Handling modules HSW

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- Minimal cycle times
- Compact design
- Simple planning, installation and commissioning

design award winner 2005

reddot design award winner 2005

Handling modules HSW

Key features at a glance

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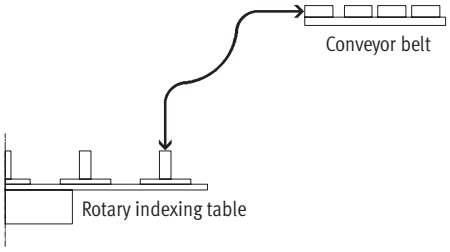
Field of application

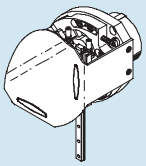
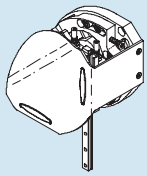
The handling module is a new generation of function modules for the automatic transfer, feed and removal of small parts in extremely confined spaces.
This is achieved by means of a guided swivel and linear motion sequence. A backlash-free guide with recirculating ball bearing elements ensures high precision 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 angle of 90°.

Special features

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



Two drive variants are available

	Pneumatic: HSW-...-AP, with swivel module DSM	Without drive: HSW-...-AS, with drive shaft
		
Advantages		
	• Fast • Cost-effective • Ready to install • No system planning required • Simple commissioning	• Compact • Universal compatibility • 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	Depends on drive
Effective load [g]	0 ... 1,600	
Repetition accuracy at end positions [mm]	±0.02	
Wait positions	Max. 2	Depends on drive
Function of wait position	Pushing with actuating cylinder	Depends on drive
Repetition accuracy at wait positions [mm]	< 1	Depends on drive
Technical data	➔ 1 / 7.2-9	➔ 1 / 7.2-20

Handling modules HSW

Typical applications

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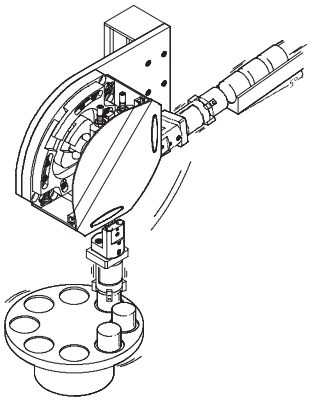
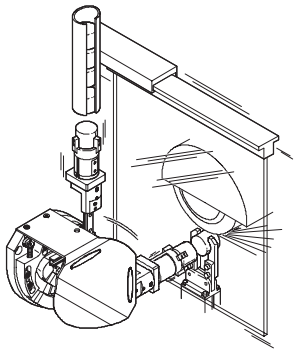
HSW-...-AP, pneumatic

Rotary indexing table



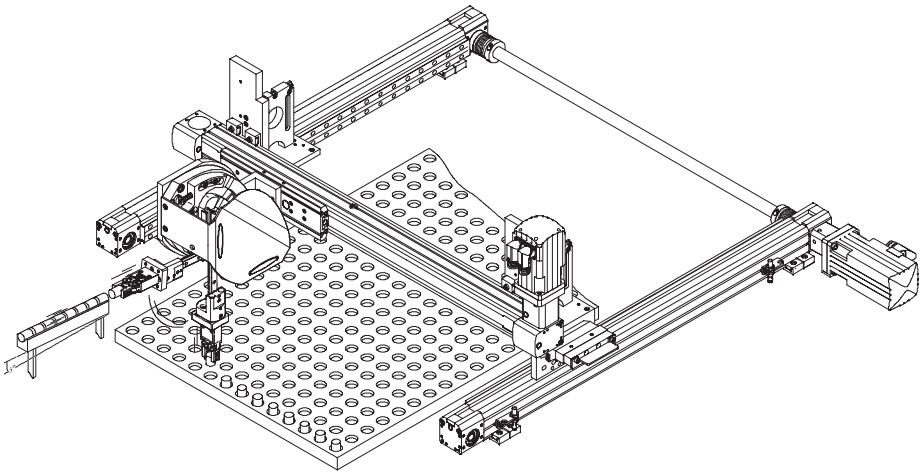
- Fast feed and removal, e.g. for linear transfer or rotary indexing table

Machine equipment



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

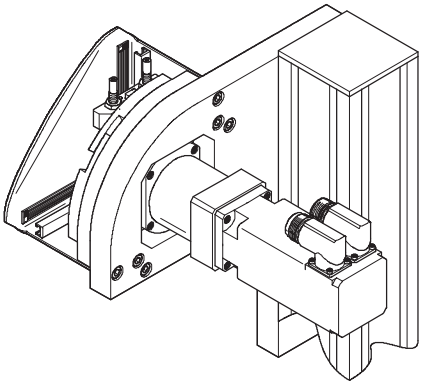
Planar surface gantry



- 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

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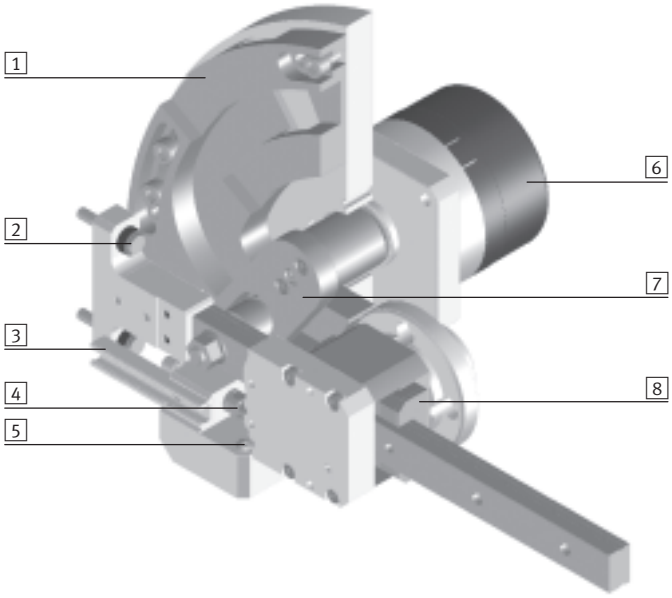
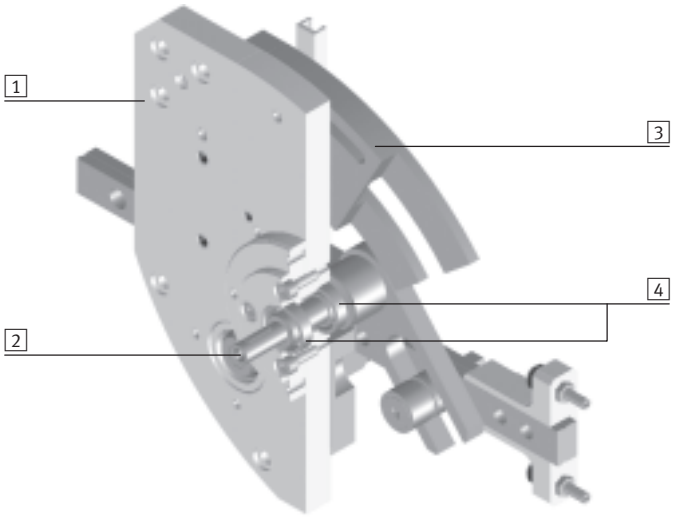
Design of HSW-...-AP – pneumatic with swivel module DSM



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 – without drive (rear side)

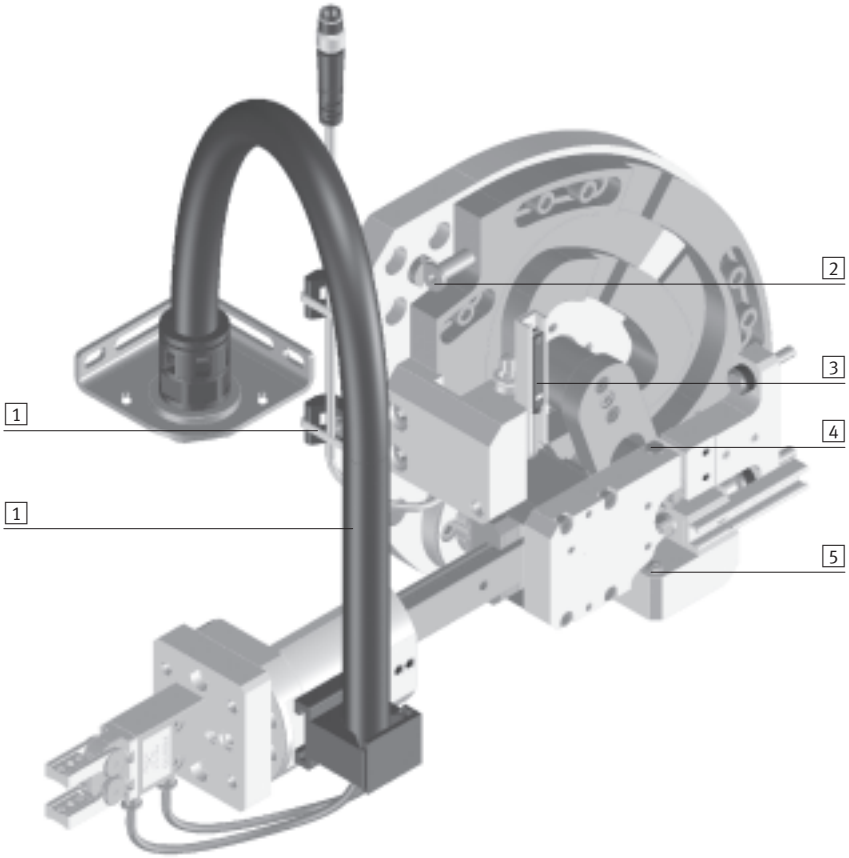


1 Base plate
2 Shaft with Woodruff key
3 Slotted guide plate
4 Ball bearings

Handling modules HSW

Key features at a glance

The technology in detail



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

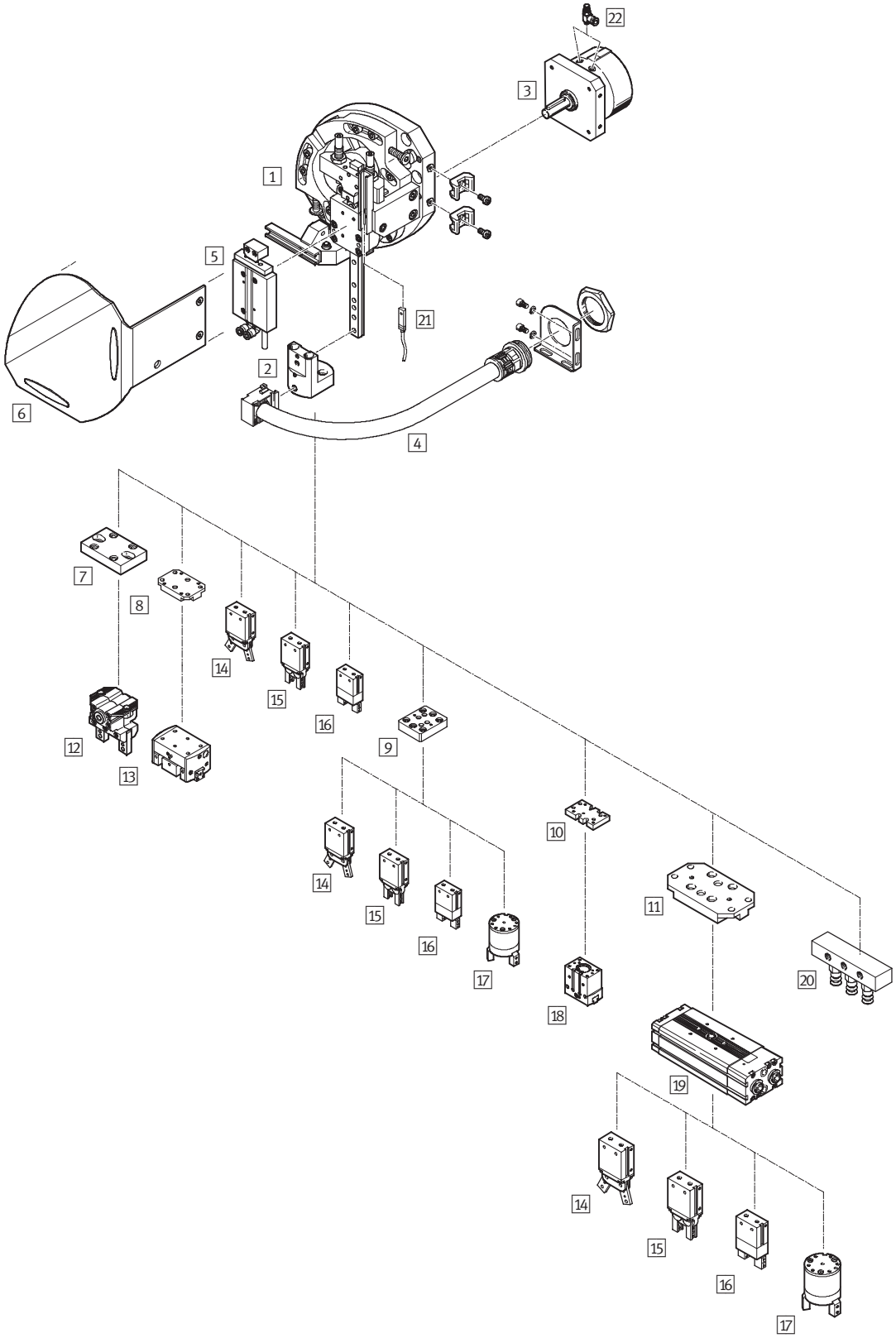
3 The sensor rail facilitates accessible and easy adjustment of the proximity sensors.

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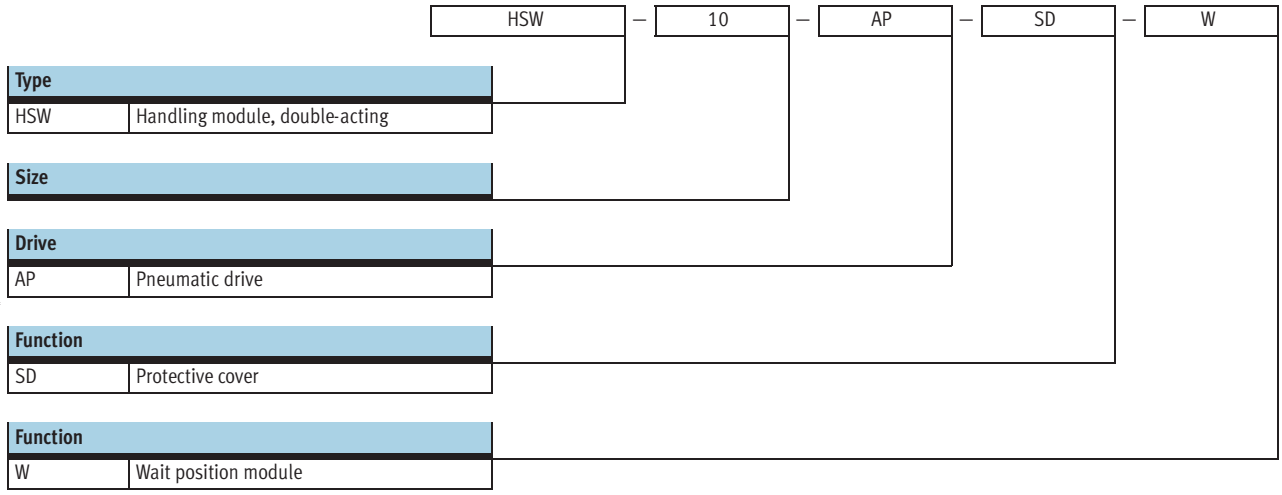
Accessories						
		Brief description	10	12	16	➔ Page
1	Handling module HSW	Standard module without accessories	■	■	■	1 / 7.2-9
2	Adapter kit HAPG-...-B	Interface for grippers, semi-rotary drive, etc.	■	■	■	1 / 7.2-22
3	Swivel module DSM	Pneumatic drive, adapted to every size	■	■	■	1 / 4.1-2
4	Installation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

Handling modules HSW, pneumatic

Type codes



Handling modules HSW, pneumatic

Technical data

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Function

www.festo.com/en/
Spare_parts_service

Size
10, 12 and 16

Swivel angle
80 ... 100

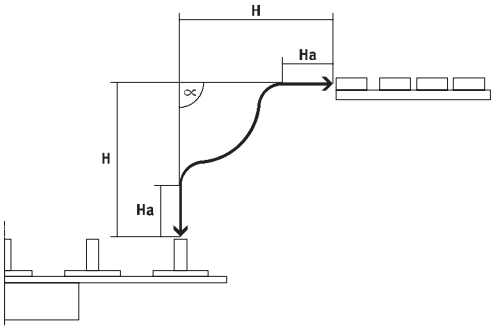
Stroke range
90 ... 175

General technical data	
Type	HSW-...-AP
Pneumatic connection	M5
Mode of operation	Double-acting
Operating medium	Filtered compressed air, lubricated or unlubricated
Design	Swivel module
	Linear guide plus ball bearing
	Guided motion sequence
Cushioning	Shock absorber at both ends, soft characteristic curve
Position sensing	For proximity sensing
Type of mounting	Via through-holes
	Via centring sleeves
Assembly position	Any

Operating and environmental conditions		
Type		HSW-...-AP
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
Y- and Z-axes (depending on lever position)			
Effective force at 6 bar	30	35	55
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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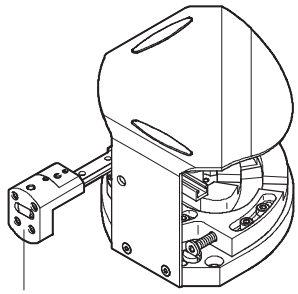
Weights [g]			
Size	10	12	16
HSW-...-AP	1,300	3,000	5,400
HSW-...-AP-SD	1,400	3,200	5,700
HSW-...-AP-W	1,350	3,140	5,550
HSW-...-AP-SD-W	1,450	3,340	5,850

Repetition accuracy [mm]

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



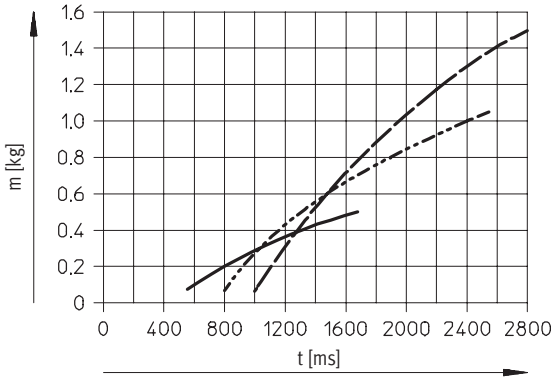
Mounting surface of HAPG

Size	10	12	16
Repetition accuracy at end positions	±0.02		

Travel times t as a function of working 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 working 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:
Working 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

Handling modules HSW, pneumatic

Technical data

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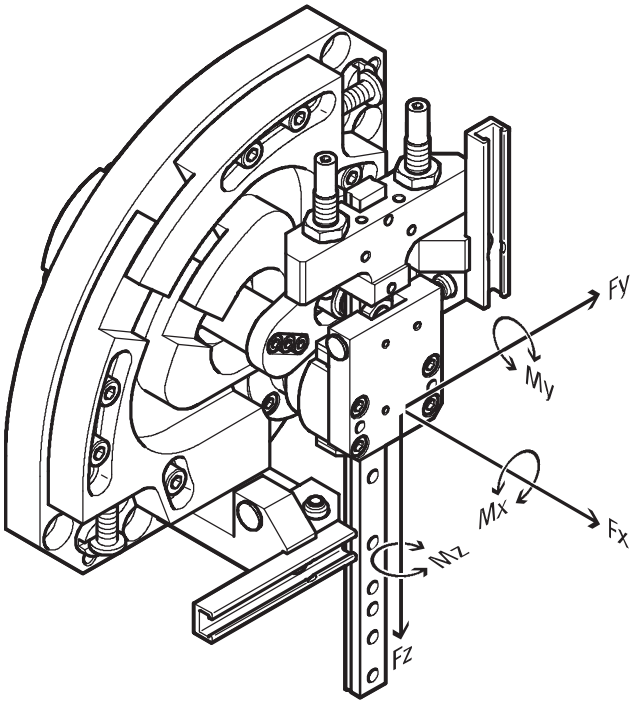
Permissible static/dynamic characteristic load values

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:

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

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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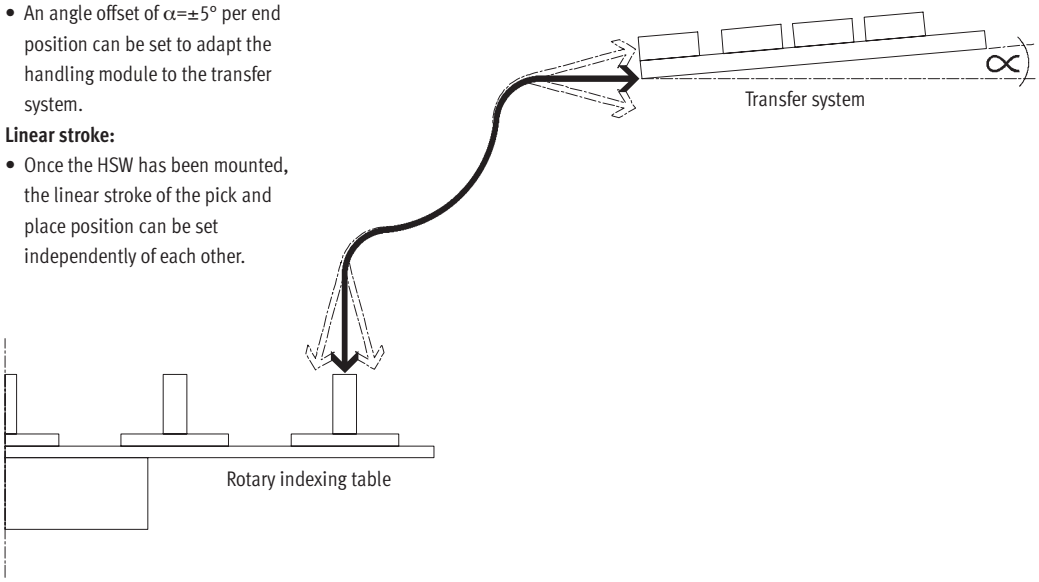
Stroke adjustment

Swivel angle:

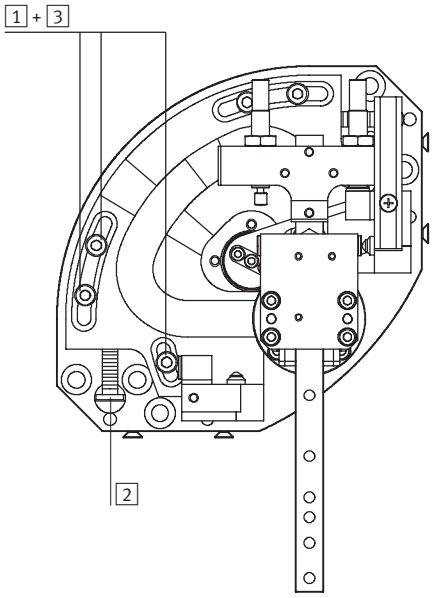
- An angle offset of α=±5° per end position can be set to adapt the handling module to the transfer system.

Linear stroke:

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



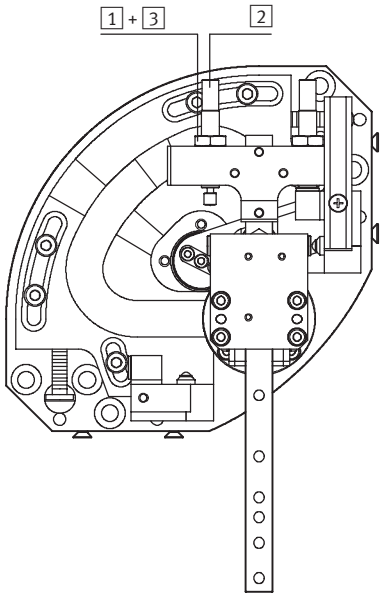
Swivel angle



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 shock absorber/ adjusting screw
3 Tighten the lock nut

Handling modules HSW, pneumatic

Technical data

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Wait position module

Application and mode of operation

Figure 1:

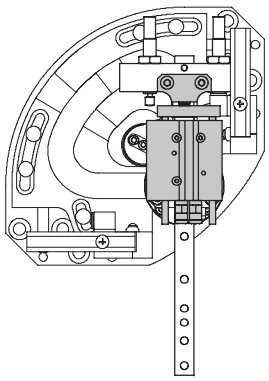


Figure 2:

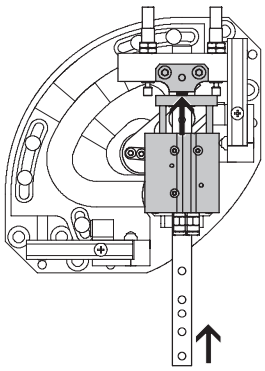
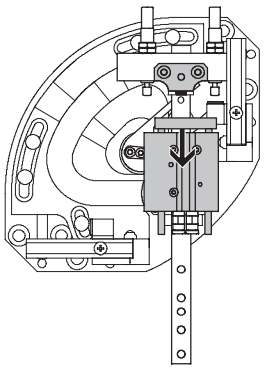
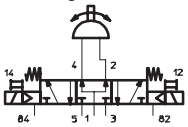


Figure 3:

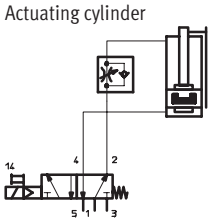


Circuit diagram for HSW with wait position module

Handling module HSW



Actuating cylinder



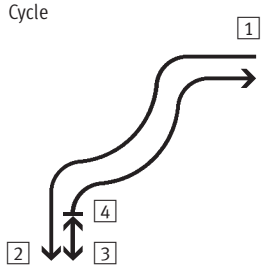
1 The handling module HSW is in the horizontal end position. The actuating cylinder is retracted in its initial position.

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



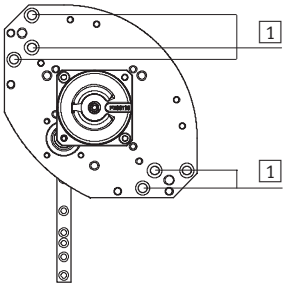
- Note

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

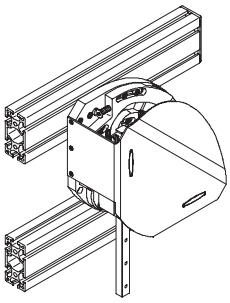
Mounting options

Direct mounting via through-holes

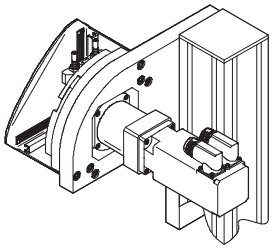


1 With or without centring rings

Fitted using slot nuts on the profile



User-specific



- 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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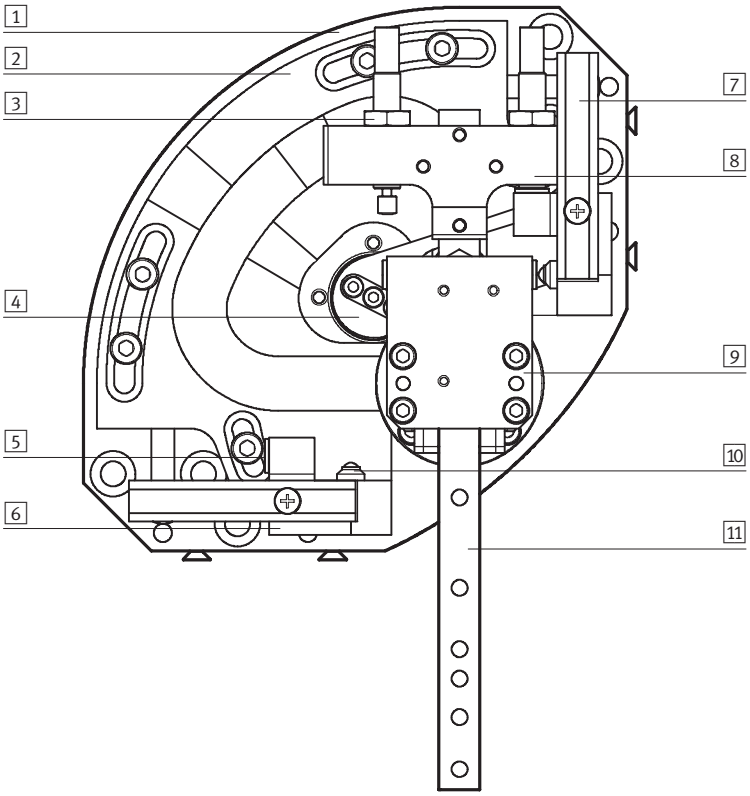
Materials

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	Bracket	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		
–	Body	Wrought aluminium alloy, anodised		
	Note on materials	Free of copper, PTFE and silicone		

Handling modules HSW, pneumatic

Technical data

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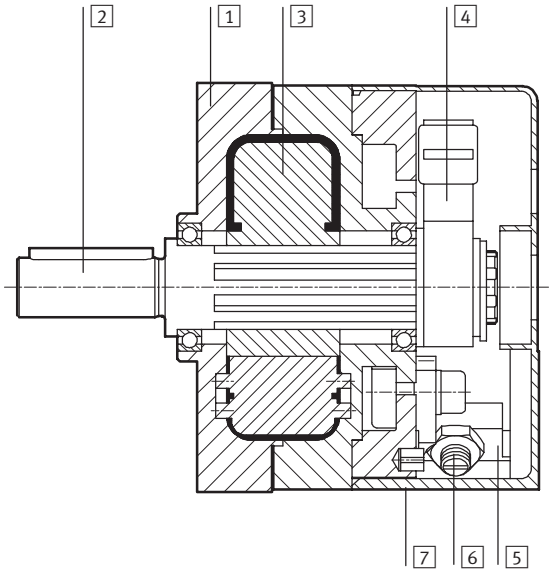
Materials

Sectional view of swivel module DSM



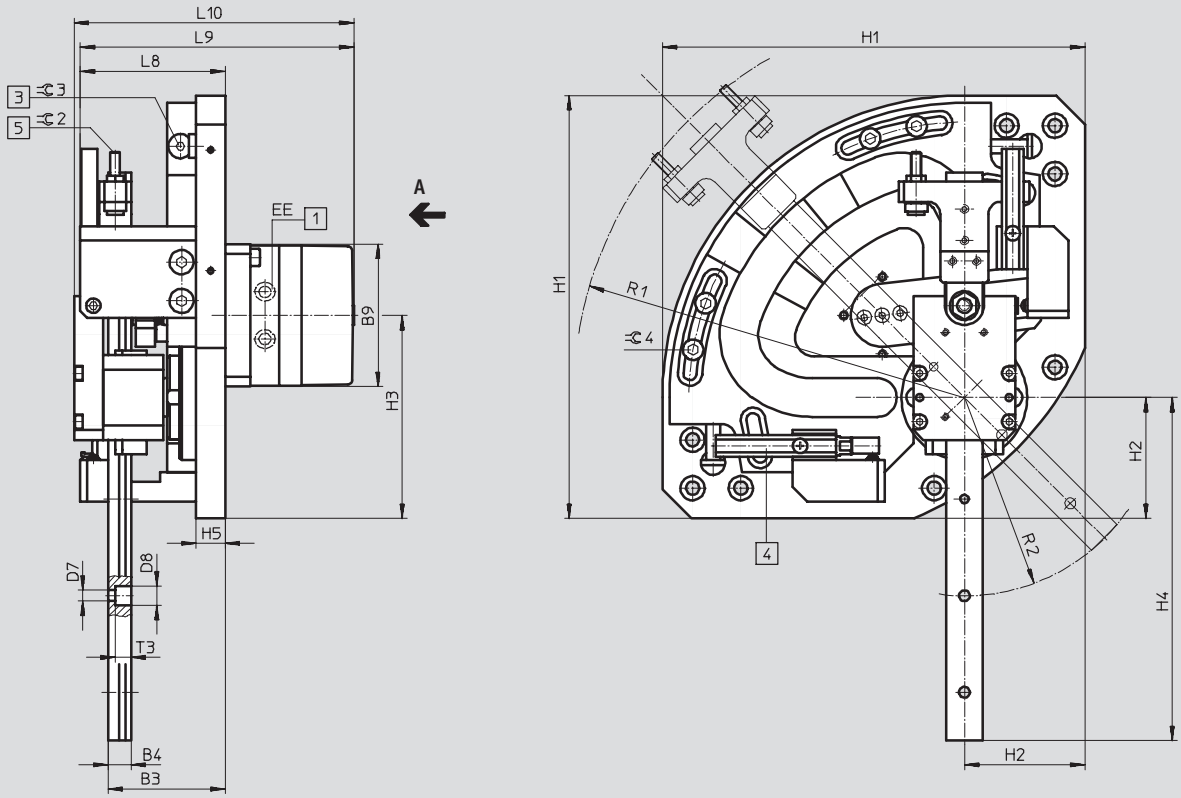
Swivel module		
1	Body	Wrought aluminium alloy
2	Shaft	Steel with nickel-plated surface
3	Rotary vane	Fibreglass-reinforced plastic
4	Stop lever	Anodised aluminium
5	Stop/shock absorber retainer	Stainless steel
6	Stop screw	Stainless steel
7	Cap	Fibreglass-reinforced plastic
–	Seals	Polyurethane
	Note on materials	Free of copper, PTFE and silicone

Handling modules HSW, pneumatic

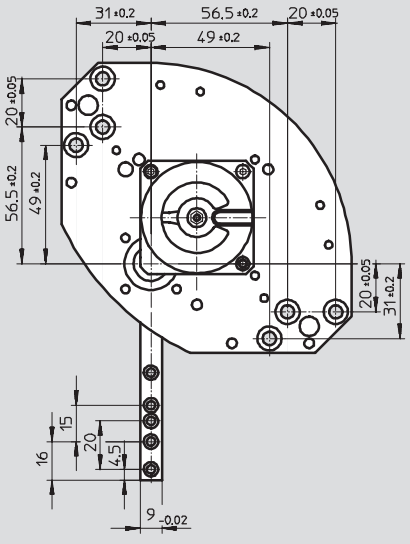
Technical data

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

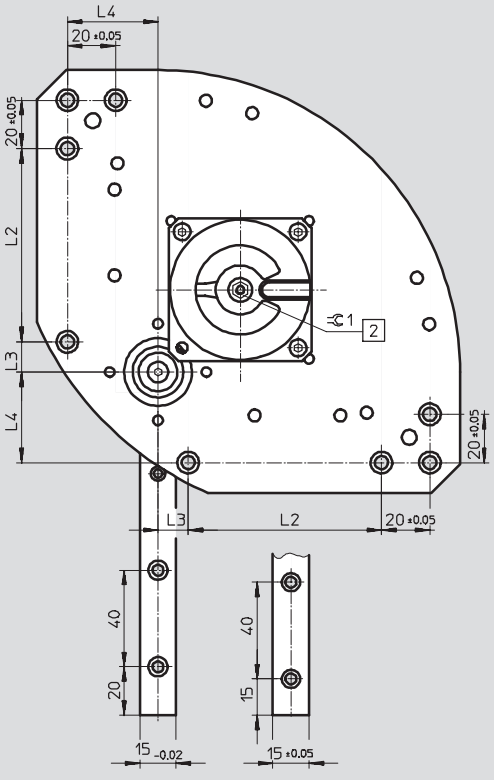
With swivel module DSM



View A



HSW-10



HSW-12 HSW-16

1 Supply ports
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

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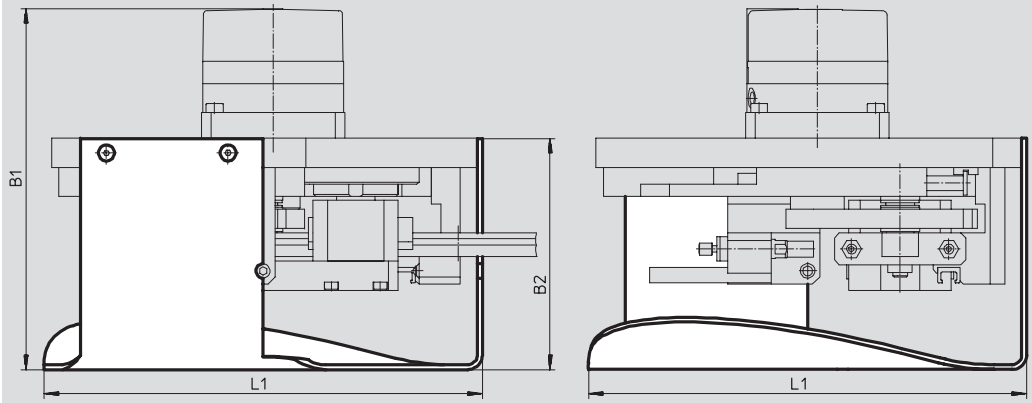
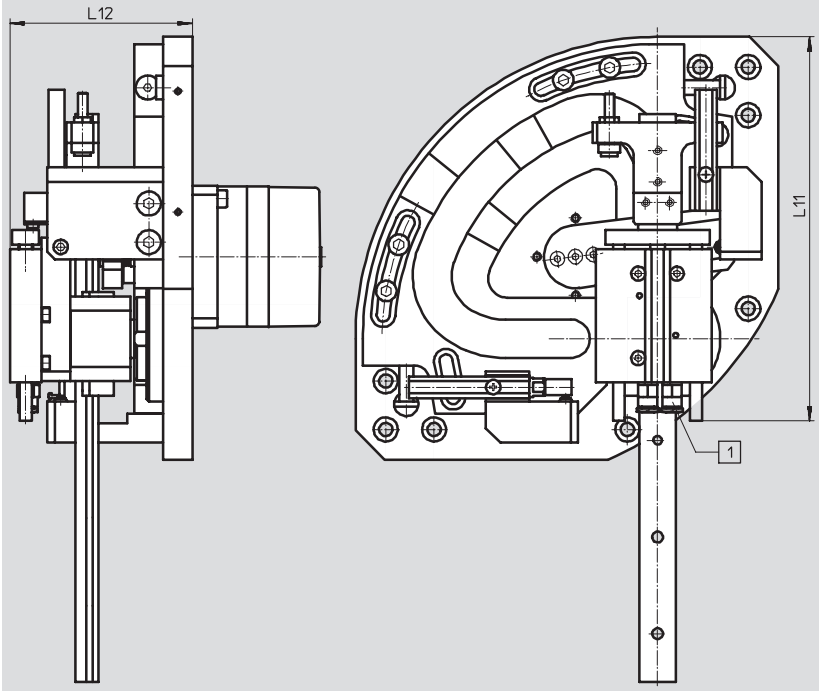
With swivel module DSM and protective cover



With wait position module



1 Supply ports

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

Handling modules HSW, pneumatic

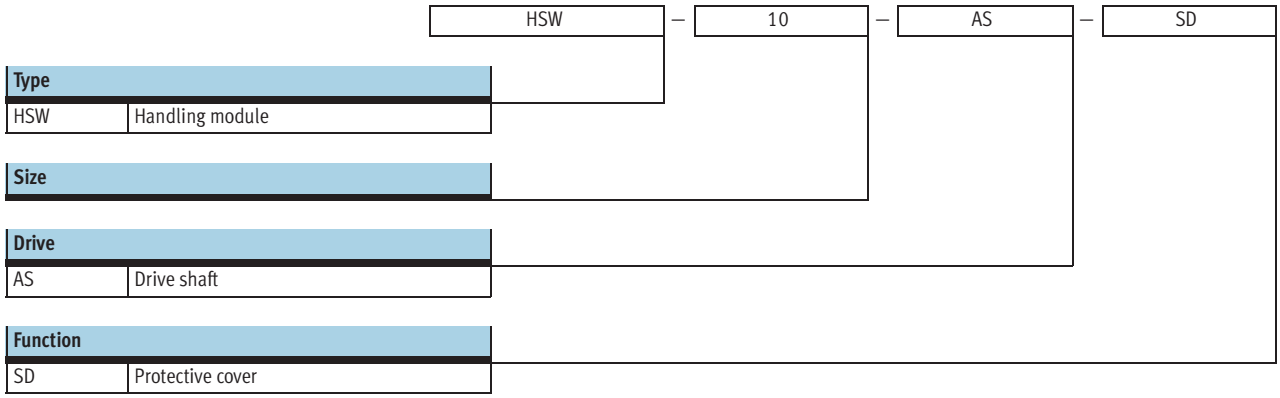
Technical data

FESTO

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, without drive

Type codes



Handling modules HSW, without drive

Technical data

FESTO

Function

www.festo.com/en/
Spare_parts_service

Size
10, 12 and 16

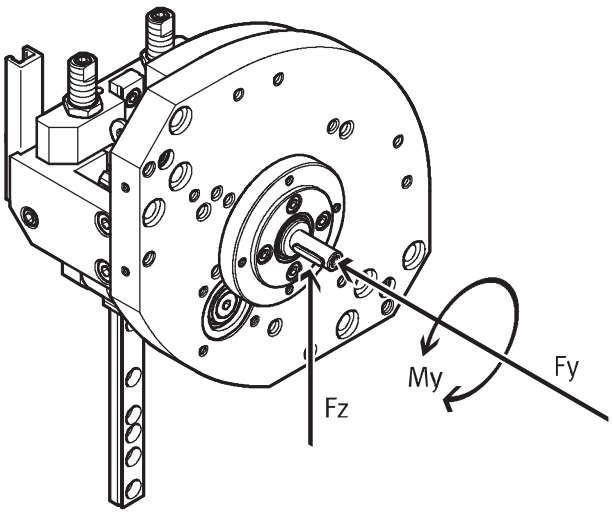
Swivel angle
80 ... 100

Stroke range
90 ... 175

General technical data	
Type	HSW-...-AS
Design	Drive shaft
	Linear guide plus ball bearing
	Guided motion sequence
Cushioning	Noise reduction via buffers
Type of mounting	Via through-holes
	Via centring sleeves
Assembly position	Any

Weights [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.

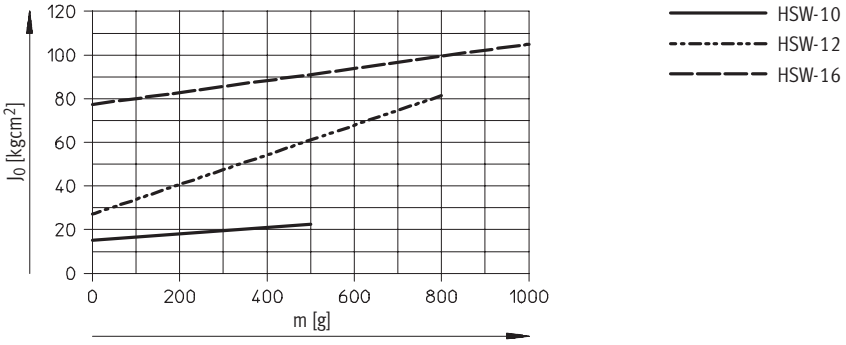
Characteristic load values				
Size		10	12	16
Max. axial force $F_{Yperm.}$	[Nm]	10	18	30
Max. radial force $F_{Zperm.}$	[Nm]	30	45	75
Max. drive torque $M_{Yperm.}$	[Nm]	0.85	1.25	2.5

Handling modules HSW, without drive

Technical data

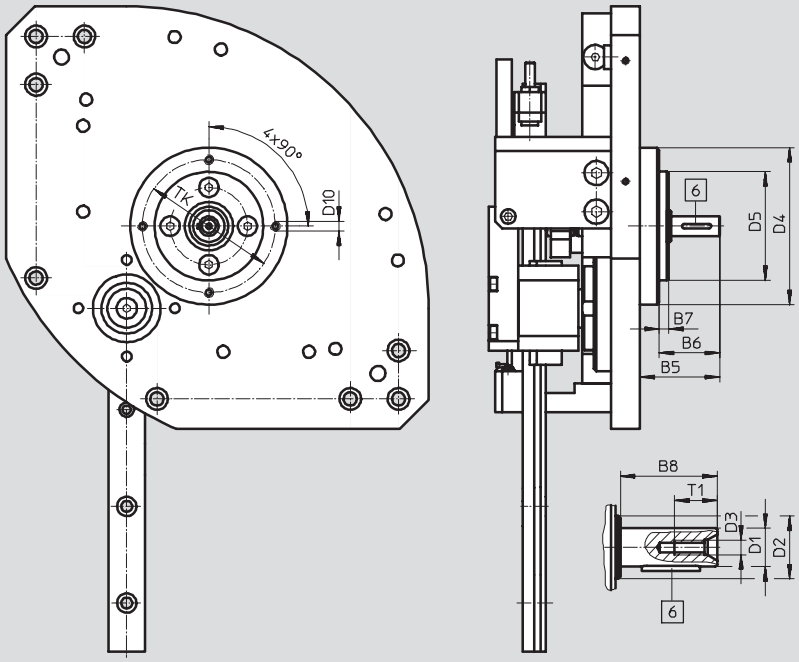
FESTO

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



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

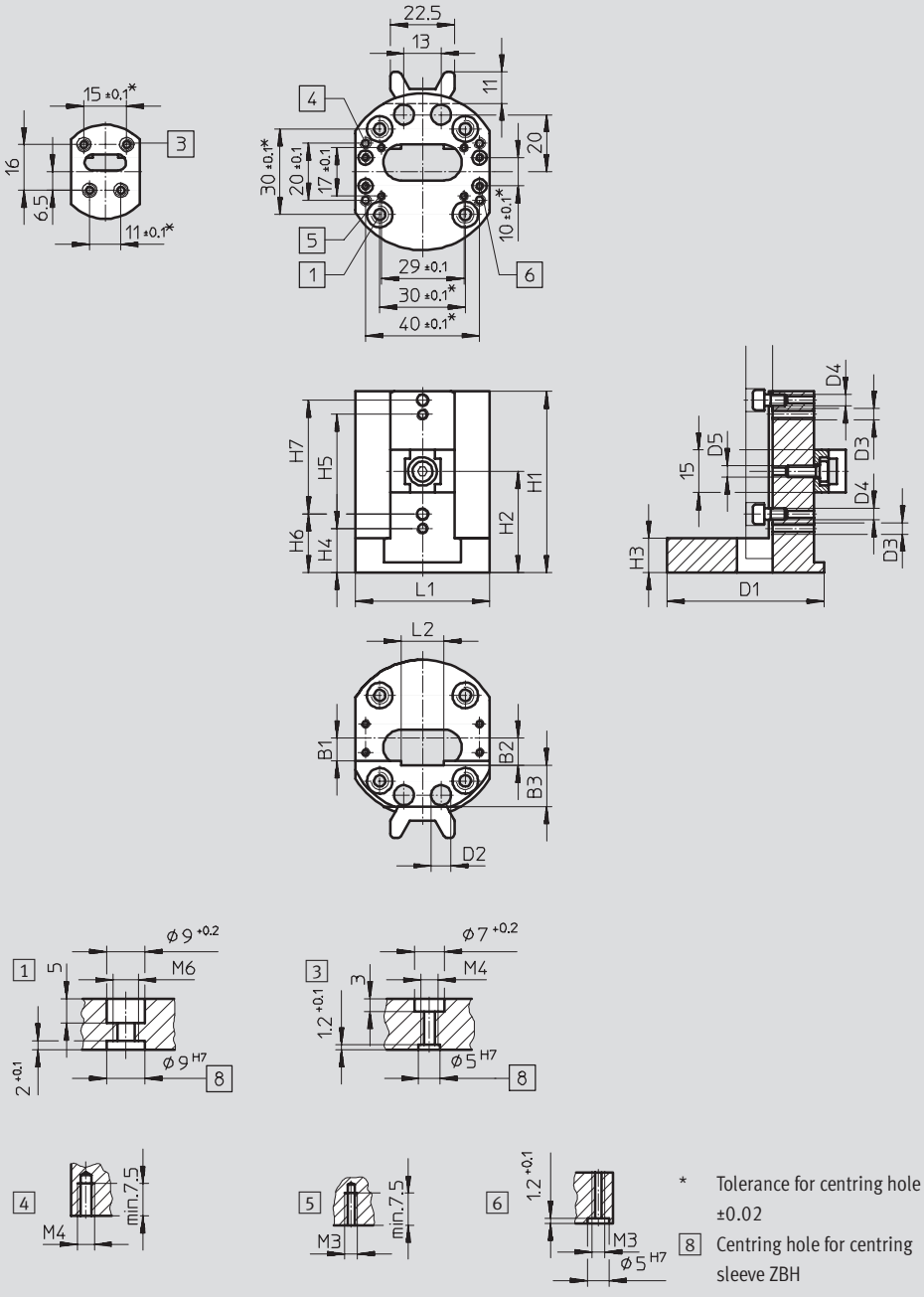
Accessories

FESTO

Adapter kit HAPG/HAPG-B

Material:
Wrought aluminium alloy, anodised

HAPG-69 HAPG-71-B



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**

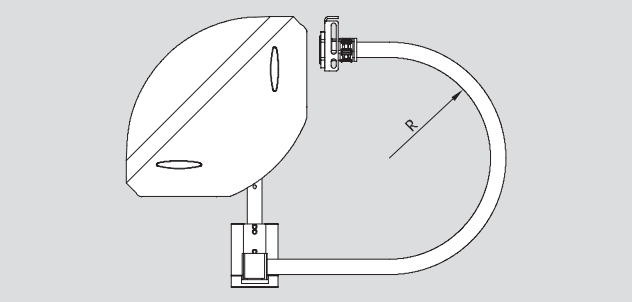
Handling modules HSW

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	**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**

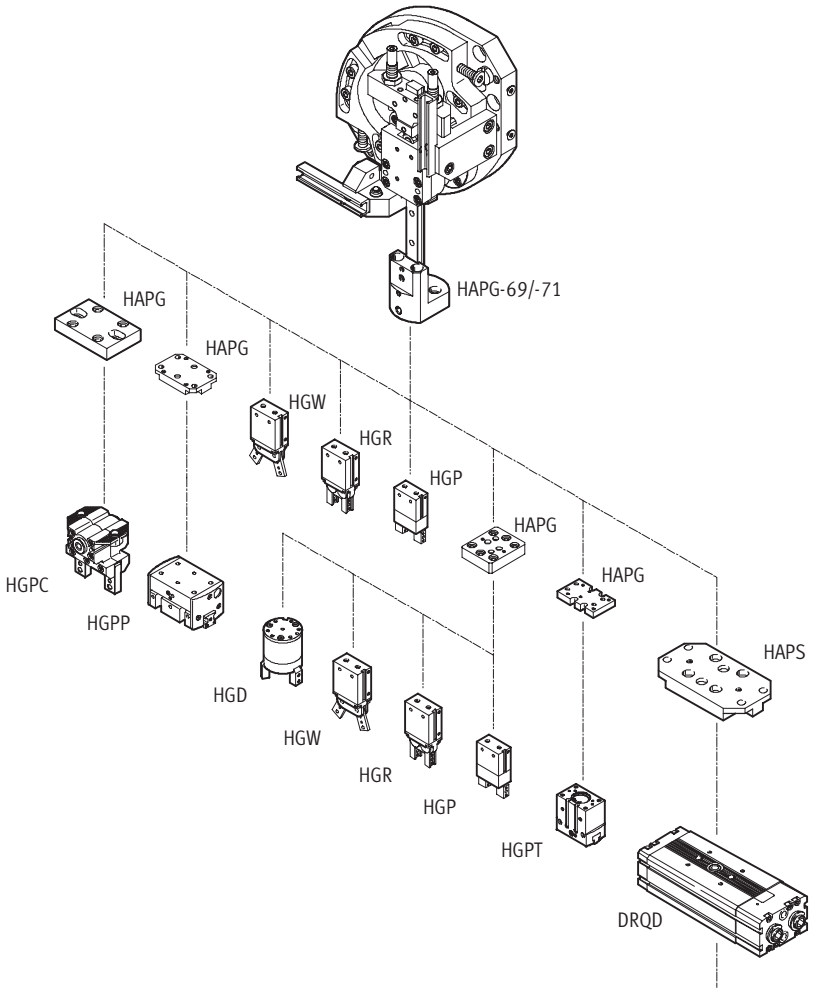
Handling modules HSW

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 components	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, visit www.festo.com
2) The centring sleeves for attaching to the adapter kit HAPG-71-B are not required.

Handling modules HSW

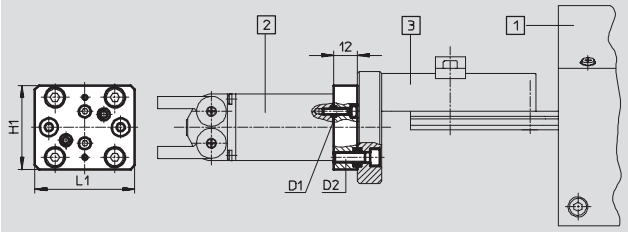
Accessories

FESTO

Gripper Part No.	Type	Adapter kit Part No.	Type	Required mounting components	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**								

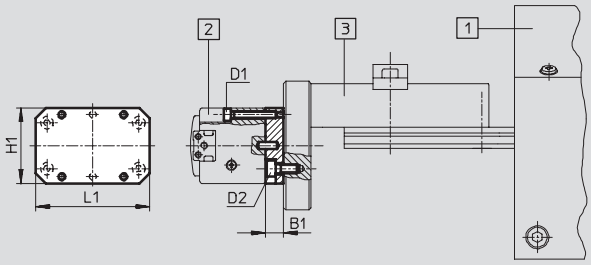
1) The semi-rotary drive DRQD is a modular product; for information on configuration and ordering, visit www.festo.com
2) The centring sleeves for attaching to the adapter kit HAPG-71-B are not required.

Adapter kit HAPG-36/-37



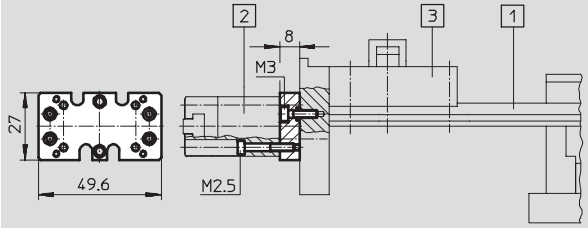
1 Handling module HSW
2 Gripper HG...
3 Adapter kit HAPG

Adapter kit HAPG-54/-55/-57



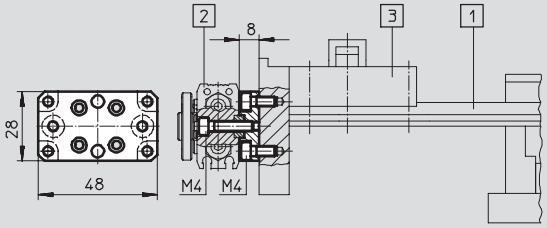
1 Handling module HSW
2 Parallel gripper HGP...
3 Adapter kit HAPG

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

Handling modules HSW

Accessories

FESTO

Ordering data – Proximity sensors for T-slot, magneto-resistive — Technical data → 1 / 10.2-13

	Assembly	Switch output	Electrical connection			Cable length [m]	Part No.	Type
			Cable	Plug M8	Plug M12			
N/O contact								
	Insertable from above	PNP	3-wire	–	–	2.5	**525 898**	**SMT-8F-PS-24V-K2,5-OE**
		NPN					**525 909**	**SMT-8F-NS-24V-K2,5-OE**
		–	2-wire	–	–	2.5	**525 908**	**SMT-8F-ZS-24V-K2,5-OE**
		PNP	–	3-pin	–	0.3	**525 899**	**SMT-8F-PS-24V-K0,3-M8D**
		NPN					**525 910**	**SMT-8F-NS-24V-K0,3-M8D**
		PNP	–	–	3-pin	0.3	**525 900**	**SMT-8F-PS-24V-K0,3-M12**
	Insertable from end, flush with the cylinder profile	PNP	3-wire	–	–	2.5	**175 436**	**SMT-8-PS-K-LED-24-B**
			–	3-pin	–	0.3	**175 484**	**SMT-8-PS-S-LED-24-B**
N/C contact								
	Insertable from above	PNP	3-wire	–	–	7.5	**525 911**	**SMT-8F-PO-24V-K7,5-OE**

Ordering data – Proximity sensors for T-slot, magnetic reed — Technical data → 1 / 10.2-18

	Assembly	Electrical connection		Cable length [m]	Part No.	Type
		Cable	Plug M8			
N/O contact						
	Insertable from above	3-wire	–	2.5	**525 895**	**SME-8F-DS-24V-K2,5-OE**
				5.0	**525 897**	**SME-8F-DS-24V-K5,0-OE**
		2-wire	–	2.5	**525 907**	**SME-8F-ZS-24V-K2,5-OE**
		–	3-pin	0.3	**525 896**	**SME-8F-DS-24V-K0,3-M8D**
	Insertable from end, flush with the cylinder profile	3-wire	–	2.5	**150 855**	**SME-8-K-LED-24**
		–	3-pin	0.3	**150 857**	**SME-8-S-LED-24**
N/C contact						
	Insertable from end, flush with the cylinder profile	3-wire	–	7.5	**160 251**	**SME-8-O-K-LED-24**

Ordering data – Plug sockets with cable — Technical data → 1 / 10.2-114

	Assembly	Switch output		Connection	Cable length [m]	Part No.	Type
		PNP	NPN				
Straight socket							
	Union nut M8	■	■	3-pin	2.5	**159 420**	**SIM-M8-3GD-2,5-PU**
					5	**159 421**	**SIM-M8-3GD-5-PU**
	Union nut M12	■	■	3-pin	2.5	**159 428**	**SIM-M12-3GD-2,5-PU**
					5	**159 429**	**SIM-M12-3GD-5-PU**
Angled socket							
	Union nut M8	■	■	3-pin	2.5	**159 422**	**SIM-M8-3WD-2,5-PU**
					5	**159 423**	**SIM-M8-3WD-5-PU**
	Union nut M12	■	■	3-pin	2.5	**159 430**	**SIM-M12-3WD-2,5-PU**
					5	**159 431**	**SIM-M12-3WD-5-PU**