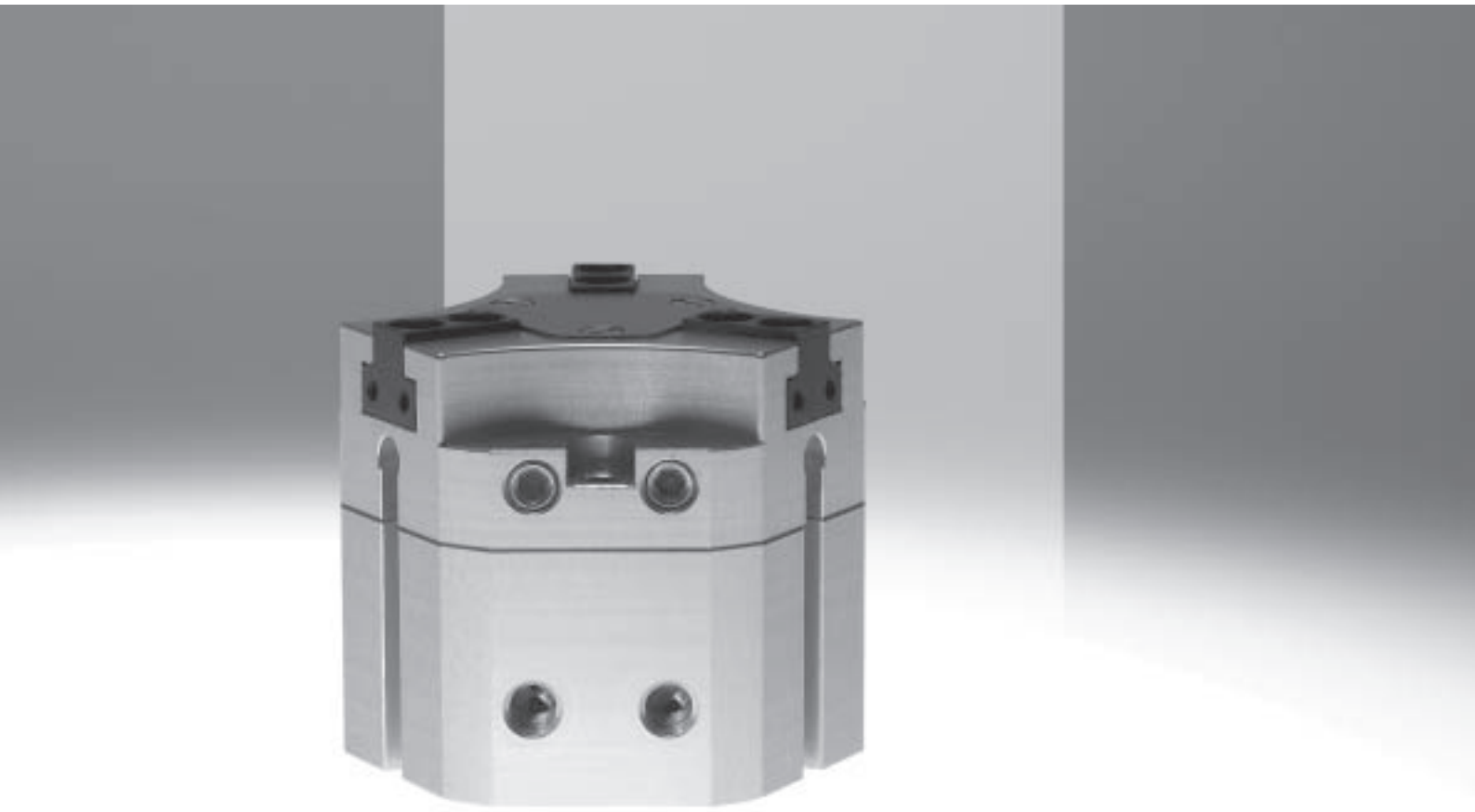
Parallel grippers HGPT, HGPL and Three-point grippers HGDT

FESTO



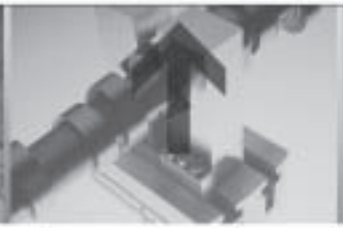
Heavy-duty grippers
for mechanical engineering

Info 139

HGPT, HGPL, HGDT: sturdy, reliable and versatile



HGPT: for sturdy parallel gripping



HGPL: ideal for long strokes



HGDT: very high load capacity

3 grippers – 1 convincing concept

Space-saving design
Low-cost SM...-10 proximity sensors are fully integrated into the housing.

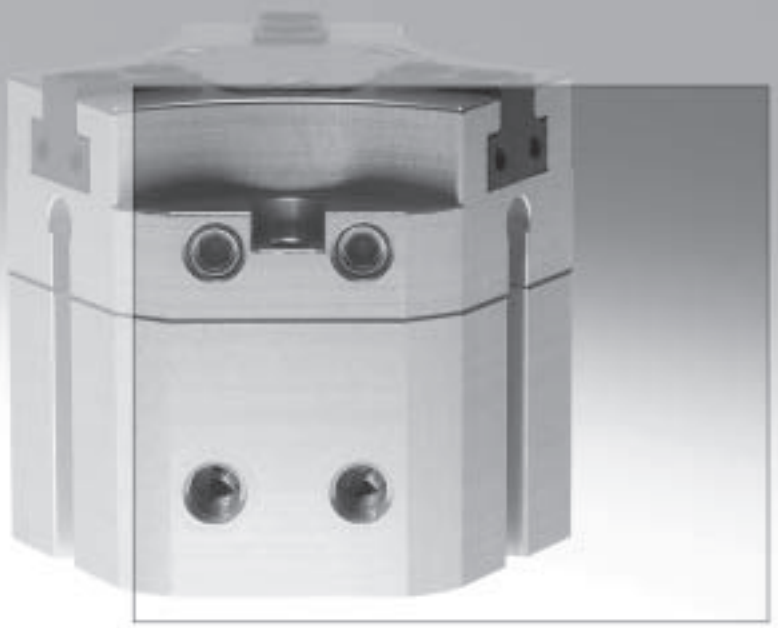
Team players
Free and easy combination with a wide range of drives from the Festo modular handling system, for example slides, handling axes and rotary drives.

Simple choice
Easy selection and sizing thanks to the software tool available with the digital catalogue.

Sturdy
Can cope with very high forces and torsional loads thanks to precision ground and paired T-slots. The HGPT and HGDT use sealing air to protect against the ingress of soluble oil and dust.

Versatile
Mounting options on different sides permit maximum freedom in design. Gripping force retention, for example in the case of multiple gripping of plates, further increases flexibility: for single-acting operation, two or more grippers can be installed more quickly.

Reliable
HGPT and HGDT are ideal for dynamic applications: thanks to gripping force retention, the grippers hold the workpiece securely in the event of a pressure drop. If more gripping force is needed for the gripping process, the spring force adds to the gripping force – there is no need to choose the next gripper size!



	Advantages for designers	Advantages for purchasers
High gripping forces and high load capacity	• Reliable, even under the most difficult operating conditions	• Reduced follow-up costs through long service life • Excellent value for money
Sturdy housing with integrated sensor slots	• Reliable sensing via low-cost slot fitting sensors • Easy installation of the sensors • High process reliability, as there are no switch lugs protruding from the housing • Maintenance-free operation under normal conditions • Very easy maintenance under difficult operating conditions	• Cost savings through low wear and long service life • Low-cost sensing option using standard proximity sensors SM...-10
Fully compatible with the modular handling and assembly system	• Quick and easy system integration thanks to clearly defined interfaces	• Everything from a single source means reduced logistics
Demand-driven, customer-specific solutions	• Inductive sensors for gripper jaw sensing and heat-resistant designs in the case of HGPT and HGDT • Single-acting design for gripping force retention or gripping force support in the case of HGPL	• Festo offers the right technical solution for virtually every application at the most economical price

HGPT, HGPL and HGDT: giving you a threefold advantage



HGPT



HGPL



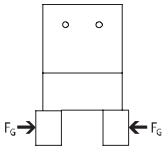
HGDT

Forces at the gripper

Basic principles

Calculation tools for determining gripping force

What is meant by gripping force?



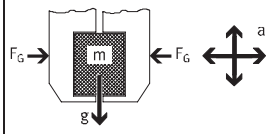
Action = Reaction
The gripping force F_G refers to the gripping force per gripper jaw.

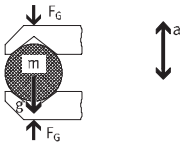
When selecting a gripper you need to determine the gripping force required to hold a workpiece of mass m [kg] and move this workpiece at an acceleration of a [m/s²].

How does the gripping force act in the case of 2-jaw grippers?

Parallel, radial and angle grippers

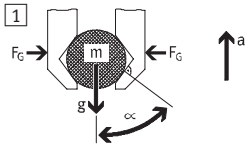
Mechanical locking

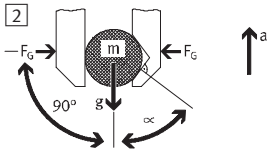




$$F_G = m \times (g + a) \times S$$

Mechanical locking with V-gripper

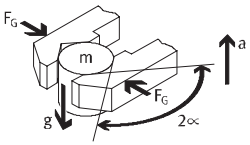




1
$$F_G = \frac{m \times (g + a)}{2} \times \tan\alpha \times S$$

2
$$F_G = m \times (g + a) \times \tan\alpha \times S$$

Frictional locking

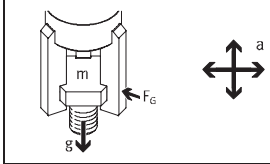


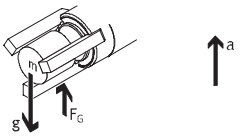
$$F_G = \frac{m \times (g + a)}{2 \times \mu} \times \sin\alpha \times S$$

How does the gripping force act in the case of 3-jaw grippers?

Three-point gripper

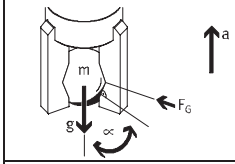
Mechanical locking





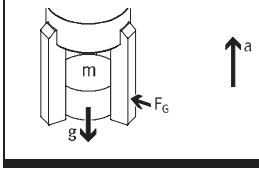
$$F_G = m \times (g + a) \times S$$

Mechanical locking with V-gripper



$$F_G = \frac{m \times (g + a)}{3} \times \tan\alpha \times S$$

Frictional locking



$$F_G = \frac{m \times (g + a)}{3 \times \mu} \times S$$

F_G Required gripping force [N] per gripper jaw

For angle and radial grippers, gripping force F_G must be converted to gripping torque M_G.

r, x Distance between the gripper zero point and the gripping point (lever arm)
➔ Catalogue specifications: "Gripping force as a function of the lever arm"

$$M_G = F_G \times r$$

m Workpiece mass [kg]

g Acceleration due to gravity (≈ 10 m/s²) is required if acting against the acceleration a

a Acceleration [m/s²] arising from the dynamic movement

S Safety factor

α Angle of V-gripper finger

μ Coefficient of friction between gripper finger and workpiece

Forces at the gripper

Basic principles

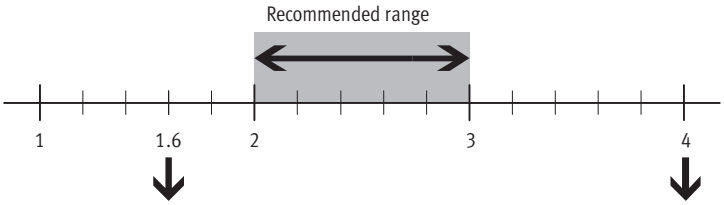
Max. acceleration values with different drive types

Peak acceleration values occur:

- In an emergency stop
- Shortly before the end position is reached

Drive function	Pneumatic			Servopneumatic	Electrical		
	with fixed cushioning	with adjustable cushioning	with shock absorber		Axis with toothed belt	Axis with spindle	with linear motor
Max. acceleration [m/s²]	50 ... 300	10 ... 300	10 ... 300	5 ... 15	0 ... 15	0 ... 6	0 ... 30

Recommended safety factor



- Low dynamic response
- Controlled, static friction factor
- No fluctuation of the compressed air in the system

- High dynamic response
- Considerable variation in the friction factor
- Considerable fluctuation of the compressed air
- Considerable overlap of accelerations (linear/rotary)

Coefficient of friction μ

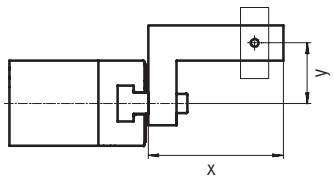
		Workpiece surface				
		ST	STl	AL	ALl	R
Gripper finger surface	ST	0.25	0.15	0.35	0.20	0.50
	STl	0.15	0.09	0.21	0.12	0.30
	AL	0.35	0.21	0.49	0.28	0.70
	ALl	0.20	0.12	0.28	0.16	0.40
	R	0.50	0.30	0.70	0.40	1.00

ST Steel
STl Lubricated steel
AL Aluminium
ALl Lubricated aluminium
R Rubber

Limits of this analysis

Eccentricity y of the centre of gravity of the mass referred to the gripping point

➔ Graphs with grippers in the catalogue
➔ In the electronic catalogue



Calculation program in the electronic catalogue on CD-ROM

Optimum entry of

- Workpiece and gripper finger geometry
- Direction of motion, dynamic response
- Coefficient of friction, pressure, temperature and safety factor



Parallel gripper

Selection aid

FESTO

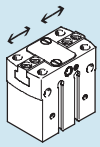
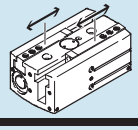
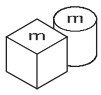
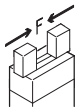
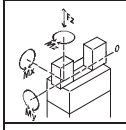
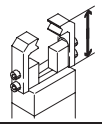
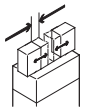
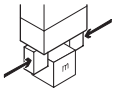
- Note

1) The workpiece mass has been calculated based on the gripping principle "Positive locking with V-gripper" using the variable values specified below.
➔ 4:
– Parallel gripper



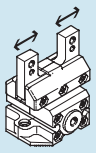
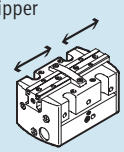
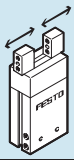
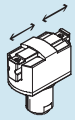
- Variable values:
  – a = 50 m/s²
  – g + a = 60 m/s²
  – α = 45 °
  – tan α = 1
  – S and x ➔ Workpiece mass

2) Possible applications:
- Workpiece retention in case of loss of compressed air
- As a single-acting gripper
- Acts to increase gripping force

Selection criteria/gripper types		Parallel gripper HGPT 	Parallel gripper HGPL 
Workpiece mass[1] [kg] 		Up to 12 kg S = 2 x = 40 mm	Up to 9.7 kg S = 2 x = 40 mm
Gripping force (external gripping) [N] at 6 bar 		F per gripper jaw	
		36 ... 770	80 ... 605
		F total	
		72 ... 1 540	160 ... 1 210
Maximum permissible characteristic load values per gripper jaw 	Fz [N]	4 000	2 500
	Mx [Nm]	140	125
	My [Nm]	120	80
	Mz [Nm]	80	100
Gripper finger length [mm] 		Max. 180	Max. 135
Gripper stroke per gripper jaw [mm] 		3 ... 16	40 ... 80
Repetition accuracy [mm] 		≤ 0.04	≤ 0.03
Gripping force retention[2], opening and closing		■	–
Proximity sensors/sensors for position sensing at the gripper		■	■
Advantages		– Sturdy T-slot – Sealing air – Integrated sensors	– Sturdy T-slot – Adjustable opening stroke – Integrated sensors
Technical data and dimensions			
Further information		➔ 12	➔ 26

Parallel gripper

Selection aid

Selection criteria/gripper types			
Parallel gripper HGPC 	Precision parallel gripper HGPP 	Parallel gripper HGP 	Micro-parallel gripper HGPM 
Workpiece mass[1] [kg]			
Up to 1.05 kg S = 3 x = 40 mm	Up to 6.7 kg S = 2 x = 40 mm	Up to 3.4 kg S = 3 x = 40 mm	Up to 0.17 kg S = 3 x = 10 mm
Gripping force (external gripping) [N] at 6 bar			
F per gripper jaw			
22 ... 63	40 ... 415	10 ... 350	8 ... 14
F total			
44 ... 126	80 ... 830	20 ... 700	16 ... 28
Maximum permissible characteristic load values per gripper jaw			
120	720	380	30
5	50	25	0.5
5	50	25	0.5
5	50	25	0.5
Gripper finger length [mm]			
Max. 60	Max. 160	Max. 100	Max. 30
Gripper stroke per gripper jaw [mm]			
3 ... 7	2 ... 12.5	2 ... 12.5	2 ... 3
Repetition accuracy [mm]			
≤ 0.05	≤ 0.02	≤ 0.04	≤ 0.05
Gripping force retention[2], opening and closing			
■	■	■	–
Proximity sensors/sensors for position sensing at the gripper			
■	■	■	–
Advantages			
– Cost-effective – Integrated sensors	– High precision thanks to gripper jaw with ball bearing guide – Integrated sensors – 3 positions can be sensed	– Dust-protected variant: HGP-16/-25...-SSK – Cost-effective – Integrated sensors	– Single-acting – Compact
Technical data and dimensions			
→ Info 154	→ Info 157	→ Info 116	→ Info 116

Parallel gripper

Selection aid

FESTO

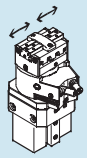
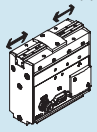
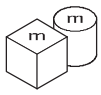
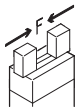
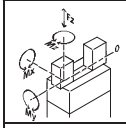
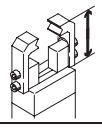
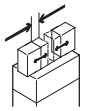
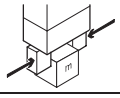
- Note

1) The workpiece mass has been calculated based on the gripping principle "Positive locking with V-gripper" using the variable values specified below.
➔ 4:
– Parallel gripper



- Variable values:
  – a = 50 m/s²
  – g + a = 60 m/s²
  – α = 45 °
  – tan α = 1
  – S and x ➔ Workpiece mass

2) Possible applications:
- Workpiece retention in case of loss of compressed air
- As a single-acting gripper
- Acts to increase gripping force

Selection criteria/gripper types		Swivel/gripper unit HGDS 	Precision proportional parallel gripper HGPPI 
Workpiece mass[1] [kg]		Up to 1.2 kg S = 2 x = 40 mm	Up to 1 kg S = 2 x = 40 mm
Gripping force (external gripping) [N] at 6 bar		F per gripper jaw	
		26 ... 65	10 ... 60 (adjustable)
		F total	
		52 ... 130	20 ... 120 (adjustable)
Maximum permissible characteristic load values per gripper jaw		Fz [N]	60 / 70
		Mx [Nm]	8 / 3
		My [Nm]	8 / 3
		Mz [Nm]	8 / 3
Gripper finger length [mm]		Max. 70	Max. 70
Gripper stroke per gripper jaw [mm]		2.5 ... 7 ↔↔ Swivel angle 0 ... 210° 	0 ... 10 ↔↔ Can be positioned freely and independently
Repetition accuracy [mm]		≤ 0.02	≤ 0.02
Gripping force retention[2], opening and closing		–	–
Proximity sensors/sensors for position sensing at the gripper		■	Absolute displacement encoder
Advantages		– Swivelling and gripping in one unit – Compact – Integrated sensors	– Gripper jaws can be positioned freely and independently – High precision thanks to gripper jaw with ball bearing guide
Technical data and dimensions			
Further information		➔ Info 135	➔ Info 157

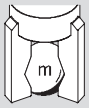
Three-point gripper

Selection aid

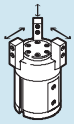
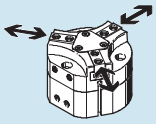
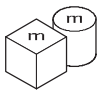
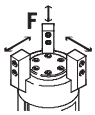
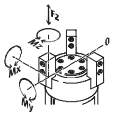
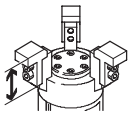
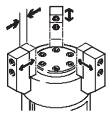
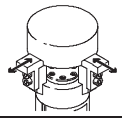
FESTO

- Note

1) The workpiece mass has been calculated based on the gripping principle "Positive locking with V-gripper" using the variable values specified below.
➔ 4:
– Three-point gripper



- Variable values:
  – a = 50 m/s²
  – g + a = 60 m/s²
  – α = 45 °
  – tan α = 1
  – S and r ➔ Workpiece mass

Selection criteria/gripper types		Three-point gripper HGD 	Three-point gripper HGDT 
Workpiece mass[1] [kg]		Up to 3.8 kg S = 3 x = 40 mm	Up to 12.7 kg S = 2 x = 40 mm
Gripping force (external gripping) [N] at 6 bar		F per gripper jaw	
		30 … 300	70 … 550
		F total	
		90 … 900	210 … 1 650
Maximum permissible characteristic load values at the gripper jaw			
	Fz [N]	170	2 500
	Mx [Nm]	5	80
	My [Nm]	8	50
	Mz [Nm]	5	60
Gripper finger length [mm]		Max. 100	Max. 140
Gripper stroke per gripper jaw [mm]		2.5 … 6 	3 … 10 
Repetition accuracy [mm]		≤ 0.04	≤ 0.03
Gripping force retention		–	■
Proximity sensors/sensors for position sensing at the gripper		■	■
Advantages		– Simple, position-centred gripping of perfectly round parts – Integrated sensors	– Sturdy T-slot – Sealing air – Integrated sensors
Technical data and dimensions			
Further information		➔ Info 116	➔ 42

Radial gripper

Selection aid

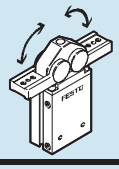
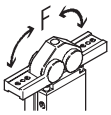
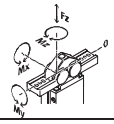
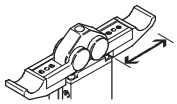
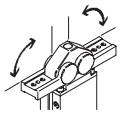
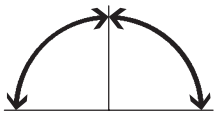
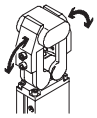
FESTO

- Note

1) The workpiece mass has been calculated based on the gripping principle "Positive locking with V-gripper" using the variable values specified below.
➔ 4:
– Radial grippers



- Variable values:
  – a = 50 m/s²
  – g + a = 60 m/s²
  – α = 45 °
  – tan α = 1
  – s and r ➔ Workpiece mass

Selection criteria/gripper types		
	Radial gripper HGR	
Workpiece mass[1] [kg]		
	Up to 1 kg	S = 3 r = 30 mm
Total gripping torque (external gripping) [Ncm] at 6 bar		
	13 ... 500	
Maximum permissible characteristic load values at the gripper jaw		
	Fz [N]	80
	Mx [Nm]	2
	My [Nm]	10
	Mz [Nm]	7
Gripper finger length [mm]		
	Max. 120	
Gripping angle per gripper jaw [°]		
	–1 ... +90	
Repetition accuracy [mm]		
	≤ 0.1	
Gripping force retention		
		–
Proximity sensors/sensors for position sensing at the gripper		
		■
Advantages		
	– Linear axes can be avoided – Integrated sensors	
Technical data and dimensions		
Further information	➔ Info 116	

Angle gripper

Selection aid

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- Note

1) The workpiece mass has been calculated based on the gripping principle "Positive locking with V-gripper" using the variable values specified below.
➔ 4:
– Angle gripper



- Variable values:
  – a = 50 m/s²
  – g + a = 60 m/s²
  – α = 45 °
  – tan α = 1
  – S and r ➔ Workpiece mass

Selection criteria/gripper types	Angle gripper HGW	Micro-angle gripper HGWM
Workpiece mass[1] [kg]	Up to 2 kg S = 3 r = 30 mm	Up to 0.2 kg S = 3 r = 20 mm
Total gripping torque (external gripping) [Ncm] at 6 bar	22 ... 880	22 ... 64
Maximum permissible characteristic load values at the gripper jaw		
Fz [N]	124	20
Mx [Nm]	5.7	0.4
My [Nm]	2.2	0.4
Mz [Nm]	3.6	0.4
Gripper finger length [mm]	Max. 120	Max. 40
Gripping angle per gripper jaw [°]	–3 ... +18	–4 ... +18
Repetition accuracy [mm]	≤ 0.04	≤ 0.02
Gripping force retention	–	–
Proximity sensors/sensors for position sensing at the gripper	■	–
Advantages	– Sturdy – Cost-effective – Integrated sensors	– Compact – Single-acting
Technical data and dimensions		
Further information	➔ Info 116	➔ Info 116

Parallel grippers HGPT, robust

Key features

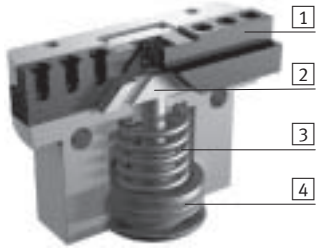
At a glance

The force generated by the linear motion is translated into the gripper jaw movement via a wedge mechanism with guided motion sequence. This also guarantees synchronous movement of the gripper jaw. The virtually backlash-free slideway is realised using ground-in gripper jaws.

Flexible range of applications
- Double-acting gripper
- Compression spring for supplementary or retaining gripping forces
- For use as a single-acting gripper with only one compressed air connection
- Suitable for external and internal gripping

Gripper selection software
www.festo.com/en/engineering

Gripper closed



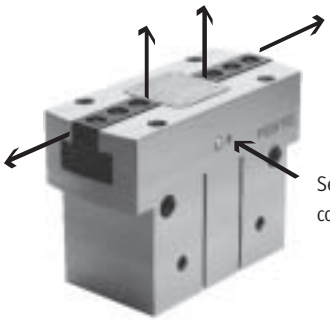
Gripper open



1 Gripper jaw
2 Wedge with restricted guidance
3 Spring
4 Piston with magnet

Sealing air connection

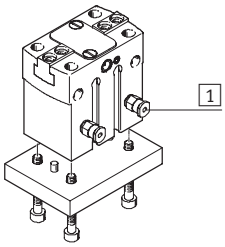
Compressed air flows past the gripper jaw when sealing air (max. 0.5 bar) is connected.
This prevents, for example, particles and soluble cutting oil from entering the gripper jaw guides.



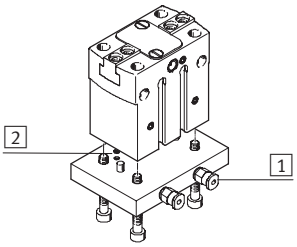
Sealing air connection

Versatile compressed air connections

Direct from the front



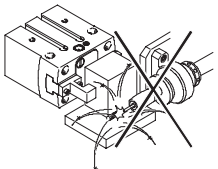
Via adapter plate from underneath



1 Compressed air connections
2 O-rings

Note

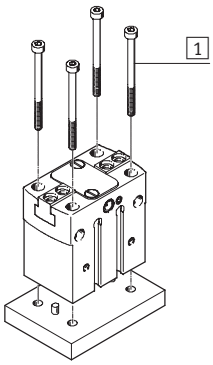
Grippers are not designed for the following application:



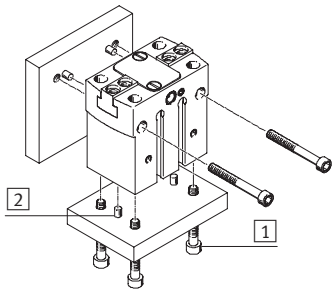
- Welding spatter

Mounting options

Direct mounting from above



from underneath and from the side



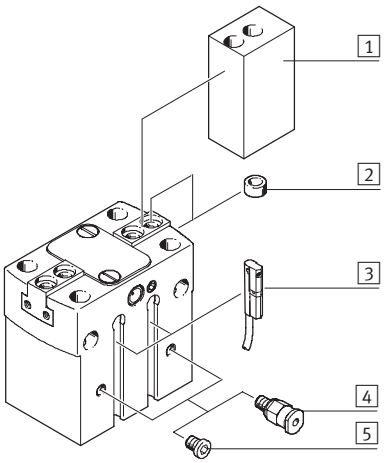
1 Mounting screws
2 Centring pins

Parallel grippers HGPT, robust

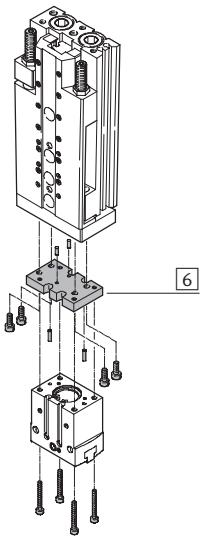
Peripherals overview and type codes

FESTO

Peripherals overview



System product for handling and assembly technology



Accessories

	Type	Brief description	→ Page
1	Unmachined gripper finger BUB-HGPT	Unmachined part specially matched to the gripper jaws for custom building of gripper fingers	24
2	Centring sleeve ZBH	For centring when attaching gripper fingers	25
3	Proximity sensor SME/SMT-10	For sensing the piston position	25
4	Push-in fitting QS	For connecting compressed air tubing with standard external diameters	www.festo.com
5	Blanking plug B	For sealing compressed air connections when using air connections at the front	25
6	–	Drive/gripper connections	www.festo.com

Type codes

HGPT – 16 – A – G1

Type

HGPT	Parallel gripper

Size

Position sensing

A	For proximity sensing

Gripping force retention

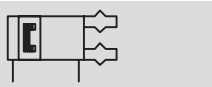
G1	Open
G2	Closed

Parallel grippers HGPT, robust

Technical data

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Function
Double-acting
HGPT-...-A



Single-acting or
with gripping force retention ...
... open HGPT-...-G1



... closed HGPT-...-G2



- ⌀ - Size
16 ... 63 mm

- | - Stroke
6 ... 32 mm



General technical data								
Size		16	20	25	35	40	50	63
Design		Wedge mechanism						
		Guided motion sequence						
Mode of operation		Double-acting						
Gripper function		Parallel						
Number of gripper jaws		2						
Max. applied load per external gripper finger[1]	[N]	0.5	1	1.5	2	2.5	3	4
Stroke per gripper jaw	[mm]	3	4	6	8	10	12	16
Pneumatic connection		M3	M3	M5	M5	M5	G1⁄8	G1⁄8
Pneumatic connection Sealing air		M3	M3	M5	M5	M5	M5	M5
Repetition accuracy[2]	[mm]	< 0.03	< 0.04		< 0.05			
Max. interchangeability	[mm]	0.2						
Max. gripper jaw backlash[3]	[mm]	0.02						
Max. gripper jaw angular backlash	[°]	0.1						
Max. operating frequency	[Hz]	3				2		
Rotational symmetry	[mm]	< ⌀ 0.2						
Position sensing		For proximity sensing						
Type of mounting		Via through-hole and dowel pin						
		Via female thread and dowel pin						
Fitting position		Any						

1) Valid for unthrottled operation
2) End-position drift under constant conditions of use with 100 consecutive strokes in the direction of movement of the gripper jaws
3) In the direction of the gripper jaw movement

Operating and environmental conditions			
Min. operating pressure	HGPT-...-A	[bar]	3
	HGPT-...-G...	[bar]	5
Max. operating pressure		[bar]	8
Operating medium			Filtered compressed air, lubricated or unlubricated
Ambient temperature[1]		[°C]	+5 ... +60
Corrosion resistance class CRC[2]			2

1) Note operating range of proximity sensors
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

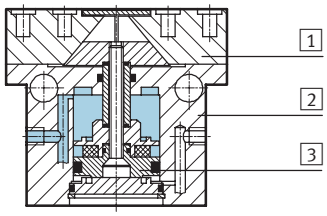
Parallel grippers HGPT, robust

Technical data

Weight [g]							
Size	16	20	25	35	40	50	63
HGPT-...-A	102	183	361	625	1209	1984	3633
HGPT-...-G1	104	186	371	645	1252	2102	3763
HGPT-...-G2	104	186	371	645	1252	2102	3763

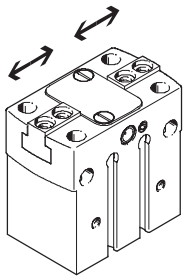
Materials

Sectional view



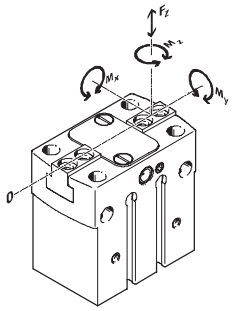
Parallel gripper		
1	Gripper jaw	Hardened steel
2	Housing	Aluminium, coated with CompCote
3	Piston	Gunmetal (red brass)
–	Seals	Nitrile rubber
	Note on materials	Free of copper, PTFE and silicone

Gripping force [N] at 6 bar



Size	16	20	25	35	40	50	63
Gripping force per gripper jaw							
Opening	42	75	110	250	300	480	825
Closing	36	70	100	230	270	440	770
Total gripping force							
Opening	84	150	220	500	600	960	1650
Closing	72	140	200	460	540	880	1540

Characteristic load values at the gripper jaws



The indicated permissible forces and torques refer to a single gripper jaw. The indicated values include the lever arm, additional applied loads caused by the workpiece or external gripper fingers, as well as forces which occur during movement.

The zero coordinate line (gripper finger guide) must be taken into consideration for the calculation of torques.

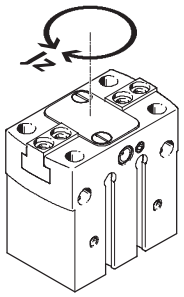
Size		16	20	25	35	40	50	63
Max. permissible force F_z	[N]	200	300	500	900	1500	2500	4000
Max. permissible torque M_x	[Nm]	10	15	30	50	80	100	140
Max. permissible torque M_y	[Nm]	7	10	25	40	60	90	120
Max. permissible torque M_z	[Nm]	5	8	15	30	40	60	80

Parallel grippers HGPT, robust

Technical data

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Mass moment of inertia [kgm²x10⁻⁴]

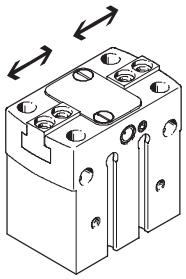


Mass moment of inertia [kgm²x10⁻⁴] for parallel grippers in relation to the central axis with no load.

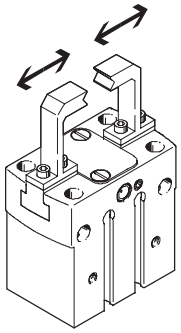
Size	16	20	25	35	40	50	63
HGPT-...-A	0.177	0.391	1.263	3.383	9.673	25.147	74.991
HGPT-...-G1	0.178	0.392	1.272	3.411	9.786	25.460	75.409
HGPT-...-G2	0.178	0.392	1.272	3.411	9.786	25.460	75.409

Opening and closing times [ms] at 6 bar

without external gripper fingers



with external gripper fingers



The indicated opening and closing times [ms] have been measured at room temperature and at 6 bar operating pressure with horizontally mounted gripper without external gripper fingers. The grippers must be throttled for greater applied loads. Opening and closing times must then be adjusted correspondingly.

Size		16	20	25	35	40	50	63
without external gripper fingers								
HGPT-...-A	Opening	20	31	30	40	66	85	150
	Closing	21	31	33	40	61	76	135
HGPT-...-G1	Opening	10	26	30	39	57	65	123
	Closing	44	51	64	92	130	150	282
HGPT-...-G2	Opening	41	52	50	78	100	130	260
	Closing	21	31	30	39	61	70	130
with external gripper fingers as a function of applied load								
HGPT-...	1 N	100	–	–	–	–	–	–
	2 N	200	150	100	–	–	–	–
	3 N	300	250	200	150	100	–	–
	4 N	–	350	300	250	200	150	–
	5 N	–	–	400	350	300	250	200
	6 N	–	–	–	450	400	300	250
	8 N	–	–	–	–	–	450	400
	10 N	–	–	–	–	–	–	500

Parallel grippers HGPT, robust

Technical data

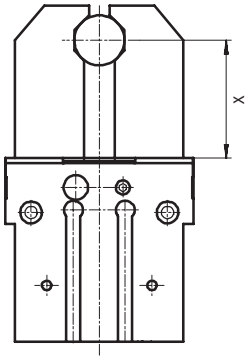
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Max. permissible applied load [N] of the add-on gripper fingers, with unthottled operation

Size	16	20	25	35	40	50	63
HGPT-...-	0.5	1	1.5	2	2.5	3	4

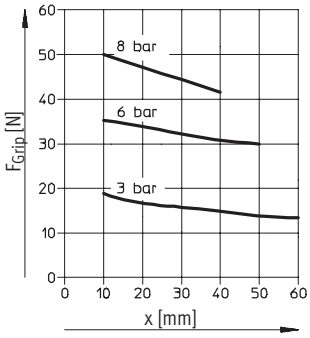
Gripping force F_{Grip} per gripper jaw as a function of operating pressure and lever arm x

Gripping forces related to operating pressure and lever arm can be determined for the various sizes using the following graphs.

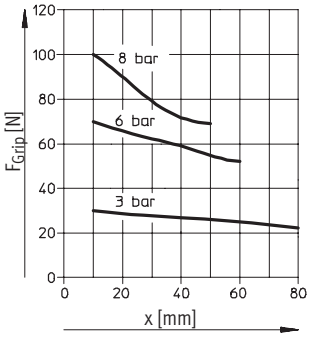


As external gripper: Closing operation

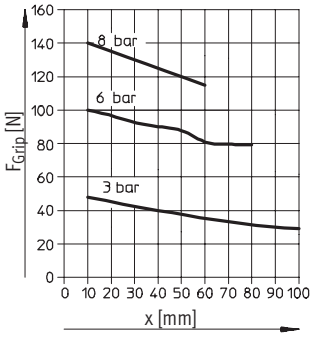
HGPT-16-A



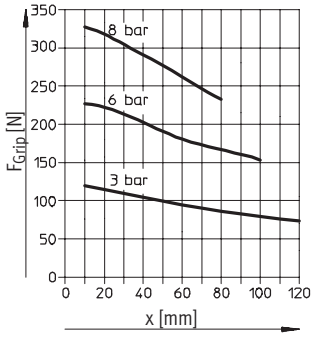
HGPT-20-A



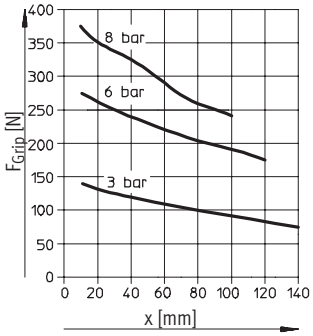
HGPT-25-A



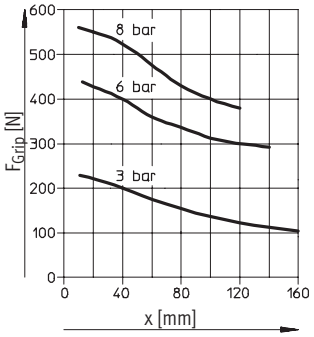
HGPT-35-A



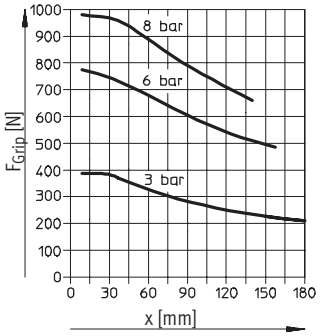
HGPT-40-A



HGPT-50-A

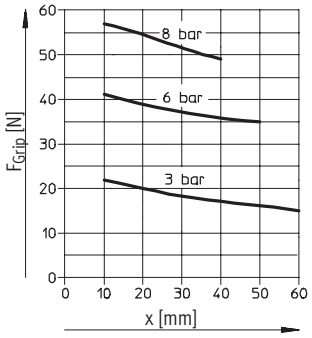


HGPT-63-A

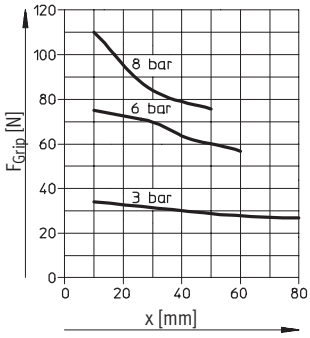


Gripping force F_{Grip} per gripper jaw as a function of operating pressure and lever arm x
As internal gripper: Opening operation

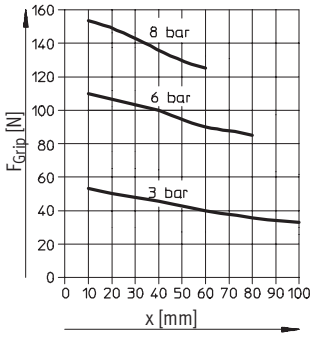
HGPT-16-A



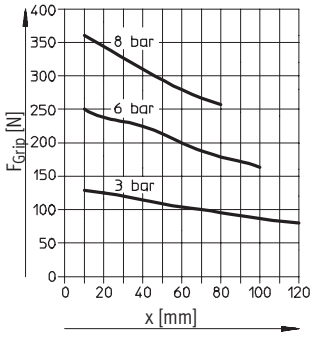
HGPT-20-A



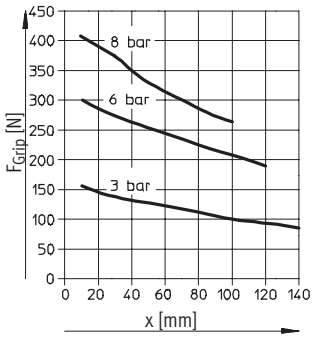
HGPT-25-A



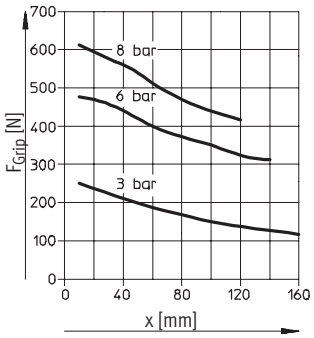
HGPT-35-A



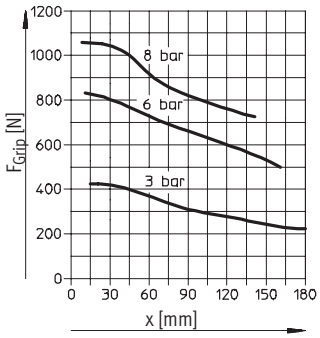
HGPT-40-A



HGPT-50-A



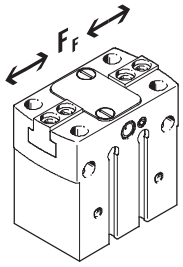
HGPT-63-A



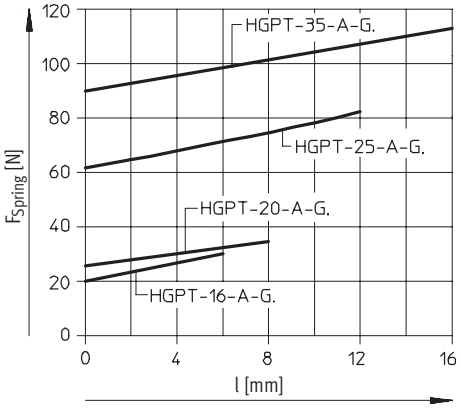
Spring force F_{Spring} as a function of gripper size and overall stroke l

Gripping force retention for HGPT-...-G...

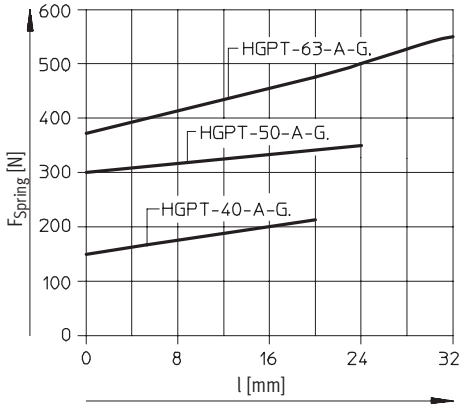
Spring forces F_{Spring} as a function of gripper size and overall stroke l can be determined for the various gripper types (HGPT-...-G...) using the following graphs.



Size 16 ... 35



Size 40 ... 63



The lever arm x must be taken into consideration when determining the actual spring force F_{Stotal}.
The formulae for calculating the spring force are provided in the table opposite.

Size	F_{Stotal} =
16	$-0.2 * x+0.8 * F_{Spring}$
20	$-0.375 * x+0.8 * F_{Spring}$
25	$-0.25 * x+0.8 * F_{Spring}$
35	$-1 * x+0.8 * F_{Spring}$
40	$-0.9 * x+0.8 * F_{Spring}$
50	$-1.36 * x+0.8 * F_{Spring}$
63	$-2.2 * x+0.8 * F_{Spring}$

Determination of the actual gripping forces F_{Gr} for HGPT-...-G1 and HGPT-...-G2 depending on the application

Parallel grippers with integrated spring type HGPT-...-G1 (opening gripping force retention) and HGPT-...-G2 (closing gripping force retention) can be used as:

- single-acting grippers
- grippers with supplementary gripping force and
- grippers with gripping force retention

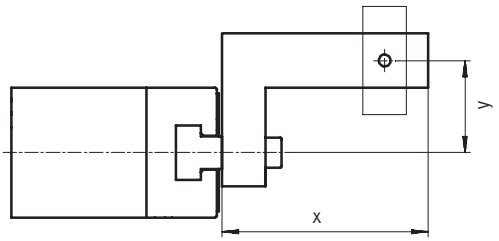
depending on requirements.

In order to calculate available gripping forces F_{Gr} (per gripper jaw), the gripping force (F_{Grip}) and spring force (F_{Stotal}) must be combined accordingly.

Application

Single-acting	Supplementary gripping force	Gripping force retention
• Gripping with spring force: $F_{Gr} = F_{Stotal}$	• Gripping with pressure and spring force: $F_{Gr} = F_{Grip} + F_{Stotal}$	• Gripping with spring force: $F_{Gr} = F_{Stotal}$
• Gripping with pressure force: $F_{Gr} = F_{Grip} - F_{Stotal}$		

Gripping force F_H per gripper jaw at 6 bar as a function of lever arm x and eccentricity y



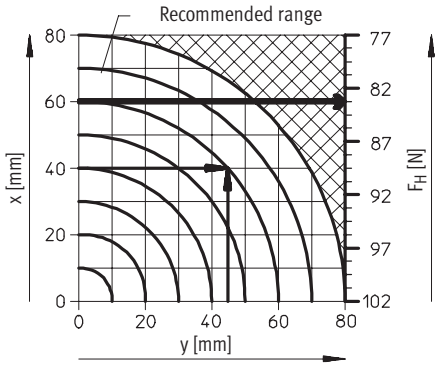
Gripping forces at 6 bar dependent upon eccentric application of force and the maximum permissible off-centre point of force application can be determined for the various sizes using the following graphs.

Calculation example

Given:
Lever arm x = 40 mm
Eccentricity y = 45 mm
To be found:
Gripping force at 6 bar

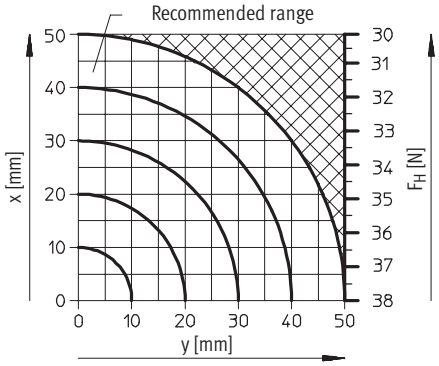
Procedure:
- Determine the intersection xy between lever arm x and eccentricity y in the graph for HGPT-25-A-...
- Draw an arc (with centre at origin) through intersection xy
- Determine the intersection between the arc and the X axis
- Read the gripping force

Result:
Gripping force = approx. 83 N

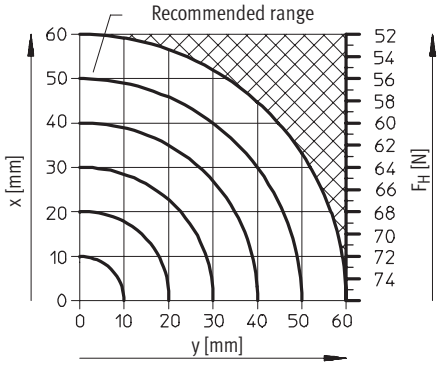


As external gripper: Closing operation

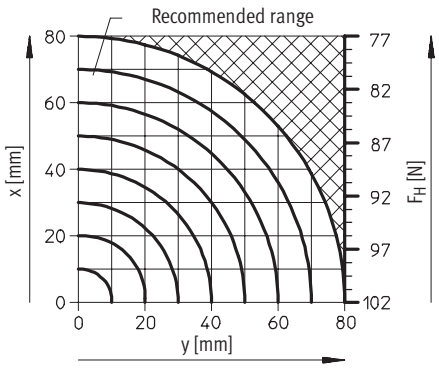
HGPT-16-A



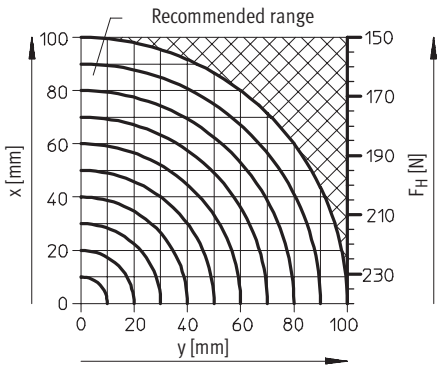
HGPT-20-A



HGPT-25-A

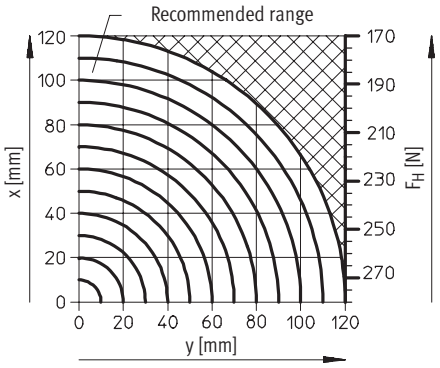


HGPT-35-A

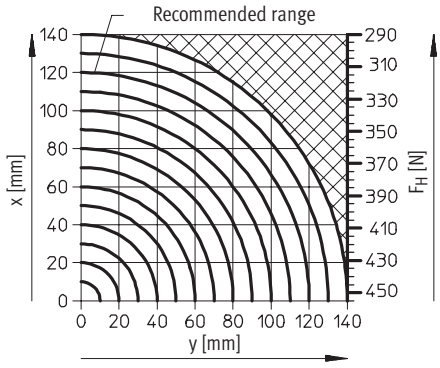


Gripping force F_H per gripper jaw at 6 bar as a function of lever arm x and eccentricity y

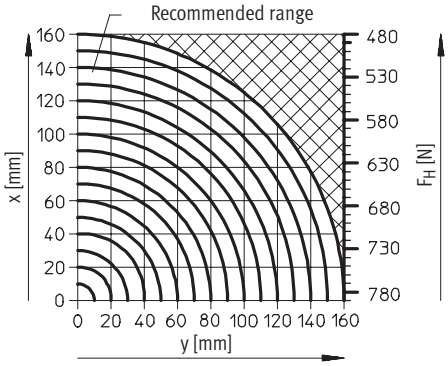
HGPT-40-A



HGPT-50-A

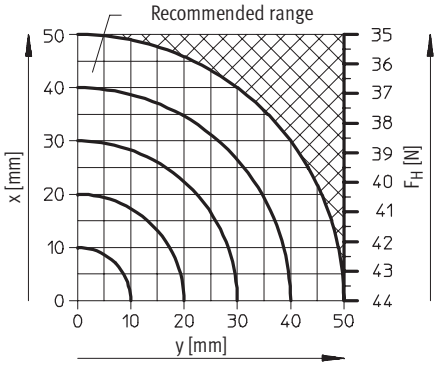


HGPT-63-A

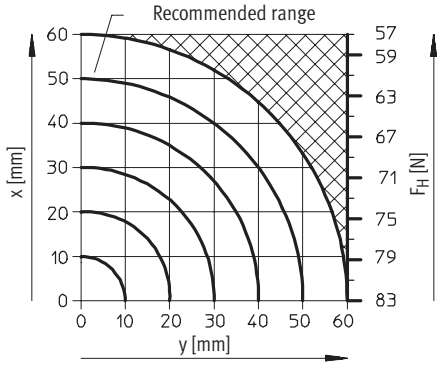


As internal gripper: Opening operation

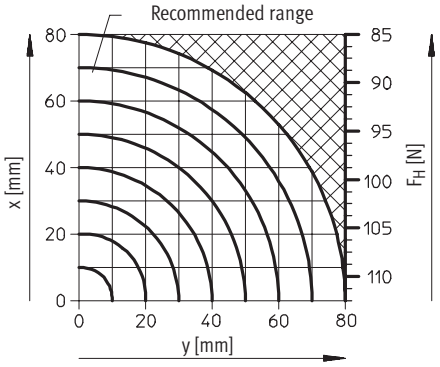
HGPT-16-A



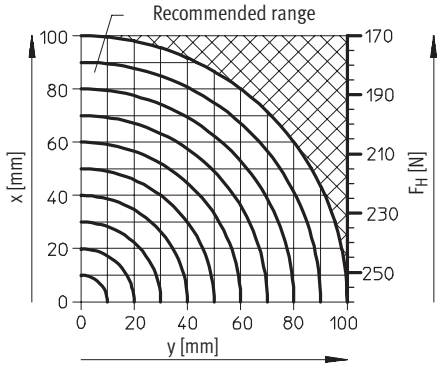
HGPT-20-A



HGPT-25-A



HGPT-35-A

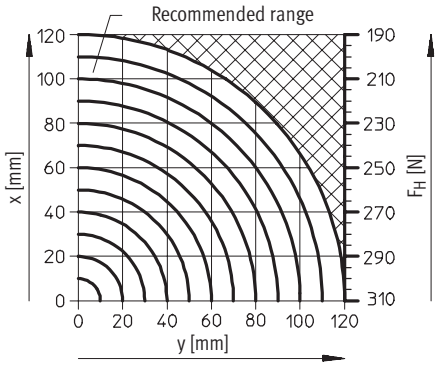


Parallel grippers HGPT, robust

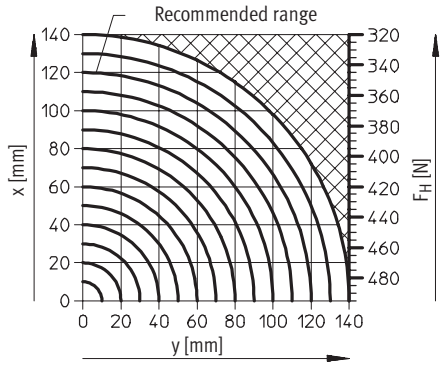
Technical data

Gripping force F_H per gripper jaw at 6 bar as a function of lever arm x and eccentricity y

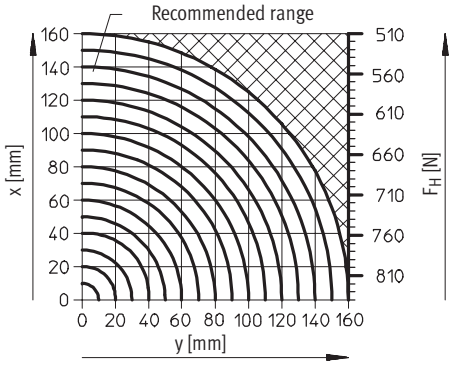
HGPT-40-A



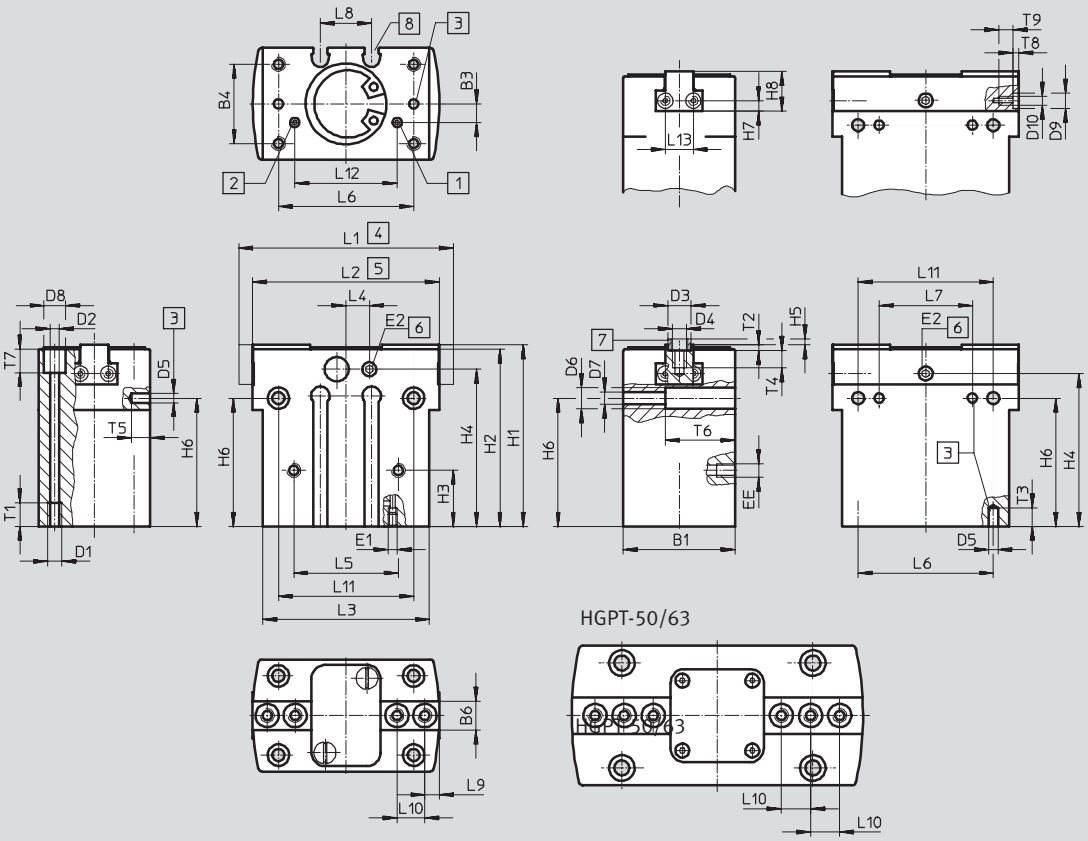
HGPT-50-A



HGPT-63-A



Dimensions Download CAD data ➔ **www.festo.com/en/engineering**



Parallel grippers HGPT, robust

Technical data

FESTO

1 Compressed air connection opening, either on the side or bottom (bottom connection sealed on delivery)

2 Compressed air connection closing, either on the side or bottom (bottom connection sealed on delivery)

3 Hole for dowel pin (not included in scope of delivery)

4 Gripper jaw open

5 Gripper jaw closed

6 Sealing air connection (sealed on delivery)

7 Centring sleeves ZBH (4 included in scope of delivery)

8 Slot for proximity sensor

Size	B1	B3	B4	B6	D1	D2	D3	D4	D5	D6	D7	D8
				−0.05		∅	∅		∅	∅	∅	∅
[mm]	±0.05	±0.1	±0.1	−0.1			H8/h7		H7			
16	24	4	17	6	M3	2.6	5	M3	2	4.6+0.1	2.6	4.6+0.1
20	28	7	22	6.5	M4	3.2	5	M3	3	6+0.2	3.2	6+0.2
25	36	10	27	10	M5	4.2	7	M4	4	8+0.3	4.2	8+0.3
35	42	9	32	12	M5	4.2	9	M6	4	10+0.3	5.3	8+0.3
40	50	13	38	14	M6	5.1	9	M6	5	11+0.3	6.4	9+0.3
50	60	14	45	15.5	M8	6.4	9	M6	6	13.5+0.3	8.4	11+0.3
63	72	12	56	20	M8	6.4	12	M8	6	13.5+0.3	8.4	11+0.3

Size	D9	D10	EE	E1	E2	H1	H2	H3	H4	H5	H6	H7
	∅										±0.02[1]	±0.02[1]
[mm]	H8					±0.05	±0.05	±0.1		−0.3	±0.1[2]	±0.1[2]
16	–	M2	M3	M2	M3	39	38	12	33.7	1.2	27.5	2.25
20	5	M3	M3	M3	M3	46	45	15	37	1.2	24	3
25	5	M3	M5	M3	M5	57	56	20	46	1.4	34	4.5
35	7	M5	M5	M4	M5	67	66	28	53	1.9	38	5.5
40	7	M5	M5	M5	M5	83	82	36	68	1.9	53	5.5
50	7	M5	G1/8	M5	M5	97	96	30	78	1.9	61	7.5
63	7	M5	G1/8	M5	M5	117	116	26	92	2.4	67	9

Size	H8	L1	L2	L3	L4	L5	L6	L7	L8	L9	L10	L11
							±0.02[1]			±0.02[1]	±0.02[1]	
[mm]	−0.02	±0.5	±0.5	±0.1		±0.1	±0.1[2]	±0.02	+0.1	±0.1[2]	±0.1[2]	±0.1
16	8.5	46	40	35.8	3.8	22.4	29	20	11	3	6	29
20	12	58	50	44	0	28	35	24	18	4	8	35
25	16	76	64	52	0	28	42	20	17	5	12	42
35	19	96	80	64	0	40	52	40	24	6	15	52
40	22	120	100	80	0	48	66	50	32	10	18	66
50	25.5	149	125	100	0	56	82	60	32	10	12.5	82
63	32	192	160	125	0	74	100	76	34	10	18	100

Size	L12	L13	T1	T2	T3	T4	T5	T6	T7	T8	T9
		±0.02[1]									
[mm]	±0.1	±0.1[2]	min.	+0.1	min.	min.	min.		+0.2	+0.1	
16	22	6	5	1.3	4	5	4	15	24	–	3
20	24	6	6	1.3	4	5	4	19	11	1.3	6
25	28	6	10	1.6	4	5	4	24	16	1.3	6
35	40	13	10	2.1	6	10	4	27	19	1.6	9
40	44	13	12	2.1	6	10	6	33	20	1.6	9
50	56	13	12	2.1	8	10	8	43	23	1.6	9
63	70	13	12	2.6	10	12	10	55	35	1.6	9

1) For centring
2) For through-and threaded hole

Parallel grippers HGPT, robust

Technical data and accessories

FESTO

Ordering data						
Size	Double-acting		Single-acting or with gripping force retention			
	without compression spring		open		closed	
[mm]	Part No.	Type	Part No.	Type	Part No.	Type
16	**535 858**	**HGPT-16-A**	**535 859**	**HGPT-16-A-G1**	**535 860**	**HGPT-16-A-G2**
20	**535 861**	**HGPT-20-A**	**535 862**	**HGPT-20-A-G1**	**535 863**	**HGPT-20-A-G2**
25	**535 864**	**HGPT-25-A**	**535 865**	**HGPT-25-A-G1**	**535 866**	**HGPT-25-A-G2**
35	**535 867**	**HGPT-35-A**	**535 868**	**HGPT-35-A-G1**	**535 869**	**HGPT-35-A-G2**
40	**535 870**	**HGPT-40-A**	**535 871**	**HGPT-40-A-G1**	**535 872**	**HGPT-40-A-G2**
50	**535 873**	**HGPT-50-A**	**535 874**	**HGPT-50-A-G1**	**535 875**	**HGPT-50-A-G2**
63	**535 876**	**HGPT-63-A**	**535 877**	**HGPT-63-A-G1**	**535 878**	**HGPT-63-A-G2**

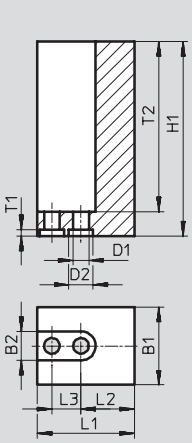
Accessories

Unmachined gripper finger
BUB-HGPT
(Scope of delivery: 2 pcs.)

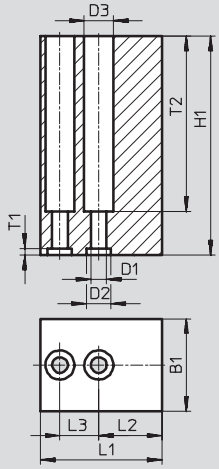
Material:
Aluminium



BUB-HGPT-16



BUB-HGPT-20 ... 63



Dimensions and ordering data							
For size	B1	B2	D1 ∅	D2 ∅	D3 ∅	H1	L1
[mm]	±0.05	+0.22	H13	H8	+0.22	±0.05	±0.05
16	16	6	3.2	5	–	40	20
20	19	–	3.2	5	6	45	25
25	24	–	4.3	7	8	60	32
35	28	–	6.4	9	11	70	40
40	34	–	6.4	9	11	75	50
50	40	–	6.4	9	11	100	62.5
63	50	–	8.4	12	13.5	120	80

For size	L2	L3	T1	T2	Weight per unmachined gripper finger	Part No.	Type
[mm]	±0.02[1] ±0.1[2]	±0.01[1] ±0.1[1]	+0.1		[g]		
16	11	6	1.3	35	28	**537 198**	**BUB-HGPT-16**
20	13	8	1.3	36	53	**537 199**	**BUB-HGPT-20**
25	15	12	1.6	51	112	**537 200**	**BUB-HGPT-25**
35	19	15	2.1	61	182	**537 201**	**BUB-HGPT-35**
40	22	18	2.1	71	312	**537 202**	**BUB-HGPT-40**
50	27.5	25	2.1	91	638	**537 203**	**BUB-HGPT-50**
63	34	36	2.6	110	1 230	**537 204**	**BUB-HGPT-63**

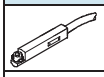
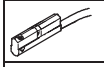
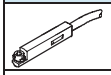
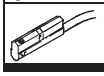
1) For centring
2) For through-hole

Ordering data

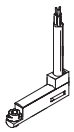
	For size [mm]	Remarks	Weight [g]	Part No.	Type	PU[1]
Centring sleeve ZBH					Technical data ➔ www.festo.com	
	16, 20	For centring unmachined gripper jaws/gripper fingers on the gripper jaws	1	**189 652**	**ZBH-5**	10
	25		1	**186 717**	**ZBH-7**	10
	35, 40, 50		1	**150 927**	**ZBH-9**	10
	63		1	**189 653**	**ZBH-12**	10
	20, 25	For lateral centring of gripper fingers on the gripper jaws	1	**189 652**	**ZBH-5**	10
	35, 40, 50, 63		1	**186 717**	**ZBH-7**	10
Blanking plug B					Technical data ➔ www.festo.com	
	16, 20	For sealing the compressed air connections	0.6	**30 979**	**B-M3-S9**	10
	25, 35, 40		1	**174 308**	**B-M5-B**	10
	50, 63		5	**3 568**	**B-⅛**	10

1) Packaging unit quantity

Ordering data – Proximity sensors for C-slot, in-line connecting cable Technical data ➔ www.festo.com

	Assembly	Electrical connection		Cable length [m]	Part No.	Type
		Cable	Plug M8			
NO contact, magneto-resistive						
	Insertable from above	3-core	–	2.5	**525 915**	**SMT-10F-PS-24V-K2,5L-OE**
		–	3-pin	0.3	**525 916**	**SMT-10F-PS-24V-K0,3L-M8D**
	Insertable from end	–	3-pin	0.3	**173 220**	**SMT-10-PS-SL-LED-24**
		3-core	–	2.5	**173 218**	**SMT-10-PS-KL-LED-24**
NO contact, magnetic reed						
	Insertable from above	–	3-pin	0.3	**525 914**	**SME-10F-DS-24V-K0,3L-M8D**
		3-core	–	2.5	**525 913**	**SME-10F-DS-24V-K2,5L-OE**
	Insertable from end	–	3-pin	0.3	**173 212**	**SME-10-SL-LED-24**
		3-core	–	2.5	**173 210**	**SME-10-KL-LED-24**

Ordering data – Proximity sensors for C-slot, connecting cable at right angles Technical data ➔ www.festo.com

	Assembly	Electrical connection		Cable length [m]	Part No.	Type
		Cable	Plug M8			
	NO contact, magneto-resistive					
	Insertable from above	3-core	–	2.5	**526 674**	**SMT-10F-PS-24V-K2,5Q-OE**
		–	3-pin	0.3	**526 675**	**SMT-10F-PS-24V-K0,3Q-M8D**
	NO contact, magnetic reed					
	Insertable from above	3-core	–	2.5	**526 670**	**SME-10F-DS-24V-K2,5Q-OE**
		–	3-pin	0.3	**526 671**	**SME-10F-DS-24V-K0,3Q-M8D**

Ordering data – Plug sockets with cable Technical data ➔ www.festo.com

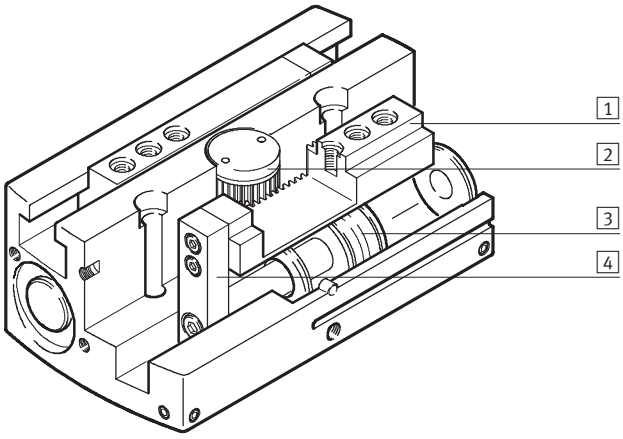
	Assembly	Switch output		Connection	Cable length [m]	Part No.	Type
		PNP	NPN				
Straight socket							
	Union nut M8	■	■	3-pin	2.5	**159 420**	**SIM-M8-3GD-2,5-PU**
					5	**159 421**	**SIM-M8-3GD-5-PU**
Angled socket							
	Union nut M8	■	■	3-pin	2.5	**159 422**	**SIM-M8-3WD-2,5-PU**
					5	**159 423**	**SIM-M8-3WD-5-PU**

Parallel grippers HGPL, robust, with long stroke

Key features

At a glance

- Space-saving and suitable for high forces
  - Two parallel and opposing pistons move the gripper jaws directly and without loss of force
- Reliable
  - A pinion that synchronises the movement of both gripper jaws ensures controlled, precise and centred gripping
  - The space-saving design of the parallel gripper jaws permits a long guide length for the gripper jaws
- Sturdy
  - The T-slot in combination with a long guide length allows the gripper jaws to withstand high forces and torques
- Flexible range of applications
  - Double-acting gripper suitable for external and internal gripping.
  - Versatile mounting options and compressed air connections
  - Opening stroke can be adjusted to optimise time

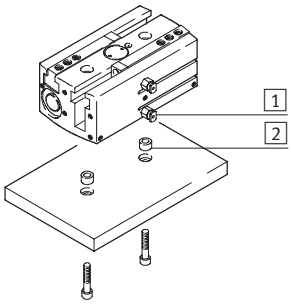


1 Gripper jaw
2 Synchronising gear
3 Piston with magnet
4 Driver

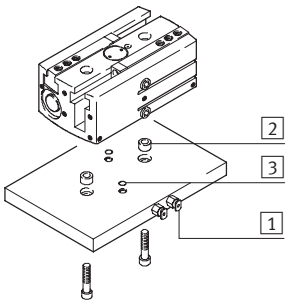
Gripper selection software
www.festo.com/en/engineering

Versatile compressed air connections

Direct
from the front



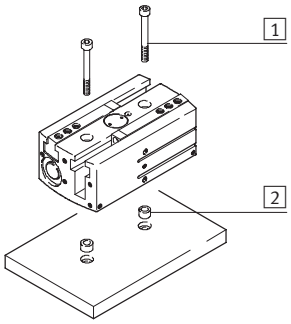
Via adapter plate
from underneath



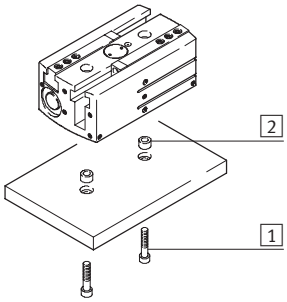
1 Compressed air connections
2 Centring sleeves
3 O-rings

Mounting options

Direct mounting
from above



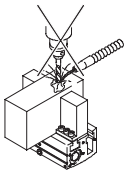
from underneath



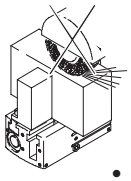
1 Mounting screws
2 Centring sleeves

Note

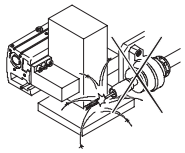
Grippers are not designed for the following or similar applications:



- Aggressive media
- Machining



- Grinding dust



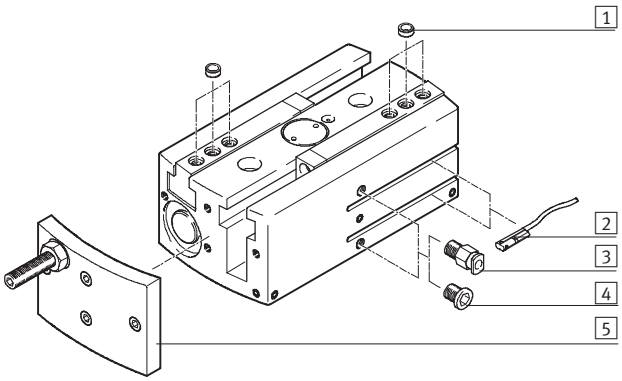
- Welding spatter

Parallel grippers HGPL, robust, with long stroke

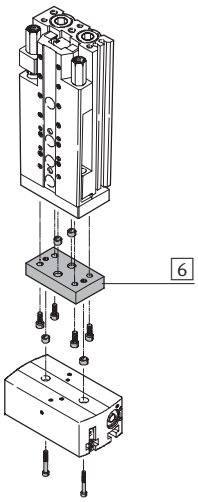
Peripherals overview and type codes

FESTO

Peripherals overview



System product for handling and assembly technology



Accessories

	Type	Brief description	➔ Page
1	Centring sleeve ZBH	For centring when attaching gripper fingers	40
2	Proximity sensor SME/SMT-10	For sensing the piston position	41
3	Push-in fitting QS	For connecting compressed air tubing with standard external diameters	www.festo.com
4	Blanking plug B	For sealing compressed air connections when using air connections at the front	40
5	Stroke reducing plate HGPL-HR-...	For reducing the opening stroke	39
6	–	Drive/gripper connections	www.festo.com
–	Unmachined gripper finger BUB-HGPL	Unmachined part specially matched to the gripper jaws for custom building of gripper fingers	40

Type codes

HGPL – 14 – 40 – A

Type	
HGPL	Parallel gripper

Size

Stroke [mm]

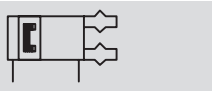
Position sensing	
A	For proximity sensing

Parallel grippers HGPL, robust, with long stroke

Technical data

FESTO

Function
Double-acting
HGPL-...-A



- Size
  14 ... 40 mm
- Stroke
  80 ... 160 mm

www.festo.com/en/
Spare_parts_service
Wearing parts kits
➔ 38



General technical data							
Size		14		25		40	
Design		Synchronised pneumatic pistons					
		Guided motion sequence					
Mode of operation		Double-acting					
Gripper function		Parallel					
Number of gripper jaws		2					
Max. applied load per external gripper finger[1]	[N]	0.8		2.5		4.2	
Stroke per gripper jaw	[mm]	40	80	40	80	40	80
Pneumatic connection		M5					
Repetition accuracy[2]	[mm]	< 0.03					
Max. interchangeability	[mm]	< 0.2					
Max. gripper jaw backlash[3]	[mm]	< 0.05					
Max. operating frequency	[Hz]	< 1					
Rotational symmetry	[mm]	< ∅ 0.2					
Position sensing		For proximity sensing					
Type of mounting		Via through-holes and centring sleeves					
		With female thread and centring sleeves					
Fitting position		Any					

1) Valid for unthrottled operation
2) End-position drift under constant conditions of use with 100 consecutive strokes in the direction of movement of the gripper jaws
3) In the direction of the gripper jaw movement

Operating and environmental conditions		
Operating pressure	[bar]	3 ... 8
Operating medium		Filtered compressed air, lubricated or unlubricated
Ambient temperature[1]	[°C]	+5 ... +60
Corrosion resistance class CRC[2]		2

1) Note operating range of proximity sensors
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

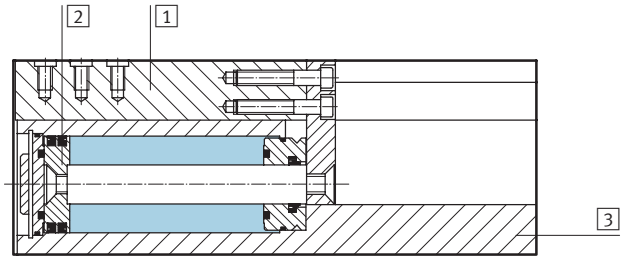
Weight [g]				
Size		14	25	40
Stroke per gripper jaw	40 mm	440	1400	3300
	80 mm	720	2200	4800

Parallel grippers HGPL, robust, with long stroke

Technical data

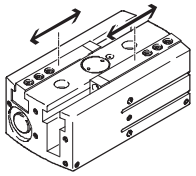
Materials

Sectional view



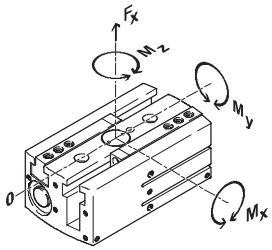
Parallel gripper		
1	Gripper jaw	Hardened steel, Citrox-coated
2	Piston	High-alloy steel
3	Housing	Wrought aluminium alloy with CompCote
–	Seals	Nitrile rubber, polyurethane
	Note on materials	Free of copper, PTFE and silicone

Gripping force [N] at 6 bar



Size	Stroke	14	25	40
Gripping force per gripper jaw				
Opening	40 mm	60	180	440
	80 mm	64	205	520
Closing	40 mm	80	240	550
	80 mm	80	255	605
Total gripping force				
Opening	40 mm	120	360	880
	80 mm	128	410	1040
Closing	40 mm	160	480	1100
	80 mm	160	510	1210

Characteristic load values at the gripper jaws



The indicated permissible forces and torques refer to a single gripper jaw. The indicated values include the lever arm, additional applied loads caused by the workpiece or external gripper fingers, as well as forces which occur during movement. The zero coordinate line (gripper finger guide slot) must be taken into consideration for the calculation of torques.

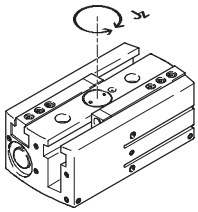
Size		14	25	40
Max. permissible force F_z	[N]	500	1500	2500
Max. permissible torque M_x	[Nm]	35	100	125
Max. permissible torque M_y	[Nm]	35	60	80
Max. permissible torque M_z	[Nm]	35	70	100

Parallel grippers HGPL, robust, with long stroke

Technical data

FESTO

Mass moment of inertia [kgm²x10⁻⁴]

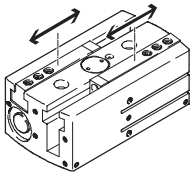


Mass moment of inertia [kgm²x10⁻⁴] for parallel grippers in relation to the central axis with no load.

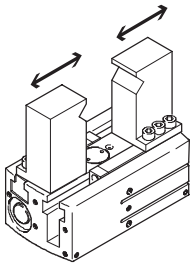
Size		14	25	40
Stroke per gripper jaw	40 mm	4.69	18.88	66.83
	80 mm	21.93	78.7	198.87

Opening and closing times [ms] at 6 bar

without external gripper fingers



with external gripper fingers



The indicated opening and closing times [ms] have been measured at room temperature and at 6 bar operating pressure with horizontally mounted additional gripper fingers.

The grippers must be throttled for greater applied loads. Opening and closing times must then be adjusted correspondingly.

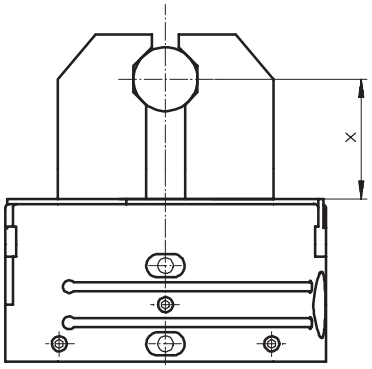
Size		14	25	40
without external gripper fingers – opening				
Stroke per gripper finger	40 mm	104	194	238
	80 mm	234	360	414
without external gripper fingers – closing				
Stroke per gripper finger	40 mm	86	192	205
	80 mm	217	366	438
with external gripper fingers as a function of applied load				
Stroke per gripper finger	40 mm			
Applied load	1 N	108	–	–
	2 N	136	–	–
	3 N	167	210	–
	4 N	192	243	–
	5 N	–	272	260
	6 N	–	–	284
	8 N	–	–	328
Stroke per gripper finger	80 mm			
Applied load	1 N	243	–	–
	2 N	343	–	–
	3 N	420	401	–
	4 N	485	463	–
	5 N	–	518	478
	6 N	–	–	524
	8 N	–	–	604

Parallel grippers HGPL, robust, with long stroke

Technical data

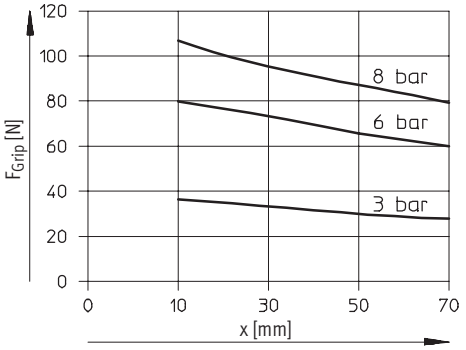
Gripping force F_{Grip} per gripper jaw as a function of operating pressure and lever arm x

Gripping forces related to operating pressure and lever arm can be determined for the various sizes using the following graphs.

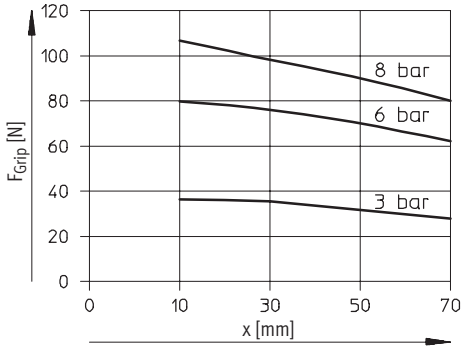


As external gripper: Closing operation

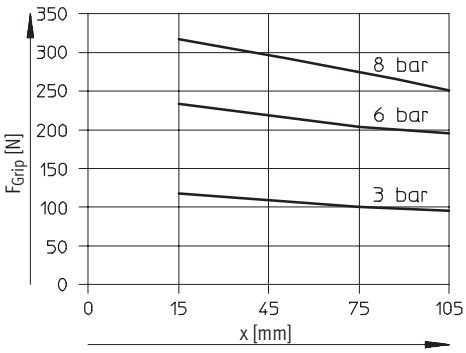
HGPL-14-40-A



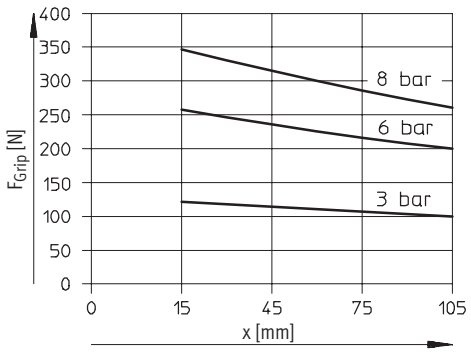
HGPL-14-80-A



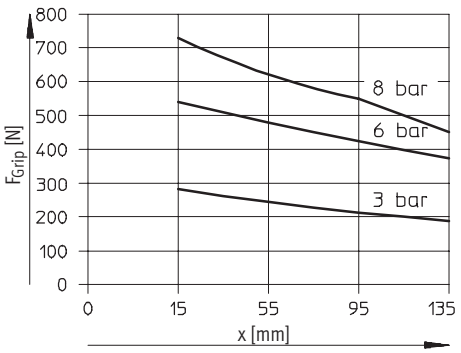
HGPL-25-40-A



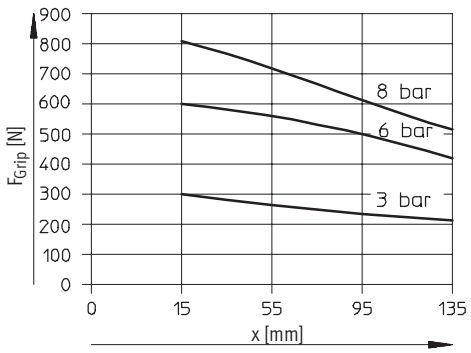
HGPL-25-80-A



HGPL-40-40-A

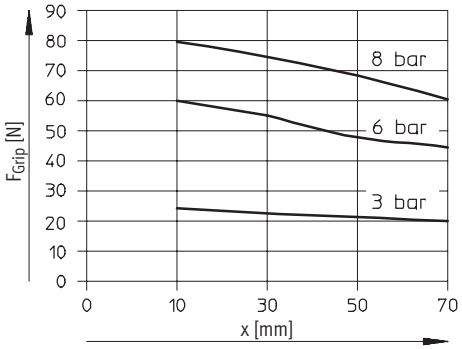


HGPL-40-80-A

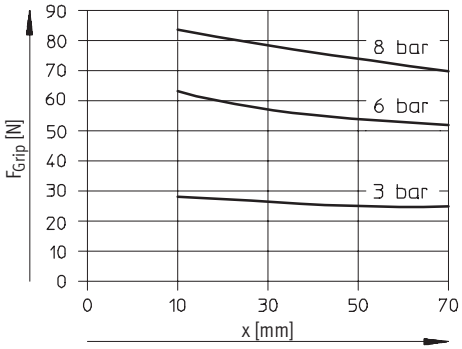


Gripping force F_{Grip} per gripper jaw as a function of operating pressure and lever arm x
As internal gripper: Opening operation

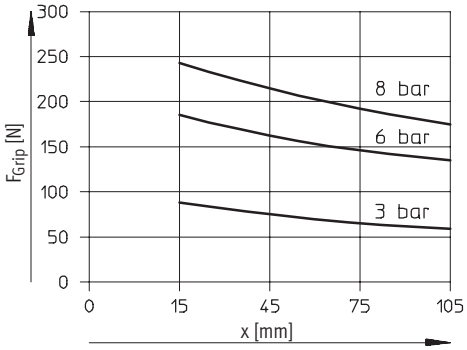
HGPL-14-40-A



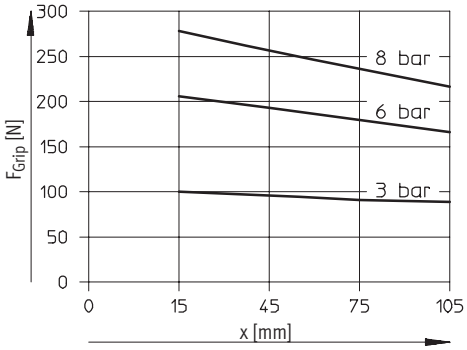
HGPL-14-80-A



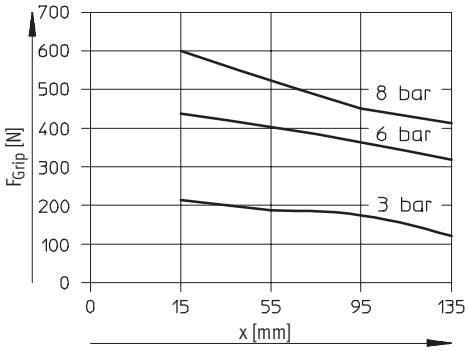
HGPL-25-40-A



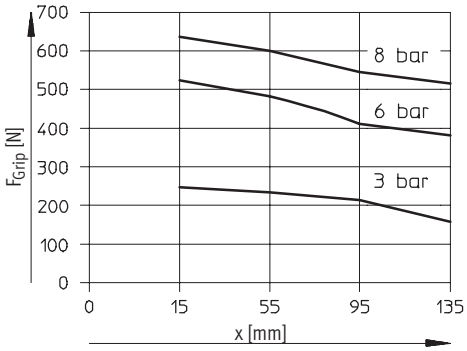
HGPL-25-80-A



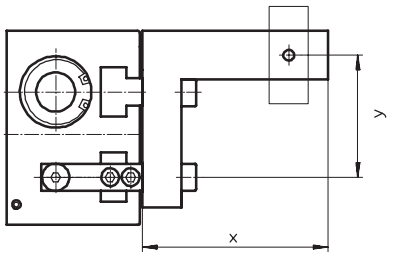
HGPL-40-40-A



HGPL-40-80-A



Gripping force F_{Grip} per gripper jaw as a function of lever arm x and eccentricity y



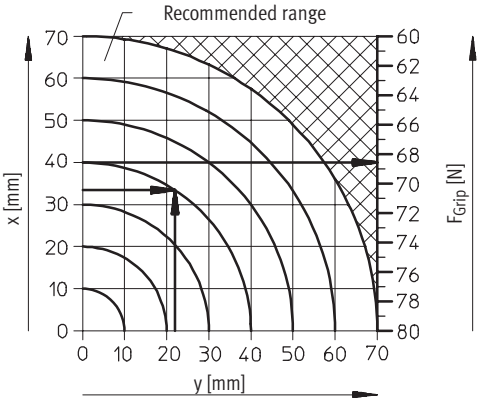
Gripping forces at 6 bar dependent upon eccentric application of force and the maximum permissible off-centre point of force application can be determined for the various sizes using the following graphs.

Calculation example

Given:
Lever arm x = 32 mm
Eccentricity y = 22 mm
To be found:
Gripping force at 6 bar

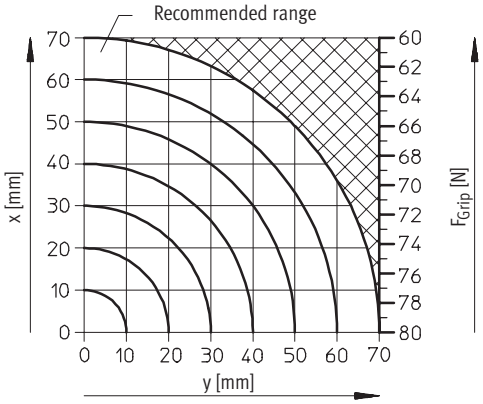
Procedure:
- Determine the intersection xy between lever arm x and eccentricity y in the graph for HGPL-14-40-A
- Draw an arc (with centre at origin) through intersection xy
- Determine the intersection between the arc and the X axis
- Read the gripping force

Result:
Gripping force = approx. 68.3 N

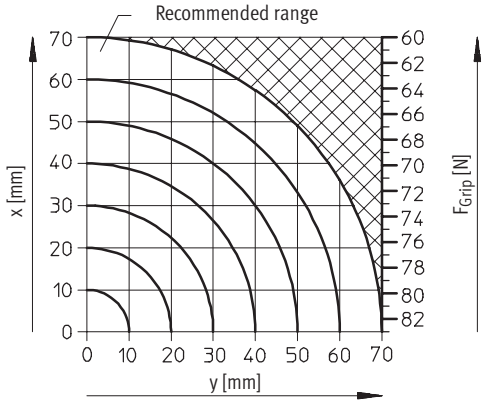


As external gripper: Closing operation

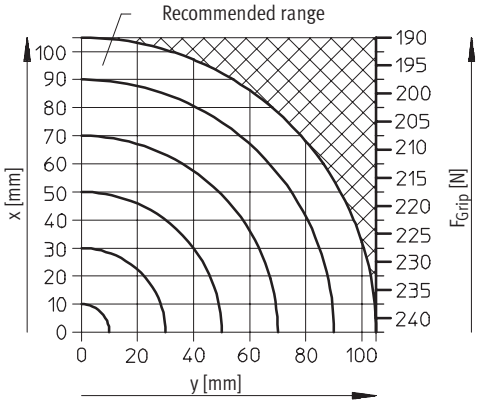
HGPL-14-40-A



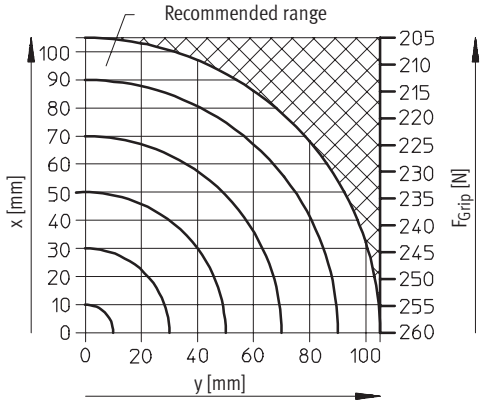
HGPL-14-80-A



HGPL-25-40-A

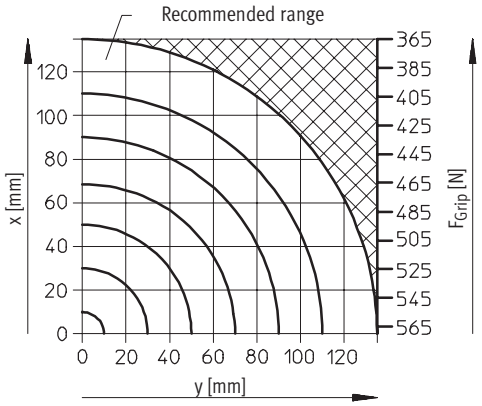


HGPL-25-80-A

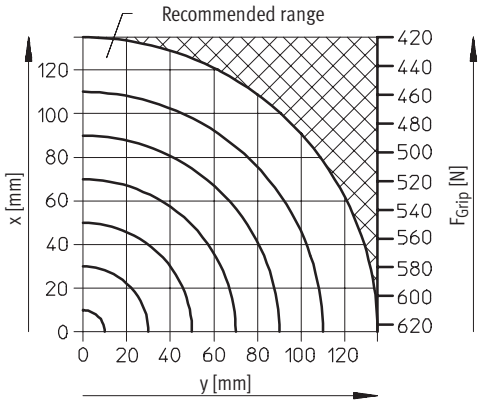


Gripping force F_{Grip} per gripper jaw as a function of lever arm x and eccentricity y

HGPL-40-40-A

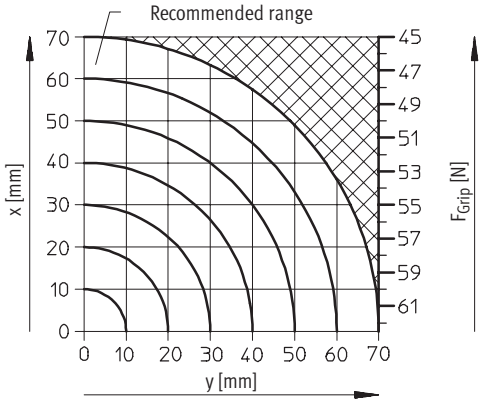


HGPL-40-80-A

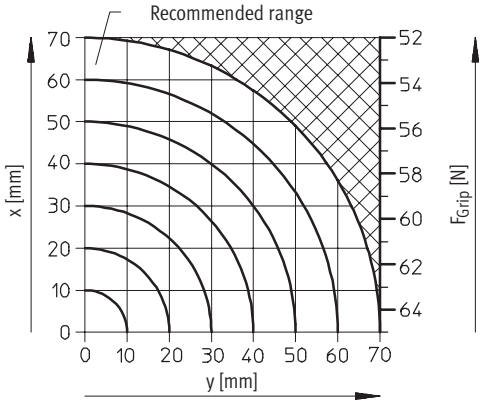


As internal gripper: Closing operation

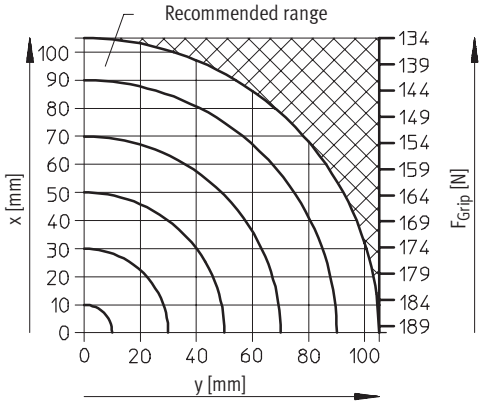
HGPL-14-40-A



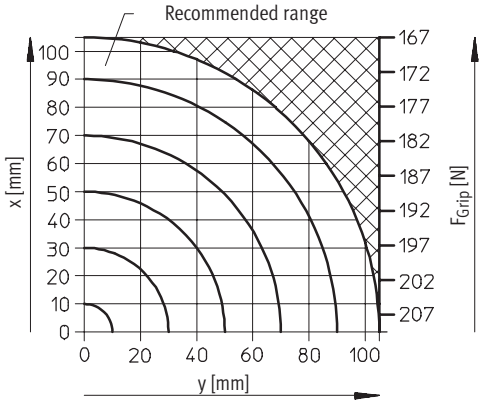
HGPL-14-80-A



HGPL-25-40-A

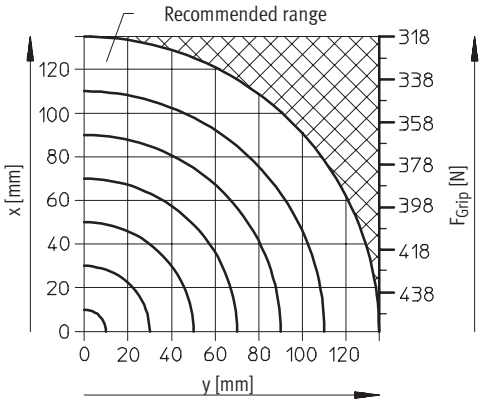


HGPL-25-80-A

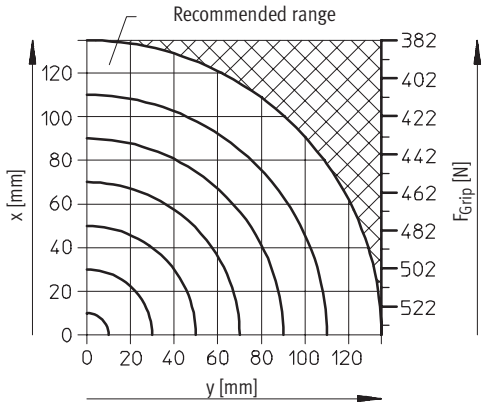


Gripping force F_{Grip} per gripper jaw as a function of lever arm x and eccentricity y

HGPL-40-40-A



HGPL-40-80-A

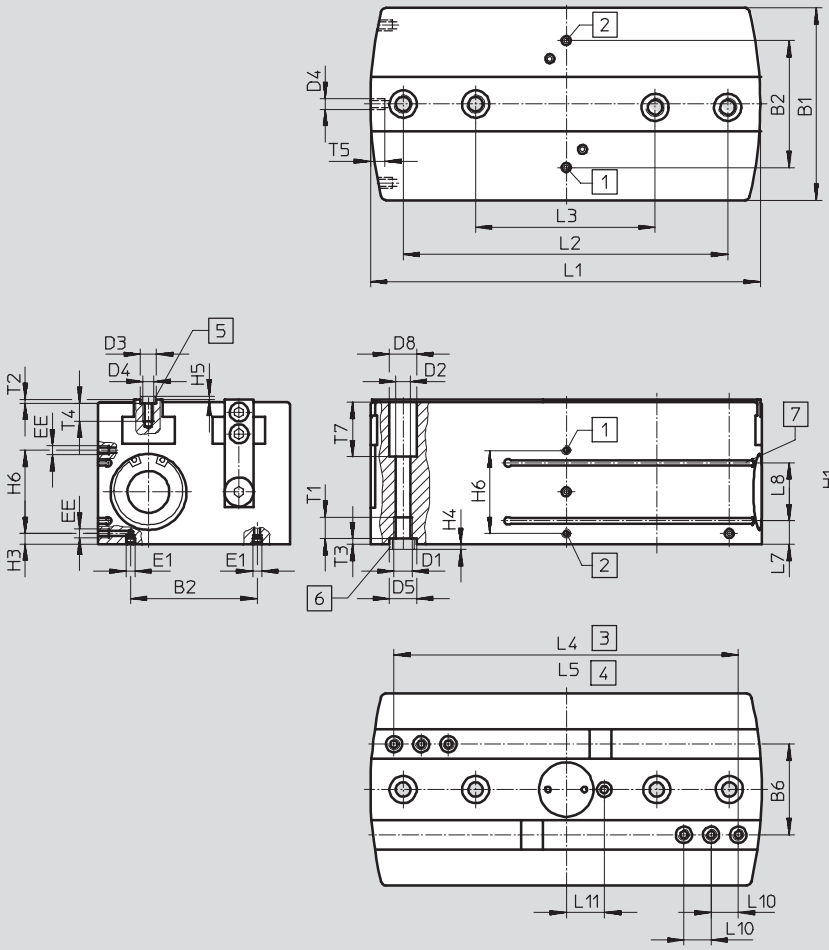


Parallel grippers HGPL, robust, with long stroke

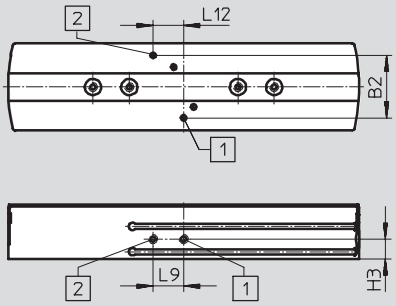
Technical data

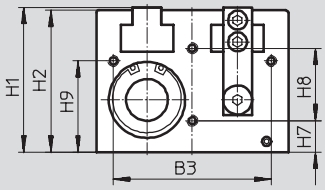
Dimensions Download CAD data ➔ **www.festo.com/en/engineering**

Size 40



Size 14/25





1 Compressed air connection opening, either on the side or bottom (bottom connection sealed on delivery)

2 Compressed air connection closing, either on the side or bottom (bottom connection sealed on delivery)

3 Gripper jaw open

4 Gripper jaw closed

5 Centring sleeves ZBH (4 included in scope of delivery)

6 Centring sleeves ZBH (2 included in scope of delivery)

7 Slot for proximity sensor SME/SMT-10

Parallel grippers HGPL, robust, with long stroke

Technical data

Type	B1 ±0.05	B2 ±0.1	B3 ±0.1	B6 ±0.01	D1	D2 ∅ +0.1	D3 ∅ H8/h7	D4	D5 ∅ H8/h7	D8 ∅ H13	EE	E1
HGPL-14-40	48	34.5	37	22	M5	4.2	5	M3	9	7.4	M5	M3
HGPL-14-80												
HGPL-25-40	80	60	65	38	M6	5.1	7	M5	9	10	M5	M5
HGPL-25-80												
HGPL-40-40	106	70	87	50	M10	8.5	9	M6	15	15	M5	M5
HGPL-40-80												

Type	H1	H2 ±0.1	H3 ±0.1	H4 −0.3	H5 −0.3	H6 ±0.1	H7 ±0.1	H8 ±0.1	H9 ±0.1	L1 ±0.1	L2 ±0.02[1] ±0.1[2]	L3 ±0.02[1] ±0.1[2]	L4 ±0.5
HGPL-14-40	30	29	11	1.9	1.2	–	10	12	18	113.6	–	60	102
HGPL-14-80										193.6	100	60	182
HGPL-25-40	50	49	18	1.9	1.4	–	18	20	30	126	–	60	104
HGPL-25-80										206	100	60	184
HGPL-40-40	80	78.5	6	2.9	1.9	46	17.5	40	50.5	136	–	100	110
HGPL-40-80										216	180	100	190

Type	L5 ±0.5	L7 ±0.1	L8 ±0.1	L9 ±0.2	L10 ±0.02[1] ±0.1[2]	L11 ±0.5	L12 ±0.1	T1 min.	T2 +0.1	T3 +0.1	T4 min.	T5 min.	T7 +0.1
HGPL-14-40	22	4	14	16.8	8	9	16.8	12	1.3	2.1	5	6	10
HGPL-14-80	22												
HGPL-25-40	24	11	14	20	10	17.5	20	12	1.6	2.1	8	7	17
HGPL-25-80	24												
HGPL-40-40	30	13	32	–	15	21	–	15	2.1	3.1	10	8	30
HGPL-40-80	30												

1) For centring
2) For through-hole

Parallel grippers HGPL, robust, with long stroke

Technical data

Ordering data			
Size [mm]	Stroke [mm]	Double-acting without compression spring Part No.	Type
14			
	40	**535 852**	**HGPL-14-40-A**
	80	**535 853**	**HGPL-14-80-A**
25			
	40	**535 854**	**HGPL-25-40-A**
	80	**535 855**	**HGPL-25-80-A**
40			
	40	**535 856**	**HGPL-40-40-A**
	80	**535 857**	**HGPL-40-80-A**

Ordering data – Wearing parts kits		
Size [mm]	Part No.	Type
14	**701 585**	**HGPL-14**
25	**701 586**	**HGPL-25**
40	**701 587**	**HGPL-40**

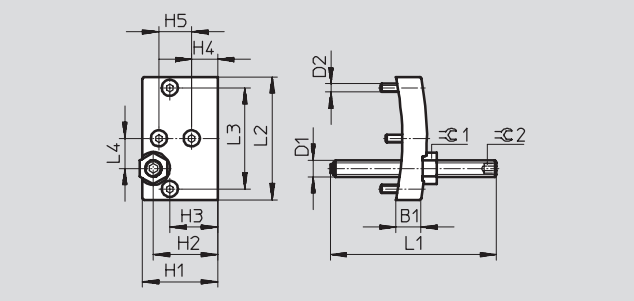
Parallel grippers HGPL, robust, with long stroke

Accessories

Stroke reducing plate HGPL-HR

Material:
Aluminium
Free of copper, PTFE and silicone





Dimensions and ordering data

For size	B1	D1	D2	H1	H2	H3	H4	H5
[mm]	±0.1			±0.1	±0.1	±0.1	±0.1	±0.1
14	9	M6	M3	27.5	23.5	17.5	9.5	12
25	12	M8	M5	47.5	37.5	29.5	17.5	20
40	18	M12	M6	77	63	50	17	40

For size	L1	L2	L3	L4	⌀C1	⌀C2	Weight	Part No.	Type
[mm]	±1	±0.1	±0.1	±0.1			[g]		
14	61	45	37	11	10	3	45	**539 092**	**HGPL-HR-14**
25	61	77	65	19	13	4	150	**539 093**	**HGPL-HR-25**
40	61	103	87	25	19	6	455	**539 094**	**HGPL-HR-40**

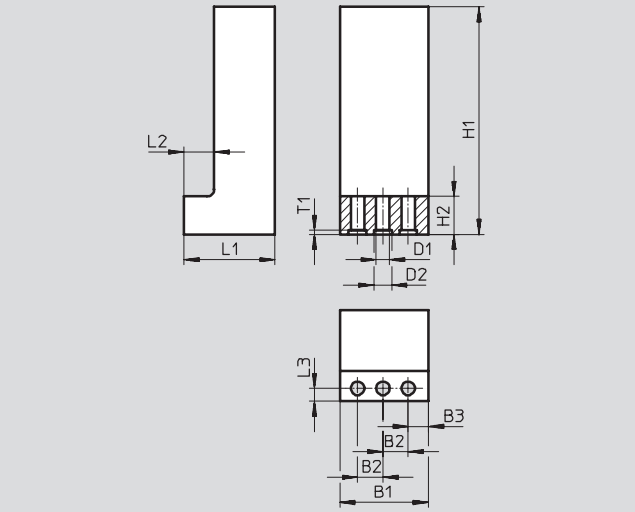
Parallel grippers HGPL, robust, with long stroke

Accessories

Unmachined gripper finger
BUB-HGPL
(Scope of delivery: 2 pcs.)

Material:
Aluminium
Free of copper, PTFE and silicone





Dimensions and ordering data

For size [mm]	B1 ±0.1	B2 +0.02	B3	D1 ∅ +0.1	D2 ∅ H8	H1 ∅ ±0.1	H2
14	25	8	4	3.2	5	80	11
25	35	10	8	5.3	7	120	15
40	50	15	10	6.4	9	150	18

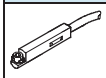
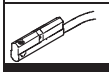
For size [mm]	L1 ±0.1	L2 +0.1	L3 +0.1	T1 +0.1	Weight per unmachined gripper finger [g]	Part No.	Type
14	20.5	8	3.3	1.3	75	**537 316**	**BUB-HGPL-14**
25	36	12	5	1.6	295	**537 317**	**BUB-HGPL-25**
40	49.5	16.5	8	2.1	720	**537 318**	**BUB-HGPL-40**

Ordering data

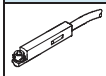
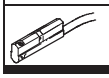
	For size [mm]	Weight [g]	Part No.	Type	PU[1]
Centring sleeve for the gripper jaws ZBH				Technical data ➔ www.festo.com	
	14	1	**189 652**	**ZBH-5**	10
	25	1	**186 717**	**ZBH-7**	10
	40	1	**150 927**	**ZBH-9**	10
Centring sleeve for the gripper ZBH				Technical data ➔ www.festo.com	
	14	1	**189 652**	**ZBH-9**	10
	25				
	40	3	**191 409**	**ZBH-15**	10
Blanking plug B				Technical data ➔ www.festo.com	
	14 (at front)	0.6	**30 979**	**B-M3-S9**	10
	14, 25, 40	1	**174 308**	**B-M5-B**	10

1) Packaging unit quantity

Ordering data – Proximity sensors for C-slot, magneto-resistive — Technical data ➔ www.festo.com

	Assembly	Switch output	Electrical connection		Cable length [m]	Connection direction	Part No.	Type
			Cable	Plug M8				
NO contact								
	Insertable from above	PNP	3-core	–	2.5	In-line	**525 915**	**SMT-10F-PS-24V-K2,5L-OE**
			–	3-pin	0.3	In-line	**525 916**	**SMT-10F-PS-24V-K0,3L-M8D**
						Lateral	**526 675**	**SMT-10F-PS-24V-K0,3Q-M8D**
	Insertable from end	PNP	–	3-pin	0.3	In-line	**173 220**	**SMT-10-PS-SL-LED-24**
			3-core	–	2.5		**173 218**	**SMT-10-PS-KL-LED-24**

Ordering data – Proximity sensors for C-slot, magnetic reed — Technical data ➔ www.festo.com

	Assembly	Electrical connection		Cable length [m]	Connection direction	Part No.	Type
		Cable	Plug M8				
NO contact							
	Insertable from above	–	3-pin	0.3	In-line	**525 914**	**SME-10F-DS-24V-K0,3L-M8D**
		3-core	–	2.5	In-line	**525 913**	**SME-10F-DS-24V-K2,5L-OE**
		2-core				**526 672**	**SME-10F-ZS-24V-K2,5L-OE**
	Insertable from end	–	3-pin	0.3	In-line	**173 212**	**SME-10-SL-LED-24**
		3-core	–	2.5		**173 210**	**SME-10-KL-LED-24**

Ordering data – Plug sockets with cable — Technical data ➔ www.festo.com

	Assembly	Switch output		Connection	Cable length [m]	Part No.	Type
		PNP	NPN				
Straight socket							
	Union nut M8	■	■	3-pin	2.5	**159 420**	**SIM-M8-3GD-2,5-PU**
					5	**159 421**	**SIM-M8-3GD-5-PU**
Angled socket							
	Union nut M8	■	■	3-pin	2.5	**159 422**	**SIM-M8-3WD-2,5-PU**
					5	**159 423**	**SIM-M8-3WD-5-PU**

Three-point grippers HGDT, robust

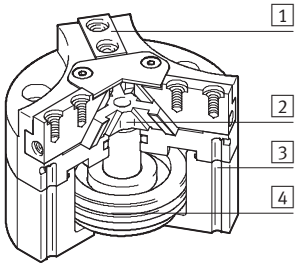
Features

At a glance

The force generated by the linear motion is translated into the gripper jaw movement via a force-guided triple wedge mechanism. This also guarantees synchronous movement of the gripper jaw. The virtually backlash-free slideway is realised using ground-in gripper jaws.

A wide range of uses:
- Double-acting gripper
- Compression springs for supplementing or retaining gripper forces, or for use as a single-acting gripper with only one compressed air connection
- Suitable for external and internal gripping

Sealing air connection:
Compressed air flows past the gripper jaw when sealing air (max. 0.5 bar) is connected.
This prevents particles and soluble oil, etc. from entering the gripper jaw guides.

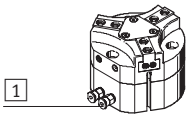


1 Three-point gripper jaw
2 Triple wedge mechanism
3 Slot for proximity sensor
4 Piston with magnet

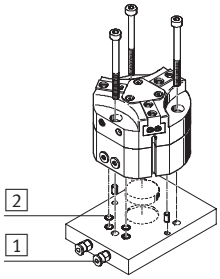
Gripper selection software
www.festo.com/en/engineering

Wide range of air connections

Direct
from the front



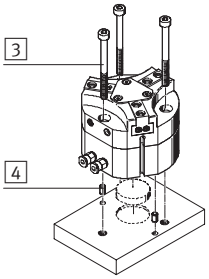
Via adapter plate
from underneath



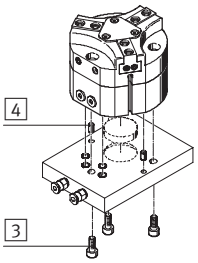
1 Compressed air connections
2 O-rings

Mounting options

Direct mounting
from above



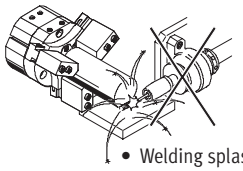
Via adapter plate
from underneath



3 Mounting screws
4 Centring pins or centring disc

Note

Grippers are not designed for use in the following applications:



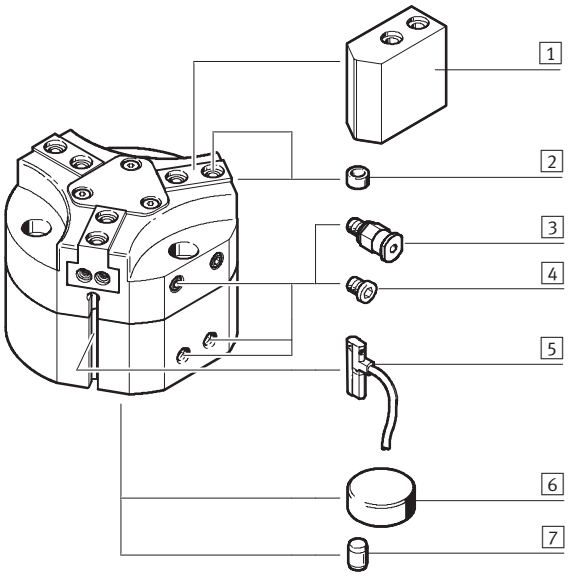
- Welding splashes

Three-point grippers HGDT, robust

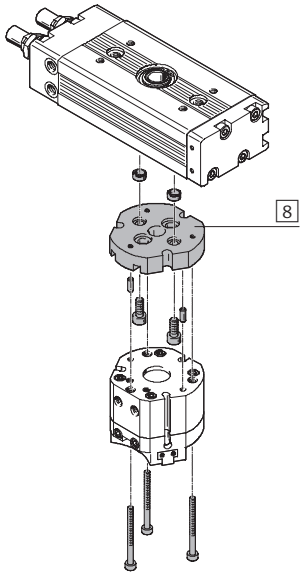
Peripherals overview and type codes

FESTO

Peripherals overview



System product for handling and assembly technology



Accessories

	Type	Brief description	➔ Page
1	Unmachined gripper finger BUB-HGDT	Unmachined part specially matched to the gripper jaws for custom building of gripper fingers	52
2	Centring sleeve ZBH	For centring unmachined gripper jaws/gripper fingers on the gripper jaws	53
3	Push-in fitting QS	For connecting compressed air tubing with standard external diameters	www.festo.com
4	Blanking plugs B	For sealing compressed air connections when using air connections at the front	53
5	With position sensing magnet SMT-10	For sensing the piston position, 3 slots available	53
6	Central mounting SLZZ	For centring the gripper when mounting	53
7	Locating pin	For centring the gripper when mounting	–
8	–	Drive/gripper connections	www.festo.com

Type code

HGDT – 25 – A – G1

Type	
HGDT	Three-point gripper

Size

Position sensing	
A	For proximity sensing

Gripping force retention	
G1	Open
G2	Closed

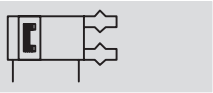
New

Three-point grippers HGDT, robust

Technical data

FESTO

Function
Double-acting
HGDT-...-A



Single-acting or
with gripping force retention ...
... open HGDT-...-G1



... closed HGDT-...-G2



Size
25 ... 63

Stroke
3 ... 10 mm



General technical data							
Size		25	35	40	50	63
Constructional design		Wedge-shaped actuator				
		Force-guided motion sequence				
Mode of operation		Double-acting				
Gripper function		3-point				
Number of gripper jaws		3				
Max. applied load per external gripper finger[1]	[N]	0.1	0.3	0.7	1.6	2.5
Stroke per gripper jaw	[mm]	3	4	6	8	10
Pneumatic connection		M5	M5	M5	G1⁄8	G1⁄8
Pneumatic connection Sealing air		M5				
Repetition accuracy[2]	[mm]	≤ 0.03				
Max. operating frequency	[Hz]	≤ 4				
Position sensing		For proximity sensing				
Type of mounting		Via through-hole, locating pin or centring disc				
		Via female thread, locating pin or centring disc				
Mounting position		Any				

1) Valid for unthrottled operation
2) Concentric to the central shaft

Operating and environmental conditions			
Min. operating pressure	HGDT-...-A	[bar]	3
	HGDT-...-G...	[bar]	4
Max. operating pressure		[bar]	8
Sealing air operating pressure		[bar]	0 ... 0.5
Operating medium			Filtered compressed air, lubricated or unlubricated
Ambient temperature[1]		[°C]	+5 ... +60
Corrosion resistance class CRC[2]			2

1) Note operating range of proximity sensors
2) Corrosion resistance class 2 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

Three-point grippers HGDT, robust

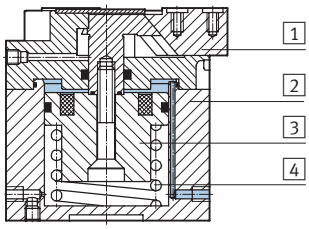
Technical data

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Weights [g]					
Size	25	35	40	50	63
HGDT-...-A	185	307	712	1,104	1,873
HGDT-...-G1	203	337	840	1,592	2,469
HGDT-...-G2	203	385	837	1,440	2,543

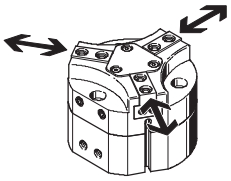
Materials

Sectional view



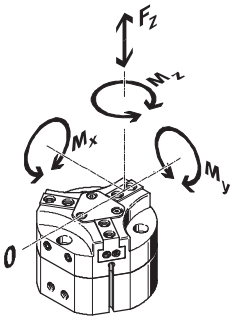
Three-point gripper		
1	Gripper jaw	Hardened steel
2	Housing	Aluminium, coated with CompCote
3	Piston	Anodised aluminium
4	Spring	Spring steel
–	Seals	Nitrile rubber
	Material note	Copper, PTFE and silicone-free

Gripping force [N] at 6 bar



Size	25	35	40	50	63
Gripping force per gripper jaw					
opening	82	164	229	347	576
closing	69	152	206	307	551
Total gripping force					
opening	246	492	687	1,041	1,728
closing	207	456	618	921	1,653
Total gripping force with spring support (gripping force retention)					
opening	286	555	814	1,159	2,186
closing	228	547	712	1,052	2,172

Characteristic load values at the gripper jaws



The indicated permissible forces and torques apply to a single gripper jaw. They include the lever arm, additional applied loads due to the workpiece or external gripper fingers, and acceleration forces occurring during movement.
The zero coordinate line (gripper finger point of rotation) must be taken into consideration for the calculation of torques.

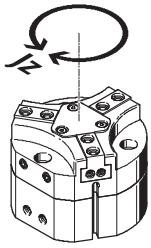
Size		25	35	40	50	63
Max. permissible force F_z	[N]	350	400	800	1,500	2,500
Max. permissible torque M_x	[Nm]	7	15	30	50	80
Max. permissible torque M_y	[Nm]	10	10	20	30	50
Max. permissible torque M_z	[Nm]	5	10	25	40	60

Three-point grippers HGDT, robust

Technical data

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Moment of inertia [kgcm²]

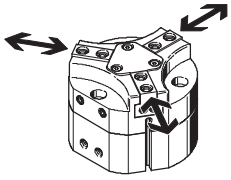


Requirements:
- The reference point is the central axis
- Without external gripper fingers
- In the load-free state

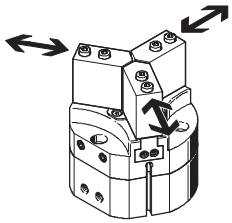
Size	25	35	40	50	63
HGDT-...-A	0.48	1.17	4.37	11.05	28.77
HGDT-...-G1	0.5	1.37	5.59	15.33	42.44
HGDT-...-G2	0.5	1.37	5.23	13.92	39.50

Opening and closing times [ms] at 6 bar

Without external gripper fingers



With external gripper fingers



The indicated opening and closing times [ms] have been measured at room temperature at an operating pressure of 6 bar with horizontally mounted gripper without additional gripper fingers. The grippers must be throttled for greater applied loads. Opening and closing times must then be adjusted accordingly.

Size		25	35	40	50	63
Without external gripper fingers						
HGDT-...-A	opening	28	40	62	85	152
	closing	25	45	59	75	142
HGDT-...-G1	opening	27	32	58	32	48
	closing	33	56	160	146	246
HGDT-...-G2	opening	33	46	111	61	159
	closing	25	35	87	70	107
With external gripper fingers per gripper finger (as a function of applied load)						
HGDT-...	0.2 N	80	–	–	–	–
	0.3 N	100	130	–	–	–
	0.7 N	150	200	115	–	–
	1 N	180	240	140	–	–
	1.5 N	220	290	170	–	–
	2 N	–	335	200	190	–
	2.5 N	–	–	220	210	190
	3 N	–	–	–	230	200
	4 N	–	–	–	270	230
	5 N	–	–	–	–	260

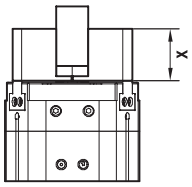
Three-point grippers HGDT, robust

Technical data

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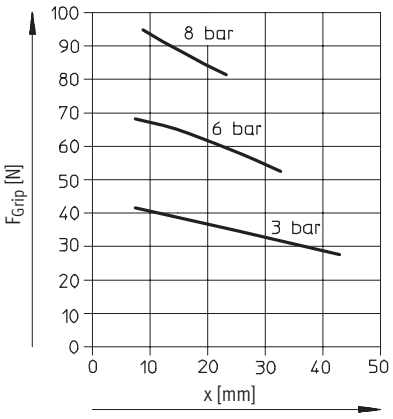
Gripping force F_{Grip} per gripper jaw as a function of operating pressure and lever arm x

The gripping forces, as a function of operating pressure and lever arm, can be determined from the following charts.

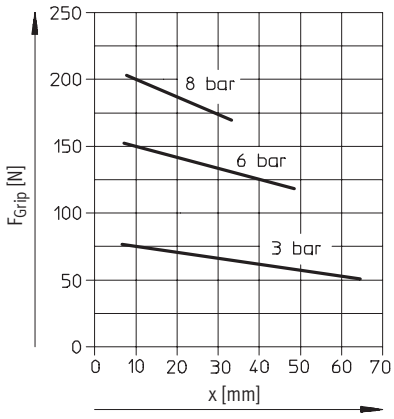


External gripping (closing)

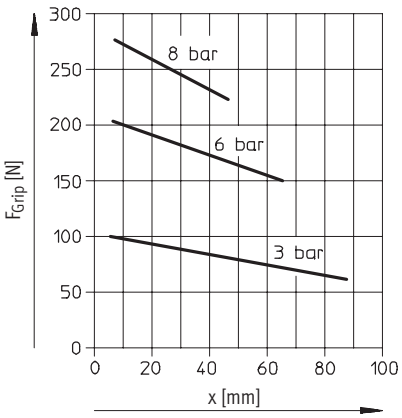
HGDT-25-A



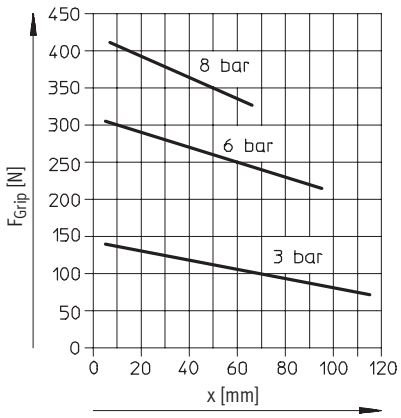
HGDT-35-A



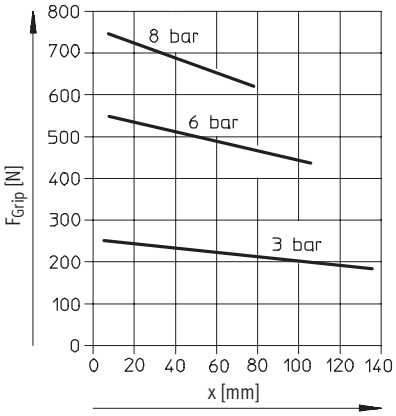
HGDT-40-A



HGDT-50-A



HGDT-63-A



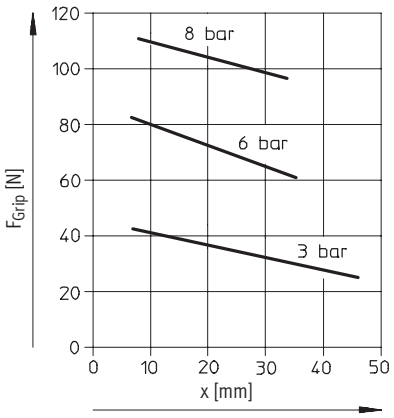
Three-point grippers HGDT, robust

Technical data

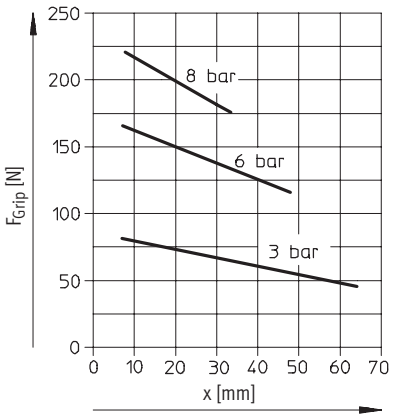
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Gripping force F_{Grip} per gripper jaw as a function of operating pressure and lever arm x
Internal gripping (opening)

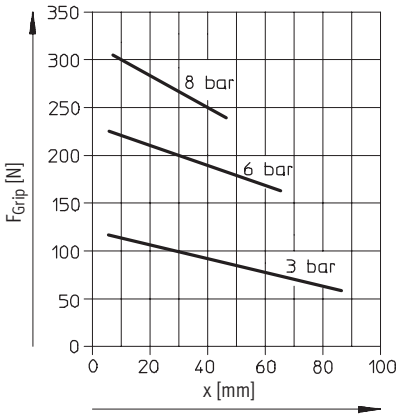
HGDT-25-A



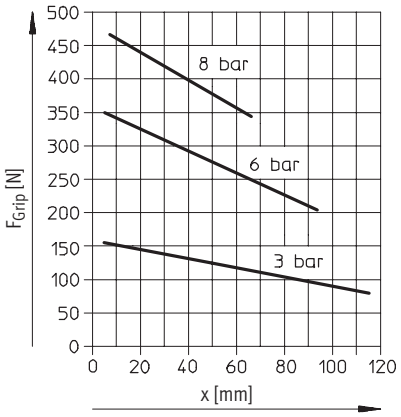
HGDT-35-A



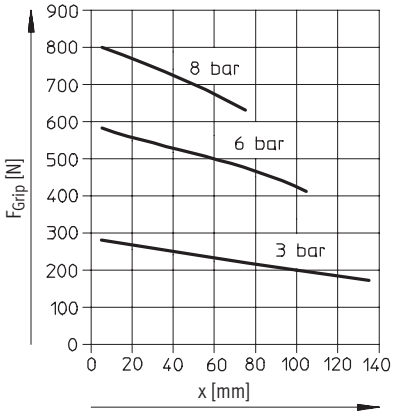
HGDT-40-A



HGDT-50-A



HGDT-63-A



Three-point grippers HGDT, robust

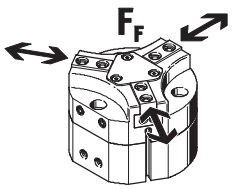
Technical data

FESTO

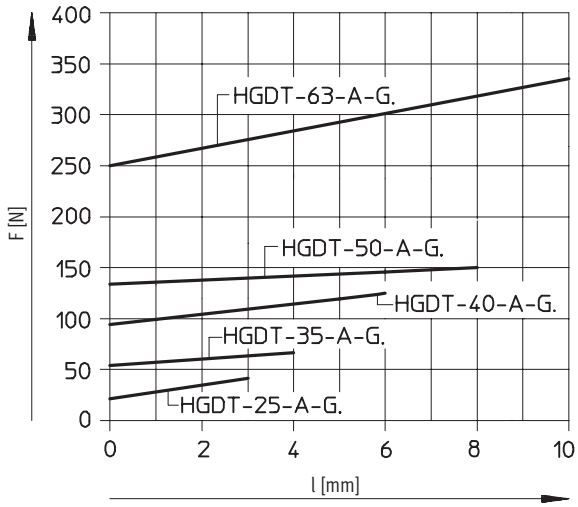
Spring force F_F as a function of size, gripper jaw stroke l and gripper length x, per gripper finger

Gripping force retention for HGDT-...-G...

The spring forces F_F as a function of the gripper jaw stroke can be determined from the following chart.



Size 25 ... 63



The lever arm x [mm] must be taken into consideration when determining the actual spring force F_{Stotal}.

The formulae for calculating the spring force are provided in the table opposite.

Size	F_{Stotal}, per gripper finger
25	$-0.3* x+0.85* F_{Spring}$
35	$-0.5* x+0.75* F_{Spring}$
40	$-0.5* x+0.8* F_{Spring}$
50	$-0.6* x+0.7* F_{Spring}$
63	$-0.6* x+0.75* F_{Spring}$

Determining the actual gripping forces F_{Gr} for HGDT-...-A-G1 and HGDT-...-A-G2 depending on the application, per gripper finger

The three-point slot grippers with integrated spring type HGDT-...-G1 (opening gripping force retention) and HGDT-...-G2 (closing gripping force retention) can be used as:

- single-acting grippers
- grippers with supplementary gripping force and
- grippers with gripping force retention

depending on the requirements.

In order to calculate the available gripping forces F_{Gr} (per gripper finger), the gripping force (F_{Grip}) and spring force (F_{Stotal}) must be combined accordingly.

Application forces per gripper finger

Single-acting	Supplementary gripping force	Gripping force retention
• Gripping with spring force: $F_{Gr} = F_{Stotal}$	• Gripping with pressure and spring force: $F_{Gr} = F_{Grip} + F_{Stotal}$	• Gripping with spring force: $F_{Gr} = F_{Stotal}$
• Gripping with pressure force: $F_{Gr} = F_{Grip} - F_{Stotal}$		

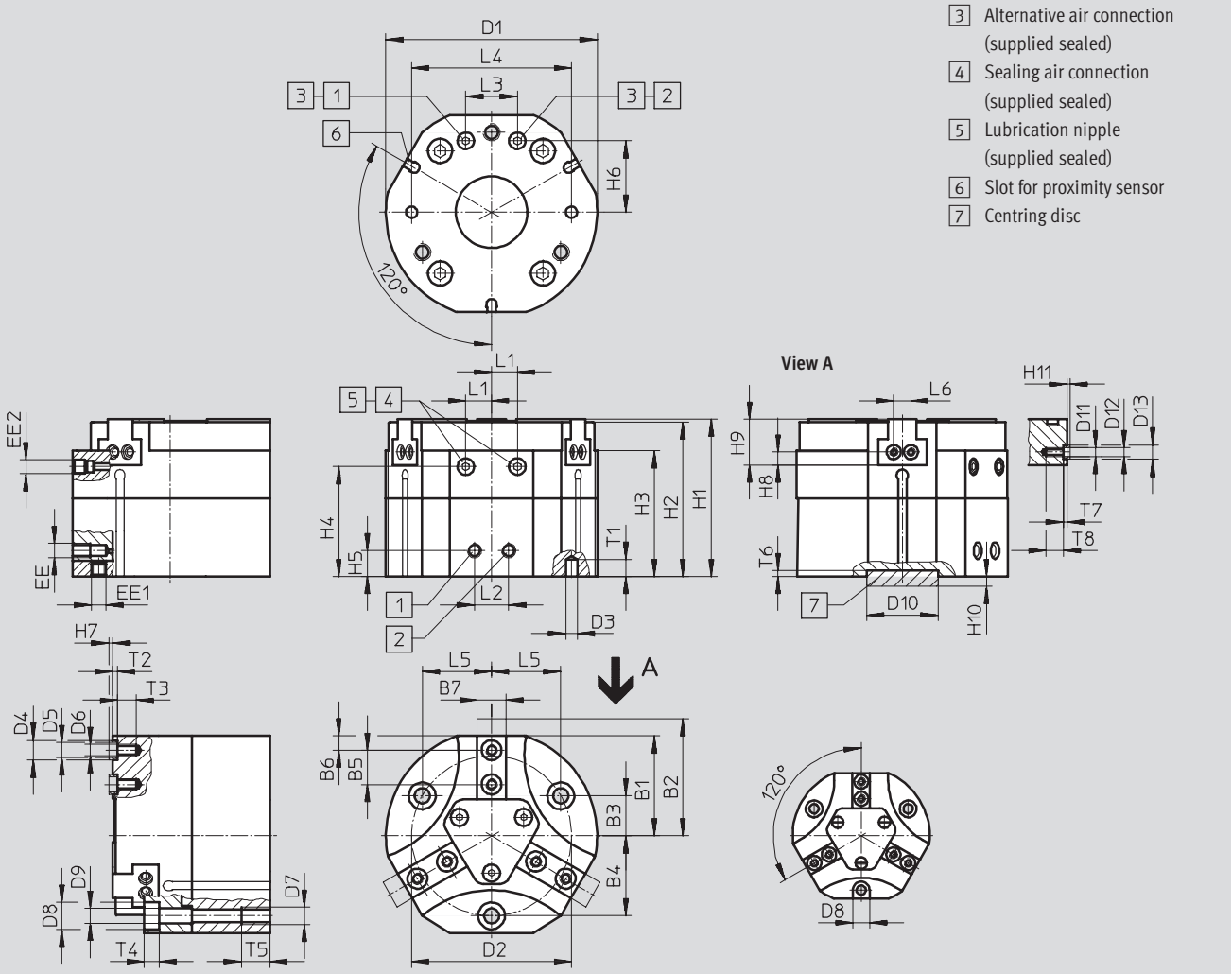
Three-point grippers HGDT, robust

Technical data

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Dimensions Download CAD data ➔ **www.festo.com/en/engineering**

1 Air connection – opening
2 Air connection – closing
3 Alternative air connection (supplied sealed)
4 Sealing air connection (supplied sealed)
5 Lubrication nipple (supplied sealed)
6 Slot for proximity sensor
7 Centring disc



Size [mm]	B1 ±0.5	B2 ±0.5	B3	B4	B5 ±0.02	B6 ±0.02	B7 −0.05 −0.1	D1 ∅ ±0.1	D2 ∅ ±0.1	D3 ∅ H8	D4 ∅ H8/h7	D5 ∅
HGDT-25-A HGDT-25-A-G...	22	25	9.5	19	6	3	6	48	38	3	5	3.2
HGDT-35-A HGDT-35-A-G...	27	31	11	22	8	4	6.5	58	44	3	5	3.2
HGDT-40-A HGDT-40-A-G...	35	41	14	28	12	5	10	74	56	4	7	5.3
HGDT-50-A HGDT-50-A-G...	43.5	51.5	17.5	35	15	6	12	93	70	5	9	6.4
HGDT-63-A HGDT-63-A-G...	54	64	22.5	45	18	10	14	116	90	5	9	6.4

Three-point grippers HGDT, robust

FESTO

Technical data

Size [mm]	D6 ∅	D7 ∅	D8 ∅ H13	D9 ∅ H13	D10 ∅ H8	D11	D12 ∅	D13 ∅ H8/h7	EE	EE1	EE2	H1 ±0.05
HGDT-25-A	M3	M4	5.9	3.3	14	M2	–	–	M5	M3	M5	41.5
HGDT-25-A-G...												
HGDT-35-A	M3	M4	5.9	3.3	25	M3	3.2	5	M5	M3	M5	46
HGDT-35-A-G...												52
HGDT-40-A	M4	M6	9.4	5.1	25	M3	3.2	5	M5	M5	M5	55
HGDT-40-A-G...												72
HGDT-50-A	M6	M8	10.2	6.4	25	M5	5.3	7	G1⁄8	M5	M5	64.5
HGDT-50-A-G...												82
HGDT-63-A	M6	M8	10.4	6.4	25	M5	5.3	7	G1⁄8	M5	M5	69
HGDT-63-A-G...												96

Size [mm]	H2 ±0.05	H3	H4	H5 ±0.1	H6 ±0.1	H7 −0.3	H8	H9 −0.02	H10 −0.2	H11 −0.3	L1 ±0.5	L2 ±0.1
HGDT-25-A	40.5	32.5	29.3	9	13.5	1.1	2.25±0.1	8.5	3.5	–	6	12
HGDT-25-A-G...												
HGDT-35-A	45	37	33.5	9	18.5	1.1	3±0.02	12	3.5	1.1	7	12
HGDT-35-A-G...	51	43	39.5									
HGDT-40-A	54	44	38.4	9	25	1.4	4.5±0.02	16	3.5	1.1	9	12
HGDT-40-A-G...	71	61	55.4									
HGDT-50-A	63.5	50.5	45	12	32	1.9	5.5±0.02	19	3.5	1.4	9	24
HGDT-50-A-G...	81	68	62.5									
HGDT-63-A	68	50	44.5	12	42	1.9	5.5±0.02	22	3.5	1.4	12	24
HGDT-63-A-G...	95	77	71.5									

Size [mm]	L3 ±0.1	L4 ±0.02	L5	L6	T1 min.	T2 +0.1	T3 min.	T4 +0.2	T5 min.	T6 +0.1	T7 +0.1	T8 min.
HGDT-25-A	12	38	16.45	6±0.1	3.5	1.3	5	3.2	8	2	–	3
HGDT-25-A-G...												
HGDT-35-A	15	45	19.05	6±0.02	5	1.3	5.5	3.2	8	2	1.3	6
HGDT-35-A-G...												
HGDT-40-A	18	56	24.25	6±0.02	6	1.6	6.5	5.1	10	2	1.3	6
HGDT-40-A-G...												
HGDT-50-A	18	70	30.31	13±0.02	8	2.1	10.5	6.1	12	2	1.6	9
HGDT-50-A-G...												
HGDT-63-A	24	90	38.97	13±0.02	8	2.1	10.5	6.1	12	2	1.6	9
HGDT-63-A-G...												

Ordering data

Size	Double-acting without compression spring		Single-acting or with gripping force retention open		 closed	
[mm]	Part No.	Type	Part No.	Type	Part No.	Type
25	**540 859**	**HGDT-25-A**	**540 860**	**HGDT-25-A-G1**	**540 861**	**HGDT-25-A-G2**
35	**540 862**	**HGDT-35-A**	**540 863**	**HGDT-35-A-G1**	**540 864**	**HGDT-35-A-G2**
40	**540 865**	**HGDT-40-A**	**540 866**	**HGDT-40-A-G1**	**540 867**	**HGDT-40-A-G2**
50	**540 868**	**HGDT-50-A**	**540 869**	**HGDT-50-A-G1**	**540 870**	**HGDT-50-A-G2**
63	**540 871**	**HGDT-63-A**	**540 872**	**HGDT-63-A-G1**	**540 873**	**HGDT-63-A-G2**

New

Three-point grippers HGDT, robust

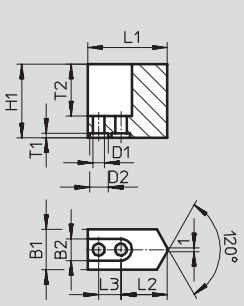
Accessories

Unmachined gripper finger
BUB-HGDT
(scope of delivery: 3 pieces)

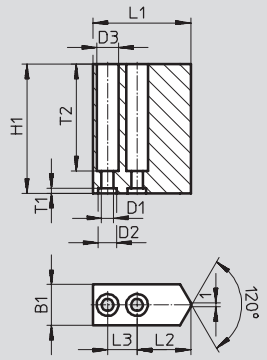
Material:
Wrought aluminium alloy
Copper, PTFE and silicone-free



BUB-HGDT-25



BUB-HGDT-35 ... 63



Dimensions and ordering data

For size [mm]	B1 ±0.05	B2 +0.22	D1 ∅ H13	D2 ∅ H8	D3 ∅ +0.22	H1 ±0.05	L1 ±0.05
25	11	5.9	3.2	5	–	20	21.6
35	11	–	3.2	5	5.9	35	26.5
40	16	–	4.3	7	7.4	50	34
50	20	–	6.3	9	10.4	65	42
63	24	–	6.3	9	10.4	80	52

For size [mm]	L2 ±0.02[1] ±0.1[2]	L3 ±0.01[1] ±0.1[1]	T1 +0.1	T2	Weights per unmachined part [g]	Part No.	Type
25	12.6	6	1.3	14	10	**541 101**	**BUB-HGDT-25**
35	14.5	8	1.3	29	22	**541 102**	**BUB-HGDT-35**
40	17	12	1.6	45	59	**541 103**	**BUB-HGDT-40**
50	21	15	2.1	58	112	**541 104**	**BUB-HGDT-50**
63	24	18	2.1	73	222	**541 105**	**BUB-HGDT-63**

1) For centring
2) For through-hole

Three-point grippers HGDT, robust

Accessories

Ordering data — Technical data ➔ www.festo.com

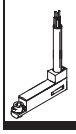
	For size [mm]	Remarks	Weights [g]	Part No.	Type	PU[1]
Centring sleeve						
	25, 35	For centring unmachined gripper jaws/gripper fingers on the gripper jaws	1	**189 652**	**ZBH-5**	10
	40		1	**186 717**	**ZBH-7**	10
	50, 63		1	**150 927**	**ZBH-9**	10
	35, 40	For lateral centring of gripper fingers on the gripper jaws	1	**189 652**	**ZBH-5**	10
	50, 63		1	**186 717**	**ZBH-7**	10
Central mounting						
	25	For centring the gripper when mounting	21	**150 900**	**SLZZ-16/10**	–
	35, 40, 50, 63		40	**150 901**	**SLZZ-25/16**	–
Blanking plugs						
	25 ... 63	For sealing the compressed air connections	0.6	**30 979**	**B-M3-S9**	10
			1	**174 308**	**B-M5-B**	10
			5	**3 568**	**B-⅛**	10

1) Packaging unit quantity

Ordering data – Proximity sensors for rounded slot, longitudinal connecting cable — Technical data ➔ www.festo.com

	Assembly	Electrical connection		Cable length [m]	Part No.	Type
		Cable	M8 plug			
NO contact, magneto-resistive						
	Insertable from end	–	3-pin	0.3	**173 220**	**SMT-10-PS-SL-LED-24**
		3-wire	–	2.5	**173 218**	**SMT-10-PS-KL-LED-24**

Ordering data – Proximity sensors for rounded slot, lateral connecting cable — Technical data ➔ www.festo.com

	Assembly	Electrical connection		Cable length [m]	Part No.	Type
		Cable	M8 plug			
	NO contact, magneto-resistive					
	Insertable from end	3-wire	–	2.5	**173 219**	**SMT-10-PS-KQ-LED-24**
		–	3-pin	0.3	**173 221**	**SMT-10-PS-SQ-LED-24**

Ordering data – Plug socket with cable — Technical data ➔ www.festo.com

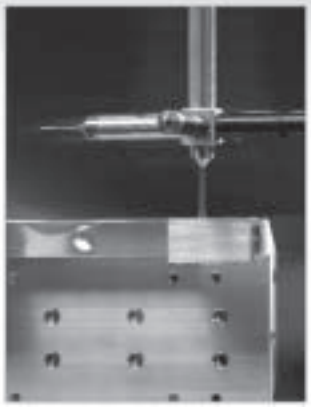
	Assembly	Switch output		Connection	Cable length [m]	Part No.	Type
		PNP	NPN				
Straight plug socket							
	M8 union nut	■	■	3-pin	2.5	**159 420**	**SIM-M8-3GD-2,5-PU**
					5	**159 421**	**SIM-M8-3GD-5-PU**
Angled plug socket							
	M8 union nut	■	■	3-pin	2.5	**159 422**	**SIM-M8-3WD-2,5-PU**
					5	**159 423**	**SIM-M8-3WD-5-PU**

Aspects of quality

Quality can be viewed from a number of aspects. A short virtual tour of the Research and Development department, the Production department or the Customer Service Centre speaks more than a thousand words.

3D engineering and simulation





Innovation quality

Let's look at some of the figures:

- 6.5% of turnover
- 2,800 patents with 100 new applications every year
- 3D engineering and simulation
- 10,600 employees worldwide
- Each and every one of them a lateral thinker

Production quality

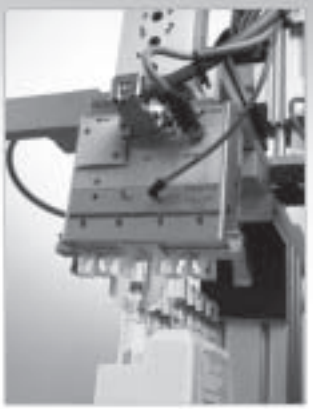
Your interest is quality and economy – therefore we place considerable value on:

- Minimum production tolerances
- Ultra-modern, proprietary production methods
- Core competencies in production
- Defined quality standards across the entire production chain
- Strict quality assurance systems: on that you can depend.



Price quality

More service for less money. Many of the new and further developments in the Festo product range have one thing in common: they are technically superior and more attractively priced than their predecessor product. Examples are to be found in all product segments: among the drives, valves, valve terminals; among the service units, and among the range of accessories.



Range quality

For individual solutions. Festo offers components as industry-specific catalogue products as well as standards-based and highly individual special designs. Ready-to-install combinations of these components play an integral part in the Festo product portfolio as modules or systems. Incidentally, an increasing number of components can be individually configured as modular products.

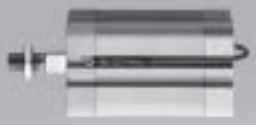


Didactic quality

To complement the products and services for automation, Festo Didactic offers exceptionally efficient training hardware, learning software and seminars of the highest quality. Optimally tailored to your value creation sequence.
In short – training in practical applications for practical application.

Products and services – everything from a single source

Products incorporating new ideas are created when enthusiasm for technology and efficiency come together. Tailor-made service goes without saying when the customer is the focus of attention.



Pneumatic and electrical drives

- Pneumatic cylinders
- Semi-rotary drives
- Handling modules
- Servopneumatic positioning systems
- Electromechanical drives
- Positioning controllers and controllers



Valves and valve terminals

- Standard valves
- Universal and application-optimised valves
- Manually and mechanically actuated valves
- Shut-off, pressure control and flow control valves
- Proportional valves
- Safety valves

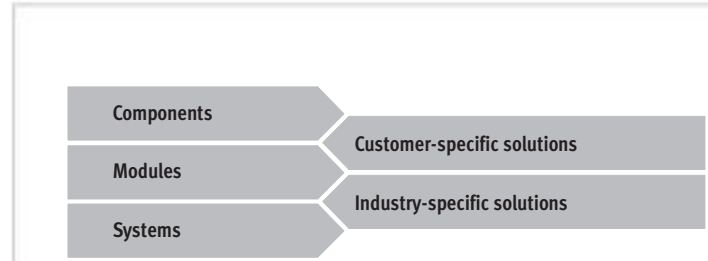
Fieldbus systems/ electrical peripherals

- Fieldbus Direct
- Installation system CP/CPI
- Modular electrical terminal CPX



Compressed air preparation

- Service unit combinations
- Filter regulators
- Filters
- Pressure regulators
- Lubricators
- On-off and soft-start valves
- Dryers
- Pressure amplifiers
- Accessories for compressed air preparation



Services from Festo to increase your productivity – across the entire value creation sequence



Engineering – for greater speed in the development process

- CAD models
- 14 engineering tools
- Digital catalogue
- FluidDRAW®
- More than 1,000 technical consultants and project engineers worldwide
- Technical hotlines



Supply chain – for greater speed in the procurement process

- E-commerce and online shop
- Online order tracking
- Euro special manufacturing service
- Logistics optimisation



Gripping and vacuum technology

- Vacuum generators
- Vacuum grippers
- Vacuum security valves
- Vacuum accessories
- Standard grippers
- Micro grippers
- Precision grippers
- Heavy-duty grippers



Sensors and monitoring units

- Proximity sensors
- Pressure and flow sensors
- Display and operating units
- Inductive and optical proximity sensors
- Displacement encoders for positioning cylinders
- Optical orientation detection and quality inspection



Controllers/bus systems

- Pneumatic and electropneumatic controllers
- Programmable logic controllers
- Fieldbus systems and accessories
- Timers/counters
- Software for visualisation and data acquisition
- Display and operating units



Accessories

- Pipes
- Tubing
- Pipe connectors and fittings
- Electrical connection technology
- Silencers
- Reservoirs
- Air guns

All in all, 100% product and service quality

A customer-oriented range with unlimited flexibility:
Components combine to produce ready-to-install modules and systems. Included in this are special designs – since at Festo, most industry-specific products and customer-specific solutions are based on the 23,000 plus catalogue products. Combined with the services for the entire value creation sequence, the end result is unbeatable economy.



Assembly – for greater speed in the assembly/commissioning process

- Prepack
- Preassembly
- Turnkey pneumatics
- Handling solutions



Operation – for greater speed in the operational process

- Spare parts service
- Energy saving service
- Compressed air consumption analysis
- Compressed air quality analysis
- Customer service

What must be observed when using Festo components?

Specified limit values for technical data and any specific instructions must be adhered to by the user in order to ensure recommended operating conditions.
When pneumatic components are used, the user shall ensure that they are operated using correctly prepared compressed air without aggressive media.
When Festo components are used in safety-oriented applications, the user shall ensure that all applicable national and local safety laws and regulations, for example the machine directive, together with the relevant references to standards are observed.
Unauthorised conversions or modifications to products and systems from Festo involve a safety risk and are thus not permissible.
Festo does not accept any liability for resulting damages.
You should contact Festo's advisors if one of the following apply to your application:

- The ambient conditions and conditions of use or the operating medium differ from the specified technical data.
- The product is to perform a safety function.
- A risk or safety analysis is required.
- You are unsure about the product's suitability for use in the planned application.
- You are unsure about the product's suitability for use in safety-oriented applications.

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