

Angle grippers DHWS

FESTO



Angle grippers DHWS

Key features

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At a glance

General information

- Improved gripper jaw guide
- Slotted guide system
- Max. repetition accuracy
- Gripping force retention
- Internal fixed flow control
- Wide range of options for mounting on drive units

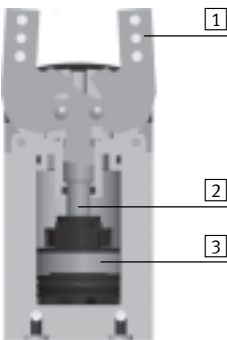
- Sensor technology:
 - Adaptable position sensor for the small gripper sizes
 - Integratable proximity sensors for the medium and large gripper sizes

Flexible range of applications

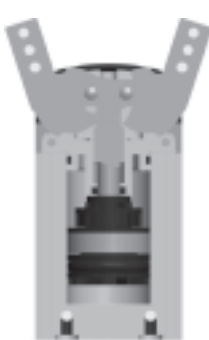
- Can be used as a double-acting and single-acting gripper
- Compression spring for supplementary or retaining gripping forces
- Suitable for external and internal gripping

The technology in detail

Gripper closed



Gripper open



- 1 Gripper jaw
- 2 Slotted guide plate
- 3 Piston with magnet

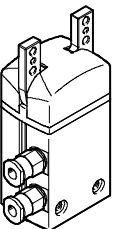


Note

Gripper selection
sizing software
→ www.festo.com

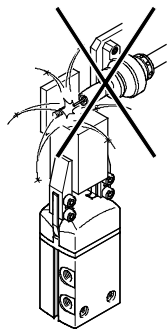
Supply ports

At the side

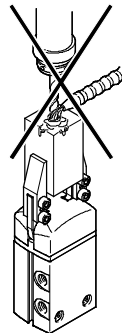


Note

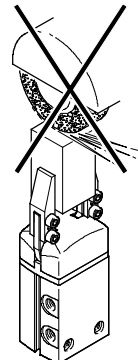
These grippers are not designed for the following or similar sample applications:



- Welding spatter



- Machining
- Aggressive media



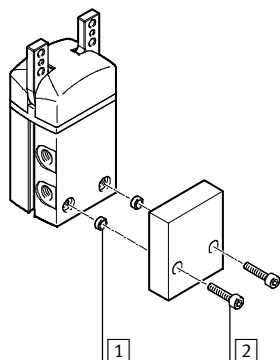
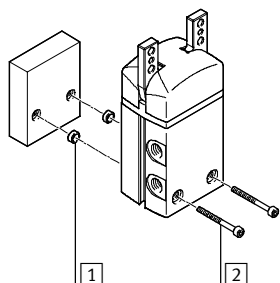
- Grinding dust

Angle grippers DHWS

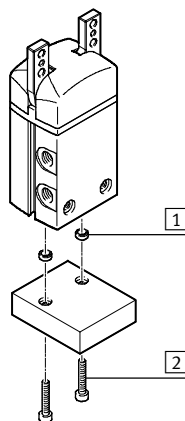
Key features and type codes

Mounting options

At the side

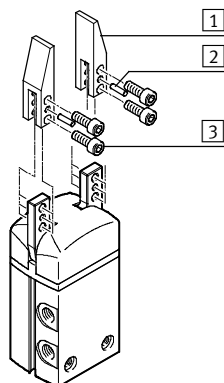


From underneath



- 1 Centring sleeves
- 2 Mounting screws

Mounting options for external gripper fingers



- 1 Gripper fingers
- 2 Centring pins
- 3 Mounting screws

Type codes

		DHWS	–	16	–	A	–	
Type								
DHWS	Angle gripper							
Size								
Position sensing								
A	Via proximity sensor							
Gripping force retention								
NC	Closing							

Angle grippers DHWS

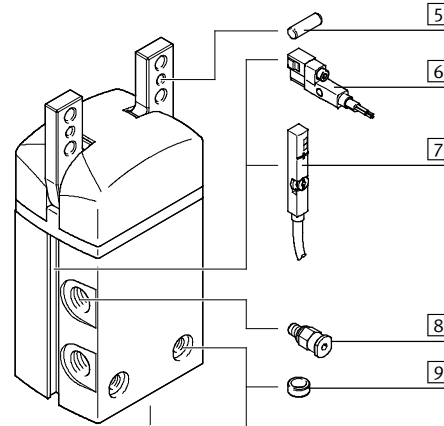
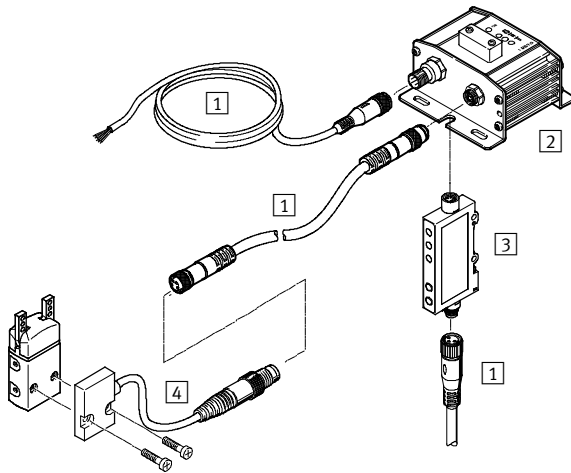
Peripherals overview

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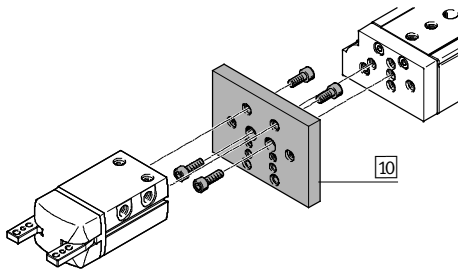
Peripherals overview

DHWS-10

DHWS-16 ... 40



System product for handling and assembly technology



Accessories		
Type	Brief description	→ Page/Internet
1 Connecting cable NEBU	For connecting evaluation unit and signal converter	19
2 Evaluation unit SMH-AE1	- For evaluating signals for position sensor SMH-S1 - For size 10	19
3 Signal converter SVE4	- For evaluating signals for position sensor SMH-S1 - For size 10	19
4 Position sensor SMH-S1	- Adaptable and integratable sensor technology, for sensing the piston position - For size 10	19
5 Centring pin	For centring the gripper fingers on the gripper jaws	–
6 Proximity sensor SMT-8G	- For sensing the piston position - Proximity sensor does not project past the housing - For size 16 ... 40	20
7 Position transmitter SMAT-8M	- Continuously senses the position of the piston. Has an analogue output with an output signal in proportion to the piston position - For size 16 ... 40	20
8 Push-in fitting QS	For connecting compressed air tubing with standard O.D.	quick star
9 Centring sleeve ZBH	- For centring the gripper during mounting - The scope of delivery of the gripper includes 2 centring sleeves	19
10 Adapter kit HMSV, HAPG, HAPS, HMVA	Connecting plate between drive and gripper	14

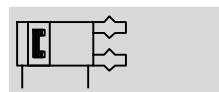
Angle grippers DHWS

Technical data

Function

Double-acting

DHWS-...-A



 Size
10 ... 40 mm

 Opening angle
40°

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Function – Variants

Single-acting or
with gripping force retention ...

... closing DHWS-...-NC



General technical data					
Size	10	16	25	32	40
Design	Lever				
Mode of operation	Double-acting				
Gripper function	Angle				
Guide	Plain-bearing guide				
Gripping force retention	–	NC	NC	NC	NC
Number of gripper jaws	2				
Opening angle per gripper jaw	[°]	20			
Pneumatic connection	M3	M3	M5	G¼	G¼
Repetition accuracy ¹⁾	[mm]	≤ 0.04			
Max. interchangeability	[mm]	≤ ±0.2			
Max. operating frequency	[Hz]	4		3	
Rotational symmetry	[mm]	< Ø 0.2			
Position sensing	Via position sensor		Via proximity sensor		
Type of mounting	Via through-hole and centring sleeve				
	Via female thread and centring sleeve				
Mounting position	Any				

1) End-position drift under constant conditions of use with 100 consecutive strokes in the direction of movement of the gripper jaws

Operating and environmental conditions						
Size		10	16	25	32	40
Min. operating pressure						
DHWS-...-A		[bar]	2			
DHWS-...-A-NC		[bar]	–	4		
Max. operating pressure		[bar]	8			
Operating medium		Compressed air in accordance with ISO 8573-1:2010 [7:4:4]				
Note on operating/pilot medium		Operation with lubricated medium possible (in which case lubricated operation will always be required)				
Ambient temperature ¹⁾		[°C]	+ 5 ... +60			
Corrosion resistance class CRC ²⁾		1				

1) Note operating range of proximity sensors

2) Corrosion resistance class 1 according to Festo standard 940 070

Components subject to low corrosion stress. Transport and storage protection. Parts that do not have primarily decorative surface requirements, e.g. in internal areas that are not visible or behind covers.

Weight [g]					
Size	10	16	25	32	40
DHWS-...-A	40	110	258	452	775
DHWS-...-A-NC	–	114	265	462	790

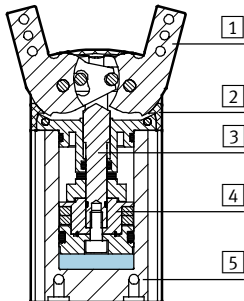
Angle grippers DHWS

Technical data

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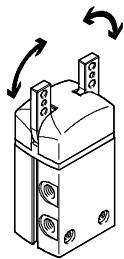
Materials

Sectional view



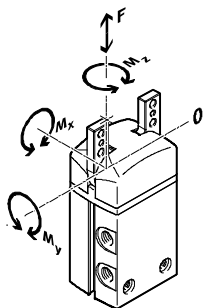
Angle gripper		
1	Gripper jaw	High-alloy stainless steel
2	Cover cap	Polyamide
3	Slotted guide plate	Tempered steel
4	Piston	Polyacetal
5	Housing	Hard anodised wrought aluminium alloy
–	Seals	Nitrile rubber
–	Note on materials	Free of copper and PTFE
		RoHS-compliant

Total gripping torque [Ncm] at 6 bar



Size		10	16	25	32	40
DHWS-...-A	Opening	43	129	386	810	1,497
	Closing	30	114	356	746	1,362

Static characteristic load values at the gripper jaws



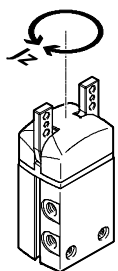
The indicated permissible forces and torques apply to a single gripper jaw. They include the lever arm, additional applied loads due to the workpiece or external gripper fingers and

acceleration forces occurring during movement.

The zero coordinate line (gripper jaw guide) must be taken into consideration for the calculation of torques.

Size		10	16	25	32	40
Max. permissible force F_z	[N]	25	50	90	120	200
Max. permissible torque M_x	[Nm]	0.6	1.6	3.6	6	13
Max. permissible torque M_y	[Nm]	0.6	1.6	3.6	6	13
Max. permissible torque M_z	[Nm]	0.6	1.6	3.6	6	13

Mass moment of inertia [$\text{kgm}^2 \times 10^{-4}$]



Mass moment of inertia of the angle gripper in relation to the central axis, without external gripper fingers, without load.

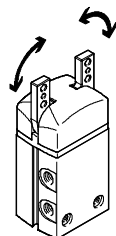
Size	10	16	25	32	40
DHWS-...-A	0.03	0.14	0.62	1.60	3.81
DHWS-...-A-NC	–	0.15	0.64	1.63	3.87

Angle grippers DHWS

Technical data

Opening and closing times [ms] at 6 bar

Without external gripper fingers



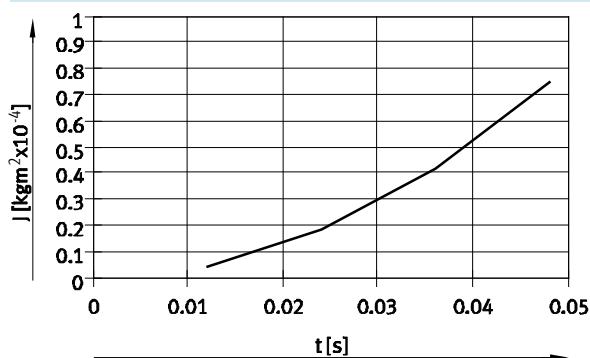
The indicated opening and closing times [ms] were measured at room temperature at an operating pressure of 6 bar with horizontally mounted grippers without additional gripper

fingers (average values). The grippers must be throttled for greater applied loads. Opening and closing times must then be adjusted accordingly.

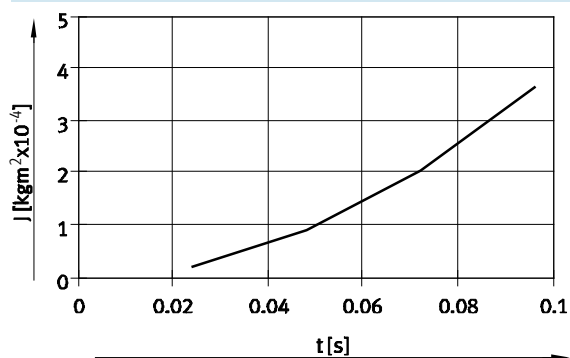
Size		10	16	25	32	40
Without external gripper fingers						
DHWS-...-A	Opening	10	44	64	46	63
	Closing	22	52	80	77	96
DHWS-...-A-NC	Opening	–	62	106	88	99
	Closing	–	36	59	55	69

Opening and closing times t to be set at 6 bar as a function of mass moment of inertia of the gripper fingers

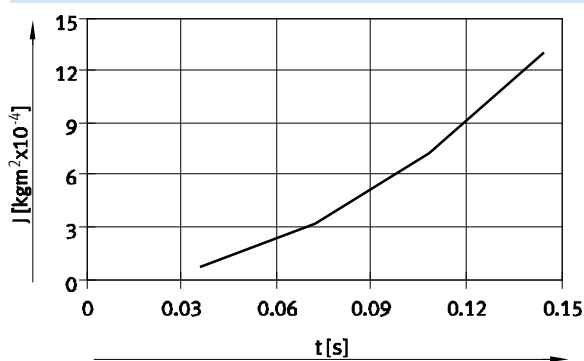
DHWS-10



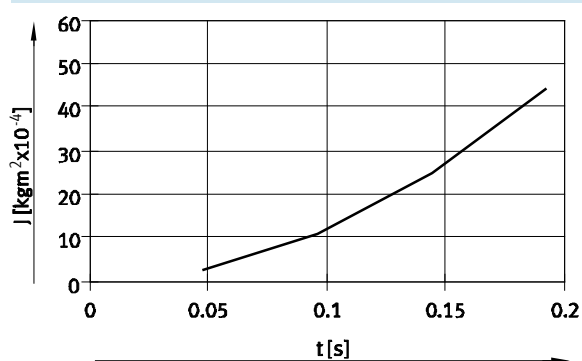
DHWS-16



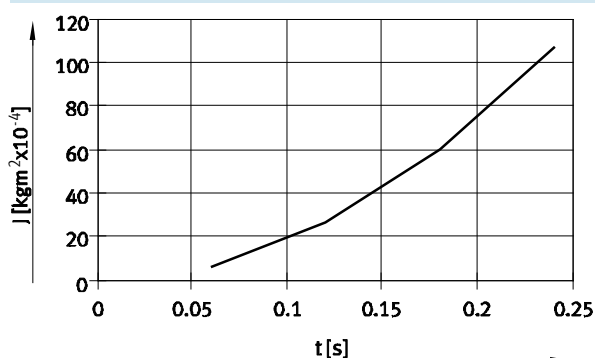
DHWS-25



DHWS-32



DHWS-40



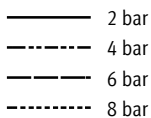
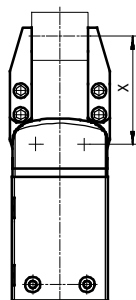
Angle grippers DHWS

Technical data

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Gripping force F_H per gripper jaw as a function of operating pressure and lever arm x

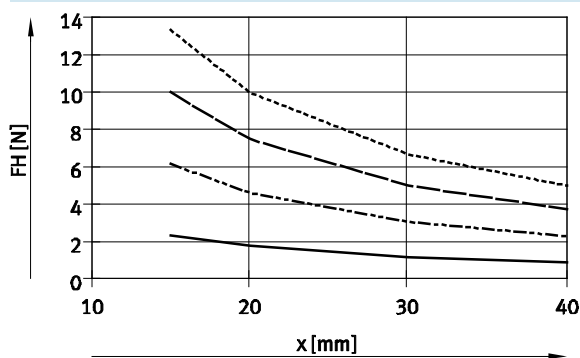
The gripping forces as a function of operating pressure and lever arm can be determined from the following graphs.



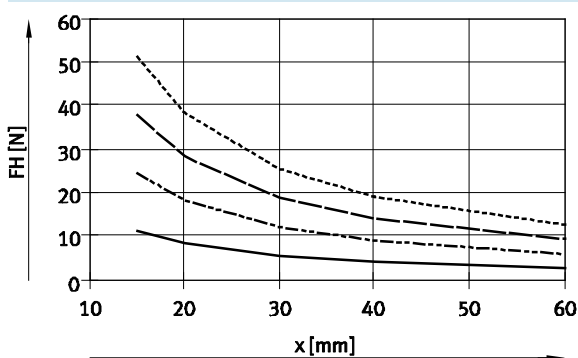
Note
Gripper selection
sizing software
→ www.festo.com

External gripping (closing)

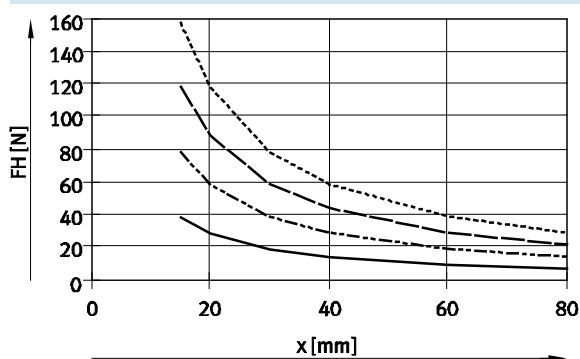
DHWS-10



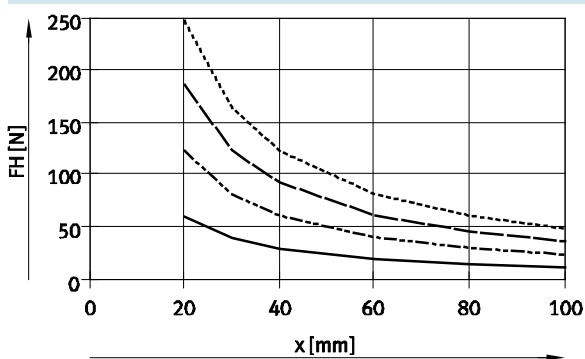
DHWS-16



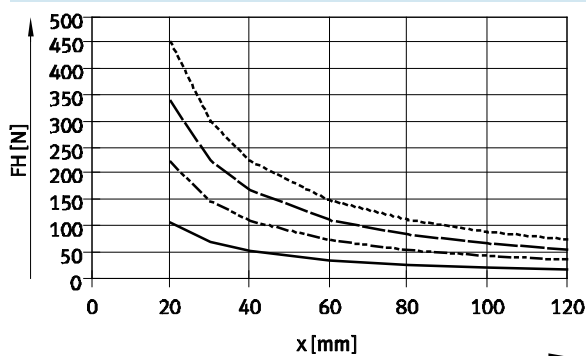
DHWS-25



DHWS-32



DHWS-40

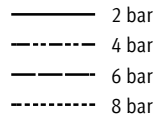
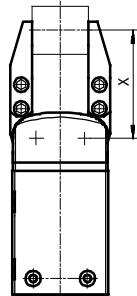


Angle grippers DHWS

Technical data

Gripping force F_H per gripper jaw as a function of operating pressure and lever arm x

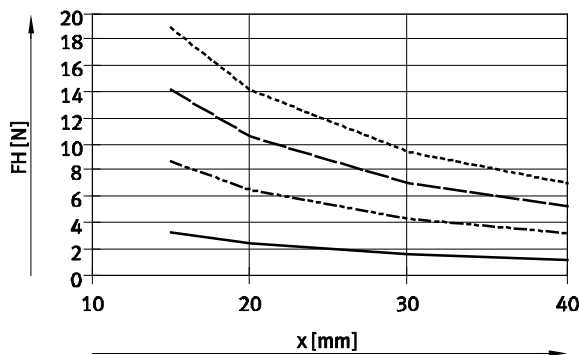
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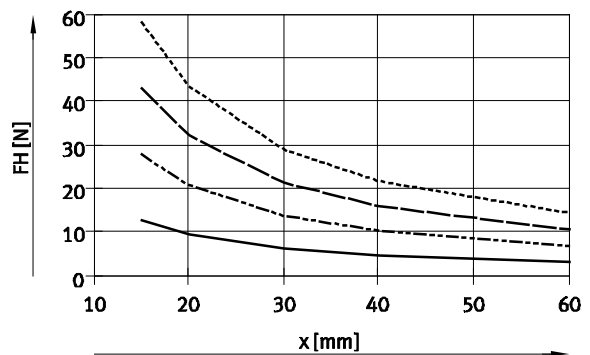
 Note
Gripper selection
sizing software
→ www.festo.com

Internal gripping (opening)

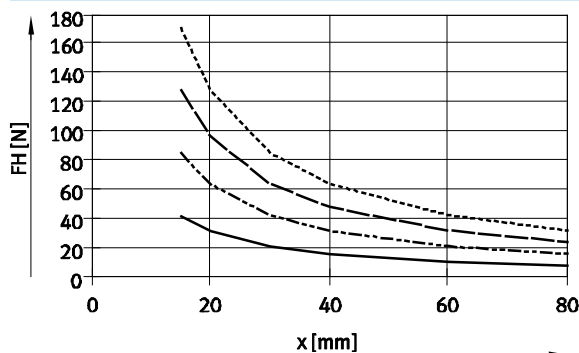
DHWS-10



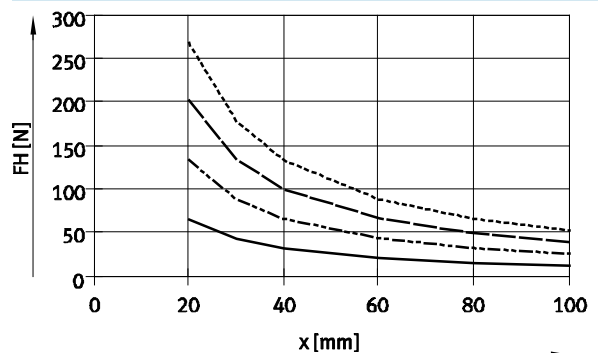
DHWS-16



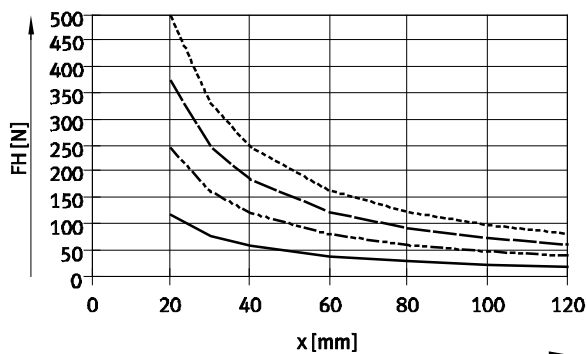
DHWS-25



DHWS-32



DHWS-40



Angle grippers DHWS

Technical data

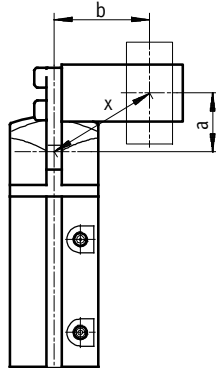
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Gripping force F_H per gripper jaw at 6 bar as a function of lever arm x and eccentricity a and b

The following formula must be used to calculate the lever arm x with eccentric gripping:

$$x = \sqrt{a^2 + b^2}$$

The gripping force F_H can be read from the graphs (→ 8/9) using the calculated value x .



Calculation example

Given:

Distance $a = 20$ mm

Distance $b = 25$ mm

To be calculated:

The gripping force at 6 bar,
with a DHWS-16,
used as an external gripper

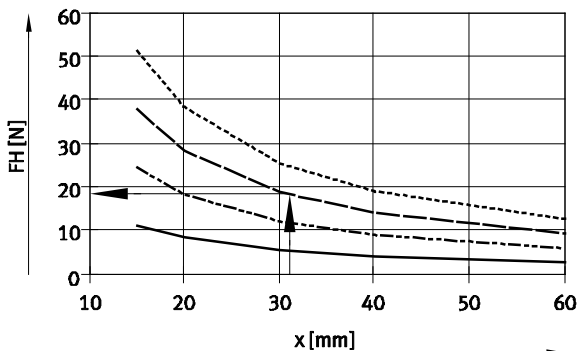
Procedure:

Calculating the lever arm x

$$x = \sqrt{20^2 + 25^2}$$

$$x = 32 \text{ mm}$$

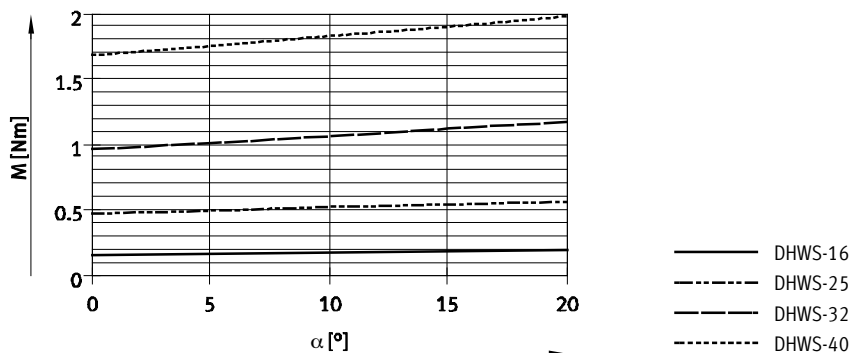
The graph (→ 8) gives a value of F_H
= 18 N for the gripping force.



Angle grippers DHWS

Technical data

Spring torque M_F as a function of opening angle α



Determination of the actual gripping torques $M_{Grtotal}$ for DHWS-...-NC as a function of application

The angle gripper with integrated spring type DHWS-...-NC (closing gripping force retention) can be used as:

- single-acting grippers
- grippers with supplementary gripping force and
- grippers with gripping force retention depending on requirements.

In order to calculate the available gripping torque $M_{Grtotal}$ (per gripper jaw), the data from the graphs for the

gripping force F_H (→ 8/9) and the spring torque M_F (→ 11) must be combined accordingly.

$$M_{Gr} = F_H \cdot x$$

M_{Gr} Gripping torque
 F_H Gripping force
 x Lever arm

Application

Single-acting

- Gripping with spring force:
 $M_{Grtotal} = M_F$
- Gripping with pressure force:
 $M_{Grtotal} = M_{Gr} - M_F$

Supplementary gripping force

- Gripping with pressure and spring force:
 $M_{Grtotal} = M_{Gr} + M_F$

Gripping force retention

- Gripping with spring force:
 $M_{Grtotal} = M_F$

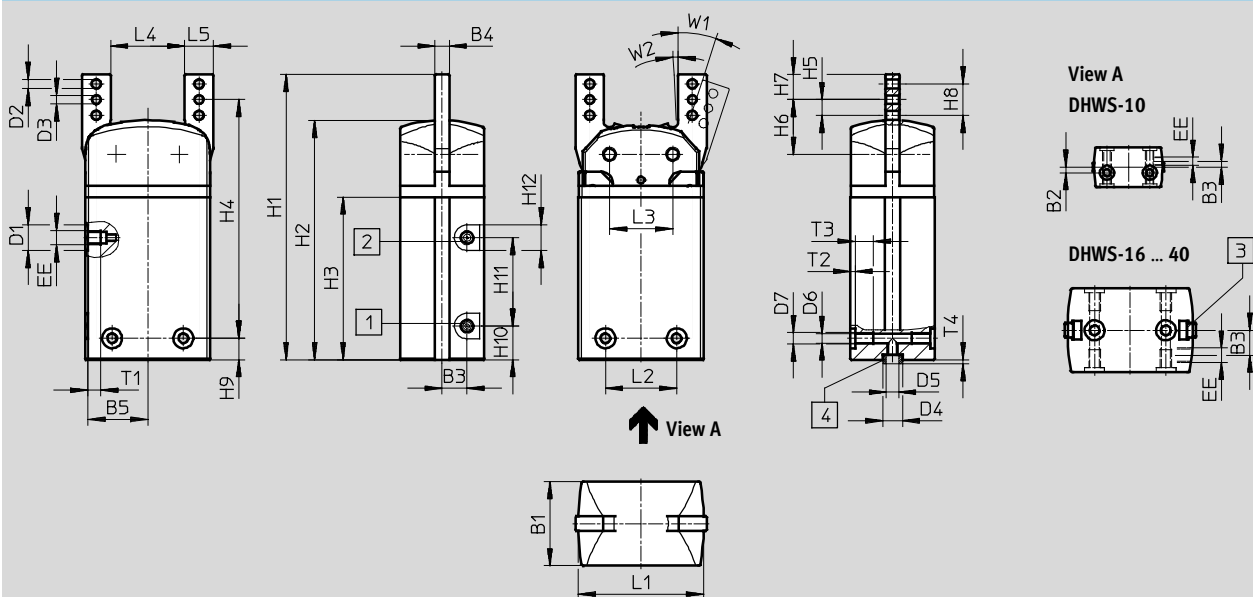
Angle grippers DHWS

Technical data

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Dimensions

Download CAD data → www.festo.com



- 1 Supply port, opening
- 2 Supply port, closing
- 3 Slot for proximity sensor
- 4 Centring sleeves ZBH
(2 included in the scope of delivery)

Size	B1	B2 ¹⁾	B3	B4	B5	D1	D2	D3	D4	D5
[mm]	±0.05			-0.03/-0.05		Ø	Ø ±0.1	Ø H8	Ø H8/h7	Ø
10	14	2	2	3	11.6	7	2.2	2	5	3.2
16	19	–	5.8	4	16	–	3.2	2.5	5	3.2
25	29.5	–	8.75	5	21	9	3.2	3	7	5.3
32	38	–	11	6	24	15	4.3	3	9	6.4
40	49	–	11	8	28.4	15	5.3	4	12	10.3

Size	D6	D7	EE	H1	H2	H3	H4	H5	H6
[mm]	+0.1						±0.2		±0.05
10	2.4	M3	M3	56.3	46	30.8	38.25	3.5	10.95
16	2.5	M3	M3	81	67	45.5	66	4.5	15.5
25	3.3	M4	M5	100	84	57	83.7	5.5	19.2
32	5.1	M6	G1/8	116	96.2	65	100.5	6.5	22.5
40	6.4	M8	G1/8	129	108.4	71.5	99.5	7	24.5

1) Tolerance for centring hole ±0.02 mm; tolerance for thread ±0.1 mm

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Size [mm]	H7	H8	H9 ²⁾	H10	H11	H12	L1 ±0.05	L2 ¹⁾	L3 ±0.02
10	5.75	7	12.3	8.8	16	7	24	15	12.4
16	7.5	9	7.5	12.25	23	7	34	16	17
25	8.8	11	7.5	11.8	31	9	44	25	22.2
32	11	13	11	20	25	15	53	29	25.8
40	12	14	17.5	9	46	15	59	33	30

Size [mm]	L4	L5 −0.02/ −0.05	T1 +0.5	T2 +0.1	T3 +1	T4 −0.2	W1 +3°/−1°	W2 ±1°
10	14	5.5	3.5	1.2	through	1.2	18	3
16	18	8	4.5	1.2	5.8	1.2	18	3
25	26	10	4.5	1.6	6.4	1.4	18	3
32	29	12	7.5	2.1	12.9	1.9	18	3
40	32	15	6	2.6	13.4	2.4	18	3

1) Tolerance for centring hole ±0.02 mm; tolerance for thread ±0.1 mm

2) Tolerance for centring hole −0.05 mm; tolerance for thread ±0.1 mm

Ordering data				
Size [mm]	Double-acting without compression spring		Single-acting or with gripping force retention	
			Closing	
	Part No.	Type	Part No.	Type
10	1310177	DHWS-10-A	–	
16	1310178	DHWS-16-A	1310179	DHWS-16-A-NC
25	1310180	DHWS-25-A	1310181	DHWS-25-A-NC
32	1310182	DHWS-32-A	1310183	DHWS-32-A-NC
40	1310184	DHWS-40-A	1310185	DHWS-40-A-NC

Angle grippers DHWS

Accessories

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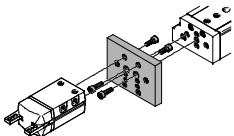
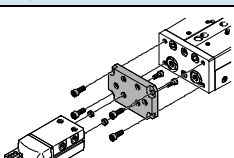
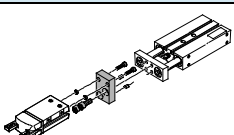
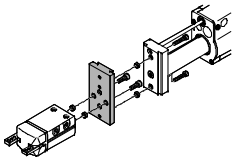
Adapter kit
HMSV, HAPG, HAPS, HMVA

Material:
Wrought aluminium alloy
Free of copper and PTFE
RoHS-compliant



Note

The kit includes the individual mounting interface as well as the necessary mounting material.

Permissible drive/gripper combinations with adapter kit							Download CAD data → www.festo.com	
Combination	Drive	Gripper		Adapter kit		Type		
	Size	Size	Mounting option		CRC ¹⁾			
								
DGSL/DHWS	DGSL	DHWS			HMSV			
	8, 10	10	■	■	2	548784	HMSV-54	
	12, 16	16	■	■		548785	HMSV-55	
	20, 25	25, 32	■	■		548786	HMSV-56	
SLT/DHWS	SLT	DHWS			HAPS			
	10	10	■	–	2	178448	HAPS-2	
	16	16	■	–		178449	HAPS-3	
	20	25	■	–		178450	HAPS-4	
	25	32	■	–		178451	HAPS-5	
DPZ/DHWS	DPZ	DHWS			HAPG			
	10, 16	16	■	–	2	163250	HAPG-1	
	16	25	■	–		163251	HAPG-2	
	20	25	■	–		163252	HAPG-3	
	25, 32	32	■	–		163253	HAPG-4	
HMP/DHWS	HMP	DHWS			HMSV			
	Direct mounting							
	16, 20	16	■	■	2	177666	HMSV-20	
	16, 20, 25	25	■	■		177761	HMSV-21	
	16, 20, 25, 32	32	■	■		177762	HMSV-22	
	25	40	■	■		177763	HMSV-23	
	32	40	■	■		177764	HMSV-24	
	Dovetail mounting							
	16, 20	16	■	■	2	177767	HMSV-27	
	16, 20, 25	25	■	■		177768	HMSV-28	
	16, 20, 25, 32	32	■	■		177769	HMSV-29	
	25	40	■	■		177770	HMSV-30	
	32	40	■	■		178211	HMSV-31	

1) Corrosion resistance class 2 according to Festo standard 940 070

Components subject to moderate corrosion stress. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

Angle grippers DHWS

Accessories

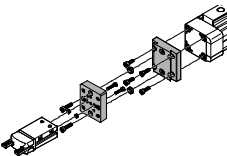
Adapter kit
HMSV, HAPG, HAPS, HMVA

Material:
Wrought aluminium alloy
Free of copper and PTFE
RoHS-compliant



Note

The kit includes the individual mounting interface as well as the necessary mounting material.

Permissible drive/gripper combinations with adapter kit					Download CAD data → www.festo.com		
Combination	Drive	Gripper			Adapter kit		
	Size	Size	Mounting option		CRC ¹⁾	Part No.	Type
							
DGP..., DGE..., DGEA/DHWS	DG...	DHWS		HMVA, HAPG, HMSV			
	Direct mounting						
	18 ²⁾ , 25 ³⁾	10	■	■	2	196788	HMVA-DLA18/25
						192706	HAPG-37-S1
	40 ³⁾	10	■	■		196790	HMVA-DLA40
						192706	HAPG-37-S1
	18 ²⁾ , 25 ³⁾	16	■	■		196788	HMVA-DLA18/25
						192705	HAPG-36-S1
	40 ³⁾	16	■	■		196790	HMVA-DLA40
						192705	HAPG-36-S1
	18 ²⁾ , 25 ³⁾	25	■	■		196788	HMVA-DLA18/25
						193922	HAPG-37-S4
	40 ³⁾	25	■	■		196790	HMVA-DLA40
						193922	HAPG-37-S4
	Dovetail mounting						
	18 ²⁾ , 25	16	■	■	2	196788	HMVA-DLA18/25
						177767	HMSV-27
	40	16	■	■		196790	HMVA-DLA40
						177767	HMSV-27
	18 ²⁾ , 25	25	■	■		196788	HMVA-DLA18/25
						177768	HMSV-28
40	25	■	■	196790		HMVA-DLA40	
				177768		HMSV-28	
40	32	■	■	196790		HMVA-DLA40	
				177769		HMSV-29	
40	40	■	■	196790		HMVA-DLA40	
				177770		HMSV-30	

- 1) Corrosion resistance class 2 according to Festo standard 940 070
Components subject to moderate corrosion stress. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.
- 2) Only for DGEA-...
- 3) Only for DGE.../DGP...

Angle grippers DHWS

Accessories

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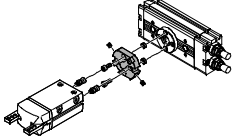
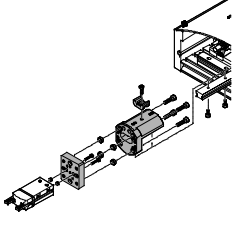
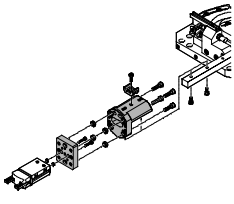
Adapter kit
HMSV, HAPG, HAPS, HMVA

Material:
Wrought aluminium alloy
Free of copper and PTFE
RoHS-compliant



Note

The kit includes the individual mounting interface as well as the necessary mounting material.

Permissible drive/gripper combinations with adapter kit					Download CAD data → www.festo.com		
Combination	Drive	Gripper	Mounting option		Adapter kit		
	Size	Size			CRC ¹⁾	Part No.	Type
							
DRQD/DHWS	DRQD-...-FW	DHWS					
	6, 8, 12	10	■	■	2	187568	HAPG-34
	16 ²⁾	10	■	■		187566	HAPG-SD2-12
	16 ²⁾	16	■	■		184477	HAPG-SD2-1
	16 ²⁾	25	■	■		184478	HAPG-SD2-2
	20 ²⁾	25	■	■		184479	HAPG-SD2-3
	20 ²⁾	32	■	■		184480	HAPG-SD2-4
	25 ³⁾	25	■	■		184482	HAPG-SD2-6
	25 ³⁾	32	■	■		184483	HAPG-SD2-7
	32 ³⁾	32	■	■		184485	HAPG-SD2-9
	32 ³⁾	40	■	■		184486	HAPG-SD2-10
	40, 50	40	■	■		526027	HAPG-SD2-21
	DRQD-...ZW	DHWS					
	16	16	■	■	2	163267	HAPG-18
	16	25	■	■		163268	HAPG-19
	20	25	■	■		163269	HAPG-20
	20	32	■	■		163270	HAPG-21
	25	32	■	■		163271	HAPG-22
HSP/DHWS	HSP	DHWS					
	12	10	■	—	2	192709	HAPG-60-S1
						540881	HAPG-70-B
	16	10	■	—		192706	HAPG-37-S1
						540882	HAPG-71-B
	16	16	■	—		192705	HAPG-36-S1
						540882	HAPG-71-B
	25	16	■	—		192705	HAPG-36-S1
						540883	HAPG-72-B
	25	25	■	—		193922	HAPG-37-S4
						540883	HAPG-72-B
HSW/DHWS	HSW	DHWS					
	12, 16	10	■	—	2	192706	HAPG-37-S1
						540882	HAPG-71-B
	12, 16	16	■	—		192705	HAPG-36-S1
						540882	HAPG-71-B

1) Corrosion resistance class 2 according to Festo standard 940 070

Components subject to moderate corrosion stress. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

2) Possible in combination with DRQD-...-E422 (flanged shaft with energy through-feed).

3) Possible in combination with DRQD-...-E444 (flanged shaft with energy through-feed).

Angle grippers DHWS

Accessories

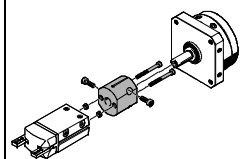
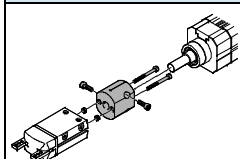
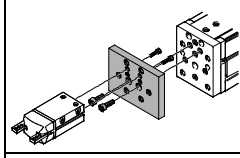
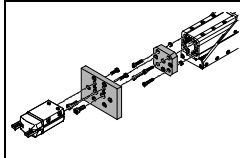
Adapter kit
HMSV, HAPG, HAPS, HMVA

Material:
Wrought aluminium alloy
Free of copper and PTFE
RoHS-compliant



Note

The kit includes the individual mounting interface as well as the necessary mounting material.

Permissible drive/gripper combinations with adapter kit					Download CAD data → www.festo.com		
Combination	Drive	Gripper			Adapter kit		
	Size	Size	Mounting option		CRC ¹⁾	Part No.	Type
							
DSM/DHWS	DSM-...-FW	DHWS			HAPG		
	6, 8, 10	10	■	■	2	187568	HAPG-34
	DSM-...	DHWS			HAPG		
	12	16	■	■	2	163266	HAPG-17
	16	16	■	■		163267	HAPG-18
	16	25	■	■		163268	HAPG-19
	25	25	■	■		163269	HAPG-20
	25	32	■	■		163270	HAPG-21
	32	32	■	■		163271	HAPG-22
DSL/DHWS	DSL	DHWS			HAPG		
	16	16	■	■	2	163266	HAPG-17
	20	16	■	■		163267	HAPG-18
	20	25	■	■		163268	HAPG-19
	25	25	■	■		163269	HAPG-20
	25	32	■	■		163270	HAPG-21
	32	32	■	■		163271	HAPG-22
EGSL/DHWS	EGSL	DHWS			HMSV		
	35	10	■	■	2	548784	HMSV-54
						1088262	HMSV-70
	45, 55	16	■	■		548785	HMSV-55
	75	25, 32	■	■		548786	HMSV-56
EGSA/DHWS	EGSA	DHWS			HMSV		
	50	16	■	■	2	560017	HMSV-61
						548785	HMSV-55
	60	16	■	■		560019	HMSV-63
						177666	HMSV-20
	60	25, 32	■	■		560018	HMSV-62
					548786	HMSV-56	

1) Corrosion resistance class 2 according to Festo standard 940 070

Components subject to moderate corrosion stress. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

Angle grippers DHWS

Accessories

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Adapter kit
HMSV, HAPG, HAPS, HMVA

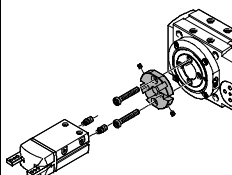
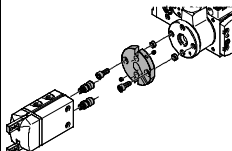
Material:
Wrought aluminium alloy
Free of copper and PTFE
RoHS-compliant



Note

The kit includes the individual mounting interface as well as the necessary mounting material.

Download CAD data → www.festo.com

Permissible drive/gripper combinations with adapter kit							
Combination	Drive	Gripper		Adapter kit			
	Size	Size	Mounting option		CRC ¹⁾	Part No.	Type
							
ERMB/DHWS	ERMB	DHWS		HAPG			
	20	25	■	■	2	184479	HAPG-SD2-3
	25	25	■	■		184482	HAPG-SD2-6
	20	32	■	■		184480	HAPG-SD2-4
	25	32	■	■		184483	HAPG-SD2-7
	32	32	■	■		184485	HAPG-SD2-9
	32	40	■	■		184486	HAPG-SD2-10
EHMB/DHWS	EHMB	DHWS		HAPG			
	20	32	■	■	2	184485	HAPG-SD2-9
	20	40	■	■		184486	HAPG-SD2-10
	25, 32	40	■	■		526027	HAPG-SD2-21

1) Corrosion resistance class 2 according to Festo standard 940 070

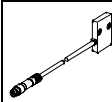
Components subject to moderate corrosion stress. Externally visible parts with primarily decorative surface requirements which are in direct contact with a normal industrial environment or media such as coolants or lubricating agents.

Angle grippers DHWS

Accessories

Ordering data						
	For size [mm]	Description	Weight [g]	Part No.	Type	PU ¹⁾
Centring sleeve ZBH Technical data → Internet: zbh						
	10, 16	For centring the gripper during mounting	1	189652	ZBH-5	10
	25		1	186717	ZBH-7	
	32		1	150927	ZBH-9	
	40		1	189653	ZBH-12	

1) Packaging unit

Ordering data				
Type	For size	Weight [g]	Part No.	Type
Position sensor SMH-S1 Technical data → Internet: smh-s1				
	10	20	175711	SMH-S1-HGW10

Signal converter/evaluation unit for position sensor SMH-S1

Signal converter SVE4

- Converts analogue signals into switching points
- Switching function freely programmable with teach-in
- Threshold value, hysteresis or window comparator

Evaluation unit SMH-AE1

- Converts analogue signals into switching points
- With 3 potentiometers for setting 3 switching points

Ordering data							
Type	For size	Input connection	Output connection	Switching output	Weight [g]	Part No.	Type
Signal converter SVE4						Technical data → Internet: sve4	
	10	Socket M8x1, 4-pin	Plug M8x1, 4-pin	2x PNP	19	544216	SVE4-HS-R-HM8-2P-M8
				2x NPN		544219	SVE4-HS-R-HM8-2N-M8
Evaluation unit SMH-AE1						Technical data → Internet: smh-ae	
	10	Socket M8x1, 4-pin	Plug M12x1, 5-pin	3x PNP	170	175708	SMH-AE1-PS3-M12
				3x NPN		175709	SMH-AE1-NS3-M12

Ordering data – Connecting cables				
	Electrical connection, left	Electrical connection, right	Cable length [m]	Part No. Type
Connection between position sensor and signal converter/evaluation unit Technical data → Internet: nebu				
	Straight socket, M8x1, 4-pin	Straight plug, M8x1, 4-pin	2.5	554035 NEBU-M8G4-K-2.5-M8G4
Connection between evaluation unit and controller				
	Straight socket, M12x1, 5-pin	Cable, open end, 5-wire	2.5	541330 NEBU-M12G5-K-2.5-LE5
			5	541331 NEBU-M12G5-K-5-LE5

Angle grippers DHWS

Accessories

FESTO

Ordering data – Connecting cables					Technical data → Internet: nebu
	Electrical connection, left	Electrical connection, right	Cable length [m]	Part No.	Type
Connection between signal converter and controller					
	Straight socket, M8x1, 4-pin	Cable, open end, 4-wire	2.5	541342	NEBU-M8G4-K-2.5-LE4
			5	541343	NEBU-M8G4-K-5-LE4
	Angled socket, M8x1, 4-pin	Cable, open end, 4-wire	2.5	541344	NEBU-M8W4-K-2.5-LE4
			5	541345	NEBU-M8W4-K-5-LE4

Proximity sensor for size 16 ... 40					
Ordering data – Proximity sensors for T-slot, magneto-resistive					Technical data → Internet: smt
	Type of mounting	Electrical connection, connection direction	Switching output	Cable length [m]	Part No. Type
N/O contact					
	Insertable in the slot lengthwise	Cable, 3-wire, lateral	PNP	2.5	547859 SMT-8G-PS-24V-E-2,5Q-OE
		Plug M8x1, 3-pin, lateral		0.3	547860 SMT-8G-PS-24V-E-0,3Q-M8D

Proximity sensor for size 16 ... 40					
Ordering data – Position transmitters for T-slot					Technical data → Internet: smat
	Type of mounting	Electrical connection, connection direction	Analogue output [V]	Cable length [m]	Part No. Type
	Insertable in the slot from above	Plug M8x1, 3-pin, lateral	0 ... 10	0.3	553744 SMAT-8M-U-E-0,3-M8D

 **Note**

Mode of operation:

The position transmitter continuously senses the position of the piston. It has an analogue output with an output signal in proportion to the piston position.

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
	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