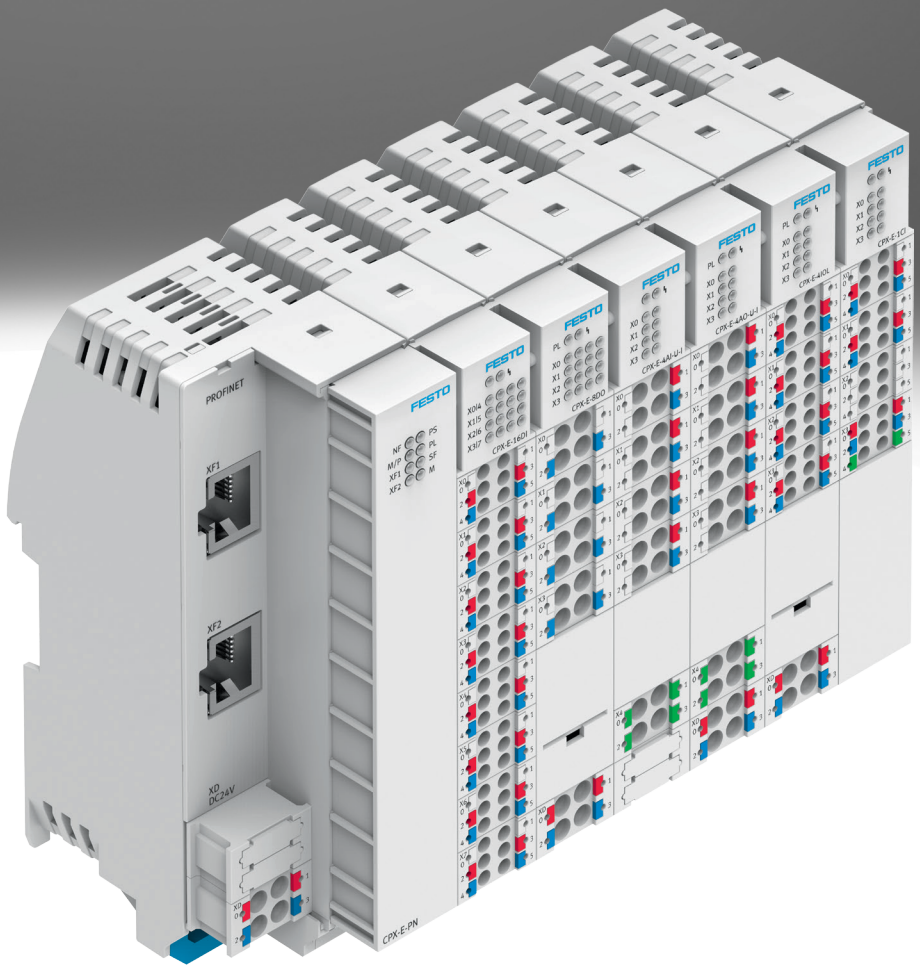
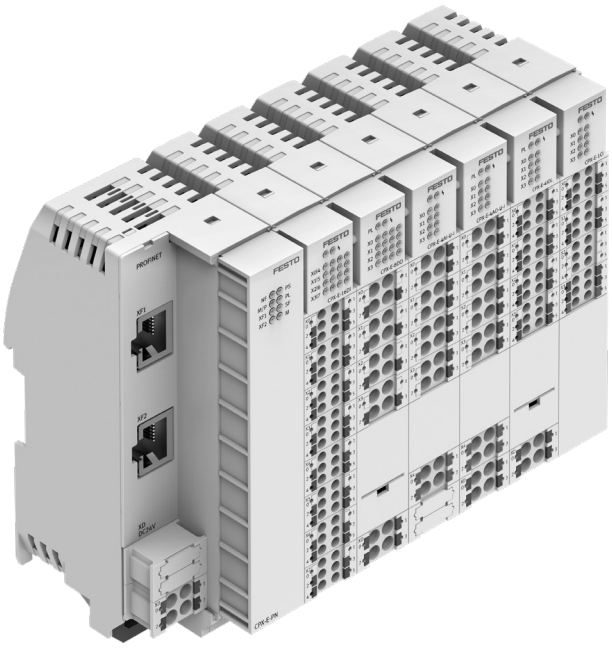
Automation system CPX-E



Key features



Key features

The automation system CPX-E is a high-performance control and automation system focusing primarily on motion control functions for handling technology. It comprises individual function modules that allow a very flexible system structure.
Depending on the combination, the automation system CPE-X can be configured and used purely as a remote I/O system or as a control system. The following modules are available:

- Controller
- Bus modules
- I/O modules
- Counter modules
- IO-Link master modules

The controllers for the automation system CPX-E are powerful and have comprehensive PLC functions. They have an integrated EtherCAT® master for communication with other products such as motor controllers.
There is support for SoftMotion, depending on the variant. SoftMotion is a powerful software library for simple and complex motion control applications.
All controllers have an integrated bus interface; an additional bus module for connection to higher-order controllers is not required.

- Standardised CODESYS programming interface
- Reduced development work through seamless data management
- Extended software functions for seamless integration and simplified control of electric drives
- Standardised, integrated platform combining servo technology and stepper motor technology, enabling mixed operation of the two technologies without problems in the application

Scalable motion control functions:

- Simple movements
- Multi-axis movements (cam discs)
- Contour applications
- Robotics

Handling technology using Festo kinematics (planar surface gantry, linear gantry, Cartesian three-dimensional gantries)

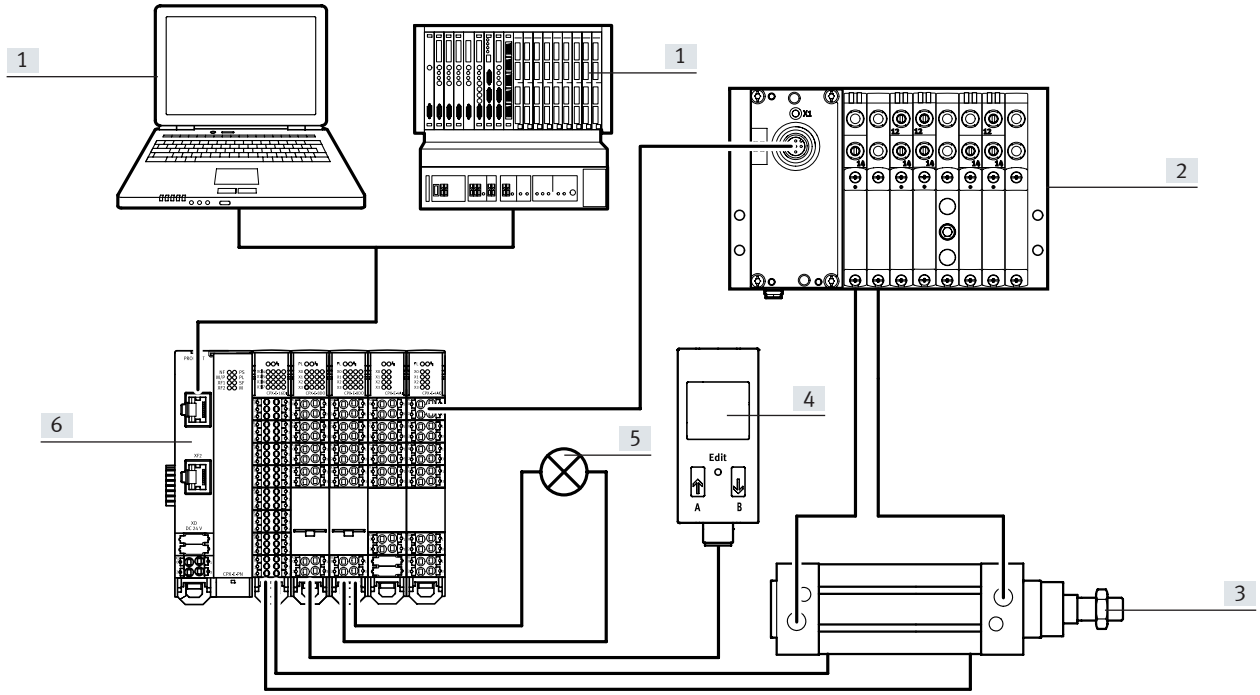
- Parts handling
- Assembly systems
- Palletising
- Gluing, dispensing

Complete automation of machines:

- Packaging machines
- Palletising systems
- Assembly machines
- Handling systems

Key features

Overview

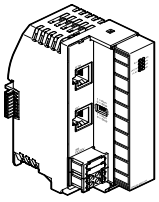
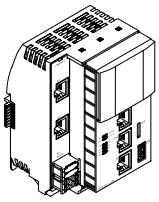
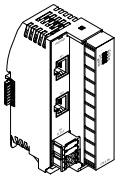


[1] Higher-order controller
[2] Valve terminal with I-Port interface/device with IO-Link® interface
[3] Cylinder with sensors for position sensing
[4] Flow sensor
[5] Visual indicator
[6] Automation system CPX-E

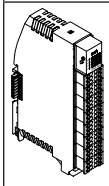
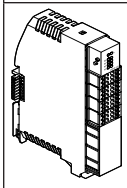
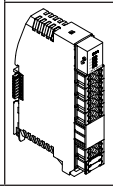
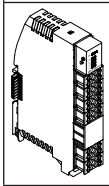
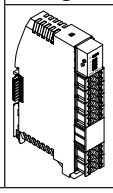
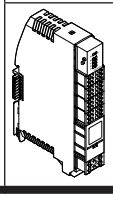
Ordering data – Product options

	Configurable product This product and all its product options can be ordered using the configurator.	The configurator can be found at ➔ **www.festo.com/catalogue/...** Enter the part number or the type.	Part no. 5237644	Type CPX-E

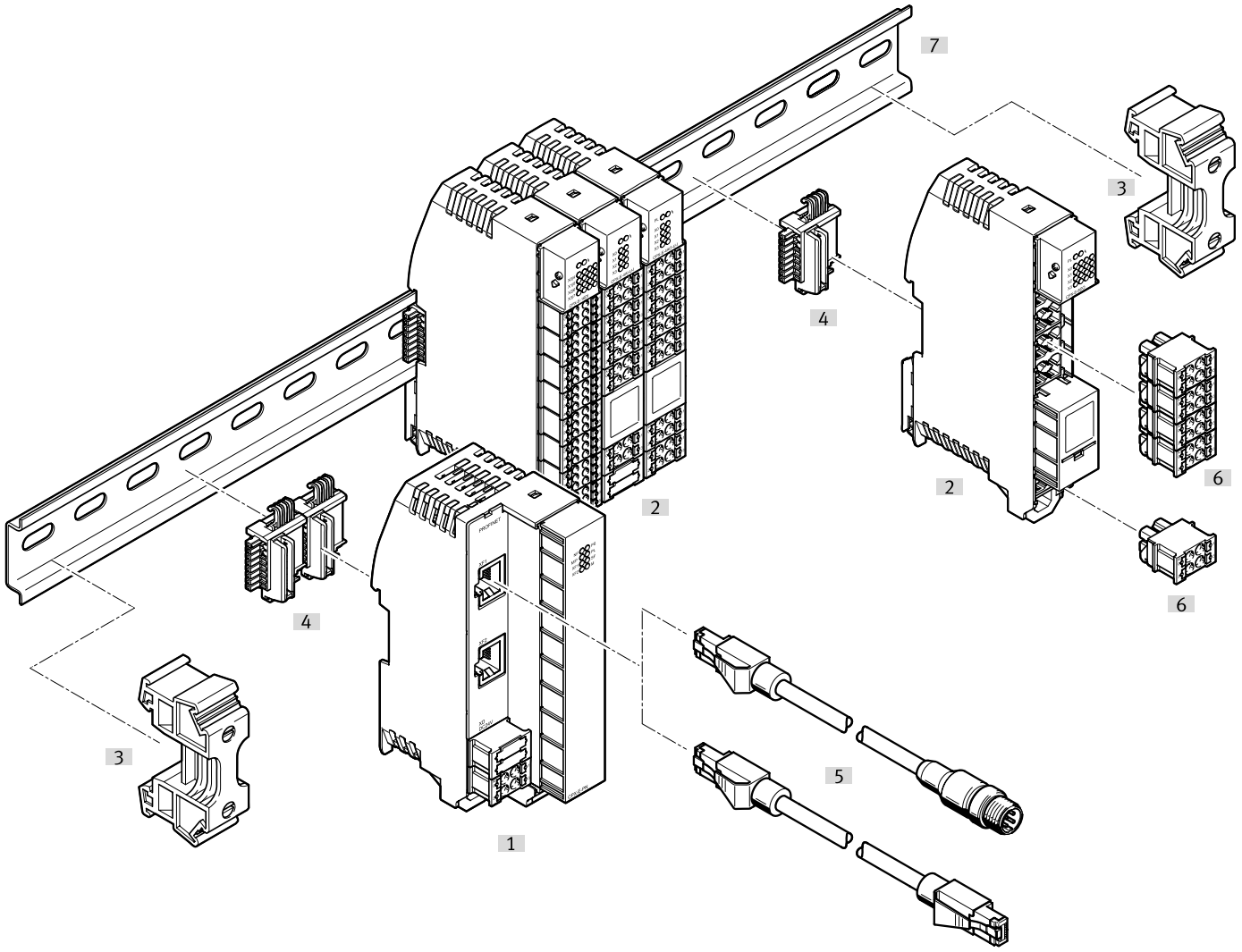
Product range overview

Function	Version		Type		→ Page
Controllers and bus modules	**Controller**				
	 	CODESYS V3	CPX-E-CEC-C1	• EtherCAT master • Stand-alone controller • Ethernet interface (EasyIP, Modbus TCP, TCP/IP, OPC-UA) • CODESYS	12
			CPX-E-CEC-C1-PN	• EtherCAT master • Communication via PROFINET IRT (Slave), EasyIP, Modbus TCP or TCP/IP • Ethernet interface (EasyIP, Modbus TCP, TCP/IP, OPC-UA) • CODESYS	18
			CPX-E-CEC-C1-EP	• EtherCAT master • Communication via EtherNet/IP (Slave), EasyIP, Modbus TCP or TCP/IP • Ethernet interface (EasyIP, Modbus TCP, TCP/IP, OPC-UA) • CODESYS	26
		CODESYS V3 with SoftMotion	CPX-E-CEC-M1	• EtherCAT master • Stand-alone controller • Ethernet interface (EasyIP, Modbus TCP, TCP/IP, OPC-UA) • CODESYS • SoftMotion functionality	12
			CPX-E-CEC-M1-PN	• EtherCAT master • Communication via PROFINET IRT (Slave), EasyIP, Modbus TCP or TCP/IP • Ethernet interface (EasyIP, Modbus TCP, TCP/IP, OPC-UA) • CODESYS • SoftMotion functionality	18
			CPX-E-CEC-M1-EP	• EtherCAT master • Communication via EtherNet/IP (Slave), EasyIP, Modbus TCP or TCP/IP • Ethernet interface (EasyIP, Modbus TCP, TCP/IP, OPC-UA) • CODESYS • SoftMotion functionality	26
	Bus module				
		PROFINET	CPX-E-PN	• Actuation via PROFINET • Ethernet interface	34
		EtherCAT®	CPX-E-EC	• Actuation via EtherCAT® • Ethernet interface	38
		EtherNet/IP	CPX-E-EP	• Actuation via EtherNet/IP • Ethernet interface	42
		PROFIBUS	CPX-E-PB	• Actuation via PROFIBUS • Sub-D interface	46

Product range overview

Function	Version		Type		→ Page
Input module	**Digital**				
		16 inputs	CPX-E-16DI	• LED indicator • PNP (positive switching) • 2- and 3-wire sensors to IEC 61131-2	50
		1 counter input	CPX-E-1CI	• LED indicator • Incremental encoder with two phase-offset signals and optional logic zero • Pulse generator with or without direction signal • Differential encoder input with 5 V DC operating voltage • Single encoder input (single ended) with 5 V DC or 24 V DC operating voltage	53
	Analogue				
		4 inputs	CPX-E-4AI-U-I	• LED indicator • Measured variable: current or voltage, can be set • Analogue input can be set up to 10 V/ up to 20 mA	60
Output module	**Digital**				
		8 outputs	CPX-E-8DO	• LED indicator • PNP (positive switching) • Characteristic curve outputs to IEC 61131-2, type 0.5	57
	Analogue				
		4 outputs	CPX-E-4AO-U-I	• LED indicator • Measured variable: current or voltage, can be set • Analogue input can be set up to 10 V/ up to 20 mA	64
Master module	**IO-Link®**				
		4 ports	CPX-E-4IOL	• LED indicator • Protocol version Master V 1.1	68

Peripherals overview



		Type	Description	→ Page/ Internet
[1]	Controller/bus module	CPX-E-CEC CPX-E-PN CPX-E-EC CPX-E-EP CPX-E-PB	Connection of the CPX-E to a higher-order controller	12 34 38 42 46
[2]	Input/output module Counter module IO-Link master module	CPX-E-16DI CPX-E-1CI CPX-E-8DO CPX-E-4AI-U-I CPX-E-4AO-U-I CPX-E-4IOL	Digital and analogue input and output modules	50 53 57 60 64 68
[3]	Retainer	CAFM-X3-HC	Prevents the CPX-E from slipping on the DIN rail	–
[4]	Electrical interlinking module	VAEA-X3-L	Electrical connection between the individual modules of the CPX-E	–
[5]	Connecting cable	NEBC	For connection to the higher-order controller	–
[6]	Terminal strip	NEKC	Blocks with spring-loaded terminals for connecting sensors and actuators	–
[7]	DIN mounting rail	NRH-35-2000	DIN rail to EN 60715	nrh

Key features – Mounting

Mounting

The automation system CPX-E can only be mounted on a DIN rail. Modules can easily be removed, replaced or added at a later date.

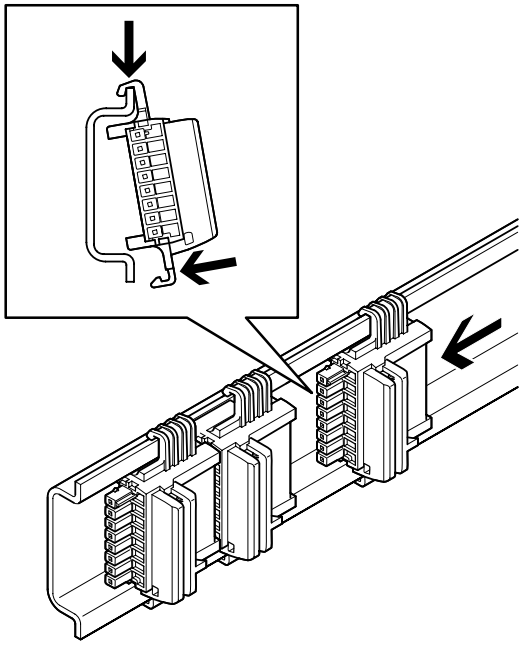
The following mounting clearances are recommended to allow sufficient ventilation of the automation system CPX-E:

- At the top: 4 cm
- At the side: 2 cm
- At the bottom: 3 cm

Note

Assembly must only take place in a de-energised state.

Mounting – Electrical manifold module



The electrical interlinking modules are clipped into the DIN rail. They can be moved along the DIN rail. The electrical interlinking modules connect the individual modules of the automation system CPX-E to one another. They are used for:

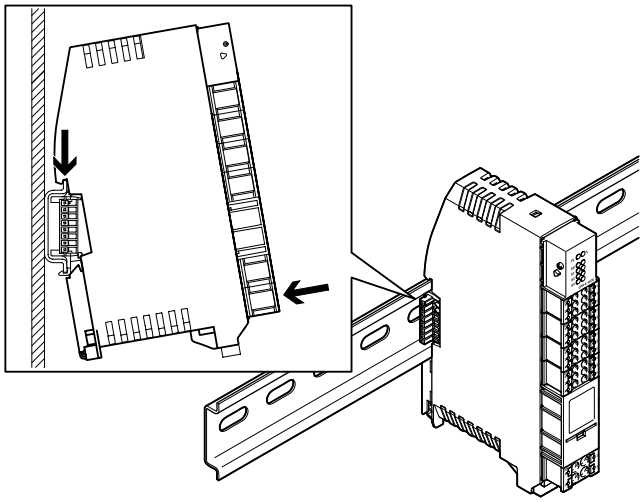
- Data transmission
- Power supply to the module
- Power supply to connected sensors

Output modules have a separate power infeed from which the consumers connected to the module are supplied.

The modules require different numbers of electrical interlinking modules (included in the scope of delivery of the module):

- One electrical interlinking module per input module
- One electrical interlinking module per counter module
- One electrical interlinking module per output module
- One electrical interlinking module per IO-Link master module
- Two electrical interlinking modules per bus module
- Two electrical interlinking modules per stand-alone controller
- Four electrical interlinking modules per PROFINET controller
- Four electrical interlinking modules per EtherNet/IP controller

Assembly – Modules



The module is hooked into the DIN rail or the electrical interlinking module and snapped into place.
For removal, a screwdriver is required to undo the fastening clamp.
The automation system CPX-E is prevented from slipping on the DIN rail by attaching retainers (included in the scope of delivery) on either side.

If a module is to be replaced, the associated electrical interlinking module remains on the DIN rail. If a module is missing, this interrupts the connection of the bus module/controller to the downstream input/output modules or IO-Link master modules.

Key features – Mounting

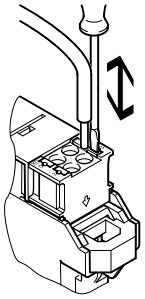
Electrical connections

All the electrical connections of the automation system CPX-E are designed as terminal strips with spring-loaded terminals.

Modules can easily be removed, replaced or added at a later date.

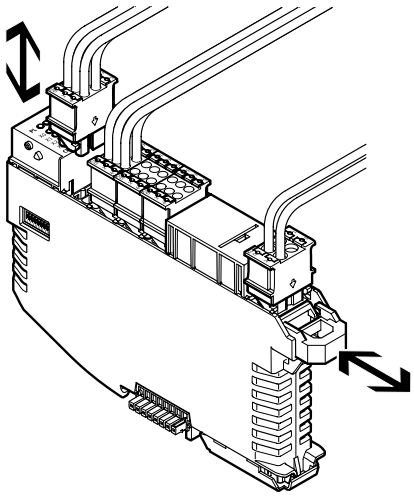
Note
Assembly must only take place in a de-energised state.

Mounting – Single wire



The electrical connection for the inputs and outputs, as well as the power supply, is provided via terminal strips for single strands.

Mounting – Terminal strip



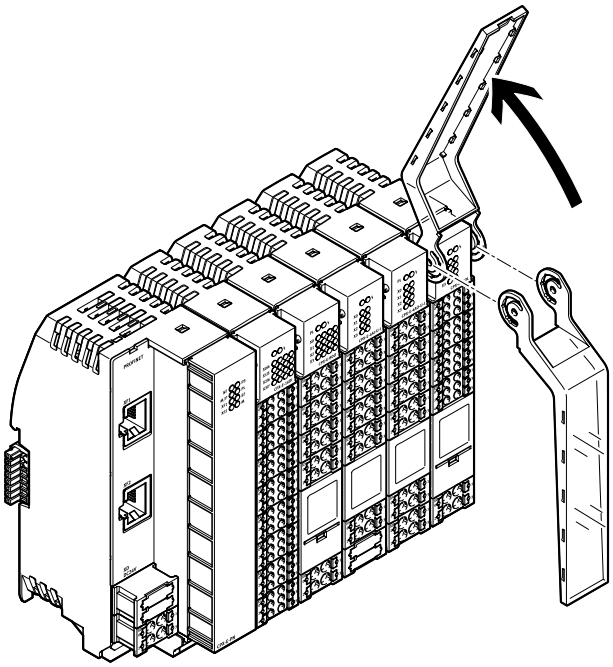
The terminal strips mounted on a module are held in position by a central locking mechanism.
To remove individual terminal strips, the locking mechanism is released using a screwdriver:

- Simple changeover of connected sensors or actuators
- Fast and visible disconnection and reconnection of the power supply
- Simple changeover of an entire CPX-E module, wiring is retained

The terminal strips have a partially coded plug pattern:

- Terminal strips with the same number of pins can be interchanged
- Terminal strips for power supply connections only fit on power supply connections

Labelling

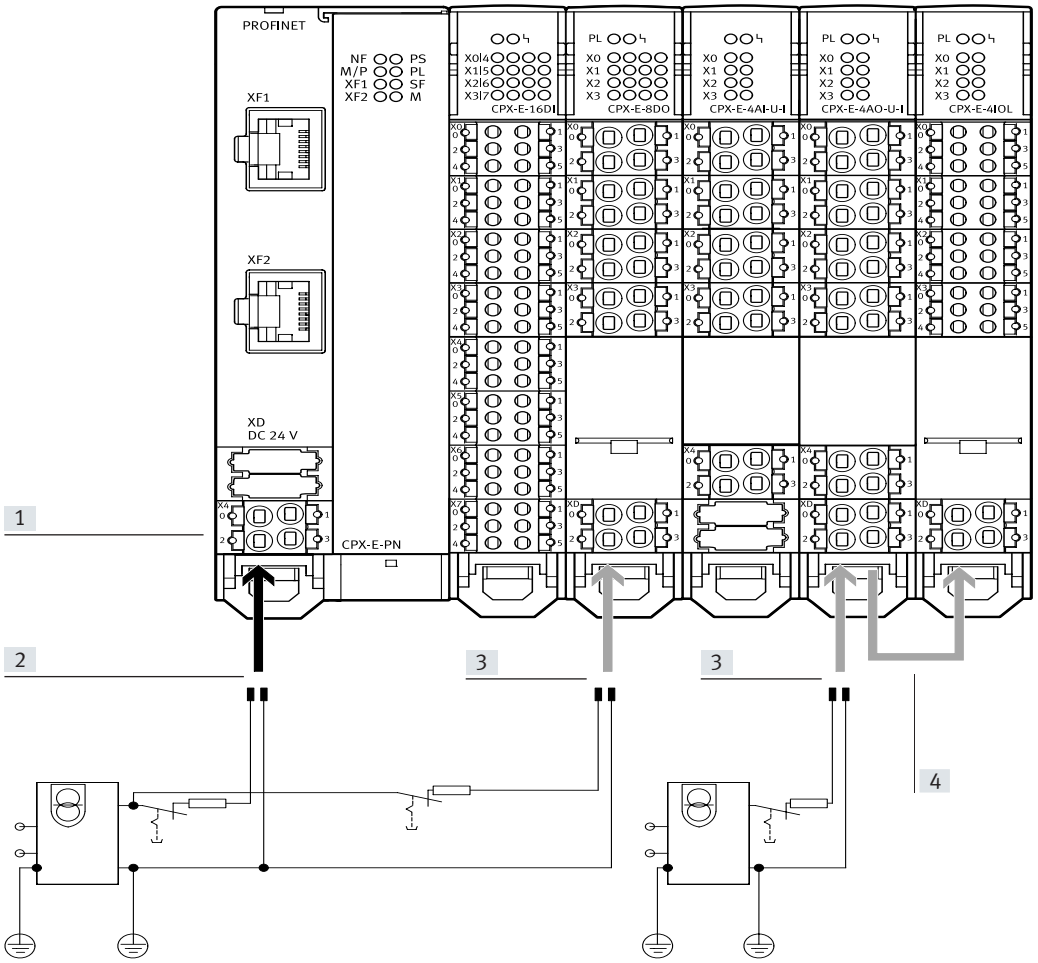


A hinged inscription label holder is available for the input and output modules and IO-Link master modules.

A matching label strip is inserted into the inscription label holder for labelling.

Key features – Power supply

Power supply concept



[1] The power supply is provided via a terminal strip with spring-loaded terminals on the module

[2] The power supply for the modules themselves and the connected sensors is provided centrally on the bus module/controller.

[3] The power supply for connected actuators is provided via a terminal strip with spring-loaded terminals on the respective output module/IO-Link master module

[4] The power supply for actuators can be looped through from output module to output module/IO-Link master module

Interlinking blocks represent the backbone of the automation system CPX-E with all supply lines. They provide the power supply for the modules used on them as well as their bus connections.
For segmentation into voltage zones, the power supply for the outputs is fed in separately at the output module.
This creates electrically isolated, all-pole disconnectable potential groups/voltage segments.

Key features – Diagnostics

System performance

Diagnostics

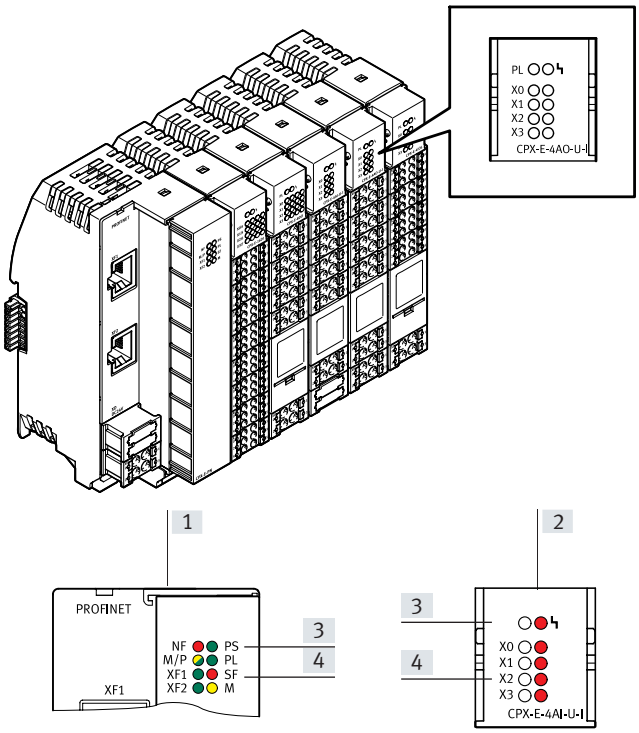
Detailed diagnostic functions are needed in order to quickly locate the causes of errors in the electrical installation and therefore reduce downtimes in production plants.
A basic distinction is made between on-the-spot diagnostics using LEDs or an operator unit and diagnostics using a bus interface.

The automation system CPX-E 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.
The parameters for maximum storage time and recording method for diagnostic messages can be set.

Module and channel-specific diagnostics are supported, for example:
- Undervoltage detection
- Short circuit detection
- Open load detection
- Storage of the 40 most recently occurring errors

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.
There is also the option of access via the integrated web server (remote maintenance via PC/web applications).

Indicator lights



Each module has a row of LEDs for indicating the operating status of the module and of the connected sensors or actuators.

[1] LED indicators on the bus module/controller
[2] LED indicators on the input/output module, IO-Link master module
[3] System-specific LED indicator (e.g. power supply)
[4] Communication-specific LED indicator (e.g. status of network connection, switching status of sensor)

Parameterisation

Changes to the application are often required during commissioning. The parameterisable characteristics of the CPX-E modules mean that functions can be very easily changed using the configuration software.

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,

Depending on the modules used, parameterisation is performed via the following interfaces:
- Ethernet
- Fieldbus

The following settings are affected by the parameterisation:
- Behaviour in event of communication errors
- Behaviour on being switched back on
- Debounce times and signal extension
- Force settings (defining the signal status)
- Operating mode of the diagnostic memory

Key features – Addressing

Addressing

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

Maximum system configuration:
- 1 bus module or controller
- 10 input/output/counter modules and IO-Link master modules

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

Addresses are allocated automatically in ascending order from left to right, as viewed from the bus module/controller.

Note

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

Overview – Address space for CPX-E bus modules and controller

	Protocol	Max. total		Max. digital		Max. analogue	
		Inputs	Outputs	Inputs	Outputs	Inputs	Outputs
CPX-E-CEC-C1	CODESYS V3	512 bit	512 bit	160 DI	80 DO	32 AI	32 AO
CPX-E-CEC-M1	CODESYS V3 with SoftMotion	512 bit	512 bit	160 DI	80 DO	32 AI	32 AO
CPX-E-CEC-C1-PN	CODESYS V3	4096 bit	4096 bit	1280 DI	360 DO	256 AI	256 AO
CPX-E-CEC-M1-PN	CODESYS V3 with SoftMotion	4096 bit	4096 bit	1280 DI	360 DO	256 AI	256 AO
CPX-E-CEC-C1-EP	CODESYS V3	4096 bit	4096 bit	1280 DI	360 DO	256 AI	256 AO
CPX-E-CEC-M1-EP	CODESYS V3 with SoftMotion	4096 bit	4096 bit	1280 DI	360 DO	256 AI	256 AO
CPX-E-PN	PROFINET	512 bit	512 bit	160 DI	80 DO	32 AI	32 AO
CPX-E-EC	EtherCAT®	512 bit	512 bit	160 DI	80 DO	32 AI	32 AO
CPX-E-EP	EtherNet/IP	512 bit	512 bit	160 DI	80 DO	32 AI	32 AO
CPX-E-PB	PROFIBUS	512 bit	512 bit	160 DI	80 DO	32 AI	32 AO

DI = Digital inputs (1 bit)
DO = Digital outputs (1 bit)
AO = Analogue outputs (16 bits)
AO = Analogue outputs (16 bits)
AI = Analogue inputs (16 bits)

Note

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

Overview – Allocated addresses for CPX-E modules

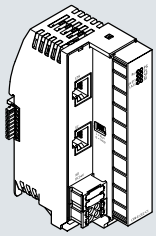
		Inputs [bit]	Outputs [bit]
CPX-E-16DI	Digital input module, 16 inputs	16	–
CPX-E-1CI	Digital counter module, 1 counter input	96	16
CPX-E-8DO	Digital output module, 8 outputs	–	8
CPX-E-4AI-U-I	Analogue input module, 4 inputs	64	–
CPX-E-4AO-U-I	Analogue output module, 4 outputs	–	64
CPX-E-4IOL	IO-Link master module, 4 ports	64 ... 256	64 ... 256

Example of CPX-E-PN (PROFINET)

	Inputs [bit]	Outputs [bit]	Remarks
3x CPX-E-16DI	48	–	• The maximum number of modules is achieved with 10 CPX-E input/output modules • The available address space (512 bits) is not fully used up • No additional modules can be configured
1x CPX-E-8DO	–	8	
6x CPX-E-4AI-U-I	384	–	
Assigned address space	432	8	

Datasheet – Stand-alone controller

Controller for operating the automation system CPX-E as an autonomous unit
Programming and process visualisation take place via CODESYS.
The controller includes the power supply for the modules of the automation system and the connected sensors.



Application

Ethernet connection

The controller can be accessed directly via two Ethernet interfaces.

There is also the option of connecting via Modbus/TCP or standard Ethernet (TCP/IP).

The interfaces support crossover detection, which means that there is a choice of using patch cables or crossover cables.

Motion control

The controller has an integrated EtherCAT master. EtherCAT® is used for communication with other products:

- Motor controllers (CMMP, CMMT)
- Electrical terminal (CPX)
- Valve terminals with I-Port interface via the installation system CTEL (bus node CTEU-EC)

The SoftMotion extension makes it possible to control/execute coordinated multi-axis movements.

Additional functions

- Web server for read access to the most important parameter and diagnostic functions
- FTP server for data exchange
- Real-time clock, can be set and read using CODESYS
- Internal temperature sensor

Datasheet – Stand-alone controller

General technical data		
CPU data		Dual core 650 MHz
		128 MB RAM
Programming software		CODESYS provided by Festo
Program memory		12 MB, user program
Buffering time real-time clock		3 weeks
Processing time		Approx. 200 µs/1 k instruction
Flags		120 kB remanent data
		CODESYS variable concept
Function elements		Read CPX module diagnostics
		CPX diagnostic status
		Copy CPX diagnostic trace
		And others
IP address setting		DHCP
		Via CODESYS
Control elements		DIP switch for RUN/STOP
Configuration support		CODESYS V3
Maximum number of modules		10
System parameters		Diagnostic memory
		Fail-safe response
		System start
Module parameters		Channel alarms bundling
		Undervoltage diagnostics
		Channel alarms for undervoltage
		Process value representation, analogue modules
Diagnostics via LED		Force mode
		Module status
		Network status engineering port 1
		Network status EtherCAT®
		Run
		Power supply, electronics/sensors
		Power supply load
		System errors
Address capacity of internal bus inputs/outputs		
Max. address capacity of outputs	[byte]	64
Max. address capacity of inputs	[byte]	64

Datasheet – Stand-alone controller

Technical data – Interfaces		
Fieldbus interface		
Protocol		EtherCAT®
		EtherCAT master
		EtherCAT CoE
		EtherCAT EoE
		EtherCAT FoE
Function		Bus connection outgoing
Transmission rate	[Mbps]	100
Type		Ethernet
Connection type		Socket
Connection technology		RJ45
Number of pins/cores		8
Galvanic isolation		Yes
Ethernet interface		
Protocol		EasyIP
		Modbus TCP
		TCP/IP
		OPC UA
Function		Diagnostics
Transmission rate	[Mbps]	10
	[Mbps]	100
Connection type		Socket
Connection technology		RJ45
Number of pins/cores		8

Technical data – Electrical		
Nominal operating voltage DC for electronics/sensors	[V DC]	24
Permissible voltage fluctuations, electronics/sensors	[%]	±25
Power failure buffering	[ms]	20
Max. power supply	[A]	8
Intrinsic current consumption at nominal operating voltage, electronics/sensors	[mA]	Typically 65
Protection against direct and indirect contact		PELV
Reverse polarity protection		24 V sensor supply against 0 V sensor supply
Note on reverse polarity protection		Self-protection
Electrical connection, power supply		
Function		Electronic system and sensors
Connection type		Terminal strip
Note on the connection type		> 4 A and UL 2x terminal strip for power supply
Connection technology		Spring-loaded terminal
Number of pins/cores		4
Conductor cross-section	[mm²]	0.2 ... 1.5
Note on conductor cross section		0.2 ... 2.5 mm² for flexible conductor without wire ferrule

Technical data – Mechanical components		
Type of mounting		With DIN rail
Mounting position		Vertical; horizontal
Product weight	[g]	145
Grid dimension	[mm]	18.9
Dimensions W x L x H	[mm]	42.2 x 76.5 x 125.8

Materials	
Housing	PA
Note on materials	RoHS-compliant
LABS (PWIS) conformity	VDMA24364 zone III

Datasheet – Stand-alone controller

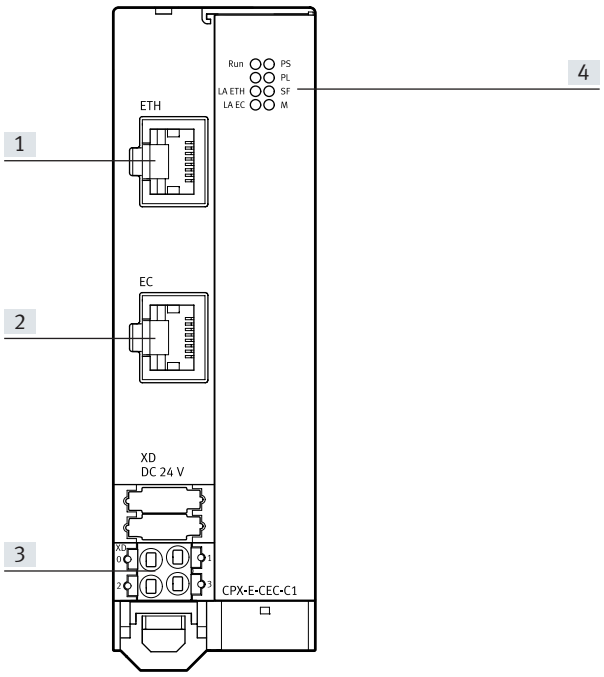
Operating and environmental conditions		
Ambient temperature	[°C]	–5 ... +50
Note on ambient temperature	[°C]	–5 ... +60 for vertical installation
Storage temperature	[°C]	–20 ... +70
Corrosion resistance class CRC[1)]		0
Relative humidity	[%]	95
		Non-condensing
CE marking (see declaration of conformity)[2)]		To EU EMC Directive[1)]
		To EU RoHS Directive
UKCA marking (see declaration of conformity)[2)]		To UK EMC regulations
		To UK RoHS regulations
KC marking		KC EMC
Certification		RCM
		c UL us-Listed (OL)
Certificate-issuing authority		UL E239998
Degree of protection		IP20

1) More information www.festo.com/x/topic/crc
2) For information about the area of use, see the EC declaration of conformity at: www.festo.com/catalogue/CPX-E ➔ Support/Downloads.
If the devices are subject to usage restrictions in residential, commercial or light-industrial environments, further measures for the reduction of the emitted interference may be necessary.
3) Additional information: www.festo.com/catalogue/CPX-E ➔ Support/Downloads.

Safety characteristics	
Shock resistance	Shock test with severity level 1 to FN 942017-5 and EN 60068-2-27
Vibration resistant	Transport application test with severity level 1 to FN 942017-4 and EN 60068-2-6

Datasheet – Stand-alone controller

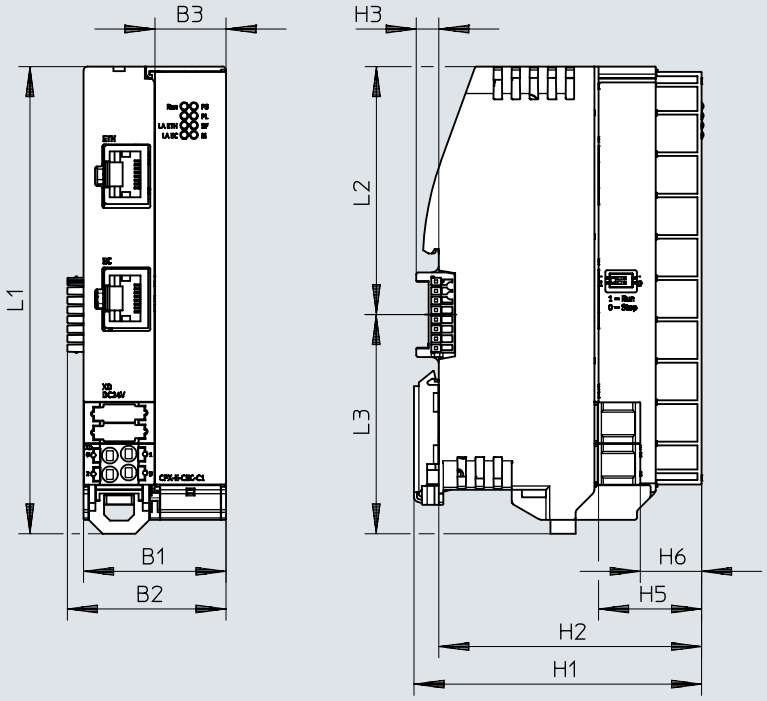
Connection and display components



[1] Ethernet network connection
[2] EtherCAT master network connection
[3] Terminal strip for operating voltage supply
[4] LED indicators

Dimensions

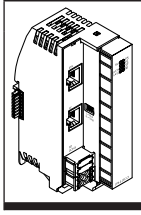
Download CAD data ➔ www.festo.com



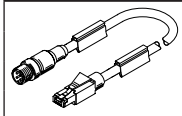
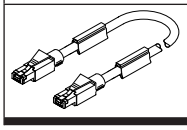
	B1	B2	B3	H1	H2	H3	H4	H5	H6	L1	L2	L3
CPX-E-CEC-C1	37.8	42.2	18.9	76.5	69.9	6	–	27.4	16.3	124.3	66	58.3
CPX-E-CEC-M1												

Datasheet – Stand-alone controller

Ordering data

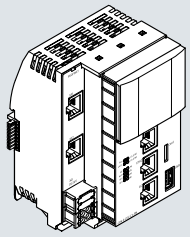
	Bus connection	Additional functions	Part no.	Type
	Autonomous control	CODESYS V3	**5226780**	**CPX-E-CEC-C1**
		CODESYS V3 with SoftMotion	**5266781**	**CPX-E-CEC-M1**

Ordering data – Accessories

			Cable length [m]	Part no.	Type
	Straight plug, M12x1, 4-pin, D-coded	Straight plug, RJ45, 8-pin	1	**8040451**	**NEBC-D12G4-ES-1-S-R3G4-ET**
			3	**8040452**	**NEBC-D12G4-ES-3-S-R3G4-ET**
			5	**8040453**	**NEBC-D12G4-ES-5-S-R3G4-ET**
			10	**8040454**	**NEBC-D12G4-ES-10-S-R3G4-ET**
	Straight plug, RJ45, 8-pin	Straight plug, RJ45, 8-pin	1	**8040455**	**NEBC-R3G4-ES-1-S-R3G4-ET**

Datasheet – PROFINET controller

Controller for operating the automation system CPX-E on PROFINET or as an autonomous unit Programming and process visualisation take place via CODESYS. The controller includes the power supply for the modules of the automation system and the connected sensors.



Application

Bus connection

The bus connection is provided via RJ45 sockets which meet Ethernet requirements. Communication with a higher-order controller takes place via PROFINET. There is also the option of connecting via Modbus/TCP or standard Ethernet (TCP/IP). The controller can be accessed directly via two Ethernet interfaces. The integrated switch supports star and line topology and enables the network to be divided into segments. The controller can be operated both as a higher-order device (master) and as a subordinate device (slave) using the communication protocol Modbus/TCP. The interfaces support crossover detection, which means that there is a choice of using patch cables or crossover cables.

Motion control

The controller has an integrated EtherCAT master. EtherCAT® is used for communication with other products:

- Motor controllers (CMMP, CMMT)
- Electrical terminal (CPX)
- Valve terminals with I-Port interface via the installation system CTEL (bus node CTEU-EC)

The SoftMotion extension makes it possible to control/execute coordinated multi-axis movements.

Data storage

An SD card slot and a USB interface are provided for reading out and storing data. The maximum memory size for compatible media is 32 GB in FAT format with a partition. There is no provision to permanently record data on the external media during operation. Only USB storage media with a current consumption of less than 0.5 A may be used.

Additional functions

- Web server for read access to the most important parameter and diagnostic functions
- FTP server for data exchange
- Real-time clock, can be set and read using CODESYS
- Internal temperature sensor

Datasheet – PROFINET controller

General technical data		
CPU data		Dual core 766 MHz
		512 MB RAM
Storage medium		Micro SD card up to 32 GB
		USB memory stick up to 32 GB
Programming software		CODESYS provided by Festo
Program memory		100 MB, user program
Buffering time real-time clock		3 weeks
Processing time		Approx. 200 µs/1 k instruction
Flags		120 kB remanent data
		CODESYS variable concept
Function elements		Read CPX module diagnostics
		CPX diagnostic status
		Copy CPX diagnostic trace
		And others
IP address setting		DHCP
		Via CODESYS
		Optional: via control unit CDSB
Control elements		DIP switch for RUN/STOP
		Optional control unit CDSB
Configuration support		Operator unit CDSB
		CODESYS V3
		GSDML file
Maximum number of modules		10
System parameters		Diagnostic memory
		Fail-safe response
		System start
Module parameters		Channel alarms bundling
		Undervoltage diagnostics
		Channel alarms for undervoltage
		Process value representation, analogue modules
Diagnostics via LED		Force mode
		Module status
		Network errors
		Network status engineering port 1
		Network status, engineering port 2
		Network status EtherCAT®
		Network status port 1
		Network status, port 2
		Run
		Power supply, electronics/sensors
		Power supply load
		System errors
		Maintenance required
Address capacity of internal bus inputs/outputs		
Max. address capacity of outputs	[byte]	64
Max. address capacity of inputs	[byte]	64

Datasheet – PROFINET controller

Technical data – Interfaces		
Fieldbus interface 1		
Protocol		PROFINET IO
		PROFINET RT
		PROFINET shared device
		PROFINET I&M0 .. 3
		MRP, MRPD (ring redundancy)
		LLDP
		SNMP
Function		Bus connection incoming/outgoing
Transmission rate	[Mbps]	100
Type		Ethernet
Connection type		2 x socket
Connection technology		RJ45
Number of pins/cores		8
Galvanic isolation		Yes
Max. address capacity of outputs	[byte]	512
Max. address capacity of inputs	[byte]	512
Fieldbus interface 2		
Protocol		EtherCAT®
		EtherCAT master
		CoE
		EoE
		FoE
Function		Bus connection incoming/outgoing
Transmission rate	[Mbps]	100
Type		Ethernet
Connection type		Socket
Connection technology		RJ45
Number of pins/cores		8
Galvanic isolation		Yes
Ethernet interface		
Protocol		EasyIP
		Modbus TCP
		TCP/IP
		OPC UA
Function		Switch
		Diagnostics
Transmission rate	[Mbps]	10
	[Mbps]	100
Connection type		2 x socket
Connection technology		RJ45
Number of pins/cores		8
USB interface		
USB interface		USB 2.0

Datasheet – PROFINET controller

Technical data – Electrical		
Nominal operating voltage DC	[V DC]	24
Nominal operating voltage DC for electronics/sensors	[V DC]	24
Permissible voltage fluctuations, electronics/sensors	[%]	±25
Power failure buffering	[ms]	20
Max. power supply	[A]	8
Intrinsic current consumption at nominal operating voltage, electronics/sensors	[mA]	Typically 150
Protection against direct and indirect contact		PELV
Reverse polarity protection		24 V sensor supply against 0 V sensor supply
Note on reverse polarity protection		Self-protection

Electrical connection, power supply		
Function		Electronic system and sensors
Connection type		Terminal strip
Note on the connection type		> 4 A and UL 2x terminal strip for power supply
Connection technology		Spring-loaded terminal
Number of pins/cores		4
Conductor cross-section	[mm^2]	0.2 ... 1.5
Note on conductor cross section		0.2 ... 2.5 mm^2 for flexible conductor without wire ferrule

Technical data – Mechanical components		
Type of mounting		With DIN rail
Mounting position		Vertical; horizontal
Product weight	[g]	288
Grid dimension	[mm]	18.9
Dimensions W x L x H	[mm]	75.9 x 82.5 x 124.3

Materials		
Housing		PA
Note on materials		RoHS-compliant
LABS (PWIS) conformity		VDMA24364 zone III

Operating and environmental conditions		
Ambient temperature	[°C]	–5 ... +50
Note on ambient temperature	[°C]	–5 ... +60 for vertical installation
Storage temperature	[°C]	–20 ... +70
Corrosion resistance class CRC[1)]		0
Relative humidity	[%]	95
		Non-condensing
CE marking (see declaration of conformity)[2)]		To EU EMC Directive[1)]
		To EU RoHS Directive
UKCA marking (see declaration of conformity)[2)]		To UK EMC regulations
		To UK RoHS regulations
KC marking		KC EMC
Certification		RCM
		c UL us-Listed (OL)
Certificate-issuing authority		UL E239998
Degree of protection		IP20

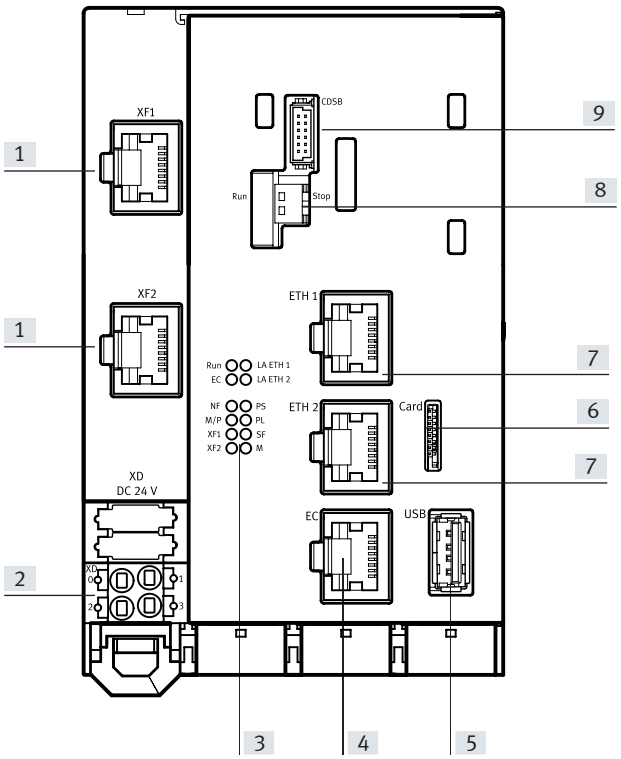
1) More information www.festo.com/x/topic/crc
2) For information about the area of use, see the EC declaration of conformity at: www.festo.com/catalogue/CPX-E ➔ Support/Downloads.
If the devices are subject to usage restrictions in residential, commercial or light-industrial environments, further measures for the reduction of the emitted interference may be necessary.
3) Additional information: www.festo.com/catalogue/CPX-E ➔ Support/Downloads.

Safety characteristics	
Shock resistance	Shock test with severity level 1 to FN 942017-5 and EN 60068-2-27
Vibration resistant	Transport application test with severity level 1 to FN 942017-4 and EN 60068-2-6

Datasheet – PROFINET controller

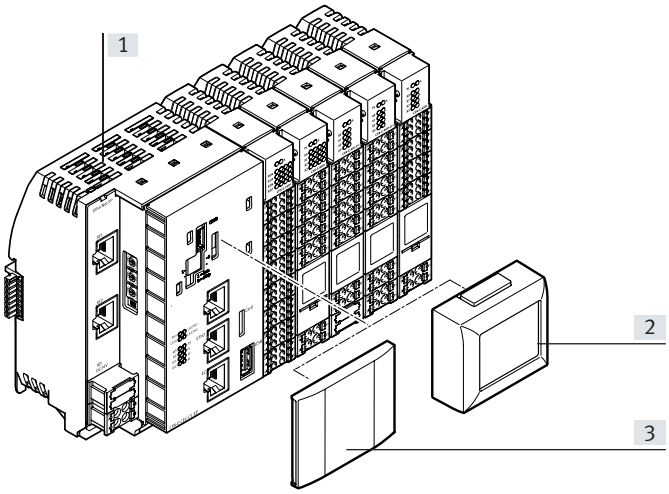
Connection and display components

CPX-E-CEC-...



[1] Network connections 1 and 2, PROFINET IO
[2] Terminal strip for operating voltage supply
[3] LED indicators
[4] EtherCAT master network connection
[5] USB interface
[6] Slot for micro SD memory card
[7] Network connections 1 and 2, Ethernet
[8] DIL switch for holding and starting projects in CODESYS
[9] Slot for operator unit CDSB

Display and operator unit CDSB-A1



The operator unit CDSB-A1 from Festo is a plug-in display and operating panel for the automation system CPX-E.
The integrated colour TFT display with touchscreen can be used both for operation and for simple diagnostics of the connected basic unit. User-friendliness is enhanced through fault diagnostics with plain-text error messages.

- Display of full-text messages (errors, warnings, data)
- Easy data backup of parameters and firmware in the unit (e.g. for series commissioning or device replacement)
- 1.77" colour TFT display
- 3 GB user memory

[1] CPX-E-CEC
[2] Operator unit CDSB-A1
[3] Cover (included in the scope of delivery of the CPX-E-CEC)

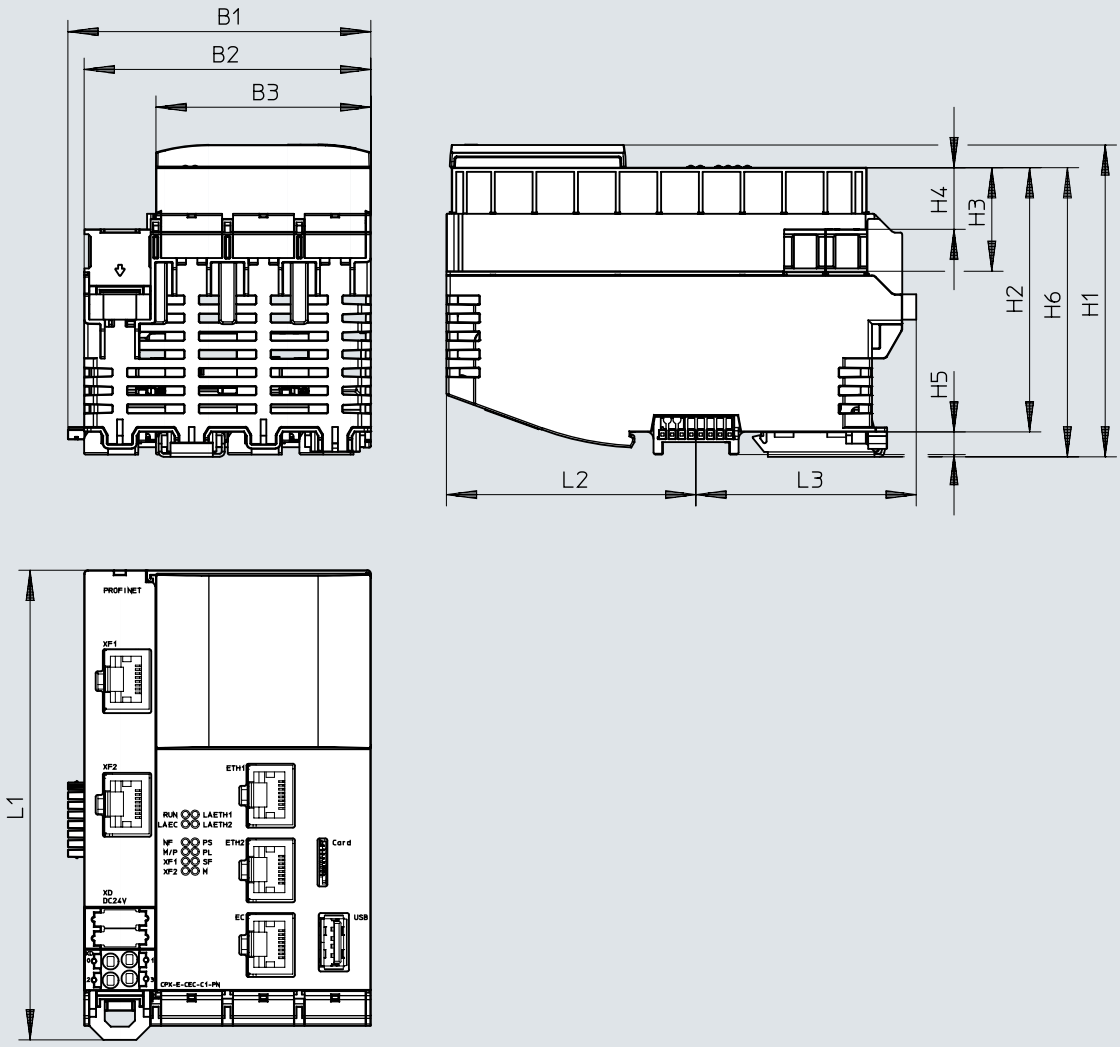
Datasheet – PROFINET controller

Software

Software licences	Licences	Minimum requirement
The "Motion & Robotics" software simplifies the configuration and programming of the automation system CPX-E in conjunction with Festo handling systems. Functions: • Support for linear gantries YXCL and EXCT from Festo • Support for planar surface gantries YXCF, EXCH and EXCM from Festo • Support for Festo 3-dimensional gantries YXCR • Easy configuration of the kinematics/drives in CODESYS • Web visualisation for easy operation and commissioning • Any required positioning thanks to free programming • Easy-to-understand textual macro programming language • Storage of motion programs in a project structure. • Teach-in programming via graphic dialogue at the handheld terminal • Motion path smoothing with full axis dynamics • Integrated limiters for programmed dynamic values with simultaneous path accuracy • Simple switching points along the contour for switching actions, for example gripper control • Interface between the integrated PLC and FTL programming	2 software licences are being offered which can be purchased from the Festo App World: PTP licence • Point-to-point interpolation • Actuation of simple kinematic systems • Graphic visualisation for handheld operator unit CDSA-D3-RV • Teach-in function • For simple applications such as pick & place, loading/unloading CP licence • Cartesian linear and circular interpolation • Interpolation of orientation • Contour applications • Graphic visualisation for handheld operator unit CDSA-D3-RV • Teach-in function	• CPX-E with revision 8 or higher • For CPX-E-CEC-M1-PN • CODESYS SP 15 P3 • SoftMotion version 4.6.3.0 • The licences are purchased once and are then always available

Datasheet – PROFINET controller

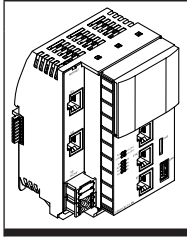
Dimensions Download CAD data ➔ www.festo.com



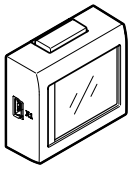
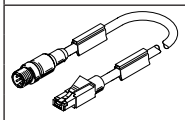
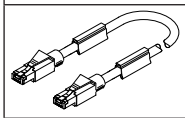
	B1	B2	B3	H1	H2	H3	H4	H5	H6	L1	L2	L3
CPX-E-CEC-...PN	80.2	75.9	56.9	82.5	69.9	27.4	16.3	6	76.5	124.3	66	58.3

Datasheet – PROFINET controller

Ordering data

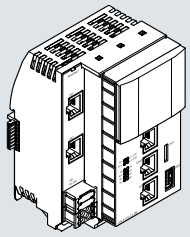
	Bus connection	Additional functions	Part no.	Type
	PROFINET IO	CODESYS V3	**4252741**	**CPX-E-CEC-C1-PN**
		CODESYS V3 with SoftMotion	**4252743**	**CPX-E-CEC-M1-PN**

Ordering data – Accessories

			Cable length [m]	Part no.	Type
	Memory card	32 GB	–	**8094425**	**CAMC-M-MS-G32-G2**
	Display and control unit	• Colour touchscreen • Diagnostic function • Update function for CPX-E-CEC (in plugged-in state)	–	**8070984**	**CDSB-A1**
	• Software licence for controlling a handling system from Festo • For CPX-E-CEC-M1-PN	Point-to-point interpolation	–	**8129269**	**GSAR-C1-L1**
		Cartesian interpolation	–	**8129270**	**GSAR-C1-L2**
	Straight plug, M12x1, 4-pin, D-coded	Straight plug, RJ45, 8-pin	1	**8040451**	**NEBC-D12G4-ES-1-S-R3G4-ET**
			3	**8040452**	**NEBC-D12G4-ES-3-S-R3G4-ET**
			5	**8040453**	**NEBC-D12G4-ES-5-S-R3G4-ET**
			10	**8040454**	**NEBC-D12G4-ES-10-S-R3G4-ET**
	Straight plug, RJ45, 8-pin	Straight plug, RJ45, 8-pin	1	**8040455**	**NEBC-R3G4-ES-1-S-R3G4-ET**

Datasheet – EtherNet/IP controller

Controller for operating the automation system CPX-E on EtherNet/IP or as an autonomous unit Programming and process visualisation take place via CODESYS. The controller includes the power supply for the modules of the automation system and the connected sensors.



Application

Bus connection

The bus connection is provided via RJ45 sockets which meet Ethernet requirements. Communication with a higher-order controller takes place via EtherNet/IP. There is also the option of connecting via Modbus/TCP or standard Ethernet (TCP/IP). The controller can be accessed directly via two Ethernet interfaces. The integrated switch supports star and line topology and enables the network to be divided into segments. The controller can be operated both as a higher-order device (master) and as a subordinate device (slave) using the communication protocol Modbus/TCP. The interfaces support crossover detection, which means that there is a choice of using patch cables or crossover cables

Motion control

The controller has an integrated EtherCAT master. EtherCAT® is used for communication with other products:

- Motor controllers (CMMP, CMMT)
- Electrical terminal (CPX)
- Valve terminals with I-Port interface via the installation system CTEL (bus node CTEU-EC)

The SoftMotion extension makes it possible to control/execute coordinated multi-axis movements.

Data storage

An SD card slot and a USB interface are provided for reading out and storing data. The maximum memory size for compatible media is 32 GB in FAT format with a partition. There is no provision to permanently record data on the external media during operation. Only USB storage media with a current consumption of less than 0.5 A may be used.

Additional functions

- Web server for read access to the most important parameter and diagnostic functions
- FTP server for data exchange
- Real-time clock, can be set and read using CODESYS
- Internal temperature sensor

Datasheet – EtherNet/IP controller

General technical data		
CPU data		Dual core 766 MHz
		512 MB RAM
Storage medium		Micro SD card up to 32 GB
		USB memory stick up to 32 GB
Programming software		CODESYS provided by Festo
Program memory		100 MB, user program
Buffering time real-time clock		3 weeks
Processing time		Approx. 200 µs/1 k instruction
Flags		120 kB remanent data
		CODESYS variable concept
Function elements		Read CPX module diagnostics
		CPX diagnostic status
		Copy CPX diagnostic trace
		And others
IP address setting		DHCP
		Via CODESYS
		Optional: via control unit CDSB
Control elements		DIP switch for RUN/STOP
		Optional control unit CDSB
		Rotary switch for address setting
Configuration support		Operator unit CDSB
		CODESYS V3
Maximum number of modules		10
System parameters		Diagnostic memory
		Fail-safe response
		System start
Module parameters		Channel alarms bundling
		Undervoltage diagnostics
		Channel alarms for undervoltage
		Process value representation, analogue modules
Diagnostics via LED		Force mode
		Module status
		Network status
		Network status engineering port 1
		Network status, engineering port 2
		Network status port 1
		Network status, port 2
		Network status EtherCAT®
		Run
		Power supply, electronics/sensors
		Power supply load
		System errors
Address capacity of internal bus inputs/outputs		
Max. address capacity of outputs	[byte]	64
Max. address capacity of inputs	[byte]	64

Datasheet – EtherNet/IP controller

Technical data – Interfaces		
Fieldbus interface 1		
Protocol		EtherNet/IP
		EtherNet/IP QoS
		EtherNet/IP Quickconnect
		ACD (Address Conflict Detection)
		DLR (Device Level Ring)
		SNMP
Function		Bus connection incoming/outgoing
Transmission rate	[Mbps]	100
Type		Ethernet
Connection type		2 x socket
Connection technology		RJ45
Number of pins/cores		8
Galvanic isolation		Yes
Max. address capacity of outputs	[byte]	512
Max. address capacity of inputs	[byte]	512
Fieldbus interface 2		
Protocol		EtherCAT®
		CoE
		EoE
		FoE
Function		Bus connection incoming/outgoing
Transmission rate	[Mbps]	100
Type		Ethernet
Connection type		Socket
Connection technology		RJ45
Number of pins/cores		8
Galvanic isolation		Yes
Ethernet interface		
Protocol		EasyIP
		Modbus TCP
		TCP/IP
		OPC UA
Function		Switch
		Diagnostics
Transmission rate	[Mbps]	10
	[Mbps]	100
Connection type		2 x socket
Connection technology		RJ45
Number of pins/cores		8
USB interface		
USB interface		USB 2.0

Datasheet – EtherNet/IP controller

Technical data – Electrical		
Nominal operating voltage DC	[V DC]	24
Nominal operating voltage DC for electronics/sensors	[V DC]	24
Permissible voltage fluctuations, electronics/sensors	[%]	±25
Power failure buffering	[ms]	20
Max. power supply	[A]	8
Intrinsic current consumption at nominal operating voltage, electronics/sensors	[mA]	Typically 150
Protection against direct and indirect contact		PELV
Electrical isolation between channel and internal bus		Yes
Reverse polarity protection		24 V sensor supply against 0 V sensor supply
Note on reverse polarity protection		Self-protection
Electrical connection, power supply		
Function		Electronic system and sensors
Connection type		Terminal strip
Note on the connection type		> 4 A and UL 2x terminal strip for power supply
Connection technology		Spring-loaded terminal
Number of pins/cores		4
Conductor cross-section	[mm²]	0.2 ... 1.5
Note on conductor cross section		0.2 ... 2.5 mm² for flexible conductor without wire ferrule

Technical data – Mechanical components		
Type of mounting		With DIN rail
Mounting position		Vertical; horizontal
Product weight	[g]	288
Grid dimension	[mm]	18.9
Dimensions W x L x H	[mm]	75.9 x 82.5 x 124.3

Materials	
Housing	PA
Note on materials	RoHS-compliant
LABS (PWIS) conformity	VDMA24364 zone III

Operating and environmental conditions		
Ambient temperature	[°C]	–5 ... +50
Note on ambient temperature	[°C]	–5 ... +60 for vertical installation
Storage temperature	[°C]	–20 ... +70
Corrosion resistance class CRC[1)]		0
Relative humidity	[%]	95
		Non-condensing
CE marking (see declaration of conformity)[2)]		To EU EMC Directive[1)]
		To EU RoHS Directive
UKCA marking (see declaration of conformity)[2)]		To UK EMC regulations
		To UK RoHS regulations
KC marking		KC EMC
Certification		RCM
		c UL us-Listed (OL)
Certificate-issuing authority		UL E239998
Degree of protection		IP20

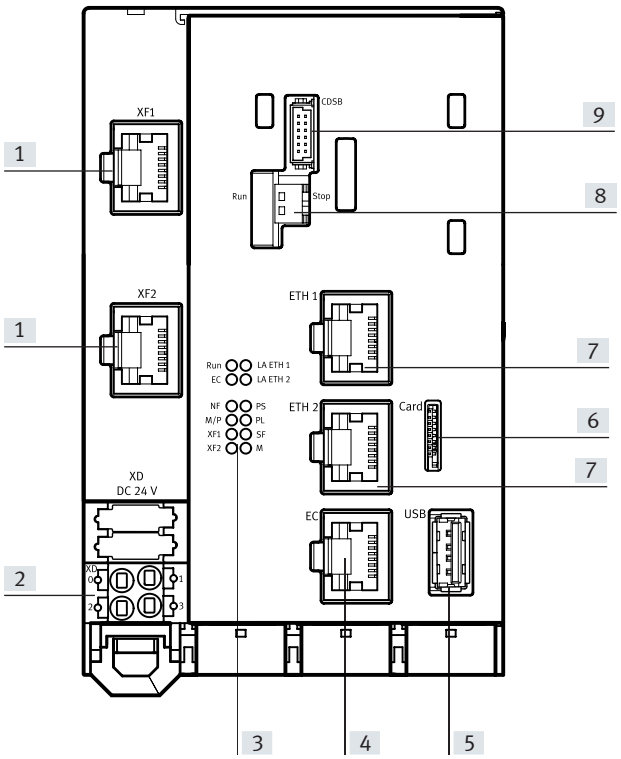
1) More information www.festo.com/x/topic/crc
2) For information about the area of use, see the EC declaration of conformity at: www.festo.com/catalogue/CPX-E ➔ Support/Downloads.
If the devices are subject to usage restrictions in residential, commercial or light-industrial environments, further measures for the reduction of the emitted interference may be necessary.
3) Additional information: www.festo.com/catalogue/CPX-E ➔ Support/Downloads.

Safety characteristics	
Shock resistance	Shock test with severity level 1 to FN 942017-5 and EN 60068-2-27
Vibration resistant	Transport application test with severity level 1 to FN 942017-4 and EN 60068-2-6

Datasheet – EtherNet/IP controller

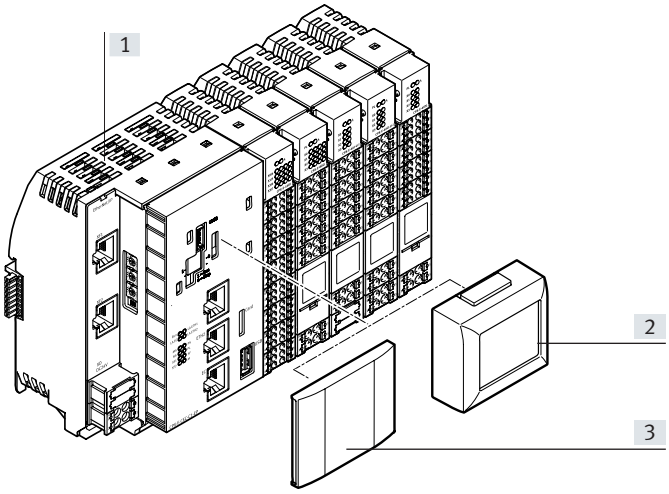
Connection and display components

CPX-E-CEC-...



[1] Network connections 1 and 2, EtherNet/IP
[2] Terminal strip for operating voltage supply
[3] LED indicators
[4] EtherCAT master network connection
[5] USB interface
[6] Slot for micro SD memory card
[7] Network connections 1 and 2, Ethernet
[8] DIL switch for holding and starting projects in CODESYS
[9] Slot for operator unit CDSB

Display and operator unit CDSB-A1



The operator unit CDSB-A1 from Festo is a plug-in display and control unit for the automation system CPX-E.
The integrated colour TFT display with touchscreen can be used both for operation and for simple diagnostics of the connected basic unit. User-friendliness is enhanced through fault diagnostics with plain-text error messages.

[1] CPX-E-CEC
[2] Operator unit CDSB-A1
[3] Cover (included in the scope of delivery of the CPX-E-CEC)

- Display of full-text messages (errors, warnings, data)
- Easy data backup of parameters and firmware in the unit (e.g. for series commissioning or device replacement)
- 1.77" colour TFT display
- 3 GB user memory

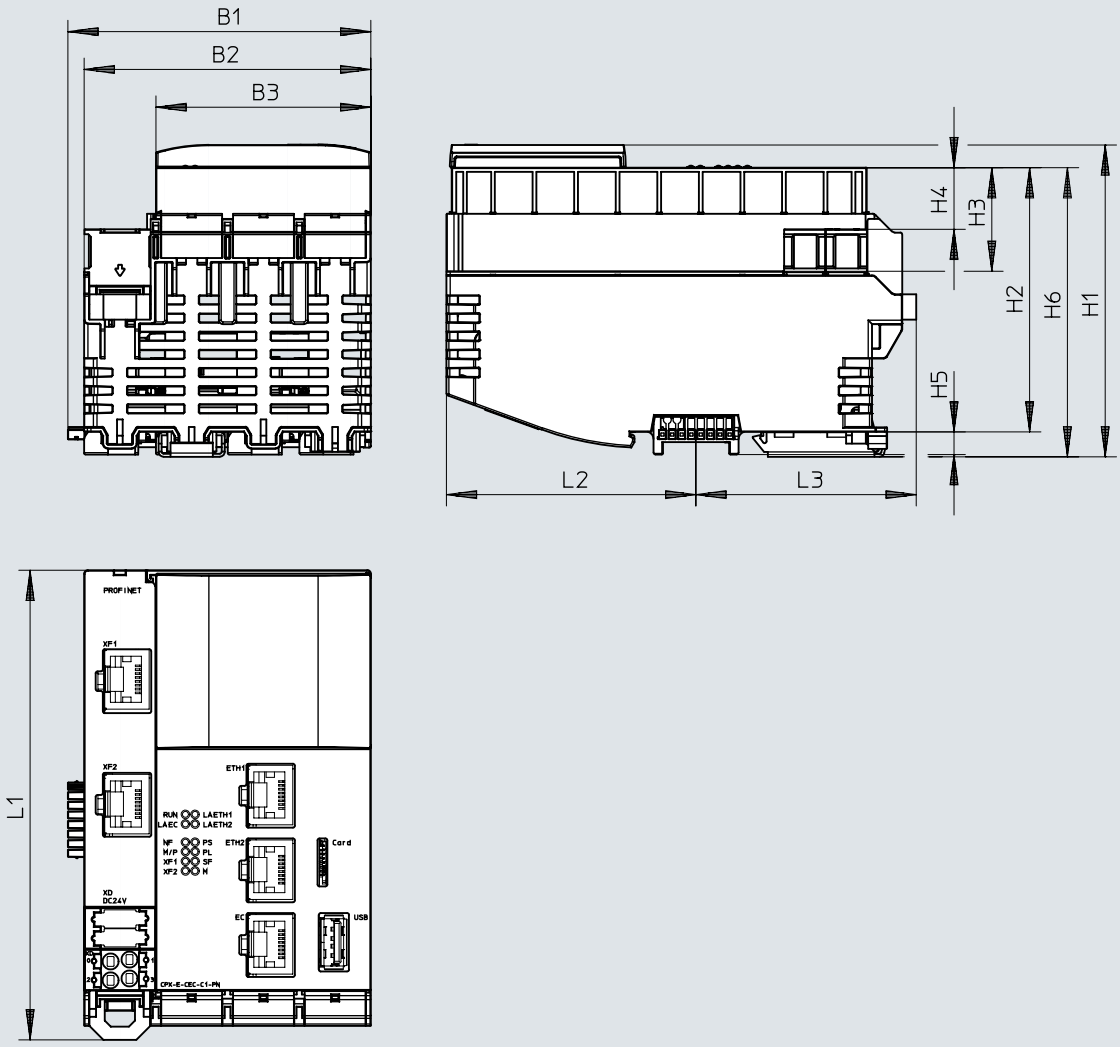
Datasheet – EtherNet/IP controller

Software

Software licences	Licences	Minimum requirement
The "Motion & Robotics" software simplifies the configuration and programming of the automation system CPX-E in conjunction with Festo handling systems. Functions: • Support for linear gantries YXCL and EXCT from Festo • Support for planar surface gantries YXCF, EXCH and EXCM from Festo • Support for Festo 3-dimensional gantries YXCR • Easy configuration of the kinematics/drives in CODESYS • Web visualisation for easy operation and commissioning • Any required positioning thanks to free programming • Easy-to-understand textual macro programming language • Storage of motion programs in a project structure. • Teach-in programming via graphic dialogue at the handheld terminal • Motion path smoothing with full axis dynamics • Integrated limiters for programmed dynamic values with simultaneous path accuracy • Simple switching points along the contour for switching actions, for example gripper control • Interface between the integrated PLC and FTL programming	2 software licences are being offered which can be purchased from the Festo App World: PTP licence • Point-to-point interpolation • Actuation of simple kinematic systems • Graphic visualisation for handheld operator unit CDSA-D3-RV • Teach-in function • For simple applications such as pick & place, loading/unloading CP licence • Cartesian linear and circular interpolation • Interpolation of orientation • Contour applications • Graphic visualisation for handheld operator unit CDSA-D3-RV • Teach-in function	• CPX-E with revision 8 or higher • For CPX-E-CEC-M1-EP • CODESYS SP 15 P3 • SoftMotion version 4.6.3.0 • The licences are purchased once and are then always available

Datasheet – EtherNet/IP controller

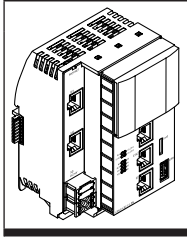
Dimensions Download CAD data ➔ www.festo.com



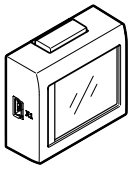
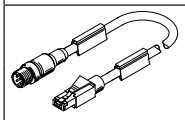
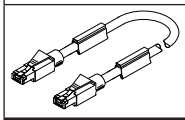
	B1	B2	B3	H1	H2	H3	H4	H5	H6	L1	L2	L3
CPX-E-CEC-...EP	80.2	75.9	56.9	82.5	69.9	27.4	16.3	6	76.5	124.3	66	58.3

Datasheet – EtherNet/IP controller

Ordering data

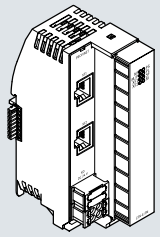
	Bus connection	Additional functions	Part no.	Type
	EtherNet/IP	CODESYS V3	**4252742**	**CPX-E-CEC-C1-EP**
		CODESYS V3 with SoftMotion	**4252744**	**CPX-E-CEC-M1-EP**

Ordering data – Accessories

			Cable length [m]	Part no.	Type
	Memory card	32 GB	–	**8094425**	**CAMC-M-MS-G32-G2**
	Display and control unit	• Colour touchscreen • Diagnostic function • Update function for CPX-E-CEC (in plugged-in state)	–	**8070984**	**CDSB-A1**
	Straight plug, M12x1, 4-pin, D-coded	Straight plug, RJ45, 8-pin	1	**8040451**	**NEBC-D12G4-ES-1-S-R3G4-ET**
			3	**8040452**	**NEBC-D12G4-ES-3-S-R3G4-ET**
			5	**8040453**	**NEBC-D12G4-ES-5-S-R3G4-ET**
			10	**8040454**	**NEBC-D12G4-ES-10-S-R3G4-ET**
	Straight plug, RJ45, 8-pin	Straight plug, RJ45, 8-pin	1	**8040455**	**NEBC-R3G4-ES-1-S-R3G4-ET**

Datasheet – PROFINET bus module

Bus module for operating the automation system CPX-E on PROFINET. Data is transmitted on the basis of Industrial Ethernet.
The bus module includes the power supply for the modules of the automation system and the connected sensors.



Application

Bus connection

The bus connection is provided via RJ45 sockets which meet Ethernet requirements.
Communication with a higher-order controller takes place via PROFINET with real-time protocol (real time RT or isochronous real time IRT).
The integrated switch supports star and line topology and enables the network to be divided into segments.

Additional functions

- The bus module supports PROFIenergy for reducing the energy requirement through selective switching off of consumers when they are not required
- The bus module has crossover detection, which means that there is the option of using patch cables or crossover cables

Device description file

The bus module is configured using a device description file (GSDML file) which includes all the necessary information for parameterisation.

Web-Server

The integrated web server enables read access to the most important parameter and diagnostic functions.

General technical data		
Fieldbus interface		
Protocol		PROFINET IRT
		PROFINET IRT
Function		Bus connection incoming/outgoing
Transmission rate	[Mbps]	100
Type		Ethernet
Connection type		2 x socket
Connection technology		RJ45
Number of pins/cores		8
Galvanic isolation		Yes
Max. address volume for outputs	[byte]	64
Max. address volume for inputs	[byte]	64
Address capacity of internal bus inputs/outputs		
Max. address capacity of outputs	[byte]	64
Note on outputs		62 bytes with I/O diagnostic interface
		64 bytes with status bits
		64 bytes without diagnostics
Max. address capacity of inputs	[byte]	64
Note on inputs		62 bytes with I/O diagnostic interface
		62 bytes with status bits
		64 bytes without diagnostics

Datasheet – PROFINET bus module

General data	
Configuration support	GSDML file
Maximum number of modules	10
Additional functions	LLDP
	MRP
	MRPD
	PROFINET FSU
	PROFINET I&MO..3, 1..3 retentive memory possible
	PROFINET shared device
	S2 system redundancy
	SNMP
System parameters	Diagnostic memory
	Fail-safe response
	Force mode
	System start
Module parameters	Channel alarms bundling
	Undervoltage diagnostics
	Channel alarms for undervoltage
	Process value representation, analogue modules
Diagnostics via LED	Force mode
	Network errors
	Network status connection 1
	Network status connection 2
	Power supply, electronics/sensors
	Power supply load
	System errors
	Maintenance required
Diagnostics via bus	Parameterisation error
	Lower limit value not observed
	Upper limit value not observed
	Wire break
	Short circuit
	PROFIsafe addresses different
	Undervoltage
	Excessive temperature

Technical data – Electrical		
Nominal operating voltage DC for electronics/sensors	[V DC]	24
Permissible voltage fluctuations, electronics/sensors	[%]	±25
Power failure buffering	[ms]	20
Max. power supply	[A]	8
Intrinsic current consumption at nominal operating voltage, electronics/sensors	[mA]	Typically 75
Reverse polarity protection		24 V sensor supply against 0 V sensor supply
Protection against direct and indirect contact		PELV
Electrical connection, power supply		
Function		Electronic system and sensors
Connection type		Terminal strip
Note on the connection type		> 4 A and UL 2x terminal strip for power supply
Connection technology		Spring-loaded terminal
Number of pins/cores		4
Conductor cross-section	[mm²]	0.2 ... 1.5
Note on conductor cross section	[mm²]	0.2 ... 2.5 for flexible conductor without wire ferrule

Technical data – Mechanical components		
Mounting position		Vertical
		Horizontal
Type of mounting		With DIN rail
Product weight	[g]	145
Grid dimension	[mm]	18.9
Dimensions W x L x H	[mm]	42.2 x 76.5 x 125.8

Datasheet – PROFINET bus module

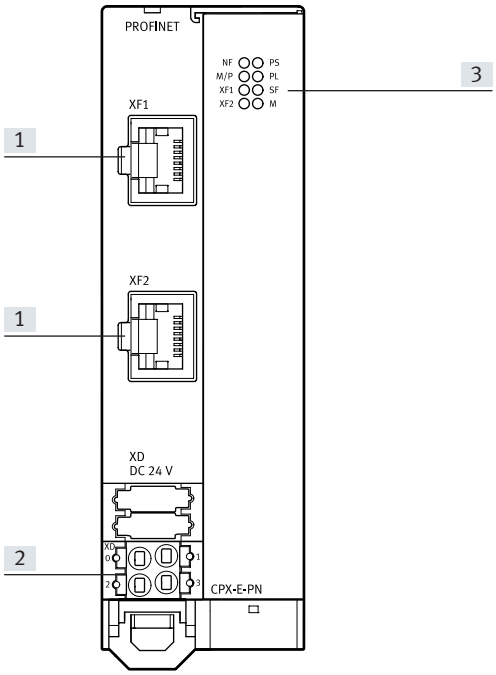
Materials	
Housing	PA
Note on materials	RoHS-compliant
LABS (PWIS) conformity	VDMA24364 zone III

Operating and environmental conditions		
Ambient temperature	[°C]	–5 ... +50
Note on ambient temperature		–5 ... +60 °C for vertical installation
Storage temperature	[°C]	–20 ... +70
Relative humidity	[%]	95
		Non-condensing
CE marking (see declaration of conformity)[2)]		To EU EMC Directive[1)]
UKCA marking (see declaration of conformity)[2)]		To UK EMC regulations
		To UK RoHS regulations
KC marking		KC EMC
Certification		RCM
		c UL us-Listed (OL)
Certificate-issuing authority		UL E239998
Degree of protection		IP20

1) For information about the area of use, see the EC declaration of conformity at: www.festo.com/catalogue/CPX-E ➔ Support/Downloads.
If the devices are subject to usage restrictions in residential, commercial or light-industrial environments, further measures for the reduction of the emitted interference may be necessary.
2) Additional information: www.festo.com/catalogue/CPX-E ➔ Support/Downloads.

Safety characteristics	
Shock resistance	Shock test with severity level 1 to FN 942017-5 and EN 60068-2-27
Vibration resistant	Transport application test with severity level 1 to FN 942017-4 and EN 60068-2-6

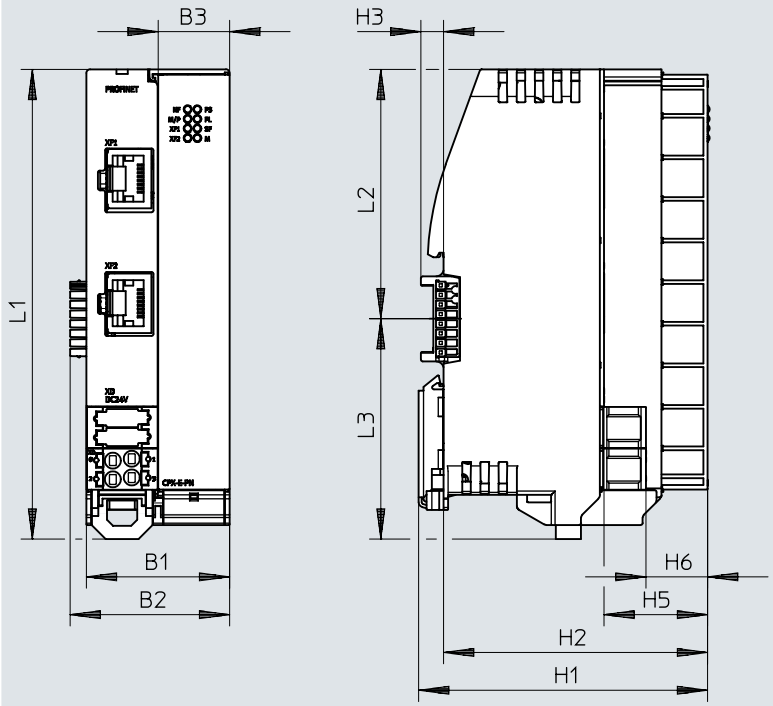
Connection and display components



[1] Network connections 1 and 2, PROFINET
[2] Terminal strip for operating voltage supply
[3] LED indicators

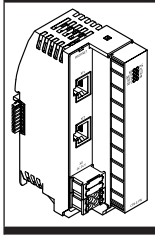
Datasheet – PROFINET bus module

Dimensions Download CAD data ➔ www.festo.com

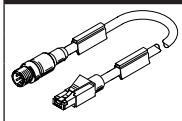
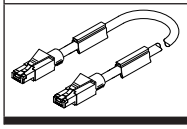


	B1	B2	B3	H1	H2	H3	H5	H6	L1	L2	L3
CPX-E-PN	37.8	42.2	18.9	76.5	69.9	6	27.4	16.3	124.3	66	58.3

Ordering data

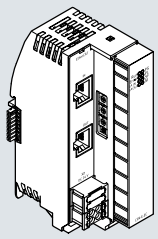
		Part no.	Type
	PROFINET bus module	**4080497**	**CPX-E-PN**

Ordering data – Accessories

	Electrical connection 1	Electrical connection 2	Cable length [m]	Part no.	Type
	Straight plug, M12x1, 4-pin, D-coded	Straight plug, RJ45, 8-pin	1	**8040451**	**NEBC-D12G4-ES-1-S-R3G4-ET**
			3	**8040452**	**NEBC-D12G4-ES-3-S-R3G4-ET**
			5	**8040453**	**NEBC-D12G4-ES-5-S-R3G4-ET**
			10	**8040454**	**NEBC-D12G4-ES-10-S-R3G4-ET**
	Straight plug, RJ45, 8-pin	Straight plug, RJ45, 8-pin	1	**8040455**	**NEBC-R3G4-ES-1-S-R3G4-ET**

Datasheet – EtherCAT® bus module

Bus module for operating the automation system CPX-E on EtherCAT®. Data is transmitted on the basis of Industrial Ethernet.
The bus module includes the power supply for the modules of the automation system and the connected sensors.



Application

Bus connection

The bus connection is provided via RJ45 sockets which meet Ethernet requirements.
All kinds of topologies are supported. Manual setting of the EtherCAT® address using a rotary coding switch enables the bus to be coupled and decoupled during operation (hot connect).

Additional functions

- The product supports the “distributed clocks” function for the precise synchronisation of participants in an EtherCAT® network
- The bus module has crossover detection, which means that there is the option of using patch cables or crossover cables

Device description file

The bus module is configured using a device description file (ESI file) which includes all the necessary information for parameterisation.

Web-Server

The integrated web server enables read access to the most important parameter and diagnostic functions.

General technical data

Fieldbus interface		
Protocol		EtherCAT®
Function		Bus connection incoming/outgoing
Transmission rate	[Mbps]	100
Note on the transmission rate		100 Mb, switched Fast Ethernet
Type		EtherCAT®
Connection type		2 x socket
Connection technology		RJ45
Number of pins/cores		8
Galvanic isolation		Yes
Max. address volume for outputs	[byte]	64
Max. address volume for inputs	[byte]	64
Address capacity of internal bus inputs/outputs		
Max. address capacity of outputs	[byte]	64
Note on outputs		62 bytes with I/O diagnostic interface
		64 bytes with status bits
		64 bytes without diagnostics
Max. address capacity of inputs	[byte]	64
Note on inputs		62 bytes with I/O diagnostic interface
		63 bytes with status bits
		64 bytes without diagnostics

Datasheet – EtherCAT® bus module

General technical data	
Configuration support	ESI file
Maximum number of modules	10
System parameters	Diagnostic memory
	Fail-safe response
	Force mode
	System start
Module parameters	Channel alarms bundling
	Undervoltage diagnostics
	Channel alarms for undervoltage
Diagnostics via LED	Connection status
	Module status
	EtherCAT Error
	EtherCAT RUN
	Force mode
	Power supply, electronics/sensors
	Power supply load
	System errors
Diagnostics via bus	Parameterisation error
	Lower limit value not observed
	Upper limit value not observed
	Wire break
	Short circuit
	Undervoltage
	Excessive temperature

Technical data – Electrical		
Nominal operating voltage DC for electronics/sensors	[V DC]	24
Permissible voltage fluctuations, electronics/sensors	[%]	±25
Power failure buffering	[ms]	20
Max. power supply	[A]	8
Intrinsic current consumption at nominal operating voltage, electronics/sensors	[mA]	Typically 64
Protection against direct and indirect contact		PELV
Reverse polarity protection		24 V sensor supply against 0 V sensor supply
Note on reverse polarity protection		Self-protection
Electrical connection, power supply		
Function		Electronic system and sensors
Connection type		Terminal strip
Note on the connection type		> 4 A and UL 2x terminal strip for power supply
Connection technology		Spring-loaded terminal
Number of pins/cores		4
Conductor cross-section	[mm²]	0.2 ... 1.5
Note on conductor cross section	[mm²]	0.2 ... 2.5 for flexible conductor without wire ferrule

Technical data – Mechanical components		
Type of mounting		With DIN rail
Mounting position		Vertical; horizontal
Product weight	[g]	145
Grid dimension	[mm]	18.9
Dimensions W x L x H	[mm]	42.2 x 76.5 x 125.8

Materials	
Housing	PA
Note on materials	RoHS-compliant
LABS (PWIS) conformity	VDMA24364 zone III

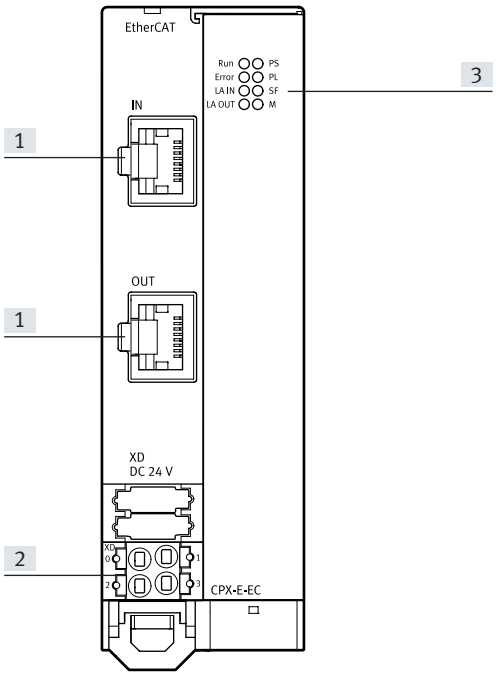
Datasheet – EtherCAT® bus module

Operating and environmental conditions		
Ambient temperature	[°C]	–5 ... +50
Note on ambient temperature		–5 ... +60 °C for vertical installation
Storage temperature	[°C]	–20 ... +70
Relative humidity	[%]	95
		Non-condensing
CE marking (see declaration of conformity)[2]		To EU EMC Directive[1]
		To EU RoHS Directive
UKCA marking (see declaration of conformity)[2]		To UK EMC regulations
		To UK RoHS regulations
KC marking		KC EMC
Certification		RCM
		c UL us-Listed (OL)
Certificate-issuing authority		UL E239998
Degree of protection		IP20

1) For information about the area of use, see the EC declaration of conformity at: www.festo.com/catalogue/CPX-E ➔ Support/Downloads.
If the devices are subject to usage restrictions in residential, commercial or light-industrial environments, further measures for the reduction of the emitted interference may be necessary.
2) Additional information: www.festo.com/catalogue/CPX-E ➔ Support/Downloads.

Safety characteristics	
Shock resistance	Shock test with severity level 1 to FN 942017-5 and EN 60068-2-27
Vibration resistant	Transport application test with severity level 1 to FN 942017-4 and EN 60068-2-6

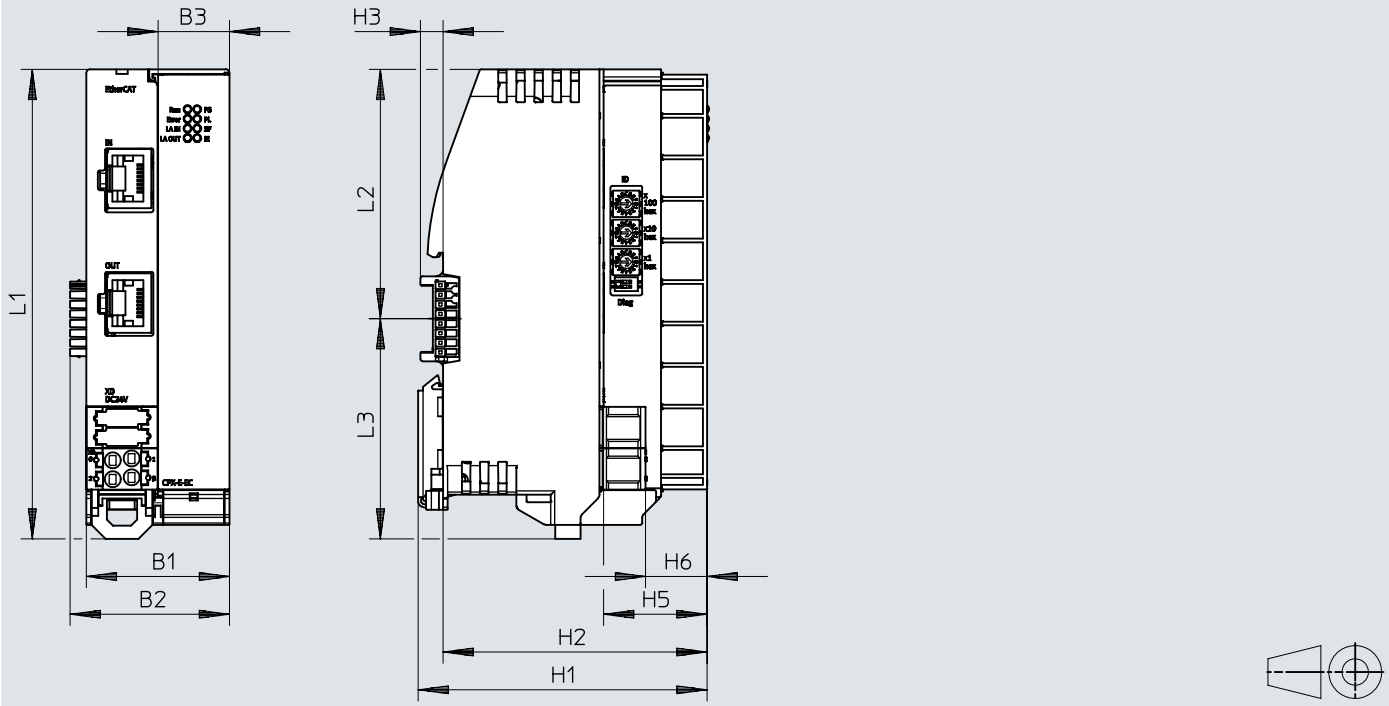
Connection and display components



[1] Network connections 1 and 2, EtherCAT
[2] Terminal strip for operating voltage supply
[3] LED indicators

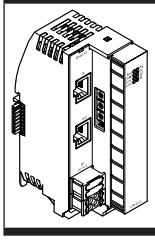
Datasheet – EtherCAT® bus module

Dimensions Download CAD data ➔ www.festo.com

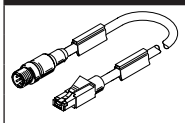
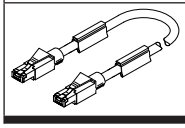


	B1	B2	B3	H1	H2	H3	H5	H6	L1	L2	L3
CPX-E-EC	37.8	42.2	18.9	76.5	69.9	6	27.4	16.3	124.3	66	58.3

Ordering data

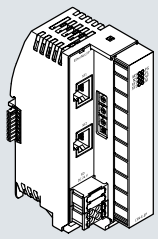
		Part no.	Type
	EtherCAT® bus module	**4080498**	**CPX-E-EC**

Ordering data – Accessories

	Electrical connection 1	Electrical connection 2	Cable length [m]	Part no.	Type
	Straight plug, M12x1, 4-pin, D-coded	Straight plug, RJ45, 8-pin	1	**8040451**	**NEBC-D12G4-ES-1-S-R3G4-ET**
			3	**8040452**	**NEBC-D12G4-ES-3-S-R3G4-ET**
			5	**8040453**	**NEBC-D12G4-ES-5-S-R3G4-ET**
			10	**8040454**	**NEBC-D12G4-ES-10-S-R3G4-ET**
	Straight plug, RJ45, 8-pin	Straight plug, RJ45, 8-pin	1	**8040455**	**NEBC-R3G4-ES-1-S-R3G4-ET**

Datasheet – EtherNet/IP bus module

Bus module for operating the automation system CPX-E in an Ethernet network using the protocols EtherNet/IP or Modbus/TCP. Data is transmitted on the basis of Industrial Ethernet.
The bus module includes the power supply for the modules of the automation system and the connected sensors.



Application

Bus connection

The bus connection is provided via RJ45 sockets which meet Ethernet requirements.
The integrated switch supports star and line topology and enables the network to be divided into segments.

Additional functions

- The bus module has quick-start capability (quick connect).
- The bus module has crossover detection, which means that there is the option of using patch cables or crossover cables

Device description file

The bus module is configured using a device description file (EDS file) which includes all the necessary information for parameterisation.

Web-Server

The integrated web server enables read access to the most important parameter and diagnostic functions.

General technical data		
Fieldbus interface		
Protocol		EtherNet/IP
		EtherNet/IP QoS
		EtherNet/IP Quickconnect
		ACD (Address Conflict Detection)
		DLR (Device Level Ring)
		SNMP
		Modbus/TCP
Function		Bus connection incoming/outgoing
Transmission rate	[Mbps]	100
Note on the transmission rate		100 Mb, switched Fast Ethernet
Type		Ethernet
Connection type		2 x socket
Connection technology		RJ45
Number of pins/cores		8
Galvanic isolation		Yes
Max. address volume for outputs	[byte]	64
Max. address volume for inputs	[byte]	64
Address capacity of internal bus inputs/outputs		
Max. address capacity of outputs	[byte]	64
Note on outputs		62 bytes with I/O diagnostic interface
		64 bytes with status bits
		64 bytes without diagnostics
Max. address capacity of inputs	[byte]	64
Note on inputs		62 bytes with I/O diagnostic interface
		63 bytes with status bits
		64 bytes without diagnostics

Datasheet – EtherNet/IP bus module

General data	
Configuration support	EDS file
Maximum number of modules	10
System parameters	Diagnostic memory
	Fail-safe response
	Force mode
	Idle response
	System start
Module parameters	Channel alarms bundling
	Undervoltage diagnostics
	Channel alarms for undervoltage
Diagnostics via LED	Network status
	Module status
	Modify
	Force mode
	Connection status
	Power supply, electronics/sensors
	Power supply load
	System errors
Diagnostics via bus	Parameterisation error
	Lower limit value not observed
	Upper limit value not observed
	Wire break
	Short circuit
	Undervoltage
	Excessive temperature

Technical data – Electrical		
Nominal operating voltage DC for electronics/sensors	[V DC]	24
Permissible voltage fluctuations, electronics/sensors	[%]	±25
Power failure buffering	[ms]	20
Max. power supply	[A]	8
Intrinsic current consumption at nominal operating voltage, electronics/sensors	[mA]	Typically 65
Protection against direct and indirect contact		PELV
Reverse polarity protection		24 V sensor supply against 0 V sensor supply
Note on reverse polarity protection		Self-protection
Electrical connection, power supply		
Function		Electronic system and sensors
Connection type		Terminal strip
Note on the connection type		> 4 A and UL 2x terminal strip for power supply
Connection technology		Spring-loaded terminal
Number of pins/cores		4
Conductor cross-section	[mm²]	0.2 ... 1.5
Note on conductor cross section	[mm²]	0.2 ... 2.5 for flexible conductor without wire ferrule

Technical data – Mechanical components		
Type of mounting		With DIN rail
Mounting position		Vertical; horizontal
Product weight	[g]	145
Grid dimension	[mm]	18.9
Dimensions W x L x H	[mm]	42.2 x 76.5 x 125.8

Materials	
Housing	PA
Note on materials	RoHS-compliant
LABS (PWIS) conformity	VDMA24364 zone III

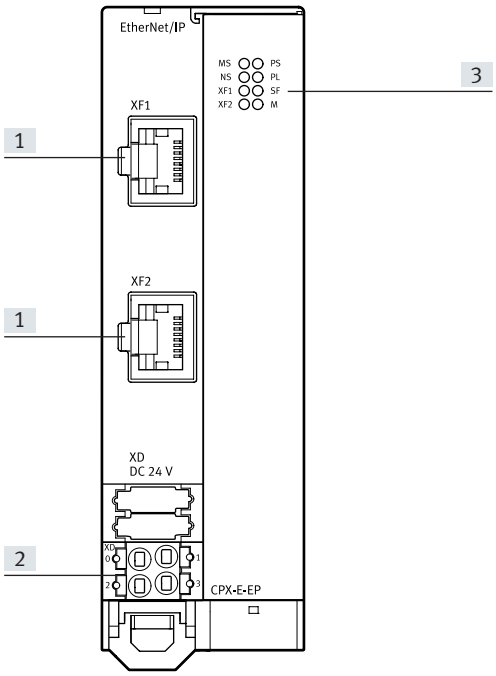
Datasheet – EtherNet/IP bus module

Operating and environmental conditions		
Ambient temperature	[°C]	–5 ... +50
Note on ambient temperature		–5 ... +60 °C for vertical installation
Storage temperature	[°C]	–20 ... +70
Relative humidity	[%]	95
		Non-condensing
CE marking (see declaration of conformity)[2]		To EU EMC Directive[1]
		To EU RoHS Directive
UKCA marking (see declaration of conformity)[2]		To UK EMC regulations
		To UK RoHS regulations
KC marking		KC EMC
Certification		RCM
		c UL us-Listed (OL)
Certificate-issuing authority		UL E239998
Degree of protection		IP20

1) For information about the area of use, see the EC declaration of conformity at: www.festo.com/catalogue/CPX-E ➔ Support/Downloads.
If the devices are subject to usage restrictions in residential, commercial or light-industrial environments, further measures for the reduction of the emitted interference may be necessary.
2) Additional information: www.festo.com/catalogue/CPX-E ➔ Support/Downloads.

Safety characteristics	
Shock resistance	Shock test with severity level 1 to FN 942017-5 and EN 60068-2-27
Vibration resistant	Transport application test with severity level 1 to FN 942017-4 and EN 60068-2-6

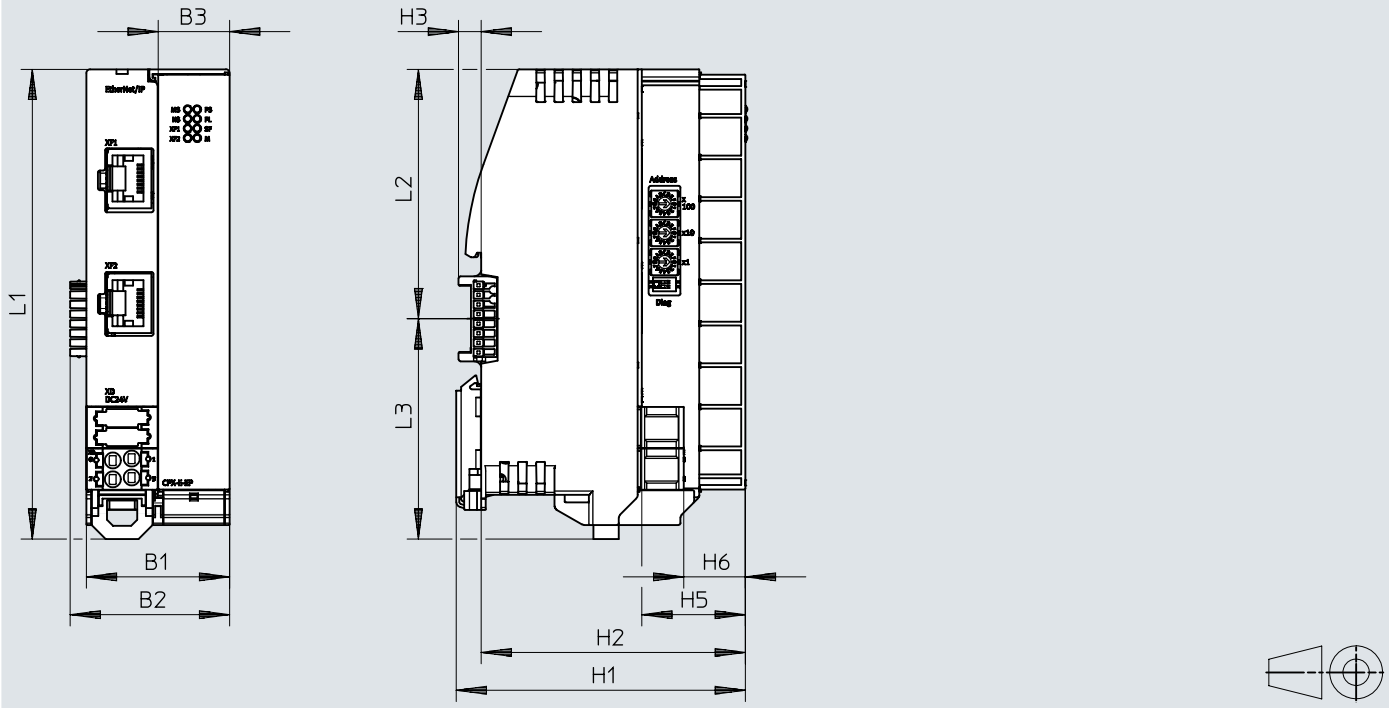
Connection and display components



[1] Network connections 1 and 2, EtherNet/IP
[2] Terminal strip for operating voltage supply
[3] LED indicators

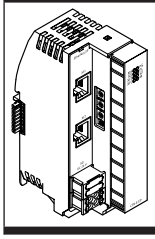
Datasheet – EtherNet/IP bus module

Dimensions Download CAD data ➔ www.festo.com

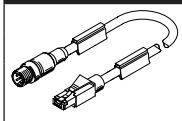
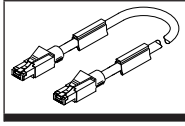


	B1	B2	B3	H1	H2	H3	H5	H6	L1	L2	L3
CPX-E-EP	37.8	42.2	18.9	76.5	69.9	6	27.4	16.3	124.3	66	58.3

Ordering data

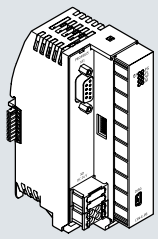
		Part no.	Type
	EtherNet/IP bus module	**4080499**	**CPX-E-EP**

Ordering data – Accessories

	Electrical connection 1	Electrical connection 2	Cable length [m]	Part no.	Type
	Straight plug, M12x1, 4-pin, D-coded	Straight plug, RJ45, 8-pin	1	**8040451**	**NEBC-D12G4-ES-1-S-R3G4-ET**
			3	**8040452**	**NEBC-D12G4-ES-3-S-R3G4-ET**
			5	**8040453**	**NEBC-D12G4-ES-5-S-R3G4-ET**
			10	**8040454**	**NEBC-D12G4-ES-10-S-R3G4-ET**
	Straight plug, RJ45, 8-pin	Straight plug, RJ45, 8-pin	1	**8040455**	**NEBC-R3G4-ES-1-S-R3G4-ET**

Datasheet – PROFIBUS bus module

Bus module for operating the automation system CPX-E on PROFIBUS. Data transmission takes place using an RS485 interface. The bus module includes the power supply for the modules of the automation system and the connected sensors.



Application

Bus connection

The bus connection is provided via an RS485 interface; the use of an optical adapter makes it possible to transmit data through a fibre-optic cable.
The bus module can be combined with up to 31 other participants in a network.

Additional functions

The bus module has a mini-USB interface via which system data can be read and the bus module can be parameterised.

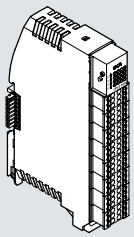
Parameterisation

The parameterisation data can be sent from the higher-order controller to the bus module via the network.

General technical data

Fieldbus interface						
Protocol		PROFIBUS DP				
Function		Bus connection incoming/outgoing				
Transmission rate	[kbps]	9.6	19.2	93.75	187.5	500
	[Mbps]	1.5	3	6	12	
Type		PROFIBUS				
Connection type		Socket				
Connection technology		Sub-D				
Number of pins/cores		9				
Note on fieldbus interface		Optional connection technology with accessories: plug/socket M12x1 B-coded, 5-pin, degree of protection IP65				
Galvanic isolation		Yes				
Max. address volume for outputs	[byte]	64				
Max. address volume for inputs	[byte]	64				
Service interface						
Function		Diagnostics and parameterisation				
Connection type		Socket				
Connection technology		USB 2.0 type B mini				
Number of pins/cores		5				
Address capacity of internal bus inputs/outputs						
Max. address volume for outputs	[byte]	64				
Note on outputs		62 bytes with I/O diagnostic interface				
		64 bytes with status bits				
		64 bytes without diagnostics				
Max. address volume for inputs	[byte]	64				
Note on inputs		62 bytes with I/O diagnostic interface				
		63 bytes with status bits				
		64 bytes without diagnostics				

Datasheet – PROFIBUS bus module

General data	
Conforms to standard	
Control elements	
Configuration support	
Maximum number of modules	
System parameters	
Module parameters	Process value representation, analogue modules
Diagnostics via LED	Bus fault
	Module status
	Force mode
	Power supply, electronics/sensors
	Power supply load
	System errors
Diagnostics via bus	Parameterisation error
	Overflow buffer
	Transmission error
	Requested function not supported
	Not ready for data exchange
	Lower limit value not observed
	Upper limit value not observed
	Wire break
	Short circuit
	Undervoltage
	Watchdog/I/O status

Technical data – Electrical		
Nominal operating voltage DC for electronics/sensors	[V DC]	24
Permissible voltage fluctuations, electronics/sensors	[%]	±25
Power failure buffering	[ms]	20
Max. power supply	[A]	8
Intrinsic current consumption at nominal operating voltage, electronics/sensors	[mA]	Typically 75
Protection against direct and indirect contact		PELV
Reverse polarity protection		24 V sensor supply against 0 V sensor supply
Note on reverse polarity protection		Self-protection
Electrical connection, power supply		
Function		Electronic system and sensors
Connection type		Terminal strip
Note on the connection type		> 4 A and UL 2x terminal strip for power supply
Connection technology		Spring-loaded terminal
Number of pins/cores		4
Conductor cross-section	[mm²]	0.2 ... 1.5
Note on conductor cross section	[mm²]	0.2 ... 2.5 for flexible conductor without wire ferrule

Technical data – Mechanical components		
Type of mounting		With DIN rail
Mounting position		Vertical; horizontal
Product weight	[g]	145
Grid dimension	[mm]	18.9
Dimensions W x L x H	[mm]	42.2 x 76.5 x 125.8

Materials	
Housing	PA
Note on materials	RoHS-compliant
LABS (PWIS) conformity	VDMA24364 zone III

Datasheet – PROFIBUS bus module

Operating and environmental conditions		
Ambient temperature	[°C]	–5 ... +50
Note on ambient temperature		–5 ... +60 °C for vertical installation
Storage temperature	[°C]	–20 ... +70
Relative humidity	[%]	95
		Non-condensing
CE marking (see declaration of conformity)[2)]		To EU EMC Directive[1)]
		To EU RoHS Directive
UKCA marking (see declaration of conformity)[2)]		To UK EMC regulations
		To UK RoHS regulations
KC marking		KC EMC
Certification		RCM
		c UL us-Listed (OL)
Certificate-issuing authority		UL E239998
Degree of protection		IP20

1) For information about the area of use, see the EC declaration of conformity at: www.festo.com/catalogue/CPX-E ➔ Support/Downloads.
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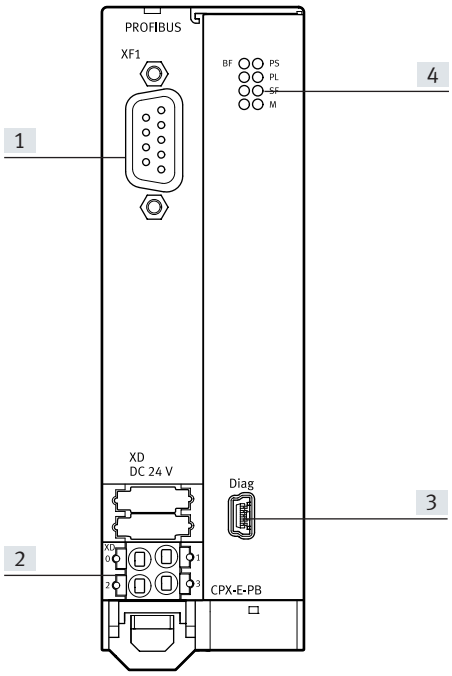
2) Additional information: www.festo.com/catalogue/CPX-E ➔ Support/Downloads.

Safety characteristics	
Shock resistance	Shock test with severity level 1 to FN 942017-5 and EN 60068-2-27
Vibration resistant	Transport application test with severity level 1 to FN 942017-4 and EN 60068-2-6

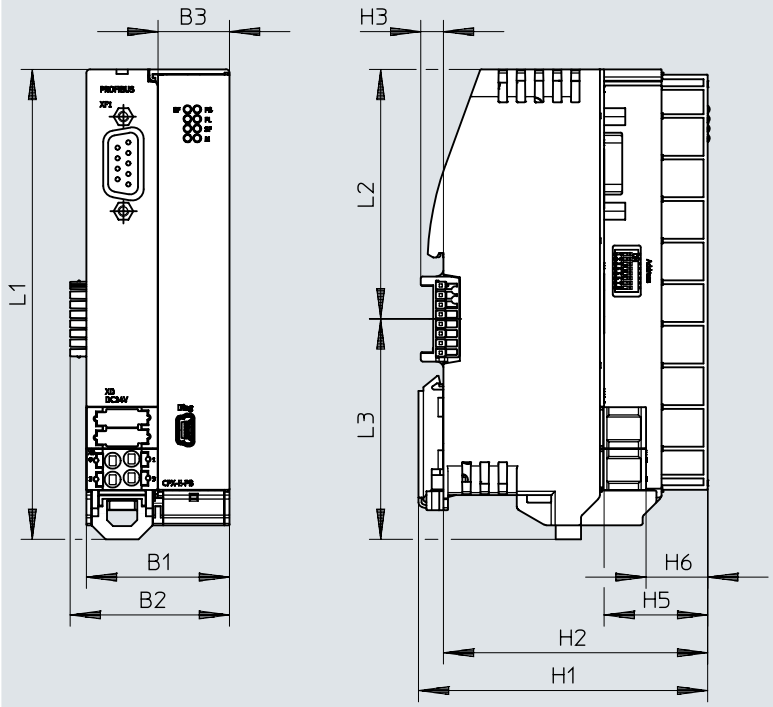
Connection and display components



[1] Network connection, PROFIBUS
[2] Terminal strip for operating voltage supply
[3] USB interface, mini USB
[4] LED indicators

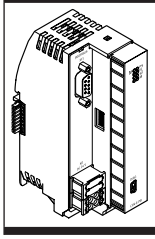
Datasheet – PROFIBUS bus module

Dimensions Download CAD data ➔ www.festo.com

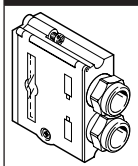
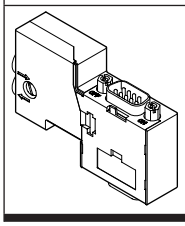


	B1	B2	B3	H1	H2	H3	H5	H6	L1	L2	L3
CPX-E-PB	37.8	42.2	18.9	76.5	69.9	6	27.4	16.3	124.3	66	58.3

Ordering data

		Part no.	Type
	PROFIBUS bus module	**4080496**	**CPX-E-PB**

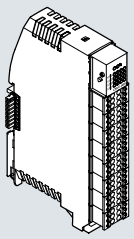
Ordering data – Accessories

		Part no.	Type
	Sub-D plug, straight	**532216**	**FBS-SUB-9-GS-DP-B**
	Sub-D plug, straight, with terminating resistor and programming interface	**574589**	**NECU-S1W9-C2-APB**

Datasheet – Digital input modules

Function
Digital input modules make it easier to connect proximity switches or other 24 V DC sensors (inductive, capacitive, etc.).

Area of application
- Input modules for 24 V DC sensor signals
- Terminal strip
- Display of the input statuses for each input signal via an assigned LED
- Operating voltage supply 24 V DC for all connected sensors
- Diagnostic LED for short circuit/ overload of sensor supply



General technical data					
Number of inputs		16			
Max. address capacity of inputs	[byte]	2			
Input characteristics		To IEC 61131-2, type 3			
Switching logic at inputs		PNP (positive switching)			
		2- and 3-wire sensors to IEC 61131-2			
Fuse protection (short circuit)		Internal electronic fuse per module			
Maximum cable length		30 m inputs			
Electrical isolation between channel and internal bus		No			
Electrical isolation between channels		No			
Switching level	Signal 0	≤5 V			
	Signal 1	≥11 V			
Input debounce time	[ms]	0.1	3	10	20
Reverse polarity protection		24 V sensor supply against 0 V sensor supply			
Note on reverse polarity protection		Self-protection			

General data		
Module parameters		Short circuit diagnostics for sensor supply
		Behaviour after short circuit/overload
		Input debounce time
		Signal extension time
Channel parameter		Signal extension
Diagnostics via LED		Errors per module
		Status per channel
Diagnostics via bus		Short circuit/overload in sensor supply

Technical data – Electrical		
Nominal operating voltage DC for electronics/sensors	[V DC]	24
Permissible voltage fluctuations, electronics/sensors	[%]	±25
Intrinsic current consumption at nominal operating voltage, electronics/ sensors	[mA]	15
Max. total current of inputs per module	[A]	1.8
Electrical connection, input		
Function		Digital input
Connection type		8x terminal strip
Connection technology		Spring-loaded terminal
Number of pins/cores		6
Conductor cross-section	[mm²]	0.2 ... 1.5
Note on conductor cross section	[mm²]	0.2 ... 2.5 for flexible conductor without wire ferrule

Technical data – Mechanical components		
Type of mounting		With DIN rail
Mounting position		Vertical; horizontal
Product weight	[g]	102
Grid dimension	[mm]	18.9
Dimensions W x L x H	[mm]	18.9 x 76.6 x 124.3

Datasheet – Digital input modules

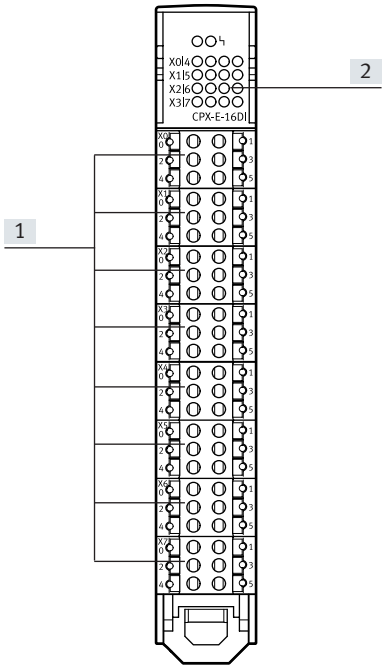
Materials	
Housing	PA
Note on materials	RoHS-compliant
LABS (PWIS) conformity	VDMA24364 zone III

Operating and environmental conditions		
Ambient temperature	[°C]	–5 ... +50
Note on ambient temperature		–5 ... +60 °C for vertical installation
Storage temperature	[°C]	–20 ... +70
Relative humidity	[%]	95
		Non-condensing
CE marking (see declaration of conformity)[2)]		To EU EMC Directive[1)]
		To EU RoHS Directive
UKCA marking (see declaration of conformity)[2)]		To UK EMC regulations
		To UK RoHS regulations
KC marking		KC EMC
Certification		RCM
		c UL us-Listed (OL)
Certificate-issuing authority		UL E239998
Degree of protection		IP20

1) For information about the area of use, see the EC declaration of conformity at: www.festo.com/catalogue/CPX-E ➔ Support/Downloads.
If the devices are subject to usage restrictions in residential, commercial or light-industrial environments, further measures for the reduction of the emitted interference may be necessary.
2) Additional information: www.festo.com/catalogue/CPX-E ➔ Support/Downloads.

Safety characteristics	
Shock resistance	Shock test with severity level 1 to FN 942017-5 and EN 60068-2-27
Vibration resistant	Transport application test with severity level 1 to FN 942017-4 and EN 60068-2-6
Explosion protection certification outside the EU	EPL Da (GB)

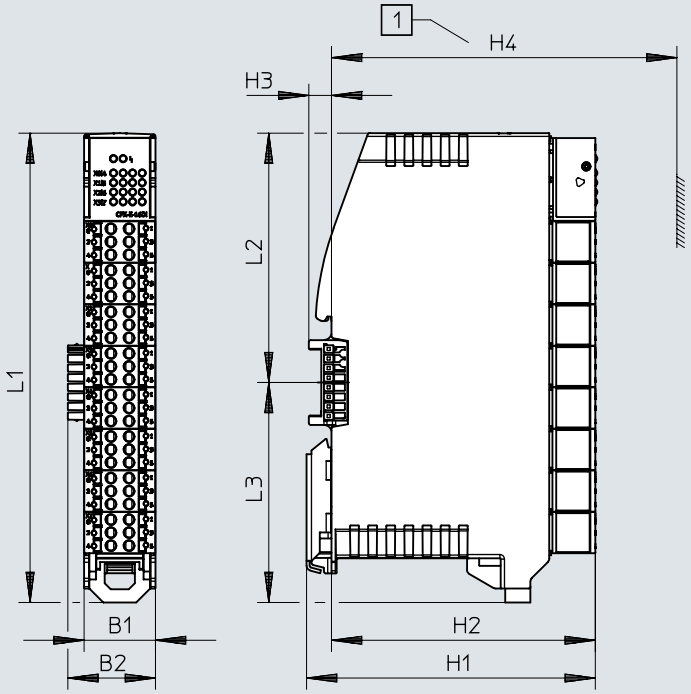
Connection and display components



[1] Digital inputs, 8 terminal strips with 2 inputs each
[2] LED indicators

Datasheet – Digital input modules

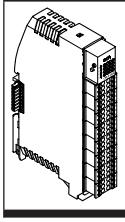
Dimensions Download CAD data ➔ www.festo.com



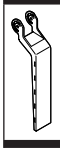
[1] Height with identification holder

	B1	B2	H1	H2	H3	H4	L1	L2	L3
CPX-E-16DI	18.9	23.2	76.5	69.9	6	91.5	124.3	66	58.3

Ordering data

		Part no.	Type
	Digital input module with 16 inputs	**4080492**	**CPX-E-16DI**

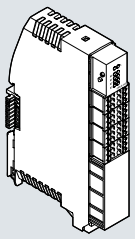
Ordering data – Accessories

		Part no.	Type
	Identification holder, 5 pieces	**4080500**	**CAFC-X3-C**

Datasheet – Digital counter modules

Function
Digital counter modules support the connection of sensors for detecting pulses.

Area of application
- Incremental encoder with two phase-offset signals and optional logic zero
- Pulse generator with or without direction signal
- Differential encoder input with 5 V DC operating voltage
- Single encoder input (single ended) with 5 V DC or 24 V DC operating voltage
- Operating voltage supply for all connected encoders/sensors
- Diagnostics LED



General technical data				
Number of inputs		4		
Max. address capacity of inputs	[byte]	12		
Input characteristics		To IEC 61131-2, type 3		
Switching logic at inputs		PNP (positive switching)		
		2- and 3-wire sensors to IEC 61131-2		
Max. address capacity of outputs	[byte]	2		
Fuse protection (short circuit)		Internal electronic fuse per module		
Electrical isolation between channel and internal bus		No		
Electrical isolation between channels		No		
Switching level	Signal 0	≤5 V		
	Signal 1	≥11 V		
Input debounce time	[ms]	0.02	0.1	3
Reverse polarity protection		24 V sensor supply against 0 V sensor supply		
Note on reverse polarity protection		Self-protection		

General data	
Module parameters	Signal type/encoder type
	Signal evaluation
	Monitoring of cable break
	Monitoring of tracking error
	Monitoring of zero pulse
	Pulse/zero pulse
	Latch signal
	Latch event
	Latch response
	Upper count limit
	Lower count limit
	Load value
	Debounce time for digital inputs
	Integration time for speed measurement
	Internal revision ID
Behaviour after end of overload of the sensor supply	Automatic return
Channel parameter	Signal extension

Datasheet – Digital counter modules

General data	
Diagnostics via LED	Errors per module
	Status per channel
	Encoder supply error
	Encoder error
	Encoder normal operation
	Encoder supply normal operation
Diagnostics via bus	Short circuit/overload in sensor supply
	Measuring system error
	Parameter error
	Monitoring wire break
	Monitoring of zero pulse
	Monitoring of tracking error

Technical data – Electrical		
Nominal operating voltage DC for electronics/sensors	[V DC]	24
Permissible voltage fluctuations, electronics/sensors	[%]	±25
Intrinsic current consumption at nominal operating voltage, electronics/sensors	[mA]	Typically 15
Max. total current of inputs per module	[A]	1.8
Power failure buffering	[ms]	10
Electrical connection input 1		
Function		Digital input
Connection type		2x terminal strip
Connection technology		Spring-loaded terminal
Number of pins/cores		6
Conductor cross-section	[mm²]	0.2 ... 1.5
Note on conductor cross section	[mm²]	0.2 ... 2.5 for flexible conductor without wire ferrule
Electrical connection input 2		
Function		Clock pulse input
Connection type		Terminal strip
Connection technology		Spring-loaded terminal
Number of pins/cores		6
Conductor cross-section	[mm²]	0.2 ... 1.5
Note on conductor cross section	[mm²]	0.2 ... 2.5 for flexible conductor without wire ferrule
Power supply		
Function		Encoder supply
Connection type		Terminal strip
Connection technology		Spring-loaded terminal
Number of pins/cores		6
Conductor cross-section	[mm²]	0.2 ... 1.5
Note on conductor cross section	[mm²]	0.2 ... 2.5 for flexible conductor without wire ferrule

Datasheet – Digital counter modules

Technical data – Mechanical components		
Type of mounting		With DIN rail
Mounting position		Vertical; horizontal
Product weight	[g]	88
Grid dimension	[mm]	18.9
Dimensions W x L x H	[mm]	18.9 x 76.6 x 124.3

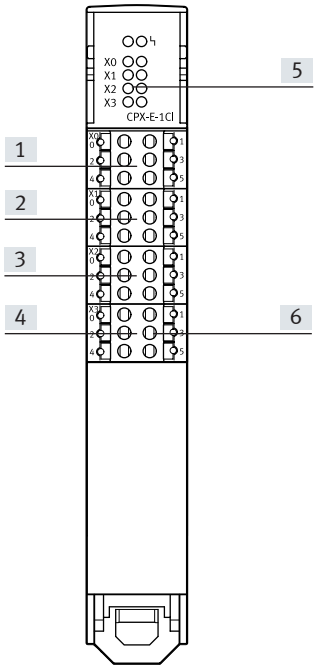
Materials	
Housing	PA
Screws	Galvanised steel
Note on materials	RoHS-compliant
LABS (PWIS) conformity	VDMA24364 zone III

Operating and environmental conditions		
Ambient temperature	[°C]	–5 ... +50
Note on ambient temperature		–5 ... +60 °C for vertical installation
Storage temperature	[°C]	–20 ... +70
Relative humidity	[%]	95
		Non-condensing
CE marking (see declaration of conformity)[2]		To EU EMC Directive[1]
		To EU RoHS Directive
UKCA marking (see declaration of conformity)[2]		To UK EMC regulations
		To UK RoHS regulations
KC marking		KC EMC
Certification		RCM
		c UL us-Listed (OL)
Certificate-issuing authority		UL E239998
Degree of protection		IP20

1) For information about the area of use, see the EC declaration of conformity at: www.festo.com/catalogue/CPX-E ➔ Support/Downloads.
If the devices are subject to usage restrictions in residential, commercial or light-industrial environments, further measures for the reduction of the emitted interference may be necessary.
2) Additional information: www.festo.com/catalogue/CPX-E ➔ Support/Downloads.

Safety characteristics	
Shock resistance	Shock test with severity level 1 to FN 942017-5 and EN 60068-2-27
Vibration resistant	Transport application test with severity level 1 to FN 942017-4 and EN 60068-2-6

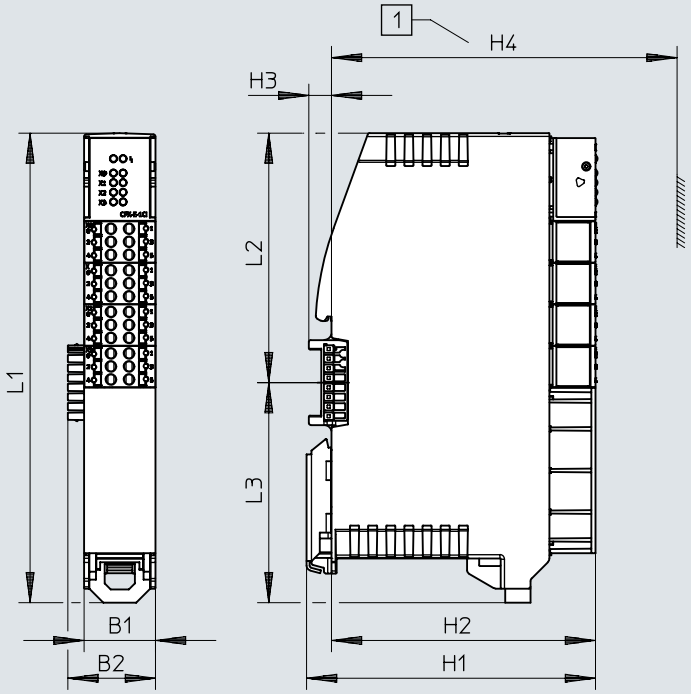
Connection and display components



[1] Transmit count/block count transmission control inputs
[2] Set counter/block counter control inputs
[3] Counter input, 1 terminal strip
[4] 24 V DC supply voltage for encoder
[5] LED indicators
[6] 5 V DC supply voltage for encoder

Datasheet – Digital counter modules

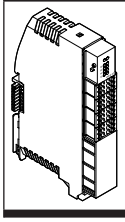
Dimensions Download CAD data ➔ www.festo.com



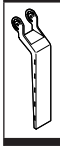
[1] Height with identification holder

	B1	B2	H1	H2	H3	H4	L1	L2	L3
CPX-E-1CI	18.9	23.2	76.5	69.9	6	91.5	124.3	66	58.3

Ordering data

		Part no.	Type
	Digital counter module with 1 input	**4827505**	**CPX-E-1CI**

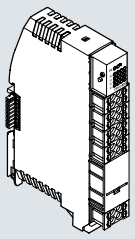
Ordering data – Accessories

		Part no.	Type
	Identification holder, 5 pieces	**4080500**	**CAFC-X3-C**

Datasheet – Digital output modules

Function
Digital output modules make it possible to connect electrical consumers in accordance with IEC 1131-2 type 0.5 (valves, contactors or display components) with an operating voltage of 24 V DC.

Area of application
- Output modules for 24 V DC operating voltage
- Terminal strip
- Electronic fuse protection against short circuit or overload with automatic resetting
- Error display via LED
- Slow response; possible short-term increase in current requirement



General technical data		
Number of outputs		8
Max. address capacity of outputs	[byte]	1
Characteristic curve of outputs		To IEC 61131-2, type 0.5
Switching logic at outputs		PNP (positive switching)
Fuse protection (short circuit)		Internal electronic fuse per channel
Maximum cable length		30 m inputs
Electrical isolation between channel and internal bus		Yes
Electrical isolation between channels		No
Reverse polarity protection		24 V load against 0 V load
Note on reverse polarity protection		Self-protection

General data	
Module parameters	Short circuit diagnostics at output
	Behaviour after short circuit/overload
	Diagnostics for load supply undervoltage
Behaviour after end of overload of the outputs	No automatic return (default)
	Parameterisable (module by module)
Channel parameter	Force channel x
Diagnostics via LED	Errors per module
	Error per channel
	Status per channel
Diagnostics via bus	Output short circuit/overload
	Undervoltage in load supply
	Module error

Technical data – Electrical		
Nominal operating voltage DC load	[V DC]	24
Permissible voltage fluctuations, load	[%]	±25
Intrinsic current consumption at nominal operating voltage, load	[mA]	34
Max. residual current outputs per module	[A]	4
Protection against direct and indirect contact		PELV
Electrical connection output		
Function		Digital output
Connection type		4x terminal strip
Connection technology		Spring-loaded terminal
Number of pins/cores		4
Conductor cross-section	[mm²]	0.2 ... 1.5
Note on conductor cross section	[mm²]	0.2 ... 2.5 for flexible conductor without wire ferrule
Power supply		
Connection type		Terminal strip
Connection technology		Spring-loaded terminal
Number of pins/cores		4
Conductor cross-section	[mm²]	0.2 ... 1.5
Note on conductor cross section	[mm²]	0.2 ... 2.5 for flexible conductor without wire ferrule

Datasheet – Digital output modules

Technical data – Mechanical components		
Type of mounting		With DIN rail
Mounting position		Vertical; horizontal
Product weight	[g]	93
Grid dimension	[mm]	18.9
Dimensions W x L x H	[mm]	18.9 x 76.6 x 124.3

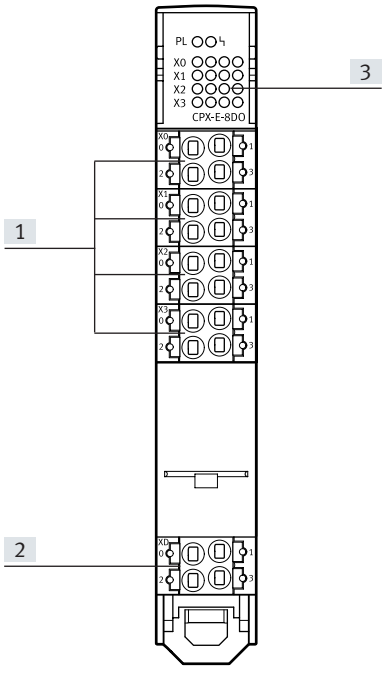
Materials	
Housing	PA
Note on materials	RoHS-compliant
LABS (PWIS) conformity	VDMA24364 zone III

Operating and environmental conditions		
Ambient temperature	[°C]	–5 ... +50
Note on ambient temperature		–5 ... +60 °C for vertical installation
Storage temperature	[°C]	–20 ... +70
Relative humidity	[%]	95
		Non-condensing
CE marking (see declaration of conformity)[2]		To EU EMC Directive[1]
		To EU RoHS Directive
UKCA marking (see declaration of conformity)[2]		To UK EMC regulations
		To UK RoHS regulations
KC marking		KC EMC
Certification		RCM
		c UL us-Listed (OL)
Certificate-issuing authority		UL E239998
Degree of protection		IP20

1) For information about the area of use, see the EC declaration of conformity at: www.festo.com/catalogue/CPX-E ➔ Support/Downloads.
If the devices are subject to usage restrictions in residential, commercial or light-industrial environments, further measures for the reduction of the emitted interference may be necessary.
2) Additional information: www.festo.com/catalogue/CPX-E ➔ Support/Downloads.

Safety characteristics	
Shock resistance	Shock test with severity level 1 to FN 942017-5 and EN 60068-2-27
Vibration resistant	Transport application test with severity level 1 to FN 942017-4 and EN 60068-2-6

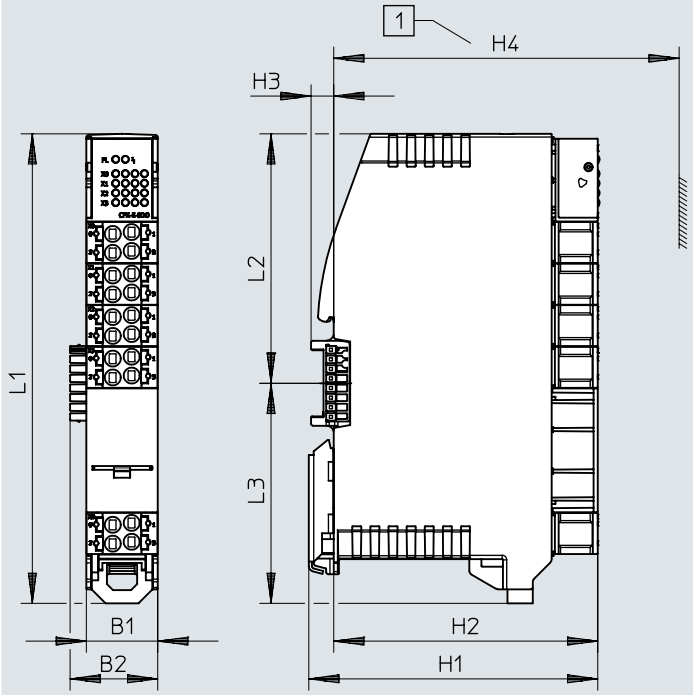
Connection and display components



[1] Digital outputs, 4 terminal strips with 2 outputs each
[2] Terminal strip for operating voltage supply
[3] LED indicators

Datasheet – Digital output modules

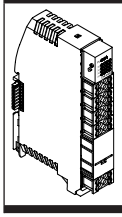
Dimensions Download CAD data ➔ www.festo.com



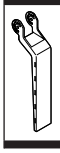
[1] Height with identification holder

	B1	B2	H1	H2	H3	H4	L1	L2	L3
CPX-E-8DO	18.9	23.2	76.5	69.9	6	91.5	124.3	66	58.3

Ordering data

		Part no.	Type
	Digital output module with 8 outputs	**4080491**	**CPX-E-8DO**

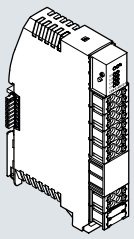
Ordering data – Accessories

		Part no.	Type
	Identification holder, 5 pieces	**4080500**	**CAFC-X3-C**

Datasheet – Analogue input modules

Function
Analogue input modules make it possible to detect analogue input signals such as current or voltage.

Area of application
- Measurement ranges, limit values, measured value smoothing and diagnostic behaviour can be set
- Terminal strip
- Electronic fuse protection against short circuit or overload with automatic resetting
- Error display via LED
- Slow response; possible short-term increase in current requirement



General technical data								
Number of inputs		4						
Max. address capacity of inputs	[byte]	8						
Measured variable		Voltage				Current		
Analogue input	[V]	–10 ... +10	–5 ... +5	0 ... +10	+1 ... +5	–	–	–
	[mA]	–	–	–	–	–20 ... +20	0 ... +20	+4 ... +20
Repetition accuracy	[%]	±0.1 at 25 °C						
Data format		15 bits + prefix						
		Linear scaling						
Basic error limit	[%]	±0.2 at 25 °C						
Operating error limit related to the ambient temperature range	[%]	±0.3						
Fuse protection (short circuit)		Internal electronic fuse per module						
Maximum cable length		30 m inputs; shielded						
Electrical isolation between channel and internal bus		Yes						
Electrical isolation between channels		No						
Internal cycle time	[µs]	≤ 500						
Reverse polarity protection		24 V sensor supply against 0 V sensor supply						
Note on reverse polarity protection		Self-protection						

General data	
Module parameters	Short circuit diagnostics for sensor supply
	Parameterisation error diagnostics
	Diagnostics of overload at analogue inputs
	Behaviour after short circuit/overload
	Behaviour after overload on analogue inputs
	Data format analogue inputs
	Hysteresis limit monitoring
	Deactivate sensor supply
Behaviour after end of overload of the sensor supply	Automatic return (default)
	Parameterisable (module by module)
Channel parameter	Signal range per channel
	Diagnostics for lower limit
	Diagnostics for upper limit
	Wire break diagnostics
	Underflow/overflow diagnostics
	Parameter error diagnostics
	Smoothing factor
	Lower/upper limits
Diagnostics via LED	Errors per module
	Error per channel
Diagnostics via bus	Short circuit/overload in sensor supply
	Parameterisation error
	Parameter error
	Overload at analogue inputs
	Upper/lower limit value exceeded
	Wire break
	Underflow/overflow

Datasheet – Analogue input modules

Technical data – Electrical		
Nominal operating voltage DC for electronics/sensors	[V DC]	24
Permissible voltage fluctuations, electronics/sensors	[%]	±25
Power failure buffering	[ms]	10
Intrinsic current consumption at nominal operating voltage, electronics/sensors	[mA]	70
Max. total current of inputs per module	[A]	1.4
Electrical connection, input		
Function		Analogue input
Connection type		4x terminal strip
Connection technology		Spring-loaded terminal
Number of pins/cores		4
Conductor cross-section	[mm²]	0.2 … 1.5
Note on conductor cross section	[mm²]	0.2 … 2.5 for flexible conductor without wire ferrule

Technical data – Mechanical components		
Type of mounting		With DIN rail
Mounting position		Vertical; horizontal
Product weight	[g]	96
Grid dimension	[mm]	18.9
Dimensions W x L x H	[mm]	18.9 x 76.6 x 124.3

Materials	
Housing	PA
Screws	Galvanised steel
Note on materials	RoHS-compliant
LABS (PWIS) conformity	VDMA24364 zone III

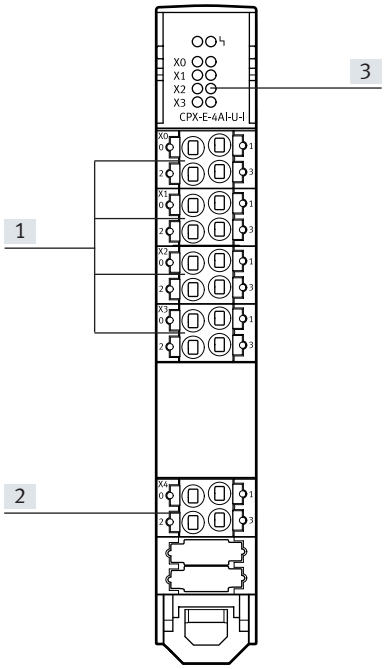
Operating and environmental conditions		
Ambient temperature	[°C]	–5 … +50
Note on ambient temperature		–5 … +60 °C for vertical installation
Storage temperature	[°C]	–20 … +70
Relative humidity	[%]	95
		Non-condensing
CE marking (see declaration of conformity)[2]		To EU EMC Directive[1]
		To EU RoHS Directive
UKCA marking (see declaration of conformity)[2]		To UK EMC regulations
		To UK RoHS regulations
KC marking		KC EMC
Certification		RCM
		c UL us-Listed (OL)
Certificate-issuing authority		UL E239998
Degree of protection		IP20

1) For information about the area of use, see the EC declaration of conformity at: www.festo.com/catalogue/CPX-E ➔ Support/Downloads.
If the devices are subject to usage restrictions in residential, commercial or light-industrial environments, further measures for the reduction of the emitted interference may be necessary.
2) Additional information: www.festo.com/catalogue/CPX-E ➔ Support/Downloads.

Safety characteristics	
Shock resistance	Shock test with severity level 1 to FN 942017-5 and EN 60068-2-27
Vibration resistant	Transport application test with severity level 1 to FN 942017-4 and EN 60068-2-6

Datasheet – Analogue input modules

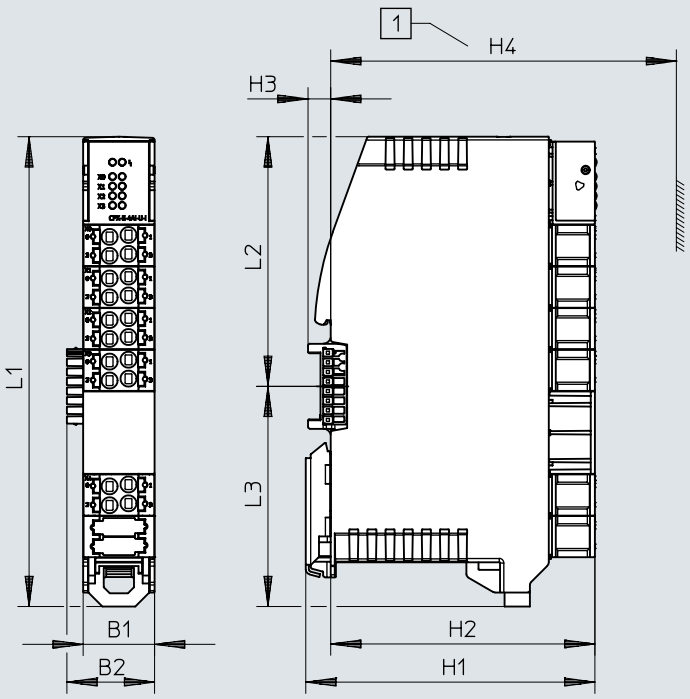
Connection and display components



[1] Analogue inputs, 4 terminal strips each with one input
[2] 4 connections for functional earth (FE)
[3] LED indicators

Dimensions

Download CAD data ➔ www.festo.com

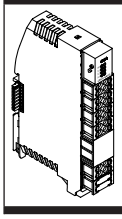


[1] Height with identification holder

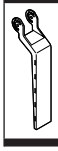
	B1	B2	H1	H2	H3	H4	L1	L2	L3
CPX-E-4AI-U-I	18.9	23.2	76.5	69.9	6	91.5	124.3	66	58.3

Datasheet – Analogue input modules

Ordering data

		Part no.	Type
	Analogue input module with 4 inputs	**4080493**	**CPX-E-4AI-U-I**

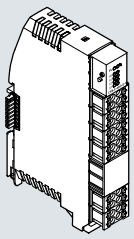
Ordering data – Accessories

		Part no.	Type
	Identification holder, 5 pieces	**4080500**	**CAFC-X3-C**

Datasheet – Analogue output modules

Function
The module converts the value specified by the controller (15-bit value with prefix) and transfers it to a connected actuator as an analogue current or voltage value.

Area of application
- Output signal (current/voltage) can be set
- Terminal strip
- Electronic fuse protection against short circuit or overload with automatic resetting
- Error display via LED
- Slow response; possible short-term increase in current requirement



General technical data							
Number of outputs		4					
Max. address capacity of outputs	[byte]	8					
Measured variable		Voltage			Current		
Analogue input	[V]	–10 ... +10	–5 ... +5	0 ... +10	–	–	–
	[mA]	–	–	–	–20 ... +20	0 ... +20	+4 ... +20
Repetition accuracy	[%]	±0.05 at 25 °C					
Data format		15 bits + prefix					
		Linear scaling					
Basic error limit	[%]	±0.1 at 25 °C					
Operating error limit related to the ambient temperature range	[%]	±0.3					
Fuse protection (short circuit)		Internal electronic fuse per module					
Maximum cable length		30 m outlets, shielded					
Electrical isolation between channel and internal bus		Yes					
Electrical isolation between channels		No					
Reverse polarity protection		24 V actuator supply against 0 V sensor supply					
		24 V load against 0 V load					
		24 V sensor supply against 0 V sensor supply					
Note on reverse polarity protection		Self-protection					

General data	
Module parameters	Short circuit diagnostics for actuator supply
	Parameterisation error diagnostics
	Diagnostics for load supply undervoltage
	Behaviour after short circuit/overload in actuator supply
	Behaviour after short circuit/overload at analogue output
	Data format for analogue outputs
	Deactivate actuator supply
Behaviour after end of overload of the outputs	No automatic return (default)
	Parameterisable (module by module)
Channel parameter	Signal range per channel
	Enable overload/short circuit diagnostics
	Enable wire break/idling diagnostics
	Release for parameterisation error diagnostics
	Force channel x
Diagnostics via LED	Errors per module
	Error per channel
Diagnostics via bus	Short circuit/overload in actuator supply
	Parameterisation error
	Nominal range exceeded
	Nominal range not reached
	Short circuit/overload at analogue output
	Undervoltage in load supply
	General error

Datasheet – Analogue output modules

Technical data – Electrical		
Nominal operating voltage DC for electronics/sensors	[V DC]	24
Nominal operating voltage DC load	[V DC]	24
Permissible voltage fluctuations, electronics/sensors	[%]	±25
Permissible voltage fluctuations, load	[%]	±25
Power failure buffering	[ms]	10
Intrinsic current consumption at nominal operating voltage, electronics/ sensors	[mA]	60
Intrinsic current consumption at nominal operating voltage, load	[mA]	15
Max. residual current outputs per module	[A]	2
Protection against direct and indirect contact		PELV
Electrical connection output		
Function		Analogue output
Connection type		4x terminal strip
Connection technology		Spring-loaded terminal
Number of pins/cores		4
Conductor cross-section	[mm²]	0.2 … 1.5
Note on conductor cross section	[mm²]	0.2 … 2.5 for flexible conductor without wire ferrule
Power supply		
Connection type		Terminal strip
Connection technology		Spring-loaded terminal
Number of pins/cores		4
Conductor cross-section	[mm²]	0.2 … 1.5
Note on conductor cross section	[mm²]	0.2 … 2.5 for flexible conductor without wire ferrule

Technical data – Mechanical components		
Type of mounting		With DIN rail
Mounting position		Vertical; horizontal
Product weight	[g]	96
Grid dimension	[mm]	18.9
Dimensions W x L x H	[mm]	18.9 x 76.6 x 124.3

Materials	
Housing	PA
Screws	Galvanised steel
Note on materials	RoHS-compliant
LABS (PWIS) conformity	VDMA24364 zone III

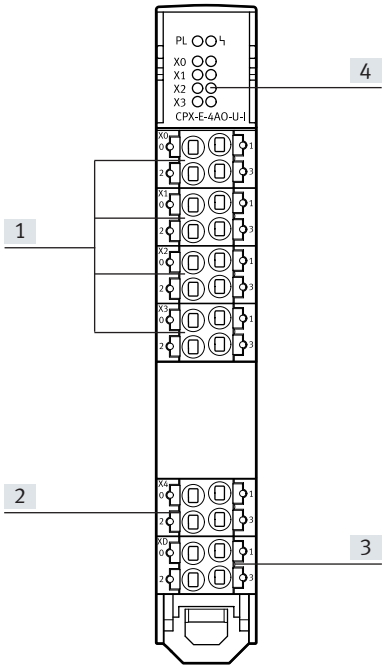
Operating and environmental conditions		
Ambient temperature	[°C]	–5 … +50
Note on ambient temperature		–5 … +60 °C for vertical installation
Storage temperature	[°C]	–20 … +70
Relative humidity	[%]	95
		Non-condensing
CE marking (see declaration of conformity)[2)]		To EU EMC Directive[1)]
		To EU RoHS Directive
UKCA marking (see declaration of conformity)[2)]		To UK EMC regulations
		To UK RoHS regulations
KC marking		KC EMC
Certification		RCM
		c UL us-Listed (OL)
Certificate-issuing authority		UL E239998
Degree of protection		IP20

1) For information about the area of use, see the EC declaration of conformity at: www.festo.com/catalogue/CPX-E ➔ Support/Downloads.
If the devices are subject to usage restrictions in residential, commercial or light-industrial environments, further measures for the reduction of the emitted interference may be necessary.
2) Additional information: www.festo.com/catalogue/CPX-E ➔ Support/Downloads.

Datasheet – Analogue output modules

Safety characteristics	
Shock resistance	Shock test with severity level 1 to FN 942017-5 and EN 60068-2-27
Vibration resistant	Transport application test with severity level 1 to FN 942017-4 and EN 60068-2-6

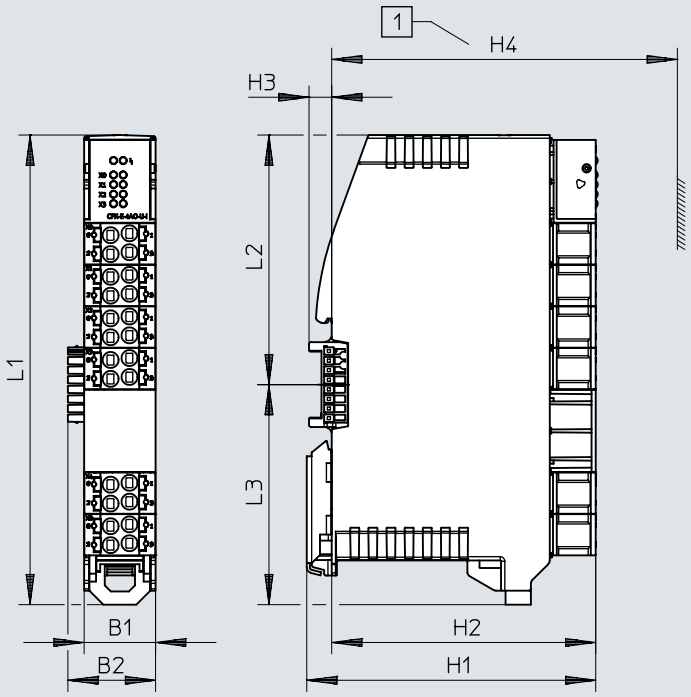
Connection and display components



[1] Analogue outputs, 4 terminal strips each with one output
[2] 4 connections for functional earth (FE)
[3] Terminal strip for operating voltage supply
[4] LED indicators

Dimensions

Download CAD data ➔ www.festo.com

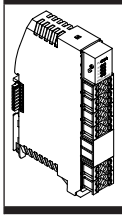


[1] Height with identification holder

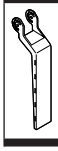
	B1	B2	H1	H2	H3	H4	L1	L2	L3
CPX-E-4AO-U-I	18.9	23.2	76.5	69.9	6	91.5	124.3	66	58.3

Datasheet – Analogue output modules

Ordering data

		Part no.	Type
	Analogue output module with 4 outputs	**4080494**	**CPX-E-4AO-U-I**

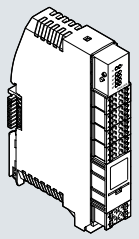
Ordering data – Accessories

		Part no.	Type
	Identification holder, 5 pieces	**4080500**	**CAFC-X3-C**

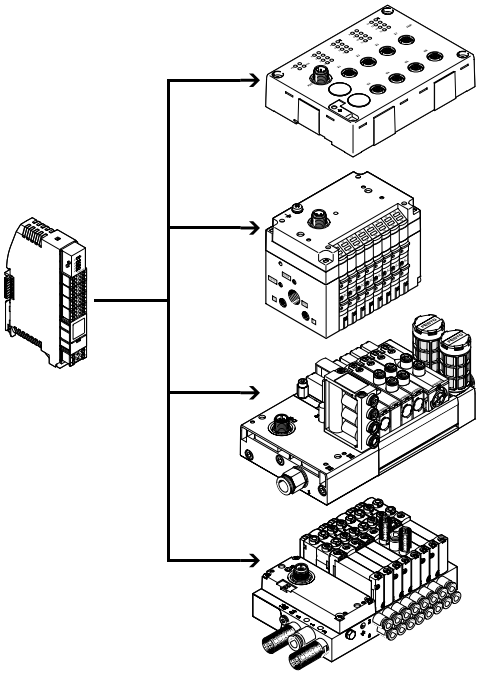
Datasheet – IO-Link master modules

Function
The IO-Link® master module establishes the connection to modules that have an IO-Link® interface (device). The I/O data from the connected devices is transmitted to the connected CPX-E bus module and thus to the higher-order controller via fieldbus.

Area of application
- Address space can be set
- Terminal strip
- Electronic fuse protection against short circuit or overload with automatic resetting
- Error display via LED
- Slow response; possible short-term increase in current requirement



Application – Example configuration



The IO-Link master module provides 4 external IO-Link interfaces.
As well as transmitting the communication data, the IO-Link® interfaces 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 load voltage supply is fed directly into the module.

The address space provided by the IO-Link master module to the IO-Link® interfaces (ports) is set using DIL switches.
2 ... 32 bytes per port can be set. Since the address space for the module is limited to a total of 32 bytes, there is the following gradation:
- For 2, 4 or 8 bytes per port, all 4 ports are active
- For 16 bytes per port, 2 ports are active
- For 32 bytes per port, just 1 port is active

The behaviour of the master module is defined using parameters.

General technical data			
Protocol			IO-Link®
IO-Link®	Number of ports		4
	Port class		B
	Communication mode		SIO, COM1 (4.8 kBaud), COM2 (38.4 kBaud), COM3 (230.4 kBaud)
			Configurable via software
	Communication		C/Q LED green
	Minimum cycle time		Depending on minimally supported cycle time of connected IO-Link® device
	Protocol version		Master V 1.1
	Process data length IN	[byte]	8 ... 32, parameterisable
	Process data length OUT	[byte]	8 ... 32, parameterisable
Number of outputs			8
Max. address capacity of outputs		[byte]	1
Characteristic curve of outputs			To IEC 61131-2, type 0.5
Switching logic at outputs			PNP (positive switching)
Fuse protection (short circuit)			Internal electronic fuse per channel
			Internal electronic fuse per module
Electrical isolation between channel and internal bus			No
Electrical isolation between channels			No
Reverse voltage strength, logic			No
Reverse voltage protection, load			No
Reverse polarity protection			24 V sensor supply against 0 V sensor supply
			24 V load against 0 V load
Note on reverse polarity protection			Self-protection

Datasheet – IO-Link master modules

General data	
Module parameters	Short circuit diagnostics for actuator supply
	Behaviour after short circuit/overload
	Deactivate sensor supply
Channel parameter	Deactivate actuator supply
	Device error code
	Channel mode
	Channel status
	Force channel x
Diagnostics via LED	Errors per module
	Status per channel
Diagnostics via bus	Short circuit
	Parameter error
	Wire break
	Module error
	Device missing/failed
	Underflow/overflow
	Undervoltage
	General error

Technical data – Electrical		
Nominal operating voltage DC for electronics/sensors	[V DC]	24
Nominal operating voltage DC load	[V DC]	24
Permissible voltage fluctuations, electronics/sensors	[%]	±25
Permissible voltage fluctuations, load	[%]	±25
Intrinsic current consumption at nominal operating voltage, electronics/sensors	[mA]	50
Intrinsic current consumption at nominal operating voltage, load	[mA]	15
Max. residual current outputs per module	[A]	4
Protection against direct and indirect contact		PELV
Electrical connection, IO-Link®		
Connection type		4x terminal strip
Connection technology		Spring-loaded terminal
Number of pins/cores		6
Conductor cross-section	[mm²]	0.2 … 1.5
Note on conductor cross section	[mm²]	0.2 … 2.5 for flexible conductor without wire ferrule
Power supply		
Connection type		Terminal strip
Connection technology		Spring-loaded terminal
Number of pins/cores		4
Conductor cross-section	[mm²]	0.2 … 1.5
Note on conductor cross section	[mm²]	0.2 … 2.5 for flexible conductor without wire ferrule

Technical data – Mechanical components		
Type of mounting		With DIN rail
Mounting position		Vertical; horizontal
Product weight	[g]	96
Grid dimension	[mm]	18.9
Dimensions W x L x H	[mm]	18.9 x 76.6 x 124.3

Materials	
Housing	PA
Note on materials	RoHS-compliant
LABS (PWIS) conformity	VDMA24364 zone III

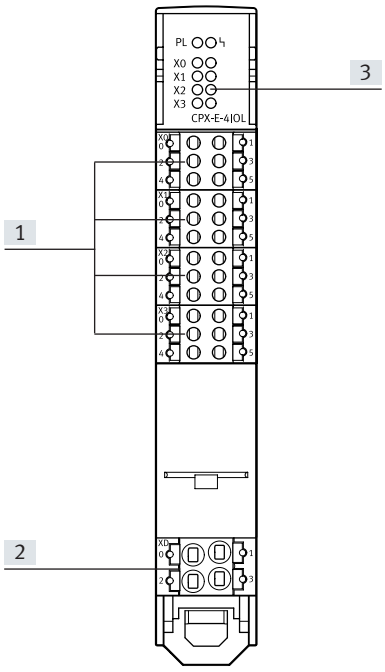
Datasheet – IO-Link master modules

Operating and environmental conditions		
Ambient temperature	[°C]	–5 ... +60
Note on ambient temperature		–5 ... +60 °C for vertical installation
Storage temperature	[°C]	–20 ... +70
Relative humidity	[%]	95
		Non-condensing
CE marking (see declaration of conformity)[2)]		To EU EMC Directive[1)]
		To EU RoHS Directive
UKCA marking (see declaration of conformity)[2)]		To UK EMC regulations
		To UK RoHS regulations
KC marking		KC EMC
Certification		RCM
		c UL us-Listed (OL)
Certificate-issuing authority		UL E239998
Degree of protection		IP20

1) For information about the area of use, see the EC declaration of conformity at: www.festo.com/catalogue/CPX-E ➔ Support/Downloads.
If the devices are subject to usage restrictions in residential, commercial or light-industrial environments, further measures for the reduction of the emitted interference may be necessary.
2) Additional information: www.festo.com/catalogue/CPX-E ➔ Support/Downloads.

Safety characteristics	
Shock resistance	Shock test with severity level 1 to FN 942017-5 and EN 60068-2-27
Vibration resistant	Transport application test with severity level 1 to FN 942017-4 and EN 60068-2-6
Explosion protection certification outside the EU	EPL Da (GB)

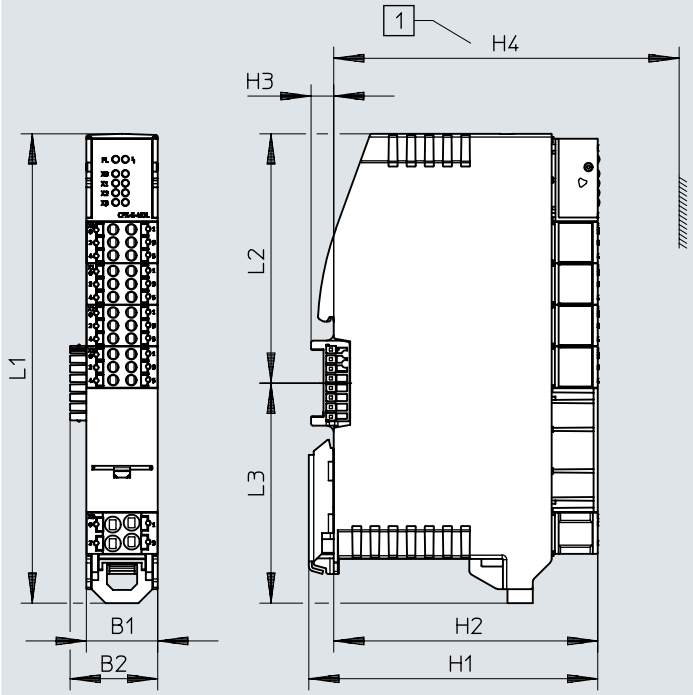
Connection and display components



[1] IO-Link® ports, 4 terminal strips each with one port
[2] Terminal strip for operating voltage supply, load voltage
[3] LED indicators

Datasheet – IO-Link master modules

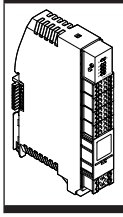
Dimensions Download CAD data ➔ www.festo.com



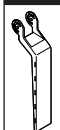
[1] Height with identification holder

	B1	B2	H1	H2	H3	H4	L1	L2	L3
CPX-E-4IOL	18.9	23.2	76.5	69.9	6	91.5	124.3	66	58.3

Ordering data

		Part no.	Type
	IO-Link master module with 4 ports	**4080495**	**CPX-E-4IOL**

Ordering data – Accessories

		Part no.	Type
	Identification holder, 5 pieces	**4080500**	**CAFC-X3-C**

Ordering data – Modular product system

Ordering table

		Conditions	Code		Enter code
Module no.	**5237644**				
Product type	System CPX-E	[1]	**60E**		60E
Electrical control	Bus module (PROFIBUS device)	[1]	**-PB**		
	Bus module (PROFINET device)	[1]	**-PN**		
	Bus module, EtherNet/IP device	[1]	**-EP**		
	Bus module, EtherCAT® device	[1]	**-EC**		
	Controller (CODESYS V3, PROFINET device)	[1]	**-CPN**		
	Controller (CODESYS V3, SoftMotion, PROFINET device)	[1]	**-MPN**		
	Controller (CODESYS V3, Ethernet/IP device)	[1]	**-CEP**		
	Controller (CODESYS V3, SoftMotion, Ethernet/IP device)	[1]	**-MEP**		
	Controller (CODESYS V3)	[1]	**-CB**		
	Controller (CODESYS V3, SoftMotion)	[1]	**-MB**		
I/O modules	Digital input module with 16 inputs	[1]	**M**		
	Digital output module with 8 outputs	[1]	**L**		
	Analogue input module with 4 inputs (current/voltage)	[1]	**NI**		
	Analogue output module with 4 outputs (current/voltage)	[1]	**N/O**		
	IO-Link master module	[1]	**T51**		
	Counter module (24 V, encoder 24 V/5 V)	[1]	**T53**		
Module configuration for IO-Link master module	DIL1 ... 8: OFF (64-bit consumption) 4 active ports,16-bit I/O per port		**OO**		
	DIL 1: ON (128-bit consumption) 4 active ports, 32-bit I/O per port		**IO**		
	DIL 2: ON (256-bit consumption) 4 active ports, 64-bit I/O per port		**OI**		
	DIL 1: ON, DIL 2: ON, DIL4: ON (256-bit consumption) 2 active ports, 128-bit I/O per port		**II**		
	DIL 3: ON, DIL 5: ON (256-bit consumption) 1 active port, 256-bit I/O per port		**III**		
Accessories	Module cover including label strips		**+MH**		
	Micro SD card		**+SK**		

1) A maximum of one bus module or one controller and 10 input/output modules can be included.