

## Axis controllers CPX-CMAX

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# Axis controllers CPX-CMAX

Overview

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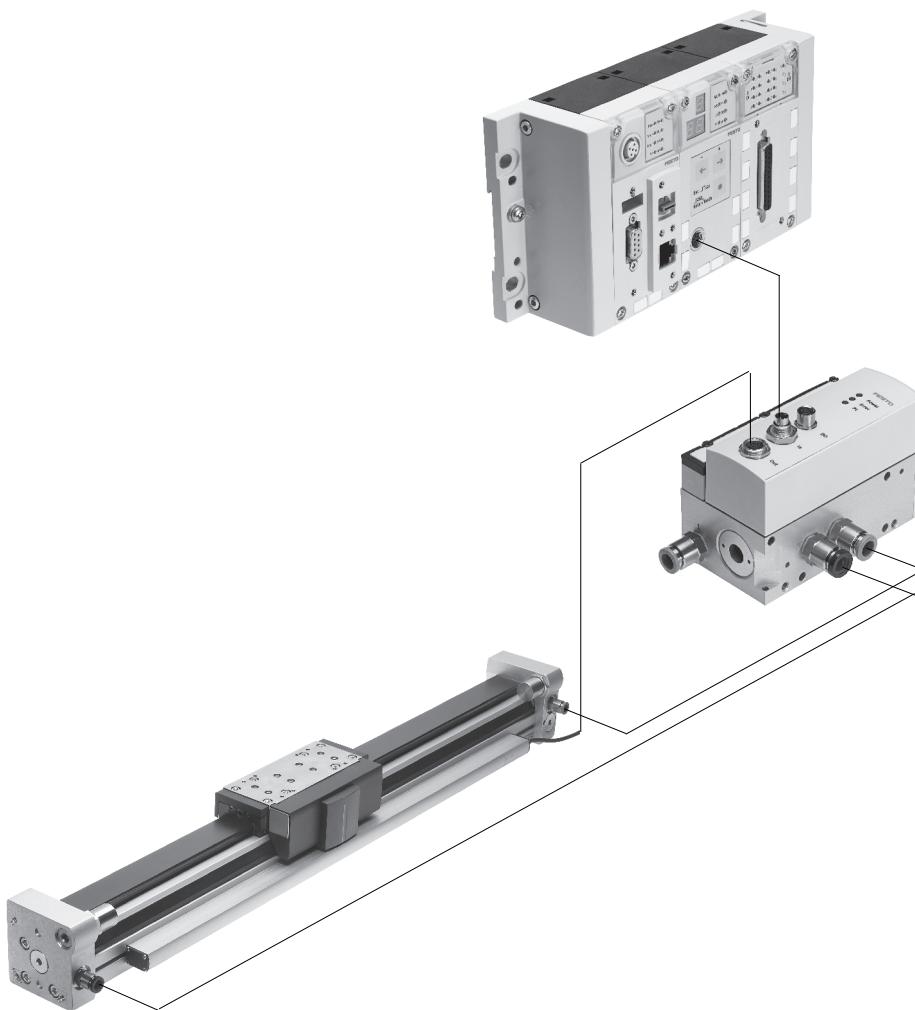
## Servo-pneumatic drive technology

Positioning and Soft Stop applications as an integral component of the valve terminal CPX – the modular peripheral system for decentralised automation tasks.

The modular design means that valves, digital inputs and outputs, positioning modules and end-position controllers, as appropriate to the application, can be combined in almost any way on the CPX terminal.

### Advantages:

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



# Axis controllers CPX-CMAX

Key features

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## Axis controllers CPX-CMAX

Technical data → 7



### Free choice:

Position and force control, directly actuated or selected from one of 64 configurable position sets. If you are looking for something more: the configurable function for switching to the next set enables simple functional sequences to be realised in the axis controller CPX-CMAX. Everything is recognisable: the auto-identification function identifies each station with its device data on the controller CPX-CMAX.

### Also included:

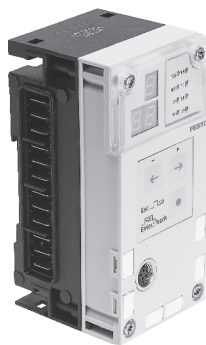
The functional scope of the controller CPX-CMAX includes actuation of a brake or clamping unit via the proportional directional control valve VPWP. Up to 7 modules (max. 7 axes) can be operated in parallel and independently of each other. Commissioning via FCT (Festo configuration software) or via fieldbus: no programming, only configuration.

### Advantages:

- Greater flexibility
- OEM friendly – commissioning also via fieldbus
- Clear installation and fast commissioning
- Cost-effective
- You program the system in your PLC environment

## End-position controllers CPX-CMPX

Technical data → Internet: cpx-cmpx



Fast travel between the mechanical end stops of the cylinder, stopping gently and without impact in the end position. Fast commissioning via control panel, fieldbus or handheld unit. Improved control of downtime. Actuation of a brake or clamping unit via the proportional directional control valve VPWP is an integral component of the controller CMPX.

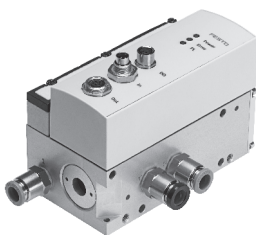
Depending on the fieldbus chosen, up to 9 end-position controllers can be actuated on the CPX terminal. All system data can be read and written via the fieldbus, including, for example the mid positions.

### Advantages:

- Greater flexibility
- OEM friendly – commissioning also via fieldbus
- Clear installation and fast commissioning
- Cost-effective
  - Up to 30% faster cycle rates
  - Significantly reduced system vibration
- Improved work ergonomics thanks to significantly reduced noise level
- The extended diagnostics help to reduce the service time of the machine

## Proportional directional control valve VPWP

Technical data → Internet: vpwp



The 5/3-way proportional directional control valve for applications with Soft Stop and pneumatic positioning. Fully digitalised – with integrated pressure sensors, with new diagnostic functions. In sizes 4, 6 and 8. Flow rate of 350, 700 and 1,400 l/min.

With switching output for actuating a brake. Coloured supply ports. Pre-assembled cables guarantee faultless and fast connection with the controllers CPX-CMPX and CPX-CMAX.

### Advantages:

- Clear installation and fast commissioning
- Reduction of system downtimes thanks to the new diagnostic options
- With switching output for actuating a brake/clamping unit

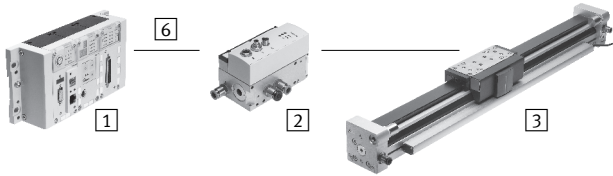
# Axis controllers CPX-CMAX

Drive options

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## System with linear drive DGCI

Technical data → Internet: dgci



- 1 Controller module CPX-CMPX or CPX-CMAX
- 2 Proportional directional control valve VPWP
- 3 Linear drive DGCI with displacement encoder
- 6 Connecting cable KVI-CP-3-...

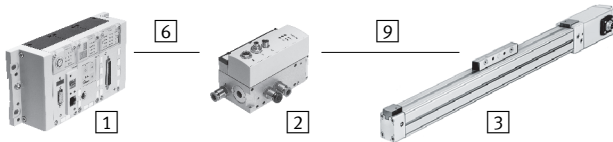
- Pneumatic rodless linear drive with displacement encoder and recirculating ball bearing guide
- Displacement encoder with absolute and contactless measuring
- Identical construction as pneumatic linear drive DGC
- Diameter: 18 ... 40 and 63 mm
- Stroke: 100 ... 2,000 mm in fixed lengths
- Range of application of Soft Stop and pneumatic positioning of loads from 1 ... 180 kg
- No sensor interface required

Advantages:

- Finished drive unit, precision guide
- Excellent running characteristics
- For fast and accurate positioning down to ±0.2 mm (only with axis controller CPX-CMAX)

## System with linear drive DGPI, DGPII or displacement encoder MME-MTS

Technical data → Internet: dgpi



- 1 Controller module CPX-CMPX or CPX-CMAX
- 2 Proportional directional control valve VPWP
- 3 Linear drive DGPI, DGPII with displacement encoder
- 6 Connecting cable KVI-CP-3-...
- 9 NEBP-M16W6-K-2-M9W5

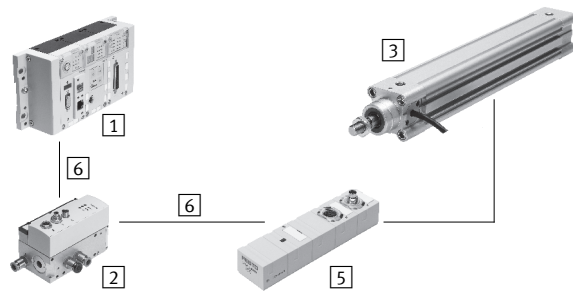
- Pneumatic rodless linear drive with displacement encoder, with or without recirculating ball bearing guide
- Displacement encoder with absolute and contactless measuring
- Diameter: 25 ... 63 mm
- Stroke: 225 ... 2,000 mm in fixed lengths
- Range of application of Soft Stop and pneumatic positioning of loads from 2 ... 180 kg
- No sensor interface required

Advantages:

- Finished drive unit
- Excellent running characteristics
- For fast and accurate positioning down to ±0.2 mm (only with axis controller CPX-CMAX)

## System with standard cylinder DNCI

Technical data → Internet: dnci



- 1 Controller module CPX-CMPX or CPX-CMAX
- 2 Proportional directional control valve VPWP
- 3 Standard cylinder DNCI with displacement encoder
- 5 Sensor interface CASM-S-D3-R7
- 6 Connecting cable KVI-CP-3-...

- Standard cylinder with integrated displacement encoder, conforms to DIN ISO 6432, VDMA 24 562, NF E 49 003.1 and Uni 10 290
- Displacement encoder with contactless and incremental measuring
- Diameter: Ø 32 ... 63 mm
- Stroke: 100 ... 750 mm
- Range of application of Soft Stop and pneumatic positioning: loads from 3 ... 180 kg and the matching sensor interface CASM-S-D3-R7
- Pre-assembled cables guarantee faultless and fast electrical connection

Advantages:

- Compact drive unit
- Universal applications
- Also with guide unit
- For fast and accurate positioning down to ±0.3 mm (only with axis controller CPX-CMAX)

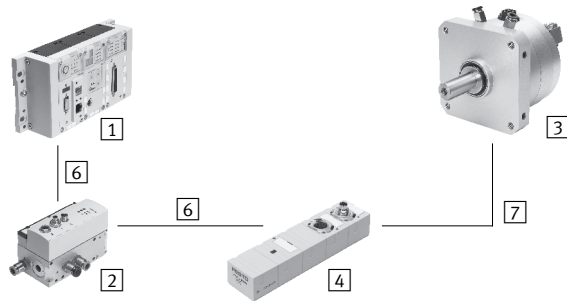
# Axis controllers CPX-CMAX

Drive options

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## System with swivel module DSMI

Technical data → Internet: [dsmi](#)



- 1 Controller module CPX-CMPX or CPX-CMAX
- 2 Proportional directional control valve VPWP
- 3 Swivel module DSMI with displacement encoder
- 4 Sensor interface CASM-S-D2-R3
- 6 Connecting cable KVI-CP-3-...
- 7 Connecting cable NEBC-P1W4-K-0,3-N-M12G5

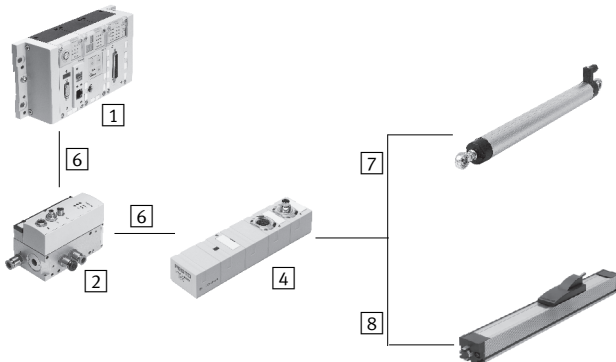
- Swivel module DSMI with integrated displacement encoder
- Identical construction as pneumatic swivel module DSM
- Absolute displacement encoder on basis of potentiometer
- Swivel range from 0 ... 270°
- Size: 25, 40, 63
- Max. torque: 5 ... 40 Nm
- Range of application of Soft Stop and pneumatic positioning: mass moments of inertia from 15 ... 6,000 kgcm<sup>2</sup> and the matching sensor interface CASM-S-D2-R3
- Pre-assembled cables guarantee faultless and fast connection with the proportional directional control valve VPWP

Advantages:

- Complete drive unit, compact, can be used immediately
- High angular acceleration
- With adjustable fixed stops
- For fast and accurate positioning down to ±0.2° (only with axis controller CPX-CMAX)

## System with potentiometer

Technical data → Internet: [casm](#)



- 1 Controller module CPX-CMPX or CPX-CMAX
- 2 Proportional directional control valve VPWP
- 4 Sensor interface CASM-S-D2-R3
- 6 Connecting cable KVI-CP-3-...
- 7 Connecting cable NEBC-P1W4-K-0,3-N-M12G5
- 8 Connecting cable NEBC-A1W3-K-0,4-N-M12G5

- Attachable potentiometers with absolute measurement, with high degree of protection
- With connecting rod or moment compensator
- Measuring range: 100 ... 2,000 mm
- Pre-assembled cables guarantee faultless and fast connection with the sensor interface CASM
- Range of application of Soft Stop and pneumatic positioning with cylinder Ø 18 ... 80 mm, loads from 1 ... 300 kg

Advantages:

- Clear installation and fast commissioning
- Cost-effective
- Can also be used in harsh environmental conditions
- Variety in the drives: CPX-CMPX and CPX-CMAX also support cylinders with external displacement encoder

## Axis controllers CPX-CMAX

Drive options

| System components for pneumatic positioning systems with axis controller CPX-CMAX |                                             |              |             |                   |               |                      |               |     |                     |
|-----------------------------------------------------------------------------------|---------------------------------------------|--------------|-------------|-------------------|---------------|----------------------|---------------|-----|---------------------|
|                                                                                   |                                             | Linear drive |             | Standard cylinder | Swivel module | Displacement encoder | Potentiometer |     | → Page/<br>Internet |
|                                                                                   |                                             | DGCI         | DGPI, DGPII | DNCI              | DSMI          | MME                  | LWG           | TLF |                     |
| 1                                                                                 | Axis controller CPX-CMAX                    | ■            | ■           | ■                 | ■             | ■                    | ■             | ■   | 7                   |
| 2                                                                                 | Proportional directional control valve VPWP | ■            | ■           | ■                 | ■             | ■                    | ■             | ■   | vpwp                |
| 4                                                                                 | Sensor interface CASM-S-D2-R3               | –            | –           | –                 | ■             | –                    | ■             | ■   | casm                |
| 5                                                                                 | Sensor interface CASM-S-D3-R7               | –            | –           | ■                 | –             | –                    | –             | –   | casm                |
| 6                                                                                 | Connecting cable KVI-CP-3-...               | ■            | ■           | ■                 | ■             | ■                    | ■             | ■   | 10                  |
| 7                                                                                 | Connecting cable NEBC-P1W4-...              | –            | –           | –                 | ■             | –                    | ■             | –   | nebc                |
| 8                                                                                 | Connecting cable NEBC-A1W3-...              | –            | –           | –                 | –             | –                    | –             | ■   | nebc                |
| 9                                                                                 | Connecting cable NEBP-M16W6-...             | –            | ■           | –                 | –             | ■                    | –             | –   | nebp                |

# Axis controllers CPX-CMAX

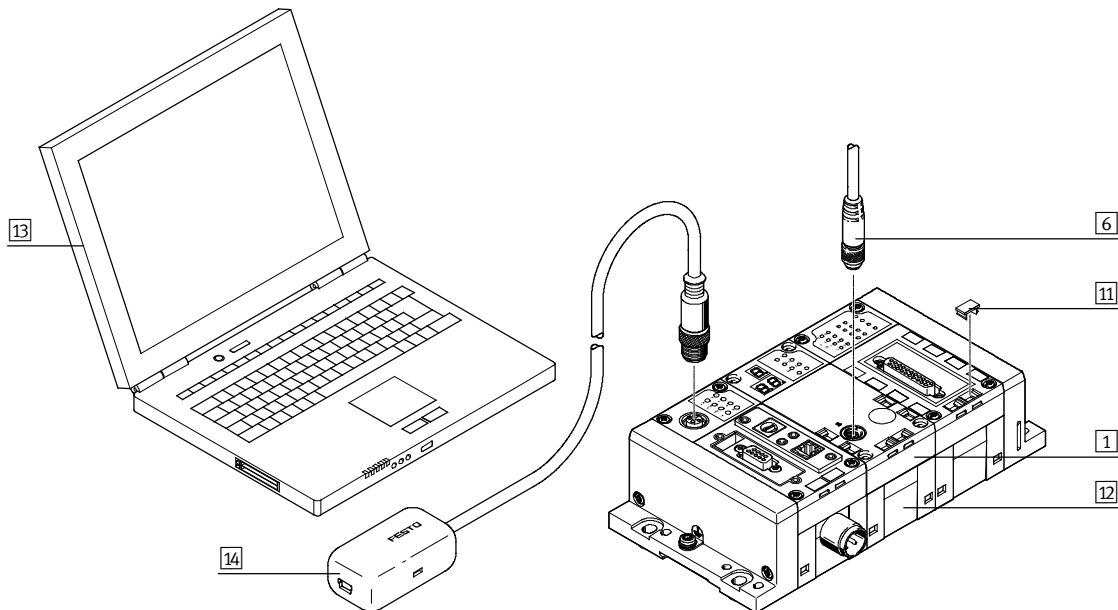
Type codes and peripherals overview

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## Type codes

|                        |                 |     |   |      |   |    |   |   |
|------------------------|-----------------|-----|---|------|---|----|---|---|
|                        |                 | CPX | – | CMAX | – | C1 | – | 1 |
| <b>Valve terminal</b>  |                 |     |   |      |   |    |   |   |
| CPX                    | Terminal        |     |   |      |   |    |   |   |
| <b>Type</b>            |                 |     |   |      |   |    |   |   |
| CMAX                   | Axis controller |     |   |      |   |    |   |   |
| <b>Function module</b> |                 |     |   |      |   |    |   |   |
| C1                     | Controller      |     |   |      |   |    |   |   |
| <b>Axes</b>            |                 |     |   |      |   |    |   |   |
| 1                      | One axis        |     |   |      |   |    |   |   |

## Peripherals overview



| Accessories |                                                                                                                                                                |                 |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Type        | Brief description                                                                                                                                              | → Page/Internet |
| 1           | Axis controller<br>CPX-CMAX<br>Integrated in the CPX terminal.<br>Screws for mounting on the plastic interlinking block are included in the scope of delivery. | 8               |
| 6           | Connecting cable<br>KVI-CP-3<br>For connecting axis controller CPX-CMAX and proportional directional control valve VPWP.                                       | 10              |
| 11          | Inscription label<br>IBS<br>For labelling the modules.                                                                                                         | 10              |
| 12          | Interlinking block<br>CPX-GE<br>Connects the individual modules.<br>Two versions are available: plastic or metal interlinking block.                           | 11              |
| 13          | Laptop<br>The CMAX can be configured and commissioned using the FCT software (Festo Configuration Tool).                                                       | –               |
| 14          | Adapter<br>NEFC<br>For connecting the interface on the CPX node with the PC.<br>A conventional USB cable with mini USB connector is also required.             | 11              |
| –           | Screws<br>CPX-M-M3<br>For mounting on the metal interlinking block.                                                                                            | 10              |

# Axis controllers CPX-CMAX

Technical data

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The axis controller CPX-CMAX is intended exclusively for valve terminals CPX.



| General technical data                           |         |        |                             |
|--------------------------------------------------|---------|--------|-----------------------------|
| Operating voltage                                |         |        |                             |
| Operating voltage range                          |         | [V DC] | 18 ... 30                   |
| Nominal operating voltage                        |         | [V DC] | 24                          |
| Current consumption at nominal operating voltage |         | [mA]   | 200                         |
| Fuse protection (short circuit)                  |         |        | Electronic                  |
| Power failure bridging                           |         | [ms]   | 10                          |
|                                                  |         |        |                             |
| Load voltage                                     |         |        |                             |
| Load voltage range                               |         | [V DC] | 20 ... 30                   |
| Nominal load voltage                             |         | [V DC] | 24                          |
| Perm. load current                               |         | [A]    | 2.5                         |
| Fuse protection (short circuit)                  |         |        | Electronic                  |
|                                                  |         |        |                             |
| Number of axis strings                           |         |        | 1                           |
| Axes per string                                  |         |        | 1                           |
| Length of connecting cable to axis               |         | [m]    | ≤ 30                        |
| Max. no. of modules                              |         |        | 7                           |
| Display                                          |         |        | 7-segment display           |
| Assigned addresses                               | Outputs | [bit]  | 8x8                         |
|                                                  | Inputs  | [bit]  | 8x8                         |
| Operating modes                                  |         |        | Record Select mode          |
|                                                  |         |        | Direct mode                 |
| Controller types                                 |         |        | Position control            |
|                                                  |         |        | Force control               |
| Diagnostics                                      |         |        | Module-orientated           |
|                                                  |         |        | Via local 7-segment display |
| Status display                                   |         |        | Module status               |
|                                                  |         |        | Power Load                  |
|                                                  |         |        | Display/Error Axis X        |
|                                                  |         |        | MC Axis X                   |
|                                                  |         |        |                             |
| Control interface                                |         |        |                             |
| Data                                             |         |        | CAN bus with Festo protocol |
|                                                  |         |        | Digital                     |
| Electrical connection                            |         |        | 5-pin                       |
|                                                  |         |        | M9                          |
|                                                  |         |        | Socket                      |
|                                                  |         |        |                             |
| Materials: Housing                               |         |        | Reinforced polyamide        |
| Note on materials                                |         |        | RoHS-compliant              |
| Product weight                                   |         | [g]    | 140                         |
| Dimensions                                       | Length  | [mm]   | 107                         |
|                                                  | Width   | [mm]   | 50                          |
|                                                  | Height  | [mm]   | 55                          |

# Axis controllers CPX-CMAX

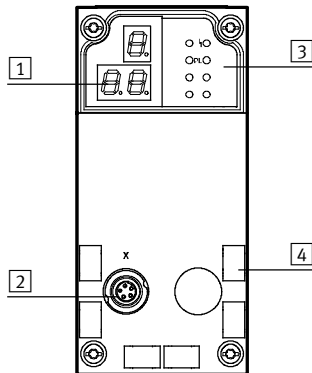
Technical data

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## Operating and environmental conditions

|                               |      |                          |
|-------------------------------|------|--------------------------|
| Ambient temperature           | [°C] | –5 ... +50               |
| Relative air humidity         | [%]  | 5 ... 95, non-condensing |
| Protection class to IEC 60529 |      | IP65                     |

## Connection and display components



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

## Pin allocation – plug 2

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

## Permitted bus nodes/FEC

| Bus node/FEC | Protocol                  | Max. no. of CMAX modules |
|--------------|---------------------------|--------------------------|
| CPX-FEC      | –                         | 7                        |
| CPX-FB6      | Interbus                  | 1                        |
| CPX-FB11     | DeviceNet <sup>1)</sup>   | 7                        |
| CPX-FB13     | PROFIBUS DP <sup>2)</sup> | 7                        |
| CPX-FB14     | CANopen                   | 2                        |
| CPX-FB23     | CC-Link                   | 7                        |
| CPX-FB32     | Ethernet/IP               | 7                        |
| CPX-FB33     | PROFINET, M12             | 7                        |
| CPX-M-FB34   | PROFINET, RJ45            | 7                        |
| CPX-FB38     | EtherCat                  | 7                        |

1) With Revision 20 (R20)

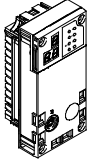
2) With Revision 23 (R23)

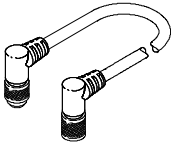
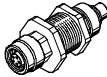
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# Axis controllers CPX-CMAX

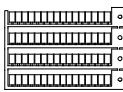
Accessories

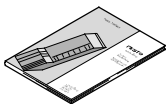
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| Ordering data – Axis controllers                                                  |                                         |          |               |
|-----------------------------------------------------------------------------------|-----------------------------------------|----------|---------------|
|                                                                                   | Brief description                       | Part No. | Type          |
|  | Order code in the CPX configurator: T21 | 548932   | CPX-CMAX-C1-1 |

| Ordering data – Connecting cables                                                   |                                                         |                  |          |                     |
|-------------------------------------------------------------------------------------|---------------------------------------------------------|------------------|----------|---------------------|
|                                                                                     | Brief description                                       | Cable length [m] | Part No. | Type                |
|    | Connecting cable with angled plug and angled socket     | 0.25             | 540327   | KVI-CP-3-WS-WD-0,25 |
|                                                                                     |                                                         | 0.5              | 540328   | KVI-CP-3-WS-WD-0,5  |
|                                                                                     |                                                         | 2                | 540329   | KVI-CP-3-WS-WD-2    |
|                                                                                     |                                                         | 5                | 540330   | KVI-CP-3-WS-WD-5    |
|                                                                                     |                                                         | 8                | 540331   | KVI-CP-3-WS-WD-8    |
|                                                                                     | Connecting cable with straight plug and straight socket | 2                | 540332   | KVI-CP-3-GS-GD-2    |
|                                                                                     |                                                         | 5                | 540333   | KVI-CP-3-GS-GD-5    |
|                                                                                     |                                                         | 8                | 540334   | KVI-CP-3-GS-GD-8    |
|  | Connector for control cabinet through-feed              | –                | 543252   | KVI-CP-3-SSD        |

| Ordering data – Screws                                                              |                                              |          |                |
|-------------------------------------------------------------------------------------|----------------------------------------------|----------|----------------|
|                                                                                     | Brief description                            | Part No. | Type           |
|  | For mounting on the metal interlinking block | 550219   | CPX-M-M3X22-4X |

| Ordering data – Inscription labels                                                  |                                    |        |          |          |
|-------------------------------------------------------------------------------------|------------------------------------|--------|----------|----------|
|                                                                                     | Brief description                  | Number | Part No. | Type     |
|  | Inscription labels 6x10, in frames | 64     | 18576    | IBS-6X10 |

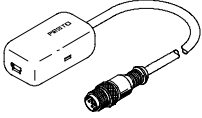
| Documentation <sup>1)</sup>                                                         |          |          |                      |
|-------------------------------------------------------------------------------------|----------|----------|----------------------|
|                                                                                     | Language | Part No. | Type                 |
|  | DE       | 559750   | P.BE-CPX-CMAX-SYS-DE |
|                                                                                     | EN       | 559751   | P.BE-CPX-CMAX-SYS-EN |
|                                                                                     | ES       | 559752   | P.BE-CPX-CMAX-SYS-ES |
|                                                                                     | FR       | 559753   | P.BE-CPX-CMAX-SYS-FR |
|                                                                                     | IT       | 559754   | P.BE-CPX-CMAX-SYS-IT |
|                                                                                     | SV       | 559755   | P.BE-CPX-CMAX-SYS-SV |

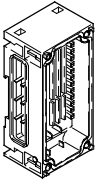
1) Manual in paper form is not included in the scope of delivery.

## Axis controllers CPX-CMAX

Accessories

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| Ordering data – Adapters                                                          |                                                                         |          |                     |  |
|-----------------------------------------------------------------------------------|-------------------------------------------------------------------------|----------|---------------------|--|
|                                                                                   | Brief description                                                       | Part No. | Type                |  |
|  | Adapter cable from 5-pin M12 to mini USB socket and controller software | 547432   | NEFC-M12G5-0.3-U1G5 |  |

| Ordering data – Interlinking block, plastic, as expansion block                   |                                          |              |          |                      |
|-----------------------------------------------------------------------------------|------------------------------------------|--------------|----------|----------------------|
|                                                                                   | Brief description                        | Connection   | Part No. | Type                 |
|  | Without power supply                     | –            | 195742   | CPX-GE-EV            |
|                                                                                   | With additional power supply for outputs | M18          | 195744   | CPX-GE-EV-Z          |
|                                                                                   |                                          | 7/8" – 5-pin | 541248   | CPX-GE-EV-Z-7/8-5POL |
|                                                                                   |                                          | 7/8" – 4-pin | 541250   | CPX-GE-EV-Z-7/8-4POL |
|                                                                                   | With additional power supply for valves  | M18          | 533577   | CPX-GE-EV-V          |
|                                                                                   |                                          | 7/8" – 4-pin | 541252   | CPX-GE-EV-V-7/8-4POL |

| Ordering data – Tie rods                                                            |                                           |           |          |            |
|-------------------------------------------------------------------------------------|-------------------------------------------|-----------|----------|------------|
|                                                                                     | Brief description                         | Extension | Part No. | Type       |
|  | For extension using an interlinking block | 1-fold    | 525418   | CPX-ZA-1-E |