Control block CPX-CEC
Control block CPX-CEC

Key features

**Application**

**Controllers**

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

**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 CPX-FMT

**Operating modes**

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

**CPX-CEC offers**

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

**Bus connection**

The CODESYS controllers are remote controllers that can be connected to a higher-order PLC via the bus 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

**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

**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

**Bus connection**

Operating modes

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

System expansion

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**Note**

When using third-party devices, data communication must be programmed by the user.

**CPU connection**

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
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**CPU-C1 offers**

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

**Bus connection**

Operating modes

- Stand-alone
- Remote controller on the fieldbus
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**Note**

When using third-party devices, data communication must be programmed by the user.
## Key features

### Advantages for users

<table>
<thead>
<tr>
<th>Increased performance</th>
<th>Reduced costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improved cycle times – more connectable actuators. Compatibility with almost all control systems on the market is ensured via the CPX terminal.</td>
<td>The extensive CODESYS function library provides diagnostics and condition monitoring options.</td>
</tr>
<tr>
<td>The extensive CODESYS function library provides diagnostics and condition monitoring options.</td>
<td>For standardised preprocessing: reduces installation costs as an intelligent remote I/O terminal to IP65/67 directly at the machine.</td>
</tr>
</tbody>
</table>

### Advantages for users

<table>
<thead>
<tr>
<th>Simple, yet efficient: decentralised structures</th>
<th>The only one in the world to IP65</th>
</tr>
</thead>
<tbody>
<tr>
<td>The modular I/O system with up to 512 I/Os and CAN master functionality (CPX-CEC) offers complete flexibility, whether for open- and closed-loop control, stand-alone for economical automation (e.g. of manual work stations) or remote control with preprocessing.</td>
<td>The fully integrated automation platform for standard, proportional and servo-pneumatic, sensor and motion control to IP65.</td>
</tr>
</tbody>
</table>

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

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

<table>
<thead>
<tr>
<th>Embedded controller</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPX-CEC permits the flexible connection of valve actuators and electric drives on the terminal. It is 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.</td>
</tr>
</tbody>
</table>

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**Internet:** [www.festo.com/catalogue/...](http://www.festo.com/catalogue/...)

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Control block CPX-CEC

Data sheet

• Industrial Ethernet
• TCP/IP
• EasyIP
• Web interface
• Email
• Data transfer

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-FMT.

Application

Bus connection

The CPX-CEC is a remote controller that can be connected to a higher-order PLC via the bus nodes of the CPX terminal or via Ethernet.

Communication protocols

At the same time, it is possible to operate the CPX-CEC as a compact stand-alone controller directly on the machine.

Operating modes

• Fieldbus via CPX bus nodes
• Modbus/TCP
• EasyIP

Setting options

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

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

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

Features

• Easy control of valve terminal configurations with MPA, VTSA
• Diagnostics with flexible monitoring options for pressure, flow rate, cylinder operating time, air consumption
• Activation of decentralised installation systems on the basis of CPI control of applications in proportional pneumatics
• AS-Interface control via gateway

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

• Connection to all fieldbuses as a remote controller and for pre-processing
• Control of electric actuators as individual axes via CANopen (CPX-CEC-C1/-M1)

• Early warnings and visualisation options
• Servo-pneumatic applications
## General technical data

| Protocol                  | CODESYS Level 2  
|---------------------------|------------------
|                           | EasyIP  
|                           | Modbus TCP  
|                           | TCP/IP  
| Processing time           | Approx. 200 µs/1 k instructions  
| Programming software      | CODESYS provided by Festo  
| Programming language      | to IEC 61131-3  
|                           | Sequential function chart (SPC)  
|                           | 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  
| Device-specific diagnostics| Diagnostic memory  
|                           | Channel and module-oriented diagnostics  
|                           | Undervoltage/short-circuit 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, and more  
| Dimensions (including 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 humidity [%]    | 95, non-condensing  
| Corrosion resistance class CRC | 2  

1) Corrosion resistance class CRC to Festo standard FN 940070  
   Moderate corrosion stress. Indoor applications in which condensation can occur. External visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment.

### Electrical data

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

## Data sheet
## Data sheet

<table>
<thead>
<tr>
<th>Technical data</th>
<th>Type</th>
<th>CPX-CEC-C1</th>
<th>CPX-CEC-C1-V3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Additional functions</td>
<td></td>
<td>Motion functions for electric drives</td>
<td>Diagnostic functions</td>
</tr>
<tr>
<td>CPU data</td>
<td></td>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td>Flash [MB]</td>
<td>32</td>
<td>32</td>
<td></td>
</tr>
<tr>
<td>RAM [MB]</td>
<td>32</td>
<td>32</td>
<td></td>
</tr>
<tr>
<td>Processor [MHz]</td>
<td>400</td>
<td>400</td>
<td></td>
</tr>
<tr>
<td>Control interface</td>
<td>CAN bus</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parameterisation</td>
<td>CODESYS V2.3</td>
<td>CODiESYS V2.3</td>
<td></td>
</tr>
<tr>
<td>Configuration support</td>
<td>CODESYS V2.3</td>
<td>CODiESYS V2.3</td>
<td></td>
</tr>
<tr>
<td>Program memory, user program [MB]</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Flags</td>
<td>CODESYS variable concept</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Remnant data [kB]</td>
<td>30</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Global data memory [MB]</td>
<td>8</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Control elements</td>
<td>DIL switch for CAN termination</td>
<td>Rotary switch for RUN/STOP</td>
<td></td>
</tr>
<tr>
<td>Total number of axes</td>
<td>31</td>
<td>127</td>
<td></td>
</tr>
<tr>
<td>Ethernet</td>
<td>Quantity</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Connection technology</td>
<td>RJ45 socket, 8-pin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data transmission speed [Mbps]</td>
<td>10/100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supported protocols</td>
<td>TCP/IP, EasyIP, Modbus TCP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fieldbus interface</td>
<td>Quantity</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Connection technology</td>
<td>Sub-D plug, 9-pin</td>
<td>Sub-D socket, 9-pin</td>
<td></td>
</tr>
<tr>
<td>Data transmission speed, can be set via software [kbps]</td>
<td>125, 250, 500, 800, 1000</td>
<td>9.6 ... 230.4</td>
<td></td>
</tr>
<tr>
<td>Supported protocols</td>
<td>CAN bus</td>
<td>RS 232 interface</td>
<td></td>
</tr>
<tr>
<td>Galvanic isolation</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
</tbody>
</table>
## Data sheet

### Connection and display elements CPX-CEC-C1

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

### Pin allocation – CPX-CEC-C1

<table>
<thead>
<tr>
<th>Pin</th>
<th>Signal</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>n.c.</td>
<td>Not connected</td>
</tr>
<tr>
<td>2</td>
<td>CAN_L</td>
<td>CAN low</td>
</tr>
<tr>
<td>3</td>
<td>CAN_GND</td>
<td>CAN ground</td>
</tr>
<tr>
<td>4</td>
<td>n.c.</td>
<td>Not connected</td>
</tr>
<tr>
<td>5</td>
<td>CAN_SHLD</td>
<td>Connection to functional earth FE</td>
</tr>
<tr>
<td>6</td>
<td>CAN_GND</td>
<td>CAN ground (optional)</td>
</tr>
<tr>
<td>7</td>
<td>CAN_H</td>
<td>CAN high</td>
</tr>
<tr>
<td>8</td>
<td>n.c.</td>
<td>Not connected</td>
</tr>
<tr>
<td>9</td>
<td>n.c.</td>
<td>Not connected</td>
</tr>
<tr>
<td>Housing Shielding</td>
<td>Plug housing must be connected to FE</td>
<td></td>
</tr>
</tbody>
</table>

### Fieldbus interface, Sub-D plug

1. Transmit data +
2. Transmit data -
3. Receive data +
4. Receive data -
5. n.c. Not connected
6. n.c. Not connected

### Ethernet interface, RJ45 plug

1. Transmit data +
2. Transmit data -
3. Receive data +
4. Receive data -
5. n.c. Not connected
6. n.c. Not connected

---

1) If a servo drive is connected to an external power supply, CAN ground (optional), pin 6, cannot be used on the CPX-CEC-C1/-M1.
Control block CPX-CEC

Data sheet

Connection and display elements CPX-CEC

[Diagram of CPX-CEC with labels 1 to 6]

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

Pin allocation – CPX-CEC

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<thead>
<tr>
<th>Pin</th>
<th>Signal</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>RS232 interface, Sub-D socket</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>n.c.</td>
<td>Not connected</td>
</tr>
<tr>
<td>2</td>
<td>RxD</td>
<td>Received data</td>
</tr>
<tr>
<td>3</td>
<td>TxD</td>
<td>Transmitted data</td>
</tr>
<tr>
<td>4</td>
<td>n.c.</td>
<td>Not connected</td>
</tr>
<tr>
<td>5</td>
<td>GND</td>
<td>Data reference potential</td>
</tr>
<tr>
<td>6</td>
<td>n.c.</td>
<td>Not connected</td>
</tr>
<tr>
<td>7</td>
<td>n.c.</td>
<td>Not connected</td>
</tr>
<tr>
<td>8</td>
<td>n.c.</td>
<td>Not connected</td>
</tr>
<tr>
<td>9</td>
<td>n.c.</td>
<td>Not connected</td>
</tr>
<tr>
<td></td>
<td>Shielding</td>
<td>Connection to functional earth</td>
</tr>
</tbody>
</table>

Ethernet interface, RJ45 plug

<table>
<thead>
<tr>
<th>Pin</th>
<th>Signal</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>TD+</td>
<td>Transmitted data+</td>
</tr>
<tr>
<td>2</td>
<td>TD-</td>
<td>Transmitted data-</td>
</tr>
<tr>
<td>3</td>
<td>RD+</td>
<td>Received data+</td>
</tr>
<tr>
<td>4</td>
<td>n.c.</td>
<td>Not connected</td>
</tr>
<tr>
<td>5</td>
<td>n.c.</td>
<td>Not connected</td>
</tr>
<tr>
<td>6</td>
<td>RD-</td>
<td>Received data-</td>
</tr>
<tr>
<td>7</td>
<td>n.c.</td>
<td>Not connected</td>
</tr>
<tr>
<td>8</td>
<td>n.c.</td>
<td>Not connected</td>
</tr>
<tr>
<td></td>
<td>Housing</td>
<td>Shielding</td>
</tr>
</tbody>
</table>
## Accessories

### Control block

<table>
<thead>
<tr>
<th>Designation</th>
<th>Part no.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motion functions for electric drives</td>
<td>567347</td>
<td>CPX-CEC-C1</td>
</tr>
<tr>
<td>RS232 communication function</td>
<td>567346</td>
<td>CPX-CEC</td>
</tr>
</tbody>
</table>

### Fieldbus interface

<table>
<thead>
<tr>
<th>Designation</th>
<th>Part no.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sub-D plug, 9-pin, for CANopen</td>
<td>532219</td>
<td>FBS-SUB-9-BU-2x5POL-B</td>
</tr>
<tr>
<td>Micro style bus connection, 2xM12 for DeviceNet/CANopen</td>
<td>525632</td>
<td>FBA-2-M12-5POL</td>
</tr>
<tr>
<td>Socket for micro style connection, M12</td>
<td>18324</td>
<td>FBSD-GD-9-5POL</td>
</tr>
<tr>
<td>Plug for micro style connection, M12</td>
<td>175380</td>
<td>FBS-M12-5GS-PG9</td>
</tr>
<tr>
<td>Open style bus connection for 5-pin terminal strip for DeviceNet/CANopen</td>
<td>525634</td>
<td>FBA-1-SL-5POL</td>
</tr>
<tr>
<td>Terminal strip for open style connection, 5-pin</td>
<td>525635</td>
<td>FBSD-KL-2x5POL</td>
</tr>
</tbody>
</table>

### Ethernet interface

<table>
<thead>
<tr>
<th>Designation</th>
<th>Part no.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>RJ45 plug</td>
<td>534494</td>
<td>FBS-RJ45-8-6S</td>
</tr>
<tr>
<td>Cover for RJ45 connection</td>
<td>534496</td>
<td>AK-RJ45</td>
</tr>
<tr>
<td>Straight plug, RJ45, 8-pin</td>
<td>Straight plug, M1 2x1, 4-pin, D-coded</td>
<td>8040451</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8040452</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8040453</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8040454</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8040455</td>
</tr>
</tbody>
</table>
## Accessories

<table>
<thead>
<tr>
<th>Coverings and attachments</th>
<th>Part no.</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inspection cover, transparent, for Sub-D connection</td>
<td>533334</td>
<td>AK-SUB-9/15-B</td>
</tr>
<tr>
<td>Inscription label holder for manifold block</td>
<td>536593</td>
<td>CPX-ST-1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>User documentation</th>
<th>Designation</th>
<th>Part no.</th>
<th>Language</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manual for control block CPX-CEC</td>
<td>German</td>
<td>569121</td>
<td>RBE-CPX-CEC-DE</td>
<td></td>
</tr>
<tr>
<td></td>
<td>English</td>
<td>569122</td>
<td>RBE-CPX-CEC-EN</td>
<td></td>
</tr>
</tbody>
</table>
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