

Chameleon's tongue for industrial automation wins design prizes

Festo's adaptive shape gripper DHEF grabs prestigious awards

Grasping workpieces like a chameleon's tongue – that's the functional principle of Festo's adaptive shape gripper DHEF. The gripper can thus pick, gather and place objects of many different shapes without any need for manual changeovers. This is why it won renowned distinctions in 2020 including the iF Design Award and the Red Dot Design Award.

The iF Design Award is one of the world's most important design prizes. It honors design achievements in all disciplines: product, packaging, communication and service design, architecture and interior design, as well as professional concepts. Red Dot is synonymous with being amongst the best in design and business. As an international design competition, the Red Dot Design Award is intended for all who want to distinguish their business activities by means of design.

The following functional principle convinced the jurors of the two coveted design awards: 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 standardized 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 is 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 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

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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".

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Festo at a glance

Festo, the world's leading supplier of automation technology and technical education, is deploying its products and services to meet the challenges of digitization and smart production. Founded in 1925, the family-owned company based in Esslingen, Germany supports a wide range of needs for advanced solutions in factory and process automation. Festo Canada, celebrating its 50th anniversary this year, has been continuously elevating the state of manufacturing in this country with innovative products, optimized motion control solutions and unrivalled support. Globally, some 300,000 customers put their trust in the company's pneumatic and electric drive products and technology. In addition, Festo Didactic provides state-of-the-art training equipment and educational programs for industrial companies and educational institutions – about 56,000 customers worldwide. The Festo Group registered sales of €3.45 billion in 2024 financial year and is represented worldwide at 250 locations with about 20,600 employees. More than 8% of its annual turnover is invested in research and development.