December 2024

QIAcuity® Lab Automation Service User Guide

Extension to the *QIAcuity User Manual* for the QIAcuity Software version 3.1

Sample to Insight

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1. Introduction

1.1. General information

1.1.1. Technical assistance

At QIAGEN®, we pride ourselves on the quality and availability of our technical support. Our Technical Services Departments are staffed by experienced scientists with extensive practical and theoretical expertise in molecular biology and the use of QIAGEN products. If you have any questions or experience any difficulties regarding the QIAcuity Lab Automation Service or QIAGEN products in general, do not hesitate to contact us.

QIAGEN customers are a major source of information regarding advanced or specialized uses of our products. This information is helpful to other scientists as well as to the researchers at QIAGEN. We therefore encourage you to contact us if you have any suggestions about product performance or new applications and techniques.

For technical assistance, contact QIAGEN Technical Services.

1.1.2. Policy statement

It is the policy of QIAGEN to improve products as new techniques and components become available. QIAGEN reserves the right to change specifications at any time. In an effort to produce useful and appropriate documentation, we appreciate your comments on this user manual. Please contact QIAGEN Technical Services.

1.2. Intended use of the QIAcuity Lab Automation Service

The QIAcuity Lab Automation Service is an extension of the regular QIAcuity systems to allow the third-party Lab Automation software controlling a robot to interact with the QIAcuity systems, run dPCR experiments, and perform analysis without human interaction. The QIAcuity Lab Automation Service is compatible to all QIAcuity systems, QIAcuity One, QIAcuity Four, and QIAcuity Eight, and several QIAcuity systems can be controlled in parallel.

The QIAcuity Lab Automation Service is part of the regular QIAcuity Software version 3.1. The data created with the QIAcuity Lab Automation Service software are compatible starting with QIAcuity Software Suite version 3.1 and higher.

1.3. Requirements for the QIAcuity Lab Automation Service

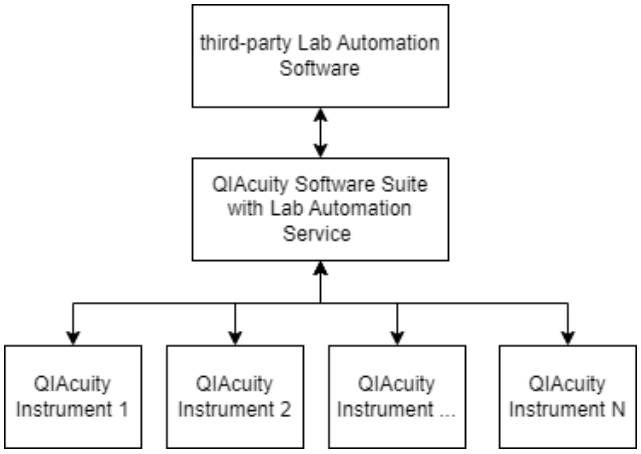
For requirements related to the QIAcuity users, the recommended notebook as well as the instrument related requirements for site, power, and grounding, please refer to the latest version of the *QIAcuity User Manual*.

2. General Description

2.1. QIAcuity Lab Automation Service principle

The goal of the QIAcuity Lab Automation Service is to provide the possibility for third-party Lab Automation Software that is controlling one or multiple robots to interact with the QIAcuity systems to run fully automated experiments, without human interaction.

The QIAcuity Lab Automation Service is available via a RESTful API that is accessible over HTTPS protocol. Using the API requires authentication by an API key, which can be obtained in the configuration environment of the QIAcuity Software Suite. Communication works according following scheme:



3. Installation Procedures

3.1. Installation and uninstallation of the QIAcuity Software Suite with the QIAcuity Lab Automation Service

The QIAcuity Lab Automation Service is part of the regular QIAcuity Software Suite version 3.1, so it is installed together with Software Suite and the same restrictions in terms of fresh installation and upgrade should be followed.

In terms of the QIAcuity Software Suite with the QIAcuity Lab Automation Service installation, uninstallation, as well as the recommended notebook requirements, please refer to the latest *QIAcuity User Manual* (**www.qiagen.com/HB-2717-010**), sections "Installing a fresh copy of the QIAcuity Software Suite" and "Uninstalling the QIAcuity Software Suite".

3.2. Installation of the Control Software with the QIAcuity Lab Automation Service

The QIAcuity Software Suite version 3.1 with the Lab Automation Service is a prerequisite for installing the QIAcuity Control Software version 3.1.

The Software Suite should be installed as a first (otherwise, no connection between the Software Suite and Control Software can be established).

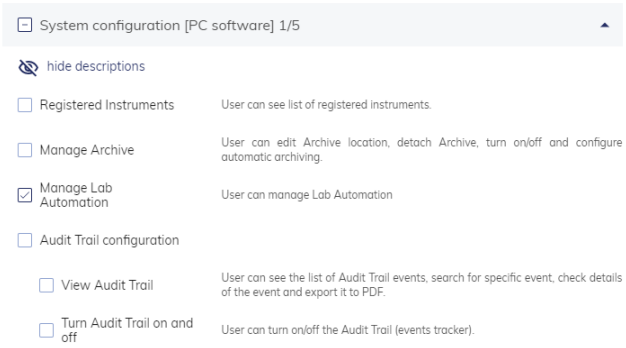
Please refer to the "Updating the instrument software" section of the latest *QIAcuity User Manual* to get guidance about the Control Software installation.

Note: Only users with Administrator and Lab Leader role can perform software updates.

3.3. Configuring the QIAcuity Software Suite to use the QIAcuity Lab Automation Service

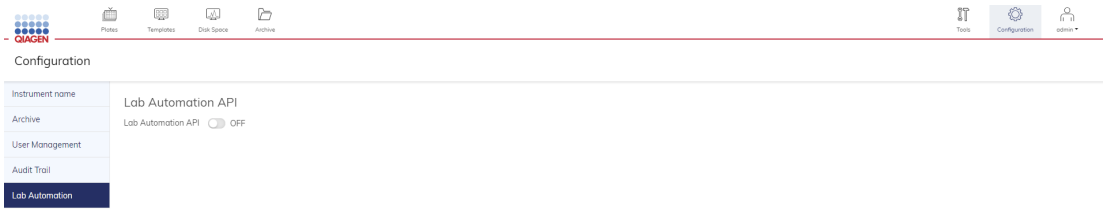
To start using the QIAcuity Lab Automation Service, it needs to be enabled in the Software Suite's configuration page. Once enabled, an API key will be presented. The Lab Automation Service API will be immediately accessible with this API key. The key can be generated again at any point in time. Previously generated keys will no longer work.

Note: Permission "Manage Lab Automation" is required to follow next steps of configuration. Please refer to the "User management" section of the *QIAcuity User Manual* for further information.

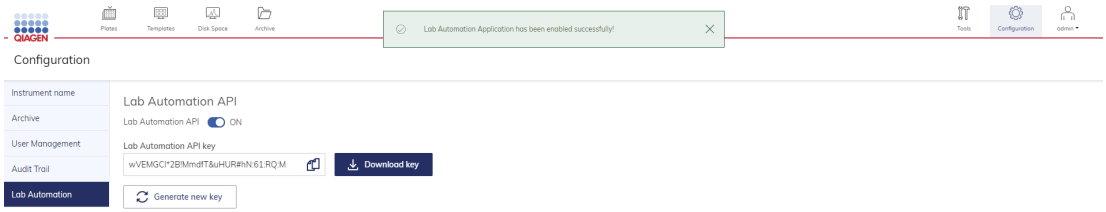


To enable Lab Automation:

1. Go to **Configuration** and select **Lab Automation** from panel on the left side.

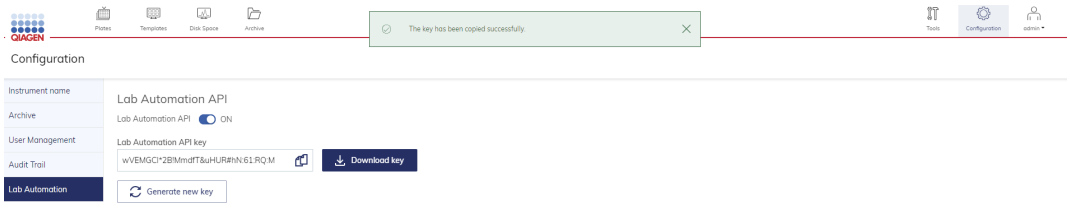


2. Toggle **ON** the Lab Automation API.

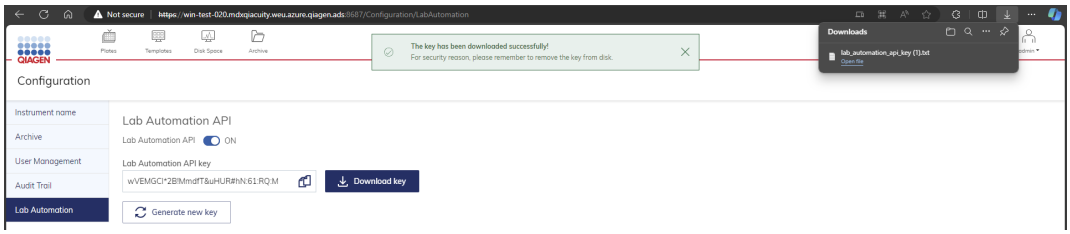


3. The Lab Automation API Key will be presented in dedicated field below. User can use one of the following methods to obtain the key:

   a. Copy that key to Windows® clipboard using icon or using Ctrl+C system shortcut.

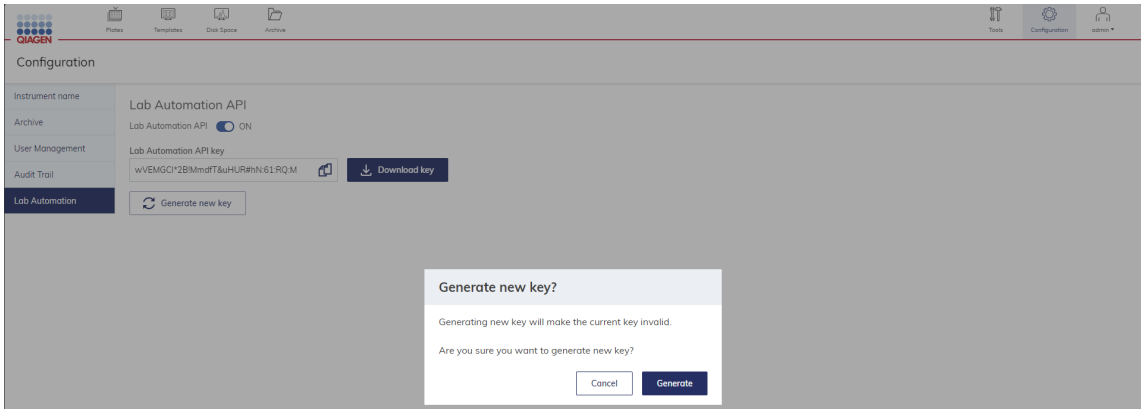


   b. Download the key in **.txt** file using the Download key button – the file named "lab_automation_api_key.txt" containing only the key will be automatically generated and downloaded.



4. Generated Lab Automation API key should be used in Customer's Lab Automation software to establish connection between the Software Suiteand Lab Automation. After this step, the QIAcuity Lab Automation Service is configured and ready to use.

Generate new key using Generate new key button. The system will generate a new key, the current key will become invalid automatically, and all connected Lab Automations will lose connection. User will be presented with prompt for confirmation.



3.4. Configuring the Control Software to use the QIAcuity Lab Automation Service

Direct configuration of the Lab Automation Service is performed from the Software Suite perspective. No additional steps are required on the instrument.

4. Operating Procedures

4.1. Use of the Lab Automation Service with the QIAcuity Control Software

The instrument is automatically operated via Lab Automation API, which is in charge of remotely booking, opening, and closing the drawer.

The drawer is booked by Lab Automation Software for its exclusive use, and when the booking is active, it is not possible to manually operate the drawer. However, if the logged-in user has a permission to cancel the booking, they may attempt to open the drawer manually and then they will be presented with pop-up window with information that opening/closing the drawer will cancel the booking established by the QIAcuity Lab Automation Service. Therefore, it will put the instrument in normal-use state.

Standard User without Lab Automation Service permission cannot abort the drawer booking, except on situation when the instrument lost connection with the Software Suite.

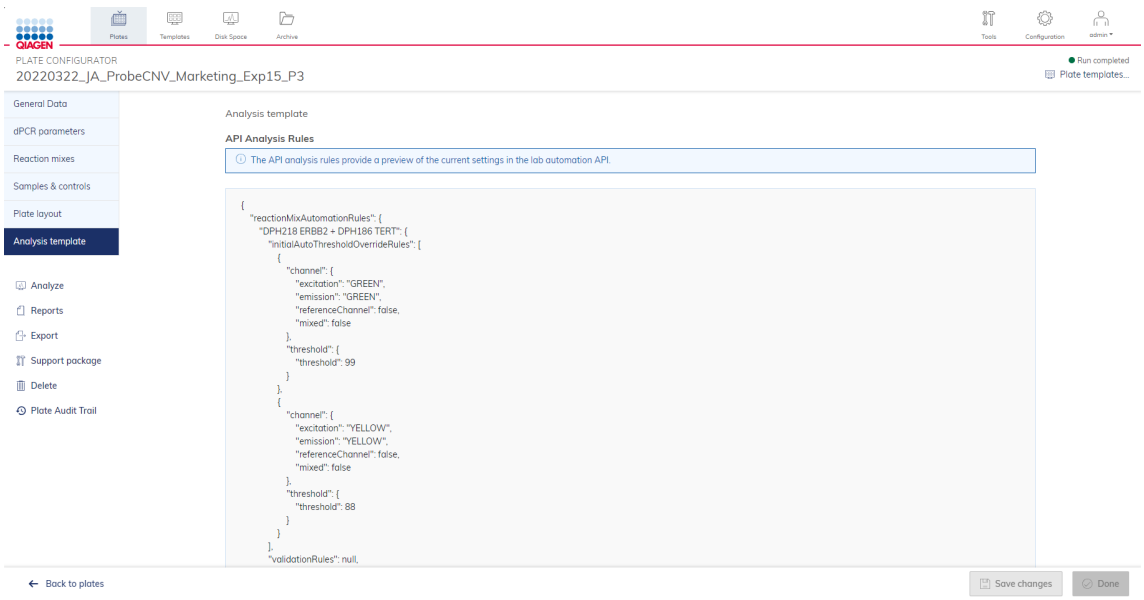
4.2. Automatic data analysis

The QIAcuity Lab Automation Service allows to perform automatic data analysis for experiments via Analysis template. This functionality is exclusively available via this service.

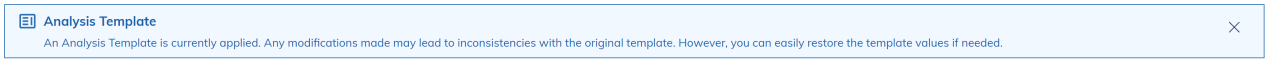
Concept of the above solution is to allow user to define analysis template in json format, assign to the requested experiment, and trigger the analysis process.

Note: To perform this operation, customer's Lab Automation software must be authenticated by Lab Automation API Key.

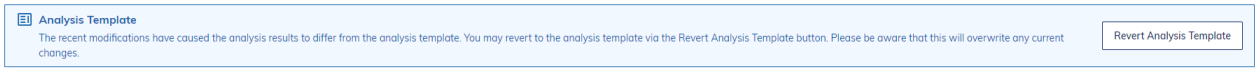
When analysis template has been successfully applied new section is visible on the Software Suite user interface in the plate configurator:



Appropriate information is also presented on Analysis:



When user overwrite analysis template settings by introducing some manual changes on analysis (e.g., changing threshold manually), the above information is exchanged with the below one, with additional **Revert Analysis Template** button that allows to revert manual changes and set values from analysis template.



In the current version, user can define values for two types of thresholds: per Reaction mix and per channel in analysis template:

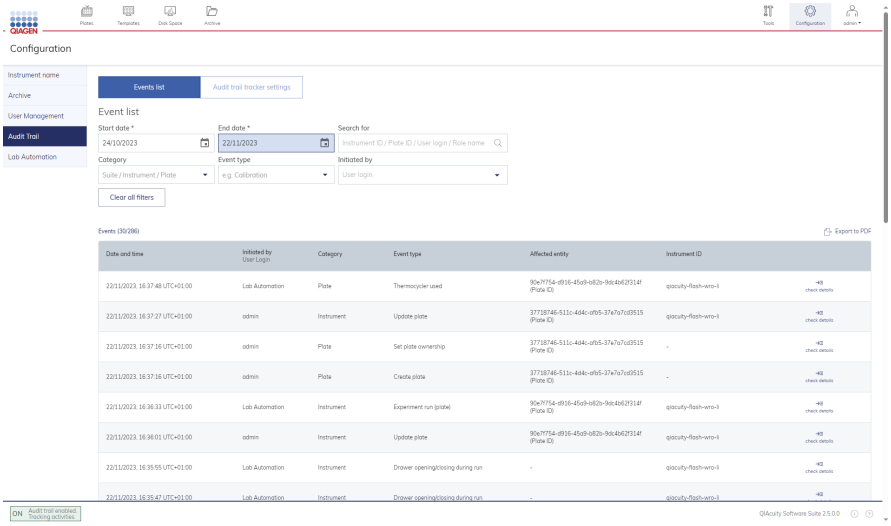
- Single threshold value
- Amplitude multiplexing thresholds values: double, high, and low

When the threshold defined by the user in analysis template cannot be set, Single threshold (autothreshold) is always assigned as a fallback.

For more technical guidance, please refer "Appendix A – QIAcuity Software Suite API" on page 12.

4.3. Audit trail

In the QIAcuity Software Suite, Audit trail events coming from third-party Lab Automation actions in the QIAcuity system are distinguished from ones coming from regular users by indicating them in the column “Initiated by” as Lab Automation.



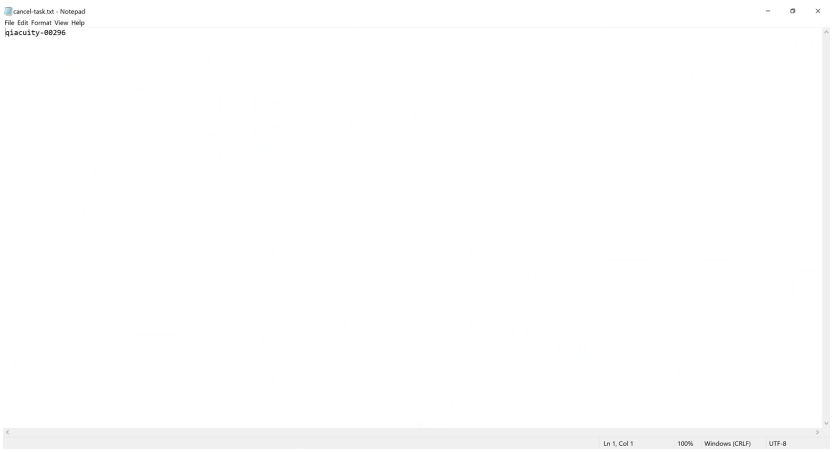
5. Troubleshooting

5.1. Clearing command queue

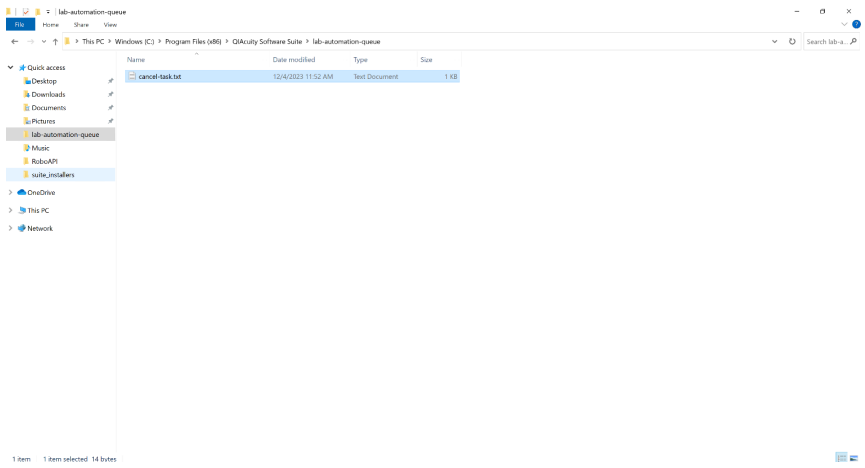
In case a user recognizes the situation when new commands are sent and no action is performed by the instrument, it might indicate that the instrument gets stuck in processing command queued by Lab Automation. There is a possibility to clear its command queue:

Note: When user is unsure on how to proceed, they should contact QIAGEN Technical Services to assist.

1. User needs to prepare or obtain from QIAGEN Technical Services the file:
    - Name of the file is always **cancel-task.txt**, and this name should not be changed manually by the user.
    - The content of the file is always the instrument ID, which is connected and for which command queue should be cleared. The file cannot contain any whitespaces, and the content should not be changed manually by the user.



2. User needs to copy and paste the file into the dedicated folder in the QIAcuity Software Suite: **C:\Program Files (x86)\QIAcuity Software Suite\lab-automation-queue**



Note: User shall never modify (delete, move, etc.) folder **C:\Program Files (x86)\QIAcuity Software Suite\lab-automation-queue**; otherwise, the folder will lose proper system permissions and it can cause whole the QIAcuity system to be corrupted, which will require reinstallation.

3. When file is correctly pasted into above directory, the system will automatically clear the command queue on the desired instrument and file will be automatically deleted.

Appendix A – QIAcuity Software Suite API

Download the QIAcuity Software Suite API document (**www.qiagen.com/QIAcuity-Software-Suite-API**).

Document Revision History

Revision	Description
December 2024	Initial release

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