

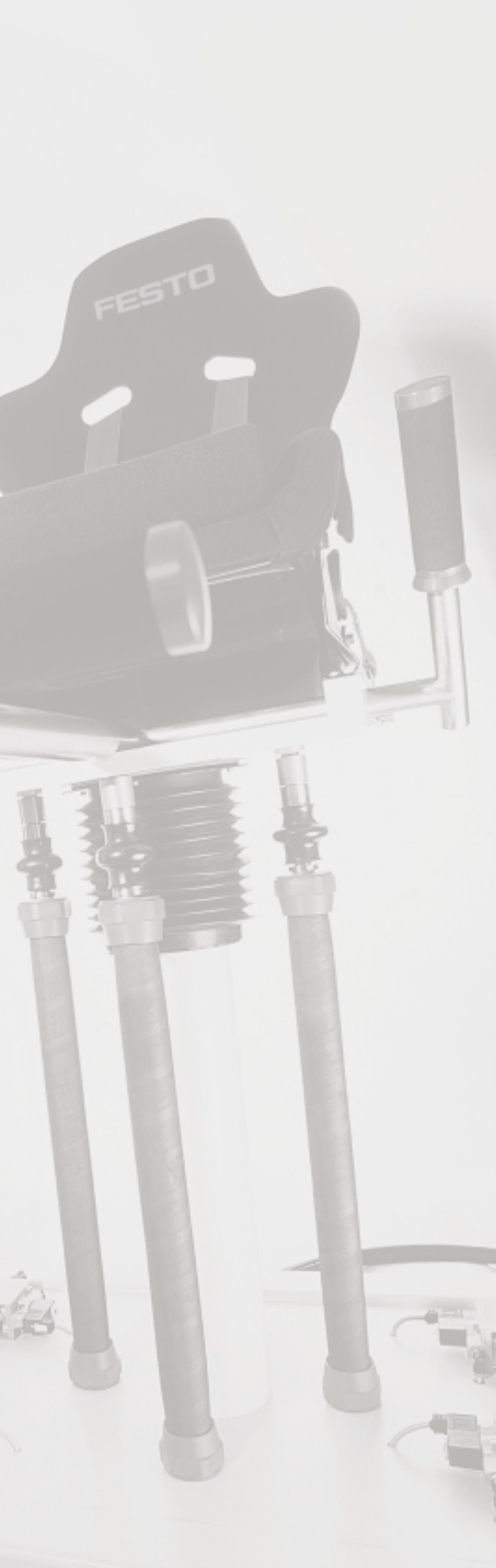
New. Fluidic Muscle MAS



FESTO

Simply ingenious –
muscles for automation

Info 501 →→



Festo proudly presents: Fluidic Muscle MAS

Innovative principle

The fluidic muscle is a membrane contraction system; put in simple terms, tubing which contracts in length under pressure. The basic idea is the combination of flexible tubing, which is impervious to fluids, and a covering of strong fibres in rhomboidal form. This creates a three-dimensional grid structure. When air is admitted, the grid structure changes in shape through expansion and a tensile force is created in the axial direction. The grid structure causes the muscle to shorten up to the neutral axis as internal pressure is increased. This corresponds to a stroke of approx. 25% of the initial unloaded length.

A winner, when it comes to comparison of force

In the distended state, the "muscle" develops up to ten times more force than a conventional pneumatic cylinder and consumes only 40 % of the energy for an identical force. A third of the cross section is sufficient for an identical force, the stroke is reduced with an identical installation length. An equation which applies in the case of numerous applications and opens up completely new areas of pneumatic applications.

Totally impervious

The membrane contraction system is hermetically sealed – compressed air can only escape through the inlet, thereby rendering the Fluidic Muscle impervious to dirt, dust and sand. Even more possibilities for the use of clean pneumatics: Also anywhere, where electrical drives are a problem or might even constitute a danger.

Worldwide service

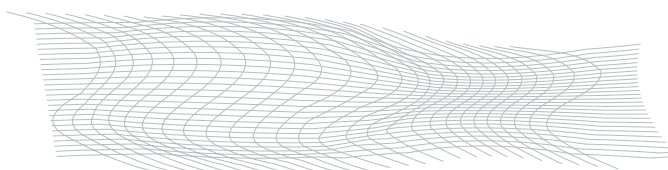
New products know no frontiers. No matter where you are, Festo is never far away – and wherever Festo is represented, you will be able to obtain the Fluidic Muscle.

Fluidic Muscle MAS – a powerful light-weight.

**The principle of contraction –
the new force for the latest drive ideas**

Simply fascinating is the perfection, with which the human muscle works: It is capable of powerful contraction or can be relaxed at will. However, the technical implementation of this natural system of contraction poses a particular challenge.

Festo has succeeded in developing the principle of muscle power to the point of series production with a new product worldwide, based on a combination of flexible tubing and strong fibres in rhomboidal form. For the Festo user the Fluidic Muscle offers maximum flexibility in use, with up to ten times more force – and that at a fraction of the weight of a pneumatic cylinder. Make sure you experience this new aspect in pneumatic technology.



Simply pneumatic – convincing in many ways

Convincingly dynamic

Thanks to its enormous initial force and acceleration, the light-weight fluidic muscle is highly suitable for applications requiring high acceleration without any stick-slip effect, e.g.

- Simulator technology
- High-speed cutting processes
- Clamping and gripping technology

Convincingly resistant

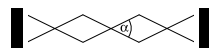
Even in dusty or contaminated environmental conditions, which would lead to mechanical wear on moving parts, the performance of the hermetically sealed Fluidic Muscle system is convincing.

- Wood-working
- Grinding shops

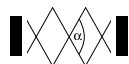
Convincingly clean

The benefits of the Fluidic Muscle's cleanliness are fully evident in any application which requires a complete separation between actuator air and the environment, e.g. in biomedical research

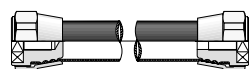
The function principle



Pretensioned



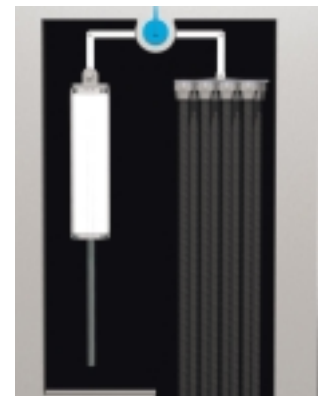
Contracted



The diameters:
Ø10 mm, Ø20 mm, Ø40 mm



Maximum dynamics, even with high loads.



Extremely low weight, ideal for mobile applications.



**Convincingly simple –
The connection technology**

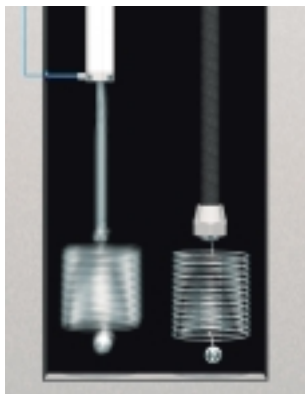
The connection to the drive medium is effected via two conical connectors in anodised light-weight metal. Various threads and inserts ensure flexibility of use for a wide variety of different applications. In the event of application modifications or if the muscle needs to be replaced, the connectors can simply be re-used.

**MAS: Innovative in principle
and simple in assembly**

MAS: The only actuator that can be cut to length with cutters, irrespective of whether the Fluidic Muscle has an internal diameter of 10, 20 or 40 mm – assembly made most simple.

The length can be determined with the help of convenient sizing software, available on the Internet under www.festo.com/fluidic_muscle. Lengths of up to 9 m are directly available.

Once the length has been defined, all you need to do is to decide whether you require a radial or axial air connection.



Totally free of sticking or jerking, even during slow movements.



Precision positioning using simple technology, without displacement encoders.



The current production length of 9 metres can be extended if required, by linking several muscles.

©Copyright by Festo AG & Co.

Whilst every effort is made to ensure that all dimensions and specifications are correct, any printers' errors not rectified are outside the control of Festo, who cannot be held responsible for same. For Liability and Guarantee conditions, refer to our standard "Conditions of Sale", available on request from your local Festo office. All rights reserved, including translation rights. No part of this publication may be reproduced or transmitted in any form or by any means, electronic, mechanical, photocopying or otherwise, without the prior written permission of Festo AG & Co.

All technical data subject to change according to technical update.


















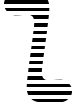


Ahead by lengths – with a smaller cross section

The future is once again within your grasp. So take the time to fully understand the benefits of Fluidic Muscle technology. Include these in your calculations and take advantage of them for your own benefit,

irrespective of the department in which you deal with pneumatic products. The Fluidic Muscle will bring about a small revolution in your workplace, one that you can look forward to.

	Benefits for Designers	Benefits for Buyers
1. Contraction Membrane pre-assembled or by the metre	<ul style="list-style-type: none"> – Three different diameters and eight variable configurations – Convenient sizing and simple X-lengths – Problem-free replacement 	<ul style="list-style-type: none"> – Reduced costs thanks to ready assembled design
2. Excellent price/performance ratio	<ul style="list-style-type: none"> – Maximum flexibility thanks to variable length and wide range of accessories, – Reduced unit volume, – No slip-stick characteristics – Highly suitable for mobile applications since the rolled-up contraction membrane is easily transportable 	<ul style="list-style-type: none"> – Minimal storage costs thanks to reduced volume of wound-up contraction membrane – Lower follow-up costs thanks to excellent resistance to ageing – Practically no mechanical wear
3. Service and delivery reliability	<ul style="list-style-type: none"> – Less planning requirement thanks to immediately available calculation software on the Festo Homepage – Technical application advice – easily obtainable via E-Mail 	<ul style="list-style-type: none"> – Cost optimisation via quick, global availability ex works – Comprehensive customer service through competent technical consultants available on the spot

Pneumatic Pictograms

-  -	Stroke length	-  -	Service
-  -	Flow rate	-  -	Repair service
-  -	Voltage	-  -	Worldwide service
-  -	Force	-  -	Hotline
-  -	Pressure	-  -	Collection facility
-  -	Temperature range	-  -	Delivery time
-  -	Diameter	-  -	In stock
-  -	Vacuum	-  -	Important
-  -	Width	-  -	Type discontinued
		-  -	New
		-  -	Repairable

Summary of further components

Important components in our product range

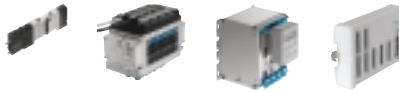
Compressed air preparation

- Service units D series



Control technology

- Individual valves type CPE
- Valve terminal type CPV
- Smart Positioning Controller type SPC200
- Front-End Controller IPC FEC Standard type FC640



Long linear movement

- Rodless cylinder type DGPL
- Electric toothed-belt drive type DGE
- Standard cylinder type DNC and type DSNU



Short linear movement

- Linear module type HMP
- Guide unit type DFM
- Mini slide type SLT
- Flat slide type SLG
- Linear module type HMPL
- Short-stroke cylinder type ADVC



Rotary movement

- Rotary drive type DRQD
- Swivel module type DSM
- Swivel/linear module type DSL



Gripping, mechanical ...

- Precision gripper type HGPP
- Micro gripper type HGWM
- Three-point gripper type HGD



... or with vacuum

- Suction gripper type ESG
- Vacuum generator type VADMI
- Vacuum generator type VAD New Line



Connecting and installing

- Basic elements
- Screw connectors
- Restrictors
- Tubing



Parts sorting and testing

- Checkbox family



Further products and details: <http://catalog.festo.com> or consult your Festo technical advisor.

Festo worldwide

Argentina

Festo S.A.
Edison 2392
RA-1640 Martínez
Pcia. de Buenos Aires
Tel. ++54 (0)11/47 17 82 14, Fax 47 17 82 15
E-mail: info_ar@festo.com

Australia

Festo Pty. Ltd.
P.O. Box 261
179-187 Browns Road
AUS-Noble Park Vic. 3174
Tel. ++61 (0)3/97 95 95 55, Fax 97 95 97 87
E-mail: info_au@festo.com

Austria

Festo Gesellschaft m.b.H.
Lützowgasse 14
A-1141 Wien
Tel. ++43 (0)1/91 07 50, Fax 91 07 52 50
E-mail: pneumatic@festo.at

Belgium

Festo Belgium nv/sa
Rue Colonel Bourgstraat 101
B-Brussel 1030 Bruxelles
Tel. ++32 (0)2/702 32 11
Fax 726 90 11
E-mail: belgium@festo.com

Brazil

Festo Automação Ltda.
Rua Giuseppe Crespi, 76
Jardim Santa Emilia
BR-04183-080 São Paulo – SP
Tel. ++55 (0)11/69 69 95 00, Fax 69 47 73 11
E-mail: Linhadireta@festo.com

Bulgaria

Festo Bulgaria EOOD
Tintjava 15 – 17
BG-1113 Sofia
Tel. ++359 (0)2/962 53 06, Fax 962 52 36
E-mail: festopneu@omega.bg

Canada

Festo Inc.
5300 Explorer Drive
CDN-Mississauga, Ontario L4W 5G4
Tel. ++1(0)905/624 90 00, Fax 624 90 01
E-mail: toronto_office@festo.com

Chile

Festo Chile
Mapocho 1901
6500151 Santiago
Tel. ++56 (0)2/6 98 46 55, Fax 6 97 07 96

China

Festo (China) Ltd.
1156 Yunqiao Road
Jinqiao Export Processing Zone
PRC-201206 Pudong, Shanghai
Tel. ++86 (0)21/58 54 90 01, Fax 58 54 03 00
E-mail: festo@online.sh.cn

Colombia

Festo Ltda.
Avenida Eldorado No. 98 – 43
CO-Santafé de Bogotá D.C.
Tel. ++57 (0)1/413 00 88, Fax 415 30 51

Croatia

Festo d.o.o.
Nova Cesta 181
HR-10 000 Zagreb
Tel. ++385 (0)1/619 19 69, Fax 619 18 18
E-mail: festo@zg.tel.hr

Czech Republic

Festo spol. s r.o.
Pod Beláříí 784
CZ-143 00 Praha 4 – Modrany
Tel. ++420 (0)2/61 09 96 11, Fax 61 09 36 34
E-mail: info_cz@festo.com

Denmark

Festo A/S
Islevdalvej 180
DK-2610 Rødovre
Tel. ++45 7021110 90
Fax 88 81 10
E-mail: festo@festo.dk

Estonia

Festo OY AB Eesti Filiaal
Türi 10
EE-11313 Tallinn
Tel. ++372(0)6/50 16 40, Fax 55 81 26
E-mail: festo_eeesti@festo.com

Finland

Festo OY
Mäkituvantie 9
FIN-01511 Vantaa
Tel. ++358 (0)9/87 06 51, Fax 87 06 52 00
E-mail: info.festofi@festo.com

France

Festo E.U.R.L.
5, rue Montgolfier
F-93116 Rosny-sous-Bois Cedex
Tel. ++33 (0)1/49 35 23 23/Fax 49 35 23 33
E-mail: info_fr@festo.com

Germany

Festo AG & Co.
Postfach
D-73726 Esslingen
Ruiter Straße 82
D-73734 Esslingen
Tel. ++49 (0)711/347-0, Fax 347-21 44
E-mail: infoservice@festo.com

Great Britain

Festo Limited
Automation House
Harvest Crescent, Ancells Business Park
GB-Fleet, Hampshire GU13 8XP
Tel. ++44 (0)12 52/77 50 00, Fax 77 50 01
E-mail: enquiry_gb@festo.com

Greece

Festo Ltd.
40 Homosternas Av.
GR-11853 Athens
Tel. ++30 (0)1/34 12 90 04, Fax 341 29 05
E-mail: festogr@hol.gr

Hong Kong

Festo Ltd.
Unit C & D, 7/F, Leroy Plaza 15 Cheung Shun Street
HK-Cheung Sha Wan, Kowloon, Hong Kong
Tel. ++852/ 27 43 83 79, Fax 27 86 21 73
E-mail: info_hk@festo.com

Hungary

Festo Kft.
Bécsi út 100
H-1034 Budapest
Tel. ++36 (0)1/250 00 55, Fax 250 15 93
E-mail: vertr.festo_hu@festo.de

India

Festo Controls
Plot No. 226, Bommasandra Industrial Area
IND-Bangalore 562 158
Tel. ++91 (0) 8110/3359, Fax 3 20 58
E-mail: fecoind@blr.vsnl.net.in

Indonesia

PT. Festo
Jl. Sultan Iskandar Muda No. 68
(Arteri Pondok Indah)
RI-Jakarta Selatan 12240
Tel. ++62 (0)21/726 73 58, Fax 726 73 86
E-mail: festo@rad.net.id

Iran

Festo Pneumatic S.K.
Kh. Ramsar, Ko. Behbahan No. 1
IR-15 Teheran
Tel. ++98 (0)21/882 92 25, Fax 882 21 62
E-mail: festoir@www.dci.co.ir

Ireland

Festo Limited
Unit 5, Sandford Park
Sandford Industrial Estate
IRL-Dublin 18
Tel. ++353 (0)1/295 49 55, Fax 295 56 80
E-mail: sales@festo.ie

Italy

Festo S.p.A.
Via Enrico Fermi 36/38
I-20090 Assago (MI)
Tel. ++39 (0)2/45 78 81, Fax 488 06 20
E-mail: info_it@festo.com

Japan

Festo K.K.
1-26-10 Hayabuchi , Tsuzuki-ku
J-Yokohama 224-0025
Tel. ++81 (0)45/593 56 10, Fax 593 56 78
E-mail: jfesto.festo_jp@festo.com

Korea

Festo Korea Co. Ltd.
470-9 Kasan-dong
Kumchun-ku
ROK-Seoul # 153-053
Tel. ++82 (0)2/850 71 14, Fax 864 70 40
E-mail: info_kr@festo.com

Latvia

Festo SIA
Deglava iela 60
LV-1035 Riga
Tel. ++371 (0)2/57 78 64, Fax 57 79 46
E-mail: festo@apollo.lv

Lithuania

Festo UAB
Karaliaus Mindaugo pr. 22
LT-3000 Kaunas
Tel. ++370 (0)7/32 13 14, Fax 32 13 15
E-mail: administration@festo.lt

Malaysia

Festo Sdn. Berhad
10, Persiaran Industri
Bandar Sri Damansara
Wilayah Persekutuan
MAL-52200 Kuala Lumpur
Tel. ++60 (0)3/632 81 22, Fax 635 64 12
E-mail: sales@festo.com.my

Mexico

Festo Pneumatic S.A.
Av. Ceylán 3
Col. Tequesquahuac
MEX-54020 Tlalnepantla, Edo. de Méx.
Tel. ++52 (0)15/321 66 00, Fax 321 66 65
E-mail: festo_mexico@festo.com

Netherlands

Festo B.V.
Schieweg 62
NL-2627 AN Delft
Tel. ++31 (0)15/251 88 99, Fax 261 10 20
E-mail: info_nl@festo.nl

New Zealand

Festo Limited
20 Fisher Crescent, MT. Wellington
NZ-Auckland
Tel. ++64 (0)9/574 10 94, Fax 574 10 99
E-mail: info.festonz@festo.com

Norway

Festo AB
Østensjøveien 27
N-0661 Oslo
Tel. ++47 (0)22/72 89 50, Fax 72 89 51
E-mail: post@festo.no

Philippines

Festo Inc.
La Fuerza Building, 2241 Pasong Tamo
RP-1231 Makati City/Manila
Tel. ++63 (0)2/815-8171 – 75, Fax 814 07 05-07
E-mail: festo@mydestiny.net

Poland

Festo Sp.zo.o.
Janki k/Warszawy, ul. Mszczonowska 7
PL-05090 Raszyn
Tel. ++48 (0)22/720 41 66, Fax 720 44 76
E-mail: festo@it.com.pl

Rumania

Festo S.R.L.
Str. Sfintul Constantin No. 17
RO-70751 Bucureşti
Tel. ++40 (0)1/310 29 83, Fax 310 24 09
E-mail: festo@canad.ro

Russia

Festo RF 000
Mitschurinskij prosp., 49
RUS-117607 Moskwa
Tel. ++7 (0)95/737 34 85, Fax 737 34 83
E-mail: festo@dol.ru

Singapore

Festo Pte. Ltd.
6 Kian Teck Way
SGP-Singapore 628 754
Tel. ++65 (0)2/264 01 52, Fax 261 10 26
E-mail: festo@pacific.net.sg

Slovakia

Festo spol. sr. o.
Gavlovi cová ul.1
SK-83103 Bratislava
Tel. ++421 (0)7/44 25 02 68, Fax 44 45 38 76
E-mail: festo_sk@festo.com

Slovenia

Festo d.o.o. Ljubljana
IC Trzin, Blatnica 8
SLO-1236 Trzin
Tel. ++386 (0)1/530 21 00, Fax 530 21 25
E-mail: festo@festo.si

South Africa

Festo (Pty.) Ltd.
22-26 Electron Ave.
ZA-Isando 1600
Tel. ++27 (0)11/971 55 00, Fax 974 21 57
E-mail: contact@festo.co.za

Spain

Festo Pneumatic, S.A.
Avda. de la Gran Vía, 159
(Polígono Gran Via Sur)
E-08908 Hospitalet de Llobregat – Barcelona
Tel. ++34 (9)3/261 64 00, Fax 261 64 20
E-mail: info_es@festo.com

Sweden

Festo AB
Stillmångatan 1
S-20021 Malmö
Tel. ++46 (0)40/38 38 00, Fax 18 97 68
E-mail: info@festo.se

Switzerland

Festo AG
Moosmattstrasse 24
CH-8953 Dietikon/Zürich
Tel. ++41 (0)1/744 55 44, Fax 744 55 00
E-mail: info_ch@festo.com

Taiwan

Festo Co., Ltd.
9, Kung 8th Road
Linkou 2nd Industrial Zone, Linkou #244
RC-Taipei Hsien
Tel. ++886 (0)22/601 92 81, Fax 601 92 87
E-mail: festow@festo.com.tw

Thailand

Festo Ltd.
67/1 Phaholyothin Road,
Moo 6, Klong 1, Amphur Klong Luang
THA-Pathumthani 12120
Tel. ++66 (0)2/901 88 00, Fax 901 88 33
E-mail: info@festo.co.th

Turkey

Festo San. ve Tic. A.S.
Fahrettin Kerim Gökay
Cad. No. 281, Özgelik han – Sahray cedid
TR-81080 Kadiköy/Istanbul
Tel. ++90 (0)216/411 44 66, Fax 411 44 74
E-mail: info_tr@festo.com

Ukraine

Festo Ukraina
ul. Borissoglebskaja, 11
UA-254070 Kiev
Tel. ++380 (0)44/239 24 34, Fax 463 70 96
E-mail: festo@gu.kiev.ua

USA

Festo Corporation
395 Moreland Road
USA-Hauppauge, N.Y. 11788
Tel. ++1 (0)631/435 08 00, Fax 435 80 26
E-mail: customer_relations@festo.com

Venezuela

Festo C.A.
Av. 23, Esquina calle 71, No. 22 – 62
Maracaibo, Edo. Zulia
Tel. ++58 (0)61/59 11 20, Fax 59 04 55
E-mail: festoven@telcel.net.ve