

# Alto Automation Suite

## Introduction

Automating drug discovery processes has traditionally been challenging, with instruments, software and consumables that do not lend themselves to it. The Alto Automation Suite™ is changing the status quo as the only fully automatable surface plasmon resonance (SPR) platform.

Nicoya's Alto™ offers an easy-to-use, high-throughput platform that provides high-quality binding kinetics measurements. The Alto Automation Suite, with its intuitive API, pre-configured labware definitions and protocols, unique well-plate-based cartridges, and cloud-native software helps scientists overcome barriers to automation to enable 24/7 unattended SPR analysis.



## Automation API

Alto's API is designed to make the creation of automation protocols easy and accessible. The API interface follows SiLA 2 automation standards and communication protocols, allowing for rapid integration of Alto with automation hardware, LIMS, scheduling, and data management software.

Detailed documentation and usage examples are provided as part of the Alto Automation Suite, allowing users with all programming skill levels to design workflows. Basic Python or C# knowledge is sufficient to program an Automated Alto workcell, while automation engineers have access to all functionalities needed to integrate Alto within larger automated labs, including starting and stopping runs, checking instrument status, retrieving sample information for cartridge preparation, and experimental results for automated analysis.

For example, to use the API to check that Alto is ready to start an experiment, load a cartridge and instruct it to start an assay, the protocol might look like:

```
Python
for experiment in self.experiments:

    # Checking the status of the instrument to see if an experiment can be run
    response = self.alto.Experiment.Verify(experiment)
    if response.Success == False or not response.IsVerified:
        print(f"Cannot run experiment {experiment}, {response.ErrorMessage}")
        return

    # Opening the Alto door for a cartridge to be placed
    response = self.alto.Device.OpenDoor()
    if response.Success == False:
        print(f"Could not open door, Error: {response.ErrorMessage}")
        return

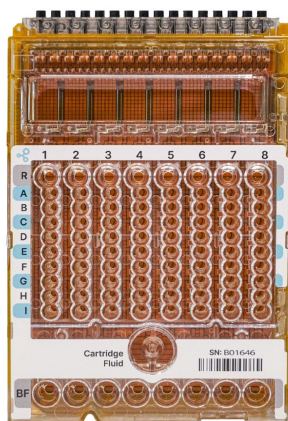
    # Checking that a cartridge is in the instrument
    response = self.alto.Device.CartridgeDetect()
    if response.Success == False or not response.IsCartridgeDetected:
        print(f"Could not detect cartridge, error: {response.ErrorMessage}")
        return

    # Starting the experiment
    response = self.alto.Experiment.Start(experiment)
    if response.Success == False:
        print(f"could not start Experiment: {experiment}, Error: {response.ErrorMessage}")
        return
```

Nicoya offers automation support services to customers for development of automated Alto protocols, enabling various functions or formats not found in the API library. To get support, customers may contact [automation@nicoyalife.com](mailto:automation@nicoyalife.com).

## Universal cartridge

Alto is the only SPR system whose consumables are entirely contained within a robot-compatible, disposable cartridge. The cartridge contains 16 sensors and 88 wells, which can be mapped to those of a well-plate for easy labware definition for any automation platform and existing workflows. The pitch of the wells is compatible with single or 8-channel pipettes.

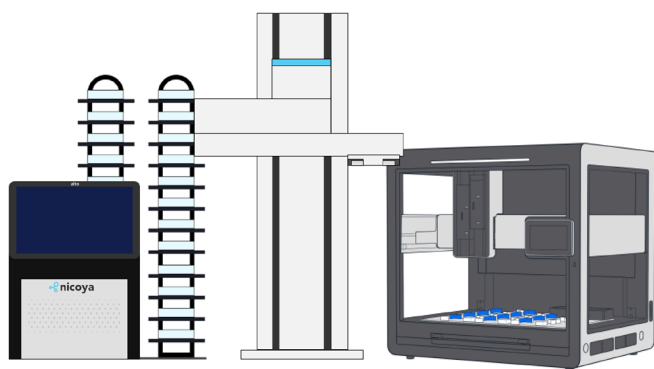


Cartridge specifications:

Dimensions	Value (mm)
Length	125.2
Width	85.5
Height	10.6

## Automated workcell

Alto and its cartridges are compatible with standard liquid handling platforms, plate hotels and robot arms. When operating as a full workcell, Alto can run fully unattended, with no need for buffer refills, sensor changes or any manual intervention, enabling screening of thousands of samples per week.



Nicoya has partnered with Opentrons to provide pre-configured labware definitions and workflows for the Opentrons Flex® liquid handling robot. This collaboration features custom labware definitions for Alto cartridges and optimized preparation protocols, delivering seamless integration. The Brooks Automation PreciseFlex™ 400 Robot arm has also been rigorously tested for operation with the Alto Automation Suite and is recommended to be used for cartridge handling in the workcell.

Recommended Opentrons products for the Alto Automation Suite:

Platform	Opentrons Flex Robot
Pipette(s)	<ul style="list-style-type: none"> <li>Opentrons Flex 1-Channel Pipette (1-50 <math>\mu</math>L)</li> <li>Opentrons Flex 1-Channel Pipette (5-1000 <math>\mu</math>L)</li> <li>Opentrons Flex 8-Channel Pipette (1-50 <math>\mu</math>L)</li> <li>Opentrons Flex 8-Channel Pipette (5-1000 <math>\mu</math>L)</li> </ul>
Pipette tips	<ul style="list-style-type: none"> <li>Opentrons Flex Tips, 50 <math>\mu</math>L</li> <li>Opentrons Flex Tips, 200 <math>\mu</math>L</li> <li>Opentrons Flex Tips, 1000 <math>\mu</math>L</li> </ul>
Modules	<ul style="list-style-type: none"> <li>Opentrons Flex Gripper</li> <li>Opentrons Flex Deck Riser (cartridge storage for increased unattended throughput)</li> </ul>

## Summary

Setting up SPR assays, whether for candidate screening or biotherapeutic quality control, can be a repetitive, tedious, error-prone and expensive task. The Alto Automation Suite eliminates errors and inefficiencies in affinity measurements while providing high-quality kinetics data with as little as 2  $\mu$ L of sample per interaction.

Operating as an integrated workcell with the Opentrons Flex and a robot arm, Alto enables screening of over 2000 samples per week with no hands-on time after initial setup. The Alto Automation Suite makes high-throughput, high-quality automated SPR measurements available to labs with every level of programming and automation experience, and helps introduce SPR analysis readily into existing assay workflows.

