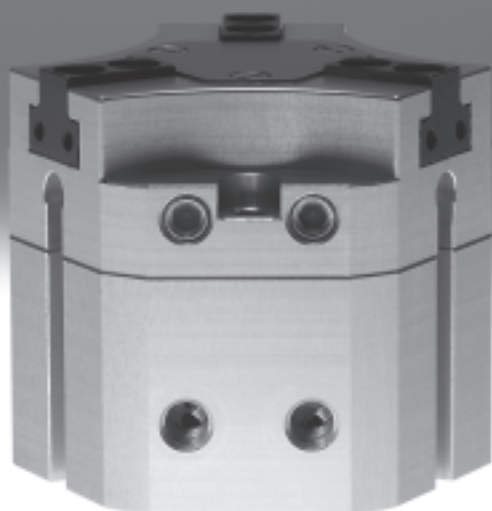


Heavy-duty three-point grippers HGDT

FESTO



Heavy-duty three-point grippers HGDT

Key features

FESTO

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.

There are two variants available:

Standard – HGDT-...

Stroke per gripper jaw:

3 ... 10 mm

Total gripping force:

207 ... 1,728 N

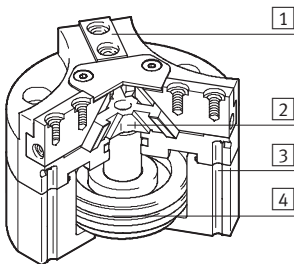
High force – HGDT-...-F

Stroke per gripper jaw:

1.5 ... 5 mm

Total gripping force:

411 ... 3,372 N



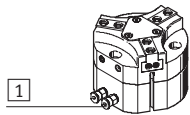
- 1 Gripper jaw
- 2 Triple wedge mechanism
- 3 Slot for proximity sensor
- 4 Piston with magnet

Note

Design software
for gripper selection
→ www.festo.com

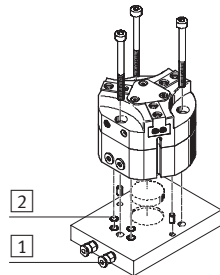
Wide range of supply ports

Direct
from the front



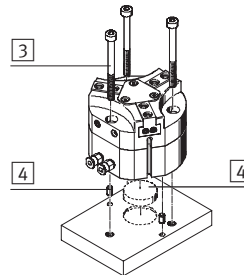
- 1 Supply ports
- 2 O-rings

Via adapter plate
from underneath



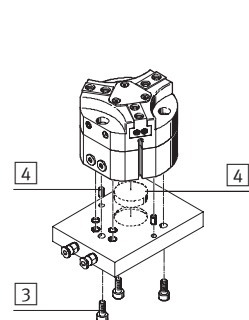
Mounting options

Direct mounting
from above



- 3 Mounting screws
- 4 Centring pins or centring disc

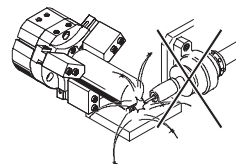
Via adapter plate
from underneath



Note

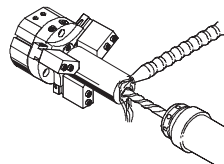
These grippers are not suitable or are of limited suitability for the following application examples:

Not suitable for:

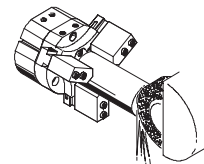


- Welding splashes

Of limited suitability for:



- Machining with sealing air possible
- Aggressive media only possible after consultation with Festo

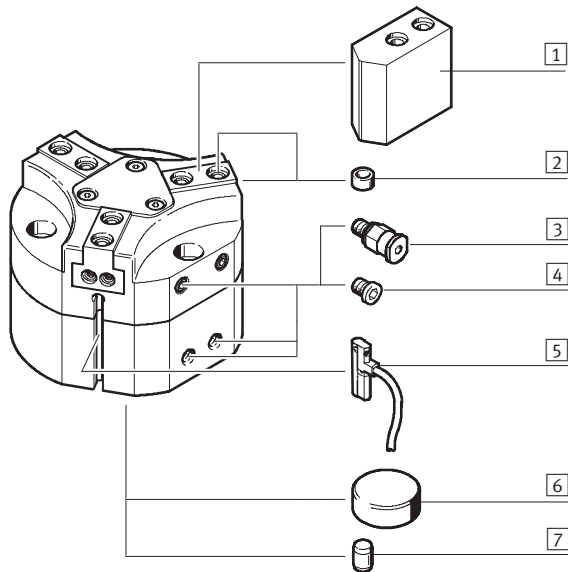


Heavy-duty three-point grippers HGDT

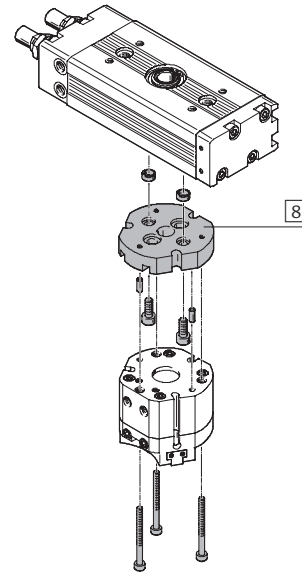
Peripherals overview and type codes

FESTO

Peripherals overview



System product for handling and assembly technology



Accessories			
Type	Brief description		→ Page/Internet
1 Gripper jaw blank BUB-HGDT	Blank specially matched to the gripper jaws for custom building of gripper fingers		15
2 Centring sleeve ZBH	For centring gripper jaw blanks/gripper fingers on the gripper jaws		16
3 Push-in fitting QS	For connecting compressed air tubing with standard outside diameter		quick star
4 Blanking plug B	For sealing supply ports when using ports at the front		16
5 Proximity sensor SMT-10	For sensing the piston position, 3 slots available		16
6 Central mounting SLZZ	For centring the gripper when mounting		16
7 Locating pin	For centring the gripper when mounting		–
8 –	Drive/gripper connectors		adapter kit

Type codes

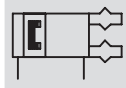
		HGDT	–	25	–	A	–	F	–	G1
Type										
HGDT	Three-point gripper									
Size										
Position sensing										
A	Via proximity sensor									
Force variant										
F	High force									
Gripping force retention										
G1	Opening									
G2	Closing									

Heavy-duty three-point grippers HGDT

FESTO

Technical data

Function
Double-acting
HGDT-...-A



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



... closing HGDT-...-G2



$\varnothing$ - Size
25 ... 63
 - I - Stroke
1.5 ... 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				
Stroke per gripper jaw	HGDT-...-A	[mm]	3	4	6	8	10
	HGDT-...-A-F	[mm]	1.5	2	3	4	5
Pneumatic connection			M5	M5	M5	G1/8	G1/8
Pneumatic connection for sealing air			M5				
Repetition accuracy ¹⁾		[mm]	≤0.03				
Max. operating frequency		[Hz]	≤4				
Position sensing			Via proximity sensor				
Type of mounting			Via through-hole, locating pin or centring disc				
			Via female thread, locating pin or centring disc				
Mounting position			Any				

1) Concentric to the central shaft

Operating and environmental conditions		
Min. operating pressure	HGDT-... [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 as per 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.

Heavy-duty three-point grippers HGDT

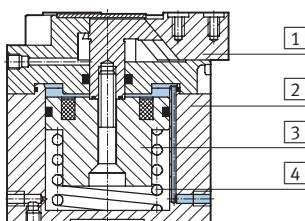
FESTO

Technical data

Weight [g]					
Size	25	35	40	50	63
HGDT-...	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

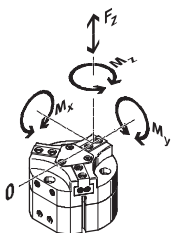
Materials

Sectional view



Three-point gripper	
1	Gripper jaw
2	Housing
3	Piston
4	Spring
-	Seals
-	Note on materials
	Hardened steel
	Aluminium, coated with CompCote
	Anodised aluminium
	Spring steel
	Nitrile rubber
	Free of copper, PTFE and silicone
	RoHS-compliant

Characteristic load values at the gripper jaws

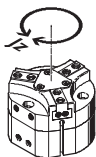


The indicated permissible forces and torques apply to a single gripper jaw. They include the lever arm, additional applied loads due to the workpiece or external gripper fingers and acceleration forces occurring during movement.

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

Moment of inertia [kgcm²]



Requirements:

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

Size	25	35	40	50	63
HGDT-...	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

Heavy-duty three-point grippers HGDT

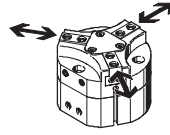
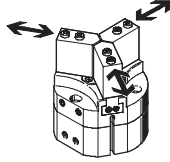
Technical data

FESTO

Opening and closing times [ms] at 6 bar

Without external gripper fingers

With external gripper fingers

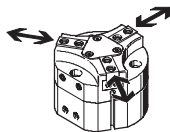


The indicated opening and closing times [ms] have been measured at room temperature at an operating pressure of 6 bar with horizontally mounted gripper without additional

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							
Standard	HGDT-...-A	opening	28	40	62	85	152
		closing	25	45	59	75	142
	HGDT-...-A-G1	opening	27	32	58	32	48
		closing	33	56	160	146	246
	HGDT-...-A-G2	opening	33	46	111	61	159
		closing	25	35	87	70	107
High force	HGDT-...-A-F	opening	20	43	48	96	163
		closing	30	39	49	83	162
	HGDT-...-A-F-G1	opening	25	29	63	31	70
		closing	61	67	190	170	299
	HGDT-...-A-F-G2	opening	38	53	117	88	169
		closing	33	36	104	65	128
With external gripper fingers per gripper finger (as a function of weight force)							
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		

Gripping force [N] at 6 bar



Size			25	35	40	50	63
Gripping force per gripper jaw							
Standard	HGDT-...-A	opening	82	164	229	347	576
		closing	69	152	206	307	551
High force	HGDT-...-A-F	opening	180	294	367	740	1,124
		closing	148	274	330	625	864
Total gripping force							
Standard	HGDT-...-A	opening	246	492	687	1,041	1,728
		closing	207	456	618	921	1,653
High force	HGDT-...-A-F	opening	540	882	1,101	2,220	3,372
		closing	444	822	990	1,875	2,592
Total gripping force with spring support (gripping force retention)							
Standard	HGDT-...-A	opening	286	555	814	1,159	2,186
		closing	228	547	712	1,052	2,172
High force	HGDT-...-A-F	opening	708	1,254	1,629	2,800	4,456
		closing	612	1,194	1,518	2,655	4,338

Heavy-duty three-point grippers HGDT

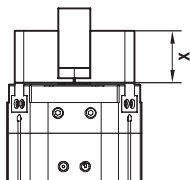
Technical data

FESTO

Standard – HGDT-...

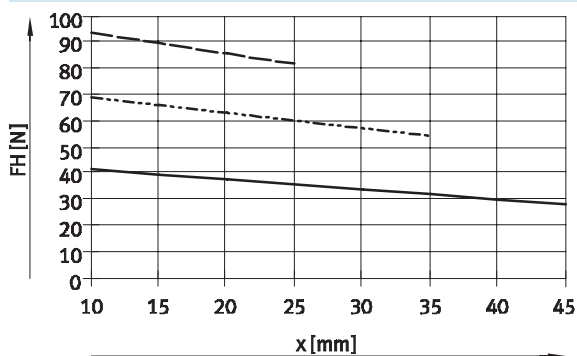
Gripping force F_{Grip} per gripper jaw as a function of operating pressure and lever arm x

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

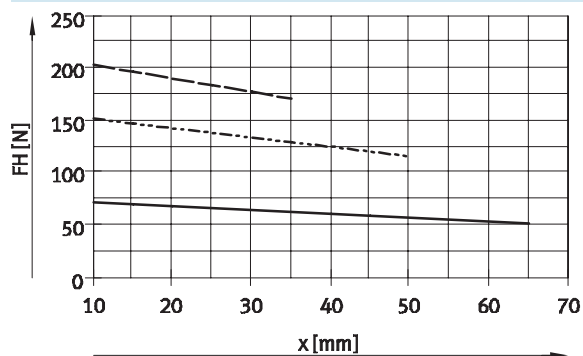


External gripping (closing)

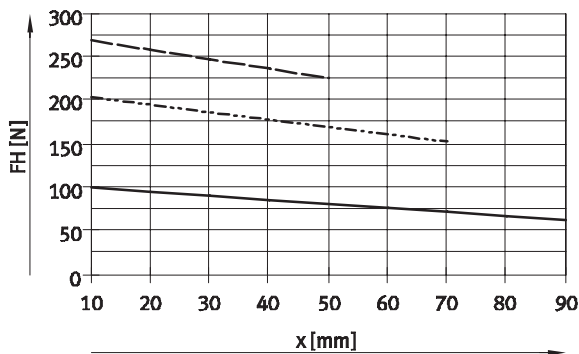
HGDT-25-A



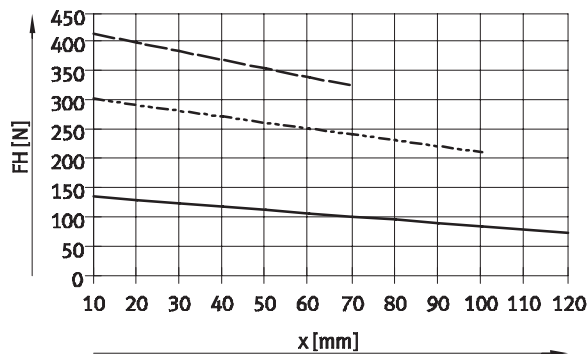
HGDT-35-A



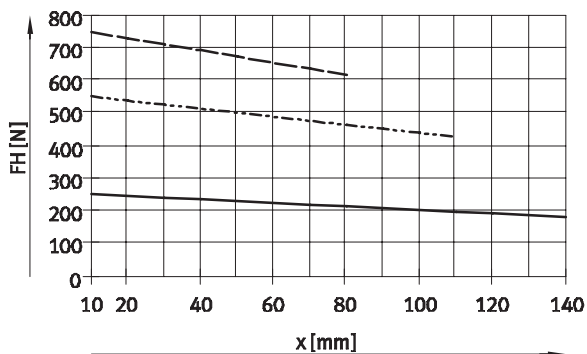
HGDT-40-A



HGDT-50-A



HGDT-63-A



— 3 bar
 - - - 6 bar
 - · - 8 bar

Heavy-duty three-point grippers HGDT

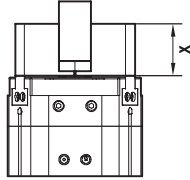
Technical data

FESTO

Standard – HGDT-...

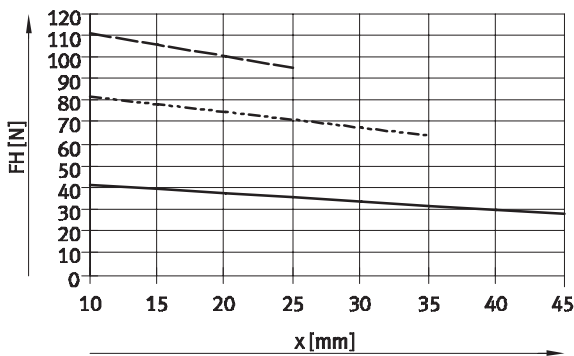
Gripping force F_{Grip} per gripper jaw as a function of operating pressure and lever arm x

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

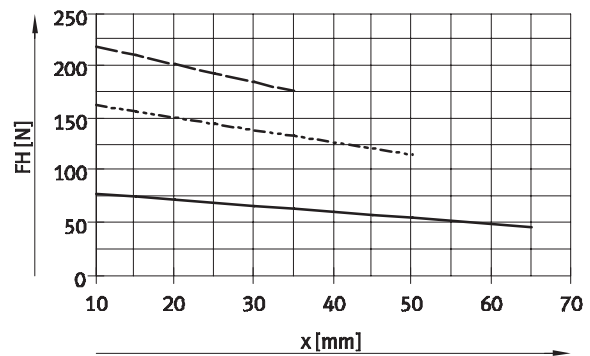


Internal gripping (opening)

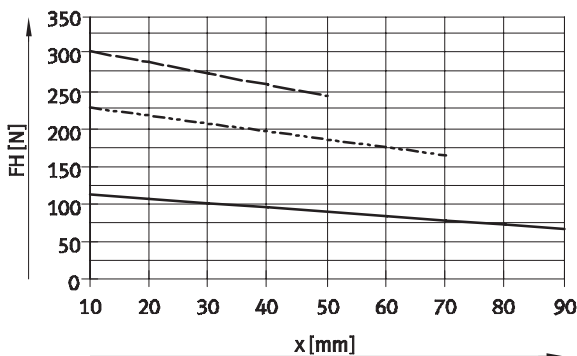
HGDT-25-A



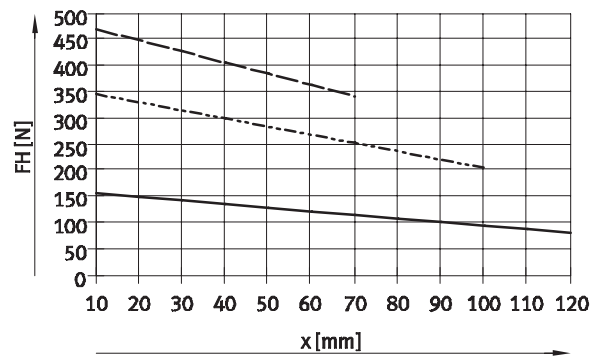
HGDT-35-A



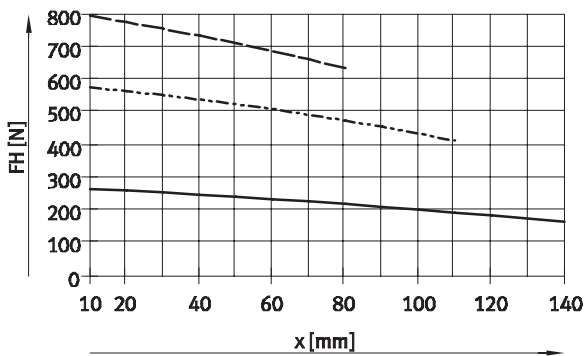
HGDT-40-A



HGDT-50-A



HGDT-63-A



— 3 bar
 - - - 6 bar
 - · - 8 bar

Heavy-duty three-point grippers HGDT

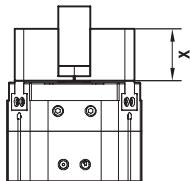
FESTO

Technical data

High force – HGDT-...-F

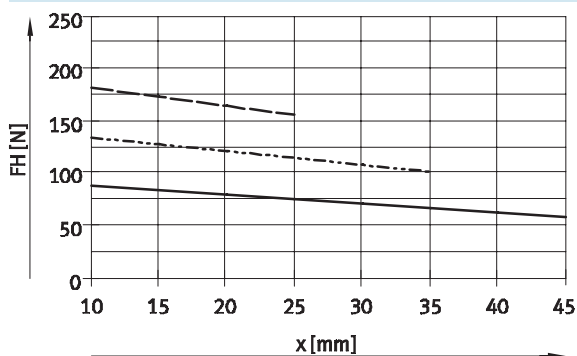
Gripping force F_{Grip} per gripper jaw as a function of operating pressure and lever arm x

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

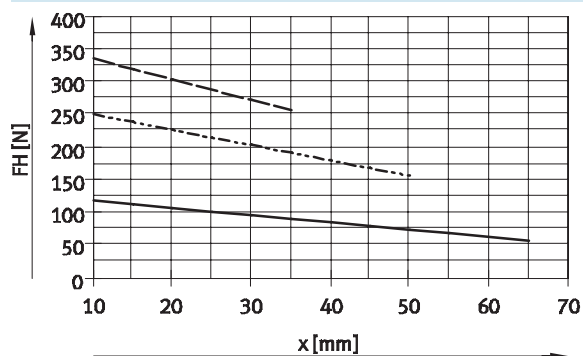


External gripping (closing)

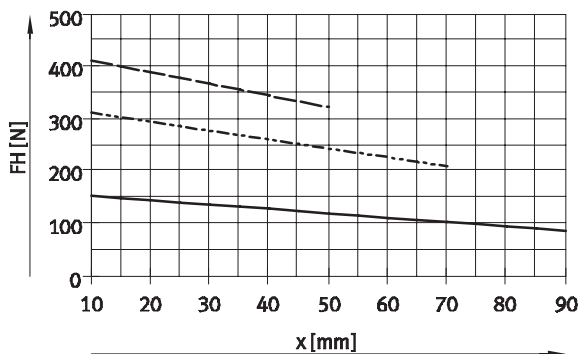
HGDT-25-A-F



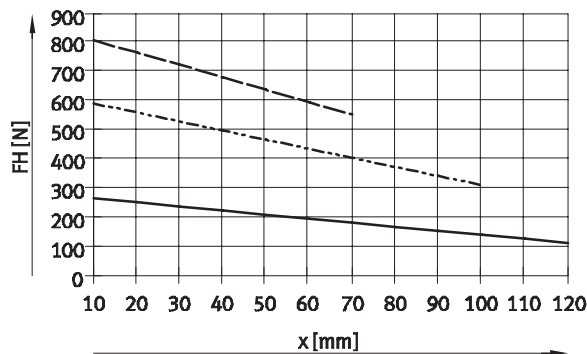
HGDT-35-A-F



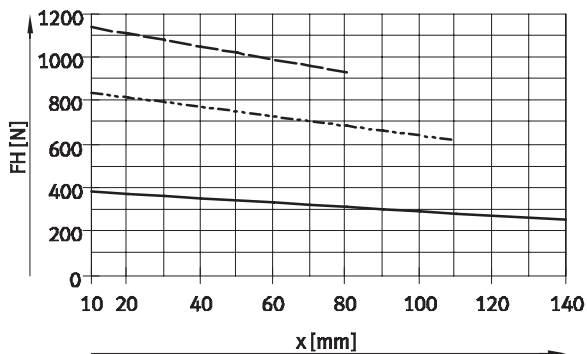
HGDT-40-A-F



HGDT-50-A-F



HGDT-63-A



— 3 bar
 - - - 6 bar
 - · - 8 bar

Heavy-duty three-point grippers HGDT

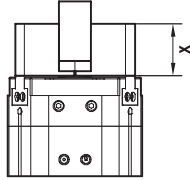
Technical data

FESTO

High force – HGDT-...-F

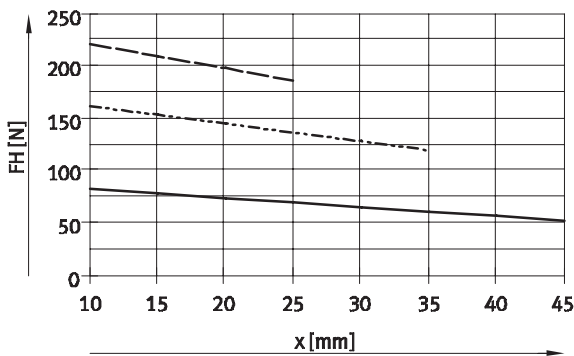
Gripping force F_{Grip} per gripper jaw as a function of operating pressure and lever arm x

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

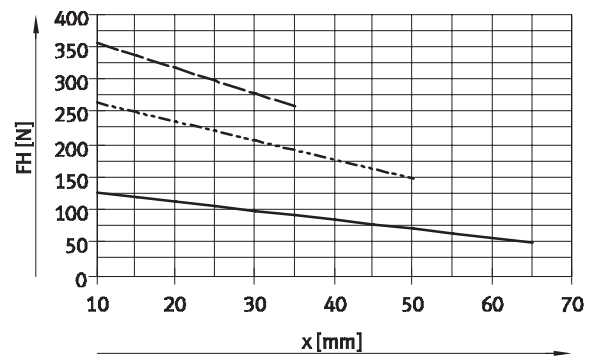


Internal gripping (opening)

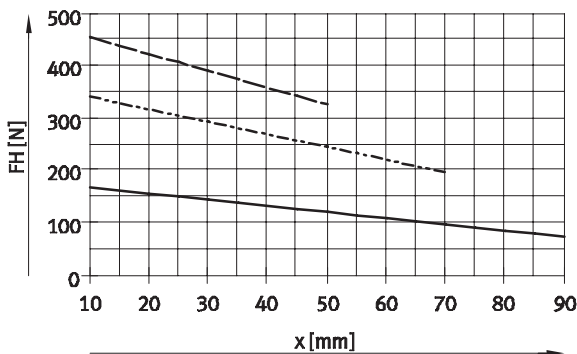
HGDT-25-A-F



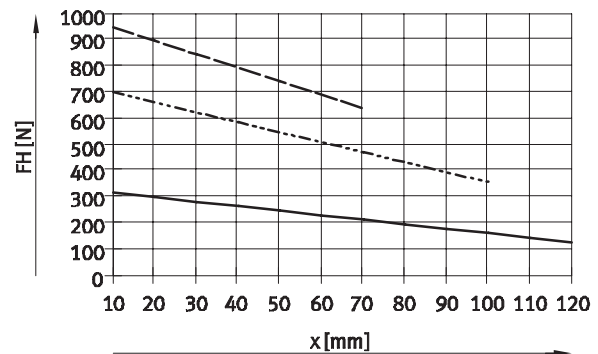
HGDT-35-A-F



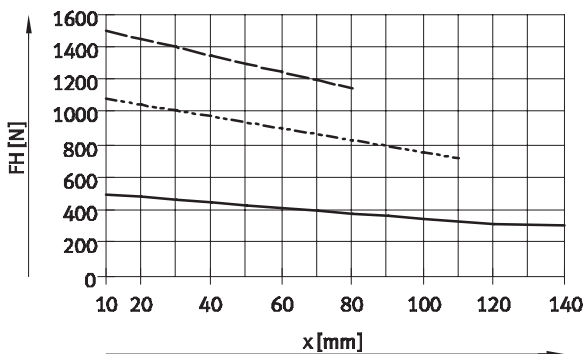
HGDT-40-A-F



HGDT-50-A-F



HGDT-63-A-F



— 3 bar
 - - - 6 bar
 - · - 8 bar

Heavy-duty three-point grippers HGDT

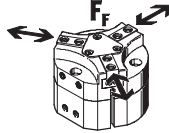
Technical data

FESTO

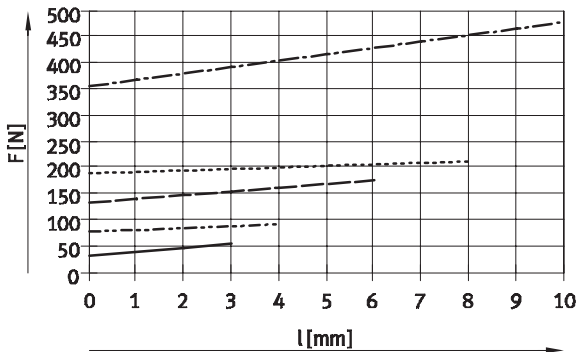
Spring force F_S as a function of size, gripper jaw stroke l and gripper length x , per gripper finger

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

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

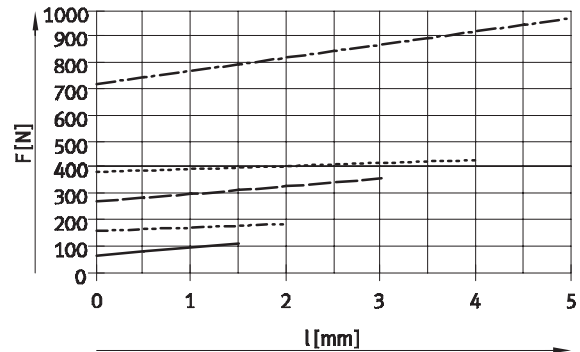


Standard – HGDT-...



— HGDT-25-A-G... - - - - - HGDT-50-A-G...
 - - - - - HGDT-35-A-G... - · - · - HGDT-63-A-G...
 - - - - - HGDT-40-A-G...

High force – HGDT-...-F-...



— HGDT-25-A-F-G... - - - - - HGDT-50-A-F-G...
 - - - - - HGDT-35-A-F-G... - · - · - HGDT-63-A-F-G...
 - - - - - HGDT-40-A-F-G...

The lever arm x [mm] must be taken into consideration when determining the actual spring force $F_{S\text{total}}$.

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

Size	$F_{S\text{total}}$, per gripper finger	
	Standard – HGDT-...	High force – HGDT-...-F
25	$-0.3 \cdot x + 0.85 \cdot F_S$	$-2.24 \cdot x + 0.64 \cdot F_S$
35	$-0.5 \cdot x + 0.75 \cdot F_S$	$-0.97 \cdot x + 0.7 \cdot F_S$
40	$-0.5 \cdot x + 0.8 \cdot F_S$	$-1.45 \cdot x + 0.66 \cdot F_S$
50	$-0.6 \cdot x + 0.7 \cdot F_S$	$-0.97 \cdot x + 0.51 \cdot F_S$
63	$-0.6 \cdot x + 0.75 \cdot F_S$	$-2.35 \cdot x + 0.72 \cdot F_S$

Determining the actual gripping forces F_{Gr} for HGDT-...-A-G1 and HGDT-...-A-G2 as a function of the application, per gripper finger

The three-point 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 ($F_{S\text{total}}$) must be combined accordingly.

Application forces per gripper finger

Single-acting	Supplementary gripping force	Gripping force retention
- Gripping with spring force: $F_{Gr} = F_{S\text{total}}$ - Gripping with pressure force: $F_{Gr} = F_{Grip} - F_{S\text{total}}$	Gripping with pressure and spring force: $F_{Gr} = F_{Grip} + F_{S\text{total}}$	Gripping with spring force: $F_{Gr} = F_{S\text{total}}$

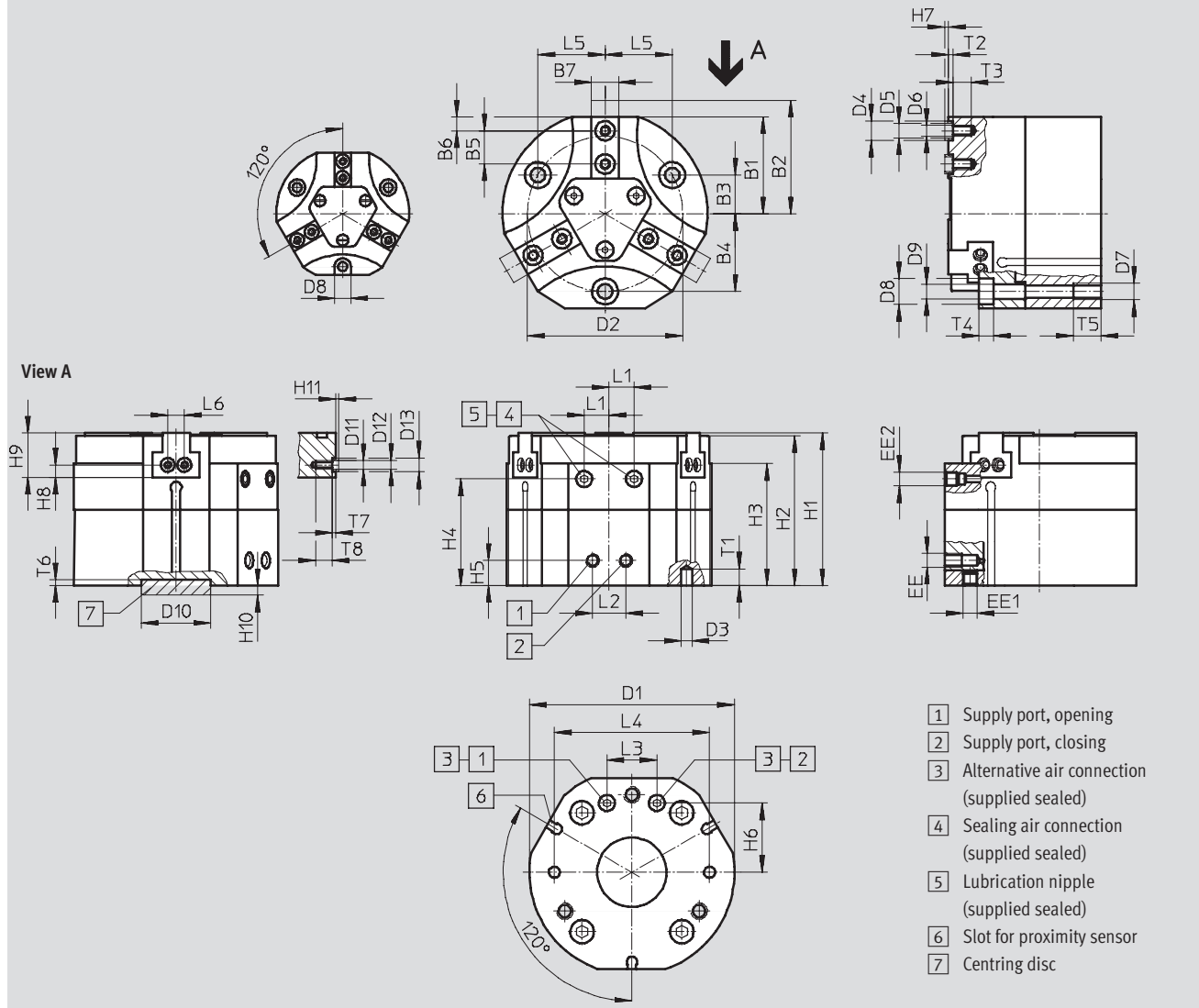
Heavy-duty three-point grippers HGDT

Technical data

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Dimensions

Download CAD Data → www.festo.com/us/cad



Size [mm]	B1 ±0.5	B2		B3	B4	B5 ±0.02	B6 ±0.02	B7 -0.05 -0.1	D1 ∅ ±0.1	D2 ∅ ±0.1
		with HGDT-... ±0.5	with HGDT-...F ±0.5							
HGDT-25-A	22	25	23.5	9.5	19	6	3	6	48	38
HGDT-25-A-G...										
HGDT-35-A	27	31	29	11	22	8	4	6.5	58	44
HGDT-35-A-G...										
HGDT-40-A	35	41	38	14	28	12	5	10	74	56
HGDT-40-A-G...										
HGDT-50-A	43.5	51.5	47.5	17.5	35	15	6	12	93	70
HGDT-50-A-G...										
HGDT-63-A	54	64	59	22.5	45	18	10	14	116	90
HGDT-63-A-G...										

Heavy-duty three-point grippers HGDT

Technical data

FESTO

Size [mm]	D3 ∅ H8	D4 ∅ H8/h7	D5 ∅	D6 ∅	D7 ∅	D8 ∅ H13	D9 ∅ H13	D10 ∅ H8	D11	D12 ∅	D13 ∅ H8/h7	EE	EE1
HGDT-25-A	3	5	3.2	M3	M4	5.9	3.3	14	M2	–	–	M5	M3
HGDT-25-A-G...													
HGDT-35-A	3	5	3.2	M3	M4	5.9	3.3	25	M3	3.2	5	M5	M3
HGDT-35-A-G...													
HGDT-40-A	4	7	5.3	M4	M6	9.4	5.1	25	M3	3.2	5	M5	M5
HGDT-40-A-G...													
HGDT-50-A	5	9	6.4	M6	M8	10.2	6.4	25	M5	5.3	7	G ¹ / ₈	M5
HGDT-50-A-G...													
HGDT-63-A	5	9	6.4	M6	M8	10.4	6.4	25	M5	5.3	7	G ¹ / ₈	M5
HGDT-63-A-G...													

Size [mm]	EE2	H1 ±0.05	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
HGDT-25-A	M5	41.5	40.5	32.5	29.3	9	13.5	1.1	2.25±0.1	8.5	3.5	–	6
HGDT-25-A-G...													
HGDT-35-A	M5	46	45	37	33.5	9	18.5	1.1	3±0.02	12	3.5	1.1	7
HGDT-35-A-G...													
HGDT-40-A	M5	55	54	44	38.4	9	25	1.4	4.5±0.02	16	3.5	1.1	9
HGDT-40-A-G...													
HGDT-50-A	M5	64.5	63.5	50.5	45	12	32	1.9	5.5±0.02	19	3.5	1.4	9
HGDT-50-A-G...													
HGDT-63-A	M5	69	68	50	44.5	12	42	1.9	5.5±0.02	22	3.5	1.4	12
HGDT-63-A-G...													

Size [mm]	L2 ±0.1	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	12	38	16.45	6±0.1	3.5	1.3	5	3.2	8	2	–	3
HGDT-25-A-G...													
HGDT-35-A	12	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	12	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	24	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	24	90	38.97	13±0.02	8	2.1	10.5	6.1	12	2	1.6	9
HGDT-63-A-G...													

Heavy-duty three-point grippers HGDT



Technical data

Ordering data					
Size [mm]	Double-acting without compression spring Part No. Type		Single-acting or with gripping force retention		
			opening Part No. Type		closing Part No. Type
Standard					
25	540859	HGDT-25-A	540860	HGDT-25-A-G1	540861 HGDT-25-A-G2
35	540862	HGDT-35-A	540863	HGDT-35-A-G1	540864 HGDT-35-A-G2
40	540865	HGDT-40-A	540866	HGDT-40-A-G1	540867 HGDT-40-A-G2
50	540868	HGDT-50-A	540869	HGDT-50-A-G1	540870 HGDT-50-A-G2
63	540871	HGDT-63-A	540872	HGDT-63-A-G1	540873 HGDT-63-A-G2
High force					
25	560177	HGDT-25-A-F	560178	HGDT-25-A-F-G1	560179 HGDT-25-A-F-G2
35	560180	HGDT-35-A-F	560181	HGDT-35-A-F-G1	560182 HGDT-35-A-F-G2
40	560183	HGDT-40-A-F	560184	HGDT-40-A-F-G1	560185 HGDT-40-A-F-G2
50	560186	HGDT-50-A-F	560187	HGDT-50-A-F-G1	560188 HGDT-50-A-F-G2
63	560189	HGDT-63-A-F	560190	HGDT-63-A-F-G1	560191 HGDT-63-A-F-G2

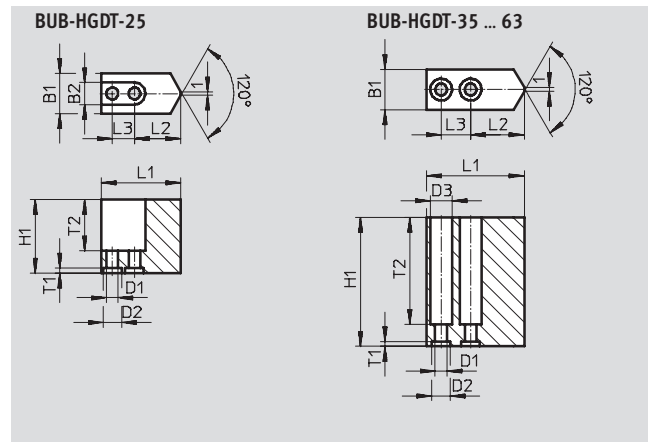
Heavy-duty three-point grippers HGDT

Accessories

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Gripper jaw blank BUB-HGDT (scope of delivery: 3 pieces)

Material:
Wrought aluminium alloy
Free of copper, PTFE and silicone



Dimensions and ordering data							
For size	B1	B2	D1	D2	D3	H1	L1
[mm]	±0.05	+0.22	Ø H13	Ø H8	Ø +0.22	±0.05	±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	L2 ±0.02 ¹⁾ ±0.1 ²⁾	L3 ±0.01 ¹⁾ ±0.1 ¹⁾	T1 +0.1	T2	Weight per blank [g]	Part No.	Type
[mm]							
25	12.6	6	1.3	14	10	541101	BUB-HGDT-25
35	14.5	8	1.3	29	22	541102	BUB-HGDT-35
40	17	12	1.6	45	59	541103	BUB-HGDT-40
50	21	15	2.1	58	112	541104	BUB-HGDT-50
63	24	18	2.1	73	222	541105	BUB-HGDT-63

- 1) For centring
2) For through-hole

Heavy-duty three-point grippers HGDT

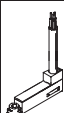
Accessories

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Ordering data						
	For size [mm]	Comment	Weight [g]	Part No.	Type	PU ¹⁾
Centring sleeve ZBH				Technical data → Internet: zbh		
	25, 35	For centring gripper jaw blanks/gripper fingers on the gripper jaws	1	189652	ZBH-5	10
	40		1	186717	ZBH-7	10
	50, 63		1	150927	ZBH-9	10
	35, 40	For lateral centring of gripper fingers on the gripper jaws	1	189652	ZBH-5	10
	50, 63		1	186717	ZBH-7	10
Central mounting SLZZ				Technical data → Internet: slzz		
	25	For centring the gripper when mounting	21	150900	SLZZ-16/10	–
	35, 40, 50, 63		40	150901	SLZZ-25/16	–
Blanking plug B				Technical data → Internet: blanking plug		
	25 ... 63	For sealing the supply ports	0.6	30979	B-M3-S9	10
			1	174308	B-M5-B	10
			5	3568	B-1/8	10

1) Packaging unit quantity

Ordering data – Proximity sensors for C-slot, in-line connecting cable						Technical data → Internet: smt	
	Assembly	Electrical connection		Cable length [m]	Part No.	Type	
		Cable	M8 plug				
N/O contact, magneto-resistive							
	Insertable from end	–	3-pin	0.3	173220	SMT-10-PS-SL-LED-24	
		3-wire	–	2.5	173218	SMT-10-PS-KL-LED-24	

Ordering data – Proximity sensors for C-slot, lateral connecting cable						Technical data → Internet: smt
	Assembly	Electrical connection		Cable length [m]	Part No.	Type
		Cable	M8 plug			
	N/O contact, magneto-resistive					
	Insertable from end	3-wire	–	2.5	173219	SMT-10-PS-KQ-LED-24
		–	3-pin	0.3	173221	SMT-10-PS-SQ-LED-24

Ordering data – Connecting cables						Technical data → Internet: nebu
	Electrical connection, left		Electrical connection, right	Cable length [m]	Part No.	Type
	Straight socket, M8x1, 3-pin		Cable, open end, 3-wire	2.5	541333	NEBU-M8G3-K-2.5-LE3
				5	541334	NEBU-M8G3-K-5-LE3
	Angled socket, M8x1, 3-pin		Cable, open end, 3-wire	2.5	541338	NEBU-M8W3-K-2.5-LE3
				5	541341	NEBU-M8W3-K-5-LE3

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