

TECH OFFER

Reconfigurable Vacuum Suction Gripper



KEY INFORMATION

TECHNOLOGY CATEGORY:

Manufacturing - Assembly, Automation & Robotics

Infocomm - Robotics & Automation

TECHNOLOGY READINESS LEVEL (TRL): **TRL7**

COUNTRY: **SINGAPORE**

ID NUMBER: **TO174970**

OVERVIEW

Fast-moving consumer goods (FMCG) and other product components come in a wide variety of shapes, sizes and packaging configurations. During the manufacture of such products, a key challenge for automation is to effectively handle and manipulate such diverse products during production or logistical processes. Users planning to automate their production lines typically have to take into consideration the use of either multiple grippers for different product types, or incorporate an automated tool changer with added complexity and cost.

To address this challenge, a Singapore start-up has developed a universal soft robotic gripper designed to manipulate a wider range of product sizes by incorporating a resizeable gripper base. Gripper adjustment is automatically carried out via an integrated computer vision system thus minimizing the need for human intervention during pick-and-place processes. The gripper's soft fingers also minimize damage to products during the gripping process.

TECHNOLOGY FEATURES & SPECIFICATIONS

Vacuum Suction Gripper

Incorporating extendable linkages in the gripper arms for resizeability, the gripping workspace remains adaptable to handle products of various sizes. The gripper arms may either take the form of fingers or suction cups configuration. With 5 vacuum cups embedded, the gripper is ideal to handle pouched products or carton boxes of various sizes.

- Gripper weight: 2.18kg
- Gripping width: 125mm to 315mm
- Manipulating weight: up to 10kg
- Actuation method: Clean, dry air up to 250kPa
- Operating temperature: up to 100°C

Computer Vision System

An integrated computer vision system provides the gripper with the ability to recognize the type, location, and orientation of the product to be picked, and commands the gripper to adjust the gripping space and pose to pick the product from the correct location. This process is fully automated without requiring human intervention. For increased utility, the computer vision system may also be configured to perform quality inspections of products being handled.

POTENTIAL APPLICATIONS

- The vacuum suction gripper can be used to palletize or depalletize carton boxes or pouched products (such as coffee powder, sugar packs, rice packs etc.) of various sizes up to 10kg.
- The computer vision system will be deployed if the working space is not in an organised condition (i.e., randomized locations and orientations of the products), such as when products are scattered in a tote bin, randomly positioned on a conveyor etc.

MARKET TRENDS & OPPORTUNITIES

The market value for FMCG robotic packing in the APAC market is estimated to be at USD 1.1 billion and the global market value is worth USD 7.8 billion.

Sources:

- Cobots Transforming the Global Industrial Robotics Market—Opportunities Forecast (Frost & Sullivan)
- Passport, The Megabrands: The Top 100 FMCG Brands Worldwide (October, 2018)
- Technavio's library

UNIQUE VALUE PROPOSITION

The reconfigurability of this gripper provides high adaptability to many applications, compared to conventional grippers with fixed gripper bases offering limited gripping ability for products of diverse shapes and sizes. Benchmarking tests have been conducted to compare the grippers with other commercially available grippers. The results showed that this universal gripper is able to provide a 22% increase in gripping efficiency. Moreover, compared to using multiple grippers and tool changers to handle

different products, this one-fits-all gripper has the potential to help users save on operating costs by up to 36%.