

Parallel gripper HPPH

FESTO



Characteristics

At a glance

[Link](#) [hpph](#)

- Gripper with integrated position transmitter and valves as well as pre-assembled gripper fingers
- Combination enables faster response behaviour and compressed air savings
- Quick and intuitive connection to robots via ISO 9409-1-50-4-M6 interface and M8x1, 8-pin electrical connection
- Developed in accordance with the requirements of ISO/TS 15066 and TÜV Süd-certified with gripper fingers HAFH-B30-16-45-N
- Actuation via digital I/O (PNP/NPN)
- Double-acting piston drive
- Resilient and precise ball guide
- Minimal height
- Low mass moments of inertia due to lightweight design
- High gripping forces
- Gripping force backup
- Switching status indication (LED), controlled via signal input
- Two switching points can be programmed with the integrated position transmitter. The switching points “Gripper open” and “Gripper closed” are defined as standard. Refer to the user documentation for further information.

Application options:

- HRC (human-robot collaboration)
- Handling of parts, e.g. pick and place

When using a gripper, note the following:

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

These grippers are not designed for the following or similar application examples:

- Machining
- Aggressive media
- Grinding dust
- Welding spatter

Engineering tools

[Link](#) [engineering tools](#)



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Gripper selection:

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

Diagrams

[Link](#) [hpph](#)



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

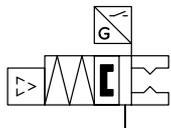
Gripping force backup

[NC] Closing

Closed by spring force in depressurised state

Characteristics

Switching input/output



- Switching input: PNP/NPN
- Switching output: PNP

Electrical connection

[R12] M8 individual plug, 8-pin



[SR12] M8 single socket, 8-pin



Type code

001	Series	
HPPH	Parallel gripper	
002	Size	
003	Complete stroke [mm]	
16	16	
004	Gripping force backup	
NC	Closing	

005	Switching input/output	
N	NPN	
P	PNP	
006	Electrical connection	
R12	M8 individual plug, 8-pin	
SR12	M8 single socket, 8-pin	

Datasheet

Connection to robots

HPPH-16-16-NC-N-R12 (part no. 8171873):

Compatible with all robots with socket M8x1, 8-pin and NPN switching input.

HPPH-16-16-NC-P-R12 (part no. 8171874):

Compatible with all robots with socket M8x1, 8-pin and PNP switching input.

HPPH-16-16-NC-N-SR12 (part no. 8205392):

Compatible with all robots with plug M8x1, 8-pin and NPN switching input.

Examples of compatible robots:

- Fanuc CRX-5iA, CRX-10iA, CRX-10iA/L, CRX-20iA/L, CRX-25iA
- Universal Robots UR3e, UR5e, UR10e, UR16e
- Hanwha HCR-3A, HCR-5A, HCR-12A (with adapter IO1/IO2)

HPPH-16-16-NC-P-SR12 (part no. 8205393):

Compatible with all robots with plug M8x1, 8-pin and PNP switching input.

Examples of compatible robots:

- Fanuc CRX-5iA, CRX-10iA, CRX-10iA/L, CRX-20iA/L, CRX-25iA
- Siasun SCR3, SCR5
- Yaskawa HC10

General technical data

Size	16
Total stroke	16
Stroke per gripper jaws	8
Design	Connection direction at side Twin piston Flat mounting method for gripper fingers Guidance Rack and pinion With gripper finger Pneumatic gripper Force pilot operated motion sequence
Drive system	Pneumatic
Mode of operation	Double-acting
Gripping force backup	Closing
Guide	Ball guide
Switching status indication	Blue LED, switching status via signal input
Gripper function	Parallel
Cushioning	On one side Not adjustable
Number of gripper jaws	2
Max. mass per external gripper finger ¹⁾	100 g
Pneumatic connection	For push-in connector O.D. 4 mm
Repetition accuracy, gripper ²⁾	≤0.06 mm
Max. operating frequency of gripper	1 Hz
Position detection	With integrated displacement encoder
Type of mounting	Via mounting kit To ISO 9409
Mounting position	optional
Product weight	680 g
Recommended workpiece weight for MRK	1 kg

1) Applies to unthrottled operation

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

Datasheet

Electrical data		
Size	16	
Electrical connection	M8 individual plug, 8-pin	M8 single socket, 8-pin
Nominal operating voltage DC	24 V	
Permissible voltage fluctuations	+/- 10%	
Max. current consumption	0.1 A	
Switching input	PNP NPN	
Switching output	PNP	
Electrical connection 1, function	Field device side	
Electrical connection 1, connection type	Cable with plug	Cable with socket
Electrical connection 1, design	Round	
Electrical connection 1, cable outlet	Angled	
Electrical connection 1, connector system	M8x1, A-coded, to EN 61076-2-104	
Electrical connection 1, number of connections/cores	8	
Electrical connection 1, used connections/cores	6	
Electrical connection 1, tightening torque	0.2 Nm	
Bending radius, fixed cable	26 mm	
Bending radius, moving cable	52 mm	

Operating and environmental conditions	
Size	16
Operating pressure	0.25 ... 0.7 MPa
Operating pressure	2.5 ... 7 bar
Operating pressure	36.25 ... 101.5 psi
Operating pressure HRC	0.25 ... 0.5 MPa
Operating pressure HRC	2.5 ... 5 bar
Operating pressure HRC	36.25 ... 72.5 psi
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	-5 ... 50°C
Relative air humidity	0 - 90% Non-condensing
Degree of protection	IP40
Sound pressure level	75 dB(A)
Maintenance interval	Life-time lubrication
Shock resistance	Shock test with severity level 2 to FN 942017-5 and EN 60068-2-27
Vibration resistance	Transport application test with severity level 2 to FN 942017-4 and EN 60068-2-6
CE mark (see declaration of conformity)	To EU EMC Directive In accordance with EU RoHS Directive
UKCA marking (see declaration of conformity)	To UK instructions for EMC To UK RoHS instructions
Approval	RCM trademark
Certificate issuing authority	TÜV Süd M70132770525.01
Partly completed machinery to Machinery Directive	Yes
Corrosion resistance class CRC ¹⁾	1 - Low corrosion stress

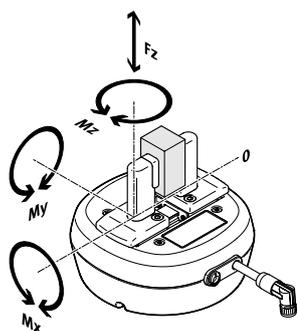
1) More information: www.festo.com/x/topic/kbk

Datasheet

Materials	
Size	16
Material housing	Anodised wrought aluminium alloy
Material cover	PA-reinforced
Material gripper jaws	High-alloy steel
Gripper finger material	Wrought aluminium alloy, anodised
Material piston	Wrought aluminium alloy, anodised
Material piston seal	TPE-U(PU)
Gear wheel material	High-alloy steel
Material spring	High-alloy stainless steel
Material screws	Galvanised steel High-alloy steel
Material o-ring	HNBR NBR
Note on materials	RoHS-compliant
LABS (PWIS) conformity	VDMA24364 zone III

Forces	
Size	16
Total gripping force, closing, 0.6MPa (6bar, 87 psi)	278 ... 302 N
Gripper force per gripper jaw, closing, 0.6 MPa (6 bar, 87 psi)	139 ... 151 N
Theoretical spring force per gripper jaw, closing	23.3 ... 34.9 N
Total gripping force HRC, closing	232 ... 256 N
Gripping force per gripper jaw HRC, closing	116 ... 128 N
Note on gripping force	Dependent on the stroke With integrated compression spring

Characteristic 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.

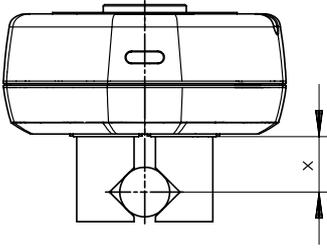
Collisions of the slides must be avoided. In the event of a collision, the slides can get damaged.

More information → User documentation

Size	16
Max. force on gripper jaw F_z static	176 N
Max. moment M_x	2.8 Nm
Max. moment M_y	1.4 Nm
Max. moment M_z	1.4 Nm

Datasheet

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

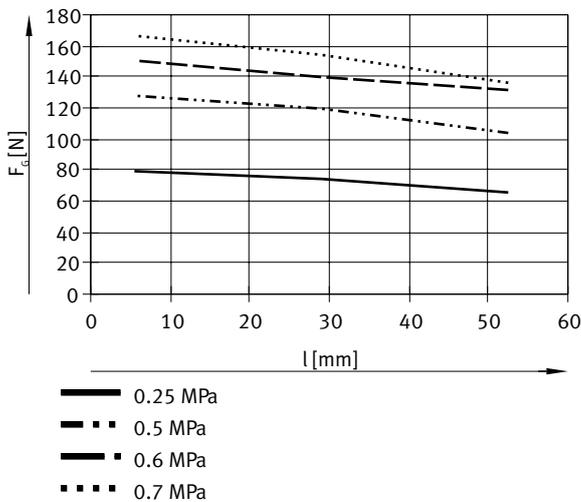


The gripping forces as a function of operating pressure and lever arm can be determined from the following graphs.

The gripping torque is not constant across the opening angle.

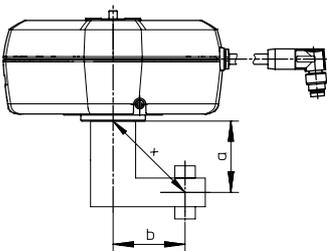
Sizing software for gripper selection → <https://www.festo.com/x/topic/eng>

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



The gripping force was measured with the gripper fully open and gripping a work-piece with a width of 16 mm.

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

$$x = \sqrt{a^2 + b^2} = \sqrt{30^2 + 20^2} = 36 \text{ mm}$$

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

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

Calculation example:

Where:

Distance $a = 30 \text{ mm}$

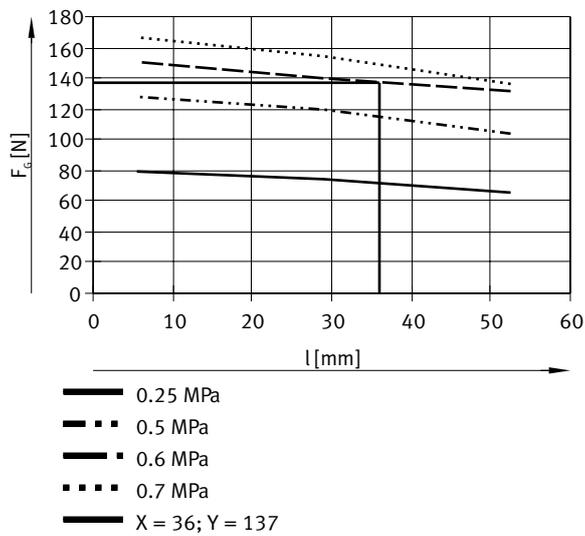
Distance $b = 20 \text{ mm}$

To be determined:

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

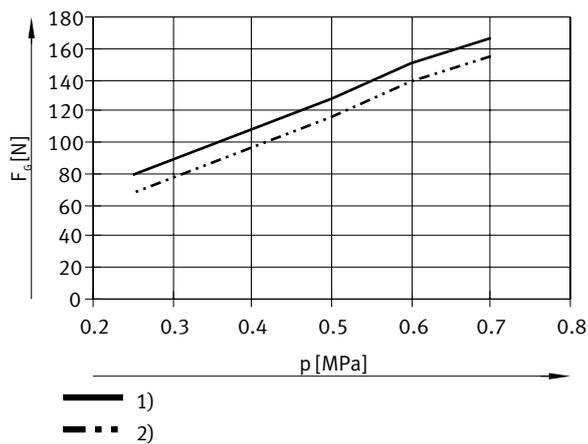
Datasheet

Gripping force F_{Gr} per gripper finger 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 $F_{Gr} = 137$ N for the gripping force.

Gripping force F_{Gr} per gripper jaw as a function of operating pressure p for human-robot collaboration

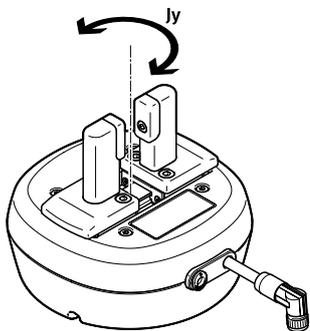


The gripping force refers to one gripper jaw, without mounted gripper fingers.

An operating pressure of max. 0.5 MPa (5 bar, 72.5 psi) is permissible for human-robot collaboration.

- 1) = Gripper open
- 2) = Gripper closed

Mass moments of inertia

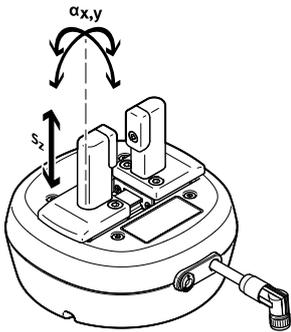


Mass moment of inertia of the gripper in relation to the central axis, with pre-mounted gripper fingers, HAFH-B30-16-45-N, with no load.

Size	16
Mass moment of inertia	0.6 kgcm ²

Datasheet

Gripper jaw backlash

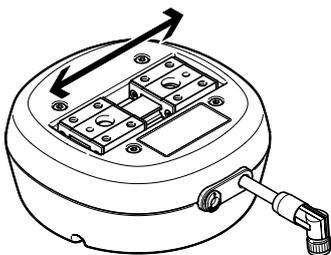


The gripper has a ball guide, which eliminates any possible backlash between the gripper jaws and the housing. The backlash values listed in the table have been calculated based on the traditional accumulative tolerance method.

Size ¹⁾	16
Max. gripper jaw backlash Sz	0 mm
Max. angular gripper jaw backlash ax, ay	0 deg

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

Opening and closing times



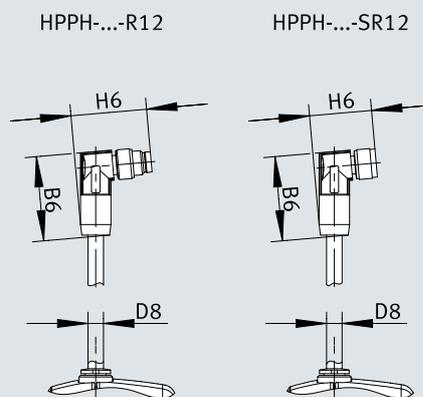
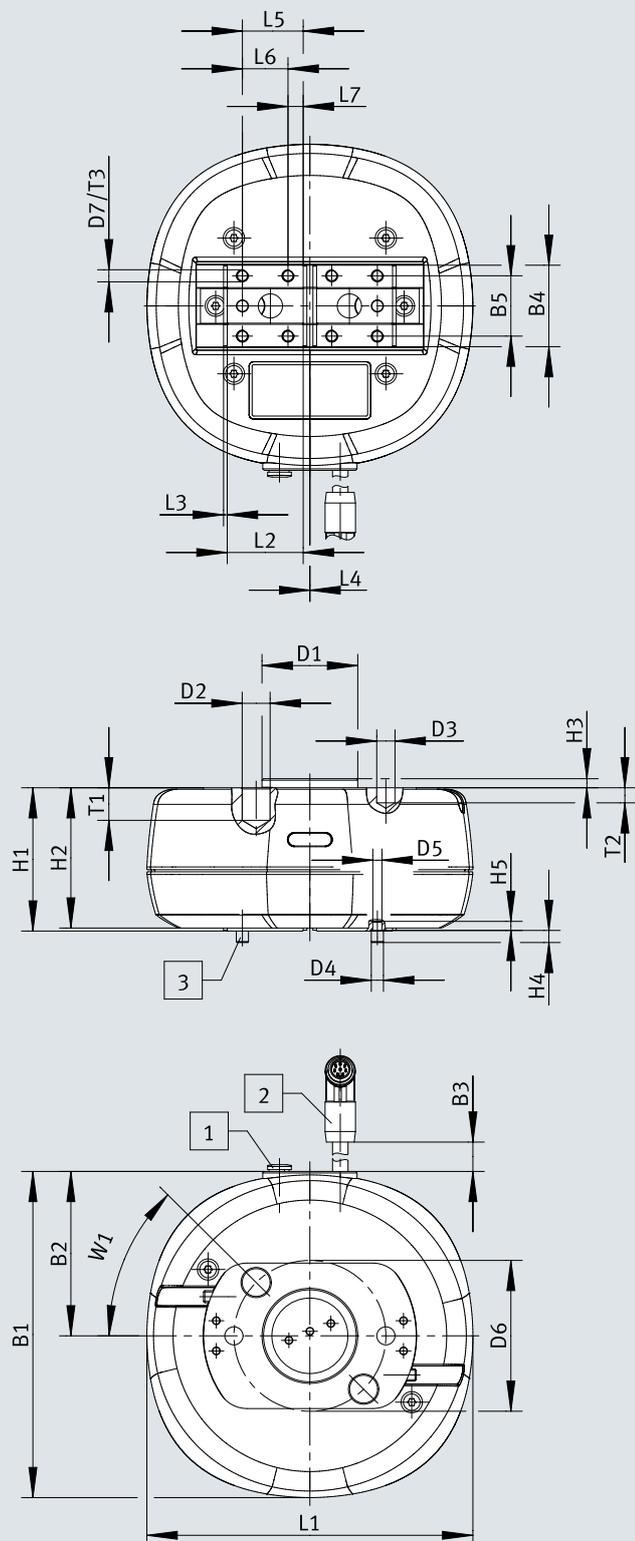
The indicated opening and closing times [ms] were measured at room temperature and with the gripper installed horizontally without additional gripper fingers. The grippers must be throttled for higher masses [g]. Opening and closing times must then be adjusted accordingly.

Size	16
Min. opening time at 0.6 MPa (6 bar, 87 psi)	180 ms
Min. closing time at 0.6 MPa (6 bar, 87 psi)	90 ms

Dimensions

Dimensions – Parallel gripper HPPH, without gripper finger

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- [1] Pneumatic connection
- [2] Electrical connection M8x1, 8-pin
- [3] Centring pin (included in the scope of delivery)



Dimensions

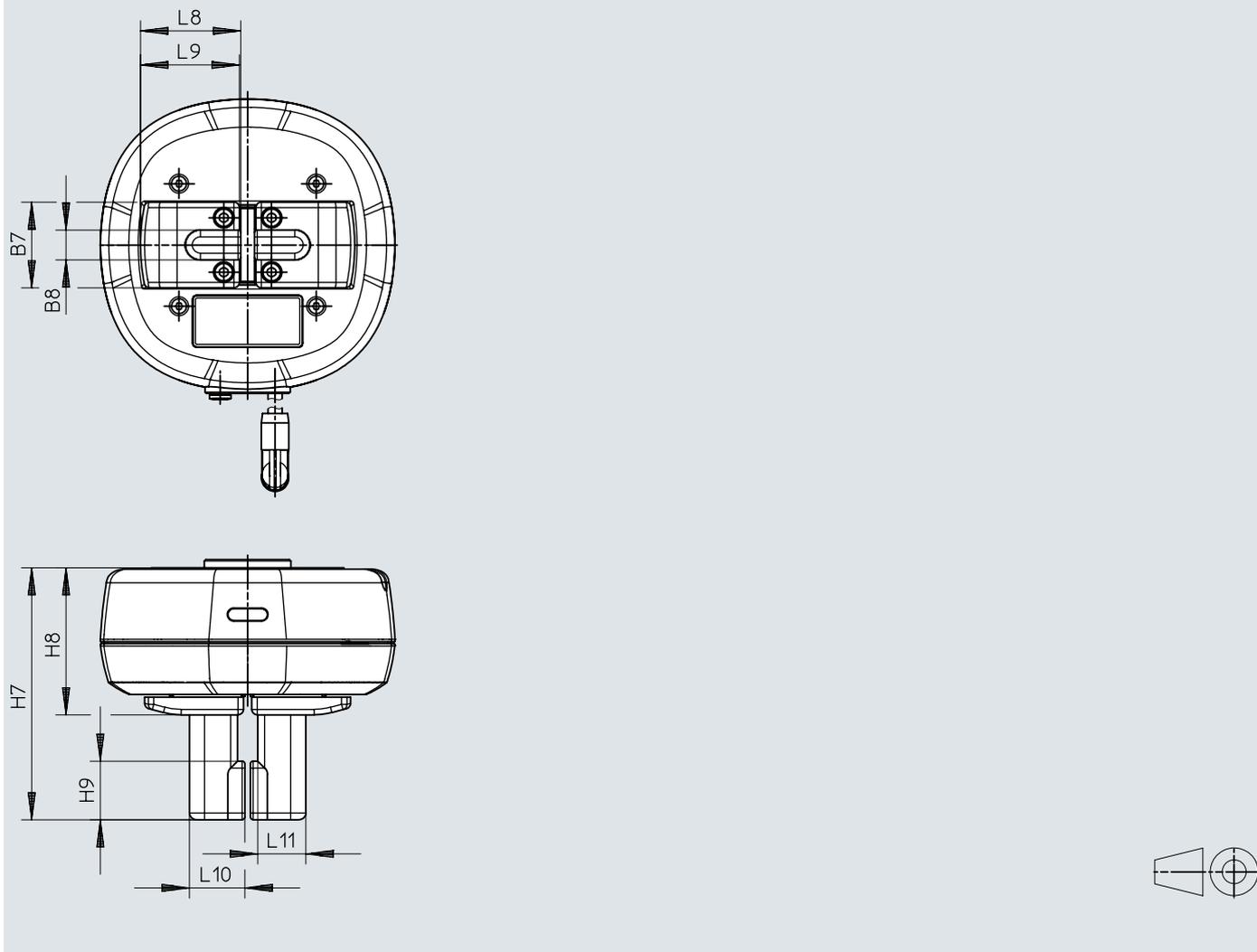
	B1	B2	B3	B4	B5	B6	D1 ∅ h7	D2 ∅ H12	D3 ∅ H7	D4 ∅ h8	
HPPH-16-16-NC-N-R12	107,3	54,5	300	27	20	28	31,5	9,2	6	4	
HPPH-16-16-NC-P-R12											
HPPH-16-16-NC-N-SR12											
HPPH-16-16-NC-P-SR12											
	D5 ∅ H9	D6 ∅	D7	D8 ∅	H1 +0,1	H2	H3	H4	H5	H6	
HPPH-16-16-NC-N-R12	3	50	M4	5,1	47,5	46,5	3	4	3	25	
HPPH-16-16-NC-P-R12											
HPPH-16-16-NC-N-SR12											
HPPH-16-16-NC-P-SR12										20,5	
	L1	L2	L3	L4 ¹⁾	L5	L6	L7	T1	T2	T3	W1
		-0,1		+2	±0,05	±0,05		+0,1			
HPPH-16-16-NC-N-R12	107,3	25	1,2	0 ... 16	20	15	5	10,8	5	4	45°
HPPH-16-16-NC-P-R12											
HPPH-16-16-NC-N-SR12											
HPPH-16-16-NC-P-SR12											

1) Gripper closed/open

Dimensions

Dimensions – Parallel gripper HPPH, with gripper fingers HAFH-B30-16-45-N

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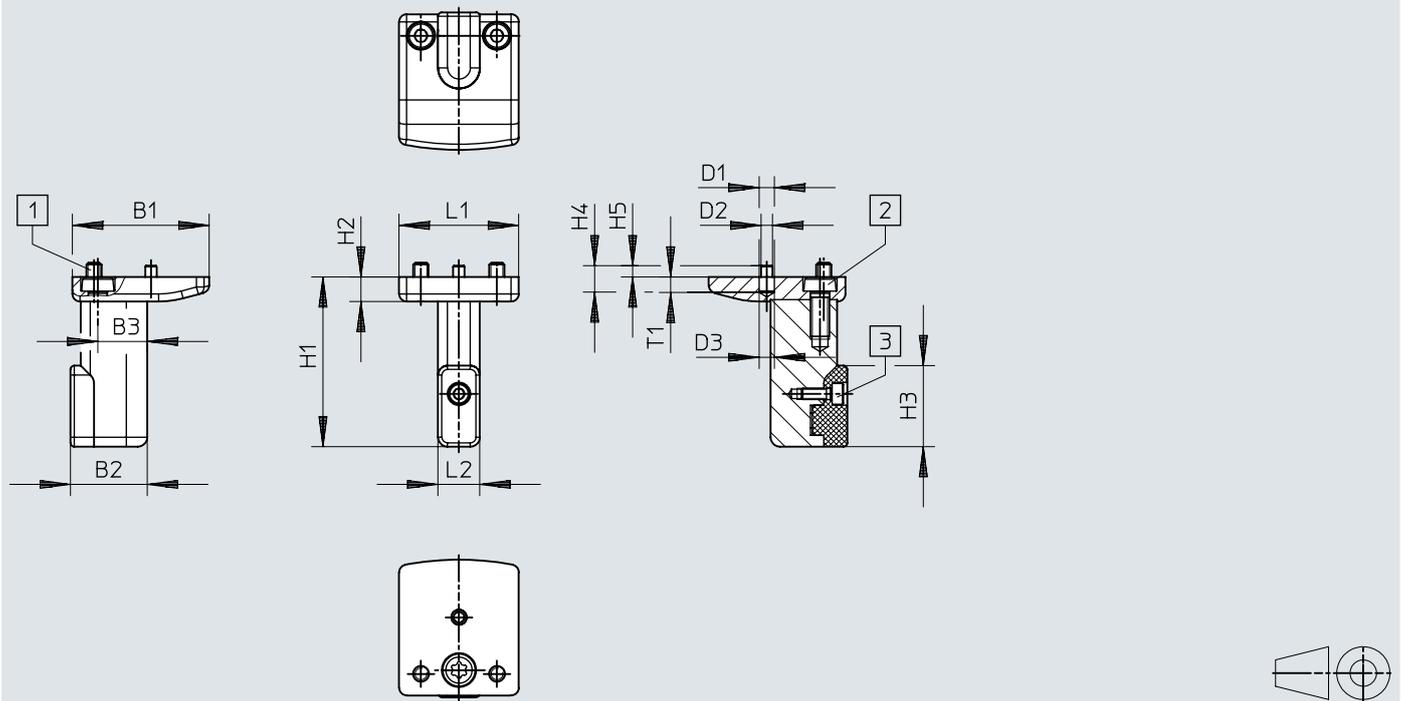


	B7	B8	H7	H8	H9	L8	L9	L10	L11
	±0,1								
HPPH-16-16-NC-N-R12	31,5	11	92,5	54	21,5	36,5	36	20,2	17,5
HPPH-16-16-NC-P-R12									
HPPH-16-16-NC-N-SR12									
HPPH-16-16-NC-P-SR12									

Dimensions

Dimensions – Gripper finger HAFH-B30-16-45-N

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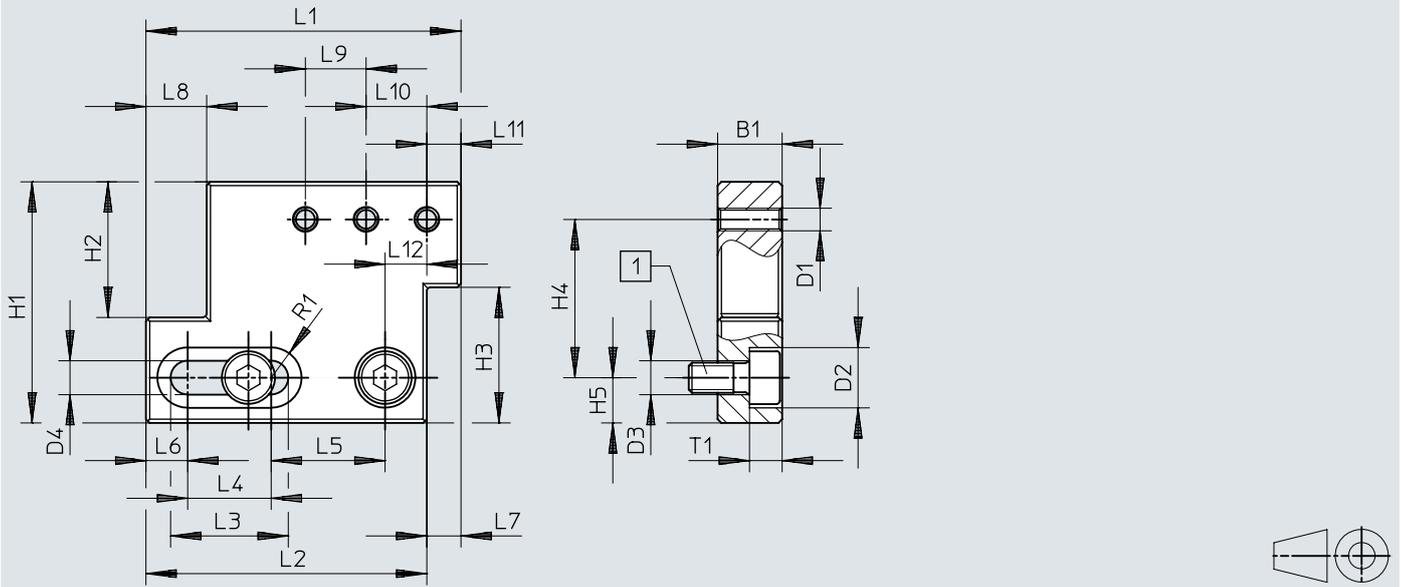
- [1] Screw M4x6-10.9 (included in the scope of delivery)
- [2] Screw M5x12-10.9 (included in the scope of delivery)
- [3] Screw M3x8-10.9 (included in the scope of delivery)

	B1	B2	B3	D1 ø h8	D2 ø h8	D3 ø h7	H1	H2	H3	H4 +0,1	H5	L1	L2	T1
HAFH-B30-16-45-N	36	20,2	17,5	4	3	4	45	6,5	21,5	7	3	31,5	11	4,1

Dimensions

Dimensions – Intermediate plate HAMF-PA

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[1] Screw M4x8-10.9 (included in the scope of delivery)

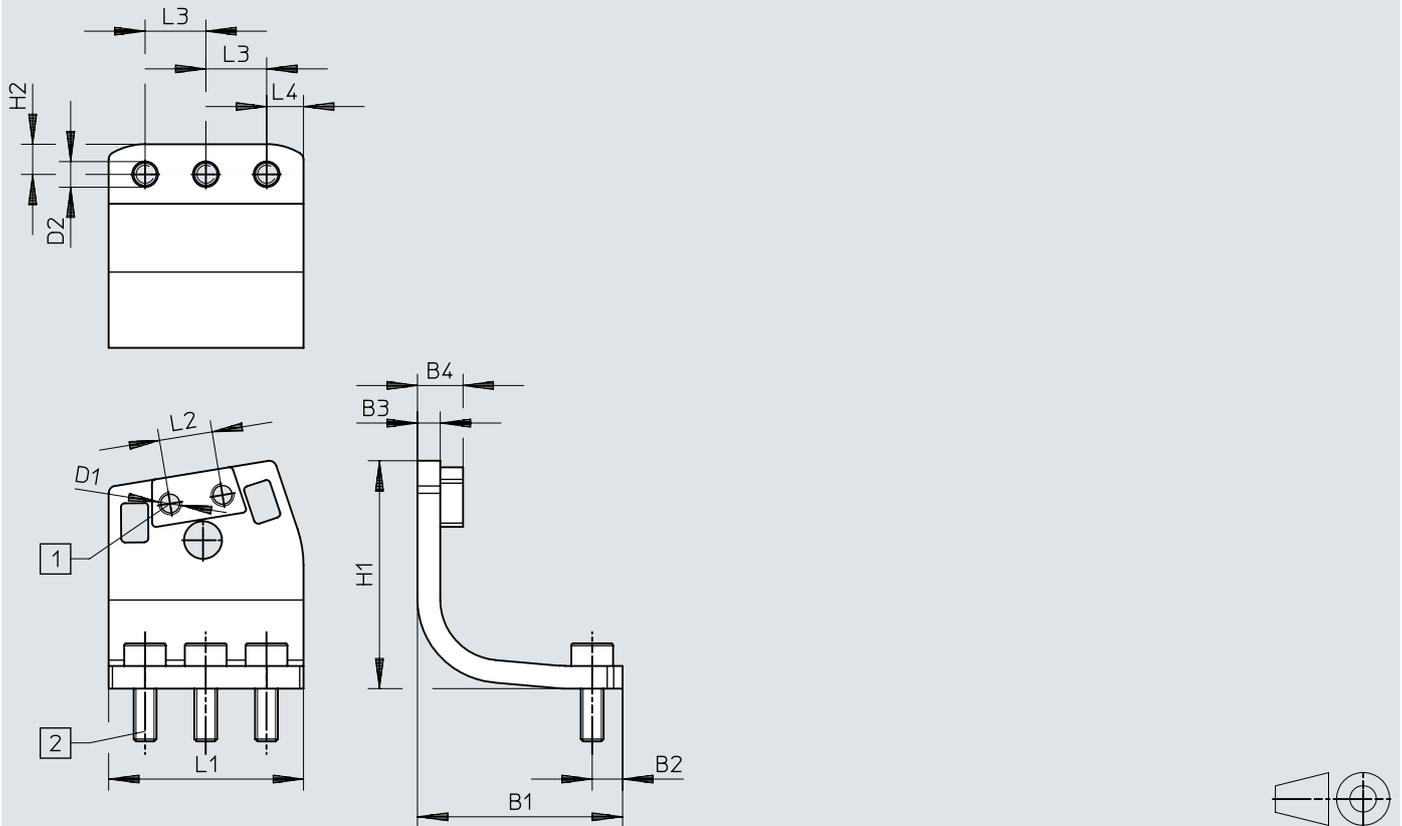
	B1	D1	D2	D3	D4	H1	H2	H3	H4	H5	L1	L2
	±0,1		∅	∅	+0,1							
HAMF-PA-B30-16	8,5	M3	8	4,5	4,5	32	18	18	21	6	41,5	37

	L3	L4	L5	L6	L7	L8	L9	L10	L11	L12	R1	T1
	+0,2											
HAMF-PA-B30-16	15,5	11	15	5,5	4,5	8	8	8	4,5	5,5	4	4,3

Dimensions

Dimensions – Mounting bracket DHAS-MA-B6-60

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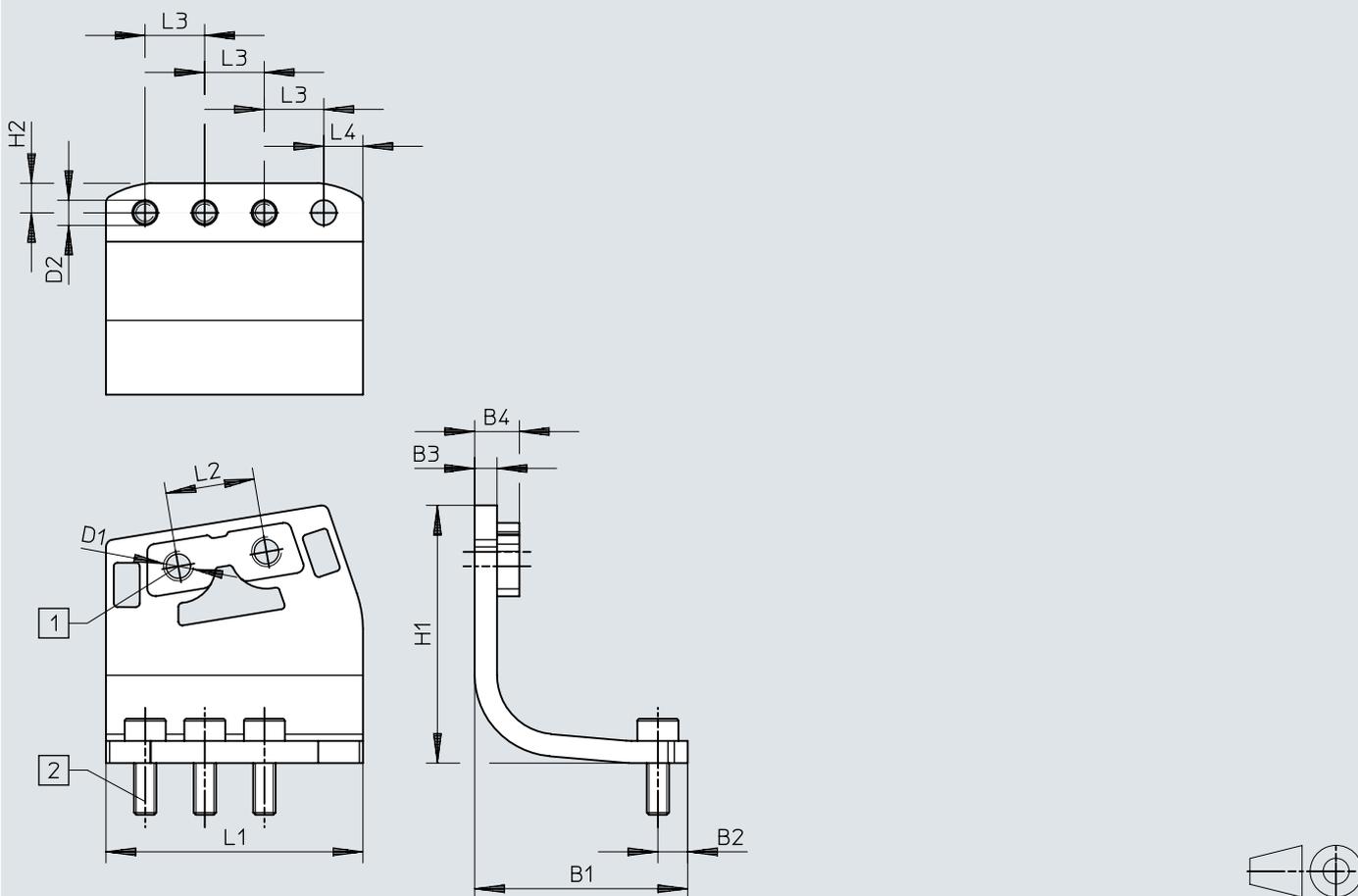
- [1] Mounting thread
- [2] Screw M3x8-8.8 (included in the scope of delivery)

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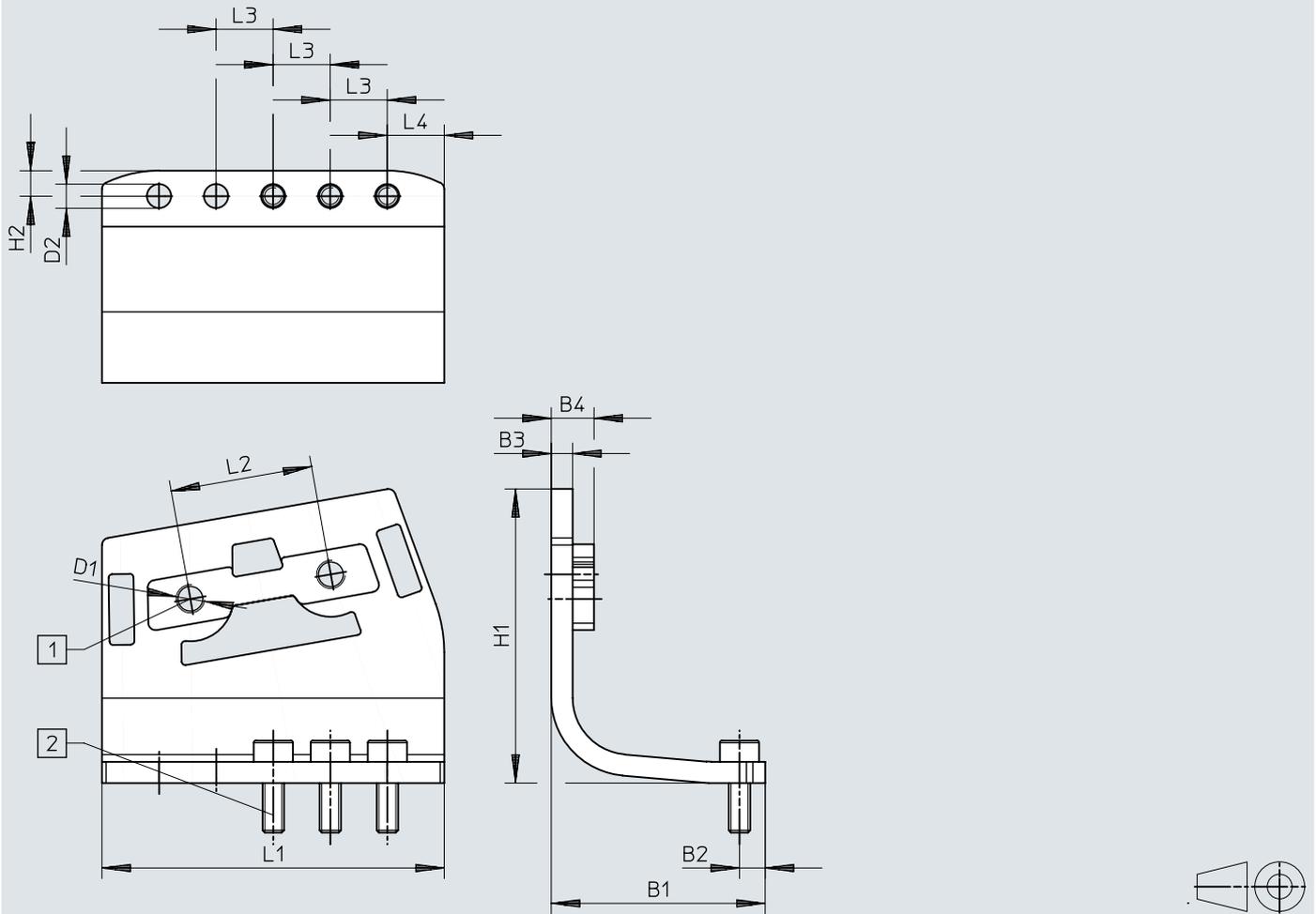
- [1] Mounting thread
- [2] Screw M3x8-8.8 (included in the scope of delivery)

	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

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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-B6-120	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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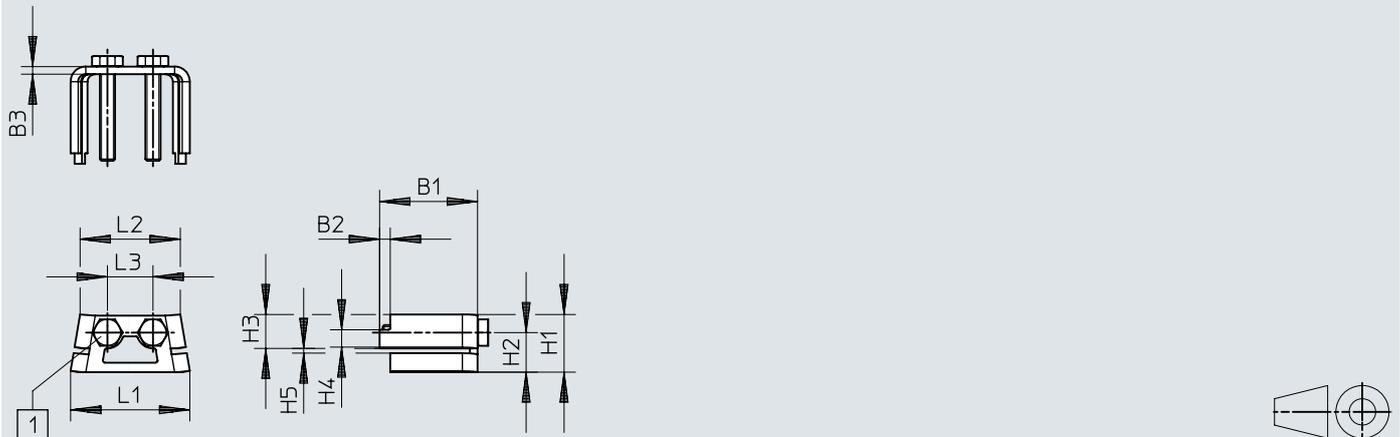


	B1	B2	H1	L1
DHAS-GF-60-U-BU	18	11,8	61,5	26
DHAS-GF-80-U-BU	21,3	11,8	94,5	37,5
DHAS-GF-120-U-BU	25	11,8	134,5	50

Dimensions

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

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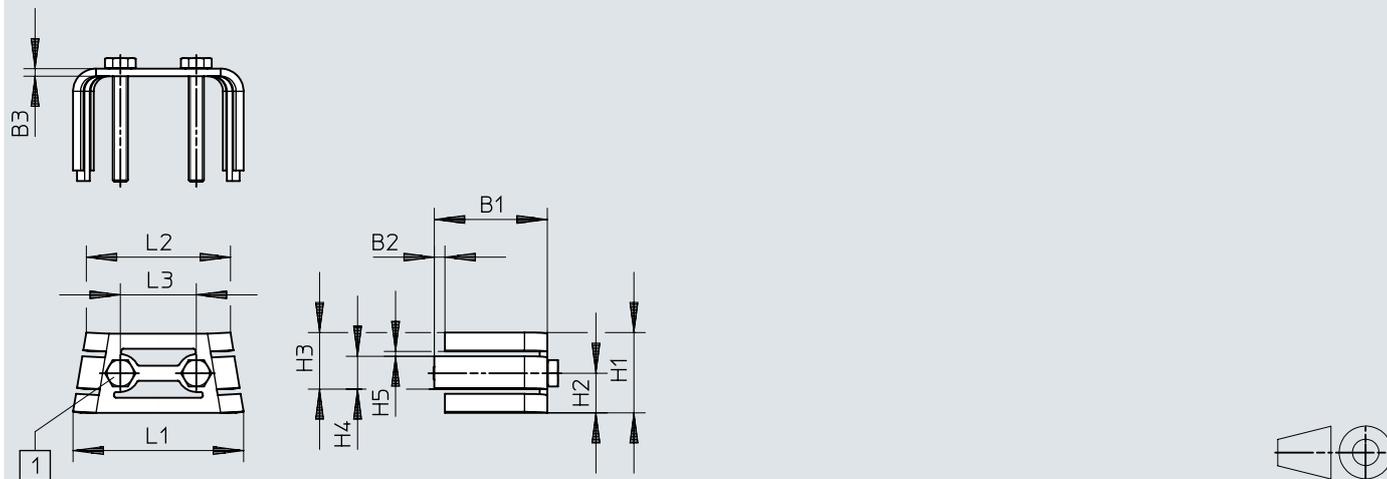
[1] DHAS-ME-H9-60: screw ISO 4017-M3x22-A2-70 / DHAS-ME-H9-80: screw ISO 4017-M4x25-A2-70 (included in the scope of delivery)

	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

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

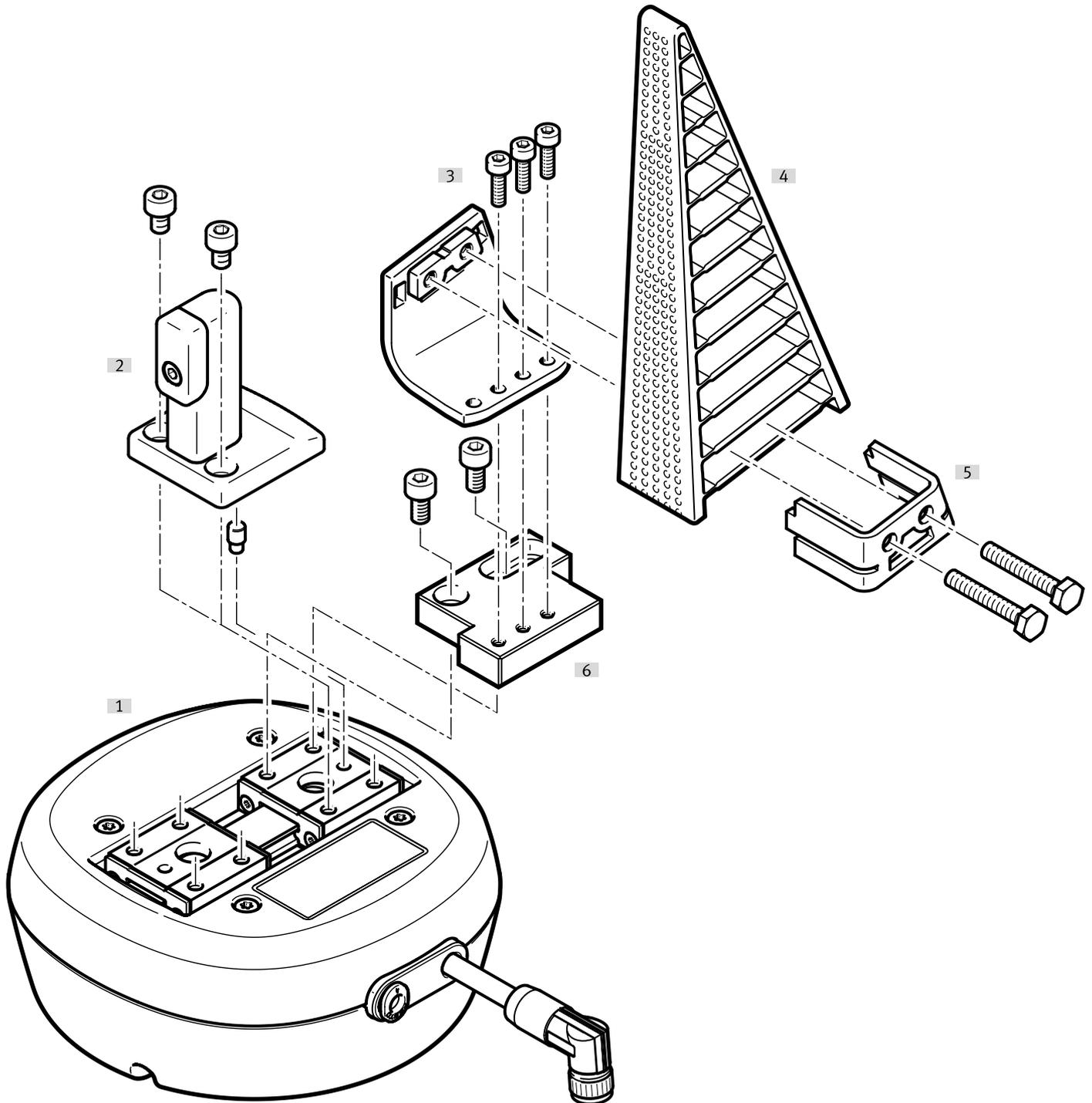
	B1	B2	B3	H1	H2	H3	H4	H5	L1	L2	L3
			±0,1					±0,1			±0,1
DHAS-ME-H9-120	29,8	2,8	2	21,3	10,5	15	8,7	1,3	44,9	38	20

Ordering data

Parallel gripper HPPH						
	Size	Total stroke	Electrical connection	Switching input	Part no.	Type
	16	16 mm	M8 individual plug, 8-pin	PNP	8171874	HPPH-16-16-NC-P-R12
				NPN	8171873	HPPH-16-16-NC-N-R12
			M8 single socket, 8-pin	PNP	8205393	HPPH-16-16-NC-P-SR12
				NPN	8205392	HPPH-16-16-NC-N-SR12

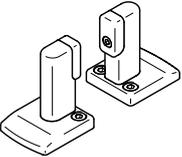
Peripherals

Parallel gripper HPPH



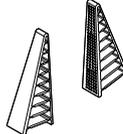
Accessories		→ Link
Type/order code	Description	
[1] Parallel gripper HPPH	Double-acting, with ball guide	hpph
[2] Gripper finger HAFH-B30-16-45-N	Already pre-assembled when the gripper is delivered, but also available as an accessory	24
[3] Mounting bracket DHAS-MA	For mounting the adaptive gripper 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 mount the adaptive gripper finger DHAS-GF on the gripper 	24
[5] Mounting kit DHAS-ME	For mounting the adaptive gripper finger DHAS-GF on the mounting bracket DHAS-MA	24
[6] Intermediate plate HAMF-PA	For mounting the mounting bracket DHAS-MA on the gripper	24

Accessories

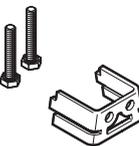
Gripper finger HAFH					
	Description	Gripper finger material	Product weight	Part no.	Type
	For size 16	Wrought aluminium alloy, anodised	42 g	8207226	HAFH-B30-16-45-N

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

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 Link 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 mount the adaptive gripper finger DHAS-GF on 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