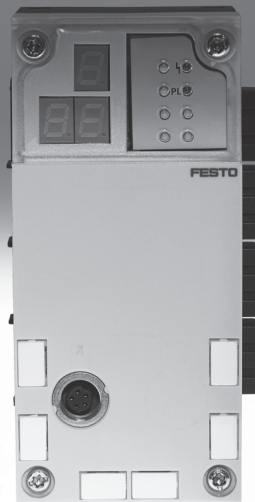


## Axis controllers CPX-CMAX

**FESTO**



# Axis controllers CPX-CMAX

Overview

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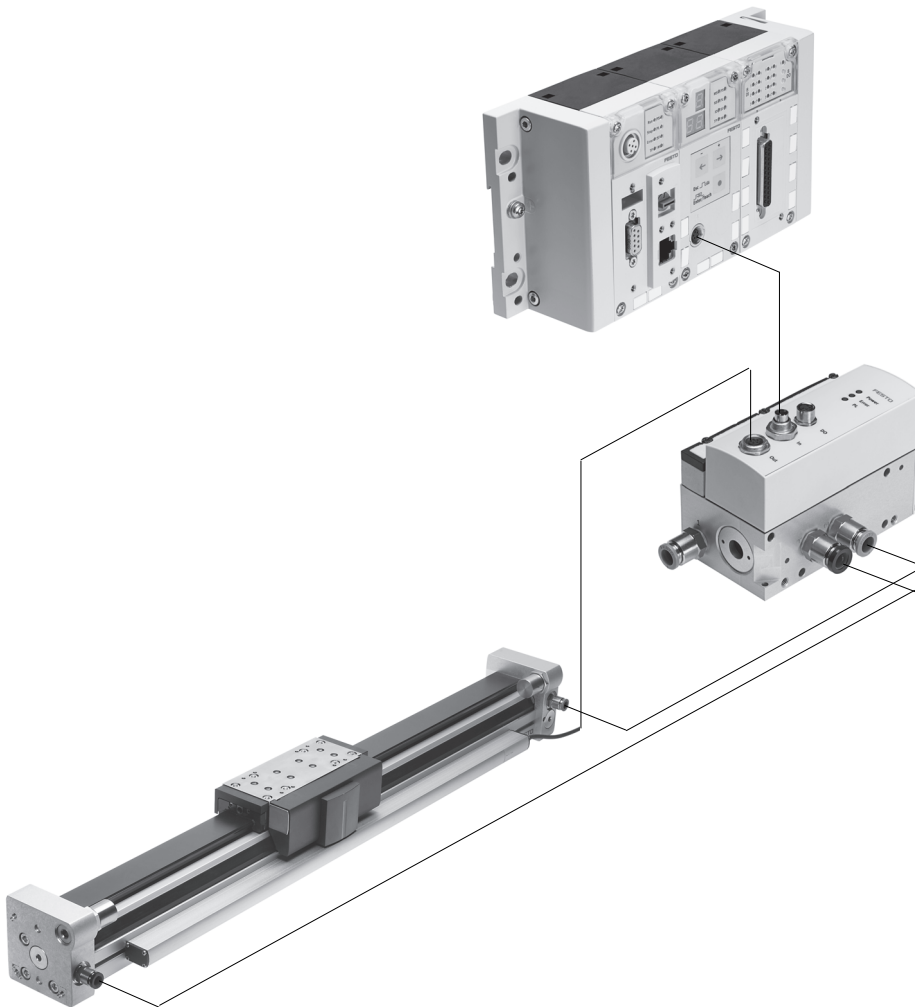
## Servo-pneumatic drive technology

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

## Axis controllers CPX-CMAX

Technical data → 7



**Free choice:**  
Position and force control, directly actuated or selected from one of 128 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](#)



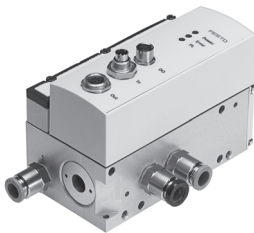
**Fast travel between the mechanical end stops of the cylinder, stopping gently and without impact in the end position.**  
Fast commissioning via control panel, fieldbus or handheld unit. Improved control of downtime. Actuation of a brake or clamping unit via the proportional directional control valve 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 1400 l/min.

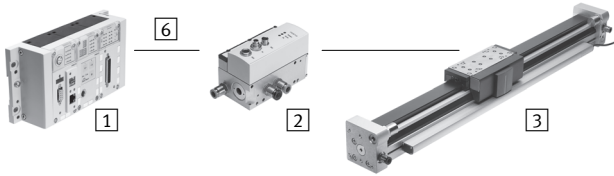
With switching output for actuating a brake. Coloured supply ports. Pre-assembled cables guarantee faultless and fast connection with the controllers CPX-CMPX and CPX-CMAX.

- 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

System with linear drive DDLI, DGCI Technical data → Internet: ddli or dgci

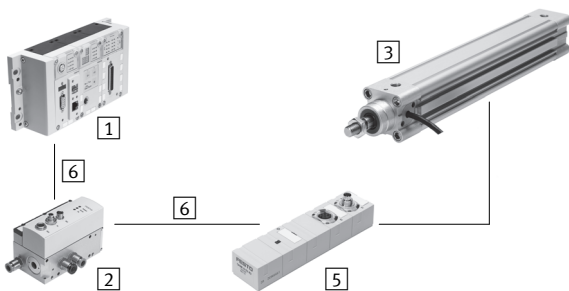


- 1 Controller module CPX-CMPX or CPX-CMAX
- 2 Proportional directional control valve VPWP
- 3 Linear drive DDLI, DGCI with displacement encoder
- 6 Connecting cable KVI-CP-3...

- Pneumatic rodless linear drive with displacement encoder, with or without recirculating ball bearing guide
- Displacement encoder with absolute and contactless measurement
- Diameters:
  - DGCI: 18 ... 63 mm
  - DDLI: 25 ... 63 mm
- Stroke: 100 ... 2000 mm in fixed lengths
- Range of applications: Soft Stop and pneumatic positioning
- Loads from 1 ... 180 kg
- No sensor interface required

- Advantages:
- Complete drive unit
  - DDLI for easy connection to customer's guide system
  - Excellent running characteristics
  - For fast and accurate positioning down to  $\pm 0.2$  mm (only with axis controller CPX-CMAX)

System with standard cylinder DNCI, DDPC Technical data → Internet: dnci



- 1 Controller module CPX-CMPX or CPX-CMAX
- 2 Proportional directional control valve VPWP
- 3 Standard cylinder DNCI, DDPC 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: 32 ... 100 mm
- Stroke: 100 ... 750 mm
- Range of applications: Soft Stop and pneumatic positioning
- Loads from 3 ... 450 kg and a matching sensor interface CASM-S-D3-R7
- Pre-assembled cables guarantee faultless and fast electrical connection

- Advantages:
- Compact drive unit
  - Can be used universally
  - Also with guide unit
  - For fast and accurate positioning up to  $\pm 0.5$  mm (only with axis controller CPX-CMAX)

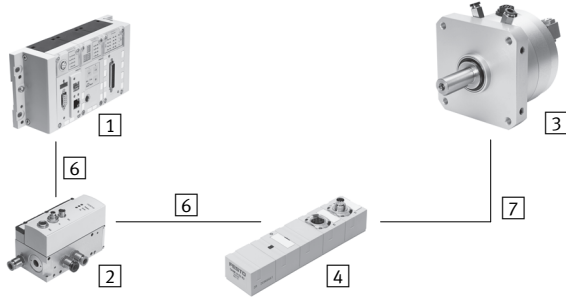
# Axis controllers CPX-CMAX

Drive options

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## System with swivel module DSMI

Technical data → Internet: [dsmi](#)



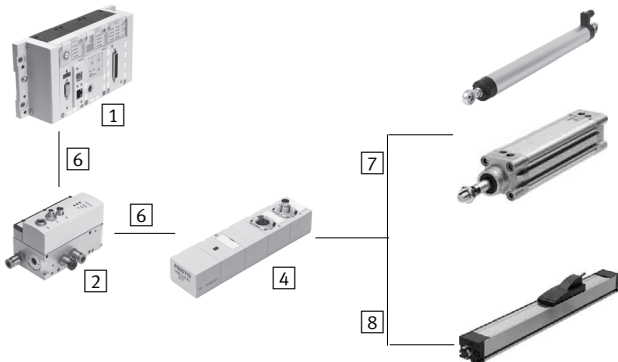
- 1 Controller module CPX-CMPX or CPX-CMAX
- 2 Proportional directional control valve VPWP
- 3 Swivel module DSMI with displacement encoder
- 4 Sensor interface CASM-S-D2-R3
- 6 Connecting cable KVI-CP-3-...
- 7 Connecting cable NEBC-P1W4-K-0,3-N-M12G5

- 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 ... 6000 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:  
Connecting rod: 100 ... 750 mm  
Moment compensator: 225 ... 2000 mm
- Pre-assembled cables guarantee faultless and fast connection with the sensor interface CASM
- Range of applications: Soft Stop and pneumatic positioning with cylinder Ø 25 ... 80 mm, e.g. DNC or DSBC
- Loads from 1 ... 300 kg

- Advantages:
- Easy installation and fast commissioning
  - Cost-effective
  - Can also be used in harsh ambient conditions
  - Variety of 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							
3		Linear drive	Standard cylinder	Swivel module	Displacement encoder		→ Page/ Internet
		DDLI/DGCI	DNCI/DDPC	DSMI	MLO-LWG/-TLF	MME-MTS	
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
-	Connecting cable NEBP-M16W6-...	-	-	-	-	■	vpwp

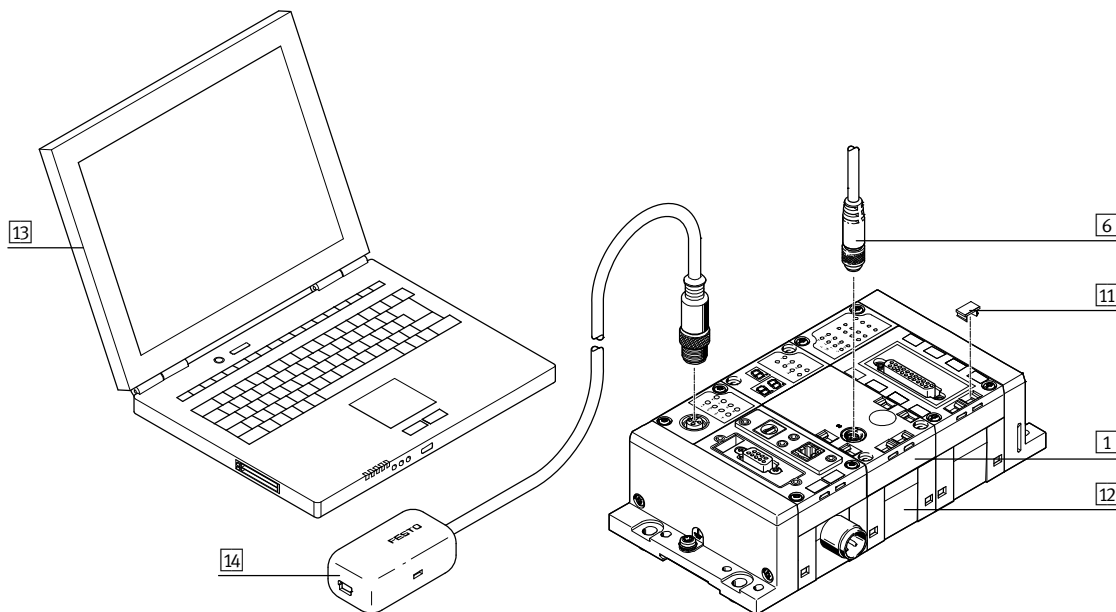
# Axis controllers CPX-CMAX

Type codes and peripherals overview

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

# Axis controllers CPX-CMAX

## Technical data

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 PA	
Note on materials			
		RoHS-compliant	
Product weight	[g]	140	
Dimensions	Length	[mm]	107
	Width	[mm]	50
	Height	[mm]	55

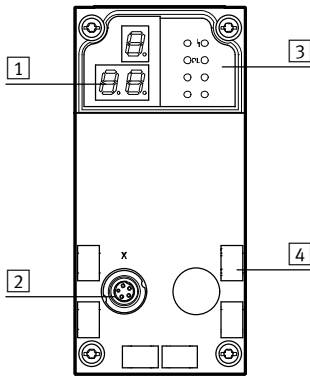
# Axis controllers CPX-CMAX

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 – Control interface			
	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/CEC		
Bus node/CEC	Protocol	Max. no. of CMAX modules
CPX-CEC...	–	8
CPX-FB6	INTERBUS	1
CPX-FB11	DeviceNet <sup>1)</sup>	8
CPX-FB13	PROFIBUS <sup>2)</sup>	8
CPX-FB14	CANopen	4
CPX-M-FB21	INTERBUS	1
CPX-FB23-24	CC-Link	4 (function module F23)
		8 (function module F24)
CPX-FB33	PROFINET RT, M12	8
CPX-M-FB34	PROFINET RT, RJ45	8
CPX-M-FB35	PROFINET RT, SCRJ	8
CPX-FB36	EtherNet/IP	8
CPX-FB37	EtherCAT	8
CPX-FB39	Sercos III	8
CPX-FB40	POWERLINK	8
CPX-M-FB41	PROFINET RT	8

1) With Revision 20 (R20)

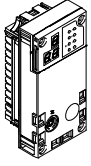
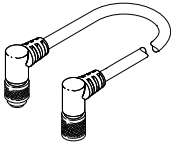
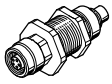
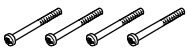
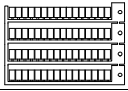

2) With Revision 23 (R23)

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# Axis controllers CPX-CMAX

Accessories

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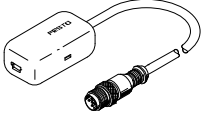
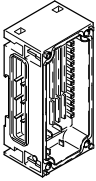
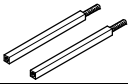
Ordering data		Brief description	Part No.	Type
<b>Axis controller</b>				
	Order code in the CPX configurator: T21		<b>548932</b>	<b>CPX-CMAX-C1-1</b>
<b>Connecting cables</b>				
	Connecting cable with angled plug and angled socket	0.25 m	<b>540327</b>	<b>KVI-CP-3-WS-WD-0,25</b>
		0.5 m	<b>540328</b>	<b>KVI-CP-3-WS-WD-0,5</b>
		2 m	<b>540329</b>	<b>KVI-CP-3-WS-WD-2</b>
		5 m	<b>540330</b>	<b>KVI-CP-3-WS-WD-5</b>
		8 m	<b>540331</b>	<b>KVI-CP-3-WS-WD-8</b>
	Connecting cable with straight plug and straight socket	2 m	<b>540332</b>	<b>KVI-CP-3-GS-GD-2</b>
	5 m	<b>540333</b>	<b>KVI-CP-3-GS-GD-5</b>	
	8 m	<b>540334</b>	<b>KVI-CP-3-GS-GD-8</b>	
	Connector for control cabinet through-feed		<b>543252</b>	<b>KVI-CP-3-SSD</b>
<b>Screws</b>				
	For mounting on the metal interlinking block		<b>550219</b>	<b>CPX-M-M3X22-4X</b>
<b>Inscription labels</b>				
	Inscription labels 6x10, in frames	64 pieces	<b>18576</b>	<b>IBS-6X10</b>
<b>User manual</b>				
	Axis controller description CPX-CMAX <sup>1)</sup>	German	<b>559750</b>	<b>P.BE-CPX-CMAX-SYS-DE</b>
		English	<b>559751</b>	<b>P.BE-CPX-CMAX-SYS-EN</b>
		Spanish	<b>559752</b>	<b>P.BE-CPX-CMAX-SYS-ES</b>
		French	<b>559753</b>	<b>P.BE-CPX-CMAX-SYS-FR</b>
		Italian	<b>559754</b>	<b>P.BE-CPX-CMAX-SYS-IT</b>

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

# Axis controllers CPX-CMAX

Accessories

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Ordering data			
	Brief description	Part No.	Type
<b>Adapters</b>			
	Adapter cable from 5-pin M12 to mini USB socket and controller software	<b>547432</b>	<b>NEFC-M12G5-0.3-U1G5</b>
<b>Interlinking block, plastic, as expansion block</b>			
	Without power supply	–	<b>195742</b> <b>CPX-GE-EV</b>
	With additional power supply for outputs	M18 – 4-pin	<b>195744</b> <b>CPX-GE-EV-Z</b>
		7/8" – 5-pin	<b>541248</b> <b>CPX-GE-EV-Z-7/8-5POL</b>
		7/8" – 4-pin	<b>541250</b> <b>CPX-GE-EV-Z-7/8-4POL</b>
	With additional power supply for valves	M18 – 4-pin	<b>533577</b> <b>CPX-GE-EV-V</b>
7/8" – 4-pin		<b>541252</b> <b>CPX-GE-EV-V-7/8-4POL</b>	
<b>Tie rods</b>			
	For extension using an interlinking block	1-fold	<b>525418</b> <b>CPX-ZA-1-E</b>

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