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GENESYS UV-Vis Spectrophotometers

GENESYS G5 Series

User Guide

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ThermoFisher SCIENTIFIC

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WARNING Avoid an explosion or fire hazard. This instrument or accessory is not designed for use in an explosive atmosphere.

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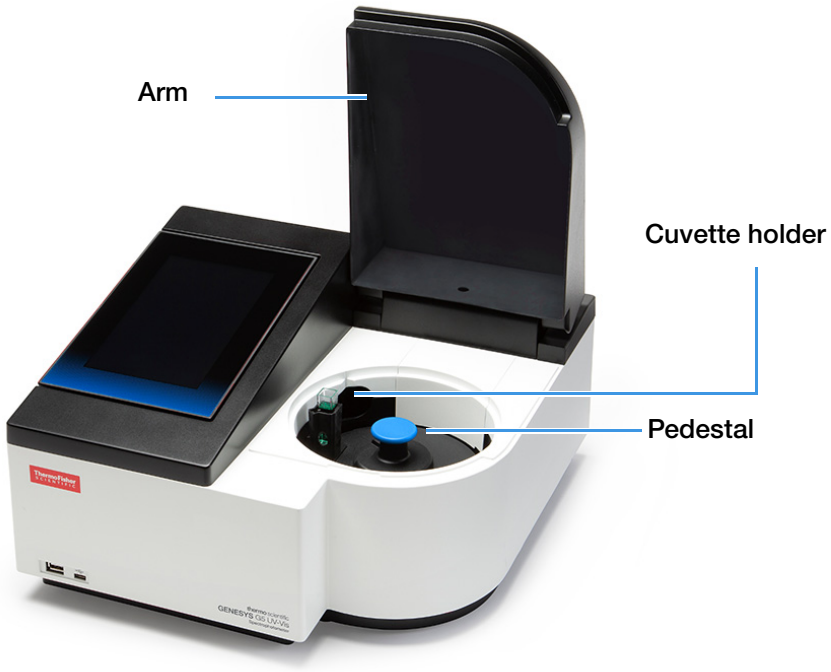
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About the Spectrophotometer

GENESYS G5 Spectrophotometer



Note Locate the instrument away from air vents and exhaust fans to minimize evaporation

The Thermo Scientific™ GENESYS™ G5 instrument series is composed of three stand-alone spectrophotometers.

- Single Beam Visible Only Model: GENESYS G5 Vis
- Dual Beam UV-Visible Model: GENESYS G5 UV-Vis
- Double Beam UV-Visible Model: GENESYS G5 UV-Vis Pro

Note Note Before operating a GENESYS G5 instrument, please read the safety and operating precautions and then follow their recommendations when using the instrument.

Features

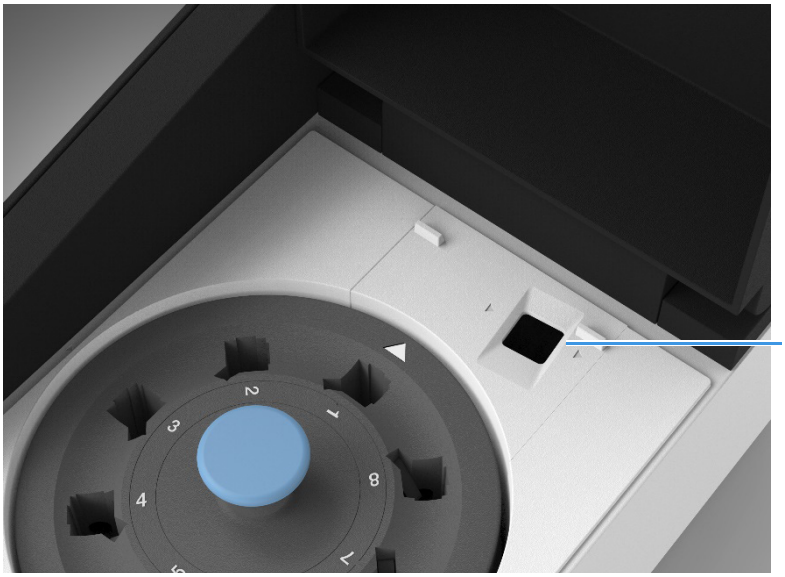
The GENESYS G5 spectrophotometers include a modern design that includes a large, accessible sample compartment compatible with a variety of accessory options. The GENESYS G5 is controlled using the touchscreen local control, or by using the separately purchased PC control software package. Either method can be used interchangeably to control the instrument and view data. The instrument can be connected to an optional printer with a USB cable or to a remote printer through an Ethernet connection or wireless network using the provided GENESYS G5 Wi-Fi and Bluetooth Dongle.

Touchscreen



The GENESYS G5 comes with a built-in, 7-inch, high-resolution touchscreen preloaded with easy-to-use instrument control software. The touchscreen can angled for optimal viewing.

Reference Cell Position



The GENESYS G5 UV-Vis Pro includes a reference cell position which is typically for the solvent or blank solution without the analyte. This position is crucial for baseline correction, ensuring accurate absorbance measurements by compensating for any absorbance due to the solvent or other components in the sample matrix. Ensure the reference cell is properly aligned and free of bubbles or contaminants to obtain reliable data.

Sample Compartment



The GENESYS G5 spectrophotometers include a specialized enclosure designed to be compatible with a variety of sample holders and during ultraviolet-visible spectroscopy measurements. It ensures precise positioning of cuvettes or other sample containers, allowing accurate light transmission through the sample for reliable absorbance and transmittance data. The compartment features a light-tight design to prevent external light interference and may include temperature control options for maintaining sample conditions.

USB-A ports

One USB-A port located on the instrument front panel and two USB-A ports located on the instrument rear panel.

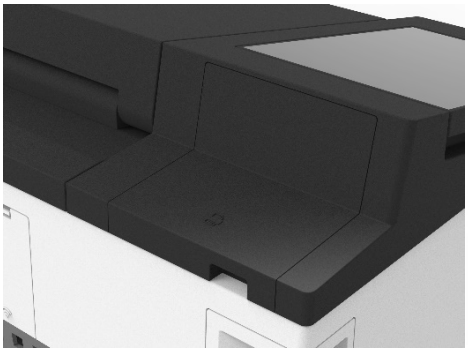
USB-B port

One USB-B port located on instrument rear panel.

USB-C port

One USB-C port located on the front of the instrument.

Printer Compartment





Remove the printer housing to attach the optional printer accessory.

The printer connects to the instrument (printer panel) via a serial port connection.

Wi-Fi™ and Bluetooth® Dongle Compartment

One recessed compartment containing a USB-A port located on the instrument rear panel dedicated for Wi-Fi and Bluetooth connectivity. This port also acts as a standard USB-A port in the event that the Wi-Fi and Bluetooth dongle is not used.

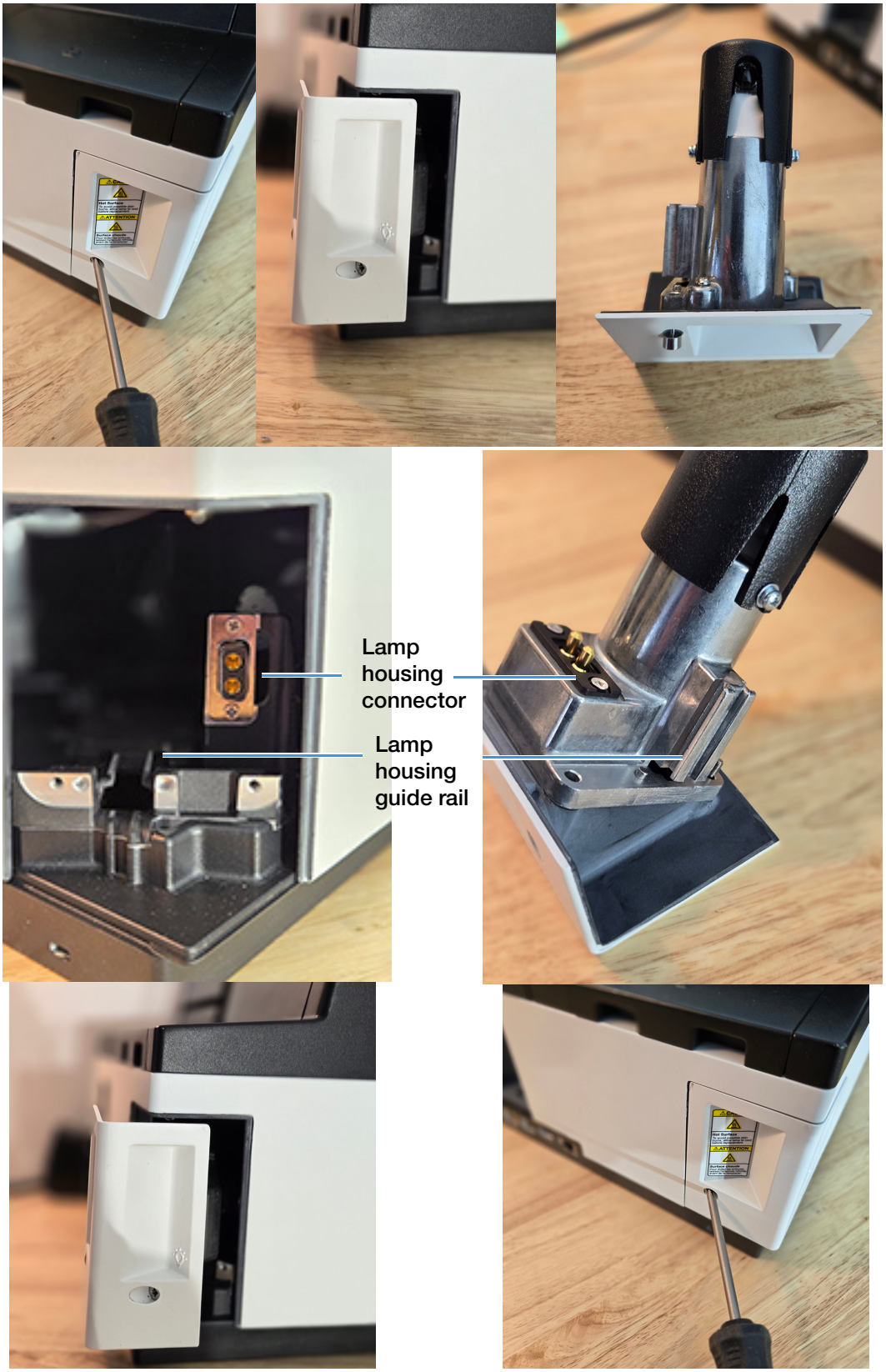
To open the compartment, push the clip tab down and pull the cover towards you. Then pull the entire cover up and out of the instrument.

Halogen Lamp Compartment



The lifetime of the halogen lamp on the GENESYS G5 VIS is approximately 1,000 hours. This compartment is available on the instrument to enable direct access to the lamp for replacement.

To replace the halogen lamp



Accessories

This section lists the accessories for use with the GENESYS G5 instruments.

Note Some accessories listed below are not included with the purchase of GENESYS G5 spectrophotometers.

GENESYS G5 USB Wi-Fi and Bluetooth Dongle

A USB Wi-Fi and Bluetooth dongle used to enable Wi-Fi and Bluetooth connectivity.



The GENESYS G5 USB W-Fi and Bluetooth Dongle is intended to be plugged into the recessed USB-A port within the compartment on the back of the instrument.

NOTICE Prevent damage to the instrument. Remove the GENESYS G5 USB Wi-Fi and Bluetooth Dongle from the instrument and package it separately when shipping the instrument - for example to our depot for service.

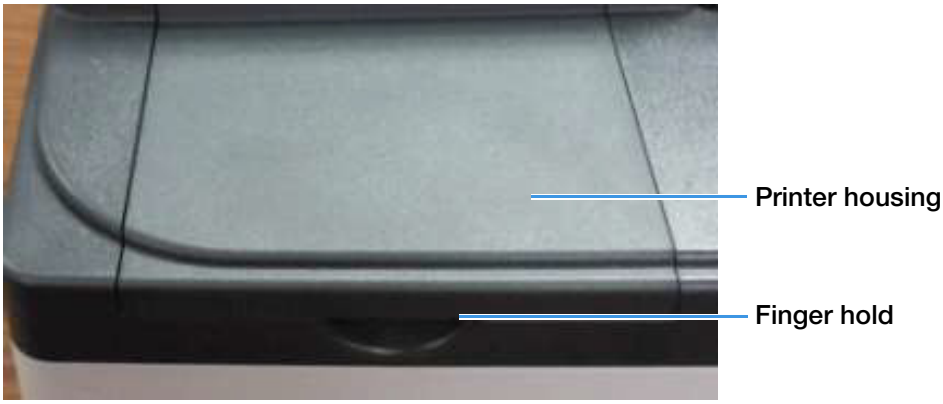
GENESYS G5 Printer



Prints reports on 4” wide paper that comes with optional self-adhesive for transferring sample data directly into laboratory notebooks or posting on bulletin boards. The software allows printing of data from each sample measurement or from a group of samples logged and measured together.

Connecting the printer

1. Remove the printer housing cover.
   Use the finger hold, pull towards you and lift.



2. Load paper into the optional printer.



3. Insert printer into GENESYS spectrophotometer.



Back of GENESYS



Bottom of printer

4. Align the guide rail on the printer with the guide rail on the GENESYS spectrophotometer.
5. Push the printer forward until the connectors are fully connected. You will hear a snap when the connectors have engaged properly.



Slide forward



Printer fully engaged

GENESYS G5 Instrument Dust Cover



Black polyester cover protects instrument against dust and any liquid exposure while not in use.

Single Cell Sample Holder



A single cuvette cell holder designed to securely hold a single cuvette in place during measurements is provided with each model. It ensures proper alignment of the cuvette with the light path of the instrument, allowing accurate and consistent readings. The holder accommodates standard cuvettes, which are often made of quartz, glass, or plastic. The sample holder fits perfectly within the sample compartment on each instrument.

NOTICE

- Clean cell holders by wiping with a solution of mild detergent. Ethanol and isopropyl alcohol can be used if necessary but do not submerge the cell holder in liquid.
- Do not allow acetone, chlorocarbons or other aggressive organic solvents to contact the cell holder or base. The PC-ABS plastic will soften and discolor.

Installing a single sample holder

1. Align white arrows as shown.



2. Lower the cell holder into the sample compartment so that the V engages with the groove on the side of the sample compartment and the hold-down magnet engages

Optional Single Sample Holders

Cell holder trays equipped to position other kinds of cells and samples are available. They insert and remove in the same way as the standard cell holder.

GENESYS G5 Test Tube Holder



Long path rectangular cell holder



Long path cylindrical cell holder



Filter holder



Disposable 50 µL microcell holder



Disposable plastic microcells with 50 µLchambers located at a Z-height of 8.5 mm and centered on the cell are supported by this accessory. At time of writing of this user guide, the EppendorfM UVette™ is the only brand supported, but see the insert with the accessory for updates. Cuvettes made by BrandTech™ are not supported because of poor manufacturing reproducibility in these cells.

Note Plastic microcells are not as transparent as quartz, especially at very short wavelengths. The combination of absorption by the cell and masking of the spectrophotometer beam required to restrict it to the 2.5 mm tall cell window reduces the energy passing through these cells. Photometric performance will be lower with these cells than with full size quartz cells.

Please see the Learning Center chapter for more information on the Disposable 50 µL microcell holder.

Beckman cell holder



Beckman™ pioneered the use of a special type of microcell with volumes of 100 µLor less. These very short cells require a special holder to accommodate them at the appropriate Z-height for the cell and to mask off part of the spectrophotometer beam to ensure that light only passes though the sample, and not over it.

Please see the Learning Center chapter for more information on the Beckman cell holder.

Peltier Thermostatted cell holder



The accessory holds a single cell at a temperature between 20 °C and 60 °C with a precision of ±0.2 °C and an absolute accuracy of ±0.5 °C.

Note The specification for absolute accuracy is limited by the accuracy of the thermocouple used in construction ofthe device. ±0.3° C is the specification of a superior quality thermocouple. Beyond this specification the cost of the thermocouple becomes exponentially higher and use of a calibrated thermocouple becomes a necessity if exceptionally high accuracy is a requirement.

Note Water thermostatted cell holders are not supported on this platform.

Please see the Learning Center chapter for more information on the Peltier Thermostatted cell holder.

Optional Sipper Accessory



A sipper system allows you to automate many of the tasks associated with handling individual cuvettes. A flow cell with a relatively small volume is placed in the beam and sample solution is pumped into and out of it by a peristaltic pump controlled by the instrument software.

Automated sample handling with a sipper pump can bring considerable efficiency to a laboratory, but thoughtful experiment design is required to get the best results in terms of both data quality and operational efficiency.

Please see the Learning Center chapter for more information on the Components of the Sipper System.

Fiber Optic Coupler and Probe (UV Vis systems only)



Easy-to-use probe that is ideal for applications ranging from daily use by students in instructional laboratories to performing at-line measurements in manufacturing settings. A perfect tool for measuring aqueous solutions, the probe attaches to the spectrophotometer via a two meter cable and can be mounted to a clamp or used in-hand to measure solutions in beakers or flasks.

The fiber optic probe comes standard with a 10 mm pathlength tip. It can easily be interchanged with the separately available 5 mm or 20 mm tips.

Please see the Learning Center chapter for more information on the Fiber Optic Coupler and Probe.

Dimensions and Weight

The table below indicates the dimensions, weight and required clearances for each instrument.

Instrument	Weight	Dimensions (W x D X H)
GENESYS G5 Vis	8.1 kg (17.9 lbs)	376 x 347 x 218 mm
GENESYS G5 UV-Vis	8.3 kg (18.3 lbs)	376 x 347 x 218 mm
GENESYS G5 UV-Vis Pro	8.3 kg (18.3 lbs)	376 x 347 x 218 mm

2

Instrument Set up

Register Your Instrument

Register your instrument to receive e-mail updates on software and accessories for the GENESYS G5 instrument. An Internet connection is required for registration.

To register your instrument

From any PC that is connected to the Internet, use any web browser to navigate to https://www.thermofisher.com/us/en/home/global/forms/industrial/genesys-software-download.html?erpType=Global_E1 and follow the instructions to register the instrument.

Preparing Your Site

Use the information in this chapter to prepare your site for installing the instrument.

Location

Consider these points when planning the location of your system:

- If possible, choose a site easily accessible by company personnel and have a telephone near the system. Should the system require technical support service, these measures will save time.
- An electrical power source must be nearby. The spectrophotometer has a 1.83 m (6 feet) power cord.
- The floor (and table or counter used for a work surface) should be rigid to avoid excessive vibration, and sturdy enough to support the spectrophotometer.
- Avoid placing the system near doorways, large windows and heating or air conditioning vents, which cause significant temperature variations.

- Make sure the system will flt in the work space you choose. Compare the work space with the dimensions and required clearances described in this manual. Always leave space for access covers to be opened for maintenance and service.

Magnetic Fields

Intense magnetic fields, such as those produced by superconducting magnets, can affect system performance. The instrument should be at least 5.5 m (18 ft) away from these fields. Minimize or eliminate exposure to magnetic fields wherever possible.

Vibration

While vibration will not damage the spectrophotometer, excessive vibration may compromise spectral quality and measurements. Extreme floor vibration or acoustical noise from heavy manufacturing equipment or other sources can affect the performance of your spectrophotometer.

Minimize or eliminate noise and vibration wherever possible by:

- Locating the system on a rigid surface.
- Placing the system away from elevators, air conditioners, refrigeration units and other machinery that causes vibration.
- Positioning the system away from equipment that produces loud acoustical noise.

If vibration is a problem in your work space, consider using a vibration isolation system.

Ventilation

The operating and storage environment must be free from corrosive and/or organic vapors. The types of analyses you plan may require special ventilation (for example, if you will be analyzing highly toxic samples or dissolving your samples in solvents with harmful vapors).

Hydrochloric acid and hydrofluoric acid are highly corrosive and may cause accelerated corrosion of the metallic components in the spectrophotometer if the concentration level of corrosive gases in the air is excessively high due to improper sampling techniques.

WARNING Hydrochloric acid, hydrofluoric acid and phosgene are highly toxic and reactive. If you plan to regularly use solvents containing halogenated hydrocarbons, be sure your work area is properly ventilated and maintain appropriate safety practices.

Static Discharge

Since static electricity can destroy electronic components, your system was designed to meet the international standards for electrostatic discharge immunity requirements for industrial process, measurement and control equipment.

If you have trouble with static electricity in your facility, protect your system (especially when you are servicing or handling components inside) by following your company's established guidelines for reducing electrostatic discharges.

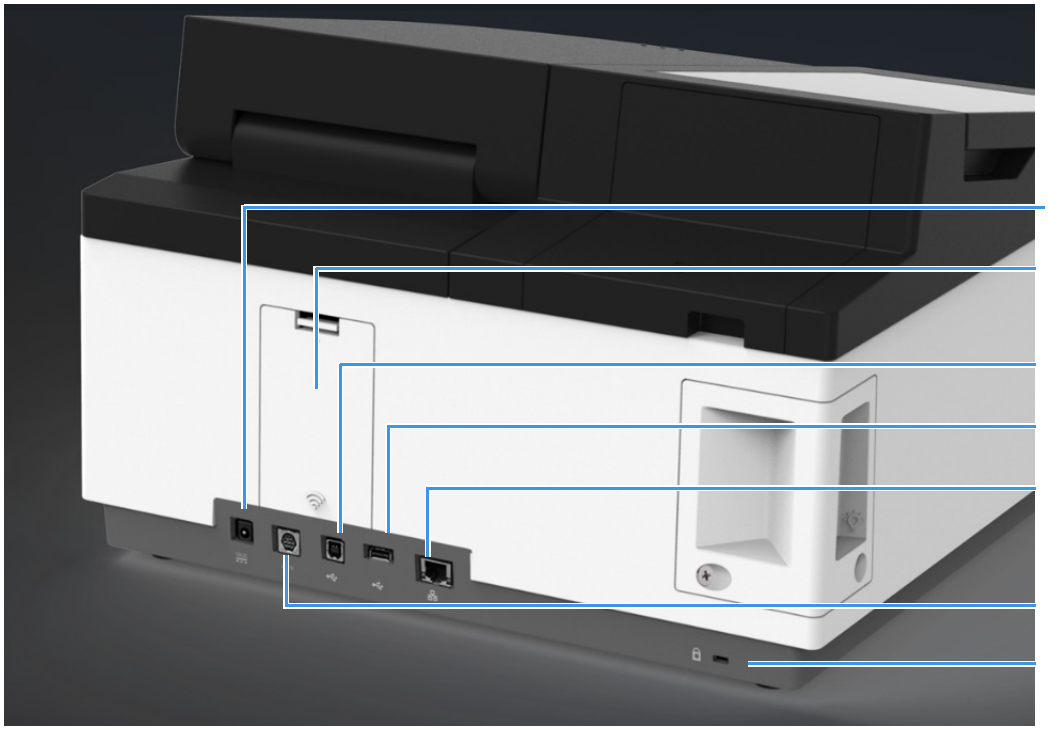
Dust and Particulate Matter

The spectrophotometer must be installed in a location where it will not be exposed to excessive dust or other airborne particulate matter. The spectrophotometer and its power supply have cooling vents through which excessive dust or particulate matter could enter, possibly causing damage to the system.

Organic and Caustic Vapors

Be sure to provide storage space for acids and bases and organic solvents that is away from the spectrophotometer; they should not be left in or on any of the sampling accessories for an extended time.

Set Up Your Instrument



Connect Power

CAUTION Avoid shock hazard. Each wall outlet used must be equipped with a ground. The ground must be a noncurrent-carrying wire connected to earth ground at the main distribution box.

Connect the provided power cord to a grounded wall outlet and then to the designated USB-C port on the back of the instrument. See "Power Cords" on page 388 for more information.

Connect an Accessory

To connect a compatible printer or other compatible accessory such as a USB keyboard and/or mouse to the instrument, use any USB port on the instrument (front or back). See Accessories for information about connecting accessories compatible with the GENESYS G5 instruments with the accessory connector port.

Connect the USB Wi-Fi and Bluetooth Dongle

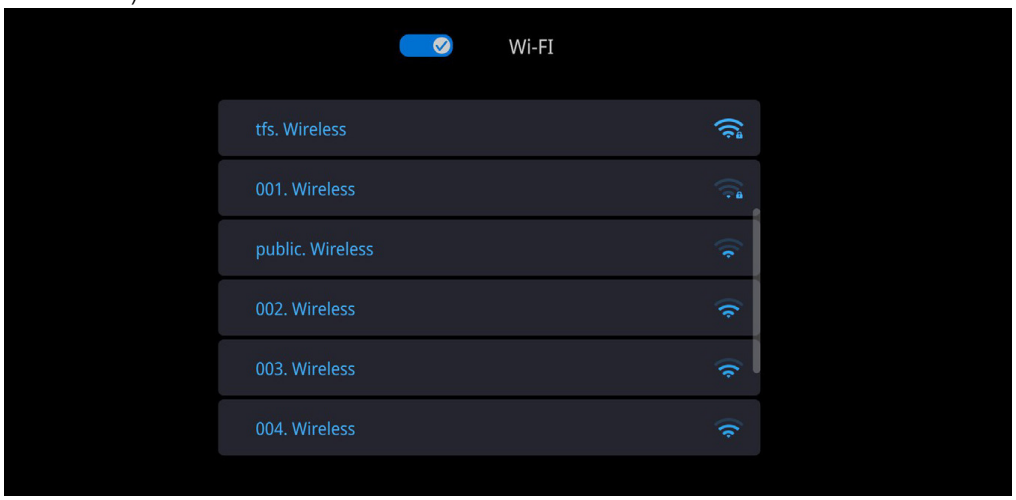


To connect the provided USB Wi-Fi and Bluetooth Dongle, use the dedicated recessed USB port on the back panel of the instrument. The Wi-Fi and Bluetooth features of this instrument will only function when a USB Wi-Fi and Bluetooth Dongle is connected.

Out-of-Box Experience

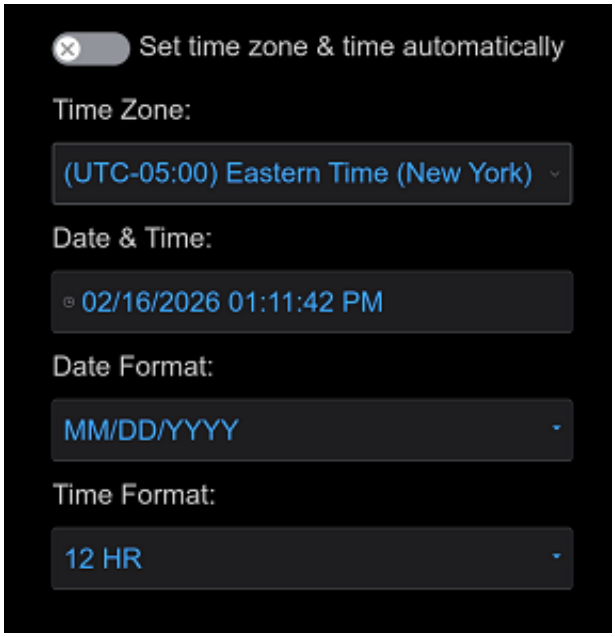
The Out-of-Box Experience (OOBE) is the initial setup process that you encounter when you first start a GENESYS G5 instrument. It is designed to help you configure essential settings, personalize your environment, and get your device ready for use.

1. Power on the instrument for the first time.
2. Read and **Accept** the End User License Agreement (EULA).
3. Select the desired language for the software from the provided drop-down menu and select **Next**.
4. If it is desired to setup a Wi-Fi connection at this time, select the toggle button next to Wi-Fi to move it to the right, it will turn blue and a checkmark will be displayed.
5. Select from the list of available Wi-Fi networks (input password if required, then select **OK**) then select **Next**.



See Instrument Settings in the Learning Center chapter for more information on how to connect to a Wi-Fi network.

6. If it is not desired to connect to a Wi-Fi network at this time, select **Next** without enabling Wi-Fi.
7. Select the desired date and time settings from the appropriate menus then select **Next**.



See Instrument Settings in the Learning Center chapter for more information on how to configure the date and time settings.

8. Select **Finish** to complete the OOBE setup. the instrument must restart for the changes to take effect.

Set Up Bluetooth Connections

Use Bluetooth to connect the instrument to one or more Bluetooth (wireless) input devices such as a Bluetooth keyboard, mouse or barcode scanner.

Note Make sure the device is labeled "Bluetooth" and not just "wireless." All Bluetooth devices are wireless but not all wireless devices will run with Bluetooth.

Ensure the GENESYS G5 Wi-Fi and Bluetooth Dongle is connected to the instrument before proceeding with setup. “Connect the USB Wi-Fi and Bluetooth Dongle” on page 28.

See the section on bluetooth connectivity for additional details on connecting to a Bluetooth device

Set Up Wireless Connection

Ensure the GENESYS G5 USB Wi-Fi and Bluetooth Dongle is connected to the instrument before proceeding with setup. “Connect the USB Wi-Fi and Bluetooth Dongle” on page 28.

See the section on Wi-Fi connectivity additional details on connecting to a Wi-Fi network.

Set Up Cloud Connection

If the instrument is connected to a Cloud account, you can export data files to the following Cloud services: Thermo Fisher Connect, Google Drive, and Microsoft OneDrive. Multiple Cloud accounts can be added to the instrument allowing the operator the ability to select from the available list when exporting data.

Note An ethernet or Wi-Fi connection to a network with internet access is required for this feature.

See the section on cloud connectivity for additional details on connecting to a Cloud platform.

Set Up Ethernet Connection

The instrument Ethernet port can be used to set up a wired connection between the instrument and an active network wall jack.

If the instrument is connected to a network wall jack, you can export data files to a network location, for example, in order to transfer them to another computer. You can define multiple network paths that the operator can select from when exporting data. See Export Settings for details. If the connected network has internet access, the ability to setup Cloud exporting and use online software updates are enabled.

Parts needed:

- Shielded (straight through) Ethernet cable (CAT5e or newer is recommended)

Set up Ethernet connection

1. Connect one end of Ethernet cable to the Ethernet port on the instrument back panel.



2. Connect the other end of the Ethernet cable to an active network wall jack.
3. When connected to a network via an Ethernet connection, the Ethernet Connectivity icon will appear at the top of the screen.

Set Up USB Connection

The instrument USB-B port can be used to set up a wired connection between the instrument and a personal computer (PC) or to connect to a USB printer.

Parts needed:

- Standard USB-A to USB-B cable (not supplied)

Set up USB connection

1. Connect the USB-B end of USB cable to the USB-B port on the instrument back panel.



2. Connect the USB-A end of the USB cable to either the computer or printer USB-A port.
3. When connected to a printer via a USB connection, a printer icon will appear at the top of the screen.

Assess Instrument Connectivity

Open the menu icon at the top right of the home screen. Select **About** to quickly assess the instrument's connectivity status including Bluetooth and Wi-Fi. See "System Status" for more details.

Operating Specifications

The instrument operates reliably when the room environment meets these specifications:

- operating temperatures*: 5 °C - 35 °C (41 °F - 95 °F)
- relative humidity (non-condensing): < 20-80%
- altitude: up to 2,000 m
- pollution degree: 2
- installation (overvoltage): category II

*Operating the instrument outside of this range may cause permanent damage.

If you move the system, protect the instrument from extreme changes in temperature and humidity by resealing it in the protective packaging that the instrument was originally shipped in. Extreme changes in temperature and humidity may cause moisture condensation, which can permanently affect the optical components.

Storage

When stored in the original shipping container, the instrument can be exposed to temperatures from -20 °C to 70 °C (-4 °F to 150 °F) without damage to the instrument.

Computer Requirements

When controlling the instrument through a connected computer using the optional PC control software as opposed to the local touch screen, use the information below to select a compatible computer to operate the software.

Required Windows Operating System

- Windows 11 Enterprise or Professional, build 1607 or greater

Minimum hardware configuration

- 2.0 GHz dual-core processor enabled
- 8 GB RAM with system managed memory enabled
- 5 GB available on drive C
- Display resolution 1366 x 768

Recommended hardware configuration

- 2.33 GHz 4-core processor enabled (or greater)
- 16 GB RAM with system managed memory enabled (or greater)
- 200 GB available on drive C (or greater)

Update Software

Quickly and easily download and install the latest GENESYS G5 software and release notes from our website. Follow the steps to update or upgrade the software on your local instrument and/or install or update the GENESYS G5 software on a personal computer (PC). A PC with an Internet connection is required to download software. See "Update Software" on page 350 for information on updating the GENESYS G5 software.

Technical Support

Contact Information for U.S./Canada Support

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5225 Verona Road
Madison, WI 53711-4495 U.S.A.

Telephone: +1-800-532-4752, option 2, then option 8
Toll Free: 1 877 724 7690 (U.S. & Canada only)
E-mail: US.techsupport.analy@thermo.com

Website: http://www.thermofisher.com/uvvis

Contact Information for International Support

Thermo Fisher Scientific
Telephone: +1 608-273-5017
Problem Report Form: https://tfs-3.my.salesforce-sites.com/madisonsupport
Or contact your local dealer.

3

Standard Applications

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Getting Started

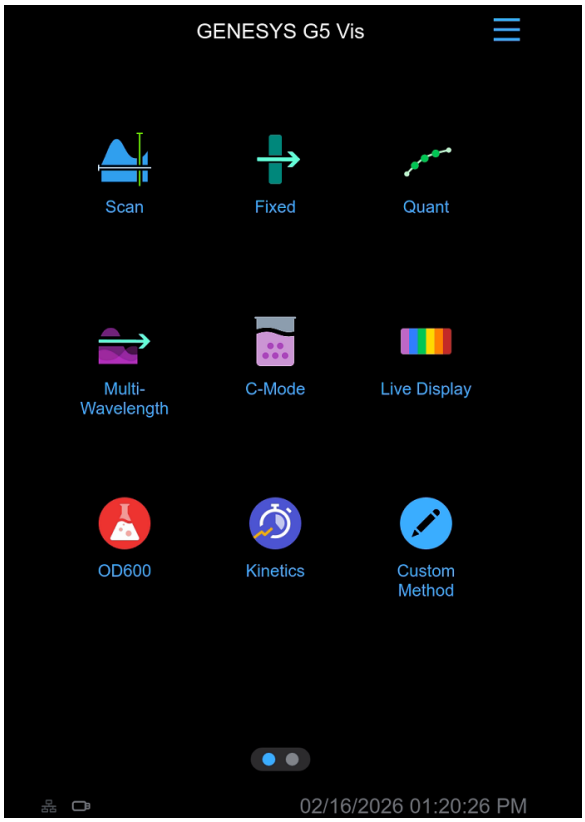
Manage Methods

Many of the standard applications require the user to run a user-defined method created using the GENESYS G5 local or PC control software.

Create method

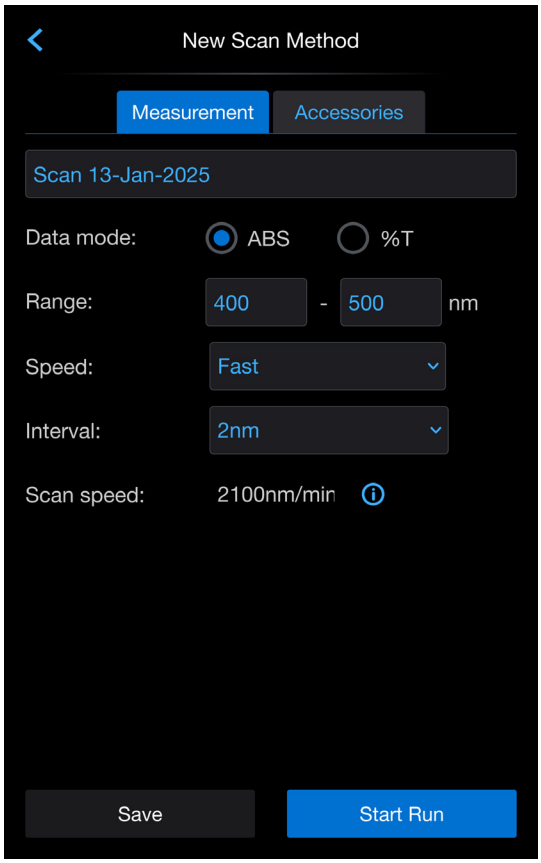
Create method to be used for sample measurements with user-defined settings.

1. From the home screen, select one of the following applications: **Scan**, **Fixed**, **Quant**, **Multi-Wavelength**, **OD600**, **Kinetics**, or **Custom Method**.



2. Select + New Method to open the Method window.
3. The **Method Name** will default as the name of the application followed by the date the method was created. This can be edited by selecting the method name window.

4. Specify the settings within the Measurement tab, these will differ depending on the application selected.



Scan

Setting	Available Options	Description
Data mode	Abs or %T	Determines if absorbance or %transmittance will be measured.
Range	325 - 1100 (GENESYS G5 Vis) Or 190 - 1100 (GENESYS G5 UV-Vis/UV-Vis Pro)	Indicates the region of the UV-Vis spectrum that will be measured.
Speed	Fast, Medum, Slow	Specifies how frequently the instrument will acquire a measurement.

Setting	Available Options	Description
Interval	Fast Speed Selected 5 nm, 2nm Medium Speed Selected 2nm, 1nm, 0.5nm Slow Speed Selected 1nm, 0.5nm, 0.2nm, 0.1nm	The available interval options are different depending on the speed selected.
Scan speed	N/A	An estimation on the scan speed will be provided based on the other settings that were selected.

Quant

Setting	Available Options	Description
Calibration expiration	Never or Custom Select Custom to provide a specific date & time that the calibration will expire.	Standard operating procedures (SOPs) often require that a method be recalibrated at a certain time in the future. The GENESYS G5 software may be configured to void the calibration curve for a method at a date in the future. On expiration, the method would require re-calibration before proceeding to measure.
λ	GENESYS G5 Vis 325 - 1100 GENESYS G5 UV-Vis & UV-Vis Pro 190 - 1100	Analytical wavelength used to determine concentration.
Reference λ	GENESYS G5 Vis 325 - 1100 GENESYS G5 UV-Vis & UV-Vis Pro 190 - 1100	Reference wavelength used to track background effects like solvent, bubbles, or light scatter. The absorbance at this wavelength is subtracted from the analytical wavelength when determining concentration of the sample.
Equation	Linear, Linear through zero, Quadratic through zero, Quadratic, Third order through zero, Third order	Equation type used to fit the standard measurement data.

Setting	Available Options	Description
Unit	mg/mL, ug/L, uM, mM, M	Unit in which the sample measurements are displayed and printed.
Replicate	1, 2, 3	Determines the number of replicate measurements that are taken for each standard.

Fixed

Setting	Available Options	Description
Data Mode	Abs or %T	Determines if absorbance or %transmittance will be measured.
Equation	$ABS(\lambda_1)xF_1$ $ABS(\lambda_1)xF_1 + ABS(\lambda_2)xF_2$ $ABS(\lambda_1)xF_1 - ABS(\lambda_2)xF_2$ $(ABS(\lambda_1)xF_1) /(ABS(\lambda_2)xF_2)$	Equation used to determine result.
Unit	µg/L, µM, mM, M, mg/L, ppm, C, mg/mL, g/L, ppb, %, mg/dL, g/100mL, IU, U/L, and Abs/cm	Result will be displayed on the measurement screen and print out with the selected units.
λ_1	GENESYS G5 Vis 325 - 1100 GENESYS G5 UV-Vis & UV-Vis Pro 190 - 1100	Wavelength #1 substituted into the selected equation.
F_1	0.000001 - 1000000	Factor #1 substituted into the selected equation.
λ_2	GENESYS G5 Vis 325 - 1100 GENESYS G5 UV-Vis & UV-Vis Pro 190 - 1100	Wavelength #2 substituted into the selected equation.
F_2	0.000001 - 1000000	Factor #2 substituted into the selected equation.

Multi-Wavelength

Setting	Available Options	Description
Data Mode	Abs or %T	Determines if absorbance or %transmittance will be measured.
Wavelength Selection	**GENESYS G5 UV** 325 - 1100 **GENESYS G5 UV-Vis & UV-Vis Pro** 190 - 1100	Results will be displayed for up to 20 discrete wavelengths that are entered.

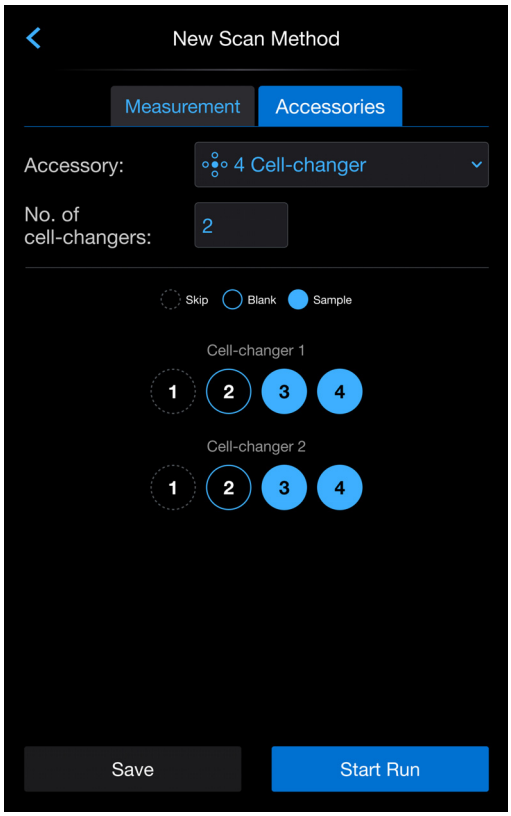
OD 600

Setting	Available Options	Description
Analysis wavelength	600 nm	Fixed analytical wavelength for optical density measured at 600 nm.
Conversion factor	1 - 9999 x (10^8) cells /mL	User defined factor. Generally accepted factor for measured cell type, or one derived empirically using a solution of study cells at known concentration using the same media.
Instrument factor	1 - 9999	A user-defined correction multiplier applied to the measured OD600 value to compensate for instrument-specific optical characteristics and ensure alignment with reference standards or historical data. The default value is 1.000 and should only be adjusted following calibration verification.

Kinetics

Setting	Available Options	Description
λ	GENESYS G5 Vis 325 - 1100 GENESYS G5 UV-Vis &UV-Vis Pro 190 - 1100	Analytical wavelength used to determine concentration.
Reference λ	GENESYS G5 Vis 325 - 1100 GENESYS G5 UV-Vis &UV-Vis Pro 190 - 1100	Wavelength used for baseline correction. Measured concurrently with the main wavelength and subtracted from the main signal to remove lamp drift, stray light, and scattering artifacts. Choose a wavelength where the analyte has negligible absorbance.
Time unit	Minutes or Seconds	Select the unit for time-based measurements (seconds or minutes).
Experiment time	Any number above 1 second	Specify the total experiment time, the total number of measurements will be determined based on the total experiment time and how long the data intervals are.
Data interval	1 second - 60 minutes	Specify the time interval between each measurement.
Integration time	0.2 - 5 seconds	Detector exposure time per measurement. Longer times improve signal-to-noise but reduce time resolution and may cause detector saturation. Select the shortest integration time that achieves acceptable signal amplitude.

5. If an accessory is connected, use the Accessories tab to specify the accessory settings. See the Accessories section within the Learning Center chapter for more information on settings specific to each accessory.



6. Choose **Start Run** to immediately start the experiment using the created method. If no experiment is to be conducted at the time of method creation, select **Save**.

Note Any errors in the method will be listed in orange text on the method editor screen. Errors must be addressed before the method can be saved.

View or edit method

1. From the Methods screen, select ⋮ to the right of the desired method to view the method details.

2. Select ⋮ once more, then select **Edit**.
3. View and adjust the method settings as desired.
4. Select **Save** to save the changes for future use or **Start Run** to start a new experiment with the updated settings.

Duplicate method

1. From the Methods screen, select to the right of the desired method to view the method details.
2. Select ⋮ once more, then select **Duplicate**.

A duplicated method will be created with a suffix added to the existing Method Name.

3. View and adjust the method settings as desired.
4. Select **Save** to save the changes for future use or **Start Run** to start a new experiment with the new method.

Export method

Export a method in order to run it and store the measurement results on another GENESYS G5 instrument or another computer running the GENESYS G5 PC control software.

1. From the Methods screen, highlight method(s) to be exported by selecting the checkbox to the left of each method.
2. Select  at the bottom of the screen (if any of the methods are invalid, an error message is displayed; errors must be fixed before method can be exported).
3. Select an available location to export to from the dropdown menu and then choose **Export** (method is exported to method file (*.method filename extension in proprietary format).

To transfer the method to a GENESYS G5 instrument or the GENESYS G5 PC control software, copy the method file to a USB memory device and then load the method (see Import method for details).

Import method

Import a method back to an instrument or computer running the GENESYS G5 software in order to edit the method settings or to use the method for data collection.

1. From the Methods screen, select .

2. Locate and select the desired ".method" file.
3. Choose **Import** (imported method is added to end of Select Method list).

Delete method

1. From the Methods screen, highlight method(s) to be exported by selecting the checkbox to the left of each method.
2. Select .
3. After the confirmation message, choose **Yes**.

Scan

The Scan feature measures the absorbance or transmittance of a sample across a specified range of wavelengths, producing a spectrum that can be analyzed for various properties.

Measure using Scan

Reported Results



Measure using Scan

Use the Scan application to create and run a user-defined method. For more information, see “Manage Methods” on page 37.

Before you begin...

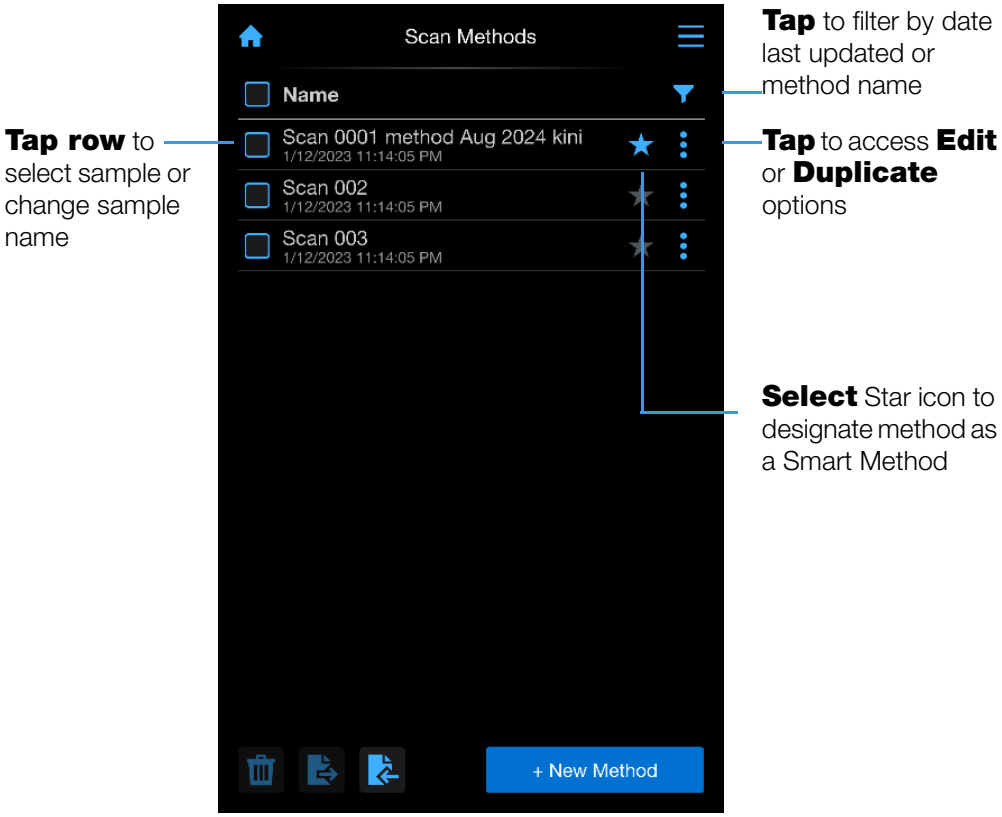
Before taking measurements with a cuvette or test tube on the GENESYS G5 instrument, it is important to make sure the cuvette or test tube is clean and wiped down with a lint-free lab wipe to remove any dust, fingerprints, or any other material that may affect the measurement.

NOTICE Do not use a squirt or spray bottle on or near the instrument as liquids will flow into the instrument and may cause permanent damage.

Procedure

Note The following steps may vary if an accessory is being used, please see the Accessories section for more information.

1. From the home screen, select **Scan**.
2. From the Scan Methods screen, select the desired method to view the method details.



Information about the selected method appears in the Method Details pane.

3. Select Start Run.
4. Place a cuvette or test tube containing the blanking solution into their respective holder. Close the compartment door for best results.
   Tip: If using a cuvette, make sure to align the cuvette light path with the instrument light path.

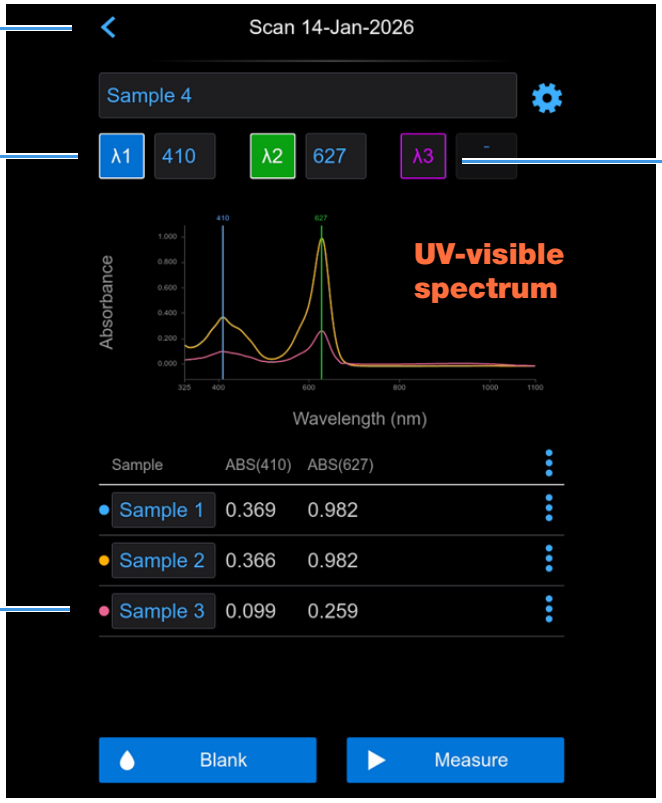
5. Select **Blank** and wait for the measurement to be completed.
6. Remove the cuvette or test tube and place a cuvette or test tube containing the sample into the respective holder. Close the compartment door for best results.
7. Select **Measure**.

   When the sample measurement is completed, the spectrum and reported values are displayed (see the next section).
8. When you are finished measuring samples, select < at the top left of the screen to end the experiment.
9. Remove the sample cuvette or test tube.

Reported Results

Scan measurement screen (local control)

For each measured sample, this application shows the absorbance spectrum and a summary of the results. Here is an example of the GENESYS G5 local control software screen:



Tap to end experiment

Absorbance at user defined wavelength 1 (519 nm); Select icon to enable or disable and use the field to edit

Tap row to select sample and update spectrum

Absorbance at user defined wavelength 2 (1100 nm); Select icon to enable or disable and use the field to edit

Drag tab down/up to see more/less sample data

Scan measurement screen (PC control)

For each measured sample, this application shows the absorbance spectrum and a summary of the results. The layout of the measurement screen of the PC control software differs slightly from the local control. See "Measurement Screen Display Options" on page 301 for an example.

Negative and Positive Absorbance in Scan

The GENESYS G5 instruments can measure negative absorbance. However, for the GENESYS G5 UV-Vis and UV-Vis Pro, the measurement of negative absorbance in the Scan application requires that this feature be enabled. Although it is not required to disable this setting when measuring positive absorbance, it is highly recommended as it may add significant time to your scan measurements.

For more information on how to enable or disable this setting, see “Preferences” on page 120

Note Toggling this setting is required only to measure negative absorbance in the Scan application.

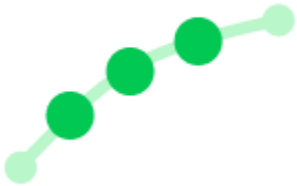
Quant

The Quant application assists in determining sample concentrations by measuring absorbance, creating a calibration curve from standards, and calculating results automatically.

Working with Standard Curves

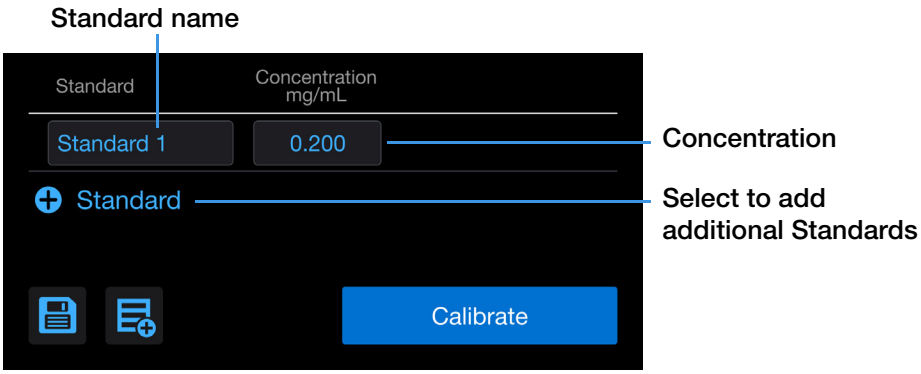
Measure using Quant

Reported Results



Working with Standard Curves

Adding Standards to a Quant Method

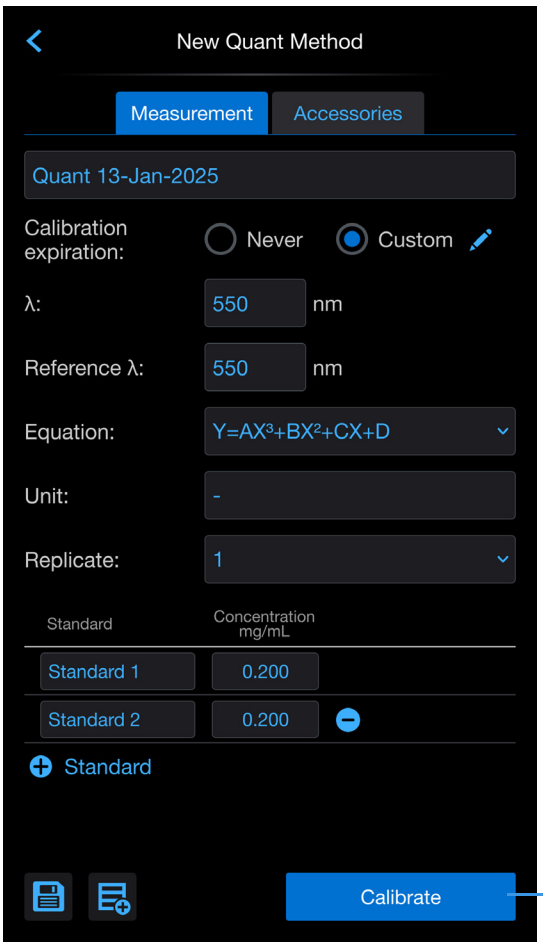


Add the desired number of standards that will be used for the Standard curve.

Note Standards with no measurement data can be removed by selecting ⊖. Standards with measurement data can be removed by deselecting the check-box next to the standard.

Calibrate a Quant method

Once all settings and a sufficient number of unique standard concentration values have been entered, the **Calibrate** button will be enabled.



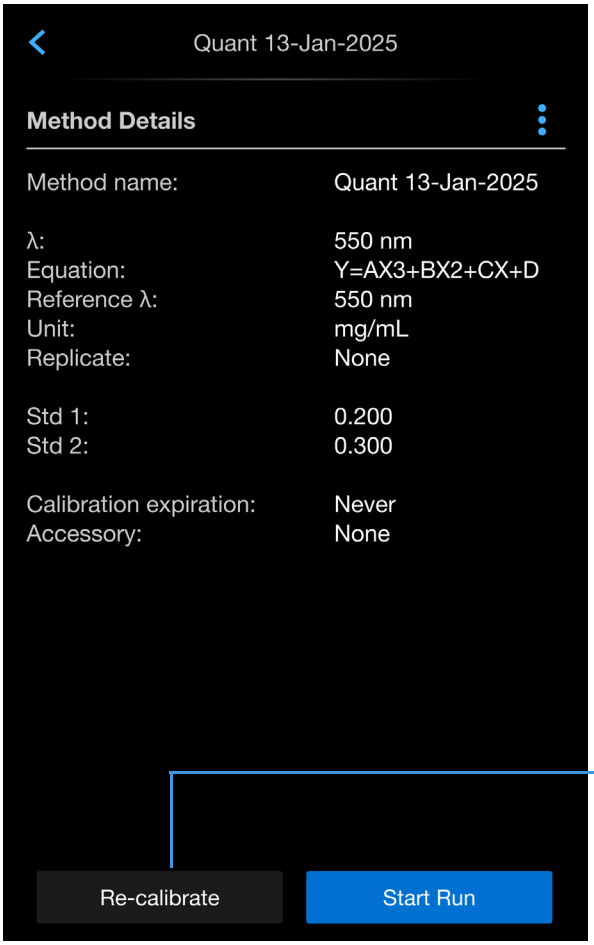
1. Select **Calibrate**.
2. Place a cuvette or test tube containing the blanking solution into their respective holder. Close the compartment door for best results.

Tip: If using a cuvette, make sure to align the cuvette light path with the instrument light path.

3. Select **Blank** and wait for the measurement to be completed.
4. Remove the cuvette or test tube and place a cuvette or test tube containing your first standard into the respective holder. Close the compartment door for best results.

5. Select **Measure**. Continue until all standards (and replicates) have been measured.
   a. If any standard needs to be remeasured during this time, select ⋮ followed by **Remeasure**. The previous data will be removed and you will be able to select **Measure** once more to obtain new data for that standard.
6. A notification will appear stating that the calibration is complete. Select **Measure Sample** to save the calibrated method and continue on to make measurements. Alternatively, select **Save Calibration and Back** to save the calibrated method and exit the application.

Re-calibrate a Quant Method



1. Select **Re-Calibrate**.
2. Place a cuvette or test tube containing the blanking solution into their respective holder. Close the compartment door for best results.

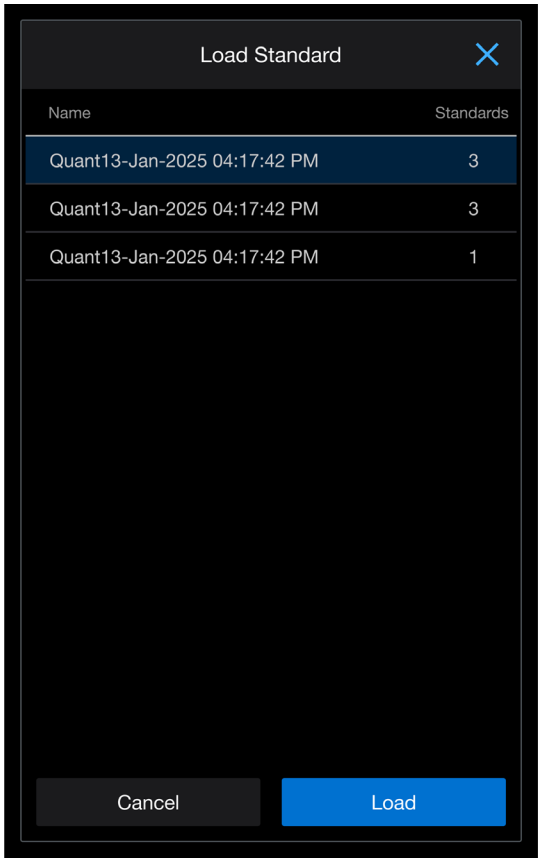
Tip: If using a cuvette, make sure to align the cuvette light path with the instrument light path.

3. Select **Blank** and wait for the measurement to be completed.
4. Remove the cuvette or test tube and place a cuvette or test tube containing your first standard into the respective holder. Close the compartment door for best results.
5. Select **Measure**. Continue until all standards (and replicates) have been measured.
   a. If any standard needs to be remeasured during this time, select ⋮ followed by **Remeasure**. The previous data will be removed and you will be able to select **Measure** once more to obtain new data for that standard.
6. A notification will appear stating that the calibration is complete. Select **Measure Sample** to continue on to make measurements. The method will not be saved unless a measurement is taken. Alternatively, select **Save Calibration and Back** to save the calibrated method and exit the application.

Load a Previously Run Standard Curve to a Quant Method

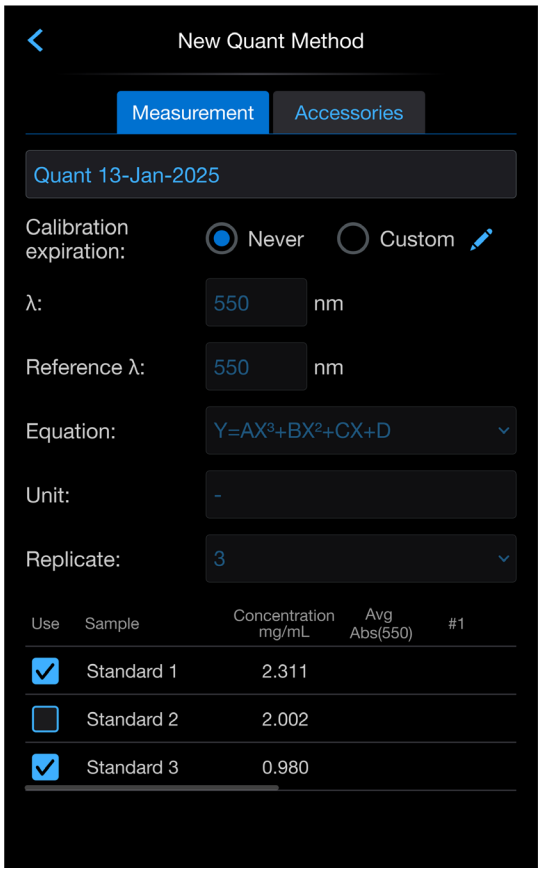
Alternatively, instead of adding new standards to the Quant method, a previously run standard curve can be loaded. If this option is used the standards do not need to be recalibrated.

1. Select  to open the Load Standard window.
2. Select from a list of previously run standard curves, then select **Load**.



Note If the standard curve has expired it will not appear on the Load Standard window.

Check or uncheck each standard depending on if you'd like to use them for your method. You must still use the minimal number of standards required for the selected equation type.



Measure using Quant

Use the Quant application to create and run a user-defined method. For more information, see “Manage Methods” on page 37.

Before you begin...

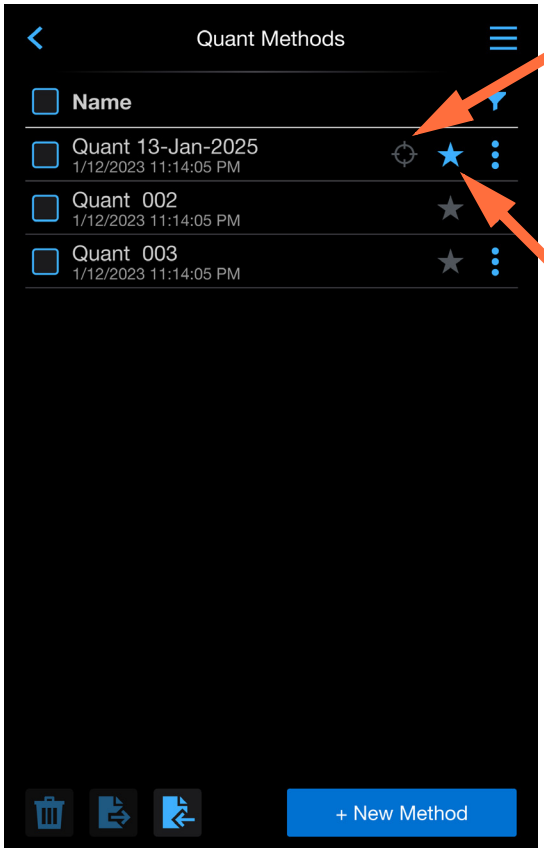
Before taking measurements with a cuvette or test tube on the GENESYS G5 instrument, it is important to make sure the cuvette or test tube is clean and wiped down with a lint-free lab wipe to remove any dust, fingerprints, or any other material that may affect the measurement.

NOTICE Do not use a squirt or spray bottle on or near the instrument as liquids will flow into the instrument and may cause permanent damage.

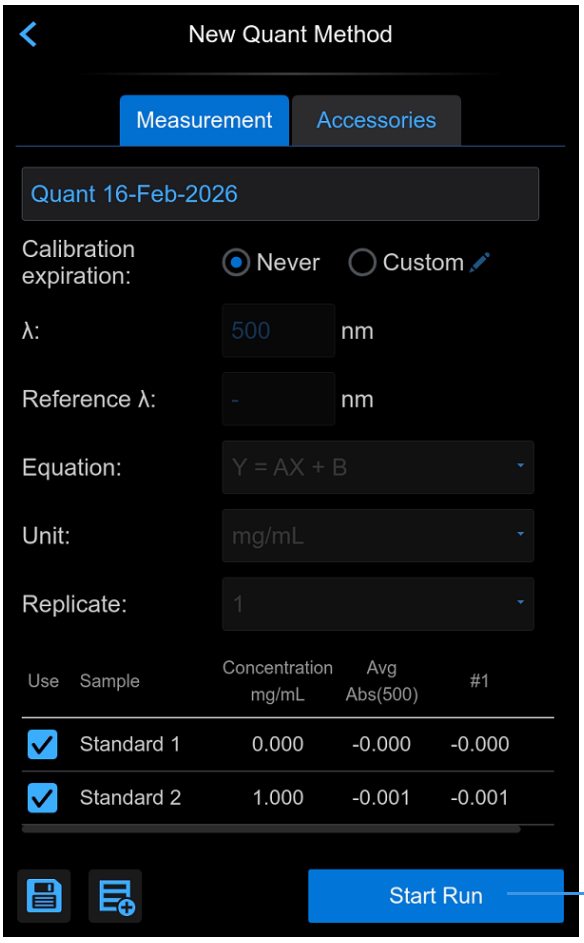
Procedure

Note: The following steps may vary if an accessory is being used, please see the Accessories section for more information.

1. From the home screen, select **Quant**.
2. From the **Quant Methods** screen, select the desired method to view the method details. Information about the selected method appears in the Method Details pane.



To create or load a previously run standard curve see "Working with Standard Curves" on page 50.



3. Select **Start Run**.

   If setting up a new standard curve, a notification will appear stating that the calibration is complete. Select **Save Calibration and Back** to save the calibrated method and exit the application or select **Measure Sample** to save the calibrated method and continue on to make measurements.

Tip: Steps 4-5 may be skipped if a blank measurement was already taken for the standards.

4. Place a cuvette or test tube containing the blanking solution into their respective holder. Close the compartment door for best results.

Tip: If using a cuvette, make sure to align the cuvette light path with the instrument light path.

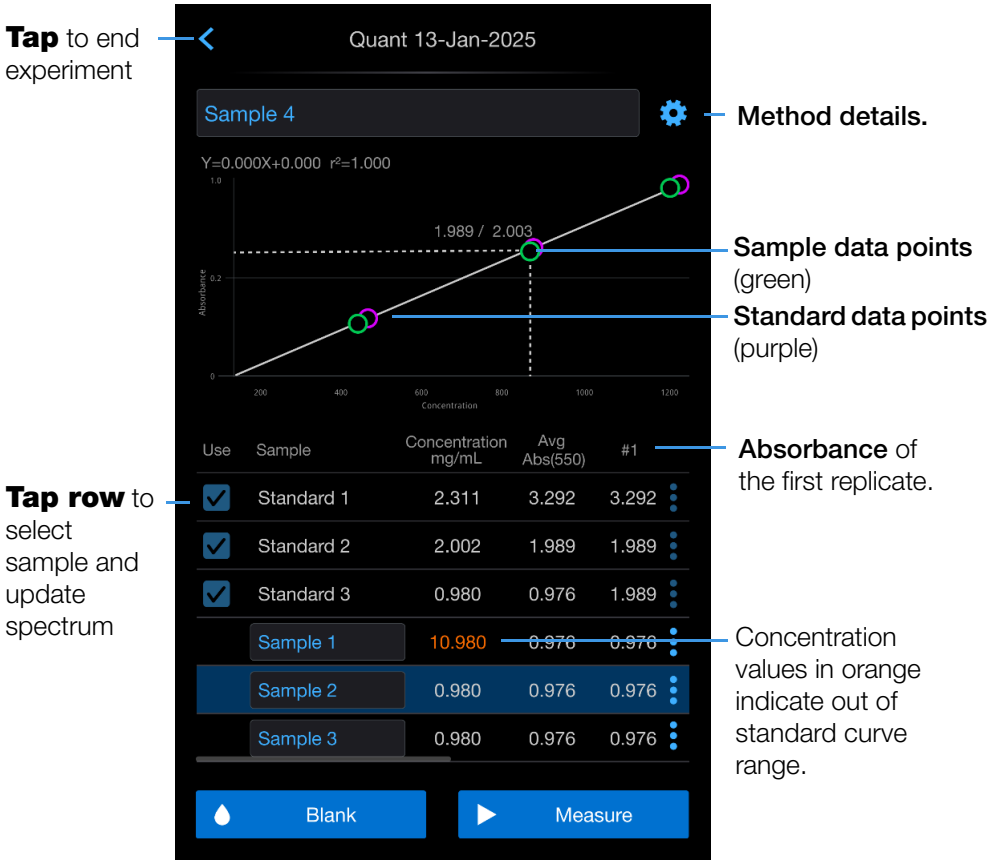
5. Select **Blank** and wait for the measurement to be completed.
6. Remove the cuvette or test tube and place a cuvette or test tube containing the sample into the respective holder. Close the compartment door for best results.
7. Select **Measure**.
   When the sample measurement is completed, the spectrum and reported values are displayed (see the next section).
8. When you are finished measuring samples, select < at the top left of the screen to end the experiment.
9. Remove the sample cuvette or test tube.

Reported Results

Quant measurement screen (local control)

A standard curve is displayed graphically showing the relationship between the measured standards, the calculated standard curve, the measured absorbance, and calculated concentration for each sample. A horizontal line connects the sample absorbance value on the Y-axis to the standard curve. A vertical line connects that point to the sample concentration value on the X-axis.

The R^2 value indicates how well the standard curve fits the standard data points (1.0 is a perfect fit; that is, all points lie exactly on the curve).



Quant measurement screen (PC control)

For each measured sample and standard, this application shows the standard curve and a summary of the results. The layout of the measurement screen of the PC control software differs slightly from the local control.

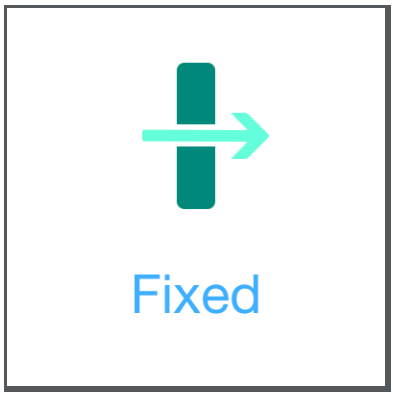
See "Measurement Screen Display Options" for an example.

Fixed

The Fixed application allows the measurement of absorbance or transmittance of a sample at up to two wavelengths, generates the concentration of the sample based on the equation set (if applicable), and produces a spectrum that can be analyzed for various properties.

Measure using Fixed

Reported Results



Measure using Fixed

Use the Fixed application to create and run a user-defined method. For more information, see “Manage Methods” on page 37.

Before you begin...

Before taking measurements with a cuvette or test tube on the GENESYS G5 instrument, it is important to make sure the cuvette or test tube is clean and wiped down with a lint-free lab wipe to remove any dust, fingerprints, or any other material that may affect the measurement.

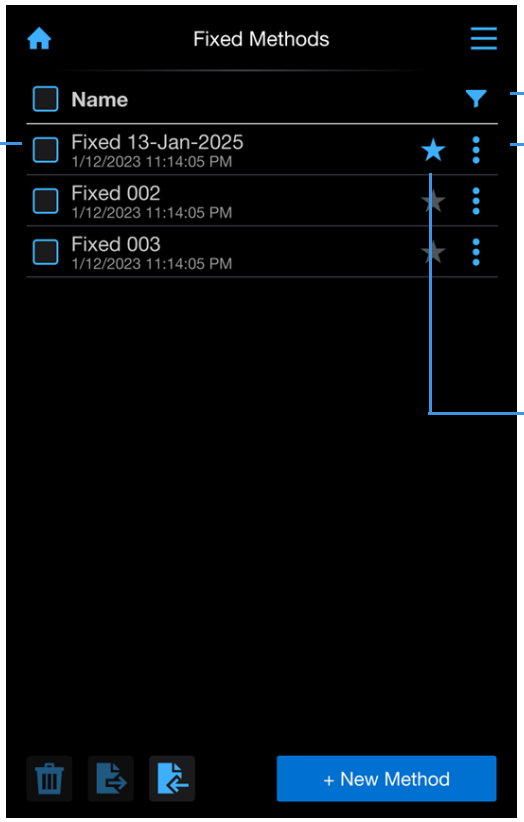
NOTICE Do not use a squirt or spray bottle on or near the instrument as liquids will flow into the instrument and may cause permanent damage.

Procedure

Note The following steps may vary if an accessory is being used, please see the Accessories section for more information.

1. From the home screen, select **Fixed**.

2. From the Fixed Methods screen, select the desired method to view the method details.



Information about the selected method appears in the Method Details pane.

3. Select Start Run.

4. Place a cuvette or test tube containing the blanking solution into their respective holder. Close the compartment door for best results.
Tip: If using a cuvette, make sure to align the cuvette light path with the instrument light path.

5. Select **Blank** and wait for the measurement to be completed.

6. Remove the cuvette or test tube and place a cuvette or test tube containing the sample into the respective holder. Close the compartment door for best results.

7. Select **Measure**.

   When the sample measurement is completed, the reported values are displayed (see the next section).

8. When you are finished measuring samples, select < at the top left of the screen to end the experiment.

9. Remove the sample cuvette or test tube.

Reported Results

Fixed measurement screen (local control)

For each measured sample, this application shows a summary of the results. Here is an example of the GENESYS G5 local control software screen:



Scan measurement screen (PC control)

For each measured sample, this application shows a summary of the results. The layout of the measurement screen of the PC control software differs slightly from the local control. See "Measurement Screen Display Options" on page 301 for an example.

Multi-Wavelength

The Multi-Wavelength application allows the measurement of absorbance values at up to 20 discrete wavelengths sequentially.

Measure using Mutli-Wavelength



Measure using Mutli-Wavelength

Use the Multi-Wavelength application to create and run a user-defined method. For more information, see "Manage Methods" on page 43.

Before you begin...

Before taking measurements with a cuvette or test tube on the GENESYS G5 instrument, it is important to make sure the cuvette or test tube is clean and wiped down with a lint-free lab wipe to remove any dust, fingerprints, or any other material that may affect the measurement.

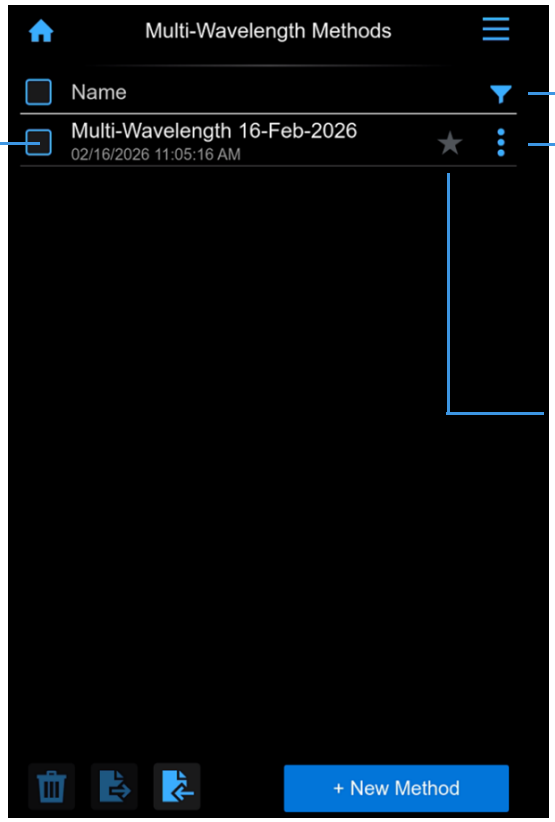
NOTICE Do not use a squirt or spray bottle on or near the instrument as liquids will flow into the instrument and may cause permanent damage.

Procedure

Note The following steps may vary if an accessory is being used, please see the Accessories section for more information.

1. From the home screen, select **Multi-Wavelength**.

2. From the Multi-Wavelength Methods screen, select the desired method to view the method details.



   Information about the selected method appears in the Method Details pane.

3. Select Start Run.

4. Place a cuvette or test tube containing the blanking solution into their respective holder. Close the compartment door for best results.
   Tip: If using a cuvette, make sure to align the cuvette light path with the instrument light path.

5. Select **Blank** and wait for the measurement to be completed.

6. Remove the cuvette or test tube and place a cuvette or test tube containing the sample into the respective holder. Close the compartment door for best results.

7. Select **Measure**.

   When the sample measurement is completed, the reported absorbance or transmittance values are displayed for each selected wavelength (see the next section).

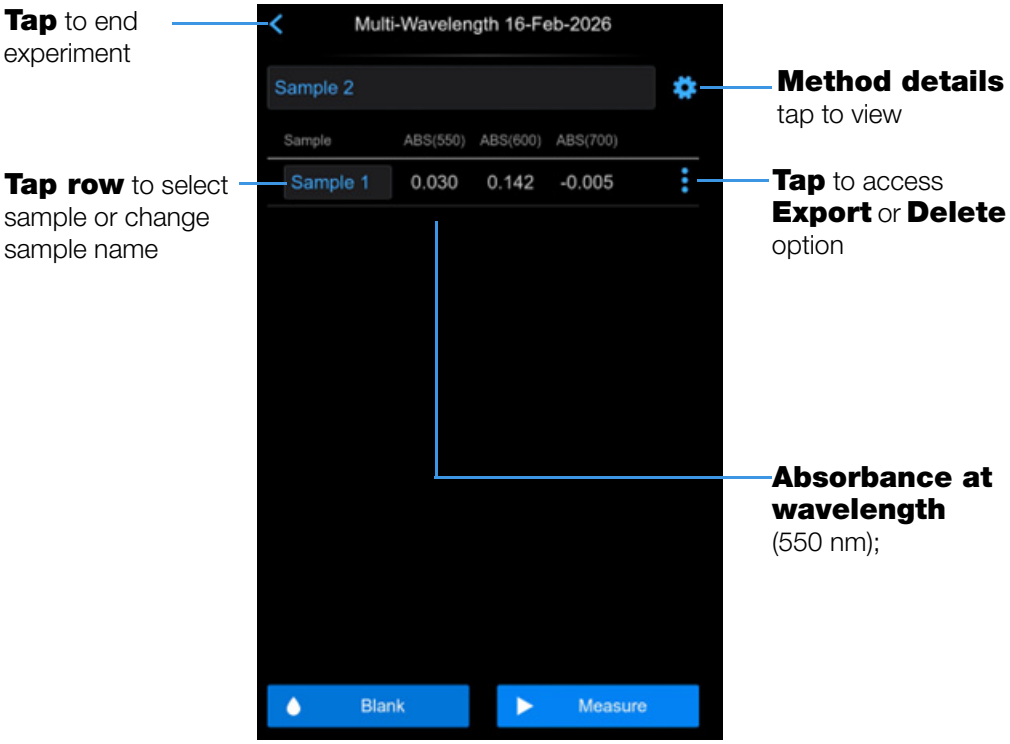
8. When you are finished measuring samples, select < at the top left of the screen to end the experiment.

9. Remove the sample cuvette or test tube.

Reported Results

Multi-Wavelength measurement screen (local control)

For each measured sample, this application shows the absorbance or transmittance values at each targeted wavelength. Here is an example of the GENESYS G5 local control software screen:



Multi-Wavelength measurement screen (PC control)

For each measured sample, this application shows a summary of the results. The layout of the measurement screen of the PC control software differs slightly from the local control. See "Measurement Screen Display Options" for an example.

OD600

The OD600 application measures the concentration of microbial cell cultures in solution by measuring scattered light at 600 nm.

Measure using OD600



Measure using OD600

Use the OD600 application to create and run a user-defined method. For more information, see “Manage Methods” on page 37.

Before you begin...

Before taking measurements with a cuvette or test tube on the GENESYS G5 instrument, it is important to make sure the cuvette or test tube is clean and wiped down with a lint-free lab wipe to remove any dust, fingerprints, or any other material that may affect the measurement.

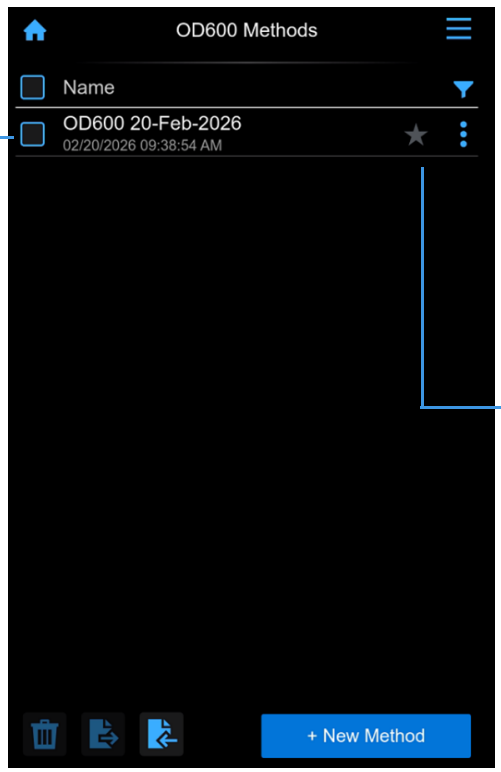
NOTICE Do not use a squirt or spray bottle on or near the instrument as liquids will flow into the instrument and may cause permanent damage.

Procedure

Note The following steps may vary if an accessory is being used, please see the Accessories section for more information..

1. From the home screen, select **OD600**.

2. From the OD600 Methods screen, select the desired method to view the method details.



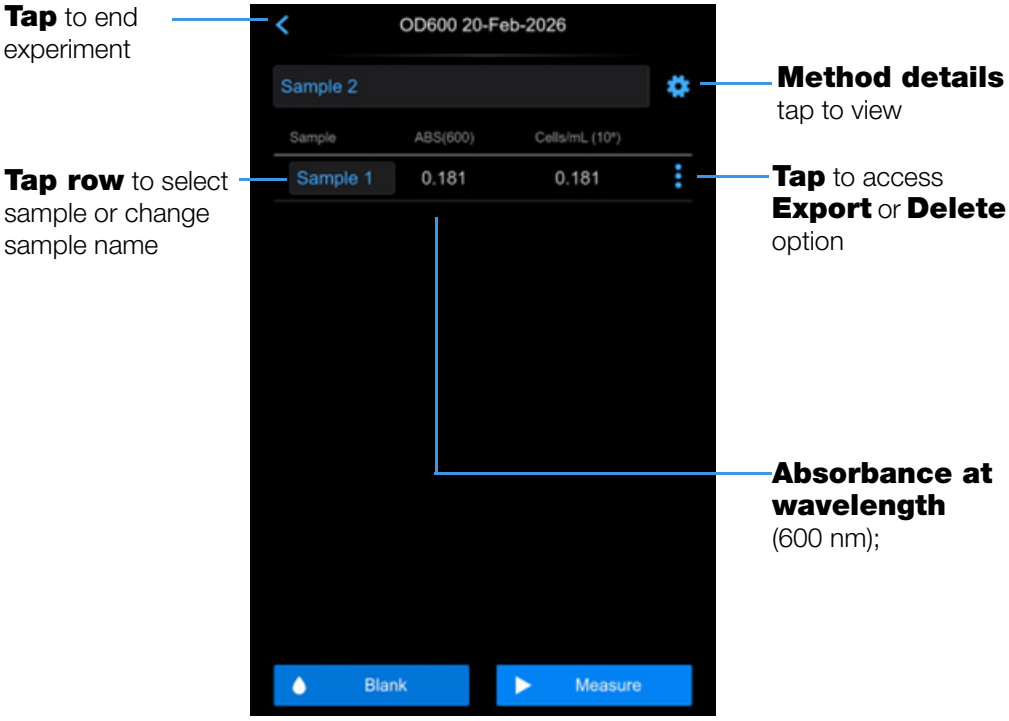
Information about the selected method appears in the Method Details pane.

3. Select Start Run.
4. Place a cuvette or test tube containing the blanking solution into their respective holder. Close the compartment door for best results.
   Tip: If using a cuvette, make sure to align the cuvette light path with the instrument light path.
5. Select **Blank** and wait for the measurement to be completed.
6. Remove the cuvette or test tube and place a cuvette or test tube containing the sample into the respective holder. Close the compartment door for best results.
7. Select **Measure**.
   When the sample measurement is completed, the reported absorbance or transmittance values are displayed for each selected wavelength (see the next section).
8. When you are finished measuring samples, select < at the top left of the screen to end the experiment.
9. Remove the sample cuvette or test tube.

Reports Results

OD600 measurement screen (local control)

For each measured sample, this application shows the absorbance values at the 600 nm wavelength and cell concentration. Here is an example of the GENESYS G5 local control software screen:



OD600 measurement screen (PC control)

For each measured sample, this application shows a summary of the results. The layout of the measurement screen of the PC control software differs slightly from the local control. See "Measurement Screen Display Options" for an example.

Kinetics

The Kinetics application allows time-based kinetic measurements.

Measure using Kinetics



Measure using Kinetics

Use the Kinetics application to create and run a user-defined method. For more information, see “Manage Methods” on page 37.

Before you begin...

Before taking measurements with a cuvette or test tube on the GENESYS G5 instrument, it is important to make sure the cuvette or test tube is clean and wiped down with a lint-free lab wipe to remove any dust, fingerprints, or any other material that may affect the measurement.

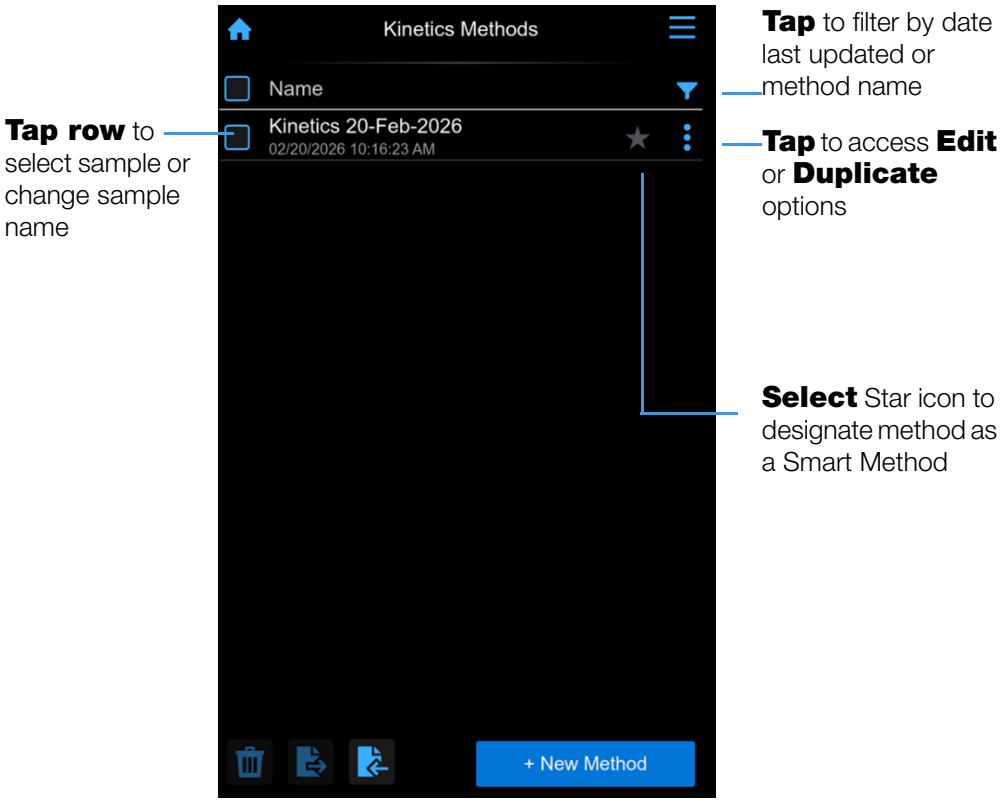
NOTICE Do not use a squirt or spray bottle on or near the instrument as liquids will flow into the instrument and may cause permanent damage.

Procedure

Note The following steps may vary if an accessory is being used, please see the Accessories section for more information..

1. From the home screen, select **Kinetics**.

2. From the Kinetics Methods screen, select the desired method to view the method details.



Information about the selected method appears in the Method Details pane.

3. Select Start Run.
4. Place a cuvette or test tube containing the blanking solution into their respective holder. Close the compartment door for best results.

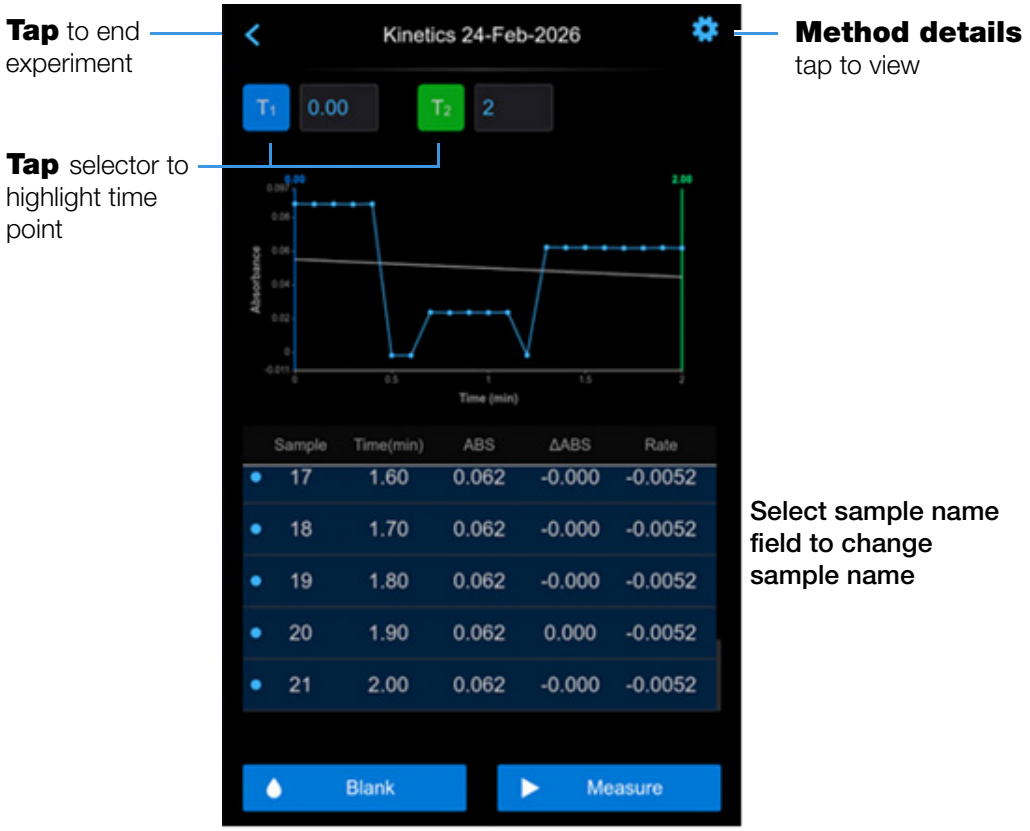
   Tip: If using a cuvette, make sure to align the cuvette light path with the instrument light path.

5. Select **Blank** and wait for the measurement to be completed.
6. Remove the cuvette or test tube and place a cuvette or test tube containing the sample into the respective holder. Close the compartment door for best results.
7. Select **Measure**.
   Results for each measurement in each interval are displayed in real time. When all intervals are completed, the measurement rate and reported values for the entire experiment are displayed (see the next section).
8. When you are finished measuring samples, select < at the top left of the screen to end the experiment.
9. Remove the sample cuvette or test tube.

Reports Results

Kinetics measurement screen (local control)

The rate measurement screen appears immediately after you select Measure. This screen shows a sample's absorbance measured at the user-defined wavelength over time, with time on the X-axis and absorbance on the Y-axis. Here is an example of the GENESYS G5 local control software screen:



Kinetics measurement screen (PC control)

For each measured sample, this application shows a summary of the results. The layout of the measurement screen of the PC control software differs slightly from the local control. See "Measurement Screen Display Options" for an example.

Live Display

The Live Display application will perform continuous absorbance measurements automatically.

Measure using Live Display



Measure using Live Display

The Live Display application is not method-based, open the Live Display application to start taking measurements.

Before you begin...

Before taking measurements with a cuvette or test tube on the GENESYS G5 instrument, it is important to make sure the cuvette or test tube is clean and wiped down with a lint-free lab wipe to remove any dust, fingerprints, or any other material that may affect the measurement.

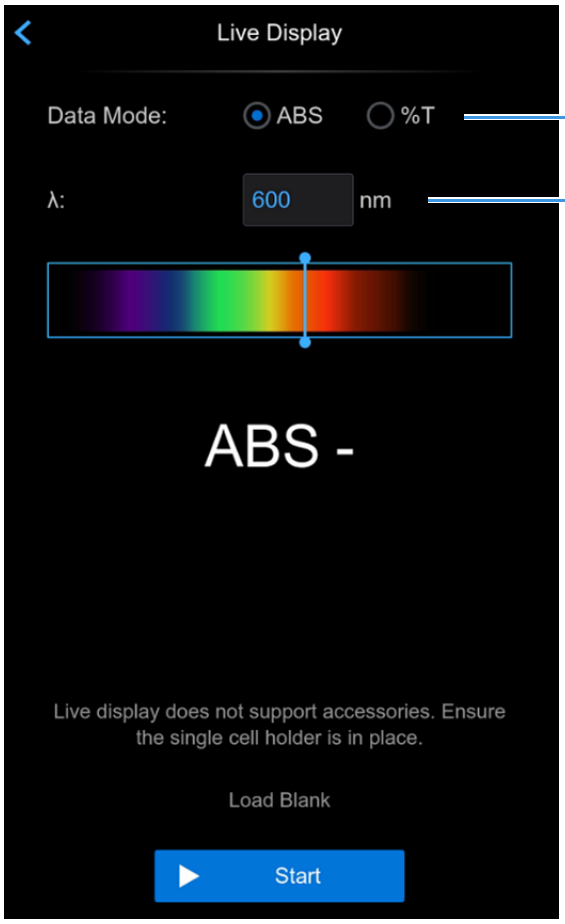
NOTICE Do not use a squirt or spray bottle on or near the instrument as liquids will flow into the instrument and may cause permanent damage.

Procedure

Note Live Display does not support the use of accessories outside single cell holders.

From the home screen, select **Live Display**.

1. From the Live Display setup screen, specify the desired settings.



Data Mode
select to measure absorbance or %transmittance

Analytical wavelength used to determine absorbance results.

Setting	Available Options	Description
Data Mode	Abs or %T	Determines if absorbance or %transmittance will be measured.
λ Or Color Display Toggle	GENESYS G5 Vis 325 - 1100 GENESYS G5 UV-Vis &UV-Vis Pro 190 - 1100	Analytical wavelength used to determine absorbance results.

2. Place a cuvette or test tube containing the blanking solution into their respective holder. Close the compartment door for best results.

   Tip: If using a cuvette, make sure to align the cuvette light path with the instrument light path.

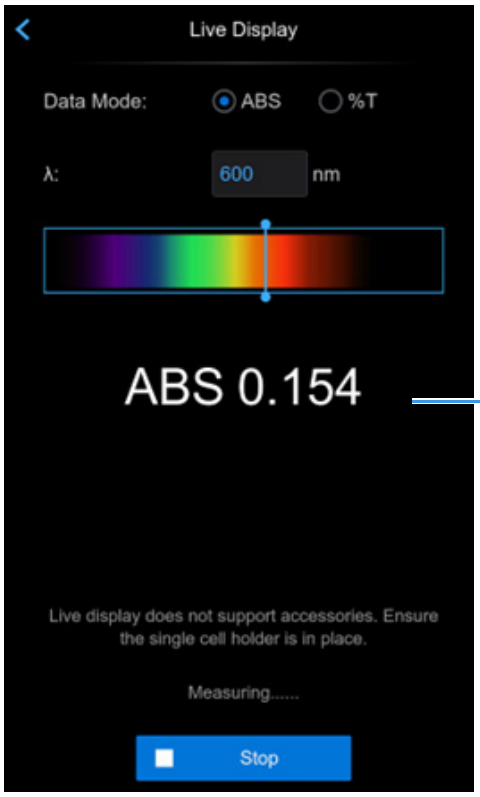
3. Select **Start** and wait for a 0.000 absorbance value to be displayed. A live absorbance reading of the current sample will be displayed (see the next section).
4. Remove the cuvette or test tube and place a cuvette or test tube containing the sample into the respective holder. Close the compartment door for best results.
5. Select **Stop** to end the live measurements. When you are finished measuring samples, select < at the top left of the screen to end the experiment. Remove the sample cuvette or test tube.

Reports Results

Live Display measurement screen (local control)

This application shows a live display of the absorbance results at the targeted wavelength for the current sample loaded on the instrument.

Here is an example of the GENESYS G5 local control software screen:



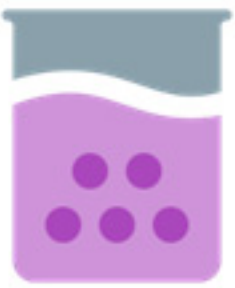
Absorbance of the current sample

Live Display measurement screen (PC control)

For each loaded sample, this application shows a displayed result. The layout of the measurement screen of the PC control software differs slightly from the local control. See "Measurement Screen Display Options" for an example.

C-Mode

The C-Mode application determines a calibration factor based on the concentration and absorbance measurement of a standard. The instrument will then perform continuous absorbance measurements automatically to determine the concentration of any sample based on that factor.



Measure using C-Mode

The C-Mode application determines a calibration factor based on the concentration and absorbance measurement of a standard. The instrument will then perform continuous absorbance measurements automatically to determine the concentration of any sample based on that factor.

Measure using C-Mode

The C-Mode application is not method-based, open the C-Mode application to start taking measurements.

Before you begin...

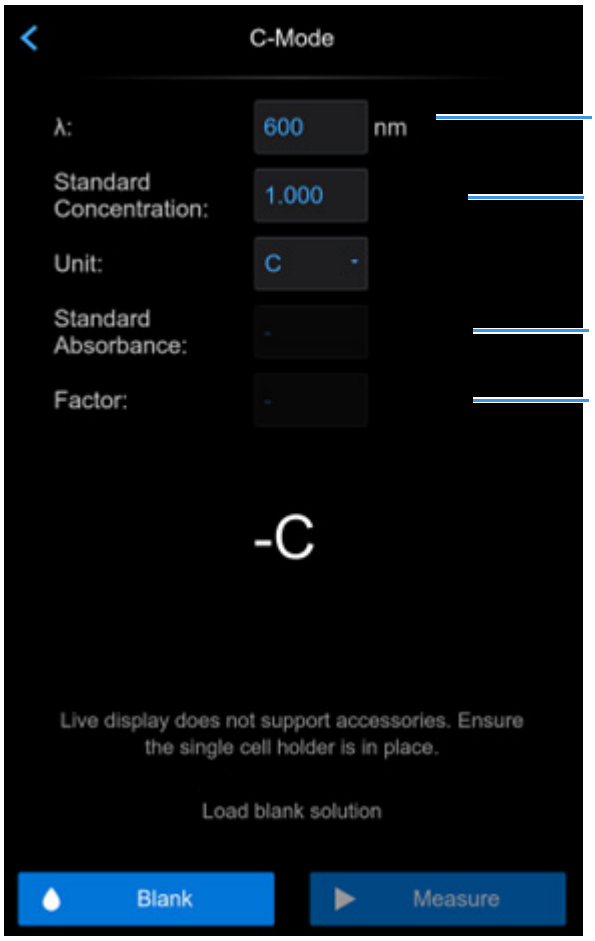
Before taking measurements with a cuvette or test tube on the GENESYS G5 instrument, it is important to make sure the cuvette or test tube is clean and wiped down with a lint-free lab wipe to remove any dust, fingerprints, or any other material that may affect the measurement.

NOTICE Do not use a squirt or spray bottle on or near the instrument as liquids will flow into the instrument and may cause permanent damage.

Procedure

Note C-Mode does not support the use of accessories outside single cell holders. From the home screen, select **C-Mode**.

1. From the C-Mode setup screen, specify the desired settings.



Analytical wavelength used to determine calibration factor and absorbance results.

Known concentration of the standard.

Measured absorbance of the known standard.

The measured calibration factor of the known standard.

Setting	Available Options	Description
λ	GENESYS G5 Vis 325 - 1100 GENESYS G5 UV-Vis &UV-Vis Pro 190 - 1100	Analytical wavelength used to determine calibration factor and absorbance results.
Standard Concentration	0 - 1100	Known concentration of the standard.
Unit	ug/L, uM, mM, M, mg/L, ppm, C, mg/mL, g/L, ppb, %, mg/dL, g/100mL, IU, U/L, Abs/cm, Blank	Unit in which the sample measurements are displayed.
Standard Absorbance	N/A	The measured absorbance of the known standard.
Factor	N/A	The measured calibration factor of the known standard.

2. Place a cuvette or test tube containing the blanking solution into their respective holder. Close the compartment door for best results.

   Tip: If using a cuvette, make sure to align the cuvette light path with the instrument light path.

3. Select **Blank** and wait for the measurement to be completed.

4. Remove the cuvette or test tube and place a cuvette or test tube containing the known standard into the respective holder. Close the compartment door for best results.

5. Select **Measure**.
   When the sample measurement is completed, the standard absorbance and factor fields will be recorded. A live absorbance reading of the current sample will be displayed (see the next section). A new measurement will occur every ~5 seconds.

6. Remove the cuvette or test tube containing the known standard and place a cuvette or test tube containing your unknown sample into the respective holder. Close the compartment door for best results.

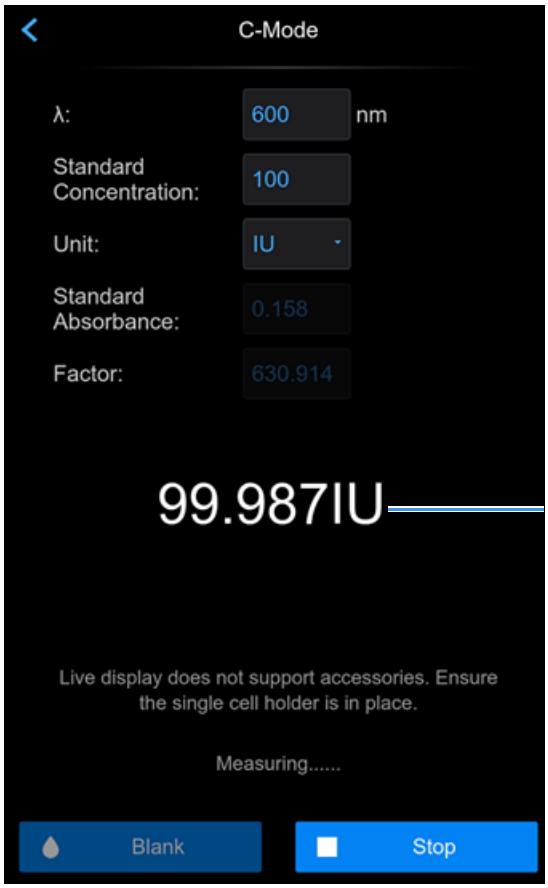
7. Select **Stop** to end the recurring measurements. When you are finished measuring samples, select < at the top left of the screen to end the experiment. Remove the sample cuvette or test tube.

Reports Results

C-Mode measurement screen (local control)

This application shows a live display of the concentration results at the targeted wavelength for the current sample loaded on the instrument.

Here is an example of the GENESYS G5 local control software screen:



C-Mode measurement screen (PC control)

For each loaded sample, this application shows a displayed result. The layout of the measurement screen of the PC control software differs slightly from the local control. See "Measurement Screen Display Options" for an example.

Custom Method

The Custom Method application allows users to create a custom measurement method with more complex mathematical functions that will display within an existing application or as its own application on the home screen. The method will display unique information for your samples.

Create a Custom Method

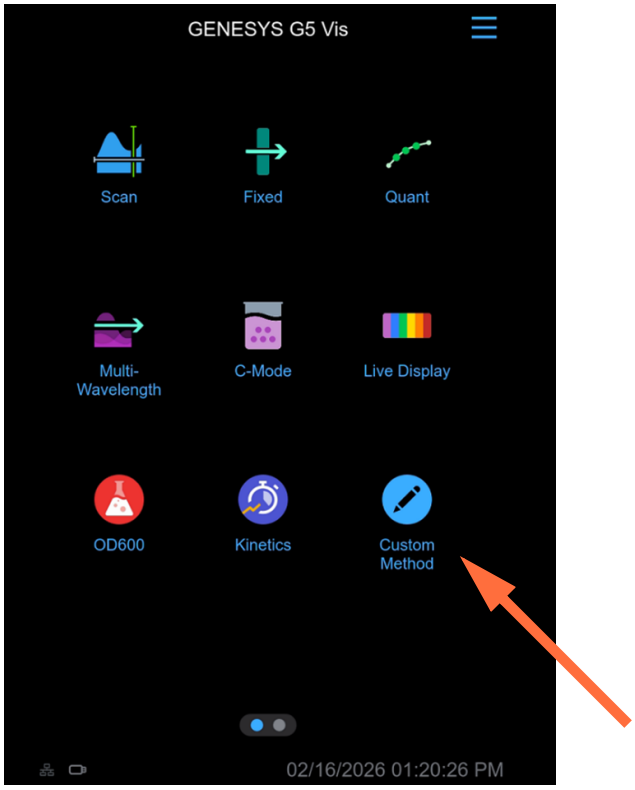


The Custom Method application allows users to create a custom measurement method with more complex mathematical functions that will display within an existing application or as its own application on the home screen. The method will display unique information for your samples.

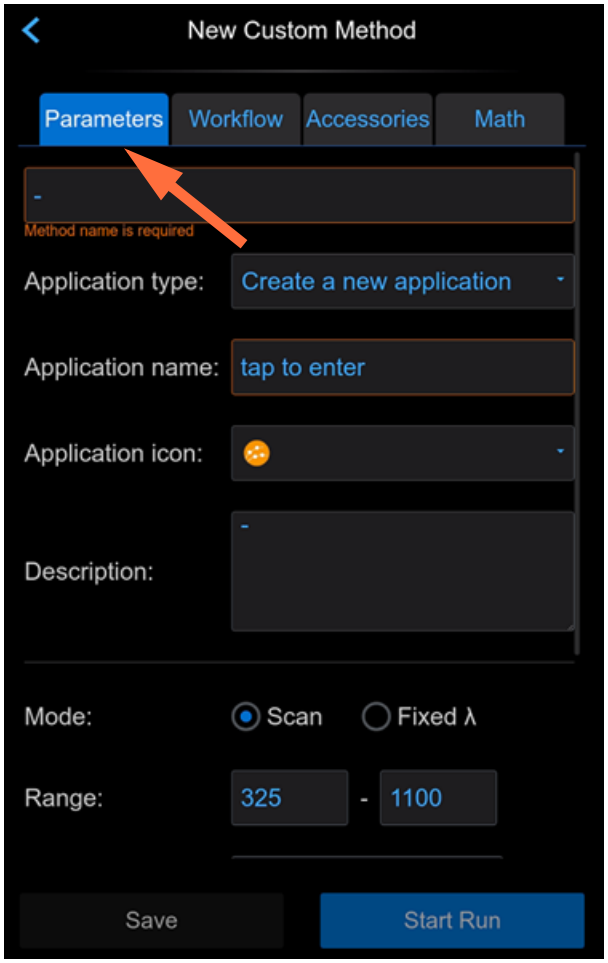
Create a Custom Method

Create method to be used for sample measurements with user-defined settings.

1. From the home screen, select **Custom Method**.



2. Enter a **Method Name** by selecting the method name window.
3. Specify the settings within the Parameters tab.



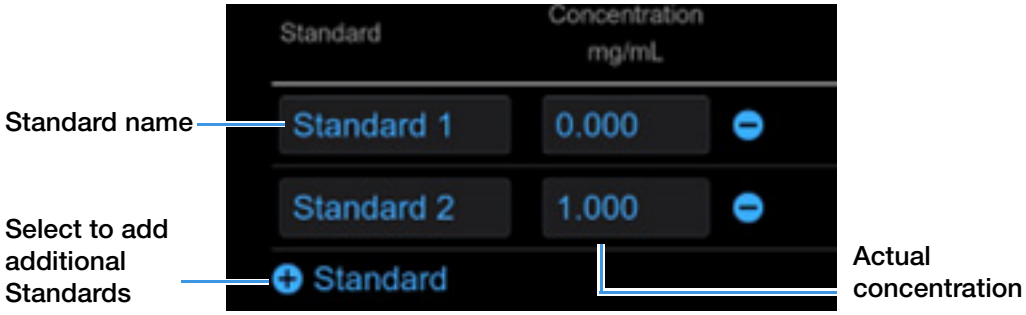
Setting	Available Options	Description
Application type	Create a new application or Add to existing application	Selecting Create a new application will create a new icon on the Home screen. Selecting Add to existing application will allow you to select an existing application to add the method to.
Application name	Open Field	Enter the desired name of the new application that will appear on the Home screen.
Application icon	6 Unique Icons	Select the desired application icon for the custom method.

Setting	Available Options	Description
Description	Open Field	Enter any specific details about the custom method.
Mode	Scan or Fixed λ	Select whether the instrument will scan across a specified range of wavelengths or at up to two specified fixed wavelengths.
Range (Scan Mode Selected)	GENESYS G5 Vis 325 - 1100 GENESYS G5 UV-Vis & UV-Vis Pro 190 - 1100	Indicates the region of the UV-Vis spectrum that will be measured.
Speed (Scan Mode Selected)	Fast, Medum, Slow	Specifies how frequently the instrument will acquire a measurement.
Interval (Scan Mode Selected)	Fast Speed Selected 5 nm, 2nm Medium Speed Selected 2nm, 1nm, 0.5nm Slow Speed Selected 1nm, 0.5nm, 0.2nm, 0.1nm	The available interval options are different depending on the speed selected.
Baseline correction (Scan Mode Selected)	GENESYS G5 Vis 325 - 1100 GENESYS G5 UV-Vis & UV-Vis Pro 190 - 1100	When enabled, the software corrects for any offset caused by light scattering particulates by subtracting measured absorbance at specified baseline correction wavelength from absorbance values at all wavelengths in sample spectrum. As a result, absorbance of sample spectrum is zero at specified baseline correction wavelength.
Wavelength Selection (Fixed λ Selected)	GENESYS G5 Vis 325 - 1100 GENESYS G5 UV-Vis & UV-Vis Pro 190 - 1100	Results will be displayed for up to 20 discrete wavelengths that are entered.

4. Specify the settings within the Workflow tab.

Setting	Available Options	Description
Workflow	Quantitative or Non-Quantitative	Select Quantitative when the sample results will be extrapolated from a standard curve. Select Non-Quantitative for all other types of measurements.
λ (Quantitative Selected)	GENESYS G5 Vis 325 - 1100 GENESYS G5 UV-Vis & UV-Vis Pro 190 - 1100	Analytical wavelength used to determine concentration.
Equation (Quantitative Selected)	Linear, Linear through zero, Quadratic through zero, Quadratic, Third order through zero, Third order	Equation type used to fit the standard measurement data.
Result (Quantitative Selected)	Open Field	Name of intended result.
Unit (Quantitative Selected)	mg/mL, ug/L, uM, mM, M	Unit in which the sample measurements are displayed and printed.
Std. Replicate (Quantitative Selected)	1,2,3	Indicate desired quantity of replicate standard measurements.
Sample Replicate (Quantitative Selected)	1,2,3,	Indicate desired quantity of replicate sample measurements.

Adding Standards to a Custom Method



Add the desired number of standards that will be used for the Standard curve.

5. Specify the settings within the Accessories tab.
   For more information, see "Accessories" on page 69.
6. Specify the settings within the **Math** tab.

Setting	Available Options	Description
Predefined Parameter	Dilution Factor, Pathlength, Weight Correction, Volume Correction	Select from a drop-down of predefined parameters, which can be used as is or edited.
New Parameter	Parameter Name, Parameter Unit, Equation Symbol	Enter in the name, unit, and equation symbol of a new parameter.
New Equation	Equation Name, Equation, Function, Add, Check, Unit, Symbol, Apply to, If/Then	**Equation Name.** Enter a name for the equation. **Equation.** Input the equation needed into this field. **Function.** Add a function to the above equation box. **Add.** Allows users to add select functions to the Equation field. **Check.** Confirms the equation syntax is correct. **Unit.** Scientific Unit the equation results with be reported in. **Symbol.** Provide a symbol to use for the output of this equation so that it may be used in another equation. **Apply to.** Determine which samples or standards this equation will apply to. **If/Then.** Allows for True/False response if values meet the If/Then criteria.

7. Choose **Start Run** to immediately start the experiment using the created method. If no experiment is to be conducted at the time of method creation, select **Save**.

Note Any errors in the method will be listed in orange text on the method editor screen. Errors must be addressed before the method can be saved.

Additional Method Options

For more information on how to edit, duplicate, export, import, and delete a custom method, see "Manage Methods" on page 37.

Measure using a Custom Method

Use the newly created Custom Method application or an existing application to run a user-defined custom method.

Before you begin...

Before taking measurements with a cuvette or test tube on the GENESYS G5 instrument, it is important to make sure the cuvette or test tube is clean and wiped down with a lint-free lab wipe to remove any dust, fingerprints, or any other material that may affect the measurement.

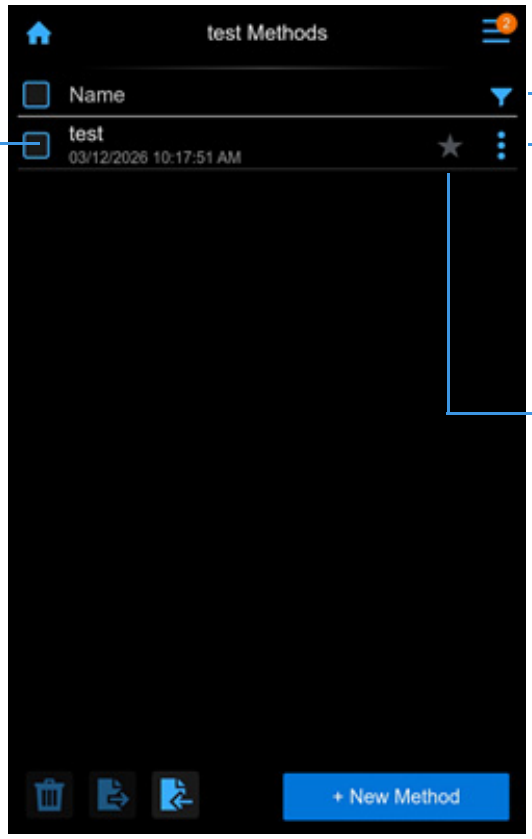
NOTICE Do not use a squirt or spray bottle on or near the instrument as liquids will flow into the instrument and may cause permanent damage.

Procedure

Note The following steps may vary if an accessory is being used, please see the Accessories section for more information.

1. From the home screen, select the application that the custom method was saved to.

2. From the Methods screen, select the desired method to view the method details.



Information about the selected method appears in the **Method Details** pane.

3. Select Start Run.

> **Note** If you are working with a custom method with a quantitative workflow you will first need to calibrate the method. See Working with Standard Curves on page 48 for more information.

4. Place a cuvette or test tube containing the blanking solution into their respective holder. Close the compartment door for best results.

   Tip: If using a cuvette, make sure to align the cuvette light path with the instrument light path.

5. Select **Blank** and wait for the measurement to be completed.

6. Remove the cuvette or test tube and place a cuvette or test tube containing the sample into the respective holder. Close the compartment door for best results.

7. Select **Measure**.

Results for each measurement in each interval are displayed in real time. When all intervals are completed, the measurement rate and reported values for the entire experiment are displayed (see the next section).

8. When you are finished measuring samples, select < at the top left of the screen to end the experiment.
9. Remove the sample cuvette or test tube.

Reports Results

Custom Method measurement screen

For each measured sample, the application will display results differently depending on the settings selected during method creation. Examples of the various different result screens can be viewed in the other standard application sections.

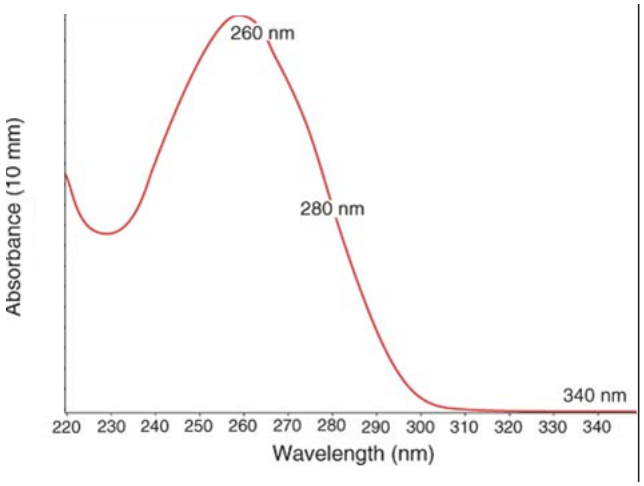
4

Learning Center

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- UV-Vis Spectroscopy—How it Works ..... page 88
- Prepare Samples and Blanks ..... page 90
- Basic Instrument Operations ..... page 91
- Instrument Settings ..... page 107
- About Instrument ..... page 125
- PC Control Software ..... page 126
- Accessories ..... page 128

UV-Vis Spectroscopy—How it Works



$$\text{Absorbance} = -\log\left[\frac{\text{intensity}_{\text{sample}}}{\text{intensity}_{\text{blank}}}\right]$$

Beer-Lambert equation

$$A = \varepsilon \cdot b \cdot c$$

where:

A = absorbance in absorbance units (A)

ε = wavelength-dependent molar absorptivity coefficient (or extinction coefficient) in liter/mol-cm

b = pathlength in cm

c = analyte concentration in moles/liter or molarity (M)

Absorbance Spectrum

The light passes through the liquid sample to the detector, which generates a spectrum of absorbance versus wavelength. The spectrum shows the amount of light absorbed by the molecules of the sample at each measured wavelength.

The example at the left shows a typical absorbance spectrum taken of a nucleic acid sample. The spectrum is measured from 190 nm to 850 nm. The displayed range may vary for each application.

Sample Absorbance

When the instrument is blanked, a reference spectrum is taken of the blanking solution and stored in memory. For each sample measurement, the sample intensities along with the blank intensities are used to calculate the total absorbance of the sample according to the equation at the left.

Sample Concentration

The Beer-Lambert equation (Beer's law) shown at the left is used to correlate sample absorbance with concentration.

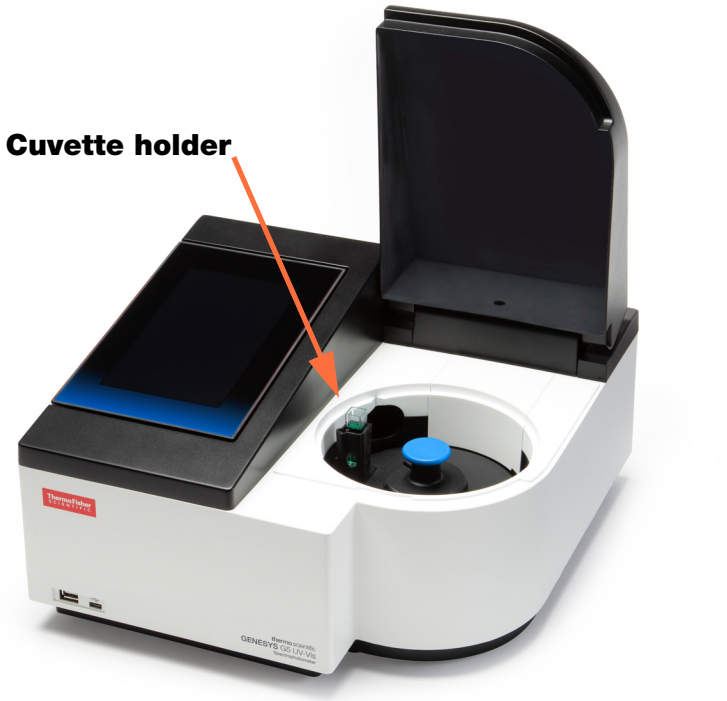
The pathlength is the distance the light travels through the sample.

Baseline Correction

For some applications, the instrument can be set up to apply a baseline correction to each measurement to minimize any offset caused by light scattering particulates in the sample spectra. The correction subtracts the absorbance value at a reference wavelength that is close to zero from the absorbance value at each wavelength across the spectrum, essentially “anchoring” the spectrum to zero absorbance units at the reference wavelength.

Best practices for cuvette measurements

- The compartment door can be up or down for cuvette measurements.
- Clean and dry cuvette after each measurement.
- Use cuvettes that are free of scratches and avoid fingerprints which may affect results.
- Use quartz cuvettes or UV-grade plastic cuvettes to measure samples with analysis wavelengths in the UV range (<340 nm).
- Micro, semi-micro, and ultra-micro cuvettes should be masked and will require manual calculation to a 10mm absorbance value if desired.
- Fill cuvettes with enough blanking or sample solution to cover instrument optical path (sample beam is 8.5 mm above cuvette bottom).
- Lift compartment door and make sure cuvette holder is free of debris.
- When inserting quartz or masked plastic cuvettes, align cuvette light path with instrument light path.



Prepare Samples and Blanks

Preparing Samples

- Isolate and purify samples before measuring them with the instrument. Commercial sample isolation kits are available for these purposes, or use an in-house protocol. After purification, analyte of interest is typically dissolved in aqueous buffer solution before it is measured.

  Tip: Any molecule that absorbs light at analysis wavelength will contribute to total absorbance value used to calculate sample concentration.

- Ensure final analyte concentration is within instrument's absorbance detection limits.

Choosing and Measuring a Blank

The buffer used to resuspend a sample analyte can contribute absorbance. Blanking minimizes any absorbance contribution due to the buffer components from the sample measurement. The resulting sample spectrum represents the absorbance of only the analyte of interest.

For best results:

- For most applications, blank with the same buffer solution used to resuspend the analyte of interest. The blanking solution should be a similar pH and ionic strength as the analyte solution.
- Measure new blank before each set of samples. It is not necessary to blank the instrument before each sample measurement unless the samples are dissolved in different buffer solutions.
- Measure a new blank every 30 minutes.

Problems associated with blanking

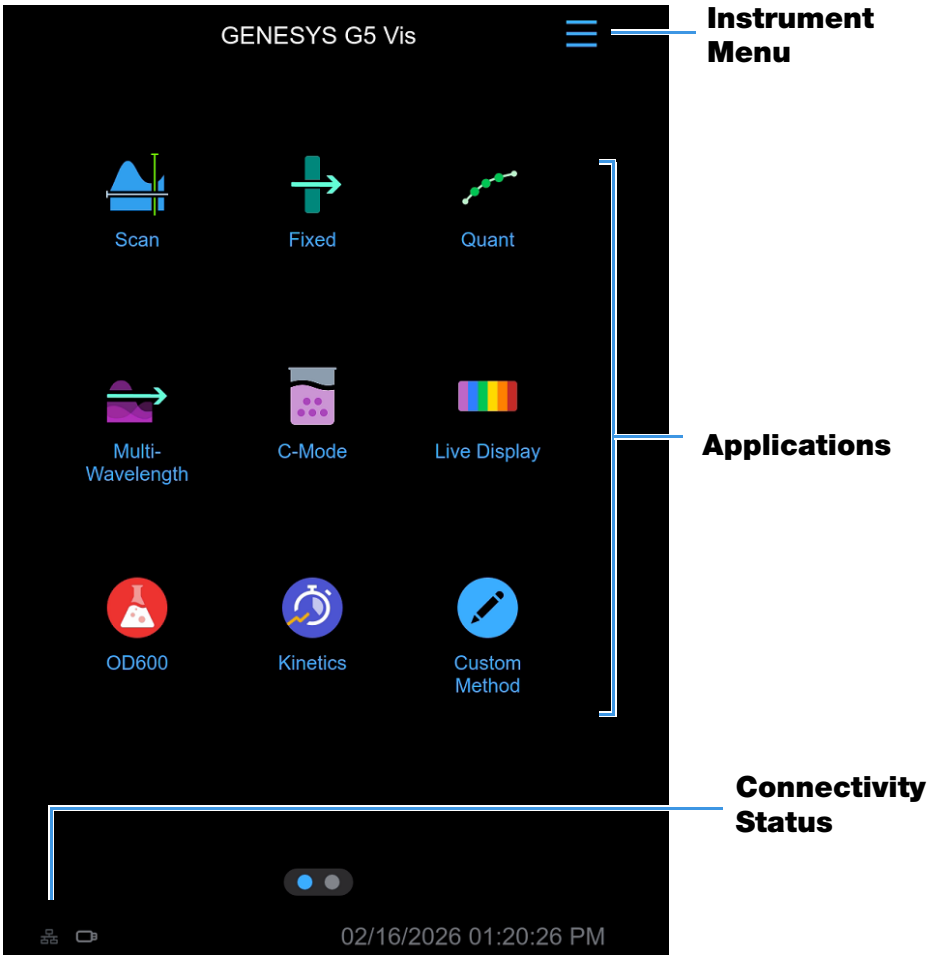
- Residual sample was left in cuvette before blank measurement was performed. (Resulting sample spectra may exhibit negative absorbance values, indicating blank had more absorbance than sample in that region of spectrum.)
- Blank measurement exhibits higher absorbance than unknown sample at analysis wavelength. (If buffer used as blank differs in composition from that used to resuspend sample, measurement results will be incorrect.)
- Sample was inadvertently used to blank instrument. (Resulting sample spectra may exhibit negative absorbance values or, in some cases, resemble a mirror image of the molecule's spectrum.

Basic Instrument Operations

- GENESYS G5 Home Screen
- GENESYS G5 General Operations

GENESYS G5 Home Screen

These operations are available from the GENESYS G5 home screen.



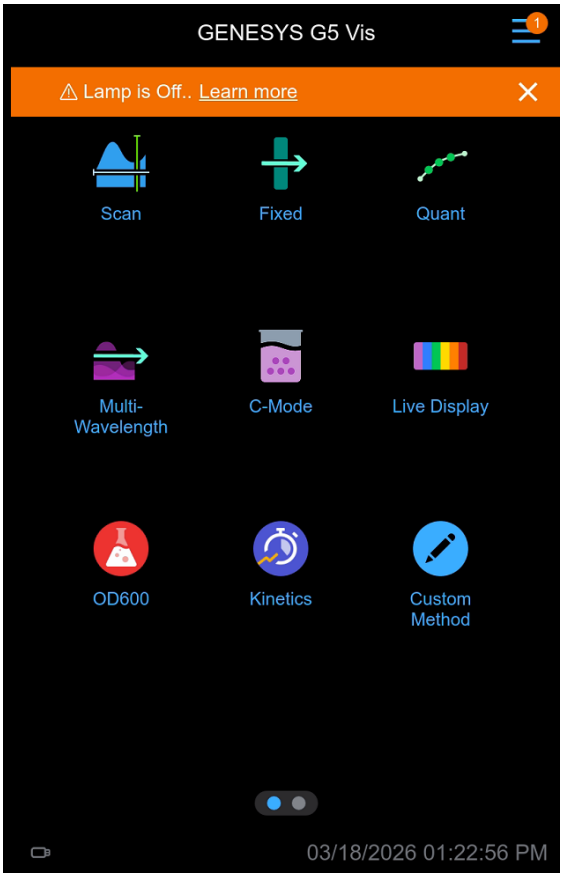
Applications

The GENESYS G5 software offers several configurable applications, which gives users full control of the measurement.

Connectivity Status

Ethernet Connectivity		Shows that the instrument is successfully connected to an Ethernet network.
Wi-Fi Connectivity		Shows that the instrument is successfully connected to a Wi-Fi network.
Bluetooth Connectivity		Shows that the instrument is successfully connected to a Bluetooth device.
Printer Connectivity		Shows that the instrument is successfully connected to a printer.
USB Connectivity		Shows that the instrument is successfully connected to a USB device.

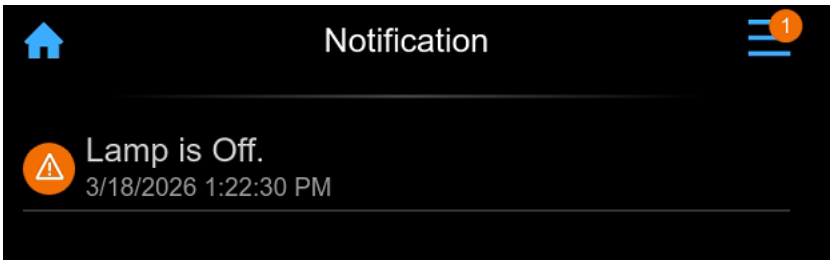
System Alarms and Alerts



The GENESYS G5 software will alert users of any potential issues and if there is an available software update.

The icon at the top right of the screen will contain a number indicating the amount of alert notifications that are available. A detailed explanation will appear of all status notifications by selecting **Notification** from the instrument menu. Selecting some individual alerts may prompt additional information.

The software will also display a banner that provides additional information about the alert or alarm at the time it was triggered. Selecting the banner will provide you additional information.



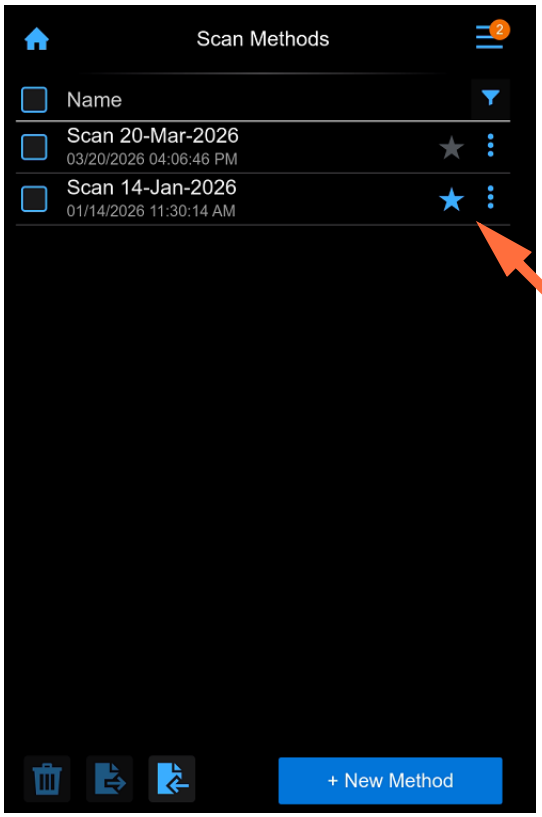
The alert banner can be minimized by selecting to the right of the message.

The alert for software updates will only occur if the instrument is connected to a network with internet access.

SmartStart

SmartStart™ allows creation of shortcuts to favorite methods on the Home screen. The Home screen will only show favorite methods.

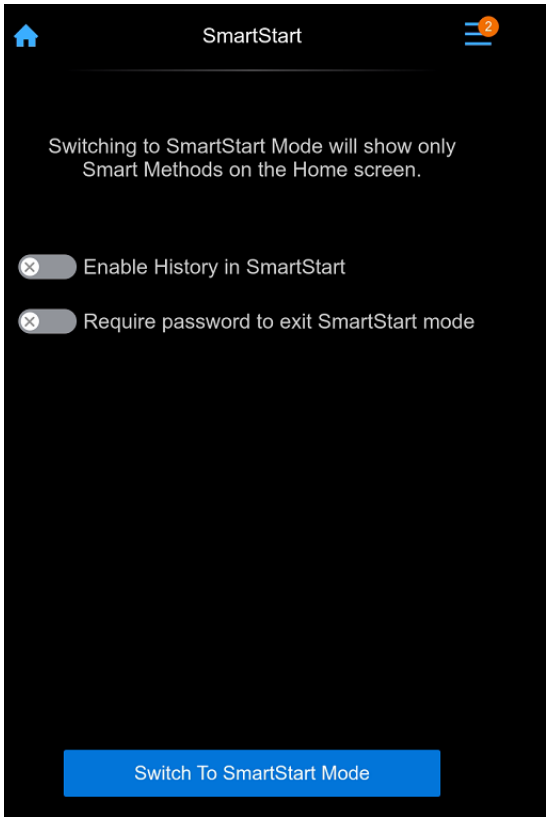
Adding/Removing a method to SmartStart



Tap to add method to SmartStart.
Tap again to remove.

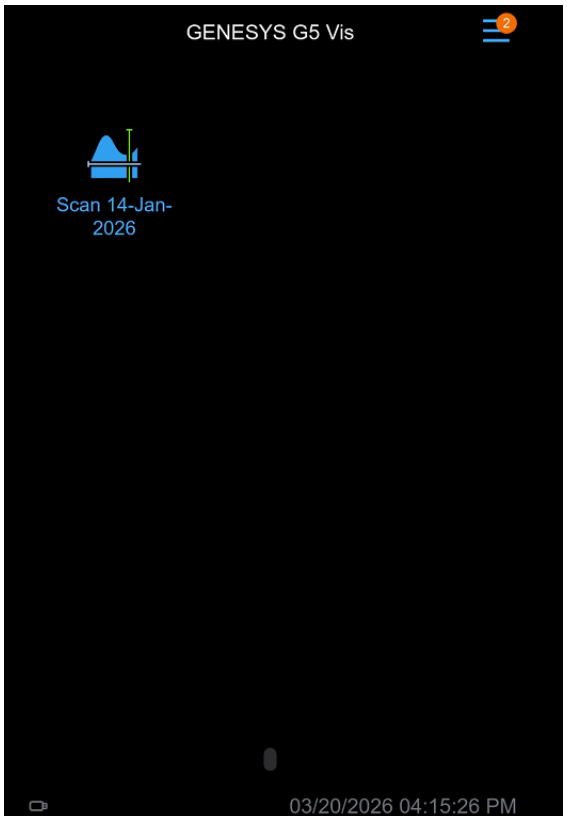
Activating SmartStart

1. From the instrument Menu screen, select **SmartStart**.



2. Use the first toggle to allow the History to be accessible during SmartStart mode.
3. Use the second toggle to require a password when exiting SmartStart mode. If enabled, enter the same password in both fields that appear.
4. Select **Switch To SmartStart Mode**.

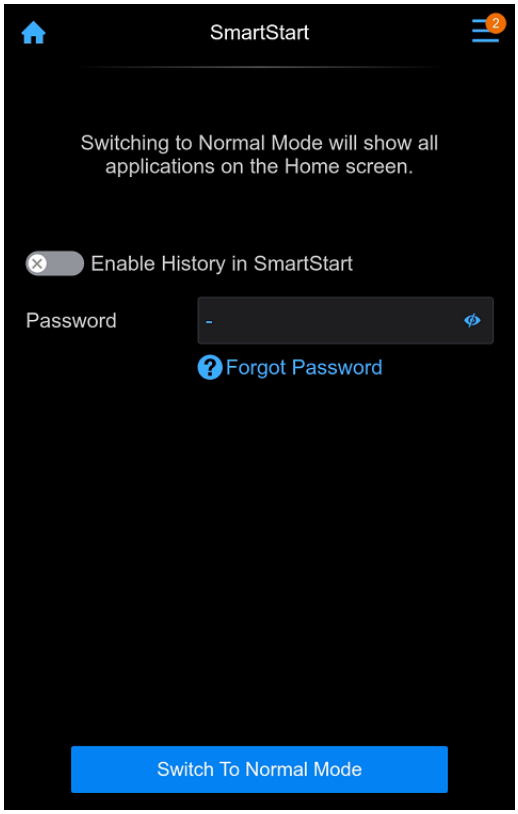
Once enabled only the select methods will appear as accessible on the Home screen.



Only Smart Methods displayed

Deactivating SmartStart

1. From the instrument Menu screen, select **SmartStart**.



2. Enter your password if applicable. **Forgot Password** can be selected if you no longer remember your password.
3. Select **Switch To Normal Mode**.

GENESYS G5 General Operations

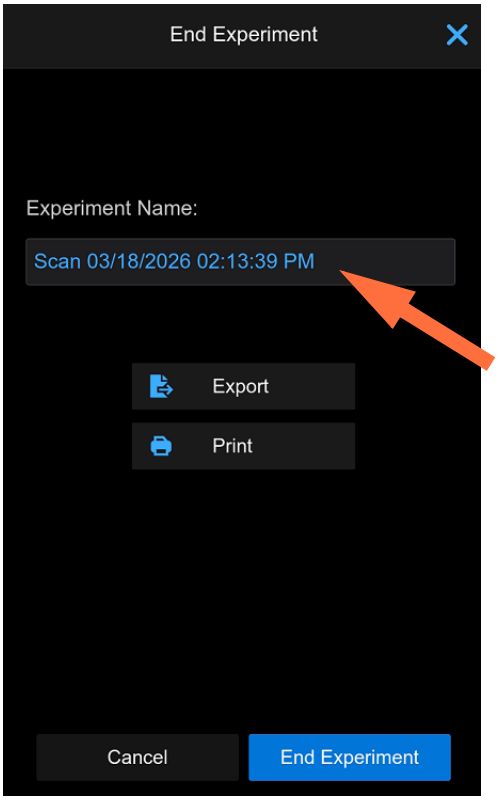
These operations are available from any measurement screen or from the History.

Edit Experiment Name

You can edit the experiment name when you save the experiment or afterwards from the History.

Edit experiment name at end of experiment

- When finished measuring samples, select <
- Enter a name for this group of measurements in the **Experiment Name** field



- Select **Export** to export the experiment
- Select **Print** to print the experiment
- Select **End Experiment** to close the experiment

Edit experiment name from History

– From home screen, the instrument menu, select **History**.

– Double click or tap the experiment to open experiment select the **Experiment Name** field to display keyboard

– Enter new experiment name

– Tap the enter key to close keyboard and save the new name

Export Selected Experiments

You can export measurement data when you save the experiment or afterwards from the History.

Measurement data can be exported in four formats:

- As comma-separated values (.CSV) files
- As portable document format (.PDF) files containing As joint photographic experts group (.JPEG) files
- As GENESYS G5 software (.GEN) files containing spectra and measurement results for each exported experiment

Use any spreadsheet or word processing application to open a CSV file.

Note The types of data exported are dependent upon the application used to measure the samples. For more information, see the application details.

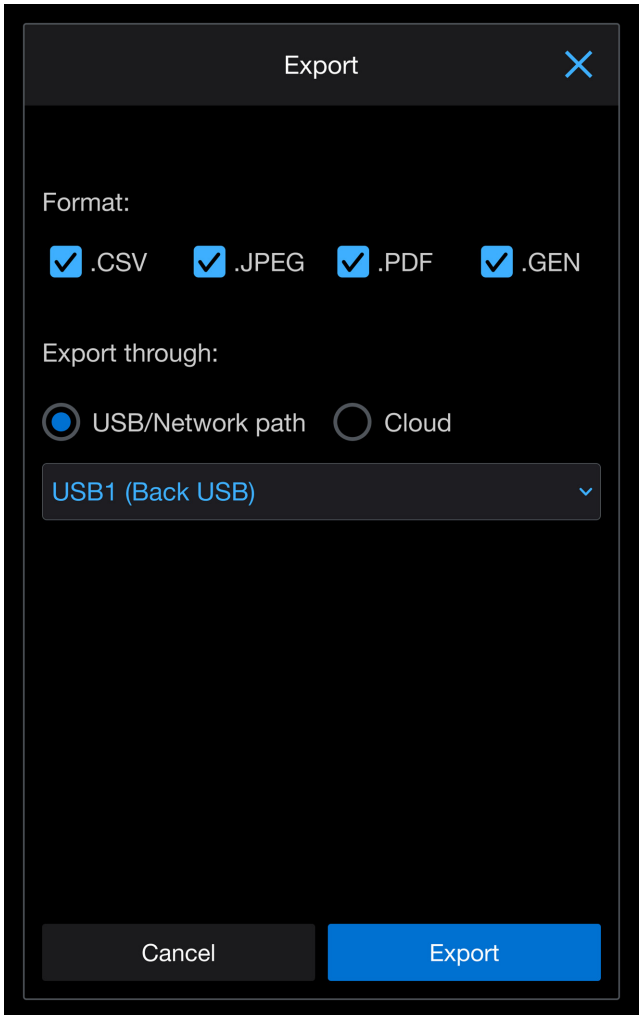
Data can be exported to a USB device connected to any USB port on the local instrument (front, back-left or back-right), a connected Cloud account, or to a network location. If you select multiple experiments for export, each exported experiment has a corresponding file. The filenames are the same as the experiment names. The files are stored in a folder named “GENESYS G5 *model*” followed by the instrument serial number. (Use About instrument to view your instrument serial number.)

Export data at end of experiment

– When finished measuring samples, select <

– From End Experiment window, select **Export**

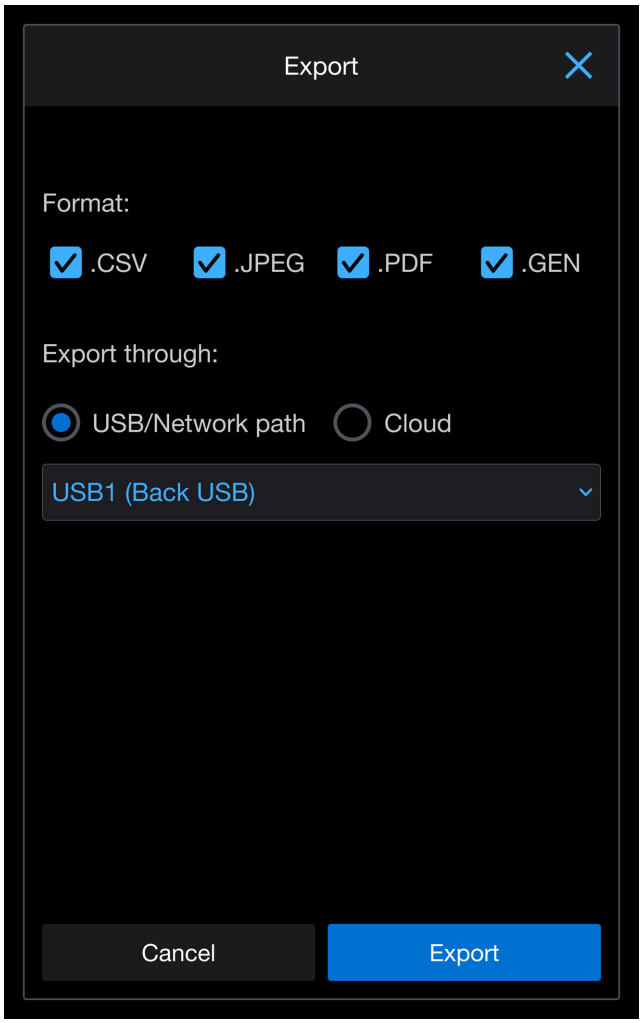
– Select one or more export file types



- Designate the export location
- Select **Export**
- After "Export Successful" message, select **OK**

Export data from History

- From instrument Menu screen, tap **History** to open History
- Select the checkbox for the experiment(s) you want to export.
- Select 
- Select one or more export file types
- Designate the export location



- Select **Export**
- After "Export Successful" message, select **OK**

Delete Selected Measurements

You can delete selected sample measurements from any experiment, or all the measurements in the database.

Delete data from any measurement screen

- Select  to the right of the sample to be deleted.
- Select **Delete**
- Select **Delete** to confirm the deletion of the sample measurement

Delete data from History

- From the instrument menu, select **History**
- Select the checkbox for the experiment(s) you want to delete.
- Select 
- Select **Yes** to confirm the deletion of the experiment and all sample measurements within that experiment

Print Selected Measurements

Connect a compatible printer to the instrument to quickly print measurement results, including spectral data, standard curves, data tables, sample details and diagnostic results. You can print to a GENESYS G5 printer or to a remote printer through an Ethernet connection or wireless network.

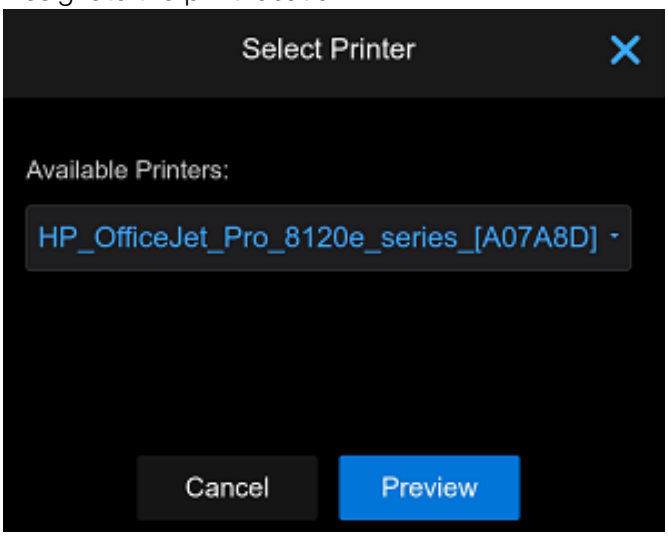
Note

- A wireless printer or the device it is connected to must be available on the same wireless network as the instrument. The wireless printer must also have its wireless function enabled.
- Full service printer options are not available if you have the GENESYS G5 printer connected. Disconnect the GENESYS G5 printer to access the full service printer options.

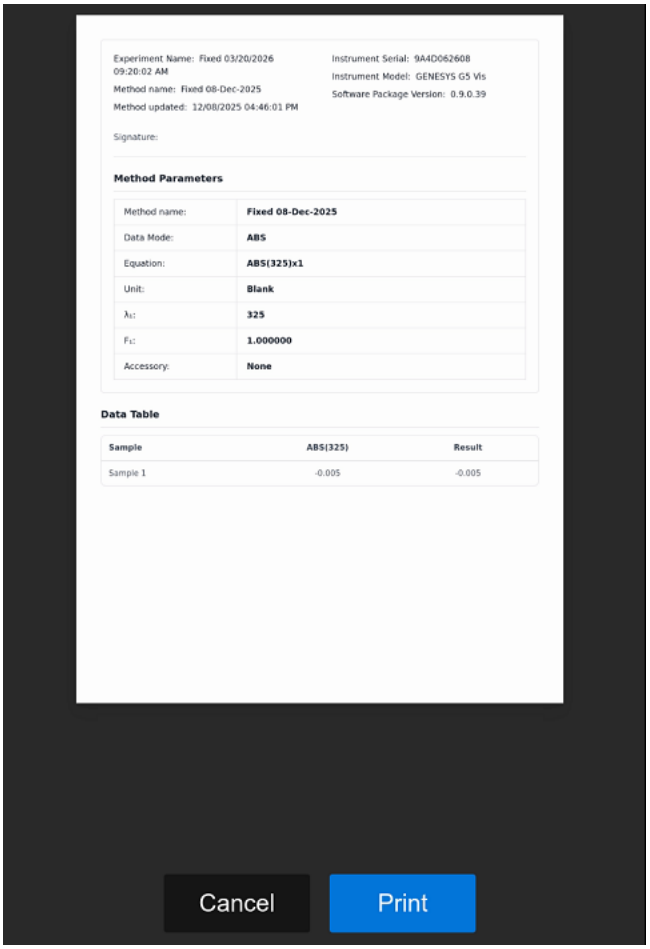
Print data at end of experiment

- When finished measuring samples, select the back arrow 
- From the **End Experiment** window, edit experiment name if desired
- Select **Print**

– Designate the print location



– Select **Preview** to see what the printed report will look like

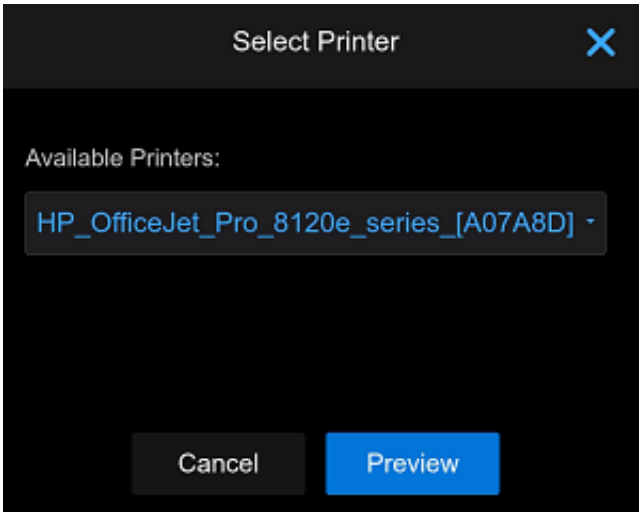


– Select **Print**

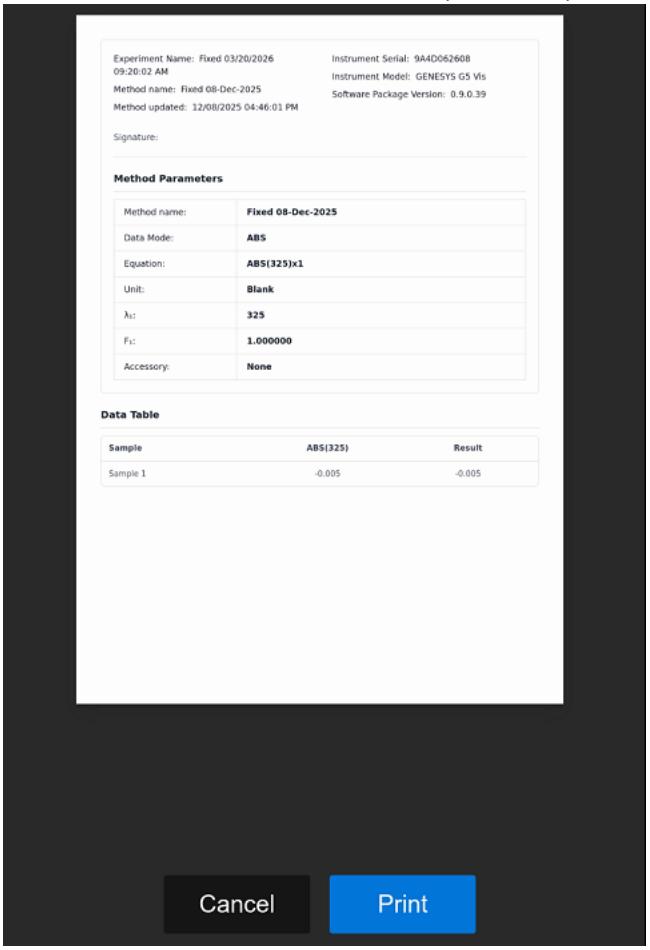
If a label printer is connected to the instrument, the software prints one label for each selected measurement. If a full service printer is connected, the selected measurement screen is printed for each selected measurement.

Print data from History

- From home screen, open the instrument Menu and select **History**
- Double click or tap the experiment name to open the experiment
- Select ⋮ at the top of the results screen to see the available menu options and select **Data Export & Report**
- Select **Print**



– Select **Preview** to see what the printed report will look like



– Select **Print**

If a label printer is connected to the instrument, the software prints one label for each selected measurement. If a full service printer is connected, the selected measurement screen is printed for each selected measurement.

LIMS API Integration

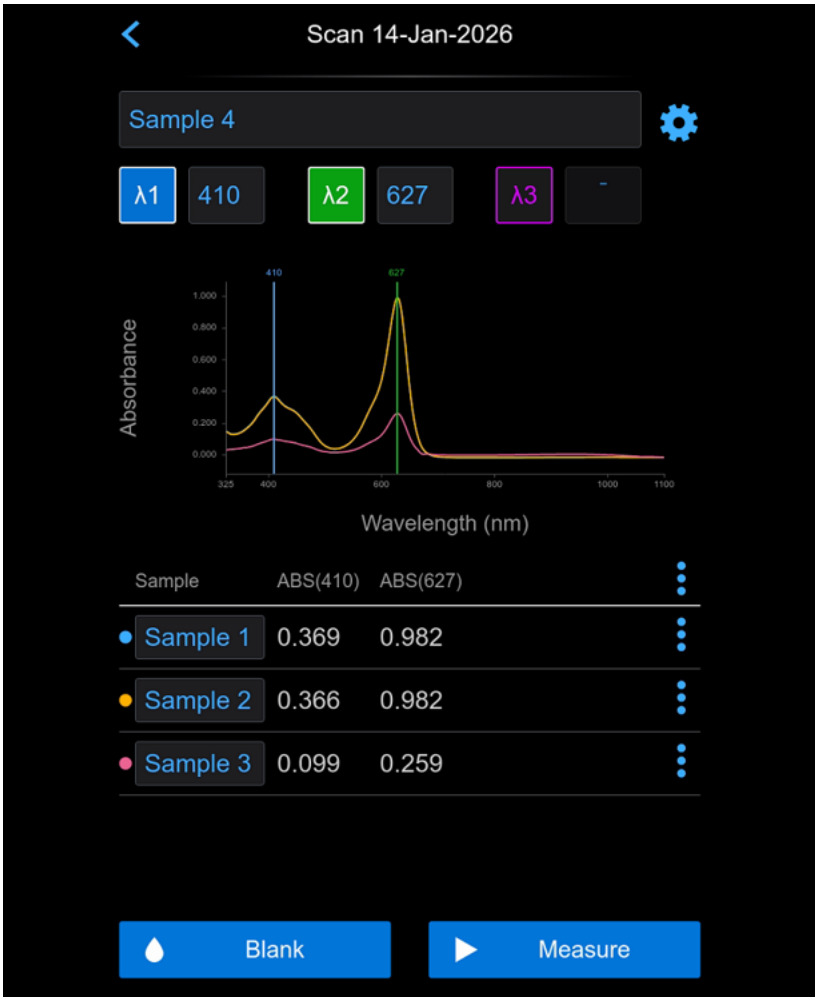
The REST API allows for efficient data exchange, including the submission, retrieval, and updating of data between the instrument and your LIMS. For more information on how to utilize the REST API, please refer to the GENESYS G5 API Reference Manual.

GENESYS G5 Results

Absorbance Spectrum

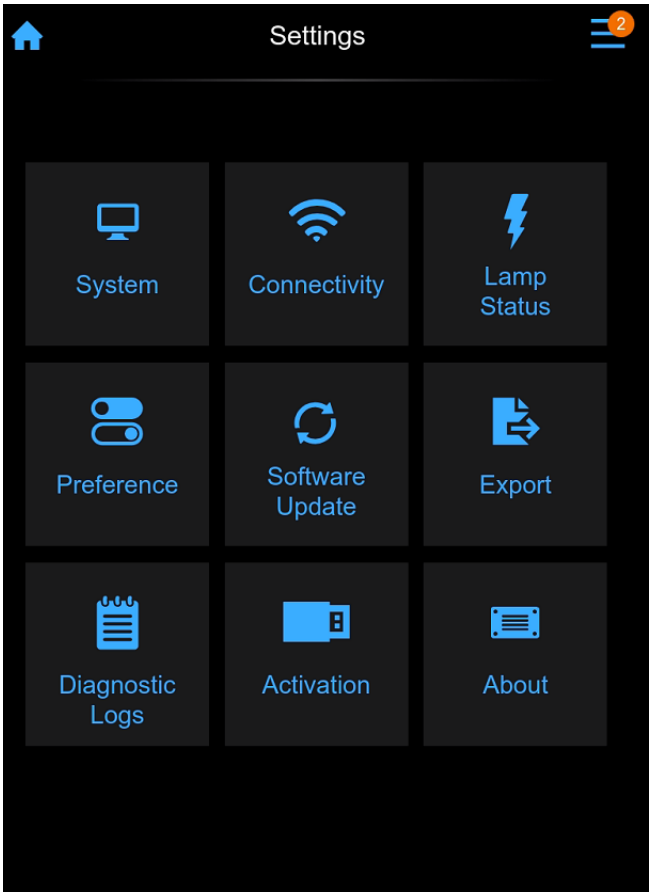
For each measured sample taken in select applications like **Scan**, the UV or UV-Visible absorbance spectrum and a summary of the results is shown. The vertical axis shows absorbance in absorbance units (A). The horizontal axis shows wavelength in nm. Here is an example for a UV-Vis method.

All absorbance-based applications display the sample pathlength along the spectrum's vertical axis. Here is an example.

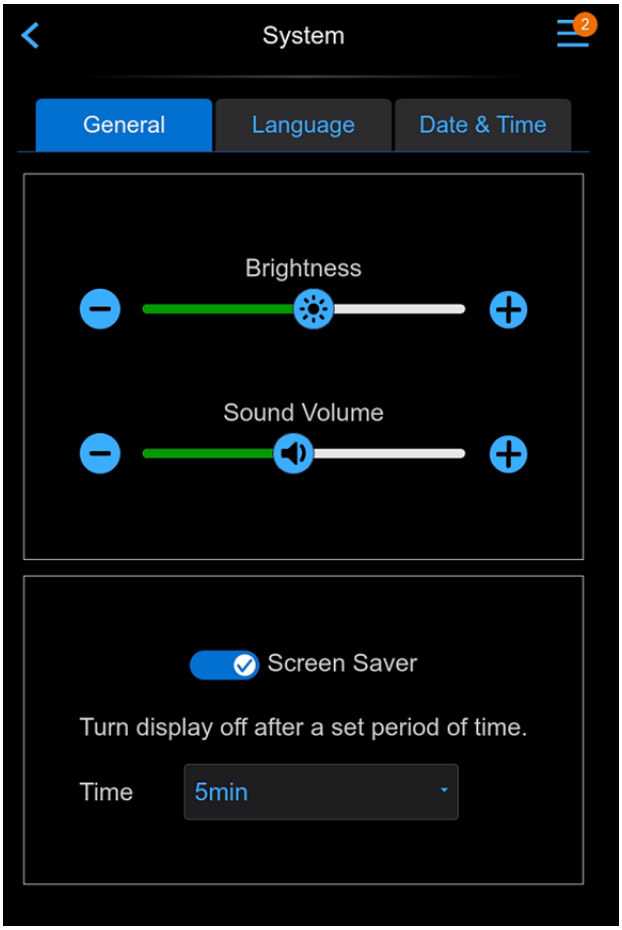


Instrument Settings

From the instrument Menu screen, select **Settings**. Available options include System Settings, Connectivity Settings, Lamp Status, Preferences, Export Settings, Update Software, Diagnostic Logs, Activation, and About Instrument.



System Settings



These options are available:

General	**Brightness and Volume**: Increase or decrease screen brightness and volume on instrument by using the respective sliders
	Energy Saver: The touchscreen will turn off and a screen saver will be displayed when the instrument has been idle for the selected time. To reactivate the instrument, tap the touch screen.
Language	Select language for displaying GENESYS G5 software and for any connected input device such as a keyboard, mouse or barcode scanner
	Notice: Changing the language requires a software restart.

Date and Time	**Automatic Time Zone & Time**: synchronize instrument time zone, time, and date with available network **Select Time Zone**: manually select instrument time zone (this option is disabled when Automatic Time Zone & Time is selected) **Set Time & Date**: manually set instrument time and date (this option is disabled when Automatic Time & Date is selected) **Choose Date Format**: choose an available date forma **Choose Time Format**: choose an available time format

Connectivity

These options are available:

Wi-Fi	Use this tab to enable and specify a Wi-Fi connection for the instrument. The GENESYS G5 Wi-Fi and Bluetooth Dongle must be inserted into the instrument, or this feature will be unavailable.
Bluetooth	Use this tab to enable and specify a Bluetooth connection for the instrument. The GENESYS G5 Wi-Fi and Bluetooth Dongle must be inserted into the instrument, or this feature will be unavailable.
Cloud	Use this tab to connect to the Thermo Fisher Connect Platform which enables direct data export to Thermo Fisher Cloud Connect.

Wi-Fi

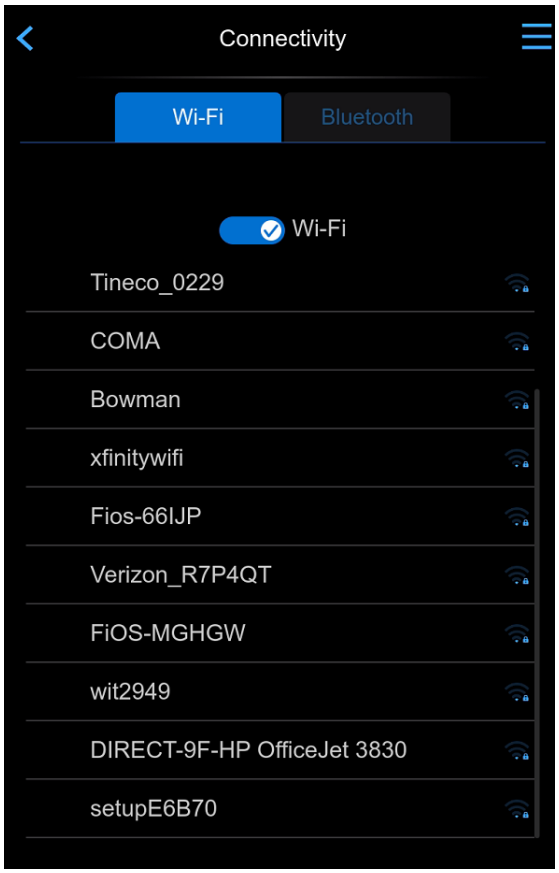
Use this tab to enable and specify a Wi-Fi connection for the instrument. The GENESYS G5 Wi-Fi and Bluetooth Dongle must be inserted into the instrument, or this feature will be unavailable.

Setup Wi-Fi network on the instrument

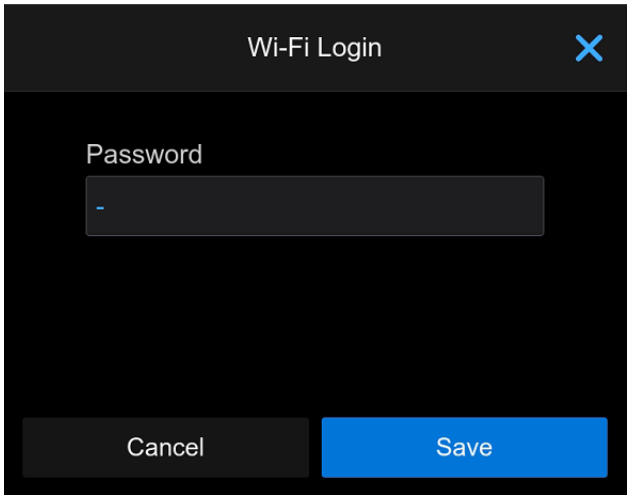
1. From the instrument Menu screen, select **Settings**.
2. Select **Connectivity**, then select the **Wi-Fi** tab at the top.
3. Use the slide toggle to enable Wi-Fi connectivity (turns blue with a checkmark and software automatically searches for any available Wi-Fi network)

   If no Wi-Fi networks are found, after a few seconds the message "No nearby Wi-Fi networks were found" is displayed

4. The GENESYS G5 instrument will continuously refresh the list of available networks.
5. The Wi-Fi name should appear in the provided list.



6. To connect to a Wi-Fi network, tap its name in Available Network list.
7. If the Wi-Fi network is password protected, a window will pop-up requesting entry of the Wi-Fi password. Enter the password and select **Save**.



8. A green checkmark will appear next to the name if the pairing was successful.
9. When Wi-Fi is enabled and connected, a Wi-Fi icon will appear at the bottom of the screen.
10. Select back to return to the Settings screen.

Disconnect Wi-Fi network

To disconnect from a connected Wi-Fi network, select the disconnect icon and then select **Ignore** to confirm.

Bluetooth

Use this tab to enable and specify a Bluetooth connection for the instrument. The GENESYS G5 Wi-Fi and Bluetooth Dongle must be inserted into the instrument, or this feature will be unavailable.

Note Make sure the device is labeled "Bluetooth" and not just "wireless." All Bluetooth devices are wireless but not all wireless devices will run with Bluetooth.

Set up Bluetooth connections on the instrument

1. From the instrument Menu screen, select **Settings**.
2. Select **Connectivity**, then select the **Bluetooth** tab at the top.
3. Use the slide toggle to enable Bluetooth connectivity (turns blue with a checkmark and software automatically searches for any available Bluetooth input devices)

   If no Bluetooth devices are found, after a few seconds the message "No nearby Bluetooth devices were found" is displayed
4. To add a Bluetooth device, follow the manufacturer instructions to pair the device (for example, you may need to hold down a button). The GENESYS G5 instrument will continuously refresh the list of available devices.
5. The device name should then appear in the provided list.
6. To pair a device, tap its name in Available Devices list, a green checkmark will appear next to the name if the pairing was successful.
7. When Bluetooth is enabled and connected, a Bluetooth icon will appear at the bottom of the screen.

8. Repeat steps above to add another Bluetooth device or select back  to return to the Settings screen.

Note If your Bluetooth device does not pair, restart the device and then repeat the steps above to pair it with the instrument (you may also try turning Bluetooth off and back on). After a device is paired, it remains paired even after the instrument is restarted.

Disconnect Bluetooth device

To disconnect from a connected Bluetooth device, select the disconnect icon  and then select **Ignore** to confirm.

Note

- If no Bluetooth device is selected for input, the instrument relies on the integrated touchscreen keyboard for input.
- To select the device again, follow the steps above and select the device's Use for Input checkbox.

Cloud

Use this tab to connect to the Thermo Fisher Connect Platform which enables direct data export to Thermo Fisher Connect.

Create a Thermo Fisher Scientific Cloud Connect Account

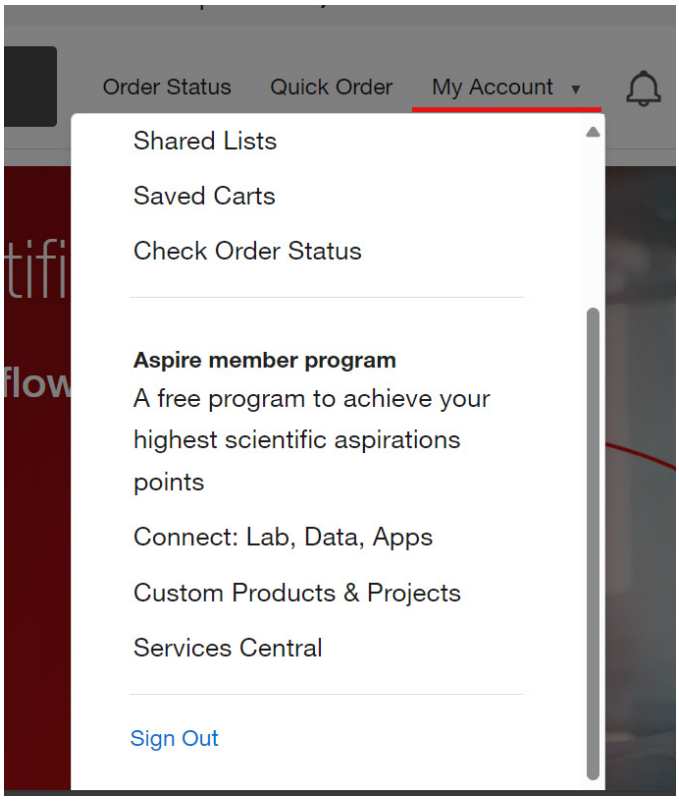
During the initial Cloud setup, the instrument needs to be connected to the Thermo Fisher Cloud Connect Platform. A Thermo Fisher account must be used during this process and requires a one-time setup.

1. From a PC browse to www.thermofisher.com/cloud
2. Select **Sign in** which will display a dropdown menu
3. Select either **Sign in** again if you already own a Thermo Fisher account or **Create Account** if you do not already have one and complete the additional steps to create a free account.

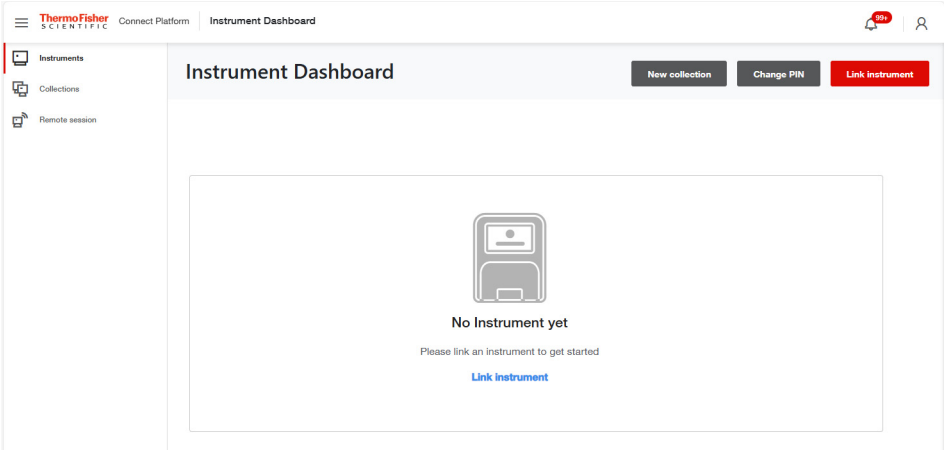
Create a Thermo Fisher Cloud Connect PIN

1. After signing into your Thermo Fisher account in your preferred browser, select **My Account**

2. Select **Connect: Lab, Data, Apps**.



3. Select the ☰ icon on the left panel to open the Instrument Connect page
4. Select **Change PIN number** towards the upper right of the Instrument Connect page

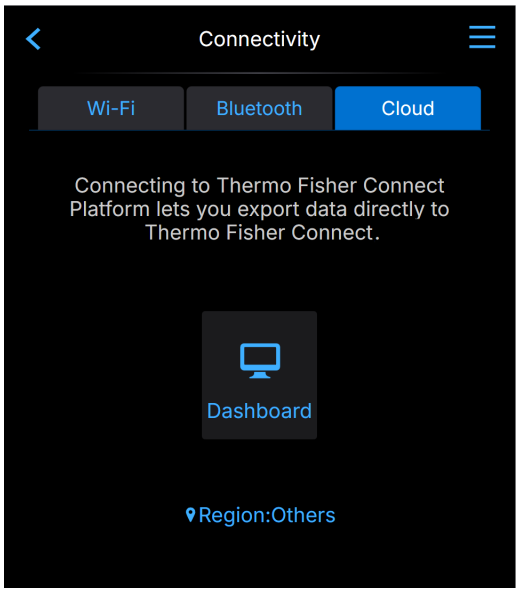


5. Enter a unique PIN number and save this information as you will need it later

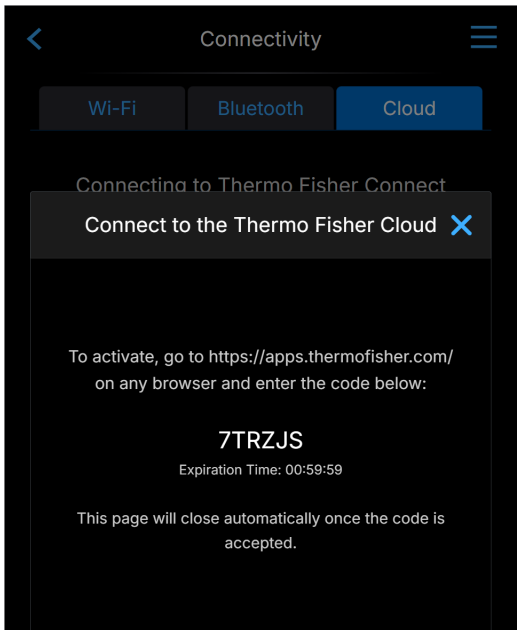
Connect to a Thermo Fisher Cloud Account

1. From the instrument home screen, select **Settings**.

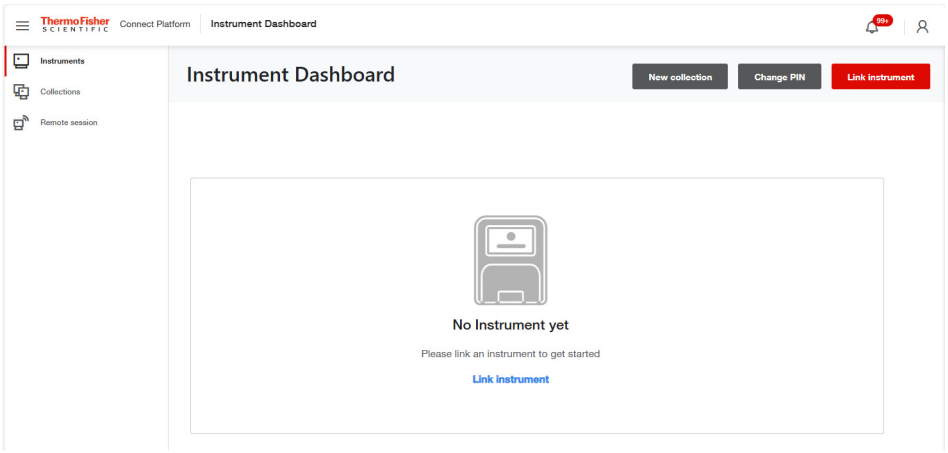
2. Select **Connectivity**, then select the **Cloud** tab at the top.



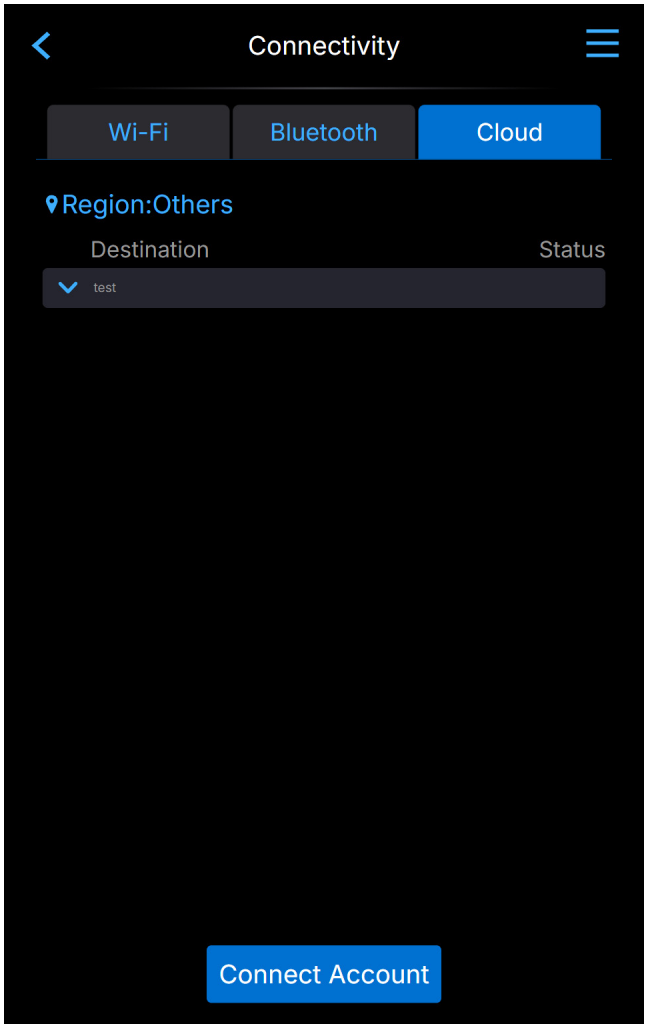
3. Ensure the appropriate Region to selected, the options are either US & Other or China.
4. Select Dashboard to display a unique linking code for the instrument.



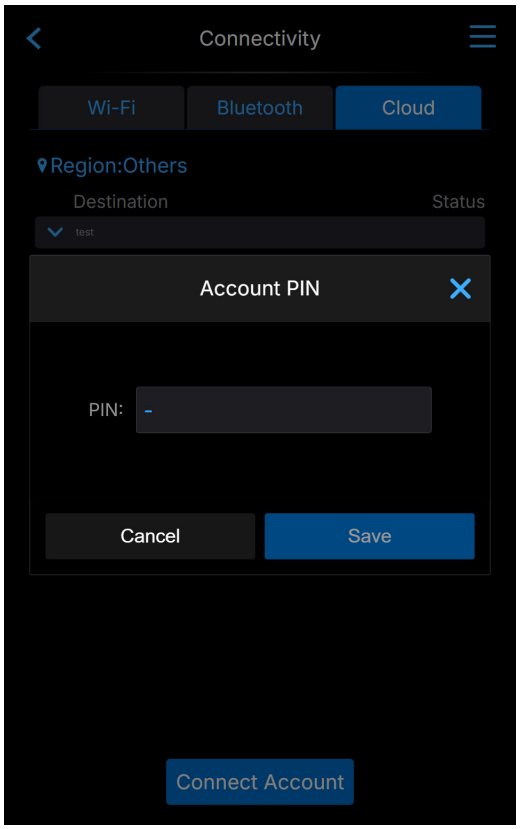
5. From a PC with internet access browse to www.thermofisher.com/cloud.
6. Sign into your Thermo Fisher account in your preferred web browser on a PC with internet access.
7. Select **Connect**: **Lab, Data, Apps**
8. Select the ☰ icon on the left panel to open the Instrument Connect page



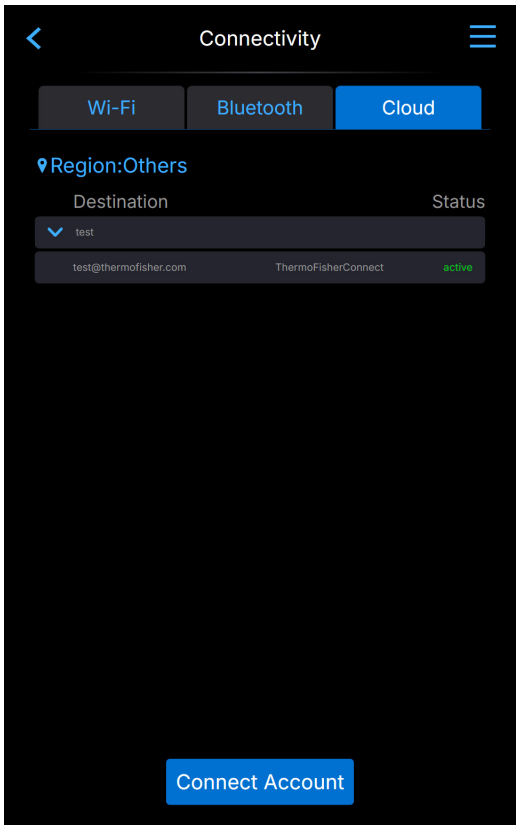
9. Select **Link instrument** and enter the unique linking code provided by the instrument
10. Select **Link**
11. The connected Thermo Fisher Scientific account will now appear in the **Settings** > **Connectivity** > **Cloud** tab with the Activated status.



12. Use  to display any Cloud accounts that have been associated with the Thermo Fisher Scientific account.



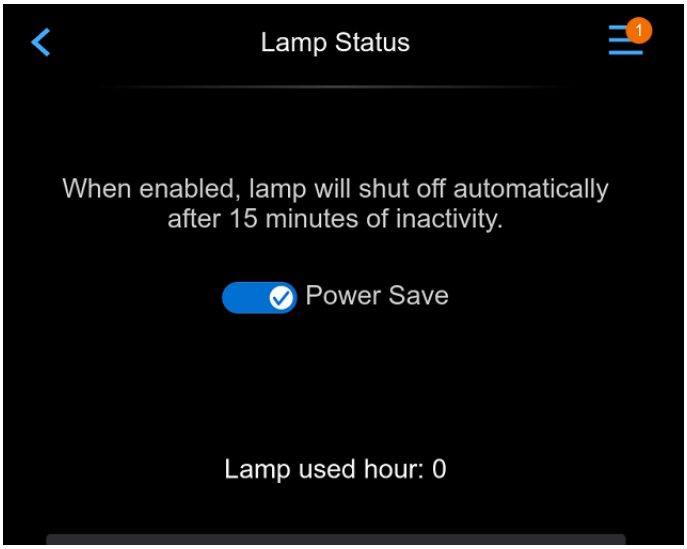
13. The Thermo Fisher Cloud Connect PIN will be requested, enter and select **Save**.



14. Select the Connect Account option and follow steps 5-10 to add additional Thermo Cloud Connect accounts.

Lamp Status

Applicable to GENESYS G5 Vis models only.

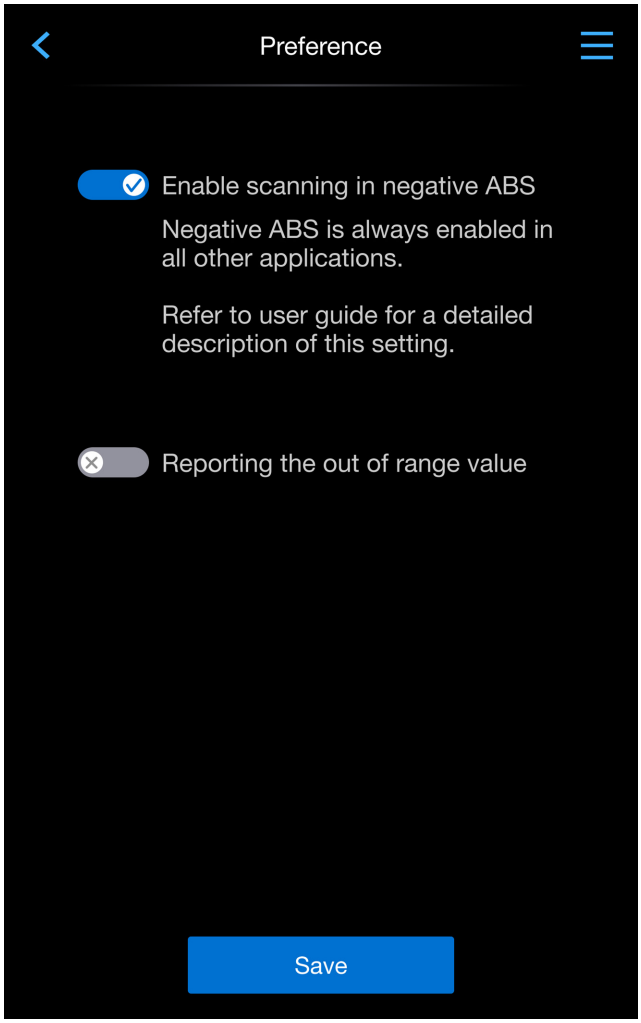


Screen will display how many hours the Halogen lamp has been on for.

Power Save. Use the toggle to enable Power Saver mode which will turn the Halogen lamp off after 15 minutes of inactivity.

Reset Lifetime. Function to reset the cumulated lamp lifetime, to be used when the lamp is replaced.

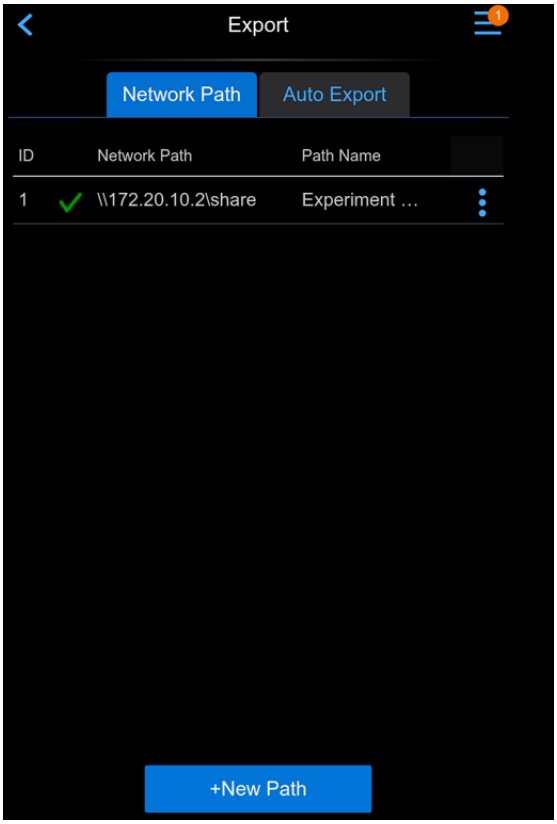
Preferences



Set your preferences for remembering certain settings when restarting the application. Scanning in negative absorbance mode is not available in the GENESYS G5 Vis model.

Export Setup

These options are available:



Network Path

Use this tab to specify one or more network paths for exporting acquired data when the instrument is connected to a network (connection can be wired or wireless). Network paths defined here will appear in the USB/Network path drop-down menu when exporting data, from both the History and the End Experiment box after you complete a measurement.

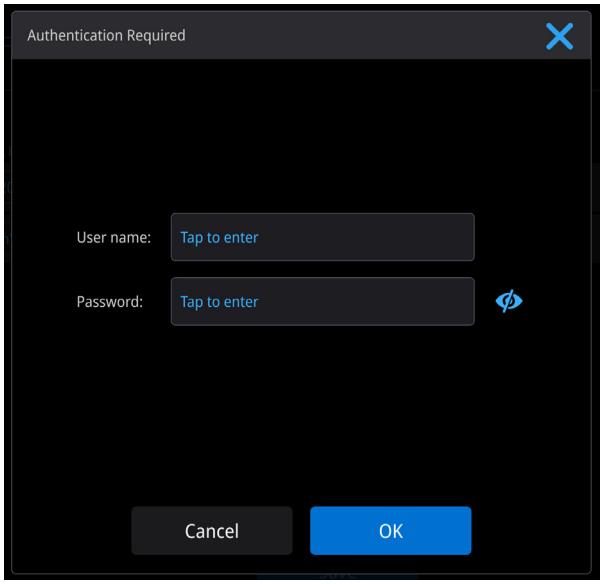
Add Network path

1. Select + New Path to add a new entry box for a network path each entry will have a unique ID.

2. Enter the Network Path in the following format: \\IP Address of Server or Server name\Name of the share drive\Name of folder on share drive. (from local control, tap field to display keyboard, tap the **enter** key to close keyboard).
3. Enter a unique Path Name which will appear in the USB/Network path drop-down menu when exporting data.

Test Network path

1. After all information has been input, select Test to confirm connection and access to the network location.
2. Enter a User name and Password for the network and are trying to connect to and select **OK**.

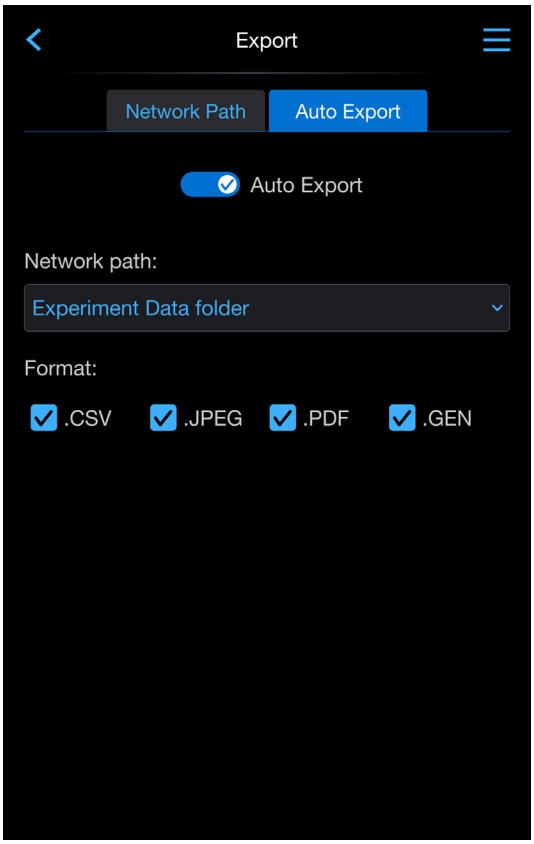


Edit or Delete Network path

1. The Network Path and Path Name can be edited at any time by selecting , then **Edit** to the right of each entry and making any necessary changes.
2. Select **Delete** to delete it.

Auto Export

Enable Auto Export toggle, then select a file path for exported files to be saved. A Network Path must be setup prior to enabling Auto Export. Select the desired network path location, and file type(s) to export. When enabled the software will save a copy of the experiment in the provided file type(s) to the location specified.



Activation

The activation screen can be used to unlock any of the optional GENESYS G5 add-on software packages. When an add-on software package is purchased, an, the SciVault 2 software and activation key is shipped to you on a USB stick and once unlocked, integrates directly into the GENESYS G5 software user interface.

See the SciVault 2 User Guide for information on activating and installing SciVault 2 software.

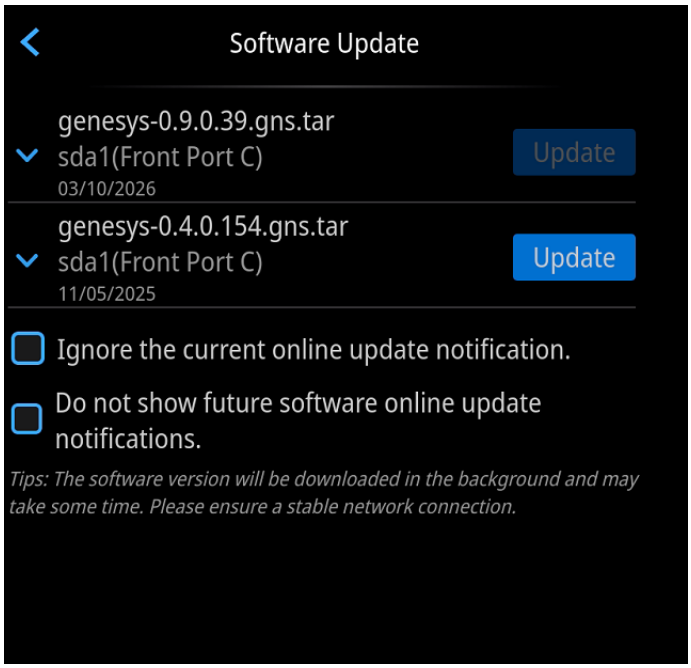
Update Software

Quickly and easily download and install the latest GENESYS G5 software and release notes from our website. Follow the steps to update or upgrade the software on your local instrument and/or install or update the GENESYS G5 software on a personal computer (PC). An Internet connection is required to download software. The GENESYS G5 PC software needs to be purchased and is not available on our website.

To install or update GENESYS G5 software on a PC

1. Insert the USB flash drive containing the installer software into an available USB port on your PC, or open the installation folder downloaded from the internet.
2. Launch **Start.exe** and click **Install**. The software installer will run.

To install or update GENESYS G5 software on the instrument



Through USB:

1. Copy the .zip file with the new software from your computer to a USB storage device. **Do not attempt to unzip the folder**.
2. Insert the USB device into any USB port on the GENESYS G5 instrument.
3. From the instrument Menu screen, tap **Settings**, then **Software Update.**
4. Select **Update** in the row with the latest version of software.

Through Online Update

Note Instrument must be connected to a network with internet access. When connected to a network with internet access, any time a software update is released, a system alert will be provided to the user to inform them they are able to update.

1. From the instrument Menu screen, tap **Settings** > Software Update.
2. Select Update in the row with "Online update" as the source.

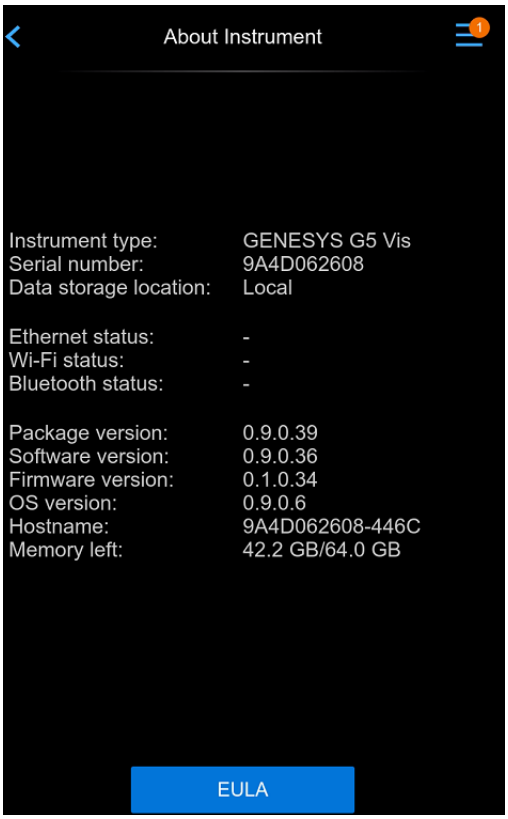
Diagnostic Logs

Select a location to export diagnostics logs to, these can be provided to technical support for review of any instrument issues.

About Instrument

System Status

Select ☰ on the instrument home screen to open the menu, then select **Settings > About** to open the About Instrument box.



The available information is described below.

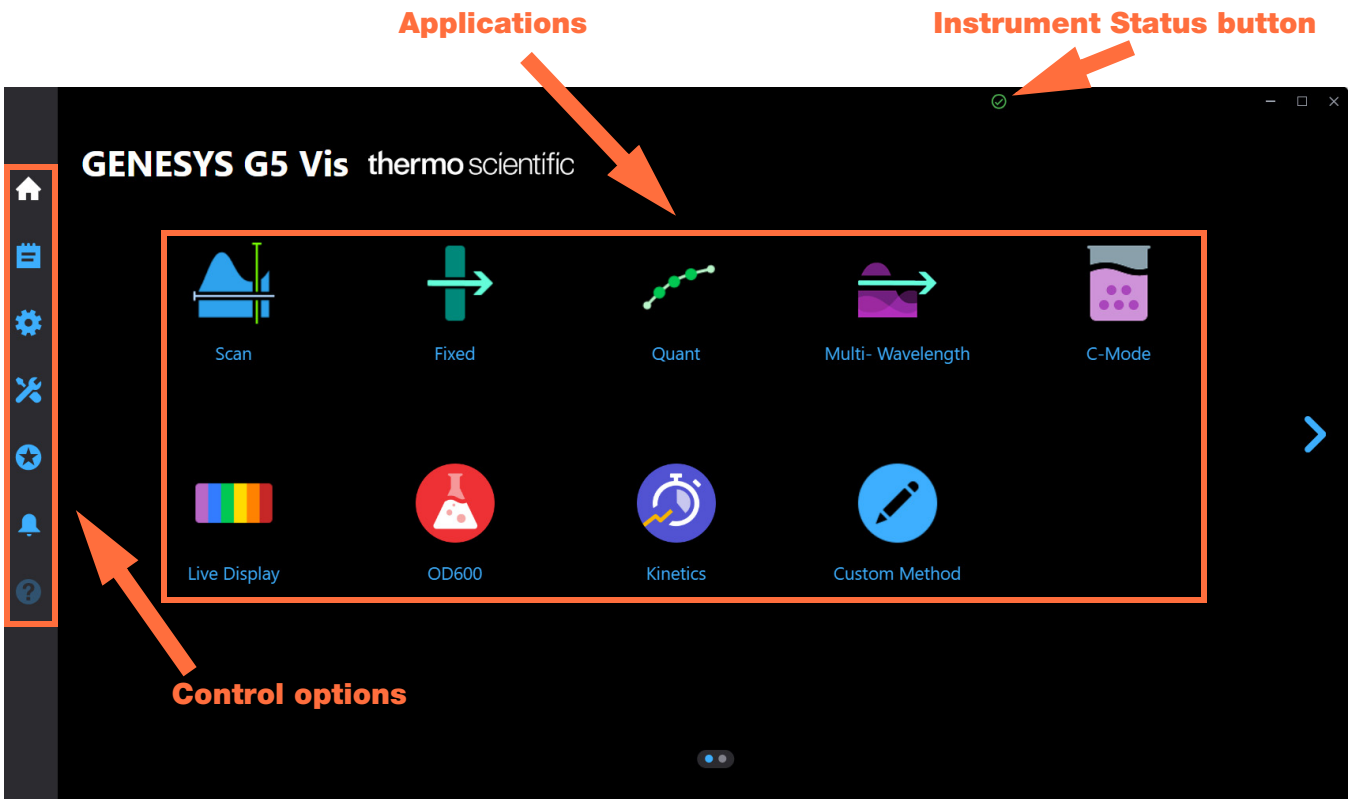
Instrument type	Instrument model (GENESYS G5)
Serial number	Instrument serial number
Data storage location	Indicates location of database set where instrument is currently storing data.
Ethernet status	Status of Ethernet connections for the instrument (“Connected to…”, or “Not connected”)

Wi-Fi status	Status of WiFi connections for the instrument (“Connected to...”, “Enabled and not connected”, or “Disabled”)
Bluetooth status	Status of Bluetooth connections for the instrument (“Connected to...”, “Enabled-[list of any paired devices]”, or “Disabled”)
Package version	Version of entire package that is installed on the system. Helps manage dependencies and ensures compatibility between firmware, OS, and software versions
Software version	Version of instrument operating software installed
Firmware version	Version of instrument firmware installed
Memory Left	Total and remaining memory left for storage purposes on the instrument.
EULA	Select **EULA** to display Thermo Fisher Scientific's End User License Agreement. Once displayed, the EULA can be exported by selecting **Export**.

PC Control Software

Control your GENESYS G5 from a PC through a USB A/B connection with the optional PC control software. You can run new experiments or view data acquired with a GENESYS G5 instrument on the PC, as well as change instrument settings, and create or edit custom methods. The GENESYS G5 local control and PC control software applications are almost identical, a few of the more significant differences will be highlighted below.

PC Control Home Screen overview



PC Control Home Screen

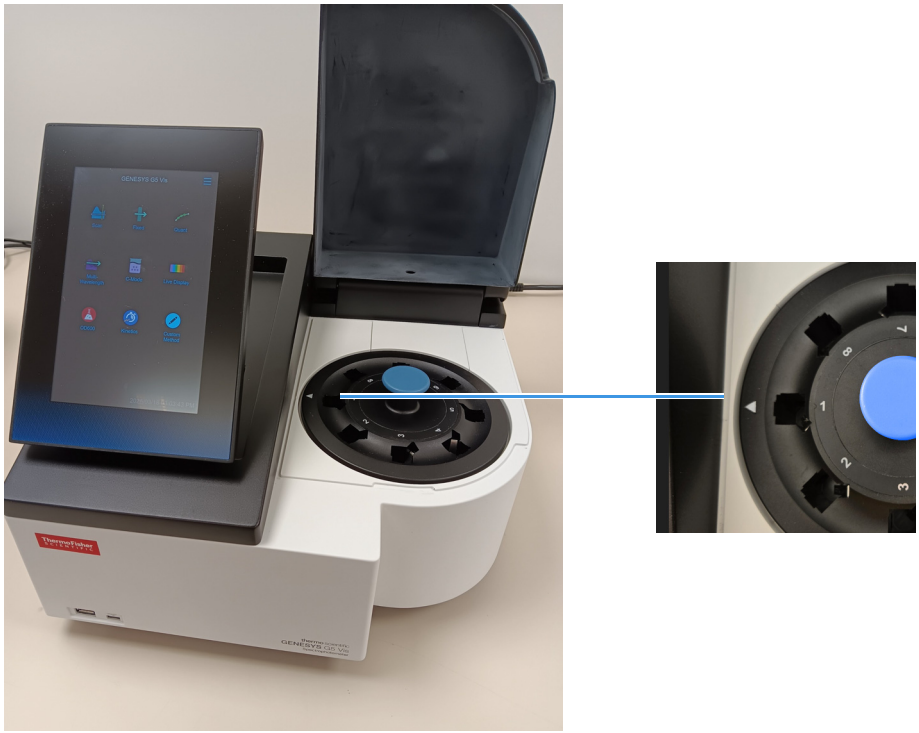
Select your application from the categorized icons just as you would with the GENESYS G5 instrument Home Screen.

Accessories

Cell-Changers

Installation

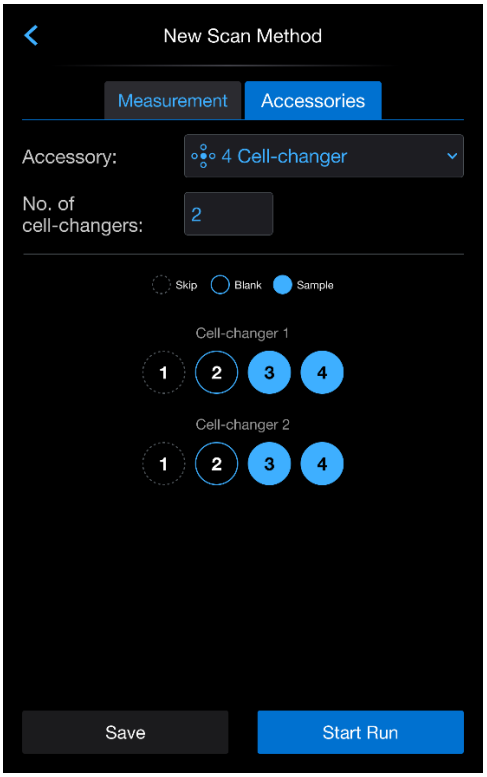
1. Align white arrows as shown.



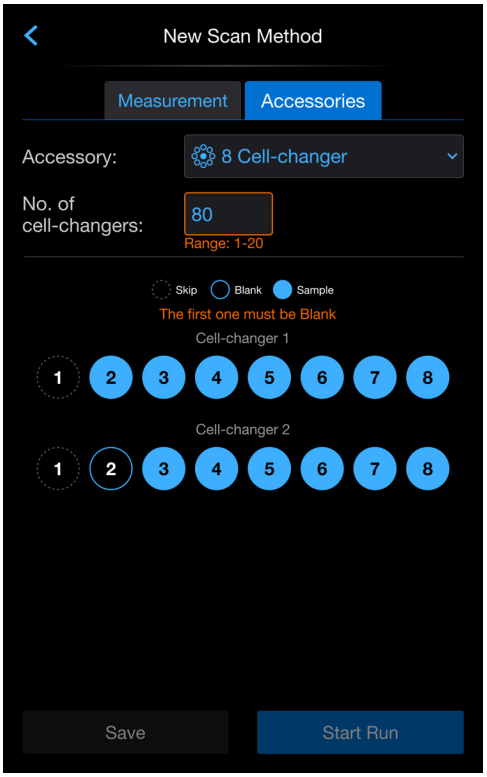
2. Lower the cell holder into the sample compartment so that the V engages with the groove on the side of the sample compartment and the hold-down magnet engages

Settings

4 Cell-changer

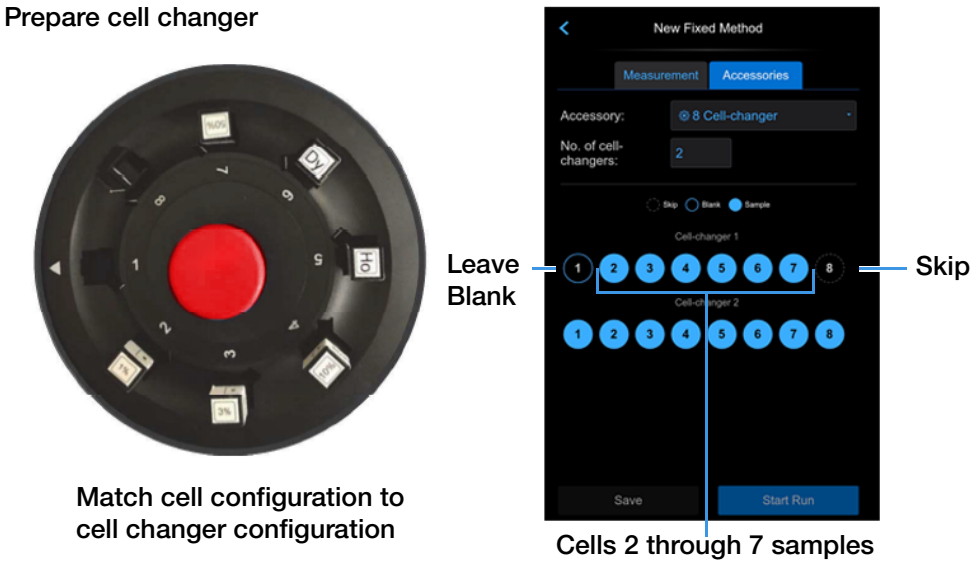


8 Cell-changer



Cell changer settings in the Scan Application are used as an example in this section. However, the same options are available for all other applications unless otherwise specified.

Setting	Available Options	Description
No. of cell-changers	1-20	Equals the number of cell changers that will be used in the expirement. You may need to scroll down to view all cell changers.
Cell type	Skip, Blank, Sample, Standard*	Select each cell within a Cell-changer row to cycle between the available cell type options. The first cell in the first Cell-changer row must be designated as a blank. “Standard” as an option is only available within the Quant Application.



Peltier Thermostatted Cell Holder

The temperature measured and reported by the device is the temperature of the metal cell-holder block. The temperature of stirred liquid in a full size quartz cell will reach the same temperature as the cell holder block after approximately 6 minutes when heating from 23 °C to 35 °C and typically falls within ±0.3 °C of the programmed block temperature. This is only a guide. Performance will vary if:

- The initial temperature is different
- The final temperature is below room temperature
- The cuvette is not stirred
- The cuvette is not made of glass or quartz
- The cuvette is a micro-cuvette

The experimental parameters for controlling the Peltier thermostatted cell holder include an equilibration time. This is a "wait time" between when the cell holder block reaches the target temperature and when the absorbance measurement is made. It is strongly recommend to place the probe of a digital thermometer or thermocouple of sufficient accuracy and precision in the liquid in a cell under what will be normal experimental conditions, and bring a quantity of appropriate matrix (solvent or buffer) to temperature in the cell holder while monitoring the temperature to determine performance under your experimental conditions.

Important Considerations:

- Quartz conducts heat six times faster than plastic - samples in quartz cells come to temperature much faster than they do in plastic cells.
- A full size cell takes approximately 66% more time to reach equilibrium temperature if it is not stirred.
- Liquid in unstirred plastic cells did not heat to within 0.6 °C of the cell holder block temperature when heating in our experiments.
- Plastic microcells and semi-microcells have significantly reduced surface contact with the walls of the cell holder block compared to full size plastic cells or glass/quartz reduced volume cells. If using a reduced volume plastic cell it is essential that you perform some experiments to determine the appropriate equilibration time setting.

Note Water thermostatted cell holders are not supported on this platform.

Installation

1. Align white arrows as shown.



2. Lower the cell holder into the sample compartment so that the V engages with the groove on the side of the sample compartment and the hold-down magnet engages

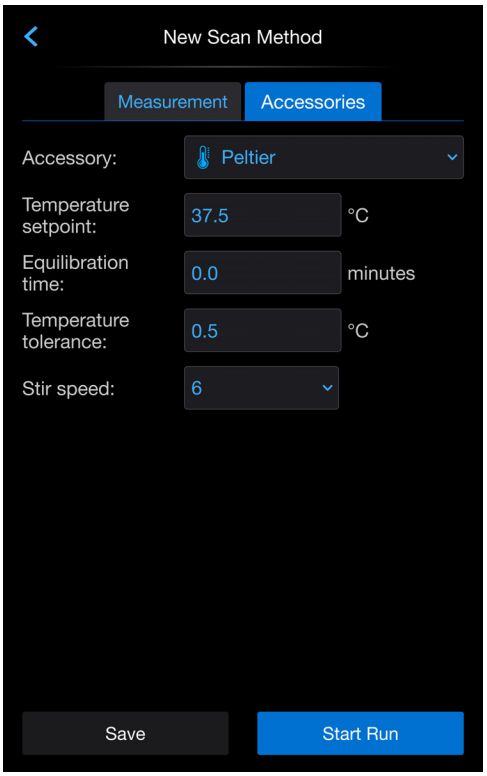
3. Connect cables as shown.





- Operate this accessory with the sample compartment lid open
- Do not close the sample compartment lid while the accessory is running

Settings



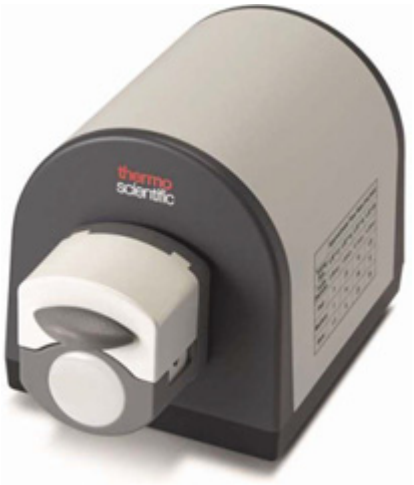
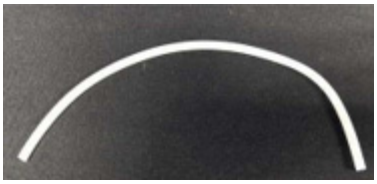
Setting	Available Options	Description
Temperature setpoint	20-60	The instrument starts measurement when the block temperature of the Peltier reaches the temperature setpoint.
Equilibration time	0-30	The equilibration time acts as a delay between when the block temperature reaches the setpoint and when the instrument begins measurement; heat transfer from the block to the sample is not instantaneous.
Temperature tolerance	0.5-5	Acceptable deviation from the setpoint temperature for stable operation.
Stir speed	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10	Controls the intensity of sample mixing, with higher values indicating faster stirring and 0 indicating off.

Sipper

Sipper control is only supported in Quant, Fixed, and Scan modes.

Components of the Sipper System

Complete sipper systems come with the following components

Item	Photograph
Sipper pump	
Sample compartment insert with gooseneck	
30 cm Silicone pump tubing (#16 size - 1.6 mm wall, 1.6 mm inside diameter)	

Item	Photograph
3 m PTFE transfer tubing	
1 Flow cell, 160 µL volume with screw connector set Smaller volume flow cells are available but the smaller window size cuts off some of the spec-trophotometer beam, reducing photometric performance. If the absorbance values measured are below 1.0, however, this will not make a noticeable impact on data quality.	
Connector package The connectors supplied are designed for use with the# 16 tubing supplied. They can also be used with smaller# 14 tubing with extra effort. To use larger# 25 tubing please purchase a larger connector separately.	

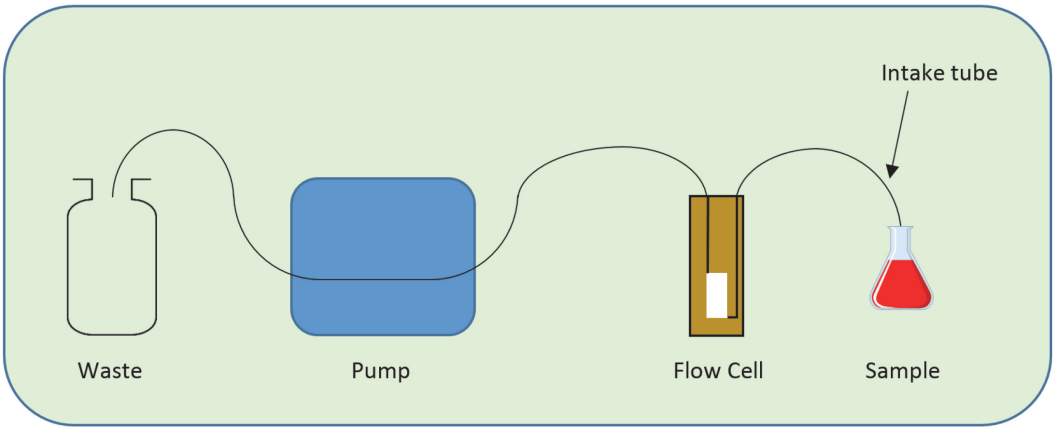
Compatibility of the GENESYS Sipper with tubing sold by us for use with spectrophotometer sippers.

Material / Size	# 13	# 14	# 16	#25
Silicone	✔	✔	✔	✔
C-Flex	✗	✔	✔	✔
Viton	✗	✗	✔	✔
ChemDurance Bioa[a]	✗	✗	✗	✗

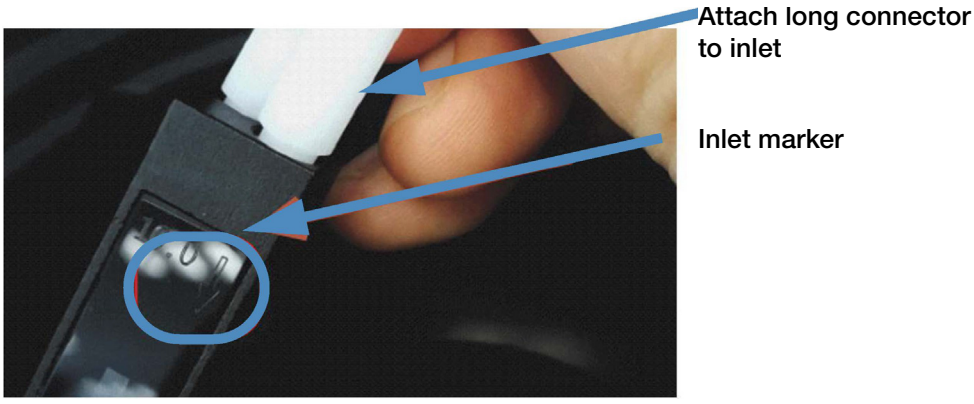
[a] Chemdurance Bio tubing is suitable for use with the Smart Sipper for Evolution spectrophotometers

Installation

Connecting the Sipper Tubing



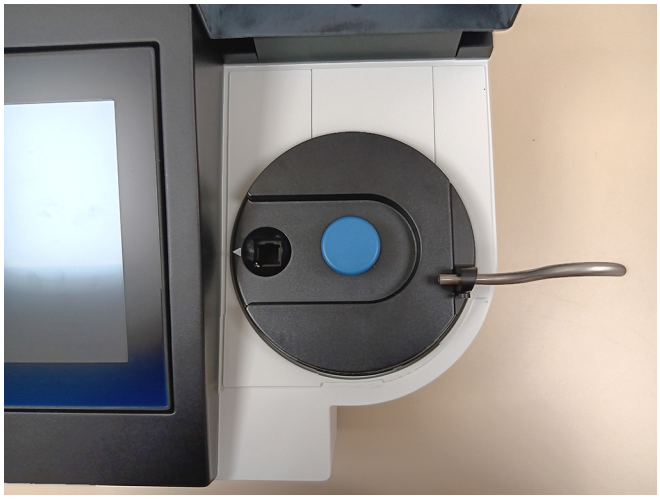
1. Connect screw connectors to flow cell.



2. Attach the gooseneck tube.



3. Lower the cell holder into the sample compartment so that the V engages with the groove on the side of the sample compartment and the hold-down magnet engages.



4. Position sipper pump and connect cables.



5. Decide where the waste container will be placed.

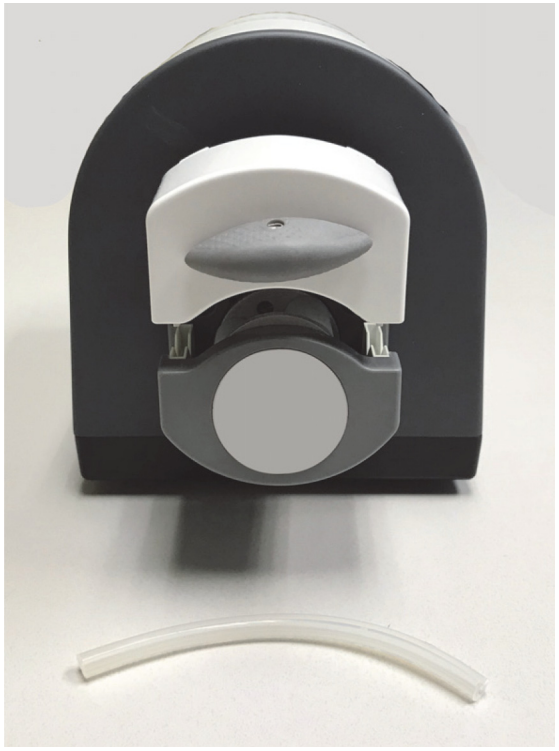
   - If very close to the pump, run the pump tubing directly to the waste container.



   - If farther, run (less expensive) PTFE transfer tubing from the pump-head tubing to the waste container.

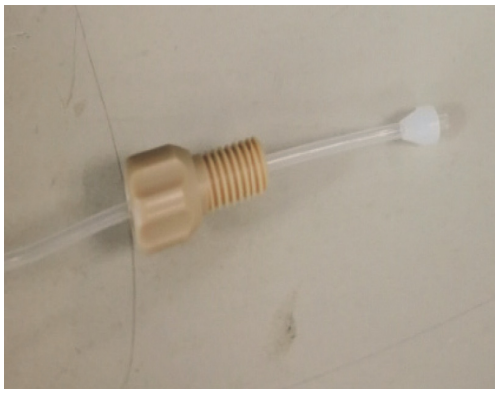


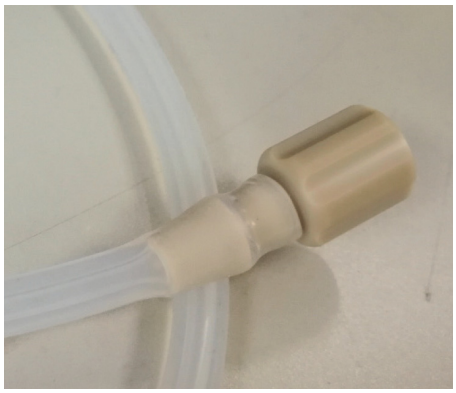
6. Determine the length of pump tubing required for your configuration. Minimum recommended length of pump tubing is 10 cm.
7. Cut a suitable length of pump head tubing and lay it on the bench in front of the pump.



8. Place the flow cell in the cell holder with the windows in the beam (facing to the front and back).
9. Route the PTFE cell connector tubing from the inlet (long connector) through the gooseneck.

   Refer to separate *Introduction to Sipper Use* for detailed information.
10. Route the PTFE cell connector tubing from the outlet (short connector) to the pump.
11. Trim all cell connector tubing to an appropriate length for your use scenario.
12. Attach the pump-head tubing to the PTFE tubing using the couplers.



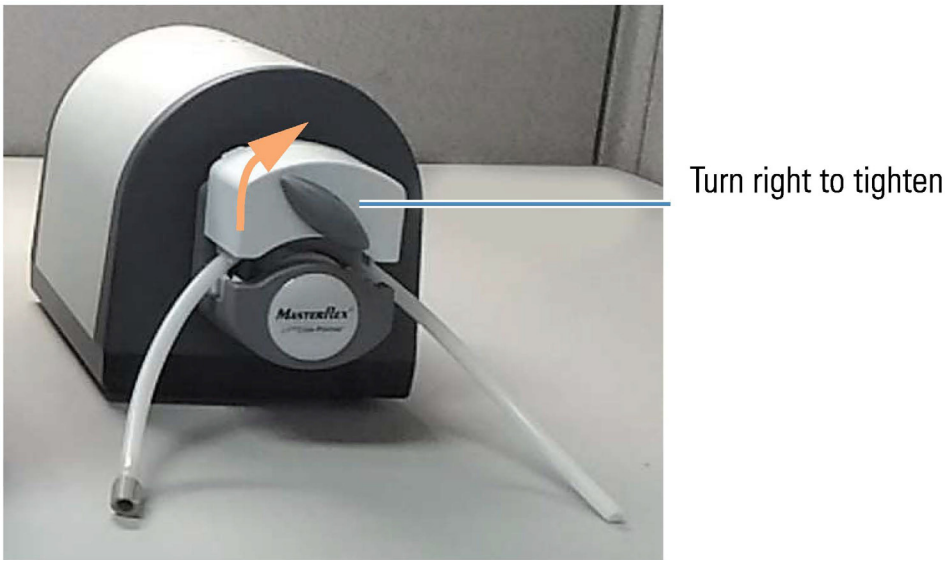




13. Secure the connections with zip-ties if using high pump speeds or tubing larger than the size supplied.



14. Install the pump-head tubing into the pump head as shown.



15. Test the system for leaks.

    a. Use the table on the pump to choose a pump speed suitable to the volume that you wish to pump in your procedure.

    Note Accuracy of the volume delivered decreases as pumping speed and tubing size increase.

    b. Program a custom sequence to sip at the chosen speed for 60 seconds, or longer if necessary. Place the inlet tube in a beaker of clean solvent and pump for long enough to completely fill the system with solvent and deliver it to the waste container.

    c. Repeat the sip sequence while observing the PTFE tubing between the flow cell and the pump. There should be no bubbles in the tubing. If there are, check the tubing connections to the flow cell.

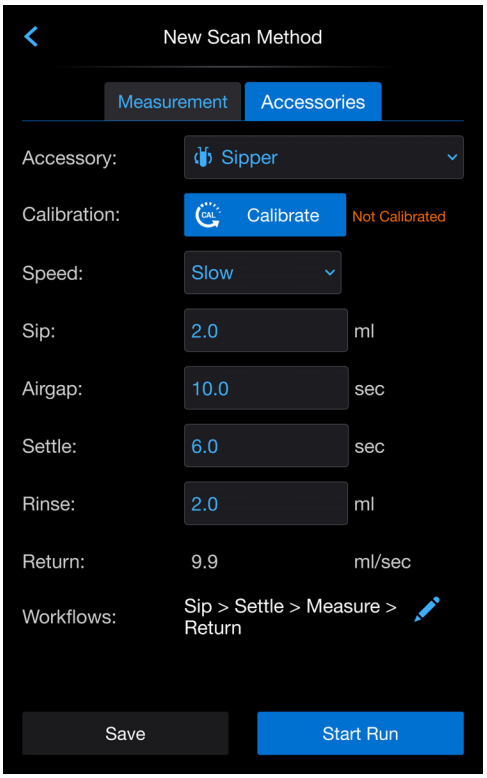
    d. Remove the flow cell from the cell holder and check it for solvent leaks.

    e. Check the connections between the PTFE tubing and the pump-head tubing for solvent leaks.

16. Follow the process to calibrate the sipper.

    Failure to deliver a consistent volume can be an indicator of an air leak at the connection between the cell outlet tubing and the pump-head tubing.

Settings



Setting	Available Options	Description
Calibration	N/A	By default, the sipper is configured in an uncalibrated mode. Calibrating a sipper allows precise control over the volume of the liquid drawn. See Calibrating the Sipper for more information.
Speed	Slow, Medium, Fast	The period the system waits after reaching the setpoint to ensure temperature stability before measurements.
Sip	0-150	Pump in the forward direction (from the inlet tube towards the flow cell and pump).
Airgap	0-150	Pump air in the forward direction to push liquid through the system.
Settle	0-150	Time to wait for the liquid to stop moving before making a measurement.
Rinse	0-150	Pump rinse solution in the forward direction.

Setting	Available Options	Description
Return	0-150	Pump in the reverse direction (from the pump and flow cell towards the inlet tube).
Rate	N/A	Overall sipper rate is displayed here.
Measure	N/A	Record the absorbance.
Prompt*	N/A	Display an on-screen prompt to tell the user what to place at inlet tube for the next step in the sequence. *This option is only available in the custom method workflow.
Workflow	Sip > Settle > Measure > Return Sip > Draw Air > Settle > Measure > Rinse > Draw Air Custom**	Select from two pre-defined workflow options or create a custom workflow. **See Custom Workflows for more information.

Calibrating the Sipper

Two sipper control modes:

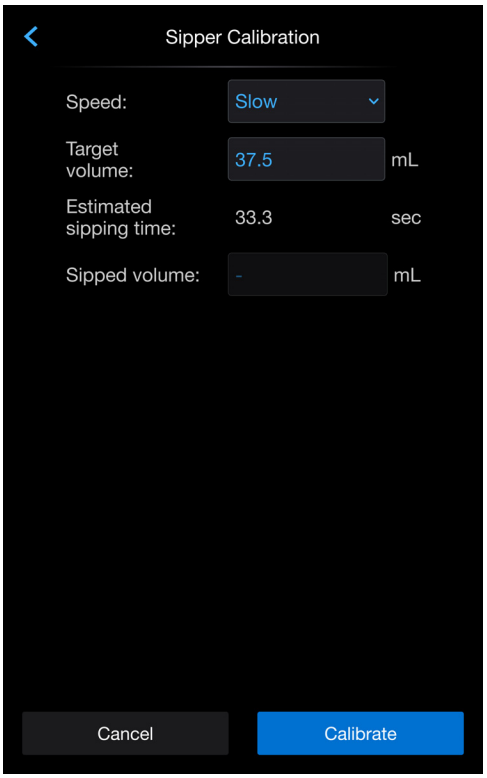
1. Uncalibrated - Define pump time at all stages.

2. Calibrated - Define pump volume at each pumping stage.

Sipper parameters are stored in the experimental method.

Customers whose existing SOPs are based on a prior sipper system that did not support calibration for volume pumped can continue to use time-based pumping in uncalibrated methods.

In general, calibrating the system for volume delivered is the preferred method. Once calibrated, the system will pump the specified volume at each step.



The sipper calibration aims to pump 10 mL or a different volume that you specify. 10 mL is recommended as it is a good choice for most applications. If using a custom volume, you will need to determine the amount. There are two recommended options to do so:

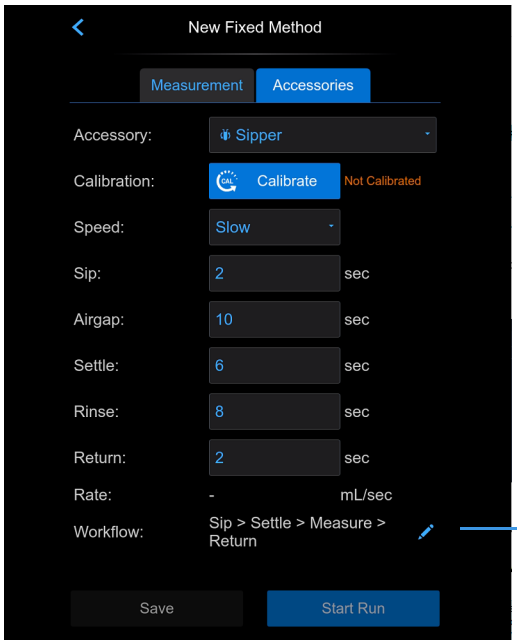
- Pump out of a filled 25 mL graduated cylinder. Note the volume on the scale before and after pumping. Calculate the volume pumped by subtraction.
- Pump out of a weighed beaker or flask. Weigh the beaker again after pumping and calculate the volume pumped by multiplying the difference in mass by the density of the solvent. The density of water can be taken as 1.00 g/mL for most purposes. However, if you require particularly high precision in pumping small volumes you may wish to use purified water and the literature value for density of water at the temperature used.

Setting	Available Options	Description
Speed	Slow, Medium, Fast	By default, the sipper is configured in an uncalibrated mode. Calibrating a sipper allows precise control over the volume of the liquid drawn.
Target volume	1-100 Recommended: 10	Enter desired volume to test

Setting	Available Options	Description
Estimated sipping time	N/A	Displays estimated sipping time based on target volume. This value will update after the actual sipped volume has been entered.
Sipped volume	1-100	After Calibrate has been selected, enter the actual sipped volume.

Custom Workflows

If an SOP calls for a specific workflow, the sipper configuration offers customization of workflow.



Open Workflow Setup



Click to remove a step.

Click and drag the icon to the left of each step to move it up or down in the order.

Fiber Optic Coupler and Probe (UV Vis systems only)

NOTICE Fiber optic cables can suffer damage when bent with too small a radius. A small radius can also lead to light loss and reduction of performance even if it does not lead to physical damage. The recommended minimum bend radius when working is 20cm.

Note The fiber optic probes are equipped with a shorter than normal collar at the SMA connector. This helps to maximize the bend radius of the input fiber. Probes purchased from other vendors will generally have a 25 mm long collar at the SMA connector. This will make them difficult to install and may result in an unacceptably small bend radius to the fiber as it exits the collar. If you wish to use a third-party probe, specify a 13 mm collar.

Installation

Assemble the fibers to the coupler as shown in the photograph.

1. Loosen the three thumb screws on the top cover and remove it from the coupler.
2. Remove the protective plastic covers from the ends of the fibers. Save these covers and re-attach them if you remove the probe.
3. Slide the tips of the SMA connector into the receivers and tighten the nuts hand tight. Do not use tools to tighten the nuts further.



4. Loosen the hold-down thumb-screw, place the fibers under it, and tighten it down to hold the fibers in place.

   Do not over-tighten. Be sure to route the cables as shown in the photograph above. This routing pattern maximizes the bend radius.

Note The routing distance for the input and output fibers is slightly different so there will be a small excess loop between the junction nut and the coupler. This is normal and correct.

5. Re-attach the top cover to the coupler.
6. Remove the black rubber cover from the pick-up lens. Be careful not to touch the lens with your fingers.



7. Lower the coupler into the sample compartment with the white arrows aligned.
8. Ensure that the probe tip is tight. It screws on and off in the expected way.

Operation

The recommended operation wavelength range is from 220 nm to 1100 nm. Although the fibers are solarization resistant they can suffer cumulative damage (they become opaque) when used at very short wavelengths. Damage to the fibers due to solarization is not covered under warranty.

Two configurations are recommended:

1. Place the probe in a clamp and bring the container with the solution up to it.
2. Hold the probe in your hand and place it into the container with the solution.



Measure the blank solution first and then measure the sample(s) - exactly as you would if you were making measurements with cuvettes.

It is VERY important to avoid having an air bubble in the tip when making a measurement. Air bubbles will result in completely incorrect measurement values. Tap the probe gently with a finger to knock air bubbles out if using configuration 1. "Shake" the probe back and forth quickly and/or tap it gently with a finger to knock air bubbles loose if using configuration 2. Do not tap the probe on the side of the container. This could damage the tip or the container.

Probe Tips with Different Pathlengths

Longer pathlengths typically lead to greater light-loss in the tip, reducing photometric range. Shorter pathlengths are more prone to trapping air bubbles in the tip and it is more difficult to shake them loose.

Performance

Fiber optic couplers and probes "cost" light in a spectrophotometer system. Having less light intensity in the system means not being able to deliver the same photometric performance with the fiber probe system that the instrument can deliver with cuvettes in a dark sample compartment. Do not perform the performance verification tests when using the fiber optic probe system.

Troubleshooting

Problem	Cause	Solution
Readings are unexpectedly high or low with no consistency to the error	Air bubbles in the tip during sample measurement	Inspect the gap in the tip prior to making the blank measurement. Take steps to remove any bubbles.
	Inconsistent small bend radius	Use a large bend radius and keep it consistent
All readings are "off" by a uniform amount	Air bubble in the tip during blank measurement	Inspect the gap in the tip prior to making a measurement. Take steps to remove any bubbles.
Change in photometric performance - depressed ABS readings or maximum ABS reading	Bend radius too small	Configure experimental setup to use a large and consistent bend radius
	Damaged optical fiber	Follow the recommendations below. • Record a blank and scan from 1100 nm to 220 nm with deionized water. Save the spectrum. The spectrum should be essentially flat with< ±0.05A baseline noise. Large spikes or discontinuities are common signs of fiber damage. • Try using a different probe if you have one available. • Contact Us
Probe does not work at all - no signal	Cover over pick-up lens on coupler	Remove the lens cover.
	Broken fiber	Replace the probe.
	Tip loose, damaged or missing	Remove and inspect the tip. Ensure that the mirror is present and clean. Attach the tip and re-test the system.
	Coupler not inserted correctly	Remove and re-insert the coupler
	SMA connector not properly secured	Remove and re-attach the SMA connectors inside the fiber coupler. Ensure that the nuts are not cross threaded.

5

Maintenance

Contents

- Maintenance Schedule ..... page 152
- Cleaning the Touchscreen ..... page 152
- Decontaminating the Instrument ..... page 153
- Maintaining the Sample Compartment ..... page 153
- Performance Verification Tests ..... page 154

Maintenance Schedule

Periodic Maintenance

- Clean touchscreen

Every 12 Months

- Run Drift
- Run Noise
- Run Baseline Flatness
- Run Stray Light
- Run Wavelength Accuracy
- Run Photometric Accuracy



If you are experiencing an issue with your system, refer to the troubleshooting information. If the issue persists, contact us. If you are outside the U.S.A. and Canada, please contact your local dealer.

If your instrument requires maintenance or repair, contact us or your local dealer.

Cleaning the Touchscreen

Note To avoid causing permanent damage to the touchscreen, **do not**:

- clean the touchscreen with abrasive material such as paper towel
- apply excessive pressure
- spray liquid directly onto the touchscreen
- apply lubricant to the touchscreen slide mechanism

To clean the touchscreen

Gently wipe the touchscreen with a soft, lint-free cloth such as microfiber.

If necessary, use a cleaner intended for glass LCD displays and follow the manufacturer's recommendations.

Decontaminating the Instrument

Decontaminate the instrument after measurements with samples that contain hazardous materials and before returning the instrument to us for maintenance or repair.

Note If your instrument requires maintenance or repair, contact us or your local dealer.

Note

- To prevent damage from spills, keep containers of liquids away from the instrument.
- Do not use a squirt or spray bottle on or near the instrument as liquids will flow into the instrument and may cause permanent damage.

Supplies recommended

- lint-free laboratory wipes
- deionized water (DI H_2O)
- 0.5% sodium hypochlorite solution (1:10 dilution of commercial bleach, freshly prepared) or a 70% isopropyl alcohol (IPA) solution.

To decontaminate the instrument surfaces

1. Dampen a clean, soft cloth or laboratory wipe with the diluted bleach solution or diluted IPA solution (see Supplies recommended) and use it to gently wipe the outside surfaces of the instrument.
2. Use a clean cloth or wipe dampened with DI H_2O to remove the bleach or IPA solution.

Maintaining the Sample Compartment

Note Do not use a squirt or spray bottle on or near the instrument as liquids will flow into the instrument and may cause permanent damage.

To maintain the sample compartment

- Keep the sample compartment door closed when the instrument is not in use.
- Use canned air to remove any dust from the sample compartment.
- Clean up any spills inside the sample compartment with a new laboratory wipe.

To clean and maintain cuvettes, follow the recommendations of the cuvette manufacturer.



Performance Verification Tests

GENESYS G5 instruments are preconfigured with default Performance Verification Tests. These tests cannot be deleted or edited.

Running Performance Verification Tests

Customized Performance Verification Tests

Customizing Stray Light Test

Customizing Wavelength Accuracy Test (Standard Mode)

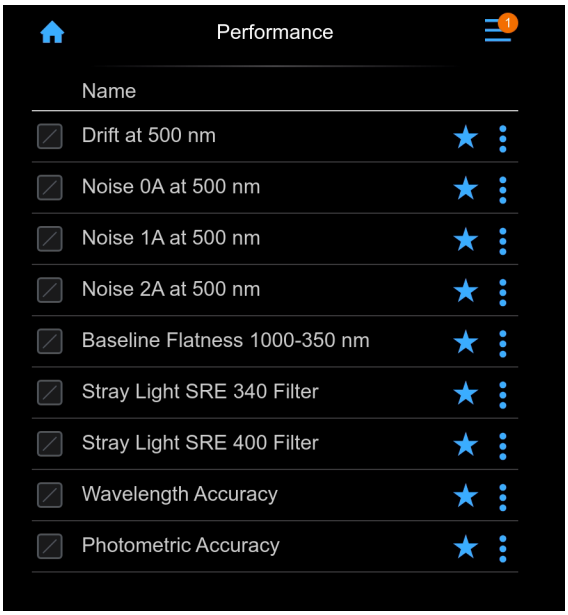
Customizing Photometric Accuracy Test

Performance Verification Schedule

Running Performance Verification Tests

Performance Verification Tests can be carried out using the GENESYS G5 local instrument software or the optional PC control software. The Performance Tests can be accessed by selecting ☰ from the GENESYS G5 Home screen followed by **Performance**.

Running a performance verification test is similar to running any other experiment method. Follow the on-screen instructions.



Note It is important that the instrument is properly warmed up to ensure accurate results for performance verification tests. Vis systems require two (2) hours and UV-Vis instruments require one (1) hour warm up time.

Customized Performance Verification Tests

Some Performance Verification Tests can be customized to meet specific verification requirements of users. To customize a test, it must first be duplicated. This can be done by selecting the three dots next to the needed test, and selecting **Duplicate**. Custom and duplicated tests can be exported and imported.

Often, standard operating procedures require performance verification of instruments periodically. Test such as Stray Light, Wavelength Accuracy and Photometric Accuracy require specific sets of filters and standards. More information on the available Performance Verification Tests and their filter standard requirements can be seen in the table below. However, select tests can be duplicated and customized to work with standards of choice.

Performance Verification Test	Description	Can Duplicate?
Wavelength Accuracy	This test verifies the wavelength axis performance of the spectrophotometer.	
(Xenon Mode)	Scans and locates known xenon emission peaks and verifies that they are found accurately to within the specification for the instrument.	No
(Standard Mode)	Use this test with a calibrated wavelength filter such as a holmium or didymium glass filter. User enters the peak wavelengths and calibration uncertainty from the calibration certificate. The instrument scans across the relevant wavelength range and locates the center of the peak. Reported wavelength should agree with certificate wavelength to within the sum of the instrument specification and the calibration uncertainty.	Yes
Drift at 500 nm	Measures absorbance at 500 nm at 1 minute intervals for an hour. Measured at 0A (open beam). Blanks and reports maximum deviation from zero. Compares result to specification for the instrument. Result should be less than the specification.	No
Noise 0A at 500nm Noise 1.0A at 500 nm Noise 2.0A at 500 nm	Records 60 ABS measurements at 1 second intervals. Returns RMS (root mean square) of data set as noise value and compares specification for the instrument. Insert 1A or 2A nominal absorbance neutral density glass filter for those measurements. Result should be less than the specification. Note: Noise in the GENESYS instruments is so low that the result is reported with more than the usual 3 decimal digits.	No

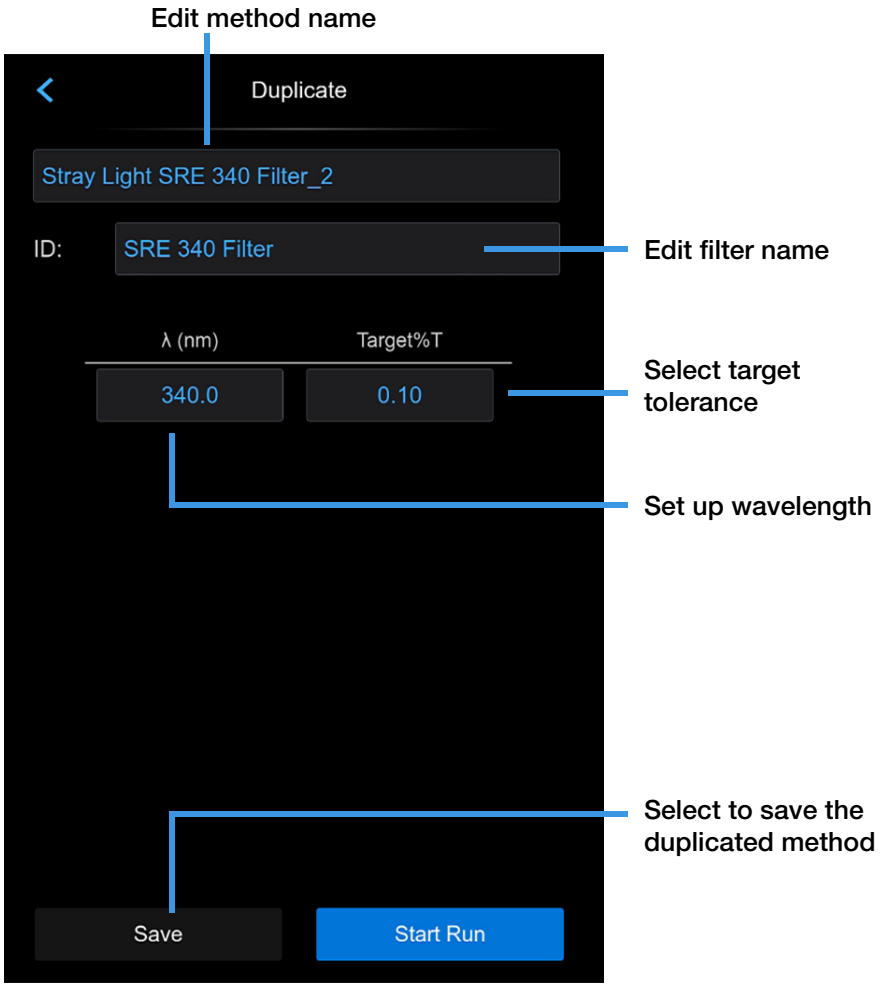
Performance Verification Test	Description	Can Duplicate?
Baseline Flatness 1000 to 350nm	Measures any systematic deviation from perfect zero when scanning across the common wavelength range. Data is smoothed to remove the impact of noise (noise can be measured separately). Result is the maximum deviation from zero and is compared to the specification for the instrument. Result should be less than the specification.	No
Stray Light SRE 220 Filter (GENESYS G5 UV-Vis models) Stray Light SRE 400 Filter (GENESYS G5 Vis models) Stray Light SRE 340 Filter (All GENESYS G5 Models)	Measures stray light at the specified wavelength. The filter is a long pass filter that cuts on slightly above the test wavelength. At the test wavelength it should be entirely dark - i.e. 0%T. Longer wavelengths pass through the filter, therefore any transmittance measured at 220 nm is actually photons of longer wavelength that are "stray light". Sources of stray light include second order effects imperfections in the grating, and imperfections or dirt on mirrors. The measured transmittance is compared to the specification for the instrument. Test measures transmittance at the specified wavelength. Result should be less than the specification.	Yes

Performance Verification Test	Description	Can Duplicate?
Photometric Accuracy	This test verifies the photometric (absorbance) performance of the spectrophotometer. Use this test with one or more calibrated absorbance filter(s) such as those found in the GENESYS Performance Verification Kit to test accuracy in the visible region. Use calibrated potassium dichromate solution cells, metal on quartz filters, or other recognized calibrated standard materials for the UV region. Multiple filters calibrated at the same wavelengths but different absorbance values can be configured in a single test. User enters • calibration wavelengths • certificate absorbance values • calibration uncertainty value from the calibration certificate. User also enters the performance specification for the absorbance value being tested from the specification sheet for the instrument. The instrument measures and reports the absorbance at each specified wavelength. Reported absorbance should agree with certificate absorbance to within the sum of the instrument specification for that absorbance level and the calibration uncertainty.	Yes

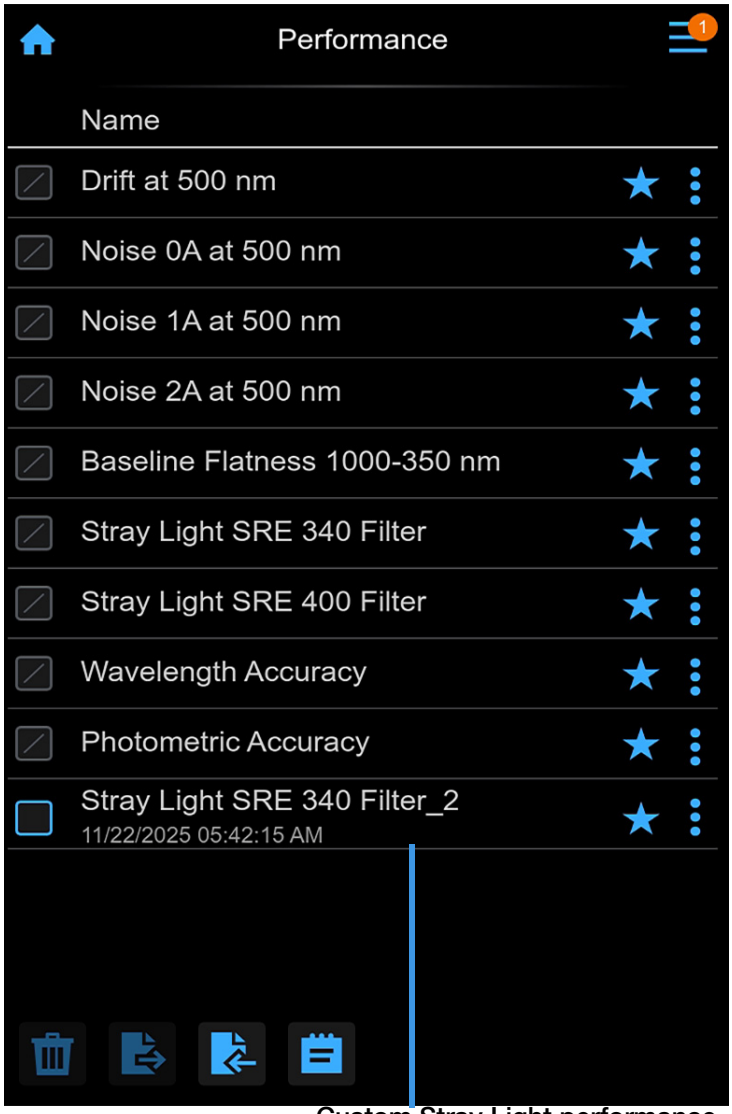
Note We recommend against use of didymium glass "dual standard" filters calibrated for both wavelength peaks and photometric accuracy. Customers have reported difficulty in reproducing calibration values for this type of standard although their instruments do reproduce the calibration values for other, more widely accepted and recognized standards. Customers who call for support because an instrument fails a photometric accuracy test with a didymium photometric standard may be required to verify photometric accuracy with a different standard before return shipment for warranty service is authorized.

Customizing Stray Light Test

1. From the Home screen, select the menu icon ☰, followed by **Performance**.
2. Select ⋮ to the right of one of the Stray Light Tests, followed by **Duplicate**.

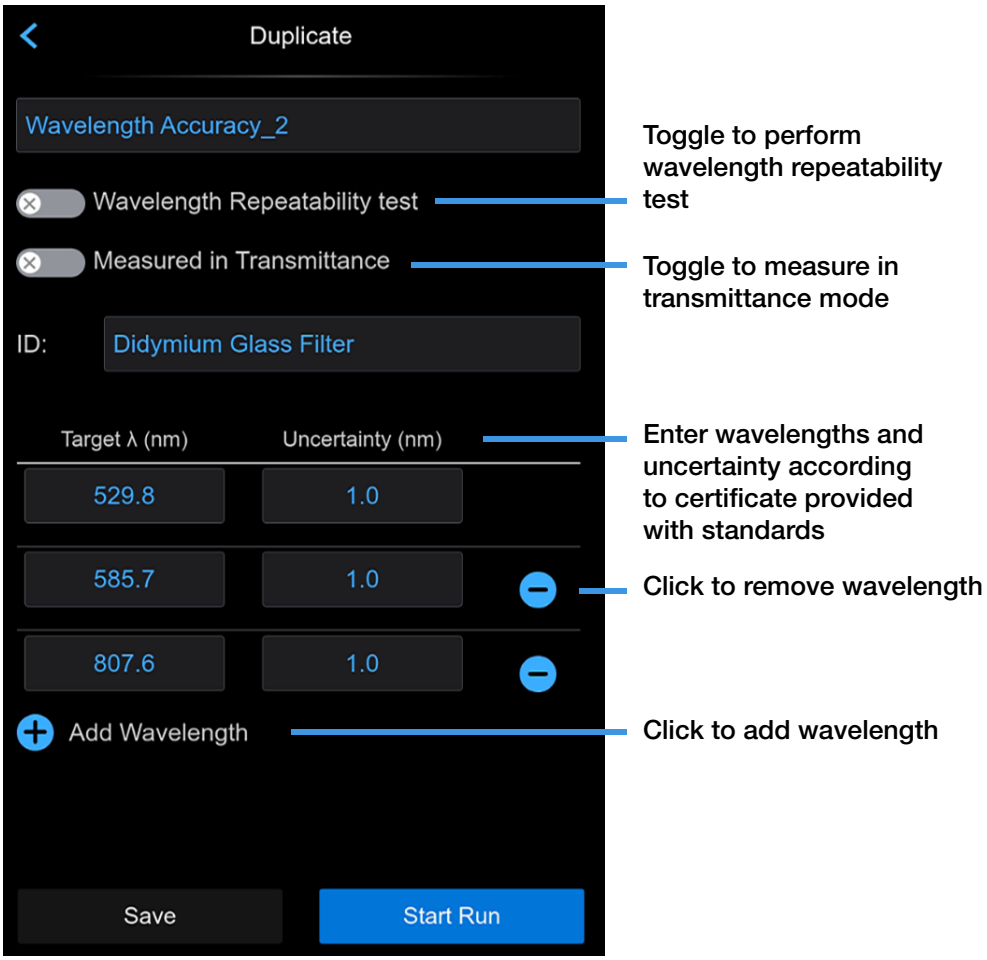


3. Select **Save**, and the new duplicated method will appear at the bottom of the Performance screen.



Customizing Wavelength Accuracy Test (Standard Mode)

1. From the Home screen, select the menu icon ☰, followed by **Performance**.
2. Select ⋮ to the right of the Wavelength Accuracy Test, followed by **Duplicate**.



Customizing Photometric Accuracy Test

A typical standards kit for photometric accuracy comes with a Certificate of Calibration. This section illustrates how to configure a photometric accuracy test for custom standard kits.

ThermoFisher SCIENTIFIC

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www.thermofisher.com/support

NVLAP CALIBRATION ilac-MRA
NVLAP LAB CODE 200955-0

Certificate of Calibration

GENESYS Standards-B Kit 840-326100

Serial Number:	SA3938
Certificate Number:	CC021160
Date of Calibration:	13-NOV-2025
Performed By:	Loy Thor, Lead Test Technician
Test Method:	267-780300 Rev A
Bench Used:	CLEV300 999001
Sample Temperature:	23 ± 1 °C
*Bench Calibration Certificate Number:	IH21152

Certified Percent Transmittance Values and Uncertainties

Standard ID	SA3938-2	SA3938-3	SA3938-5
Nominal %T	30% T	10% T	1% T
Uncertainty	± 0.18% T	± 0.071% T	± 0.0025% T
440.0 nm	25.56 %T	7.50 %T	0.57 %T
465.0 nm	32.45 %T	9.40 %T	0.90 %T
546.1 nm	34.49 %T	9.47 %T	0.91 %T
590.0 nm	32.13 %T	8.67 %T	0.76 %T
635.0 nm	32.37 %T	10.31 %T	1.08 %T

Certified Absorbance Values and Uncertainties

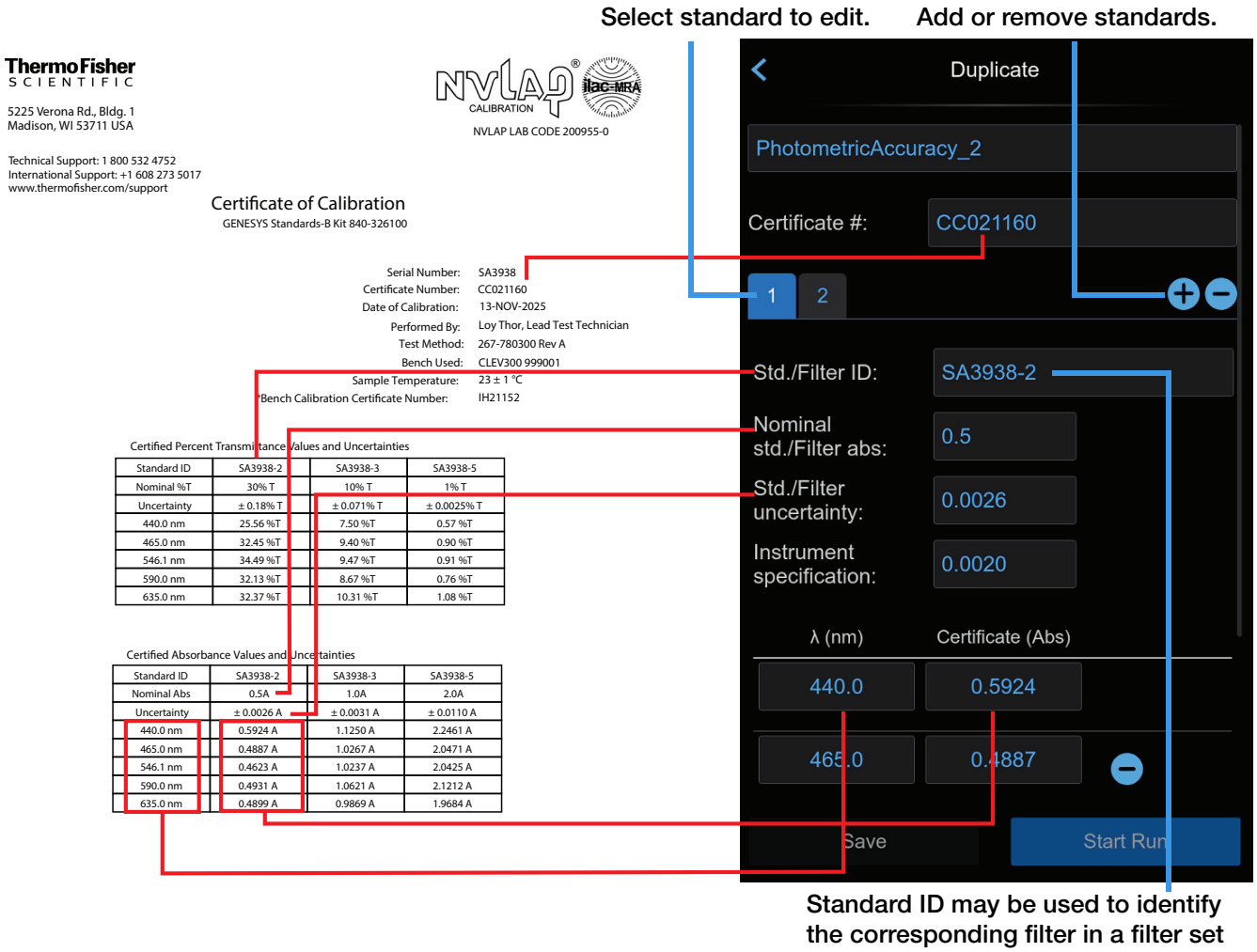
Standard ID	SA3938-2	SA3938-3	SA3938-5
Nominal Abs	0.5A	1.0A	2.0A
Uncertainty	± 0.0026 A	± 0.0031 A	± 0.0110 A
440.0 nm	0.5924 A	1.1250 A	2.2461 A
465.0 nm	0.4887 A	1.0267 A	2.0471 A
546.1 nm	0.4623 A	1.0237 A	2.0425 A
590.0 nm	0.4931 A	1.0621 A	2.1212 A
635.0 nm	0.4899 A	0.9869 A	1.9684 A

Master Copy

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1. From the Home screen, select the menu icon ☰, followed by **Performance**.

2. Select ⋮ to the right of the Photometric Accuracy Test, followed by **Duplicate**.



3. Select **Save**, and the new duplicated method will appear at the bottom of the Performance screen.

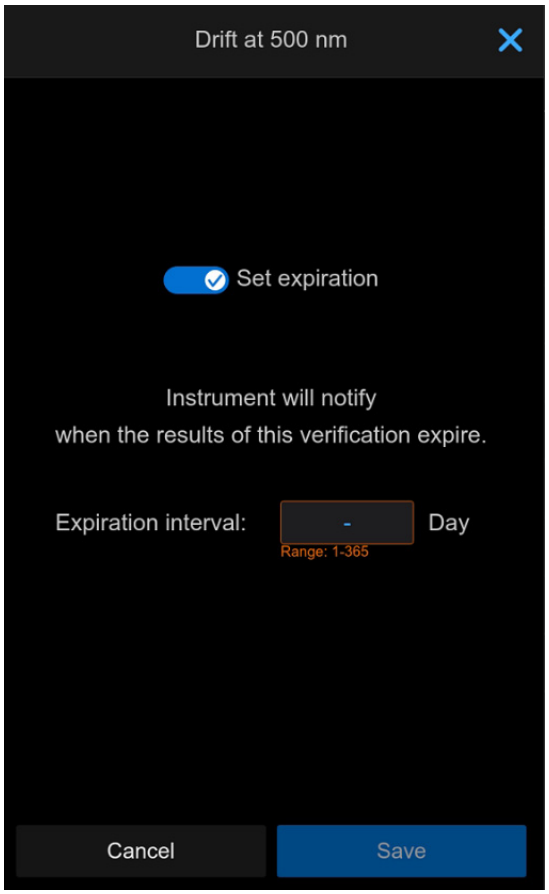
Performance Verification Schedule

Standard operating procedures (SOPs) often require that performance of analytical instruments be verified at regular intervals of time. The Performance Verification Schedule setting allows configuration of such an interval.

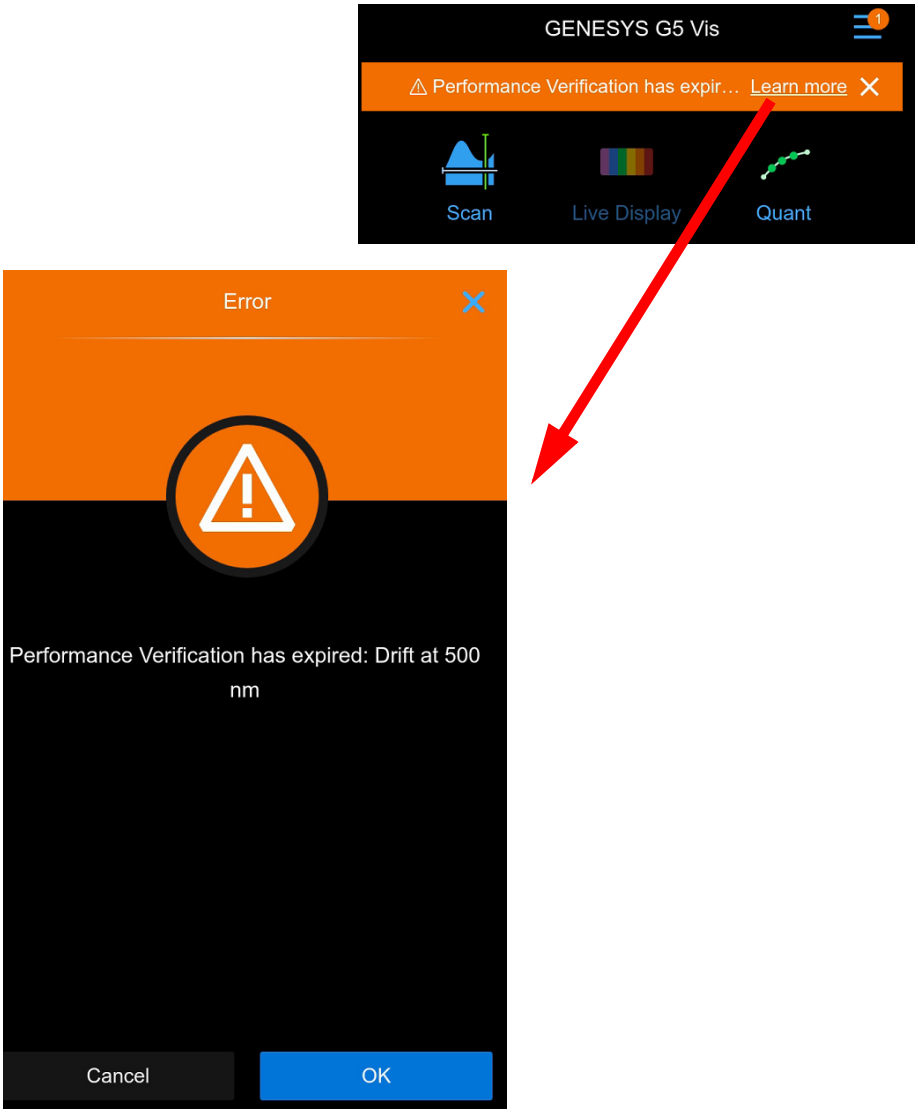
This feature enables users to set specific intervals for receiving alerts, ensuring timely execution of performance verification tests on the instrument. The GENESYS G5 Spectrophotometers track the last run date and time for all available performance verification tests, providing an automated, reliable system to maintain optimal instrument performance.

To enable the Performance Verification Schedule

1. From the Home screen, select the menu icon ☰, followed by **Performance**.
2. Select ⋮ to the right of test that needs to be scheduled, followed by **Schedule**.
3. Use the toggle switch next Set expiration to enable or disable the feature.
4. Once enabled, use the entry box besides Expiration interval to define the number of days (1-365) that will pass before a performance verification test is deemed expired.



Once a diagnostic test has expired, an alert will then trigger to alert message to the user. An example of this alert has been provided below.



The time interval is relative to the currently configured instrument date. Changing the system time after a performance verification schedule is configured may cause the instrument to display the expiration notification. It is therefore suggested that all expiration dates be verified when the system time is changed.

6

Safety and Operating Precautions

Contents

- Operating Precautions 168
- Safety Information 169



Note Be sure that all persons operating this system read the safety manual first.

Operating Precautions

GENESYS G5 spectrophotometers are designed to operate indoors in an environment that meets our specifications and to comply with domestic and international safety regulations and applicable product standards. For details, see the Operating Specifications section found in Chapter 2.

Follow these precautions to avoid damaging your GENESYS G5 spectrophotometer during use:

- Use a grounded power cord appropriate for your electrical service. If the supplied power cord is incompatible or if it becomes damaged, contact us.
- The LCD display uses heat treated, chemical tempered glass and is rugged and difficult to break. However, should the display become cracked or broken, contact us for replacement.
- To prevent damage from spills, keep containers of liquids away from the instrument.
- Do not use a squirt or spray bottle on or near the instrument as liquids will flow into the instrument and may cause permanent damage.

Safety Information

Before operating a GENESYS G5 instrument, please read the safety information and follow its recommendations for the system.

Safety and Special Notices

In many cases, safety information is displayed on the instrument itself. The symbol indicates that there is additional safety information in the documentation and failure to heed the safety precautions could result in injury.



WARNING Indicates a hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

Note Follow instructions with this label to avoid damaging the system hardware or losing data.

Note Contains helpful supplementary information.

The following table lists some of the safety symbols and their indications that may appear in the user documentation.

Symbols	Indication
	This is a mandatory action symbol. It is used to indicate that an action shall be taken to avoid a hazard.
	This is a prohibition symbol. The graphic in this symbol is used to alert the user to actions that shall not be taken or shall be stopped.
	This is the general warning sign. Failure to heed the safety precautions could result in personal injury.
	Avoid shock hazard. If you see either of these symbols, there is a risk of electrical shock in the vicinity. Only qualified persons shall perform the related procedures.
	Avoid fire hazard. Do not test flammable or explosive samples. Read and follow the associated instructions carefully.
	Avoid Biohazard. This icon informs of a biological hazard in the area. Read and follow the associated instructions carefully.
	Avoid chemical burns. This symbol alerts you to possible skin irritation. Wear gloves when handling toxic, carcinogenic, mutagenic, or corrosive or irritant chemicals. Use approved containers and proper procedures to dispose of waste.

Symbol	Description
	Alternating current
	Earth terminal or ground
	Direct current
	Protective conductor terminal
	Frame or chassis terminal
	Fuse
	Power on
	Power off

When the System Arrives



WARNING Avoid personal injury. If this equipment is used in a manner not specified in the accompanying documentation, the protection provided by the equipment may be impaired.



CAUTION Avoid personal injury. Perform *only* those procedures described in the documentation. If there are other problems, contact us.

When the instrument arrives, check the exterior of the shipping box for signs of damage. If damage is apparent, contact us or your local distributor for instructions.

- Move the shipping box to the installation location at least 24 hours before installation.

Note

- Inside the shipping box, the instrument is sealed in a plastic bag to keep the unit dry.
- Allow 24 hours for the instrument to reach room temperature before opening the bag. If the bag is opened before the instrument reaches room temperature, moisture could condense on the optical components and cause permanent damage.

- Keep the instrument upright at all times.

The warranty will not cover:

- Damage due to improper moving techniques.
- Damage due to removing the sealed plastic bag before the instrument has come to room temperature.

Note It is important to have all system utilities installed before the instrument arrives. Utility installations must comply with all local building and safety codes.

Utility Requirements

The power connections for the spectrophotometer and accessories should be easily accessible for operation and service purposes.

Note It is important to have all system utilities installed before the spectrophotometer arrives. Utility installations must comply with all local building and safety codes.

Lifting or Moving the Instrument

To avoid risk of injury, use proper lifting techniques when lifting or moving the instrument or other system components.

Electrical Requirements and Safety

Power supplied to the system must be from dedicated, uninterrupted sources. Power must be free of voltage dropouts, transient spikes, frequency shifts, and other line disturbances that impair reliable performance.

If you suspect power quality problems at your site, or if your system will be installed in a heavy industrial environment, we recommend a power quality audit before installation. Contact us or your local electrical authority for more information.



CAUTION Avoid shock hazard.

- Only a qualified person using the appropriate measuring device shall check the line voltage, current and frequency.
- Only our trained and certified service representatives shall attempt to service a component that carries this symbol.
- If a protective cover on a system component appears damaged, turn off the system and secure it against any unintended operation. Always examine the protective cover for transport stresses after shipping.
- Even after this instrument has been disconnected from all voltage sources, capacitors may remain charged for up to 30 seconds and can cause an electrical shock.
- Do not allow liquid to run over or into any surface where it may gain entry into the instrument.

Grounding



CAUTION Avoid shock hazard. Each wall outlet used must be equipped with a ground. The ground must be a noncurrent-carrying wire connected to earth ground at the main distribution box.

Power Cords

Be sure to use an appropriate power cord for your specific electrical service. If the power cord received is not appropriate for the electrical system in your location, or if the power cord becomes damaged, contact us.



CAUTION Instrument must be connected to a grounded AC power source.

Power Line Conditioning Accessories

A UPS reduces the probability of a system shutdown if power is lost elsewhere in the building. Power line conditioners (which ensure that your service is free from sags, surges or other line disturbances) also are available in the U.S.A. from us for 120 volt operation. Line conditioners for 220 volt operation can be purchased locally. Contact technical support for information about power conditioners and UPS.

Electrical Service Specifications

Confirm that the following specifications are met before you connect the instrument or turn on the power. Contact our service representative in your area if you have questions about the requirements.

WARNING Avoid shock hazard. Only a qualified person using the appropriate measuring device should check the line voltage and frequency.

Requirements	Specifications
Input current	5.0 A (max.)
Input voltage	100-240 VAC
Line frequency	50/60 Hz
Line disturbances	Sags, surges or other line disturbances must not exceed 10% of input voltage (even for a half cycle).
Noise	< 2 V (common mode) < 20 V (normal mode)
Branch circuit protection	15 A, 10,000 AIC circuit breaker

Power Consumption

Generally, 50% more power should be available than the entire system (including accessories) typically uses. Maximum power consumption and heat dissipation specifications for the spectrometer and accessories are shown below. The values are approximate.

Item	Power Consumption	Max. Heat Dissipation
instrument	80 W	273 Btu/hr

FCC/IC Notices

This system complies with Part 15 of the FCC Rules and Industry Canada ICES-003 for a Class A system. Operation is subject to the following two conditions:

1. This system may not cause harmful interference, and
2. This system must accept any interference received, including interference that may cause undesired operation.

Note This is a Class A product. In a domestic environment, this product may cause radio interference, in which case the user may be required to take adequate measures.

Fire Safety and Burn Hazards



CAUTION Avoid personal injury. Allow lamp to cool before replacement.

Note Do not position the instrument so that it is difficult to operate the power switch or access the power supply and power cord.

To avoid a burn injury and the risk of fire or explosion:

- Do not test flammable or explosive samples.
- Never block any of the vents on the instrument or its power supply
- Only use exact replacement power supplies from us
- Do not place anything on the electronics cover.
- After you turn off your instrument, wait 15 minutes before you replace components.

Optical Safety

This instrument was designed with a protective housing to prevent user exposure to ultraviolet light.

Hazardous Materials

Many standard spectroscopy methods are based on the use of solvents. Others involve corrosive samples or pressurized samples in a gaseous state.

Volatile Solvents and Flammable Samples



CAUTION Avoid personal injury. Do not leave solvents or flammable samples near the instrument. Be sure that the workspace is properly ventilated.

Biohazard or Radioactive Materials and Infectious Agents

Biological samples such as tissues, body fluids, infectious agents, and blood of humans and other animals have the potential to transmit infectious diseases. Wear appropriate protective equipment. Individuals should be trained according to applicable regulatory and organization requirements before working with potentially infectious materials. Follow your organization's Biosafety Program protocols for working with and/or handling potentially infectious materials.

Instruments, accessories, components or other associated materials should not be disposed of and may not be returned to us or other accessory manufacturers if they are contaminated with biohazard or radioactive materials, infectious agents, or any other materials and/or conditions that could constitute a health or injury hazard to employees. Contact us if you have questions about decontamination requirements.



WARNING Reduce the risk associated with potentially infectious samples:

- Do not spill samples inside the sample compartment or any of the instrument components.
- If spill occurs, disinfect the external surfaces immediately.

Environmental Considerations

These systems are designed for indoor use. They operate reliably at temperatures within their operating environment specifications. Operating environment specifications were described earlier in this manual. They may briefly be exposed to lower temperatures (for example, during transport) without degradation of its safety.

WEEE Compliance

This product is required to comply with the European Union's Waste Electrical & Electronic Equipment (WEEE) Directive 2012/19/EU. It is marked with the following symbol:



Thermo Fisher Scientific has contracted with one or more recycling or disposal companies in each European Union (EU) Member State, and these companies should dispose of or recycle this product.