

## Control blocks CPX-CEC

**FESTO**



# Control blocks CPX-CEC

Key features

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## Application

Controller



The CODESYS controllers are modern control systems for CPX terminals that enable programming with CODESYS to IEC 61131-3.

## Programming in a global language

CODESYS provided by Festo offers a convenient user interface with the following functions:

- Integrated module libraries
- Library Manager for integrating further libraries
- Visualisation editor

- Simulation mode
- Integrated project documentation
- Debugging functions for fault finding
- Configuration and parameterisation of the controller using the control configuration

## Basic functions

The CODESYS controllers offer the following basic functions:

- Programming with CODESYS to IEC 61131-3
- Communication via Ethernet (Modbus/TCP, EasyIP, TCP/IP)
- Process visualisation using operator unit CDPX or OPC server

- Communication via fieldbus in combination with a fieldbus node in the CPX terminal
- Diagnostics and quick commissioning of CPX modules via handheld CPX-MMI

## CPX-CEC-C1 offers

- All basic functions
- CANopen master for controlling up to 127 CANopen stations. Electric axes can be controlled in point-to-point mode

## CPX-CEC offers

- All basic functions
- RS232 interface for operating external devices



Note

When using external devices, data communication must be programmed by the user.

## Bus connection

The CODESYS controllers are remote controllers that can be connected to a higher-order PLC via the fieldbus nodes of the CPX terminal or via Ethernet, for example:

- PROFINET
- EtherNet/IP
- EtherCAT
- PROFIBUS
- DeviceNet

## Operating modes

- Stand-alone
- Remote controller on the fieldbus
- Remote controller on Ethernet

## System expansion

CANopen connects CPX-CEC with valve terminals and electric drive controllers from Festo:

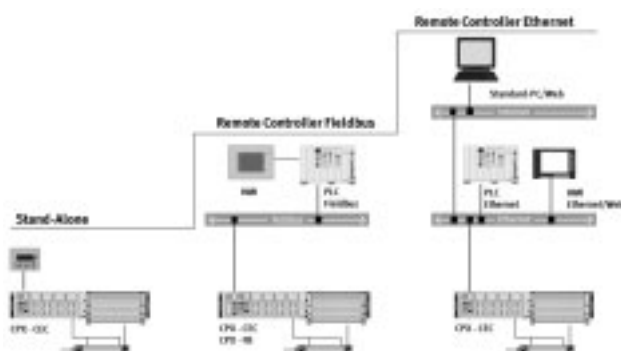
- CPX, CPV
- CMMP-AS, CMMS-ST, etc.
- AS-Interface gateway

Ethernet connects CPX-CEC with additional controllers and operator units from Festo:

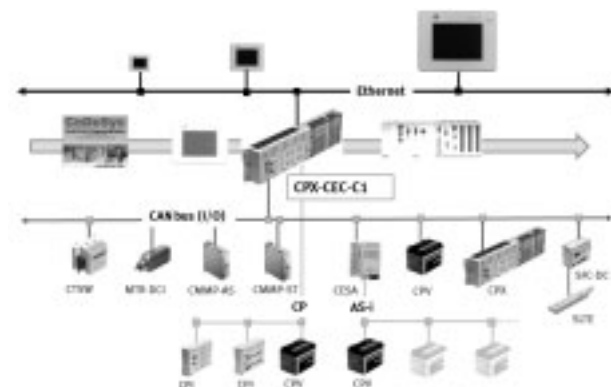
- CECX
- CDPX
- Camera SBO...-Q

## System expansion (examples)

CPX-CEC/CPX-CEC as a stand-alone or remote controller



CPX-CEC-C1 as a CANopen fieldbus master



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## Key features

### Advantages for users

#### Increased performance

Improved cycle times – more connectable actuators.  
Compatibility with almost all control systems on the market is ensured via the CPX terminal.

The extensive CODESYS function library provides diagnostics and condition monitoring options.

#### Reduced costs

For standardised pre-processing: reduces installation costs as an intelligent remote I/O terminal to IP65/IP67 directly at the machine.

CPX-CEC is ideally adapted to CPX and motion applications with up to 31 axes.

#### Simple, yet efficient: decentralised structures

The modular I/O system with up to 512 I/Os and CAN master functionality (CPX-CEC) offers complete flexibility, whether for open-loop or closed-loop

control.  
Stand-alone for low-cost automation of manual workstations, for example, or remote control with pre-processing.

#### The only one in the world to IP65

The fully integrated automation platform for standard, proportional and servopneumatic, sensor and motion control to IP65.

Included: simple commissioning.

### Classification of CPX-CEC in the portfolio for multi-axis controllers for electric drive technology

#### Embedded controller

CPX-CEC permits the flexible connection of valve actuators and electric drives on the terminal - programmable in CODESYS and can, if necessary, be

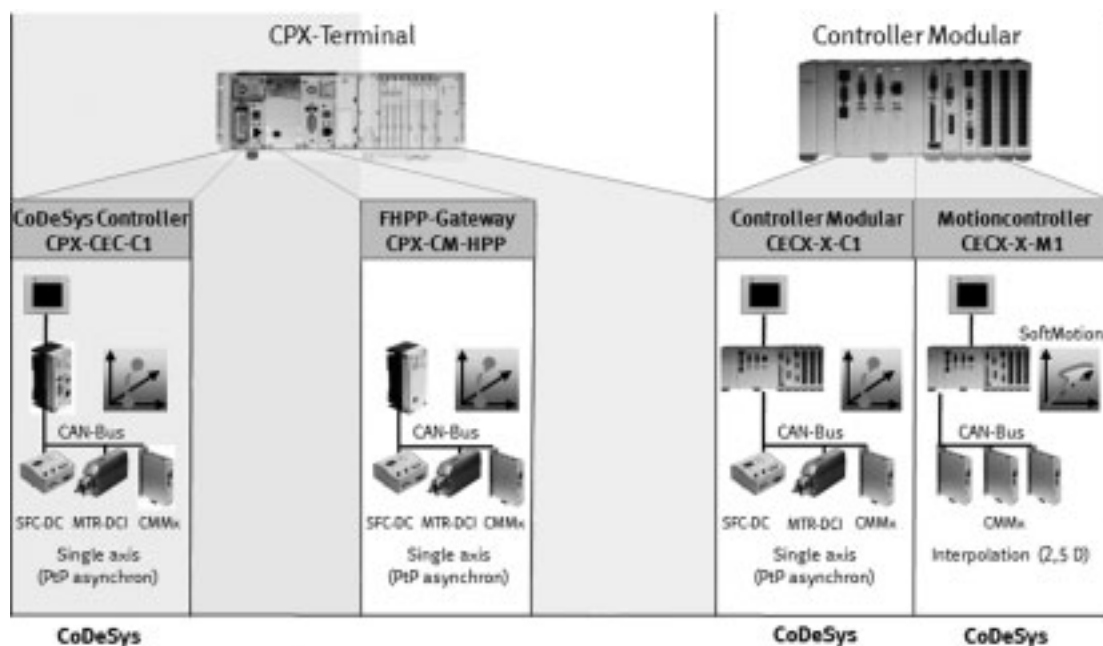
directly installed at the machine to IP65. The ideal complement to the gateway module CPX-CM-HPP.

#### Modular controller

The modular controllers complete the upper end of the range for actuating electric drives.  
The CECX-X-C1 is the ideal expansion option for a control cabinet in combination with electric drive technology and general control technology.  
The CECX-X-M1 executes advanced

tasks such as cam disks, multi-axis function modules to PLCopen and simple NC functions up to 2.5D.  
The robotic controller CMXR provides interpolating control for different kinematic systems (e.g. parallel kinematic system) with up to six axes.

### CPX-CEC in the world of electric drive technology



# Control blocks CPX-CEC

Type codes

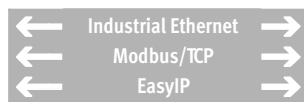
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		CPX	–	CEC	–	C1
<b>Type</b>						
CPX	Modular electrical terminal					
<b>Electrical control</b>						
CEC	Control block					
<b>Interface and function</b>						
C1	CANopen					
–	RS232					

# Control blocks CPX-CEC

Technical data

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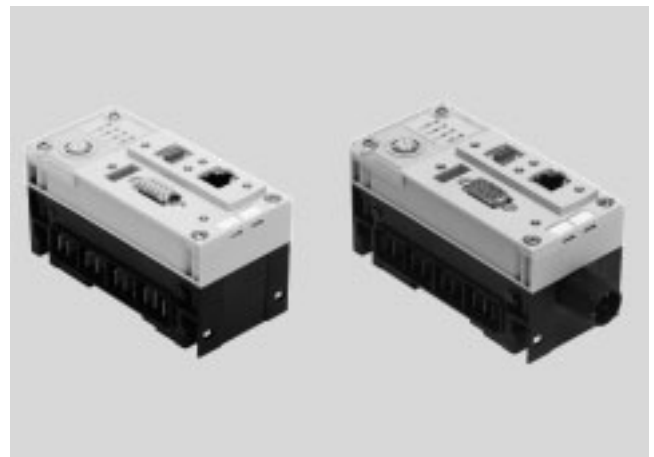
## IT services:



The CODESYS controller is a modern control system for CPX terminals that enables programming with CODESYS to IEC 61131-3.

The power supply to and communication with other modules takes place via the interlinking block.

In addition to network connections, LEDs are also provided for the bus status, operating status of the PLC and CPX peripherals information, as are switching elements and a diagnostic interface for CPX-MMI and CPX-FMT.



Application			
Bus connection		Communication protocols	Operating modes
The CPX-CEC is a remote controller that can be connected to a master PLC via the fieldbus nodes of the CPX terminal or via Ethernet. At the same	time, it is possible to operate the CPX-CEC as a compact stand-alone controller directly on the machine.	<ul style="list-style-type: none"> <li>• Fieldbus via CPX bus nodes</li> <li>• Modbus/TCP</li> <li>• EasyIP</li> </ul>	<ul style="list-style-type: none"> <li>• Stand-alone</li> <li>• Remote controller, fieldbus</li> <li>• Remote controller, Ethernet</li> </ul>
Setting options			
The CPX-CEC has the following interfaces for monitoring, programming and commissioning:	<ul style="list-style-type: none"> <li>• For the CPX-MMI/-FMT</li> <li>• Ethernet interface for IT applications</li> <li>• Remote diagnostics</li> </ul>	The operating mode and fieldbus protocol are set using the DIL switch on the CPX-CEC.	The integrated web server offers a convenient means of querying data saved in the CPX-CEC.
Features			
<ul style="list-style-type: none"> <li>• Easy actuation of valve terminal configurations with MPA, VTSA</li> <li>• Diagnostics with flexible monitoring options for pressure, flow rate, cylinder operating time, air consumption</li> </ul>	<ul style="list-style-type: none"> <li>• Actuation of decentralised installation systems based on CPI actuation of applications in proportional pneumatics</li> <li>• AS-Interface actuation via gateway</li> </ul>	<ul style="list-style-type: none"> <li>• Connection to all fieldbuses as a remote controller and for pre-processing</li> <li>• Actuation of electric drives as individual axes via CANopen (CPX-CEC-C1)</li> </ul>	<ul style="list-style-type: none"> <li>• Early warnings and visualisation options</li> <li>• Closed-loop pneumatic applications</li> </ul>

# Control blocks CPX-CEC

Technical data

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General technical data		
Protocol		CODESYS Level 2
		EasyIP
		Modbus TCP
		TCP/IP
Processing time		Approx. 200 µs/1 k instruction
Programming software		CODESYS provided by Festo V2.3
Programming language		To IEC 61131-3
		Sequential function chart (SFC)
		Instruction list (IL)
		Function chart (FCH), additional continuous function chart (CFC)
		Ladder diagram (LD)
		Structured text (ST)
Programming	Operating language	German, English
	Support for file handling	Yes
Device-specific diagnostics		Diagnostic memory
		Channel and module-oriented diagnostics
		Undervoltage/short circuit of modules
LED displays	Bus-specific	TP: Link/traffic
	Product-specific	RUN: PLC status
		STOP: PLC status
		ERR: PLC runtime error
		PS: Electronics supply, sensor supply
		PL: Load supply
		SF: System fault
		M: Modify/forcing active
IP address setting		DHCP
		Via CODESYS
		Via MMI
Function blocks		CPX diagnostic status, copy CPX diagnostic trace, read CPX module diagnostics, etc.
Product weight	[g]	155
Dimensions (incl. interlinking block) W x L x H	[mm]	50 x 107 x 55

Materials	
Housing	Reinforced PA
	PC
Note on materials	RoHS-compliant

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

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

# Control blocks CPX-CEC

Technical data

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

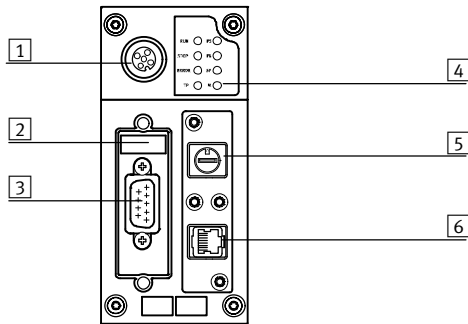
Technical data				
Type		CPX-CEC		CPX-CEC-C1
Additional functions		RS232 communication function		Motion functions for electric drives
CPU data	Flash	[MB]	32	32
	RAM	[MB]	32	32
	Processor	[MHz]	400	400
Control interface		–		CAN bus
Parameterisation		CODESYS V2.3		
Configuration support		CODESYS V2.3		
Program memory, user program		[MB]	4	
Flags		CODESYS variable concept		
	Remanent data	[kB]	30	30
	Global data memory	[MB]	8	8
Control elements		–		DIL switch for CAN termination
		Rotary switch for RUN/STOP		Rotary switch for RUN/STOP
Total number of axes		–		31
Ethernet	Number	1		
	Connection technology	RJ45 socket, 8-pin		
	Data transmission speed	[Mbps]	10/100	
	Supported protocols	TCP/IP, EasyIP, Modbus TCP		
Fieldbus interface	Number	–		1
	Connection technology	–		Sub-D plug connector, 9-pin
	Data transmission speed, can be set via software	[kbps]	–	125, 250, 500, 800, 1000
	Supported protocols	–		CAN bus
	Galvanic isolation	–		Yes
Data interface	Number	1		–
	Connection technology	Sub-D socket, 9-pin		–
	Data transmission speed, can be set via software	[kbps]	9.6 ... 230.4	–
	Supported protocols	RS232 interface		–
	Galvanic isolation	Yes		–

# Control blocks CPX-CEC

Technical data

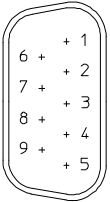
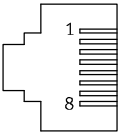
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## Connection and display components CPX-CEC-C1



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

## Pin allocation – CPX-CEC-C1

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

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

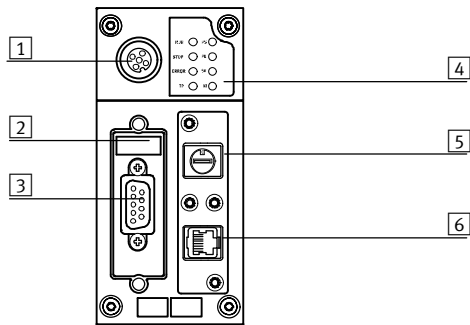


# Control blocks CPX-CEC

Technical data

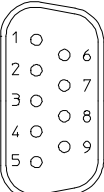
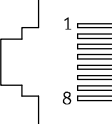
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## Connection and display components CPX-CEC



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

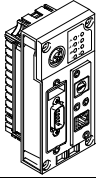
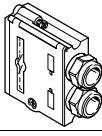
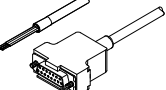
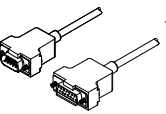





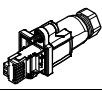

## Pin allocation – CPX-CEC

	Pin	Signal	Meaning
RS232 interface, Sub-D socket			
	1	n.c.	Not connected
	2	RXD	Received data
	3	TXD	Transmitted data
	4	n.c.	Not connected
	5	GND	Data reference potential
	6	n.c.	Not connected
	7	n.c.	Not connected
	8	n.c.	Not connected
	9	n.c.	Not connected
	Screening	Screening	Connection to functional earth
Ethernet interface, RJ45 plug connector			
	1	TD+	Transmitted data+
	2	TD-	Transmitted data-
	3	RD+	Received data+
	4	n.c.	Not connected
	5	n.c.	Not connected
	6	RD-	Received data-
	7	n.c.	Not connected
	8	n.c.	Not connected
	Housing	Screening	Screening

# Control blocks CPX-CEC

Accessories

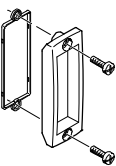
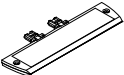

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Ordering data			
Designation		Part No.	Type
Control block			
	Motion functions for electric drives	567347	CPX-CEC-C1
	RS232 communication function	567346	CPX-CEC
Fieldbus interface			
	Sub-D plug connector, 9-pin, for CANopen	532219	FBS-SUB-9-BU-2x5POL-B
	Connecting cable FED for RS232 interface	539642	FEC-KBG7
	Connecting cable FED for RS232 interface	539643	FEC-KBG8
	Micro Style bus connection, 2xM12 for DeviceNet/CANopen	525632	FBA-2-M12-5POL
	Socket for Micro Style connection, M12	18324	FBSD-GD-9-5POL
	Plug connector for Micro Style connection, M12	175380	FBS-M12-5GS-PG9
	Open Style bus connection for 5-pin terminal strip for DeviceNet/CANopen	525634	FBA-1-SL-5POL
	Terminal strip for Open Style connection, 5-pin	525635	FBSD-KL-2x5POL
Ethernet interface			
	RJ45 plug connector	534494	FBS-RJ45-8-GS
	Cover for RJ45 connection	534496	AK-Rj45

# Control blocks CPX-CEC

Accessories

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