From the Factory to the Lab:

Flexible automation solutions that improve quality and quantity.

INTRODUCTION

As the life sciences market continues to grow so does the demand for automated solutions that can meet the needs of academic laboratories and biotechnology research companies across the country. Scientists in pharmaceuticals, biotechnology and clinical diagnostics seeking to produce faster, more accurate data at a reduced cost have increasingly turned to industrial automation suppliers—who have overcome similar obstacles in microchip and electronic applications—for flexible automation solutions.

Applied Robotics, a global supplier of end-of-arm tooling, has responded to this need by developing a flexible solution package that enables laboratories to acquire the robotic tools necessary to carry out the multitude of automation applications required in scientific discovery. This customizable suite of products, including servo and pneumatic grippers, microplate hotels, tool changers, collision sensors and connectivity solutions, can be applied to the user's choice of motion systems—whether it is a robot arm, linear slide or other method of mobility. These products, which integrate easily with each other and operate within a closed or open architecture system, often result in high throughput at a significant cost reduction.

By understanding the value of flexible, customized end-of-arm tooling solutions that Applied Robotics is able to provide, life scientists will be able to witness greater efficiencies and benefit from accelerated research and development processes, reductions in human error, increased volumes of sample tracking and/or improvements in sterile conditions.

FLEXIBLE AUTOMATION SOLUTIONS

Applications Served

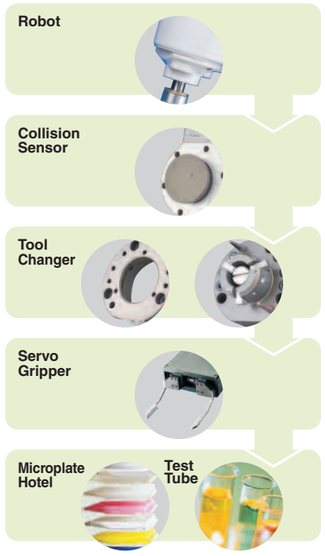
- Material handling (microplates, flasks, tubes, slides, tip boxes, etc.)
- Assay development
- Sample preparation
- Compound storage and retrieval
- Microplate reformatting-replication
- High-throughput screening

Key Performance Advantages

- Accelerated research and development processes
- Improved sterile conditions
- Increased production volumes
- Greater precision
- Reduction in human errors
- Reduction in human injuries
- Conserved laboratory space
- Decreased costs

APPLIED ROBOTICS SOLUTIONS AT WORK

This diagram demonstrates how Applied Robotics solution components can be integrated to automate a more effective, more efficient laboratory process.



INCREASE EFFICIENCY. REDUCE COSTS.

Problem	Solution	Result	Savings
Timing problem with robot instrument interface leads to tool crashing and assay failure	Collision sensor	Preservation of experiments that would otherwise be lost	$10,000 to $100,000 or more (excluding costs associated with tool damage)
Automated plate handling and pipetting for plate reformatting applications are currently performed by two robots	Tool changer	One robot ready to handle multiple tasks	$25,000 or more per robot
Plates needing handling in both landscape and portrait orientation	Servo gripper with force sensing and feedback	Programmable to accommodate plates in varying orientations, eliminating the need for additional tooling	$1,000 to $5,000 per robot $25,000 or more by eliminating extra robots and multiple tools
Misalignments causing cross-contamination of costly research experiments	Microplate hotel and shelving	Precise location of plate storage in hotel and on microplate shelves	$1,000 or more in sampling errors

APPLIED ROBOTICS SOLUTION COMPONENTS: AN OVERVIEW

Collision Sensor

- Operates on an air pressure system
- Regulated air supply provides positive, variable pressure to hold the collision sensor rigid during normal operation
- On impact, the air chamber seal is opened, while the shutdown signal is immediately sent to the system controller

Tool Changer

- Offers the flexibility needed for one robot to complete multiple tasks within a self-contained environment
- Conserves floor space by minimizing number of robots needed
- Reduces risk of contamination due to human error
- Built with a unique latching mechanism—positive, non-gravity disconnect, greater repeatability area and reduced wear tolerances

Servo Gripper

- Designed for open or closed control architecture systems
- Interchangeable fingers to handle microplates, test tubes and other media
- Able to handle microplates in portrait or landscape orientation
- Programmable to sense force (tactile and intuitive)
- 76.2 mm of finger travel
- Position servo control and feedback
- Variable grip force
- Easy installation and programming

Microplate Hotel

- Sturdy, lightweight hotel mounts to the working surface of an aluminum locator
- Locator allows repeatability when hotel is removed for loading, unloading or cleaning
- Available in portrait orientation
- Shelves are autoclavable, made of chemically resistant plastic, and are able to move vertically to accommodate various plate thicknesses

PROBLEM DEFINED. SOLUTION IN REACH.

Case Study

To automate the detection of IgG antibodies in human serum panels to cytomegalovirus, rubella virus and Toxoplasma gondii and to simultaneously perform all three tests at once from a single sample in sequential assays at a rate of 60 per hour.

Applied Robotics' collision sensor protected the automation sequencing from unforeseen crashes and subsequent damage to the tooling and serum.

Case Study

An OEM provider of life science automation solutions needed to automate multiple steps of an enzymatic assay process to identify kinase inhibiting compounds from an enzyme inhibitor set within an "island" of automation. The "island" is comprised of a SCARA robot, plate handler and liquid dispense head.

On-the-fly tool changing allowed for changes between the plate handling tool and the dispense head to occur within the closed environment.

Case Study

An international manufacturer of electrophoresis instrumentation needed to verify the electrical circuit integrity in machines used in sealing gel vacuum chambers.

Quick connect/disconnect electrical modules provided the ability to test the correctness of the wiring.

Case Study

An international pharmaceutical research company using robotics for compound storage and retrieval needed to protect the robot from crashing during a 75-step programming sequence.

Collision sensors were installed to prevent crashes and unnecessary reprogramming.

For More Information

For more information about Applied Robotics' laboratory automation solutions visit www.arobotics.com.