Clamping cartridges/units





Clamping cartridges/units

Key features

FESTO

At a glance

- The clamping cartridges/clamping units use spring force to hold round material in any desired position.
- Able to stop and hold material for long periods, even in applications involving varying loads, fluctuating operating pressure and system leaks.
- The clamping force is released by pressurising the clamping mechanism.
- Clamping cartridges and clamping units can be mounted in any position.
- They are not suitable for use as positioning devices.
- The clamping cartridge KP and the clamping units KPE, KEC, KEC-S are discrete components and are not intended for use as attachments for pneumatic cylinders.
- In their clamped state, the clamping cartridges and clamping units are not free of backlash when their piston rods are subjected to alternating loads.

Selection aid

Clamping cartridge KP



- For in-house assembly of clamping units
- Not certified for use in safety-relevant control systems

Clamping unit KPE



- Ready-to-install combination of clamping cartridge KP and housing
- Versatile mounting options → 7
- Not certified for use in safety-relevant control systems

Clamping unit KEC



- For use as holding device (static application):
 - Holding and clamping in the event of a power failure
 - Protection against pressure failure and pressure drop
 - Securing the piston rod during intermediate stops for process operations
- Mounting hole pattern to ISO 15552 (DIN ISO 6431)
- Not certified for use in safety-relevant control systems

→ 8

Clamping-unit cylinder KEC-...-S, for safety-related applications



For use as holding device (static application):

- Holding and clamping in the event of a power failure
- Protection against pressure failure and pressure drop
- Securing of the piston rod during intermediate stops for process operations
- For use as a braking device (dynamic application):
 - Braking or stopping of movements
 - Suspension of movement upon entering a danger area
- Mounting hole pattern to ISO 15552 (DIN ISO 6431)
- When used as a braking device, the overtravel must be checked regularly

- Suitable for use in safety-related parts of control systems belonging to category 1 to EN ISO 13849-1 (reliable component). For use in higher categories, additional control measures are required
- Certified for use in safety-relevant control systems by the BG-Institute for Occupational Safety and Health (Berufsgenossenschaftlichen Institut für Arbeitsschutz – BIA) in Germany
- Products intended for use in safety-related applications must be selected, sized and arranged in accordance with the risk assessment (EN ISO 14121-1) as well as any other valid standards and regulations

Clamping cartridges/units

FESTO

Key features and type codes

Requirements for the round material to be clamped

in combination with clamping cartridge KP or clamping unit KPE

- Material:
 - Hard-chromium plated steel
 - Hardened steel
 - Rolled steel: tensile strength > 650 N/mm², hardness (HB30) > 175
- Diameter tolerance: h8
- Surface roughness:
- $R_{max.} = 4 \mu m$
- The specified holding forces refer to a static load. If these values are exceeded, slippage may occur
- Clamping cartridge KP and clamping unit KPE are not suitable for dynamic operation

in combination with clamping unit KEC

- Material:
 - Hard-chromium plated steel: coating thickness min. 20 µm
 - Hardened steel: min. HRC 60
- Diameter tolerance: h7 ... f7
- Surface roughness:
- $R_{max.} = 4 \mu m$
- The specified holding forces refer to a static load. If these values are exceeded, slippage may occur
- Clamping unit KEC is not suitable for dynamic operation
- The following applies to clamping unit KEC-S: Dynamic forces occurring during operation must not exceed the static holding force

Type codes

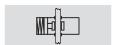


Safety component to Machinery Directive 2006/42/EC. Approved for use in safety-related parts of control systems. Certified by the Institute for Occupational Safety and Health (Berufsgenossenschaftlichen Institut für Arbeitsschutz - BIA) in Germany.

Clamping cartridges KP Technical data

FESTO

Function



-Nof round material to be clamped: 4 ... 32 mm

Force

80 ... 7,500 N



Note

Additional measures are required for use in safety-related control systems; in Europe, for example, the standards listed under the EC Machinery Directive must be observed. Without

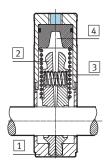
additional measures in accordance with statutory minimum requirements, the product is not suitable for use in safety-related sections of control systems.

General technical data												
For round material ∅		4	6	8	10	12	16	20		25	32	
Pneumatic connection	M5				G1/8							
Design	Tilting wed	Tilting wedge mechanism										
Type of mounting		Via self-cor	nfigured hous	sing								
Clamping type with effective direction		At both ends										
		Clamping via spring force, air to release										
Static holding force	[N]	80	180	350	350	600	1,000	1,400	2,000	5,000	7,500	
Max. axial backlash with	[mm]	0.2	0.3		0.5			0.7			1	
clamped piston rod without												
load												
Min. release pressure	[bar]	3										
Assembly position	Any	Any										
Product weight	[g]	10	15	50	50	50	90	170	170	700	1,600	

Operating and environmental conditions							
Operating medium		Compressed air in accordance with ISO 8573-1:2010 [7:4:4]					
Note on operating/pilot medium		Operation with lubricated medium possible (in which case lubricated operation will always be required)					
Operating pressure	[bar]	≤10					
Ambient temperature	[°C]	-10 +80					
Corrosion resistance class CRC ¹⁾		2					

¹⁾ Corrosion resistance class 2 according to Festo standard 940 070 Components requiring moderate corrosion resistance. 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.

Materials

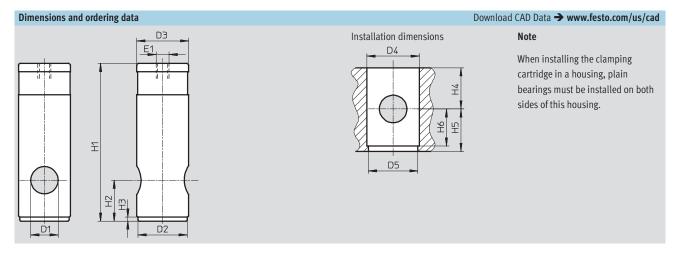


Clam	Clamping cartridge							
1	Body	Anodised aluminium						
2	Clamping plates	Brass						
3	Spring	Spring steel						
4	Piston	Polyacetal						
-	Seals	Nitrile rubber, polyurethane						

Clamping cartridges KP Technical data

FESTO

5



For Ø	D1 Ø	D2 Ø	D3 Ø	D4 Ø	D5 Ø	E1	H1	H2
[mm]		h12	f9	D9				
4	4	10	12	12	11	M5	28	7
6	6	14	16	16	15	M5	35	10
8	8	18	20	20	19	M5	62	17.5
10	10	18	20	20	19	M5	62	17.5
12	12	18	20	20	19	M5	62	17.5
16	16	22	24	24	23	G1/8	83	22
20	20	28	30	30	29	G1/8	100	25
	20	36	38	38	37	G1/8	115.5	30
25	25	46	48	48	47	G1/8	155	36
32	32	63	65	65	64	G1/8	195	55

For Ø	Н3	H4	H5	Н6	Weight	Part No.	Туре
[mm]		min.	min.		[g]		
4	2	9	7	6	10	178 452	KP-4-80
6	3	10	11	8	15	178 453	KP-6-180
8	3	18	18.5	15.5	50	178 454	KP-8-350
10	3	18	18.5	15.5	50	178 455	KP-10-350
12	3	18	18.5	15.5	50	178 456	KP-12-600
16	3	22	23	20	90	178 457	KP-16-1000
20	3	25	26	23	170	178 458	KP-20-1400
	3	30	31	28	170	178 459	KP-20-2000
25	3	36	37	34	700	178 460	KP-25-5000
32	3	55	56	53	1,600	178 461	KP-32-7500

Function



-Nof round material to be clamped: 4 ... 32 mm

Force

80 ... 7,500 N

www.festo.com/en/ Spare_parts_service



Note

Additional measures are required for use in safety-related control systems; in Europe, for example, the standards listed under the EC Machinery Directive must be observed. Without

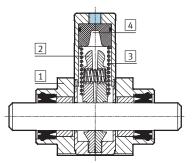
additional measures in accordance with statutory minimum requirements, the product is not suitable for use in safety-related sections of control systems.

General technical data													
For round material \varnothing	For round material \varnothing		6	8	10	12	16	20	25	32			
Pneumatic connection		M5					G1/8						
Design		Tilting wedg	ge mechanism										
Type of mounting		Via mountir	Via mounting thread										
		Via through	-holes										
Clamping type with effective d	irection	At both ends											
		Clamping via spring force, air to release											
Static holding force	[N]	80	180	350	350	600	1,000	1,400	5,000	7,500			
Max. axial backlash with	[mm]	0.2	0.3		0.5			0.7		1			
clamped piston rod without													
load													
Min. release pressure	[bar]	3											
Assembly position		Any											
Product weight	[g]	100	150	240	260	270	410	930	2,000	4,600			

Operating and environmental conditions							
Operating medium		Compressed air in accordance with ISO 8573-1:2010 [7:4:4]					
Note on operating/pilot medium		Operation with lubricated medium possible (in which case lubricated operation will always be required)					
Operating pressure	[bar]	≤10					
Ambient temperature	[°C]	-10 +80					
Corrosion resistance class CRC ¹⁾		2					

Corrosion resistance class 2 according to Festo standard 940 070
Components requiring moderate corrosion resistance. 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.

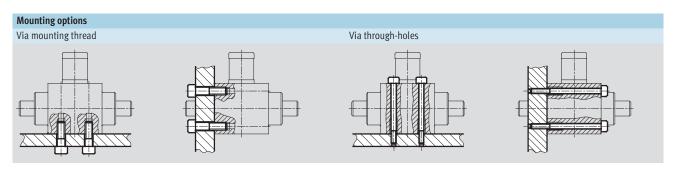
Materials

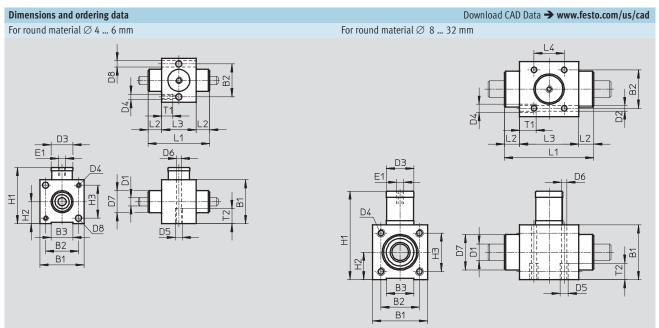


Clam	Clamping unit							
1	Housing	Anodised aluminium						
2	Clamping plates	Brass						
3	Spring	Spring steel						
4	Piston	Polyacetal						
-	Seals	Nitrile rubber, polyurethane						

Clamping units KPE Technical data







For Ø [mm]	B1	B2	В3	D1 Ø	D2 Ø	D3 Ø	D4	D5	D6 Ø	D7 ∅ d11	D8 Ø	E1	H1	H2
/	27	19.5	12	4	_	12	_	M5	4.2	12	4.5	M5	34.5	13.5
4	32	24	16			16		M5	4.2	16	4.5	M5	41	16
6		24	16	6	-	16	-	IVI5	4.2	16	4.5	INIS	41	16
8	36	27	20	8	4.2	20	M5	M5	4.2	22	ı	M5	62.5	18
10	36	27	20	10	4.2	20	M5	M5	4.2	22	-	M5	62.5	18
12	40	28	20	12	5.2	20	M6	M6	5.2	28	-	M5	64.5	20
16	45	32.5	25	16	5.2	24	M6	M6	5.2	32	-	G1/8	83.5	22.5
20	65	50	38	20	6.5	38	M8	M8	6.5	45	-	G1/8	118	32.5
25	88	65	50	25	8.5	48	M10	M10	8.5	55	-	G1/8	163	44
32	118	90	70	32	10.3	65	M12	M12	10.3	60	-	G ¹ /8	199	59

For Ø	Н3	L1	L2	L3	L4	T1	T2	Weight	Part No. Type
[mm]								[g]	
4	19.5	33	7.5	18	-	9	11	100	178 462 KPE-4
6	24	45	10	25	-	9	11	150	178 463 KPE-6
8	27	58	10	38	20	10	11	240	178 464 KPE-8
10	27	62	12	38	20	10	11	260	178 465 KPE-10
12	28	65	11	43	22	12	12	270	178 466 KPE-12
16	32.5	69	12.5	44	22	12	12	410	178 467 KPE-16
20	50	83	12.5	58	30	16	16	930	178 468 KPE-20
25	65	100	15	70	34	20	20	2,000	178 469 KPE-25
32	90	154	25	104	60	24	24	4,600	178 470 KPE-32

Technical data

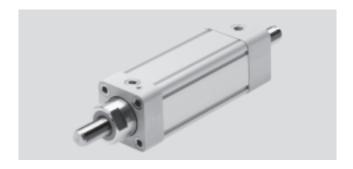
Function



-N- Diameter of round material to be clamped: 16 ... 25 mm

Force

1,300 ... 8,000 N



Note

Additional measures are required for use in safety-related control systems; in Europe, for example, the standards listed under the EC Machinery
Directive must be observed. Without

additional measures in accordance with statutory minimum requirements, the product is not suitable for use in safety-related sections of control systems.

General technical data								
For round material \varnothing	16	20	25					
Pneumatic connection	G1/8	G ¹ / ₄	G ³ / ₈					
Type of mounting	Via accessories → 12							
Clamping type with effective direction	At both ends							
	Clamping via spring force, air to release							
Static holding force	1,300	3,200	8,000					
Min. release pressure [bar]	3.8							
Assembly position	Any							
Product weight [g]	1,860	4,515	16,760					

Operating and environmental conditions						
Operating medium		Compressed air in accordance with ISO 8573-1:2010 [7:4:4]				
Note on operating/pilot medium		Operation with lubricated medium possible (in which case lubricated operation will always be required)				
Operating pressure	[bar]	3.8 10				
Ambient temperature	[°C]	-20 +80				
ATEX		Specified types → www.festo.com				

Note

The specified holding force refers to a static load. If this value is exceeded, slippage may occur. Dynamic forces occurring during operation must not exceed the static holding force if

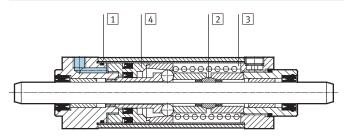
slippage is to be avoided. The clamping unit is backlash-free in the clamped condition if varying loads are applied to the piston rod.

Activation:

The clamping unit may only be released when equilibrium of forces is present on the piston rod. Otherwise there is a risk of accidents due to the

sudden movement of the piston rod. Blocking off the air supply at both ends (e.g. with a 5/3-way valve) does not provide any safety.

Materials



Clamping unit									
1 Housing	Wrought aluminium alloy								
2 Clamping jaws	Tool steel								
3 Spring	High-alloy steel								
4 Piston	Wrought aluminium alloy								
- Seals	Nitrile rubber, polyurethane								

Clamping units KEC Technical data

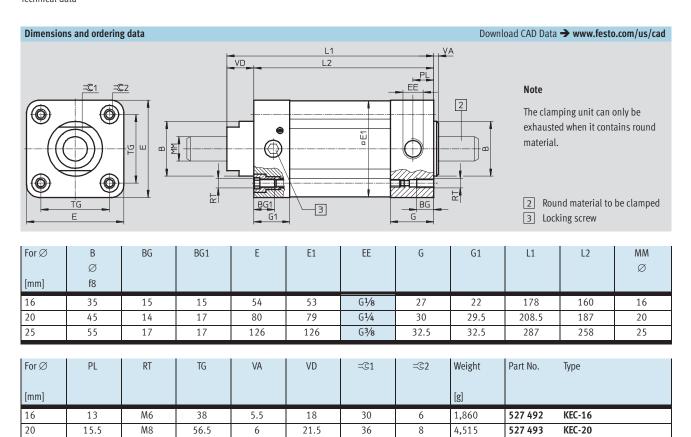
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25

17

M10

89



29

41

10

15,600

527 494

KEC-25

Technical data

Function



-N- Diameter of round material to be clamped: 16 ... 25 mm

Force

1,300 ... 8,000 N



General technical data							
For round material \varnothing	16	20	25				
Pneumatic connection	G½	G3/8					
Type of mounting	Via accessories → 12						
Clamping type with effective direction	At both ends						
	Clamping via spring force, air to release						
Static holding force	1,300	3,200 8,000					
Min. release pressure [bar]	3.8						
Assembly position	Any						
CE symbol	EU-compliant to directive 98/37/EC (ma	chines)					
Function	Single-channel to EN ISO 13849-1, category 1						
Certification	BIA (Berufsgenossenschaftliches Institut	für Arbeitsschutz – BG-Institute for Occup	pational Safety and Health)				
Product weight [g]	1,860	4,515	15,600				

Operating and environmental conditions									
Operating medium		Compressed air in accordance with ISO 8573-1:2010 [7:4:4]							
Note on operating/pilot medium		Operation with lubricated medium possible (in which case lubricated operation will always be required)							
Operating pressure	[bar]	3.8 8							
Max. permissible test pressure	[bar]	10							
Ambient temperature	[°C]	-10 +60							

Note

The specified holding force refers to a static load. If this value is exceeded, slippage may occur. Dynamic forces occurring during operation must not exceed the static holding force if

slippage is to be avoided. The clamping unit is backlash-free in the clamped condition if varying loads are applied to the piston rod.

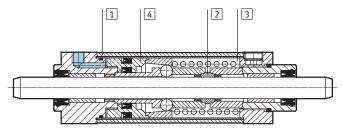
Activation:

The clamping unit may only be released when equilibrium of forces is present on the round material.

Otherwise there is a risk of accidents due to the sudden movement of the

round material. Blocking off the air supply at both ends (e.g. with a 5/3-way valve) does not provide any safety.

Materials

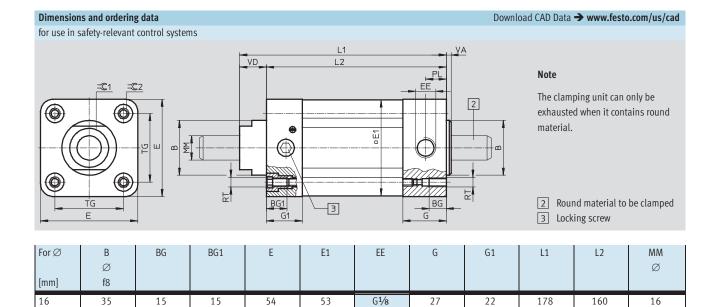


Clamp	ing unit	
1	Housing	Wrought aluminium alloy
2 (Clamping jaws	Tool steel
3 9	Spring	High-alloy steel
4	Piston	Wrought aluminium alloy
- 3	Seals	Nitrile rubber, polyurethane

Clamping units KEC-...-S

Technical data





								_		
For Ø	PL	RT	TG	VA	VD	=©1	= ©2	Weight	Part No.	Туре
[mm]								[g]		
16	13	M6	38	5.5	18	30	6	1,860	538 242	KEC-16-S
20	15.5	M8	56.5	6	21.5	36	8	4,515	538 243	KEC-20-S
25	17	M10	89	7	29	41	10	15,600	538 244	KEC-25-S

G1/4

G3/8

79

126

Note

20

The overtravel is the distance that the round material covers between exhausting of the clamping unit and coming to a standstill. It must be determined by the customer when setting up the machine and be compared with the calculated overtravel

45

14

17

17

DIN EN 999/EN ISO 13849-2.

The clamping unit KEC-S can be used in safety-related parts of control systems belonging to category 1 (reliable component) as defined by EN ISO 13849-1. For use in higher categories than category 1 to EN ISO 13849-1, the overtravel must be achieved even in the event

80

126

of faults.

It is dependent on the environmental conditions and stress, e.g.:

30

32.5

29.5

32.5

208.5

287

- Operating pressure
- Nominal size of switching valve
- Line length
- Diameter of connecting line to clamping unit
- Load and speed

The overtravel can be reduced by attaching a quick exhaust valve to the supply port of the clamping unit.

187

258

20

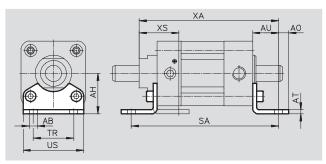
25

Clamping units Accessories **FESTO**

Foot mounting HNC

Material: Galvanised steel Free of copper, PTFE and silicone





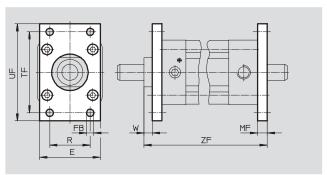
Dimension	Dimensions and ordering data													
For Ø	AB Ø	АН	AO	AT	AU	SA	TR	US	XA	XS	CRC ¹⁾	Weight	Part No.	Туре
[mm]												[g]		
16	10	36	9	5	28	216	36	54	206	42	2	193	174 370	HNC-40
20	10	50	12.5	6	32	251	50	75	240.5	48.5	2	436	174 372	HNC-63
25	14.5	71	17.5	6	41	340	75	110	328	64	2	1,009	174 374	HNC-100

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

Flange mounting FNC

Material: Galvanised steel Free of copper, PTFE and silicone





Dimension	Dimensions and ordering data											
For \varnothing	Е	FB	MF	R	TF	UF	W	ZF	CRC ¹⁾	Weight	Part No.	Туре
		Ø										
[mm]		H13								[g]		
40	54	9	10	36	72	90	20	287	1	291	174 377	FNC-40
63	75	9	12	50	100	120	25	327	1	679	174 379	FNC-63
100	110	14	16	75	150	175	35	424	1	2,041	174 381	FNC-100

¹⁾ CRC1: Corrosion resistance class to Festo standard 940070 Components with light corrosion exposure. Protection for transport and storage. Components without significant decorative function or surface, e.g. installed out of sight internally or behind covers.

Product Range and Company Overview

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.



Custom Automation Components Complete custom engineered solutions



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Complete Systems Shipment, stocking and storage services

The Broadest Range of Automation Components

With a comprehensive line of more than 30,000 automation components, Festo is capable of solving the most complex automation requirements.



Electromechanical Electromechanical actuators, motors, controllers & drives



Pneumatics Pneumatic linear and rotary actuators, valves, and air supply



PLCs and I/O Devices PLC's, operator interfaces, sensors and I/O devices

Supporting Advanced Automation... As No One Else Can!

Festo is a leading global manufacturer of pneumatic and electromechanical systems, components and controls for industrial automation, with more than 12,000 employees in 56 national headquarters serving more than 180 countries. For more than 80 years, Festo has continuously elevated the state of manufacturing with innovations and optimized motion control solutions that deliver higher performing, more profitable automated manufacturing and processing equipment. Our dedication to the advancement of automation extends beyond technology to the education and development of current and future automation and robotics designers with simulation tools, teaching programs, and on-site services.

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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) 1.800.96.FESTO (1.800.963.3786) Email: 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

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USA Headquarters

Festo Corporation 395 Moreland Road P.O. Box 18023 Hauppauge, NY 11788, USA 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

Dallas

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 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

Mexico



Headquarters: Festo Pneumatic, S.A., Av. Ceylán 3, Col. Tequesquinahuac, 54020 Tlalnepantla, 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 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, Livermore, CA 94550. USA

Phone: 1.925.371.1099 Fax: 1.925.245.1286



Festo Worldwide

Argentina Australia Austria Belarus Belgium Brazil Bulgaria Canada Chile China Colombia Croatia Czech Republic Denmark Estonia Finland France Germany Great Britain Greece Hong Kong Hungary India Indonesia Iran Ireland Israel Italy Japan Latvia Lithuania Malaysia Mexico Netherlands New Zealand Norway Peru Philippines Poland Romania Russia Serbia Singapore Slovakia Slovenia South Africa South Korea Spain Sweden Switzerland Taiwan Thailand Turkey Ukraine United States Venezuela