

DHEF

Adaptive shape gripper



Instructions | Operating

8102537
2019-01
[8102539]



Translation of the original instructions

1 Further applicable documents



All available documents for the product → www.festo.com/pk.

2 Safety

2.1 Safety instructions

- Take into consideration the ambient conditions at the location of use.
- Only use the product in original status without unauthorised modifications.
- Observe labelling on the product.
- Store the product in a cool, dry, UV-protected and corrosion-protected environment. Ensure that storage times are kept to a minimum.
- Prior to mounting, installation and maintenance work: Switch off compressed air supply and secure it from being switched back on.
- Observe tightening torques. Unless otherwise specified, the tolerance is $\pm 20\%$.

2.2 Intended use

The product is intended to be used for gripping objects from the outside.

2.3 Foreseeable misuse

The product is not intended for use as a stopper cylinder, shock absorber or linear drive.

2.4 Training of qualified personnel

Installation, commissioning, maintenance and disassembly should only be conducted by qualified personnel.

The skilled personnel must be familiar with the installation of pneumatic control systems.

3 Further information

- Accessories → www.festo.com/catalogue.
- Spare parts → www.festo.com/spareparts.

4 Service

Contact your regional Festo contact person if you have technical questions → www.festo.com.

5 Product overview

5.1 Function

When the supply ports are pressurized, a piston rod moves out and in. The internal piston rod is connected to the tip of the inverting cap. When the piston rod is retracted, the inverting cap is turned inside out. This forms an indentation of the surface of the inverting cap in which an object is enclosed and gripped.

5.2 Product design

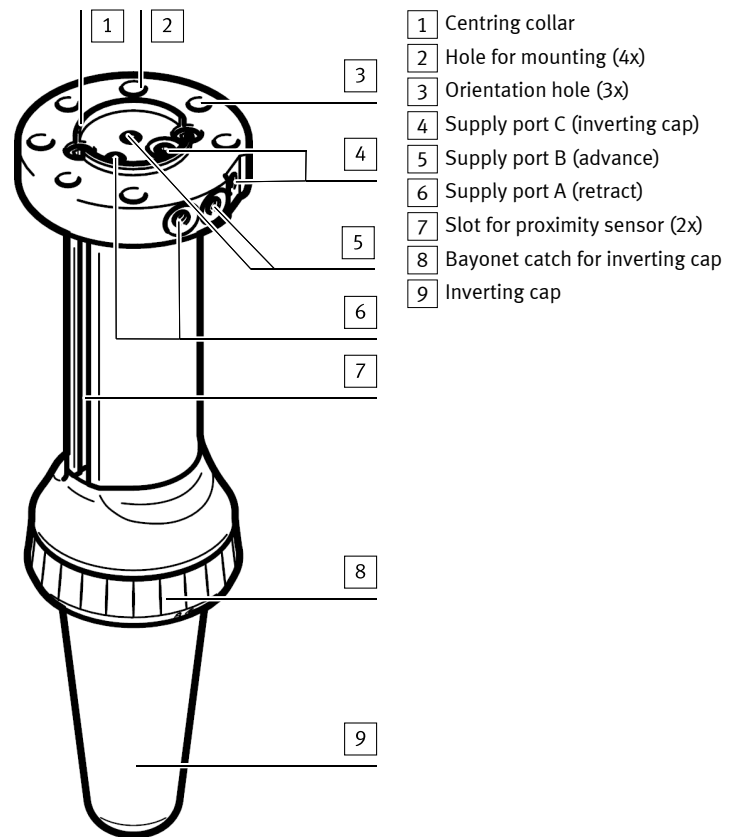


Fig. 1 Product design DHEF

6 Mounting

6.1 Assembly of product

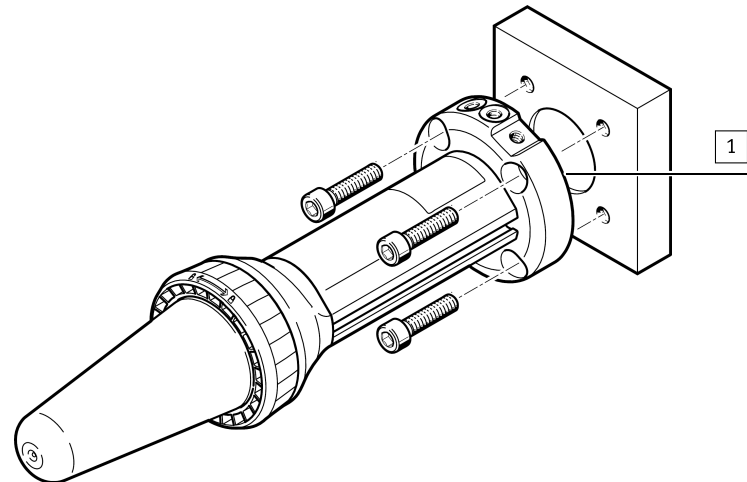


Fig. 2 Mounting DHEF



The DHEF fits into a mounting interface in accordance with ISO 9409-1-50-4-M6:2004-03.

1. Use the centring collar **1** ($\varnothing 31.5$ mm) for centring.
2. Mount adaptive shape gripper with 4 screws (M6).

6.2 Mounting accessories

If required:

- Use one-way flow control valves directly in the supply ports.
 - ↳ They can be used to adjust the retraction and extension speed.

To query the piston position:

- Use proximity sensors in the slot **7** → www.festo.com/catalogue.

7 Pneumatic installation

Requirement:

1. Adjust pressure for the inverting cap at the port [4] with a pressure regulator.
2. Maintain maximum pressure → 13 Technical data. Recommended pressure regulators → www.festo.com/catalogue.

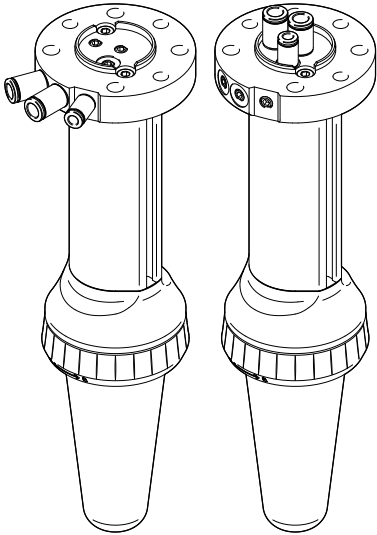


Fig. 3 Alternative pneumatic ports

- Connect hoses to supply ports [4] to [6] → 5.2 Product design. Alternative ports (axial) are delivered closed with plug screws and must be opened as required.



To avoid confusion:

- Use a smaller hose diameter for port [4].

8 Commissioning

Requirements

- Objects must always be approached centrally only with the adaptive shape gripper to eliminate the possibility of transverse loads on the piston rod.
- The inverting cap must be continuously pressurised with low pressure → 7 Pneumatic installation.
- For use in the human-robot collaboration area: use face connections.
- Do not use pointed objects with sharp edges. They may damage the inverting cap and affect its function.
- Maintain permissible velocities (with/without gripped object) and note the gripper stroke → 13 Technical data.

Initial position for test run:

- adaptive shape gripper is advanced.
- Supply ports [5] and [6] are exhausted.

Processing

- Start test run in the specified sequence and process the required tests.

Test run	Tests
without gripped object	<ul style="list-style-type: none"> – Supply ports are correctly allocated. – Permissible velocities are maintained. – Operating pressure in the inverting cap is maintained.
with gripped object	<ul style="list-style-type: none"> – Object remains gripped in the inverting cap throughout the gripping cycle.

Tab. 1 Tests in the test run

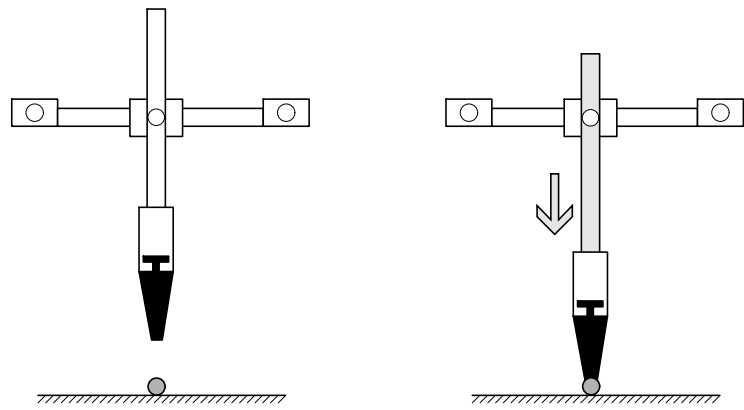


Fig. 4 Approach gripped object

1. Move advanced inverting cap tip to the object.

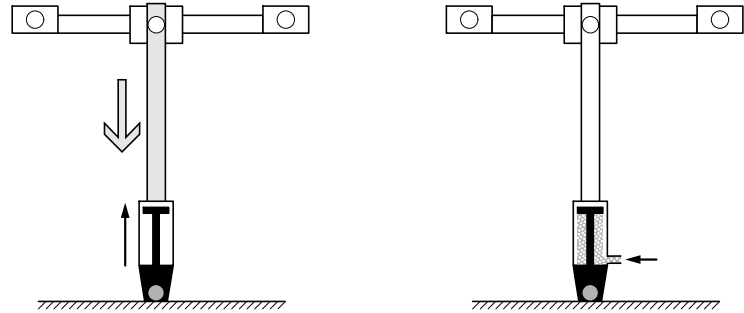


Fig. 5 Grip object

2. Press adaptive shape gripper on the object until the complete inverting cap tip is retracted. Maintain recommended stroke of 63 mm, otherwise the internal piston will travel to the stop.
3. Pressurise supply port [6] for retraction.
 - ↳ The object is gripped.

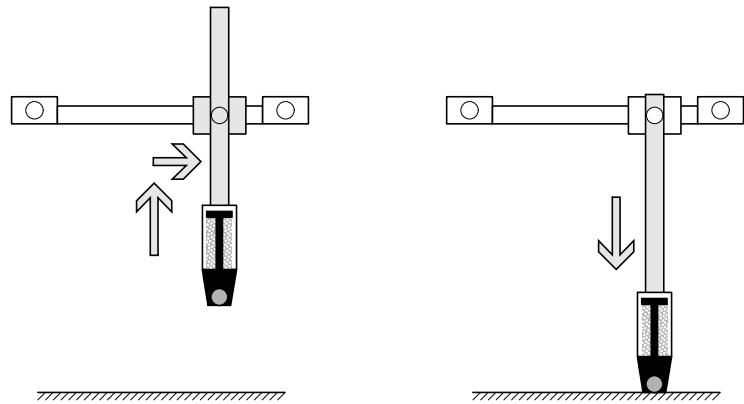


Fig. 6 Move gripped object

4. Move adaptive shape gripper to the placement position.

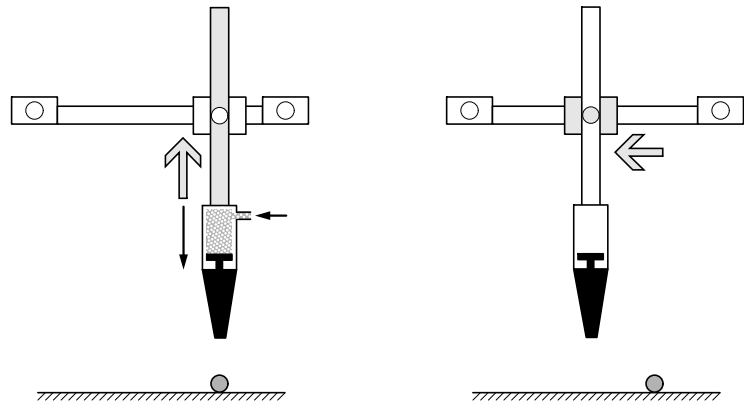


Fig. 7 Place gripped object

5. Move adaptive shape gripper away from the object and exhaust the supply port [6]. The operating pressure of the inverting cap is generally sufficient to press the inverting cap outwards.
 - ↳ The inverting cap advances and the object is in the placement position. If the operating pressure in the inverting cap is not sufficient: pressurise the supply port [5] for advancing.

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If the adaptive shape gripper is moved away slower than the inverting cap advances, the extension force of the gripper presses on the object. If necessary, reduce the operating pressure of the gripper.

9 Operation

Inspect inverting cap

Inspect the inverting cap for wear every day.

10 Maintenance

10.1 Replacement

Replacing inverting cap

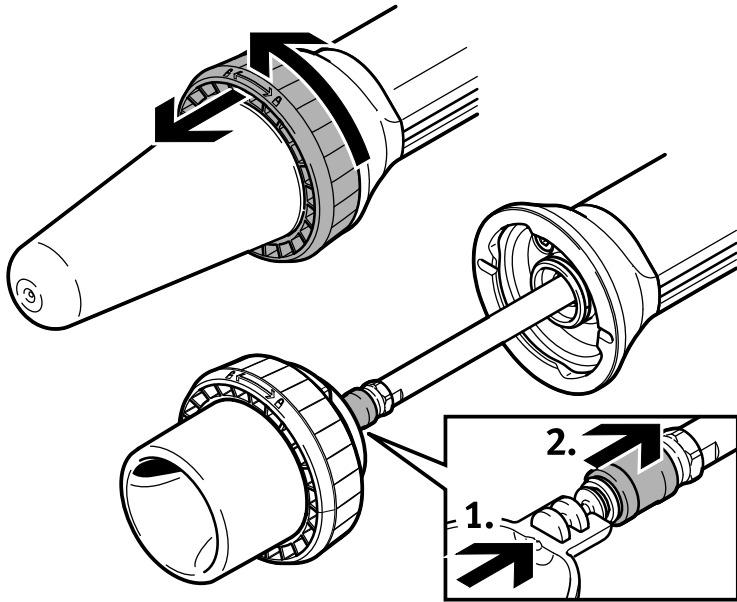


Fig. 8 Replacing inverting cap

1. Exhaust adaptive shape gripper (including inverting cap).
2. Open bayonet catch and evert inverting cap.
3. Press the inverting cap tip into the coupling and at the same time push the releasing ring towards the piston rod. This releases the inverting cap from the coupling.
4. Mount new inverting cap → assembly instructions for the inverting cap.

10.2 Clean product

- Clean the outside of the product with a soft cloth as required. Cleaning agents include all non-abrasive media.

11 Fault clearance

Error description	Cause	Remedy
Adaptive shape gripper does not grip object tightly or loses it during transport.	Pressure is too low.	Increase operating pressure (drive) (only to the max. permitted value).
	Gripping speed is too fast.	Reduce speed
	Inverting cap is dirty.	Clean inverting cap.
	Inverting cap is worn.	Replace inverting cap.
	Control variant unsuitable	Contact Festo Service.
	Object is incorrectly aligned.	Change orientation of object.
	Operating pressure (cap) too low with small objects.	Increase operating pressure (cap) (only to the max. permitted value).
Adaptive shape gripper does not move.	Object is unsuitable for the adaptive shape gripper.	Contact Festo Service.
	No compressed air or operating pressure is too low.	Check supply ports or increase operating pressure of the gripper (only to the max. permitted value).
	Adaptive shape gripper is defective.	Send adaptive shape gripper to Festo.

Tab. 2 Fault clearance

12 Disposal

Dispose of the product and packaging at the end of its useful life through environmentally friendly recycling in accordance with applicable regulations.

13 Technical data

Type code	DHEF-20-A	
Function	pneumatically operated gripper with inverting cap	
Pneumatic connection	M5	
Mounting position	Any	
Stroke	[mm]	66
Operating medium	Compressed air to ISO 8573-1:2010 [7:4:4]	
Information on operating medium	Lubricated operation not possible	
Operating pressure of drive	[bar]	1 ... 8
Operating pressure of cap	[bar]	0.07 ... 0.1 (nominal pressure: 0.08)
Recommended min. flow rate for pressure regulator	[l/min]	10
Max. speed without gripped object	[mm/s]	290
Max. speed for picking up gripped object	[mm/s]	120 ¹⁾
Ambient temperature	[°C]	0 ... +60
Storage temperature	[°C]	-20 ... +80
Max. operating frequency	[Hz]	1
Force at 6 bar		
- Retracting	[N]	158
- Advancing	[N]	189
Permissible transverse load, dynamic	[N]	2.3 ²⁾
Max. permissible impact energy at the end positions	[J]	0.1
Materials		
- Housing, cover	Anodised aluminium	
- Inverting cap	VMQ (silicone)	
- Scraper	TPE	
- Locking cover	Polyamide	
- Note on materials	Includes substances containing PWIS ³⁾	
Product weight	[g]	475

1) adaptive shape gripper must be restricted.

2) at maximum advance

3) PWIS = paint-wetting impairment substances

Tab. 3 Technical data DHEF