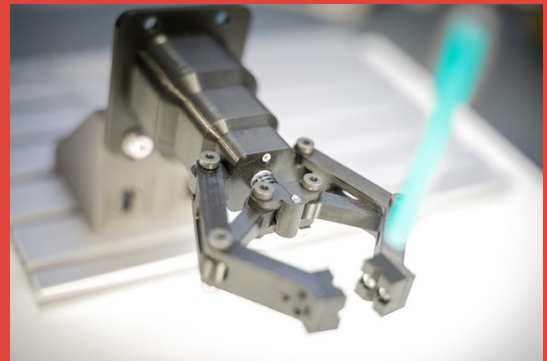




FRAUNHOFER ADAPTRONICS ALLIANCE



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- 1 Variable adjustment of the gripping force
- 2 Sensitive gripping of sensitive components

FORCE-SENSITIVE SHAPE MEMORY ALLOY GRIPPER

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Innovation

Robot grippers are usually powered by electric motors or pneumatics. These take up a lot of space and require a high weight for stabilization. Grippers based on a shape memory alloy (SMA) do not require rotating parts and complex sensor technology. Equipped with a force-sensitive measuring strip and a thermocouple, the gripper is driven by a SMA wire. When the wire is heated, the gripper closes. If the wire cools down, the gripper is pushed apart again by a return spring.

Background and Technology

The wire offers a wide range of applications, requires little space and is cost-effective. The material is also characterized by a very high energy density. Elongations of up to 8% of the wire length are possible, resulting in displacements. Due to the diameter of only 0.3 mm, the wire can already be heated by a low current of max. 1.5 Ampere. In view of the

non-linear material properties, intelligent control is required. The values of the force or temperature sensor serve as input variables for control. The force sensor measures forces up to 10 Newton, so that the gripping force can be adjusted very precisely. The temperature sensor is attached directly to the wire. The demonstrator shows how even thin-walled, sensitive workpieces can be gripped by a robot »with a sure instinct«.

Added value

The SMA gripper is particularly suitable for the sensitive gripping of sensitive components (figure 2), such as thin glass or plastic components. The stepless adjustment of the gripping force (figure 1) and the light and space-saving design of the gripper are further strengths and advantages of the SMA gripper. With two simple sensors and a small electronics module, the smart, force-sensitive SMA gripper can be used efficiently and cost-effectively in many applications.

