

The automated chameleon tongue

The adaptive shape gripper DHEF by Festo can pick up anything

Gripping workpieces just as a chameleon's tongue grips insects – that is the operating principle of the adaptive shape gripper DHEF from Festo. This unusual gripper can pick up, gather and set back down again objects of many different shapes without the need for manual adjustment.

The silicone cap of the adaptive shape gripper DHEF can fold itself over and grip objects of virtually any shape. This creates a firm, form-fitting hold. The elastic silicone enables the gripper to precisely adapt to a wide range of geometries. When combined with a pneumatic drive, the adaptive shape gripper requires little energy for a secure grip.

Formless, round, sensitive

Unlike the mechanical grippers currently available on the market that can only grip specific components, the adaptive shape gripper is extremely flexible. It can even manage components with freely formed shapes and round geometries. The absence of sharp edges makes it ideal for gripping sensitive objects such as air nozzles or trim strips. In principle, the gripper can pick up several parts in one movement, for example nuts from a bowl.

This means that the bionic gripper can be used to handle small parts in classic machine building, in the electronic or automotive industry, in supply units for packaging installations, for human-robot interaction during assembly tasks or for prosthetic extensions in medical technology.

Practical product characteristics

The gripper has an elastic silicone membrane that is flexible and pliable; once it is supplied with compressed air and the standardised robot interface with integrated air connections has been added, it is ready to be used as a practical automation component. The standard sensor slot for position sensing as well as the bayonet lock for easy replacement of the cap are additional useful features.

Nature as a model

The unique combination of force and form fitting of the chameleon's tongue can be observed when it is on the hunt for insects. Once the chameleon has its prey in its sights, its tongue

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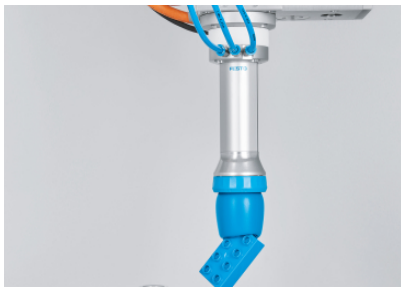
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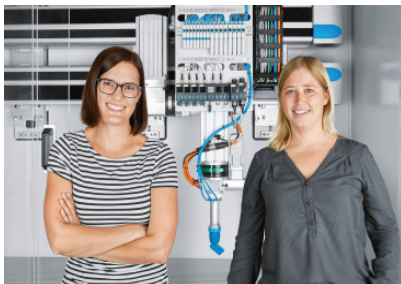
shoots out like a rubber band. Just before the tip of the tongue reaches the insect, it retracts in the middle whilst the edges continue to move forwards. This allows the tongue to adapt to the shape and size of the prey and firmly enclose it. The prey sticks to the tongue and is pulled in as though caught on a fishing line. The Festo Bionic Learning Network with researchers from the University of Oslo used these observations when developing a prototype with the name "FlexShapeGripper".

Press Images



DHEF Adaptive Shape Gripper 1

Adaptive shape gripper DHEF: like a chameleon's tongue, it reliably grasps irregular, round and sensitive objects. Festo's gripper won the internationally acclaimed iF Design Award and Red Dot Design Award for this extraordinary gripping ...



Stefanie Seiler and Nenja Rieskamp

Stefanie Seiler (Product Management, on the left) und Nenja Rieskamp (Product Development).