

Bellows grippers DHEB

FESTO



Key features

At a glance

When the supply port is pressurised, an internal piston is moved. The mechanism transfers the movement of the piston to the bellows, causing them to expand outwards.

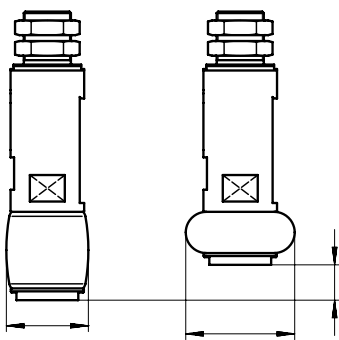
The increase in the bellows diameter enables the bellows to grasp loads from the inside. When the gripper is exhausted, the resetting force of the bellows pushes the piston back into its initial position.

- Single-acting internal gripper
- Optionally with internal through-hole
- Max. payload: 5.1 kg
- Operating range: $\varnothing 8 \dots 85 \text{ mm}$
- Choice of two directions of bellows movement:
 - Upwards
 - Downwards
- Choice of two bellows materials:
 - Ethylene propylene rubber (EPDM)
 - Silicone
- Choice of two supply port variants:
 - At the side
 - At the rear

The technology in detail

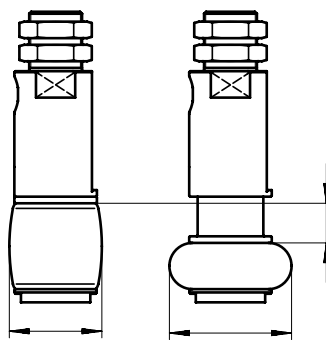
Direction of movement: upwards

Bellows exhausted/pressurised



Direction of movement: downwards

Bellows exhausted/pressurised



Bellows material

Silicone

- Very good temperature resistance (wide range)
- Food-safe
- Longer service life than EPDM
- Contains paint-wetting impairment substances

EPDM

- Higher friction coefficient than silicone
- Minimal marking of shiny surfaces

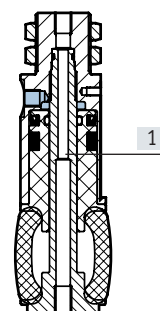
Application examples

Note

Use the grippers only to cylindrical shaped workpieces.

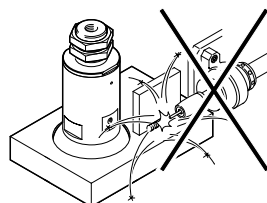
- Gentle internal gripping of fragile workpieces (e.g. glass or ceramics).
- Transporting and packaging of glasses, cups and bottles, for example

- The internal through-hole [1] (optional) enables the workpiece to be cooled, cleaned, checked for leaks or disinfected during the handling process

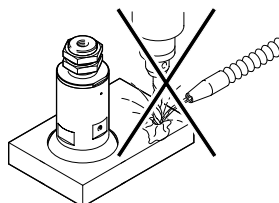


Note

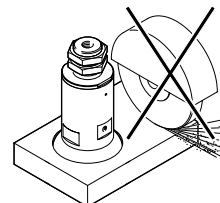
These grippers are not designed for the following applications:



- Welding spatter



- Machining
- Aggressive media

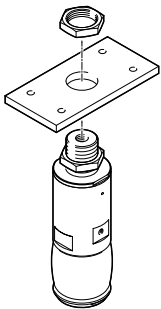


- Grinding dust

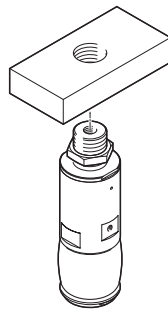
Peripherals overview

Mounting options

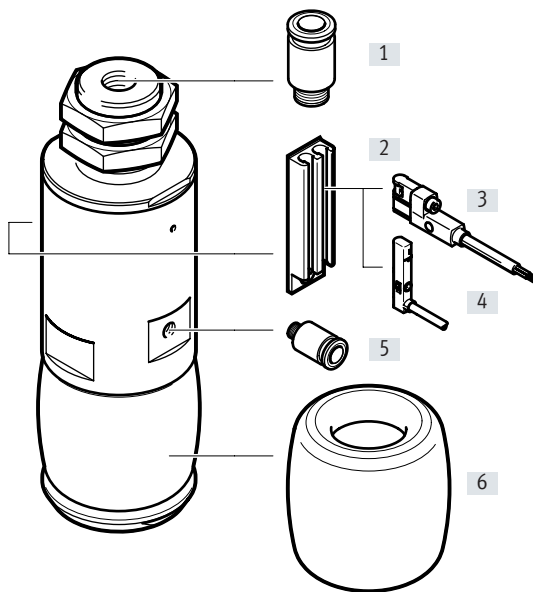
Through-hole



Threaded hole



Peripherals overview



Accessories		
Type	Description	→ Page/Internet
[1] Push-in fitting QS	- For connecting tubing with standard O.D. - In the variant with supply port at the side DHEB-...-P, this port (with internal through-hole) can be used to cool or clean the workpiece, for example, or to check it for leaks - In the variant DHEB-...-P, this port is used to supply the gripper with compressed air	qs
[2] Sensor rail DASP	- For mounting the proximity sensors - For size 27 ... 63	11
[3] Proximity sensor SMT-10G	- For sensing the piston position - For size 27 ... 63	12
[4] Proximity sensor SME-/SMT-10	- For sensing the piston position - For size 27 ... 63	12
[5] Push-in fitting QS	- For connecting tubing with standard O.D. - In the variant with supply port at the side DHEB-...-L, this port is used to supply the gripper with compressed air	qs
[6] Bellows DHAS	Can be replaced in the event of wear	–

Type codes

001	Series	
DHEB	Bellows grippers	

002	Size	
8	8	
10	10	
12	12	
14	14	
18	18	
22	22	
27	27	
33	33	
41	41	
51	51	
63	63	

003	Gripper function	
E	Single-acting	

004	Actuation direction	
D	Downwards	
U	Upwards	

005	Bellows material	
E	EPDM	
S	Silicone	

006	Connection position	
L	In the direction of motion	
P	Perpendicular to direction of movement	

Data sheet

-  Size
 8 ... 63 mm
-  Diameter
 Ø 11 ... 85 mm



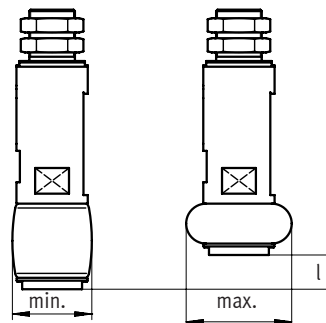
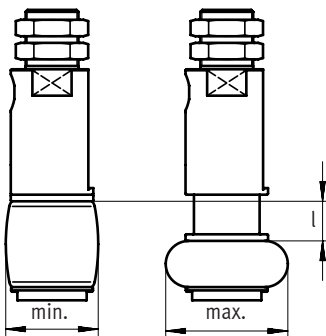
General technical data

Size	8	10	12	14	18	22	27	33	41	51	63	
Design	Contracting diaphragm with forced motion sequence											
Mode of operation	Single-acting, closed											
Pneumatic connection												
DHEB-...P	M3	M3	M3	M3	M5	M5	M5	M5	M5	G1/8	G1/8	
DHEB-...L	M5	M5	M5	M5	M5	M5	M5	G1/8	G1/8	G1/8	G1/8	
Guide value for payload	[kg]	0.08	0.1	0.12	0.15	0.21	0.32	0.45	0.7	1.2	2.5	5.1
Max. operating frequency	[Hz]	≤ 4										
Average replacement interval for the bellows												
DHEB-...S	1 million switching cycles											
DHEB-...E	0.5 million switching cycles											
Position sensing	None						Via proximity sensor, with sensor rail DASP					
Type of mounting	With lock nut											
	With male thread											
Mounting position	Any											

Diameter to be gripped, bellows stroke l

DHEB-...-D

DHEB-...-U



Size	8	10	12	14	18	22	27	33	41	51	63
min. (±1 mm) [mm]	8	10.5	13	15	19.5	24	28	34	42	54	66
max. (±1 mm) [mm]	11	14	17	19.5	25	31.5	37	45	54	68	85
Bellows stroke (±0.5 mm) [mm]	3.5	4	5.5	7	7.5	12	12	14.5	15.5	18	25

Weight [g]

Size	8	10	12	14	18	22	27	33	41	51	63
DHEB-...-D	15	16	17	17	28	43	79	118	280	490	800
DHEB-...-U	16	17	18	20	35	50	100	130	300	500	785

Data sheet

Operating and environmental conditions													
Size		8	10	12	14	18	22	27	33	41	51	63	
Min. operating pressure	[bar]	5						4					
Max. operating pressure	[bar]	8											
Reset pressure	[bar]	≤ 1											
Operating medium		Compressed air to ISO 8573-1:2010 [7:4:4]											
Note on the operating/pilot medium		Lubricated operation possible (in which case lubricated operation will always be required)											
Ambient temperature ¹⁾													
Gripper	[°C]	+5 ... +60											
EPDM bellows	[°C]	−30 ... +120											
Silicone bellows	[°C]	−40 ... +150											
Food-safe ²⁾													
DHEB-...S		→ supplementary information on materials											
Corrosion resistance class CRC ³⁾		2											

1) Note operating range of proximity sensors

2) Additional information is available at www.festo.com/sp → Certificates.

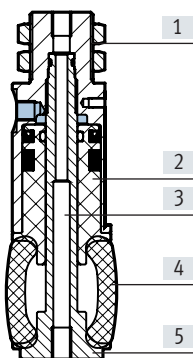
3) Corrosion resistance class CRC 2 to Festo standard FN 940070

Moderate corrosion stress. Indoor applications in which condensation can occur. External visible parts with primarily decorative surface requirements in direct contact with a normal industrial environment.

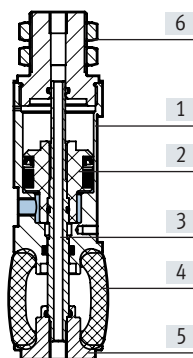
Materials

Sectional view

DHEB-...-D



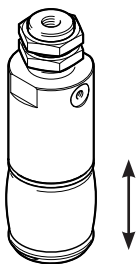
DHEB-...-U



Bellows grippers

[1]	Housing	Hard-anodised aluminium
[2]	Piston	
	DHEB-...-D	Polyacetal
	DHEB-...-U	Hard-anodised aluminium
[3]	Piston rod	Hard-anodised aluminium
[4]	Bellows	
	DHEB-...-S	Silicone (milky, transparent, natural)
	DHEB-...-E	EPDM (ethylene propylene rubber, black)
[5]	Cover	Hard-anodised aluminium
[6]	Cover	Hard-anodised aluminium
–	Note on materials	Contains paint-wetting impairment substances
		RoHS-compliant

Opening and closing times [ms] at 6 bar



The indicated opening and closing times [ms] were measured at room temperature and 6 bar operating pressure with a vertically mounted gripper. The times refer to the gripper without load.

Depending on the design variant, the expansion of the bellows is defined as the opening time and the reset as the closing time.

Size	8	10	12	14	18	22	27	33	41	51	63
Open	10	20	20	20	20	30	30	30	30	30	40
Closing	30	40	40	40	50	60	60	60	70	70	100

Data sheet

Holding force/slip force F at 6 bar as a function of diameter d and actuation direction of the gripper

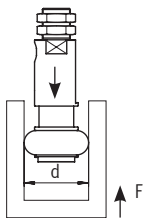
The forces depend on the following factors:

- Diameter of the workpiece to be held
- Actuation direction of the gripper
- Surface texture
- Coefficients of friction
- Operating pressure

Application 1

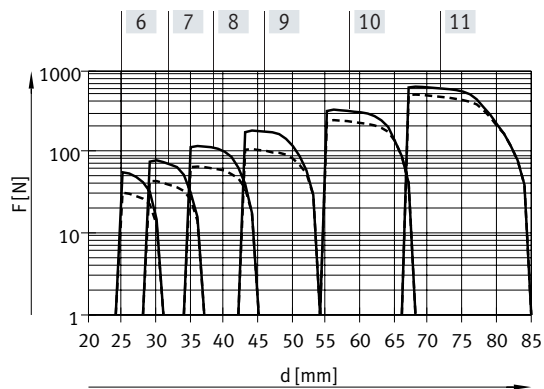
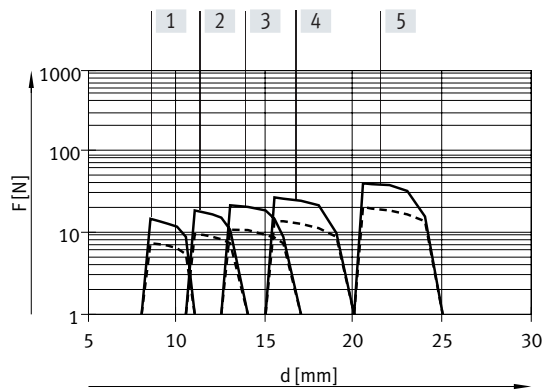
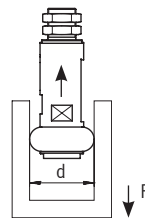
DHEB-...-D

- Actuation direction downwards
- Workpiece pushing



DHEB-...-U

- Actuation direction upwards
- Workpiece pulling



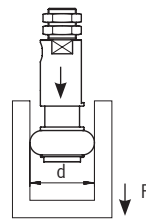
- [1] Size 8
- [2] Size 10
- [3] Size 12
- [4] Size 14
- [5] Size 18
- [6] Size 22

- [7] Size 27
- [8] Size 33
- [9] Size 41
- [10] Size 51
- [11] Size 63

Application 2

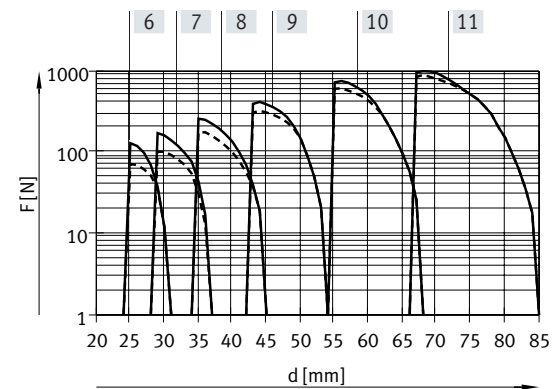
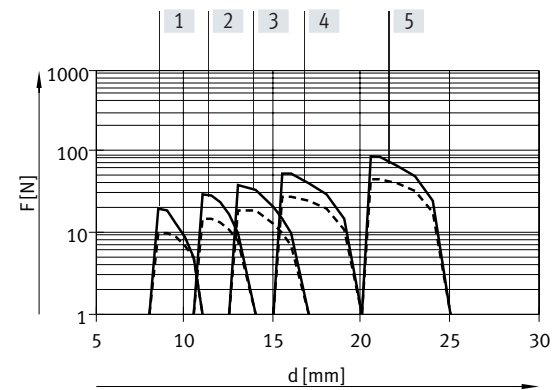
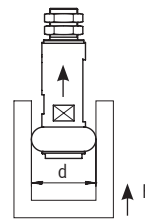
DHEB-...-D

- Actuation direction downwards
- Workpiece pulling



DHEB-...-U

- Actuation direction upwards
- Workpiece pushing



- Material: EPDM
- - - - - Material: Silicone

Note
A tolerance of ± 1 mm must be noted with diameter d.

Data sheet

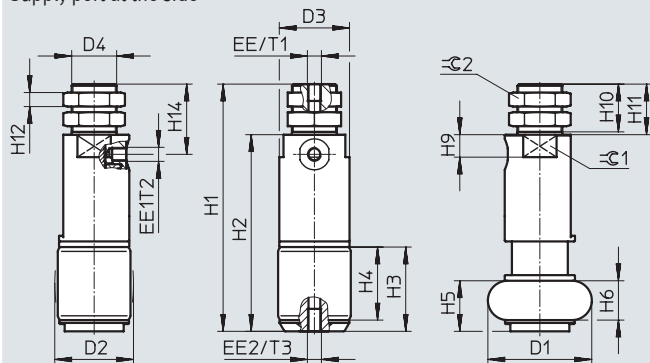
Dimensions

Download CAD data → www.festo.com

DHEB-...-D – Actuation direction: downwards

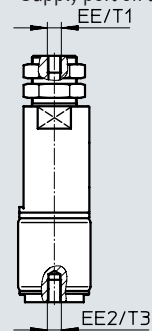
DHEB-...-D-...-P

Supply port at the side



DHEB-...-D-...-L

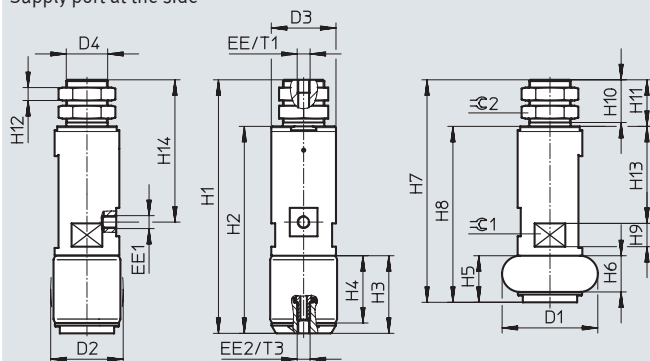
Supply port on top



DHEB-...-U – Actuation direction: upwards

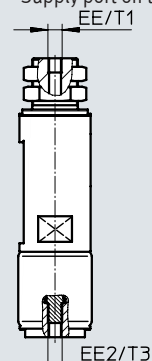
DHEB-...-U-...-P

Supply port at the side



DHEB-...-U-...-L

Supply port on top



Size [mm]	D1 ø ±1	D2 ø ±1	D3 ø	D4		EE	EE1	EE2	H1	
				DHEB-...-D	DHEB-...-U				DHEB-...-D ±1	DHEB-...-U ±1
8	11	8	14	M10x1	M10x1	M5	M3	M2	52.7	57.5
10	14	10.5	14	M10x1	M10x1	M5	M3	M2	54.2	58.8
12	17	13	14	M12x1	M10x1	M5	M3	M3	55.5	60.5
14	19.5	15	14	M12x1	M10x1	M5	M3	M3	55.8	64
18	25	19.5	18	M12x1	M12x1	M5	M5	M3	65	72.5
22	31.5	24	21.5	M14x1	M14x1	M5	M5	M3	75.5	82
27	37	28	25	M16x1	M16x1	M5	M5	M5	88	98
33	45	34	30	M22x1.5	M22x1.5	G1/8	M5	G1/8	109	116
41	54	42	40	M22x1.5	M22x1.5	G1/8	M5	G1/8	126.5	131
51	68	54	50	M26x1.5	M26x1.5	G1/8	G1/8	G1/8	159	160
63	85	66	60	M26x1.5	M26x1.5	G1/8	G1/8	G1/8	189	185

Data sheet

Size [mm]	H2		H3	H4	H5	H6	H7	H8
	DHEB-...-D ±1	DHEB-...-U ±1						
8	39.7	44.5	9.2	7	5.2	3	53.5	40.5
10	41.2	45.5	10.7	8.5	6.2	4	54	41
12	42.5	47.5	13	10.5	7.5	5	55	42
14	42.8	51	15.8	13	8.8	6	57	44
18	51	58.5	19.5	16.5	12	9	65	51
22	60.5	67	24.2	21	14.2	11	72	57
27	70	80	30.5	26.5	18	14	86	68
33	84	91	37	32.5	22.5	18	101.5	76.5
41	101.5	106	45	39.5	29.5	24	115.5	90.5
51	127	128	55	48	37	30	142	110
63	157	153	70	61	45	36	160	128

Size [mm]	H9		H10		H11	H12		H13	H14	
	DHEB-...-D	DHEB-...-U	DHEB-...-D ±1	DHEB-...-U ±1		DHEB-...-D	DHEB-...-U		DHEB-...-D ±0.5	DHEB-...-U ±0.5
8	6	–	12	12	13	3.5	3.5	21	17.5	35.5
10	6	–	12	12	13	3.5	3.5	21.55	17.5	36
12	6	–	12	12	13	4	3.5	22.4	17.5	36.5
14	6	6	12	12	13	4	3.5	26.2	17.5	38.2
18	6	7	13	13	14	4	4	29	19.3	42
22	7	8	14	14	15	5	5	31.8	21	46.5
27	8	9	17	16.5	18	5	5	37.5	25	55
33	8	10	24	23.5	25	6	6	40.5	31.5	65
41	11	12	23.5	23.5	25	6	6	45	32.5	70
51	13	14	30	30	32	8	8	54	42.5	88.5
63	16	16	30	30	32	8	8	62	46	96.5

Size [mm]	T1		T2	T3		=G1		=G2	
	DHEB-...-D ±2	DHEB-...-U ±2		DHEB-...-D min.	DHEB-...-U min.	DHEB-...-D	DHEB-...-U	DHEB-...-D	DHEB-...-U
8	5	5	–	3.5	3.5	13	13	13	13
10	5	5	–	3.5	3.5	13	13	13	13
12	5	5	–	4	4	13	13	15	13
14	5	5	–	4	4	13	13	15	13
18	5	5	–	4	4	16	16	15	15
22	5	5	–	5	5	19	20	17	17
27	5	5	5	8	–	22	22	19	19
33	8	8	5	8	7	28	27	27	27
41	8	8	6	7	–	36	36	27	27
51	8	9	8	–	–	45	45	32	32
63	10	10	8	–	–	54	54	32	32

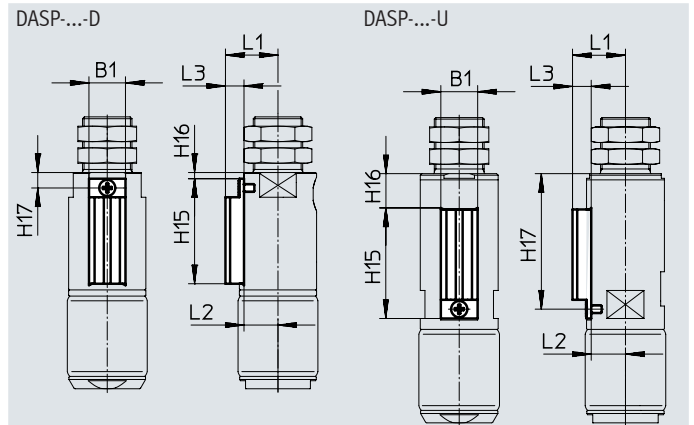
Data sheet

Ordering data – Actuation direction: downwards				
Size	Bellows material		EPDM	
[mm]	Part no.	Type	Part no.	Type
Supply port: on top				
8	1320754	DHEB-8-E-D-S-L	1320765	DHEB-8-E-D-E-L
10	1320755	DHEB-10-E-D-S-L	1320766	DHEB-10-E-D-E-L
12	1320756	DHEB-12-E-D-S-L	1320767	DHEB-12-E-D-E-L
14	1320757	DHEB-14-E-D-S-L	1320768	DHEB-14-E-D-E-L
18	1320758	DHEB-18-E-D-S-L	1320769	DHEB-18-E-D-E-L
22	1320759	DHEB-22-E-D-S-L	1320770	DHEB-22-E-D-E-L
27	1320760	DHEB-27-E-D-S-L	1320771	DHEB-27-E-D-E-L
33	1320761	DHEB-33-E-D-S-L	1320772	DHEB-33-E-D-E-L
41	1320762	DHEB-41-E-D-S-L	1320773	DHEB-41-E-D-E-L
51	1320763	DHEB-51-E-D-S-L	1320774	DHEB-51-E-D-E-L
63	1320764	DHEB-63-E-D-S-L	1320775	DHEB-63-E-D-E-L
Supply port: at the side				
8	1320776	DHEB-8-E-D-S-P	1320787	DHEB-8-E-D-E-P
10	1320777	DHEB-10-E-D-S-P	1320788	DHEB-10-E-D-E-P
12	1320778	DHEB-12-E-D-S-P	1320789	DHEB-12-E-D-E-P
14	1320779	DHEB-14-E-D-S-P	1320790	DHEB-14-E-D-E-P
18	1320780	DHEB-18-E-D-S-P	1320791	DHEB-18-E-D-E-P
22	1320781	DHEB-22-E-D-S-P	1320792	DHEB-22-E-D-E-P
27	1320782	DHEB-27-E-D-S-P	1320793	DHEB-27-E-D-E-P
33	1320783	DHEB-33-E-D-S-P	1320794	DHEB-33-E-D-E-P
41	1320784	DHEB-41-E-D-S-P	1320795	DHEB-41-E-D-E-P
51	1320785	DHEB-51-E-D-S-P	1320796	DHEB-51-E-D-E-P
63	1320786	DHEB-63-E-D-S-P	1320797	DHEB-63-E-D-E-P
Ordering data – Actuation direction: upwards				
Size	Bellows material		EPDM	
[mm]	Part no.	Type	Part no.	Type
Supply port: on top				
8	1320798	DHEB-8-E-U-S-L	1320809	DHEB-8-E-U-E-L
10	1320799	DHEB-10-E-U-S-L	1320810	DHEB-10-E-U-E-L
12	1320800	DHEB-12-E-U-S-L	1320811	DHEB-12-E-U-E-L
14	1320801	DHEB-14-E-U-S-L	1320812	DHEB-14-E-U-E-L
18	1320802	DHEB-18-E-U-S-L	1320813	DHEB-18-E-U-E-L
22	1320803	DHEB-22-E-U-S-L	1320814	DHEB-22-E-U-E-L
27	1320804	DHEB-27-E-U-S-L	1320815	DHEB-27-E-U-E-L
33	1320805	DHEB-33-E-U-S-L	1320816	DHEB-33-E-U-E-L
41	1320806	DHEB-41-E-U-S-L	1320817	DHEB-41-E-U-E-L
51	1320807	DHEB-51-E-U-S-L	1320818	DHEB-51-E-U-E-L
63	1320808	DHEB-63-E-U-S-L	1320819	DHEB-63-E-U-E-L
Supply port: at the side				
8	1320820	DHEB-8-E-U-S-P	1320831	DHEB-8-E-U-E-P
10	1320821	DHEB-10-E-U-S-P	1320832	DHEB-10-E-U-E-P
12	1320822	DHEB-12-E-U-S-P	1320833	DHEB-12-E-U-E-P
14	1320823	DHEB-14-E-U-S-P	1320834	DHEB-14-E-U-E-P
18	1320824	DHEB-18-E-U-S-P	1320835	DHEB-18-E-U-E-P
22	1320825	DHEB-22-E-U-S-P	1320836	DHEB-22-E-U-E-P
27	1320826	DHEB-27-E-U-S-P	1320837	DHEB-27-E-U-E-P
33	1320827	DHEB-33-E-U-S-P	1320838	DHEB-33-E-U-E-P
41	1320828	DHEB-41-E-U-S-P	1320839	DHEB-41-E-U-E-P
51	1320829	DHEB-51-E-U-S-P	1320840	DHEB-51-E-U-E-P
63	1320830	DHEB-63-E-U-S-P	1320841	DHEB-63-E-U-E-P

Accessories

Sensor rail DASP

Material:
Anodised wrought aluminium alloy
Copper/PTFE-free
RoHS-compliant

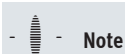


Dimensions and ordering data										
For size	B1	H15	H16	H17	L1	L2	L3	Weight	Part no.	Type
[mm]								[g]		
For bellows gripper DHEB-...-D (direction of movement: downwards)										
27	11.8	34.5	2	5	17	11	6	4	1329132	DASP-G3-27-C-D
33	11.8	41	2	5	19.7	13.7	6	5	1325616	DASP-G3-33-C-D
41	11.8	47	3	6	23.8	17.8	6	5	1355309	DASP-G3-41-C-D
51	11.8	55.5	7	10	28.5	22.5	6	6	1356949	DASP-G3-51-C-D
63	11.8	61	11	14	33.5	27.5	6	7	1359395	DASP-G3-63-C-D
For bellows gripper DHEB-...-U (direction of movement: upwards)										
27	11.8	34.5	12	43.5	17	11	6	4	1329142	DASP-G3-27-C-U
33	11.8	39.5	11	47.5	19.8	13.8	6	5	1323641	DASP-G3-33-C-U
41	11.8	43	13.5	53.5	23.8	17.8	6	5	1355307	DASP-G3-41-C-U
51	11.8	45.5	17	59.5	28.5	22.5	6	6	1356889	DASP-G3-51-C-U
63	11.8	51.5	20	68.5	33.5	27.5	6	7	1359219	DASP-G3-63-C-U

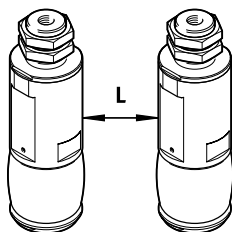
Accessories

Ordering data – Proximity sensor for C-slot, magneto-resistive							Data sheets → Internet: smt
	Type of mounting	Electrical connection, outlet direction of connection	Switching output	Cable length [m]	Part no.	Type	
N/O contact							
	Inserted in the slot lengthwise	Cable, 3-wire, lateral	PNP	2.5	547862	SMT-10G-PS-24V-E-2.5Q-OE	
		Plug M8x1, 3-pin, lateral		0.3	547863	SMT-10G-PS-24V-E-0.3Q-M8D	
		Cable, 3-wire, lateral	NPN	2.5	8065030	SMT-10G-NS-24V-E-2.5Q-OE	
		Plug M8x1, 3-pin, lateral		0.3	8065029	SMT-10G-NS-24V-E-0.3Q-M8D	

Ordering data – Proximity sensor for C-slot						
	Type of mounting	Electrical connection, outlet direction of connection	Switching output	Cable length [m]	Part no.	Type
	N/O contact, magneto-resistive			Data sheets → Internet: smt		
	Inserted in the slot from above	Cable, 3-wire, lengthwise	PNP	2.5	551373	SMT-10M-PS-24V-E-2.5-L-OE
		Plug M8x1, 3-pin, in-line		0.3	551375	SMT-10M-PS-24V-E-0.3-L-M8D
	N/O contact, magnetic reed			Data sheets → Internet: sme		
	Inserted in the slot lengthwise	Cable, 3-wire, lengthwise	Contacting	2.5	173210	SME-10-KL-LED-24
		Plug M8x1, 3-pin, in-line		0.3	173212	SME-10-SL-LED-24

**Note**

When using proximity sensors, ferritic parts (e.g. retaining screws) can cause interference. A minimum distance must therefore be adhered to between the grippers.



Size	27	33	41	51	63
Minimum distance [mm]	20	20	30	15	15

Ordering data – Connecting cables							Data sheets → 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		

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