



August 2025

QIAcuity® Lab Automation Service User Guide

Extension to the *QIAcuity User Manual* for the QIAcuity Software version 3.2.0.0

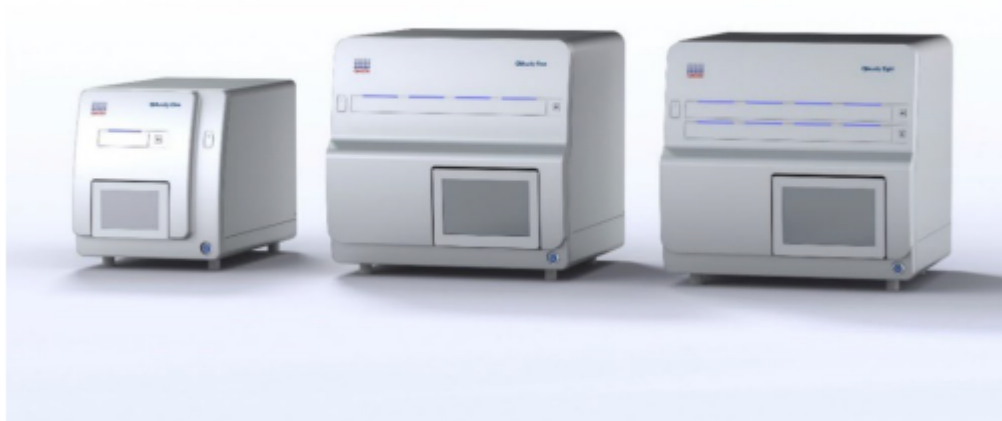


Table of Contents

1. Introduction	3
1.1. General information	3
1.1.1. Technical assistance	3
1.1.2. Policy statement	3
1.2. Intended use of the QIAcuity Lab Automation Service	3
1.3. Requirements for the QIAcuity Lab Automation Service	3
2. General Description	4
2.1. QIAcuity Lab Automation Service principle	4
3. Installation Procedures	5
3.1. Installation and uninstallation of the QIAcuity Software Suite with the QIAcuity Lab Automation Service	5
3.2. Installation of the Control Software with the QIAcuity Lab Automation Service	5
3.3. Configuring the QIAcuity Software Suite to use the QIAcuity Lab Automation Service	6
3.4. Configuring the Control Software to use the QIAcuity Lab Automation Service	7
4. Operating Procedures	8
4.1. Use of the Lab Automation Service with the QIAcuity Control Software	8
4.2. Automatic data analysis	8
4.2.1. General principles	8
4.2.2. Analysis rules	9
4.3. Automatic RFU export	10
4.4. Audit trail	10
5. Troubleshooting	11
5.1. Clearing command queue	11
Appendix A – QIAcuity Software Suite API v3.2.0.0	13
Document Revision History	14

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

1.3. Requirements for the QIAcuity Lab Automation Service

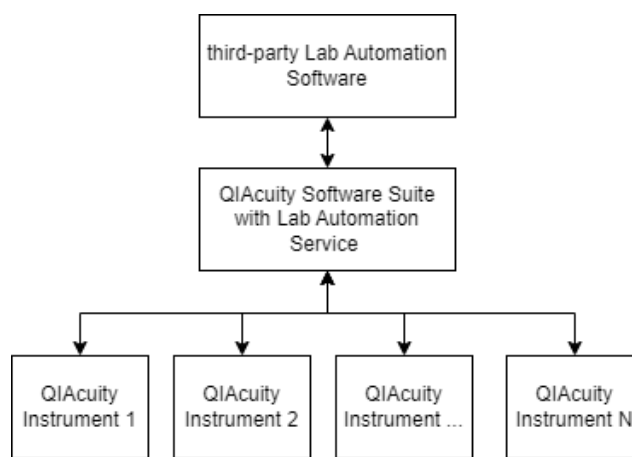
For requirements related to the QIAcuity users, the recommended notebook as well as the instrument related requirements for site, power, and grounding, please refer to the latest version of the *QIAcuity User Manual* (www.qiagen.com/HB-2717-011).

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 to the 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 3.2, 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-2717-011), “Installing a fresh copy of the QIAcuity Software Suite” and “Uninstalling the QIAcuity Software Suite” sections.

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

The QIAcuity Software Suite version 3.2 with the Lab Automation Service is a prerequisite for installing the QIAcuity Control Software version 3.2.

The Software Suite should be installed 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: "Manage Lab Automation" permission is required to follow next steps of configuration. Please refer to the "User management" section of the *QIAcuity User Manual* for further information.

System configuration [PC software] 1/5

hide descriptions

☐ Registered Instruments

User can see list of registered instruments.

☐ Manage Archive

User can edit Archive location, detach Archive, turn on/off and configure automatic archiving.

☒ Manage Lab Automation

User can manage Lab Automation

☐ Audit Trail configuration

☐ View Audit Trail

User can see the list of Audit Trail events, search for specific event, check details of the event and export it to PDF.

☐ Turn Audit Trail on and off

User can turn on/off the Audit Trail (events tracker).

To enable Lab Automation:

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

QIAcuity

Plates

Templates

Disk Space

Archive

Tools

Configuration

admin

Configuration

Instrument name

Lab Automation API

Archive

Lab Automation API ☐ OFF

User Management

Audit Trail

Lab Automation

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

QIAcuity

Plates

Templates

Disk Space

Archive

Tools

Configuration

admin

Configuration

Instrument name

Lab Automation API

Archive

Lab Automation API ☒ ON

User Management

Lab Automation API key

Audit Trail

wVEMGCh*2BImndfT&uHUR#N.61.RQ.M

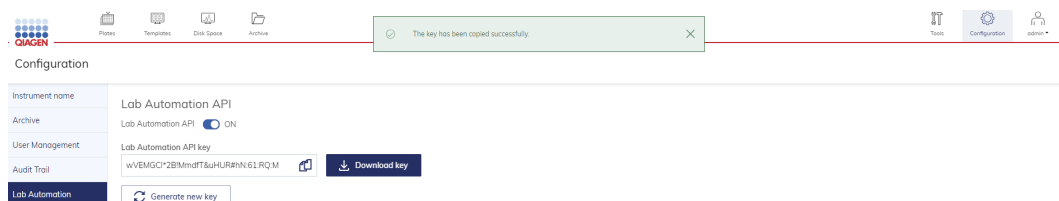
Lab Automation

Generate new key

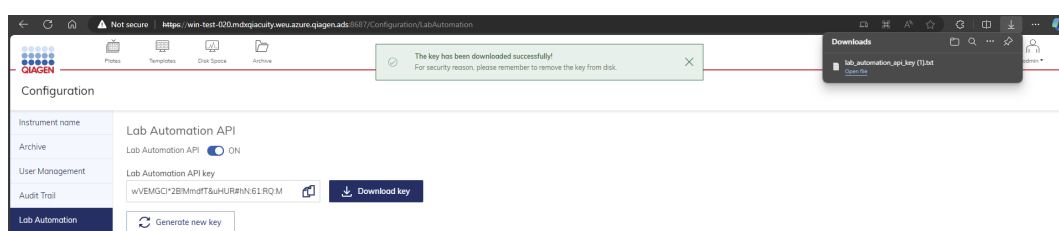
Download key

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

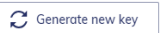
- a. Copy that key to Windows® clipboard using icon  or using Ctrl+C system shortcut.

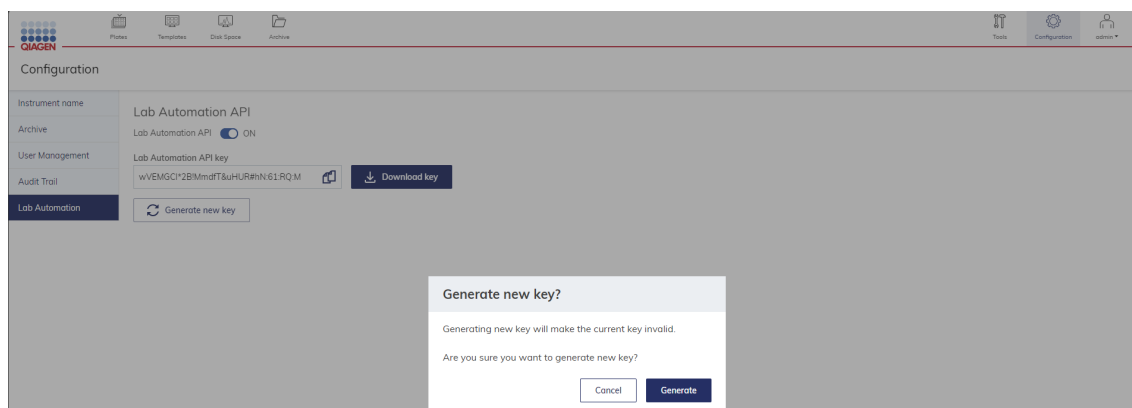


- b. Download the key in .txt file using the  button – the file named “lab_automation_api_key.txt” containing only the key will be automatically generated and downloaded.



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

Generate new key using  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

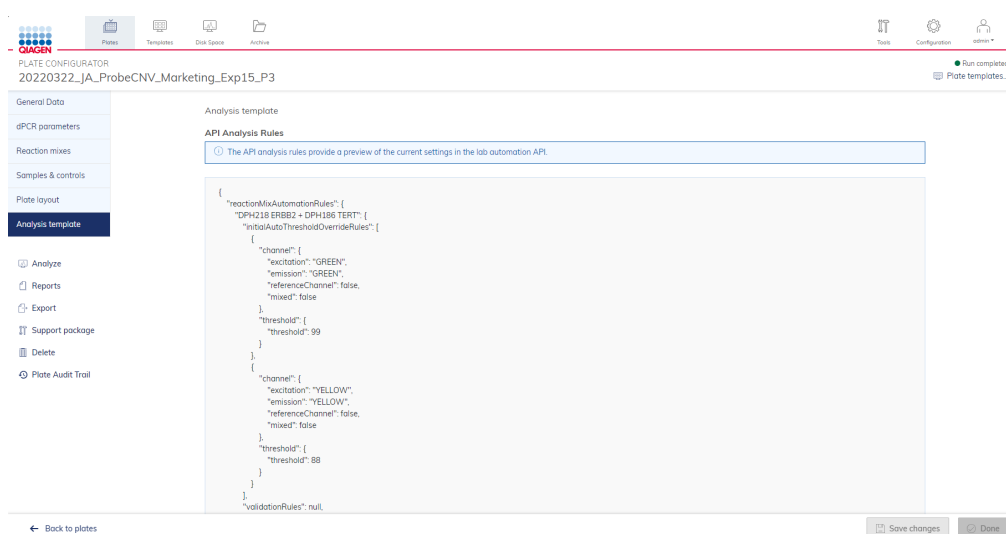
4.2.1. General principles

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

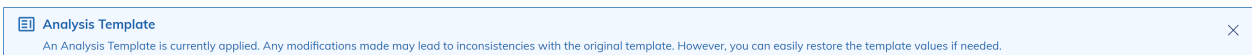
Concept of the above solution is to allow user to define analysis template in **json** format, assign to the requested experiment, and trigger the analysis process.

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

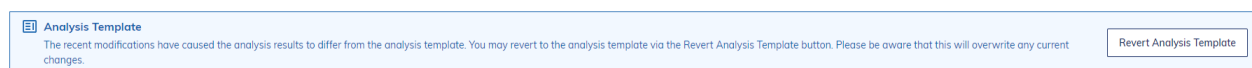
When analysis template has been successfully applied new section is visible on the Software Suite user interface in the plate configurator:



Appropriate information is also presented on Analysis:



When user overwrites 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.



4.2.2. Analysis rules

1. Numeric threshold or auto-threshold

Values for two types of thresholds per reaction mix and per channel are available in analysis template:

- Single threshold value
 - Threshold type must be set as "ST".
 - Values are constrained within the range of 0–255.
 - Decimal values are permitted.
- Amplitude multiplexing thresholds values: double, high, and low
 - Threshold type must be set as "AM".
 - Threshold values must satisfy the constraint double > high > low.
 - Values are constrained within the range of 0–255.
 - Decimal values are permitted.

When the threshold is not explicitly specified by the user in analysis template (json), single threshold (auto-threshold) is always assigned as a fallback (e.g., when user specified threshold only for one well on plate, all other wells will be analyzed with the auto-threshold).

2. Quality Control analysis

Starting with the QIAcuity Software Suite version 3.2, a quality control rule can be defined to validate quality of the experiment and mark wells that do not meet quality criteria. In version 3.2, user can define percent of minimum valid partitions per reaction mix. If any channel from well with assigned reaction mix will have lower number of valid partitions than defined percent the whole well is marked as failed.

Note: The information regarding QC rule failure is present in the API result response only.

3. Dynamic threshold

On top of numeric threshold or auto-threshold and QC analysis, user can define dynamic threshold per Reaction mix and per channel, which is based on threshold value taken from:

- Positive Control,
- Negative Control, or

- Non Template Control (NTC)

For unknown samples exhibiting the identical reaction mix, a control-based threshold value will be applied. All previous thresholds values will be overwritten by these values.

Note: If there are several wells with controls that correspond to the above rule and these have different values for the recognized threshold value, the system calculates the arithmetic mean from this and applies this mean value to the samples of this specified reaction mix and channels. Wells excluded in QC analysis are not taken into account here.

Note: If any matching wells with above control are not found, rule will be skipped.

For more technical guidance and example, please refer Appendix A – QIAcuity Software Suite API v3.2.0.0.

4.3. Automatic RFU export

In the current version, user can additionally define to export additional **json** file with export of RFU values. Data included in such export are the same as in case of regular RFU in application, but optionally, user can define for which wells results should be generated.

Please refer to the “Export CSV: RFU values” section of the latest *QIAcuity User Manual* to get guidance how this functionality works on UI.

For more technical guidance and examples, please refer Appendix A – QIAcuity Software Suite API v3.2.0.0.

4.4. 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.

The screenshot displays the QIAcuity Software Suite Audit Trail interface. The sidebar on the left includes options like 'Instrument name', 'Archive', 'User Management', and 'Audit Trail' (which is currently selected). The main panel features an 'Event list' section with filters for 'Start date' (24/10/2023), 'End date' (22/11/2023), 'Search for' (Instrument ID / Plate ID / User login / Role name), 'Category' (Suite / Instrument / Plate), 'Event type' (e.g. Calibration), and 'Initiated by' (User login). Below the filters is a 'Clear all filters' button. The 'Events (30/286)' table lists various events with columns for 'Date and time', 'Initiated by', 'Category', 'Event type', 'Affected entity', and 'Instrument ID'. The table shows events initiated by 'Lab Automation' and 'admin' users. At the bottom left, there is a checkbox for 'Audit Trail enabled (default: on)' and at the bottom right, the version 'QIAcuity Software Suite 2.5.0.0' is displayed.

Date and time	Initiated by	Category	Event type	Affected entity	Instrument ID
22/11/2023, 16:37:48 UTC+01:00	Lab Automation	Plate	Thermocycler used	90c77f5a-df35-45eb-b82b-9d44a29147 (Plate ID)	qiacuity-flash-wars-1
22/11/2023, 16:37:27 UTC+01:00	admin	Instrument	Update plate	37738748-511c-4d46-ef55-37a7b7d9515 (Plate ID)	qiacuity-flash-wars-1
22/11/2023, 16:37:18 UTC+01:00	admin	Plate	Set plate ownership	37738748-511c-4d46-ef55-37a7b7d9515 (Plate ID)	-
22/11/2023, 16:37:18 UTC+01:00	admin	Plate	Create plate	37738748-511c-4d46-ef55-37a7b7d9515 (Plate ID)	-
22/11/2023, 16:36:33 UTC+01:00	Lab Automation	Instrument	Experiment run (start)	90c77f5a-df35-45eb-b82b-9d44a29147 (Plate ID)	qiacuity-flash-wars-1
22/11/2023, 16:36:01 UTC+01:00	admin	Instrument	Update plate	90c77f5a-df35-45eb-b82b-9d44a29147 (Plate ID)	qiacuity-flash-wars-1
22/11/2023, 16:35:55 UTC+01:00	Lab Automation	Instrument	Drawer opening/closing during run	-	qiacuity-flash-wars-1
22/11/2023, 16:35:47 UTC+01:00	Lab Automation	Instrument	Drawer opening/closing during run	-	qiacuity-flash-wars-1

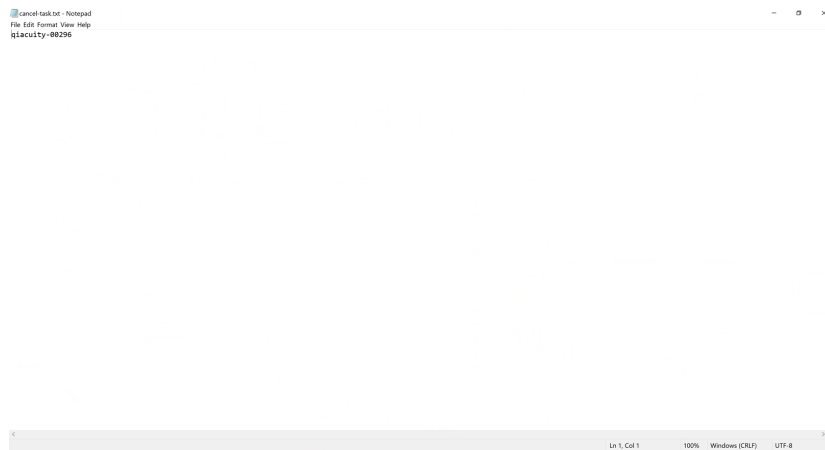
5. Troubleshooting

5.1. Clearing command queue

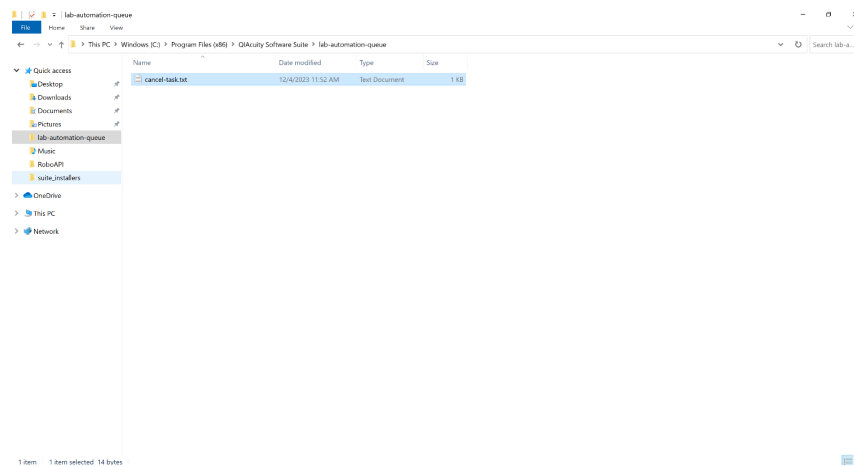
In case a user recognizes the situation when new commands are sent and no action is performed by the instrument, it might indicate that the instrument gets stuck in processing command queued by Lab Automation. There is a possibility to clear its command queue:

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 the whole QIAcuity system to be corrupted, which will require reinstallation.

3. When file is correctly pasted into the 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 v3.2.0.0

Download the QIAcuity Software Suite API document (www.qiagen.com/QIAcuity-Software-Suite-API-v3.2.0.0).

Document Revision History

Revision	Description
August 2025	Content adjusted to Software Release 3.2
May 2025	Content adjusted to Software Release 3.1.1
December 2024	Content adjusted to Software Release 3.1

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