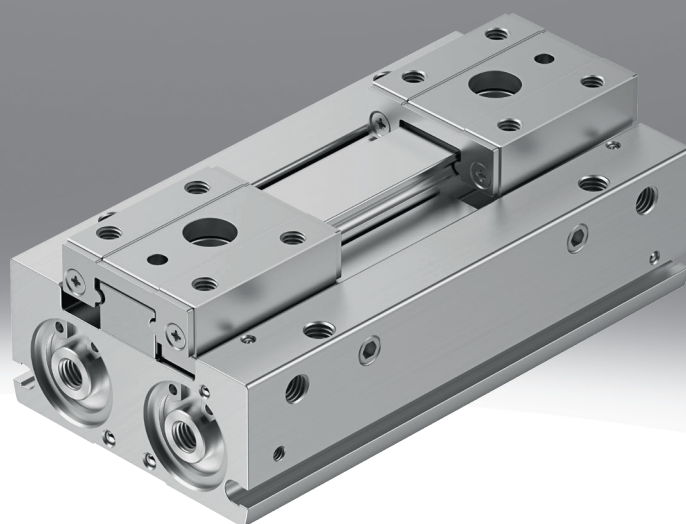


Parallel grippers HPPF

FESTO



Characteristics

At a glance

[Further information → hppf](#)

- Low height, ideal for applications with limited installation space
- Double-acting piston drive
- Optionally with adjustable stroke
- Resilient and precise ball guide
- High gripping forces with compact dimensions
- Wide range of mounting and connection options
- Mounting proximity switches via C-slot

When using a gripper, note the following:

- Protect against vibrations
- Comply with torques
- Protect against magnetic fields

Engineering tools

[Further information → engineering tools](#)



Save time with engineering tools Smart Engineering for the optimal solution. Our goal is to increase your productivity. Our engineering tools play an integral part in this. They help you size your system correctly, tap into unimagined productivity reserves and generate additional productivity along the entire value chain. In every phase of your project, from the initial contact to the modernisation of your machine, you will come across a number of different tools which will be of use to you.

Gripper selection:

- This tool helps you to select the right grippers by simply entering the exact parameters for your application

Diagrams

[Further information → hppf](#)



The diagrams shown in this document are also available online. These can be used to display precise values.

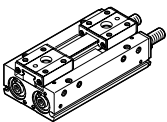
Position sensing

[A] For proximity sensor

By using proximity switches, any position can be detected.

Stroke variant

[S] Adjustable stroke



Allows adjustment of the stroke, opening and closing

Special material properties

Product:

Metals with more than 1% copper, zinc or nickel by mass are excluded from use. Exceptions are nickel in steel, chemically nickel-plated surfaces, circuit boards, cables, electrical plug connectors and coils

Accessories:

Please contact your Festo representative for information on which accessories are suitable for manufacturing lithium-ion batteries

Type code

001	Series
HPPF	Parallel grippers

002	Size [mm]
8	8
12	12
16	16
20	20

003	Complete stroke [mm]
8	8
12	12
16	16
20	20
24	24
32	32
40	40
48	48
64	64
80	80

004	Position sensing
A	For proximity sensor

005	Stroke variant
	Without
S	Adjustable stroke

Datasheet

General technical data

Size	8			12			16			20		
Total stroke	8	16	32	12	24	48	16	32	64	20	40	80
Stroke per gripper jaws	4	8	16	6	12	24	8	16	32	10	20	40
Design	Flat mounting method for gripper fingers, Rack and pinion, Force pilot operated motion sequence											
Mode of operation	Double-acting											
Guide	Ball guide											
Gripper function	Parallel											
Cushioning	Elastic cushioning rings/plates at both ends											
Number of gripper jaws	2											
Pneumatic connection	M3			M5								
Repetition accuracy, gripper ¹⁾	≤0.03 mm			≤0.02 mm			≤0.06 mm					
Max. operating frequency of gripper	2 Hz						1 Hz					
Position detection	Via proximity switch											
Type of mounting	Direct mounting via through-hole, Direct mounting via thread											
Mounting position	optional											

1) Under constant exposure to operating conditions, end-position drift occurs in the direction of movement of the gripper jaws, at 100 consecutive strokes

Operating and environmental conditions

Size	8			12			16			20		
Operating pressure	0.15 ... 0.7 MPa			0.1 ... 0.7 MPa								
Operating pressure	21.75 ... 101.5 psi			14.5 ... 101.5 psi								
Operating pressure	1.5 ... 7 bar			1 ... 7 bar								
Operating medium	Compressed air to ISO 8573-1:2010 [7:4:4]											
Note on operating and pilot medium	Lubricated operation possible (in which case lubricated operation will always be required)											
Ambient temperature ¹⁾	-10 ... 60°C											
Corrosion resistance class CRC ²⁾	0 - No corrosion stress											

1) Note the operating range of the proximity switches

2) More information: www.festo.com/x/topic/crc

Weight – HPPF-8 ... 12

Size	8						12					
Total stroke	8		16		32		12		24		48	
Stroke variant	Without	Adjustable stroke	Without	Adjustable stroke	Without	Adjustable stroke	Without	Adjustable stroke	Without	Adjustable stroke	Without	Adjustable stroke
Product weight	68 g	78 g	83 g	95 g	122 g	135 g	157 g	182 g	205 g	233 g	305 g	339 g

Weight – HPPF-16 ... 20

Size	16						20					
Total stroke	16		32		64		20		40		80	
Stroke variant	Without	Adjustable stroke	Without	Adjustable stroke	Without	Adjustable stroke	Without	Adjustable stroke	Without	Adjustable stroke	Without	Adjustable stroke
Product weight	366 g	415 g	471 g	524 g	691 g	755 g	690 g	783 g	887 g	993 g	1,326 g	1,458 g

Datasheet

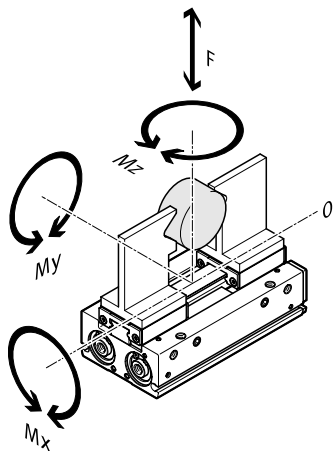
Materials				
Size	8	12	16	20
Material housing	Anodised wrought aluminium alloy			
Material cover	Anodised wrought aluminium alloy			
Material cover cap	Wrought aluminium alloy, anodised			
Material end plate	High-alloy stainless steel			
Material gripper jaws	High-alloy steel			
Material piston seal	TPE-U(PU)			
Gear rack material	High-alloy stainless steel			
Material screws	Coated steel			
LABS (PWIS) conformity	VDMA24364 zone III			
Material o-ring	NBR			
Note on materials	RoHS-compliant			
Cleanroom class	Class 7 according to ISO 14644-1			
Suitability for the production of Li-ion batteries	Metals with more than 1% by mass of copper, zinc or nickel by mass are excluded from use. Exceptions are nickel in steel, chemically nickel-plated surfaces, printed circuit boards, cables, electrical plug connectors and coils	Metals with more than 1% by mass of copper, zinc or nickel by mass are excluded from use. Exceptions are nickel in steel, chemically nickel-plated surfaces, printed circuit boards, cables, electrical plug connectors and coils, Metals with more than 1% by mass of copper, zinc or nickel are excluded from use. Exceptions are nickel in steel, chemically nickel-plated surfaces, printed circuit boards, cables, electrical plug connectors and coils	Metals with more than 1% by mass of copper, zinc or nickel by mass are excluded from use. Exceptions are nickel in steel, chemically nickel-plated surfaces, printed circuit boards, cables, electrical plug connectors and coils	Metals with more than 1% by mass of copper, zinc or nickel by mass are excluded from use. Exceptions are nickel in steel, chemically nickel-plated surfaces, printed circuit boards, cables, electrical plug connectors and coils, Metals with more than 1% by mass of copper, zinc or nickel are excluded from use. Exceptions are nickel in steel, chemically nickel-plated surfaces, printed circuit boards, cables, electrical plug connectors and coils

Measured gripping force with a lever arm of 20 mm				
Size ¹⁾	8	12	16	20
Total gripping force, closing, 0.6MPa (6bar, 87 psi)	60.32 N	135.72 N	241.28 N	377 N
Total gripping force, opening, 0.6MPa (6bar, 87 psi)	60.32 N	135.72 N	241.28 N	377 N
Gripper force per gripper jaw, closing, 0.6 MPa (6 bar, 87 psi)	30.16 N	67.86 N	120.64 N	188.5 N
Gripper force per gripper jaw, opening, 0.6 MPa (6 bar, 87 psi)	30.16 N	67.86 N	120.64 N	188.5 N

1) Graphs relating to this are on the following pages.

Datasheet

Static load values at the gripper jaws



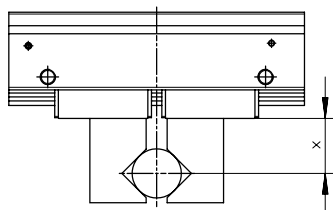
The indicated permissible forces and torques refer to one gripper jaw. The indicated values include the lever arm, additional applied loads due to the workpiece or external gripper fingers and acceleration forces occurring during movement. The zero coordinate line (gripper jaw guide) must be taken into account when calculating the torques.

Note: A collision of the slides must be avoided. In the event of a collision, the slides can get damaged.

More information → User documentation

Size	8	12	16	20
Max. force on gripper jaw F_z static	58 N	98 N	176 N	294 N
Max. moment M_x	0.6 Nm	1.4 Nm	2.8 Nm	4 Nm
Max. moment M_y	0.3 Nm	0.7 Nm	1.4 Nm	2 Nm
Max. moment M_z	0.3 Nm	0.7 Nm	1.4 Nm	2 Nm

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

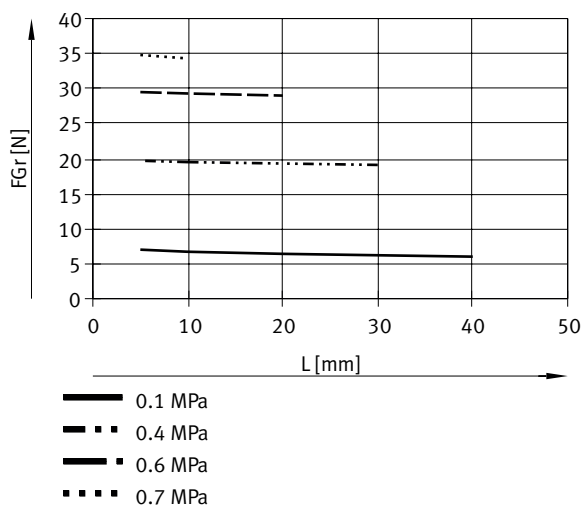


The gripping forces as a function of operating pressure and lever arm can be determined from the following graphs.

The gripping torque is not constant across the opening angle.

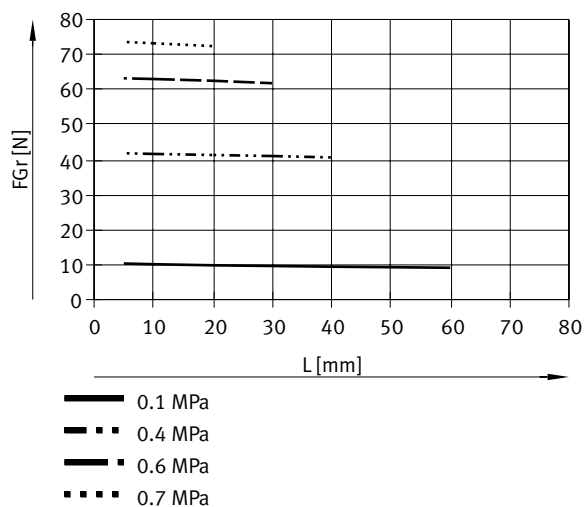
Sizing software for gripper selection → <https://www.festo.com/x/topic/eng>

Gripping force F_{Gr} per gripper jaw as a function of operating pressure and lever arm x – external gripping (closing), double-acting – HPPF-8

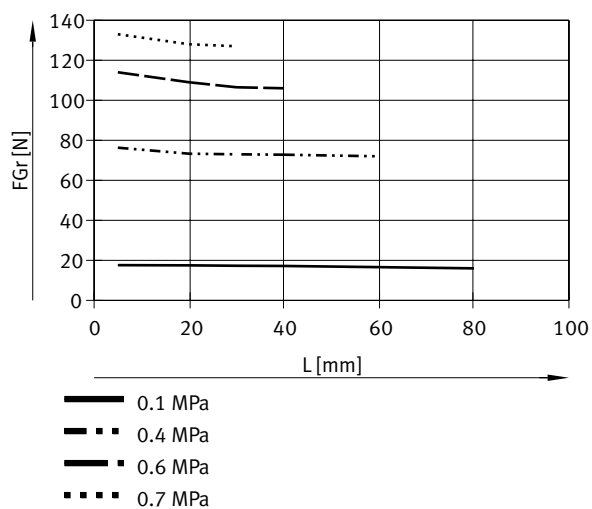


Datasheet

Gripping force F_{Gr} per gripper jaw as a function of operating pressure and lever arm x – external gripping (closing), double-acting – HPPF-12

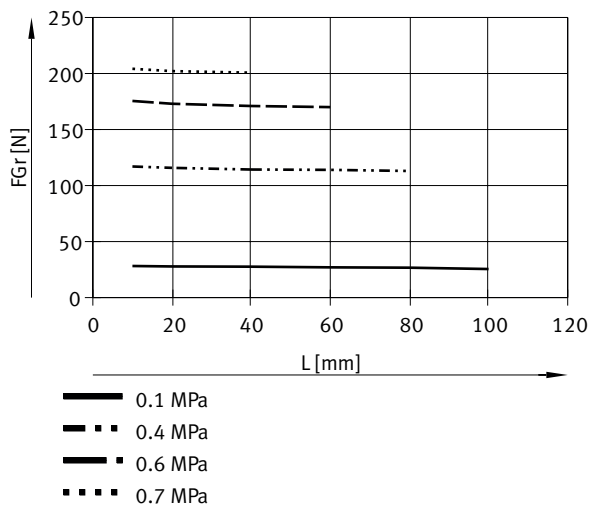


Gripping force F_{Gr} per gripper jaw as a function of operating pressure and lever arm x – external gripping (closing), double-acting – HPPF-16

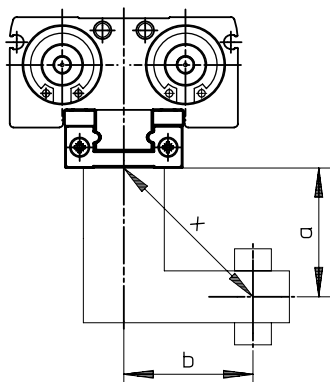


Datasheet

Gripping force F_{Gr} per gripper jaw as a function of operating pressure and lever arm x – external gripping (closing), double-acting – HPPF-20



Gripping force F_{Gr} per gripper jaw at 0.6 MPa (6 bar, 87 psi) as a function of lever arm x and eccentricity a and b



Gripping force F_{Gr} per gripper jaw at 0.6 MPa (6 bar, 87 psi) as a function of lever arm x and eccentricity a and b

$$x = \sqrt{a^2 + b^2} = \sqrt{20^2 + 25^2} = 32 \text{ mm}$$

The formula (on the left) must be used to calculate the lever arm x with eccentric gripping.

The gripping force F_{Gr} can then be read from the graphs using the calculated value x .

Calculation example:

Where:

Distance $a = 20$ mm

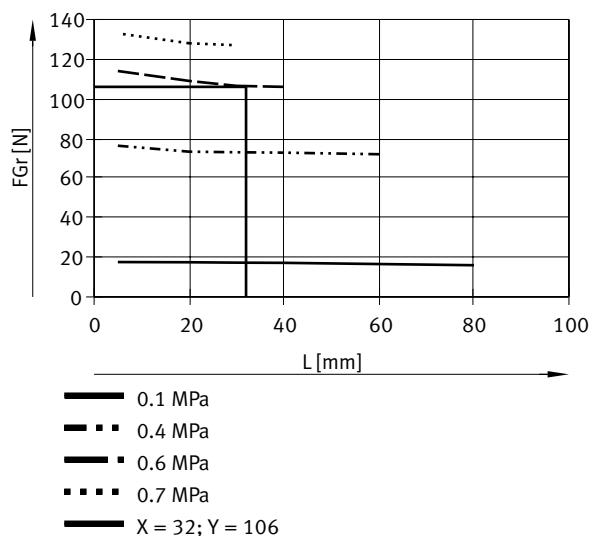
Distance $b = 25$ mm

To be determined:

The gripping force at 0.6 MPa (6 bar, 87 psi), with an HPPF-16, used as an external gripper.

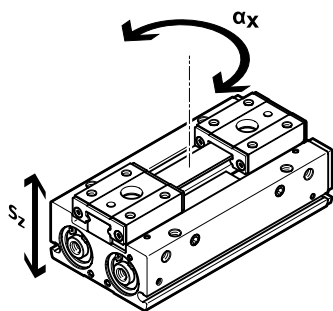
Datasheet

Gripping force F_{Gr} per gripper jaw at 0.6 MPa (6 bar, 87 psi) as a function of lever arm x and eccentricity a and b



The graph gives a value of $F_{Gr} = 106$ N for the gripping force.

Gripper jaw backlash

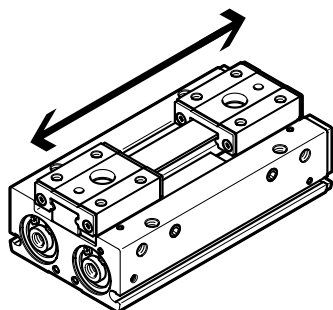


The gripper has a ball guide, which eliminates any possible backlash between the gripper jaws and the housing. The backlash values listed in the table have been calculated based on the traditional accumulative tolerance method.

Size ¹⁾	8	12	16	20
Max. gripper jaw backlash S_z	0 mm			
Max. angular gripper jaw backlash α_x, α_y	0 deg			

¹⁾ The values only apply when the gripper is open.

Opening and closing times – HPPF-8 ... 12



The specified opening and closing times [ms] were measured at room temperature and with the gripper installed horizontally without additional gripper fingers. The grippers must be throttled for higher masses [g]. Opening and closing times must then be adjusted accordingly.

Size	8				12				16				20			
	Without stroke		Adjustable stroke		Without stroke		Adjustable stroke		Without stroke		Adjustable stroke		Without stroke		Adjustable stroke	
Total stroke	8				12				16				20			
Min. opening time at 0.6 MPa (6 bar, 87 psi)	15 ms		32 ms		46 ms		75 ms		121 ms							
Min. closing time at 0.6 MPa (6 bar, 87 psi)	12 ms		31 ms		44 ms		43 ms		44 ms		73 ms		105 ms			

Datasheet

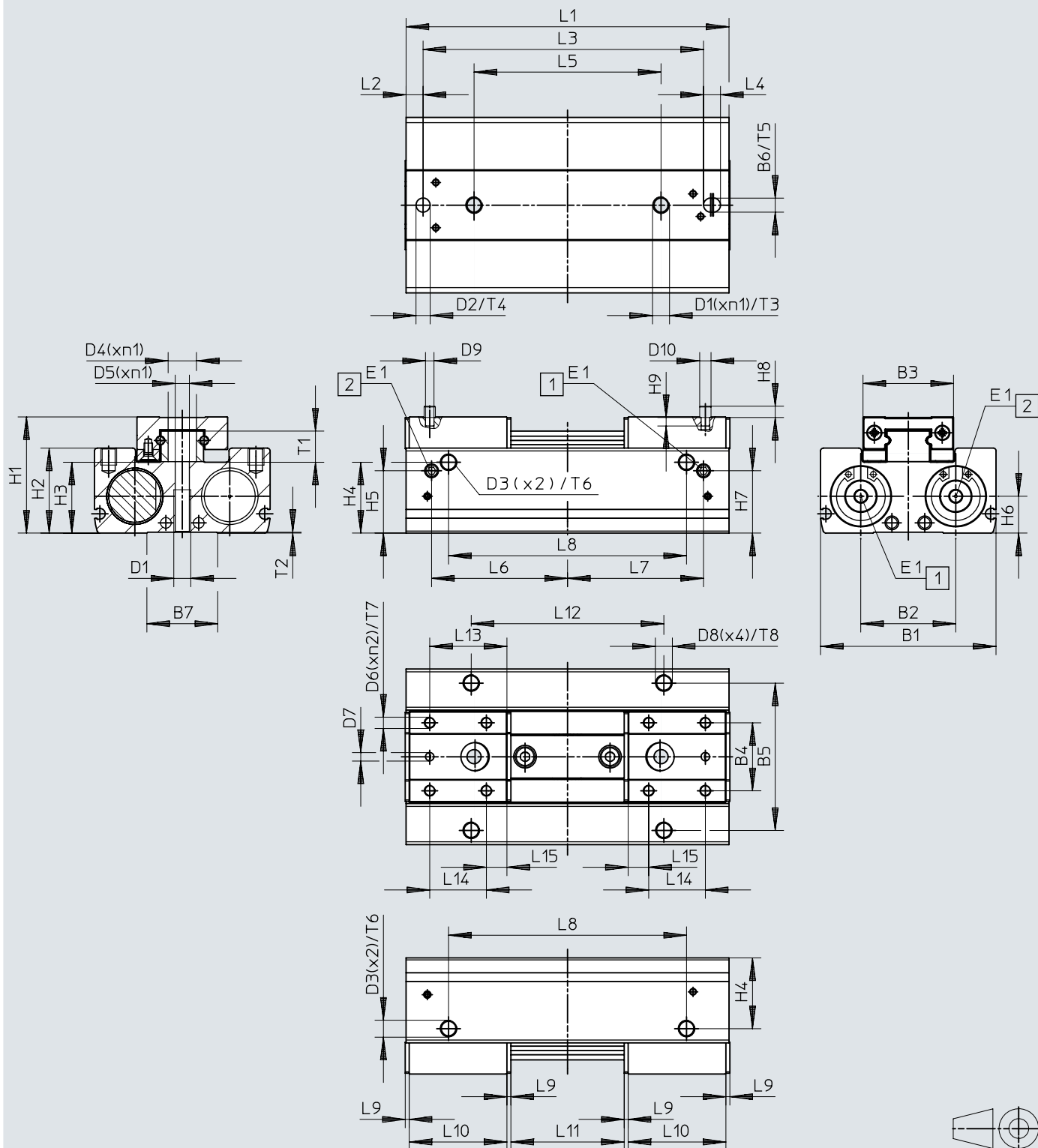
Opening and closing times – HPPF-16 ... 20

Size	16						20					
Total stroke	16		32		64		20		40		80	
Stroke variant	Without	Adjustable stroke	Without	Adjustable stroke	Without	Adjustable stroke	Without	Adjustable stroke	Without	Adjustable stroke	Without	Adjustable stroke
Min. opening time at 0.6 MPa (6 bar, 87 psi)	55 ms		93 ms		189 ms		90 ms		120 ms		240 ms	
Min. closing time at 0.6 MPa (6 bar, 87 psi)	47 ms		91 ms		181 ms		70 ms		110 ms		225 ms	

Dimensions

Dimensions – Parallel gripper HPPF

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- [1] Open pneumatic connection
- [2] Close pneumatic connection



Dimensions

	L ¹⁾	B1	B2	B3	B4	B5	B6	B7	D1	D2 ∅ H9	D3	D4 ∅	D5 ∅	D6	D7 H9	D8	D9 ∅	D10 ∅
HPPF-8	8																	
	16	32	15,7	17	12	26	2,5	16	M3	2,5	M3	4,4	2,5	M2,5	2	M3	2	2,5
	32																	
HPPF-12	12																	
	24	40	20,3	20	15	33	3	16,6	M4	3	M4	5,5	3,5	M3	2,5	M4	2,5	3
	48																	
HPPF-16	16																	
	32	50	24	27	20	43	4	15,6	M5	4	M5	8	4,2	M4	3	M5	3	4
	64																	
HPPF-20	20																	
	40	62	33,5	32	24	52	5	25	M6	5	M6	10	5			M6		
	80																	

	L ¹⁾	E1	H1	H2	H3	H4	H5	H6	H7	H8	H9	L1	L2	L3	L4	L5	L6	L7
			±0,1	±0,2	±0,05	±0,05						-0,1	±0,05	±0,05	±0,1	±0,1		
HPPF-8	8											38,5		31,1		16	13,8	13,5
	16	M3	19	14	11,2	11	7,6	5,9	7,6	2	2,5	48	3	40,3	3,4	28	18,5	17,7
	32											72		64,3		17	29,9	29,7
HPPF-12	12											52		42		26	8,2	8,2
	24		25	19	15,2	15	14,7	7,7	14,7	2,5	3	69	4	58	4	42	16,7	16,7
	48											104		94		26	34,2	34,2
HPPF-16	16											72		60		38	11	11
	32	M5	33	25	21	20	20	10,5	20			94		81	5	60	22	22
	64											142		129,5		36	46	46
HPPF-20	20									3	4	87		71		38	34,5	34,5
	40		41	30	25,2	25	22	13	22			114		99	6	66	48	48
	80											174		159		42	78	78

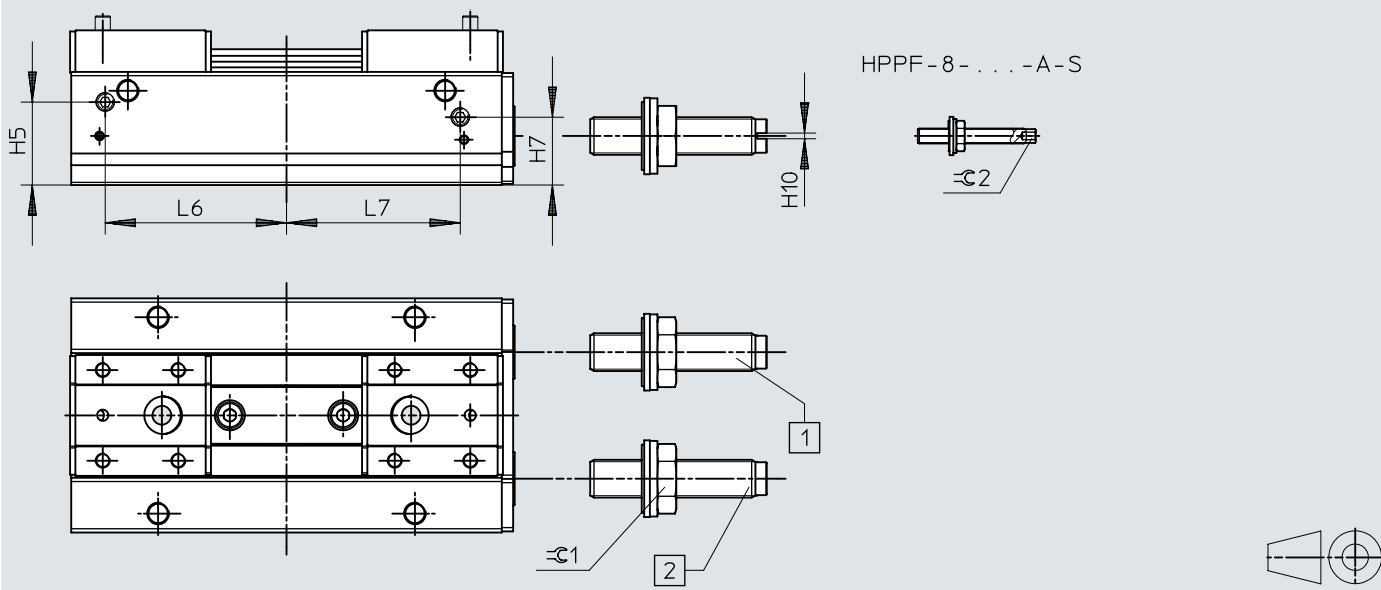
	L ¹⁾	L8	L9	L10	L11	L12	L13	L14	L15	n1	n2	T1	T2	T3	T4	T5	T6	T7	T8
		±0,1		-0,1	±1	±0,1	±0,05	±0,05											
HPPF-8	8	22		12	8	14	10	0	6	2	2	5,2	0,2	4	2,5	2,5	4	3	4
	16	34	0,9	14	16	26	11	8	7	4	4								
	32	58		18	32	50	13	8	5										
HPPF-12	12	38		20,5	24	44	16,3	12	4,3	2	2	6,6		10			5		5
	24	54	1	27	48	80	22,5	18	4,5	4									
	48	90		37	64	106	31,5	26	5,5					3	3				
HPPF-16	16	52		25	16	36	20	15	5										
	32	74	1,2	29	32	58	23,5	18	5,5	2	4	8,2	0,3	12			4	5,5	
	64	122		37	64	106	31,5	26	5,5										
HPPF-20	20	56		31	20	40	23,5	16	7,5								6		
	40	84	1,4	34,5	40	68	27,3	20	7,3			10,8		15	4	4			6
	80	144		44,5	80	128	37,3	30	7,3	4									

1) Stroke

Dimensions

Dimensions – Parallel gripper HPPF-...-S – adjustable stroke

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- [1] For adjusting the stroke, opening
- [2] For adjusting the stroke, closing

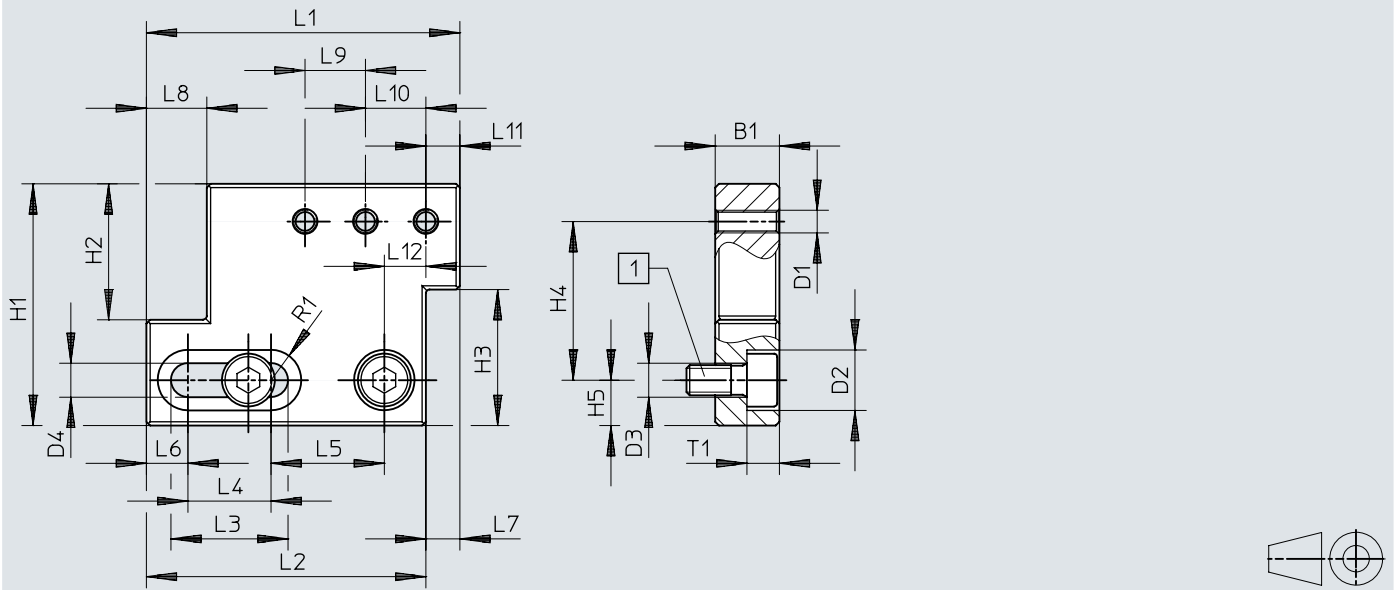
	L ¹⁾	H5	H7	H10	L6	L7	≃1	≃2
HPPF-8	8	7,6	7,6	-	13,8	13,5	7	2
	16				18,5	17,7		
	32				29,9	29,7		
HPPF-12	12	14,7	14,7	0,8	8,2	8,2	10	
	24				16,7	16,7		
	48				34,2	34,2		
HPPF-16	16	20	20	1,5	11	11	13	-
	32				22	22		
	64				46	46		
HPPF-20	20	22,5	18	1,5	35,5	32,5	16	
	40	22			48	46		
	80				78	76		

1) Stroke

Dimensions

Dimensions – Intermediate plate HAMF-PA

Download CAD data → www.festo.com



[1] HAMF-PA-B30-16: screw M4x8-10.9, HAMF-PA-B30-20: screw M4x10-10.9 (included in the scope of delivery)

	L ¹⁾	B1 ±0,1	D1	D2 ∅	D3 ∅	D4 +0,1	H1	H2	H3	H4	H5	L1	L2
HAMF-PA-B30-16	32, 64	8,5	M3	8	4,5	4,5	32	18	18	21	6	41,5	37
HAMF-PA-B30-20	40, 80	8,5	M3	8	4,5	4,5	36	21	21	23	6	47,5	42,8

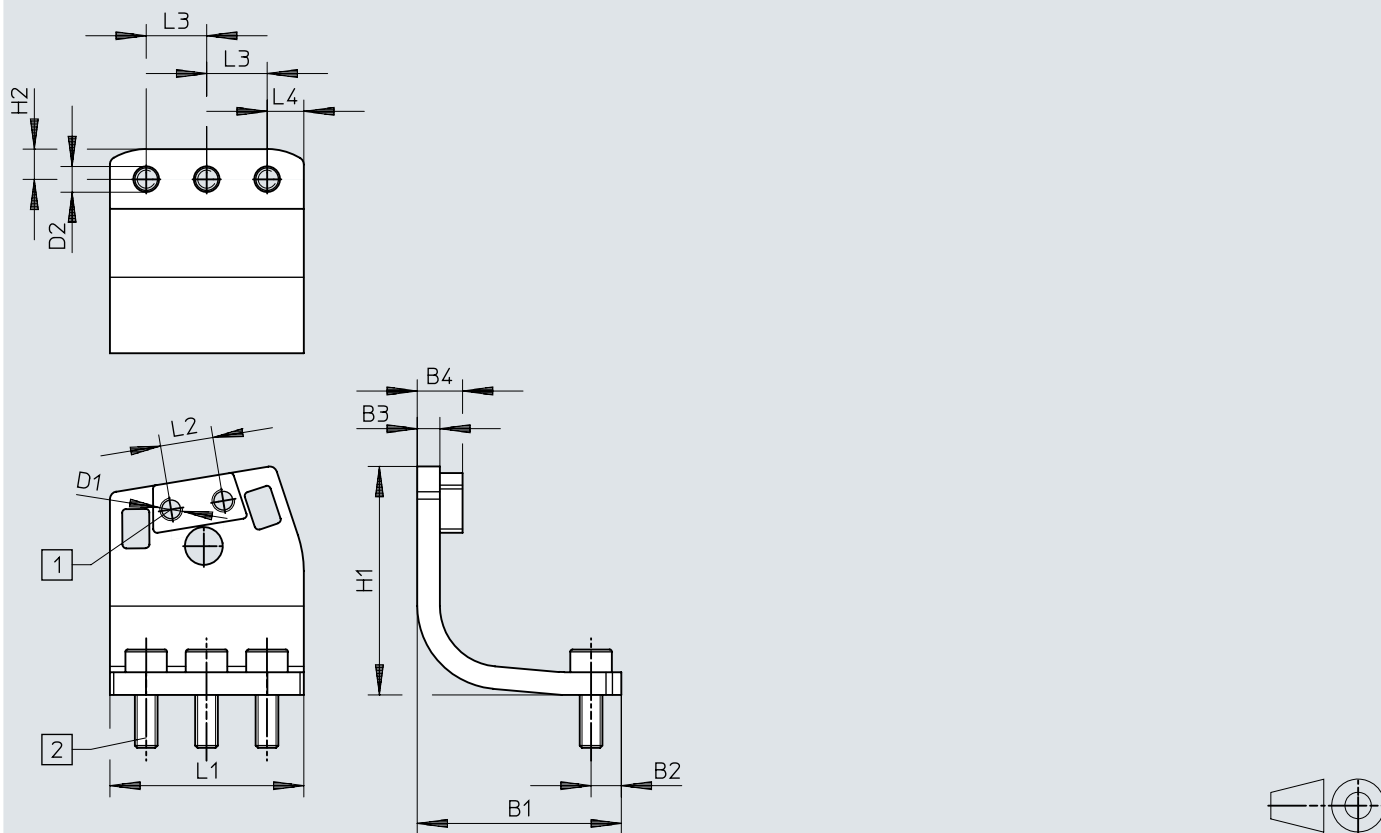
	L ¹⁾	L3 +0,2	L4	L5	L6	L7	L8	L9	L10	L11	L12	R1	T1
HAMF-PA-B30-16	32, 64	15,5	11	15	5,5	4,5	8	8	8	4,5	5,5	4	4,3
HAMF-PA-B30-20	40, 80	19,5	15	15	5,3	4,8	12	8	8	4,5	7,5	4	4,3

1) Stroke

Dimensions

Dimensions – Mounting bracket DHAS-MA-B6-60

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[1] Mounting thread

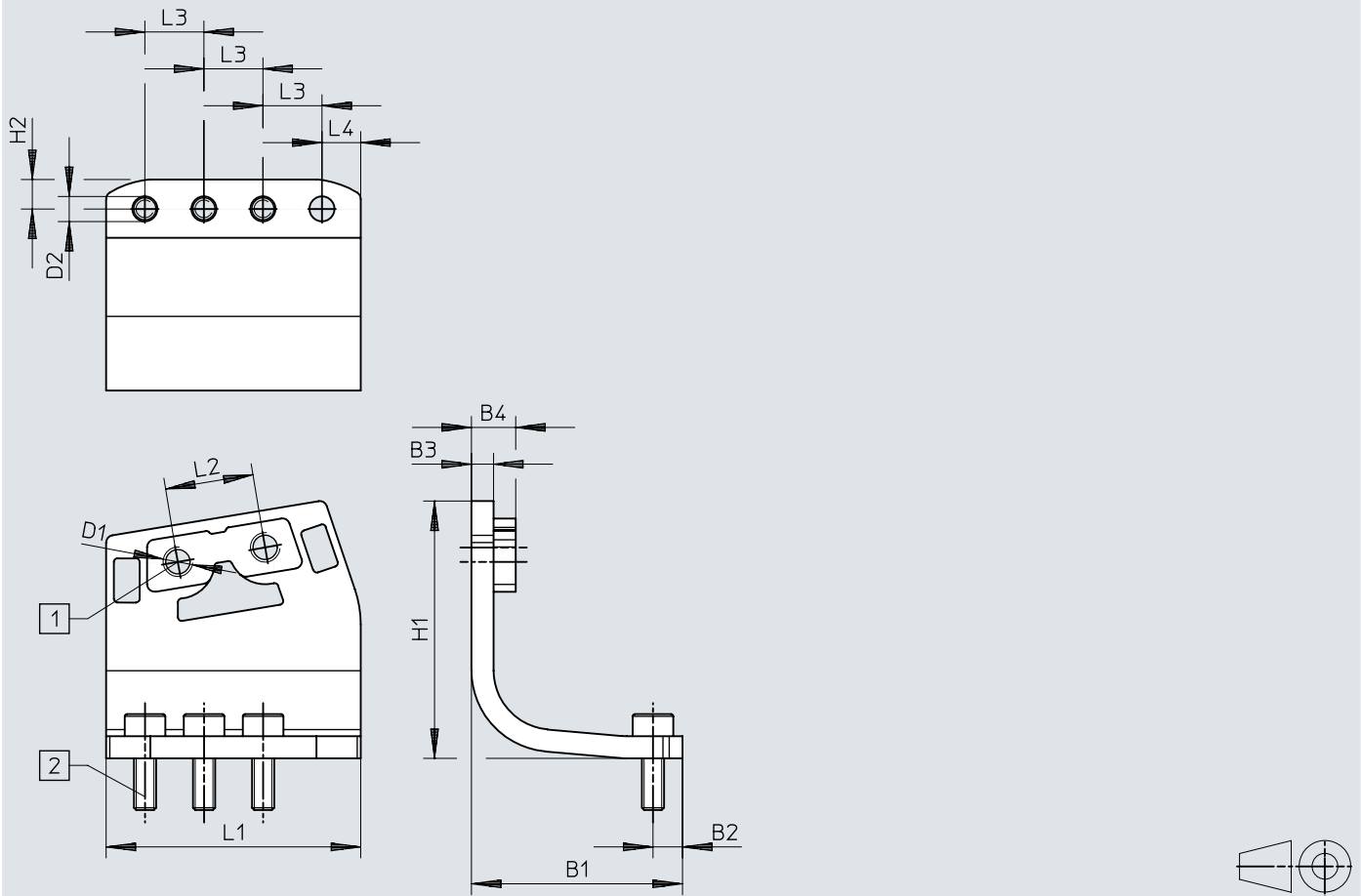
[2] Screw M3x8-8.8 (included in the scope of delivery)

	B1	B2	B3	B4	D1	D2	H1	H2	L1	L2	L3	L4
			±0,2	±0,1		∅				±0,1	±0,1	
DHAS-MA-B6-60	27	4	3	6	M3	3,4	30,3	4	25,7	7	8	4,85

Dimensions

Dimensions – Mounting bracket DHAS-MA-B6-80

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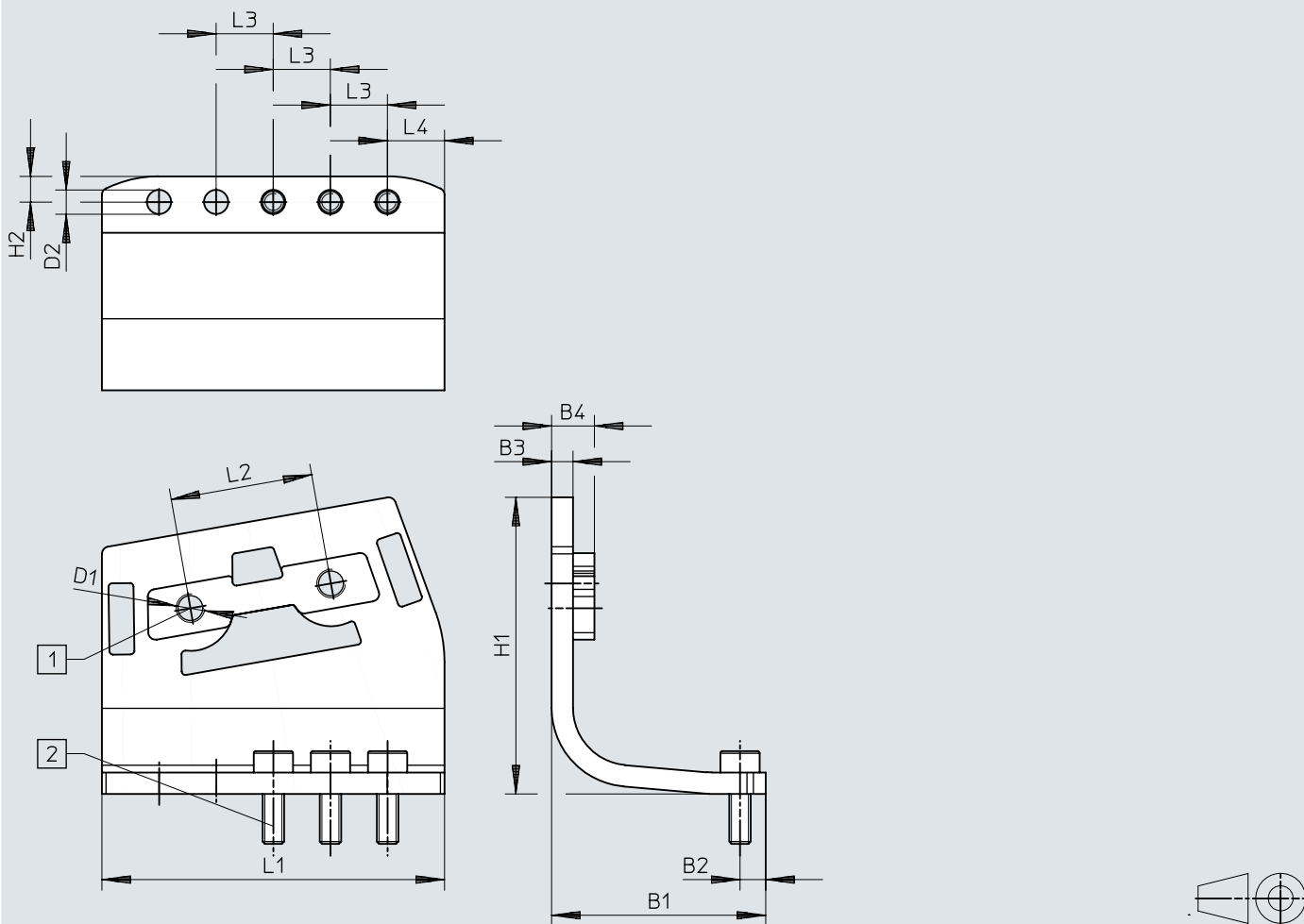
- [1] Mounting thread
- [2] Screw M3x8-8.8 (included in the scope of delivery)

	B1	B2	B3	B4	D1	D2	H1	H2	L1	L2	L3	L4
			±0,2	±0,1		∅				±0,1	±0,1	
DHAS-MA-B6-80	28,6	4	3	6	M4	3,3	35	4	34,5	12	8	5,25

Dimensions

Dimensions – Mounting bracket DHAS-MA-B6-120

Download CAD data → www.festo.com



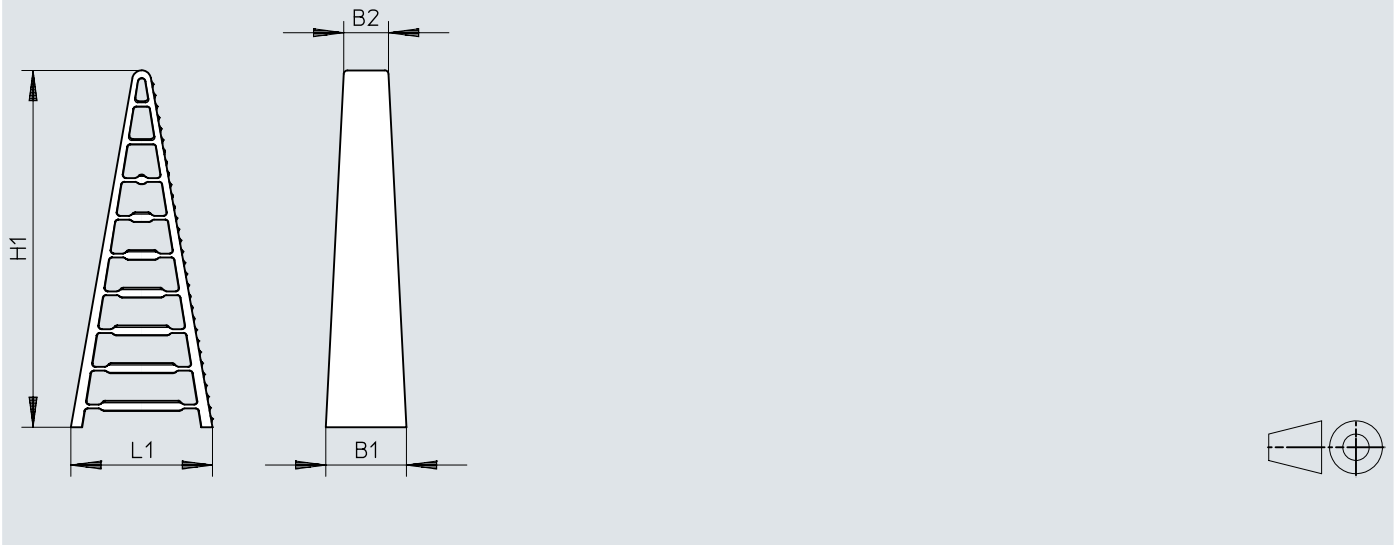
- [1] Mounting thread
- [2] Screw M3x8-8.8 (included in the scope of delivery)

	B1	B2	B3	B4	D1	D2	H1	H2	L1	L2	L3	L4
			±0,2	±0,1		∅				±0,1	±0,1	
DHAS-MA-B6-120	30	3,6	3	6	M4	3,4	41,7	3,6	48	20	8	7,9

Dimensions

Dimensions – Adaptive gripper finger DHAS-GF

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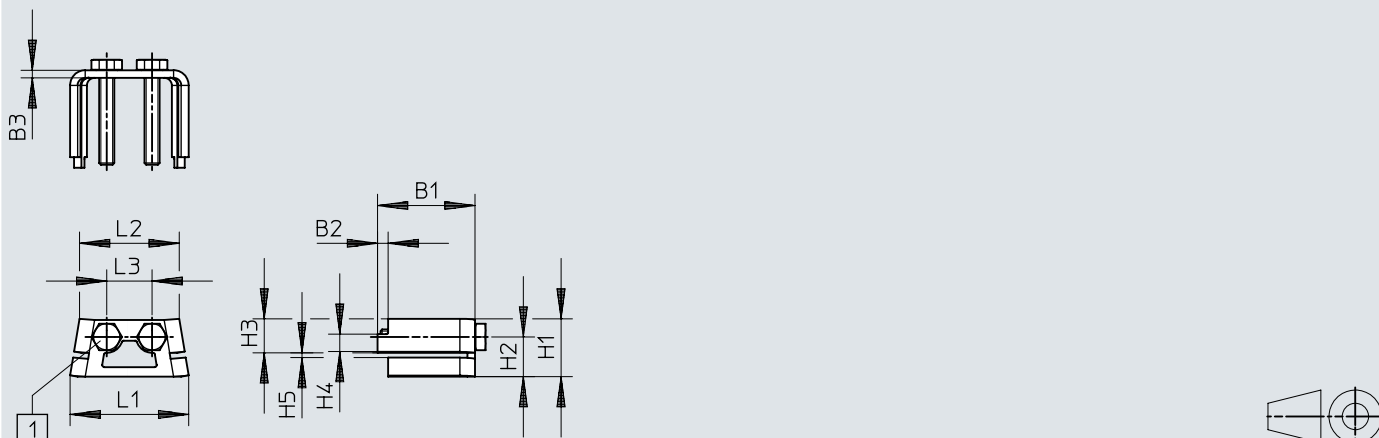


	B1	B2	H1	L1
DHAS-GF-60-U-BU	18	11,8	61,5	26
DHAS-GF-80-U-BU	21,3	11,8	94,5	37,5
DHAS-GF-120-U-BU	25	11,8	134,5	50

Dimensions

Dimensions – Mounting kit DHAS-ME-H9-60/80

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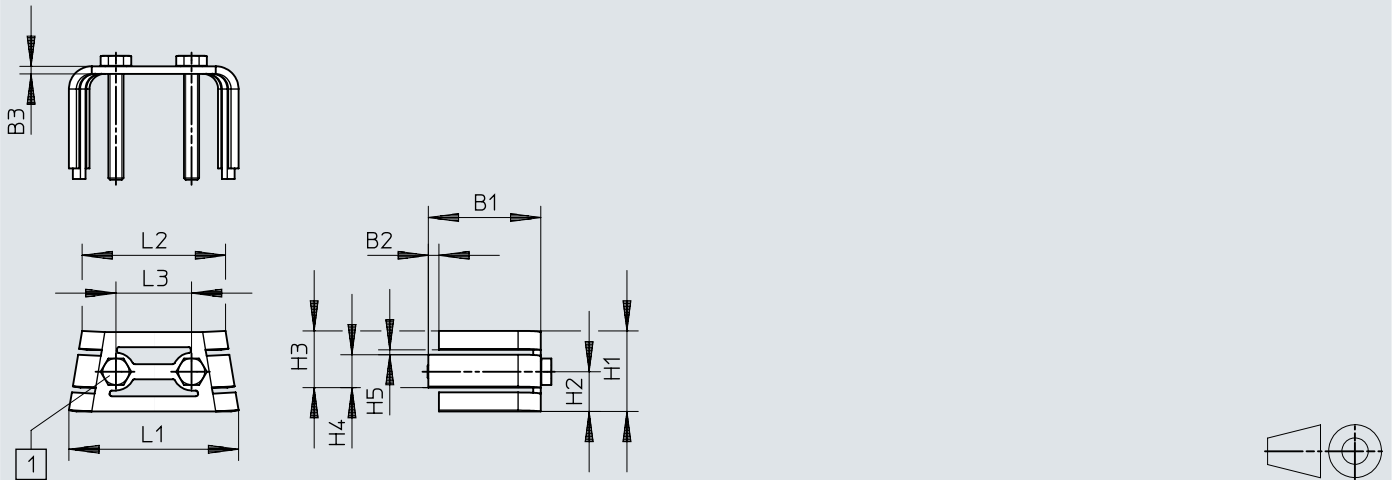
[1] DHAS-ME-H9-60: screw ISO 4017-M3x22-A2-70 / DHAS-ME-H9-80: screw ISO 4017-M4x25-A2-70 (included in the scope of delivery)

	B1	B2	B3	H1	H2	H3	H4	H5	L1	L2	L3
			±0,1					±0,1			±0,1
DHAS-ME-H9-60	22,8	2,8	2	10,3	6,7	7	3,6	1,3	20,7	17,4	7
DHAS-ME-H9-80	25,8	2,8	2	15,3	10,5	9	4,6	1,3	31,4	26,4	12

Dimensions

Dimensions – Mounting kit DHAS-ME-H9-120

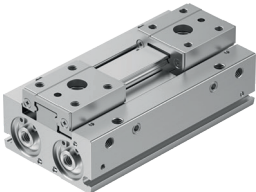
Download CAD data → www.festo.com

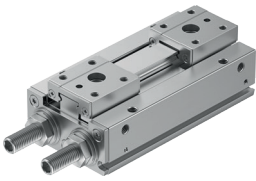


[1] DHAS-ME-H9-120: screw ISO 4017-M4x30-A2-70 (included in the scope of delivery)

	B1	B2	B3	H1	H2	H3	H4	H5	L1	L2	L3
			±0,1					±0,1			±0,1
DHAS-ME-H9-120	29,8	2,8	2	21,3	10,5	15	8,7	1,3	44,9	38	20

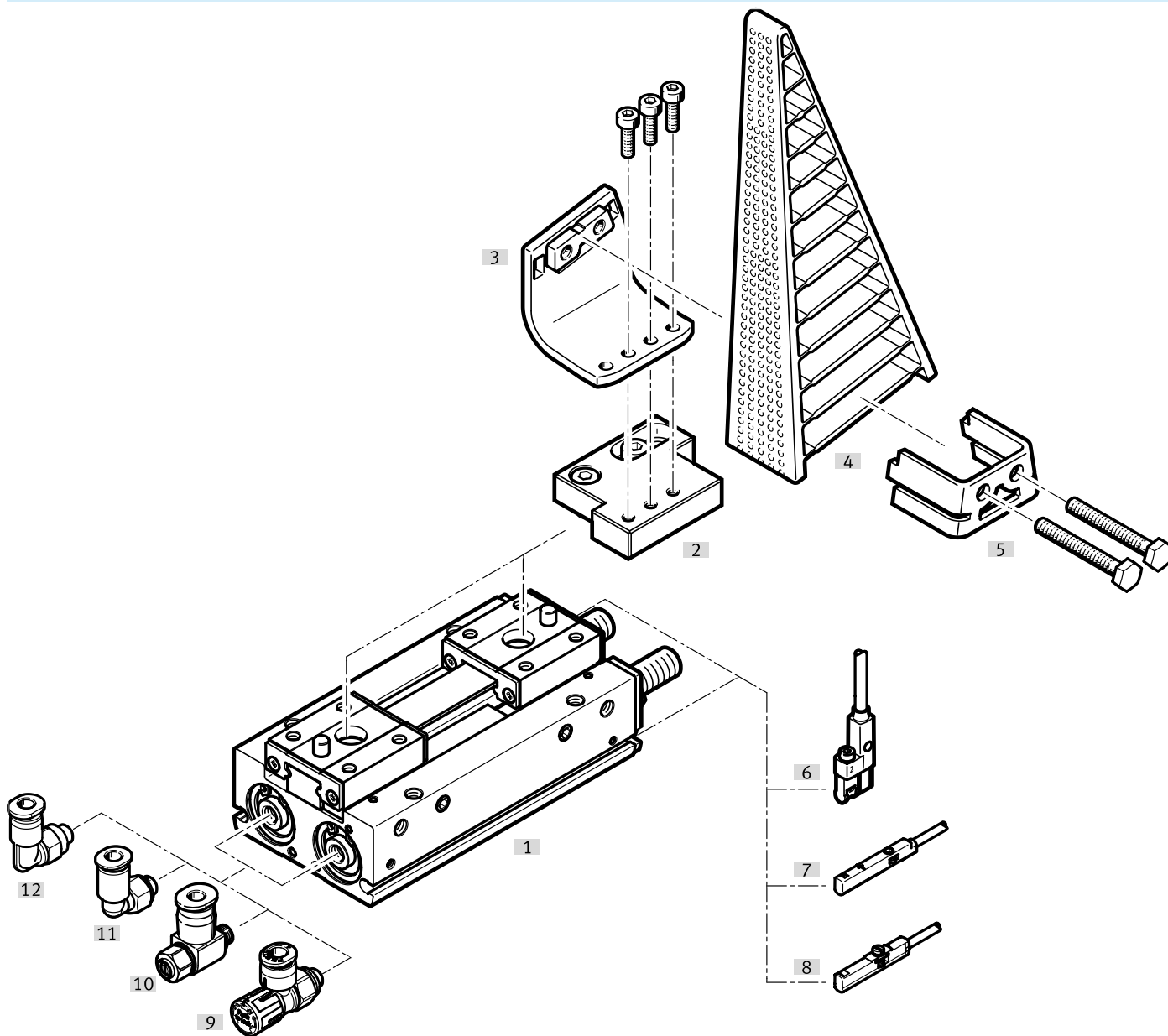
Ordering data

HPPF						
	Size	Total stroke	Mode of operation	Product weight	Part no.	Type
	8	8 mm	Double-acting	68 g	8133724	HPPF-8-8-A
		16 mm		83 g	8133731	HPPF-8-16-A
		32 mm		122 g	8128415	HPPF-8-32-A
	12	12 mm		157 g	8139790	HPPF-12-12-A
		24 mm		205 g	8139791	HPPF-12-24-A
		48 mm		305 g	8139792	HPPF-12-48-A
	16	16 mm		366 g	8105829	HPPF-16-16-A
		32 mm		471 g	8143243	HPPF-16-32-A
		64 mm		691 g	8143246	HPPF-16-64-A
	20	20 mm		690 g	8141226	HPPF-20-20-A
		40 mm		887 g	8143408	HPPF-20-40-A
		80 mm		1,326 g	8143409	HPPF-20-80-A

HPPF...-S – adjustable stroke						
	Size	Total stroke	Mode of operation	Product weight	Part no.	Type
	8	8 mm	Double-acting	78 g	8134368	HPPF-8-8-A-S
		16 mm		95 g	8134375	HPPF-8-16-A-S
		32 mm		135 g	8134364	HPPF-8-32-A-S
	12	12 mm		182 g	8141587	HPPF-12-12-A-S
		24 mm		233 g	8141588	HPPF-12-24-A-S
		48 mm		339 g	8141589	HPPF-12-48-A-S
	16	16 mm		415 g	8143712	HPPF-16-16-A-S
		32 mm		524 g	8143713	HPPF-16-32-A-S
		64 mm		755 g	8143714	HPPF-16-64-A-S
	20	20 mm		783 g	8143425	HPPF-20-20-A-S
		40 mm		993 g	8143426	HPPF-20-40-A-S
		80 mm		1,458 g	8143427	HPPF-20-80-A-S

Peripherals

Peripherals overview

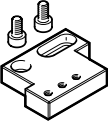



Accessories		→ Link
Type/order code	Description	
[1] Parallel gripper HPPF	Double-acting; with ball guide, optionally with adjustable stroke	hppf
[2] Intermediate plate HAMF-PA	<ul style="list-style-type: none"> For fitting the mounting bracket DHAS-MA on the gripper Available for sizes 16, 20 	24
[3] Mounting bracket DHAS-MA	For mounting the adaptive gripper finger DHAS-GF on the intermediate plate HAMF-PA	24
[4] Adaptive gripper finger DHAS-GF	<ul style="list-style-type: none"> For flexible gripping Available in the sizes 60, 80, 120 The mounting components HAMF-PA, DHAS-MA and DHAS-ME are also required to attach the gripper fingers to the gripper 	24
[5] Mounting kit DHAS-ME	For mounting the adaptive gripper finger DHAS-GF on the mounting bracket DHAS-MA	24
[6] Proximity switch SMT-10G	<ul style="list-style-type: none"> For round slot For sensing the piston position in the end positions 	25
[7] Proximity switch SMT-10M	<ul style="list-style-type: none"> For round slot For sensing the piston position in the end positions 	24
[8] Proximity switch SDBC-MSB	<ul style="list-style-type: none"> For round slot For sensing the piston position in the end positions 	25
[9] One-way flow control valve VFOE	For regulating speed	26
[10] One-way flow control valve GRLA	For regulating speed	26

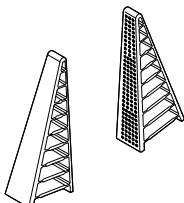
Peripherals

Accessories		→ Link
Type/order code	Description	
[11] Push-in fitting QS	For connecting tubing with standard O.D	qs
[12] Push-in fitting NPQE	For connecting tubing with standard O.D	npqe

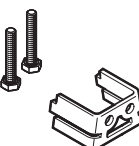
Accessories

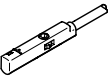
Intermediate plate HAMF-PA					
	Description	Material adapter plate	Product weight	Part no.	Type
	For size 16	Aluminium	25 g	8175319	HAMF-PA-B30-16
	For size 20		31 g	8175321	HAMF-PA-B30-20


Mounting bracket DHAS-MA					
	Description	Material adapter bracket	Product weight	Part no.	Type
	For HAMF-PA-B30	High-alloy stainless steel	23 g	3920696	DHAS-MA-B6-60
			38 g	3899099	DHAS-MA-B6-80
			59 g	3889257	DHAS-MA-B6-120

Adaptive gripper finger DHAS-GF					
	Description ¹⁾	Material clamp jaws	Product weight	Part no.	Type
	For DHAS-MA-B6-60	TPE-U(PU)	7 g	3998967	DHAS-GF-60-U-BU
	For DHAS-MA-B6-80		13 g	3998964	DHAS-GF-80-U-BU
	For DHAS-MA-B6-120		29 g	3998959	DHAS-GF-120-U-BU


1) The mounting components HAMF-PA, DHAS-MA and DHAS-ME are also required to attach the gripper fingers to the gripper.

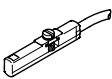
Mounting kit DHAS-ME					
	Description	Material adapter	Product weight	Part no.	Type
	For DHAS-GF-60-U-BU	High-alloy stainless steel	7 g	4464306	DHAS-ME-H9-60
	For DHAS-GF-80-U-BU		13 g	4463570	DHAS-ME-H9-80
	For DHAS-GF-120-U-BU		23 g	4461433	DHAS-ME-H9-120

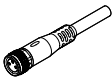
Proximity switch SMT-10M for round slot, magneto-resistive						
	Type of mounting	Switching output	Electrical connection	Cable length	Part no.	Type
	Screw-clamped, Insertable in the slot from above	3-wire PNP N/O contact	Open end	2.5 m	551374	SMT-10M-PS-24V-E-2,5-Q-OE
				2.5 m	★ 551373	SMT-10M-PS-24V-E-2,5-L-OE
			Plug M8, A-coded	0.3 m	★ 551375	SMT-10M-PS-24V-E-0,3-L-M8D
				0.3 m	551376	SMT-10M-PS-24V-E-0,3-Q-M8D

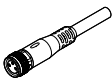
Proximity switch SMT-10G for round slot, magneto-resistive						
	Type of mounting	Switching output	Electrical connection	Cable length	Part no.	Type
	Clamped in C-slot, Insertable in the slot lengthwise	3-wire NPN N/O contact	Open end	2.5 m	8065030	SMT-10G-NS-24V-E-2,5Q-OE

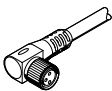
Accessories

Proximity switch SMT-10G for round slot, magneto-resistive						
	Type of mounting	Switching output	Electrical connection	Cable length	Part no.	Type
	Clamped in C-slot, Insertable in the slot lengthwise	3-wire NPN N/O contact	Plug M8, A-coded	0.3 m	8065029	SMT-10G-NS-24V-E-0,3Q-M8D
		3-wire PNP N/O contact	Open end	2.5 m	547862	SMT-10G-PS-24V-E-2,5Q-OE
			Plug M8, A-coded	0.3 m	547863	SMT-10G-PS-24V-E-0,3Q-M8D

Proximity switch SDBC-MSB for round slot, magneto-resistive						
	Switching output	Switching element function	Electrical connection	Cable length	Part no.	Type
	NPN	N/O contact	Open end	2 m	8139724	SDBC-MSB-1L-NU-K-2-LE
			Plug M8, A-coded	0.3 m	8139727	SDBC-MSB-1L-NU-K-0,3-M8
	PNP		Open end	2 m	8139723	SDBC-MSB-1L-PU-K-2-LE
			Plug M8, A-coded	0.3 m	8139726	SDBC-MSB-1L-PU-K-0,3-M8
	Non-contacting, 2-wire		Open end	2 m	8139725	SDBC-MSB-1L-ZU-K-2-LE

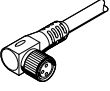
Connecting cables NEBU, straight, M8 connection						
	Electrical connection 1, connector system	Electrical connection 2, connector system	Electrical connection 2, number of connections/cores	Cable length	Part no.	Type
	M8x1, A-coded, to EN 61076-2-104	Open end	3	2.5 m	541333	NEBU-M8G3-K-2.5-LE3
				5 m	541334	NEBU-M8G3-K-5-LE3

Connecting cables NEBU, straight, M12 connection						
	Electrical connection 1, connector system	Electrical connection 2, connector system	Electrical connection 2, number of connections/cores	Cable length	Part no.	Type
	M12x1, A-coded to EN 61076-2-101	Open end	3	2.5 m	541363	NEBU-M12G5-K-2.5-LE3
				5 m	541364	NEBU-M12G5-K-5-LE3


Connecting cables NEBU, angled, M8 connection						
	Electrical connection 1, connector system	Electrical connection 2, connector system	Electrical connection 2, number of connections/cores	Cable length	Part no.	Type
	M8x1, A-coded, to EN 61076-2-104	Open end	3	2.5 m	541338	NEBU-M8W3-K-2.5-LE3
				5 m	541341	NEBU-M8W3-K-5-LE3

Accessories

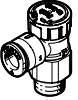
Connecting cables NEBU, angled, M12 connection

	Electrical connection 1, connector system	Electrical connection 2, connector system	Electrical connection 2, number of connections/cores	Cable length	Part no.	Type
	M12x1, A-coded to EN 61076-2-101	Open end	3	2.5 m	541367	NEBU-M12W5-K-2.5-LE3
				5 m	541370	NEBU-M12W5-K-5-LE3

One-way flow control valves GRLA – for exhaust air

	Pneumatic connection 1	Pneumatic connection, port 2	Part no.	Type
	Same size as pneumatic connection 2	M3	175038	GRLA-M3
	Push-in connector 3 mm	M5	175041	GRLA-M3-QS-3
	Push-in connector 4 mm		★ 193137	GRLA-M5-QS-3-D
	Push-in connector 6 mm		★ 193138	GRLA-M5-QS-4-D
			★ 193139	GRLA-M5-QS-6-D

One-way flow control valves VFOE – for exhaust air

	Pneumatic connection 1	Pneumatic connection, port 2	Part no.	Type
	Push-in connector 4 mm	M5	★ 8068723	VFOE-LE-T-M5-Q4
			8095432	VFOE-LE-T-M5-Q4-P50
	Push-in connector 6 mm		★ 8068724	VFOE-LE-T-M5-Q6