FE
	2	CAN_V+	24 V DC supply CAN interface
	3	CAN_GND	0 V CAN interface
	4	CAN_H	Received/transmitted data high
	5	CAN_L	Received/transmitted data low
Open Style bus connection			
	1	CAN_GND	0 V CAN interface
	2	CAN_L	Received/transmitted data low
	3	Shield	Connection to FE
	4	CAN_H	Received/transmitted data high
	5	CAN_V+	24 V DC supply CAN interface

1) Connected internally via pin 3

Ordering data				
Designation			Part no.	Type
Bus node				
	CANopen bus node		**526174**	**CPX-FB14**
Bus connection				
	Sub-D socket for CANopen with terminating resistor and programming interface		**574588**	**NECU-S1W9-C2-ACO**
	Sub-D socket		**532219**	**FBS-SUB-9-BU-2x5POL-B**
	Sub-D socket, angled		**533783**	**FBS-SUB-9-WS-CO-K**
	Connection block, 9-pin Sub-D socket, 5-pin 7/8" plug		**571052**	**CPX-AB-1-7/8-DN**
	Micro Style bus connection, 2xM12, 5-pin		**525632**	**FBA-2-M12-5POL**
	Fieldbus socket for Micro Style connection, M12, 5-pin		**18324**	**FBSD-GD-9-5POL**
	Plug for Micro Style connection, M12, 5-pin		**175380**	**FBS-M12-5GS-PG9**
	Open Style bus connection		**525634**	**FBA-1-SL-5POL**
	Terminal strip for Open Style connection, 5-pin		**525635**	**FBSD-KL-2x5POL**
	Inspection cover, transparent		**533334**	**AK-SUB-9/15-B**
	Inscription label holder for connection block		**536593**	**CPX-ST-1**
	M12 adapter, 5-pin to mini USB socket, and controller software		**547432**	**NEFC-M12G5-0.3-U1G5**
User documentation				
	User documentation for bus node CPX-FB14	German	**526409**	**P.BE-CPX-FB14-DE**
		English	**526410**	**P.BE-CPX-FB14-EN**
		Spanish	**526411**	**P.BE-CPX-FB14-ES**
		French	**526412**	**P.BE-CPX-FB14-FR**
		Italian	**526413**	**P.BE-CPX-FB14-IT**

Terminal CPX-P

Technical data – Bus node for PROFINET, CPX-FB33

Bus node for operating the CPX-P valve terminal on PROFINET.
The bus node is provided with system supply via the interlinking block and processes communication with the I/O modules.
The status of the CPX-P terminal is displayed as a common message via 4 CPX-P-specific LEDs.
The fieldbus communication status is displayed via three bus-specific LEDs.

Application

Bus connection

The bus connection is established via two M12 sockets, D-coded to IEC61076-2-101 with IP65, IP67 protection.

Both connections are equivalent 100BaseTX Ethernet ports with integrated auto MDI functionality (cross-over and patch cables can be used) that are brought together via an internal switch.

- Maximum segment length 100 m
- Baud rate 100 Mbps

PROFINET implementation

The CPX-FB33 supports the PROFINET protocol based on the Ethernet standard and the TCP/IP technology to IEEE802.3.
This guarantees a data exchange with a high data transmission rate, for example I/O data from sensors, actuators or robot controllers, PLCs or process equipment. In addition, non-real-time critical information such as diagnostic information, configuration information, etc. can be transferred.
The Ethernet bandwidth is sufficient to transfer both data types (real-time and non-real-time) in parallel.

The bus node features LEDs for bus status and CPX-P peripheral information as well as switch elements, memory stick and a diagnostic interface. The purpose of the memory stick is to guarantee fast replacement of the bus node in the event of an error.
PROFINET provides the user with access to all peripherals, diagnostic data and parameter data of the CPX-P valve terminal. The bus node can be used as a remote I/O or remote controller. All information relevant to the CPX-P can be read out and, depending on the function, changed via the diagnostic interface.

Points to note in connection with CPX-CEC

When a bus node is combined with a control block (CPX-CEC, in the fieldbus remote controller operating mode), the connected I/Os and/or valves, sensors and actuators are controlled via the CPX-P control block.

In this case, the bus node only provides the communication interface to the PLC.
Communication between the control block and CPX-P bus node takes place by interlinking the CPX-P modules and takes up the following address capacity in the CPX-P system:

- 8 byte outputs
- 8 byte inputs

The remaining address capacity of the control block or CPX-P system for actuating the peripherals is:

- 56 byte inputs
- 56 byte outputs

General technical data			
Type			**CPX-FB33**
Fieldbus interface			2x M12 socket, 4-pin, D-coded
Baud rate		[Mbps]	100
Protocol			PROFINET RT
			PROFINET IRT
Max. address capacity	Inputs	[bytes]	64
	Outputs	[bytes]	64
LED indicators	(bus-specific)		M/P = Maintenance/PROFIenergy NF = Network fault TP1 = Network active port 1 TP2 = Network active port 2
	(product-specific)		M = Modify, parameterisation PL = Load supply PS = Electronic supply, sensor supply SF = System fault
Device-specific diagnostics			• Channel and module-oriented diagnostics • Undervoltage of modules • Diagnostic memory
Configuration support			GSDML file
Parameterisation			• System parameters • Diagnostic behaviour • Signal setup • Fail-safe response • Forcing of channels
Additional functions			• Start-up parameterisation in plain text via fieldbus • Fast start-up (FSU) • Channel-oriented diagnostics via fieldbus • Acyclic data access via fieldbus • System status can be displayed using process data • Additional diagnostic interface for operator units • Acyclic data access via EtherCAT
Control elements			• DIL switches • Optional memory card
Operating voltage	Nominal value	[V DC]	24
	Permissible range	[V DC]	18 ... 30
Current consumption		[mA]	Typically 120
Degree of protection to EN 60529			IP65, IP67
Temperature range	Operation	[°C]	– 5... +50
	Storage/transport	[°C]	–20 ... +70
Materials	Housing		Die-cast aluminium
Grid dimension		[mm]	50
Dimensions (incl. interlinking block) W x L x H		[mm]	50 x 107 x 50
Product weight		[g]	280

Note

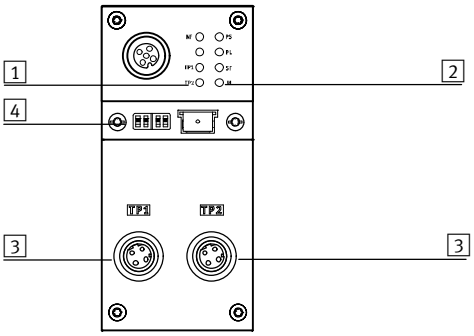
Please observe the general limits and guidelines for the system when configuring the electrical modules.

Note

Always use the correct screws for the interlinking block; this depends on whether the block is made of metal or polymer:

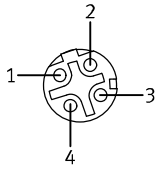
- Self-tapping screws for polymer interlinking blocks
- Screws with metric thread for metal interlinking blocks

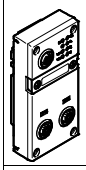
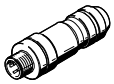
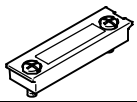
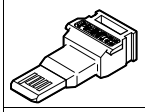
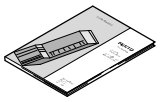
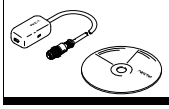
Connection and display components



1 Bus-specific status LEDs
2 CPX-P-specific status LEDs
3 Fieldbus interface (M12 socket, 4-pin, D-coded)
4 Transparent cover for DIL switch and memory card

Pin allocation for the fieldbus interface

Pin allocation	Pin	Signal	Designation
M12 socket, D-coded			
	1	TD+	Transmitted data+
	2	RD+	Received data+
	3	TD-	Transmitted data-
	4	RD-	Received data-
	Housing		Shield

Ordering data				
Designation			Part no.	Type
Bus node				
	PROFINET bus node		**548755**	**CPX-FB33**
Bus connection				
	Plug M12x1, 4-pin, D-coded		**543109**	**NECU-M-S-D12G4-C2-ET**
Covers				
	Cover cap for sealing unused M12 connections (10 pieces)		**165592**	**ISK-M12**
	Transparent cover for DIL switch and memory card		**548757**	**CPX-AK-P**
Function element				
	Memory card for PROFINET bus node, 2MB		**4798288**	**CPX-SK-3**
Screws				
	Screws for attaching an inscription label holder to the bus node (12 pieces)		**550222**	**CPX-M-M2,5X8-12X**
User documentation				
	Electronics manual, CPX-P bus node, type CPX-FB33	German	**548759**	**P.BE-CPX-PNIO-DE**
		English	**548760**	**P.BE-CPX-PNIO-EN**
		Spanish	**548761**	**P.BE-CPX-PNIO-ES**
		French	**548762**	**P.BE-CPX-PNIO-FR**
		Italian	**548763**	**P.BE-CPX-PNIO-IT**
Software				
	M12 adapter, 5-pin to mini USB socket, and controller software		**547432**	**NEFC-M12G5-0.3-U1G5**

Terminal CPX-P

Technical data – Bus node for PROFINET, CPX-M-FB34

Bus node for operating the CPX-P terminal on PROFINET.
The bus node is provided with system supply via the interlinking block and processes communication with the I/O modules.
The status of the CPX-P terminal is displayed as a common message via 4 CPX-P-specific LEDs.
The fieldbus communication status is displayed via three bus-specific LEDs.

Application

Bus connection

The bus connection is established via two RJ45 push-pull sockets to IEC61076-3-106 and IEC60603 with IP65, IP67 protection.

Both connections are equivalent 100BaseTX Ethernet ports with integrated auto MDI functionality

(cross-over and patch cables can be used) that are brought together via an internal switch.

- Maximum segment length 100 m
- Transmission rate 100 Mbps

PROFINET implementation

The CPX-M-FB34 supports the PROFINET protocol based on the Ethernet standard and TCP/IP technology to IEEE802.3.
This guarantees data exchange with a high data transmission rate, for example I/O data from sensors, actuators or robot controllers, PLCs or process equipment. In addition, non-real-time critical information such as diagnostic information, configuration information, etc. can be transferred.
The Ethernet bandwidth is sufficient to transfer both data types (real-time and non-real-time) in parallel.

The bus node features LEDs for bus status and CPX-P peripheral information as well as switch elements, memory stick and a diagnostic interface. The purpose of the memory stick is to guarantee fast replacement of the bus node in the event of an error.
PROFINET provides the user with access to all peripherals, diagnostic and parameter data of the CPX-P terminal. The bus node can be used as a remote I/O or remote controller. All information relevant to the CPX-P can be read out and, depending on the function, changed via the diagnostic interface.

Points to note in connection with CPX-CEC

When a bus node is combined with a control block (CPX-CEC, in the fieldbus remote controller operating mode), the connected I/Os and/or valves, sensors and actuators are controlled via the CPX-P control block.

In this case, the bus node only provides the communication interface to the PLC.
Communication between the control block and CPX-P bus node takes place by interlinking the CPX-P modules and takes up the following address capacity in the CPX-P system:

- 8/16 byte outputs
- 8/16 byte inputs

The remaining address capacity of the control block or CPX-P system for actuating the peripherals is:

- 56/48 byte inputs
- 56/48 byte outputs

General technical data			
Type			**CPX-M-FB34**
Fieldbus interface			2x RJ45 push-pull socket, AIDA
Baud rate		[Mbps]	100
Protocol			PROFINET RT
			PROFINET IRT
Max. address capacity	Inputs	[bytes]	64
	Outputs	[bytes]	64
LED indicators	(bus-specific)		M/P = Maintenance/PROFIenergy NF = Network fault TP1 = Network active port 1 TP2 = Network active port 2
	(product-specific)		M = Modify, parameterisation PL = Load supply PS = Electronic supply, sensor supply SF = System fault
Device-specific diagnostics			• Channel and module-oriented diagnostics • Undervoltage of modules • Diagnostic memory
Configuration support			GSDML file
Parameterisation			• System parameters • Diagnostic behaviour • Signal setup • Fail-safe response • Forcing of channels
Additional functions			• Start-up parameterisation in plain text via fieldbus • Fast start-up (FSU) • Channel-oriented diagnostics via fieldbus • Acyclic data access via fieldbus and via Ethernet • System status can be displayed using process data • Additional diagnostic interface for operator unit
Control elements			DIL switch, optional memory card
Operating voltage	Nominal value	[V DC]	24
	Permissible range	[V DC]	18 ... 30
Intrinsic current consumption at nominal operating voltage		[mA]	Typically 120
Degree of protection to EN 60529			IP65, IP67
Temperature range	Operation	[°C]	– 5... +50
	Storage/transport	[°C]	–20 ... +70
Housing material			Die-cast aluminium
Grid dimension		[mm]	50
Dimensions (incl. interlinking block) W x L x H		[mm]	50 x 107 x 80
Product weight		[g]	280

Note

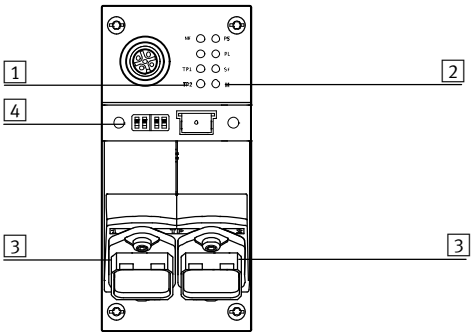
Please observe the general limits and guidelines for the system when configuring the electrical modules.

Note

Always use the correct screws for the interlinking block; this depends on whether the block is made of metal or polymer:

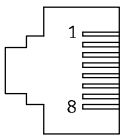
- Self-tapping screws for polymer interlinking blocks
- Screws with metric thread for metal interlinking blocks

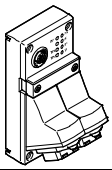
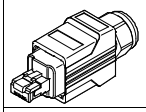
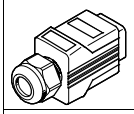
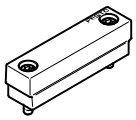
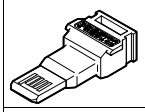
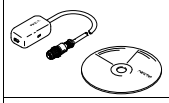
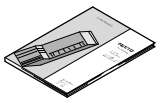
Connection and display components



1 Bus-specific status LEDs
2 CPX-P-specific status LEDs
3 Fieldbus interface (RJ45 socket, 8-pin)
4 DIL switch and memory card

Pin allocation for the fieldbus interface

Pin allocation	Pin	Signal	Designation
RJ45 socket			
	1	TD+	Transmitted data+
	2	TD-	Transmitted data-
	3	RD+	Received data+
	4	n.c.	Not connected
	5	n.c.	Not connected
	6	RD-	Received data-
	7	n.c.	Not connected
	8	n.c.	Not connected
	Housing	Shield	Shield

Ordering data				
Designation			Part no.	Type
Bus node				
	PROFINET bus node		**548751**	**CPX-M-FB34**
Bus connection				
	RJ45 plug, 8-pin, push-pull		**552000**	**FBS-RJ45-PP-GS**
	Cover cap for bus connection		**548753**	**CPX-M-AK-C**
	Cover cap for bus connection		**2873540**	**CPX-M-AK-D**
	Cover for DIL switch and memory card		**548754**	**CPX-M-AK-M**
	Memory card for PROFINET bus node, 2MB		**4798288**	**CPX-SK-3**
	Screws for attaching an inscription label to the bus node (12 pieces)		**550222**	**CPX-M-M2,5X8-12X**
	M12 adapter, 5-pin to mini USB socket, and controller software		**547432**	**NEFC-M12G5-0.3-U1G5**
User documentation				
	Electronics manual, CPX-P bus node, type CPX-M-FB34	German	**548759**	**P.BE-CPX-PNIO-DE**
		English	**548760**	**P.BE-CPX-PNIO-EN**
		Spanish	**548761**	**P.BE-CPX-PNIO-ES**
		French	**548762**	**P.BE-CPX-PNIO-FR**
		Italian	**548763**	**P.BE-CPX-PNIO-IT**

Terminal CPX-P

Technical data – Bus node for PROFINET, CPX-M-FB35

Bus node for operating the CPX-P terminal on PROFINET.
The bus node is provided with system supply via the interlinking block and processes communication with the I/O modules.
The status of the CPX-P terminal is displayed as a common message via 4 CPX-P-specific LEDs.
The fieldbus communication status is displayed via three bus-specific LEDs.

Application

Bus connection

The bus connection is established via SCRJ push-pull sockets to IEC61754-24 (fibre-optic cable, AIDA standard) with IP65, IP67 protection.

The connections on the CPX-M-FB35 are equivalent 100BaseFX Ethernet ports that are brought together via an internal switch.

Fibre-optic cables made from plastic (POF, 980/1000 µm) are also suitable for transmission.

- Maximum segment length 50 m
- Transmission rate 100 Mbps
- Supports LLDP and SNMP

PROFINET implementation

The CPX-M-FB35 supports the PROFINET protocol based on the Ethernet standard and TCP/IP technology to IEEE802.3.
This guarantees a data exchange with a high data transmission rate, for example I/O data from sensors, actuators or robot controllers, PLCs or process equipment. In addition, non-real-time critical information such as diagnostic information, configuration information, etc. can be transferred.
The Ethernet bandwidth is sufficient to transfer both data types (real-time and non-real-time) in parallel.

The bus node features LEDs for bus status and CPX-P peripheral information as well as switch elements, memory stick and a diagnostic interface. The purpose of the memory stick is to guarantee fast replacement of the bus node in the event of an error.
PROFINET provides the user with access to all peripherals, diagnostic and parameter data of the CPX-P terminal. The bus node can be used as a remote I/O or remote controller. All information relevant to the CPX-P can be read out and, depending on the function, changed via the diagnostic interface.

Points to note in connection with CPX-CEC

When a bus node is combined with a control block (CPX-CEC, in the fieldbus remote controller operating mode), the connected I/Os and/or valves, sensors and actuators are controlled via the CPX-P control block.

In this case, the bus node only provides the communication interface to the PLC.
Communication between the control block and CPX-P bus node takes place by interlinking the CPX-P modules and takes up the following address capacity in the CPX-P system:

- 8/16 byte outputs
- 8/16 byte inputs

The remaining address capacity of the control block or CPX-P system for actuating the peripherals is:

- 56/48 byte inputs
- 56/48 byte outputs

General technical data			
Type			**CPX-M-FB35**
Fieldbus interface			2x SCRJ push-pull socket, AIDA
Baud rate		[Mbps]	100
Protocol			PROFINET RT
			PROFINET IRT
Max. address capacity	Inputs	[bytes]	64
	Outputs	[bytes]	64
LED indicators	(bus-specific)		M/P = Maintenance/PROFIenergy NF = Network fault TP1 = Network active port 1 TP2 = Network active port 2
	(product-specific)		M = Modify, parameterisation PL = Load supply PS = Electronic supply, sensor supply SF = System fault
Device-specific diagnostics			• Channel and module-oriented diagnostics • Undervoltage of modules • Diagnostic memory
Configuration support			GSDML file
Parameterisation			• System parameters • Diagnostic behaviour • Signal setup • Fail-safe response • Forcing of channels
Additional functions			• Start-up parameterisation in plain text via fieldbus • Fast start-up (FSU) • Channel-oriented diagnostics via fieldbus • Acyclic data access via fieldbus and via Ethernet • System status can be displayed using process data • Additional diagnostic interface for operator unit
Control elements			DIL switch, optional memory card
Operating voltage	Nominal value	[V DC]	24
	Permissible range	[V DC]	18 ... 30
Intrinsic current consumption at nominal operating voltage		[mA]	Typically 150
Degree of protection to EN 60529			IP65, IP67
Temperature range	Operation	[°C]	– 5... +50
	Storage/transport	[°C]	–20 ... +70
Housing material			Die-cast aluminium
Note on materials			RoHS-compliant
Grid dimension		[mm]	50
Dimensions (incl. interlinking block) W x L x H		[mm]	50 x 107 x 80
Product weight		[g]	280

- Note

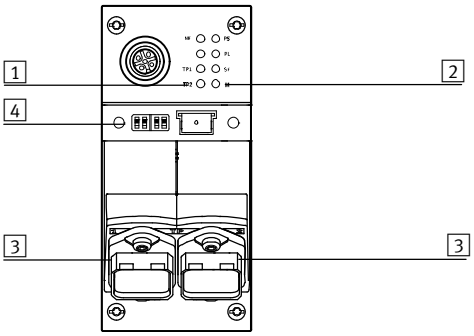
Please observe the general limits and guidelines for the system when configuring the electrical modules.

- Note

Always use the correct screws for the interlinking block; this depends on whether the block is made of metal or polymer:

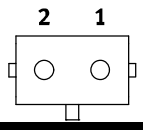
- Self-tapping screws for polymer interlinking blocks
- Screws with metric thread for metal interlinking blocks

Connection and display components

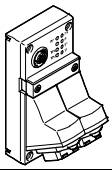
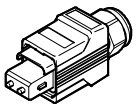
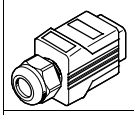
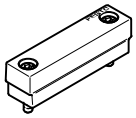
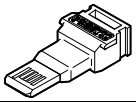
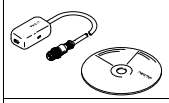
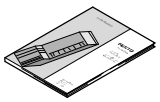


1 Bus-specific status LEDs
2 CPX-P-specific status LEDs
3 Fieldbus interface (SCRJ socket, 2-pin)
4 DIL switch and memory card

Pin allocation for the fieldbus interface

Pin allocation	Pin	Signal	Designation
SCRJ socket			
	1	TX	Outgoing
	2	RX	Incoming

Ordering data

Designation			Part no.	Type
Bus node				
	PROFINET bus node	2x SCRJ push-pull socket, AIDA	**548749**	**CPX-M-FB35**
Bus connection				
	SCRJ plug, 2-pin, push-pull		**571017**	**FBS-SCRJ-PP-GS**
	Cover cap for bus connection		**548753**	**CPX-M-AK-C**
	Cover cap for bus connection		**2873540**	**CPX-M-AK-D**
	Cover for DIL switch and memory card		**548754**	**CPX-M-AK-M**
	Memory card for PROFINET bus node, 2MB		**4798288**	**CPX-SK-3**
	Screws for attaching an inscription label to the bus node (12 pieces)		**550222**	**CPX-M-M2,5X8-12X**
	M12 adapter, 5-pin to mini USB socket, and controller software		**547432**	**NEFC-M12G5-0.3-U1G5**
User documentation				
	Electronics manual, CPX-P bus node, type CPX-M-FB35	German	**548759**	**P.BE-CPX-PNIO-DE**
		English	**548760**	**P.BE-CPX-PNIO-EN**
		Spanish	**548761**	**P.BE-CPX-PNIO-ES**
		French	**548762**	**P.BE-CPX-PNIO-FR**
		Italian	**548763**	**P.BE-CPX-PNIO-IT**

Terminal CPX-P

Technical data – Bus node for EtherNet/IP, CPX-FB36

FESTO

Industrial Ethernet
EtherNet/IP

IT services:

Web

Bus node for handling communication between the electrical CPX-P terminal and the EtherNet/IP network.
The bus node is provided with system supply via the interlinking block and processes communication with the I/O modules.
The status of the CPX-P terminal is displayed as a common message via 4 CPX-P-specific LEDs.

Application

Bus connection

The bus connection is established via an M12 plug, D-coded to IEC947-5-2 with IP65, IP67 protection.

EtherNet/IP is an open bus system based on the Ethernet standard and TCP/IP technology (IEEE802.3).

EtherNet/IP implementation

The CPX-FB36 supports the two operating modes: remote I/O and remote controller.
In remote I/O operating mode, all functions of the CPX-P terminal are directly controlled by the EtherNet/IP master (host).
In addition to activation via a bus system, it is possible to use IT technologies. An integrated web server enables diagnostic data to be visualised via HTML. Various programs support direct access to the data of the device from the automation network.

The EtherNet/IP node for CPX-P supports the transmission technology that conforms to DIN EN 50173/CAT 5 as an integrated interface.

Points to note in connection with CPX-CEC

When a bus node is combined with a control block (CPX-CEC, in the fieldbus remote controller operating mode), the connected I/Os and/or valves, sensors and actuators are controlled via the CPX-P control block.

In this case, the bus node only provides the communication interface to the PLC.
Communication between the control block and CPX-P bus node takes place by interlinking the CPX-P modules and takes up the following address capacity in the CPX-P system:

- 8 byte outputs
- 8 byte inputs

The remaining address capacity of the control block or CPX-P system for actuating the peripherals is:

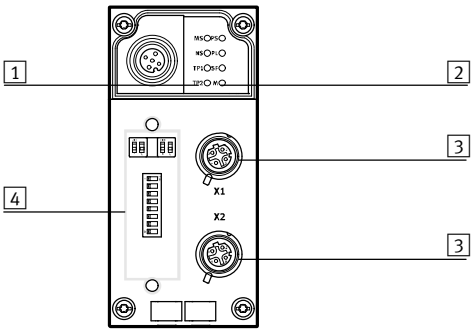
- 56 byte inputs
- 56 byte outputs

General technical data			
Type			**CPX-FB36**
Fieldbus interface			2x M12x1 socket, 4-pin, D-coded
Baud rate		[Mbps]	10/100
Protocol			EtherNet/IP
			Modbus TCP
Max. address capacity, inputs		[bytes]	64
Max. address capacity, outputs		[bytes]	64
LED displays (bus-specific)			MS = Module status NS = network status TP1 = Network active port 1 TP2 = Network active port 2
Device-specific diagnostics			• Module and channel-oriented diagnostics • Undervoltage of modules • Diagnostic memory
Configuration support			• EDS file • L5K export with CPX-FMT
Parameterisation			• Diagnostic behaviour • Fail-safe response • Forcing of channels • Idle mode characteristics • Signal setup • System parameters
Additional functions			• EtherNet/IP Quickconnect • Ring topology (DLR) • Acyclic data access via "Explicit Message" and Ethernet • Integrated switch • IP addressing via DHCP, DIL switch or operator unit • Channel-oriented diagnostics via fieldbus • Start-up parameterisation in plain text via fieldbus • System status can be displayed using process data • Additional diagnostic interface for operator units
Control elements			DIL switch
Operating voltage	Nominal value	[V DC]	24
	Permissible range	[V DC]	18 ... 30
Current consumption at nominal voltage		[mA]	Typically 100
Degree of protection to EN 60529			IP65, IP67
Temperature range	Operation	[°C]	– 5... +50
	Storage/transport	[°C]	–20 ... +70
Materials			PA-reinforced
Note on materials			RoHS-compliant
Grid dimension		[mm]	50
Dimensions (incl. interlinking block) W x L x H		[mm]	50 x 107 x 50
Product weight		[g]	125

- Note

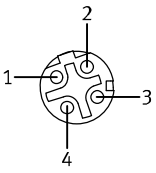
Please observe the general limits and guidelines for the system when configuring the electrical modules.

Connection and display components

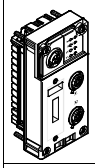
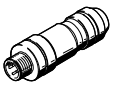
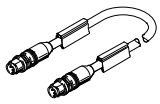
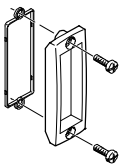
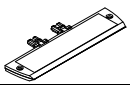
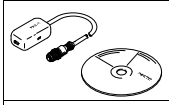
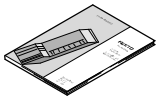


1 Bus-specific status LEDs
2 CPX-P-specific status LEDs
3 Fieldbus interface (M12 socket, 4-pin, D-coded)
4 Transparent DIL switch cover

Pin allocation for the fieldbus interface

Pin allocation	Pin	Signal	Designation
M12 socket, D-coded			
	1	TD+	Transmitted data+
	2	RD+	Received data+
	3	TD-	Transmitted data-
	4	RD-	Received data-
	Housing	FE	Shield

Ordering data

Designation			Part no.	Type
Bus node				
	EtherNet/IP bus node		**1912451**	**CPX-FB36**
Bus connection				
	M12x1 plug, 4-pin, D-coded		**543109**	**NECU-M-S-D12G4-C2-ET**
	Connecting cable, Straight plug, M12x1, 4-pin, D-coded	Straight plug, M12x1, 4-pin, D-coded	0.5 m	**8040446**	**NEBC-D12G4-ES-0.5-S-D12G4-ET**
			1 m	**8040447**	**NEBC-D12G4-ES-1-S-D12G4-ET**
			3 m	**8040448**	**NEBC-D12G4-ES-3-S-D12G4-ET**
			5 m	**8040449**	**NEBC-D12G4-ES-5-S-D12G4-ET**
			10 m	**8040450**	**NEBC-D12G4-ES-10-S-D12G4-ET**
		Straight plug, RJ45, 8-pin	1 m	**8040451**	**NEBC-D12G4-ES-1-S-R3G4-ET**
			3 m	**8040452**	**NEBC-D12G4-ES-3-S-R3G4-ET**
			5 m	**8040453**	**NEBC-D12G4-ES-5-S-R3G4-ET**
			10 m	**8040454**	**NEBC-D12G4-ES-10-S-R3G4-ET**
		Open end, 4-wire	5 m	**8040456**	**NEBC-LE4-ES-5-D12G4-ET**
	Inspection cover, transparent			**533334**	**AK-SUB-9/15-B**
	Inscription label holder for connection block			**536593**	**CPX-ST-1**
	M12 adapter, 5-pin to mini USB socket, and controller software			**547432**	**NEFC-M12G5-0.3-U1G5**
User documentation				
	User documentation for bus node CPX-FB36		German	**8024074**	**CPX-FB36-DE**
			English	**8024075**	**CPX-FB36-EN**
			Spanish	**8024076**	**CPX-FB36-ES**
			French	**8024077**	**CPX-FB36-FR**
			Italian	**8024078**	**CPX-FB36-IT**
			Chinese	**8024079**	**CPX-FB36-ZH**

Terminal CPX-P

Technical data – Bus node for EtherCAT, CPX-FB37

Bus node for operating the CPX-P terminal on EtherCAT.
The bus node is provided with system supply via the interlinking block and processes communication with the I/O modules.
The status of the CPX-P terminal is displayed as a common message via 4 CPX-P-specific LEDs.
The fieldbus communication status is displayed via 4 bus-specific LEDs.

Application

Bus connection

The bus connection is established via two M12x1 sockets, D-coded to IEC61076-2-101 with IP65, IP67 protection.

Both connections are equivalent 100BaseTX Ethernet ports with integrated auto MDI functionality

(cross-over and patch cable can be used) that are brought together via an internal switch.

- Maximum segment length 100 m
- Transmission rate 100 Mbps

EtherCAT implementation

The CPX-FB37 supports the EtherCAT protocol based on the Ethernet standard and TCP/IP technology to IEEE802.3.
This guarantees a data exchange with a high data transmission rate, for example I/O data from sensors, actuators or robot controllers, PLCs or process equipment. In addition, non-real-time critical information such as diagnostic information, configuration information, etc. can be transferred.

The data bandwidth is sufficient to transfer both data types (real-time and non-real-time) in parallel.
The bus node features LEDs for bus status and CPX-P peripheral information as well as switch elements and a diagnostic interface. The bus node can be used as a remote I/O or remote controller. All information relevant to the CPX-P can be read out and, depending on the function, changed via the diagnostic interface.

The functions MDP (modular device profile) and CoE (CAN over EtherCAT) enable easy access to parameters and diagnostic data via EtherCAT.

Specific EtherCAT functions:
- CoE (parameters and diagnostics or fail-safe mode): all module parameters can be set
- FoE (file over EtherCAT) makes it possible to download firmware easily

- EoE (Ethernet over EtherCAT): diagnostic data can be retrieved easily using a browser
- MDP (modular device profile): easy configuration using a module selection box
- Hot connect, easy replacement of an EtherCAT CPX-P terminal
- DC (distributed clocks), time-synchronised data transmission

Points to note in connection with CPX-CEC

When a bus node is combined with a control block (CPX-CEC, in the fieldbus remote controller operating mode), the connected I/Os and/or valves, sensors and actuators are controlled via the CPX-P control block.

In this case, the bus node only provides the communication interface to the PLC.
Communication between the control block and CPX-P bus node takes place

by interlinking the CPX-P modules and takes up the following address capacity in the CPX-P system:
- 8/16 byte outputs
- 8/16 byte inputs

The remaining address capacity of the control block or CPX-P system for actuating the peripherals is:
- 56/48 byte inputs
- 56/48 byte outputs

General technical data			
Type			**CPX-FB37**
Fieldbus interface			2x M12x1 socket, 4-pin, D-coded
Baud rate		[Mbps]	100
Protocol			EtherCAT
Max. address capacity	Inputs	[bytes]	64
	Outputs	[bytes]	64
LED indicators	Bus-specific		Error = Communication error L/A1 = Network active port 1 L/A2 = Network active port 2 Run = Communication status
	Product-specific		M = Modify, parameterisation PL = Load supply PS = Electronic supply, sensor supply SF = System fault
Device-specific diagnostics			• Channel and module-oriented diagnostics • Undervoltage of modules • Diagnostic memory
Configuration support			ESI file
Parameterisation			• System parameters • Diagnostic behaviour • Signal setup • Fail-safe response • Forcing of channels
Additional functions			• System status can be displayed using process data • Additional diagnostic interface for operator units • Emergency message • Acyclic data access via fieldbus • Diagnostic object • Compatibility mode for the CPX-FB38 • Modular device profile (MDP) • Variable PDO mapping
Control elements			DIL switch
Operating voltage	Nominal value	[V DC]	24
	Permissible range	[V DC]	18 ... 30
Current consumption		[mA]	Typically 100
Degree of protection to EN 60529			IP65, IP67
Temperature range	Operation	[°C]	– 5... +50
	Storage/transport	[°C]	–20 ... +70
Materials	Housing		PA-reinforced
Note on materials			RoHS-compliant
Grid dimension		[mm]	50
Dimensions (incl. interlinking block) W x L x H		[mm]	50 x 107 x 50
Product weight		[g]	125

Note

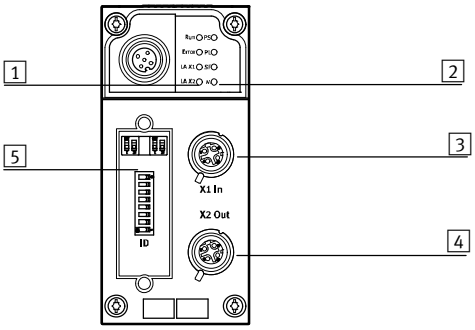
Please observe the general limits and guidelines for the system when configuring the electrical modules.

Note

Always use the correct screws for the interlinking block; this depends on whether the block is made of metal or polymer:

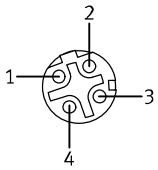
- Self-tapping screws for polymer interlinking blocks
- Screws with metric thread for metal interlinking blocks

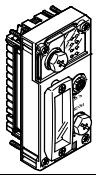
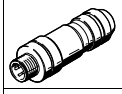
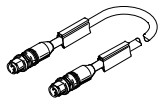
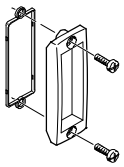
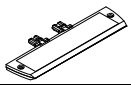
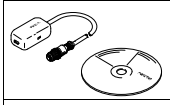
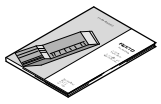
Connection and display components



1 Bus-specific status LEDs
2 CPX-P-specific status LEDs
3 Fieldbus interface, input (M12x1 socket, 4-pin, D-coded)
4 Fieldbus interface, output (M12x1 socket, 4-pin, D-coded)
5 DIL switch

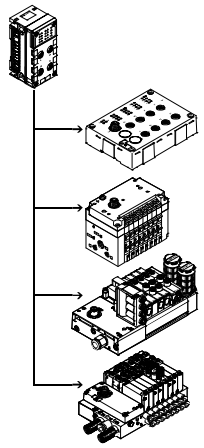
Pin allocation for the fieldbus interface

Pin allocation	Pin	Signal	Designation
M12x1 socket, D-coded			
	1	TD+	Transmitted data+
	2	RD+	Received data+
	3	TD-	Transmitted data-
	4	RD-	Received data-
	Housing	FE	Shield

Ordering data					
Designation				Part no.	Type
Bus node					
	EtherCAT bus node			**2735960**	**CPX-FB37**
Bus connection					
	Plug M12x1, 4-pin, D-coded			**543109**	**NECU-M-S-D12G4-C2-ET**
	Connecting cable, straight plug, M12x1, 4-pin, D-coded	Straight plug, M12x1, 4-pin, D-coded	0.5 m	**8040446**	**NEBC-D12G4-ES-0.5-S-D12G4-ET**
			1 m	**8040447**	**NEBC-D12G4-ES-1-S-D12G4-ET**
			3 m	**8040448**	**NEBC-D12G4-ES-3-S-D12G4-ET**
			5 m	**8040449**	**NEBC-D12G4-ES-5-S-D12G4-ET**
			10 m	**8040450**	**NEBC-D12G4-ES-10-S-D12G4-ET**
		Straight plug, RJ45, 8-pin	1 m	**8040451**	**NEBC-D12G4-ES-1-S-R3G4-ET**
			3 m	**8040452**	**NEBC-D12G4-ES-3-S-R3G4-ET**
			5 m	**8040453**	**NEBC-D12G4-ES-5-S-R3G4-ET**
			10 m	**8040454**	**NEBC-D12G4-ES-10-S-R3G4-ET**
		Open end, 4-wire	5 m	**8040456**	**NEBC-LE4-ES-5-D12G4-ET**
	Inspection cover, transparent			**533334**	**AK-SUB-9/15-B**
	Cover cap for sealing unused bus connections (10 pieces)			**165592**	**ISK-M12**
	Inscription label holder for connection block			**536593**	**CPX-ST-1**
	M12 adapter, 5-pin to mini USB socket, and controller software			**547432**	**NEFC-M12G5-0.3-U1G5**
User documentation					
	Electronics manual, CPX-P bus node, type CPX-FB37		German	**8029674**	**P.BE-CPX-FB37-DE**
			English	**8029675**	**P.BE-CPX-FB37-EN**
			Spanish	**8029676**	**P.BE-CPX-FB37-ES**
			French	**8029677**	**P.BE-CPX-FB37-FR**
			Italian	**8029678**	**P.BE-CPX-FB37-IT**
			Chinese	**8029679**	**P.BE-CPX-FB37-ZH**

Terminal CPX-P

Technical data – I-Port interface, CPX-CTEL



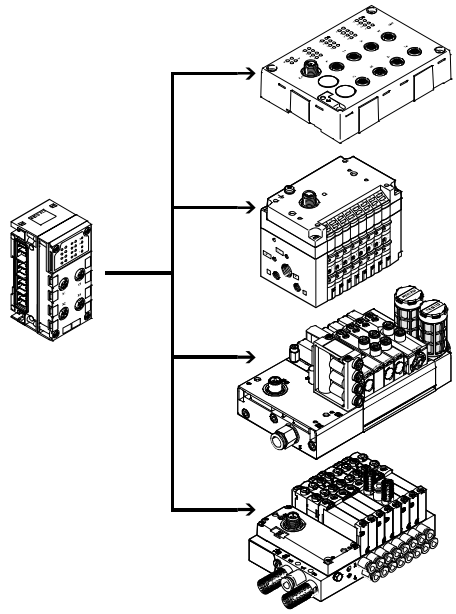
The electrical interface CPX-P CTEL master establishes the connection to modules of the CTEL/CTEU series that have an I-Port interface (device). The I/O data from the connected devices are transmitted to the connected CPX-P bus node and thus to the higher-order controller via fieldbus. A maximum of 4 devices can be connected to a CPX-P CTEL master via corresponding M12 interfaces.

Application

I-Port interface

As well as transmitting the communication data, the I-Port interfaces of a CPX-P CTEL master also transmit the power supply to the connected sensors and the load supply to the valves (or outputs). Both circuits are supplied separately with 24 V, using a separate reference potential.
The connecting cables used must meet the enhanced requirements resulting from the dual function of signal cable and supply cable.

Configuration example – CPX-P CTEL master with CTEL modules



The CPX-P CTEL master provides 4 external I-Port interfaces, each of which can be connected to a device. I-Port is an interface for exchanging serial data for connecting decentralised modules or valve terminals from Festo. The I-Port interface is based on IO-Link and is compatible with it in certain areas.
The connection type corresponds to a star topology. In other words, only one module or valve terminal can be connected to each I-Port.

The restrictions compared to IO-Link include:

- Permanently set baud rate of 230.4 kbps
- SIO mode is not supported
- Max. 32 bytes of input data and 32 bytes of output data
- Only one dump of the master commands is used
- Configuration via IODD is not supported

Implementation

The CPX-P CTEL master from Festo enables modules with an I-Port interface to be connected to a CPX-P system:

- Max. 4 devices with individual electronic protection
- Max. 64 inputs/64 outputs per I-Port interface
- The maximum length of a string is 20 m

The following device variants are available:

- Input modules with 16 digital inputs (connection technology M8 3-pin and M12 5-pin)
- Valve terminals with I-Port interface (up to 48 solenoid coils, different valve functions)

The decentralised arrangement of the modules and valve terminals with I-Port enables them to be mounted close to the cylinders and actuators or sensors to be controlled. This means that the compressed air supply lines and sensor connecting cables used can be shortened, and it may be possible to use smaller valves, thereby saving costs.

Several CPX-P CTEL masters can be combined in one CPX-P terminal, depending on the address capacity of the bus node.
Example:

- CPX-FB13 (512 I/O)
- A maximum of 2 CPX-P CTEL masters is possible (each with 256 E/A)

Configuration

Settings

The precise number of the I/O bytes made available depends on the requirements of the connected devices or of the suitable selected operating mode.
The operating mode or preset configuration of the CPX-P CTEL master can be specified by the user.
DIL switches are used for selecting the operating mode and setting the manual configuration. These DIL switches are not required during continuous operation and are only accessible in the disassembled state.

Manual configuration

In the case of manual configuration (tool change mode), the volume of inputs and outputs in the process image of the CPX-P system or of the higher-order fieldbus can be defined manually using the DIL switches.

The process image then always has the same scope, regardless of the connected devices.
The I/O length specified always applies to all four I-Ports (max. 8 bytes per I-Port).

Automatic configuration

In the case of automatic configuration, the I/O length for each I-Port is determined individually and this value is used to select the appropriate or next highest configuration preset.

Power supply for I-Port devices

The CPX-P CTEL master provides two separate power supplies for the connected devices:

- For operation of the device and the inputs connected to it
- For the outputs and valves that are connected to the device

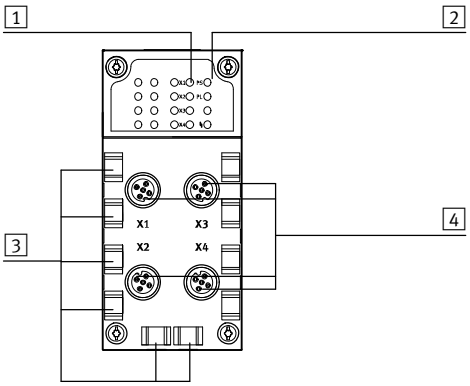
The power supply for the devices and the inputs is provided by the power supply for the electronics and sensors of the CPX-P terminal.
The power supply for the outputs and valves is provided by the power supply for the valves of the CPX-P terminal.
The interlinking block with additional supply ensures a separate supply voltage for the valves and outputs. This allows the supply voltage to be disconnected separately.
The valves and outputs of the connected I-Port devices can therefore be disconnected separately without disconnecting the devices.

General technical data			
Type			**CPX-CTEL-4-M12-5POL**
Protocol			I-Port
Max. address capacity	Outputs	[bit]	256
	Inputs	[bit]	256
I-Port connection			4x socket M12, 5-pin, A-coded
Number of I-Port interfaces			4
Max. cable length		[m]	20
Internal cycle time		[ms]	1 per 8 bits of user data
Electrical isolation	Channel – channel		No
	Channel – internal bus		Yes, using intermediate supply
LED indicators			X1 … 4 = status of the I-Port interface 1 … 4 PS = Electronic supply PL = Load supply ↳ = Module error
Diagnostics			• Communication error • Short circuit module • Module-oriented diagnostics • Undervoltage
Parameterisation			• Diagnostic behaviour • Failsafe per channel • Forcing per channel • Idle mode per channel • Module parameters • Tool change mode
Additional functions			Tool change mode
Control elements			DIL switch
Operating voltage	Nominal value	[V DC]	24 (polarity-safe)
	Permissible range	[V DC]	18 … 30
	Power failure buffering	[ms]	10
Intrinsic current consumption at nominal operating voltage		[mA]	Typically 65
Max. power supply per channel		[A]	4x 1.6
Max. residual current of outputs per channel		[A]	4x 1.6
Degree of protection to EN 60529			IP65, IP67
Temperature range	Operation	[°C]	–5 … +50
	Storage/transport	[°C]	–20 … +70
Materials			PA reinforced, PC
Note on materials			RoHS-compliant
Grid dimension		[mm]	50
Dimensions (incl. interlinking block) W x L x H		[mm]	50 x 107 x 55
Product weight		[g]	110

Note

Please observe the general limits and guidelines for the system when configuring the electrical modules.

Connection and display components

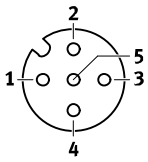


1 Status LEDs for I-Port interfaces
2 CPX-P-specific status LEDs
3 Holders for inscription labels (IBS 6x10)
4 I-Port interfaces for up to 4 devices

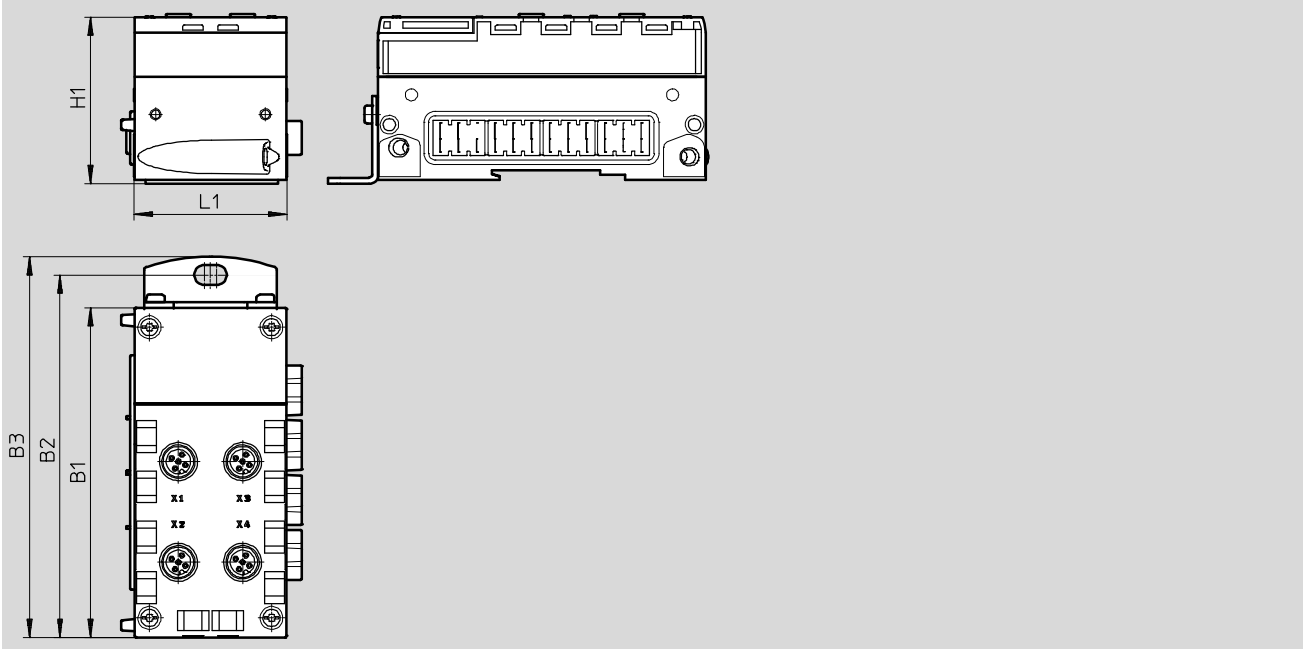
Combinations of bus nodes/control blocks with interface CPX-CTEL

Bus node/control block	Part no.	Interface
		CPX-CTEL-4-M12-5POL
CPX-CEC-C1-V3	**3473128**	■
CPX-CEC-M1-V3	**3472765**	■
CPX-CEC-S1-V3	**3472425**	■
CPX-FB11	**526172**	■
CPX-FB13	**195740**	■
CPX-FB14	**526174**	■
CPX-FB33	**548755**	■
CPX-M-FB34	**548751**	■
CPX-M-FB35	**548749**	■
CPX-FB36	**1912451**	■
CPX-FB37	**2735960**	■

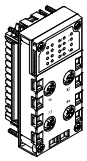
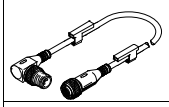
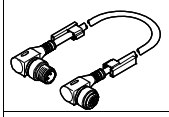
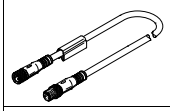
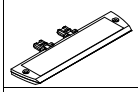
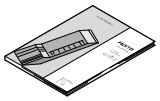
Pin allocation – I-Port interface

Pin allocation	Pin	Signal	Designation
	1	24 V_{SEN}	24 V DC supply voltage for electronics and inputs
	2	24 V_{VAL}	24 V DC load voltage supply for valves and outputs
	3	0 V_{SEN}	0 V DC supply voltage for electronics and sensors
	4	C/Q $_{I\text{-}PORT}$	Communication signal C/Q, data transmission line
	5	0 V_{VALVES}	0 V DC load voltage supply for valves and outputs

Dimensions Download CAD data ➔ **www.festo.com**

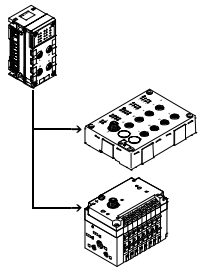


Type	B1	B2	B3	H1	L1
CPX-CTEL-4-M12-5POL	108.1	118.9	124.9	55.1	50

Ordering data					
Designation				Part no.	Type
CPX-P CTEL master					
	Interface for max. 4 I/O modules and valve terminals with I-Port interface (devices)			**1577012**	**CPX-CTEL-4-M12-5POL**
Bus connection					
	Cover cap	M12		**165592**	**ISK-M12**
	Connecting cable M12-M12, 5-pin • Straight socket • Angled plug	Cable characteristic: standard	0.5 m	**8003617**	**NEBU-M12G5-K-0.5-M12W5**
			2 m	**8003618**	**NEBU-M12G5-K-2-M12W5**
	Connecting cable M12-M12, 5-pin • Angled socket • Angled plug	Cable characteristic: standard	0.5 m	**570733**	**NEBU-M12W5-K-0.5-M12W5**
			2 m	**570734**	**NEBU-M12W5-K-2-M12W5**
	Connecting cable M12-M12, 5-pin • Straight socket • Straight plug	Cable characteristic: suitable for use with energy chains	5 m	**574321**	**NEBU-M12G5-E-5-Q8N-M12G5**
			7.5 m	**574322**	**NEBU-M12G5-E-7.5-Q8N-M12G5**
			10 m	**574323**	**NEBU-M12G5-E-10-Q8N-M12G5**
	Inscription label holder for connection block			**536593**	**CPX-ST-1**
User documentation					
	User documentation for CPX-P CTEL master	German		**574600**	**P.BE-CPX-CTEL-DE**
		English		**574601**	**P.BE-CPX-CTEL-EN**
		Spanish		**574602**	**P.BE-CPX-CTEL-ES**
		French		**574603**	**P.BE-CPX-CTEL-FR**
		Italian		**574604**	**P.BE-CPX-CTEL-IT**

Terminal CPX-P

Technical data – IO-Link interface, CPX-CTEL-2



The electrical interface CPX-CTEL-2-... enables the connection of modules with IO-Link interface (IO-Link device) to the CPX-P terminal. The I/O data from the connected devices are transmitted to the connected CPX-P bus node and thus to the higher-order controller via fieldbus.
A maximum of two IO-Link devices can be connected to an electrical interface CPX-CTEL-2-... via the corresponding M12 interfaces.

Application

IO-Link interface

The communication system IO-Link is used to exchange serial data from decentralised function modules (devices) at the field level.
The electrical interface CPX-CTEL-2-... provides two external IO-Link interfaces, each of which can be connected to a device.
The connection type corresponds to a star topology, which means that only one device can be connected to each port.
The address space that the module makes available and assigns accordingly in the CPX-P system can be configured according to various presettings.
DIL switches are used for selecting the operating mode and setting the manual configuration. These DIL switches are not required during continuous operation and are only accessible in the disassembled state.

Restrictions

The interfaces (ports) of electrical interface CPX-CTEL-2-... support the connection of IO-Link devices with few limitations.

- The process data length of the inputs and outputs is limited to 16 bytes for inputs and 16 bytes for outputs per port
- The driver strength on the C/Q line is limited to 250 mA
- SIO mode is not supported

Power supply for devices

The electrical interface CPX-CTEL-2-... provides two separate power supplies for the connected devices:

- For operation of the device and the inputs connected to it
- For the outputs and valves that are connected to the device

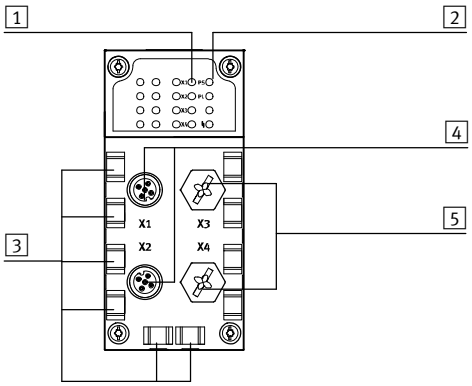
The power supply for the devices and the inputs is provided by the power supply for the electronics and sensors of the CPX-P terminal.
The power supply for the outputs and valves is provided by the power supply for the valves of the CPX-P terminal.
The interlinking block with additional supply ensures a separate supply voltage for the valves and outputs. This allows the supply voltage to be disconnected separately.
The valves and outputs of the connected I-Port devices can therefore be disconnected separately without disconnecting the devices.

General technical data			
Type			**CPX-CTEL-2-M12-5POL-LK**
Protocol			IO-Link, master version V 1.0
Max. address capacity	Outputs	[bit]	256
	Inputs	[bit]	256
I-Port connection			2x socket M12, 5-pin, A-coded
Number of IO-Link interfaces			2
Max. cable length		[m]	20
Internal cycle time		[ms]	1 per 8 bits of user data
Electrical isolation	Channel – channel		No
	Channel – internal bus		Yes, using intermediate supply
LED indicators			X1 … 2 = status of the IO-Link interface 1 … 2 PS = Electronic supply PL = Load supply ϟ = Module error
Diagnostics			• Communication error • Short circuit module • Module-oriented diagnostics • Undervoltage
Parameterisation			• Diagnostic behaviour • Failsafe per channel • Forcing per channel • Idle mode per channel • Module parameters
Additional functions			–
Control elements			DIL switch
Operating voltage	Nominal value	[V DC]	24 (polarity-safe)
	Permissible range	[V DC]	18 … 30
	Power failure buffering	[ms]	10
Intrinsic current consumption at nominal operating voltage		[mA]	Typically 65
Max. power supply per channel		[A]	2x 1.6
Max. residual current of outputs per channel		[A]	2x 1.6
Degree of protection to EN 60529			IP65, IP67
Temperature range	Operation	[°C]	–5 … +50
	Storage/transport	[°C]	–20 … +70
Materials			PA reinforced, PC
Note on materials			RoHS-compliant
Grid dimension		[mm]	50
Dimensions (incl. interlinking block) W x L x H		[mm]	50 x 107 x 55
Product weight		[g]	110

Note

Please observe the general limits and guidelines for the system when configuring the electrical modules.

Connection and display components

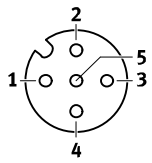


1 Status LEDs for I-Port interfaces
2 CPX-P-specific status LEDs
3 Holders for inscription labels (IBS 6x10)
4 IO-Link interfaces for up to 2 devices
5 Unoccupied connections

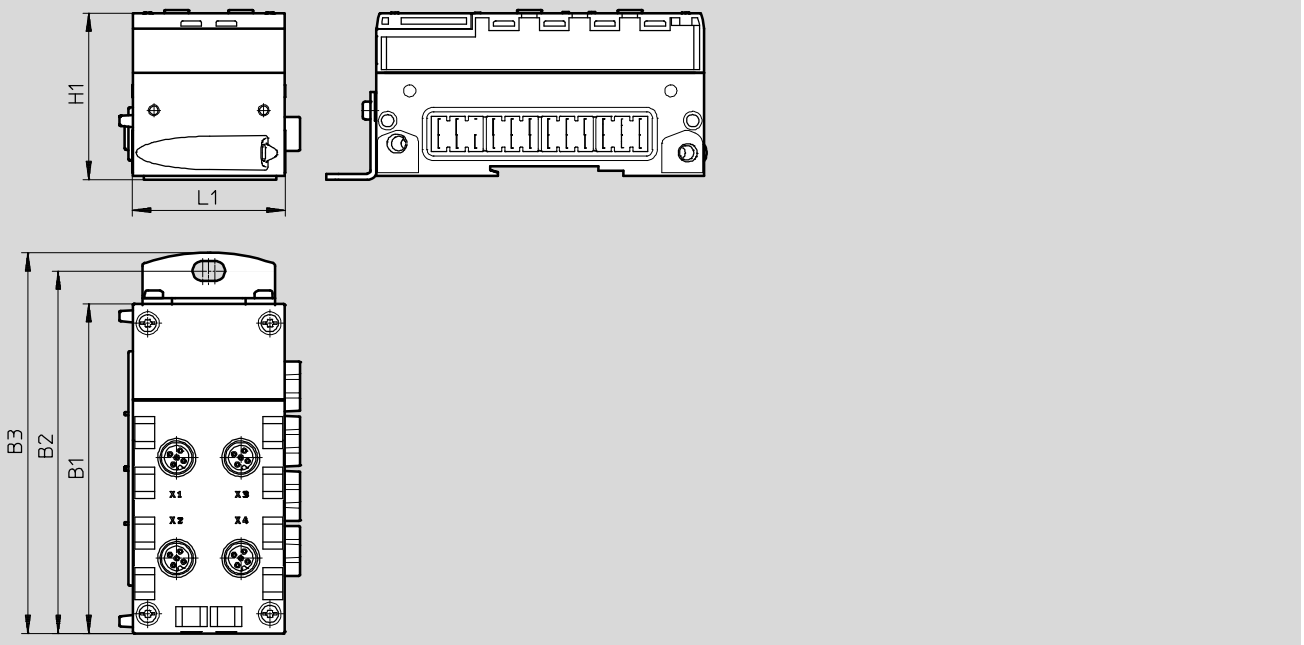
Combinations of bus nodes/control blocks with interface CPX-CTEL-2

Bus node/control block	Part no.	Interface
		CPX-CTEL-2-M12-5POL-LK
CPX-CEC-C1-V3	**3473128**	■
CPX-CEC-M1-V3	**3472765**	■
CPX-CEC-S1-V3	**3472425**	■
CPX-FB33	**548755**	■
CPX-M-FB34	**548751**	■
CPX-M-FB35	**548749**	■
CPX-FB36	**1912451**	■

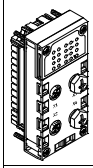
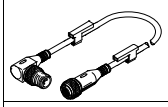
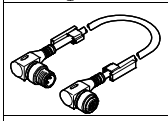
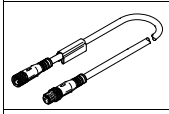
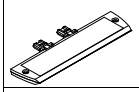
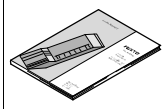
Pin allocation – IO-Link® interface

Pin allocation	Pin	Signal	Designation
	1	24 V_{SEN}	24 V DC supply voltage for electronics and inputs
	2	24 V_{VAL}	24 V DC load voltage supply for valves and outputs
	3	0 V_{SEN}	0 V DC supply voltage for electronics and sensors
	4	C/Q $_{I\text{-}PORT}$	Communication signal C/Q, data transmission line
	5	0 V_{VALVES}	0 V DC load voltage supply for valves and outputs

Dimensions Download CAD data ➔ **www.festo.com**



Type	B1	B2	B3	H1	L1
CPX-CTEL-2-M12-5POL-LK	108.1	118.9	124.9	55.1	50

Ordering data					
Designation				Part no.	Type
CPX-P CTEL master, IO-Link					
	Interface for max. 2 I/O modules and valve terminals with IO-Link interface (devices)			**2900543**	**CPX-CTEL-2-M12-5POL-LK**
Bus connection					
	Cover cap	M12		**165592**	**ISK-M12**
	Connecting cable M12-M12, 5-pin • Straight socket • Angled plug	Cable characteristic: standard	0.5 m	**8003617**	**NEBU-M12G5-K-0.5-M12W5**
			2 m	**8003618**	**NEBU-M12G5-K-2-M12W5**
	Connecting cable M12-M12, 5-pin • Angled socket • Angled plug	Cable characteristic: standard	0.5 m	**570733**	**NEBU-M12W5-K-0.5-M12W5**
			2 m	**570734**	**NEBU-M12W5-K-2-M12W5**
	Connecting cable M12-M12, 5-pin • Straight socket • Straight plug	Cable characteristic: suitable for use with energy chains	5 m	**574321**	**NEBU-M12G5-E-5-Q8N-M12G5**
			7.5 m	**574322**	**NEBU-M12G5-E-7.5-Q8N-M12G5**
			10 m	**574323**	**NEBU-M12G5-E-10-Q8N-M12G5**
	Inscription label holder for connection block			**536593**	**CPX-ST-1**
User documentation					
	User documentation for CPX-P CTEL master	German		**8034115**	**P.BE-CPX-CTEL-LK-DE**
		English		**8034116**	**P.BE-CPX-CTEL-LK-EN**
		Spanish		**8034117**	**P.BE-CPX-CTEL-LK-ES**
		French		**8034118**	**P.BE-CPX-CTEL-LK-FR**
		Italian		**8034119**	**P.BE-CPX-CTEL-LK-IT**
		Swedish		**8034120**	**P.BE-CPX-CTEL-LK-ZH**

Terminal CPX-P

Technical data – Measuring module, digital

The measuring module CPX-CMIX is intended exclusively for use in valve terminals CPX-P.
Movement and measurement in one, as an integral component of the valve terminal CPX-P – the modular peripheral system for decentralised automation tasks.
The modular design means that valves, digital inputs and outputs, positioning modules, end-position controllers and measuring modules, as appropriate to the application, can be combined in almost any way on the terminal CPX-P.

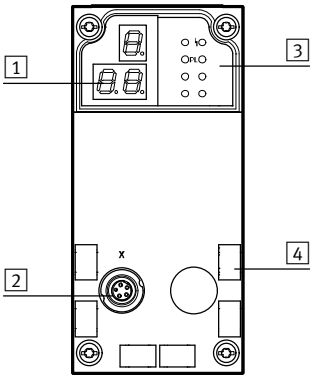
Advantages:

- Pneumatics and electrics – movement and measurement on one platform
- Innovative measurement technology – piston rod drives, rodless drives, rotary drives
- Actuation via fieldbus
- Remote maintenance, remote diagnostics, web server, SMS and e-mail alert are all possible via TCP/IP
- Modules can be quickly exchanged and expanded without altering the wiring

General technical data			
Operating voltage			
Operating voltage range		[V DC]	18 ... 30
Nominal operating voltage		[V DC]	24
Current consumption at nominal operating voltage		[mA]	80
Short circuit protection rating			Yes
Power failure buffering		[ms]	10
No. of axis strings			1
Axes per string			1
Length of connecting cable to axis		[m]	≤ 30
Max. no. of modules			9
Indicator			7-segment display
Assigned addresses	Outputs	[bit]	6x8
	Inputs	[bit]	6x8
Diagnostics			Channel and module-oriented
			Via local 7-segment display
			Undervoltage of modules
			Undervoltage of measuring system
Status indication			Power load
			Error
Control interface			
Data			CAN bus with Festo protocol
			Digital
Electrical connection			5-pin
			M9
			Socket
Materials: housing			PA reinforced
Note on materials			RoHS-compliant
Product weight		[g]	140
Dimensions	Length	[mm]	107
	Width	[mm]	50
	Height	[mm]	55

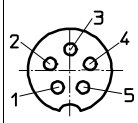
Operating and environmental conditions		
Ambient temperature	[°C]	–5 … +50
Relative humidity	[%]	5 … 95, non-condensing
Degree of protection to IEC 60529		IP65

Connection and display components



1 3-digit display
2 Control interface
3 Status LEDs
4 Inscription labels

Pin allocation – Control interface



Pin	Signal	Designation
1	+24 V	Nominal operating voltage
2	+24 V	Load voltage
3	0 V	Ground
4	CAN_H	CAN high
5	CAN_L	CAN low
Housing	Shield	Cable shielding

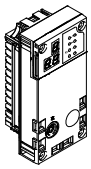
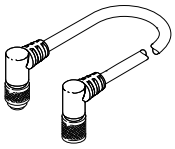
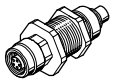
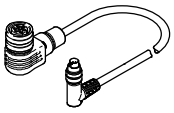
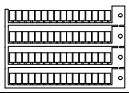
Permitted bus nodes/CEC

Bus node/CEC	Protocol	Max. no. of CMIX modules
CPX-CEC…	–	9
CPX-FB11	DeviceNet[1)]	9
CPX-FB13	PROFIBUS[2)]	9
CPX-FB14	CANopen	5
CPX-FB33	PROFINET RT, M12	9
CPX-M-FB34	PROFINET RT, RJ45	9
CPX-M-FB35	PROFINET RT, SCRJ	9
CPX-FB36	Ethernet/IP	9
CPX-FB37	EtherCAT	9

1) As of revision 20 (R20)
2) As of revision 23 (R23)

PROFIBUS®, DeviceNet®, CANopen®, INTERBUS®, CC-LINK®, EtherCAT®, PROFINET®, Sercos®, EtherNet/IP® is a registered trademark of its respective trademark holder in certain countries.

Ordering data

Designation			Part no.	Type
Measuring module				
	Order code in CPX-P configurator: T23		**567417**	**CPX-CMIX-M1-1**
Connecting cables				
	Connecting cable M9-M9, 5-pin • Angled socket • Angled plug	0.25 m	**540327**	**KVI-CP-3-WS-WD-0,25**
		0.5 m	**540328**	**KVI-CP-3-WS-WD-0,5**
		2 m	**540329**	**KVI-CP-3-WS-WD-2**
		5 m	**540330**	**KVI-CP-3-WS-WD-5**
		8 m	**540331**	**KVI-CP-3-WS-WD-8**
	Connecting cable M9-M9, 5-pin • Straight socket • Straight plug	2 m	**540332**	**KVI-CP-3-GS-GD-2**
		5 m	**540333**	**KVI-CP-3-GS-GD-5**
		8 m	**540334**	**KVI-CP-3-GS-GD-8**
	Connecting component M9-M9, 5-pin, for cabinet through-feed		**543252**	**KVI-CP-3-SSD**
	For displacement encoder MME: Connection between displacement encoder MME and measuring module CPX-CMIX	2 m	**575898**	**NEBP-M16W6-K-2-M9W5**
Screws				
	For fastening to the metal interlinking block		**550219**	**CPX-M-M3X22-4X**
Inscription labels				
	Inscription labels 6x10, in frames	64 pieces	**18576**	**IBS-6X10**
User documentation				
	User documentation for measuring module CPX-CMIX[1)]	German	**567053**	**P.BE-CPX-CMIX-DE**
		English	**567054**	**P.BE-CPX-CMIX-EN**
		Spanish	**567055**	**P.BE-CPX-CMIX-ES**
		French	**567056**	**P.BE-CPX-CMIX-FR**
		Italian	**567057**	**P.BE-CPX-CMIX-IT**

1) User documentation in paper form is not included in the scope of delivery

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Terminal CPX-P

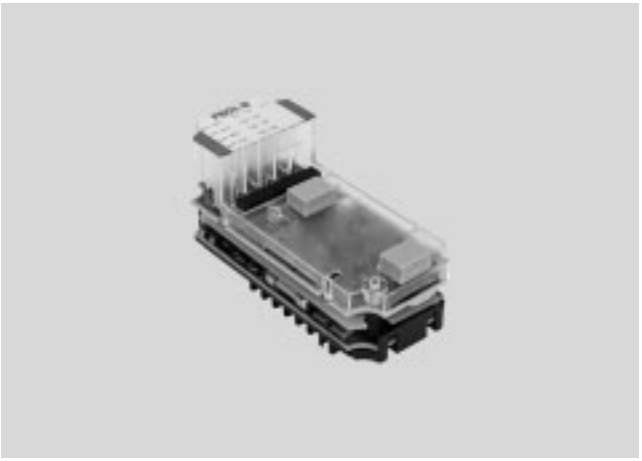
Technical data – Input module, digital, to NAMUR

Function

Digital input modules enable the connection of up to 8 NAMUR sensors (or wired mechanical contacts). In addition, the first 4 channels can alternatively be used as counters or for frequency measurement.
M12 and terminal strip connection technology can be used, in either intrinsically safe or non-intrinsically safe design.

Area of application

- Input modules for 24 V DC sensor supply voltage
- Module features can be parameterised
- The input module receives the voltage supply for the electronics and the sensors from the interlinking block
- Module protection and diagnostics through integrated electronic protection in each channel



General technical data			
No. of inputs			8
Max. cable length		[m]	200
Input debounce time		[ms]	3 (0, 10, 20 parameterisable)
Fuse protection (short circuit)			Internal electronic fuse per channel
Module current consumption (power supply for electronics)		[mA]	Typically 75
Nominal operating voltage		[V DC]	24 (reverse polarity protected)
Permissible voltage fluctuations		[%]	±25
Power failure buffering		[ms]	20
Residual ripple		[Vpp]	0.4
Electrical isolation	Channel – channel		No
	Channel – internal bus		Yes
Input characteristics			To EN 60947-5-6
Switching level			To EN 60947-5-6
LED indicators	Group diagnostics		1
	Channel diagnostics		8
	Channel status		8
Diagnostics			Wire break per channel
			Limit value violation per channel
			Parameterisation error
			Overload per channel
Parameterisation			Data format
			Input debounce time per channel
			Input function per channel
			Replacement value in diagnostic case per channel
			Upper limit value per channel
			Signal extension time per channel
			Gate time per channel
			Monitoring limit values per channel
			Monitoring short circuit per channel
			Monitoring wire break per channel
			Monitoring parameters
			Lower limit value per channel
			Upper limit value per channel
			Counter configuration per channel
Control elements			DIL switch
Additional functions			Frequency measurement
			Counter function
Degree of protection to EN 60529			Depending on connection block

Terminal CPX-P

Technical data – Input module, digital, to NAMUR

General technical data		
Grid dimension	[mm]	50
Dimensions (incl. interlinking block and connection block) W x L x H	[mm]	50 x 107 x 70
Product weight	[g]	100

Explosion protection parameters of the module inputs			
Type		CPX-P-8DE-N	CPX-P-8DE-N-IS
Maximum output power	[mW]	–	42
Maximum output voltage	[V]	–	10
Maximum output current	[mA]	–	16.8
Maximum external inductance	[mH]	–	125
Maximum external capacitance	[µF]	–	3

Certifications and approvals – Maximum values			
Type		CPX-P-8DE-N	CPX-P-8DE-N-IS
ATEX category for gas		–	II (1) G
Type of ignition protection for gas		–	[Ex ia Ga] IIC
ATEX category for dust		–	II (1) D
Type of ignition protection for dust		–	[Ex ia Da] IIIC
Explosion protection certification outside the EU		–	EPL Ga (IEC-EX)
		–	EPL Da (IECEx)
		–	EPL Ga (BR)
		–	EPL Da (BR)
Explosion-proof ambient temperature	[°C]	–	–5 ≤ Ta ≤ +70
Certificate issuing authority		–	ZELM 12 ATEX 0500 X
		–	IECEx ZLM 12.0007 X
		–	DNV 15.0192 X

Note

The module CPX-P-8DE-N-IS has additional safety measures for possible faults such as non-resettable fuses to ensure safe operation as per the ignition protection type.
If the module is operated within the permissible parameters, these protective measures will be irrelevant.

Note

Only the end plate, the pneumatic interface or another module in intrinsically safe design are permitted directly to the right of modules in intrinsically safe design (CPX-P-8DE-N-IS) within the CPX-P terminal.

Note

The insulating plate CPX-P-AB-IP must be mounted between a module in intrinsically safe design (CPX-P-8DE-N-IS) and another, non-intrinsically safe CPX input or output module.

Note

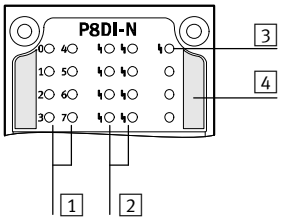
The above-mentioned certifications for the CPX-P-8DE-N-IS module do not apply if the module is used outside the appropriately configured terminal CPX-P.

Materials	
Housing	PA-reinforced
	PC
Note on materials	RoHS-compliant

Operating and environmental conditions			
Type		CPX-P-8DE-N	CPX-P-8DE-N-IS
Ambient temperature	[°C]	–5 … +50	–5 … +50
Storage temperature	[°C]	–20 … +70	–20 … +70
Relative humidity	[%]	95, non-condensing	95, non-condensing
CE marking (see declaration of conformity)[1)]		–	To EU Explosion Protection Directive (ATEX)

1) Additional information www.festo.com/sp ➔ Certificates.

Connection and display components

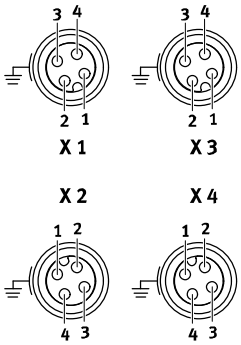
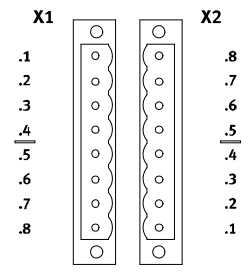


1 Status LEDs (green)
For allocation to inputs
➔ Pin allocation for module
2 Channel-related error LEDs (red)
3 Error LED (red, module error)
4 Marking for intrinsically safe variant, CPX-P-8DE-N-IS (blue)

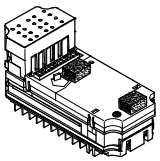
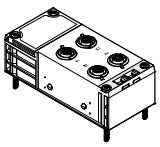
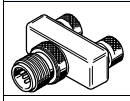
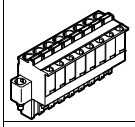
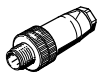
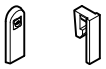
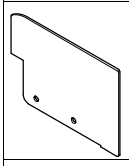
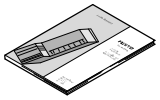
Combinations of connection block and digital input module

Connection blocks	Part no.	Digital input module	
		CPX-P-8DE-N	CPX-P-8DE-N-IS
CPX-P-AB-4XM12-4POL	**565706**	■	–
CPX-P-AB-2XKL-8POL	**565704**	■	–
CPX-P-AB-4XM12-4POL-8DE-N-IS	**565705**	–	■
CPX-P-AB-2XKL-8POL-8DE-N-IS	**565703**	–	■

Pin allocation

Connection block outputs	CPX-P-8DE-N and CPX-P-8DE-N-IS	
CPX-P-AB-4XM12-4POL and CPX-P-AB-4XM12-4POL-8DE-N-IS		
	X1.1: BN+ [0] X1.2: BU– [0] X1.3: BN+ [1] X1.4: BU– [1] X2.1: BN+ [2] X2.2: BU– [2] X2.3: BN+ [3] X2.4: BU– [3]	X3.1: BN+ [4] X3.2: BU– [4] X3.3: BN+ [5] X3.4: BU– [5] X4.1: BN+ [6] X4.2: BU– [6] X4.3: BN+ [7] X4.4: BU– [7]
CPX-P-AB-2XKL-8POL and CPX-P-AB-2XKL-8POL-8DE-N-IS		
	X1.1: BN+ [0] X1.2: BU– [0] X1.3: BN+ [1] X1.4: BU– [1] X1.5: BN+ [2] X1.6: BU– [2] X1.7: BN+ [3] X1.8: BU– [3]	X2.1: BN+ [4] X2.2: BU– [4] X2.3: BN+ [5] X2.4: BU– [5] X2.5: BN+ [6] X2.6: BU– [6] X2.7: BN+ [7] X2.8: BU– [7]

Ordering data

Designation					Part no.	Type
Input module, digital, to NAMUR						
	8 digital inputs				565933	CPX-P-8DE-N
	8 digital inputs, intrinsically safe design		Note: An intrinsically safe circuit may only be constructed using components and accessories approved for intrinsically safe operation.		565934	CPX-P-8DE-N-IS
Connection block						
	Made of polymer	4x socket, M12, 4-pin	For non-intrinsically safe design		565706	CPX-P-AB-4XM12-4POL
			For intrinsically safe design		565705	CPX-P-AB-4XM12-4POL-8DE-N-IS
		2x plug, 8-pin	For non-intrinsically safe design		565704	CPX-P-AB-2XKL-8POL
			For intrinsically safe design		565703	CPX-P-AB-2XKL-8POL-8DE-N-IS
Plug						
	Push-in T-connector	1x plug M12, 4-pin	2x socket M12, 4-pin		562248	NEDU-M12D4-M12T4-IS[1]
	Socket	8-pin	Spring-loaded terminal	Black	565712	NECU-L3G8-C1
				Blue	565711	NECU-L3G8-C1-IS[1]
			Screw terminal	Black	565710	NECU-L3G8-C2
				Blue	565709	NECU-L3G8-C2-IS[1]
	Plug, M12, 4-pin	Spring-loaded terminal	For cable diameter 4 ... 8 mm		575719	NECU-M-S-A12G4-IS[1]
		Screw terminal	For cable diameter 2.5 ... 2.9 mm		570955	NECU-S-M12G4-P1-Q6-IS[1]
			For cable diameter 4 ... 6 mm		570953	NECU-S-M12G4-P1-IS[1]
			For cable diameter 6 ... 8 mm		570954	NECU-S-M12G4-P2-IS[1]
			For cable diameter 2x3 mm or 2x5 mm		570956	NECU-S-M12G4-D-IS[1]
Cover						
	Cover cap for closing off unused ports (10 pieces)			For M12 connections	165592	ISK-M12
Coding element						
	Ensures that a coded socket NECU-L3G8 can only be inserted in the matching coded connection block CPX-P-AB-2XKL (96 pieces of each)			For NECU-L3G8	565713	CPX-P-KDS-AB-2XKL
Screening plate						
	Insulating plate for safe separation of intrinsically safe and non-intrinsically safe areas of the CPX terminal				565708	CPX-P-AB-IP
User documentation						
	User documentation			German	575378	P.BE-CPX-P-EA-DE
				English	575379	P.BE-CPX-P-EA-EN
				Spanish	575380	P.BE-CPX-P-EA-ES
				French	575381	P.BE-CPX-P-EA-FR
				Italian	575382	P.BE-CPX-P-EA-IT
				Swedish	575383	P.BE-CPX-P-EA-SV

1) Component preferred for operation in intrinsically safe circuits.

Terminal CPX-P

Technical data – Input module, digital

Function

Digital input modules enable the connection of two-wire and three-wire sensors (proximity sensors, inductive or capacitive sensors, etc.).
Depending on the connection block selected, the module supports various connection concepts with different numbers of sockets (single or double allocation).

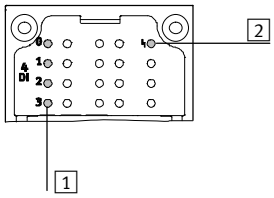
Area of application

- Input modules for 24 V DC sensor supply voltage
- PNP or NPN logic
- Supports connection blocks with M12, M8, Sub-D, HARAX® and terminal connection
- Module features can be parameterised
- The input module receives the voltage supply for the electronics and the sensors from the interlinking block
- Module protection and diagnostics through integrated electronic protection

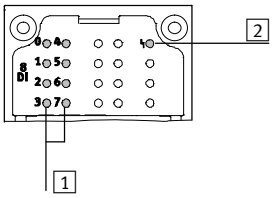
General technical data						
Type			CPX-4DE	CPX-8DE	CPX-8DE-D	CPX-8NDE
No. of inputs			4	8	8	8
Max. residual current of inputs per module		[A]	0.7	1	0.7	0.7
Fuse protection			Internal electronic fuse per module	Internal electronic fuse per module	Internal electronic fuse per channel	Internal electronic fuse per module
Intrinsic current consumption at operating voltage		[mA]	Typically 15			
Operating voltage	Nominal value	[V DC]	24			
	Permissible range	[V DC]	18 ... 30			
Electrical isolation	Channel – channel		No			
	Channel – internal bus		No			
Switching level	Signal 0	[V DC]	≤ 5			≥ 11
	Signal 1	[V DC]	≥ 11			≤ 5
Input debounce time		[ms]	3 (0.1, 10, 20 parameterisable)			
Input characteristic			IEC 1131-T2			
Switching logic			Positive logic (PNP)			Negative logic (NPN)
LED indicators	Group diagnostics		1	1	1	1
	Channel diagnostics		–	–	8	–
	Channel status		4	8	8	8
Diagnostics			Short circuit/overload per channel			
Parameterisation			• Module monitoring • Behaviour after short circuit • Input debounce time • Signal extension time			
Degree of protection to EN 60529			Depending on connection block			
Temperature range	Operation	[°C]	–5 ... +50			
	Storage/transport	[°C]	–20 ... +70			
Materials			PA reinforced, PC			
Grid dimension		[mm]	50			
Dimensions (incl. interlinking block and connection block) W x L x H		[mm]	50 x 107 x 50			
Product weight		[g]	38			

Connection and display components

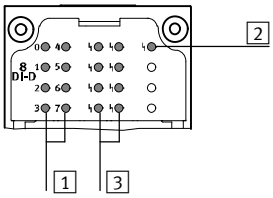
CPX-4DE



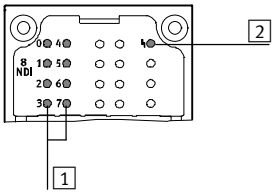
CPX-8DE



CPX-8DE-D



CPX-8NDE



[1] Status LEDs (green)

[2] Error LED (red, module error)

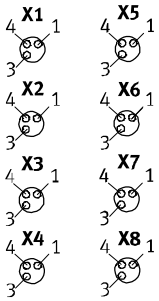
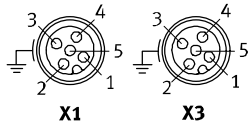
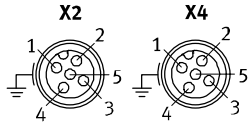
[3] Channel-related error LEDs (red)

For allocation to inputs
➔ Pin allocation for module

Combinations of connection blocks and digital input modules

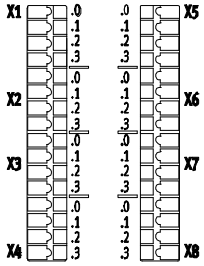
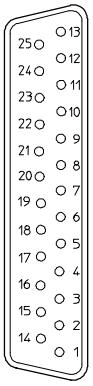
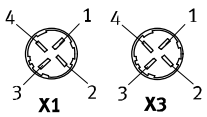
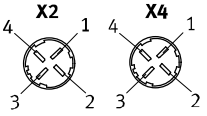
Connection blocks	Part no.	Digital input modules			
		CPX-4DE	CPX-8DE	CPX-8DE-D	CPX-8NDE
CPX-AB-8-M8-3POL	**195706**	■	■	■	■
CPX-AB-4-M12X2-5POL	**195704**	■	■	■	■
CPX-AB-4-M12X2-5POL-R	**541254**	■	■	■	■
CPX-AB-8-KL-4POL	**195708**	■	■	■	■
CPX-AB-1-SUB-BU-25POL	**525676**	■	■	■	■
CPX-AB-4-HAR-4POL	**525636**	■	■	■	■
CPX-M-AB-4-M12X2-5POL	**549367**	■	■	■	■

Pin allocation

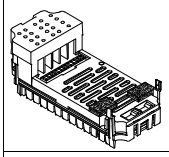
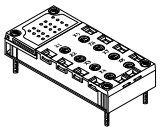
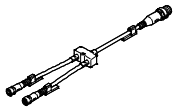
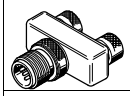
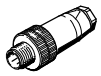
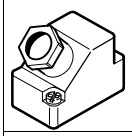
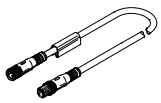
Connection block inputs	CPX-4DE		CPX-8DE, CPX-8DE-D and CPX-8NDE	
CPX-AB-8-M8-3POL				
	X1.1: 24 V_{SEN} X1.3: 0 V_{SEN} X1.4: Input x X2.1: 24 V_{SEN} X2.3: 0 V_{SEN} X2.4: Input x+1 X3.1: 24 V_{SEN} X3.3: 0 V_{SEN} X3.4: Input x+1 X4.1: 24 V_{SEN} X4.3: 0 V_{SEN} X4.4: n.c.	X5.1: 24 V_{SEN} X5.3: 0 V_{SEN} X5.4: Input x+2 X6.1: 24 V_{SEN} X6.3: 0 V_{SEN} X6.4: Input x+3 X7.1: 24 V_{SEN} X7.3: 0 V_{SEN} X7.4: Input x+3 X8.1: 24 V_{SEN} X8.3: 0 V_{SEN} X8.4: n.c.	X1.1: 24 $V_{SEN\ x}$ X1.3: 0 $V_{SEN\ x}$ X1.4: Input x X2.1: 24 $V_{SEN\ x+1}$ X2.3: 0 $V_{SEN\ x+1}$ X2.4: Input x+1 X3.1: 24 $V_{SEN\ x+2}$ X3.3: 0 $V_{SEN\ x+2}$ X3.4: Input x+2 X4.1: 24 $V_{SEN\ x+3}$ X4.3: 0 $V_{SEN\ x+3}$ X4.4: Input x+3	X5.1: 24 $V_{SEN\ x+4}$ X5.3: 0 $V_{SEN\ x+4}$ X5.4: Input x+4 X6.1: 24 $V_{SEN\ x+5}$ X6.3: 0 $V_{SEN\ x+5}$ X6.4: Input x+5 X7.1: 24 $V_{SEN\ x+6}$ X7.3: 0 $V_{SEN\ x+6}$ X7.4: Input x+6 X8.1: 24 $V_{SEN\ x+7}$ X8.3: 0 $V_{SEN\ x+7}$ X8.4: Input x+7
CPX-AB-4-M12X2-5POL, CPX-AB-4-M12X2-5POL-R[1]				
	X1.1: 24 V_{SEN} X1.2: Input x+1 X1.3: 0 V_{SEN} X1.4: Input x X1.5: FE	X3.1: 24 V_{SEN} X3.2: Input x+3 X3.3: 0 V_{SEN} X3.4: Input x+2 X3.5: FE	X1.1: 24 $V_{SEN\ x}$ X1.2: Input x+1 X1.3: 0 $V_{SEN\ x}$ X1.4: Input x X1.5: FE	X3.1: 24 $V_{SEN\ x+4}$ X3.2: Input x+5 X3.3: 0 $V_{SEN\ x+4}$ X3.4: Input x+4 X3.5: FE
	X2.1: 24 V_{SEN} X2.2: n.c. X2.3: 0 V_{SEN} X2.4: Input x+1 X2.5: FE	X4.1: 24 V_{SEN} X4.2: n.c. X4.3: 0 V_{SEN} X4.4: Input x+3 X4.5: FE	X2.1: 24 $V_{SEN\ x+2}$ X2.2: Input x+3 X2.3: 0 V_{SENx+2} X2.4: Input x+2 X2.5: FE	X4.1: 24 $V_{SEN\ x+6}$ X4.2: Input x+7 X4.3: 0 $V_{SEN\ x+6}$ X4.4: Input x+6 X4.5: FE

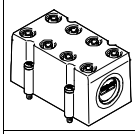
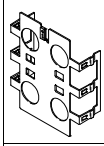
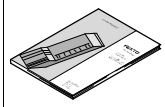
1) Speedcon quick lock, additional shielding on metal thread

Pin allocation

Connection block inputs	CPX-4DE		CPX-8DE, CPX-8DE-D and CPX-8NDE	
CPX-AB-8-KL-4POL				
	X1.0: 24 V_{SEN} X1.1: 0 V_{SEN} X1.2: Input x X1.3: FE X2.0: 24 V_{SEN} X2.1: 0 V_{SEN} X2.2: Input x+1 X2.3: FE X3.0: 24 V_{SEN} X3.1: 0 V_{SEN} X3.2: Input x+1 X3.3: FE X4.0: 24 V_{SEN} X4.1: 0 V_{SEN} X4.2: n.c. X4.3: FE	X5.0: 24 V_{SEN} X5.1: 0 V_{SEN} X5.2: Input x+2 X5.3: FE X6.0: 24 V_{SEN} X6.1: 0 V_{SEN} X6.2: Input x+3 X6.3: FE X7.0: 24 V_{SEN} X7.1: 0 V_{SEN} X7.2: Input x+3 X7.3: FE X8.0: 24 V_{SEN} X8.1: 0 V_{SEN} X8.2: n.c. X8.3: FE	X1.0: 24 $V_{SEN\ x}$ X1.1: 0 $V_{SEN\ x}$ X1.2: Input x X1.3: FE X2.0: 24 $V_{SEN\ x+1}$ X2.1: 0 $V_{SEN\ x+1}$ X2.2: Input x+1 X2.3: FE X3.0: 24 $V_{SEN\ x+2}$ X3.1: 0 $V_{SEN\ x+2}$ X3.2: Input x+2 X3.3: FE X4.0: 24 $V_{SEN\ x+3}$ X4.1: 0 $V_{SEN\ x+3}$ X4.2: Input x+3 X4.3: FE	X5.0: 24 $V_{SEN\ x+4}$ X5.1: 0 $V_{SEN\ x+4}$ X5.2: Input x+4 X5.3: FE X6.0: 24 $V_{SEN\ x+5}$ X6.1: 0 $V_{SEN\ x+5}$ X6.2: Input x+5 X6.3: FE X7.0: 24 $V_{SEN\ x+6}$ X7.1: 0 $V_{SEN\ x+6}$ X7.2: Input x+6 X7.3: FE X8.0: 24 $V_{SEN\ x+7}$ X8.1: 0 $V_{SEN\ x+7}$ X8.2: Input x+7 X8.3: FE
CPX-AB-1-SUB-BU-25POL				
	1: Input x 2: Input x+1 3: Input x+1 4: n.c. 5: 24 V_{SEN} 6: 0 V_{SEN} 7: 24 V_{SEN} 8: 0 V_{SEN} 9: 24 V_{SEN} 10: 24 V_{SEN} 11: 0 V_{SEN} 12: 0 V_{SEN} 13: FE	14: Input x+2 15: Input x+3 16: Input x+3 17: n.c. 18: 24 V_{SEN} 19: 24 V_{SEN} 20: 24 V_{SEN} 21: 24 V_{SEN} 22: 0 V_{SEN} 23: 0 V_{SEN} 24: 0 V_{SEN} 25: FE Housing: FE	1: Input x 2: Input x+1 3: Input x+2 4: Input x+3 5: 24 $V_{SEN\ x+1}$ 6: 0 $V_{SEN\ x+1}$ 7: 24 $V_{SEN\ x+3}$ 8: 0 $V_{SEN\ x+3}$ 9: 24 $V_{SEN\ x}$ 10: 24 $V_{SEN\ x+2}$ 11: 0 $V_{SEN\ x}$ 12: 0 $V_{SEN\ x+2}$ 13: FE	14: Input x+4 15: Input x+5 16: Input x+6 17: Input x+7 18: 24 $V_{SEN\ x+4}$ 19: 24 $V_{SEN\ x+5}$ 20: 24 $V_{SEN\ x+6}$ 21: 24 $V_{SEN\ x+7}$ 22: 0 $V_{SEN\ x+2\ u.\ 3}$ 23: 0 $V_{SEN\ x+2\ u.\ 3}$ 24: 0 $V_{SEN\ x+2\ u.\ 3}$ 25: FE Housing: FE
CPX-AB-4-HAR-4POL				
	X1.1: 24 V_{SEN} X1.2: Input x+1 X1.3: 0 V_{SEN} X1.4: Input x	X3.1: 24 V_{SEN} X3.2: Input x+3 X3.3: 0 V_{SEN} X3.4: Input x+2	X1.1: 24 $V_{SEN\ x}$ X1.2: Input x+1 X1.3: 0 $V_{SEN\ x}$ X1.4: Input x	X3.1: 24 $V_{SEN\ x+4}$ X3.2: Input x+5 X3.3: 0 $V_{SEN\ x+4}$ X3.4: Input x+4
	X2.1: 24 V_{SEN} X2.2: n.c. X2.3: 0 V_{SEN} X2.4: Input x+1	X4.1: 24 V_{SEN} X4.2: n.c. X4.3: 0 V_{SEN} X4.4: Input x+3	X2.1: 24 $V_{SEN\ x+2}$ X2.2: Input x+3 X2.3: 0 $V_{SEN\ x+2}$ X2.4: Input x+2	X4.1: 24 $V_{SEN\ x+6}$ X4.2: Input x+7 X4.3: 0 $V_{SEN\ x+6}$ X4.4: Input x+6

Ordering data

Designation				Part no.	Type
Input module, digital					
	4 digital inputs, positive logic (PNP)			**195752**	**CPX-4DE**
	8 digital inputs, positive logic (PNP)			**195750**	**CPX-8DE**
	8 digital inputs, positive logic (PNP), enhanced diagnostic function			**541480**	**CPX-8DE-D**
	8 digital inputs, negative logic (NPN)			**543813**	**CPX-8NDE**
Connection block					
	Made of polymer	8x socket M8, 3-pin		**195706**	**CPX-AB-8-M8-3POL**
		4x socket M12, 5-pin		**195704**	**CPX-AB-4-M12X2-5POL**
		4x socket, M12 with quick-lock technology, 5-pin		**541254**	**CPX-AB-4-M12X2-5POL-R**
		Spring-loaded terminal, 32-pin		**195708**	**CPX-AB-8-KL-4POL**
		1x socket, Sub-D, 25-pin		**525676**	**CPX-AB-1-SUB-BU-25POL**
		4x socket, quick connector, 4-pin		**525636**	**CPX-AB-4-HAR-4POL**
	Made of metal	4x socket M12, 5-pin		**549367**	**CPX-M-AB-4-M12X2-5POL**
Distributors					
	Modular system for all types of sensor/actuator distributors			–	**NEDY-...** ➔ Internet: nedy
	1x plug M12, 4-pin	2x socket M8, 3-pin		**8005311**	**NEDY-L2R1-V1-M8G3-N-M12G4**
		2x socket, M12, 5-pin		**8005310**	**NEDY-L2R1-V1-M12G5-N-M12G4**
Plug					
	Plug	M8, 3-pin	Solderable	**18696**	**SEA-GS-M8**
			Screw-in	**192009**	**SEA-3GS-M8-S**
		M12, 4-pin, PG7		**18666**	**SEA-GS-7**
		M12, PG7, 4-pin for cable diameter 2.5 mm		**192008**	**SEA-4GS-7-2,5**
		M12, 4-pin, PG9		**18778**	**SEA-GS-9**
		M12, 4 pin for 2 cables		**18779**	**SEA-GS-11-DUO**
		M12 for 2 cables, 5-pin		**192010**	**SEA-5GS-11-DUO**
		M12, 5-pin		**175487**	**SEA-M12-5GS-PG7**
	HARAX® plug, 4-pin			**525928**	**SEA-GS-HAR-4POL**
	Sub-D plug, 25-pin			**527522**	**SD-SUB-D-ST25**
Connecting cable					
	Connecting cable M8-M8		0.5 m	**541346**	**NEBU-M8G3-K-0.5-M8G3**
			1.0 m	**541347**	**NEBU-M8G3-K-1-M8G3**
			2.5 m	**541348**	**NEBU-M8G3-K-2.5-M8G3**
			5.0 m	**541349**	**NEBU-M8G3-K-5-M8G3**
	Modular system for all types of connecting cables			–	**NEBU-...** ➔ Internet: nebu

Ordering data				
Designation			Part no.	Type
Cover				
	Cover for CPX-AB-8-KL-4POL (IP65, IP67)	• 8 cable through-feeds M9 • 1 cable through-feed for multi-pin plug	**538219**	**AK-8KL**
	Set of fittings		**538220**	**VG-K-M9**
Screening plate				
	Screening plate for M12 connections		**526184**	**CPX-AB-S-4-M12**
User documentation				
	User documentation	German	**526439**	**P.BE-CPX-EA-DE**
		English	**526440**	**P.BE-CPX-EA-EN**
		Spanish	**526441**	**P.BE-CPX-EA-ES**
		French	**526442**	**P.BE-CPX-EA-FR**
		Italian	**526443**	**P.BE-CPX-EA-IT**

Terminal CPX-P

Technical data – PROFIsafe input module

Function

The PROFIsafe input module has 8 input channels whose signal status is detected for safety reasons, with the information transmitted to a suitable safety controller using the PROFIsafe safety protocol in combination with the appropriate fieldbus (PROFINET or PROFIBUS). This function is exclusively available for safety controllers using the PROFIsafe protocol, profile version 2.4.

Area of application

- Input module for 24 V DC sensor supply voltage
- Supports connection blocks with M12 and terminal connection
- Module features can be parameterised
- The input module receives the voltage supply for the electronics and the sensors from the interlinking block
- Module protection and diagnostics through integrated electronic protection

Description

Module-based passivation

While channel-by-channel passivation is disabled, the input module, in accordance with PROFIsafe specification, switches all information in the input image to the safe status, even when there is only one channel error.

Channel-by-channel passivation

In the case of channel-by-channel passivation, when a channel error occurs, the input module switches the input information of the affected channel pair to 0, depending on the function mode.

- The input information for unaffected channel pairs does not change
- The input module remains integrated
- The input module indicates the current channel error status to the control unit via the input image

Applications

The inputs on the PROFIsafe input module can be combined for multi-channel sensor applications. Every two inputs form a channel pair, which is set separately with one of 11 function modes.

The function mode has an influence on the evaluation of the input signals, and optionally on the generation of clock signals.

There are 5 independent clock outputs available for safe operation of passive sensors; the pulse patterns are used in some operating modes to detect crossovers in the signal paths.

The entire input module is designed to ensure that the input channels provide either secure data or no data at all, even when a fault is present in the system.

Application areas

- Use as an input module for a higher-order safety controller. Several input modules can be used together that can monitor independently operating sensors
- Use of multi-channel sensor applications with up to 8 secure inputs, which can be grouped and are suitable for configuration with the help of 11 different function modes
- Connection of different switches and sensors within the safety chain

Note

The safety integrity level, Performance Level and category for the system as a whole correspond to that of the component in the safety chain with the lowest characteristic value.

Application examples

- Two-hand control device for starting a function
- Emergency stop switch for incidents
- Operating mode selector switch with 4 positions
- Rotary indexing table
- Light curtain
- Acknowledge button with request
- End-position switches
- Protective door with two NO switches

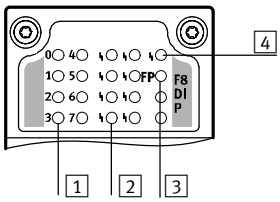
General technical data			
Type			**CPX-F8DE-P**
No. of inputs			8
Safety function			Reliable detection and evaluation of input statuses
Max. address capacity	Inputs	[bytes]	6
	Outputs	[bytes]	7
Max. cable length		[m]	200
Max. power supply	Per module	[A]	3
Current consumption of module		[mA]	Typ. 35 (power supply for electronics)
Operating voltage	Nominal value	[V DC]	24
	Permissible range	[V DC]	20.4 ... 28.8
Voltage drop per channel		[V]	0.6
Residual ripple		[Vpp]	2 within voltage range
Electrical isolation	Channel – channel		No
Input characteristics			To IEC 61131-2, type 2
Switching logic	Inputs		PNP (positive switching)
Safety integrity level	As per EN 62061		Reliable detection and evaluation of input statuses up to SIL CL3
	As per EN 61508		Reliable detection and evaluation of input statuses up to SIL3
Performance Level	As per ISO 13849		Reliable detection and evaluation of input statuses up to Cat 4 and PL e
Failure rate per hour (PFH)			1.0x 10^{-9}
Certificate issuing authority			01/205/5444.00/15
LED indicators	Group diagnostics		1
	Channel diagnostics		8
	Channel status		8
	Failsafe protocol active		1
Diagnostics			• Short circuit per channel • Undervoltage • Overvoltage • Excessive temperature • Crossover per channel • Wire break per channel • Communication • Process data error • Self-test
Control elements			DIL switch
Degree of protection to EN 60529			Depending on connection block
Grid dimension		[mm]	50
Dimensions (incl. interlinking block and connection block) W x L x H		[mm]	50 x 107 x 55

Materials	
Note on materials	RoHS-compliant

Operating and environmental conditions		
Ambient temperature	[°C]	–5 ... +50
Storage temperature	[°C]	–20 ... +70
CE marking (see declaration of conformity)		To EU Machinery Directive
Certification		c UL us Recognized (OL)

Connection and display components

CPX-F8DE-P



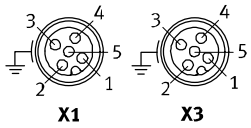
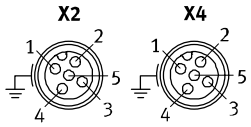
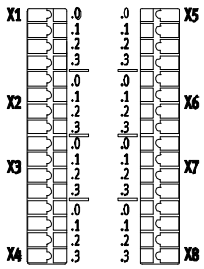
1 Channel-related status LEDs (green)
2 Channel-related error LEDs (red)
3 Fail-safe protocol active (green)
4 Error LED (red, module error)

Combinations of bus nodes/control blocks with PROFIsafe input module		
Bus node/control block	Part no.	PROFIsafe input module
		CPX-F8DE-P
CPX-FB13	**195740**	■
CPX-FB33	**548755**	■
CPX-M-FB34	**548751**	■
CPX-M-FB35	**548749**	■

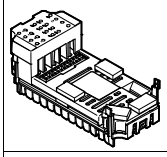
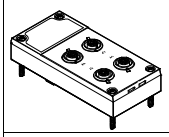
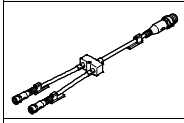
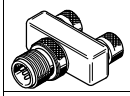
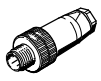
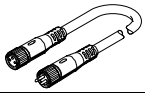
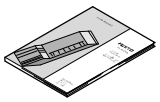
Note

The PROFIsafe input module CPX-F8DE-P can only be connected as of software release 21 or release 30 (in the case of CPX-FB13).

Combinations of connection blocks and PROFIsafe input module		
Connection blocks	Part no.	PROFIsafe input module
		CPX-F8DE-P
CPX-M-AB-4-M12X2-5POL	**549367**	■
CPX-AB-8-KL-4POL	**195708**	■

Pin allocation		
Connection block inputs	CPX-F8DE-P	
CPX-M-AB-4-M12X2-5POL		
	X1.1: 24 V_{SEN} X1.2: Input x+1 X1.3: 0 V_{SEN} X1.4: Input x X1.5: FE	X3.1: 24 V_{SEN} X3.2: Input x+5 X3.3: 0 V_{SEN} X3.4: Input x+4 X3.5: FE
	X2.1: 24 V_{SEN} X2.2: Input x+3 X2.3: 0 V_{SEN} X2.4: Input x+2 X2.5: FE	X4.1: 24 V_{SEN} X4.2: Input x+7 X4.3: 0 V_{SEN} X4.4: Input x+6 X4.5: FE
CPX-AB-8-KL-4POL		
	X1.0: 24 V_{SEN} X1.1: 0 V_{SEN} X1.2: Input x X1.3: FE X2.0: 24 $V_{SEN\ x}$ X2.1: 24 $V_{SEN\ x+1}$ X2.2: Input x+1 X2.3: FE X3.0: 24 V_{SEN} X3.1: 0 V_{SEN} X3.2: Input x+2 X3.3: FE X4.0: 24 $V_{SEN\ x+2}$ X4.1: 24 $V_{SEN\ x+3}$ X4.2: Input x+3 X4.3: FE	X5.0: 24 V_{SEN} X5.1: 0 V_{SEN} X5.2: Input x+4 X5.3: FE X6.0: 24 $V_{SEN\ x+4}$ X6.1: 24 $V_{SEN\ x+5}$ X6.2: Input x+5 X6.3: FE X7.0: 24 V_{SEN} X7.1: 0 V_{SEN} X7.2: Input x+6 X7.3: FE X8.0: 24 $V_{SEN\ x+6}$ X8.1: 24 $V_{SEN\ x+7}$ X8.2: Input x+7 X8.3: FE

Combinations of interlinking blocks and PROFIsafe input module		
Interlinking blocks	Part no.	PROFIsafe input module
		CPX-F8DE-P
CPX-M-GE-EV-S-7/8-5POL	**550208**	■
CPX-M-GE-EV-S-7/8-5POL-VL	**8022165**	■
CPX-M-GE-EV	**550206**	■
CPX-M-GE-EV-FVO	**567806**	–
CPX-M-GE-EV-Z-7/8-5POL	**550210**	■
CPX-M-GE-EV-Z-7/8-5POL-VL	**8022158**	■

Ordering data					
	Description			Part no.	Type
PROFIsafe input module					
	8 digital inputs, positive logic (PNP), for reliable detection and evaluation of input statuses			**2597424**	**CPX-F8DE-P**
Connection block					
	Made of polymer	Spring-loaded terminal, 32-pin		**195708**	**CPX-AB-8-KL-4POL**
	Made of metal	4x socket M12, 5-pin	Unclocked sensor supply	**549367**	**CPX-M-AB-4-M12X2-5POL**
Distributors					
	Modular system for all types of sensor/actuator distributors			–	**NEDY-...** ➔ Internet: nedy
	1x plug M12, 4-pin	2x socket, M12, 5-pin		**8005310**	**NEDY-L2R1-V1-M12G5-N-M12G4**
Plug					
	Plug	M12, PG7		**18666**	**SEA-GS-7**
		M12, PG7, 4-pin for cable diameter 2.5 mm		**192008**	**SEA-4GS-7-2,5**
		M12, PG9		**18778**	**SEA-GS-9**
		M12 for 2 cables		**18779**	**SEA-GS-11-DUO**
		M12 for 2 cables, 5-pin		**192010**	**SEA-5GS-11-DUO**
		M12, 5-pin		**175487**	**SEA-M12-5GS-PG7**
Connecting cable					
	Modular system for all types of connecting cable			–	**NEBU-...** ➔ Internet: nebu
User documentation					
	User documentation for PROFIsafe input module		German	**8035496**	**P.BE-CPX-F8DE-P-DE**
			English	**8035497**	**P.BE-CPX-F8DE-P-EN**
			Spanish	**8035498**	**P.BE-CPX-F8DE-P-ES**
			French	**8035499**	**P.BE-CPX-F8DE-P-FR**
			Italian	**8035500**	**P.BE-CPX-F8DE-P-IT**
			Chinese	**8035501**	**P.BE-CPX-F8DE-P-ZH**

Terminal CPX-P

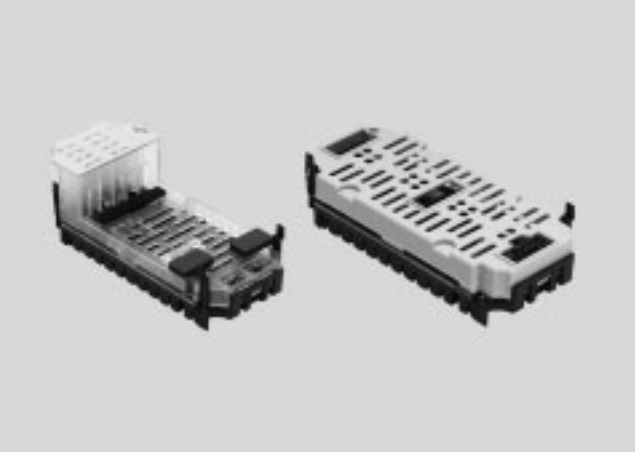
Technical data – Input module, digital, 16 inputs

Function

Digital input modules enable the connection of two-wire and three-wire sensors (proximity sensors, inductive or capacitive sensors, etc.).
Depending on the connection block selected, the module supports various connection concepts with different numbers of sockets (single or double allocation).

Area of application

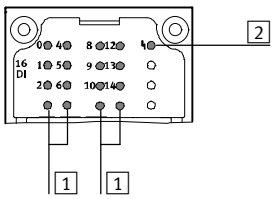
- Input modules for 24 V DC sensor supply voltage
- PNP logic
- Module features can be parameterised
- The input module receives the voltage supply for the electronics and the sensors from the interlinking block
- Module protection and diagnostics through integrated electronic protection



General technical data				
Type			**CPX-16DE**	**CPX-M-16DE-D**
No. of inputs			16	16
Max. residual current of inputs per module		[A]	1.8	1.8
Intrinsic current consumption at operating voltage		[mA]	Typically 15	Typically 34
Fuse protection			Internal electronic fuse per module	Internal electronic fuse per channel pair, additional safety fuse
Nominal operating voltage		[V DC]	24	
Operating voltage range		[V DC]	18 ... 30	
Electrical isolation	Channel – channel		No	
	Channel – internal bus		No	
Switching level	Signal 0	[V DC]	≤ 5	
	Signal 1	[V DC]	≥ 11	
Input debounce time		[ms]	3 (0.1, 10, 20 parameterisable)	
Input characteristic			IEC 1131-T2	
Switching logic			Positive logic (PNP)	
LED indicators	Group diagnostics		1	1
	Channel diagnostics		–	16
	Channel status		16	16
Diagnostics			Short circuit/overload per channel	
Parameterisation			• Module monitoring • Behaviour after short circuit • Input debounce time • Signal extension time	
Degree of protection to EN 60529			Depending on connection block	
Temperature range	Operation	[°C]	–5 ... +50	
	Storage/transport	[°C]	–20 ... +70	
Materials			PA reinforced, PC	
Grid dimension		[mm]	50	
Dimensions (incl. interlinking block and connection block) W x L x H		[mm]	50 x 107 x 50	
Product weight		[g]	38	

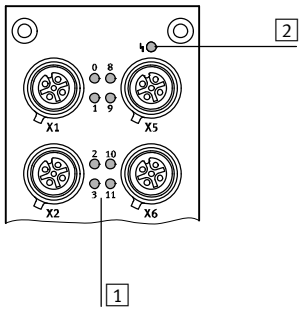
Connection and display components

CPX-16DE



1 Status LEDs (green)
For allocation to inputs
➔ Pin allocation for module
2 Error LED (red, module error)

CPX-M-16DE-D

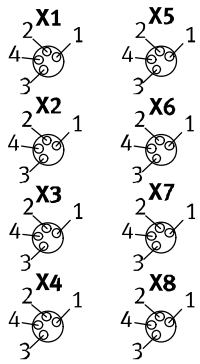


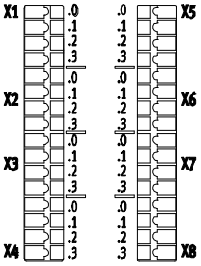
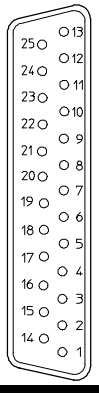
1 Common status LEDs (green)/error LEDs (red) for each input signal
2 Error LED (red, module error)

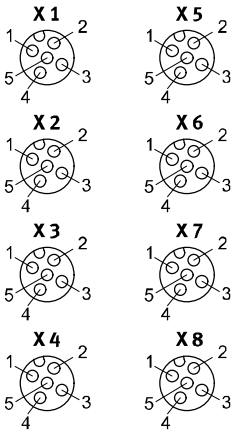
Combinations of connection blocks and digital input modules

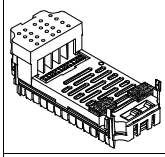
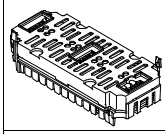
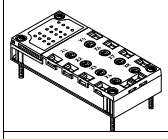
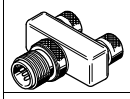
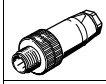
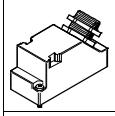
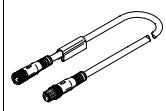
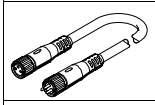
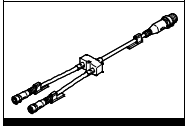
Connection blocks	Part no.	Digital input modules	
		CPX-16DE	CPX-M-16DE-D
CPX-AB-8-M8X2-4POL	**541256**	■	–
CPX-AB-8-KL-4POL	**195708**	■	–
CPX-AB-1-SUB-BU-25POL	**525676**	■	–
CPX-M-AB-8-M12X2-5POL	**549335**	–	■

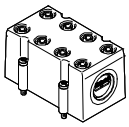
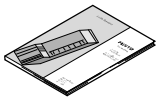
Pin allocation

Connection block inputs	CPX-16DE	
CPX-AB-8-M8x2-4POL		
	X1.1: 24 V_{SEN} X1.2: Input x+1 X1.3: 0 V_{SEN} X1.4: Input x	X5.1: 24 V_{SEN} X5.2: Input x+9 X5.3: 0 V_{SEN} X5.4: Input x+8
	X2.1: 24 V_{SEN} X2.2: Input x+3 X2.3: 0 V_{SEN} X2.4: Input x+2	X6.1: 24 V_{SEN} X6.2: Input x+11 X6.3: 0 V_{SEN} X6.4: Input x+10
	X3.1: 24 V_{SEN} X3.2: Input x+5 X3.3: 0 V_{SEN} X3.4: Input x+4	X7.1: 24 V_{SEN} X7.2: Input x+13 X7.3: 0 V_{SEN} X7.4: Input x+12
	X4.1: 24 V_{SEN} X4.2: Input x+7 X4.3: 0 V_{SEN} X4.4: Input x+6	X8.1: 24 V_{SEN} X8.1: Input x+15 X8.3: 0 V_{SEN} X8.4: Input x+14

Pin allocation		
Connection block inputs	CPX-16DE	
CPX-AB-8-KL-4POL		
	X1.0: Input x+8 X1.1: 24 V_{SEN} X1.2: Input x X1.3: FE X2.0: Input x+9 X2.1: 24 V_{SEN} X2.2: Input x+1 X2.3: FE X3.0: Input x+10 X3.1: 24 V_{SEN} X3.2: Input x+2 X3.3: FE X4.0: Input x+11 X4.1: 24 V_{SEN} X4.2: Input x+3 X4.3: FE	X5.0: Input x+12 X5.1: 0 V_{SEN} X5.2: Input x+4 X5.3: FE X6.0: Input x+13 X6.1: 0 V_{SEN} X6.2: Input x+5 X6.3: FE X7.0: Input x+14 X7.1: 0 V_{SEN} X7.2: Input x+6 X7.3: FE X8.0: Input x+15 X8.1: 0 V_{SEN} X8.2: Input x+7 X8.3: FE
CPX-AB-1-SUB-BU-25POL		
	1: Input x 2: Input x+1 3: Input x+2 4: Input x+3 5: Input x+9 6: 24 V_{SEN} 7: Input x+11 8: 24 V_{SEN} 9: Input x+8 10: Input x+10 11: 24 V_{SEN} 12: 24 V_{SEN} 13: FE	14: Input x+4 15: Input x+5 16: Input x+6 17: Input x+7 18: Input x+12 19: Input x+13 20: Input x+14 21: Input x+15 22: 0 V_{SEN} 23: 0 V_{SEN} 24: 0 V_{SEN} 25: FE Housing: FE

Pin allocation		
Connection block inputs	CPX-M-16DE-D	
CPX-M-AB-8-M12X2-5POL		
	X1.1: 24 V_{Sx} X1.2: Input x+1 X1.3: 0 V_{Sx} X1.4: Input x X1.5: FE X2.1: 24 V_{Sx+2} X2.2: Input x+3 X2.3: 0 V_{Sx+2} X2.4: Input x+2 X2.5: FE X3.1: 24 V_{Sx+4} X3.2: Input x+5 X3.3: 0 V_{Sx+4} X3.4: Input x+4 X3.5: FE X4.1: 24 V_{Sx+6} X4.2: Input x+7 X4.3: 0 V_{Sx+6} X4.4: Input x+6 X4.5: FE	X5.1: 24 V_{Sx+8} X5.2: Input x+9 X5.3: 0 V_{Sx+8} X5.4: Input x+8 X5.5: FE X6.1: 24 V_{Sx+10} X6.2: Input x+11 X6.3: 0 V_{Sx+10} X6.4: Input x+10 X6.5: FE X7.1: 24 V_{Sx+12} X7.2: Input x+13 X7.3: 0 V_{Sx+12} X7.4: Input x+12 X7.5: FE X8.1: 24 V_{Sx+14} X8.2: Input x+15 X8.3: 0 V_{Sx+14} X8.4: Input x+14 X8.5: FE

Ordering data					
Designation				Part no.	Type
Input module, digital					
	16 digital inputs, internal electronic fuse for each module			**543815**	**CPX-16DE**
	16 digital inputs, internal electronic fuse per channel pair			**550202**	**CPX-M-16DE-D**
Connection block					
	Made of polymer	8x socket, M8, 4-pin		**541256**	**CPX-AB-8-M8X2-4POL**
		Spring-loaded terminal, 32-pin		**195708**	**CPX-AB-8-KL-4POL**
		1x socket, Sub-D, 25-pin		**525676**	**CPX-AB-1-SUB-BU-25POL**
	Made of metal	8x socket M12, 5-pin		**549335**	**CPX-M-AB-8-M12X2-5POL**
Plug					
	Push-in T-connector	1x plug, M8, 4-pin	2x socket M8, 3-pin	**8005312**	**NEDY-L2R1-V1-M8G3-N-M8G4**
	For push-in T-connector	M8 3-pin	Solderable	**18696**	**SEA-GS-M8**
			Screw-in	**192009**	**SEA-3GS-M8-S**
	Sub-D plug, 25-pin			**527522**	**SD-SUB-D-ST25**
Connecting cable					
	For push-in T-connector	1x socket, M8, 3-pin 1x plug M8, 3-pin	0.5 m	**541346**	**NEBU-M8G3-K-0.5-M8G3**
			1.0 m	**541347**	**NEBU-M8G3-K-1-M8G3**
			2.5 m	**541348**	**NEBU-M8G3-K-2.5-M8G3**
			5.0 m	**541349**	**NEBU-M8G3-K-5-M8G3**
	Modular system for all types of connecting cable			–	**NEBU-...** ➔ Internet: nebu
	Modular system for all types of sensor/actuator distributors			–	**NEDY-...** ➔ Internet: nedy

Ordering data				
Designation			Part no.	Type
Cover				
	Cover for CPX-AB-8-KL-4POL (IP65/67)	• 8 cable through-feeds M9 • 1 cable through-feed for multi-pin plug	**538219**	**AK-8KL**
	Set of fittings for cover AK-8KL		**538220**	**VG-K-M9**
	Cover cap for closing off unused M8 ports (10 pieces)		**177672**	**ISK-M8**
User documentation				
	User documentation	German	**526439**	**P.BE-CPX-EA-DE**
		English	**526440**	**P.BE-CPX-EA-EN**
		Spanish	**526441**	**P.BE-CPX-EA-ES**
		French	**526442**	**P.BE-CPX-EA-FR**
		Italian	**526443**	**P.BE-CPX-EA-IT**

Terminal CPX-P

Technical data – Output module, digital

FESTO

Function

Digital outputs control actuators such as individual valves, hydraulic valves, heating controllers and many more. Separate circuits are created using an additional supply. Parallel connection of the outputs of a module enables consuming devices to be controlled with up to 4 A.

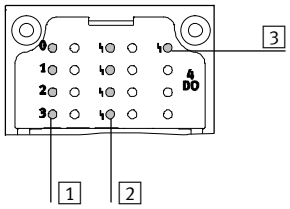
Area of application

- Output module for 24 V DC supply voltage
- PNP logic
- Module features can be parameterised
- The output module receives the voltage supply for the electronics and the outputs from the interlinking block
- Module protection and diagnostics through integrated electronic protection in each channel

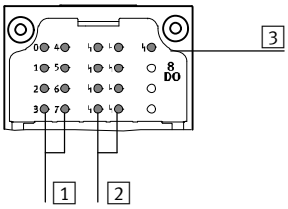
General technical data					
Type			CPX-4DA	CPX-8DA	CPX-8DA-H
Number of outputs			4	8	8
Max. power supply	Per module	[A]	4		8.4
	Per channel	[A]	1 (24 W lamp load, 4 channels can be connected in parallel)	0.5 (12 W lamp load, 8 channels can be connected in parallel)	2.1 (50 W lamp load), per channel pair
Fuse protection (short circuit)			Internal electronic fuse per channel		
Module current consumption (power supply for electronics)		[mA]	Typically 16		Typically 34
Operating voltage	Nominal value	[V DC]	24		
	Permissible range	[V DC]	18 ... 30		
Electrical isolation	Channel – channel		No		
	Channel – internal bus		Yes, using intermediate supply		
Output characteristic			To IEC 1131-2		
Switching logic			Positive logic (PNP)		
LED indicators	Group diagnostics		1	1	1
	Channel diagnostics		4	8	8
	Channel status		4	8	8
Diagnostics			• Short circuit/overload, channel x • Undervoltage at outputs		
Parameterisation			• Module monitoring • Behaviour after short circuit • Fail-safe channel x • Forcing channel x • Idle mode channel x		
Degree of protection to EN 60529			Depending on connection block		
Temperature range	Operation	[°C]	–5 ... +50		
	Storage/transport	[°C]	–20 ... +70		
Materials			PA reinforced, PC		
Grid dimension		[mm]	50		
Dimensions (incl. interlinking block and connection block) W x L x H		[mm]	50 x 107 x 50		
Product weight		[g]	38		

Connection and display components

CPX-4DA



CPX-8DA

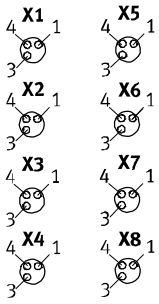


1 Status LEDs (yellow)
For allocation to outputs
➔ Pin allocation for module
2 Channel-related error LEDs (red)
3 Error LED (red, module error)

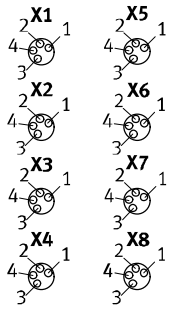
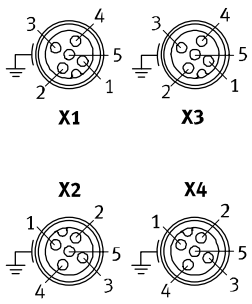
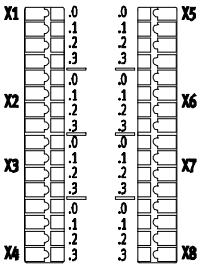
Combinations of connection block and digital output module

Connection blocks	Part no.	Digital output module		
		CPX-4DA	CPX-8DA	CPX-8DA-H
CPX-AB-8-M8-3POL	**195706**	■	■	–
CPX-AB-8-M8X2-4POL	**541256**	■	■	■
CPX-AB-4-M12X2-5POL	**195704**	■	■	–
CPX-AB-4-M12X2-5POL-R	**541254**	■	■	■
CPX-AB-8-KL-4POL	**195708**	■	■	■
CPX-AB-1-SUB-BU-25POL	**525676**	■	■	■
CPX-AB-4-HAR-4POL	**525636**	■	■	–
CPX-M-AB-4-M12X2-5POL	**549367**	■	■	■

Pin allocation

Connection block outputs	CPX-4DA		CPX-8DA	
CPX-AB-8-M8-3POL				
	X1.1: n.c. X1.3: 0 V_{OUT} X1.4: Output x X2.1: n.c. X2.3: 0 V_{OUT} X2.4: Output x+1 X3.1: n.c. X3.3: 0 V_{OUT} X3.4: Output x+1 X4.1: n.c. X4.3: 0 V_{OUT} X4.4: n.c.	X5.1: n.c. X5.3: 0 V_{OUT} X5.4: Output x+2 X6.1: n.c. X6.3: 0 V_{OUT} X6.4: Output x+3 X7.1: n.c. X7.3: 0 V_{OUT} X7.4: Output x+3 X8.1: n.c. X8.3: 0 V_{OUT} X8.4: n.c.	X1.1: n.c. X1.3: 0 V_{OUT} X1.4: Output x X2.1: n.c. X2.3: 0 V_{OUT} X2.4: Output x+1 X3.1: n.c. X3.3: 0 V_{OUT} X3.4: Output x+2 X4.1: n.c. X4.3: 0 V_{OUT} X4.4: Output x+3	X5.1: n.c. X5.3: 0 V_{OUT} X5.4: Output x+4 X6.1: n.c. X6.3: 0 V_{OUT} X6.4: Output x+5 X7.1: n.c. X7.3: 0 V_{OUT} X7.4: Output x+6 X8.1: n.c. X8.3: 0 V_{OUT} X8.4: Output x+7

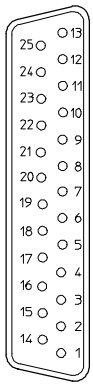
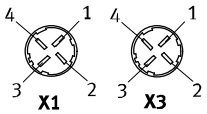
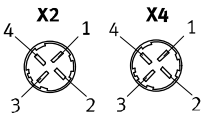
Pin allocation

Connection block outputs	CPX-4DA		CPX-8DA and CPX-8DA-H	
CPX-AB-8-M8X2-4POL				
	X1.1: 0 V_{OUT} X1.2: Output x+1 X1.3: 0 V_{OUT} X1.4: Output x X2.1: 0 V_{OUT} X2.2: n.c. X2.3: 0 V_{OUT} X2.4: Output x+1 X3.1: 0 V_{OUT} X3.2: Output x+3 X3.3: 0 V_{OUT} X3.4: Output x+2 X4.1: 0 V_{OUT} X4.2: n.c. X4.3: 0 V_{OUT} X4.4: Output x+3	X5.1: 0 V_{OUT} X5.2: n.c. X5.3: 0 V_{OUT} X5.4: n.c. X6.1: 0 V_{OUT} X6.2: n.c. X6.3: 0 V_{OUT} X6.4: n.c. X7.1: 0 V_{OUT} X7.2: n.c. X7.3: 0 V_{OUT} X7.4: n.c. X8.1: 0 $V_{OUT\,x+1}$ X8.2: n.c. X8.3: 0 $V_{OUT\,x+3}$ X8.4: n.c.	X1.1: 0 V_{OUT} X1.2: Output x+1 X1.3: 0 V_{OUT} X1.4: Output x X2.1: 0 V_{OUT} X2.2: Output x+3 X2.3: 0 V_{OUT} X2.4: Output x+2 X3.1: 0 V_{OUT} X3.2: Output x+5 X3.3: 0 V_{OUT} X3.4: Output x+4 X4.1: 0 V_{OUT} X4.2: Output x+7 X4.3: 0 V_{OUT} X4.4: Output x+6	X5.1: 0 V_{OUT} X5.2: n.c. X5.3: 0 V_{OUT} X5.4: n.c. X6.1: 0 V_{OUT} X6.2: n.c. X6.3: 0 V_{OUT} X6.4: n.c. X7.1: 0 V_{OUT} X7.2: n.c. X7.3: 0 V_{OUT} X7.4: n.c. X8.1: 0 V_{OUT} X8.2: n.c. X8.3: 0 V_{OUT} X8.4: n.c.
CPX-AB-4-M12X2-5POL[1]				
	X1.1: n.c. X1.2: Output x+1 X1.3: 0 V_{OUT} X1.4: Output x X1.5: FE X2.1: n.c. X2.2: n.c. X2.3: 0 V_{OUT} X2.4: Output x+1 X2.5: FE	X3.1: n.c. X3.2: Output x+3 X3.3: 0 V_{OUT} X3.4: Output x+2 X3.5: FE X4.1: n.c. X4.2: n.c. X4.3: 0 V_{OUT} X4.4: Output x+3 X4.5: FE	X1.1: n.c. X1.2: Output x+1 X1.3: 0 V_{OUT} X1.4: Output x X1.5: FE X2.1: n.c. X2.2: Output x+3 X2.3: 0 V_{OUT} X2.4: Output x+2 X2.5: FE	X3.1: n.c. X3.2: Output x+5 X3.3: 0 V_{OUT} X3.4: Output x+4 X3.5: FE X4.1: n.c. X4.2: Output x+7 X4.3: 0 V_{OUT} X4.4: Output x+6 X4.5: FE
CPX-AB-8-KL-4POL				
	X1.0: n.c. X1.1: 0 V_{OUT} X1.2: Output x X1.3: FE X2.0: n.c. X2.1: 0 V_{OUT} X2.2: Output x+1 X2.3: FE X3.0: n.c. X3.1: 0 V_{OUT} X3.2: Output x+1 X3.3: FE X4.0: n.c. X4.1: 0 V_{OUT} X4.2: n.c. X4.3: FE	X5.0: n.c. X5.1: 0 V_{OUT} X5.2: Output x+2 X5.3: FE X6.0: n.c. X6.1: 0 V_{OUT} X6.2: Output x+3 X6.3: FE X7.0: n.c. X7.1: 0 V_{OUT} X7.2: Output x+3 X7.3: FE X8.0: n.c. X8.1: 0 V_{OUT} X8.2: n.c. X8.3: FE	X1.0: n.c. X1.1: 0 V_{OUT} X1.2: Output x X1.3: FE X2.0: n.c. X2.1: 0 V_{OUT} X2.2: Output x+1 X2.3: FE X3.0: n.c. X3.1: 0 V_{OUT} X3.2: Output x+2 X3.3: FE X4.0: n.c. X4.1: 0 V_{OUT} X4.2: Output x+3 X4.3: FE	X5.0: n.c. X5.1: 0 V_{OUT} X5.2: Output x+4 X5.3: FE X6.0: n.c. X6.1: 0 V_{OUT} X6.2: Output x+5 X6.3: FE X7.0: n.c. X7.1: 0 V_{OUT} X7.2: Output x+6 X7.3: FE X8.0: n.c. X8.1: 0 V_{OUT} X8.2: Output x+7 X8.3: FE

1) Not suitable for CPX-8DA-H.

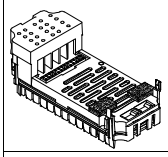
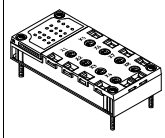
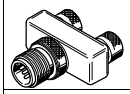
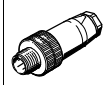
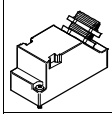
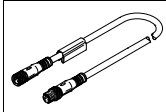
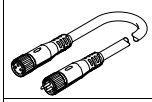
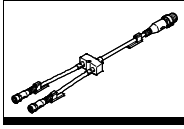
2) Speedcon quick lock, additional shielding on metal thread

Pin allocation

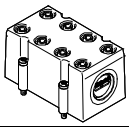
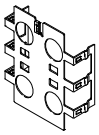
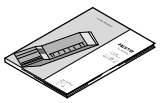
Connection block outputs	CPX-4DA		CPX-8DA and CPX-8DA-H	
CPX-AB-1-SUB-BU-25POL				
	1: Output x 2: Output x+1 3: Output x+1 4: n.c. 5: n.c. 6: 0 V_{OUT} 7: n.c. 8: 0 V_{OUT} 9: n.c. 10: n.c. 11: 0 V_{OUT} 12: 0 V_{OUT} 13: FE	14: Output x+2 15: Output x+3 16: Output x+3 17: n.c. 18: n.c. 19: n.c. 20: n.c. 21: n.c. 22: 0 V_{OUT} 23: 0 V_{OUT} 24: 0 V_{OUT} 25: FE Housing: FE	1: Output x 2: Output x+1 3: Output x+2 4: Output x+3 5: n.c. 6: 0 V_{OUT} 7: n.c. 8: 0 V_{OUT} 9: n.c. 10: n.c. 11: 0 V_{OUT} 12: 0 V_{OUT} 13: FE	14: Output x+4 15: Output x+5 16: Output x+6 17: Output x+7 18: n.c. 19: n.c. 20: n.c. 21: n.c. 22: 0 V_{OUT} 23: 0 V_{OUT} 24: 0 V_{OUT} 25: FE Housing: FE
CPX-AB-4-HAR-4POL[1]				
	X1.1: n.c. X1.2: Output x+1 X1.3: 0 V_{OUT} X1.4: Output x	X3.1: n.c. X3.2: Output x+3 X3.3: 0 V_{OUT} X3.4: Output x+2	X1.1: n.c. X1.2: Output x+1 X1.3: 0 V_{OUT} X1.4: Output x	X3.1: n.c. X3.2: Output x+5 X3.3: 0 V_{OUT} X3.4: Output x+4
	X2.1: n.c. X2.2: n.c. X2.3: 0 V_{OUT} X2.4: Output x+1	X4.1: n.c. X4.2: n.c. X4.3: 0 V_{OUT} X4.4: Output x+3	X2.1: n.c. X2.2: Output x+3 X2.3: 0 V_{OUT} X2.4: Output x+2	X4.1: n.c. X4.2: Output x+7 X4.3: 0 V_{OUT} X4.4: Output x+6

1) Not suitable for CPX-8DA-H.

Ordering data

Designation					Part no.	Type
Output module, digital						
	4 digital outputs, power supply 1 A per channel				**195754**	**CPX-4DA**
	8 digital outputs, power supply 0.5 A per channel				**541482**	**CPX-8DA**
	8 digital outputs, power supply 2.1 A per channel pair				**550204**	**CPX-8DA-H**
Connection block						
	Made of polymer	8x socket, M8, 3-pin			**195706**	**CPX-AB-8-M8-3POL**
		8x socket, M8, 4-pin			**541256**	**CPX-AB-8-M8X2-4POL**
		4x socket, M12, 5-pin			**195704**	**CPX-AB-4-M12X2-5POL**
		4x socket, M12, 5-pin with quick-lock technology			**541254**	**CPX-AB-4-M12X2-5POL-R**
		Spring-loaded terminal, 32-pin			**195708**	**CPX-AB-8-KL-4POL**
		1x socket, Sub-D, 25-pin			**525676**	**CPX-AB-1-SUB-BU-25POL**
		4x socket, quick connector, 4-pin			**525636**	**CPX-AB-4-HAR-4POL**
	Made of metal	4x socket, M12, 5-pin			**549367**	**CPX-M-AB-4-M12X2-5POL**
Plug						
	Push-in T-connector	1x plug, M8, 4-pin	2x socket M8, 3-pin		**8005312**	**NEDY-L2R1-V1-M8G3-N-M8G4**
		1x plug M12, 4-pin	2x socket M8, 3-pin		**8005311**	**NEDY-L2R1-V1-M8G3-N-M12G4**
			2x socket, M12, 5-pin		**8005310**	**NEDY-L2R1-V1-M12G5-N-M12G4**
	Plug	M8 3-pin	Solderable		**18696**	**SEA-GS-M8**
			Screw-in		**192009**	**SEA-3GS-M8-S**
			Insulation displacement connector	0.1 … 0.14 mm²	**564945**	**NECU-S-M8G3-HX-Q3**
				0.14 … 0.34 mm²	**562024**	**NECU-S-M8G3-HX**
		M12, 4-pin	PG7, for cable diameter 4 … 6 mm		**18666**	**SEA-GS-7**
			PG7, for cable diameter 2.5 … 2.9 mm		**192008**	**SEA-4GS-7-2,5**
			PG9, for cable diameter 6 … 8 mm		**18778**	**SEA-GS-9**
			PG11, for 2x cable diameter 3 … 5 mm		**18779**	**SEA-GS-11-DUO**
		M12, 5-pin	PG7, for cable diameter 4 … 6 mm		**175487**	**SEA-M12-5GS-PG7**
			PG11, for 2x cable diameter 2.5 … 5 mm		**192010**	**SEA-5GS-11-DUO**
	HARAX® plug, 4-pin				**525928**	**SEA-GS-HAR-4POL**
	Sub-D plug, 25-pin				**527522**	**SD-SUB-D-ST25**
Connecting cable						
	Connecting cable	1x socket M8, 3-pin 1x plug M8, 3-pin		0.5 m	**541346**	**NEBU-M8G3-K-0.5-M8G3**
				1.0 m	**541347**	**NEBU-M8G3-K-1-M8G3**
				2.5 m	**541348**	**NEBU-M8G3-K-2.5-M8G3**
				5.0 m	**541349**	**NEBU-M8G3-K-5-M8G3**
	Modular system for all types of connecting cable				–	**NEBU-...** ➔ Internet: nebu
	Modular system for all types of sensor/actuator distributors				–	**NEDY-...** ➔ Internet: nedy

Ordering data

Designation			Part no.	Type
Cover				
	Cover for CPX-AB-8-KL-4POL (IP65/67)	• 8 cable through-feeds M9 • 1 cable through-feed for multi-pin plug	**538219**	**AK-8KL**
	Set of fittings for hood AK-8KL		**538220**	**VG-K-M9**
	Cover cap for closing off unused ports (10 pieces)	For M8 connections	**177672**	**ISK-M8**
		For M12 connections	**165592**	**ISK-M12**
Screening plate				
	Screening plate for connection block • CPX-AB-4-M12X2-5POL • CPX-AB-4-M12X2-5POL-R		**526184**	**CPX-AB-S-4-M12**
User documentation				
	User documentation	German	**526439**	**P.BE-CPX-EA-DE**
		English	**526440**	**P.BE-CPX-EA-EN**
		Spanish	**526441**	**P.BE-CPX-EA-ES**
		French	**526442**	**P.BE-CPX-EA-FR**
		Italian	**526443**	**P.BE-CPX-EA-IT**

Terminal CPX-P

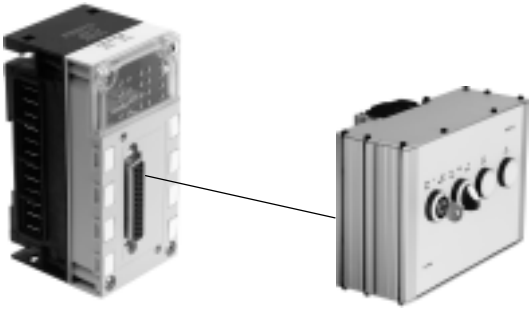
Technical data – Input/output module, digital

FESTO

Area of application

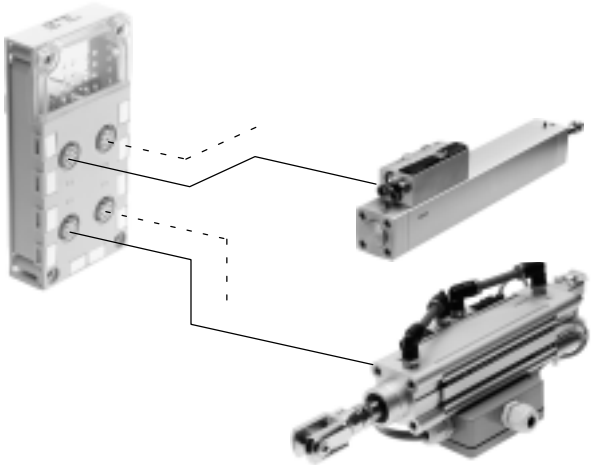
- Digital multi I/O module for 24 V DC supply voltage
- Supports connection blocks with Sub-D, terminal connection and M12 connection (8-pin)
- Module features can be parameterised
- The inputs receive the voltage supply for the electronics and the sensors from the interlinking block
- The outputs receive the voltage supply for the electronics and the outputs from the interlinking block
- Module protection and diagnostics through integrated electronic fuse protection for the sensor power supply and integrated electronic fuse protection in each output channel

Function



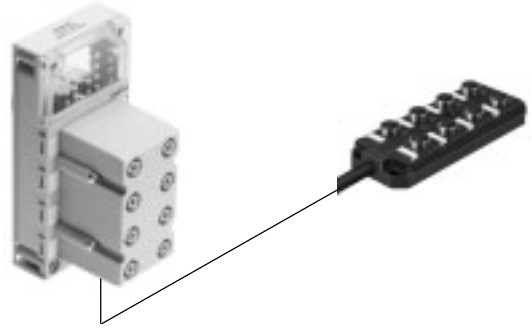
The multi I/O module controls devices with a high number of inputs and outputs per connection point. Because the module supports Sub-D connection blocks, consoles with pushbuttons and lamps can be connected to the CPX-P terminal with minimal installation effort.

Up to 8 inputs and 8 outputs can be connected to one connection point with high protection to IP65.



Support for the M12 connection block (8-pin) means that up to 4 cylinder-valve combinations with integrated sensors can be connected. Each cylinder/valve combination is supported by 2 inputs and 2 outputs per socket. It is therefore possible to control max. 2 solenoid coils and record signals from 2 sensors with a pre-assembled connecting cable.

Two inputs on two ports are bridged to provide support for the diagnostic module of the cylinder/valve combination. This means that 3 inputs and 2 outputs are available at 2 ports.



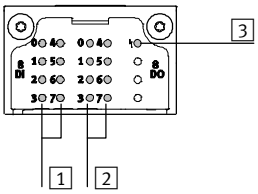
As an alternative to the Sub-D and M12 connection block (8-pin) for installation with high protection to IP65, the terminal connection block produces an identical result for installation with IP20 protection – or with IP65/IP67 protection with additional cover.

Subordinate I/O modules with multi-pin plug connection (Sub-D plug or connecting cable for multi-pin plug connection for self-assembly) support the cost-effective and economical integration of critical installation areas such as energy chains or upstream functions.

General technical data			
Type			**CPX-8DE-8DA**
Number	Inputs		8
	Outputs		8
Max. power supply per module	Sensor supply	[A]	0.7
	Outputs	[A]	4
Max. power supply per channel		[A]	0.5 (12 W lamp load, channels A0 ... A03 can be connected in parallel to A4 ... A7)
Fuse protection (short circuit)			Internal electronic fuse per channel
Intrinsic current consumption at nominal operating voltage		[mA]	Typically 22
Operating voltage	Nominal value	[V DC]	24
	Permissible range	[V DC]	18 ... 30
Electrical isolation, inputs	Channel – channel		No
	Channel – internal bus		No
Electrical isolation, outputs	Channel – channel		No
	Channel – internal bus		Yes, using intermediate supply
Characteristic curve	Inputs		IEC 1131-T2
	Outputs		IEC 1131-T2
Switching level, inputs	Signal 0	[V DC]	≤ 5
	Signal 1	[V DC]	≥ 11
Input debounce time		[ms]	3 (0.1 ms, 10 ms, 20 ms parameterisable)
Switching logic			Positive logic (PNP)
LED indicators	Group diagnostics		1
	Channel status		16
Diagnostics			• Short circuit/overload per channel • Undervoltage at outputs
Parameterisation			• Input debounce time • Failsafe per channel • Forcing per channel • Idle mode per channel • Signal extension time • Module monitoring • Behaviour after short circuit
Degree of protection to EN 60529			Depending on connection block
Temperature range	Operation	[°C]	–5 ... +50
	Storage/transport	[°C]	–20 ... +70
Materials			PA reinforced, PC
Grid dimension		[mm]	50
Dimensions (incl. interlinking block and connection block) W x L x H		[mm]	50 x 107 x 50
Product weight		[g]	38

Connection and display components

CPX-8DE-8DA



1 Status LEDs (green)
For allocation to inputs
➔ pin allocation for module

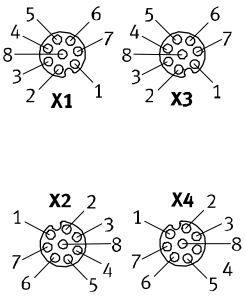
2 Status LEDs (yellow)
For allocation to outputs
➔ Pin allocation for module

3 Error LED (red)
(module error)

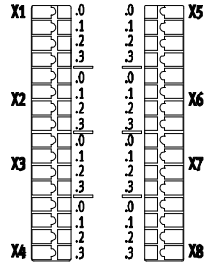
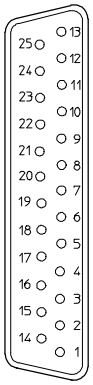
Combinations of connection blocks and digital I/O module

Connection blocks	Part no.	Digital I/O module
		CPX-8DE-8DA
CPX-AB-4-M12-8POL	**526178**	■
CPX-AB-8-KL-4POL	**195708**	■
CPX-AB-1-SUB-BU-25POL	**525676**	■

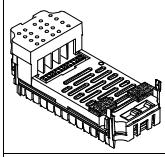
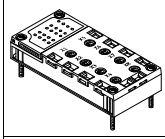
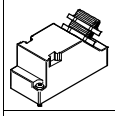
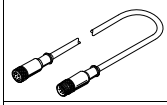
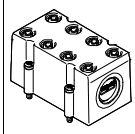
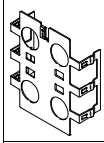
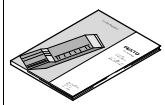
Pin allocation

Connection block inputs/outputs	CPX-8DE-8DA	
CPX-AB-4-M12-8POL		
	X1.1: 24 V_{SEN}	X3.1: 24 V_{SEN}
	X1.2: Input x	X3.2: Input x+4
	X1.3: Input x+1	X3.3: Input x+5
	X1.4: 0 V_{SEN}	X3.4: 0 V_{SEN}
	X1.5: Output x	X3.5: Output x+4
	X1.6: Output x+1	X3.6: Output x+5
	X1.7: Input x+4	X3.7: n.c.
	X1.8: 0 V_{OUT}	X3.8: 0 V_{OUT}
	X2.1: 24 V_{SEN}	X4.1: 24 V_{SEN}
	X2.2: Input x+2	X4.2: Input x+6
	X2.3: Input x+3	X4.3: Input x+7
	X2.4: 0 V_{SEN}	X4.4: 0 V_{SEN}
	X2.5: Output x+2	X4.5: Output x+6
	X2.6: Output x+3	X4.6: Output x+7
	X2.7: Input x+6	X4.7: n.c.
	X2.8: 0 V_{OUT}	X4.8: 0 V_{OUT}

Pin allocation

Connection block inputs/outputs	CPX-8DE-8DA	
CPX-AB-8-KL-4POL		
	X1.0: 24 V_{SEN} X1.1: 0 V_{SEN} X1.2: Input x X1.3: FE X2.0: Input x+4 X2.1: Input x+5 X2.2: Input x+1 X2.3: FE X3.0: 24 V_{SEN} X3.1: 0 V_{SEN} X3.2: Input x+2 X3.3: FE X4.0: Input x+6 X4.1: Input x+7 X4.2: Input x+3 X4.3: FE	X5.0: Output x+4 X5.1: 0 V_{OUT} X5.2: Output x X5.3: FE X6.0: Output x+5 X6.1: 0 V_{OUT} X6.2: Output x+1 X6.3: FE X7.0: Output x+6 X7.1: 0 V_{OUT} X7.2: Output x+2 X7.3: FE X8.0: Output x+7 X8.1: 0 V_{OUT} X8.2: Output x+3 X8.3: FE
CPX-AB-1-SUB-BU-25POL		
	1: Input x 2: Input x+1 3: Input x+2 4: Input x+3 5: Input x+4 6: Input x+5 7: Input x+6 8: Input x+7 9: 24 V_{SEN} 10: 24 V_{SEN} 11: 0 V_{SEN} 12: 0 V_{SEN} 13: FE	14: Output x 15: Output x+1 16: Output x+2 17: Output x+3 18: Output x+4 19: Output x+5 20: Output x+6 21: Output x+7 22: 0 V_{OUT} 23: 0 V_{OUT} 24: 0 V_{OUT} 25: FE Housing: FE

Ordering data

Designation			Part no.	Type
Input/output module, digital				
	8 digital inputs, 8 digital outputs		**526257**	**CPX-8DE-8DA**
Connection block				
	Made of polymer	4x socket M12, 8-pin	**526178**	**CPX-AB-4-M12-8POL**
		Spring-loaded terminal, 32-pin	**195708**	**CPX-AB-8-KL-4POL**
		1x socket, Sub-D, 25-pin	**525676**	**CPX-AB-1-SUB-BU-25POL**
Plug				
	Sub-D plug, 25-pin		**527522**	**SD-SUB-D-ST25**
Connecting cable				
	Connecting cable M12		**525617**	**KM12-8GD8GS-2-PU**
Cover				
	Cover for CPX-AB-8-KL-4POL (IP65, IP67)	• 8 cable through-feeds M9 • 1 cable through-feed for multi-pin plug	**538219**	**AK-8KL**
	Set of fittings		**538220**	**VG-K-M9**
Screening plate				
	Screening plate for M12 connections		**526184**	**CPX-AB-S-4-M12**
User documentation				
	User documentation	German	**526439**	**P.BE-CPX-EA-DE**
		English	**526440**	**P.BE-CPX-EA-EN**
		Spanish	**526441**	**P.BE-CPX-EA-ES**
		French	**526442**	**P.BE-CPX-EA-FR**
		Italian	**526443**	**P.BE-CPX-EA-IT**

Terminal CPX-P

Technical data – Counter module, digital

Function

The counter module has two channels. Depending on the parameterisation, these can independently be used as counter inputs or as incremental value encoder inputs or SSI. The counter module additionally has one output per channel. The outputs can either be controlled by a counter channel or an incremental value encoder channel, i.e. through an event such as "Comparative value reached". Alternatively, outputs can also be controlled via process data.

Area of application

- Continuous counting
- One-off counting to count limit
- One-off counting to count limit, return to load value
- Periodic counting
- Measurement of frequencies
- Measurement of rotational speeds
- Measurement of duty cycle
- Measurement of position
- Measurement of speed
- Measurement with pulse generators
- Measurement with pulse generators and direction encoders
- Measurement with incremental encoders
- Measurement with SSI absolute encoders

Description

Applications

- Recording travel and speed of a conveyor
- Position and speed synchronisation of conveyors and pick & place applications
- Counting goods e.g. in packaging installations
- Systems for filling by weight and volume
- Monitoring motor speeds
- Measuring equipment for determining the position of axis systems (linear, rotatory)
- Control of fast-switching valves
- Control of the opening time of a valve
- Activation of semiconductor relays
- Temperature monitoring and rotational speed control for drives
- Change of direction in fast drives
- Control of motors with pulse-width modulation (PWM)

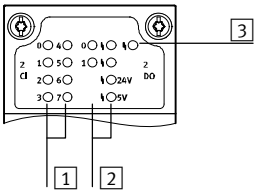
Supported devices

- 5 V incremental encoder, single-ended or differential, with two 90° phase offset tracks
- 24 V incremental encoder, single-ended, with two 90° phase offset tracks
- 24 V pulse generator with or without direction level
- 24 V direct current motors
- Absolute encoder with SSI interface (13 bits to 25 bits)

General technical data			
Type			**CPX-2ZE2DA**
Number	Inputs		2
	Outputs		2
Max. power supply per module	Inputs	[A]	2
	Outputs	[A]	10
Max. power supply per channel		[A]	5 (adjustable, 20 W lamp load)
Max. cable length		[m]	30
Fuse protection (short circuit)			Internal electronic fuse per channel
Intrinsic current consumption at nominal operating voltage		[mA]	Typically 35
Operating voltage	Nominal value	[V DC]	24
	Permissible range	[V DC]	18 ... 30
Electrical isolation, inputs	Channel – channel		No
	Channel – internal bus		No
Electrical isolation, outputs	Channel – channel		No
	Channel – internal bus		Yes, if an intermediate supply is used
Characteristic curve	Inputs		To IEC 1131-2, Type 02
	Outputs		IEC 1131-T2
Switching level	Signal 0	[V DC]	≤ 5
	Signal 1	[V DC]	≥ 11
Input debounce time		[µs]	0.1 (0.2 µs, 0.4 µs, 0.8 µs, 1 µs, 2 µs, 4 µs, 8 µs, 10 µs, 50 µs, 100 µs, 500 µs, 1 ms, 3 ms, 10 ms, 20 ms parameterisable)
Switching logic	Inputs		Positive logic (PNP)
	Outputs		• Negative logic (NPN) • Positive logic (PNP) • Push-pull driver
LED indicators	Group diagnostics		1
	Channel diagnostics		2
	Channel status		10
	Module diagnostics		2
Diagnostics			Operating mode-dependent diagnostics
Parameterisation			• Switch-on/off delay • Frequency output • Speed measurement • Pulse output • Pulse train • Rotational speed measurement • Frequency measurement • Duty cycle measurement • Engine operating mode • Determination of position • Pulse width modulation • One-off counting • Continuous counting • Periodic counting
Degree of protection to EN 60529			IP65, IP67
Temperature range	Operation	[°C]	–5 ... +50
	Storage/transport	[°C]	–20 ... +70
Certification			UL - Recognized (OL)
Information on materials – housing			Polymer
Note on materials			RoHS-compliant
Grid dimension		[mm]	50
Dimensions (incl. interlinking block and connection block) W x L x H		[mm]	50 x 107 x 50
Product weight		[g]	130

Connection and display components

CPX-2ZE2DA

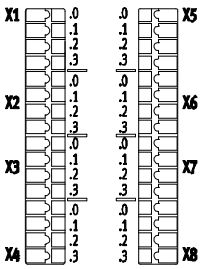


1 Status LEDs (green)
For allocation to inputs
➔ Pin allocation for module

2 Status LEDs (yellow, red)
For allocation to outputs
➔ Pin allocation for module

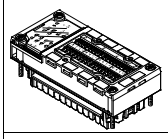
3 Error LED (red)
(module error)

Pin allocation

Inputs/outputs	CPX-2ZE2DA	
	Channel 0	Channel 1
	X1.0: Input	X5.0: Input
	X1.1: Input	X5.1: Input
	X1.2: Input	X5.2: Input
	X1.3: Input	X5.3: Input
	X2.0: Input	X6.0: Input
	X2.1: Input	X6.1: Input
	X2.2: 5 V DC	X6.2: 5 V DC
	X2.3: 0 V	X6.3: 0 V
	X3.0: 24 V DC	X7.0: 24 V DC
	X3.1: 0 V	X7.1: 0 V
	X3.2: 24 V DC for digital input DI	X7.2: 24 V DC for digital input DI
	X3.3: Digital input DI	X7.3: Digital input DI
	X4.0: 0 V for digital input DI	X8.0: 0 V for digital input DI
	X4.1: Digital output DO	X8.1: Digital output DO
	X4.2: Reference potential for DO	X8.2: Reference potential for DO
	X4.3: FE	X8.3: FE

Note

The allocation and designation of inputs differs fundamentally depending on which type of encoder is connected. Appropriate allocation diagrams can be found in the user documentation for the counter module.

Ordering data				
Designation			Part no.	Type
Counter module, digital				
	2 digital inputs, 2 digital outputs		**576046**	**CPX-2ZE2DA**
User documentation				
	User documentation for counter module CPX-2ZE2DA	German	**8035733**	**P.BE-CPX-2ZE2DA-DE**
		English	**8035734**	**P.BE-CPX-2ZE2DA-EN**
		Spanish	**8035735**	**P.BE-CPX-2ZE2DA-ES**
		French	**8035736**	**P.BE-CPX-2ZE2DA-FR**
		Italian	**8035737**	**P.BE-CPX-2ZE2DA-IT**
		Chinese	**8035738**	**P.BE-CPX-2ZE2DA-ZH**

Terminal CPX-P

Technical data – HART input/output module

Function

The HART input/output module allows the connection of up to 4 sensors or actuators. The corresponding communication channel is made available for sensors or actuators that communicate using the HART protocol.
With the HART protocol, a conventional analogue 4 ... 20 mA current signal is modulated by a second frequency-modulated signal.
Each of the 4 connections of the module can be configured as inputs or outputs.

Area of application

- Multi I/O module for 24 V DC supply voltage
- Supports connection blocks with M12 and terminal connection
- Module features can be parameterised
- The module receives the voltage supply for the electronics, outputs and the sensors from the interlinking block
- Module protection and diagnostics through integrated electronic protection

General technical data					
Type			CPX-4AE-4AA-H		
Protocol			HART		
Number of selectable analogue inputs/outputs			4		
Sensor type			0 ... 20 mA	4 ... 20 mA	4 ... 20 mA with HART
Operating voltage	Nominal value	[V DC]	24		
	Permissible range	[V DC]	18 ... 30		
Power failure buffering		[ms]	10		
Intrinsic current consumption at nominal operating voltage		[mA]	Typically 170		
Maximum short circuit current		[mA]	22		
Maximum open circuit voltage		[V]	28.8		
Minimum available sensor voltage			20.7 V DC at 20 mA		
Fuse protection (short circuit)			Internal electronic fuse per channel		
Reverse polarity protection			For all electrical connections		
Electrical isolation	Channel – channel		No		
	Channel – internal bus		Yes		
Signal range			0 ... 20 mA	4 ... 20 mA	4 ... 20 mA with HART
Data format			15 bits + prefix		
			Scalable to 15 bits		
Maximum load		[Ω]	750		
Maximum input resistance		[Ω]	300		
Max. cable length		[m]	500		
Basic error limit at 25 °C		[%]	±0.1		
Operating error limit related to the ambient temperature range		[%]	±0.3		
Repetition accuracy			0.05% at 20 °C		
LED indicators	Group diagnostics		1		
	Channel diagnostics		4		
	Channel status		4		
Control elements			DIL switch		
Diagnostics			• Wire break per channel • Limit value violation per channel • Short circuit/overload per channel • Parameterisation error • Overflow/underflow • Limit violation to NE43 per channel		

General technical data	
Parameterisation	• Data format • Failsafe per channel • Forcing per channel • Limit value monitoring per channel • Idle mode per channel • Measured value smoothing • Signal range per channel • Monitoring of overflow/underflow • Monitoring to NE43, inputs • Monitoring wire break per channel • Wire break per channel • Limit value violation per channel • Short circuit/overload per channel • Parameterisation error • Overflow/underflow • Limit violation to NE43 per channel • Number of HART repetitions • Hysteresis for limit values • HART variables (4 pieces) • Behaviour after short circuit/overload
Degree of protection to EN 60529	Depending on connection block

Technical data – Mechanical components		
Type of mounting		On interlinking block
Product weight	[g]	77.4
Grid dimension	[mm]	50
Dimensions (incl. interlinking block and connection block) W x L x H	[mm]	50 x 107 x 70

Materials	
Housing	PA reinforced, PC
Note on materials	RoHS-compliant

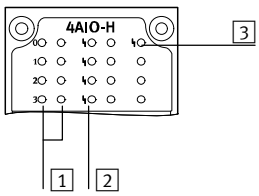
Operating and environmental conditions		
Ambient temperature	[°C]	–5 … +50
Storage temperature	[°C]	–20 … +70
Relative humidity	[%]	95, non-condensing
Corrosion resistance class CRC[1)]		1 (when installed)
CE marking (see declaration of conformity)[3)]		To EU EMC Directive[2)]

1) Corrosion resistance class CRC 1 to Festo standard FN 940070
Low corrosion stress. For dry indoor applications or transport and storage protection. Also applies to parts behind covers, in the non-visible interior area, and parts which are covered in the application (e.g. drive trunnions).
2) For information about the applicability of the component see the manufacturer's EC declaration of conformity at: www.festo.com/sp ➔ Certificates.
If the component is subject to restrictions on usage in residential, office or commercial environments or small businesses, further measures to reduce the emitted interference may be necessary.
3) Additional information www.festo.com/sp ➔ Certificates.

Safety characteristics	
Shock resistance	Shock test with severity level 2 to FN 942017-5 and EN 60068-2-27
Vibration resistance	Transport application test with severity level 2 according to FN 942017-4 and EN 60068-2-6

Connection and display components

CPX-4EA-4AA-H



1 Status LEDs:
- Inputs (green)
- Outputs (yellow)

➔ Pin allocation for module

2 Error LEDs (red)
Allocation to inputs/outputs

➔ Pin allocation for module

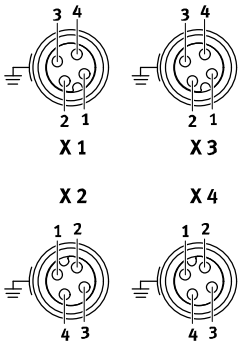
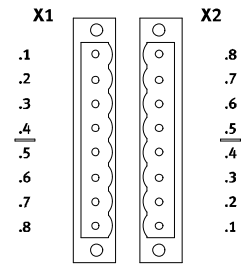
3 Error LED (red)
(module error)

Combinations of bus nodes/control blocks with HART input/output module

Bus node/control block	Part no.	Protocol	Can be combined as of release	HART variables in process image only	Full HART functionality
CPX-FB11	**526172**	DeviceNet	25	■	–
CPX-FB13	**195740**	PROFIBUS	34	–	■
CPX-FB14	**526174**	CANopen	30	■	–
CPX-FB33	**548755**	PROFINET RT, M12	33	–	■
CPX-M-FB34	**548751**	PROFINET RT, RJ45	33	–	■
CPX-M-FB35	**548749**	PROFINET RT, SCRJ	33	–	■
CPX-FB36	**1912451**	EtherNet/IP	15	–	■
CPX-FB37	**2735960**	EtherCAT	7	■	–

Combinations of connection blocks with HART input/output module

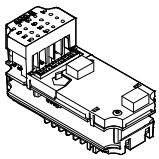
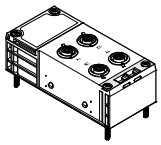
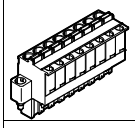
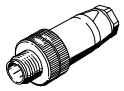
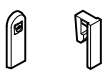
Connection blocks	Part no.	HART input/output module
		CPX-4EA-4AA-H
CPX-P-AB-4XM12-4POL	**565706**	■
CPX-P-AB-2XKL-8POL	**565704**	■

Pin allocation				
Connection block inputs/outputs	CPX-4AE-4AA-H			
	Inputs		Outputs	
CPX-P-AB-4XM12-4POL				
	X1.1: 24 $V_{SEN\ x}$ X1.2: 0 V X1.3: Input x X1.4: 0 V X2.1: 24 $V_{SEN\ x+1}$ X2.2: 0 V X2.3: Input x+1 X2.4: 0 V	X3.1: 24 $V_{SEN\ x+2}$ X3.2: 0 V X3.3: Input x+2 X3.4: 0 V X4.1: 24 $V_{SEN\ x+3}$ X4.2: 0 V X4.3: Input x+3 X4.4: 0 V	X1.1: Output I0+ X1.2: 0 V X1.3: – X1.4: 0 V X2.1: Output I1+ X2.2: 0 V X2.3: – X2.4: 0 V	X3.1: Output I2+ X3.2: 0 V X3.3: – X3.4: 0 V X4.1: Output I3+ X4.2: 0 V X4.3: – X4.4: 0 V
CPX-P-AB-2XKL-8POL				
	X1.1: 24 $V_{SEN\ x}$ X1.2: 0 V X1.3: Input x X1.4: 0 V X1.5: 24 $V_{SEN\ x+1}$ X1.6: 0 V X1.7: Input x+1 X1.8: 0 V	X2.1: 24 $V_{SEN\ x+2}$ X2.2: 0 V X2.3: Input x+2 X2.4: 0 V X2.5: 24 $V_{SEN\ x+3}$ X2.6: 0 V X2.7: Input x+3 X2.8: 0 V	X1.1: Output I0+ X1.2: 0 V X1.3: – X1.4: 0 V X1.5: Output I1+ X1.6: 0 V X1.7: – X1.8: 0 V	X2.1: Output I2+ X2.2: 0 V X2.3: – X2.4: 0 V X2.5: Output I3+ X2.6: 0 V X2.7: – X2.8: 0 V

- Note

In the case of mixed operation of inputs and outputs in one module, the connections are first assigned input signals and then output signals, in ascending order.

Ordering data

Designation				Part no.	Type
HART input/output module					
	4 analogue inputs/outputs			**8059847**	**CPX-4AE-4AA-H**
Connection block					
	Made of polymer	4x socket, M12, 4-pin		**565706**	**CPX-P-AB-4XM12-4POL**
		2x plug, 8-pin		**565704**	**CPX-P-AB-2XKL-8POL**
Plugs					
	Socket, 8-pin	Spring-loaded terminal	Connection cross-section 0.2 … 2.5 mm^2	**565712**	**NECU-L3G8-C1**
		Screw terminal	Connection cross-section 0.2 … 2.5 mm^2	**565710**	**NECU-L3G8-C2**
	Plug M12x1, 4-pin, straight, A-coded	Insulation displacement connector	Connection cross-section 0.25 … 0.5 mm^2	**525928**	**SEA-GS-HAR-4POL**
		Screw terminal	Connection cross-section 0.14 … 0.5 mm^2	**192008**	**SEA-4GS-7-2,5**
			Connection cross-section 0.75 mm^2 Permissible cable diameter 4 … 6 mm	**18666**	**SEA-GS-7**
			Connection cross-section 0.75 mm^2 Permissible cable diameter 6 … 8 mm	**18778**	**SEA-GS-9**
Cover					
	Cover cap for sealing unused ports M12x1 (10 pieces)			**165592**	**ISK-M12**
Coding element					
	Ensures that a coded socket NECU-L3G8 can only be inserted in the matching coded connection block CPX-P-AB-2XKL (96 pieces of each)		For NECU-L3G8	**565713**	**CPX-P-KDS-AB-2XKL**

Terminal CPX-P

Technical data – Analogue module for inputs

Function

Analogue modules control devices with a standardised analogue interface such as sensors for pressure, temperature, flow rate, filling level, etc.

Depending on the connection block selected, the analogue module supports various connection concepts with different numbers of sockets or terminals.

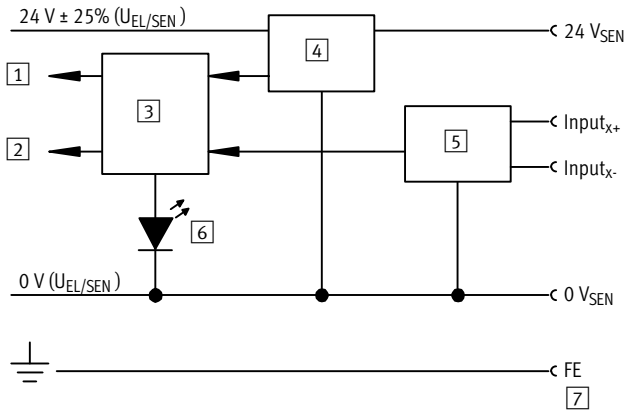
Area of application

- Analogue module for 0 ... 10 V, 0 ... 20 mA or 4 ... 20 mA
- Supports connection blocks with Sub-D, terminal connection and M12 connection
- Analogue module features can be parameterised
- Different data formats available
- Operation with and without galvanic isolation possible
- The analogue module receives the voltage supply for the electronics and the sensors from the interlinking block
- Analogue module protection and diagnostics through integrated electronic fuse protection

General technical data						
Type		CPX-2AE-U-I		CPX-4AE-U-I		CPX-4AE-I
		Voltage input	Current input	Voltage input	Current input	Current input
Number of analogue inputs		2		4		4
Max. power supply per module	[A]	0.7				
Fuse protection		Internal electronic fuse				
Current consumption from 24 V sensor supply (quiescent current)	[mA]	Typically 50				
Current consumption from 24 V sensor supply (at full load)	[A]	Max. 0.7				
Nominal operating voltage for load voltage	[V DC]	24 ±2%				
Nominal operating voltage	[V DC]	24				
Operating voltage range	[V DC]	18 ... 30				
Signal range (parameterisable for each channel via DIL switch or software)		0 ... 10 V	0 ... 20 mA 4 ... 20 mA	1 ... 5 V 0 ... 10 V −5 ... +5 V −10 ... +10 V	0 ... 20 mA 4 ... 20 mA −20 ... +20 mA	0 ... 20 mA 4 ... 20 mA
Operational error limit	[%]	±0.5	–	±0.3	±0.3	±0.6
Basic error limit (at 25 °C)	[%]	±0.3	–	±0.2	±0.2	±0.5
Repetition accuracy (at 25 °C)	[%]	0.15	0.15	0.1	0.1	0.15
Input resistance		100 kΩ	≤ 100 Ω	100 kΩ	≤ 100 Ω	≤ 100 Ω
Max. permissible input voltage	[V DC]	30	–	−30 ... +30	–	–
Max. permissible input current	[mA]	–	40	–	Internally limited to 60	40
Conversion time per channel	[µs]	Typically 150				
Cycle time (module)	[ms]	≤ 4		≤ 0.5		≤ 10
Data format		12 bits + prefix		15 bits + prefix		12 bits + prefix
		Scalable to 15 bits		Scalable to 15 bits		Scalable to 15 bits
Cable length	[m]	Max. 30 (shielded)				

General technical data					
Type			CPX-2AE-U-I	CPX-4AE-U-I	CPX-4AE-I
Electrical isolation	Channel – channel		No		
	Channel – internal bus		Yes, with external sensor supply		
LED indicators	Group diagnostics		1		
	Channel diagnostics		Via flashing frequency of group diagnostics	4	Via flashing frequency of group diagnostics
Diagnostics			Wire break per channel		
			Limit value violation per channel		
			Parameterisation error		
			Short circuit, input signal	Overload at input	Short circuit, input signal
			–	Overflow/underflow	–
			–	Short circuit in sensor supply	–
Parameterisation			Data format		
			Forces per channel		
			Limit value monitoring per channel		
			Measured value smoothing		
			Signal range per channel		
			Monitoring wire break per channel		
			Behaviour after short circuit		
			–	Behaviour after overload at input	–
			–	Sensor supply active	–
Degree of protection to EN 60529			Depending on connection block		
Temperature range	Operation	[°C]	–5 … +50		
	Storage/transport	[°C]	–20 … +70		
Materials			PA reinforced, PC		
Note on materials			–	RoHS-compliant	–
Grid dimension		[mm]	50		
Dimensions (incl. interlinking block and connection block) W x L x H		[mm]	50 x 107 x 50		
Product weight		[g]	38	46	38

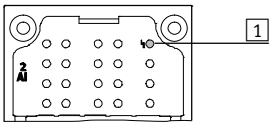
Internal structure, basic diagram



1 Diagnostics
2 $Input_x$ (PLC/IPC via fieldbus)
3 Logic
4 Monitoring/disconnection of the sensor supply
5 D/A conversion
6 Error LED (red, module error)
7 Connections on the connection block

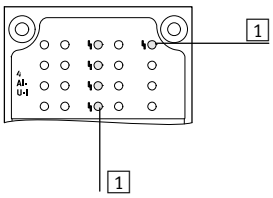
Connection and display components

CPX-2AE-U-I and CPX-4AE-I



1 Error LED (red, module error)

CPX-4AE-U-I

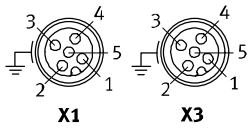
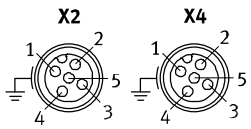
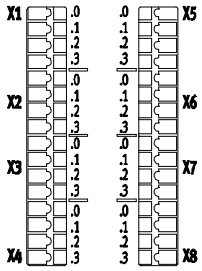


1 Error LED (red, module error)
2 Channel-related error LEDs (red)

Combinations of connection blocks and analogue module

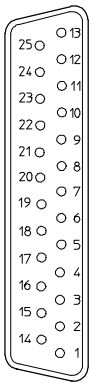
Connection blocks	Part no.	Analogue module		
		CPX-2AE-U-I	CPX-4AE-U-I	CPX-4AE-I
CPX-AB-4-M12X2-5POL	**195704**	■	■	■
CPX-AB-4-M12X2-5POL-R	**541254**	■	■	■
CPX-AB-8-KL-4POL	**195708**	■	■	■
CPX-AB-1-SUB-BU-25POL	**525676**	■	■	■
CPX-M-AB-4-M12X2-5POL	**549367**	■	■	■

Pin allocation

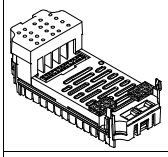
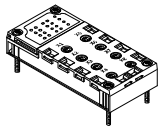
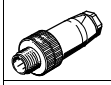
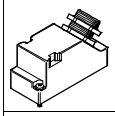
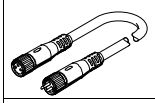
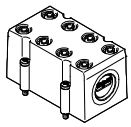
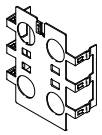
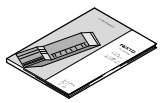
Connection block inputs	CPX-2AE-U-I		CPX-4AE-U-I		CPX-4AE-I	
CPX-AB-4-M12X2-5POL, CPX-AB-4-M12X2-5POL-R[1]						
	X1.1: 24 V_{SEN} X1.2: Input U0+ X1.3: 0 V_{SEN} X1.4: Input U0– X1.5: FE[2]	X3.1: 24 V_{SEN} X3.2: Input U1+ X3.3: 0 V_{SEN} X3.4: Input U1– X3.5: FE[2]	X1.1: 24 V_{SEN} X1.2: Input 0+ X1.3: 0 V_{SEN} X1.4: Input 0– X1.5: FE[2]	X3.1: 24 V_{SEN} X3.2: Input 2+ X3.3: 0 V_{SEN} X3.4: Input 2– X3.5: FE[2]	X1.1: 24 V_{SEN} X1.2: Input I0+ X1.3: 0 V_{SEN} X1.4: Input I0– X1.5: FE[2]	X3.1: 24 V_{SEN} X3.2: Input I2+ X3.3: 0 V_{SEN} X3.4: Input I2– X3.5: FE[2]
	X2.1: 24 V_{SEN} X2.2: Input I0+ X2.3: 0 V_{SEN} X2.4: Input I0– X2.5: FE[2]	X4.1: 24 V_{SEN} X4.2: Input I1+ X4.3: 0 V_{SEN} X4.4: Input I1– X4.5: FE[2]	X2.1: 24 V_{SEN} X2.2: Input 1+ X2.3: 0 V_{SEN} X2.4: Input 1– X2.5: FE[2]	X4.1: 24 V_{SEN} X4.2: Input 3+ X4.3: 0 V_{SEN} X4.4: Input 3– X4.5: FE[2]	X2.1: 24 V_{SEN} X2.2: Input I1+ X2.3: 0 V_{SEN} X2.4: Input I1– X2.5: FE[2]	X4.1: 24 V_{SEN} X4.2: Input I3+ X4.3: 0 V_{SEN} X4.4: Input I3– X4.5: FE[2]
CPX-AB-8-KL-4POL						
	X1.0: 24 V_{SEN} X1.1: 0 V_{SEN} X1.2: Input U0– X1.3: FE X2.0: n.c. X2.1: n.c. X2.2: Input U0+ X2.3: FE X3.0: 24 V_{SEN} X3.1: 0 V_{SEN} X3.2: Input I0– X3.3: FE X4.0: n.c. X4.1: n.c. X4.2: Input I0+ X4.3: FE	X5.0: 24 V_{SEN} X5.1: 0 V_{SEN} X5.2: Input U1– X5.3: FE X6.0: n.c. X6.1: n.c. X6.2: Input U1+ X6.3: FE X7.0: 24 V_{SEN} X7.1: 0 V_{SEN} X7.2: Input I1– X7.3: FE X8.0: n.c. X8.1: n.c. X8.2: Input I1+ X8.3: FE	X1.0: 24 V_{SEN} X1.1: 0 V_{SEN} X1.2: Input 0– X1.3: FE X2.0: n.c. X2.1: n.c. X2.2: Input 0+ X2.3: FE X3.0: 24 V_{SEN} X3.1: 0 V_{SEN} X3.2: Input 1– X3.3: FE X4.0: n.c. X4.1: n.c. X4.2: Input 1+ X4.3: FE	X5.0: 24 V_{SEN} X5.1: 0 V_{SEN} X5.2: Input 2– X5.3: FE X6.0: n.c. X6.1: n.c. X6.2: Input 2+ X6.3: FE X7.0: 24 V_{SEN} X7.1: 0 V_{SEN} X7.2: Input 3– X7.3: FE X8.0: n.c. X8.1: n.c. X8.2: Input 3+ X8.3: FE	X1.0: 24 V_{SEN} X1.1: 0 V_{SEN} X1.2: Input I0– X1.3: FE X2.0: n.c. X2.1: n.c. X2.2: Input I0+ X2.3: FE X3.0: 24 V_{SEN} X3.1: 0 V_{SEN} X3.2: Input I1– X3.3: FE X4.0: n.c. X4.1: n.c. X4.2: Input I1+ X4.3: FE	X5.0: 24 V_{SEN} X5.1: 0 V_{SEN} X5.2: Input I2– X5.3: FE X6.0: n.c. X6.1: n.c. X6.2: Input I2+ X6.3: FE X7.0: 24 V_{SEN} X7.1: 0 V_{SEN} X7.2: Input I3– X7.3: FE X8.0: n.c. X8.1: n.c. X8.2: Input I3+ X8.3: FE

1) Speedcon quick lock, additional shielding on metal thread
2) FE/additional shielding on metal thread

Pin allocation

Connection block inputs	CPX-2AE-U-I		CPX-4AE-U-I		CPX-4AE-I	
CPX-AB-1-SUB-BU-25POL						
	1: Input U0–	14: Input U1–	1: Input 0–	14: Input 2–	1: Input I0–	14: Input I2–
	2: Input U0+	15: Input U1+	2: Input 0+	15: Input 2+	2: Input I0+	15: Input I2+
	3: Input I0–	16: Input I1–	3: Input 1–	16: Input 3–	3: Input I1–	16: Input I3–
	4: Input I1+	17: Input I1+	4: Input 1+	17: Input 3+	4: Input I1+	17: Input I3+
	5: n.c.	18: 24 V_{SEN}	5: n.c.	18: 24 V_{SEN}	5: n.c.	18: 24 V_{SEN}
	6: n.c.	19: n.c.	6: n.c.	19: n.c.	6: n.c.	19: n.c.
	7: n.c.	20: 24 V_{SEN}	7: n.c.	20: 24 V_{SEN}	7: n.c.	20: 24 V_{SEN}
	8: n.c.	21: n.c.	8: n.c.	21: n.c.	8: n.c.	21: n.c.
	9: 24 V_{SEN}	22: 0 V_{SEN}	9: 24 V_{SEN}	22: 0 V_{SEN}	9: 24 V_{SEN}	22: 0 V_{SEN}
	10: 24 V_{SEN}	23: 0 V_{SEN}	10: 24 V_{SEN}	23: 0 V_{SEN}	10: 24 V_{SEN}	23: 0 V_{SEN}
	11: 0 V_{SEN}	24: 0 V_{SEN}	11: 0 V_{SEN}	24: 0 V_{SEN}	11: 0 V_{SEN}	24: 0 V_{SEN}
	12: 0 V_{SEN}	25: FE	12: 0 V_{SEN}	25: FE	12: 0 V_{SEN}	25: FE
	13: Shield[1)]	Housing: FE	13: Shield[1)]	Housing: FE	13: Shield[1)]	Housing: FE

1) Connect shield to functional earth FE

Ordering data					
Designation				Part no.	Type
Input module, analogue					
	2 analogue current or voltage inputs			**526168**	**CPX-2AE-U-I**
	4 analogue current or voltage inputs			**573710**	**CPX-4AE-U-I**
	4 analogue current inputs			**541484**	**CPX-4AE-I**
Connection block					
	Made of polymer	4x socket, M12, 5-pin		**195704**	**CPX-AB-4-M12X2-5POL**
		4x socket, M12 with quick-lock technology, 5-pin		**541254**	**CPX-AB-4-M12X2-5POL-R**
		Spring-loaded terminal, 32-pin		**195708**	**CPX-AB-8-KL-4POL**
		1x socket, Sub-D, 25-pin		**525676**	**CPX-AB-1-SUB-BU-25POL**
	Made of metal	4x socket, M12, 5-pin		**549367**	**CPX-M-AB-4-M12X2-5POL**
Plug					
	Plug	M12, 5-pin	PG7, for cable diameter 4 … 6 mm	**175487**	**SEA-M12-5GS-PG7**
	Sub-D plug, 25-pin			**527522**	**SD-SUB-D-ST25**
Connecting cable					
	Modular system for all types of connecting cable			–	**NEBU-…** ➔ Internet: nebu
Cover					
	Cover for CPX-AB-8-KL-4POL (IP65/67)		• 8 cable through-feeds M9 • 1 cable through-feed for multi-pin plug	**538219**	**AK-8KL**
	Set of fittings for cover AK-8KL			**538220**	**VG-K-M9**
	Cover cap for closing off unused M12 ports (10 pieces)			**165592**	**ISK-M12**
Screening plate					
	Screening plate for connection block • CPX-AB-4-M12X2-5POL • CPX-AB-4-M12X2-5POL-R			**526184**	**CPX-AB-S-4-M12**
User documentation					
	User documentation		German	**526415**	**P.BE-CPX-AX-DE**
			English	**526416**	**P.BE-CPX-AX-EN**
			Spanish	**526417**	**P.BE-CPX-AX-ES**
			French	**526418**	**P.BE-CPX-AX-FR**
			Italian	**526419**	**P.BE-CPX-AX-IT**

Terminal CPX-P

Technical data – Analogue input module with pressure sensors

Function

The pressure input modules make it possible to process a maximum of 4 pressures. The internal measured value of the sensor (analogue value with 10-bit resolution) is converted into an internal numerical format as appropriate to the parameterisation and made available to the bus node as a process image. It is additionally also possible to combine 2 channels in each case to form a differential pressure channel.

Area of application

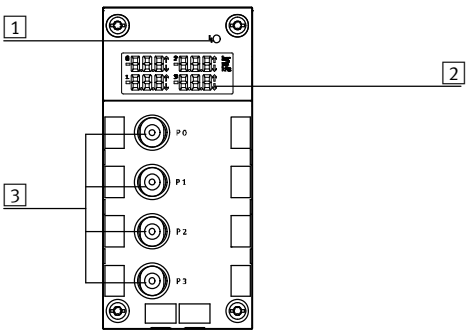
- Measuring range 0 ... 10 bar or −1 ... +1 bar
- Choice of units of measurement
- Processing a maximum of 4 pressures per module
- Pressure indication via LCD display
- Direct connection via QS4 push-in connectors
- Error message via CPX-P
- Channel-oriented diagnostics

General technical data				
Type			CPX-4AE-P-B2	CPX-4AE-P-D10
Number of analogue inputs			4	
Pneumatic connection			QS-4	
Nominal operating voltage		[V DC]	24	
Operating voltage range		[V DC]	18 ... 30	
Intrinsic current consumption		[mA]	Typically 50	
Measured variable			4x relative or 2x differential pressure measurement	
Displayable units			• kPa • mbar • psi	
Pressure measuring range	Start value	[bar]	−1	0
	End value	[bar]	1	10
Internal cycle time		[ms]	5	
Data format			• 15 bits + prefix • Binary notation in mbar, kPa, psi	
LED indicators			Group diagnostics	
Diagnostics			• Limit value violation per channel • Parameterisation error • Sensor limit per channel	
Parameterisation			• Diagnostic delay per channel • Hysteresis per module • Unit of measurement • Measured value smoothing per channel • Limit value monitoring per channel • Sensor limit per channel • Measurement of relative/differential pressure	
Degree of protection to EN 60529			IP65, IP67	
Operating medium			Compressed air to ISO 8573-1:2010 [7:4:4]	
Note on the operating/pilot medium			Lubricated operation (in which case lubricated operation will always be required)	
Ambient temperature		[°C]	−5 ... 50	
Storage temperature		[°C]	−20 ... 70	
Temperature of medium		[°C]	0 ... 50	
Note on materials			RoHS-compliant	
Materials			PA reinforced, PC	
Grid dimension		[mm]	50	
Dimensions (incl. interlinking block) W x L x H		[mm]	50 x 107 x 55	
Product weight		[g]	112	

Note

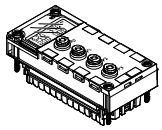
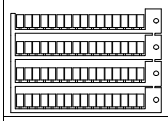
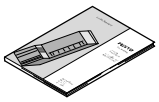
Extreme pneumatic conditions, e.g. high cycle rates with high pressure amplitudes, can damage the sensors.

Connection and display components



1 Error LED (red, module error)
2 LCD display with permanent display of the four measured pressures, unit of measurement and if applicable limit value violation
3 QS connections

Ordering data

Designation		Part no.	Type
Input module, analogue			
	4 analogue pressure inputs, pressure range –1 … +1 bar	**560361**	**CPX-4AE-P-B2**
	4 analogue pressure inputs, pressure range 0 … 10 bar	**560362**	**CPX-4AE-P-D10**
Inscription labels			
	Inscription labels 6x10 mm, 64 pieces, in frame	**18576**	**IBS-6x10**
User documentation			
	User documentation, German	**526415**	**P.BE-CPX-AX-DE**
	User documentation, English	**526416**	**P.BE-CPX-AX-EN**
	User documentation, Spanish	**526417**	**P.BE-CPX-AX-ES**
	User documentation, French	**526418**	**P.BE-CPX-AX-FR**
	User documentation, Italian	**526419**	**P.BE-CPX-AX-IT**

Terminal CPX-P

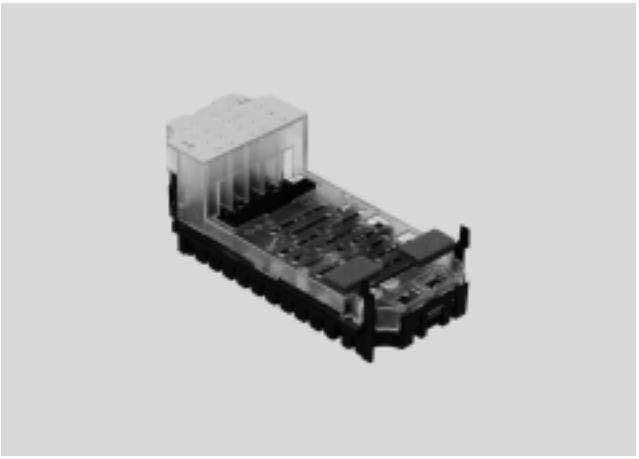
Technical data – Analogue module for temperature inputs

Function

The CPX-PT100 analogue input module with 4 channels for temperature measurement enables the connection of up to 4 temperature sensors of the type PT100-PT1000, Ni100-Ni1000, etc. The temperature module supports various connection concepts with different numbers of sockets or terminals as appropriate to the connection block selected.

Area of application

- Temperature module for temperature sensors PT100, PT200, PT500, PT1000, Ni100, Ni120, Ni500, Ni1000
- Supports connection blocks with M12, Harax and terminal connection
- Temperature module features can be parameterised
- 2-wire, 3-wire and 4-wire connection
- The temperature module is provided with voltage supply for the electronics and the sensors via the interlinking block
- Temperature module protection and diagnostics through integrated electronic fuse protection

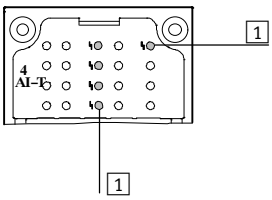


General technical data			
Type			**CPX-4AE-T**
			Temperature input
Number of analogue inputs			Choice of 2 or 4
Max. power supply per module		[A]	0.7
Fuse protection			Internal electronic fuse for sensor supply
Current consumption from 24 V sensor supply (quiescent current)		[mA]	Typically 50
Sensor supply voltage		[V DC]	24 ±25%
Sensor type (parameterisable for each channel via DIL switch)			PT100, PT200, PT500, PT1000 Ni100, Ni120, Ni500, Ni1000
Temperature range	Pt standard	[°C]	–200 ... +850
	Pt climate	[°C]	–120 ... +130
	Ni	[°C]	–60 ... +180
Sensor connection technology			2-wire, 3-wire and 4-wire technology
Resolution			15 bits + prefix
Operating error limit relative to input range		[%]	±0.06
Basic error limit (25 °C)	Standard	[K]	±0.6
	Pt climate	[K]	±0.2
Temperature error relative to input range		[%]	±0.001
Linearity error (no software scaling)		[%]	±0.02
Repetition accuracy (at 25 °C)		[%]	±0.05
Max. line resistance per conductor		[Ω]	10
Max. permissible input voltage		[V]	±30
Cycle time (module)		[ms]	≤ 250

General technical data			
Data format			15 bits + prefix, complement of two, binary notation in tenths of a degree
Cable length		[m]	Max. 200 (shielded)
Electrical isolation	Channel – channel		No
	Channel – internal bus		Yes
LED indicators	Group diagnostics		1
	Channel diagnostics		4
Diagnostics			• Short circuit/overload, channel • Parameterisation error • Value falling below nominal range/full-scale value • Value exceeding nominal range/full-scale value • Wire break
Parameterisation			• Unit of measurement and interference frequency suppression • Diagnostic message in the event of a wire break or short circuit • Limit monitoring per channel • Sensor connection technology • Sensor type/temperature coefficient, temperature range • Limit value per channel • Measured value smoothing
Degree of protection to EN 60529			Depending on connection block
Temperature range	Operation	[°C]	–5 ... +50
	Storage/transport	[°C]	–20 ... +70
Materials			PA reinforced, PC
Grid dimension		[mm]	50
Dimensions (incl. interlinking block and connection block) W x L x H		[mm]	50 x 107 x 50
Product weight		[g]	38

Connection and display components

CPX-4AE-T

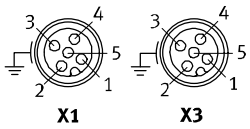
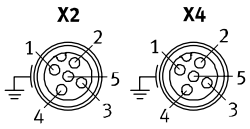
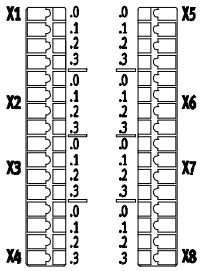
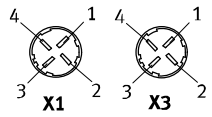
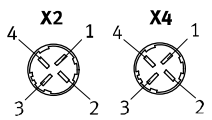


1 Error LED (red, module error)
2 Channel-related error LEDs (red)

Combinations of connection blocks and analogue module

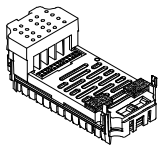
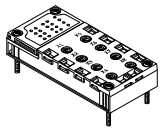
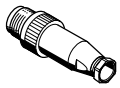
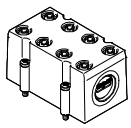
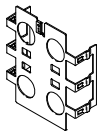
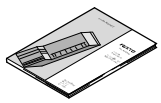
Connection blocks	Part no.	Temperature module
		CPX-4AE-T
CPX-AB-4-M12X2-5POL	**195704**	■
CPX-AB-4-M12X2-5POL-R	**541254**	■
CPX-AB-8-KL-4POL	**195708**	■
CPX-AB-4-HAR-4POL	**525636**	■
CPX-M-AB-4-M12X2-5POL	**549367**	■

Pin allocation

Connection block inputs	CPX-4AE-T	
CPX-AB-4-M12X2-5POL, CPX-AB-4-M12X2-5POL-R[1]		
	X1.1: Input I0+ X1.2: Input U0+ X1.3: Input I0– X1.4: Input U0– X1.5: FE[2]	X3.1: Input I2+ X3.2: Input U2+ X3.3: Input I2– X3.4: Input U2– X3.5: FE[2]
	X2.1: Input I1+ X2.2: Input U1+ X2.3: Input I1– X2.4: Input U1– X2.5: FE[2]	X4.1: Input I3+ X4.2: Input U3+ X4.3: Input I3– X4.4: Input U3– X4.5: FE[2]
CPX-AB-8-KL-4POL		
	X1.0: Input I0+ X1.1: Input I0– X1.2: Input U0– X1.3: FE X2.0: n.c. X2.1: n.c. X2.2: Input U0+ X2.3: FE X3.0: Input I1+ X3.1: Input I1– X3.2: Input U1– X3.3: FE X4.0: n.c. X4.1: n.c. X4.2: Input U1+ X4.3: FE	X5.0: Input I2+ X5.1: Input I2– X5.2: Input U2– X5.3: FE X6.0: n.c. X6.1: n.c. X6.2: InputUI2+ X6.3: FE X7.0: Input I3+ X7.1: Input I3– X7.2: Input U3– X7.3: FE X8.0: n.c. X8.1: n.c. X8.2: Input U3+ X8.3: FE
CPX-AB-4-HAR-4POL		
	X1.1: Input I0+ X1.2: Input U0+ X1.3: Input I0– X1.4: Input U0–	X3.1: Input I2+ X3.2: Input U2+ X3.3: Input I2– X3.4: Input U2–
	X2.1: Input I1+ X2.2: Input U1+ X2.3: Input I1– X2.4: Input U1–	X4.1: Input I3+ X4.2: Input U3+ X4.3: Input I3– X4.4: Input U3–

1) Speedcon quick lock, additional shielding on metal thread
2) FE/additional shielding on metal thread

Ordering data

Designation				Part no.	Type
Input module, analogue					
	2 or 4 analogue temperature inputs			**541486**	**CPX-4AE-T**
Connection block					
	Made of polymer	4x socket M12, 5-pin		**195704**	**CPX-AB-4-M12X2-5POL**
		4x socket, M12 with quick-lock technology, 5-pin		**541254**	**CPX-AB-4-M12X2-5POL-R**
		Spring-loaded terminal, 32-pin		**195708**	**CPX-AB-8-KL-4POL**
		4x socket, quick connector, 4-pin		**525636**	**CPX-AB-4-HAR-4POL**
	Made of metal	4x socket M12, 5-pin		**549367**	**CPX-M-AB-4-M12X2-5POL**
Plug					
	Plug M12, 5 pin			**175487**	**SEA-M12-5GS-PG7**
	HARAX® plug, 4-pin			**525928**	**SEA-GS-HAR-4POL**
Cover					
	Cover for CPX-AB-8-KL-4POL (IP65, IP67)		• 8 cable through-feeds M9 • 1 cable through-feed for multi-pin plug	**538219**	**AK-8KL**
	Set of fittings			**538220**	**VG-K-M9**
Screening plate					
	Screening plate for M12 connections			**526184**	**CPX-AB-S-4-M12**
User documentation					
	User documentation		German	**526415**	**P.BE-CPX-AX-DE**
			English	**526416**	**P.BE-CPX-AX-EN**
			Spanish	**526417**	**P.BE-CPX-AX-ES**
			French	**526418**	**P.BE-CPX-AX-FR**
			Italian	**526419**	**P.BE-CPX-AX-IT**

Terminal CPX-P

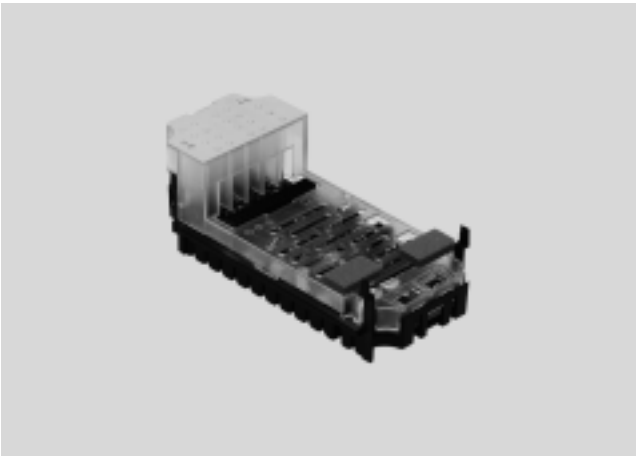
Technical data – Analogue module for thermocoupler

Function

The CPX-4AE-TC analogue input module with 4 channels for temperature measurement enables up to 4 thermocoupler sensors to be connected.
The channels feature wire break and short circuit detection.
If no cold junction compensation sensor is being used, an internal theoretical value of 25 °C can be used (accuracy is impaired).

Area of application

- Supports connection blocks with M12 and terminal connection
- Temperature module features can be parameterised
- 2-wire connection
- 2-wire connection for a PT1000 sensor for cold junction compensation
- The temperature module is provided with voltage supply for the electronics and the sensors via the interlinking block
- Temperature module protection and diagnostics through integrated electronic fuse protection

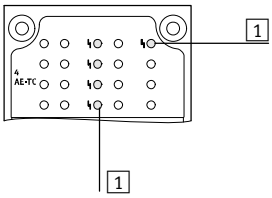


General technical data		
Type		**CPX-4AE-TC**
		Temperature input
Number of analogue inputs		4
Fuse protection (short circuit)		Internal electronic fuse per channel
Nominal operating voltage	[V DC]	24
Operating voltage range	[V DC]	18 … 30
Sensor type (parameterisable for each channel via software)		• Type B +400 … +1820 °C, 8 µV/°C • Type E –270 … +900 °C, 60 µV/°C • Type J –200 … +1200 °C, 51 µV/°C • Type K –200 … +1370 °C, 40 µV/°C • Type N –200 … +1300 °C, 38 µV/°C • Type R 0 … +1760 °C, 12 µV/°C • Type S 0 … +1760 °C, 11 µV/°C • Type T –200 … +400 °C, 40 µV/°C
Sensor connection technology		2-wire technology
Operating error limit relative to ambient temperature	[%]	Max. ±0.6
Basic error limit (at 25 °C)	[%]	Max. ±0.4
Repetition accuracy (at 25 °C)	[%]	±0.05
Max. line resistance per conductor	[Ω]	10
Max. residual current per module	[mA]	30
Max. permissible input voltage	[V]	±30
Internal cycle time (module)	[ms]	250

General technical data			
Data format			• 15 bits + prefix, complement of two • Binary notation in tenths of a degree
Cable length		[m]	Max. 50 (shielded)
Electrical isolation	Channel – channel		No
	Channel – internal bus		Yes
LED indicators	Group diagnostics		1
	Channel diagnostics		4
Diagnostics			• Parameterisation error • Wire break per channel • Limit value violation per channel
Parameterisation			• Monitoring wire break per channel • Unit of measurement • Cold-junction compensation • Sensor type per channel • Limit value monitoring per channel • Measured value smoothing
Degree of protection to EN 60529			Depending on connection block
Temperature range	Operation	[°C]	–5 ... +50
	Storage/transport	[°C]	–20 ... +70
Materials			PA reinforced, PC
Grid dimension		[mm]	50
Dimensions (incl. interlinking block and connection block) W x L x H		[mm]	50 x 107 x 50
Product weight		[g]	38

Connection and display components

CPX-4AE-TC

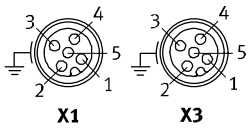
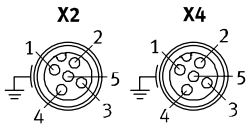
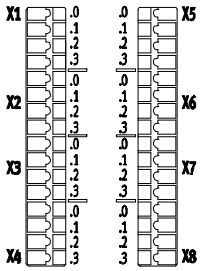


1 Error LED (red, module error)
2 Channel-related error LEDs (red)

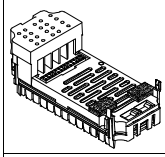
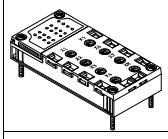
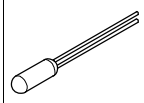
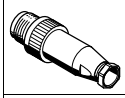
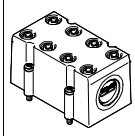
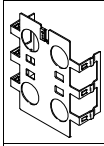
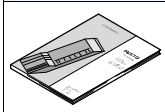
Combinations of connection blocks and analogue module

Connection blocks	Part no.	Temperature module
		CPX-4AE-TC
CPX-AB-4-M12X2-5POL	**195704**	■
CPX-AB-4-M12X2-5POL-R	**541254**	■
CPX-AB-8-KL-4POL	**195708**	■
CPX-M-AB-4-M12X2-5POL	**549367**	■

Pin allocation

Connection block inputs	CPX-4AE-TC	
CPX-AB-4-M12X2-5POL, CPX-AB-4-M12X2-5POL-R[1]		
	X1.1: Cold junction compensation 0+ X1.2: Input signal U0+ X1.3: Cold junction compensation 0– X1.4: Input signal U0– X1.5: FE[2]	X3.1: Cold junction compensation 2+ X3.2: Input signal U2+ X3.3: Cold junction compensation 2– X3.4: Input signal U2– X3.5: FE[2]
	X2.1: Cold junction compensation 1+ X2.2: Input signal U1+ X2.3: Cold junction compensation 1– X2.4: Input signal U1– X2.5: FE[2]	X4.1: Cold junction compensation 3+ X4.2: Input signal U3+ X4.3: Cold junction compensation 3– X4.4: Input signal U3– X4.5: FE[2]
CPX-AB-8-KL-4POL		
	X1.0: Cold junction compensation 0+ X1.1: Cold junction compensation 0– X1.2: Input signal U0– X1.3: FE X2.0: n.c. X2.1: n.c. X2.2: Input signal U0+ X2.3: FE X3.0: Cold junction compensation 1+ X3.1: Cold junction compensation 1– X3.2: Input signal U1– X3.3: FE X4.0: n.c. X4.1: n.c. X4.2: Input signal U1+ X4.3: FE	X5.0: Cold junction compensation 2+ X5.1: Cold junction compensation 2– X5.2: Input signal U2– X5.3: FE X6.0: n.c. X6.1: n.c. X6.2: Input signal U2+ X6.3: FE X7.0: Cold junction compensation 3+ X7.1: Cold junction compensation 3– X7.2: Input signal U3– X7.3: FE X8.0: n.c. X8.1: n.c. X8.2: Input signal U3+ X8.3: FE

1) Speedcon quick lock, additional shielding on metal thread
2) FE/additional shielding on metal thread

Ordering data					
Designation				Part no.	Type
Input module, analogue					
	4 analogue temperature inputs, with 2-wire connection for a PT1000 sensor for cold junction compensation			**553594**	**CPX-4AE-TC**
Connection block					
	Made of polymer	4x socket M12, 5-pin		**195704**	**CPX-AB-4-M12X2-5POL**
		4x socket, M12 with quick-lock technology, 5-pin		**541254**	**CPX-AB-4-M12X2-5POL-R**
		Spring-loaded terminal, 32-pin		**195708**	**CPX-AB-8-KL-4POL**
	Made of metal	4x socket M12, 5-pin		**549367**	**CPX-M-AB-4-M12X2-5POL**
Cold junction compensation					
	PT1000 temperature sensor for cold junction compensation			**553596**	**CPX-W-PT1000**
Plug					
	Plug M12, 5 pin			**175487**	**SEA-M12-5GS-PG7**
Cover					
	Cover for CPX-AB-8-KL-4POL (IP65, IP67)		• 8 cable through-feeds M9 • 1 cable through-feed for multi-pin plug	**538219**	**AK-8KL**
	Set of fittings			**538220**	**VG-K-M9**
Screening plate					
	Screening plate for M12 connections			**526184**	**CPX-AB-S-4-M12**
User documentation					
	User documentation		German	**526415**	**P.BE-CPX-AX-DE**
			English	**526416**	**P.BE-CPX-AX-EN**
			Spanish	**526417**	**P.BE-CPX-AX-ES**
			French	**526418**	**P.BE-CPX-AX-FR**
			Italian	**526419**	**P.BE-CPX-AX-IT**

Terminal CPX-P

Technical data – Analogue module for outputs

Function

Analogue modules control devices with a standard analogue interface such as proportional valves, etc. Depending on the connection block selected, the analogue module supports various connection concepts with different numbers of sockets or terminals.

Area of application

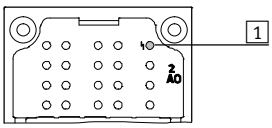
- Analogue module for 0 ... 10 V, 0 ... 20 mA or 4 ... 20 mA
- Supports connection blocks with Sub-D, terminal connection and M12 connection
- Analogue module features can be parameterised
- Different data formats available
- Operation with and without galvanic isolation possible
- The analogue module receives the voltage supply for the electronics and the actuators from the interlinking block
- Analogue module protection and diagnostics through integrated electronic fuse protection

General technical data				
Type			**CPX-2AA-U-I**	
			Voltage output	Current output
Number of analogue outputs			2	
Max. actuator supply per module		[A]	2.8	
Fuse protection			Internal electronic fuse for actuator supply	
Current consumption from 24 V sensor supply (at full load)		[mA]	Max. 150	
Current consumption from 24 V actuator supply (at full load)		[A]	4 ... 10	
Supply voltage for actuators		[V DC]	24 ±25%	
Signal range (parameterisable for each channel via DIL switch or software)			0 ... 10 V DC	0 ... 20 mA 4 ... 2 mA
Resolution		[bit]	12	
Number of units			4096	
Absolute accuracy		[%]	±0.6	
Linearity error (no software scaling)		[%]	±0.1	
Repetition accuracy (at 25 °C)		[%]	0.05	
Encoder selection	Load resistance for ohmic load	[kΩ]	Min. 1	Max. 0.5
	Load resistance for capacitive load	[µF]	Max. 1	–
	Load resistance for inductive load	[mH]	–	Max. 1
	Short circuit protection for analogue output		Yes	–
	Short circuit current of analogue output	[mA]	Approx. 20	–
	Open circuit voltage	[V DC]	–	18
	Destruction limit against externally applied voltage	[V DC]	15	
	Actuator connection		2 wires	
Cycle time (module)		[ms]	≤ 4	

General technical data				
Type			CPX-2AA-U-I	
			Voltage output	Current output
Response time	For ohmic load	[ms]	0.1	0.1
	For capacitive load	[ms]	0.7	–
	For inductive load	[ms]	–	0.5
Data format			15 bits + prefix, linear scaling 12 bits right-justified 12 bits left-justified, S7 compatible 12 bits left-justified, S5 compatible	
Cable length		[m]	Max. 30 (shielded)	
LED indicators	Group diagnostics		1	
	Channel diagnostics		Yes, via flashing frequency of group diagnostics	
Diagnostics			• Short circuit/overload, actuator supply • Parameterisation error • Value falling below nominal range/full-scale value • Value exceeding nominal range/full-scale value • Wire break	
Parameterisation			• Short circuit monitoring, actuator supply • Short circuit monitoring, analogue output • Behaviour after short circuit, actuator supply • Data format • Lower limit value/full-scale value • Upper limit value/full-scale value • Monitoring value falling below nominal range/full-scale value • Monitoring value exceeding nominal range/full-scale value • Monitoring wire break • Signal range	
Degree of protection to EN 60529			Depending on connection block	
Temperature range	Operation	[°C]	–5 ... +50	
	Storage/transport	[°C]	–20 ... +70	
Materials			PA reinforced, PC	
Grid dimension		[mm]	50	
Dimensions (incl. interlinking block and connection block) W x L x H		[mm]	50 x 107 x 50	
Product weight		[g]	38	

Connection and display components

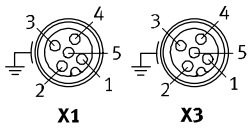
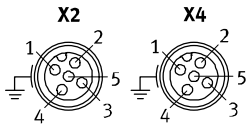
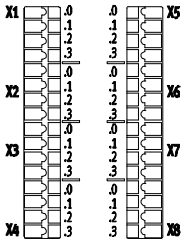
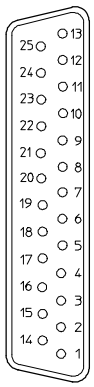
CPX-2AA-U-I



1 Error LED (red, module error)

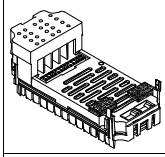
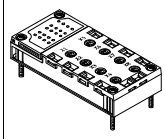
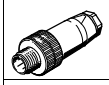
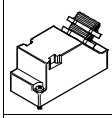
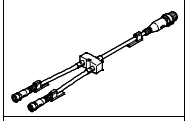
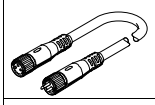
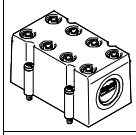
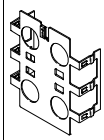
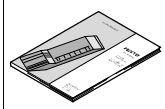
Combinations of connection blocks and analogue module		
Connection blocks	Part no.	Analogue module
		CPX-2AA-U-I
CPX-AB-4-M12X2-5POL	**195704**	■
CPX-AB-4-M12X2-5POL-R	**541254**	■
CPX-AB-8-KL-4POL	**195708**	■
CPX-AB-1-SUB-BU-25POL	**525676**	■
CPX-M-AB-4-M12X2-5POL	**549367**	■

Pin allocation

Connection block outputs	CPX-2AA-U-I	
CPX-AB-4-M12X2-5POL, CPX-AB-4-M12X2-5POL-R[1]		
	X1.1: 24 V_{OUT} X1.2: Output U0+ X1.3: 0 V_{OUT} X1.4: Output GND X1.5: FE[2]	X3.1: 24 V_{OUT} X3.2: Output U1+ X3.3: 0 V_{OUT} X3.4: Output GND X3.5: FE[2]
	X2.1: 24 V_{OUT} X2.2: Output I0+ X2.3: 0 V_{OUT} X2.4: Output GND X2.5: FE[2]	X4.1: 24 V_{OUT} X4.2: Output I1+ X4.3: 0 V_{OUT} X4.4: Output GND X4.5: FE[2]
CPX-AB-8-KL-4POL		
	X1.0: 24 V_{OUT} X1.1: 0 V_{OUT} X1.2: Output GND X1.3: FE X2.0: n.c. X2.1: n.c. X2.2: Output U0+ X2.3: FE X3.0: 24 V_{OUT} X3.1: 0 V_{OUT} X3.2: Output GDN X3.3: FE X4.0: n.c. X4.1: n.c. X4.2: Output I0+ X4.3: FE	X5.0: 24 V_{OUT} X5.1: 0 V_{OUT} X5.2: Output GND X5.3: FE X6.0: n.c. X6.1: n.c. X6.2: Output U1+ X6.3: FE X7.0: 24 V_{OUT} X7.1: 0 V_{OUT} X7.2: Output GND X7.3: FE X8.0: n.c. X8.1: n.c. X8.2: Output I1+ X8.3: FE
CPX-AB-1-SUB-BU-25POL		
	1: Output GND 2: Output U0+ 3: Output GND 4: Output I0+ 5: n.c. 6: n.c. 7: n.c. 8: n.c. 9: 24 V_{OUT} 10: 24 V_{OUT} 11: 0 V_{OUT} 12: 0 V_{OUT} 13: Shield[3]	14: Output GND 15: Output U1+ 16: Output GND 17: Output I1+ 18: 24 V_{OUT} 19: n.c. 20: 24 V_{OUT} 21: n.c. 22: 0 V_{OUT} 23: 0 V_{OUT} 24: 0 V_{OUT} 25: FE Housing: FE

1) Speedcon quick lock, additional shielding on metal thread
2) FE/additional shielding on metal thread
3) Connect shield to functional earth FE

Ordering data

Designation				Part no.	Type
Output module, analogue					
	2 analogue current or voltage outputs			**526170**	**CPX-2AA-U-I**
Connection block					
	Made of polymer	4x socket, M12, 5-pin		**195704**	**CPX-AB-4-M12X2-5POL**
		4x socket, M12 with quick-lock technology, 5-pin		**541254**	**CPX-AB-4-M12X2-5POL-R**
		Spring-loaded terminal, 32-pin		**195708**	**CPX-AB-8-KL-4POL**
		1x socket, Sub-D, 25-pin		**525676**	**CPX-AB-1-SUB-BU-25POL**
	Made of metal	4x socket, M12, 5-pin		**549367**	**CPX-M-AB-4-M12X2-5POL**
Plug					
	Plug	M12, 5-pin	PG7, for cable diameter 4 … 6 mm	**175487**	**SEA-M12-5GS-PG7**
	Sub-D plug, 25-pin			**527522**	**SD-SUB-D-ST25**
Connecting cable					
	Modular system for all types of sensor/actuator distributors			–	**NEDY-…** ➔ Internet: nedy
	Modular system for all types of connecting cable			–	**NEBU-…** ➔ Internet: nebu
Cover					
	Cover for CPX-AB-8-KL-4POL (IP65/67)	• 8 cable through-feeds M9 • 1 cable through-feed for multi-pin plug		**538219**	**AK-8KL**
	Set of fittings for hood AK-8KL			**538220**	**VG-K-M9**
	Cover cap for closing off unused M12 ports (10 pieces)			**165592**	**ISK-M12**
Screening plate					
	Screening plate for connection block • CPX-AB-4-M12X2-5POL • CPX-AB-4-M12X2-5POL-R			**526184**	**CPX-AB-S-4-M12**
User documentation					
	User documentation		German	**526415**	**P.BE-CPX-AX-DE**
			English	**526416**	**P.BE-CPX-AX-EN**
			Spanish	**526417**	**P.BE-CPX-AX-ES**
			French	**526418**	**P.BE-CPX-AX-FR**
			Italian	**526419**	**P.BE-CPX-AX-IT**

Terminal CPX-P

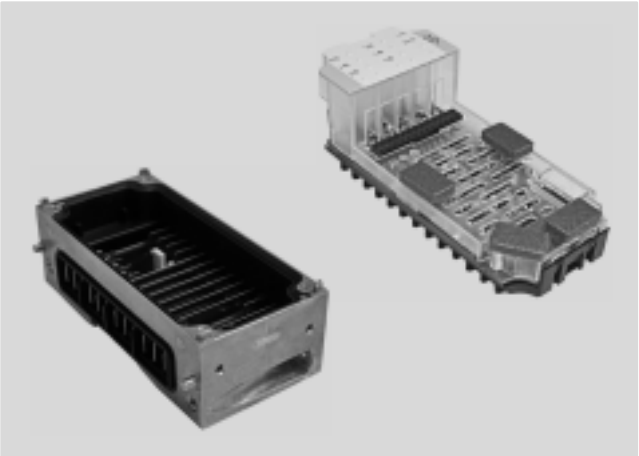
Technical data – PROFIsafe shut-off module

Function

The PROFIsafe shut-off module interrupts the contact rails of the interlinking block for valves and outputs. The supply voltage for valves can be switched by the module within the CPX-P terminal and via a connection block to two consuming devices. Actuation takes place via the bus node (PROFINET) of the CPX-P terminal.

Area of application

- Output module for 24 V DC supply voltage
- Shut-off module for supply voltage for valves
- Can only be used with PROFINET or PROFIBUS bus nodes
- The shut-off module is supplied with voltage for the electronics and the outputs by the interlinking block
- The outputs are supplied from the power supply for valves (V_{Valves})



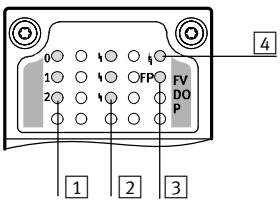
General technical data			
Type			**CPX-FVDA-P2**
Number of outputs			2
Note on outputs			1 internal channel for shutting off the supply voltage for valves
			2 external outputs
Max. address capacity	Inputs	[B]	6
	Outputs	[B]	6
Max. cable length		[m]	200
Max. power supply	Per module	[A]	5
	Per channel	[A]	1.5
Fuse protection (short circuit)			Internal electronic fuse per channel
Current consumption of module		[mA]	Typically 65 (power supply for valves)
		[mA]	Typically 25 (power supply for electronics)
Operating voltage	Nominal value	[V DC]	24
	Permissible range	[V DC]	20.4 ... 28.8
Voltage drop per channel		[V]	0.6
Residual ripple		[Vpp]	2 within voltage range
Load capacity to FE		[nF]	400
Max. response time to shut-off command		[ms]	23
Electrical isolation	Channel – channel		No
	Channel – internal bus		Yes, with intermediate supply
Switching logic	Outputs		P-M switching
Safety integrity level			Safe Switch Off, SIL 3
Performance Level			Safe Switch Off/category 3, Performance Level e
Failure rate per hour (PFH)			$1.0x\ 10^{-9}$
Certificate issuing authority			01/205/50294/13
LED indicators	Group diagnostics		1
	Channel diagnostics		3
	Channel status		3
	Failsafe protocol active		1
Diagnostics			• Short circuit/overload per channel • Undervoltage at valves • Cross circuit • Wire break per channel
Parameterisation			• Monitoring wire break per channel • Diagnostic behaviour
Degree of protection to EN 60529			Depending on connection block
Grid dimension		[mm]	50
Dimensions (incl. interlinking block and connection block) W x L x H		[mm]	50 x 107 x 55

Materials	
Housing	PA reinforced, PC
Note on materials	RoHS-compliant

Operating and environmental conditions		
Ambient temperature	[°C]	–5 … +50
Storage temperature	[°C]	–20 … +70
CE marking (see declaration of conformity)		To EU Machinery Directive
Certification		c UL us Recognized (OL)

Connection and display components

CPX-FVDA-P2



1 Status LEDs (yellow):
0: Supply voltage for valves
1: X1
2: X2

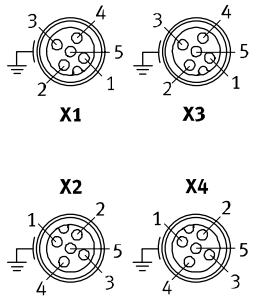
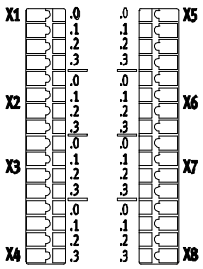
2 Channel-related error LEDs (red)
3 Fail-safe protocol active (green)
4 Error LED (red, module error)

Combinations of bus nodes/control blocks and PROFIsafe shut-off module		
Bus node/control block	Part no.	PROFIsafe shut-off module
		CPX-FVDA-P2
CPX-FB13	**195740**	■
CPX-FB33	**548755**	■
CPX-M-FB34	**548751**	■
CPX-M-FB35	**548749**	■

Note

The PROFIsafe shut-off module CPX-FVDA-P2 can only be connected as of software release 21 or release 30 (in the case of CPX-FB13).

Combinations of connection blocks and PROFIsafe shut-off module		
Connection blocks	Part no.	PROFIsafe shut-off module
		CPX-FVDA-P2
CPX-M-AB-4-M12X2-5POL	**549367**	■
CPX-AB-8-KL-4POL	**195708**	■

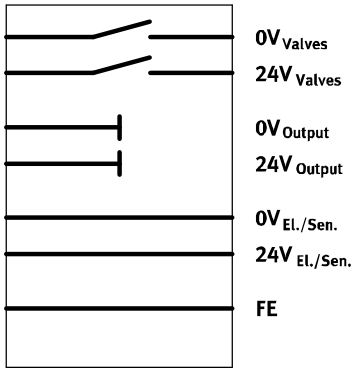
Pin allocation		
Connection block outputs	CPX-FVDA-P2	
CPX-M-AB-4-M12X2-5POL		
	X1.1: 0 V_{OUT} 1 (cannot be switched off) X1.2: 24 V_{OUT} 1 (cannot be switched off) X1.3: 0 V_{OUT} 1 (can be switched off via fieldbus) X1.4: 24 V_{OUT} 1 (can be switched off via fieldbus) X1.5: FE X2.1: 0 V_{OUT} 2 (cannot be switched off) X2.2: 24 V_{OUT} 2 (cannot be switched off) X2.3: 0 V_{OUT} 2 (can be switched off via fieldbus) X2.4: 24 V_{OUT} 2 (can be switched off via fieldbus) X2.5: FE	X3.1: n.c. X3.2: n.c. X3.3: n.c. X3.4: n.c. X3.5: FE X4.1: n.c. X4.2: n.c. X4.3: n.c. X4.4: n.c. X4.5: FE
CPX-AB-8-KL-4POL		
	X1.0: 0 V_{OUT} 1 (cannot be switched off) X1.1: 0 V_{OUT} 1 (can be switched off via fieldbus) X1.2: 24 V_{OUT} 1 (can be switched off via fieldbus) X1.3: FE X2.0: n.c. X2.1: n.c. X2.2: 24 V_{OUT} 1 (cannot be switched off) X2.3: FE X3.0: 0 V_{OUT} 2 (cannot be switched off) X3.1: 0 V_{OUT} 2 (can be switched off via fieldbus) X3.2: 24 V_{OUT} 2 (can be switched off via fieldbus) X3.3: FE X4.0: n.c. X4.1: n.c. X4.2: 24 V_{OUT} 2 (cannot be switched off) X4.3: FE	X5.0: n.c. X5.1: n.c. X5.2: n.c. X5.3: n.c. X6.0: n.c. X6.1: n.c. X6.2: n.c. X6.3: n.c. X7.0: n.c. X7.1: n.c. X7.2: n.c. X7.3: n.c. X8.0: n.c. X8.1: n.c. X8.2: n.c. X8.3: n.c.

Combinations of interlinking blocks and PROFIsafe shut-off module		
Interlinking blocks	Part no.	PROFIsafe shut-off module
		CPX-FVDA-P2
CPX-M-GE-EV-S-7/8-5POL	**550208**	–
CPX-M-GE-EV-S-7/8-5POL-VL	**8022165**	–
CPX-M-GE-EV	**550206**	–
CPX-M-GE-EV-FVO	**567806**	■
CPX-M-GE-EV-Z-7/8-5POL	**550210**	–
CPX-M-GE-EV-Z-7/8-5POL-VL	**8022158**	–

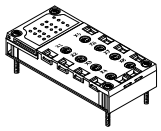
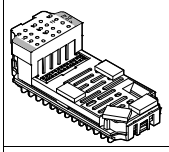
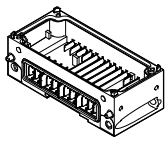
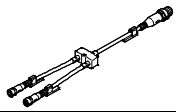
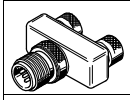
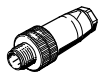
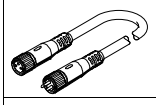
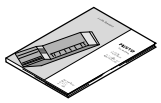
General technical data		
Type		**CPX-M-GE-EV-FVO**
Nominal operating voltage	[V DC]	24
Acceptable current load (per contact/contact rail)	[A]	16
Degree of protection to EN 60529		Depending on connection block
Ambient temperature	[°C]	–5 ... +50
Note on materials		RoHS-compliant
Materials		Die-cast aluminium
Type of mounting		Angled fitting
Grid dimension	[mm]	50
Dimensions W x L x H	[mm]	50 x 107 x 35
Product weight	[g]	170

Pin allocation

Circuitry



Pin	Allocation
–	–
–	–
–	–
–	–

Ordering data				
	Description		Part no.	Type
PROFIsafe shut-off module				
	Metal connection block	4x socket, M12, 5-pin	**549367**	**CPX-M-AB-4-M12X2-5POL**
	Polymer connection block	Spring-loaded terminal, 32-pin	**195708**	**CPX-AB-8-KL-4POL**
	Electronics module (can only be used with CPX-M-GE-EV-FVO)	PROFINET, PROFIBUS	**1971599**	**CPX-FVDA-P2**
	Metal interlinking block (for CPX-FVDA-P2 only)		**567806**	**CPX-M-GE-EV-FVO**
Distributors				
	Modular system for all types of sensor/actuator distributors		–	**NEDY-...** ➔ Internet: nedy
	1x plug, M12, 4-pin	2x socket, M12, 5-pin	**8005310**	**NEDY-L2R1-V1-M12G5-N-M12G4**
Plug				
	Plug	M12, PG7	**18666**	**SEA-GS-7**
		M12, PG7, 4-pin for cable diameter 2.5 mm	**192008**	**SEA-4GS-7-2,5**
		M12, PG9	**18778**	**SEA-GS-9**
		M12 for 2 cables	**18779**	**SEA-GS-11-DUO**
		M12 for 2 cables, 5-pin	**192010**	**SEA-5GS-11-DUO**
		M12, 5-pin	**175487**	**SEA-M12-5GS-PG7**
Connecting cable				
	Modular system for all types of connecting cables		–	**NEBU-...** ➔ Internet: nebu
User documentation				
	User documentation for PROFIsafe shut-off module	German	**8022606**	**P.BE-CPX-FVDA-P2-DE**
		English	**8022607**	**P.BE-CPX-FVDA-P2-EN**
		Spanish	**8022608**	**P.BE-CPX-FVDA-P2-ES**
		French	**8022609**	**P.BE-CPX-FVDA-P2-FR**
		Italian	**8022610**	**P.BE-CPX-FVDA-P2-IT**
		Chinese	**8022611**	**P.BE-CPX-FVDA-P2-ZH**

Terminal CPX-P

Technical data – Interlinking block with system supply

Function

Interlinking blocks ensure the electrical supply of all other CPX-P modules. They have contact rails, from which the other CPX-P components on the interlinking modules are supplied with current.

Internal division of the power supply makes it possible to switch off specific areas of the sensors and actuators individually.

Area of application

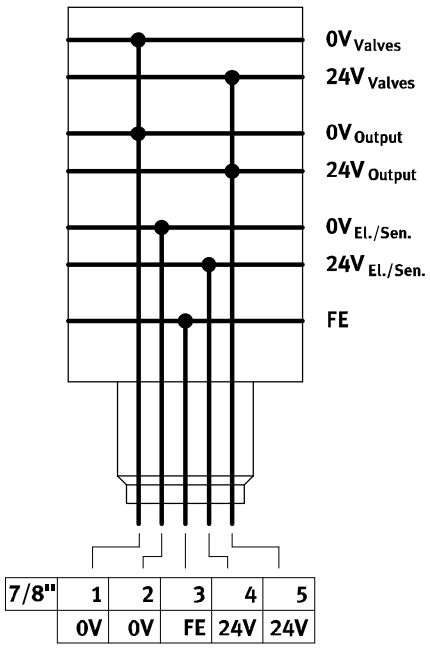
- 24 V DC supply voltage for electronics of the CPX-P terminal
- 24 V DC supply voltage for inputs
- 24 V DC supply voltage for valves
- 24 V DC supply voltage for outputs

General technical data			
Nominal operating voltage		[V DC]	24
Degree of protection to EN 60529			Depending on connection block
Ambient temperature		[°C]	–5 ... +50
Note on materials			RoHS-compliant
Grid dimension		[mm]	50
Dimensions W x L x H		[mm]	50 x 107 x 35
Electrical connection			7/8", 5-pin
Current supply	Sensors and electronics	[A]	Max. 8
	Valves and outputs	[A]	Max. 8
Materials			Die-cast aluminium
Product weight		[g]	187

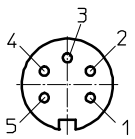
Pin allocation

Circuitry

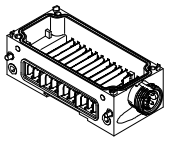
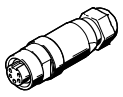
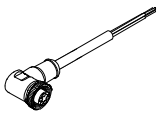
Round plug, 5-pin



7/8"



Pin	Allocation
1	0 V valves and outputs
2	0 V electronics and sensors
3	FE
4	24 V DC supply voltage for electronics and sensors
5	24 V DC load voltage supply for valves and outputs

Ordering data					
Designation				Part no.	Type
Interlinking block with system supply					
	7/8" connection, metal interlinking block	5-pin	–	**550208**	**CPX-M-GE-EV-S-7/8-5POL**
			For ATEX environment	**8022165**	**CPX-M-GE-EV-S-7/8-5POL-VL**
Connection sockets 7/8"					
	Power supply socket	5-pin		**543107**	**NECU-G78G5-C2**
	Angled socket, 5-pin – open cable end, 5-pin	2 m		**573855**	**NEBU-G78W5-K-2-N-LE5**
Mounting accessories					
	Screws for mounting the bus node/connection block on an interlinking block	Bus node/polymer connection block		**550219**	**CPX-M-M3x22-4x**
		Bus node/metal connection block		**550216**	**CPX-M-M3x22-S-4x**

Terminal CPX-P

Technical data – Interlinking block

Function

Interlinking blocks ensure the electrical supply of all other CPX-P modules. They have contact rails, from which the other CPX-P components on the interlinking modules are supplied with power.

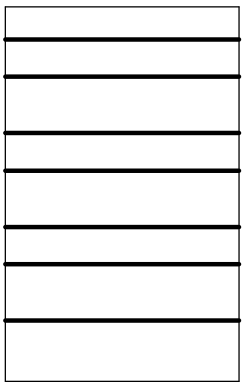
Internal division of the power supply makes it possible to switch off specific areas of the sensors and actuators individually.

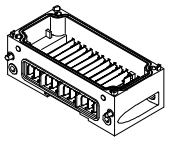
Area of application

- All voltages are fed through to the next module via the interlinking blocks without supply.
- The connected electronics module for inputs/outputs or bus node taps off the required voltage.

General technical data		
Electrical connection		–
Nominal operating voltage	[V DC]	24
Acceptable current load (per contact/contact rail)	[A]	16
Degree of protection to EN 60529		Depending on connection block
Ambient temperature	[°C]	–5 ... +50
Note on materials		RoHS-compliant
Materials		Aluminium
Grid dimension	[mm]	50
Dimensions W x L x H	[mm]	50 x 107 x 35
Product weight	[g]	169

Pin allocation

Circuitry		Pin	Allocation
		–	–
		–	–
		–	–
		–	–

Ordering data				
Designation			Part no.	Type
Interlinking block without power supply				
	Metal interlinking block		**550206**	**CPX-M-GE-EV**
Mounting accessories				
	Screws for mounting the bus node/connection block on an interlinking block	Bus node/polymer connection block	**550219**	**CPX-M-M3x22-4x**
		Bus node/metal connection block	**550216**	**CPX-M-M3x22-S-4x**

Terminal CPX-P

Technical data – Interlinking block with additional supply for outputs

Function

Interlinking blocks ensure the electrical supply of all other CPX-P modules. They have contact rails, from which the other CPX-P components on the interlinking modules are supplied with current.
Internal division of the power supply makes it possible to switch off specific areas of the sensors and actuators individually.

Area of application

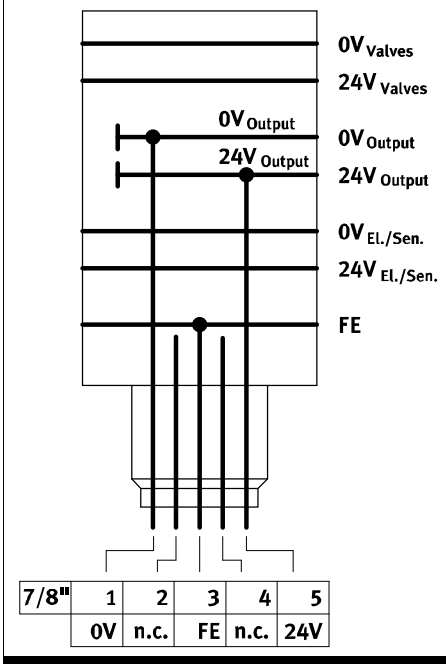
- 24 V DC supply voltage for outputs

General technical data			
Nominal operating voltage		[V DC]	24
Degree of protection to EN 60529			Depending on connection block
Ambient temperature		[°C]	–5 ... +50
Note on materials			RoHS-compliant
Grid dimension		[mm]	50
Dimensions W x L x H		[mm]	50 x 107 x 35
Electrical connection			7/8", 5-pin
Current supply	Outputs	[A]	Max. 8
Materials			Die-cast aluminium
Product weight		[g]	187

Pin allocation – Metal interlinking blocks

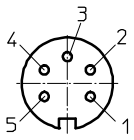
Circuitry

Round plug, 5-pin

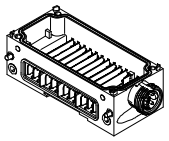
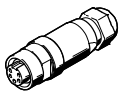
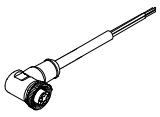


7/8"	1	2	3	4	5
	0V	n.c.	FE	n.c.	24V

7/8"



Pin	Allocation
1	0 V outputs
2	n.c.
3	FE
4	n.c.
5	24 V DC load voltage supply for outputs

Ordering data					
Designation				Part no.	Type
Interlinking block with additional supply for outputs					
	7/8" connection, metal interlinking block	5-pin	–	**550210**	**CPX-M-GE-EV-Z-7/8-5POL**
		5-pin	For ATEX environment	**8022158**	**CPX-M-GE-EV-Z-7/8-5POL-VL**
Connection sockets 7/8"					
	Power supply socket	5-pin		**543107**	**NECU-G78G5-C2**
	Angled socket, 5-pin – open cable end, 5-pin	2 m		**573855**	**NEBU-G78W5-K-2-N-LE5**
Mounting accessories					
	Screws for mounting the bus node/connection block on an interlinking block	Bus node/polymer connection block		**550219**	**CPX-M-M3x22-4x**
		Bus node/metal connection block		**550216**	**CPX-M-M3x22-S-4x**

Terminal CPX-P

Technical data – Pneumatic interface VMPA-FB

Function

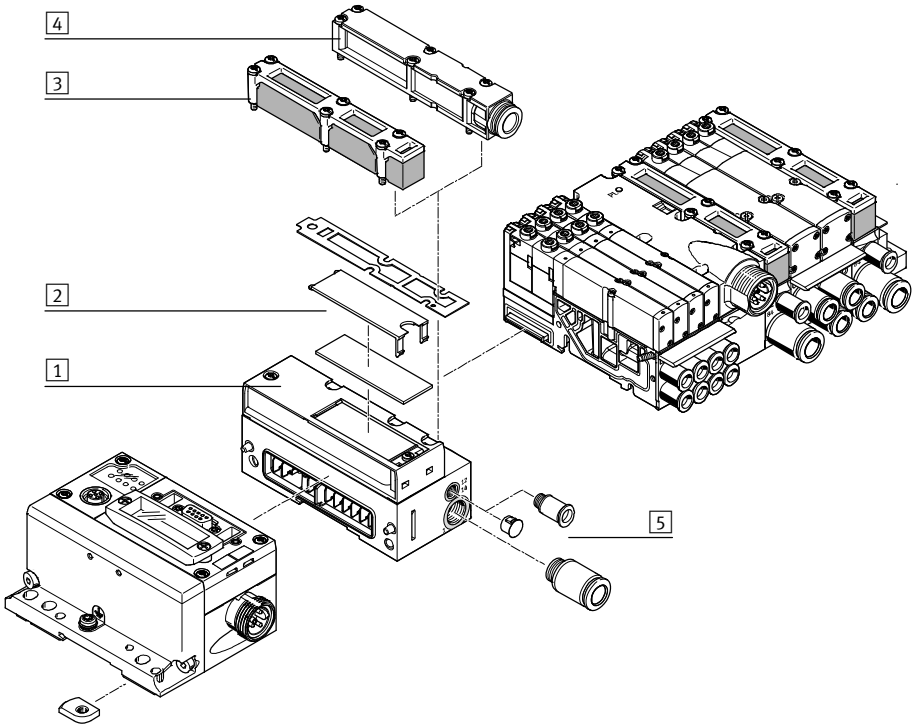
The pneumatic interface VMPA-FB establishes the electromechanical connection between the CPX-P terminal and the valve terminal MPA-S.
The signals from the bus node are forwarded to the control electronics in the electrical modules of the valve terminal MPA-S via the integrated CPX-P bus. The bus signal for activation of the solenoid coils is converted in the electronics module for max. 8 coils.
From a technical point of view, the individual MPA pneumatic modules each represent a separate electric module with digital outputs. Valves, which are galvanically isolated, can be supplied with power via the interlinking block CPX-GE-EV-V.

Area of application

- Interface to the valve terminal MPA-S
- Max. 128 solenoid coils
- Features of the electronics module of the valve terminal MPA-S can be parameterised, for example status of the solenoid coils in the event of fieldbus communication being interrupted (fail-safe), individual channel diagnostics can be activated, condition monitoring can be activated individually for each valve
- The pneumatic interface receives the voltage for the electronics and the supply voltage for the valves from the left-hand interlinking block and feeds them through to the electronics modules of the valve terminal MPA-S
- Electronics modules of the valve terminal MPA-S:
  - Undervoltage of valves
  - Short circuit of valves
  - Open load of valves
  - Counter preset reached in condition monitoring

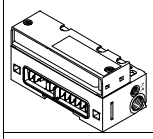
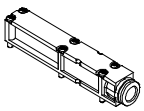
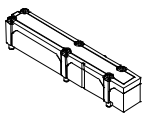
General technical data				
Type			VMPA-FB-EPL-G	VMPA-FB-EPL-E
Number of solenoid coils			128	
Pilot air supply			Internal	External
Pilot air port 12/14			–	M7
Pneumatic connection 1			G1/4	G1/4
Operating pressure		[bar]	3 ... 8	–0.9 ... 10
Pilot pressure		[bar]	3 ... 8	3 ... 8
Nominal operating voltage		[V DC]	24	
Degree of protection to EN 60529			IP65	
Ambient temperature		[°C]	–5 ... +50	
Materials	Cover		PA	
	Housing		Die-cast aluminium	
Product weight		[g]	Approx. 320	

Overview – Pneumatic interface VMPA-FB



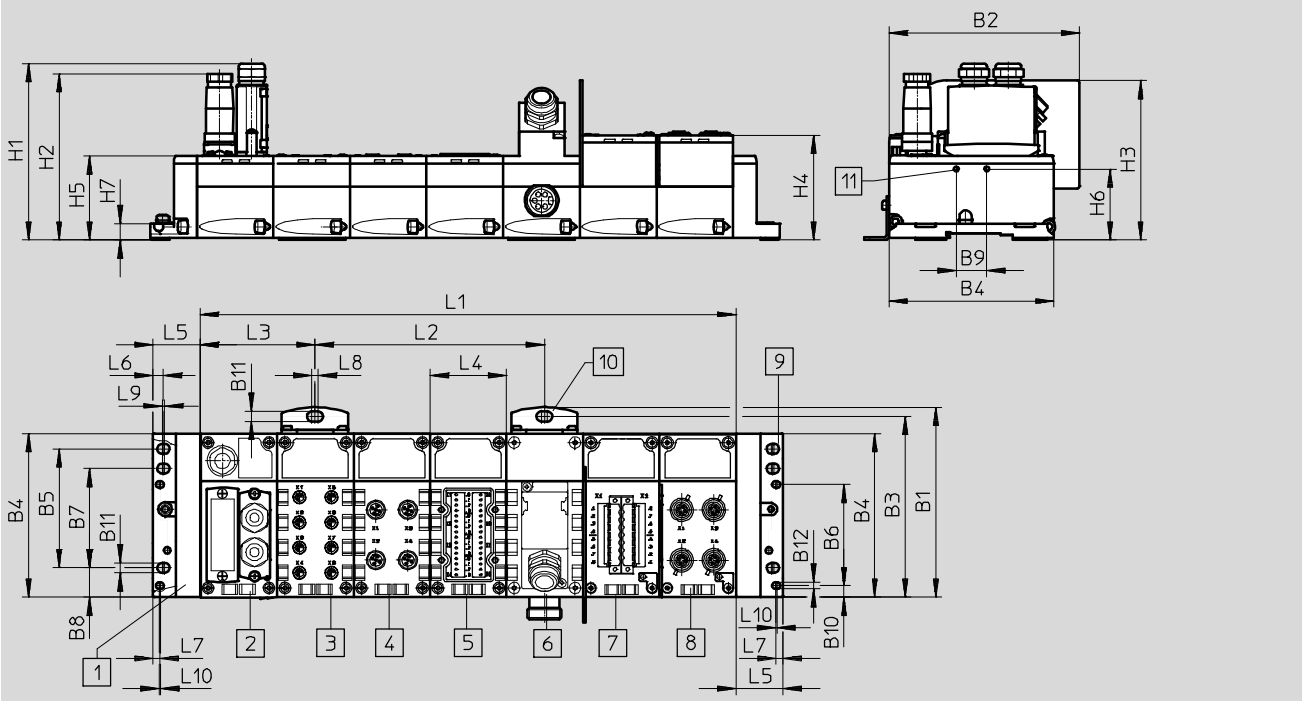
1 Pneumatic interface VMPA-FB
2 Inscription label
3 Flat plate silencer
4 Exhaust plate for ducted exhaust air
5 Fittings

Ordering data

Designation			Part no.	Type
Pneumatic interface				
	Ducted exhaust air	Internal pilot air	**552286**	**VMPA-FB-EPLM-G**
		External pilot air	**552285**	**VMPA-FB-EPLM-E**
	Flat plate silencer	Internal pilot air	**552288**	**VMPA-FB-EPLM-GU**
		External pilot air	**552287**	**VMPA-FB-EPLM-EU**
Exhaust plate				
	For ducted exhaust air, with push-in connector	For tubing O.D. 10 mm	**533375**	**VMPA-AP**
		For tubing O.D. 3/8"	**541629**	**VMPA-AP-3/8**
	Flat plate silencer		**533374**	**VMPA-APU**

Dimensions – Metal interlinking block Download CAD data ➔ **www.festo.com**

With bus nodes and connection blocks



1 Left-hand end plate
2 Bus node
3 Connection block CPX-AB-8-M8-3POL
4 Connection block CPX-AB-4-M12X2-5POL
5 Connection block CPX-AB-8-KL-4POL
6 Connection block CPX-AB-1-SUB-BU-25POL
7 Connection block CPX-P-AB-4-2XKL-8POL
8 Connection block CPX-P-AB-4XM12-4POL
9 Right-hand end plate
10 Mounting bracket for wall mounting
11 Hole for self-tapping screw M2.5

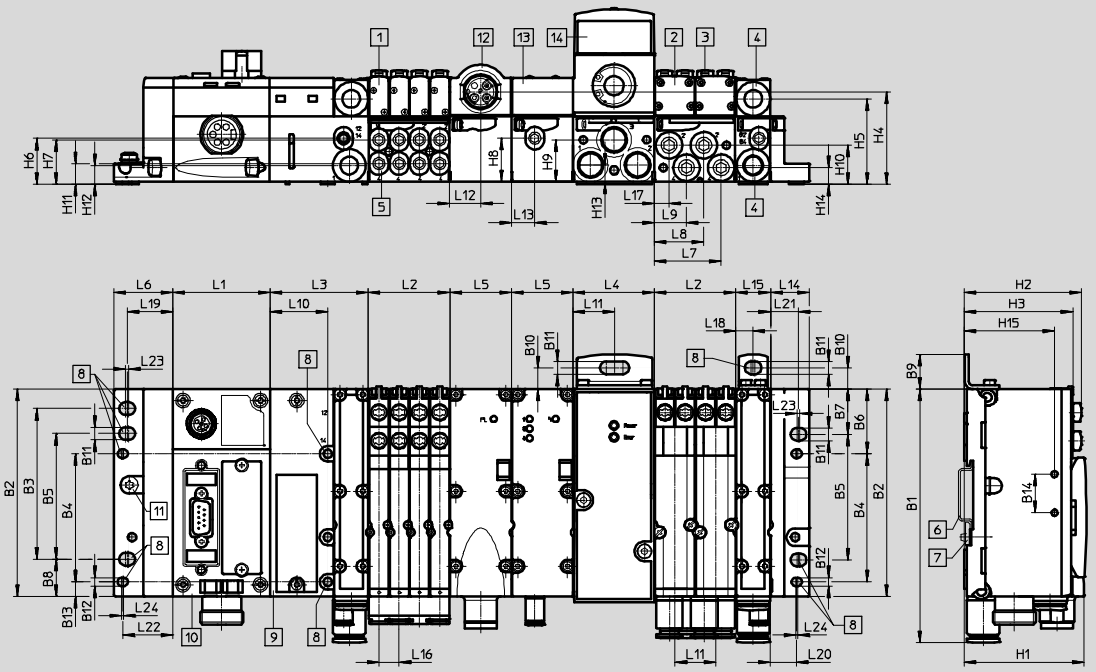
Type	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12
CPX-P	124.9	124.6	118.9	108.1	78	66.3	65	19.3	20	7.9	6.6	4.4

Type	H1	H2	H3	H4	H5	H6	H7
CPX-P	116	109	106.2	69.2	55.1	46.6	10.8

Type	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10
CPX-P	nx50.1	150.3	125.3	50.1	30.4	6.8	4.5	4	1.5	1

Dimensions Download CAD data ➔ **www.festo.com**

With bus nodes and valve terminal MPA-S



1 Solenoid valve MPA1
2 Solenoid valve MPA2
3 Manual override
4 Supply/exhaust ports
5 Working ports
6 H-rail
7 H-rail mounting
8 Mounting holes
9 Pneumatic interface VMPA-FB
10 CPX-P module
11 Earthing screw
12 Electrical supply plate
13 Pressure sensor
14 Proportional-pressure regulator
n Number of sub-bases in a grid of 4 MPA1 or 2 MPA2 valves
m Number of CPX-P modules

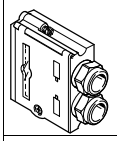
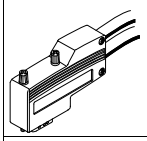
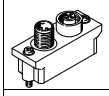
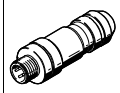
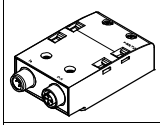
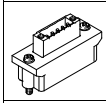
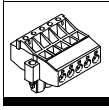
Type	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14
CPX-P	131.4	107.3	78	66.3	65	33.5	23.5	19.3	18	11	6.6	4.4	7.5	20

Type	H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	H11	H12	H13	H14	H15
CPX-P	62	60.5	56	48	44.3	23.9	23.1	22.6	21.8	20.3	10.8	9.8	8.8	8.7	46.6

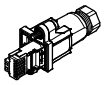
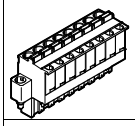
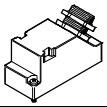
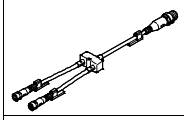
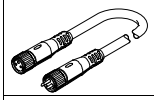
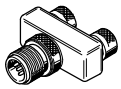
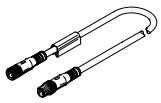
Type	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11	L12
CPX-P	m x 50.1	n x 42	51.2	42	32	30.4	34.7	25.7	16.7	30	21	16

Type	L13	L14	L15	L16	L17	L18	L19	L20	L21	L22	L23	L24
CPX-P	12	20	18	10.5	7.7	9	23.7	13.5	14.5	25.9	1.5	1

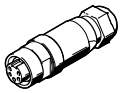
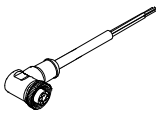
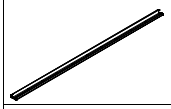
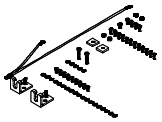
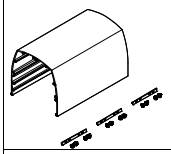
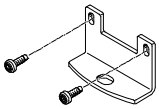
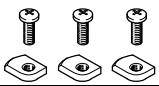
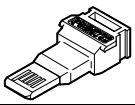
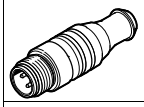
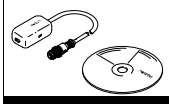
Ordering data – Accessories

Designation					Part no.	Type
Connectors						
	Sub-D socket, 9-pin			For DeviceNet®	**532219**	**FBS-SUB-9-BU-2x5POL-B**
	Sub-D plug, 9-pin			For PROFIBUS DP	**532216**	**FBS-SUB-9-GS-DP-B**
	Sub-D plug, angled			For PROFIBUS DP	**533780**	**FBS-SUB-9-WS-PB-K**
	Bus connection, adapter to 5-pin M12 plug/socket	Sub-D plug, 9-pin	B-coded	For PROFIBUS DP	**533118**	**FBA-2-M12-5POL-RK**
		Sub-D socket, 9-pin	Micro Style	For DeviceNet®	**525632**	**FBA-2-M12-5POL**
	M12 socket, 5-pin	Screw terminal	For FBA-2-M12-5POL		**18324**	**FBSD-GD-9-5POL**
		Screw terminal	For FBA-2-M12-5POL-RK and CPX-AB-2-M12-RK-DP		**1067905**	**NECU-M-B12G5-C2-PB**
	M8 plug, 3-pin	Solderable	For NEDY-L2R1-V1-M8G3-N-M8G4		**18696**	**SEA-GS-M8**
		Screw-in	For NEDY-L2R1-V1-M8G3-N-M8G4		**192009**	**SEA-3GS-M8-S**
	M12 plug, 4-pin	Spring-loaded terminal	For cable diameter 4 … 8 mm		**575719**	**NECU-M-S-A12G4-IS**[1]
		Screw terminal	D-coded	For Ethernet	**543109**	**NECU-M-S-D12G4-C2-ET**
			For cable diameter 2.5 … 2.9 mm		**570955**	**NECU-S-M12G4-P1-Q6-IS**[1]
					192008	**SEA-4GS-7-2,5**
			For cable diameter 2x3 mm or 2x5 mm		**570956**	**NECU-S-M12G4-D-IS**[1]
			For 2x cable diameter 3 … 5 mm		**18779**	**SEA-GS-11-DUO**
			For cable diameter 4 … 6 mm		**570953**	**NECU-S-M12G4-P1-IS**[1]
					18666	**SEA-GS-7**
			For cable diameter 6 … 8 mm		**570954**	**NECU-S-M12G4-P2-IS**[1]
					18778	**SEA-GS-9**
		Insulation displacement connector	Connection cross-section 0.25 … 0.5 mm^2		**525928**	**SEA-GS-HAR-4POL**
	M12 plug, 5-pin	Screw terminal	For 2x cable diameter 2.5 … 5 mm		**192010**	**SEA-5GS-11-DUO**
			For cable diameter 4 … 6 mm		**175487**	**SEA-M12-5GS-PG7**
			For FBA-2-M12-5POL		**175380**	**FBS-M12-5GS-PG9**
			For FBA-2-M12-5POL-RK and CPX-AB-2-M12-RK-DP		**1066354**	**NECU-M-S-B12G5-C2-PB**
	Connection block, adapter to 5-pin 7/8" plug	Sub-D socket, 9-pin	–	For DeviceNet®	**571052**	**CPX-AB-1-7/8-DN**
	Connection block, adapter to M12 plug/socket	Sub-D plug, 9-pin	B-coded	For PROFIBUS DP	**541519**	**CPX-AB-2-M12-RK-DP**
	Open Style bus connection for 5-pin terminal strip			For DeviceNet®	**525634**	**FBA-1-SL-5POL**
	5-pin terminal strip			For Open Style connection	**525635**	**FBSD-KL-2x5POL**

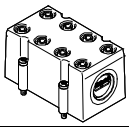
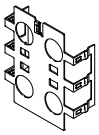
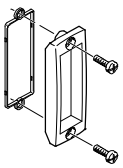
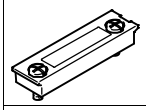
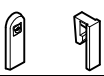
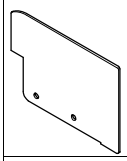
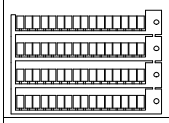
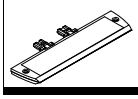
1) Component preferred for operation in intrinsically safe circuits.

Ordering data – Accessories						
Designation					Part no.	Type
Plug connectors						
	RJ45 plug				**534494**	**FBS-RJ45-8-GS**
	Socket, 8-pin	Spring-loaded terminal	Black		**565712**	**NECU-L3G8-C1**
			Blue		**565711**	**NECU-L3G8-C1-IS**[1]
		Screw terminal	Black		**565710**	**NECU-L3G8-C2**
			Blue		**565709**	**NECU-L3G8-C2-IS**[1]
	Sub-D plug, 25-pin				**527522**	**SD-SUB-D-ST25**
Connecting cables						
	Modular system for all types of sensor/actuator distributors				–	**NEDY-...** ➔ Internet: nedy
	Modular system for choice of connecting cable				–	**NEBU-...** ➔ Internet: nebu
	Push-in T-connector	1x plug, M8, 4-pin	2x socket M8, 3-pin		**8005312**	**NEDY-L2R1-V1-M8G3-N-M8G4**
		1x plug M12, 4-pin	2x socket M8, 3-pin		**8005311**	**NEDY-L2R1-V1-M8G3-N-M12G4**
			2x socket, M12, 4-pin		**562248**	**NEDU-M12D4-M12T4-IS**[1]
			2x socket, M12, 5-pin		**8005310**	**NEDY-L2R1-V1-M12G5-N-M12G4**
	Connecting cable M8-M8	3-pin	Straight plug/ straight socket	0.5 m	**541346**	**NEBU-M8G3-K-0.5-M8G3**
				1.0 m	**541347**	**NEBU-M8G3-K-1-M8G3**
				2.5 m	**541348**	**NEBU-M8G3-K-2.5-M8G3**
				5.0 m	**541349**	**NEBU-M8G3-K-5-M8G3**
	Connecting cable M12-M12	5-pin	Straight plug/ straight socket	1.5 m	**529044**	**KV-M12-M12-1,5**
				3.5 m	**530901**	**KV-M12-M12-3,5**

1) Component preferred for operation in intrinsically safe circuits.

Ordering data – Accessories				
Designation			Part no.	Type
Connectors and accessories – Power supply				
	Power supply socket, straight	7/8" connection, 5-pin	**543107**	**NECU-G78G5-C2**
	7/8" power supply socket, 5-pin, angled socket/open cable end, 5-pin	2 m	**573855**	**NEBU-G78W5-K-2-N-LE5**
Hood				
	Mounting rail for attaching the hood	1000 mm	**572256**	**CAFC-X1-S**
	Mounting kit for CPX hood		**572257**	**CAFC-X1-BE**
	Hood section for CPX-P terminal including mounting attachments for connecting several hood sections in series	200 mm	**572258**	**CAFC-X1-GAL-200**
		300 mm	**572259**	**CAFC-X1-GAL-300**
Screws				
	Screws for mounting the bus node/connection block on an interlinking block	Bus node/polymer connection block	**550219**	**CPX-M-M3x22-4x**
		Bus node/metal connection block	**550216**	**CPX-M-M3x22-S-4x**
	Screws for mounting an inscription label on the bus node (CPX-FB33)	12 pieces	**550222**	**CPX-M-M2,5X8-12X**
Mounting				
	Attachment for wall mounting (for long valve terminals, 2 mounting brackets and 4 screws)	Version for metal interlinking plates	**550217**	**CPX-M-BG-RW-2x**
	Mounting for H-rail		**526032**	**CPX-CPA-BG-NRH**
Function elements				
	Memory card for PROFINET bus node, 2MB		**4798288**	**CPX-SK-3**
	Terminating resistor, M12, B-coded for PROFIBUS		**1072128**	**CACR-S-B12G5-220-PB**
	M12 adapter, 5-pin to mini USB socket, and controller software		**547432**	**NEFC-M12G5-0.3-U1G5**

Ordering data – Accessories

Designation			Part no.	Type
Covers and attachments				
	Hood for CPX-AB-8-KL-4POL (IP65/67)	8 cable through-feeds M9 1 cable through-feed for multi-pin plug	**538219**	**AK-8KL**
	Set of fittings for cover AK-8KL		**538220**	**VG-K-M9**
	Screening plate for connection block • CPX-AB-4-M12X2-5POL • CPX-AB-4-M12X2-5POL-R		**526184**	**CPX-AB-S-4-M12**
	Inspection cover, transparent		**533334**	**AK-SUB-9/15-B**
	Transparent cover for DIL switch and memory card		**548757**	**CPX-AK-P**
	Cover for RJ45 connection		**534496**	**AK-Rj45**
	Cover cap for closing off unused ports (10 pieces)	For M8 connections	**177672**	**ISK-M8**
		For M12 connections	**165592**	**ISK-M12**
	Coding element (96 pieces of each)	For NECU-L3G8	**565713**	**CPX-P-KDS-AB-2XKL**
	Insulating plate for safe separation of intrinsically safe and non-intrinsically safe areas of the CPX terminal		**565708**	**CPX-P-AB-IP**[1)]
Inscription labels				
	Inscription labels 6x10 mm, 64 pieces, in frame		**18576**	**IBS-6x10**
	Inscription label holder for connection block		**536593**	**CPX-ST-1**

1) Component preferred for operation in intrinsically safe circuits.