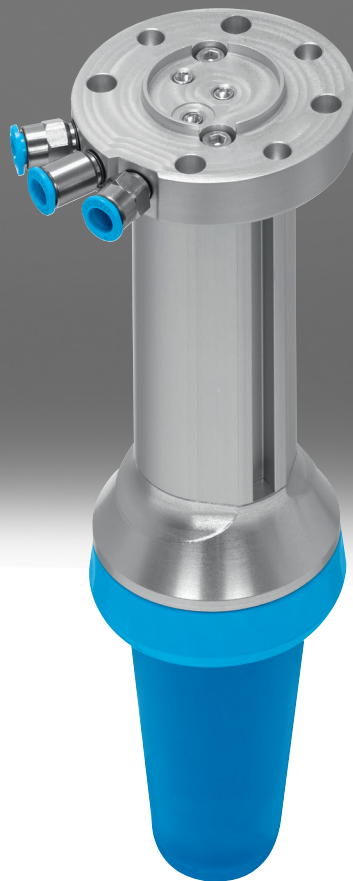


## Adaptive shape gripper DHEF

**FESTO**



### Characteristics

#### At a glance

[Link](#) [dhf](#)

Several gripping benefits are combined in a single model:

- Gripping of parts with undefined positions and shapes
- Positive gripping of products with different geometries
- Positive gripping with suction cup effect
- Gentle gripping of delicate products of varying sizes

Sensors:

- Position sensing with position transmitter or proximity switch

Application options:

- Human-robot collaboration with edgeless grippers
- Unpacking boxes, separating and positioning the parts
- Commissioning and storing

#### Engineering tools

[Link](#) [engineering tools](#)



Save time with engineering tools: Smart engineering for the optimal solution. Our goal is to increase your productivity. Our engineering tools play an integral part in achieving this goal. They help you size your system correctly, tap into unimagined productivity reserves and generate additional productivity along the entire value chain. In every phase of your project, from the initial contact to the modernisation of your machine, you will come across a number of different tools that will be of use to you.

Gripper selection:

- This tool helps you to select the right grippers by simply entering the exact parameters for your application

#### Position sensing

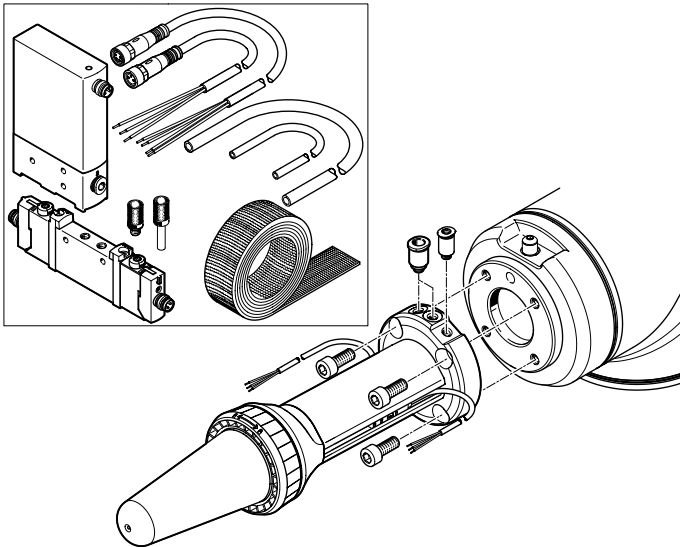
[A] For proximity sensor

By using proximity switches, any position can be detected.

## Characteristics

### Robot connection

[RA50] Flange ISO 9409-1-50-4-M6



The gripper with robot connection DHEF-...-RA50 can be quickly installed on a lightweight robot.

The gripper can be connected to a wide range of robots with the DIN ISO 9409-1-50-4-M6 interface. For example, to robots from the manufacturers:

- Universal Robots
- Fanuc
- Hanwha
- Aubo
- Doosan

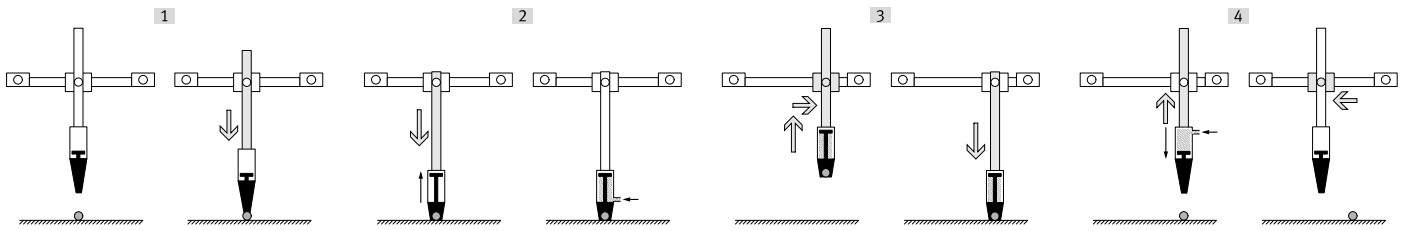
The scope of delivery of the DHEF-...-RA50 gripper with robot connection also includes the necessary accessories:

- Proximity switch
- Valve and pressure regulator
- Connecting cables
- Tubing for connecting the gripper
- QS fittings and silencers
- Velcro strip for fixing the connecting cables and tubing in place
- Mounting screws

The connecting cables can optionally be attached to the outside of the robot arm using the Velcro straps provided to avoid overloading the robot's internal cabling.

## Characteristics

### Overview



Control:

#### [1] Positioning:

- Move the tip of the inverting cap to the object to be gripped
- The inverting cap is supplied with 0.07 ... 0.1 bar via a pressure regulator
- The drive is exhausted

#### [2] Gripping:

- Press the gripper on the object to be gripped until the inverting cap is retracted
- Pressurise the compressed air supply port for retracting in order to hold the object in place

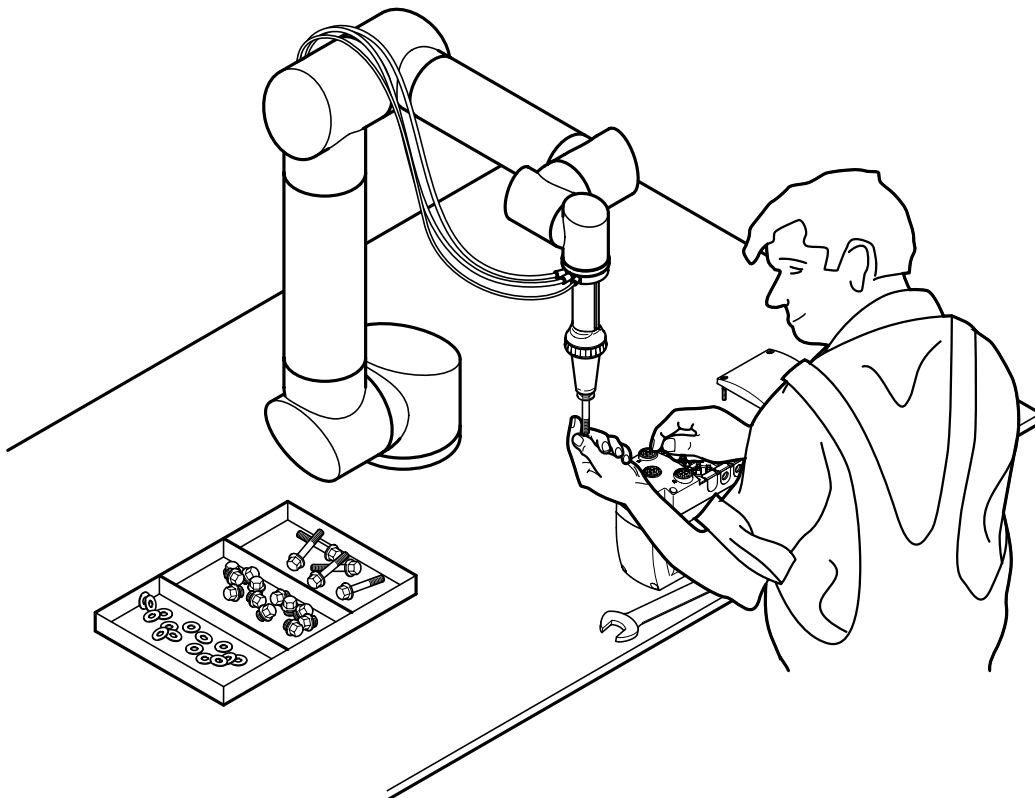
#### [3] Method:

- Move to the set-down position

#### [4] Setting down:

- Exhaust the compressed air supply port for retracting
- The object to be gripped is released
- Move the gripper away from the gripped object
- If the gripper does not release the object it has gripped, the compressed air connection for advancing will have to be pressurised

### Application example



- Human-robot collaboration

## Type code

001	Series	
<b>DHEF</b>	Adaptive shape gripper	

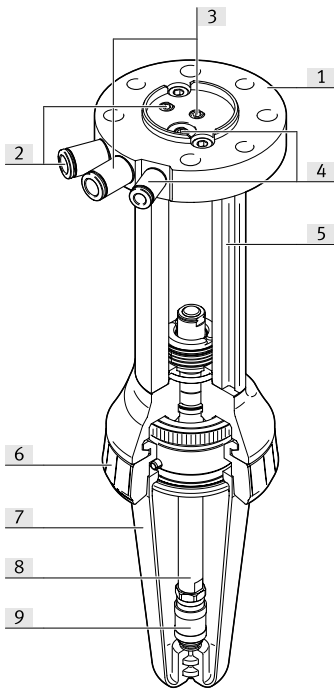
002	Size [mm]	
<b>20</b>	20	

003	Position sensing	
<b>A</b>	For proximity sensor	

004	Robot connection	
	None	
<b>RA50</b>	Flange ISO 9409-1-50-4-M6	

## Datasheet

### The technology in detail



- [1] Direct mounting via interface DIN ISO 9409-1-50-4-M6 (industrial robots – mechanical interfaces)
- [2] Compressed air connection, retracting
- [3] Compressed air connection, extending
- [4] Compressed air connection, inverting cap
- [5] T-slot for mounting the sensors (both sides)
- [6] Bayonet lock
- [7] Inverting cap
- [8] Piston rod
- [9] Releasing ring for replacing the inverting cap

### General technical data

The technical data is valid for the following conditions:

- Gripping object: Steel ball
- Diameter: 30 mm
- Weight: 390 g
- Smooth, lathed surface

The values may differ if another type of object needs to be gripped.  
Sharp-edged gripped objects can affect the service life of the inverting cap.

Size	20
Stroke	66 mm
Design	Inverting cap Force pilot operated motion sequence
Inverting cap version	Standard
Drive system	Pneumatic
Mode of operation	Double-acting
Guide	Basic guide
Gripper function	Adaptive
Pneumatic connection	M5
Max. operating frequency of gripper	1 Hz
Position detection	Via proximity switch
Type of mounting	To ISO 9409
Mounting position	optional
Min. $\varnothing$ to be gripped	12 mm
Max. $\varnothing$ to be gripped	38 mm
Dynamic lateral force with max. projection	2.3 N
Mass moment of inertia	1.29 kgcm <sup>2</sup>
Guide value for effective load	1 kg

## Datasheet

Operating and environmental conditions		
Size	20	
Robot connection	None	Flange ISO 9409-1-50-4-M6
Operating pressure of ball valve drive unit	1 ... 8 bar	
Operating pressure of cap	0.07 ... 0.1 bar	
Burst pressure of cap	0.3 bar	
Operating medium	Compressed air to ISO 8573-1:2010 [7:4:4]	
Note on operating and pilot medium	Lubricated operation not possible	
Recommended flow rate for pressure regulator	10 l/min	
Ambient temperature <sup>1)</sup>	0 ... 60°C	
Suitable for use with food	See supplementary material information	–
Corrosion resistance class CRC <sup>2)</sup>	2 - Moderate corrosion stress	
Scope of delivery	–	1x Velcro® roll 1x solenoid valve 1x proportional-pressure regulator 2x proximity switches 3x connecting cables

1) Note the operating range of the proximity switches

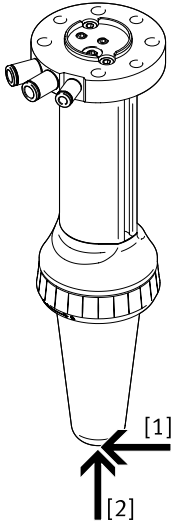
2) More information: [www.festo.com/x/topic/crc](http://www.festo.com/x/topic/crc)

Weight		
Size	20	
Product weight	475 g	
Moving mass	60 g	
Note on the moving mass	Without inverting cap	

Materials		
Size	20	
Material housing	Anodised aluminium	
Material cap	VMQ (silicone)	
Locking cover material	PA	
LABS (PWIS) conformity	VDMA24364 zone III	
Note on materials	RoHS-compliant	

## Datasheet

### Forces and impact energy



- [1] Holding force perpendicular to the gripper axis
- [2] Holding force parallel to the gripper axis

Size	20
Theoretical force at 0.6 MPa (6 bar, 87 psi), advance stroke	158 N
Theoretical force at 0.6 MPa (6 bar, 87 psi), return stroke	189 N
Contact force on the gripping object <sup>1)</sup>	20 N
Static holding force parallel to the gripper axis	26 N
Static holding force perpendicular to the gripper axis	45 N
Impact energy in end positions	0.1 J

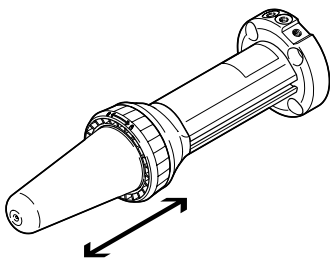
1) In depressurised state

### Speeds

Size	20
Max. speed without gripped object	290 mm/s
Max. speed during gripping <sup>1)</sup>	120 mm/s

1) The gripper must be throttled

### Retracting and advancing times



The indicated retracting and advancing times are valid for the following conditions:

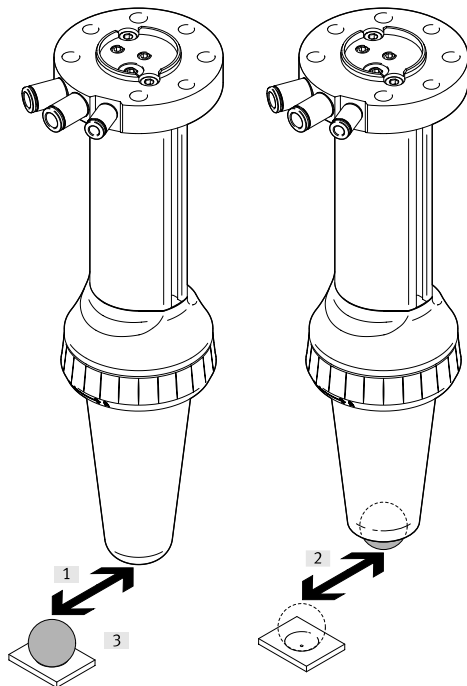
- Operating pressure of 0.6 MPa (6 bar, 87 psi)
- Horizontal mounting position
- Without gripped object

Size	20
Return-stroke time	290 ms
Advance time	270 ms



## Datasheet

## Pick-up and placement tolerances



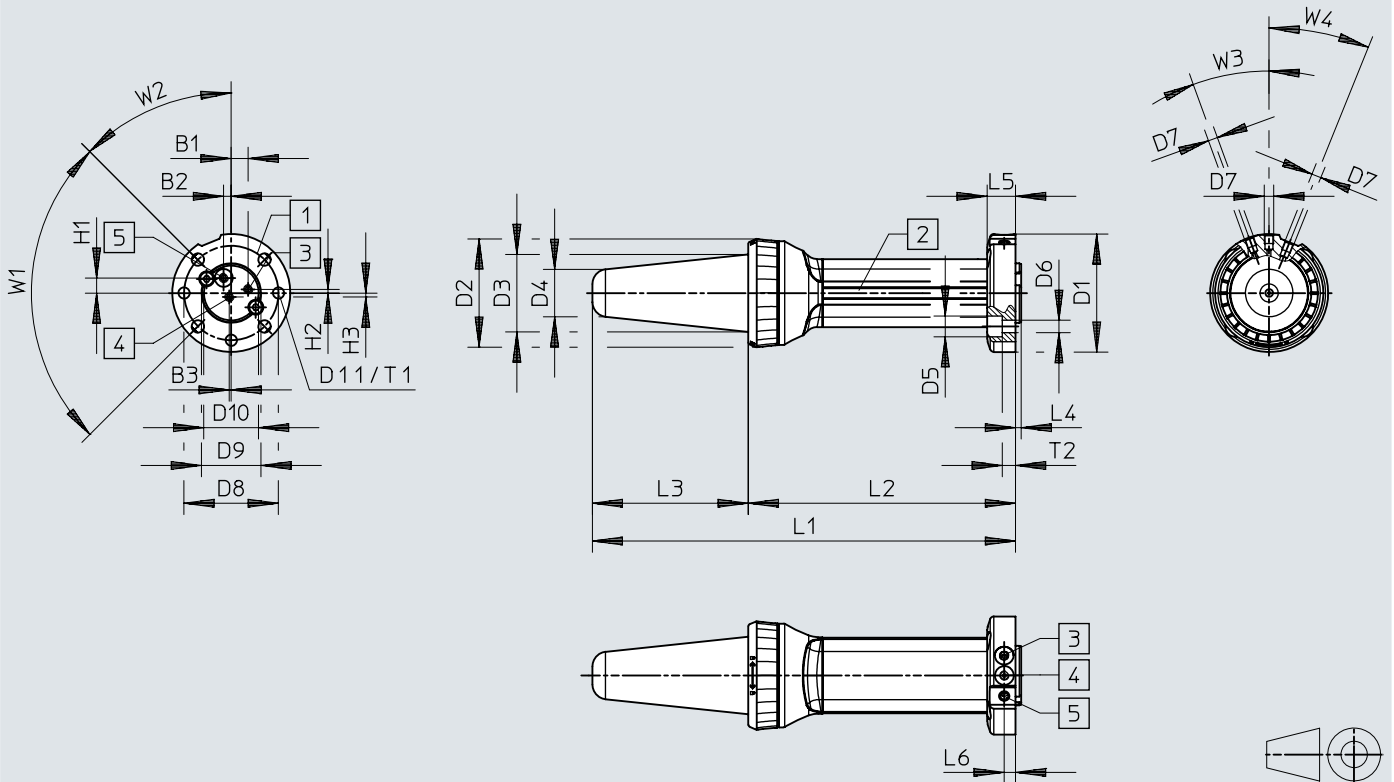
- [1] Pick-up tolerance
- [2] Placement tolerance
- [3] Object to be gripped

Size	20
Pick-up tolerance	$\pm 4$ mm
Placement tolerance	$\pm 2$ mm

## Dimensions

Dimensions – Adaptive shape gripper

Download CAD data [www.festo.com](http://www.festo.com)




- [1] Mechanical interface/mounting flange suitable for DIN ISO 9409-1-50-4-M6 (industrial robots – mechanical interfaces)
- [2] T-slot for mounting the sensors (both sides)
- [3] Compressed air supply port for retracting
- [4] Compressed air supply port for extending
- [5] Compressed air supply port for inverting cap

	B1	B2	B3	D1	D2	D3	D4	D5	D6	D7
				∅	∅	∅	∅	∅	∅	∅
DHEF-20	9	4	1	62,5	57,5	41	25	11	6,6	M5

	D8	D9	D10	D11	H1	H2	H3	L1	L2	L3
	∅	∅ f9	∅	∅ H8						
DHEF-20	50	31,5	29	6	8	2	2	224	141,5	82,5

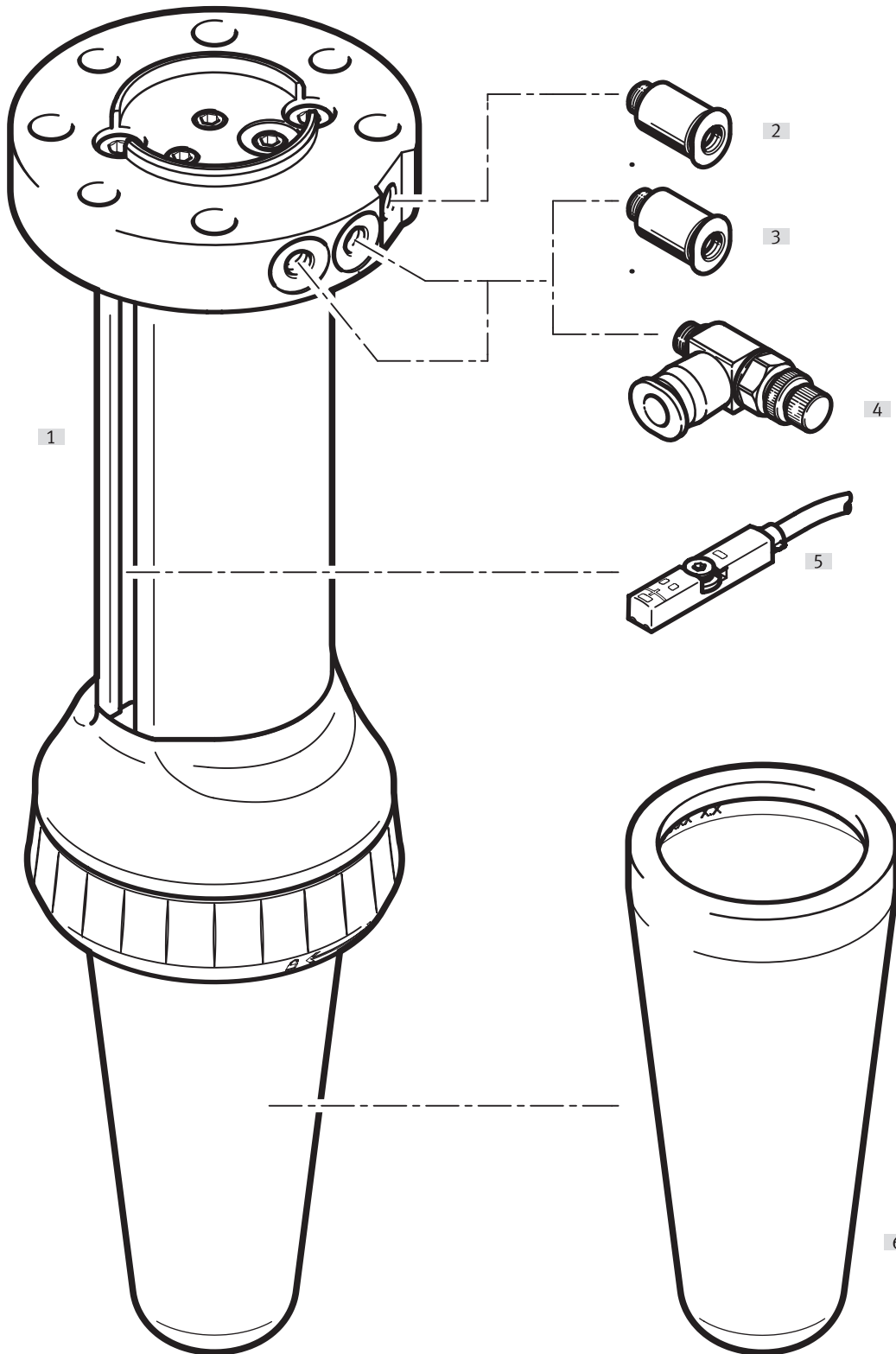
	L4	L5	L6	T1	T2	W1	W2	W3	W4
DHEF-20	3	15	6	8,5	7	90°	45°	20°	22°

## Ordering data

Adaptive shape gripper DHEF					
	Size	Stroke	Robot connection	Part no.	Type
	20	66 mm	None	<b>8092533</b>	<b>DHEF-20-A</b>
			Flange ISO 9409-1-50-4-M6	<b>8210811</b>	<b>DHEF-20-A-RA50</b>

Peripherals

Peripherals overview



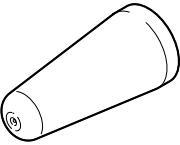
Accessories		→ Link
Type/order code	Description	
[1] Adaptive shape gripper DHEF	Double-acting	<a href="#">dhef</a>
[2] Push-in fitting QSM	For connecting tubing with standard O.D	<a href="#">16</a>
[3] Push-in fitting QSMLV	For connecting tubing with standard O.D.	<a href="#">16</a>
[4] One-way flow control valve GRLA	For regulating speed	<a href="#">14</a>

## Peripherals


Accessories		→ Link
Type/order code	Description	
[5] Proximity switches SMT-8	For position sensing	<a href="#">14</a>
[5] Position transmitter SDAT/SMAT/SDAS	For sensing the current position	<a href="#">15</a>
[6] Inverting cap DHAS	<ul style="list-style-type: none"> <li>• Included in the scope of delivery of the gripper</li> <li>• Also available as accessories</li> </ul>	<a href="#">14</a>
[7] Precision pressure regulator LRP	For manually regulating the operating pressure of the inverting cap	<a href="#">14</a>
[8] Proportional-pressure regulator VEAB	For electronically regulating the operating pressure of the inverting cap	<a href="#">14</a>

Accessories

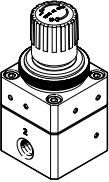
Inverting cap DHAS – Spare part for gripper

	Material cap	Product weight	Part no.	Type
	VMQ (silicone)	18 g	8097634	DHAS-GA-B22-S

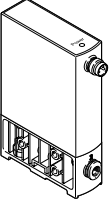
One-way flow control valves GRLA – for exhaust air

	Pneumatic connection, port 2	Pneumatic connection 1	Product weight	Part no.	Type
	M5	Push-in connector 3 mm	13 g	193137	GRLA-M5-QS-3-D
		Push-in connector 4 mm		★ 193138	GRLA-M5-QS-4-D

Precision pressure regulator LRP – for regulating the operating pressure of the inverting cap, manual

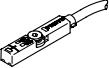
	Pressure regulation range	Product weight	Part no.	Type
	0.05 ... 0.7 bar	310 g	159500	LRP-1/4-0,7

Proportional-pressure regulator VEAB – for regulating the operating pressure of the inverting cap, electronic

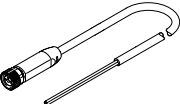
	Signal range analogue output	Output pressure 2	Product weight	Part no.	Type
	0 - 10 V	0.001 ... 0.2 bar	70 g	8046301	VEAB-L-26-D12-Q4-V1-1R1
	4 - 20 mA			8046302	VEAB-L-26-D12-Q4-A4-1R1

Proximity switch SMT-8M for T-slot, magneto-resistive

[Link](#) 

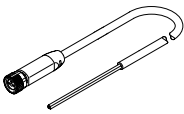
	Type of mounting	Switching output	Electrical connection	Cable length	Part no.	Type
	Screw-clamped, insertable in the slot from above	3-wire NPN N/O contact	Open end	2.5 m	★ 574338	SMT-8M-A-NS-24V-E-2,5-OE
			Plug M8, A-coded	0.3 m	574339	SMT-8M-A-NS-24V-E-0,3-M8D
		3-wire PNP N/O contact	Open end	2.5 m	★ 574335	SMT-8M-A-PS-24V-E-2,5-OE
			Plug M8, A-coded	0.3 m	★ 574334	SMT-8M-A-PS-24V-E-0,3-M8D

Connecting cables NEBA, straight

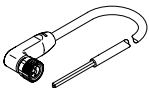
	Electrical connection 1, connector system	Electrical connection 2, connector system	Electrical connection 2, number of connections/cores	Cable length	Part no.	Type
	M8x1, A-coded, to EN 61076-2-104	Open end	3	2.5 m	★ 8078223	NEBA-M8G3-U-2.5-N-LE3

## Accessories

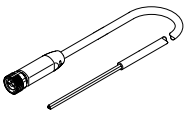
## Connecting cables NEBA, straight

	Electrical connection 1, connector system	Electrical connection 2, connector system	Electrical connection 2, number of connections/cores	Cable length	Part no.	Type
	M8x1, A-coded, to EN 61076-2-104	Open end	3	5 m	★ 8078224	NEBA-M8G3-U-5-N-LE3

## Connecting cables NEBA, angled

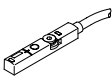
	Electrical connection 1, connector system	Electrical connection 2, connector system	Electrical connection 2, number of connections/cores	Cable length	Part no.	Type
	M8x1, A-coded, to EN 61076-2-104	Open end	3	2.5 m	★ 8078230	NEBA-M8W3-U-2.5-N-LE3
				5 m	★ 8078231	NEBA-M8W3-U-5-N-LE3

## Connecting cables NEBA, straight, for the gripper's connecting plugs

	Electrical connection 1, connector system	Electrical connection 2, connector system	Electrical connection 2, number of connections/cores	Cable length	Part no.	Type
	M8x1, A-coded, to EN 61076-2-104	Open end	3	5 m	★ 8078224	NEBA-M8G3-U-5-N-LE3

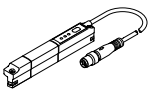
## Position transmitter SDAS for T-slot, connector M8, A-coded

Link [sdas](#)

	Description	Sensing range	Electrical connection 1, number of connections/cores	Cable length	Part no.	Type
	Operating modes: two adjustable switching outputs; IO-Link®	52 mm	4	0.3 m	8063974	SDAS-MHS-M40-1L-PNLK-PN-E-0.3-M8
				2.5 m	8063975	SDAS-MHS-M40-1L-PNLK-PN-E-2.5-LE

## Position transmitter SDAT for T-slot, M8 plug, A-coded

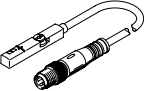
Link [sdatt](#)

	Sensing range	Analogue output	Electrical connection 1, number of connections/cores	Cable length	Part no.	Type
	0 ... 50.000 mm	4 - 20 mA	4	0.3 m	1531265	SDAT-MHS-M50-1L-SA-E-0.3-M8

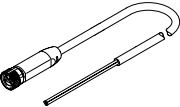
Accessories

Position transmitter SMAT for T-slot, M8 plug, A-coded

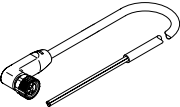
[Link](#) 

	Sensing range	Analogue output	Electrical connection 1, number of connections/cores	Cable length	Part no.	Type
	52 mm	0 - 10 V	4	0.3 m	553744	SMAT-8M-U-E-0,3-M8D


Connecting cables NEBA, straight

	Electrical connection 1, connector system	Electrical connection 2, connector system	Electrical connection 2, number of connections/cores	Cable length	Part no.	Type
	M8x1, A-coded, to EN 61076-2-104	Open end	4	2.5 m	★ 8078227	NEBA-M8G4-U-2.5-N-LE4
				5 m	★ 8078228	NEBA-M8G4-U-5-N-LE4


Connecting cables NEBA, angled

	Electrical connection 1, connector system	Electrical connection 2, connector system	Electrical connection 2, number of connections/cores	Cable length	Part no.	Type
	M8x1, A-coded, to EN 61076-2-104	Open end	4	2.5 m	★ 8078233	NEBA-M8W4-U-2.5-N-LE4
				5 m	★ 8078234	NEBA-M8W4-U-5-N-LE4

Push-in fitting QSM

	Pneumatic connection 1	Pneumatic connection, port 2	Product weight	Part no.	Type
	Male thread M5	For tubing outer diameter of 3 mm	3.2 g	153313	QSM-M5-3-I
		For tubing outside diameter of 4 mm	3 g	★ 153315	QSM-M5-4-I
		For tubing outside diameter of 6 mm	4.4 g	★ 153317	QSM-M5-6-I

Push-in L-fitting QSMLV

	Pneumatic connection 1	Pneumatic connection, port 2	Product weight	Part no.	Type
	Male thread M5	For tubing outer diameter of 3 mm	5.1 g	130830	QSMLV-M5-3-I
		For tubing outside diameter of 4 mm	5 g	★ 130831	QSMLV-M5-4-I