Handling modules HSW

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- Extremely short cycle times
- Compact design
- Simple planning, installation and commissioning
- Choice of pneumatic or electrical actuation

design award winner 2005

reddot design award winner 2005

Handling modules HSW

Key features at a glance

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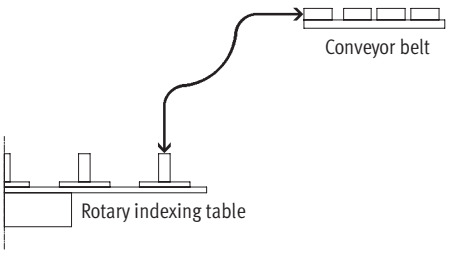
Range of applications

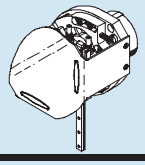
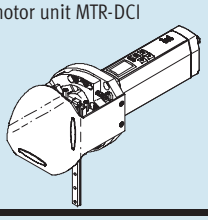
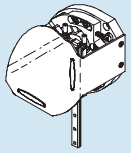
The handling module is a new generation of function modules for the automatic transfer, feed and removal of small parts in extremely confined spaces.
This is achieved by means of a guided swivel and linear motion sequence. A backlash-free guide with recirculating ball bearing elements ensures high precision and good rigidity.
The combination of a semi-rotary drive and a slotted guide system produces a compact unit for a complete pick & place cycle at an operating angle of 90°.

Special features

- Compact design
- Extremely short cycle times
- Cost optimised
- Simple commissioning
- For effective loads up to 1.6 kg
- Angle and stroke adjustment
- Wait positions possible
- No planning costs



Product range overview – Two drive variants are available

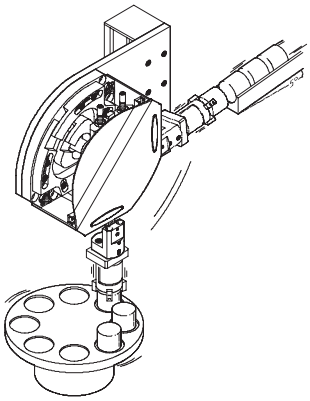
	Pneumatic: HSW-...-AP, with swivel module DSM	Electrical: HSW-...-AE, with motor unit MTR-DCI	Without drive: HSW-...-AS, with drive shaft
			
Advantages			
	• Fast • Cost effective • Ready to install • No system planning required • Simple commissioning	• Freely positionable • Freely selectable speed • Smooth motion sequence • Ready to install • No system planning required • Simple commissioning using teach-in procedure	• Compact • Universal applications • Variable drive interface • On request: Drive options in combination with servo motors MTR-AC
Technical data			
Max. linear stroke at 90° swivel angle [mm]	90 ... 175		
Working stroke [mm]	9 ... 35		
Min. cycle time [s]	0.6 ... 1.0	0.8 ... 1.2	Dependent on drive
Effective load [g]	0 ... 1,600		
Repetition accuracy at end positions [mm]	±0.02	±0.02	±0.02
Wait positions	Max. 2	Any	Dependent on drive
Function of wait position	Pushing via actuating cylinder	Freely approachable	Dependent on drive
Repetition accuracy at wait positions [mm]	< 1	< 2	Dependent on drive
Technical data	→ 1 / 7.2-9	→ 1 / 7.2-26	→ 1 / 7.2-36

Handling modules HSW

Application examples

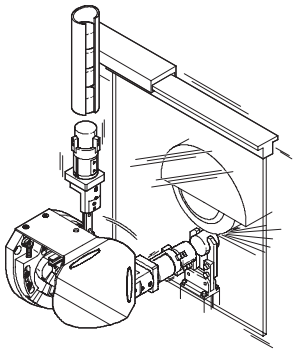
HSW-...-AP, pneumatic / HSW-...-AE, electrical

Rotary indexing table



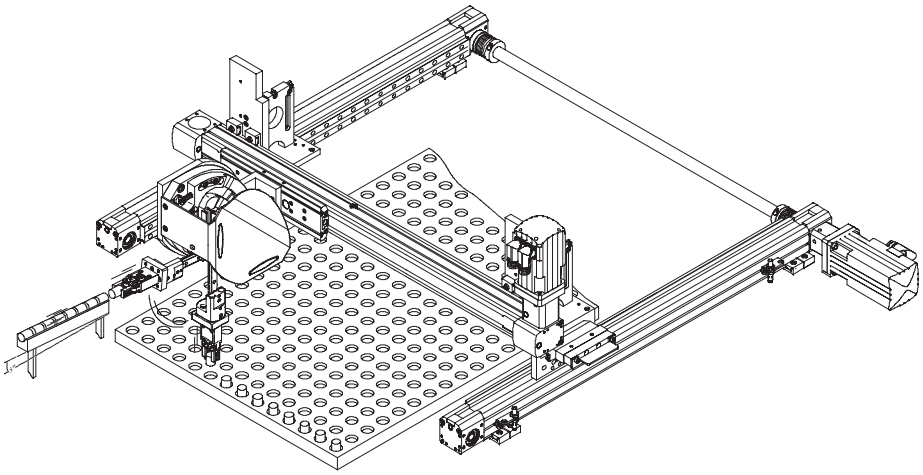
- Fast feed and removal at a linear transfer unit or rotary indexing table, for example

Machine equipment



- Loading and unloading of small parts on a grinding or injection moulding machine, for example

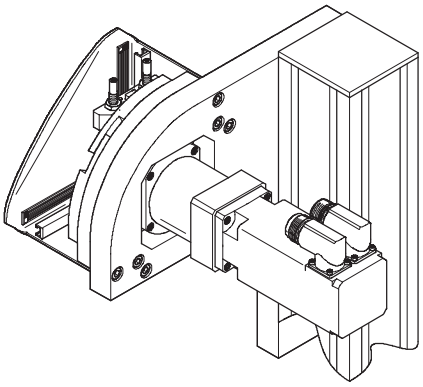
Planar surface gantry



- Fast equipping of pallets

HSW-...-AS, without drive

Rotary indexing table, linear transfer

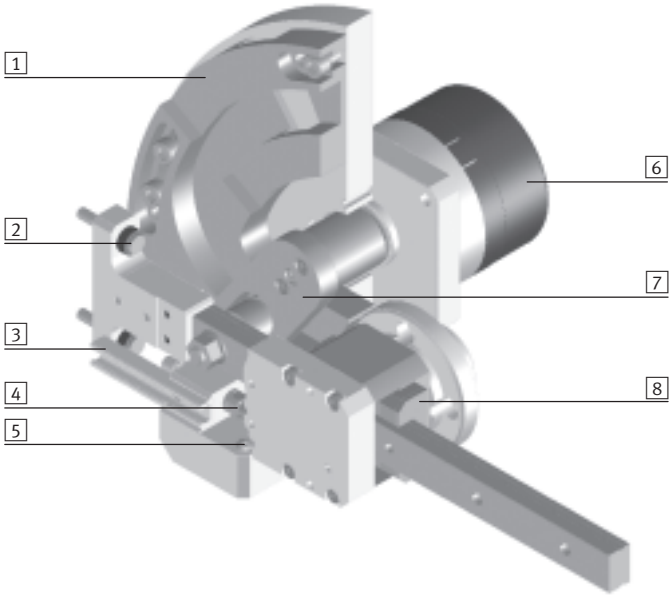


- Fast and flexible 90° pick & place unit with servo motor MTR-AC
- Electrical variant using third-party motor

Handling modules HSW

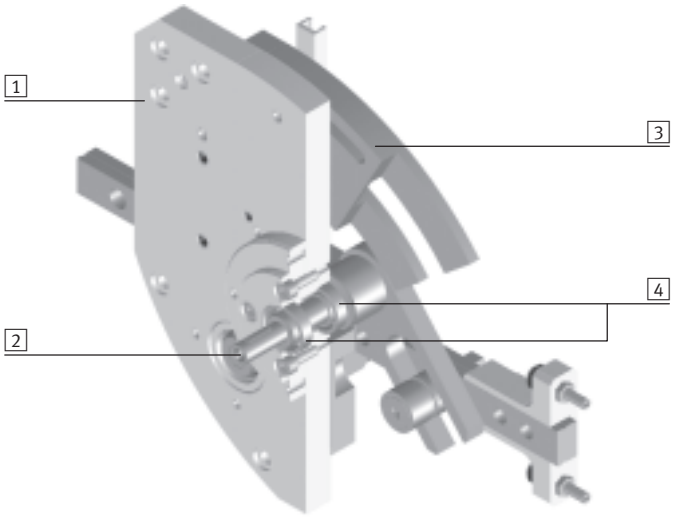
Key features at a glance

Design of HSW-...-AP – pneumatic variant with swivel module DSM



1 Slotted guide plate
2 Adjustable stop
3 Sensor rail
4 Shock absorber
5 Pressure piece
6 Swivel module DSM
7 Swivel lever
8 Guide with recirculating ball bearing element

Design of HSW-...-AS – variant without drive (rear side)

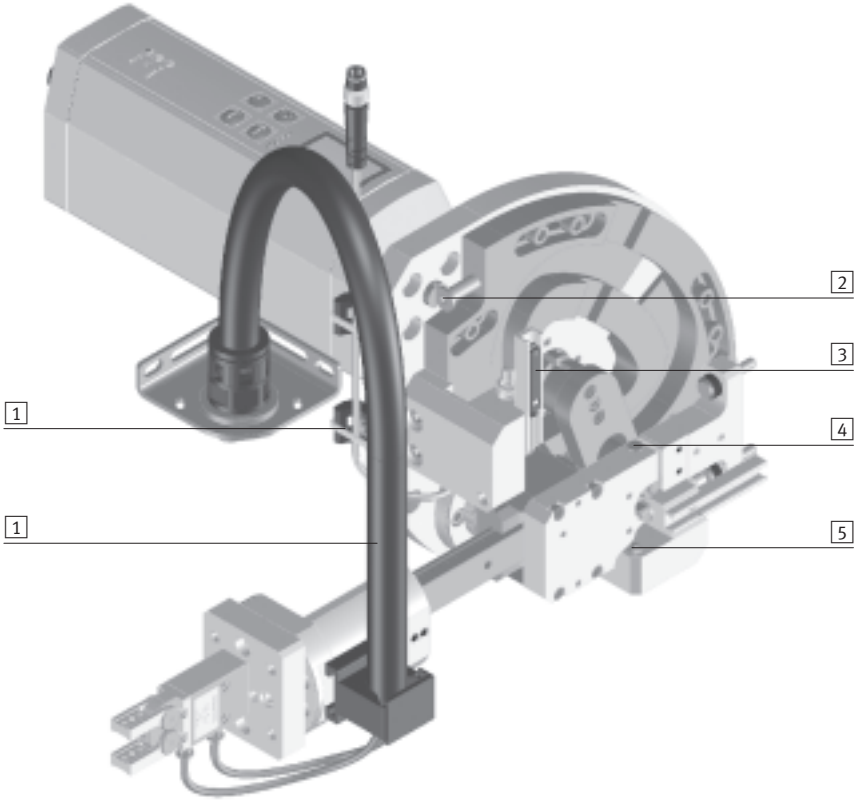


1 Base plate
2 Shaft with Woodruff key
3 Slotted guide plate
4 Ball bearings

Handling modules HSW

Key features at a glance

Design of HSW-...-AE – electrical variant with motor unit MTR-DCI-...-HM



Cable binder holder and protective conduit

1 Holder and protective conduit facilitate the secure routing of tubing and cables.

Stroke adjustment

2 The adjustable slotted guide plate permits precise adjustment of the swivel angle.

Adjustment of proximity sensors

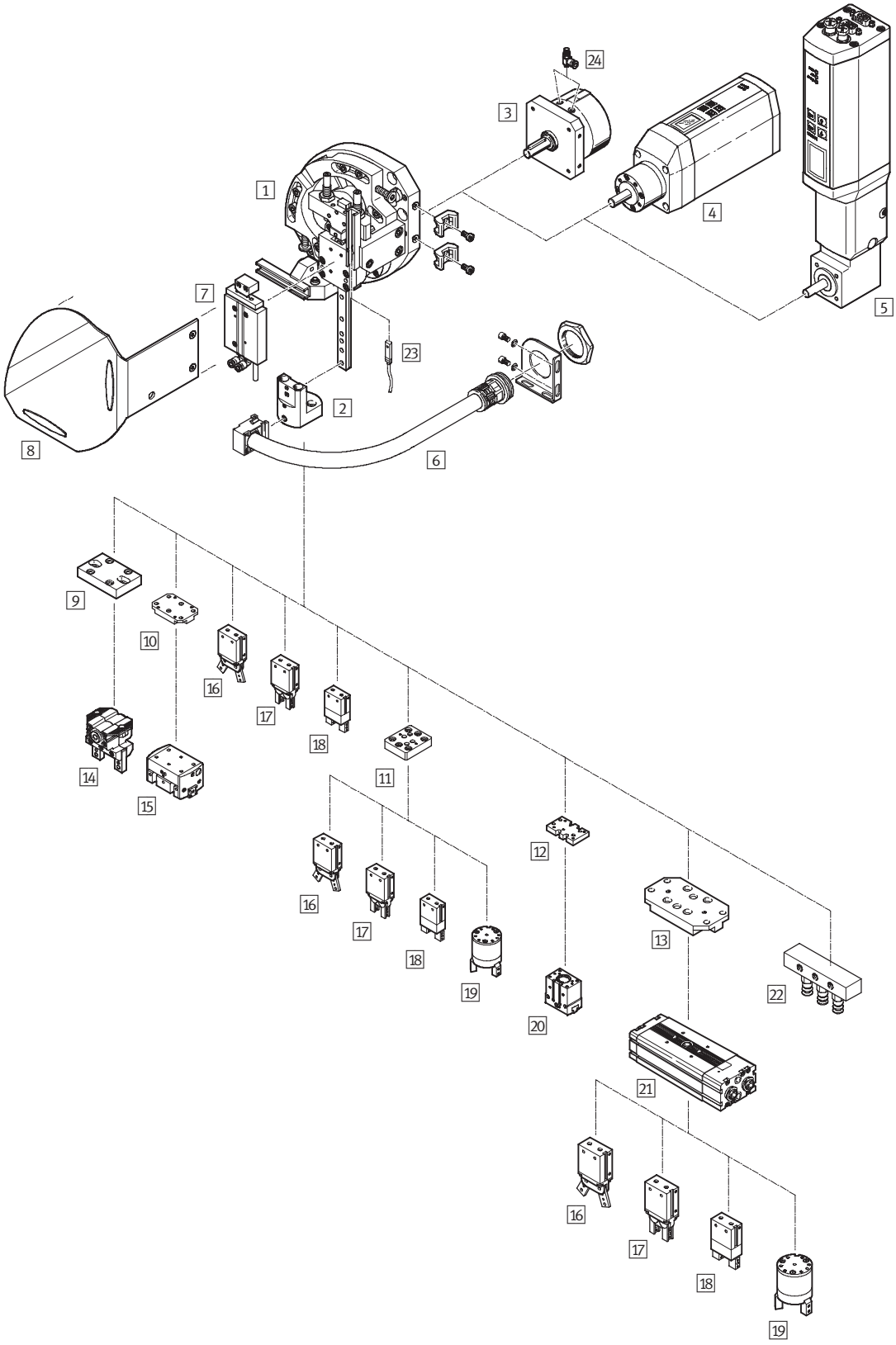
3 The sensor rail facilitates readily accessible and easy adjustment of the proximity sensors.

Stop element and pressure piece

4+5 The stop element and pressure piece guarantee freedom from backlash and precision in the end positions and in the effective linear stroke.

Handling modules HSW

Peripherals overview



Handling modules HSW

Peripherals overview

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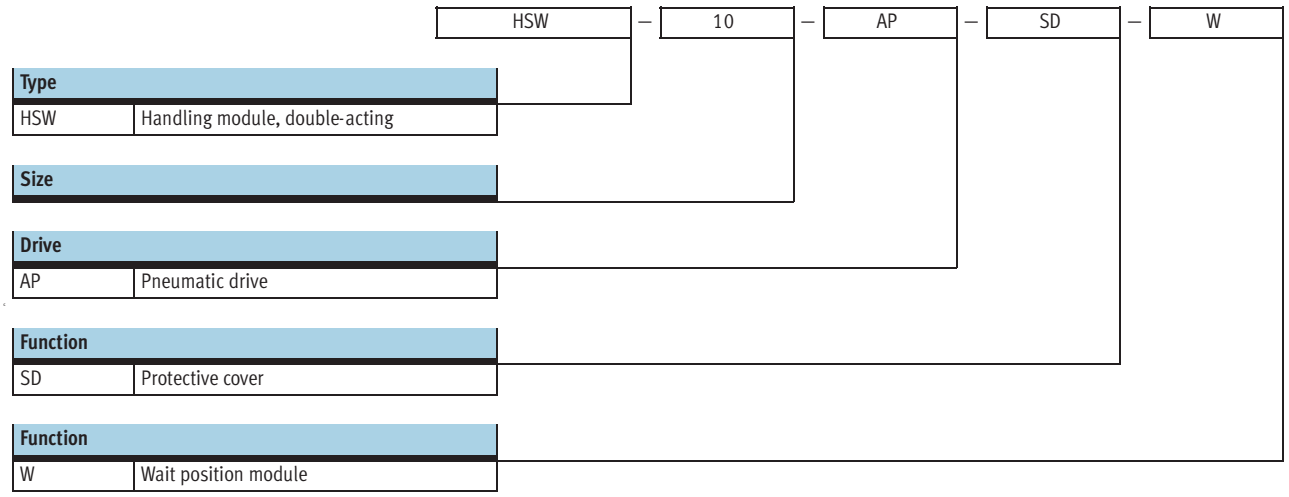
Accessories						
		Brief description	10	12	16	➔ Page
1	Handling module HSW	Standard module without accessories	■	■	■	1 / 7.2-9
2	Adapter kit HAPG-...-B	Interface for grippers, semi-rotary drive, etc.	■	■	■	1 / 7.2-38
3	Swivel module DSM	Pneumatic drive, adapted to each size	■	■	■	1 / 4.1-2
4	Motor unit MTR-DCI-...-HM	Servo motor with integrated power electronics	■	■	■	1 / 7.2-26
5	Motor unit MTR-DCI-...-HM	Servo motor with right-angle gear unit and integrated power electronics	■	■	■	1 / 7.2-26
6	Installation kit MKRP	Conduit to protect electrical cables and tubing	■	■	■	1 / 7.2-39
7	Wait position module BW-HSW	With pneumatic drive: Pushes the swivel arm from the operating area	■	■	■	1 / 7.2-39
8	Cover kit BSD-HSW	To protect against accidental contact	■	■	■	1 / 7.2-39
9	Adapter kit HAPG	Interface between HSW and parallel gripper HGPC	–	■	■	1 / 7.2-40
10	Adapter kit HAPG	Interface between HSW and parallel gripper HGPP	–	■	■	1 / 7.2-40
11	Adapter kit HAPG	Interface between HSW and gripper	■	■	■	1 / 7.2-40
12	Adapter kit HAPG	Interface between HSW and parallel gripper HGPT	–	■	■	1 / 7.2-40
13	Adapter kit HAPS	Interface between HSW and semi-rotary drive DRQD	–	■	■	1 / 7.2-40
14	Parallel gripper HGPC	Appropriate gripper for every application	–	■	■	1 / 7.2-40
15	Parallel gripper HGPP		–	■	■	1 / 7.2-40
16	Angle gripper HGW		■	■	■	1 / 7.2-40
17	Radial gripper HGR		■	■	■	1 / 7.2-40
18	Parallel gripper HGP		■	■	■	1 / 7.2-40
19	Three-point gripper HGD		–	–	■	1 / 7.2-40
20	Parallel gripper HGPT		–	■	■	1 / 7.2-40
21	Semi-rotary drive DRQD	Semi-rotary drive for transferring parts	–	■	■	1 / 4.2-24
22	Suction cups	Appropriate suction cup for every application	■	■	■	Volume 6
23	Proximity sensor SME-/SMT-8	Sensing option for end positions	■	■	■	1 / 7.2-42
24	Non-return and flow control valve GRLA	For setting the speed of pneumatic drives	■	■	■	Volume 2

Handling modules HSW, pneumatic

Type codes



Handling modules HSW, pneumatic

Technical data

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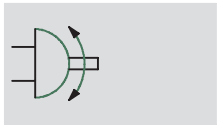
Function



Size
10, 12 and 16

Swivel angle
80 ... 100

Stroke range
90 ... 175

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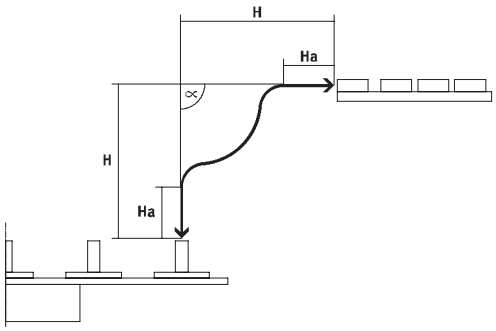
General technical data	
Type	HSW-...-AP
Pneumatic connection	M5
Mode of operation	Double-acting
Constructional design	Swivel module
	Linear guide plus ball bearing
	Force-guided motion sequence
Cushioning	Shock absorber at both ends, soft characteristic curve
Position sensing	Via proximity sensor
Type of mounting	Via through-holes
	Via slot nuts
Mounting position	Any

Operating and environmental conditions		
Type		HSW-...-AP
Operating medium		Filtered compressed air, lubricated or unlubricated
Operating pressure	[bar]	4 ... 8
Ambient temperature	[°C]	0 ... +60

Stroke [mm] and angle range [°]

Size		10	12	16
Max. linear stroke at 90° swivel angle	H	90/90	142/142	175/175
Working stroke	Ha	9 ... 15	15 ... 25	20 ... 35
Angle range	α	80 ... 100		



Forces [N]			
Size	10	12	16
Along Y and Z axes (depending on lever position)			
Effective force at 6 bar	30	35	55
Along Z and Y axes			
Permissible process force[1)]	30	35	50

1) Due to the pretension force on the guide

Handling modules HSW, pneumatic

Technical data

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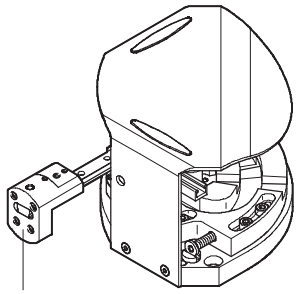
Weight [g]			
Size	10	12	16
HSW-...-AP	1,300	3,000	5,400
HSW-...-AP-SD	1,400	3,200	5,700
HSW-...-AP-W	1,350	3,140	5,550
HSW-...-AP-SD-W	1,450	3,340	5,850

Repetition accuracy [mm]

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



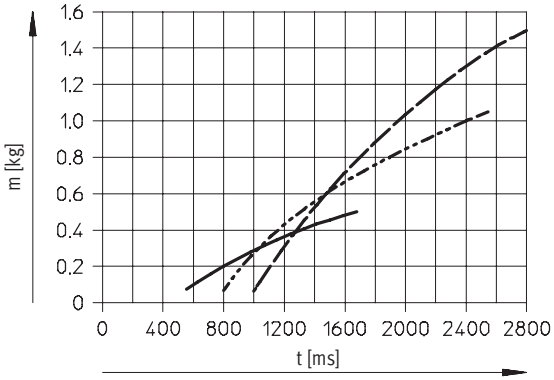
Mounting surface of HAPG

Size	10	12	16
Repetition accuracy at end positions	±0.02		

Travel times t as a function of effective load m with observance of repetition accuracy

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



HSW-10-AP
HSW-12-AP
HSW-16-AP

Note

Higher speeds are possible at a constant load with restriction of the repetition accuracy.

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	10	12	16
Min. cycle time	0.6	0.8	1.0

Example for HSW-10-AP

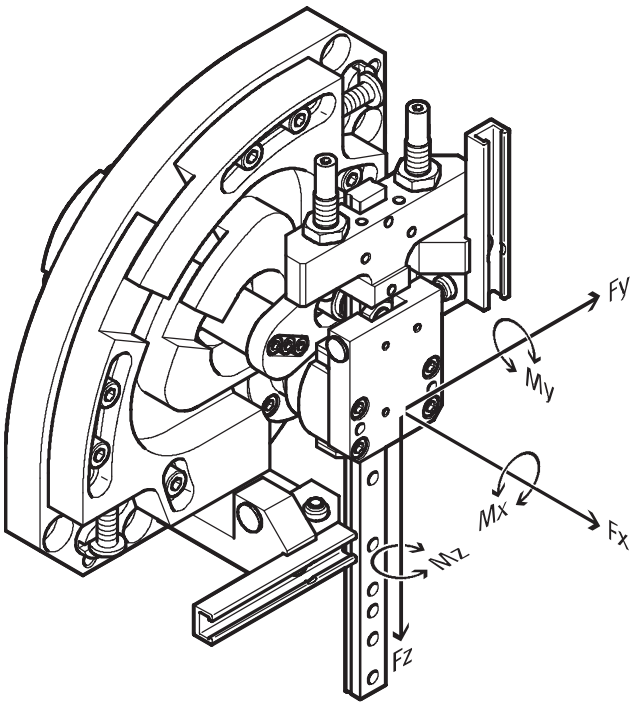
Step 1:
The following values are assumed:
Effective load m = 0.2 kg
Dwell time t_e= 2x 350 ms
(350 ms per end position)

Step 2:
The travel time can be determined from the graph:
t = 800 ms

Step 3:
This gives us a cycle time:
t_t = 800 ms + 700 ms
= 1,500 ms

Permissible static/dynamic characteristic load values

Linear guide and ball bearing



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	10	12	16
Max. torques [Nm] $Mx_{perm.}$, $My_{perm.}$, $Mz_{perm.}$	0.6	1.5	2.5

Handling modules HSW, pneumatic

Technical data

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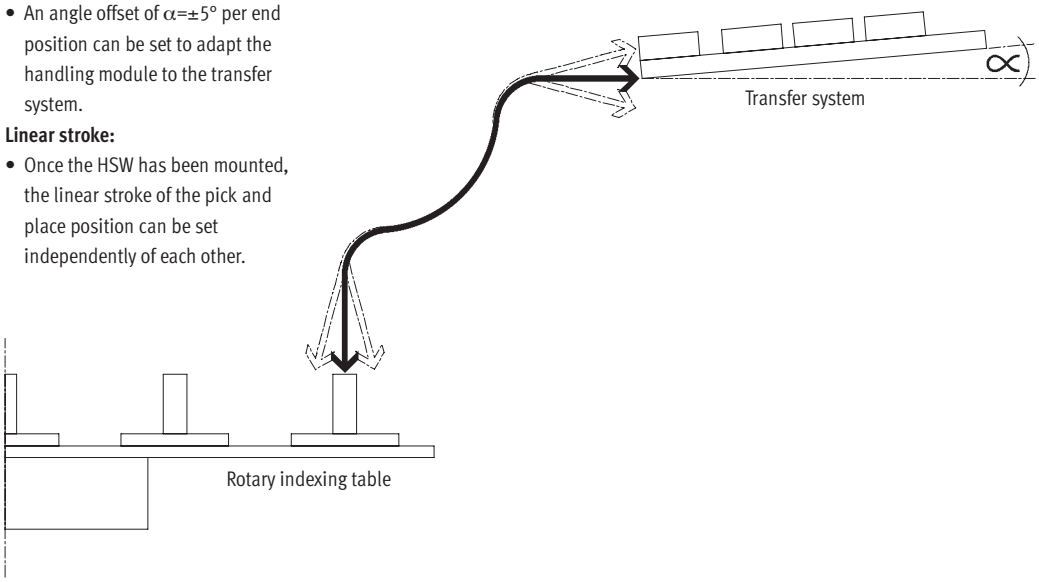
Stroke adjustment

Swivel angle:

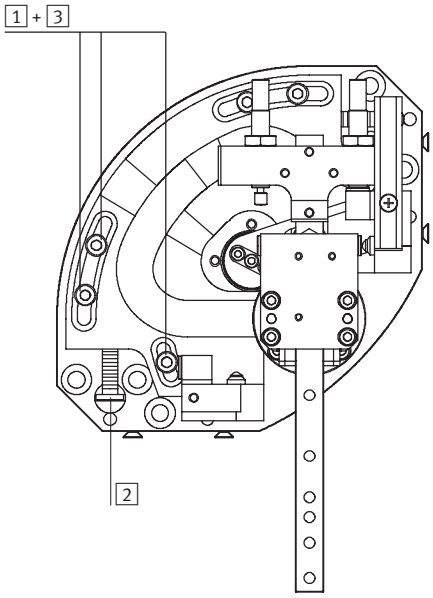
- An angle offset of α=±5° per end position can be set to adapt the handling module to the transfer system.

Linear stroke:

- Once the HSW has been mounted, the linear stroke of the pick and place position can be set independently of each other.



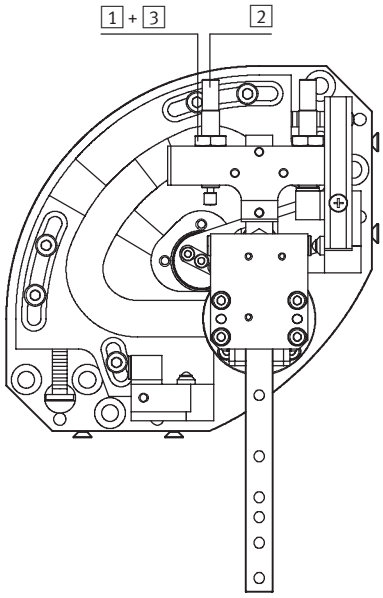
Swivel angle



Procedure:

1 Loosen the screws
2 Adjust the slotted guide plate using the adjusting screw (the slotted guide plate must always make contact with the guide ring)
3 Tighten the screws

Linear stroke



Procedure:

1 Loosen the lock nut
2 Set the desired linear stroke using the cushioning component/adjusting screw
3 Tighten the lock nut

Handling modules HSW, pneumatic

Technical data

Wait position module

Application and mode of operation

Figure 1:

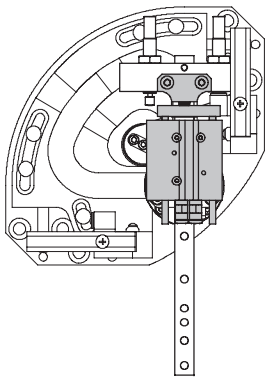


Figure 2:

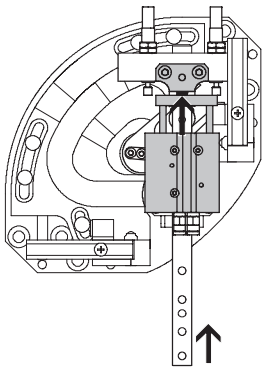
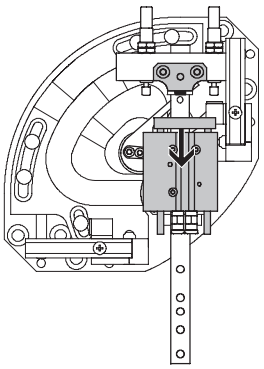
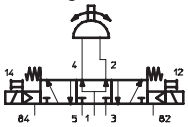


Figure 3:

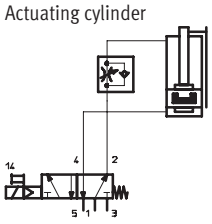


Circuit diagram for HSW with wait position module

Handling modules HSW



Actuating cylinder



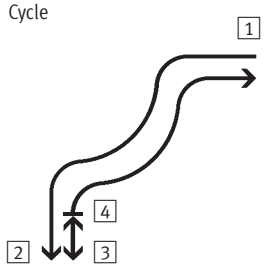
1 The handling module HSW is in the horizontal end position. The actuating cylinder is retracted in its initial position.

2 The 5/3-way valve is reset once the handling module reaches the vertical end position (Figure 1). The actuating cylinder must always be retracted before reaching an end position.

3 During extension the actuating cylinder pushes the handling module upwards into its wait position. The operating range is then free (Figure 2). The actuating cylinder can be used at both end positions.

4 From the wait position, the handling module can move either to the initial position or to the other end position (Figure 3).

Cycle



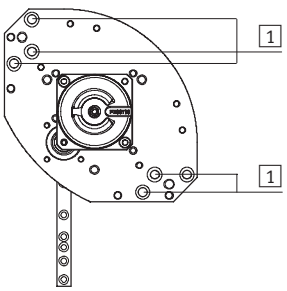
- Note

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

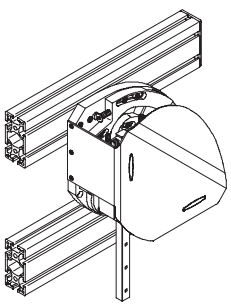
Size	10	12	16
Max. stroke of wait position module	10	15	25

Mounting options

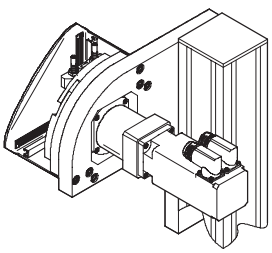
Directly via through-holes



Via slot nuts on profile supports



User-specific



1 With or without centring rings

- Note

The handling module HSW-10 can also be attached with the adjusting unit HMXY-1.

Handling modules HSW, pneumatic

Technical data

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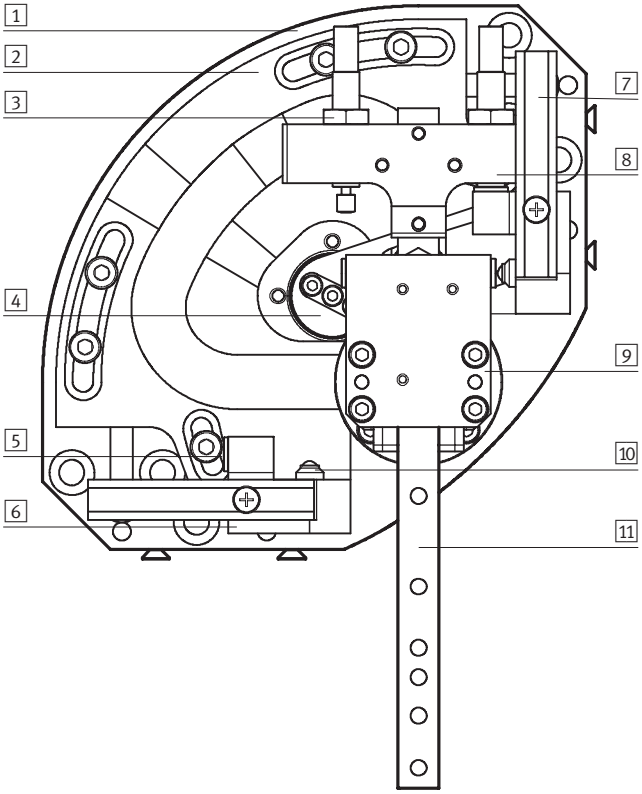
Materials

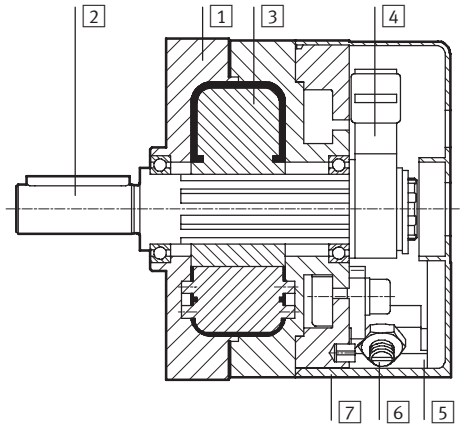
Sectional view of handling module HSW



Size		10	12	16
1	Back plate	Wrought aluminium alloy, anodised		
2	Slotted guide plate	Case-hardened steel		
3	Adjusting screw	–	High-alloy steel	
4	Swivel lever	Case-hardened steel		
5	Stop sleeve	High-alloy steel		
6	Retainer	Wrought aluminium alloy, anodised		
7	Sensor rail	Wrought aluminium alloy, anodised		
8	Flange	Wrought aluminium alloy, anodised		
9	Top plate	Wrought aluminium alloy, anodised		
10	Pressure piece	High-alloy steel		
11	Guide	Tempered steel		
–	Housing	Wrought aluminium alloy, anodised		
	Note on materials	Free of copper, PTFE and silicone		

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
5	Stop/shock absorber retainer	Stainless steel
6	Stop screw	Stainless steel
7	Cap	Fibreglass-reinforced plastic
–	Seals	Polyurethane
	Note on materials	Free of copper, PTFE and silicone

Handling modules HSW, pneumatic

Technical data

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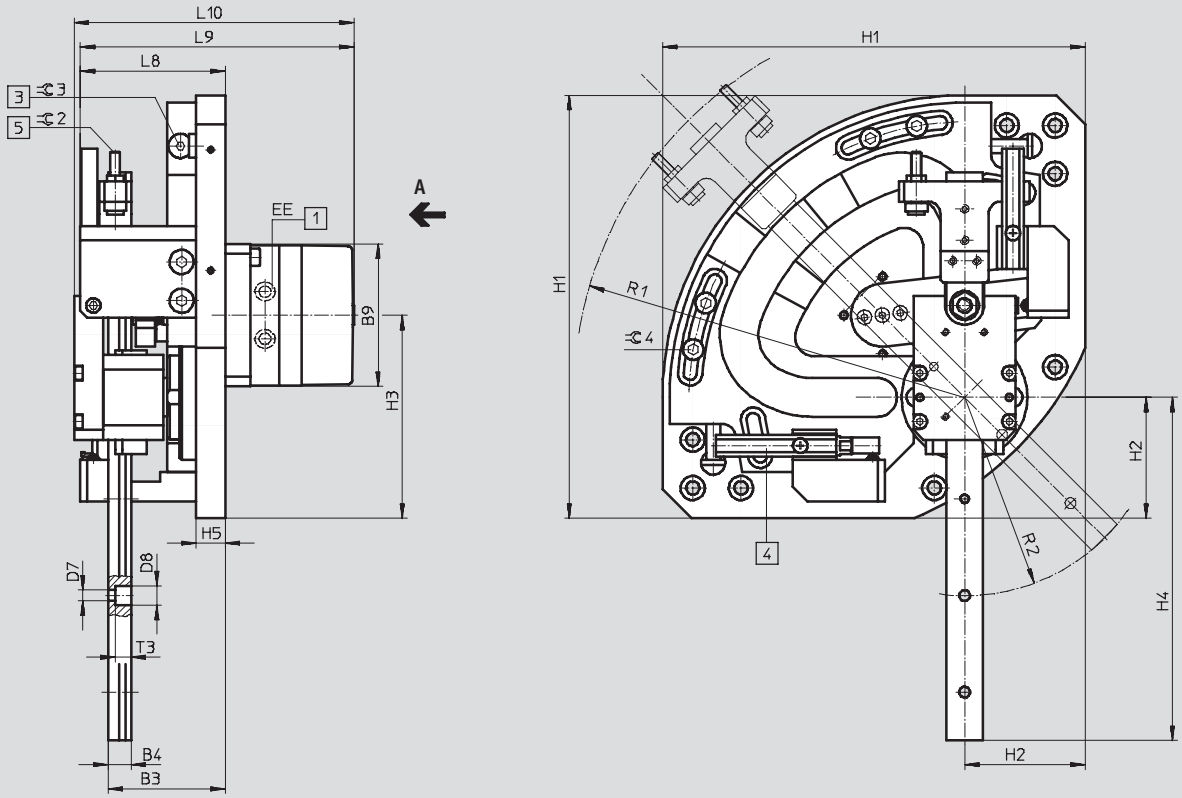
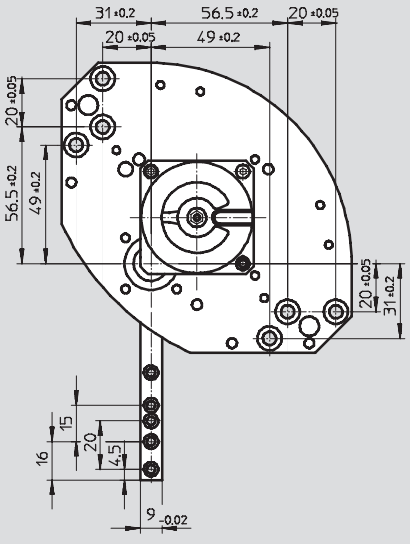
Dimensions Download CAD data ➔ **www.festo.com/en/engineering**

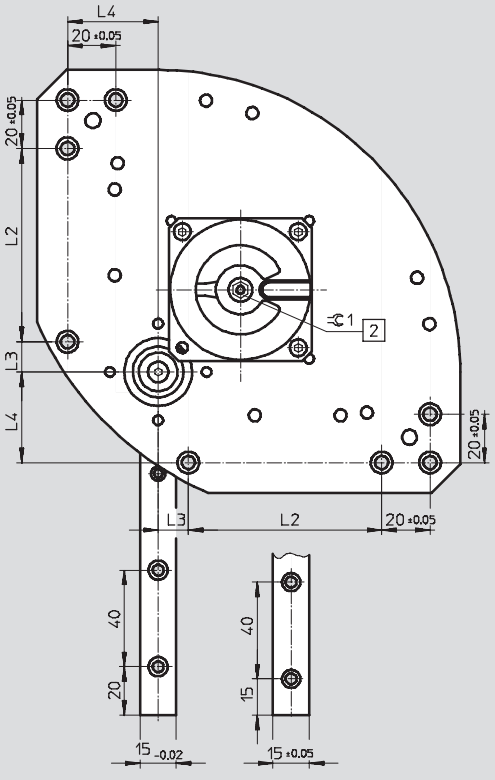
with swivel module DSM



View A



HSW-10



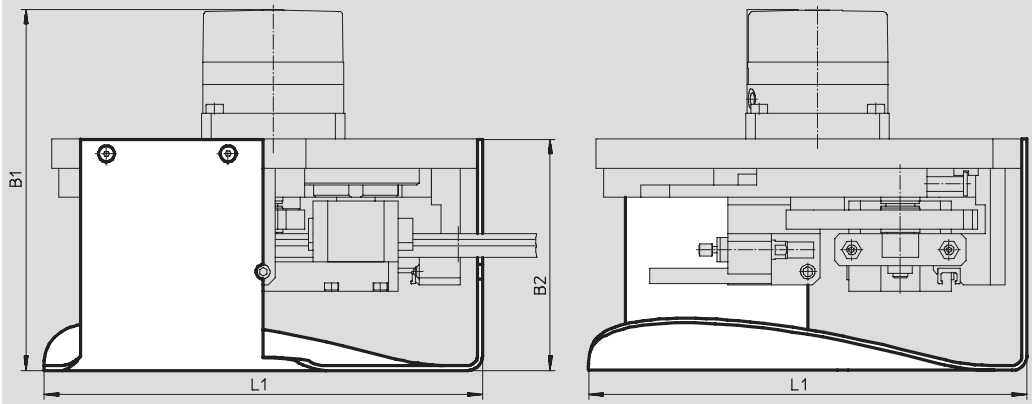
HSW-12 HSW-16

1 Compressed air connections
2 Manual override (internal hex)
3 Angle adjustment for slotted guide plate
4 Sensor slot for SME-/SMT-8
5 Stroke adjustment

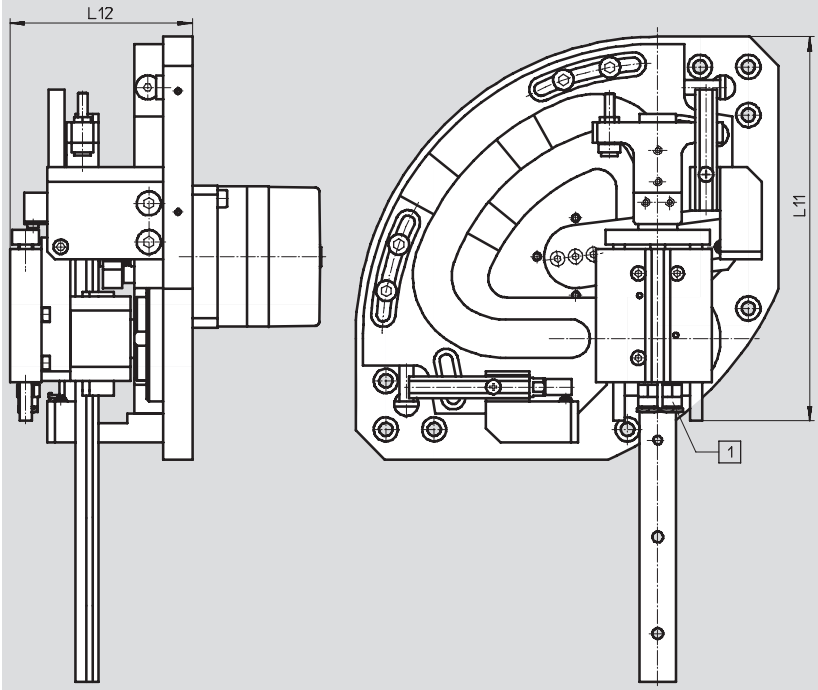
Handling modules HSW, pneumatic

Technical data

with swivel module DSM and protective cover



with wait position module



1 Compressed air connections

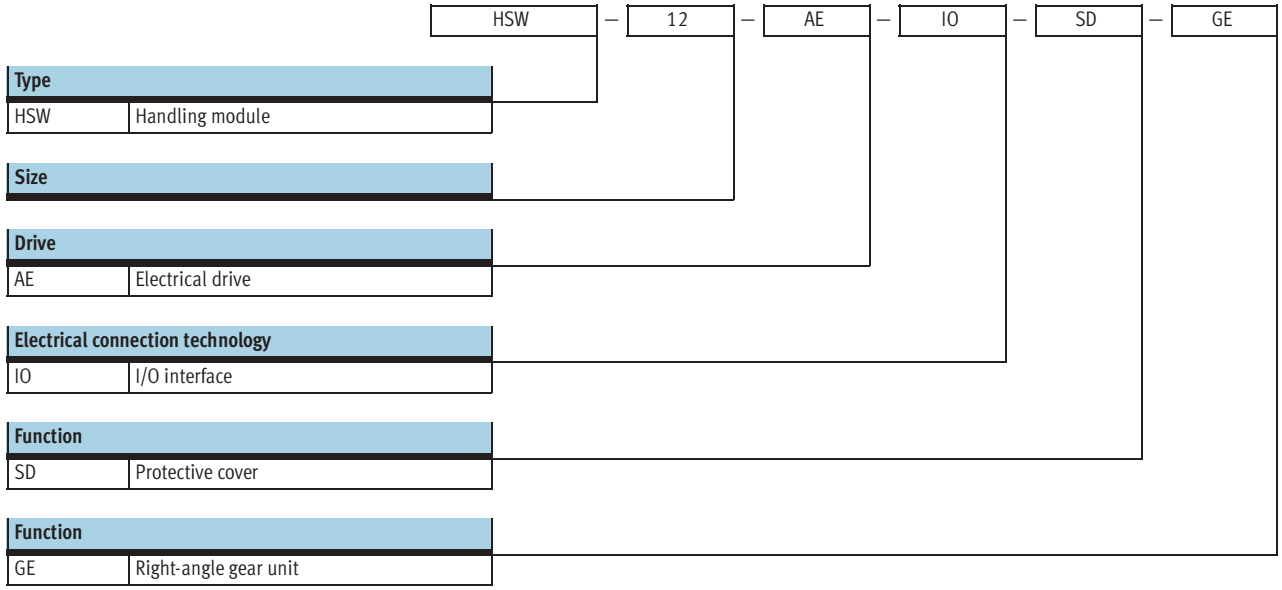
Size	B1 ±2	B2 ±3	B3 ±0.5	B4	B9	D7 ∅	D8 ∅	EE	H1 ±0.3	H2 ±0.2	H3 ±0.5	H4 ±1	H5	L1 ±2	L2 ±0.2
10	121	80	45	5.5	47	3.5	6	M3	120	37	56	89.6	12	123	–
12	148	95	48.5	9.5	59	4.5	8	M5	175	50	84	142	12	180	80
16	168	105	57	12.5	70	4.5	7.5	M5	215	58.5	103.5	174	12	219	100

Size	L3 ±0.2	L4 ±0.2	L8 ±2	L9 ±3	L10	L11 max.	L12 ±2	R1 ±3	R2 ±3	T3	⌭1	⌭2	⌭3	⌭4
10	–	–	62	103	95	102.5	61.8	113	55	3.3	4.5	2	3	3
12	12.5	37.5	60	113	116	159	75.5	162	82	6.5	6	2	3	4
16	12	50	71.5	134	131	202.5	80.8	200	100	5.3	8	2.5	4	4

Ordering data for HSW-...-AP								
Size	10			12			16	
	Part No.	Type		Part No.	Type		Part No.	Type
Without protective cover								
–	540 222	HSW-10-AP		540 228	HSW-12-AP		540 234	HSW-16-AP
Wait position module	540 225	HSW-10-AP-W		540 231	HSW-12-AP-W		540 237	HSW-16-AP-W
With protective cover								
–	540 223	HSW-10-AP-SD		540 229	HSW-12-AP-SD		540 235	HSW-16-AP-SD
Wait position module	540 224	HSW-10-AP-SD-W		540 230	HSW-16-AP-SD-W		540 236	HSW-16-AP-SD-W

Handling modules HSW, electrical

Type codes



Handling modules HSW, electrical

Technical data

FESTO

Function

- Diameter 10, 12 and 16
- Swivel angle 80 ... 100
- Stroke range 90 ... 175

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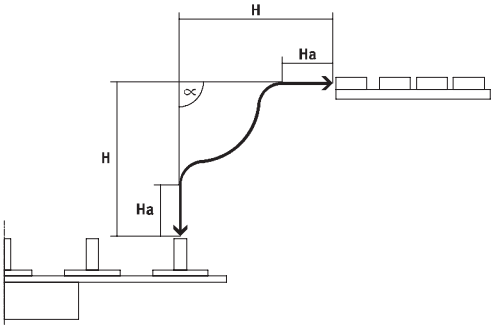
General technical data	
Type	HSW-...-AE
Constructional design	Motor unit
	Linear guide plus ball bearing
	Force-guided motion sequence
Cushioning	Noise reduction via buffers
Type of mounting	Via through-holes
	Via slot nuts
Mounting position	Any

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

Stroke [mm] and angle range [°]

Size		10	12	16
Max. linear stroke at 90° swivel angle	H	90/90	142/142	175/175
Working stroke	Ha	9 ... 15	15 ... 25	20 ... 35
Angle range	α	80 ... 100		



Forces [N]			
Size	10	12	16
Along Y and Z axes (depending on lever position)			
Feed force at 80 % of the nominal motor force	15	30	70
Along Z and Y axes			
Permissible process force[1)]	30	35	50

1) Due to the pretension force on the guide

Handling modules HSW, electrical

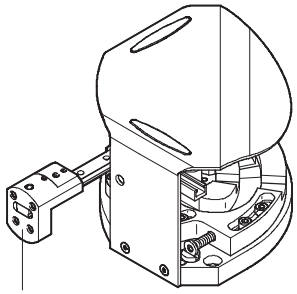
Technical data

FESTO

Weight [g]			
Size	10	12	16
HSW-...-AE	2,000	4,500	8,900
HSW-...-AE-SD	2,110	4,700	9,200
HSW-...-AE-GE	2,410	5,000	10,000
HSW-...-AE-SD-GE	2,520	5,200	10,300

Repetition accuracy [mm]

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



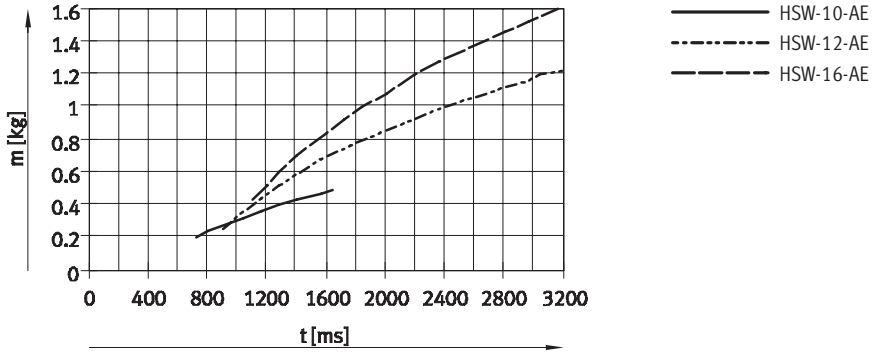
Mounting surface of HAPG

Size		10	12	16
Repetition accuracy	At end positions	±0.02		
	Intermediate positions	< 2		

Travel times t as a function of effective 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 effective load m is the load attached to the vertical guide rail (e.g. adapter, gripper, semi-rotary drive and workpiece)



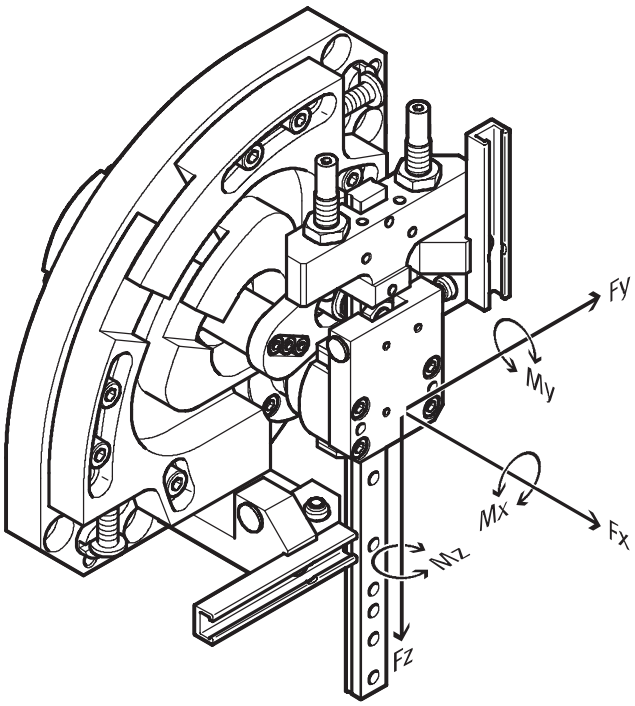
Handling modules HSW, electrical

Technical data

FESTO

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	10	12	16
Max. torques [Nm] $Mx_{perm.}$, $My_{perm.}$, $Mz_{perm.}$	0.6	1.5	2.5

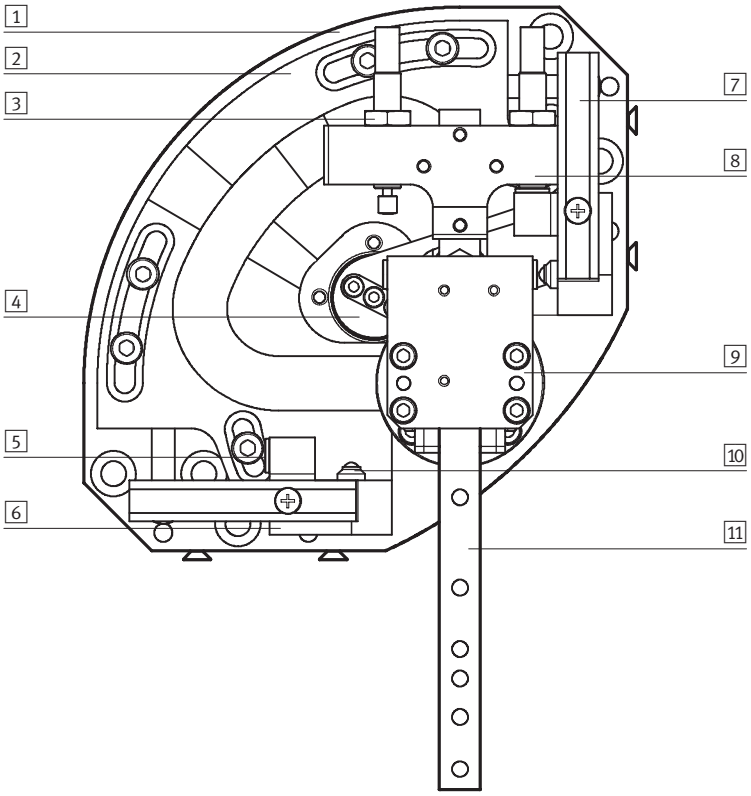
Handling modules HSW, electrical

Technical data

FESTO

Materials

Sectional view of handling module HSW



Size		10	12	16
1	Back plate	Wrought aluminium alloy, anodised		
2	Slotted guide plate	Case-hardened steel		
3	Adjusting screw	–	High-alloy steel	
4	Swivel lever	Case-hardened steel		
5	Stop sleeve	High-alloy steel		
6	Retainer	Wrought aluminium alloy, anodised		
7	Sensor rail	Wrought aluminium alloy, anodised		
8	Flange	Wrought aluminium alloy, anodised		
9	Top plate	Wrought aluminium alloy, anodised		
10	Pressure piece	High-alloy steel		
11	Guide	Tempered steel		
–	Housing	Wrought aluminium alloy, anodised		
	Note on materials	Free of copper, PTFE and silicone		

Handling modules HSW, electrical

Technical data

FESTO

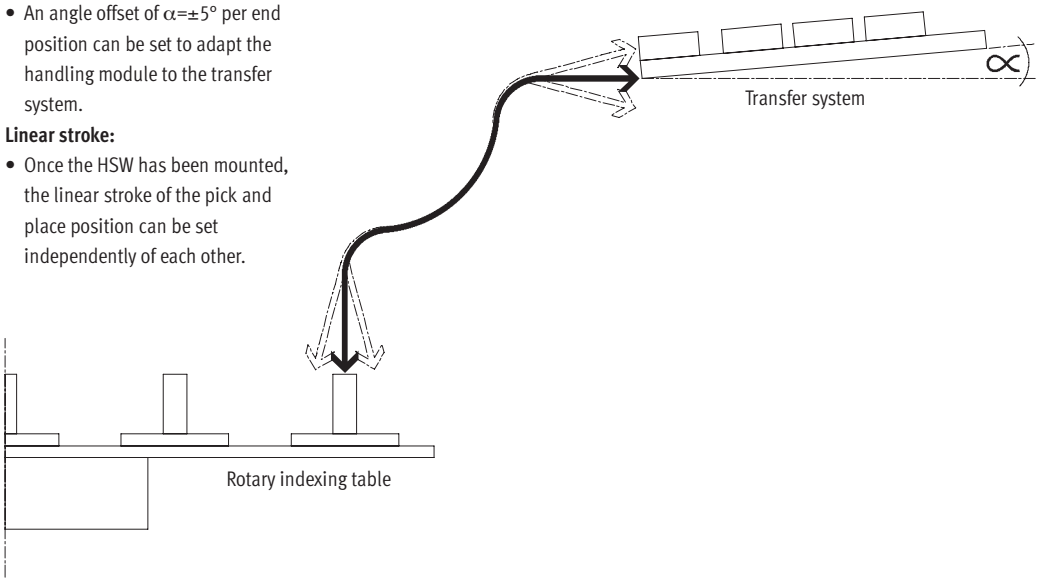
Stroke adjustment

Swivel angle:

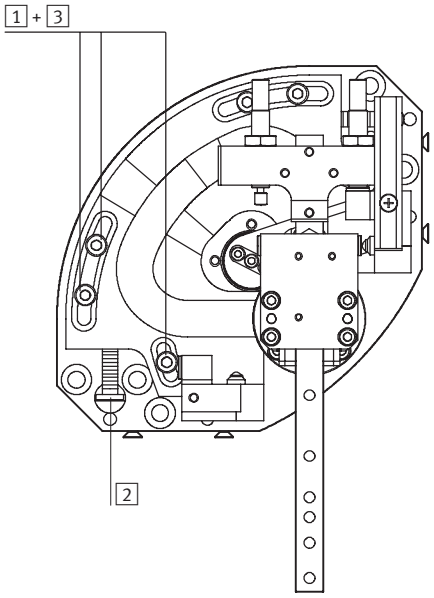
- An angle offset of α=±5° per end position can be set to adapt the handling module to the transfer system.

Linear stroke:

- Once the HSW has been mounted, the linear stroke of the pick and place position can be set independently of each other.



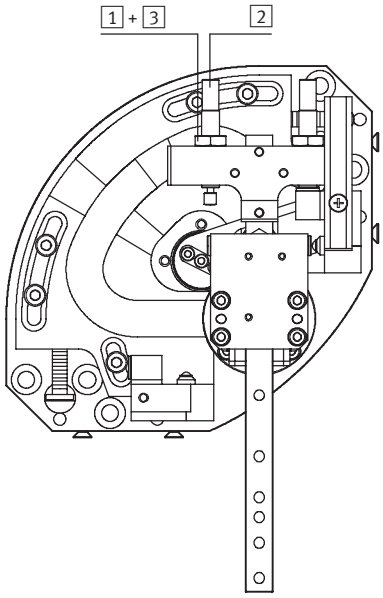
Swivel angle



Procedure:

1 Loosen the screws
2 Adjust the slotted guide plate using the adjusting screw (the slotted guide plate must always make contact with the guide ring)
3 Tighten the screws

Linear stroke



Procedure:

1 Loosen the lock nut
2 Set the desired linear stroke using the cushioning component/adjusting screw
3 Tighten the lock nut

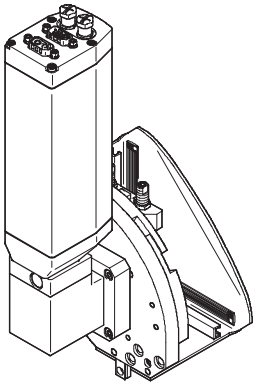
Handling modules HSW, electrical

Technical data

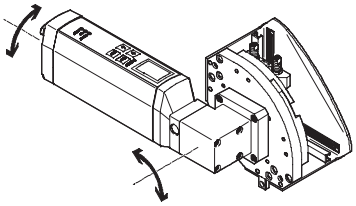
FESTO

Motor mounting variants

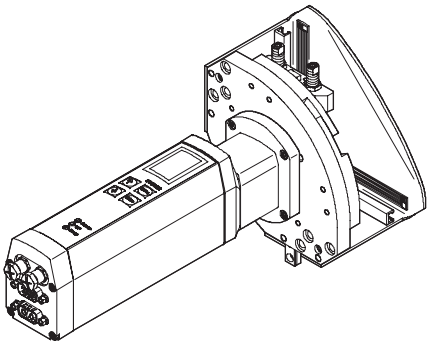
Motor pointing upwards/to side



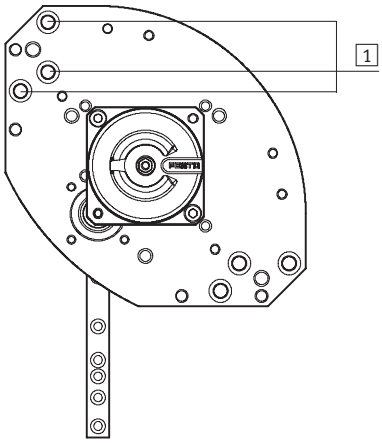
Control panel and access to the connections can be rotated according to space requirements.



Motor towards rear



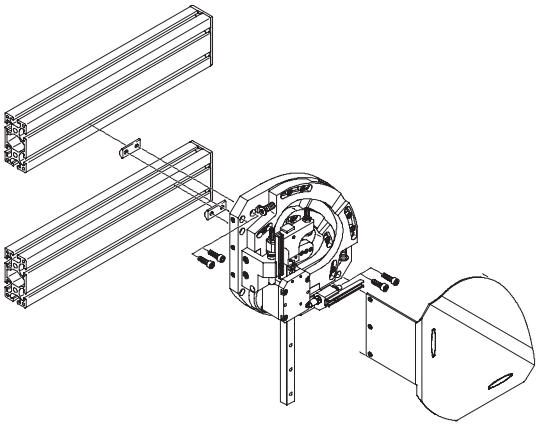
Mounting options



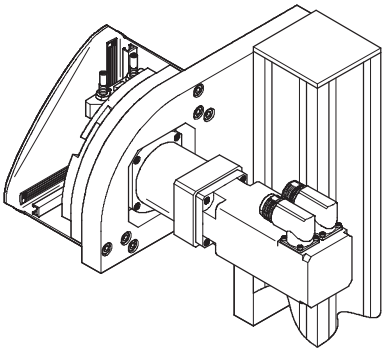
1 Directly via through-holes

Examples:

Via slot nuts on profile supports



User-specific



Handling modules HSW, electrical

Technical data

FESTO

Motor unit MTR-DCI-...-HM

General technical data				→ Volume 5
Type		MTR-DCI-32-...-HM	MTR-DCI-42-...-HM	MTR-DCI-52-...-HM
For handling module		HSW-10-...-AE	HSW-12-...-AE	HSW-16-...-AE
Rotary position generator		Optical encoder		
No. of increments/revolution		300	500	
Temperature monitoring		Silicon absolute temperature sensor, switches off at temperatures >80 °C		
Display resolution		128 x 64 pixels		
Type of mounting		Can be bolted on or clamped to gear unit flange		
Gear unit type		Planetary gearing		
Gear reduction ratio		13.73 (14:1), 2-stage		

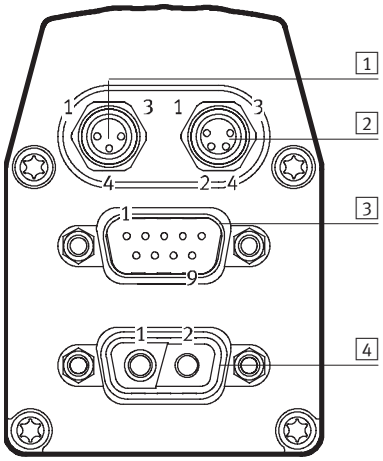
Electrical data				→ Volume 5
Type		MTR-DCI-32-...-HM	MTR-DCI-42-...-HM	MTR-DCI-52-...-HM
For handling module		HSW-10-...-AE	HSW-12-...-AE	HSW-16-...-AE
Nominal voltage	[V DC]	24 ±10%		
Nominal current (motor)	[A]	0.73	2	5.1
Peak current	[A]	2.1	3.8	7.7
Nominal power (motor)	[W]	17.5	48	122.4
Max. current (digital logic outputs)	[mA]	200	200	60
No. of digital logic inputs (with I/O interface)	–	6		
No. of digital logic outputs (with I/O interface)	–	2		
Parameterisation interface		RS232; 9,600 baud		

Handling modules HSW, electrical

Technical data

FESTO

Pin allocation



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

2 RS232 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	Traversing record coding, bit 0
2	Traversing record coding, bit 1
3	Traversing record coding, bit 2
4	Traversing record 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
–	
–	
–	
–	
–	
–	
–	

Handling modules HSW, electrical

Technical data

FESTO

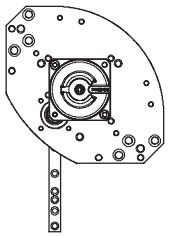
Simple solution for your application

Advantages of the handling module HSW-...-AE for 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

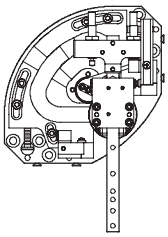
Step 1: Mount the handling module



- Wide choice of mounting options

➔ 1 / 7.2-25

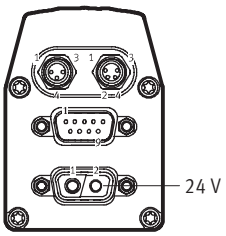
Step 2: Mechanically adjust the end positions



- Set the desired linear stroke using the cushioning component and adjusting screw

➔ 1 / 7.2-24

Step 3: Connect the 24 V voltage supply

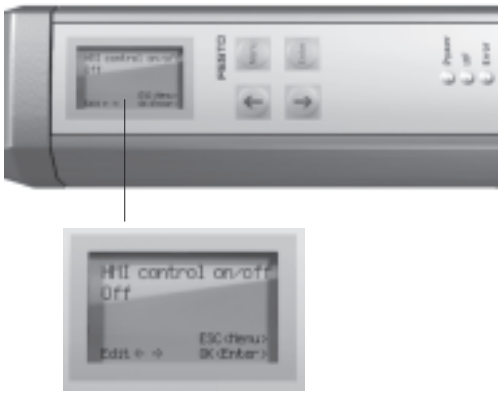


- Plug and work:
  Connect the voltage –
  HSW is ready for operation

➔ 1 / 7.2-26

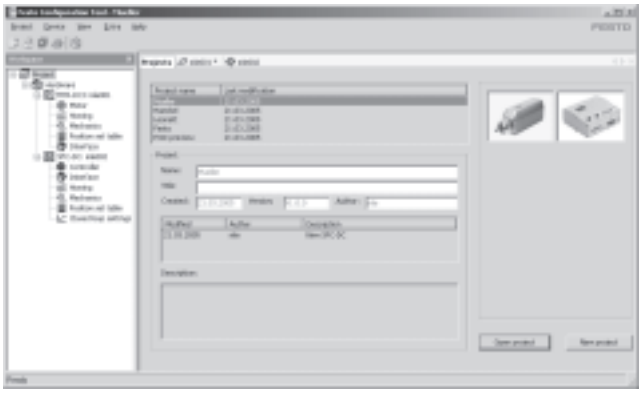
Step 4: Parameterisation either via control panel on motor or using FCT software

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 a 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

Handling modules HSW, electrical

Technical data

FESTO

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

HSW mode 1

- Precise travel to the mechanical end position

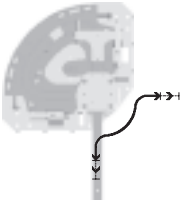
HSW mode 2

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

HSW mode 3

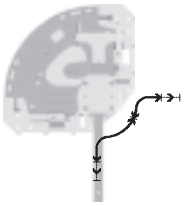
- Additional ejector station for reject parts or quality inspection
- Precise travel to end position via setup position

HSW mode 4



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

HSW 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)

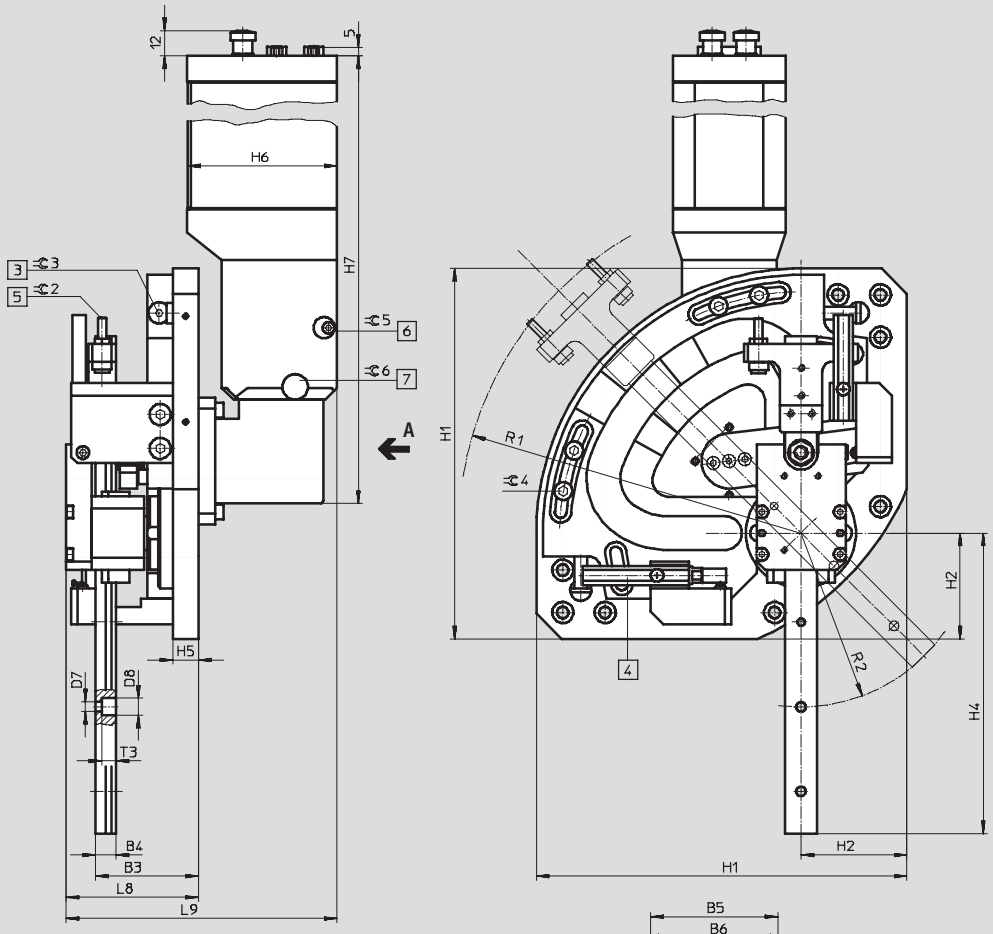
Handling modules HSW, electrical

Technical data

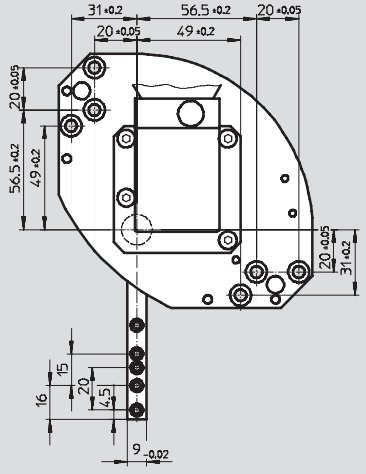
FESTO

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

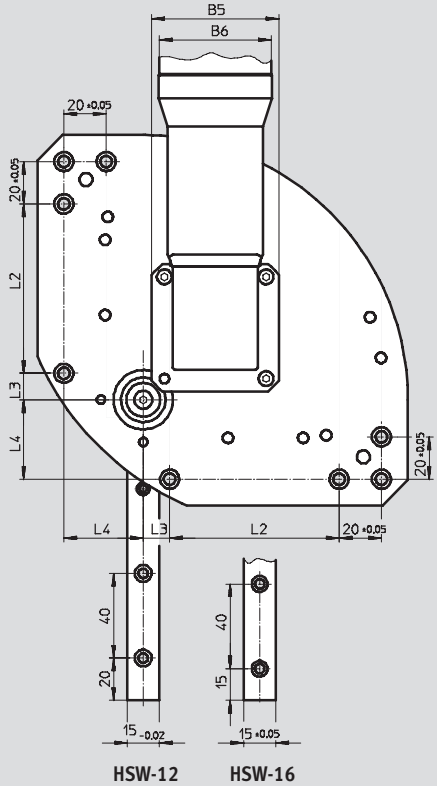
with motor unit pointing upwards



View A



HSW-10



HSW-12 **HSW-16**

3 Angle adjustment for slotted guide plate
4 Sensor slot for SME/SMT-8
5 Stroke adjustment
6 Clamping component for motor
7 Clamp for gear unit

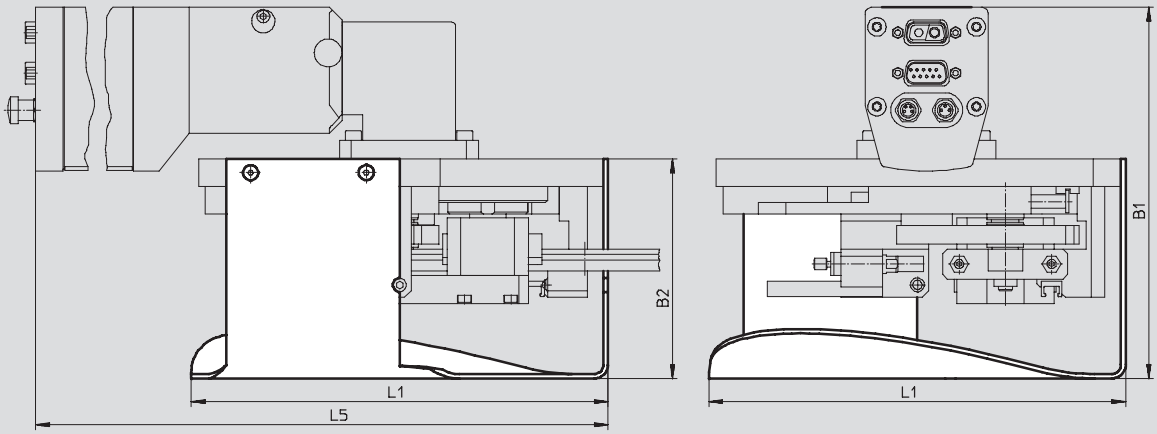
Handling modules HSW, electrical

Technical data

FESTO

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

with motor unit pointing upwards and protective cover



Size	B1 ±3	B2 ±3	B3 ±0.5	B4	B5	B6	D7 ∅
10	148	80	45	5.5	60	46	3.5
12	160.5	95	48.5	9.5	60	53.3	4.5
16	193	105	57	12.5	100	69.5	4.5

Size	D8 ∅	H1 ±0.3	H2 ±0.2	H4[1)] ±1	H5	H6 ±0.4	H7 ±3
10	6	120	37	89.6	12	66	239
12	8	175	50	142	12	70.8	291
16	7.5	215	58.5	174	12	94.8	344.5

Size	L1 ±2	L2 ±0.2	L3 ±0.2	L4 ±0.2	L5 ±3	L8 ±2	L9 ±3
10	123	–	–	–	276	62	121
12	180	80	12.5	37.5	357	60	128
16	219	100	12	50	420	71.5	156

Size	R1[1)] ±3	R2[1)] ±3	T3	⌀2	⌀3	⌀4	⌀5	⌀6
10	113	55	3.3	2	3	3	2.5	2.5
12	162	82	6.5	2	3	4	2.5	2.5
16	200	100	5.3	2.5	4	4	5	3

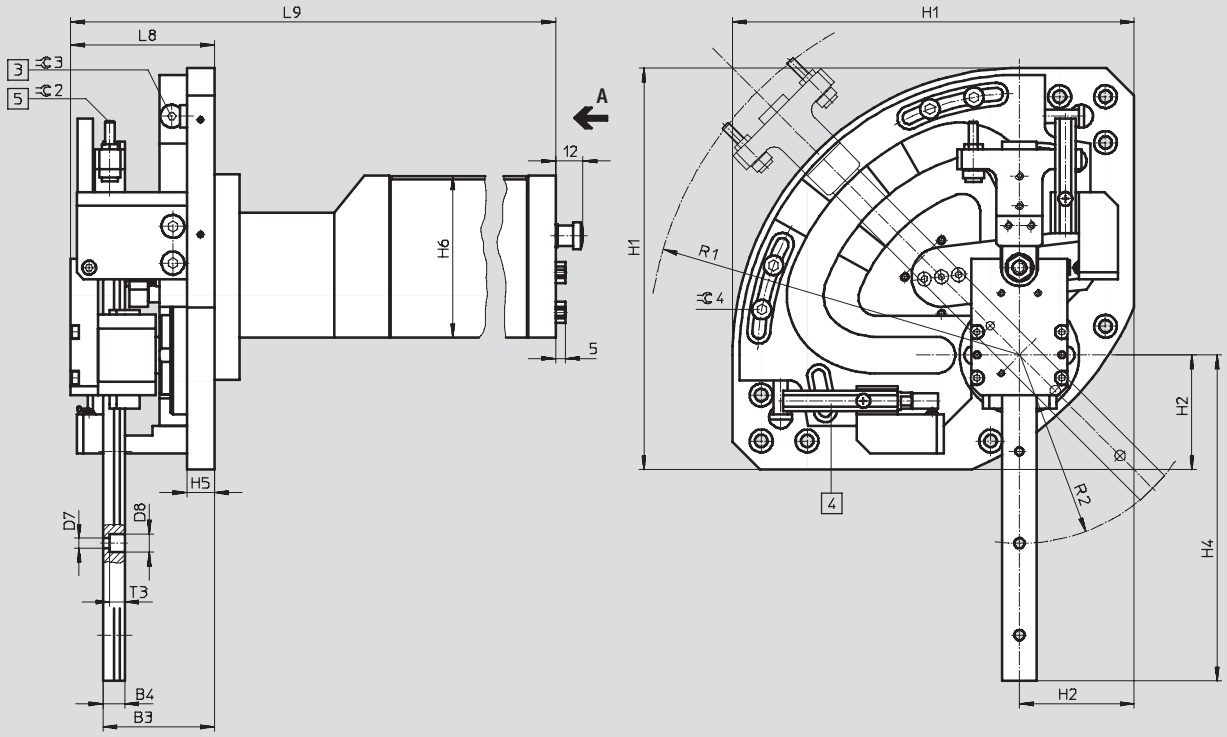
1) Maximum stroke and 90° angle

Handling modules HSW, electrical

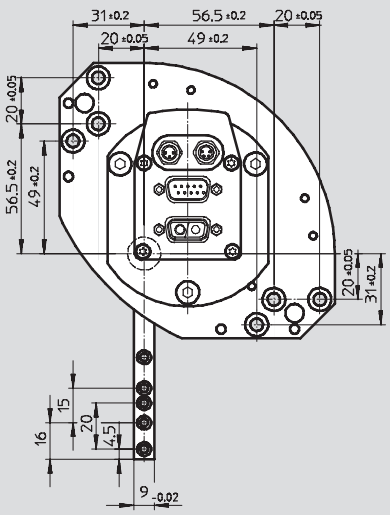
Technical data

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

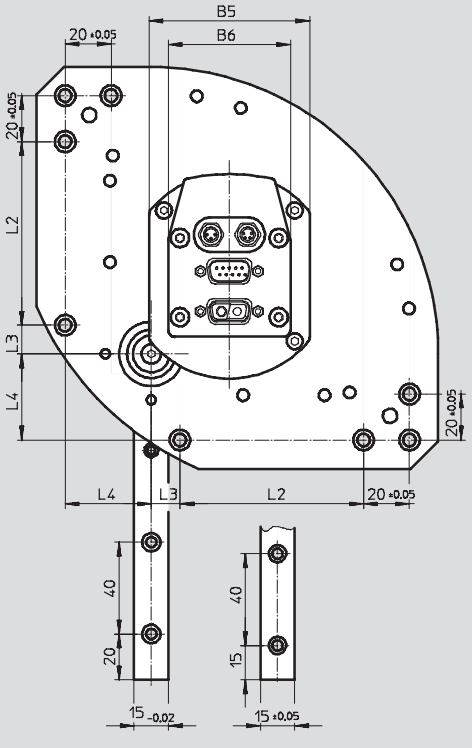
with motor unit towards the rear



View A



HSW-10



HSW-12 **HSW-16**

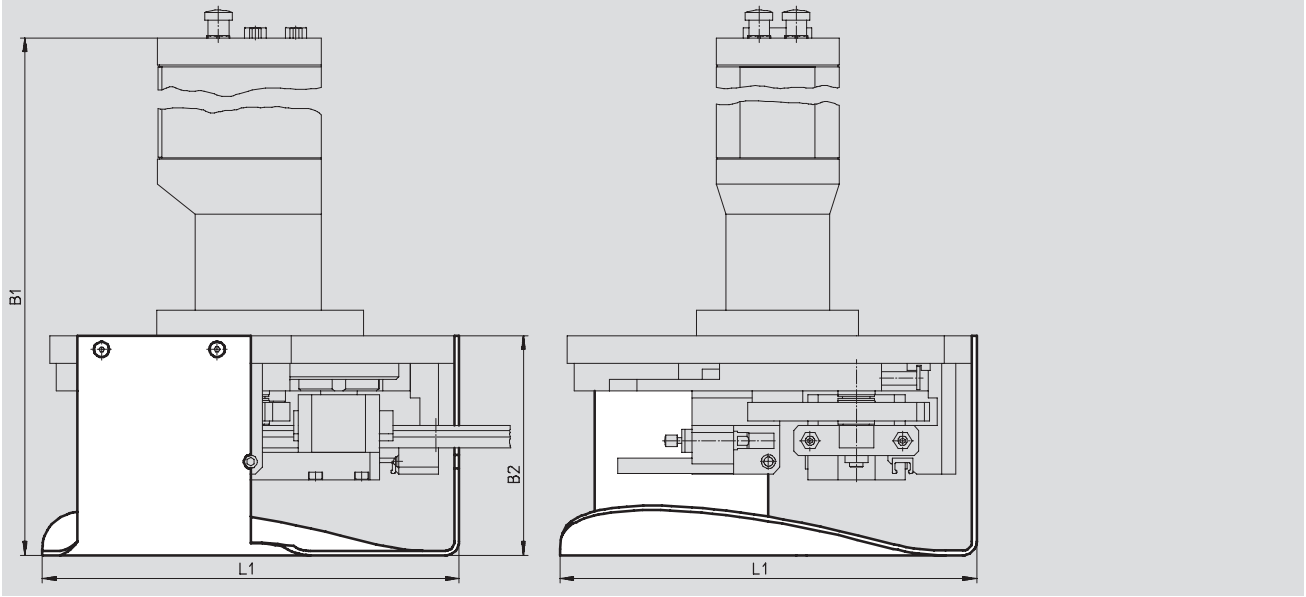
3 Angle adjustment for slotted guide plate
4 Sensor slot for SME/SMT-8
5 Stroke adjustment

Handling modules HSW, electrical

Technical data

FESTO

with motor unit towards the rear and protective cover



Size	B1 ±3	B2 ±2	B3 ±0.5	B4	B6	D7 ∅
10	263	80	45	5.5	46	3.5
12	323	95	48.5	9.5	53.3	4.5
16	363	105	57	12.5	69.5	4.5

Size	D8	H1 ±0.3	H2 ±0.2	H4[1)] ±1	H5	H6 ±0.4
10	6	120	37	89.6	12	66
12	8	175	50	142	12	70.8
16	7.5	215	58.5	174	12	94.8

Size	L1 ±2	L2 ±0.2	L3 ±0.2	L4 ±0.2	L8 ±2	L9 ±3
10	123	–	–	–	62	245
12	180	80	12.5	37.5	60	290
16	219	100	12	50	71.5	328.5

Size	R1[1)] ±3	R2[1)] ±3	T3	⌯2	⌯3	⌯4
10	113	55	3.3	2	3	3
12	162	82	6.5	2	3	4
16	200	100	5.3	2.5	4	4

Handling modules HSW, electrical

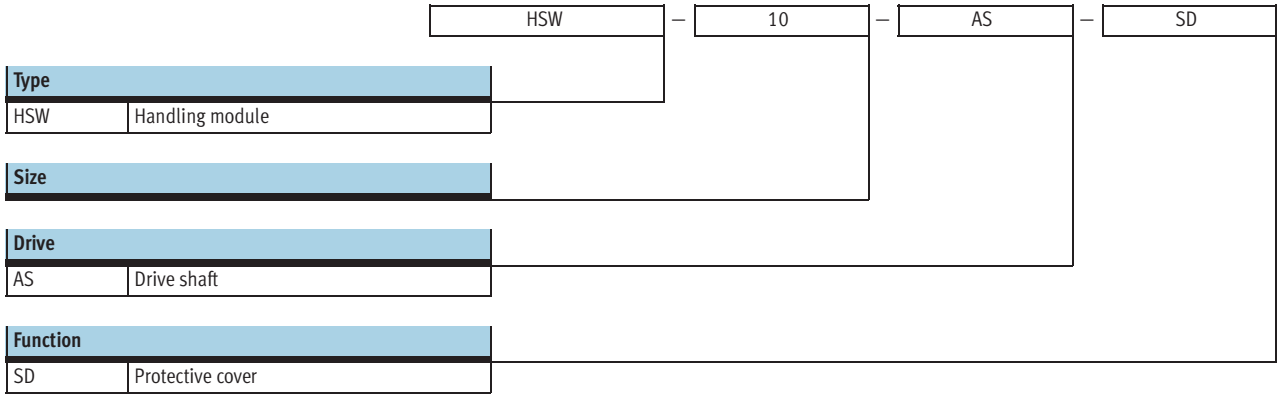
Technical data

FESTO

Ordering data for HSW-...-AE								
Size	10			12			16	
	Part No.	Type		Part No.	Type		Part No.	Type
I/O interface								
without gear unit								
without protective cover	**540 250**	**HSW-10-AE-IO**		**540 266**	**HSW-12-AE-IO**		**540 282**	**HSW-16-AE-IO**
with protective cover	**540 252**	**HSW-10-AE-IO-SD**		**540 268**	**HSW-12-AE-IO-SD**		**540 284**	**HSW-16-AE-IO-SD**
with right-angle gear unit								
without protective cover	**540 251**	**HSW-10-AE-IO-GE**		**540 267**	**HSW-12-AE-IO-GE**		**540 283**	**HSW-16-AE-IO-GE**
with protective cover	**540 253**	**HSW-10-AE-IO-SD-GE**		**540 269**	**HSW-12-AE-IO-SD-GE**		**540 285**	**HSW-16-AE-IO-SD-GE**

Handling modules HSW, without drive

Type codes

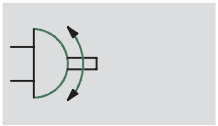


Handling modules HSW, without drive

Technical data

FESTO

Function



Size
10, 12 and 16

Swivel angle
80 ... 100

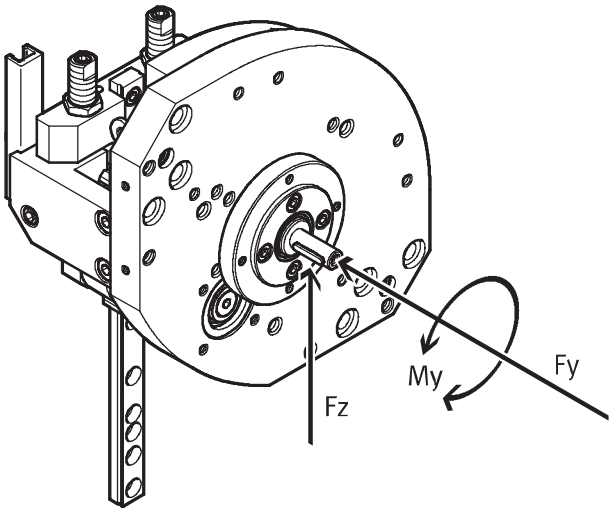
Stroke range
90 ... 175

www.festo.com/en/
Spare_parts_service

General technical data	
Type	HSW-...-AS
Constructional design	Drive shaft
	Linear guide plus ball bearing
	Force-guided motion sequence
Cushioning	Noise reduction via buffers
Type of mounting	Via through-holes
	Via centring sleeves
Mounting position	Any

Weight [g]			
Size	10	12	16
HSW-...-AS	1,200	2,800	5,200
HSW-...-AS-SD	1,300	3,000	5,500

Permissible static/dynamic characteristic load values



Note

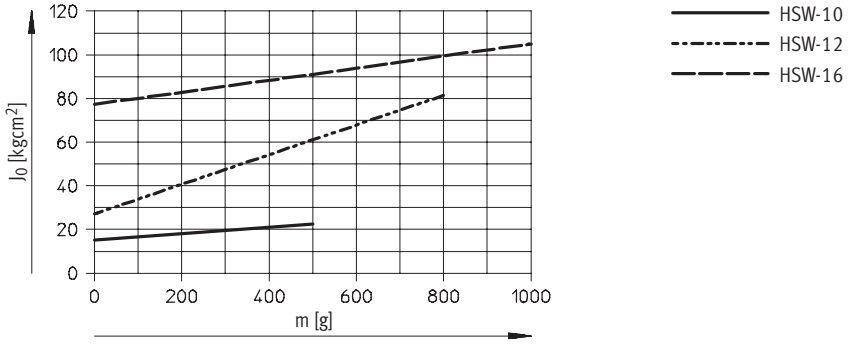
Technical data for mechanical components ➔ 1 / 7.2-11.

Characteristic load values				
Size		10	12	16
Max. axial force $F_{Yperm.}$	[Nm]	10	18	30
Max. radial force $F_{Zperm.}$	[Nm]	30	45	75
Max. drive torque $M_{Yperm.}$	[Nm]	0.85	1.25	2.5

Handling modules HSW, without drive

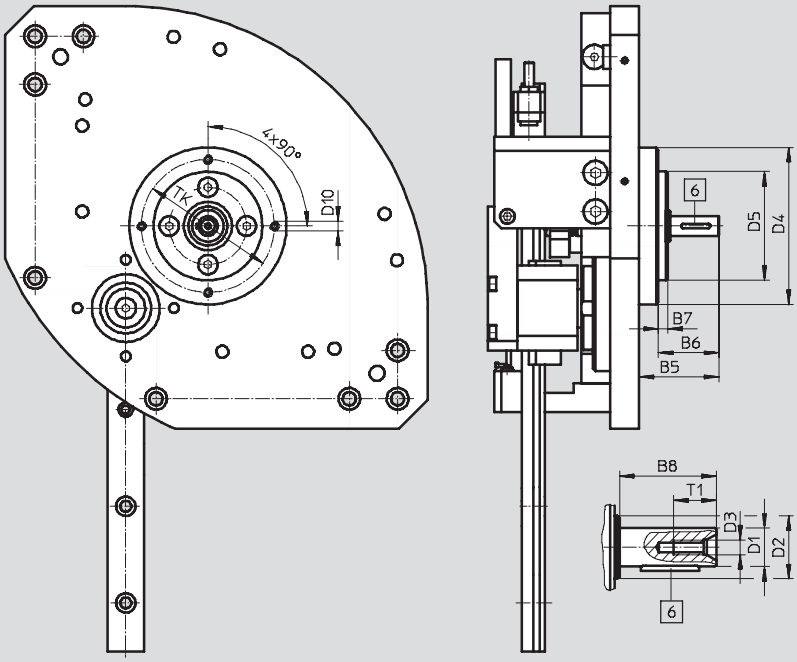
Technical data

Mass moment of inertia J_0 as a function of effective load m (for sizing drive)



Dimensions

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



Basic dimensions
➔ 1 / 7.2-16
6 Woodruff key

Size	B5	B6	B7	B8	D1 ∅ g7	D2 ∅	D3	D4 ∅	D5 ∅ f8	D10	T1	TK ±0.1
10	25	19	2	16	6	12	M2.5	46	32	M3	6.8	39
12	33	25	4	20	8	13	M3	65	45	M4	8.8	55
16	36.5	28.5	4	23	10	16	M3	70	50	M4	10.6	60

Ordering data for HSW-...-AS

Size	10		12		16	
	Part No.	Type	Part No.	Type	Part No.	Type
without protective cover	**540 226**	**HSW-10-AS**	**540 232**	**HSW-12-AS**	**540 238**	**HSW-16-AS**
with protective cover	**540 227**	**HSW-10-AS-SD**	**540 233**	**HSW-12-AS-SD**	**540 239**	**HSW-16-AS-SD**

Handling modules HSW

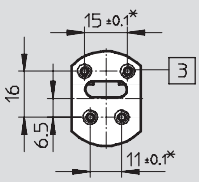
Accessories

FESTO

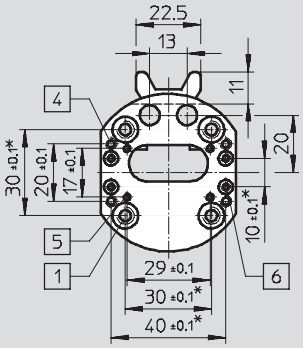
Adapter kit HAPG/HAPG-B

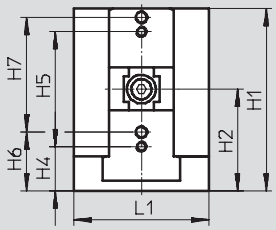
Material:
Wrought aluminium alloy, anodised

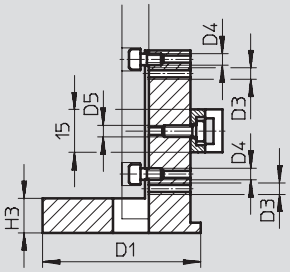
HAPG-69

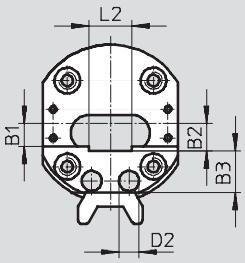


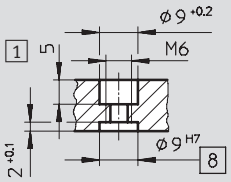
HAPG-71-B

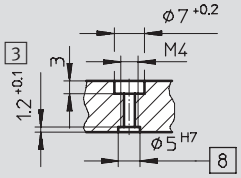


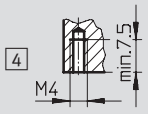


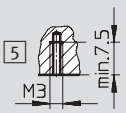


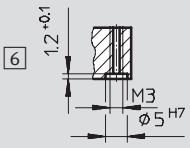












* Tolerance for centring hole ±0.02

8 Centring hole for centring sleeve ZBH

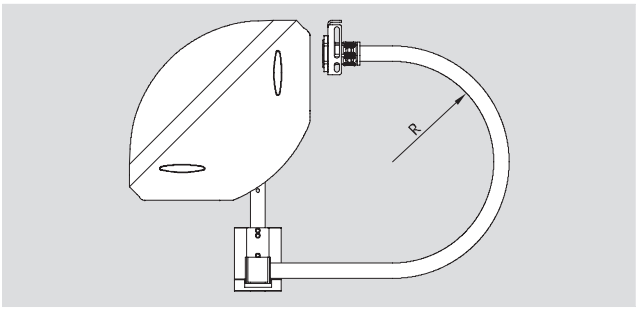
Dimensions and ordering data

For size	B1	B2 ±0.2	B3	D1 ∅	D2 ∅	D3	D4	D5	H1	H2
10	5	6	8	33	–	M4	M3	–	34	–
12, 16	8	9.5	14.5	56	7	M4	M4	M4	63.5	35.5

For size	H3	H4 +0.2	H5 ±0.2	H6 +0.2	H7 ±0.2	L1	L2 +0.1	Weight [g]	Part No.	Type
10	10	5	20.5	16.5	15	24	9	25	**540 249**	**HAPG-69**
12, 16	12	15.5	40	20.5	40	47	15	110	**540 882**	**HAPG-71-B**

Installation kit MKRP

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



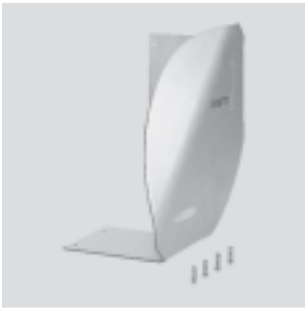
Ordering data

For size	Max. bending radius for conduit[1) R [mm]	Tubing I.D. [mm]	Weight [g]	Part No.	Type
10, 12	55	12	140	**540 247**	**MKRP-5**
12, 16	75	16.5	150	**540 248**	**MKRP-6**

1) The conduit must not be filled beyond 70%

Cover kit BSD-HSW

Material:
Wrought aluminium alloy, anodised



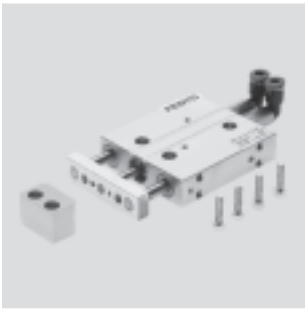
Dimensions ➔ 1 / 7.2-17

Ordering data

For size	Weight [g]	Part No.	Type
10	100	**540 240**	**BSD-HSW-10**
12	200	**540 241**	**BSD-HSW-12**
16	300	**540 242**	**BSD-HSW-16**

Wait position module BW-HSW for HSW-...-AP

Material:
Wrought aluminium alloy, anodised



Dimensions ➔ 1 / 7.2-17

Ordering data

For size	Weight [g]	Part No.	Type
10	50	**540 243**	**BW-HSW-10**
12	140	**540 244**	**BW-HSW-12**
16	150	**540 245**	**BW-HSW-16**

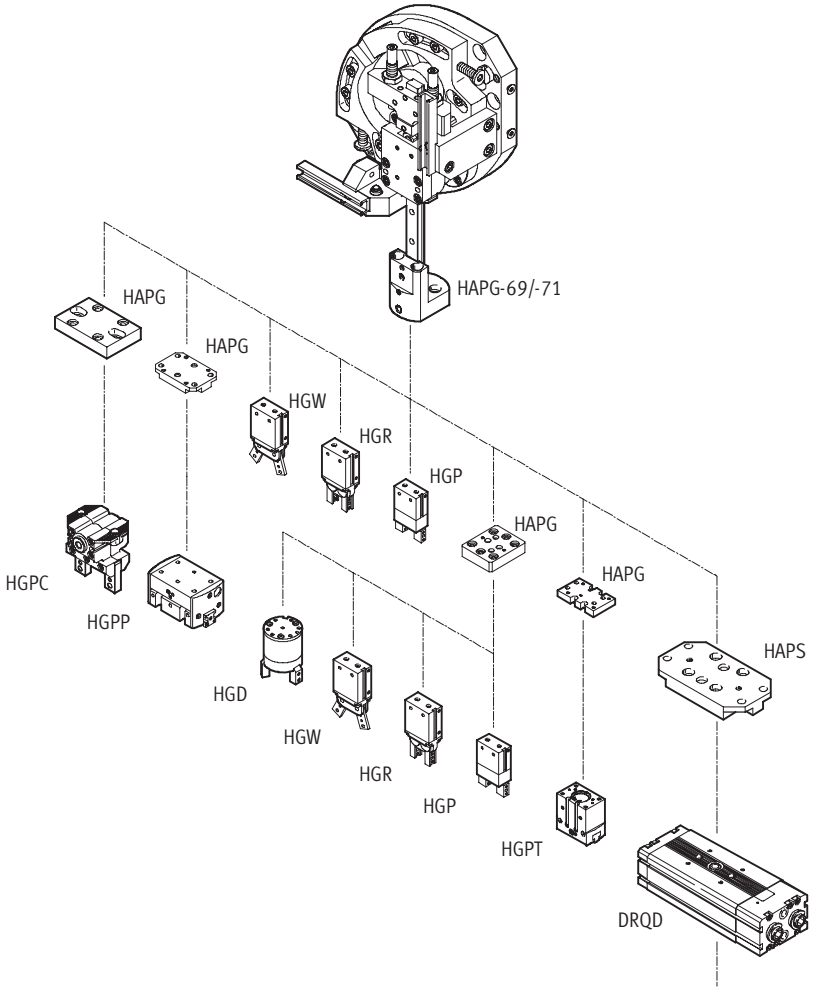
Handling modules HSW

Accessories

FESTO

Adapter kits for grippers

For combining HSW with grippers HG-... or semi-rotary drive DRQD



Gripper Part No.	Type	Adapter kit Part No.	Type	Required mounting attachments	B1	D1	D2	H1	L1
HSW-10-... with HAPG-69									
174 815	**HGP-06-A**	–		M3 x 14 (2x)	–				
174 817	**HGR-10-A**			M3 x 16 (2x)					
174 818	**HGW-10-A**			M3 x 16 (2x)					
HSW-12-... with HAPG-71-B									
174 815	**HGP-06-A**	**192 706**	**HAPG-37-S1**	–	12	M3	M5	42	50
174 817	**HGR-10-A**								
174 818	**HGW-10-A**								
1)	**DRQD-8-...**	**178 448**	**HAPS-2** 2)		8	M4	M4	28	48
1)	**DRQD-12-...**								
197 542	**HGP-10-A-B**	**192 705**	**HAPG-36-S1**		12	M3	M5	42	50
161 829	**HGR-16-A**								
161 833	**HGW-16-A**								
525 658	**HGPP-10-A**	**529 017**	**HAPG-57**		8	M3	M4	33	49.6
539 269	**HGPC-16-A**	**191 901**	**HAPG-55**		10	M3	M5	40	62
535 858	**HGPT-16-A**	**537 169**	**HAPG-75**		8	M2.5	M3	27	49.6

1) The semi-rotary drive DRQD is a modular product; for information on configuration and ordering ➔ 1 / 4.2-23
2) The centring sleeves for attaching to the adapter kit HAPG-71-B are not required

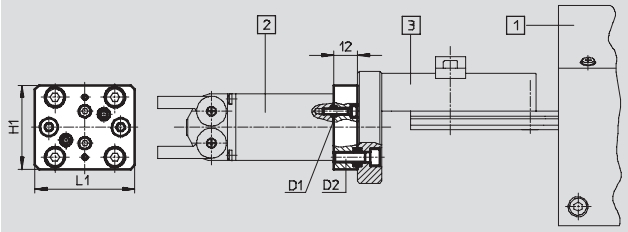
Handling modules HSW

Accessories

Gripper Part No.	Type	Adapter kit Part No.	Type	Required mounting attachments	B1	D1	D2	H1	L1
HSW-16-... with HAPG-71-B									
174 815	**HGP-06-A**	**192 706**	**HAPG-37-S1**	–	12	M3	M5	42	50
174 817	**HGR-10-A**								
174 818	**HGW-10-A**								
1)	**DRQD-8-...**	**178 448**	**HAPS-2** 2)		8	M4	M4	28	48
1)	**DRQD-12-...**								
197 542	**HGP-10-A-B**	**192 705**	**HAPG-36-S1**		12	M3	M5	42	50
161 829	**HGR-16-A**								
161 833	**HGW-16-A**								
174 819	**HGD-16-A**								
525 658	**HGPP-10-A**	**529 017**	**HAPG-57** 2)		8	M3	M4	33	49.6
187 867	**HGPP-12-A**	**191 900**	**HAPG-54**		12	M3	M5	44	52
187 870	**HGPP-16-A**	**191 901**	**HAPG-55**		10	M3	M5	40	62
539 269	**HGPC-16-A**								
535 858	**HGPT-16-A**	**537 169**	**HAPG-75**		8	M2.5	M3	27	49.6
535 861	**HGPT-20-A**								

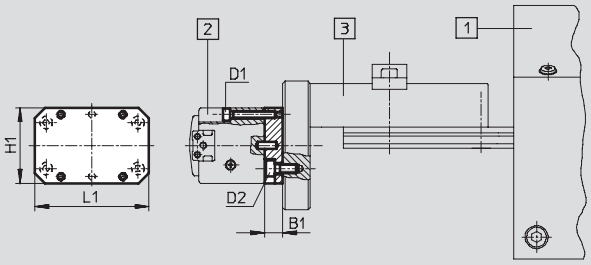
1) The semi-rotary drive DRQD is a modular product; for information on configuration and ordering → 1 / 4.2-23
2) The centring sleeves for attaching to the adapter kit HAPG-71-B are not required

Adapter kit HAPG-36/-37



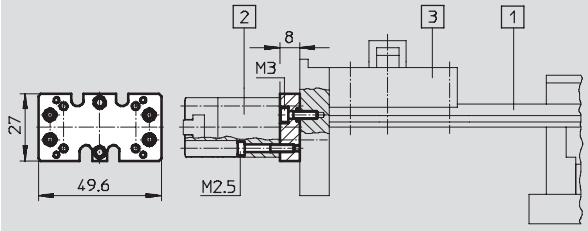
1 Handling module HSW
2 Gripper HG...
3 Adapter kit HAPG

Adapter kit HAPG-54/-55/-57



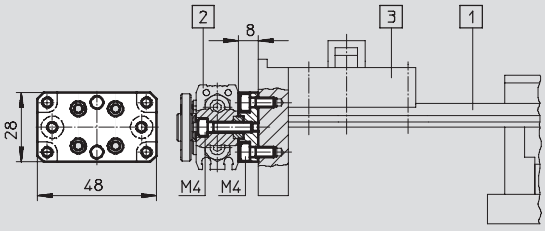
1 Handling module HSW
2 Parallel gripper HGP...
3 Adapter kit HAPG

Adapter kit HAPG-75



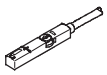
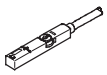
1 Handling module HSW
2 Parallel gripper HGPT
3 Adapter kit HAPG

Adapter kit HAPS-2

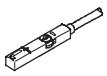


1 Handling module HSW
2 Semi-rotary drive DRQD
3 Adapter kit HAPG

Ordering data – Proximity switches for T-slot, magneto-resistive — Technical data ➔ www.festo.com/catalogue/sm

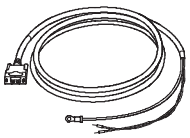
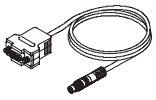
	Type of mounting	Switch output	Electrical connection	Cable length [m]	Part No.	Type
N/O contact						
	Insertable in the slot from above, flush with cylinder profile	PNP	Cable, 3-wire	2,5	**543 867**	**SMT-8M-PS-24V-K-2,5-OE**
			Plug M8x1, 3-pin	0,3	**543 866**	**SMT-8M-PS-24V-K-0,3-M8D**
			Plug M12x1, 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 switches for T-slot, magnetic reed — Technical data ➔ www.festo.com/catalogue/sm

	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 ➔ www.festo.com/catalogue/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 – Cables for HSW-...-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**