Handling modules HSP

FESTO

Handling modules HSP

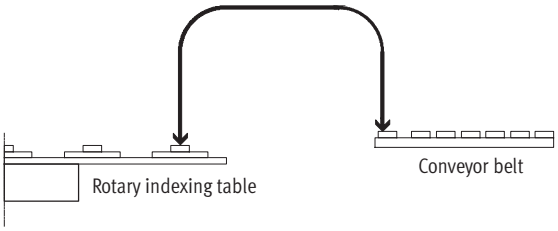
Key features at a glance

Field of application

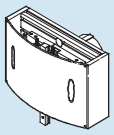
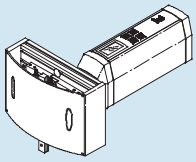
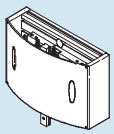
The handling module is a new generation of function modules for the automatic transfer, feed and removal of small parts in extremely confined spaces.
This is achieved by means of a guided vertical and horizontal motion sequence. A backlash-free cross-guide with recirculating ball bearing elements ensures high precision and good rigidity.
The combination of a semi-rotary drive and a slotted guide system produces a compact unit for a complete pick and place cycle.

Special features

- Compact design
- Extremely short cycle times
- Low cost
- Simple commissioning
- For working loads up to 1.6 kg
- Stroke adjustment along Y- and Z-axes
- Wait positions possible
- No planning costs



Three drive variants are available

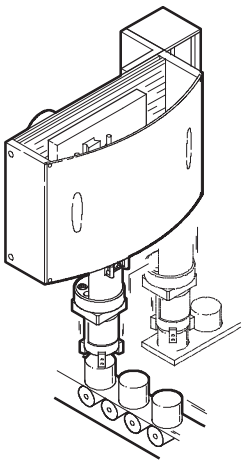
	Pneumatic: HSP-...-AP, with swivel module DSM	Electric: HSP-...-AE, with servo motor unit MTR-DCI-...-HM	Without drive: HSP-...-AS, with drive shaft
			
Advantages			
	• Fast • Cost-effective • Ready to install • No system planning required • Simple commissioning	• Freely positionable • Freely selectable speed • Smooth motion sequence • Ready to install • No system planning required • Simple commissioning using teach-in procedure	• Compact • Universal compatibility • Variable drive interface • On request: Drive options in combination with servo motors MTR-AC
Technical data			
Stroke Y [mm]	52 ... 170		
Z [mm]	20 ... 70		
Min. cycle time [s]	0.6 ... 1.0	0.8 ... 1.2	Depends on drive
Working load [g]	0 ... 1600		
Repetition accuracy at end positions [mm]	±0.02		
Wait positions	Max. 2	Any	Depends on drive
Function of wait position	Pulling with return cylinder	Freely approachable	Depends on drive
Repetition accuracy at wait positions [mm]	< 1	< 2	Depends on drive
Data sheet	→ 8	→ 18	→ 32

Handling modules HSP

Typical applications

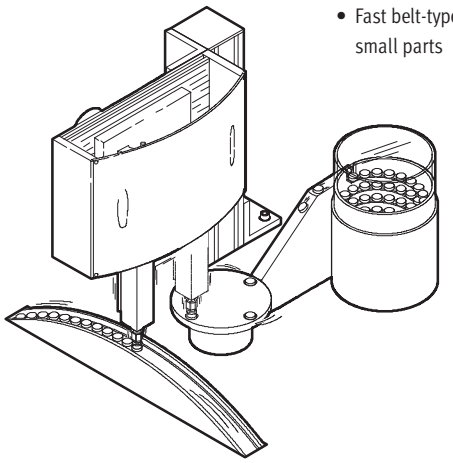
HSP-...-AP, pneumatic

Linear transfer



- Fast feed and removal, e.g. for linear transfer or rotary indexing table

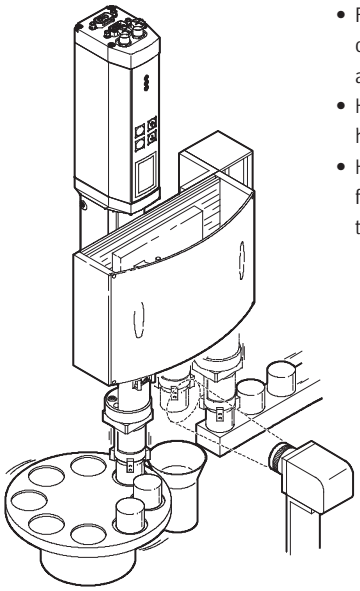
Belt-type part positioning



- Fast belt-type part positioning of small parts

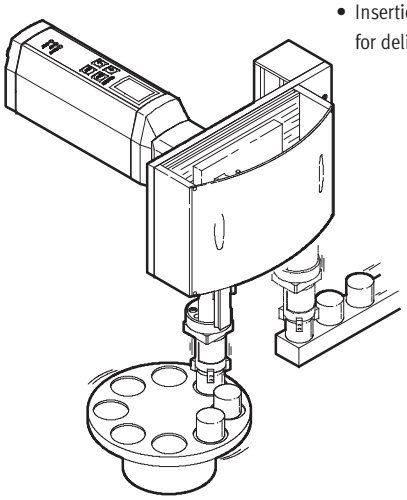
HSP-...-AE, electric

Rotary indexing table



- Flexible pick and place unit with quality inspection of components and ejector for reject parts
- Handling of parts with different heights
- Handling at different speeds, e.g. for linear transfer or rotary indexing table

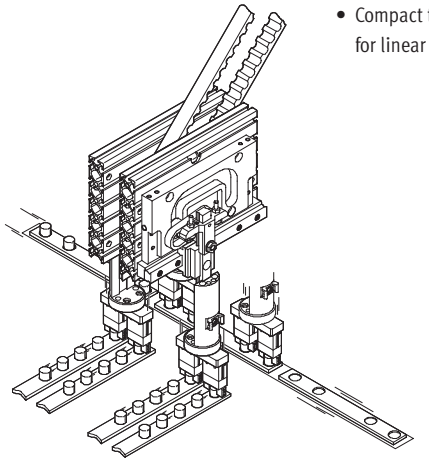
Rotary indexing table



- Adjustable wait position module directly above workpiece/workpiece carrier
- Insertion tasks at different speeds for delicate components

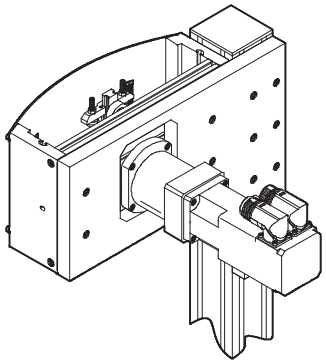
HSP-...-AS, without drive

Linear transfer



- Compact twin pick and place unit for linear transfer

Rotary indexing table, linear transfer

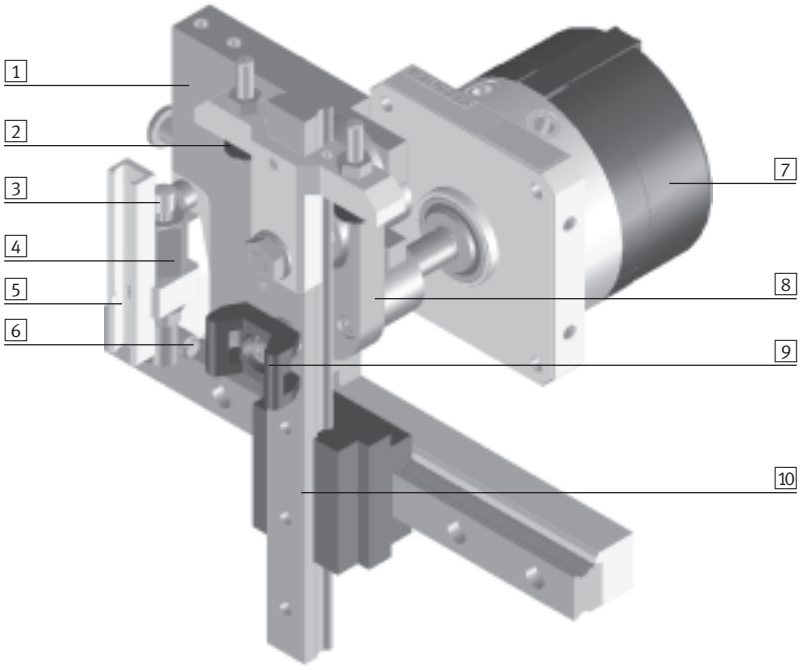


- Fast and flexible pick and place unit with servo motor EMMS-AS
- Electrical variant using third-party motor

Handling modules HSP

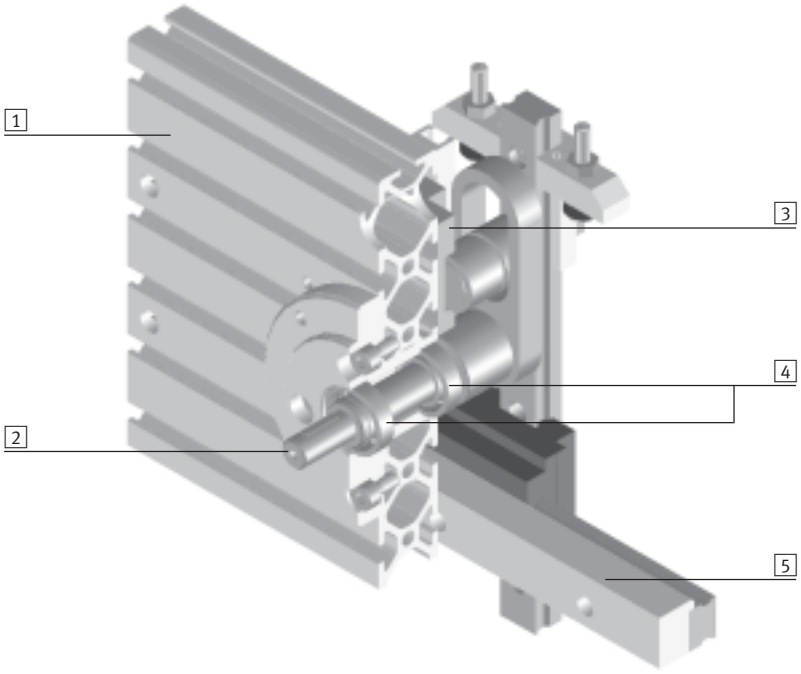
Key features at a glance

HSP-...-AP – pneumatic with swivel module DSM



1 Slotted guide plate
2 Adjustable stop
3 Shock absorber YSRW
4 Stop sleeve
5 Sensor rail
6 Pressure piece
7 Swivel module DSM
8 Swivel lever
9 Cable binder holder
10 Cross-guide

HSP-...-AS – without drive (rear side)



1 Back plate
2 Shaft with Woodruff key
3 Slotted guide plate
4 Ball bearings
5 Aluminium rail for alignment of slotted guide plates

Handling modules HSP

Key features at a glance

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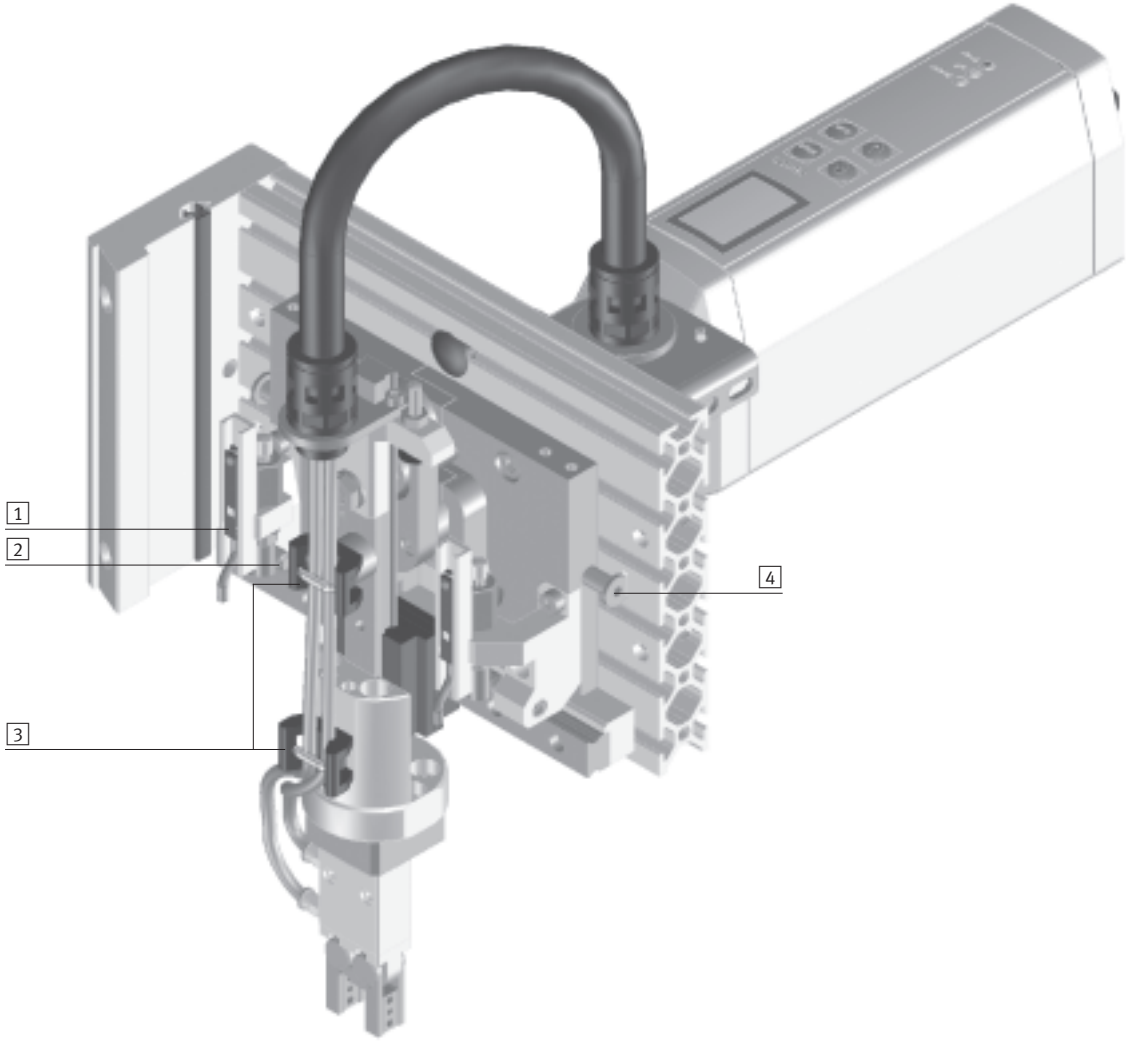
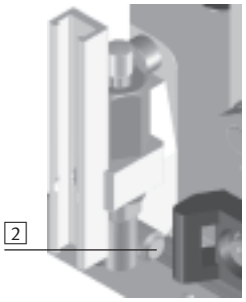
HSP-…-AE – electrical version with servo motor unit MTR-DCI-…-HM



The technology in detail

1 Proximity sensor cables are installed via profile slots in the side and back plate.



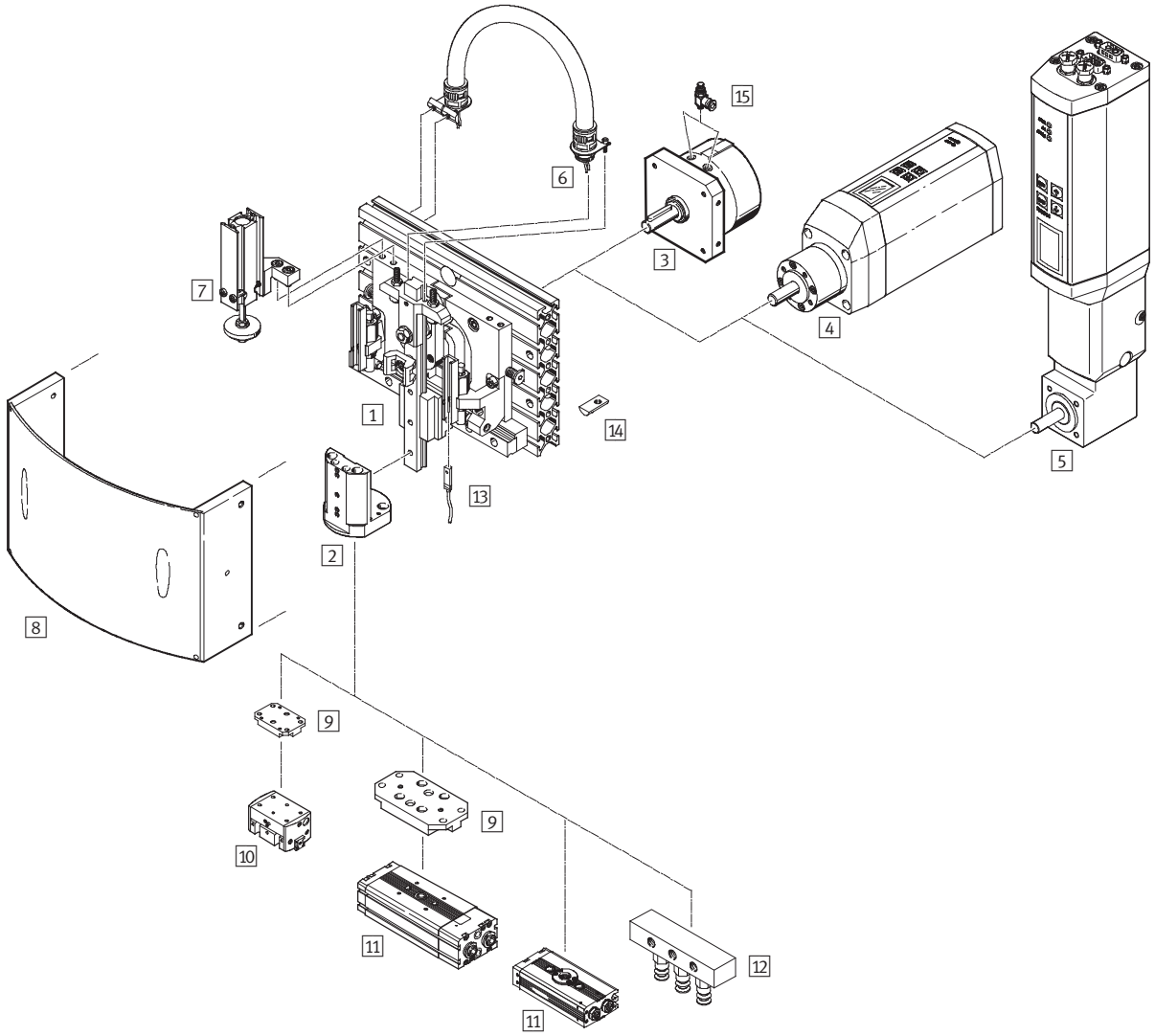
2 The pressure piece guarantees freedom from backlash and precision at the end positions and in the effective linear stroke along the Z-axis.

3 Cable binder holders facilitate the secure routing of tubing and cables.

4 The adjustable slotted guide plate permits precise stroke setting.

Handling modules HSP

Peripherals overview



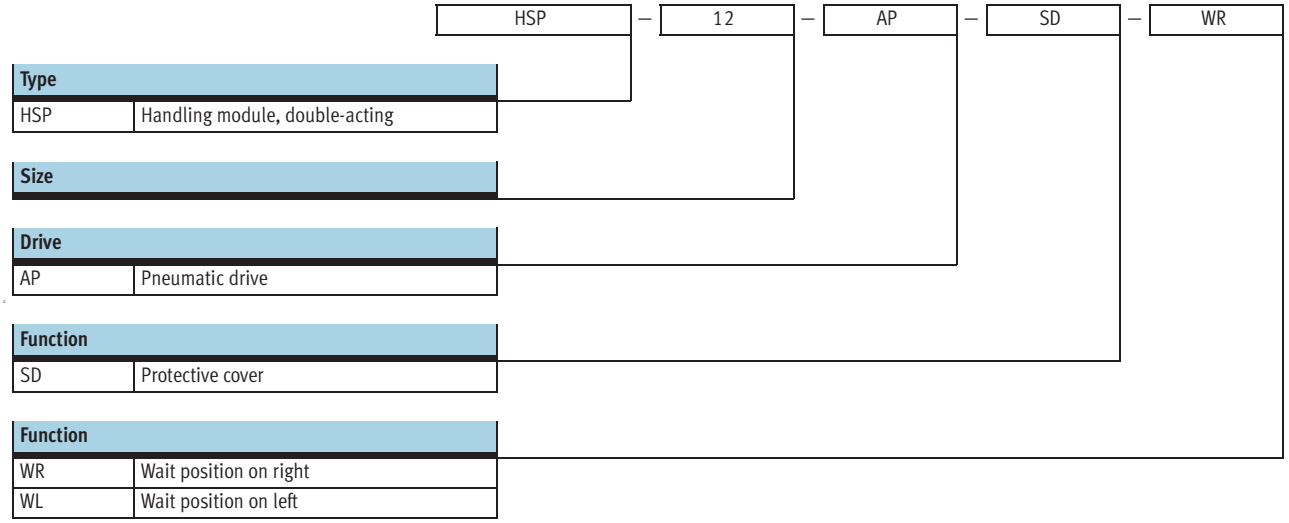
Handling modules HSP

Peripherals overview

Accessories			
		Brief description	➔ Page/Internet
1	Handling module HSP	Standard module without accessories	9
2	Adapter kit HAPG	Interface for grippers, semi-rotary drives, etc.	35
3	Swivel module DSM	Pneumatic drive, adapted to each size	dsm
4	Motor unit MTR-DCI-...-HM	Servo motor with integrated power electronics	25
5	Motor unit MTR-DCI-...-HM	Servo motor with angle gear unit and integrated power electronics	25
6	Installation kit MKRP	Conduit to protect electric cables and tubing	35
7	Wait position module BWL-/BWR-HSP	With pneumatic drive: Function for retracting the swivel arm from operating area	36
8	Cover kit BSD-HSP	To protect against accidental contact	36
9	Adapter kit	Interface between HSP and gripper or semi-rotary drive	gripper drqd
10	Gripper	Parallel/Three-point/Radial/Angle gripper, appropriate gripper for every application	gripper
11	Semi-rotary drive DRQD	Semi-rotary drive for transferring parts	drqd
12	Suction cups	Appropriate suction cup for every application	suction cup
13	Proximity sensor SME-/SMT-8	Sensing facility for end positions	37
14	Slot nut HMBN	Mounting element	38
15	Non-return and flow control valve GRLA	Speed setting of pneumatic drives	grla

Handling modules HSP, pneumatic

Type codes



Type	
HSP	Handling module, double-acting

Size	

Drive	
AP	Pneumatic drive

Function	
SD	Protective cover

Function	
WR	Wait position on right
WL	Wait position on left

Handling modules HSP, pneumatic

Technical data

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Function

-N- Size
12, 16 and 25
-T- Y-stroke length
52 ... 170
-T- Z-stroke length
20 ... 70

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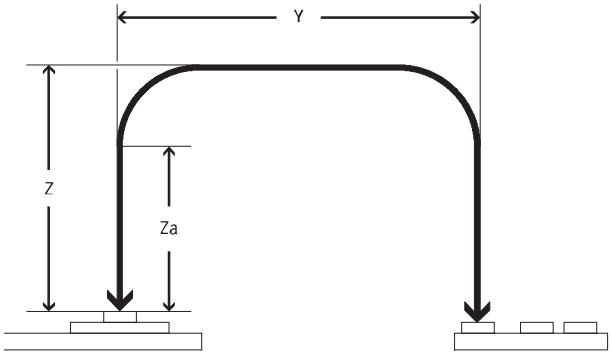
Spare_parts_service

General technical data	
Type	HSP-...-AP
Pneumatic connection	M5
Mode of operation	Double-acting
Operating medium	Filtered compressed air, lubricated or unlubricated
Constructional design	Swivel module
	Cross-guide
	Guided motion sequence
Cushioning	Shock absorber at both ends, soft characteristic curve
Position sensing	For proximity sensing
Type of mounting	With through-holes
	With slot nuts
Mounting position	Guide rail, vertical/horizontal

Operating and environmental conditions		
Type		HSP-...-AP
Operating pressure	[bar]	4 ... 8
Ambient temperature	[°C]	0 ... +60

Stroke [mm]

Size		12	16	25
Y-axis				
Stroke		52 ... 68	90 ... 110	130 ... 170
Z-axis				
Stroke	Z	20 ... 30	35 ... 50	50 ... 70
Working stroke	Za	5 ... 15	5 ... 20	5 ... 25

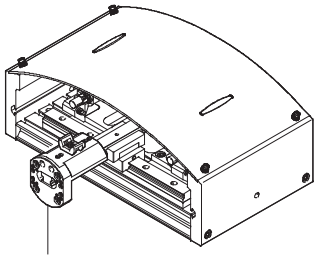


Forces [N]			
Size	12	16	25
Z-axis			
Effective force at 6 bar	40	50	65
Y-axis			
Permissible process force	30	35	50

Weight [g]			
Size	12	16	25
HSP-...-AP	1900	2900	6400
HSP-...-AP-SD	2600	3400	7600
HSP-...-AP-SD-WR	2800	3600	8100
HSP-...-AP-SD-WL	2800	3600	8100

Repetition accuracy [mm]

To ensure low-vibration operation, the working load should be mounted as close as possible to the guide rail of the handling module.
Repetition accuracy is guaranteed by mounting the working load (adapter plate, rotary drive and/or gripper, gripper finger, workpiece) within the mounting surface of the adapter kit HAPG.



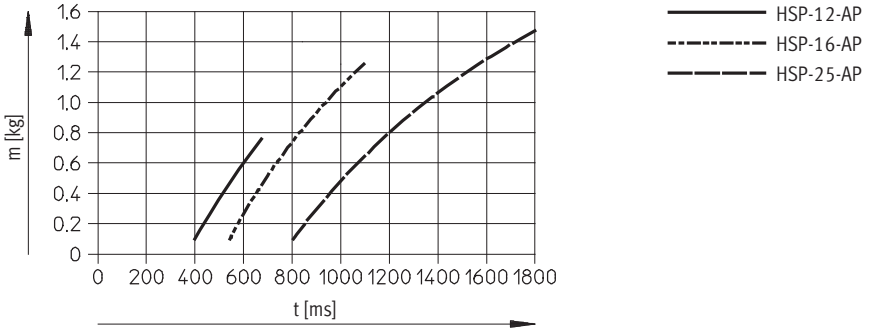
Mounting surface of HAPG

Size	12	16	25
Repetition accuracy at end positions	±0.01	±0.01	±0.02

Travel times t as a function of working load m

The travel time t is the time taken for the handling module to move from one end position to the other and back again.

The working load m is the load attached to the vertical guide rail (e.g. adapter, gripper, semi-rotary drive and workpiece).



Cycle times [s]

The cycle time t_t comprises the travel time t and the dwell time t_e at the end positions.

t_t = travel time t + dwell time t_e
The value must not fall below the minimum cycle time.

Size	12	16	25
Min. cycle time	0.6	0.8	1.0

Example for HSP-12-AP

Step 1:
The following values are assumed:
Working load m = 0.15 kg
Dwell time t_e= 2 x 50 ms
(50 ms per end position)

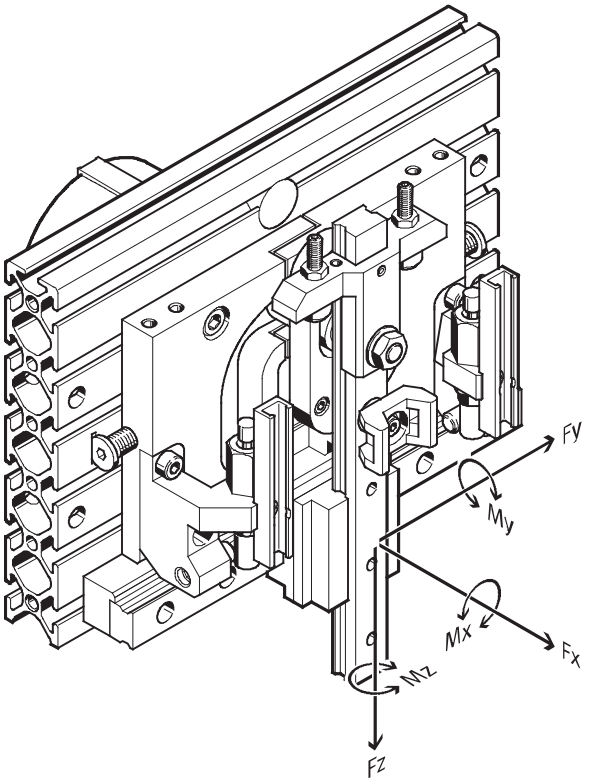
Step 2:
The travel time can be determined from the graph:
t = 400 ms

Step 3:
This gives us a cycle time:
t_t = 400 ms + 100 ms = 500 ms

Step 4:
The table gives us a min. cycle time of 600 ms. This means that the movement has to be controlled.

Permissible static/dynamic characteristic load values

Cross-guide



Note

The torques apply to the centre of the vertical guide.

Combined load

The following torque equation must be satisfied with combined load:

$$\frac{M_x}{Mx_{perm.}} + \frac{M_y}{My_{perm.}} + \frac{M_z}{Mz_{perm.}} \leq 1$$

Dynamic characteristic load values			
Size	12	16	25
Max. torques [Nm] $Mx_{perm.}$, $My_{perm.}$, $Mz_{perm.}$	1.1	2.4	3.2

Combined load

The following torque equation must be satisfied with combined load:

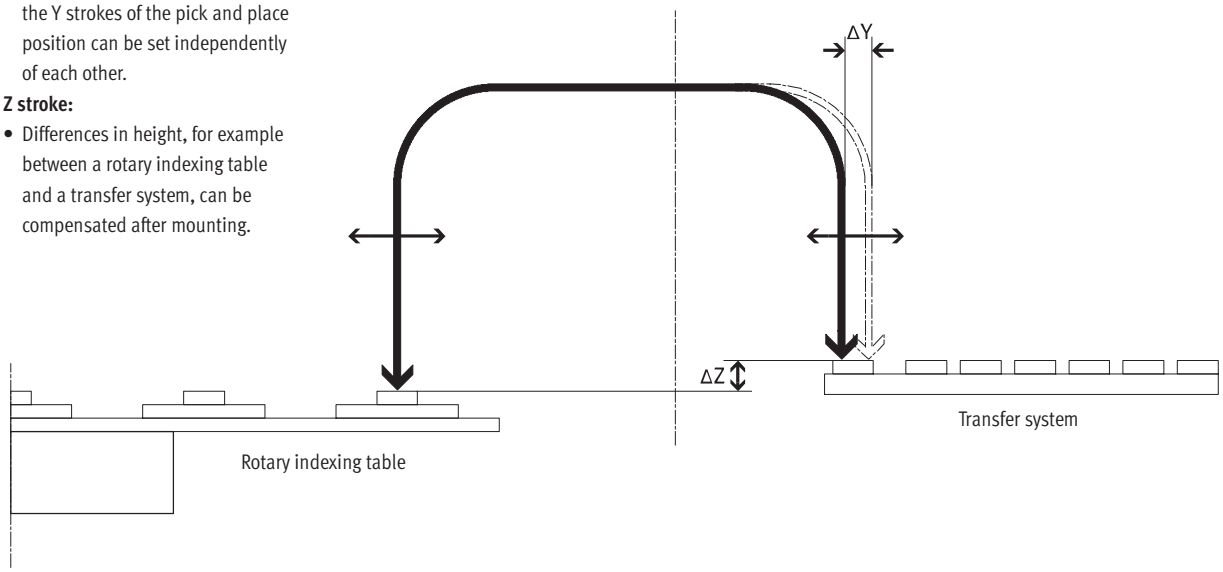
$$\frac{M_{ox}}{Mox_{perm.}} + \frac{M_{oy}}{Moy_{perm.}} + \frac{M_{oz}}{Moz_{perm.}}$$

Static characteristic load values			
Size	12	16	25
Max. torques [Nm] $Mox_{perm.}$, $Moy_{perm.}$, $Moz_{perm.}$	5	10	15

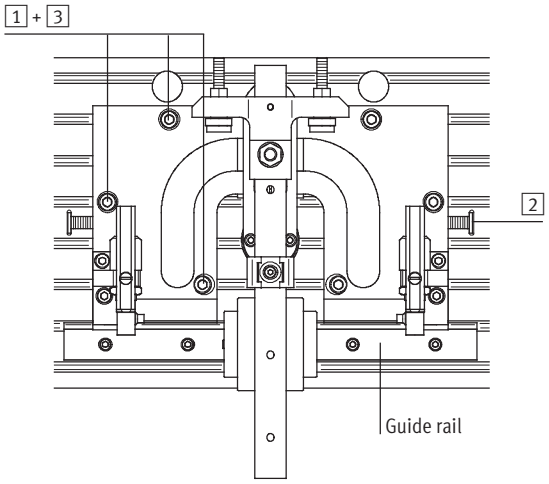
Stroke adjustment

Y stroke:
- Once the HSP has been mounted, the Y strokes of the pick and place position can be set independently of each other.

Z stroke:
- Differences in height, for example between a rotary indexing table and a transfer system, can be compensated after mounting.

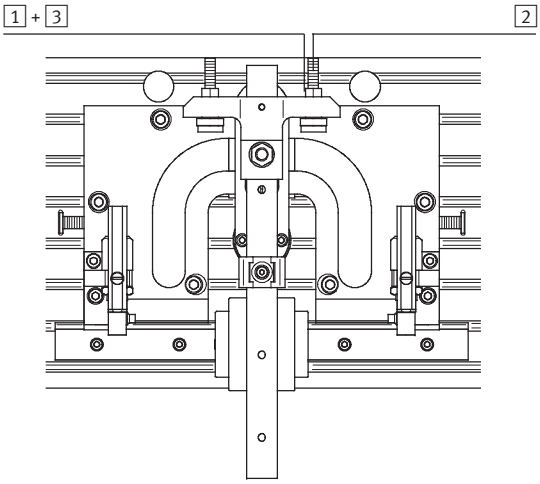


Y-axis (horizontal)



Procedure:
1. Loosen the screws
2. Adjust the slotted guide plate using the adjustment screw (the slotted guide plate must always make contact with the guide rail)
3. Tighten the screws

Z-axis (vertical)



Procedure:
1. Loosen the lock nut
2. Set the desired Z stroke using the set screw
3. Tighten the lock nut

Wait position module

Application and mode of operation

Figure 1:

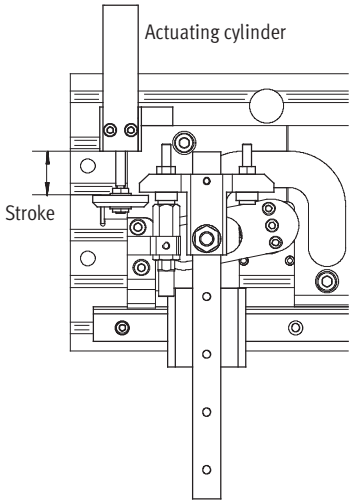
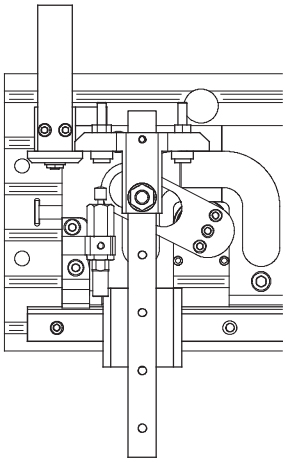
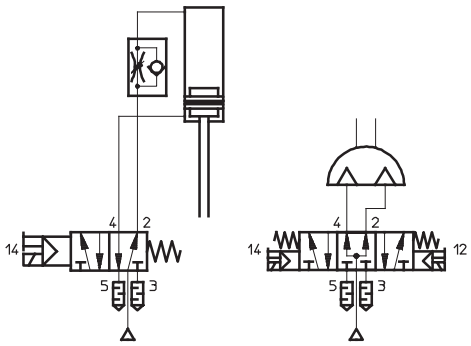


Figure 2:



Circuit diagram for HSP with wait position module



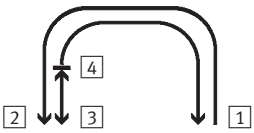
1 The handling module HSP is at the right-hand end position. The actuating cylinder is extended in its initial position.

2 The 5/3-way valve is reset once the handling module reaches the left-hand end position. (Figure 1)

3 During retraction, the actuating cylinder pulls the handling module upwards to its wait position. The operating area is then free. (Figure 2)

4 From the wait position, the handling module can move either to the initial position or to the other end position.

Cycle

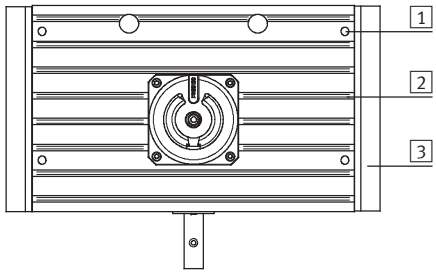


Note

When used in combination with the wait position module, the handling module HSP must be actuated using a 5/3-way valve (normally pressurised). The actuating cylinder is actuated using a 5/2-way valve. The actuating cylinder may only be used for "pulling" applications.

Size	HSP-12	HSP-16	HSP-25
Max. Z stroke of wait position module	15	25	25

Mounting options



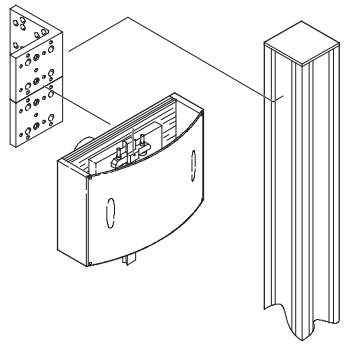
1 Direct mounting via through-holes

2 Via slot nuts

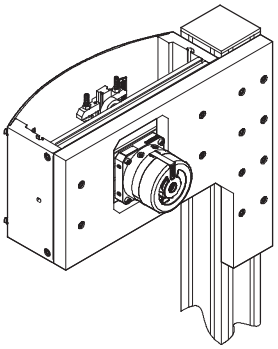
3 User-specific

Examples:

With adapter kit HMBV

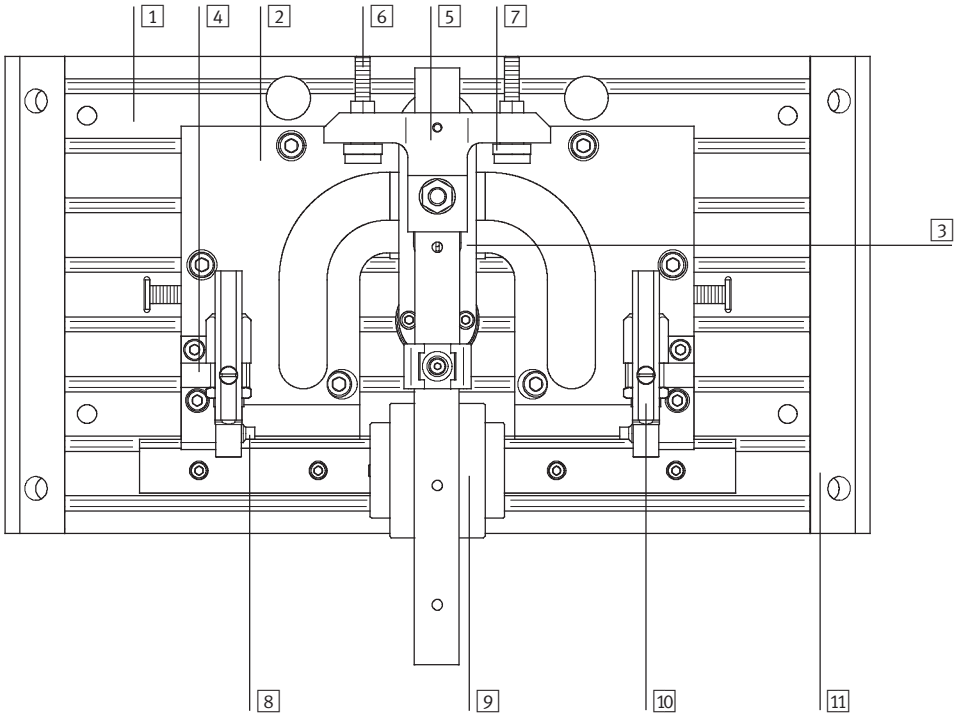


User-specific



Materials

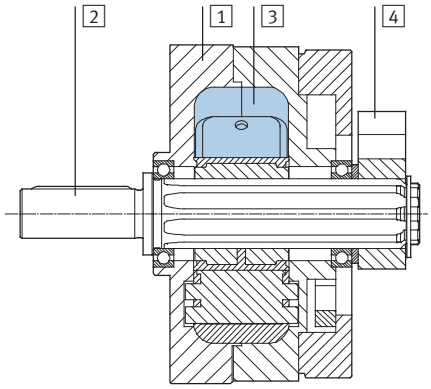
Sectional view of handling module HSP



Handling module		
1	Back plate	Wrought aluminium alloy, anodised
2	Slotted guide plate	Case-hardened steel, burnished
3	Swivel lever	Case-hardened steel, burnished
4	Retainer	Wrought aluminium alloy, anodised
5	Flange	Wrought aluminium alloy, anodised
6	Adjusting screw	High-alloy steel
7	Stop sleeve	High-alloy steel
8	Pressure piece	High-alloy steel
9	Cross-guide	Tempered steel
10	Sensor rail	Wrought aluminium alloy, anodised
11	Housing	Wrought aluminium alloy, anodised
	Material note	Copper, PTFE and silicone-free

Materials

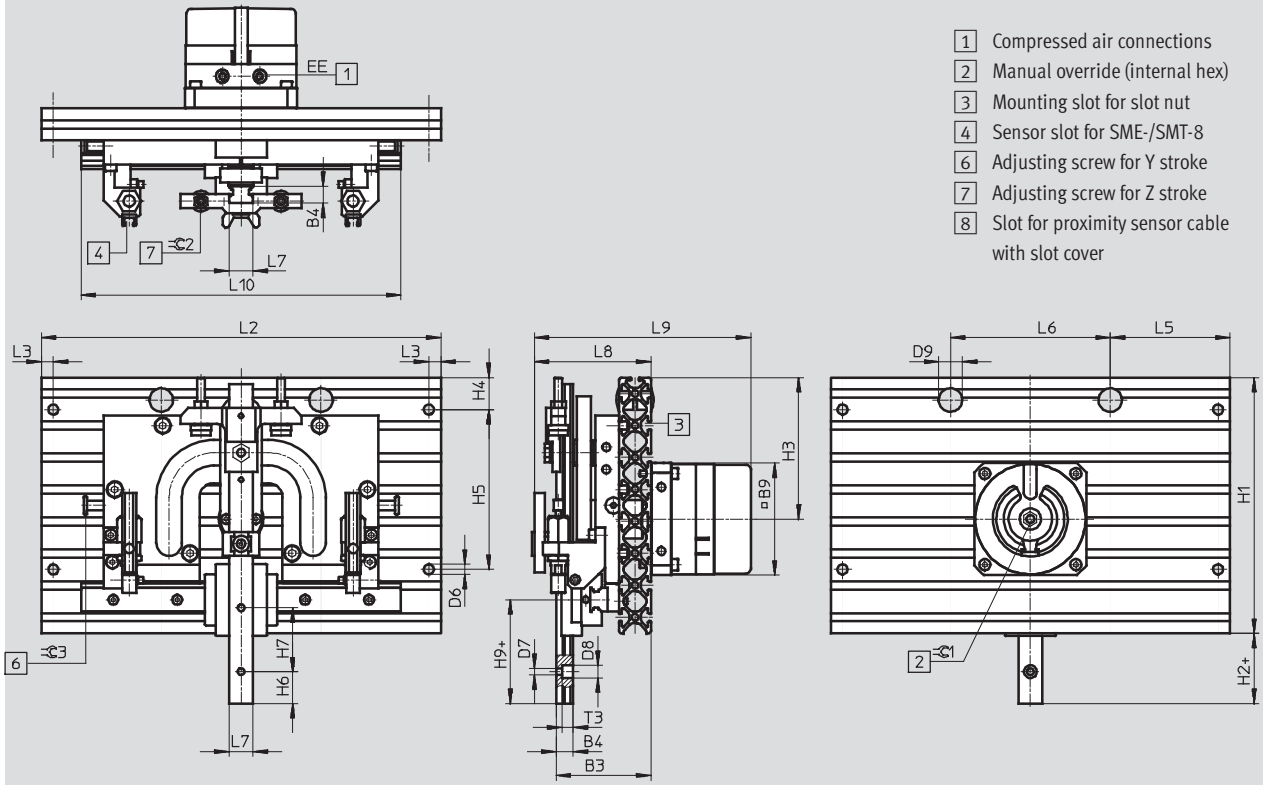
Sectional view of swivel module DSM



Swivel module		
1	Housing	Wrought aluminium alloy
2	Shaft	Steel with nickel-plated surface
3	Rotary vane	Fibreglass reinforced plastic
4	Stop lever	Anodised aluminium
–	Cap	Fibreglass reinforced plastic
	Seals	Polyurethane
	Material note	Copper, PTFE and silicone-free

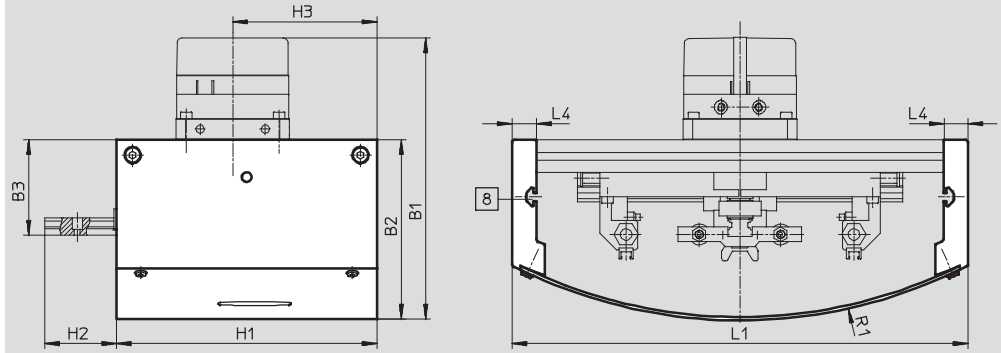
Dimensions Download CAD Data ➔ **www.festo.com/us/cad**

With swivel module DSM

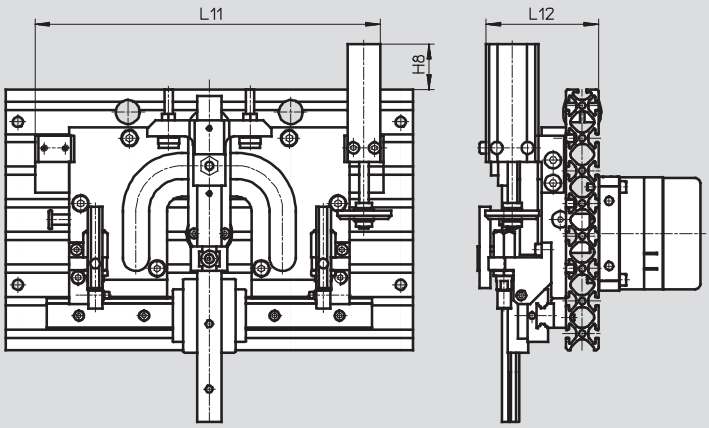


1 Compressed air connections
2 Manual override (internal hex)
3 Mounting slot for slot nut
4 Sensor slot for SME-/SMT-8
6 Adjusting screw for Y stroke
7 Adjusting screw for Z stroke
8 Slot for proximity sensor cable with slot cover

With swivel module DSM and protective cover



With wait position on right



Size	B1 ±3	B2 ±2	B3 ±0.5	B4	B9	D6 ∅	D7 ∅	D8 ∅	D9 ∅
12	150	93	56	9 –0.03	56	6.3	3.5	6.2	13
16	179	111	60	10.6 –0.03	70	6.3	4.3	8	13
25	188	115	62	10 ±0.05	83	6.3	4.5	10	13

Size	EE	H1	H2 ±0.2	H3	H4	H5 ±0.2	H6	H7	H8
12	M5	120	34	66	40	40	12.5	25	30
16	M5	160	44	88.5	20	100	20	40	33
25	M5	200	75	110	40	100	20	30	13

Size	H9	L1 ±0.6	L2 ±0.2	L3	L4	L5	L6	L7	L8 ±1.2
12	44	200	170	7.5	15	85	–	12 –0.01/–0.05	65
16	65	280	250	7.5	15	75	100	15 –0.01/–0.05	73
25	101	370	340	7.5	15	30	280	23.2 ±0.05	80

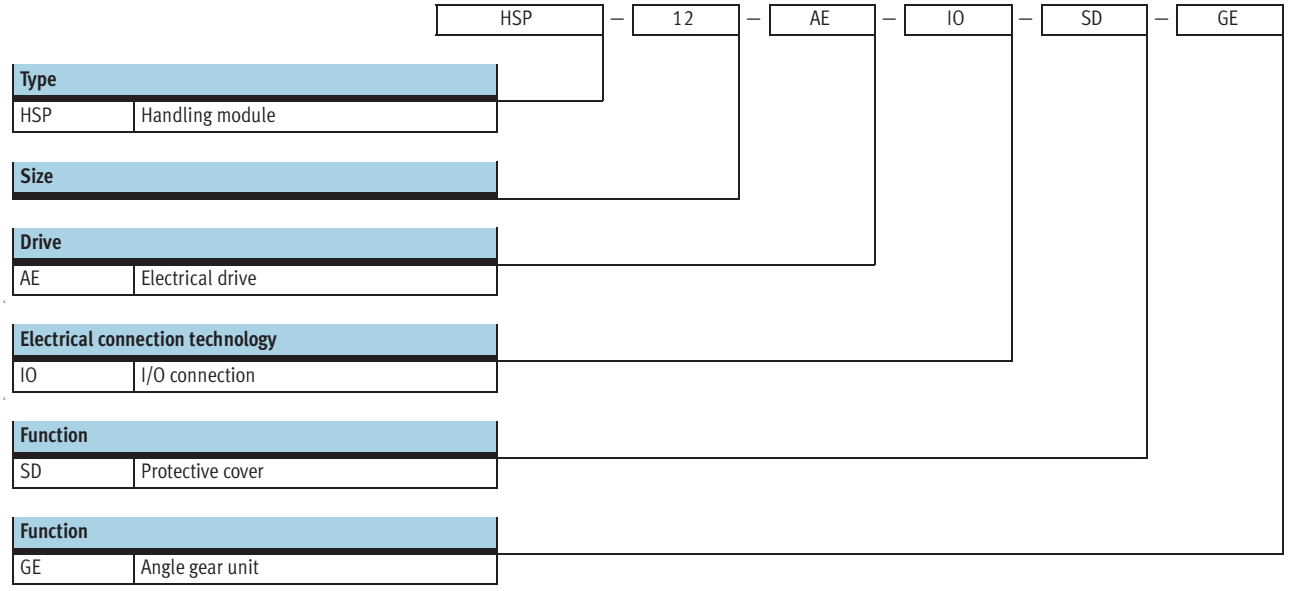
Size	L9 ±3	L10	L11[1)]	L12	R1	T3	⌯1	⌯2	⌯3
12	122	150	141.5	64	200	6	6	2	3
16	142	200	210	69	306	6.5	8	2.5	3
25	153	250	277	79	484	6.3	8	2.5	4

1) If the Y stroke is increased, the change in stroke must be added to the dimension.

Ordering data for HSP-...-AP								
Size	12		16		25	
	Part No.	Type	Part No.	Type	Part No.	Type
Without protective cover						
–	**533 599**	**HSP-12-AP**	**533 607**	**HSP-16-AP**	**533 615**	**HSP-25-AP**
Wait position on right	**533 603**	**HSP-12-AP-WR**	**533 611**	**HSP-16-AP-WR**	**533 619**	**HSP-25-AP-WR**
Wait position on left	**533 604**	**HSP-12-AP-WL**	**533 612**	**HSP-16-AP-WL**	**533 620**	**HSP-25-AP-WL**
With protective cover						
–	**533 600**	**HSP-12-AP-SD**	**533 608**	**HSP-16-AP-SD**	**533 616**	**HSP-25-AP-SD**
Wait position on right	**533 601**	**HSP-12-AP-SD-WR**	**533 609**	**HSP-16-AP-SD-WR**	**533 617**	**HSP-25-AP-SD-WR**
Wait position on left	**533 602**	**HSP-12-AP-SD-WL**	**533 610**	**HSP-16-AP-SD-WL**	**533 618**	**HSP-25-AP-SD-WL**

Handling modules HSP, electric

Type codes

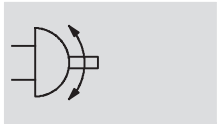


Handling modules HSP, electric

Technical data

FESTO

Function



-N- Diameter
12, 16 and 25
-T- Y-stroke length
52 ... 170
-T- Z-stroke length
20 ... 70

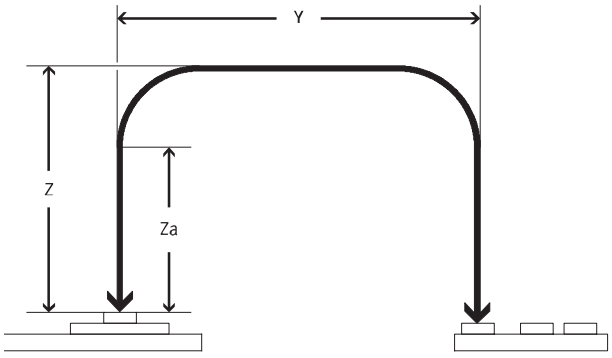
www.festo.com/en/
Spare_parts_service

General technical data	
Type	HSP-...-AE
Constructional design	Motor unit
	Cross-guide
	Guided motion sequence
Cushioning	Noise reduction via buffers
Type of mounting	With through-holes
	With slot nuts
Mounting position	Guide rail, vertical/horizontal

Operating and environmental conditions		
Type		HSP-...-AE
Ambient temperature	[°C]	0 ... +50
Protection class handling module		IP40
Protection class motor		IP54
CE marking (see declaration of conformity)		In accordance with EU EMC directive

Stroke [mm]

Size		12	16	25
Y-axis				
Stroke		52 ... 68	90 ... 110	130 ... 170
Z-axis				
Stroke	Z	20 ... 30	35 ... 50	50 ... 70
Working stroke	Za	5 ... 15	5 ... 20	5 ... 25

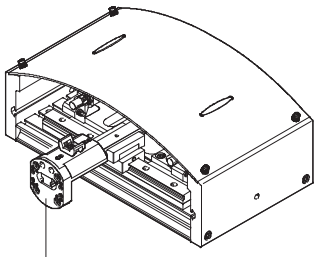


Forces [N]						
Size	12		16		25	
Stroke [mm]	52	68	90	110	130	170
Z-axis						
Effective force at 40% of drive torque (preset)	10		10		15	
Max. effective force relative to stroke	22	17	24	20	48	36
Y-axis						
Permissible process force	30		35		50	

Weight [g]			
Size	12	16	25
HSP-...-AE	3700	5300	9000
HSP-...-AE-SD	4500	6600	10700
HSP-...-AE-GE	4000	5700	10100
HSP-...-AE-SD-GE	4800	7000	11800

Repetition accuracy [mm]

To ensure low-vibration operation, the working load should be mounted as close as possible to the guide rail of the handling module.
Repetition accuracy is guaranteed by mounting the working load (adapter plate, rotary drive and/or gripper, gripper finger, workpiece) within the mounting surface of the adapter kit HAPG.



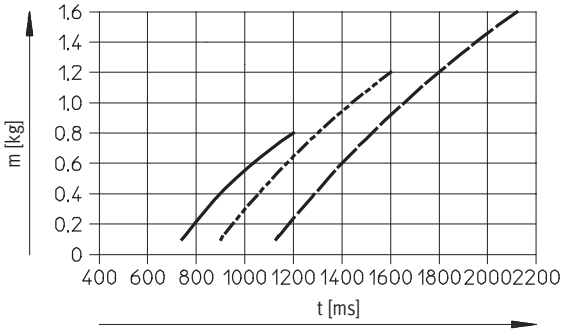
Mounting surface of HAPG

Size		12	16	25
Repetition accuracy	At end positions	±0.01	±0.01	±0.02
	Intermediate positions	< 1.5	< 1.5	< 2

Travel times t as a function of working load m

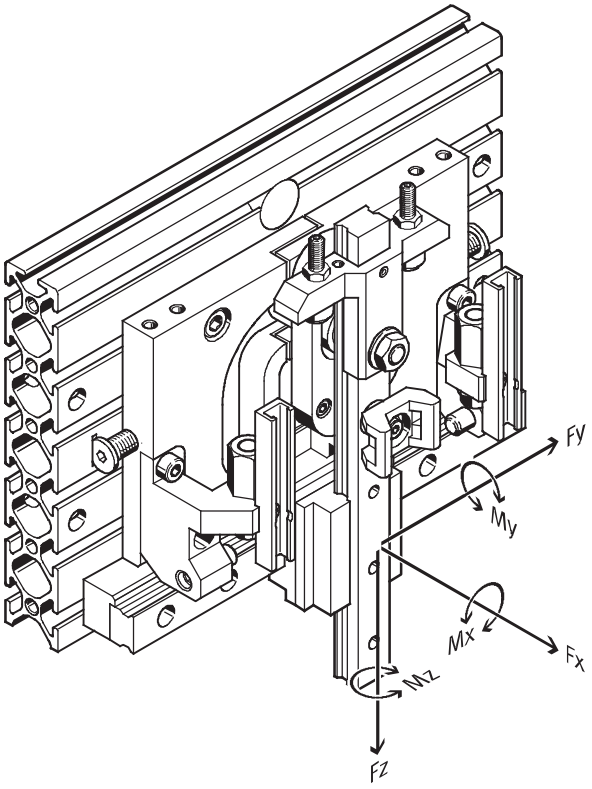
The travel time t is the time taken for the handling module to move from one end position to the other and back again.

The working load m is the load attached to the vertical guide rail (e.g. adapter, gripper, semi-rotary drive and workpiece)



Permissible static/dynamic characteristic load values

Cross-guide



Note

The torques apply to the centre of the vertical guide.

Combined load

The following torque equation must be satisfied with combined load:

$$\frac{M_x}{Mx_{perm.}} + \frac{M_y}{My_{perm.}} + \frac{M_z}{Mz_{perm.}} \leq 1$$

Dynamic characteristic load values			
Size	12	16	25
Max. torques [Nm] $Mx_{perm.}$, $My_{perm.}$, $Mz_{perm.}$	1.1	2.4	3.2

Combined load

The following torque equation must be satisfied with combined load:

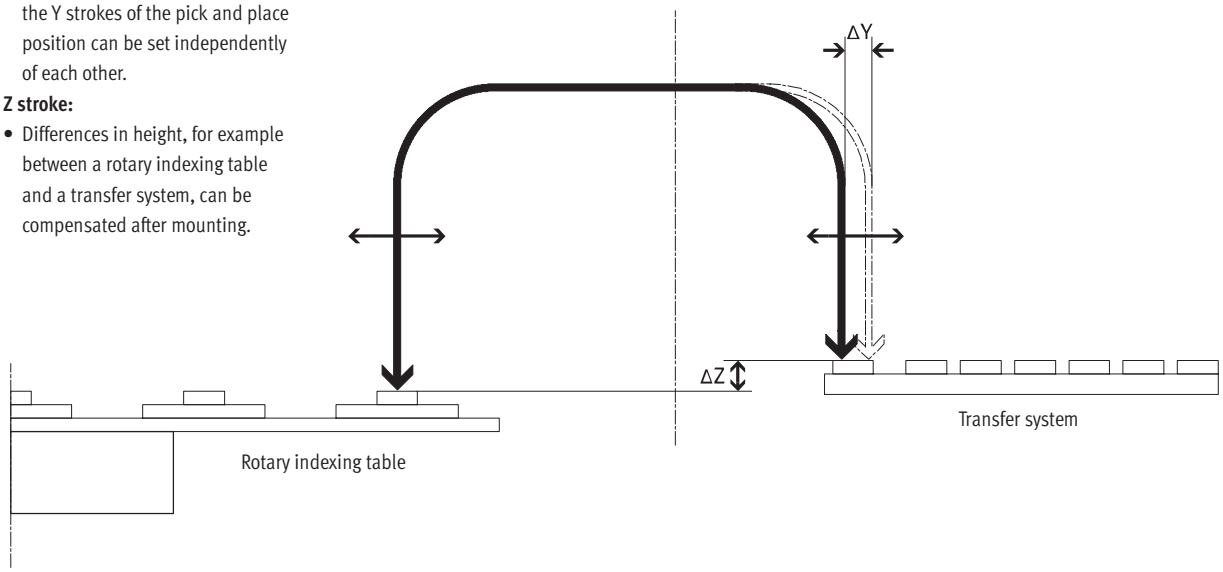
$$\frac{M_{ox}}{Mox_{perm.}} + \frac{M_{oy}}{Moy_{perm.}} + \frac{M_{oz}}{Moz_{perm.}}$$

Static characteristic load values			
Size	12	16	25
Max. torques [Nm] $Mox_{perm.}$, $Moy_{perm.}$, $Moz_{perm.}$	5	10	15

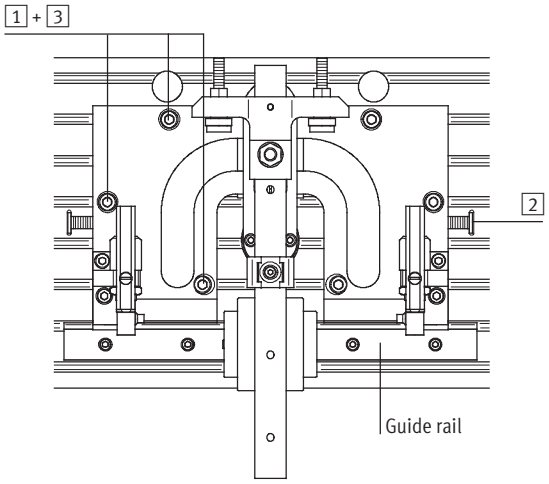
Stroke adjustment

Y stroke:
- Once the HSP has been mounted, the Y strokes of the pick and place position can be set independently of each other.

Z stroke:
- Differences in height, for example between a rotary indexing table and a transfer system, can be compensated after mounting.

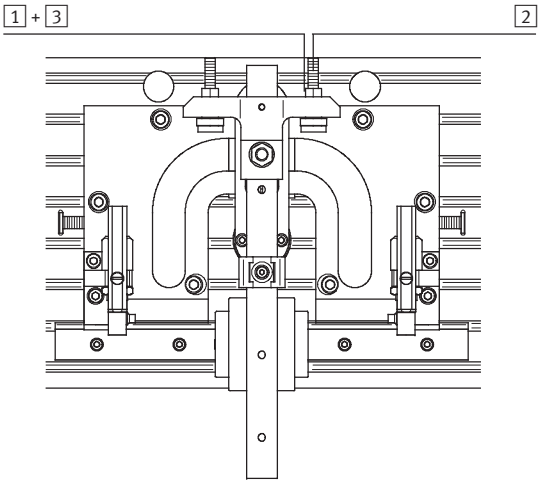


Y-axis (horizontal)



Procedure:
1. Loosen the screws
2. Adjust the slotted guide plate using the adjustment screw (the slotted guide plate must always make contact with the guide rail)
3. Tighten the screws

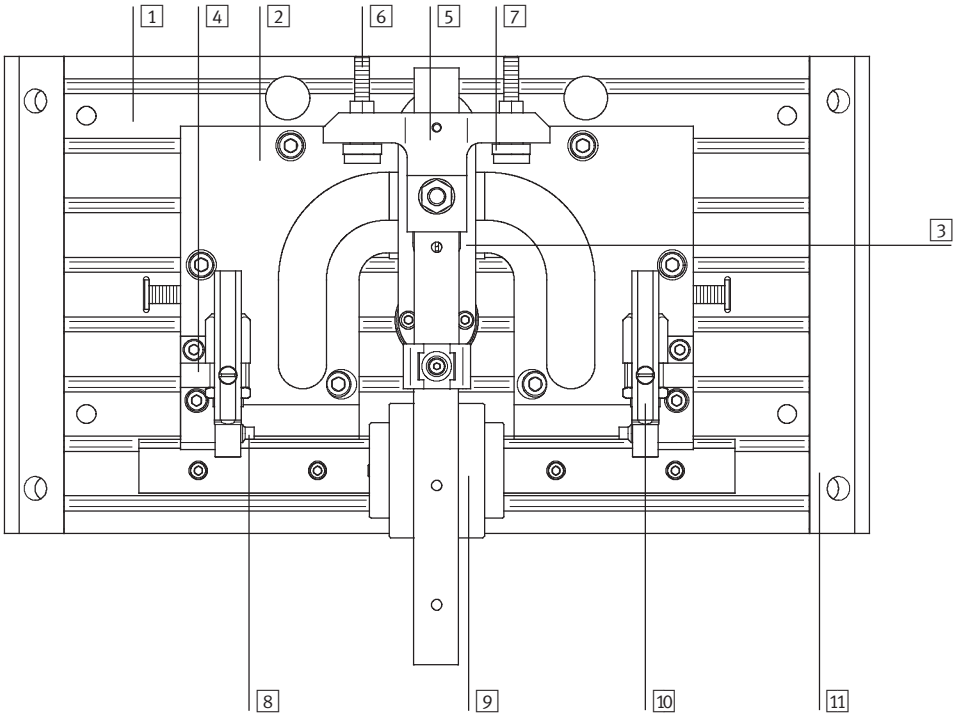
Z-axis (vertical)



Procedure:
1. Loosen the lock nut
2. Set the desired Z stroke using the set screw
3. Tighten the lock nut

Materials

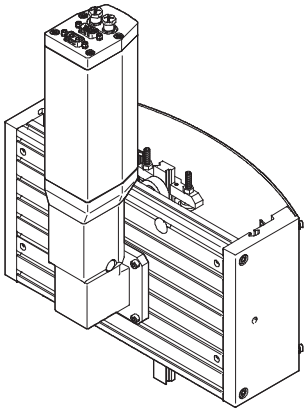
Sectional view



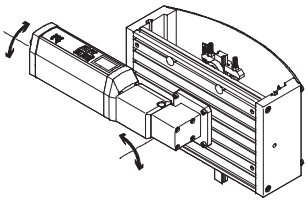
Handling module		
1	Back plate	Wrought aluminium alloy, anodised
2	Slotted guide plate	Case-hardened steel, burnished
3	Swivel lever	Case-hardened steel, burnished
4	Retainer	Wrought aluminium alloy, anodised
5	Flange	Wrought aluminium alloy, anodised
6	Adjusting screw	High-alloy steel
7	Stop sleeve	High-alloy steel
8	Pressure piece	High-alloy steel
9	Cross-guide	Tempered steel
10	Sensor rail	Wrought aluminium alloy, anodised
11	Housing	Wrought aluminium alloy, anodised
	Material note	Copper, PTFE and silicone-free

Motor mounting variants

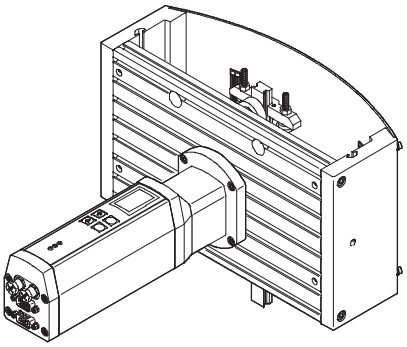
Motor pointing upwards/to side



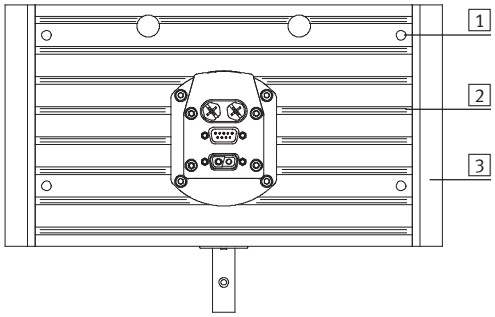
Control panel and access to the connections can be rotated according to space requirements.



Motor towards rear



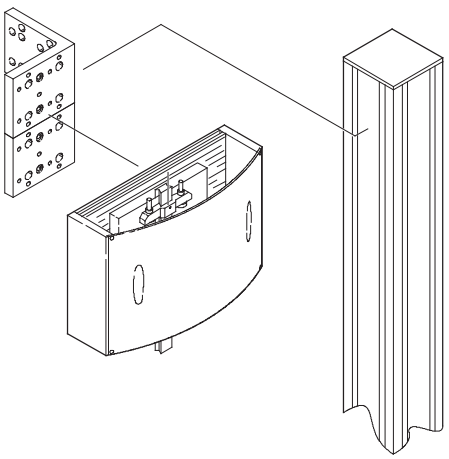
Mounting options



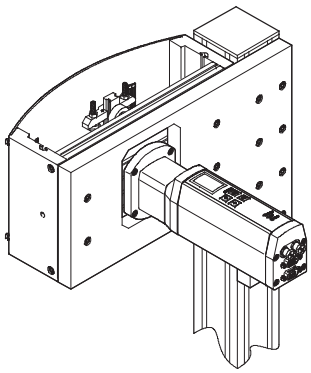
1 Direct mounting via through-holes
2 Via slot nuts
3 User-specific

Examples:

With adapter kit HMBV



User-specific

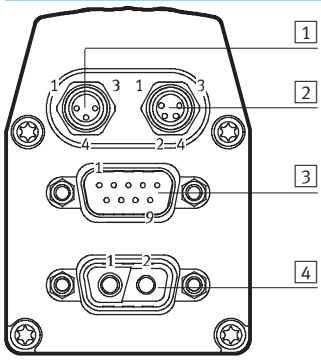


Servo-motor unit MTR-DCI-...-HM

General technical data			→ Internet: mtr-dci
Type		MTR-DCI-...	
for handling module		HSP-12-AE	HSP-16/25-AE
Rotary position generator		Optical encoder	
No. of increments/revolution		500	
Temperature monitoring		Silicon absolute temperature sensor, switches off at temperatures >70 °C	
Display resolution		128 x 64 pixels	
Type of mounting		Can be screwed on or clamped to gearing flange	
Gearing type		Planetary gear unit	
Gear unit ratio		6.752 (7:1); 1-stage	13.73 (14:1); 2-stage

Electrical data			→ Internet: mtr-dci
Type		MTR-DCI-42-HM	MTR-DCI-52-HM
for handling module		HSP-12/16-AE	HSP-25-AE
Nominal voltage	[V DC]	24 ±10%	24 ±10%
Nominal current (motor)	[A]	2	5.1
Peak current	[A]	3.8	7.7
Nominal power (motor)	[W]	48	122.4
Max. current (digital logic outputs)	[mA]	200	60
No. of digital logic inputs (with I/O connection)	–	6	
No. of digital logic outputs (with I/O connection)	–	2	
Parameterisation interface		RS232, 9600 baud	

Pin allocation



1 3-pin M8 socket	
Pin	Function
1	Unused
3	Unused
4	Unused
–	

2 RS 232 interface, 4-pin M8 socket	
Pin	Function
1	0 V
2	Transmitted Data (TxD)
3	Received Data (RxD)
4	–

3 I/O interface, 9-pin SUB-D plug	
Pin	Function
1	Travel time coding, bit 0
2	Travel time coding, bit 1
3	Travel time coding, bit 2
4	Travel time coding, bit 3
5	Start bit
6	Enable bit
7	Ready signal output
8	MC signal output
9	0 V

4 Power supply, 2-pin plug	
Pin	Function
1	24 V DC
2	0 V
–	
–	
–	
–	
–	
–	
–	

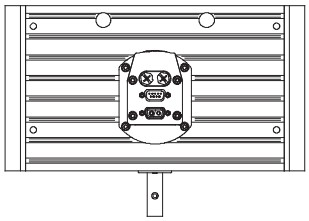
Simple solution for your application

Advantages of handling module HSP-...-AE – Installation and commissioning

- Handling module is supplied with motor already attached.
- Less wiring required thanks to integration of controller concept.
- Motor with gear unit, controller and power electronics are all fitted in one housing. This means that only one unit has to be taken into consideration when planning the system.
- Only one voltage supply of 24 V is required for commissioning.
- Commissioning via:
  - control panel on handling module
  - PC using FESTO Configuration Tool (FCT) software

Installation and commissioning

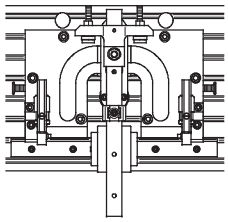
Step 1: Mount the handling module



- Wide choice of mounting options

➔ 24

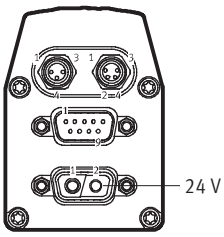
Step 2: Mechanically adjust the end positions



- End positions of strokes along Y- and Z-axes can be adjusted independently of each other

➔ 22

Step 3: Connect the 24 V voltage supply

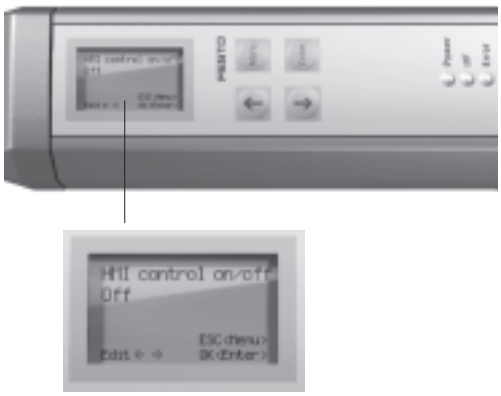


- Plug and work:
  Connect voltage –
  HSP is ready for operation

➔ 25

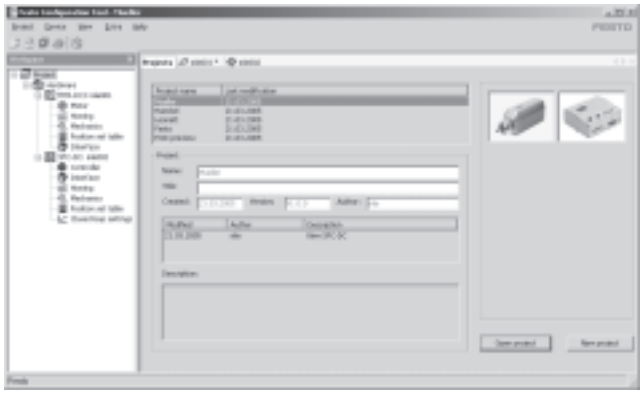
Step 4: Parameterisation either via control panel on motor or using FCT software

Control panel on motor



- Clearly arranged LCD display
- All data is entered and saved using 4 keys:
  - menu key
  - arrow keys for changing parameter values or traversing records
  - key for confirming the entered actions

FCT software – Festo Configuration Tool



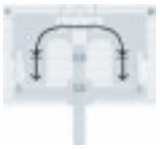
- All the drives in a system can be managed and archived in the common project
- Project and data management for all supported device types
- Simple to use thanks to graphically supported parameter entry
- Universal mode of operation for all drives
- Working offline at your desk or online at the machine

Step 5: Selection of predefined motion sequences (HSP mode) via the control panel or using the FCT software

HSP mode 1

- Precise travel to the mechanical end position

HSP mode 2

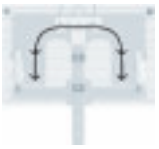


- Additional adjustable wait position module directly above workpiece/workpiece carrier
- Handling of parts with different heights
- Insertion procedures at different speeds

HSP mode 3

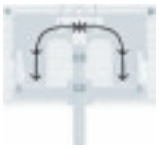
- Additional ejector station for reject parts or quality inspection
- Precise travel to end position with setup position

HSP mode 4



- Insertion procedures with defined force
- Continued travel from wait position with adjustable torque

HSP mode 5



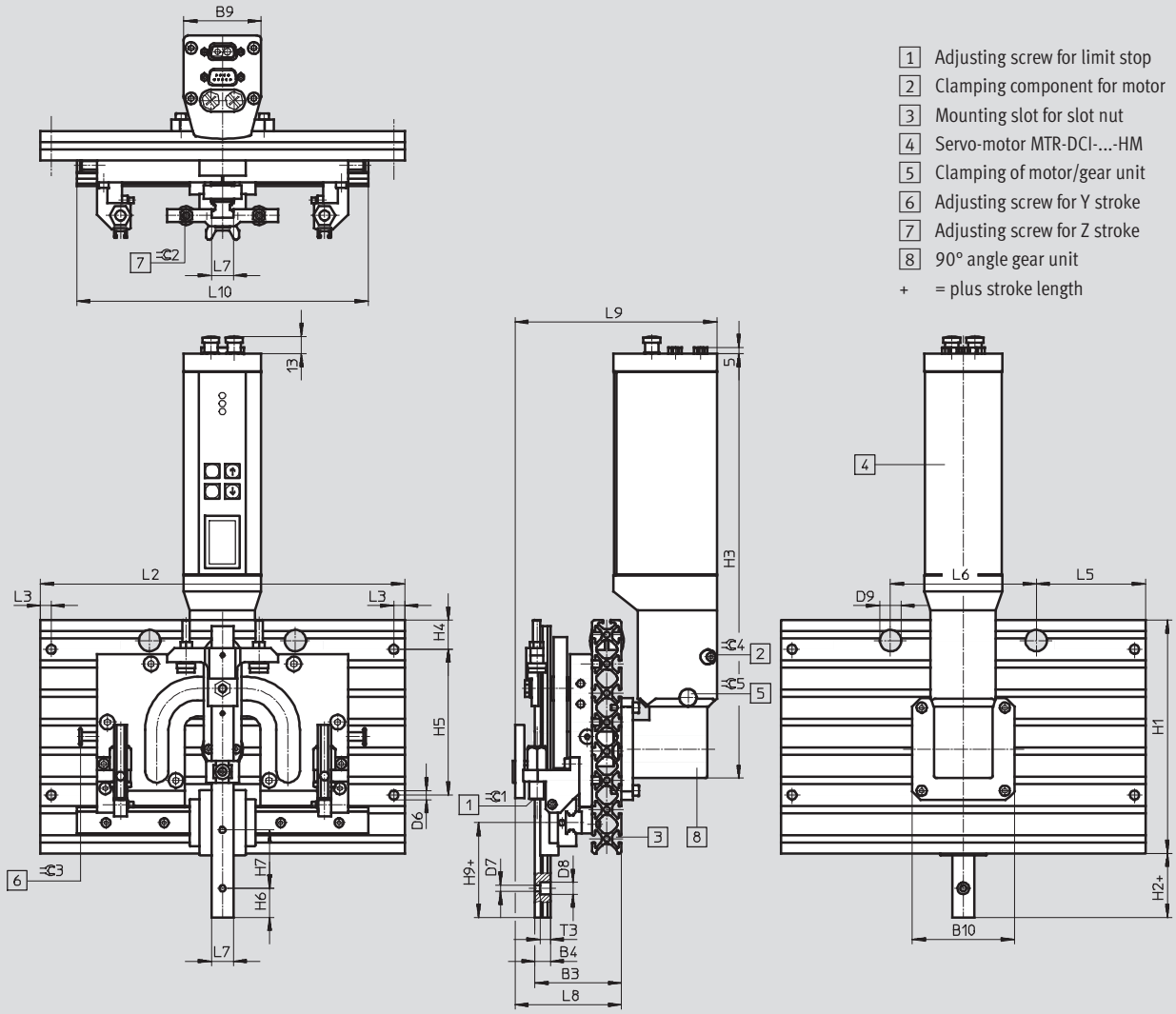
- Insertion procedures with defined force and additional intermediate position
- Continued travel from wait position with adjustable torque

Step 6: Fine adjustment

- Adjustment of preset positions, speeds and torques
- Addition of new traversing records (where necessary)

Dimensions Download CAD Data ➔ **www.festo.com/us/cad**

With motor unit pointing upwards

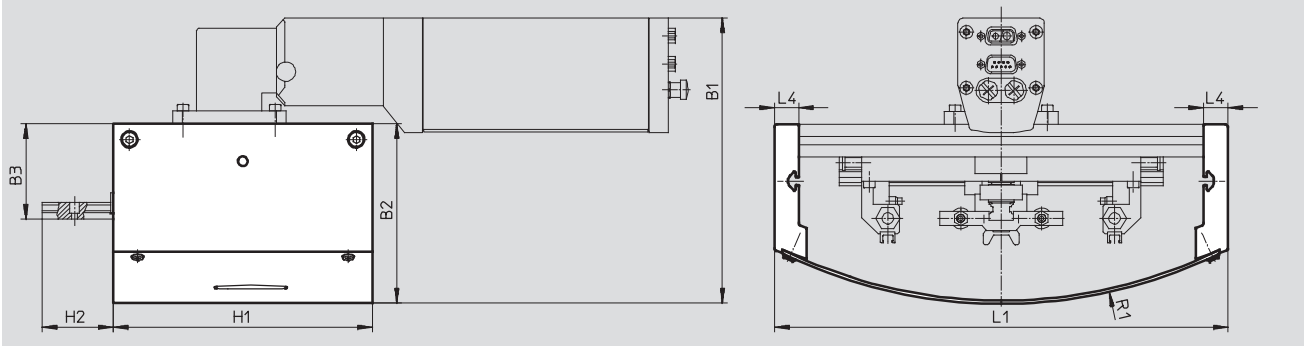


1 Adjusting screw for limit stop
2 Clamping component for motor
3 Mounting slot for slot nut
4 Servo-motor MTR-DCI-...-HM
5 Clamping of motor/gear unit
6 Adjusting screw for Y stroke
7 Adjusting screw for Z stroke
8 90° angle gear unit
\+ = plus stroke length

With motor unit pointing sideways

Dimensions Download CAD Data ➔ **www.festo.com/us/cad**

With motor unit pointing upwards and protective cover



Size	B1 ±3	B2 ±2	B3 ±0.5	B4	B9	B10	D6 ∅	D7 ∅	D8 ∅
12	159	93	56	9 –0.03	53.3	59	6.3	3.5	6.2
16	178	111	60	10.6 –0.03	53.3	70	6.3	4.3	8
25	203	115	62	10 ±0.05	69.5	100	6.3	4.5	10

Size	D9 ∅	H1	H2 ±0.2	H3	H4	H5 ±0.2	H6	H7	H9	H10
12	13	120	34	278	40	40	12.5	25	44	312
16	13	160	44	291	20	100	20	40	65	343
25	13	200	75	321	40	100	20	30	101	391

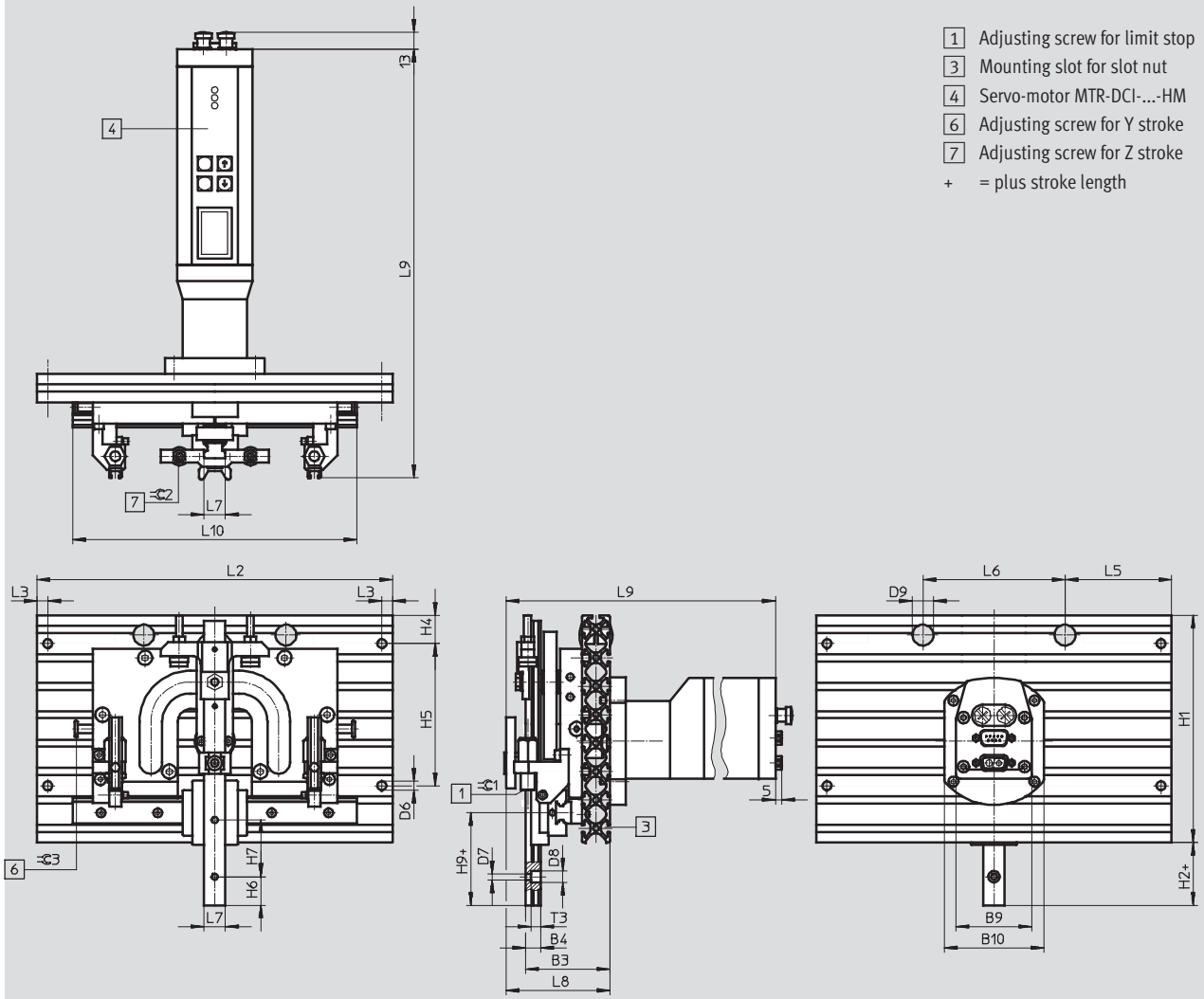
Size	H11	L1 ±0.6	L2 ±0.2	L3	L4	L5	L6	L7	L8 ±1.2
12	344	200	170	7.5	15	85	–	12 –0.01/–0.05	65
16	397	280	250	7.5	15	75	100	15 –0.01/–0.05	73
25	485	370	340	7.5	15	30	280	23.2 ±0.05	80

Size	L9 ±3	L10	R1	T3	⌭1	⌭2	⌭3	⌭4	⌭5	Woodruff key to DIN 6885[1)]
12	118	150	200	6	2.5	2	3	2.5	2.5	A2x2x12
16	136	200	306	6.5	3	2.5	3	2.5	2.5	A3x3x18
25	136	250	484	6.3	3	2.5	4	5	3	A4x4x25

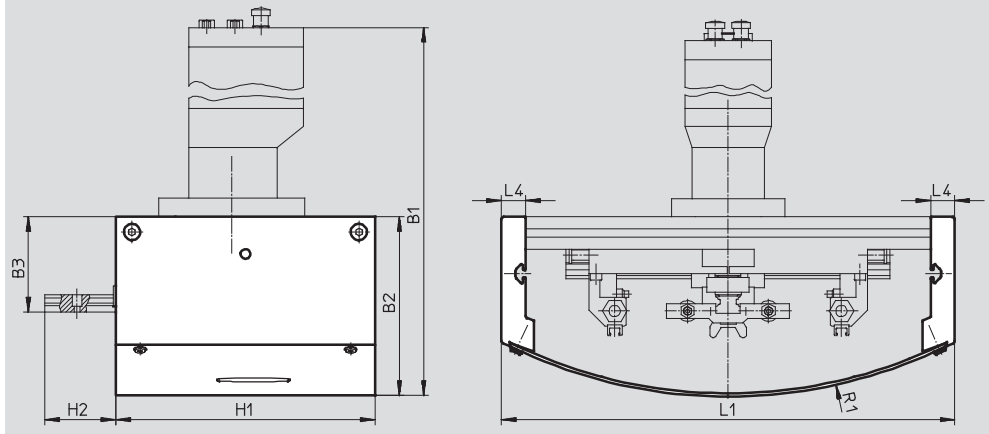
1) included in scope of delivery

Dimensions Download CAD Data ➔ **www.festo.com/us/cad**

With motor unit towards the rear



With motor unit towards the rear and protective cover



Handling modules HSP, electric

Technical data

Size	B1 ±3	B2 ±2	B3 ±0.5	B4	B9	B10	D6 ∅	D7 ∅
12	308	93	56	9 –0.03	53.3	71	6.3	3.5
16	339	111	60	10.6 –0.03	53.3	70	6.3	4.3
25	372	115	62	10 ±0.05	69.5	90	6.3	4.5

Size	D8 ∅	D9 ∅	H1	H2 ±0.2	H4	H5 ±0.2	H6	H7
12	6.2	13	120	34	40	40	12.5	25
16	8	13	160	44	20	100	20	40
25	10	13	200	75	40	100	20	30

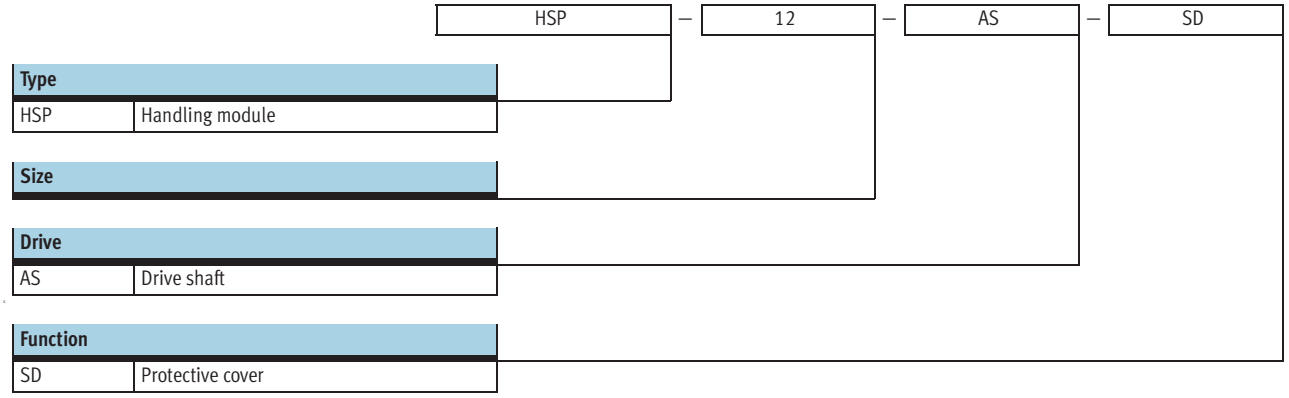
Size	H9	L1 ±0.6	L2 ±0.2	L3	L4	L5	L6	L7
12	44	200	170	7.5	15	85	–	12 –0.01/–0.05
16	65	280	250	7.5	15	75	100	15 –0.01/–0.05
25	101	370	340	7.5	15	30	280	23.2 ±0.05

Size	L8 ±1.2	L9 ±3	L10	R1	T3	⌭1	⌭2	⌭3
12	65	280	150	200	6	6	2	3
16	73	301	200	306	6.5	8	2.5	3
25	80	337	250	484	6.3	8	2.5	4

Ordering data for HSP-...-AE								
Size	12			16			25	
	Part No.	Type		Part No.	Type		Part No.	Type
I/O connection								
Without gear unit								
Without protective cover	**539 536**	**HSP-12-AE-IO**		**539 544**	**HSP-16-AE-IO**		**539 552**	**HSP-25-AE-IO**
With protective cover	**539 538**	**HSP-12-AE-IO-SD**		**539 546**	**HSP-16-AE-IO-SD**		**539 554**	**HSP-25-AE-IO-SD**
With angle gear unit								
Without protective cover	**539 537**	**HSP-12-AE-IO-GE**		**539 545**	**HSP-16-AE-IO-GE**		**539 553**	**HSP-25-AE-IO-GE**
With protective cover	**539 539**	**HSP-12-AE-IO-SD-GE**		**539 547**	**HSP-16-AE-IO-SD-GE**		**539 555**	**HSP-25-AE-IO-SD-GE**

Handling modules HSP, without drive

Type codes

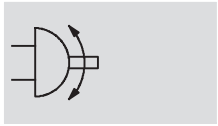


Handling modules HSP, without drive

Technical data

FESTO

Function



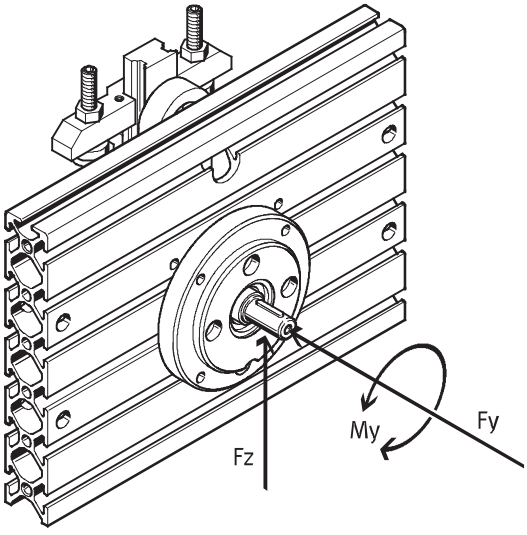
-N- Diameter
12, 16 and 25
-T- Y-stroke length
52 ... 170
-T- Z-stroke length
20 ... 70

www.festo.com/en/
Spare_parts_service

General technical data	
Type	HSP-...-AS
Constructional design	Drive shaft
	Cross-guide
	Guided motion sequence
Cushioning	Noise reduction via buffers
Type of mounting	With through-holes
	With slot nuts
Mounting position	Guide rail, vertical/horizontal

Weight [g]			
Size	12	16	25
HSP-...-AS	1800	2700	6200
HSP-...-AS-SD	2500	3200	7400

Permissible static/dynamic characteristic load values



Note

Technical data for mechanical components ➔ 21.

Characteristic load values				
Size		12	16	25
Max. axial force $F_{Yperm.}$	[N]	18	30	50
Max. radial force $F_{Zperm.}$	[N]	45	75	120
Max. drive torque $M_{Yperm.}$	[Nm]	1.25	2.5	5

Handling modules HSP, without drive

Technical data

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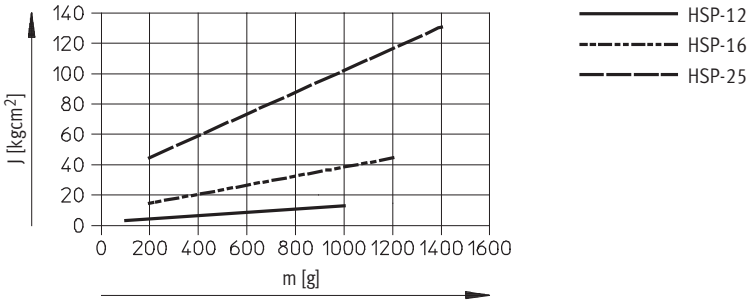
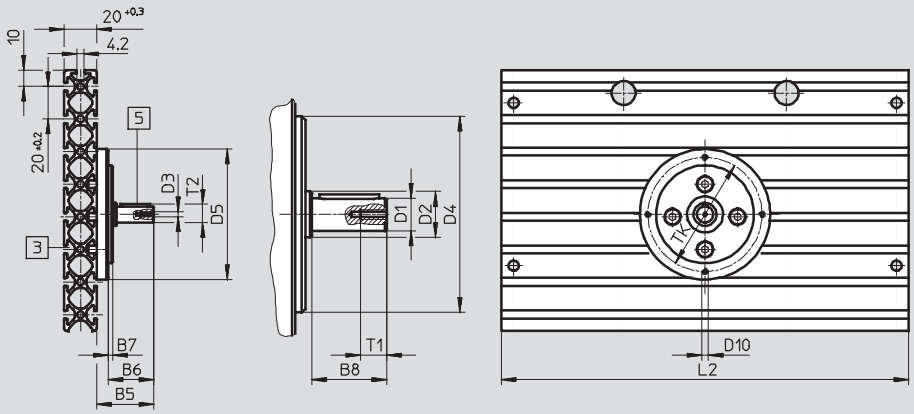
Mass moment of inertia J_0 as a function of working load m (for cylinder sizing)



Dimensions

Download CAD Data ➔ **www.festo.com/us/cad**



Basic dimensions
➔ 28
3 Mounting slot for slot nut
5 Woodruff key

Size	B5	B6	B7	B8	D1 ∅ g7	D2 ∅	D3
12	29	22	3	17.5	8	12.5	M3
16	35	28	3	23	10	14	M3
25	44	36	4	30	12	17	M4

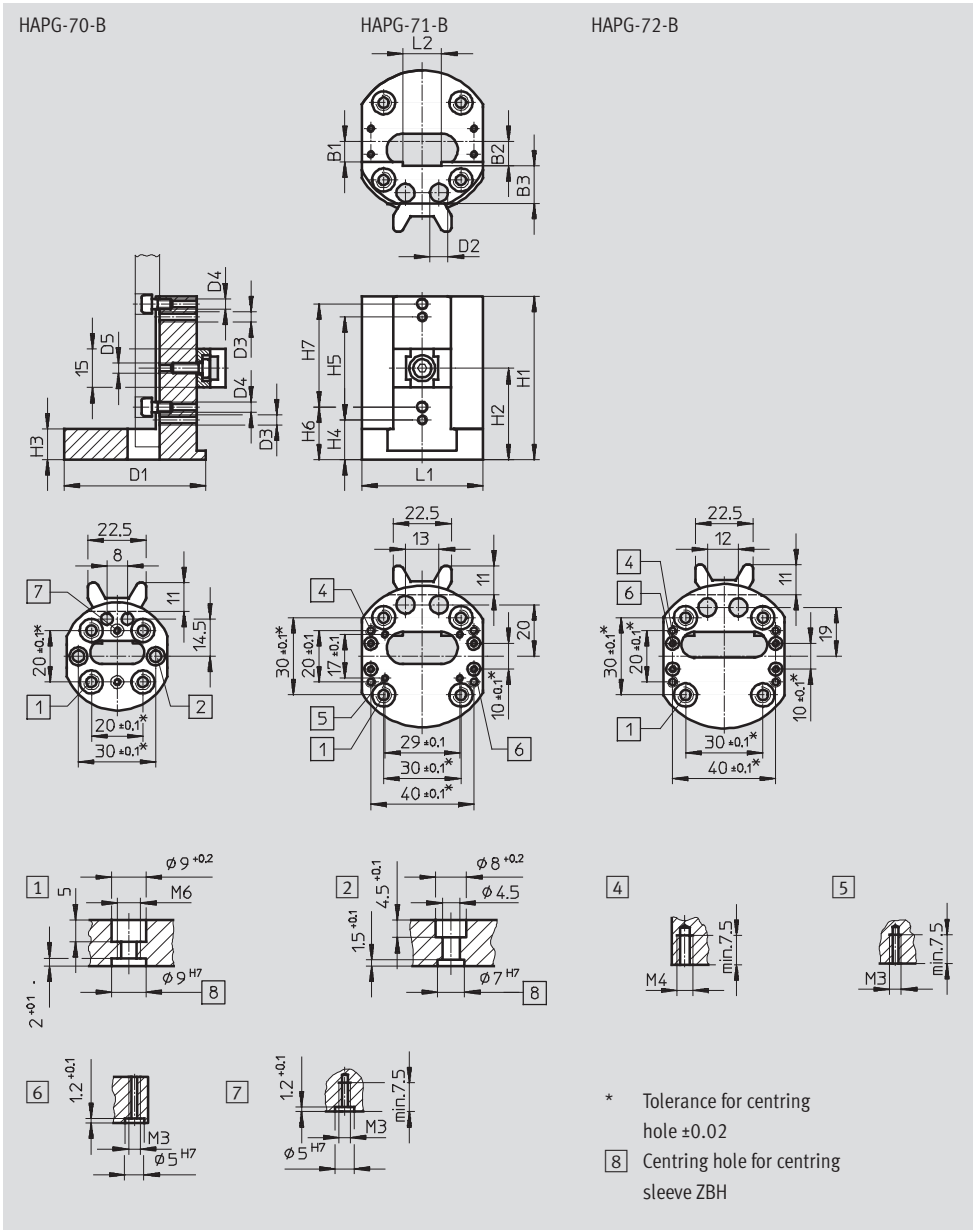
Size	D4 ∅ f8	D5 ∅	D10	L2 ±0.2	T1	T2 max.	TK ±0.1
12	45	65	M4	170	9	8.8	55
16	60	80	M4	250	9	11.2	70
25	70	95	M5	340	10	13.5	82

Ordering data for HSP-...-AS

Size	12		16		25	
	Part No.	Type	Part No.	Type	Part No.	Type
Without protective cover	**533 605**	**HSP-12-AS**	**533 613**	**HSP-16-AS**	**533 621**	**HSP-25-AS**
With protective cover	**533 606**	**HSP-12-AS-SD**	**533 614**	**HSP-16-AS-SD**	**533 622**	**HSP-25-AS-SD**

Adapter kit HAPG-B

Material:
Wrought aluminium alloy, anodised

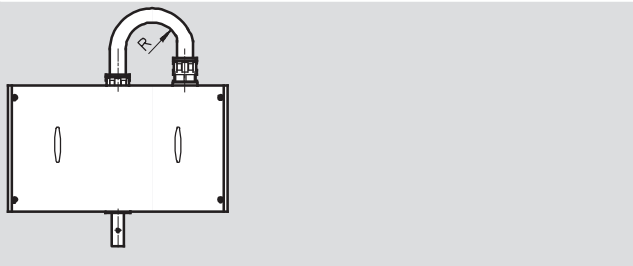


Dimensions and ordering data										
Type	B1	B2 +0.2	B3	D1 ∅	D2 ∅	D3	D4	D5	H1	H2
HAPG-70-B	5	6	11.5	42	4.5	–	M3	M4	50	28.5
HAPG-71-B	8	9.5	14.5	56	7	M4	M4	M4	63.5	35.5
HAPG-72-B	8	9.5	15	56	7	–	M4	M4	60	41.5

Type	H3	H4 +0.2	H5 ±0.2	H6 +0.2	H7 ±0.2	L1	L2 +0.1	Weight [g]	Part No.	Type
HAPG-70-B	12	–	–	15	25	39	12	55	**540 881**	**HAPG-70-B**
HAPG-71-B	12	15.5	40	20.5	40	47	15	110	**540 882**	**HAPG-71-B**
HAPG-72-B	12	–	–	20.5	30	47	23.2	115	**540 883**	**HAPG-72-B**

Installation kit MKRP

Material:
Conduit/fitting: Polyamide
Reducer/lock nut:
Nickel-plated brass
Adapter plate/bracket:
Powder-coated steel



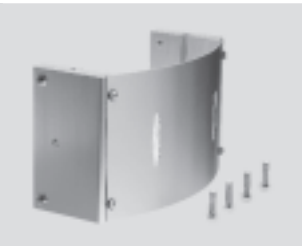
Ordering data

For size	Max. bending radius for conduit[1)] R	Tubing I.D. [mm]	Weight [g]	Part No.	Type
12	55	12	150	**533 632**	**MKRP-1**
16	75	16.5	160	**533 633**	**MKRP-2**
25	75	16.5	160	**533 634**	**MKRP-3**

1) The conduit must not be filled beyond 70%.

Cover kit BSD-HSP

Material:
Wrought aluminium alloy, anodised



Dimensions HSP-...-AP ➔ 16
HSP-...-AE ➔ 30
HSP-...-AS ➔ 30

Ordering data

For size	Weight [g]	Part No.	Type
12	825	**533 635**	**BSD-HSP-12**
16	1 350	**533 636**	**BSD-HSP-16**
25	1 770	**533 637**	**BSD-HSP-25**

Wait position module BWL-/BWR-HSP for HSP-...-AP

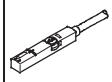
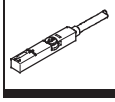
Material:
Wrought aluminium alloy, anodised

Dimensions ➔ 16

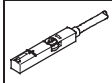
Ordering data

For size	Wait position	Weight [g]	Part No.	Type
12	Right	75	**533 623**	**BWR-HSP-12**
	Left	75	**533 624**	**BWL-HSP-12**
16	Right	135	**533 625**	**BWR-HSP-16**
	Left	135	**533 626**	**BWL-HSP-16**
25	Right	275	**533 627**	**BWR-HSP-25**
	Left	275	**533 628**	**BWL-HSP-25**

Ordering data – Proximity sensors for T-slot, magneto-resistive — Technical data ➔ Internet: smt

	Type of mounting	Switch output	Electrical connection	Cable length [m]	Part No.	Type
N/O contact						
	Insertable in the slot from above, flush with cylinder profile	PNP	Cable, 3-wire	2.5	**543 867**	**SMT-8M-PS-24V-K-2,5-OE**
			Plug M8x1, 3-pin	0.3	**543 866**	**SMT-8M-PS-24V-K-0,3-M8D**
			Plug M12x1, 3-pin	0.3	**543 869**	**SMT-8M-PS-24V-K-0,3-M12**
		NPN	Cable, 3-wire	2.5	**543 870**	**SMT-8M-NS-24V-K-2,5-OE**
			Plug M8x1, 3-pin	0.3	**543 871**	**SMT-8M-NS-24V-K-0,3-M8D**
	Insertable in the slot lengthwise, flush with the cylinder profile	PNP	Cable, 3-wire	2.5	**175 436**	**SMT-8-PS-K-LED-24-B**
			Plug M8x1, 3-pin	0.3	**175 484**	**SMT-8-PS-S-LED-24-B**
N/C contact						
	Insertable in the slot from above, flush with cylinder profile	PNP	Cable, 3-wire	7.5	**543 873**	**SMT-8M-PO-24V-K7,5-OE**

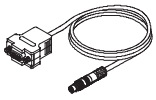
Ordering data – Proximity sensors for T-slot, magnetic reed — Technical data ➔ Internet: sme

	Type of mounting	Switch output	Electrical connection	Cable length [m]	Part No.	Type
N/O contact						
	Insertable in the slot from above, flush with cylinder profile	Contacting	Cable, 3-wire	2.5	**543 862**	**SME-8M-DS-24V-K-2,5-OE**
				5.0	**543 863**	**SME-8M-DS-24V-K-5,0-OE**
			Cable, 3-wire	2.5	**543 872**	**SME-8M-ZS-24V-K-2,5-OE**
			Plug M8x1, 3-pin	0.3	**543 861**	**SME-8M-DS-24V-K-0,3-M8D**
	Insertable in the slot lengthwise, flush with the cylinder profile	Contacting	Cable, 3-wire	2.5	**150 855**	**SME-8-K-LED-24**
			Plug M8x1, 3-pin	0.3	**150 857**	**SME-8-S-LED-24**
N/C contact						
	Insertable in the slot lengthwise, flush with the cylinder profile	Contacting	Cable, 3-wire	7.5	**160 251**	**SME-8-O-K-LED-24**

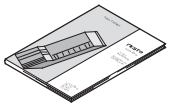
Ordering data – Connecting cables — Technical data ➔ Internet: nebu

	Electrical connection, left	Electrical connection, right	Cable length [m]	Part No.	Type
	Straight socket, M8x1, 3-pin	Cable, open end, 3-wire	2.5	**541 333**	**NEBU-M8G3-K-2.5-LE3**
			5	**541 334**	**NEBU-M8G3-K-5-LE3**
	Straight socket, M12x1, 5-pin	Cable, open end, 3-wire	2.5	**541 363**	**NEBU-M12G5-K-2.5-LE3**
			5	**541 364**	**NEBU-M12G5-K-5-LE3**
	Angled socket, M8x1, 3-pin	Cable, open end, 3-wire	2.5	**541 338**	**NEBU-M8W3-K-2.5-LE3**
			5	**541 341**	**NEBU-M8W3-K-5-LE3**
	Angled socket, M12x1, 5-pin	Cable, open end, 3-wire	2.5	**541 367**	**NEBU-M12W5-K-2.5-LE3**
			5	**541 370**	**NEBU-M12W5-K-5-LE3**

Ordering data			Technical data ➔ Internet: abp, hmbn
	Brief description	Part No.	Type
Slot cover for T-slot			
	For protecting against ingress of dirt and securing proximity sensor cables. Scope of delivery: 2x 0.5 m	**151 680**	**ABP-5-S**
Slot nut for back plate			
	Inserted from above	**189 654**	**HMBN-5-M5**

Ordering data – Cables for HSP-AE				
	Brief description	Cable length	Part No.	Type
	Supply cable	2.5 m	**537 931**	**KPWR-MC-1-SUB-9HC-2,5**
		5 m	**537 932**	**KPWR-MC-1-SUB-9HC-5**
		10 m	**537 933**	**KPWR-MC-1-SUB-9HC-10**
	Control cable for I/O connection to any PLC controller	2.5 m	**537 923**	**KES-MC-1-SUB-9-2,5**
		5 m	**537 924**	**KES-MC-1-SUB-9-5**
		10 m	**537 925**	**KES-MC-1-SUB-9-10**
	Programming cable	2.5 m	**537 926**	**KDI-MC-M8-SUB-9-2,5**

Ordering data – Software for HSP-AE			
	Brief description	Part No.	Type
	The operator's package: – CD-ROM – With user's manual in the languages DE, EN, ES, FR, IT, SV – With configuration package FCT (Festo Configuration Tool) – Brief description The operator's package is included in the delivery.	**541 951**	**P.BP-HSP_HSW-AE**

Ordering data – Documentation for HSP-AE				
	Brief description	Language	Part No.	Type
	Description User's manual in paper form is not included in the scope of delivery.	DE	**541 945**	**P.BE-HSP-AE-IO-DE**
		EN	**541 946**	**P.BE-HSP-AE-IO-EN**
		ES	**541 947**	**P.BE-HSP-AE-IO-ES**
		FR	**541 948**	**P.BE-HSP-AE-IO-FR**
		IT	**541 949**	**P.BE-HSP-AE-IO-IT**
		SV	**541 950**	**P.BE-HSP-AE-IO-SV**

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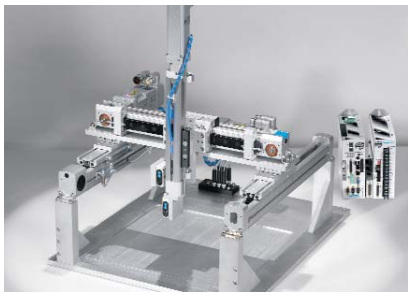

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