Force-Regulated Grasping of Deformable Objects

Case Study

Adaptive force control with fingertip 6-axis force/torque sensing

Pavlic et al. (2026). Control Architecture for Safe Grasping of Fragile Objects Using a Coarse Position-Controlled Gripper.

Challenges

Standard grippers apply excessive force to fragile objects.

Unknown object properties make predefined force settings unreliable.

Grip force must prevent slip without deforming the object.

Solution

Fingertip 6-axis F/T sensors measure contact forces directly.

Contact state estimation adapts the grasp without object knowledge.

Adaptive admittance control applies only the force needed.

Results

Minimal-force grasping prevents visible deformation.

Stable handling of deformable and rigid objects.

Automatic force adaptation during lifts and disturbances.

Impact

Robots can safely grasp unknown fragile objects with force feedback from the fingertips.

Scientific Paper

Resense GmbH | www.resense.io | info@resense.io

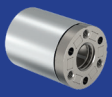
Resense F/T Sensors
Portfolio Overview

Compact
8 - 32 mm in diameter

Precise
from 10 mN resolution

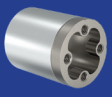
Ready-to-Use
sensor kit

HEX8
Ø 8.4 mm



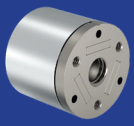
F = 25N

HEX8 High Force
Ø 8.8 mm
NEW



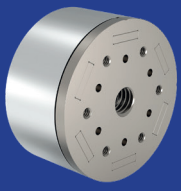
Fz = 250N

HEX12
Ø 12.5 mm



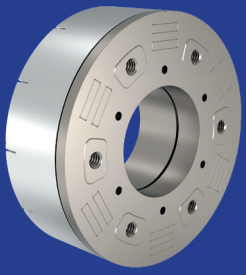
F = 25N

HEX21
Ø 21 mm



F = 50N

HEX32
Ø 32 mm



F = 125N

Resense
A Sense of Touch

Contact Us

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