


# Control block CPX-CEC



# Control block CPX-CEC

Key features

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Application			
Controller		Programming in a global language	
<div></div>		<p>The CoDeSys controllers are modern control systems for CPX terminals that enable programming with CoDeSys to IEC 61131-3.</p> <p>CoDeSys provided by Festo offers a convenient user interface with the following functions:</p> <ul style="list-style-type: none"><li>• Integrated module libraries</li><li>• Library administrator for integrating additional libraries</li><li>• Visualisation editor</li></ul> <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>	
Basic functions		CPX-CEC-C1 offers...	CPX-CEC-M1 offers...
<p>The CoDeSys controllers offer the following basic functions:</p> <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 FED or OPC server</li><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-MMI</li></ul>		<ul style="list-style-type: none"><li>• All basic functions</li><li>• CANopen master for controlling 31 CANopen stations. Electric axes can be controlled in point-to-point mode</li></ul>	<ul style="list-style-type: none"><li>• All basic functions</li><li>• CANopen master for controlling up to eight electric axes (recommended) in interpolated mode (two of these axes with circular interpolation and six additionally with linear interpolation)</li><li>• SoftMotion function library for coordinated multi-axis movements</li></ul>
		<div><b>Note</b></div> <p>The SoftMotion functions are not available when the control block is operated as a CANopen master.</p>	<div><b>Note</b></div> <p>When using external devices, data communication must be programmed by the user.</p>
Bus connection		Operating modes	System expansion
<p>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:</p> <ul style="list-style-type: none"><li>• PROFINET</li><li>• Ethernet/IP</li><li>• EtherCAT</li><li>• Profibus</li><li>• DeviceNet</li></ul>		<ul style="list-style-type: none"><li>• Stand-alone</li><li>• Remote controller on the fieldbus</li><li>• Remote controller on the Ethernet</li></ul>	<p>CANopen connects CPX-CEC... with valve terminals and electric drive controllers from Festo:</p> <ul style="list-style-type: none"><li>• CPX, CPV</li><li>• CMMP-AS, CMMS-AS/-ST, etc.</li><li>• AS-interface gateway, wireless gateway</li></ul> <p>Ethernet connects CPX-CEC... with additional controllers and operator units from Festo:</p> <ul style="list-style-type: none"><li>• CECX</li><li>• FED-50 to FED-5000</li><li>• FED-CEC</li><li>• Camera SBOx-Q</li></ul>
System expansion (examples)			
CPX-CEC/CPX-CEC-... as a stand-alone or remote controller		CPX-CEC-C1 as a CANopen fieldbus master	

# Control block CPX-CEC

## Key features

### Advantages for users

#### Increased performance

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

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

#### Reduced costs

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

and motion applications with up to 31 axes. We recommend operating the CPX-CEC-M1 with a maximum of eight axes.

#### Simple, yet efficient: decentralised structures

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

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

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

The fully integrated automation platform for standard, proportional and servopneumatics, sensors and motion control to IP65.

Included: simple commissioning.

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

#### Embedded controller

The controller FED-CEC (CoDeSys) for insertion in the display and operator units from Festo facilitates compact solutions for small control tasks in combination with electric drive technology.

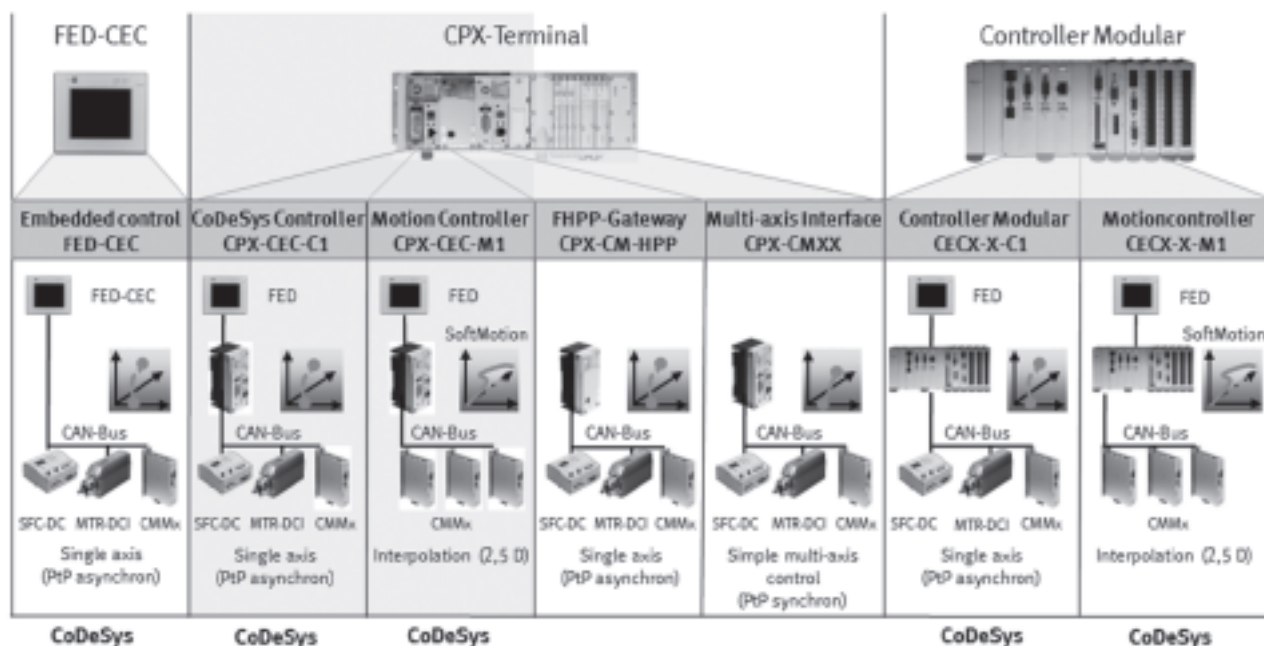
CPX-CEC-... (CoDeSys) permits the flexible connection of valve actuators and electric drives on the terminal – programmable in CoDeSys and can, if necessary, be directly installed at the machine to IP65. The ideal complement to the gateway module CPX-CM-HPP and the multi-axis interface CPX-CMXX.

#### Modular controller

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

The CECX-X-M1 (CoDeSys) executes advanced tasks such as cam disks, multi-axis function modules to PLCopen and simple NC functions up to 2.5D.  
The robot controller CMXR provides interpolating control for different kinematic systems (e.g. tripod) with up to six axes.

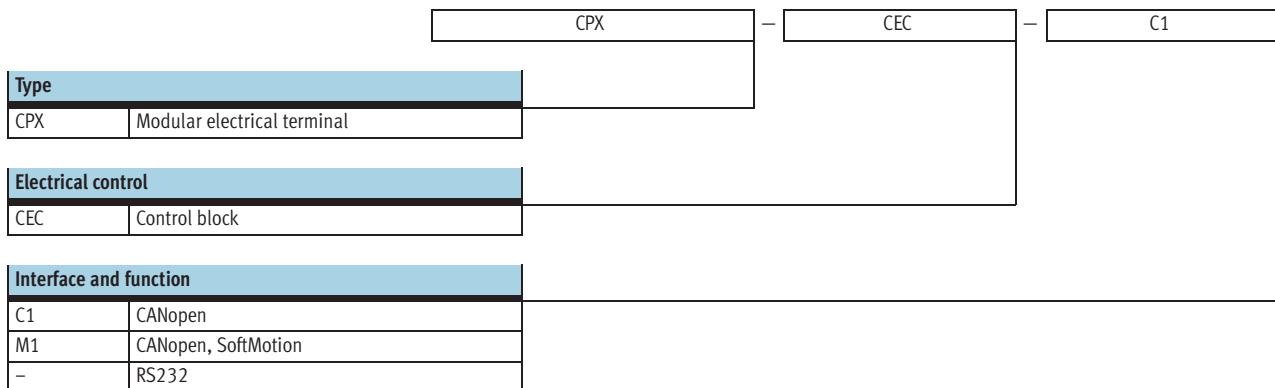
### CPX-CEC-... in the electric drive world



# Control block CPX-CEC

Type codes

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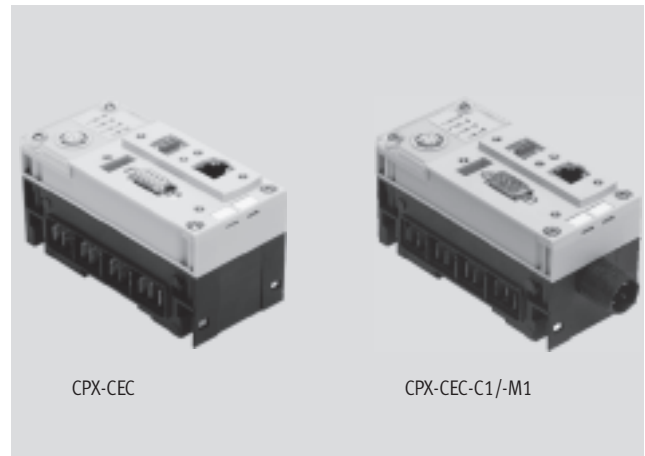
# Control block CPX-CEC

Technical data

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

- Easy actuation of valve terminal configurations with MPA, VTSA
- Connection to all fieldbuses as a remote controller and for preprocessing
- Actuation of electric drives as individual axes via CANopen (CPX-CEC-C1/-M1)
- Diagnostics with flexible monitoring options for pressure, flow rate, cylinder operating time, air consumption
- Early warnings and visualisation options
- Actuation of decentralised installation systems on the basis of CPI actuation of applications in proportional pneumatics
- Servopneumatic applications
- AS-interface actuation via gateway



General technical data			
Type	CPX-CEC-C1	CPX-CEC-M1	CPX-CEC
Protocol	CoDeSys level 2		
	EasyIP		
	Modbus TCP		
	TCP/IP		
CPU data	32 MB RAM		
	32 MB flash		
	400 MHz processor		
Control interface	CAN bus		-
Processing time	Approx. 200 µs/1k instruction		
Baud rate	10/100 bps to IEEE 802.3 (10BaseT) or 802.3u (100BaseTx)		
Programming software	CoDeSys provided by Festo		
Programming language	SFC, IL, FCH, LD and ST to IEC 61131-3		
	Additionally CFC		
Programming, operating language	German		
	English		
Programming, support for file handling	Yes		
Program memory	4 MB user program		
Flags	30 kB remanent memory		
	8 MB global data memory		
	CoDeSys variable concept		
Device-specific diagnostics	Diagnostic memory		
	Channel and module-oriented diagnostics		
	Undervoltage/short circuit of modules		
LED displays (bus-specific)	TP: Link/traffic		
LED displays (product-specific)	RUN: PLC status		
	STOP: PLC status		
	ERR: PLC runtime error		
	PS: Electronics supply, sensor supply		
	PL: Load supply		
	SF: System fault		
Parameterisation	M: Modify/forcing active		
	CoDeSys		
Configuration support	CoDeSys		
IP address setting	DHCP		
	Via CoDeSys		
	Via MMI		
Control elements	DIL switch for CAN termination		-
	Rotary switch for RUN/STOP		

# Control block CPX-CEC

Technical data

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General technical data				
Type		CPX-CEC-C1	CPX-CEC-M1	CPX-CEC
Function blocks		CPX diagnostic status, copy CPX diagnostic trace, read CPX module diagnostics		
		And others		
Additional functions		Diagnostic functions		
		Motion functions for electric drives	SoftMotion functions for electric drives	Communication functions RS232
Total number of axes		31	31 (recommended: max. 8)	–
Nominal operating voltage	[V DC]	24		
Nominal operating voltage of the load voltage	[V DC]	24		
		18 ... 30, without pneumatics		
		21.6 ... 26.4, with pneumatics type midi/maxi		
		20.4 ... 26.4, with pneumatics type CPA		
		18 ... 30, with pneumatics type MPA		
Power failure bridging	[ms]	10		
Intrinsic current consumption at nominal operating voltage	[mA]	Typically 85		
Protection class		IP65, IP67		
Dimensions W x L x H (incl. interlinking block)	[mm]	50 x 107 x 55		
Product weight	[g]	155		
Materials				
Housing		Reinforced polyamide, polycarbonate		
Note on materials		RoHS-compliant		

Technical data – Interfaces				
Type	CPX-CEC-C1	CPX-CEC-M1	CPX-CEC	
Ethernet				
Number	1			
Ethernet interface	RJ45			
Connector plug	RJ45 socket, 8-pin			
Data transmission speed	[Mbps]	10/100		
Supported protocols	TCP/IP			
	Easy IP			
	Modbus TCP (Server)			
Fieldbus interface				
Type	CAN bus		–	
Connection technology	Sub-D plug, 9-pin			
Transmission rate	[kbps]	125; 250; 500; 800; 1,000		125; 250; 500; 1,000
		Adjustable via software		Adjustable via software
Electrical isolation	Yes			
RS232 interface				
Data interface	–		Sub-D socket, 9-pin	
			9.6 ... 230.4 kbps	
			Electrically isolated	

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

1) Corrosion resistance class 2 according to Festo standard 940 070  
Components subject to moderate corrosion stress. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents

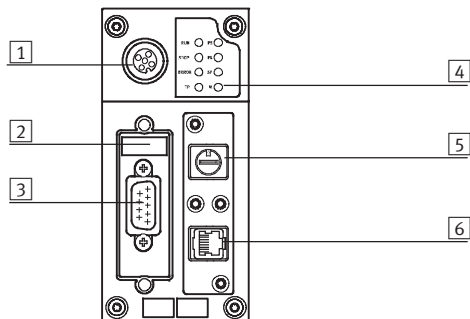
# Control block CPX-CEC

Technical data

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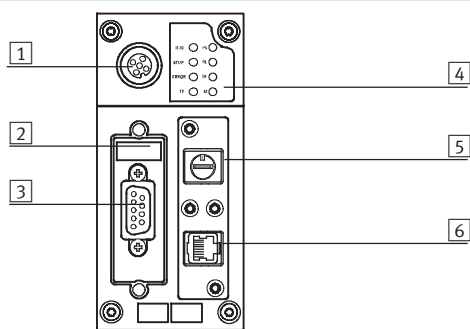
## Connection and display components

CPX-CEC-C1/-M1



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

## CPX-CEC



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

## Pin allocation – Fieldbus interface (CPX-CEC-C1/-M1)

	Pin	Signal	Meaning
Sub-D plug			
	1	n.c.	Not connected
	2	CAN_L	CAN low
	3	CAN_GND	CAN ground
	4	n.c.	Not connected
	5	CAN_SHLD	Connection to functional earth (FE)
	6	CAN_GND	CAN ground (optional) <sup>1)</sup>
	7	CAN_H	CAN high
	8	n.c.	Not connected
	9	n.c.	Not connected
	Housing	Screened	Plug housing must be connected to FE

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

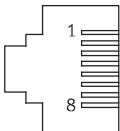
## Pin allocation – RS232 interface (CPX-CEC)

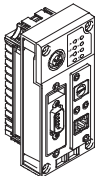
	Pin	Signal	Meaning
Sub-D socket			
	1	n.c.	Not connected
	2	RxD	Received data
	3	TxD	Transmitted data
	4	n.c.	Not connected
	5	GND	Data reference potential
	6	n.c.	Not connected
	7	n.c.	Not connected
	8	n.c.	Not connected
	9	n.c.	Not connected
	Screened	Screened	Connection to functional earth

# Control block CPX-CEC

Technical data

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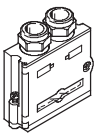
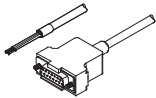
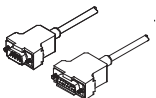





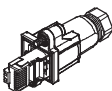

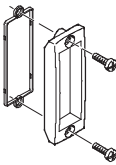
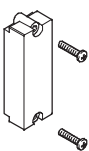
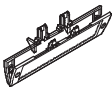
Pin allocation – Ethernet interface			
	Pin	Signal	Meaning
RJ45 plug			
	1	TD+	Transmitted data+
	2	TD-	Transmitted data-
	3	RD+	Received data+
	4	n.c.	Not connected
	5	n.c.	Not connected
	6	RD-	Received data-
	7	n.c.	Not connected
	8	n.c.	Not connected
	Housing	Screened	Screened


Ordering data			
Designation		Part No.	Type
	Control block	567347	CPX-CEC-C1
		567348	CPX-CEC-M1
		567346	CPX-CEC

# Control block CPX-CEC

Accessories

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Ordering data – Bus connection			
Designation		Part No.	Type
	Sub-D plug, 9-pin (for CPX-CEC-C1/-M1)	532219	FBS-SUB-9-BU-2x5POL-B
	Connecting cable FED (for CPX-CEC)	539642	FEC-KBG7
	Connecting cable FED (for CPX-CEC)	539643	FEC-KBG8
	Bus connection, plug 2xM12, 5-pin	525632	FBA-2-M12-5POL
	Plug socket for fieldbus connection, M12, 5-pin	18324	FBSD-GD-9-5POL
	Plug, M12, 5-pin	175380	FBS-M12-5GS-PG9
	Bus connection, 5-pin	525634	FBA-1-SL-5POL
	Bus connection, screw terminal, 5-pin	525635	FBSD-KL-2x5POL
	RJ45 plug, 8-pin	534494	FBS-RJ45-8-GS
	Cover for RJ45 connection	534496	AK-RJ45
	Inspection cover, transparent for Sub-D plug/socket	533334	AK-SUB-9/15-B
	Cover for Sub-D plug/socket	557010	AK-SUB-9/15
	Inscription label holder for manifold block	536593	CPX-ST-1

Documentation			
Designation	Language	Part No.	Type
	German	569121	P.BE-CPX-CEC-DE
	English	569122	P.BE-CPX-CEC-EN

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### A Complete Suite of Automation Services

Our experienced engineers provide complete support at every stage of your development process, including: conceptualization, analysis, engineering, design, assembly, documentation, validation, and production.



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### Quality Assurance, ISO 9001 and ISO 14001 Certifications

Festo Corporation is committed to supply all Festo products and services that will meet or exceed our customers' requirements in product quality, delivery, customer service and satisfaction.

To meet this commitment, we strive to ensure a consistent, integrated, and systematic approach to management that will meet or exceed the requirements of the ISO 9001 standard for Quality Management and the ISO 14001 standard for Environmental Management.



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# Festo North America

## Festo Regional Contact Center

5300 Explorer Drive  
Mississauga, Ontario L4W 5G4  
Canada

### USA Customers:

For ordering assistance,

**Call:** 1.800.99.FESTO (1.800.993.3786)

**Fax:** 1.800.96.FESTO (1.800.963.3786)

**Email:** [customer.service@us.festo.com](mailto:customer.service@us.festo.com)

For technical support,

**Call:** 1.866.GO.FESTO (1.866.463.3786)

**Fax:** 1.800.96.FESTO (1.800.963.3786)

**Email:** [product.support@us.festo.com](mailto:product.support@us.festo.com)

### Canadian Customers:

**Call:** 1.877.GO.FESTO (1.877.463.3786)

**Fax:** 1.877.FX.FESTO (1.877.393.3786)

**Email:** [festo.canada@ca.festo.com](mailto:festo.canada@ca.festo.com)

## USA Headquarters

Festo Corporation  
395 Moreland Road  
P.O. Box 18023  
Hauppauge, NY 11788, USA  
[www.festo.com/us](http://www.festo.com/us)

## USA Sales Offices

### Appleton

North 922 Tower View Drive, Suite N  
Greenville, WI 54942, USA

### Boston

120 Presidential Way, Suite 330  
Woburn, MA 01801, USA

### Chicago

1441 East Business Center Drive  
Mt. Prospect, IL 60056, USA

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1825 Lakeway Drive, Suite 600  
Lewisville, TX 75057, USA

### Detroit – Automotive Engineering Center

2601 Cambridge Court, Suite 320  
Auburn Hills, MI 48326, USA

### New York

395 Moreland Road  
Hauppauge, NY 11788, USA

### Silicon Valley

4935 Southfront Road, Suite F  
Livermore, CA 94550, USA

## United States



**USA Headquarters, East:** Festo Corp., 395 Moreland Road, Hauppauge, NY 11788

Phone: 1.631.435.0800; Fax: 1.631.435.8026;

Email: [info@festo-usa.com](mailto:info@festo-usa.com)

[www.festo.com/us](http://www.festo.com/us)

## Canada



**Headquarters:** Festo Inc., 5300 Explorer Drive, Mississauga, Ontario L4W 5G4

Phone: 1.905.624.9000; Fax: 1.905.624.9001;

Email: [festo.canada@ca.festo.com](mailto:festo.canada@ca.festo.com)

[www.festo.ca](http://www.festo.ca)

## Mexico



**Headquarters:** Festo Pneumatic, S.A., Av. Ceylán 3, Col. Tequesquahuac,  
54020 Tlalneapantla, Edo. de México

Phone: 011 52 [55] 53 21 66 00; Fax: 011 52 [55] 53 21 66 65;

Email: [festo.mexico@mx.festo.com](mailto:festo.mexico@mx.festo.com)

[www.festo.com/mx](http://www.festo.com/mx)

## Central USA

Festo Corporation  
1441 East Business  
Center Drive  
Mt. Prospect, IL 60056, USA  
Phone: 1.847.759.2600  
Fax: 1.847.768.9480



## Western USA

Festo Corporation  
4935 Southfront Road,  
Suite F  
Livermore, CA 94550, USA  
Phone: 1.925.371.1099  
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