

Handling modules HSW

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Handling modules HSW

Key features at a glance

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Range of applications

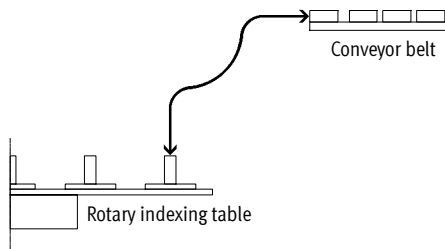
The handling module is a new generation of function modules for the automatic transfer, feed and removal of small parts in extremely confined spaces.

This is achieved by means of a guided swivel and linear motion sequence. A backlash-free guide with recirculating

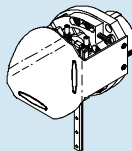
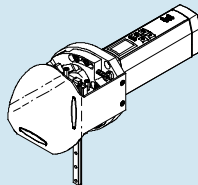
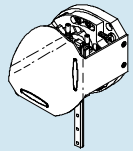
ball bearing elements ensures high precision and good rigidity. The combination of a semi-rotary drive and a slotted guide system produces a compact unit for a complete pick and place cycle at an operating angle of 90°.

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 (→ 13)	Freely approachable (→ 29)	Dependent on drive
Repetition accuracy at wait positions	[mm]	< 1	< 2	Dependent on drive
Technical data		→ 9	→ 26	→ 36

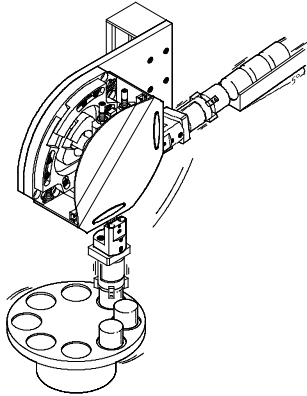
Handling modules HSW

Application examples

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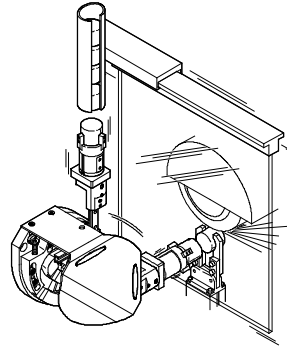
HSW-...-AP, pneumatic / HSW-...-AE, electrical

Rotary indexing table



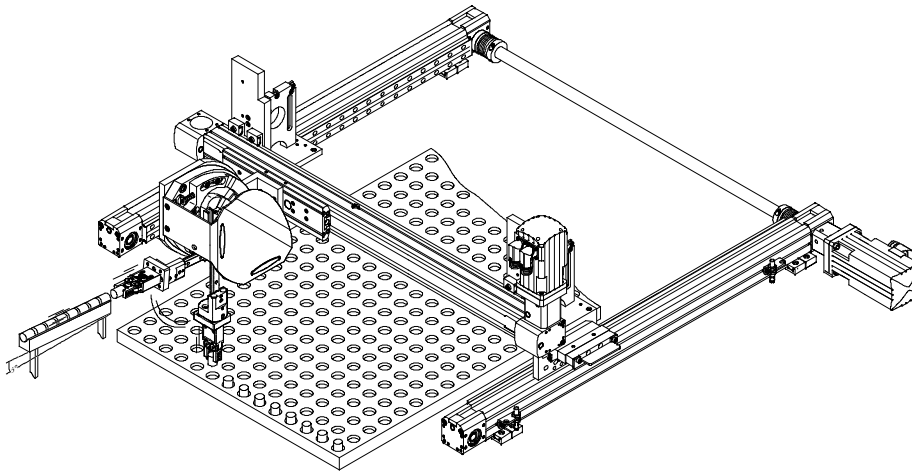
- Fast feed and removal at a linear transfer unit or rotary indexing table, for example

Machine equipment



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

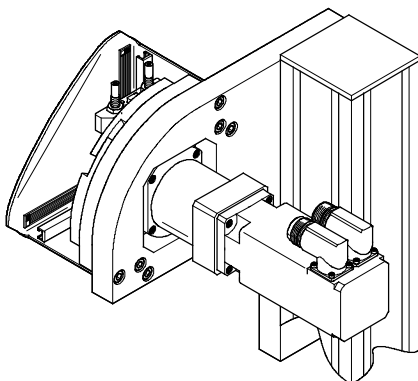
Planar surface gantry



- Fast equipping of pallets

HSW-...-AS, without drive

Rotary indexing table, linear transfer



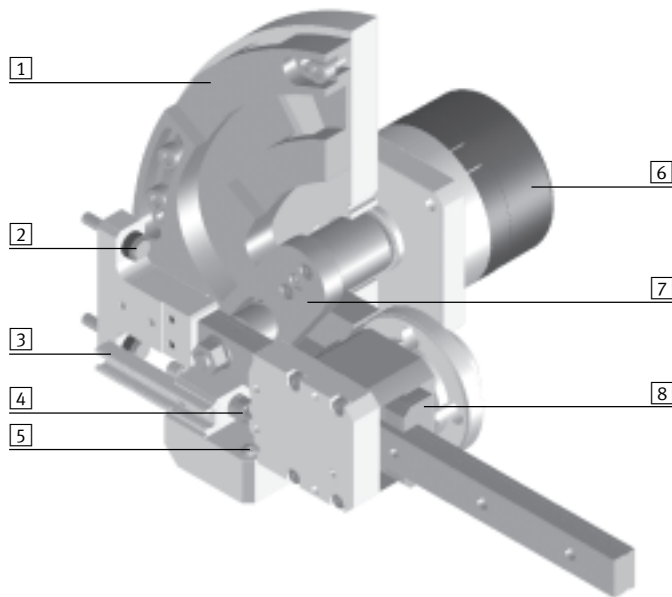
- Fast and flexible 90° pick and place unit with servo motor EMMS-AS
- Electrical variant using third-party motor

Handling modules HSW

Key features at a glance

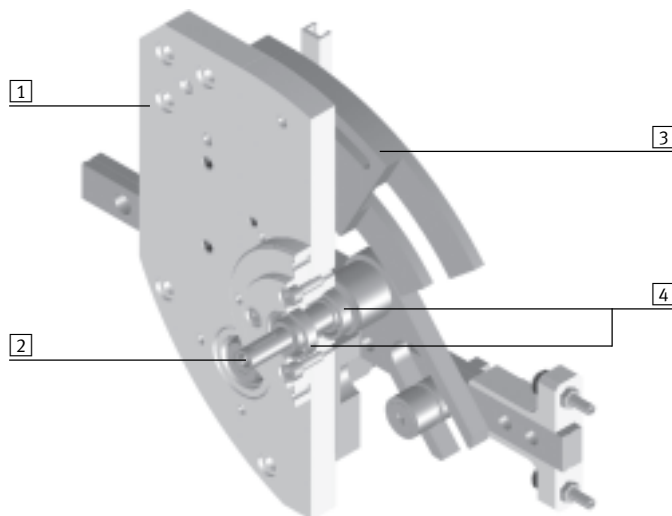
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Design of HSW-...-AP – pneumatic variant with swivel module DSM



- 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)



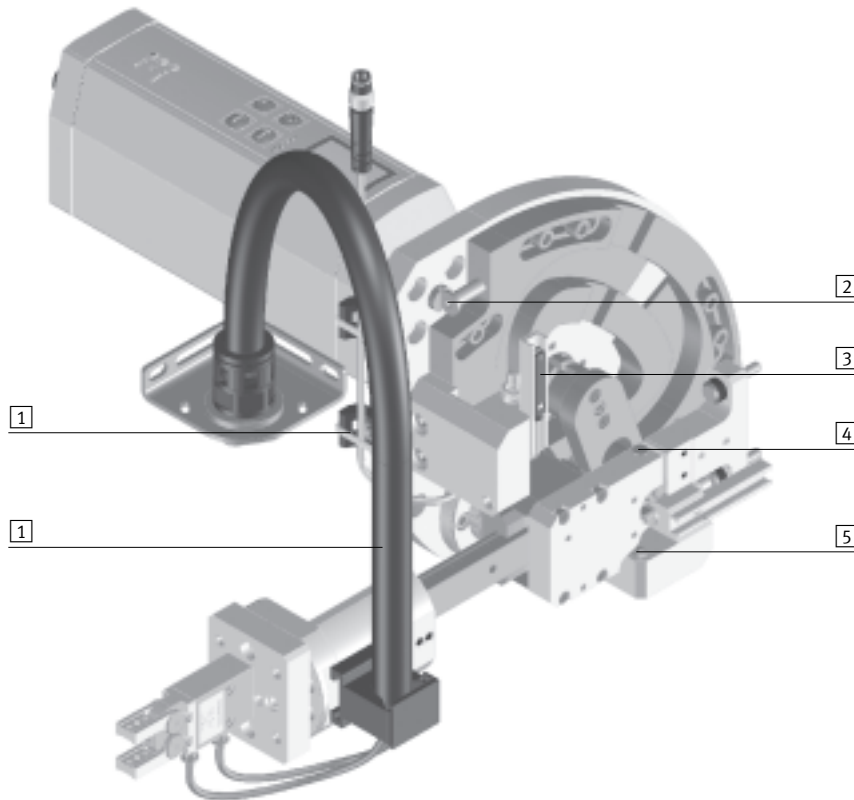
- 1 Base plate
- 2 Shaft with Woodruff key
- 3 Slotted guide plate
- 4 Ball bearings

Handling modules HSW

Key features at a glance

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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

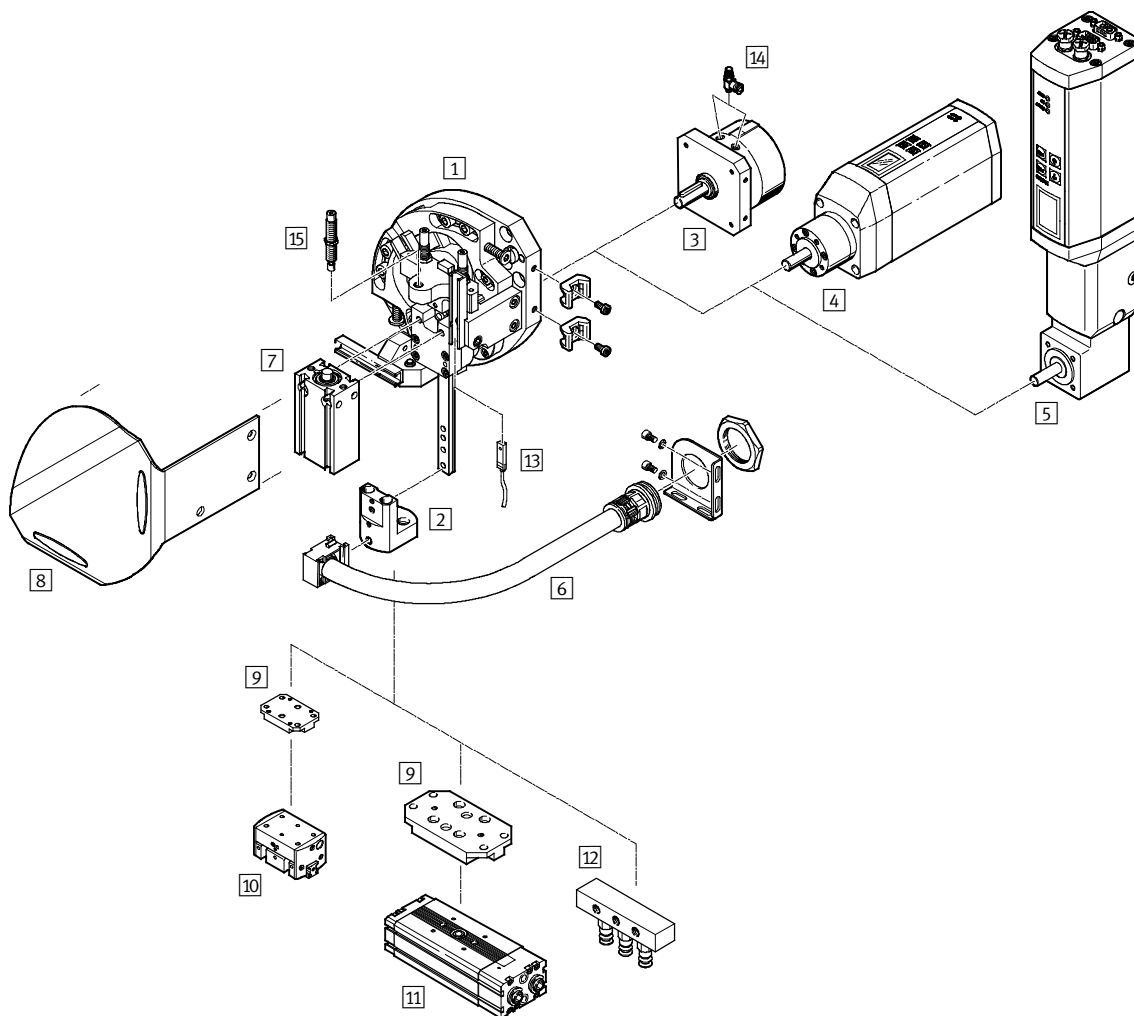


- 4+5 The stop element and pressure piece guarantee freedom from backlash and precision in the end positions and in the effective linear stroke.

Handling modules HSW

Peripherals overview

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Handling modules HSW

Peripherals overview



Accessories		
	Brief description	→ Page/Internet
1 Handling module HSW	Standard module without accessories	9
2 Adapter kit HAPG-...-B	Interface for grippers, semi-rotary drive, etc.	38
3 Swivel module DSM	Pneumatic drive, adapted to each size	dsm
4 Motor unit MTR-DCI-...-HM	Servo motor with integrated power electronics	26
5 Motor unit MTR-DCI-...-HM	Servo motor with right-angle gear unit and integrated power electronics	26
6 Installation kit MKRP	Conduit to protect electrical cables and tubing	39
7 Wait position module BAW-HSW	With pneumatic drive: Pushes the swivel arm from the operating area	39
8 Cover kit BSD-HSW	To protect against accidental contact	39
9 Adapter kit	Interface between HSW 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 option for end positions	40
14 Non-return and flow control valve GRLA	For setting the speed of pneumatic drives	grla
15 Shock absorber DYSW/YSRW	• With path-controlled flow control function • Slowly increasing cushioning force curve	40

Handling modules HSW, pneumatic



Type codes

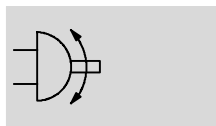
		HSW	–	10	–	AP	–	SD	–	W
Type										
HSW	Handling module, double-acting									
Size										
Drive										
AP	Pneumatic drive									
Function										
SD	Protective cover									
Function										
AW	Wait position module									

Handling modules HSW, pneumatic

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Technical data

Function



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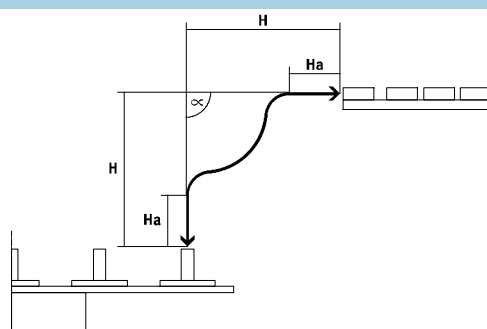


- Ø - Size
10, 12 and 16
- ⤿ - Swivel angle
80 ... 100
- | - Stroke range
90 ... 175

General technical data			
Size	10	12	16
Pneumatic connection	M3	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	Compressed air in accordance with ISO 8573-1:2010 [7:-:-]
Note on operating/pilot medium	Operation with lubricated medium possible (in which case lubricated operation will always be required)
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 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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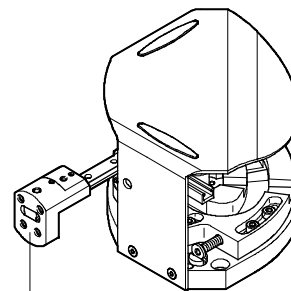
Weight [g]			
Size	10	12	16
HSW-...-AP	1,300	3,000	5,100
HSW-...-AP-SD	1,400	3,200	5,400
HSW-...-AP-AW	1,370	3,200	5,500
HSW-...-AP-SD-AW	1,470	3,400	5,800

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.



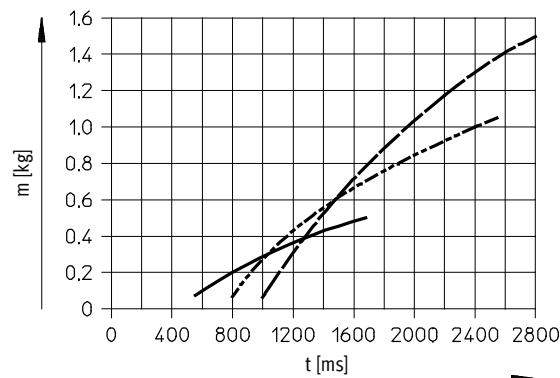
Mounting surface of HAPG

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.

$$t_t = \text{travel time } t + \text{dwell time } t_e$$

The value must not fall below the minimum cycle time.

Size	10	12	16
Min. cycle time	0.6	0.8	1.0
Min. cycle time with wait position module	0.7	1.1	1.2

Example for HSW-10-AP

Step 1:

The following values are assumed:

Effective load $m = 0.2 \text{ kg}$

Dwell time $t_e = 2 \times 350 \text{ ms}$

(350 ms per end position)

Step 2:

The travel time can be determined from the graph:

$t = 800 \text{ ms}$

Step 3:

This gives us a cycle time:

$t_t = 800 \text{ ms} + 700 \text{ ms}$

$= 1,500 \text{ ms}$

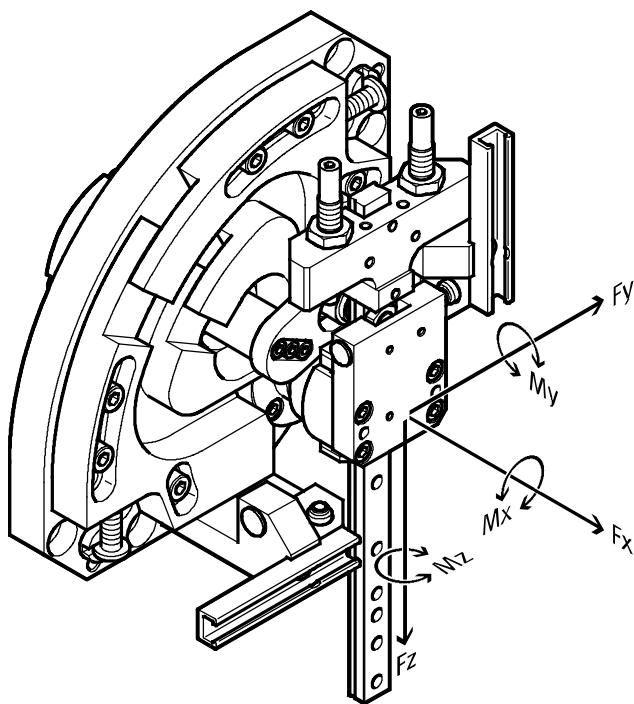
Handling modules HSW, pneumatic

Technical data

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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:

$$\frac{M_x}{M_{x_{perm.}}} + \frac{M_y}{M_{y_{perm.}}} + \frac{M_z}{M_{z_{perm.}}} \leq 1$$

Dynamic characteristic load values			
Size	10	12	16
Max. torques [Nm]	0.6	1.5	2.5
$M_{x_{perm.}}, M_{y_{perm.}}, M_{z_{perm.}}$			

Handling modules HSW, pneumatic

Technical data

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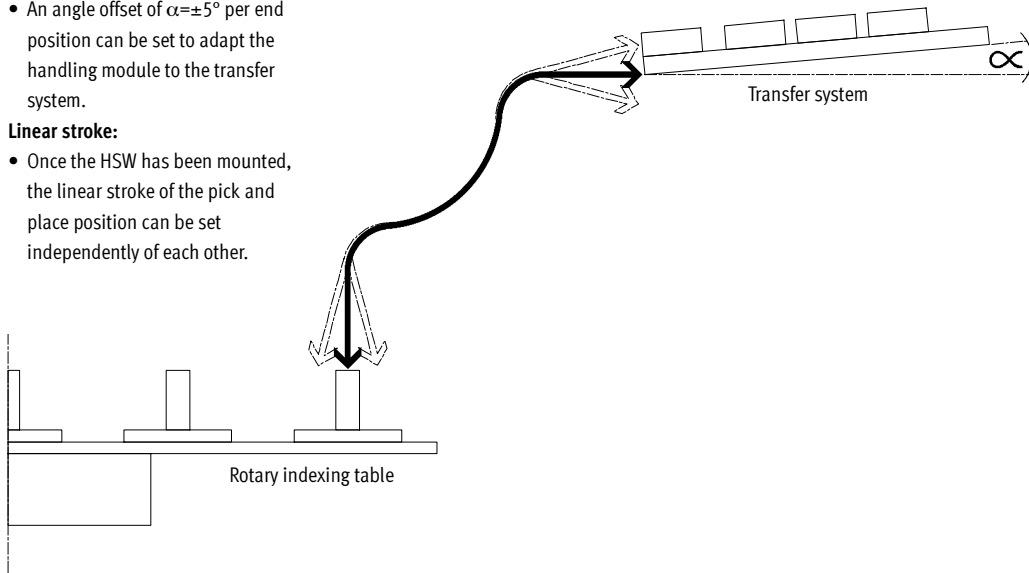
Stroke adjustment

Swivel angle:

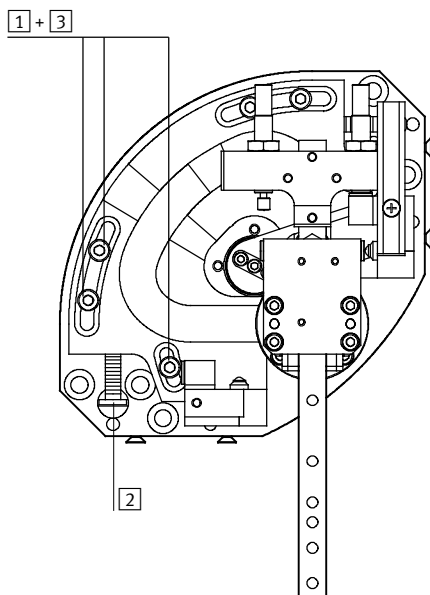
- An angle offset of $\alpha = \pm 5^\circ$ per end position can be set to adapt the handling module to the transfer system.

Linear stroke:

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



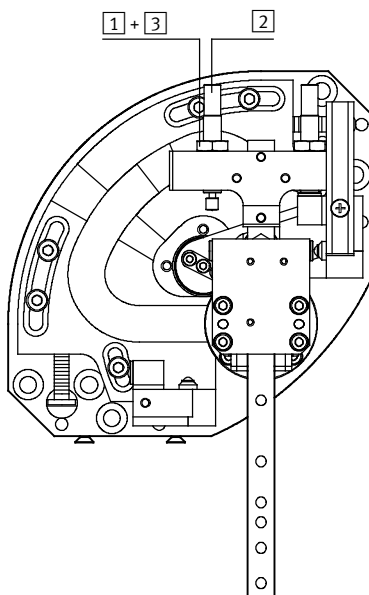
Swivel angle



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

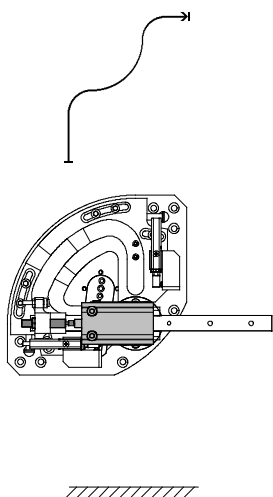
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Wait position module

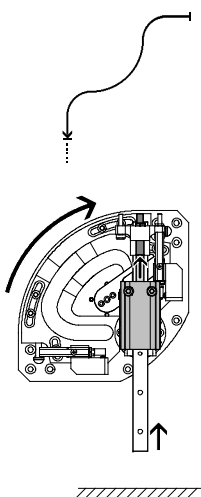
- Enables a movement to be paused before the end position, outside of the operating range (→ Step 2)
- The wait position module can be approached dynamically from the end position. This greatly reduces the cycle time
- Flexible adjustment within the adjustment range (working stroke) possible
- The wait position module may only be used with shock absorbers due to the high dynamic forces that occur
- The handling module HSW and actuating cylinder are actuated via a 5/2-way valve
- The valve for the wait position module should be activated with a time delay compared with the valve for the handling module

Cycle sequence

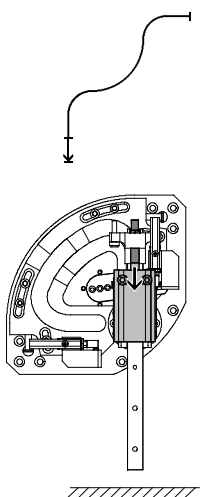
Step 1:
Handling module is in the horizontal end position.
Wait position module is retracted.



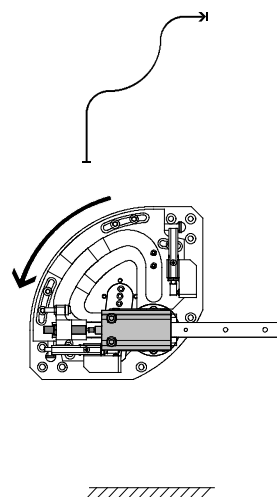
Step 2:
Handling module moves to the vertical end position.
Wait position module advances with time delay.
Handling module pauses outside the operating range.



Step 3:
Wait position module retracts.
Handling module moves into the operating range.



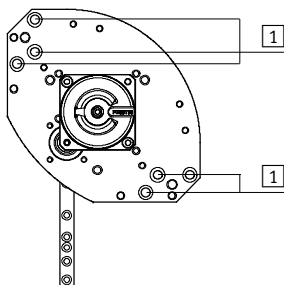
Step 4:
Handling module moves to the horizontal end position.



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

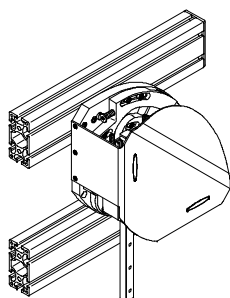
Mounting options

Directly via through-holes

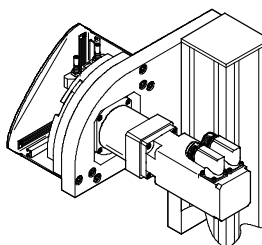


1 With or without centring rings

Via slot nuts on profile supports



User-specific



Note

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

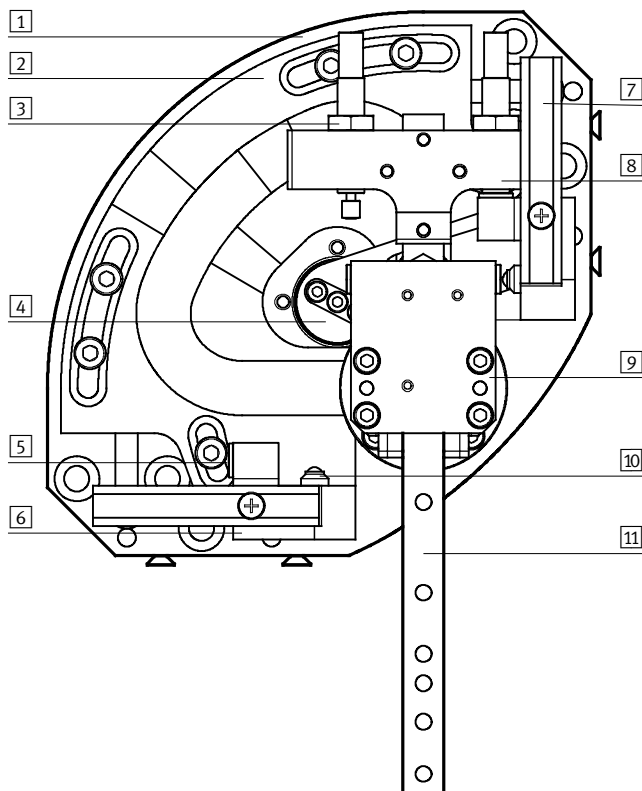
Handling modules HSW, pneumatic

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		

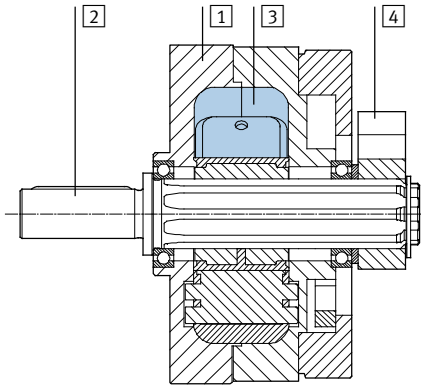
Handling modules HSW, pneumatic

Technical data

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Materials

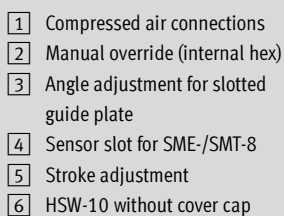
Sectional view of swivel module DSM



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
-	Note on materials	Free of copper, PTFE and silicone

Technical data

with swivel module DSM



Handling modules HSW, pneumatic

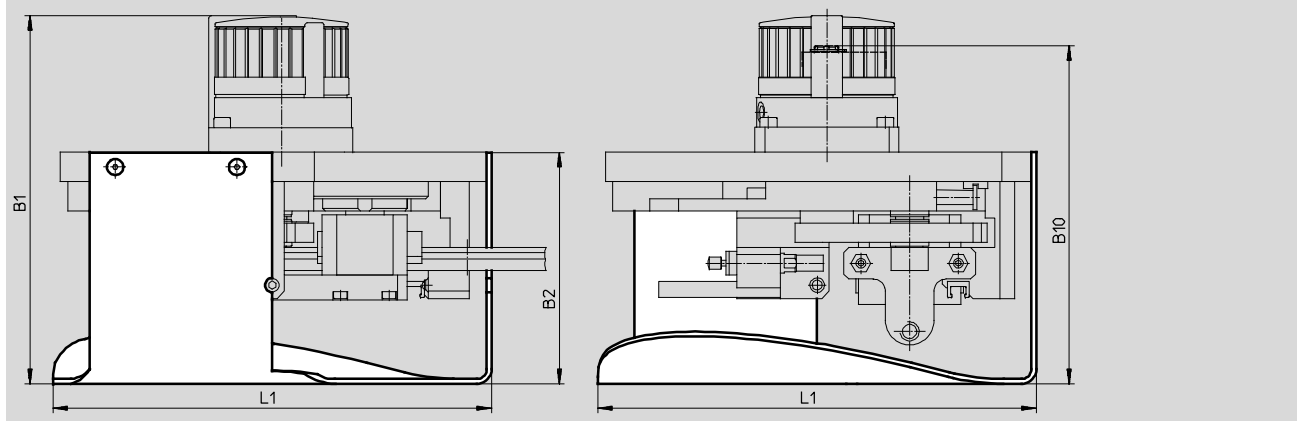
Technical data

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Dimensions

Download CAD data → www.festo.com

with swivel module DSM and protective cover



Size	B1	B2	B3	B4	B9	B10	D1 Ø	D2 Ø	D3 Ø	D7 Ø
	±2	±1	±0.5			±2	H7	Ø	Ø	Ø
10	–	85	45	5.5	47	126	9	5.5	10	3.5
12	157	100	48.5	9.5	59	144	9	5.5	10	4.5
16	179	110	57	12.5	70	163	9	5.5	10	4.5

Size	D8 Ø	EE	H1	H2	H3	H4 ¹⁾	H5	H8	H9	H10
			±0.3	±0.2	±0.5	±1				
10	6	M3	120	37	56	89.6	12	16	15	20
12	8	M5	175	50	84	142	12	20	40	–
16	7.5	M5	215	58.5	103.5	174	12	15	40	–

Size	H11	L1	L2	L3	L4	L6	L7	L8	L9	L10
		±2	±0.2	±0.2		±0.2		±2	±3	
10	4.5	123	56.5	49	31	20	9–0.02	62	–	–
12	–	180	80	12.5	37.5	20	15–0.02	60	117	136
16	–	219	100	12	50	20	15±0.05	71.5	140	158

Size	L13	R1 ¹⁾		R2 ¹⁾	T3	≲C1	≲C2	≲C3	≲C4
		±3	AW ±3						
10	113	113	116	55	3.3	4.5	2	3	3
12	123	162	177	82	6.5	6	2	3	4
16	143	200	206	100	5.3	8	2.5	4	4

1) Maximum stroke and 90° angle

Handling modules HSW, pneumatic

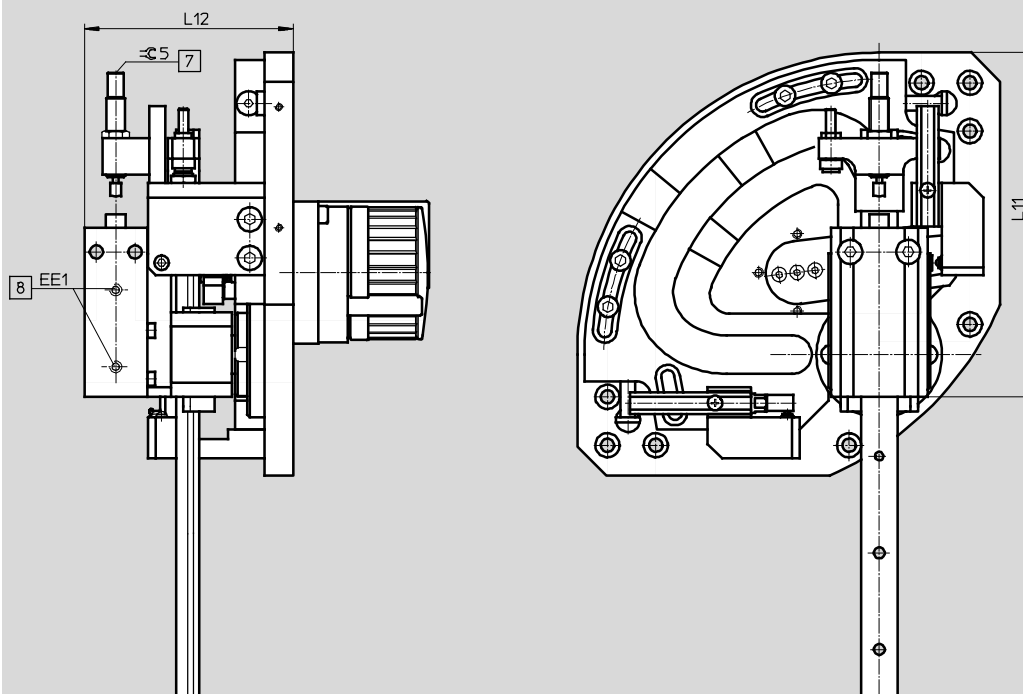
Technical data

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Dimensions

Download CAD data → www.festo.com

with wait position module



- 7 Shock absorber for wait position module
- 8 Compressed air connections for wait position module

Size	EE1	L11	L12	5
		max.	±2	
10	M5	115	75.5	2
12	M5	142.5	86.5	2.5
16	M5	190.5	98	13

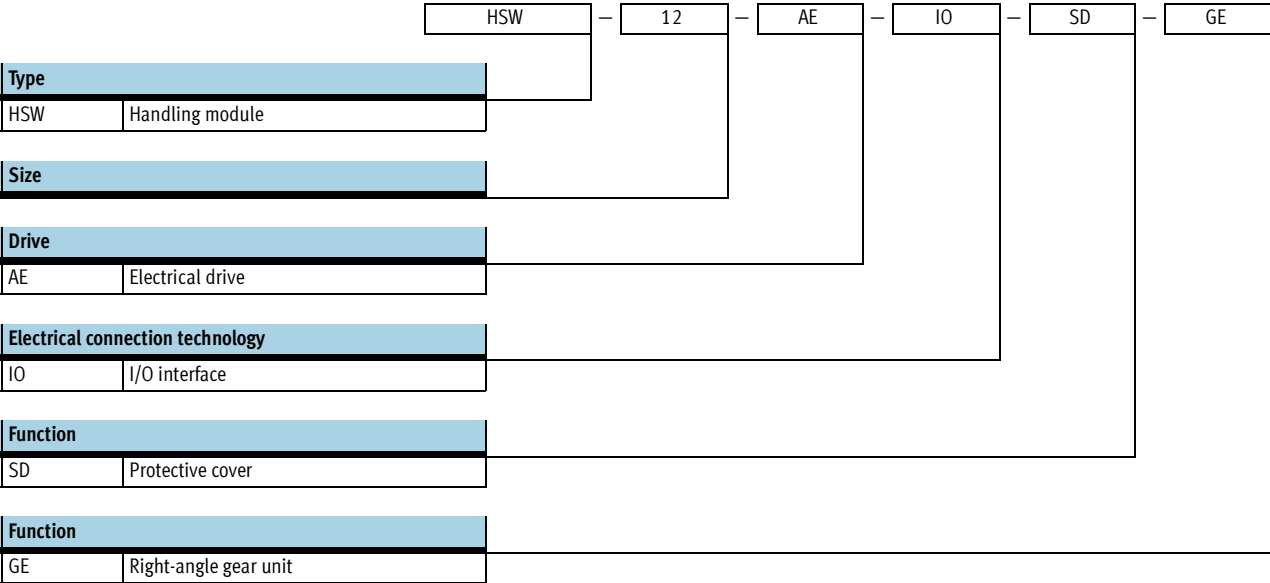
Ordering data for HSW-...-AP

Size	10	12	16
	Part No. Type	Part No. Type	Part No. Type
Without protective cover			
–	540222 HSW-10-AP	540228 HSW-12-AP	540234 HSW-16-AP
Wait position module	562559 HSW-10-AP-AW	562560 HSW-12-AP-AW	562561 HSW-16-AP-AW
With protective cover			
–	540223 HSW-10-AP-SD	540229 HSW-12-AP-SD	540235 HSW-16-AP-SD
Wait position module	562562 HSW-10-AP-SD-AW	562563 HSW-12-AP-SD-AW	562564 HSW-16-AP-SD-AW

Handling modules HSW, electrical



Type codes

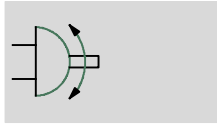


Handling modules HSW, electrical

Technical data

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Function



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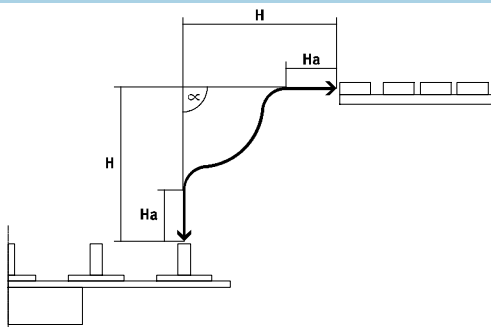


-  - Size
10, 12 and 16
-  - Swivel angle
80 ... 100
-  - Stroke range
90 ... 175

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)			
Effective force at 80 % of the nominal motor force	15	30	50
Along Y axes			
Permissible process force ¹⁾	30	35	50

1) Due to the pretension force on the guide

Handling modules HSW, electrical

Technical data

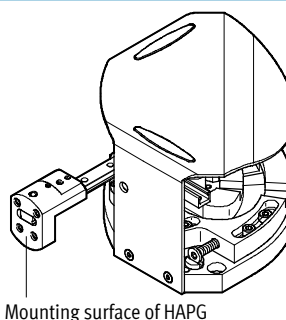
Weight [g]			
Size	10	12	16
HSW-...-AE	2,000	4,500	8,900
HSW-...-AE-SD	2,110	4,700	9,200
HSW-...-AE-GE	2,410	5,000	10,000
HSW-...-AE-SD-GE	2,520	5,200	10,300

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.

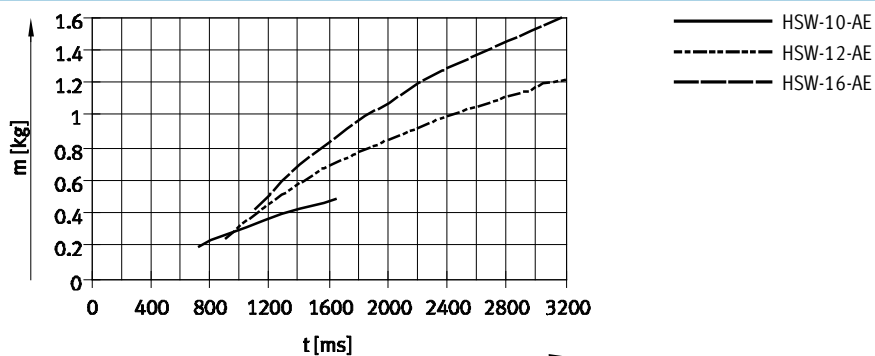


Size		10	12	16
Repetition accuracy	At end positions	± 0.02		
	Intermediate positions	< 2		

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)



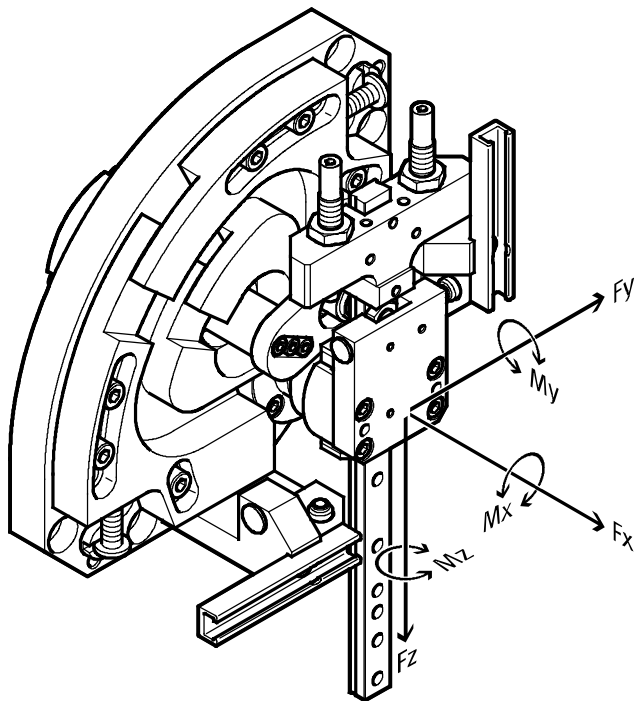
Handling modules HSW, electrical

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:

$$\frac{M_x}{M_{xperm.}} + \frac{M_y}{M_{yperm.}} + \frac{M_z}{M_{zperm.}} \leq 1$$

Dynamic characteristic load values			
Size	10	12	16
Max. torques [Nm]	0.6	1.5	2.5
$M_{xperm.}, M_{yperm.}, M_{zperm.}$			

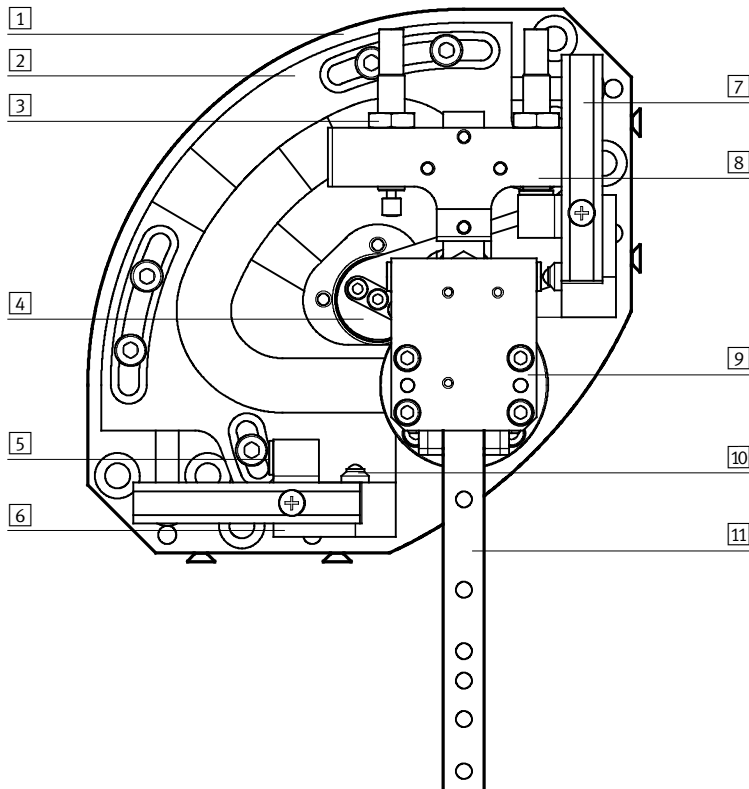
Handling modules HSW, electrical

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

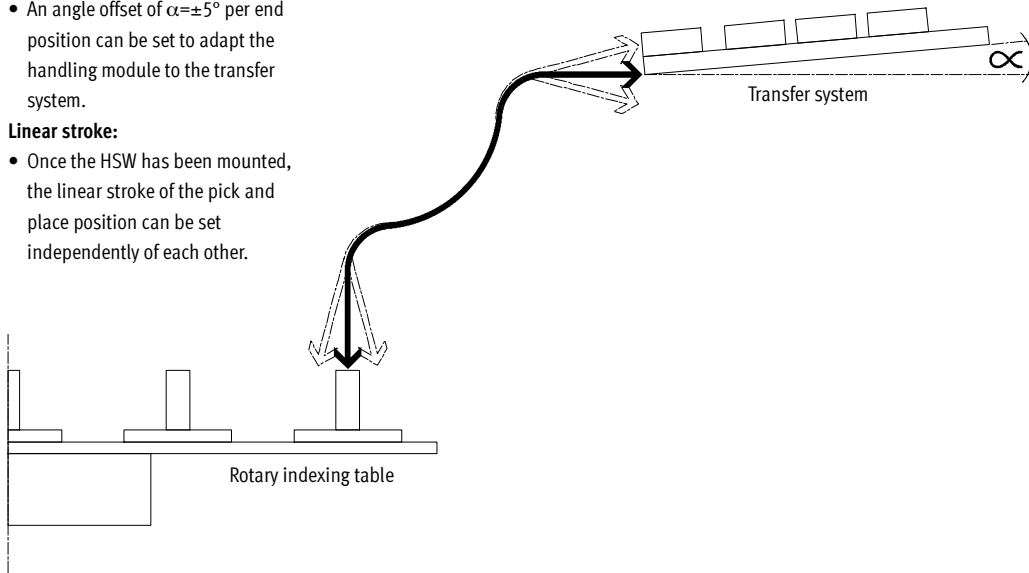
Stroke adjustment

Swivel angle:

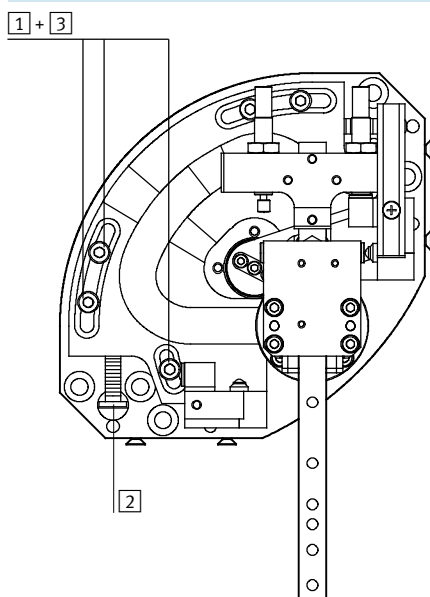
- An angle offset of $\alpha = \pm 5^\circ$ per end position can be set to adapt the handling module to the transfer system.

Linear stroke:

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



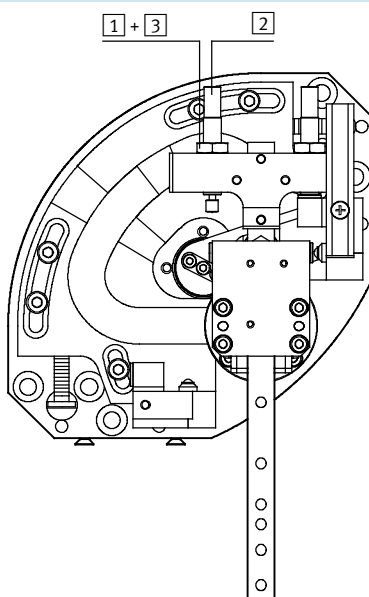
Swivel angle



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

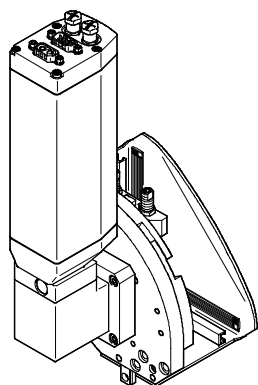
Handling modules HSW, electrical

Technical data

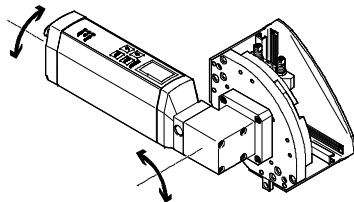
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Motor mounting variants

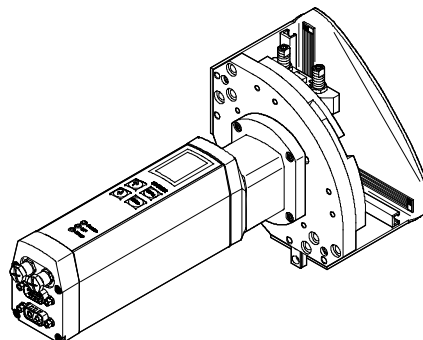
Motor pointing upwards/to side



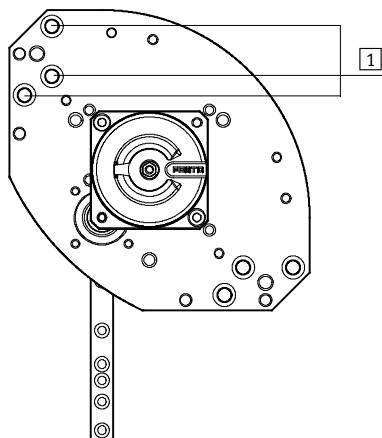
Control panel and access to the connections can be rotated according to space requirements.



Motor towards rear



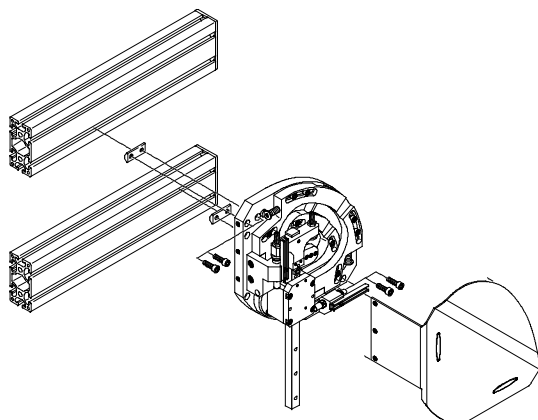
Mounting options



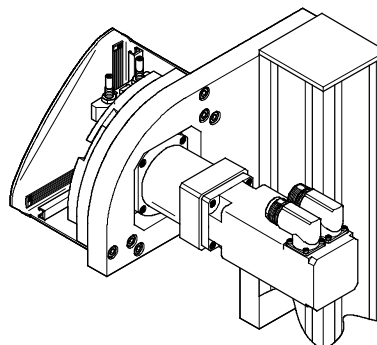
1 Directly via through-holes

Examples:

Via slot nuts on profile supports



User-specific



Handling modules HSW, electrical

Technical data

FESTO

Motor unit MTR-DCI-...-HM



General technical data				→ Internet: mtr-dci
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 unit ratio	13.73 (14:1), 2-stage			

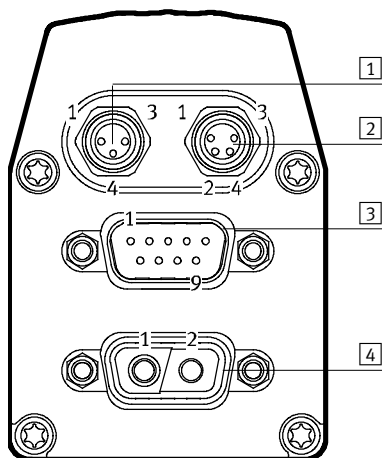
Electrical data				➔ Internet: mtr-dci
Type		MTR-DCI-32-...-HM	MTR-DCI-42-...-HM	MTR-DCI-52-...-HM
For handling module		HSW-10-...-AE	HSW-12-...-AE	HSW-16-...-AE
Nominal voltage	[V DC]	24 ±10%		
Nominal current (motor)	[A]	0.73	2	5.1
Peak current	[A]	2.1	3.8	7.7
Nominal power (motor)	[W]	17.5	48	122.4
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

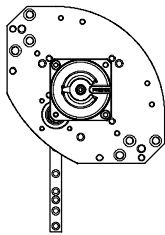
Simple solution for your application

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

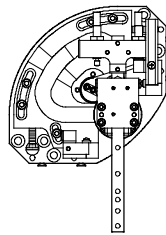
Step 1: Mount the handling module



- Wide choice of mounting options

→ 25

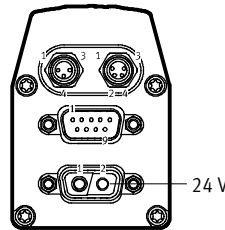
Step 2: Mechanically adjust the end positions



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

→ 24

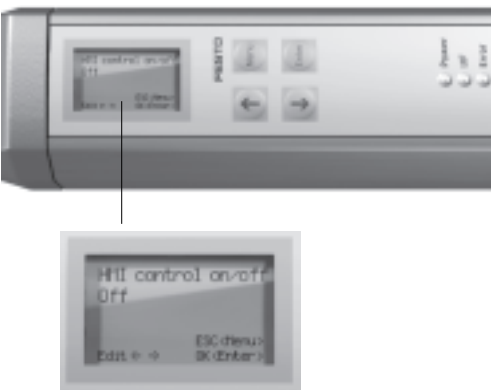
Step 3: Connect the 24 V voltage supply



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

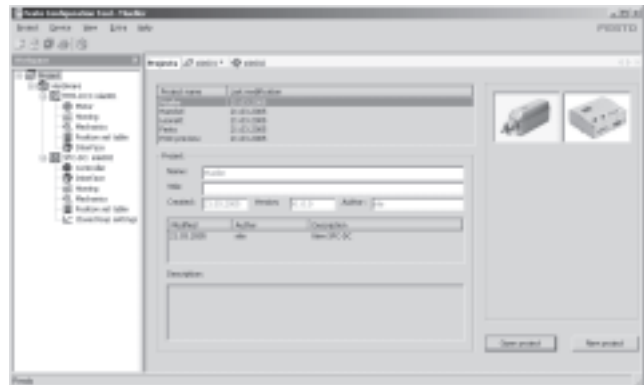
→ 26

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



- 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



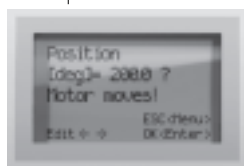
- All the drives in a system can be managed and archived in a common project
- Project and data management for all supported device types
- Simple to use thanks to graphically supported parameter entry
- Universal mode of operation for all drives
- Working offline at your desk or online at the machine

Handling modules HSW, electrical

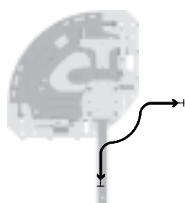
Technical data

FESTO

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

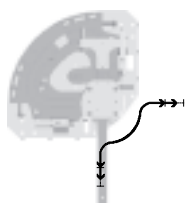


HSW mode 1



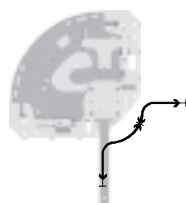
- Precise travel to the mechanical end position

HSW mode 2



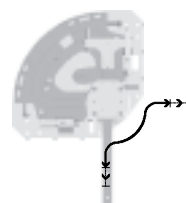
- Additional adjustable wait position module directly above workpiece/ workpiece carrier
- Handling of parts with different heights
- Insertion procedures at different speeds

HSW mode 3



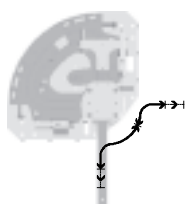
- Additional ejector station for reject parts or quality inspection
- Precise travel to end position via setup position

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

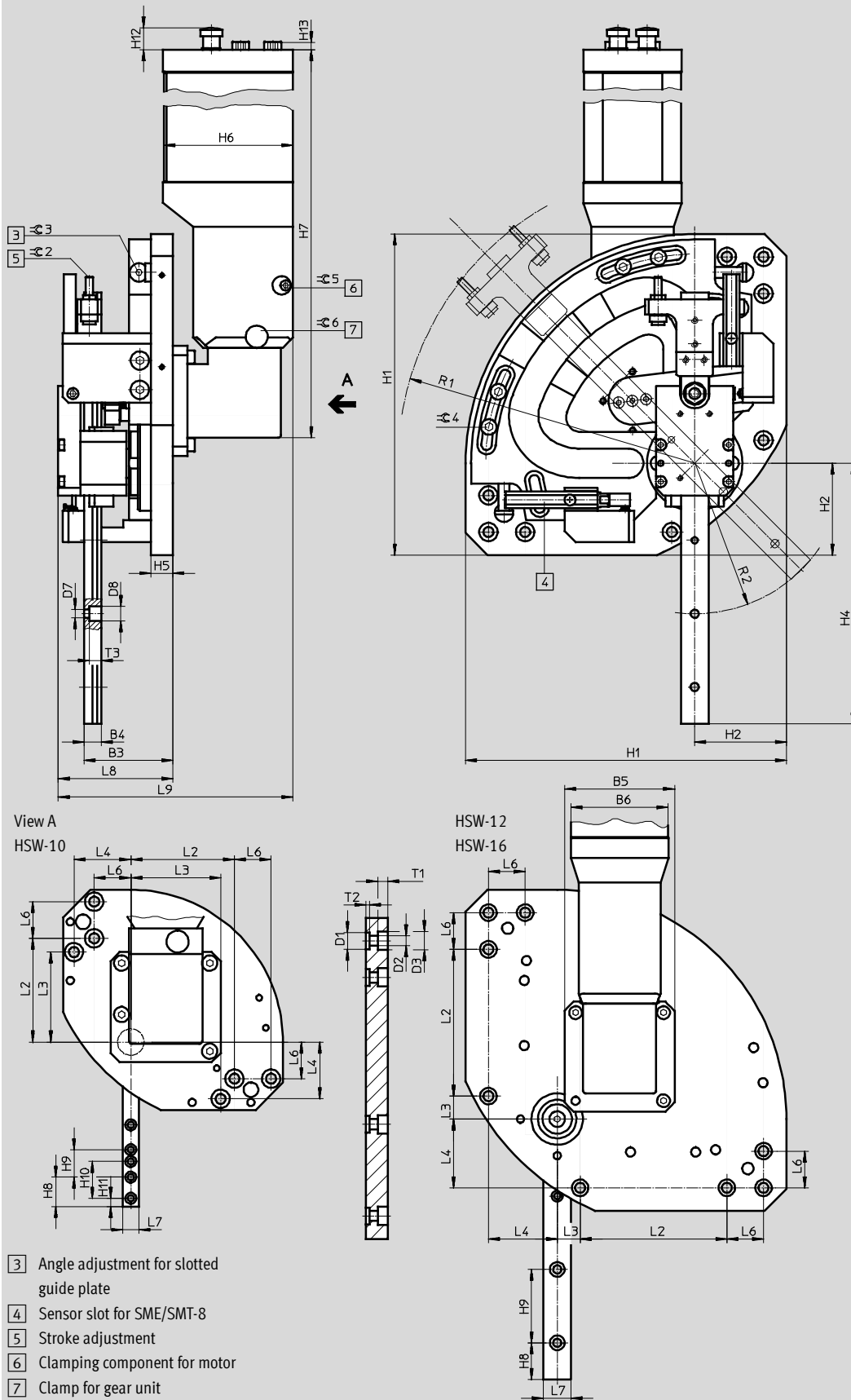
Technical data

FESTO

Dimensions

Download CAD data → www.festo.com

with motor unit pointing upwards



Handling modules HSW, electrical

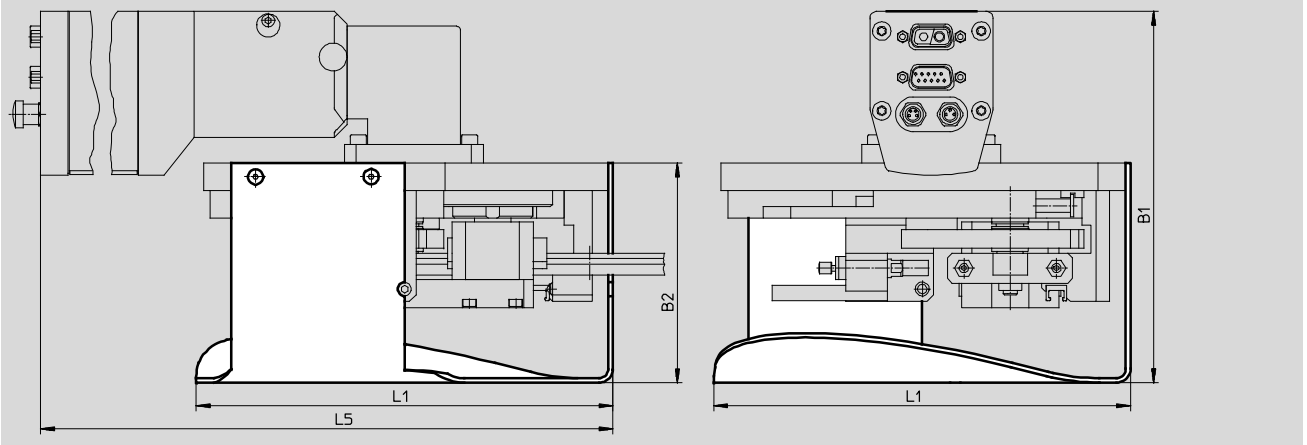
Technical data

FESTO

Dimensions

Download CAD data → www.festo.com

with motor unit pointing upwards and protective cover



Size	B1 ±3	B2 ±1	B3 ±0.5	B4	B5	B6	D1 Ø H7	D2 Ø	D3 Ø	D7 Ø	D8 Ø
10	153	85	45	5.5	60	46	9	5.5	10	3.5	6
12	165.5	100	48.5	9.5	60	53.3	9	5.5	10	4.5	8
16	198	110	57	12.5	100	69.5	9	5.5	10	4.5	7.5

Size	H1 ±0.3	H2 ±0.2	H4 ¹⁾ ±1	H5	H6 ±0.4	H7 ±3	H8	H9	H10	H11	H12
10	120	37	89.6	12	66	239	16	15	20	4.5	12
12	175	50	142	12	70.8	291	20	40	–	–	12
16	215	58.5	174	12	94.8	344.5	15	40	–	–	12

Size	H13	L1 ±2	L2 ±0.2	L3 ±0.2	L4 ±0.2	L5 ±3	L6 ±0.05	L7	L8 ±2	L9 ±3
10	5	123	56.5	49	31	276	20	9 _{-0.02}	62	121
12	5	180	80	12.5	37.5	357	20	15 _{-0.02}	60	128
16	5	219	100	12	50	420	20	15 _{±0.05}	71.5	156

Size	R1 ¹⁾ ±3	R2 ¹⁾ ±3	T1	T2 +0.1	T3	≈C2	≈C3	≈C4	≈C5	≈C6
10	113	55	5.5	2	3.3	2	3	3	2.5	2.5
12	162	82	5.5	2	6.5	2	3	4	2.5	2.5
16	200	100	5.5	2	5.3	2.5	4	4	5	3

1) Maximum stroke and 90° angle

Handling modules HSW, electrical

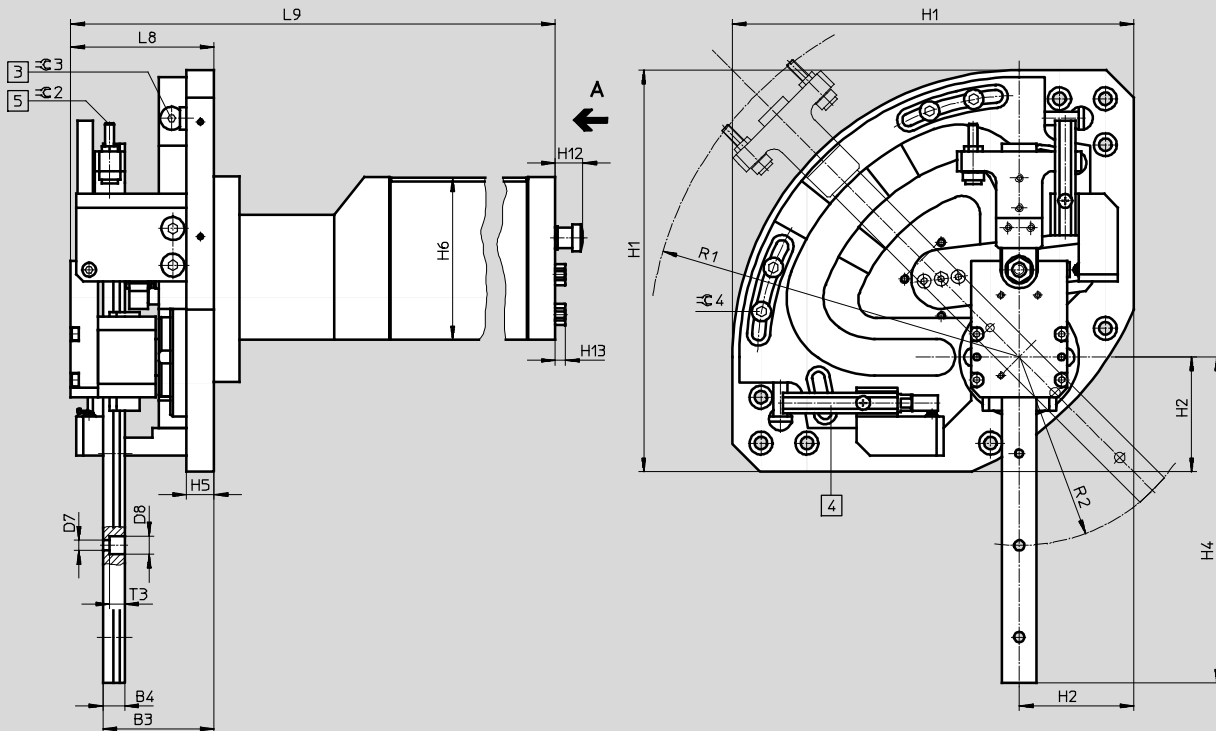
Technical data

FESTO

Dimensions

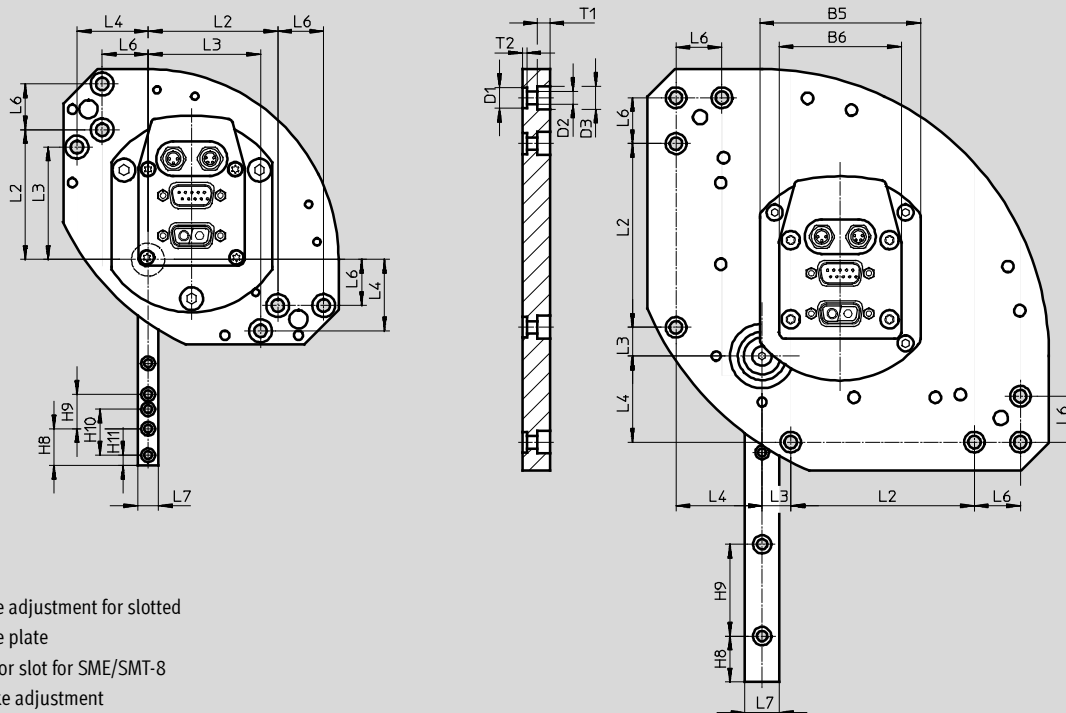
Download CAD data → www.festo.com

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

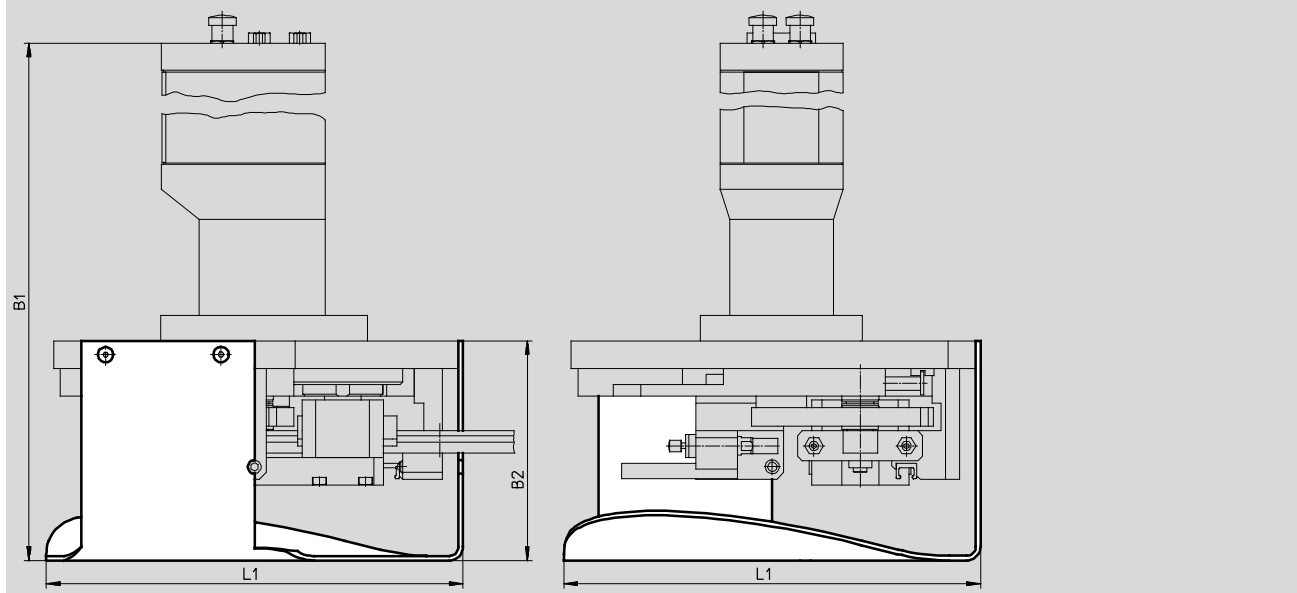
Technical data

FESTO

Dimensions

Download CAD data → www.festo.com

with motor unit towards the rear and protective cover



Size	B1 ±3	B2 ±1	B3 ±0.5	B4	B5	B6	D1 Ø H7	D2 Ø	D3 Ø	D7 Ø
10	268	85	45	5.5	70	46	9	5.5	10	3.5
12	328	100	48.5	9.5	70	53.3	9	5.5	10	4.5
16	368	110	57	12.5	70	69.5	9	5.5	10	4.5

Size	D8 Ø	H1 ±0.3	H2 ±0.2	H4 ¹⁾ ±1	H5	H6 ±0.4	H8	H9	H10	H11	H12	H13
10	6	120	37	89.6	12	66	16	15	20	4.5	12	5
12	8	175	50	142	12	70.8	20	40	–	–	12	5
16	7.5	215	58.5	174	12	94.8	15	40	–	–	12	5

Size	L1 ±2	L2 ±0.2	L3 ±0.2	L4 ±0.2	L6 ±0.05	L7	L8 ±2	L9 ±3
10	123	56.5	49	31	20	9 _{-0.02}	62	245
12	180	80	12.5	37.5	20	15 _{-0.02}	60	290
16	219	100	12	50	20	15 _{±0.05}	71.5	328.5

Size	R1 ¹⁾ ±3	R2 ¹⁾ ±3	T1	T2 ±0.1	T3	≈C2	≈C3	≈C4
10	113	55	5.5	2	3.3	2	3	3
12	162	82	5.5	2	6.5	2	3	4
16	200	100	5.5	2	5.3	2.5	4	4

1) Maximum stroke and 90° angle

Handling modules HSW, electrical

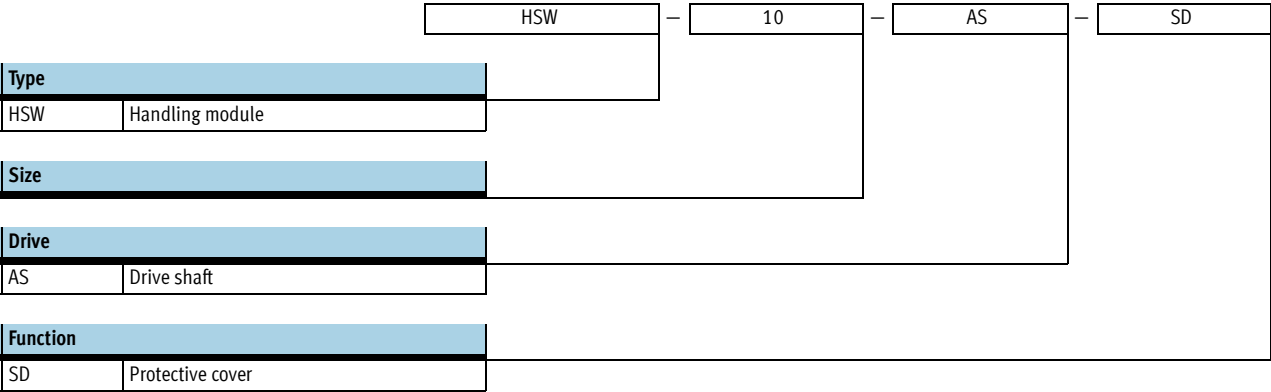
Technical data

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	540250	HSW-10-AE-IO	540266	HSW-12-AE-IO	540282	HSW-16-AE-IO
with protective cover	540252	HSW-10-AE-IO-SD	540268	HSW-12-AE-IO-SD	540284	HSW-16-AE-IO-SD
with right-angle gear unit						
without protective cover	540251	HSW-10-AE-IO-GE	540267	HSW-12-AE-IO-GE	540283	HSW-16-AE-IO-GE
with protective cover	540253	HSW-10-AE-IO-SD-GE	540269	HSW-12-AE-IO-SD-GE	540285	HSW-16-AE-IO-SD-GE

Handling modules HSW, without drive

Type codes

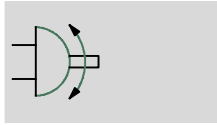


Handling modules HSW, without drive

FESTO

Technical data

Function



 www.festo.com

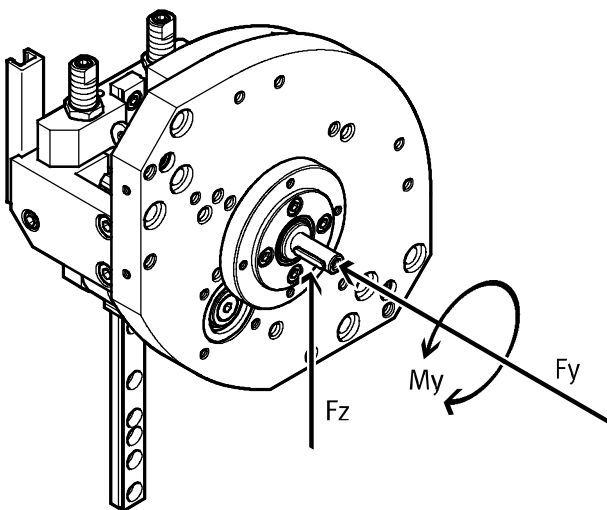


-  Size
10, 12 and 16
-  Swivel angle
80 ... 100
-  Stroke range
90 ... 175

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 → 11.

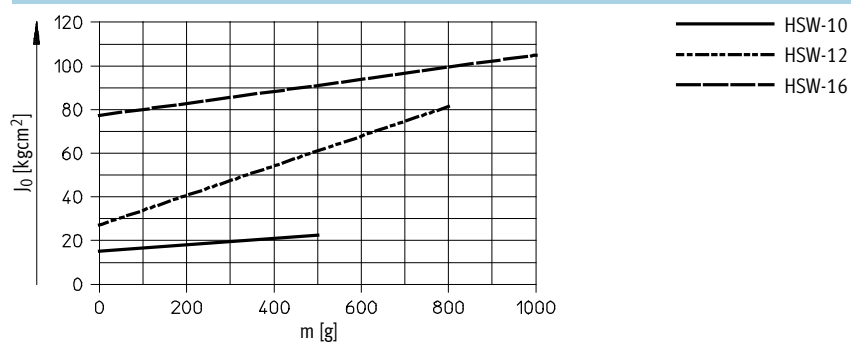
Characteristic load values			
Size	10	12	16
Max. axial force $F_{yperm.}$ [Nm]	10	18	30
Max. radial force $F_{zperm.}$ [Nm]	30	45	75
Max. drive torque $M_{yperm.}$ [Nm]	0.85	1.25	2.5

Handling modules HSW, without drive

Technical data

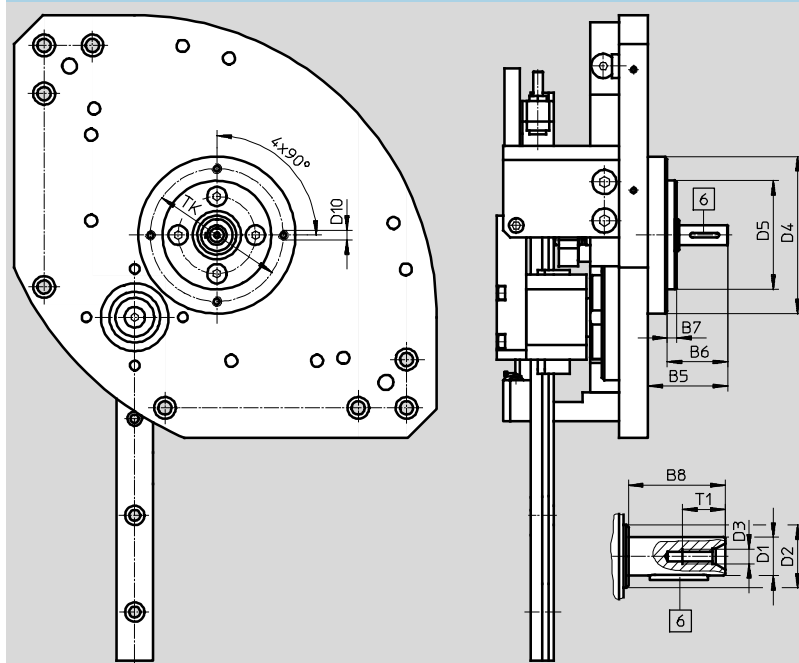
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Mass moment of inertia J_0 as a function of effective load m (for sizing drive)



Dimensions

Download CAD data → www.festo.com



Basic dimensions

→ 16

6 Woodruff key

Size	B5	B6	B7	B8	D1 Ø g7	D2 Ø	D3	D4 Ø	D5 Ø 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 Part No.	Type	12 Part No.	Type	16 Part No.	Type
without protective cover	540226	HSW-10-AS	540232	HSW-12-AS	540238	HSW-16-AS
with protective cover	540227	HSW-10-AS-SD	540233	HSW-12-AS-SD	540239	HSW-16-AS-SD

Handling modules HSW

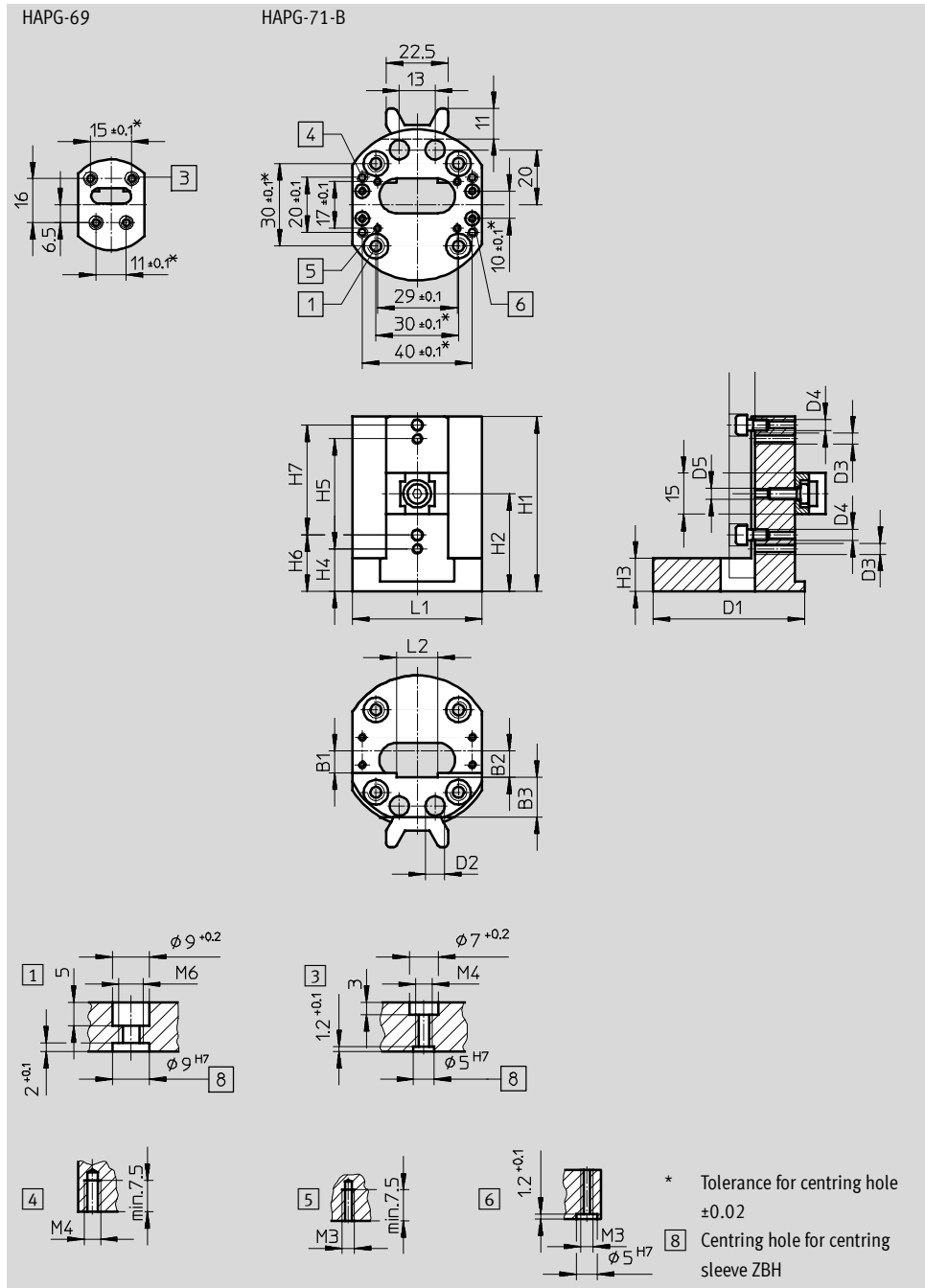
Accessories

FESTO

Adapter kit HAPG/HAPG-B

Material:

Wrought aluminium alloy, anodised



Dimensions and ordering data										
For size	B1	B2 ± 0.2	B3	D1 $\varnothing$	D2 $\varnothing$	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	540249	HAPG-69
12, 16	12	15.5	40	20.5	40	47	15	110	540882	HAPG-71-B

Handling modules HSW

Accessories

FESTO

Installation kit MKRP

Material:

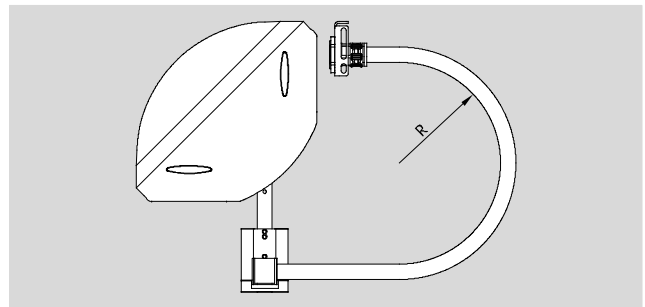
Conduit/fitting: Polyamide

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	540247	MKRP-5
12, 16	75	16.5	150	540248	MKRP-6

1) The conduit must not be filled beyond 70%

Cover kit BSD-HSW

Material:

Wrought aluminium alloy, anodised



Dimensions → 17

Ordering data			
For size	Weight [g]	Part No.	Type
10	100	540240	BSD-HSW-10
12	200	540241	BSD-HSW-12
16	300	540242	BSD-HSW-16

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

Material:

Wrought aluminium alloy, anodised



Dimensions → 17

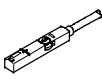
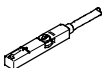
Ordering data			
For size	Weight [g]	Part No.	Type
10	110	562589	BAW-HSW-10
12	220	562590	BAW-HSW-12
16	400	562591	BAW-HSW-16

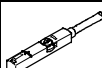
Handling modules HSW

Accessories

FESTO

Ordering data – Shock absorber			Technical data → Internet: dysw; ysrw	
	For size	Weight [g]	Part No.	Type
	10	6	548070	DYSW-4-6-Y1F
	12	11	548071	DYSW-5-8-Y1F
	16	18	191193	YSRW-7-10

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	543867	SMT-8M-PS-24V-K-2,5-OE
			Plug M8x1, 3-pin	0.3	543866	SMT-8M-PS-24V-K-0,3-M8D
			Plug M12x1, 3-pin	0.3	543869	SMT-8M-PS-24V-K-0,3-M12
	Insertable in the slot lengthwise, flush with the cylinder profile	NPN	Cable, 3-wire	2.5	543870	SMT-8M-NS-24V-K-2,5-OE
			Plug M8x1, 3-pin	0.3	543871	SMT-8M-NS-24V-K-0,3-M8D
			Cable, 3-wire	2.5	175436	SMT-8-PS-K-LED-24-B
			Plug M8x1, 3-pin	0.3	175484	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	543873	SMT-8M-PO-24V-K7,5-OE

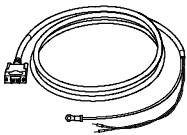
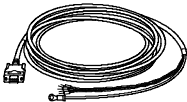
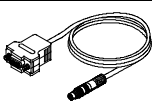
Ordering data – Proximity sensors for T-slot, magnetic reed					Technical data → Internet: sme	
	Type of mounting	Switch output	Electrical connection	Cable length [m]	Part No.	Type
N/O contact						
	Insertable in the slot from above, flush with cylinder profile	Contacting	Cable, 3-wire	2.5	543862	SME-8M-DS-24V-K-2,5-OE
				5.0	543863	SME-8M-DS-24V-K-5,0-OE
			Cable, 3-wire	2.5	543872	SME-8M-ZS-24V-K-2,5-OE
			Plug M8x1, 3-pin	0.3	543861	SME-8M-DS-24V-K-0,3-M8D
	Insertable in the slot lengthwise, flush with the cylinder profile	Contacting	Cable, 3-wire	2.5	150855	SME-8-K-LED-24
			Plug M8x1, 3-pin	0.3	150857	SME-8-S-LED-24
N/C contact						
	Insertable in the slot lengthwise, flush with the cylinder profile	Contacting	Cable, 3-wire	7.5	160251	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	541333	NEBU-M8G3-K-2.5-LE3
			5	541334	NEBU-M8G3-K-5-LE3
	Straight socket, M12x1, 5-pin	Cable, open end, 3-wire	2.5	541363	NEBU-M12G5-K-2.5-LE3
			5	541364	NEBU-M12G5-K-5-LE3
	Angled socket, M8x1, 3-pin	Cable, open end, 3-wire	2.5	541338	NEBU-M8W3-K-2.5-LE3
			5	541341	NEBU-M8W3-K-5-LE3
	Angled socket, M12x1, 5-pin	Cable, open end, 3-wire	2.5	541367	NEBU-M12W5-K-2.5-LE3
			5	541370	NEBU-M12W5-K-5-LE3

Handling modules HSW

Accessories

FESTO

Ordering data – Cables for HSW-AE				
	Brief description	Cable length	Part No.	Type
	Supply cable	2.5 m	537931	KPWR-MC-1-SUB-9HC-2,5
		5 m	537932	KPWR-MC-1-SUB-9HC-5
		10 m	537933	KPWR-MC-1-SUB-9HC-10
	Control cable for I/O connection to any PLC controller	2.5 m	537923	KES-MC-1-SUB-9-2,5
		5 m	537924	KES-MC-1-SUB-9-5
		10 m	537925	KES-MC-1-SUB-9-10
	Programming cable	2.5 m	537926	KDI-MC-M8-SUB-9-2,5

Ordering data – Software for HSW-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.	541951	P.BP-HSP_HSW-AE

Ordering data – Documentation for HSW-AE				
	Brief description	Language	Part No.	Type
	Description User's manual in paper form is not included in the scope of delivery.	DE	553133	P.BE-HSW-AE-IO-DE
		EN	553134	P.BE-HSW-AE-IO-EN
		ES	553135	P.BE-HSW-AE-IO-ES
		FR	553136	P.BE-HSW-AE-IO-FR
		IT	553137	P.BE-HSW-AE-IO-IT
		SV	553138	P.BE-HSW-AE-IO-SV