

## Control block CPX-CEC

**FESTO**



Key features

| Application                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                         |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Controller                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                              | Programming in a global language                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                         |
| <div><div><div>CODESYS</div><div>The IEC 61131-3 Programming System provided by Festo</div><div></div></div></div> <div>The CODESYS controllers are modern control systems for CPX terminals that enable programming with CODESYS to IEC 61131-3.</div>                                                                                                                                                                                                                           |                                                                                                                                                              | <div>CODESYS provided by Festo offers a convenient user interface with the following functions:</div> <div><div><ul style="list-style-type: none"><li>• Integrated module libraries</li><li>• Library Manager for integrating further libraries</li><li>• Visualisation editor</li></ul></div><div><ul style="list-style-type: none"><li>• Simulation mode</li><li>• Integrated project documentation</li><li>• Debugging functions for fault finding</li><li>• Configuration and parameterisation of the controller using the control configuration</li></ul></div></div> |                                                                                                                                                                                                                                                                                         |
| Basic functions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                              | CPX-CEC-C1 offers                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | CPX-CEC offers                                                                                                                                                                                                                                                                          |
| <div>The CODESYS controllers offer the following basic functions:</div> <div><div><ul style="list-style-type: none"><li>• Programming with CODESYS to IEC 61131-3</li><li>• Communication via Ethernet (Modbus/TCP, EasyIP, TCP/IP)</li><li>• Process visualisation using operator unit CDPX or OPC server</li></ul></div><div><ul style="list-style-type: none"><li>• Communication via fieldbus in combination with a fieldbus node in the CPX terminal</li><li>• Diagnostics and quick commissioning of CPX modules via handheld CPX-FMT</li></ul></div></div> |                                                                                                                                                              | <div><ul style="list-style-type: none"><li>• All basic functions</li><li>• CANopen master for controlling up to 127 CANopen stations. Electric axes can be controlled in point-to-point mode</li></ul></div>                                                                                                                                                                                                                                                                                                                                                               | <div><ul style="list-style-type: none"><li>• All basic functions</li><li>• RS232 interface for operating external devices</li></ul></div> <div><div><div></div><div>Note</div></div><div>When using third-party devices, data communication must be programmed by the user.</div></div> |
| Bus connection                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Operating modes                                                                                                                                              | System expansion                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                         |
| <div>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:</div> <div><ul style="list-style-type: none"><li>• PROFINET</li><li>• EtherNet/IP</li><li>• EtherCAT®</li><li>• PROFIBUS</li><li>• DeviceNet®</li></ul></div>                                                                                                                                                                                                                            | <div><ul style="list-style-type: none"><li>• Stand-alone</li><li>• Remote controller on the fieldbus</li><li>• Remote controller on Ethernet</li></ul></div> | <div>CANopen connects CPX-CEC with valve terminals and electric drive controllers from Festo:</div> <div><div><ul style="list-style-type: none"><li>• CPX, CPV</li><li>• CMMP-AS etc.</li><li>• AS-Interface gateway</li></ul></div><div>Ethernet connects CPX-CEC with additional controllers and operator units from Festo:</div><div><ul style="list-style-type: none"><li>• CDPX</li><li>• Camera SBO...-Q</li></ul></div></div>                                                                                                                                       |                                                                                                                                                                                                                                                                                         |

## Key features

### Advantages for users

#### Increased performance

Improved cycle times – more connectable actuators.

The CPX terminal ensures compatibility with virtually all control systems on the market.

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

#### Reduced costs

As an intelligent remote I/O terminal to IP65/IP67, it reduces installation costs for standardised preprocessing 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- and closed-loop control, stand-alone for economical automation (e.g. of manual workstations) or remote control with preprocessing.

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

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

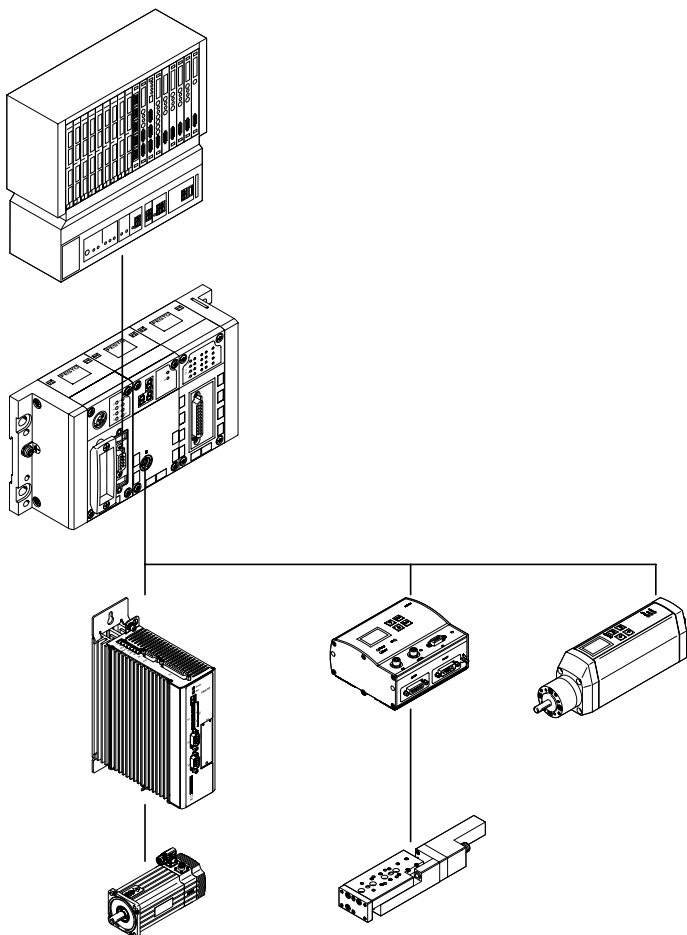
And commissioning is really easy.

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

#### CPX-CEC as part of the world of electric drive technology

#### Embedded controller

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.



Datasheet

- 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                                                                                                                                                                                                                            |                                                                                                                                                                                                                      | Communication protocols                                                                                                                                                                                              | Operating modes                                                                                                                           |
| 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.                                                                                                     | 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 node</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-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.                                                |
| Characteristics                                                                                                                                                                                                                           |                                                                                                                                                                                                                      |                                                                                                                                                                                                                      |                                                                                                                                           |
| <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>• Activation of decentralised installation systems on the basis of CPI control of applications in proportional pneumatics</li><li>• AS-Interface control 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>• Control of electric actuators as individual axes via CANopen (CPX-CEC-C1/-M1)</li></ul> | <ul style="list-style-type: none"><li>• Early warnings and visualisation options</li><li>• Servo-pneumatic applications</li></ul>         |

# Datasheet

| 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 (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                         |                           | Diagnostics memory                                                                      |
|                                                     |                           | Channel and module-oriented diagnostics                                                 |
|                                                     |                           | Undervoltage/short circuit of modules                                                   |
| LED indicators                                      | Bus-specific              | TP:      Link/traffic                                                                   |
|                                                     | Product-specific          | RUN:      PLC status                                                                    |
|                                                     |                           | STOP:      PLC status                                                                   |
|                                                     |                           | ERR:      PLC runtime error                                                             |
|                                                     |                           | PS:      Electronics supply, sensor supply                                              |
|                                                     |                           | PL:      Load supply                                                                    |
|                                                     |                           | SF:      System fault                                                                   |
|                                                     |                           | M:      Modify/forcing active                                                           |
| IP address setting                                  | DHCP                      |                                                                                         |
|                                                     | Via CODESYS               |                                                                                         |
|                                                     | Via MMI                   |                                                                                         |
| Function elements                                   |                           | CPX 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 <sup>1)</sup> |      | 2                  |  |

1) More information [www.festo.com/x/topic/crc](http://www.festo.com/x/topic/crc)

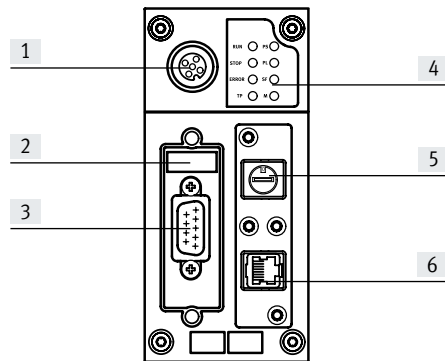
| Electrical data                                            |                           |              |               |
|------------------------------------------------------------|---------------------------|--------------|---------------|
| Nominal operating voltage                                  | [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 |               |
| Protection rating to EN 60529                              |                           | IP65, IP67   |               |

## Datasheet

| Technical data               |                                                     |                                      |                                                      |
|------------------------------|-----------------------------------------------------|--------------------------------------|------------------------------------------------------|
| Type                         |                                                     | CPX-CEC                              | CPX-CEC-C1                                           |
| Additional functions         |                                                     | Motion functions for electric drives | Diagnostic functions<br>RS232 communication function |
| CPU data                     | Flash                                               | [MB]                                 | 32                                                   |
|                              | RAM                                                 | [MB]                                 | 32                                                   |
|                              | Processor                                           | [MHz]                                | 400                                                  |
| Control interface            |                                                     | CAN bus                              | —                                                    |
| Parameterisation             |                                                     | CODESYS V2.3                         | CODESYS V2.3                                         |
| Configuration support        |                                                     | CODESYS V2.3                         | CODESYS V2.3                                         |
| Program memory, user program |                                                     | [MB]                                 | 4                                                    |
| Flags                        |                                                     | CODESYS variable concept             |                                                      |
|                              | Remanent data                                       | [kB]                                 | 30                                                   |
|                              | Global data memory                                  | [MB]                                 | 8                                                    |
| Control elements             |                                                     | DIL switch for CAN termination       | —                                                    |
|                              |                                                     | Rotary switch for RUN/STOP           | Rotary switch for RUN/STOP                           |
| Total number of axes         |                                                     | 31                                   | 127                                                  |
| Ethernet                     | No. of                                              | 1                                    |                                                      |
|                              | Connection technology                               | RJ45 socket, 8-pin                   |                                                      |
|                              | Data transmission speed                             | [Mbps]                               | 10/100                                               |
|                              | Supported protocols                                 | TCP/IP, EasyIP, Modbus TCP           |                                                      |
| Fieldbus interface           | No. of                                              | 1                                    |                                                      |
|                              | Connection technology                               | Sub-D plug, 9-pin                    | Sub-D socket, 9-pin                                  |
|                              | Data transmission speed,<br>can be set via software | [kbps]                               | 125, 250, 500, 800, 1000<br>9.6 ... 230.4            |
|                              | Supported protocols                                 | CAN bus                              | RS232 interface                                      |
|                              | Galvanic isolation                                  | Yes                                  | Yes                                                  |

## Datasheet

## 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)

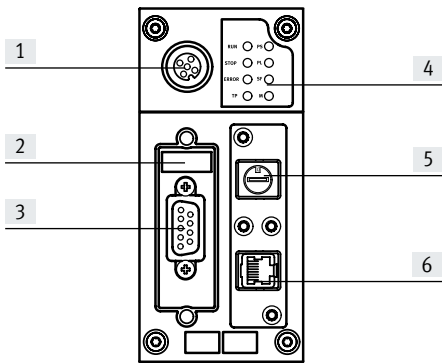
## Pin assignment – CPX-CEC-C1

|                                       | Pin     | Signal    | Meaning                              |
|---------------------------------------|---------|-----------|--------------------------------------|
| <b>Fieldbus interface, Sub-D plug</b> |         |           |                                      |
|                                       | 1       | n.c.      | Not connected                        |
|                                       | 2       | CAN_L     | CAN low                              |
|                                       | 3       | CAN_GND   | CAN Ground                           |
|                                       | 4       | n.c.      | Not connected                        |
|                                       | 5       | CAN_SHLD  | Connection to functional earth FE    |
|                                       | 6       | CAN_GND   | CAN Ground (optional) 1)             |
|                                       | 7       | CAN_H     | CAN High                             |
|                                       | 8       | n.c.      | Not connected                        |
|                                       | 9       | n.c.      | Not connected                        |
|                                       | Housing | Shielding | Plug housing must be connected to FE |
| <b>Ethernet interface, RJ45 plug</b>  |         |           |                                      |
|                                       | 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 | Shielding | Shielding                            |

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.

Datasheet

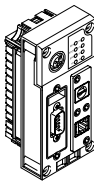
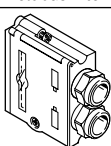
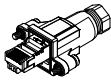
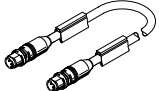
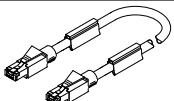
Connection and display elements CPX-CEC



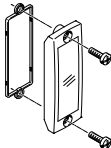
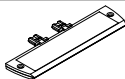
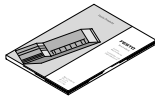
- [1] CPX-FMT connection
- [2] DIL switch
- [3] RS232 interface (Sub-D socket, 9-pin)
- [4] Status LEDs, bus-specific and product-specific
- [5] RUN/STOP rotary switch
- [6] Ethernet interface (RJ45 socket, 8-pin)

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

## Accessories

| 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, 9-pin, for CANopen                                           |                                      |                                  | 532219   | FBS-SUB-9-BU-2x5POL-B              |
|    | Micro style bus connection, 2xM12 for DeviceNet/CANopen                  |                                      |                                  | 525632   | FBA-2-M12-5POL                     |
|    | Socket for micro style connection, M12                                   |                                      |                                  | 8162291  | NECB-M12G5-C2                      |
|   | Plug for micro style connection, M12                                     |                                      |                                  | 8162296  | NECB-S-M12G5-C2                    |
|  | Open style bus connection for 5-pin terminal strip for DeviceNet/CANopen |                                      |                                  | 525634   | FBA-1-SL-5POL                      |
|  | Terminal strip for open style connection, 5-pin                          |                                      |                                  | 525635   | FBSD-KL-2x5POL                     |
| Ethernet interface                                                                  |                                                                          |                                      |                                  |          |                                    |
|  | RJ45 plug                                                                |                                      | Degree of protection IP 65, IP67 |          | 534494 FBS-RJ45-8-GS               |
|  | Cover for RJ45 connection                                                |                                      | Degree of protection IP 65, IP67 |          | 534496 AK-RJ45                     |
|  | Straight plug, RJ45, 8-pin                                               | Straight plug, M12x1, 4-pin, D-coded | Degree of protection IP20        | 1 m      | 8040451 NEBC-D12G4-ES-1-S-R3G4-ET  |
|                                                                                     |                                                                          |                                      |                                  | 3 m      | 8040452 NEBC-D12G4-ES-3-S-R3G4-ET  |
|                                                                                     |                                                                          |                                      |                                  | 5 m      | 8040453 NEBC-D12G4-ES-5-S-R3G4-ET  |
|                                                                                     |                                                                          |                                      |                                  | 10 m     | 8040454 NEBC-D12G4-ES-10-S-R3G4-ET |
|  | Straight plug, RJ45, 8-pin                                               | Straight plug, RJ45, 8-pin           | Degree of protection IP20        | 1 m      | 8040455 NEBC-R3G4-ES-1-S-R3G4-ET   |

Accessories

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