

Engineering Tools

FESTO





Table of contents

Brief overview	4
Positioning Drives	6
Pneumatic sizing using ProPneu	8
Vacuum selection	10
Tube selection	12
Air consumption	14
Gripper selection	15
Shock absorber selection	16
Mass moment of inertia	17
Soft Stop	18
Bearing calculation for pneumatic linear drives	19



Saving energy through more efficient design

The design of a system is the starting point for efficient use of energy and a rapid return on investment. This is because every form of energy, be it pneumatic or electric, has specific advantages. Festo has an expert understanding of both technologies and thus you benefit from technology-neutral advice. Tremendous energy saving potentials can be realised during the design phase by using highly efficient software tools for selecting and sizing both electrical and pneumatic drive systems.

Make the most of Festo's extensive experience in energy efficiency for all aspects of design. The engineering tools from Festo enable you to avoid oversizing your components/systems. At the same time, with our software tools you can customise all components and systems optimally to your application.

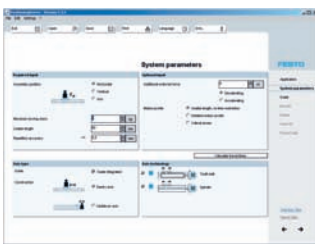
No matter what your requirements are, as a complete service provider, Festo offers the ideal solution for every type of application. Almost all mechanical interfaces between pneumatics and electrics are identical, thus providing a wide variety of combinations. Plug & work simplifies commissioning without the need for special expertise. Know-how and advice are all included.

Note:

You can find all engineering tools described in this brochure in the download area at www.festo.com and in the electronic catalogue.



Brief overview



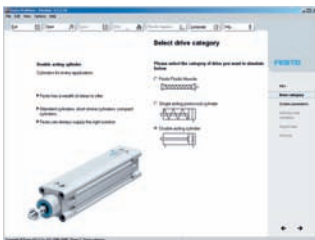
Positioning Drives

Which electro-mechanical linear drive is best suited to your task? Enter the data of your application such as positioning values, working load and mounting position and the software will suggest several optimum solutions.



Tube selection

Simply enter parameters such as working pressure, chemicals and the required resistance to cleaning agents, and the program will instantly calculate the tubing best suited to your application.



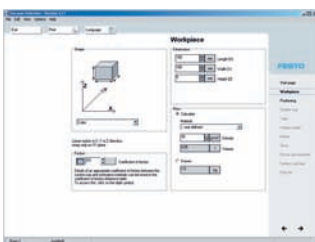
Pneumatic sizing using ProPneu

Accurate simulations replace expensive reality tests. ProPneu is an expert system that helps you to select and configure the entire pneumatic control chain. If a parameter changes, the program will automatically adjust all other parameters.



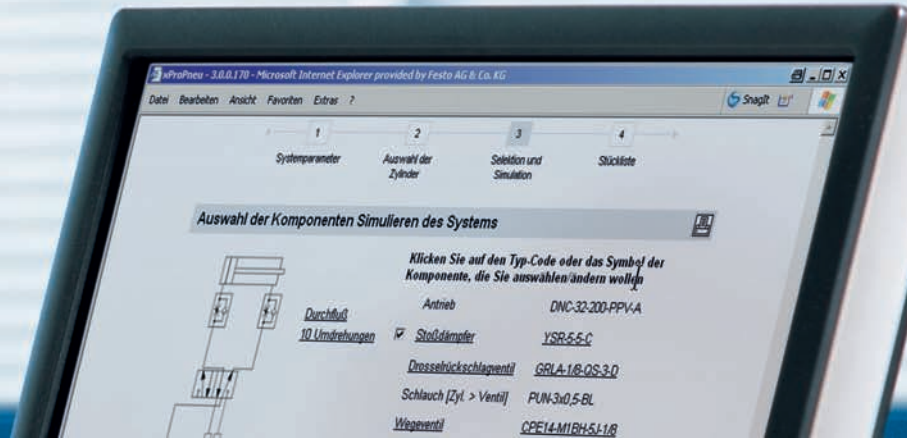
Air consumption

Determine the air consumption of your system quickly and easily. Simply enter all the drives and tubes, set the cycle times and working pressure and the air consumption per minute and per day is calculated. The entry table together with the results is then exported directly to Excel.



Vacuum selection

Which suction cup with which surface for which movement? Don't experiment – calculate! The software tool can even differentiate between linear and rotary movements.



Selecting grippers

Choosing the right gripper is a question of correctly calculating weight, direction of movement, distances, etc. The software tool immediately indicates which size parallel, radial, angle or 3-point gripper best matches your requirement.



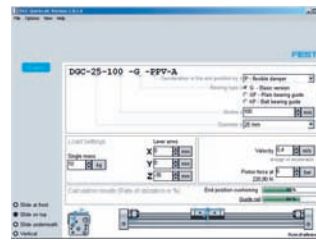
Soft Stop

The rapid Soft Stop makes the virtually impossible possible. Travel times are reduced by as much as 30% for pneumatic drives, and vibration is also greatly reduced. The selection program performs all the necessary calculations.



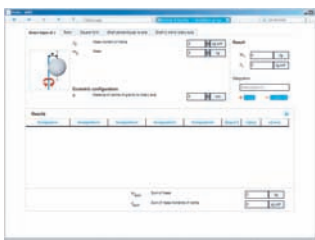
Selecting shock absorbers

Whether diagonal or vertical, curved or straight, lever or disc, all types of cushioned movements are taken into account. The tool always suggests the best shock absorber.



Guide calculation for pneumatic linear drives

Linear drives from Festo are well-known for being able to provide maximum power while taking up minimum space. You specify the project parameters such as mass or force, mounting position and travel and the software tool determines the optimum drive configuration for you.



Mass moment of inertia

Juggling pencils and calculators is now a thing of the past. No matter whether discs, blocks, push-on flanges, grippers etc, this tool does the job of calculating all mass moments of inertia for you. Just save, send or print and you're finished.



PositioningDrives

The PositioningDrives software tool prevents incorrect designs and energy waste thanks to the right choice of components. Designing drive mechanics, gear unit and motor separately increases safety factors, resulting in oversized electronic drive systems and wasted primary energy.

Toothed belt, spindle drives or direct drives, servo motors, stepper motors or DC motors, ball bearing guides or plain-bearing guides – the plethora of different options to choose from presents the user with a major challenge: calculating the correct drive.

The software tool

Once a few application details have been entered, the PositioningDrives software calculates the ideal combination from the widely co-ordinated range of electric linear axes, motors, gear units, controllers and software. By specifying various project parameters, the tool also calculates the load characteristic values for the selected drive quickly and reliably.

A practical example

"Electrical assembly" of a vehicle part:

Load = 12 kg

$s = 0.5$ m

$t = 1$ s

Cycle = 3 s

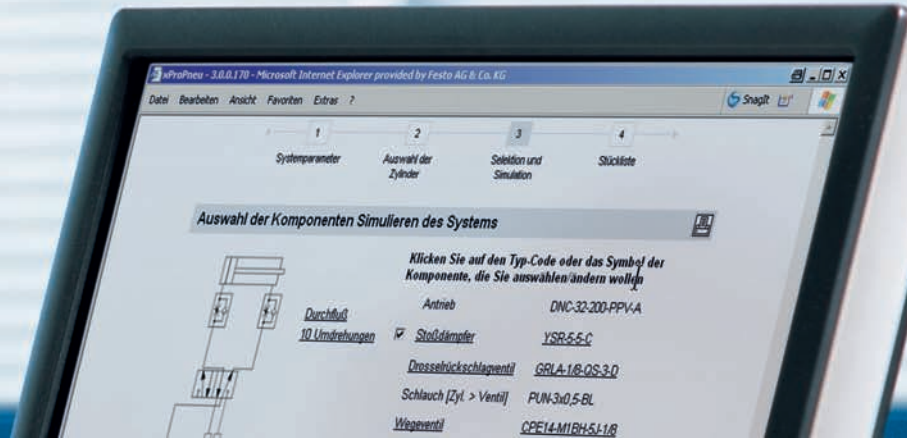
Selection with PositioningDrives

Power consumption 20.67 W,
Consumption p.a. 60.35 kWh

Conventional design

of motor, axis and gear unit as component:

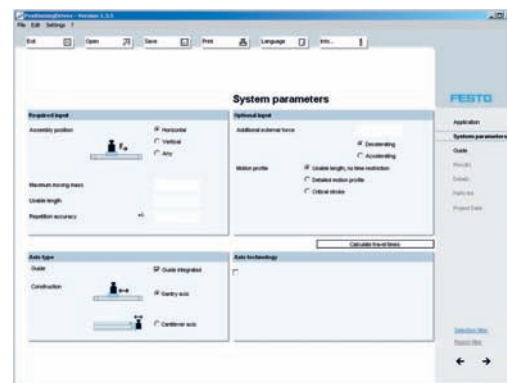
Power consumption 66.81 W,
Consumption p.a. 195.1 kWh



Typical program interfaces

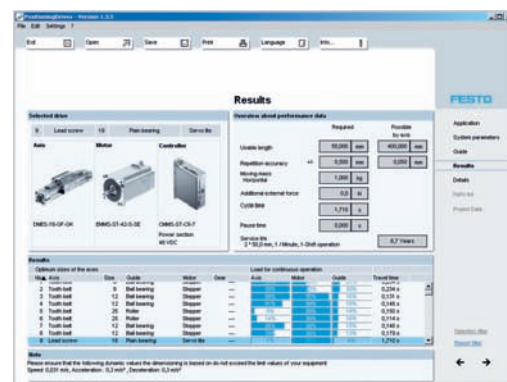
Application parameters

Such as mounting position, load, stroke and accuracy for entry. You also have the option of indicating the required process time and preselecting the drive technology.



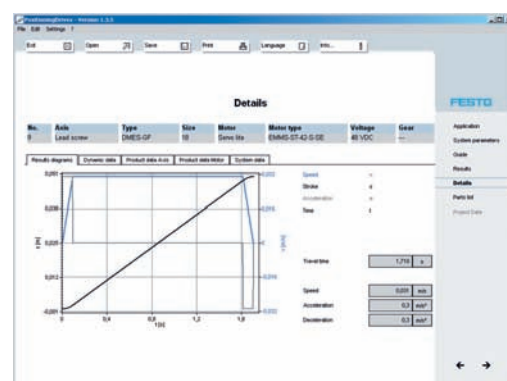
Selecting the required solution package

For easy selection, these are sorted by motor and axis technology, component utilisation, cycle time or the package price.



Detailed results

The program also provides detailed results such as motor characteristic curve, dynamic characteristic values, system data, product data and parts list. These results are saved as a file and can be used for orders and machine documentation.





Pneumatic sizing using ProPneu

From drives to valves, fittings, circuit diagrams and parts lists – complete pneumatic systems can be configured with the smart software ProPneu.

Design and configuration programs for pneumatic drives and systems help you to choose and size your components. When configuring a pneumatic control chain, ProPneu ensures that all the system components are used in the optimum size. Call up, calculate, select – that's all there is to it.

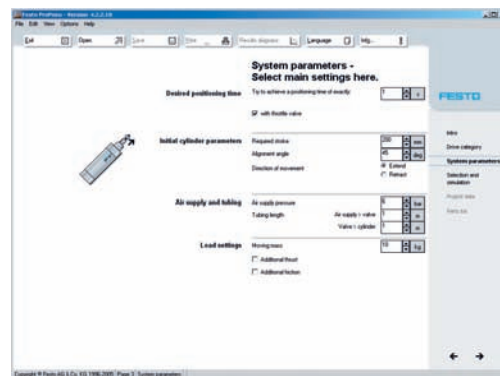
Selecting the simulation cylinder

- Festo Fluidic Muscle
- Single-acting cylinder with piston rod
- Double-acting cylinder



Example with double-acting cylinder

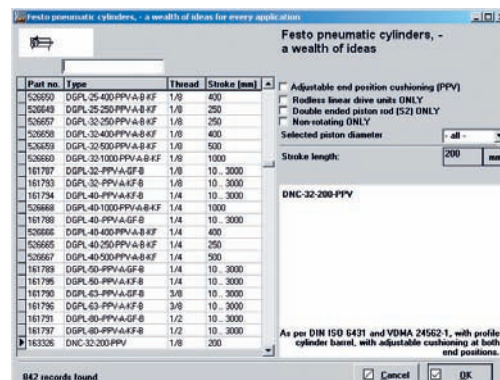
- Expected positioning time
- Travel
- Installation angle
- Direction of movement
- Operating pressure
- Tube length
- Moving mass
- Sensing via additional impact force/frictional force

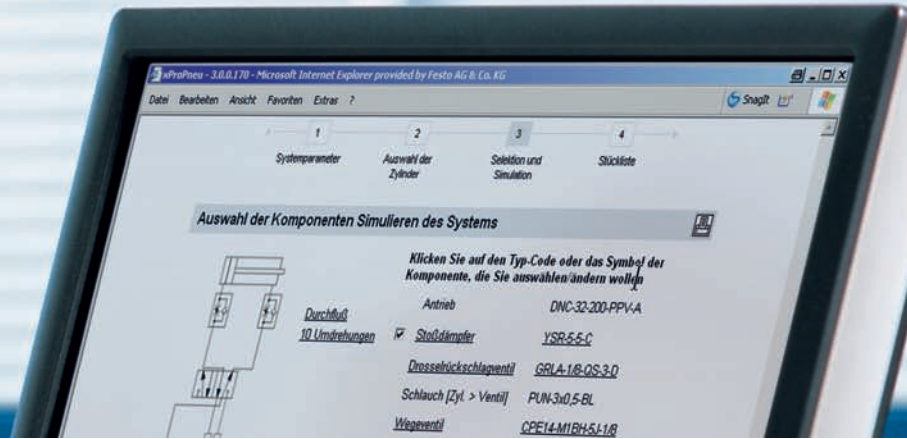


Suggestion for suitable cylinder

Restriction options

- Only adjustable pneumatic end-position cushioning (PPV)
- Only rodless drives
- Only through piston rod (special design S2)
- Only non-rotating
- Selected piston diameter

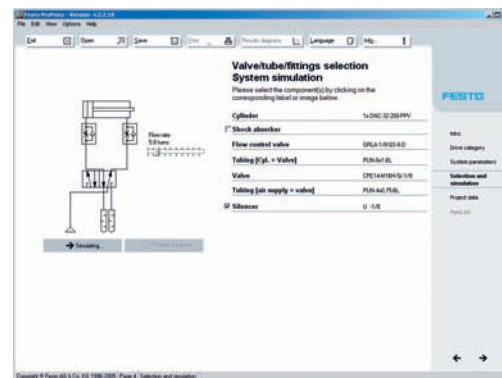




Typical program interfaces

Selection display

- Drive
- Shock absorbers
- One-way flow control valve
- Tubing (cylinder -> valve)
- Directional control valve
- Tubing (source -> valve)
- Silencers
- Optionally: shock absorber selection
- Sequence simulation: you can now control the flow and simulate the sequence



Output

The following output appears after the simulation

- Total positioning time
- Average speed
- Impact velocity of shock absorbers
- Maximum speed
- Medium air consumption
- Minimum air consumption
- Converted energy (YSR)

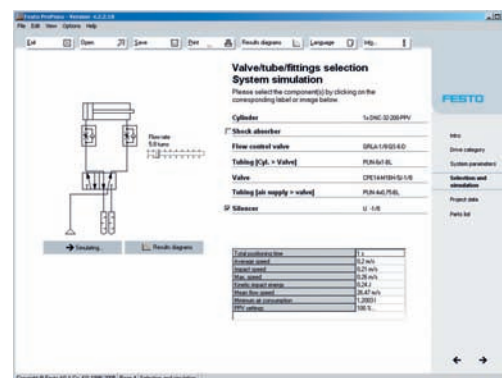


Diagram output

- Speed/travel (time diagram)
- Pressure/acceleration (time diagram)



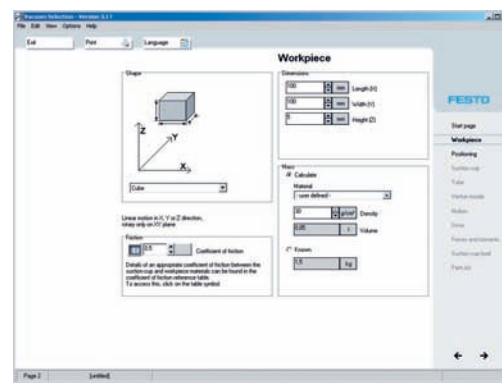


Vacuum selection

Handling parts with vacuum technology is a relatively simple and cost-saving method. The vacuum selection program helps you to choose the correct components such as suction cups, tubes and vacuum generators. The program also calculates the distribution of forces on the individual suction cups and the evacuation time. In addition, it answers the question: which surface for which movement?

Data on the workpiece

- Form and dimensions
- Load
- Frictional value



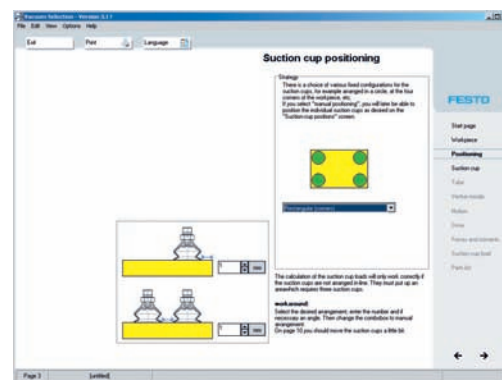
Selecting suction configuration

From circular or square to manual configuration, the program provides everything you need to operate your applications perfectly.

Next steps

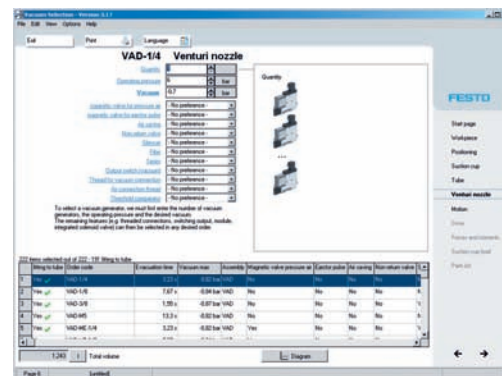
(not illustrated)

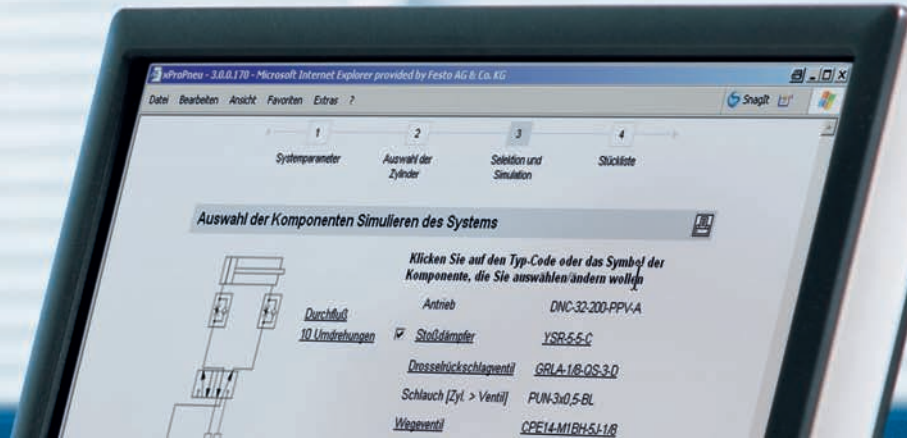
- Suction cup selection
- Tube selection



Venturi nozzle

- Number
- Operating pressure
- Vacuum
- Electrical actuation of compressed air supply
- Electrical actuation of ejector pulse
- Air-saving circuit
- Non-return valve
- Silencers
- Vacuum switch output (NPN/PNP)

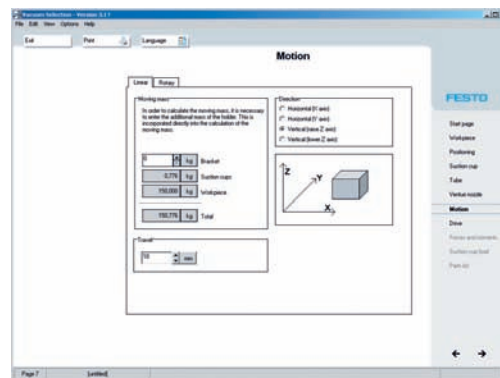




Typical program interfaces

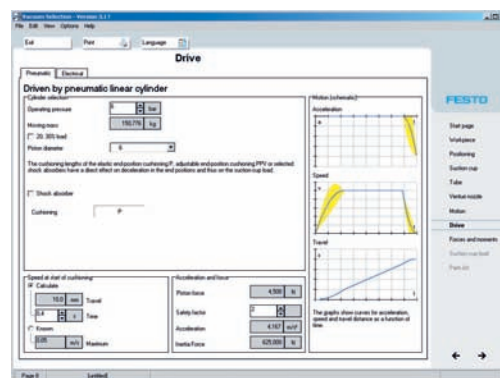
Sensing linear direction of movement

- Moving mass
 - Retainer
 - Travel
- Direction
 - Vertical (lift Z-axis)
 - Vertical (lower Z-axis)
- Travel



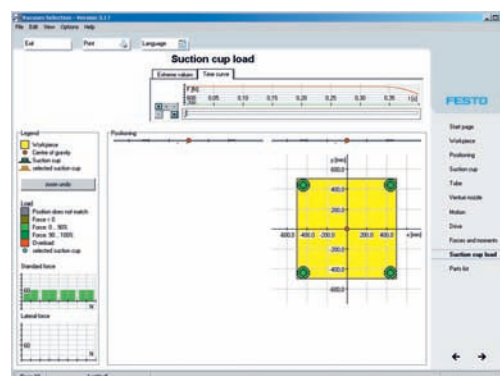
Sensing for the drive

- Pneumatic cylinder or
- Electric linear axis



Suction cup load output

- Normal force
- Lateral force
- Force diagram



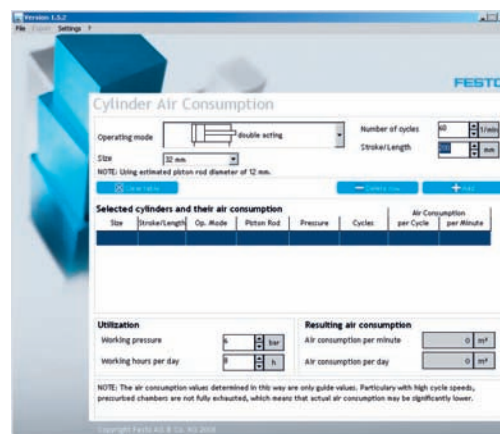


Air consumption

Determine the air consumption of your system quickly and easily. Simply enter all the drives and tubes, set the cycle times and working pressure and the air consumption per minute and per day is calculated. The input table and results can then be exported directly to Excel.

Parameter entry

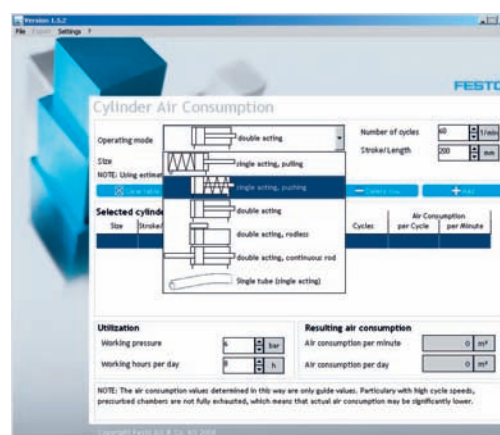
The program enables you to select diverse cylinder functioning modes as well as the tubing. The air consumption is calculated based on the number of cycles or via the stroke. Further parameters such as working pressure and operating hours are also integrated.



Selection option

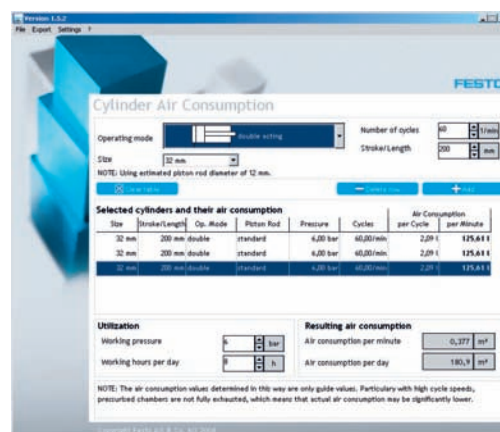
via drop-down menu for:

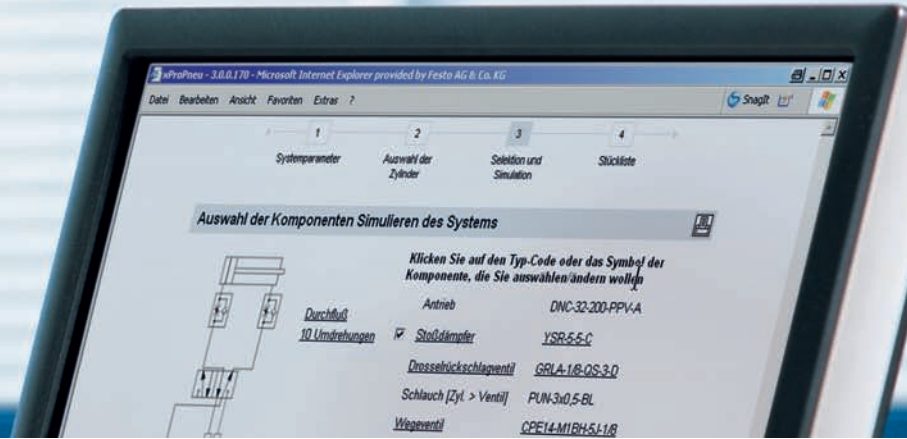
- Single-acting, pulling
- Single-acting, pushing
- Double-acting
- Double-acting, without piston rod
- Double-acting, universal
- Tubing



Result

The added cylinders are indicated in a list, including their air consumption per cycle and per minute. The air consumption per minute and per day is indicated for all additional cylinders.



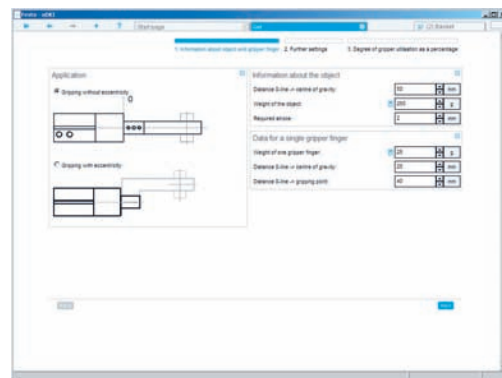


Gripper selection

Choosing the right gripper means calculating weight, direction of movement, distances etc. The tool immediately indicates which parallel, radial, angle or 3-point gripper you need to use and in which size.

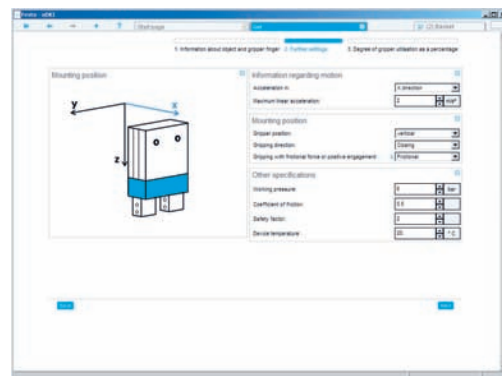
Application parameters

- Selection of the application
 - Gripping without eccentricity
 - Gripping with eccentricity
- Data on the workpiece
 - Distance 0-line/centre of gravity
 - Mass of the workpiece
 - Required stroke
- Data on the gripper finger
 - Distance 0-line/centre of gravity (pressure point)



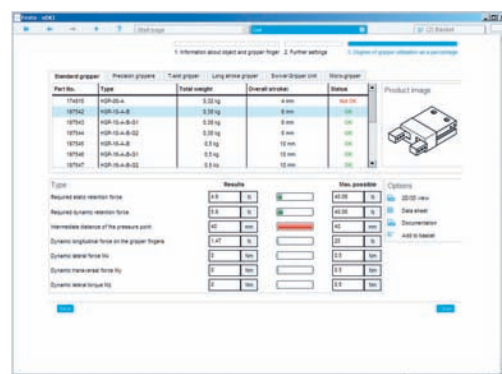
Data on the movement (x, y or z direction)

- Largest linear acceleration (m/s^2)
- Position of the gripper
- Gripping action
- Gripping with frictional or positive locking
- Operating pressure
- Coefficient of friction
- Safety factor
- Device temperature



Result

Suggested optimum gripper and its properties including graph of the capacity utilisation



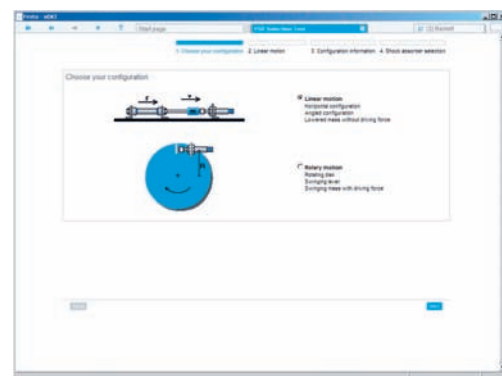


Shock absorber selection

Whether diagonal or vertical, curved or straight, lever or disc, all types of cushioned movements are taken into account. The tool always suggests the correct shock absorber.

Selection of the corresponding application

- Linear motion
- Rotary motion



Application specification

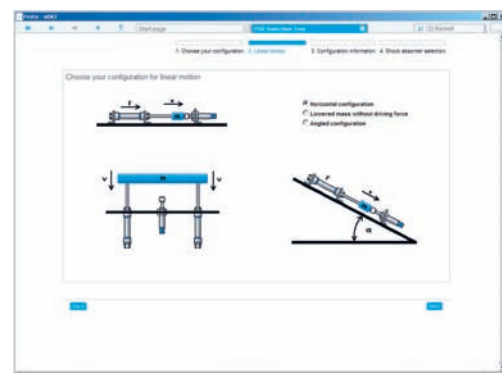
(Linear motion example)

- Horizontal layout
- Lowered load without drive force

- Oblique layout

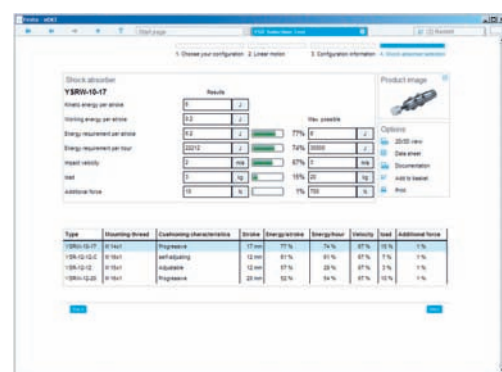
General data such as:

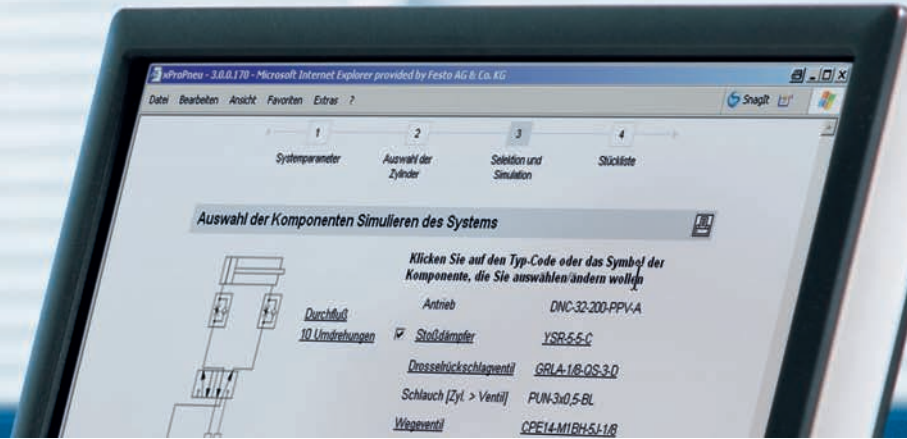
- Moving mass
- Angle
- Additional force
- Impact velocity
- Number of strokes
- Number shock absorbers



Result

Suggested optimum shock absorber including information on performance





Mass moment of inertia

Juggling pencils and calculators is now a thing of the past. No matter whether discs, blocks, push-on flanges, grippers etc: this tool does the job of calculating all mass moments of inertia for you. Just save, send or print and you're finished.

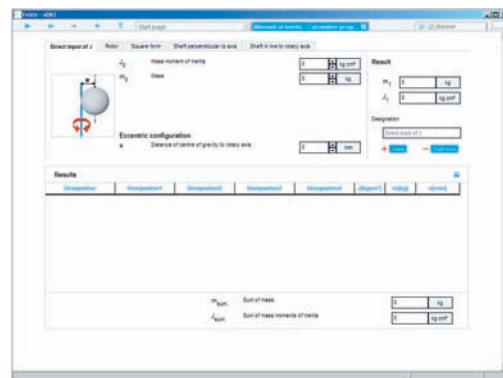
The program calculates:

- Total load (kg)
- Total mass moments of inertia (kg cm²)

The calculation is performed via various selection options.

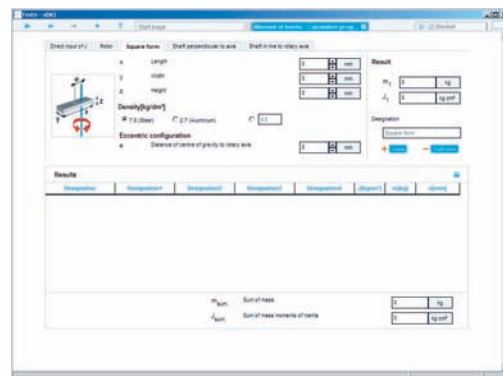
Direct entry

- Mass moment of inertia
- Load
- Distance from the centre of gravity to the axis of rotation



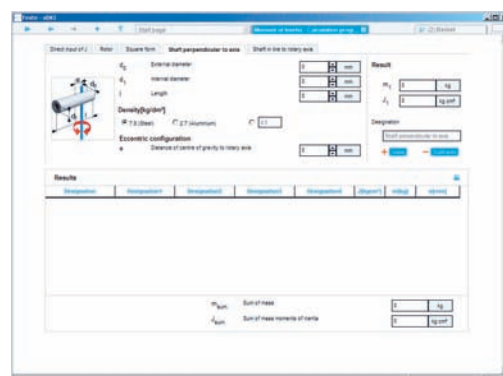
Block

- Length, width, height
- Density
- Distance from the centre of gravity to the axis of rotation



Shaft in-line/right angle to the axis of rotation

- Outer diameter
- Internal diameter
- Length
- Density
- Distance from the centre of gravity to the axis of rotation





Soft Stop

Soft Stop makes the virtually impossible possible. Travel times are reduced by as much as 30% for pneumatic drives, and vibration is also greatly reduced. The corresponding selection program performs all the necessary calculations.

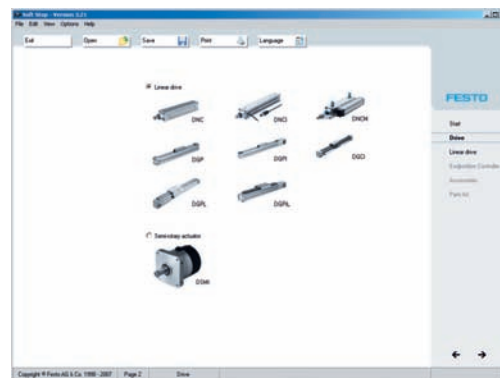
In conjunction with permissible drives, displacement encoders and a proportional valve, the end-position controller SPC11 enables rapid travel to the mechanical end positions. At the same time, the piston or slide of the drive is pneumatically decelerated and immediately accelerated in the opposite direction. The end positions are adjusted via fixed stops. Besides the end positions, the SPC11 can also move to two selectable mid-positions. The end-position cushioning is controlled electronically.

Selection

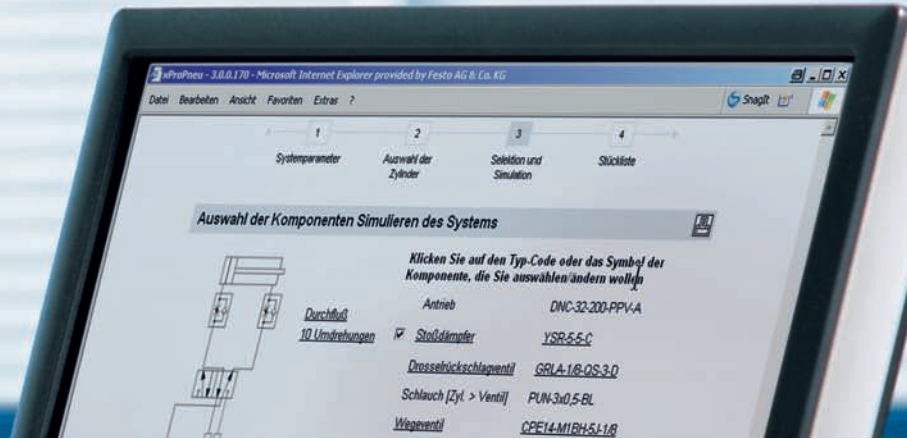
- Linear drive
- Semi-rotary drive

Criteria

- Effective stroke
- End position controller
- Displacement encoder
- and others



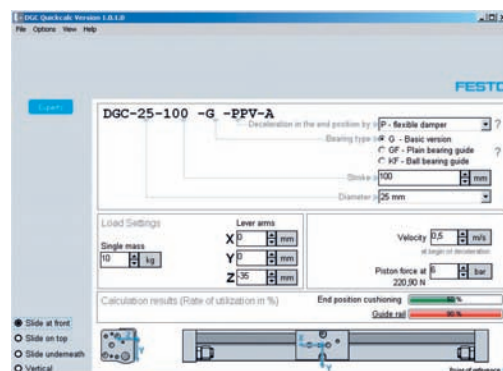
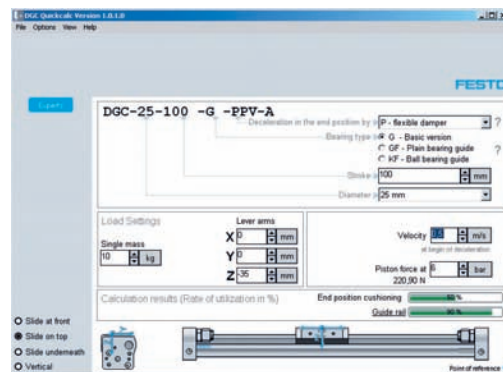
Type	Displacement Controller	End-position Controller	End-position stroke	Guide brackets	Working stroke	Seal buffer	Cushion stop	Cushion	Cushion for B&C
1	DND	SPC11	WFS-2	18	150 mm	yes	without	without	
2	DND	SPC11	WFS-2	18	160 mm	yes	without	without	
3	DND	SPC11	WFS-2	18	220 mm	yes	without	without	
4	DND	SPC11	WFS-2	18	280 mm	yes	without	without	
5	DND	SPC11	WFS-2	18	350 mm	yes	without	without	
6	DND	SPC11	WFS-2	18	450 mm	yes	without	without	
7	DND	SPC11	WFS-2	18	500 mm	yes	without	without	



Bearing calculation for pneumatic linear drives

Linear drives of the type DGC are well known for being able to provide maximum power while taking up minimum space. You specify the project parameters such as mass or force, mounting position and travel and the software tool determines the optimum drive configuration for you.

If you enter the stroke, diameter, speed and piston force as well as the individual load and distances/lever arm, the software will calculate the percentage of capacity utilised by the end-position cushioning and the guide.



Festo worldwide

Argentina

Festo S.A.
Edison 2392
(B1640 HRV) Martinez
Prov. Buenos Aires
Tel. ++54 (0)11/47 17 82 00, Fax 47 17 82 82
E-mail: info_ar@festocom.com

Australia

Festo Pty. Ltd.
Head Office (Melbourne)
179-187 Browns Road, P.O. Box 261
Noble Park Vic. 3174
Call Toll Free 1300 88 96 96
Fax Toll Free 1300 88 95 95
Tel. ++ 61(0)3/97 95 55 55, Fax 97 95 97 87
E-mail: info_au@festocom.com.au

Austria

Festo Gesellschaft m.b.H.
Linzer Straße 227
1140 Wien
Tel. ++43 (0)1/91 07 50, Fax 91 07 52 50
E-mail: info_at@festocom.com

Belarus

IP Festo
Minsk, 220035
Mascherov Prospekt, 78, Belarus
Tel. ++375 (0)17/204 85 58, Fax 204 85 59
E-mail: info_by@festocom.com

Belgium

Festo Belgium sa/nv
Rue Colonel Bourg 101
1030 Bruxelles/Brussel
Tel. ++32 (0)2/702 32 11, Fax 702 32 09
E-mail: info_be@festocom.com

Brazil

Festo Automação Ltda.
Rua Guiseppe Crespi, 76
KM 12,5 - Via Anchieta
04183-080 Sao Paulo SP-Brazil
Tel. ++55 (0)11/50 13 16 00, Fax 50 13 18 68
E-mail: info_br@festocom.com

Bulgaria

Festo Bulgaria EOOD
1592 Sofia
9, Christophor Kolumb Blvd.
Tel. ++359 (0)2/960 07 12, Fax 960 07 13
E-mail: info_bg@festocom.com

Canada

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

Chile

Festo S.A.
Mapocho 1901
6500151 Santiago de Chile
Tel. ++56 (0)2/690 28 00, Fax 695 75 90
E-mail: info_chile@cl.festocom.com

China

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

Colombia

Festo Ltda.
Avenida El Dorado No. 98-43
Bogotá
Tel. ++57 (0)1/404 80 88, Fax 404 81 01
E-mail: festo@festocom.com.co

Croatia

Festo d.o.o.
Nova Cesta 181
10000 Zagreb
Tel. ++385 (0)1/619 19 69, Fax 619 18 18
E-mail: info_hr@festocom.com

Czech Republic

Festo, s.r.o.
Modranska 543/76
147 00 Praha 4
Tel. ++420 261 09 96 11,
Fax ++420 241 77 33 84
E-mail: info_cz@festocom.com

Denmark

Festo A/S
Islevdalvej 180
2610 Rødovre
Tel. ++45 70 21 10 90, Fax ++45 44 88 81 20
E-mail: info_dk@festocom.com

Estonia

Festo OY AB Eesti Filiaal
Laki 11B
12915 Tallinn
Tel. ++372 666 15 60, Fax ++372 666 15 61
E-mail: info_ee@festocom.com

Finland

Festo OY
Mäkituvantie 9, P.O. Box 86
01511 Vantaa
Tel. ++358 (09)/87 06 51, Fax 87 06 52 00
E-mail: info_fi@festocom.com

France

Festo Eurl
Numéro Indigo Tel. 0820/204640, Fax 204641
ZA des Maisons Rouges
8 rue du Clos Sainte Catherine
94367 Bry-sur-Marne cedex
Tel. ++33 (0)1/48 82 64 00, Fax 48 82 64 01
E-mail: info_fr@festocom.com

Germany

Festo AG & Co. KG
Postfach
73726 Esslingen
Rüter Straße 82
73734 Esslingen-Berkheim
Tel. ++49 (0)711/34 70, Fax 347 21 44
E-mail: info_de@festocom.com

Greece

Festo Ltd.
Hamosfernas 40
11853 Athens
Tel. ++30 210/341 29 00, Fax 341 29 05
E-mail: info_gr@festocom.com

Hong Kong

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

Hungary

Festo Kft.
Csillaghegyi út 32-34.
1037 Budapest
Tel. ++36 (06)1/250 00 55, Fax 250 15 93
E-mail: info_hu@festocom.com

India

Festo Controls Private Ltd.
237B,
Bommasandra Industrial Area,
Bangalore Hosur Highway,
Bangalore 560 099
Tel. ++91 (0)80/22 89 41 00, Fax 783 20 58
E-mail: info_in@festocom.com

Indonesia

PT. Festo
Jl. Sultan Iskandar Muda No.68
Arteri Pondok Indah
Jakarta 12240
Tel. ++62 (0)21/27 50 79 00, Fax 27 50 79 98
E-mail: info_id@festocom.com

Iran

Festo Pneumatic S.K.
#1, Behbahan St. Ramsar ave
Tehran 1581975411
Tel. ++98 (0)21/88 82 92 25, Fax 882 21 62
E-mail: info_ir@festocom.com

Ireland

Festo Limited
Unit 5 Sandyford Park
Sandyford Industrial Estate
Dublin 18
Tel. ++ 353(0)1/295 49 55, Fax 295 56 80
E-mail: info_ie@festocom.com

Israel

Festo Pneumatic Israel Ltd.
P.O. Box 1076, Ha'atzma'ut Road 48
Yehud 56100
Tel. ++972 (0)3/632 22 66, Fax 632 22 77
E-mail: info_il@festocom.com

Italy

Festo S.p.A
Via Enrico Fermi 36/38
20090 Assago (MI)
Tel. ++39 02/45 78 81, Fax 488 06 20
E-mail: info_it@festocom.com

Japan

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

Korea South

Festo Korea Co., Ltd.
470-1 Gasan-dong, Geumcheon-gu
Seoul #153-803
Tel. ++82 (0)2/850 71 14, Fax 864 70 40
E-mail: info_kr@festocom.com

Latvia

Festo SIA
Deglava 60
1035 Riga
Tel. ++371 67/57 78 64, Fax 57 79 46
E-mail: info_lv@festocom.com

Lithuania

Festo UAB
Karaliaus Mindago pr. 22
3000 Kaunas
Tel. ++370 (8)7/32 13 14, Fax 32 13 15
E-mail: info_lt@festocom.com

Malaysia

Festo Sdn.Berhad
10 Persiaran Industri
Bandar Sri Damansara, Wilayah Persekutuan
52200 Kuala Lumpur
Tel. ++60 (0)3/62 86 80 00, Fax 62 75 64 11
E-mail: info_my@festocom.com

Mexico

Festo Pneumatic, S.A.
Av. Ceylán 3, Col. Tequesquihuac
54020 Tlalnepantla, Edo. de México
Tel. ++52 (01)55/53 21 66 00, Fax 53 21 66 55
E-mail: festo.mexico@mx.festocom.com

Netherlands

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

New Zealand

Festo Limited
MT, Wellington
Auckland NZ
Tel. ++64 (0)9/574 10 94, Fax 574 10 99
E-mail: info_nz@festocom.com

Norway

Festo AS
Ole Deviksvei 2
0666 Oslo, Norway
Tel. ++47 22 72 89 50, Fax ++47 22 72 89 51
E-mail: info_no@festocom.com

Peru

Festo S.R.L.
Calle Amador Merino Reyna #480, San Isidro
Lima, Perú
Tel. ++51 (0)1/222 15 84, Fax 222 15 95

Philippines

Festo Inc.
KM 18, West Service Road, South Superhighway
1700 Paranaque City, Metro Manila
Tel. ++63 (0)2/776 68 88, Fax 823 42 19
E-mail: info_ph@festocom.com

Poland

Festo Sp. z o.o.
Janki k/Warszawy, ul. Mszczonowska 7
05090 Raszyn
Tel. ++48 (0)22/711 41 00, Fax 711 41 02
E-mail: info_pl@festocom.com

Romania

Festo S.R.L.
St. Constantin 17
010217 Bucuresti
Tel. ++40 (0)21/310 29 83, Fax 310 24 09
E-mail: info_ro@festocom.com

Russia

Festo-RF OOO
Michurinskiy prosp., 49
119607 Moscow
Tel. ++7 495/737 34 00, Fax 737 34 01
E-mail: info_ru@festocom.com

Singapore

Festo Pte. Ltd.
6 Kian Teck Way
Singapore 628754
Tel. ++65 62 64 01 52, Fax ++65 62 61 10 26
E-mail: info_sg@festocom.com

Slovakia

Festo spol. s r.o.
Gavlovcová ul. 1
83103 Bratislava 3
Tel. ++421 (0)2/49 10 49 10, Fax 49 10 49 11
E-mail: info_sk@festocom.com

Slovenia

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

South Africa

Festo (Pty) Ltd.
22-26 Electron Avenue, P.O. Box 255
Isando 1600
Tel. ++27 (0)11/971 55 00, Fax 974 21 57
E-mail: info_za@festocom.com

Spain

Festo Pneumatic, S.A.
Tel.: 901243660 Fax: 902243660
Avenida Granvia, 159
Distrito económico Granvia L'H
ES-08908 Hospitalet de Llobregat, Barcelona
Tel. ++ 3493/261 64 00, Fax 261 64 20
E-mail: info_es@festocom.com

Sweden

Festo AB
Ställmångatan 1, P.O. Box 21038
20021 Malmö
Tel. ++46 (0)40/38 38 40, Fax 38 38 10
E-mail: info_se@festocom.com

Switzerland

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

Taiwan

Festo Co., Ltd.
9 Kung 8th Road
Linkou 2nd Industrial Zone, Linkou #244
Taipei Hsien Taiwan
Tel. ++886 (0)2/26 01 92 81, Fax 26 01 92 87
E-mail: info_tw@festocom.com

Thailand

Festo Ltd.
67/1 Moo 6 Phaholyothin Road
Klong 1, Klong Luang,
Pathumthani 12120
Tel. ++66 29 01 88 00, Fax ++66 29 01 88 33
E-mail: info_th@festocom.com

Turkey

Festo San. ve Tic. A.S.
Tuzla Mermerciler Organize
Sanayi Bölgesi, 6/18 TR
34956 Tuzla - Istanbul/TR
Tel. ++90 (0)216/585 00 85, Fax 585 00 50
E-mail: info_tr@festocom.com

Ukraine

Festo Ukraina
Borisoglebskaja 11
Kiev 04070
Tel. ++380 (0)44/239 24 33, Fax 463 70 96
E-mail: info_ua@festocom.com

United Kingdom

Festo Limited
Applied Automation Centre, Caswell Road
Brackmills Trading Estate
Northampton NN4 7PY
Tel. ++44 (0)1604/66 70 00, Fax 66 70 01
E-mail: info_gb@festocom.com

United States

Festo Corporation (New York)
Call Toll-free 800/993 3786
Fax Toll-free 800/963 3786
395 Moreland Road, P.O.Box 18023
Hauppauge, N.Y. 11788
Tel. ++ 1(0)314/770 01 12, Fax 770 16 84
E-mail: info_us@festocom.com

Venezuela

Festo C.A.
Av. 23, Esquina calle 71, No. 22-62
Maracaibo, Edo. Zulia
Tel. ++58 (0)261/759 09 44, Fax 759 04 55
E-mail: festo@festocom.com.ve