Agilent BioTek 800 TS

Absorbance Microplate Reader

INSTRUCTIONS FOR USE

ERRATA NOTICE: This document contains references to BioTek. Please note that BioTek is now Agilent. For more information, go to www.agilent.com/lifesciences/biotek.

Document part number 1561011I
Revision C
Agilent Technologies, Inc.
May 2022

For In Vitro Diagnostic Use

Contents

Preface

Copyright

Contact Information

Agilent Technologies, Inc.
5301 Stevens Creek Blvd.
Santa Clara, CA 95051

Worldwide Sales and Support

www.agilent.com/en/contact-us/page

Technical Support and Service

www.agilent.com/en/support

bio.tac@agilent.com

Instrument service and repair is available worldwide at one of our international service centers and in the field at your location.

Customer Care

bio.CustomerCare@agilent.com

European Coordination Center

Agilent Technologies Denmark ApS
Produktionsvej 42, 2600 Glostrup, Denmark

UK Responsible Person (UKRP)

Agilent LDA UK Ltd.
5500 Lakeside
Cheadle Royal Business Park
Cheadle, Cheshire SK8 3GR

Intended Use Statement

The 800TS is an absorbance microplate reader and intended to be used for the examination of clinical specimens to analyze their characteristics in relation to a variety of analytes including in human serum and cells.

Incident Reporting

Any serious incident that has occurred in relation to the device shall be reported to the manufacturer and the competent authority, or appropriate regulatory body, in the country or region in which the user is established.

Quality Control

It is considered good laboratory practice to run laboratory samples according to instructions and specific recommendations included in the assay package insert for the test to be conducted. Failure to conduct Quality Control checks could result in erroneous test data.

Safety Notices

Pay special attention to the following safety notices in all product documentation.

WARNING A WARNING notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.

CAUTION A CAUTION notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a CAUTION notice until the indicated conditions are fully understood and met.

Warnings and Precautions

Electrical Hazards

WARNING **Internal Voltage.** Always turn off the power switch and unplug the power supply before cleaning the outer surface of the instrument.

WARNING **Power Rating.** The instrument's power supply or power cord must be connected to a power receptacle that provides voltage and current within the specified rating for the system. Use of an incompatible power receptacle may produce electrical shock and fire hazards.

WARNING **Electrical Grounding.** Never use a plug adapter to connect primary power to the external power supply. Use of an adapter disconnects the utility ground, creating a severe shock hazard. Always connect the power cord directly to an appropriate receptacle with a functional ground.

WARNING **Service.** Only qualified technical personnel should perform service procedures on internal components.

CAUTION **Power Supply.** Use only the power supply shipped with the instrument and operate it within the range of line voltages listed on it.

Chemical/Environmental

WARNING

Potential Biohazards. Some assays or specimens may pose a biohazard. Adequate safety precautions should be taken as outlined in the assay's package insert. Always wear safety glasses and appropriate protective equipment, such as chemical-resistant rubber gloves and apron.

WARNING **Liquids.** Avoid spilling liquids on the instrument; fluid seepage into internal components creates a potential for shock hazard or instrument damage. If a spill occurs while a program is running, stop the program and turn off the instrument. Wipe up all spills immediately. Do not operate the instrument if internal components have been exposed to fluid.

CAUTION **Liquids.** Do not immerse the instrument, spray it with liquid, or use a dripping-wet cloth on it. Do not allow water or other cleaning solution to run into the interior of the instrument. If this happens, contact Technical Support. Do not soak the touchscreen.

CAUTION **Environmental Conditions.** Do not expose the instrument to temperature extremes. For proper operation, temperature near the instrument should remain within the range in the ***Specifications*** section of this document. Performance may be adversely affected if temperatures fluctuate above or below this range

CAUTION **Sodium Hypochlorite.** Do not expose any part of the instrument to the recommended diluted sodium hypochlorite solution for more than 20

minutes. Prolonged contact may damage the instrument surfaces. Be certain to rinse and thoroughly wipe all surfaces.

CAUTION **Lubricants.** Do not apply lubricants to moving parts. Lubricant on components in the carrier compartment will attract dust and other particles, which may cause the instrument to produce an error.

Components

WARNING **Hot Surface.** The lamp assembly is hot when the instrument is turned on. Turn off the reader and allow the bulb to cool for at least 15 minutes before attempting to replace it.

WARNING **Bulb replacement.** The alignment procedure requires you to observe the light path while the bulb is turned on. To prevent possible vision impairment, avoid looking directly at the bulb while it is on.

WARNING **Accessories.** Only accessories that meet the manufacturer's specifications shall be used with the instrument.

CAUTION **Shipping Hardware.** All shipping hardware must be removed before operating the instrument and reinstalled before repackaging the instrument for shipment.

CAUTION **Filters.** The reader's internal filter table must exactly match the contents of the installed filter wheel. When changing, cleaning, or replacing filters, it is critical that the filters be placed in the filter wheel in the correct orientation, with the light-direction arrow pointing downward. Gen5 users: The Gen5 software filter table must exactly match the contents of the filter wheel.

CAUTION **Touchscreen.** Use your fingertip to operate the touchscreen. Do not use a sharp stylus or pencil on the touchscreen. Doing so will damage the touchscreen's surface. You can use a stylus designed for resistive touchscreens.

CAUTION **Touchscreen.** Avoid strong solvents, such as alcohol, acetone, ammonium chloride, methylene chloride, and hydrocarbons. These will permanently damage the touchscreen. Avoid fibrous materials, such as paper towels, which can scratch the touchscreen. Dirt particles and cleaning agents will get trapped in the scratches. Never spray solutions directly on the touchscreen.

CAUTION **Spare Parts.** Only approved spare parts should be used for maintenance. The use of unapproved spare parts and accessories may result in a loss of warranty and potentially impair instrument performance or cause damage to the instrument.

CAUTION **Service.** Only qualified technical personnel should perform service procedures on internal components.

Intended Product Use

WARNING **Software Quality Control.** The operator must follow the manufacturer's assay package insert when modifying software parameters and establishing reading methods. It is considered good laboratory practice to run laboratory samples according to instructions and specific recommendations included in the assay package insert for the test to be conducted. Failure to conduct quality control checks could result in erroneous test data.

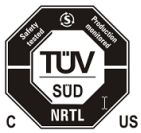
WARNING **Data Reduction.** No limits are applied to the raw measurement data. Data exported via computer control must be analyzed by the operator. The performance characteristics of the data reduction software have not been established with any laboratory diagnostic assay. Users must evaluate this instrument and PC-based software in conjunction with their specific assay(s). This evaluation must include the confirmation that performance characteristics for the specific assay(s) are met.

WARNING **Unspecified Use.** Failure to operate equipment according to the guidelines and safeguards specified in the product user documentation could result in a hazardous condition.

CAUTION Use of labware other than described in this document can result in positioning errors during program execution.

Symbols

	Caution
	Warning; Biological hazard
	Warning; Hot surface
	Disposal Notice: Dispose of the instrument according to Directive 2012/19/EU, "on waste electrical and electronic equipment (WEEE)" or local ordinances
	Consult instructions for use or consult electronic instructions for use
	*In vitro* diagnostic medical device
	CE Marking — indicates compliance with the requirements of the In Vitro Diagnostic Regulation (2017/746)

EC REP	Authorized representative in the European Community/European Union
	Manufacturer
	Date of manufacture
REF	Catalogue number
SN	Serial number
	TÜV SÜD Certification Mark – Type tested; production monitored
IP20	Ingress Protection - Product protected against solid objects up to 12 millimeters. Not protected from liquids.
	This product complies with environmental protection use period as defined in People's Republic of China Electronic Industry Standard SJ/T11364-2006. Toxic or hazardous substances will not leak or mutate under normal operating conditions for 40 years.
UK CA	UK Conformity Assessed marking is a certification mark that indicates conformity with the applicable requirements for products sold within Great Britain.
	Temperature limit
	Humidity limitation
UDI	Unique device identifier
#	Model number
	Importer

Conformance to Standards

The 800 TS meets the requirements of the following standards:

2014/35/EU – Low Voltage Directive

2014/30/EU – EMC Directive

2017/746 – In Vitro Diagnostic Regulation

2011/65/EU (with exemptions) and (EU) 2015/863 – RoHS Directives

2012/19/EU – WEEE Directive as amended by (EU) 2018/849

2006/42/EC of the European Parliament and of the Council of 17 May 2006 on machinery

Standard	Description
IEC QC 080000	IEC Quality Assessment System for Electronic Components (IECQ System) - Hazardous Substance Process Management (HSPM) System Requirements
UL 61010-1	UL Standard for Safety Electrical Equipment For Measurement, Control, and Laboratory Use; Part 1: General Requirements
EN 61010-1	Safety Requirements for Electrical Equipment For Measurement, Control, and Laboratory Use – Part 1: General Requirements
EN 61010-2-010	Safety Requirements for Electrical Equipment For Measurement, Control, and Laboratory Use – Part 2-010: Particular requirements for laboratory equipment for the heating of materials
EN 61010-2-101	Safety Requirements for Electrical Equipment For Measurement, Control, and Laboratory Use – Part 2-101: Particular requirements for in vitro diagnostic (IVD) medical equipment
CAN/CSA C22.2 No. 61010-1	Safety Requirements for Electrical Equipment For Measurement, Control, and Laboratory Use – Part 1: General Requirements
CAN/CSA C22.2 No. 61010-2-010	Safety Requirements for Electrical Equipment For Measurement, Control, and Laboratory Use – Part 2-010: Particular requirements for laboratory equipment for the heating of materials
CAN/CSA C22.2 No. 61010-2-101	Safety Requirements for Electrical Equipment For Measurement, Control, and Laboratory Use – Part 2-101: Particular requirements for in vitro diagnostic (IVD) medical equipment

EMC Information and Technical Description

The 800 TS conforms to:

Emissions:

EN55011/CISPR 11, Class A
CFR Title 47 FCC Part 15 Subpart B, Class A
ICES-001, Issue 5, Class A (CAN ICES-001(A)/NMB-001(A))
ACMA AS/NZS CISPR 11, Class A

Immunity:

EN/IEC 61326-1 and 61326-2-6
ELECTRICAL EQUIPMENT FOR MEASUREMENT, CONTROL AND LABORATORY USE
PART 2-6: PARTICULAR REQUIREMENTS FOR (IVD) MEDICAL EQUIPMENT

Ingress Protection Code

IP 20. Protected against solid foreign objects of 12.5 mm diameter and greater. No protection against water.

Disposal

Dispose of the instrument according to Directive 2012/19/EU, “on waste electrical and electronic equipment (WEEE)” or local ordinances.

Installation

Important Information

CAUTION **Shipping Hardware.** All shipping hardware must be removed before operating the instrument and reinstalled before repackaging the instrument for shipment.

- This chapter contains installation and setup tasks for the 800 TS and accessories. Perform the tasks in the order presented.
- Save all packaging materials. Be sure to use packaging materials supplied by the manufacturer when shipping the reader. Using other forms of commercially available packaging, or failing to follow the repackaging instructions, may void your warranty.
- During the unpacking process, inspect the packaging, reader, and accessories for shipping damage. If the reader is damaged, notify the carrier and your Agilent representative. Keep the shipping boxes and the packaging materials for the carrier's inspection.

Package Contents

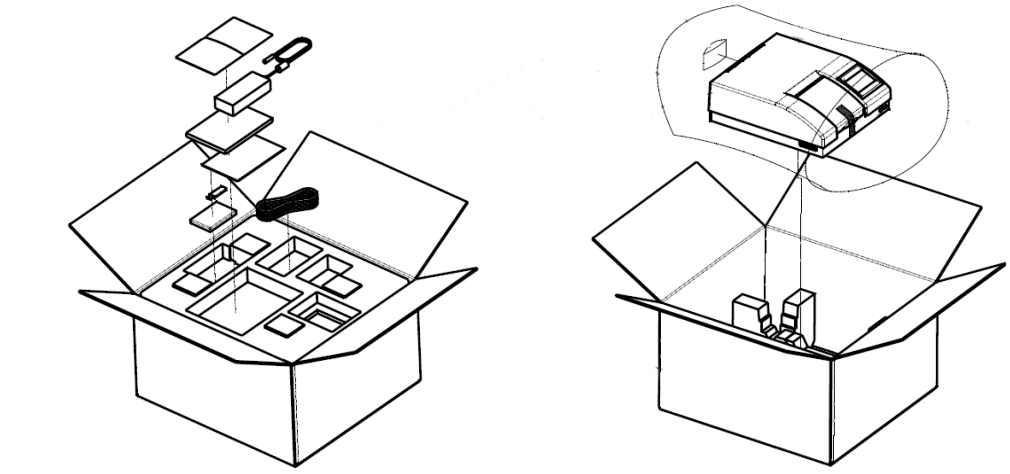
- 800 TS instrument model per the sales order
- *800 TS User Manual* on USB flash drive
- Power supply
- Power cord
- USB cable
- Blank USB flash drive
- Dust cover
- Software and optional accessories per the sales order, unless shipped separately

Models

Part Number	Measurement Range	Default Filters (nm)	Plate Types	Shaking	Incubation	Light Bulb Type
800TS-SI	400-750 nm	405, 450, 490, 630, plug	6- to 96-well	Yes	No	Tungsten

800TSI-SI	400-750 nm	405, 450, 490, 630, plug	6- to 96-well	Yes	Yes	Tungsten
800TSNB-SI	400-750 nm	405, 450, 490, 630, plug	6- to 384-well	No	No	Halogen
800TSUV-SI	340-750nm	340, 405, 450, 490, 630	6- to 96-well	Yes	No	Halogen
800TSUVI-SI	340-750nm	340, 405, 450, 490, 630	6- to 96-well	Yes	Yes	Halogen

Unpack the Box



Save the packaging in case you need to ship the instrument for service/repair.

Select an Appropriate Location

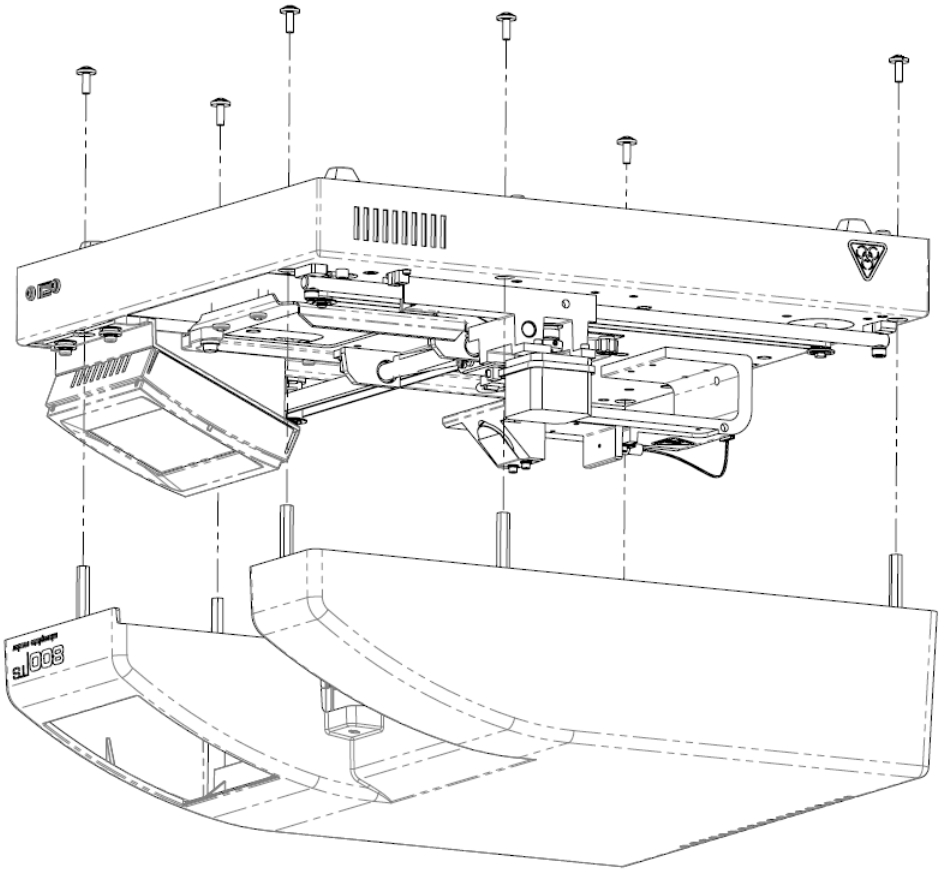
Install the reader on a level, stable surface in an area where an operating temperature between 18°C and 40°C can be maintained. The reader is sensitive to extreme environmental conditions. Avoid:

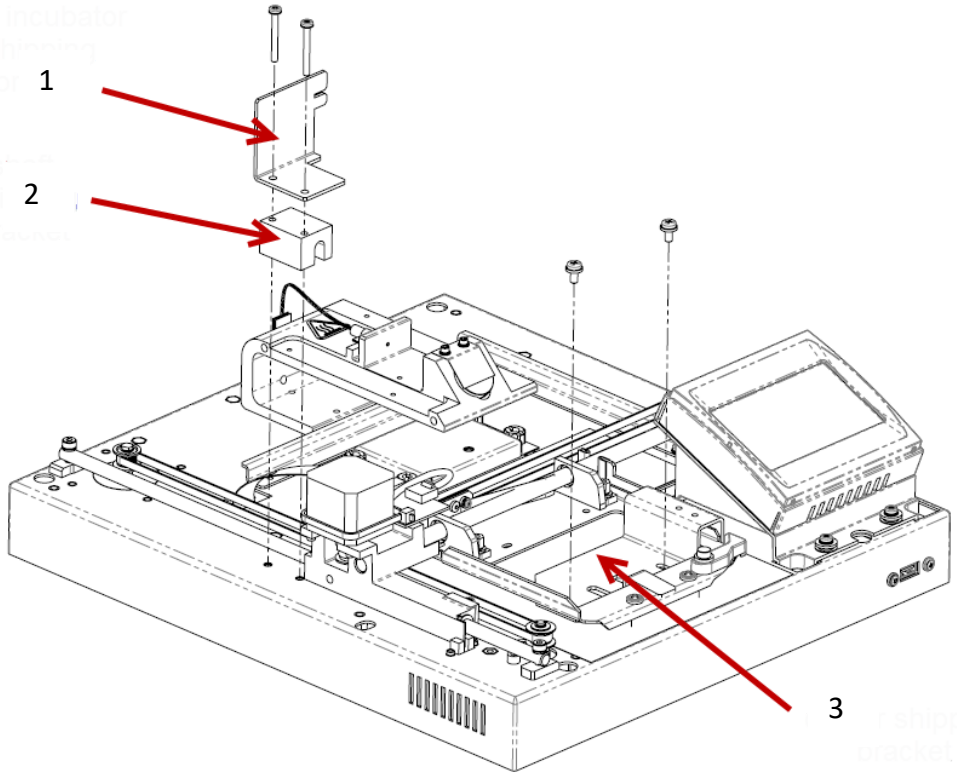
- Excessive humidity. Condensation directly on the sensitive electronic circuits can cause the instrument to fail internal self-checks. The humidity must be in the range of 10–85%, non-condensing.
- Excessive ambient light. Bright light may affect the reader's optics and readings, reducing its linear range.
- Dust. Readings may be affected by extraneous particles in the microplate wells. A clean work area is necessary to ensure accurate readings.

Remove the Shipping Hardware

CAUTION **Shipping Hardware.** All shipping hardware must be removed before operating the instrument and reinstalled before repackaging the instrument for shipment.

1. Turn the reader upside down.
2. Remove the six black screws.
3. Lift the base and set it right side up on a level surface.
4. Remove the shipping brackets.
5. Store the shipping brackets.

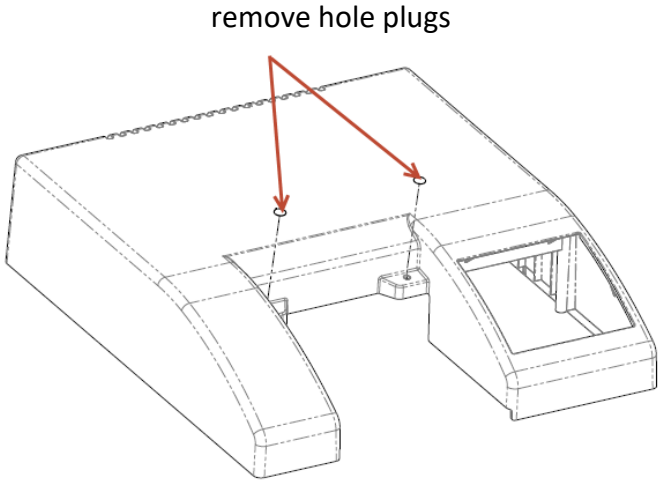


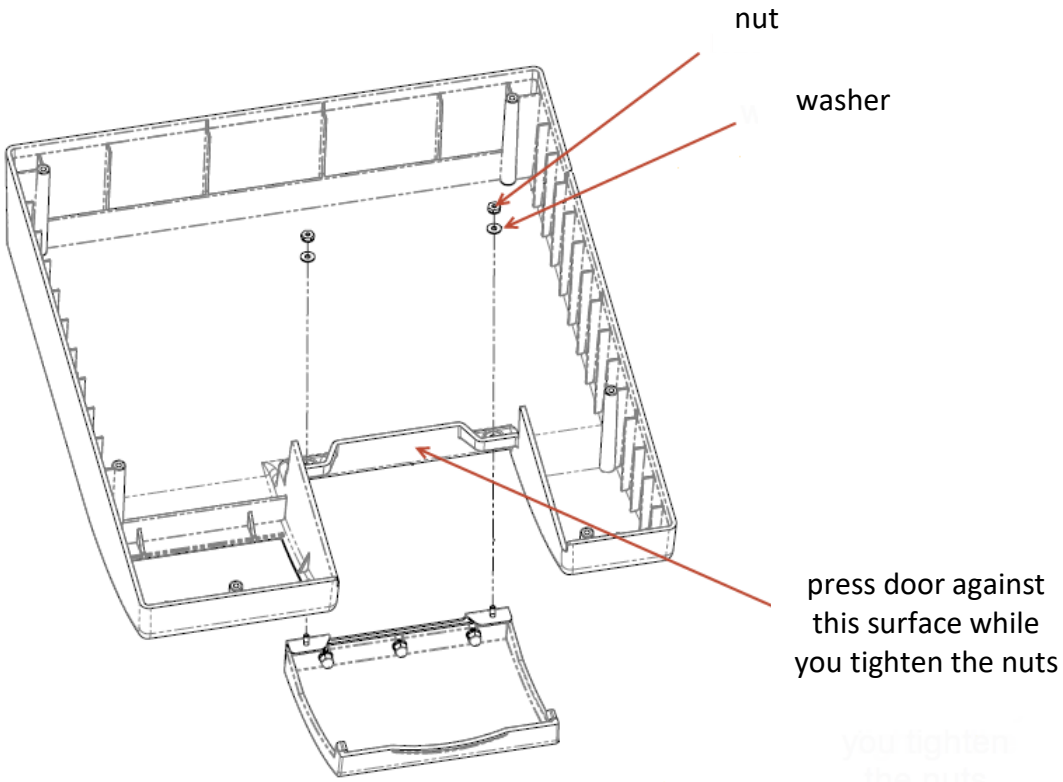


1	Top incubator shipping bracket
2	Shaft shipping bracket
3	Carrier shipping bracket

Install the Optional Door

Applies to models for which the door was ordered as a separate accessory.





Verify the Filter Wheel Contents

CAUTION **Filters.** The reader's internal filter table must exactly match the contents of the installed filter wheel. When changing, cleaning, or replacing filters, it is critical that the filters be placed in the filter wheel in the correct orientation, with the light-direction arrow pointing downward. Gen5 users: The Gen5 software filter table must exactly match the contents of the filter wheel.

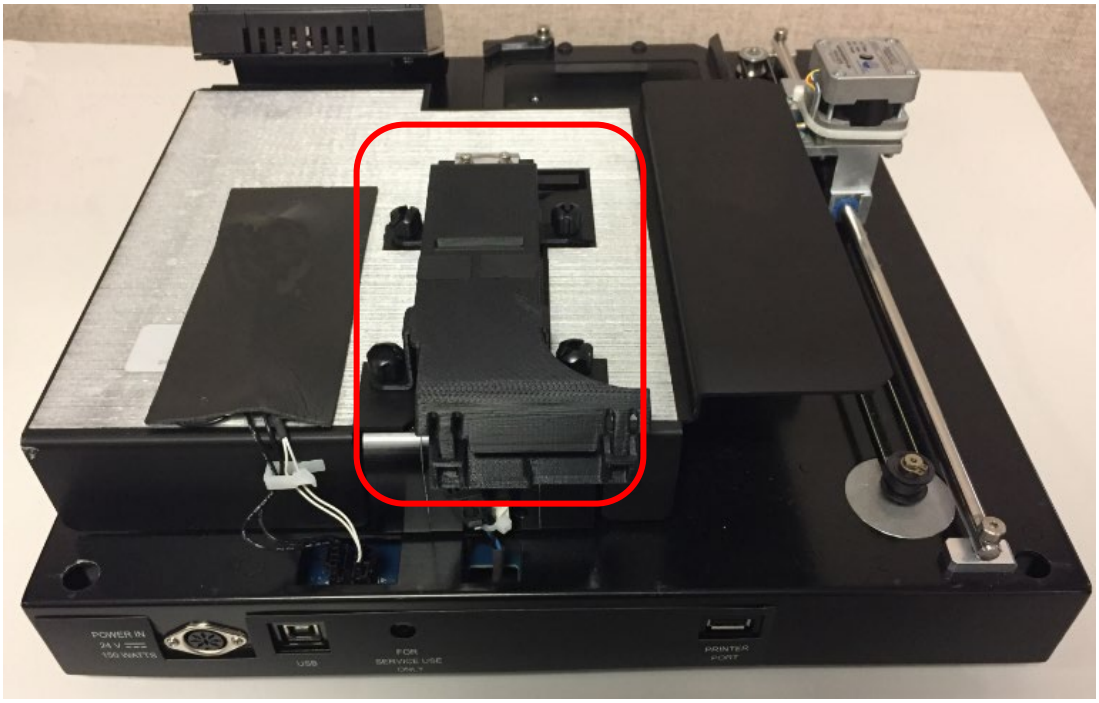
The 800 TS ships with up to five preordered filters in the filter wheel.

During installation, it is good practice to verify the filters and their positions in the wheel and confirm that the software filter table matches the filter wheel's configuration. Each location in the wheel must contain either a filter or a plug.

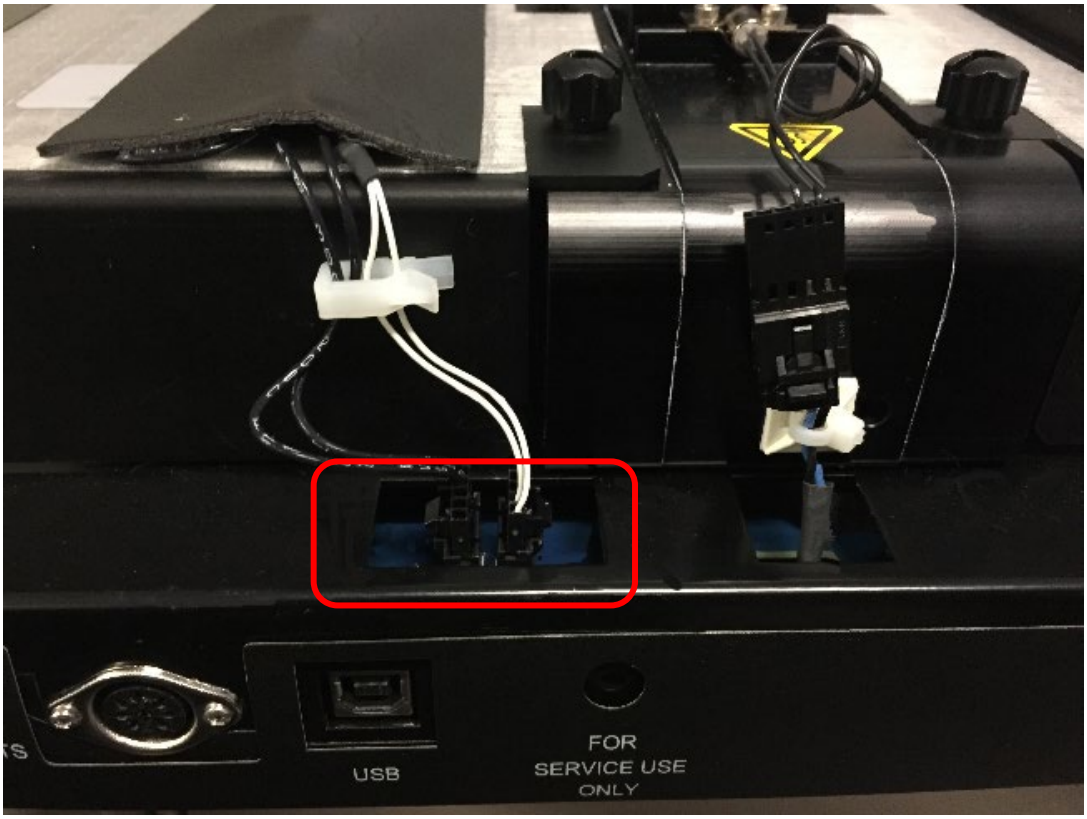
Before continuing, obtain a clean, lint-free cloth.

Models with incubation: Remove the incubation housing to access the filter wheel.

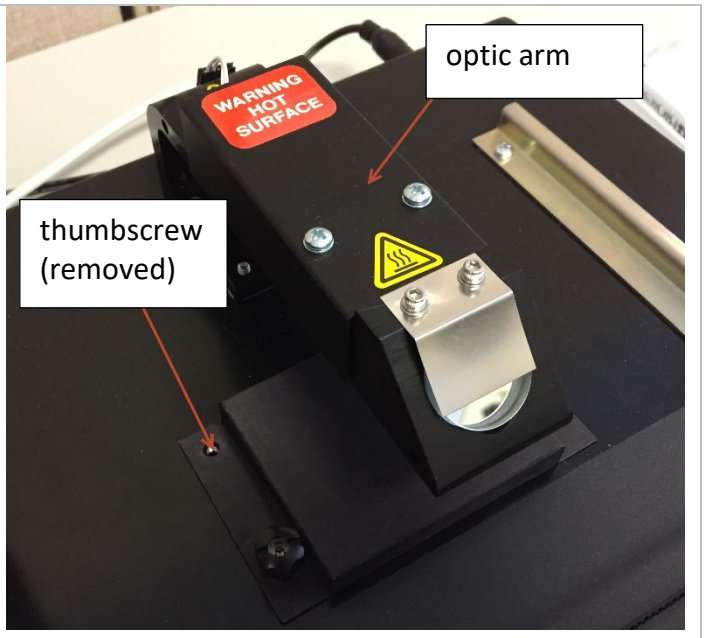
1. Remove the top case. Remove four thumbscrews from the optic arm. If equipped, lift off the optic arm cover.

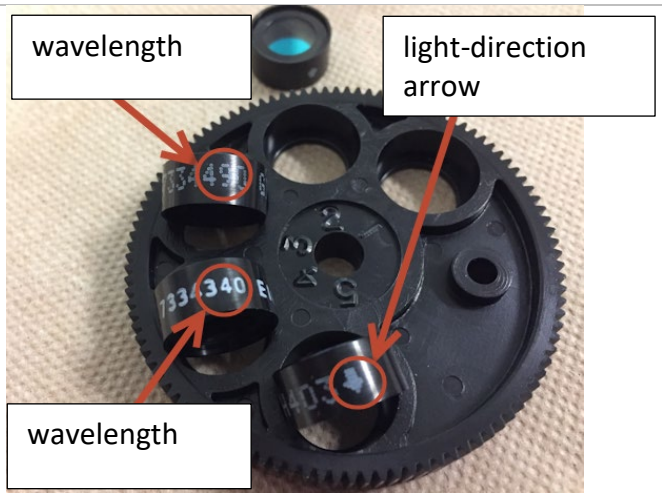


2. Disconnect two connectors on the back of the incubation housing. Lift the housing off of the reader.

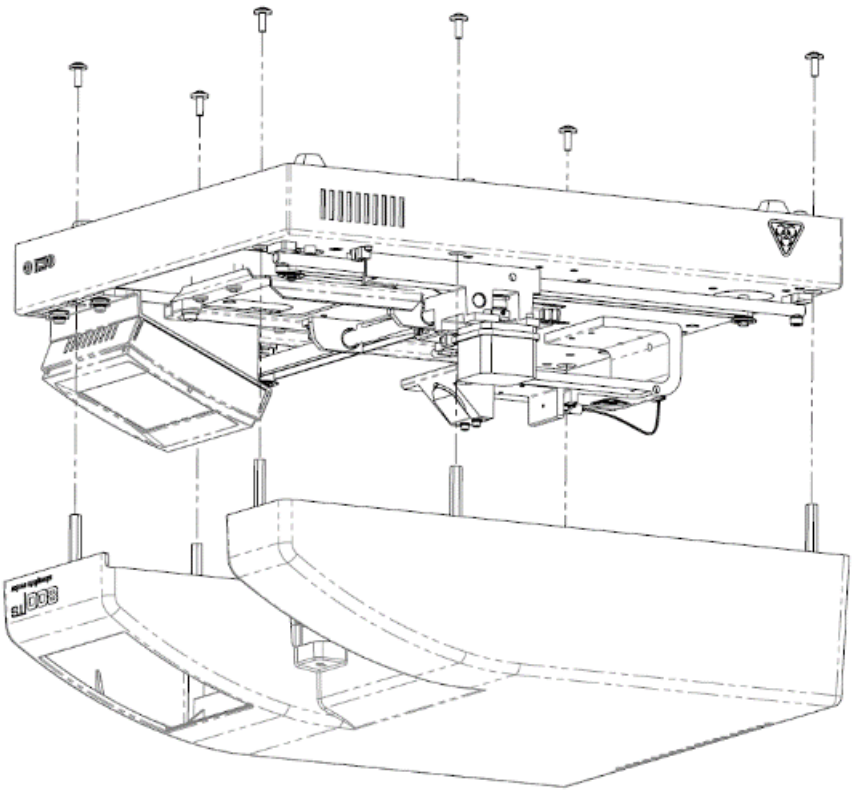


Access the filter wheel:

Remove four thumbscrews from the filter wheel cover.	
Note: The filters are not held in place and fall out of the wheel easily. Have a clean, lint-free cloth in place before turning over the filter wheel.	
Lift the filter wheel off its pin. Remove the filters by turning the wheel upside down over a clean, lint-free cloth. **Write down which filters are installed in the filter wheel and the location of each filter.** As appropriate: Compare the filters with your model's default filters (see page 12) or with the sales order. Contact Technical Support if any filters or plugs are missing.	

Each filter is labeled with a wavelength and an arrow showing the light direction. The arrow indicates the direction of light and must point DOWN when the filter wheel is installed.	

3. Replace the filters in the filter wheel. **Insert them in the correct direction.**
4. Replace the filter wheel on its pin. Replace the filter wheel cover
5. Reattach the reader to the top cover.



Install the Power Supply

WARNING **Power Rating.** The instrument's power supply or power cord must be connected to a power receptacle that provides voltage and current within the specified rating for the system. Use of an incompatible power receptacle may produce electrical shock and fire hazards.

WARNING **Electrical Grounding.** Never use a plug adapter to connect primary power to the external power supply. Use of an adapter disconnects the utility ground, creating a severe shock hazard. Always connect the power cord directly to an appropriate receptacle with a functional ground.

CAUTION **Power Supply.** Use only the power supply shipped with the instrument and operate it within the range of line voltages listed on it.

1. Connect the power cord to the external power supply.
2. Locate the power inlet on the rear of the reader.
3. Plug the rounded end of the power supply's cord into the power inlet.
4. Plug the other end of the power cord into an appropriate power receptacle.

(Optional) Install the Printer

1. Connect the printer to its power supply.
2. Connect the printer to the USB port on the back of the reader.

(Optional) Prepare the Host Computer

Follow instructions supplied with Gen5 to install the necessary software.

- Ensure the computer meets the minimum system requirements as described in the *Gen5 Instructions for Use*.
- You must have administrator privileges to install Gen5. Log in to Windows as "Administrator" or consult your IT department for assistance.

(Optional) Connect the Host Computer and Reader

1. Turn off the computer.
2. Using the supplied USB cable, connect the square end of the cable to the USB port on the rear of the reader.
3. Connect the other end of the cable to an available USB port on the computer.
4. Turn on the computer.

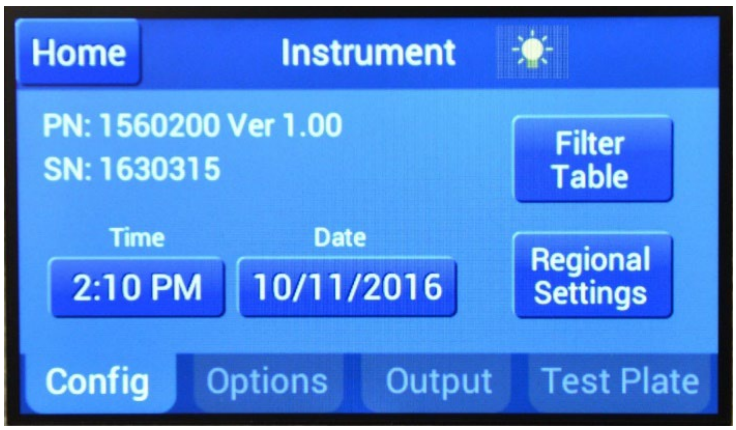
Turn on the Reader

1. On the right side of the reader, locate the power switch. Turn on the reader. The reader delays any action until the bulb has warmed up: three minutes for narrow beam and UV models, and 30 seconds otherwise. The reader then performs a power-up system test.
2. When the system test is completed, the touchscreen displays its main screen.

If an error occurs during the system test, a message indicating the problem appears. If the problem is something you can fix, turn off the reader, fix the problem, and turn the reader back on. If the problem is something you cannot fix, or if the test continues to fail, contact Technical Support.

Set the Time and Date on the Touchscreen

1. From the Main Menu, select **Instrument > Config**.
2. Use the keypad to set the current Time and Date.



Verify the Reader's Filter Table

CAUTION **Filters.** The reader's internal filter table must exactly match the contents of the installed filter wheel. When changing, cleaning, or replacing filters, it is critical that the filters be placed in the filter wheel in the correct orientation, with the light-direction arrow pointing downward. Gen5 users: The Gen5 software filter table must exactly match the contents of the filter wheel.

1. From the Main Menu, tap **Instrument**, the **Config** tab, and then **Filter Table**. Filter wheel locations 1 through 5 are shown, with each location's filter value (in nm) or "plug" for a blank filter.
2. Verify that the values match the contents of the filter wheel; refer to page 16.
3. If you need to change the setting for a filter wheel location, tap its value and use the keypad to enter a wavelength value (in nm), or select Plug. Tap **OK** when finished

and tap **Save** in the Installed Filters screen. The filter values are available for selection in protocols and the absorbance test plate setup screen.

(Optional) Establish Communication

On the host computer, start Gen5 and log in if prompted.

1. From the main screen, select **System > Instrument Configuration** and click **Add**.
2. Set the Reader Type to **800 TS**.
3. Perform one of the following steps, as applicable:
   - Select **Plug & Play**.
   - Set the **Com Port** to the computer's COM port to which the reader is connected.
4. To verify that Gen5 can communicate with the instrument, click **Test Comm**.

Troubleshooting

If the communication attempt is not successful, try the following:

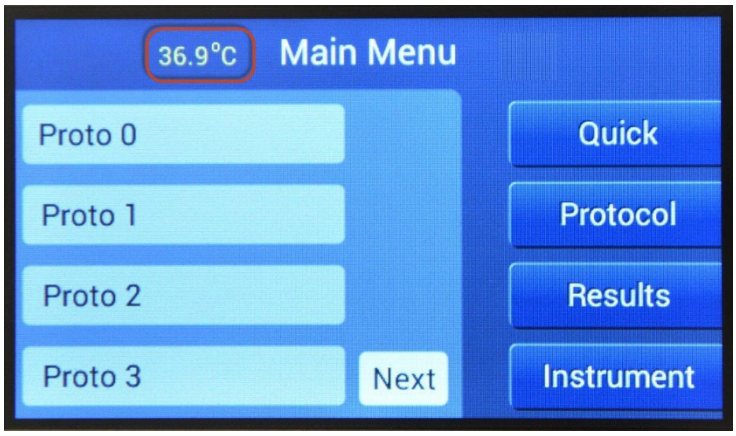
- Is the reader connected to the power supply and turned on?
- Is the communication cable firmly attached to both the reader and the computer?
- Did you select the correct Reader Type?
- Try a different COM Port or use Plug & Play.
- Did you install the USB driver software?
- Is the touchscreen at the main menu?

If you remain unable to get Gen5 and the reader to communicate with each other, contact Technical Support.

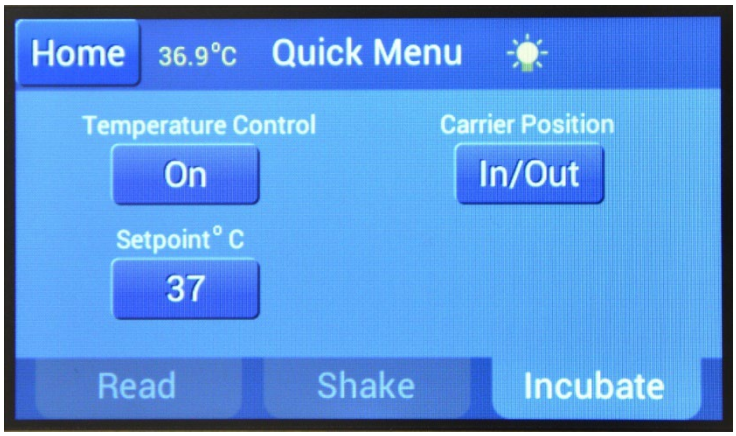
Run a System Test

Running a system test will confirm that the reader is functioning properly or will provide an error message if a problem is detected.

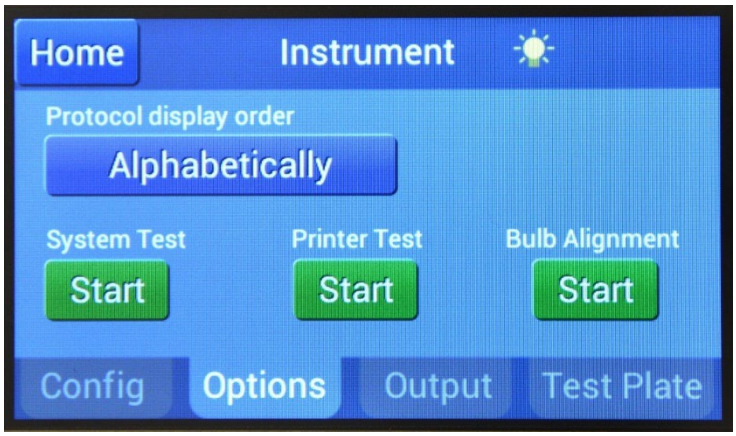
1. If the reader is equipped with an incubator, turn it on.



- Tap **Quick > Incubate**.
- Tap **Temperature Control** to turn it On. Define a Setpoint of at least 37°C.
- Tap **Home**. Wait for the temperature display to reach the Setpoint.



2. Tap **Home** > **Instrument** > **Options**.



3. Under System Test, tap **Start**.
4. When the test is done, tap:

   USB Report to save the test results to a USB flash drive

   Print to print the test results

   Exit to close the screen.
5. If Temperature Control is On, turn it Off.

If the test fails, an error message indicating the problem appears. If the problem is something you can fix, turn off the instrument, fix the problem, and turn the instrument back on. If the test continues to fail, contact Technical Support.

Verify Performance

Refer to the *Instrument Testing* section for Absorbance Test procedures.

Repackaging and Shipping Instructions

Please read the information provided below before preparing the 800 TS for shipment.

- Contact Technical Support before returning equipment for service.
- Decontamination prior to shipment is required by the U.S. Department of Transportation regulations.
- If the 800 TS has been exposed to potentially hazardous material, decontaminate it to minimize the risk to all who come in contact with the instrument during shipping, handling, and servicing. The Maintenance chapter contains decontamination instructions.
- Ensure the microplate carrier is empty. Spilled fluids can contaminate the optics and damage the instrument.
- Install the shipping hardware (see next section).
- The instrument's packaging design is subject to change. If the instructions in this document do not apply to the packaging materials you are using, contact Technical Support for guidance.
- Be sure to use packaging materials supplied by the manufacturer. Other forms of commercially available packaging are not recommended and can void the warranty.
- If the packaging materials have been damaged or lost, or if the same set has been used more than four times, order replacement part number 1563000.
- Note: The shipping box, accessories box, and foam trays are included as a whole set under this part number and cannot be ordered separately.

Install the Shipping Hardware

CAUTION **Shipping Hardware.** All shipping hardware must be removed before operating the instrument and reinstalled before repackaging the instrument for shipment.

Refer to the figures on page 14.

1. Turn off the reader. Unplug the power supply from the power outlet and from the power supply port on the back of the reader.
2. Disconnect the USB cable(s) from the reader (if using a computer and/or printer).
3. Carefully turn the reader upside down on a level surface.
4. Remove the six black screws holding the top cover to the base, then lift the base off of the cover and set it right side up on a level surface.
5. Place the carrier shipping bracket around the carrier rail first, then rotate the bracket down so that it sits on the base pan.
6. Hold the carrier shipping bracket snug against the front of the carrier, then screw in the two screws to secure it.
7. Place the shaft shipping bracket over the shaft, and, for non-incubation-capable readers, secure it with the two screws.
8. For incubation-capable readers, place the top incubation shipping bracket over the shaft shipping bracket, and secure the brackets with two screws.

Repackage the Instrument and Accessories

Refer to the figure on page 13.

1. Place the bottom foam tray into the bottom of the shipping container.
2. If the reader has a door, tape it shut, then place the reader inside the original plastic bag, and carefully lower the reader into the foam tray in the bottom of the box.
3. Place the accessory tray in the box, and then place the accessories into the tray.
4. Close the top of the box and secure it with shipping tape.

Getting Started

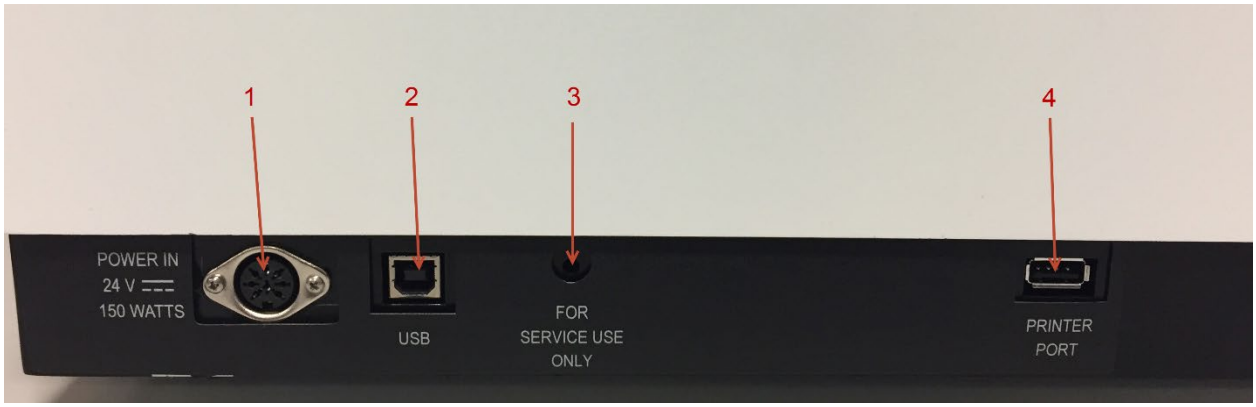
External Components

1	Microplate carrier
2	Touchscreen
3	Power switch
4	USB port for data storage

Rear ports

(reader without incubation capability)

(reader with incubation capability)



1	Power
2	USB for computer control
3	DO NOT USE! For Agilent Service only
4	Printer

Operate the Reader Using the Touchscreen

CAUTION **Touchscreen.** Use your fingertip to operate the touchscreen. Do not use a sharp stylus or pencil on the touchscreen. Doing so will damage the touchscreen's surface. You can use a stylus designed for resistive touchscreens.

The Main Menu appears after the system test and bulb warm-up. The bulb warm-up process takes three minutes for NB and UV models, and 30 seconds otherwise.

- To select an option or activate a tab, tap the item.
- To return to the Main Menu, tap **Home**.
- To preserve the life of the bulb, tap the light bulb icon to turn it off when not needed.

The left side of the Main Menu lists the assay protocols defined on the reader. As shipped, the reader contains no protocols and the list is empty. Up to 40 uniquely named protocols can be programmed and stored. Tap **Next** to scroll through the list.

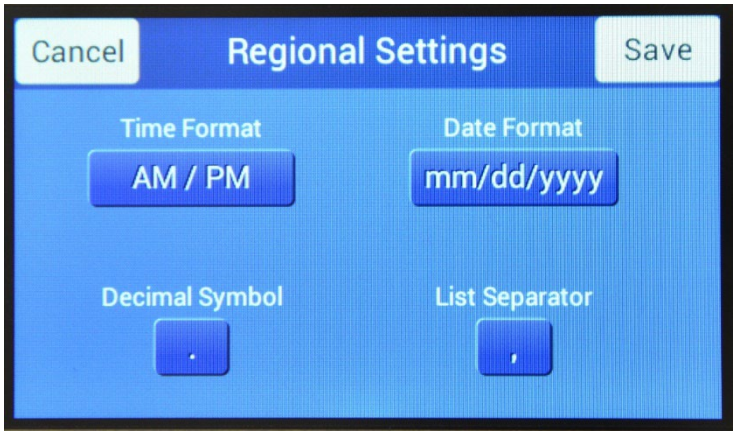
On the right side of the Main Menu:

Quick	Define and run a single- or dual-wavelength protocol. You can select the primary and secondary wavelength values and the plate type. If applicable to your reader model, shake and/or incubate options are available.
Protocol	Edit, create, save, delete, and copy protocols. Define the protocol name; select the primary and secondary wavelengths, read speed, and plate type; and define blank well(s). If supported, shake options are available.
Results	View, print, or export measurement data stored on the reader (for the last 12 protocols).
Instrument	Configure the reader, printer, and USB flash drive settings; define results output criteria; run an Absorbance Plate Test; and more.

The reader automatically performs delta OD and blank subtraction. To select the data set(s) for print or export, tap **Instrument > Output**.

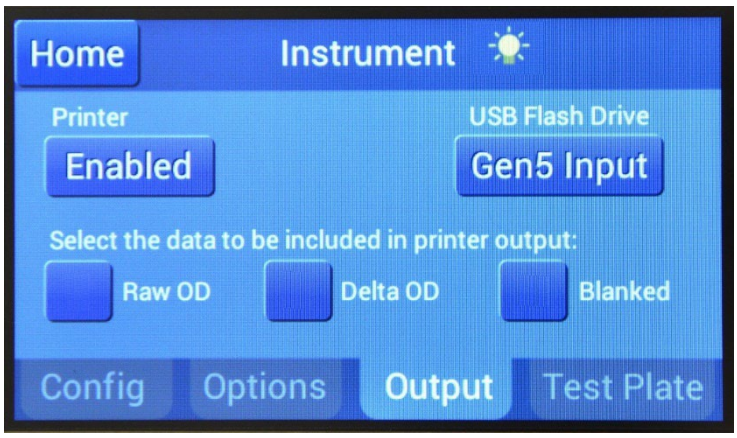
Configure the 800 TS

Define Regional Settings



1. From the Main Menu, tap **Instrument > Config** > **Regional Settings**.
2. Tap to set:
   - **Time Format**: AM/PM or 24 hour
   - **Date Format**: mm/dd/yyyy or dd/mm/yyyy
   - **Decimal Symbol**: period or comma (does not apply to the system test report content)
   - **List Separator**: comma or semicolon (used in the exported report .csv file)

Define Output Formats for Measurement Data



To send results to a printer connected to the reader:

1. From the Main Menu, tap **Instrument > Output**.
2. Toggle **Printer** to Enabled. Select the data to print:
   - **Raw OD**: Raw measurement value for each well.

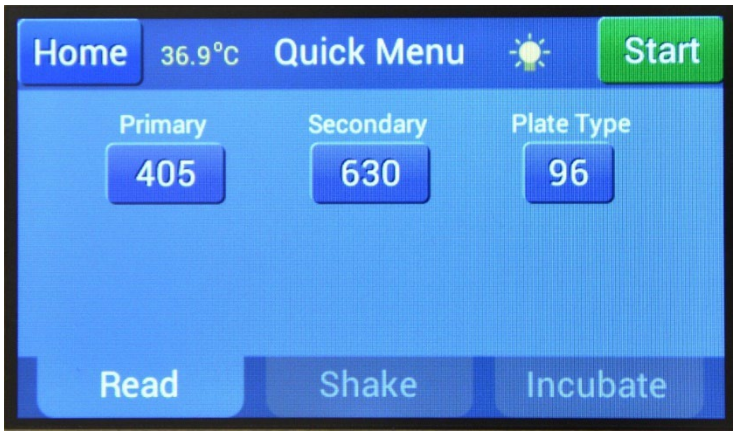
- **Delta OD**: When a secondary wavelength is selected: the calculated value for each well of the primary wavelength measurement minus the secondary wavelength measurement.
- **Blanked**. The calculated value for each well. Single-wavelength protocol: Raw OD minus the blank well average. Dual-wavelength protocol: Delta OD minus the blank well average.

To send results to a USB flash drive inserted in the reader, toggle the **USB Flash Drive** button among the options.

- **Report**: Generate a CSV file containing the measurement values (with Raw OD/Delta OD/blanked values, as applicable).
- **Gen5 Input**: Generate a text file that can be opened in Gen5 using the Read from File option. This file contains raw data (no delta ODs or blanks).

Define and Start a Quick Protocol

1. From the Main Menu, tap **Quick > Read**.



2. Set the Primary and (optional) Secondary wavelengths, and Plate Type.

   Note: You cannot define blank wells in a Quick protocol.

3. Place the plate on the carrier. Tap **Start**.
4. When finished, Tap **Output** to send results to the printer or USB flash drive.

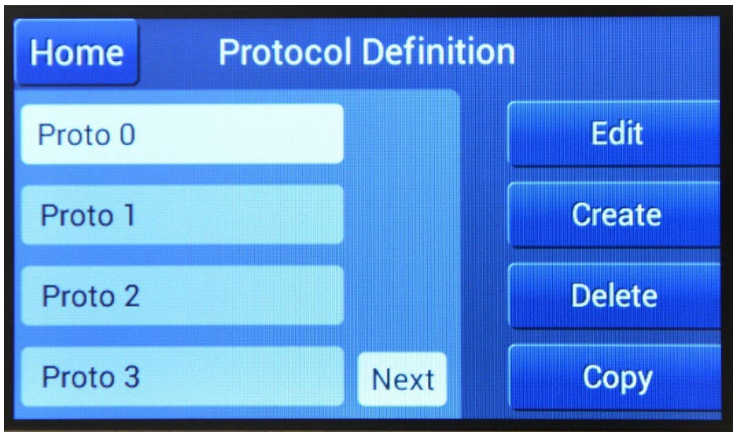
Create, Save, and Start a Protocol

The maximum number of uniquely named protocols that can be saved on the touchscreen at the same time is 40.

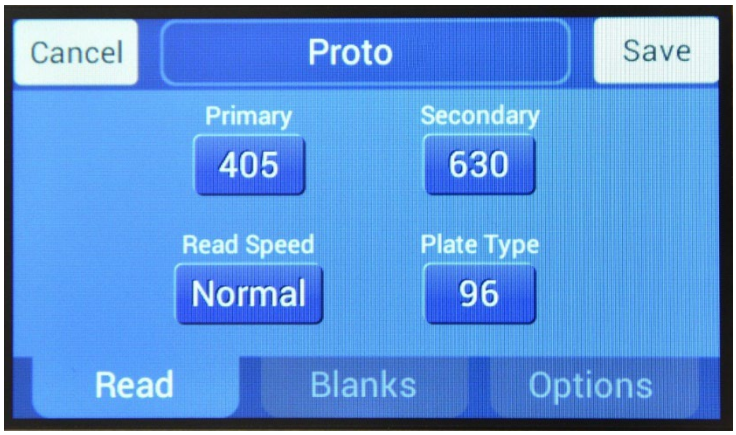
Only full plate reads are supported on the touchscreen. To read a partial plate, you must use Gen5.

Create a Protocol

1. From the Main Menu, tap **Protocol.**



2. Tap **Create.** Enter a name for the protocol. Tap **OK**.



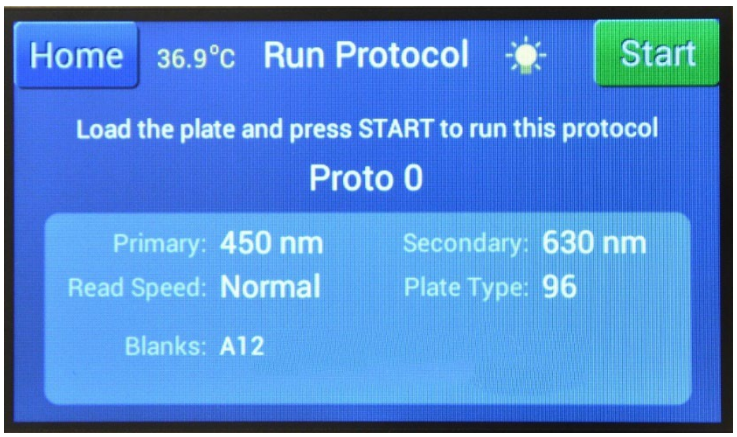
3. Set a **Primary** wavelength.
4. If applicable, set a **Secondary** wavelength. Otherwise, leave as "---."
5. Set a **Read Speed**: Normal, Rapid, or Sweep.
6. Set the **Plate Type**.
7. If applicable, tap **Blanks** to add blank wells (up to 12).
8. (If equipped) Tap **Options** to define a shake step. Set the duration and intensity.
9. Tap **Save**. The protocol now appears on the Main Menu.

Run a Protocol

For instruments with incubation: To perform incubation during measurement, either turn on incubation from the Incubate tab (Quick Menu) or tap the temperature to the left of the Run Protocol screen.

The touchscreen can store data for up to 12 microplate reads. Data is stored by date and time. If 12 results are already in storage, the next data set saved will overwrite the oldest of the saved results.

1. From the Main Menu, tap the protocol name. The Run Protocol screen opens and displays the protocol's parameters.



2. Place the microplate on the carrier.
3. Tap **Start**. When the read is finished, the results are displayed.
4. Tap **Output** to send results to the printer or USB flash drive.

Change the Protocol Display Order

1. From the Main Menu, tap **Instrument > Options**.
2. Select **Alphabetically** or **Last accessed first**.

Edit a Protocol

1. From the Main Menu, tap **Protocol**.
2. Tap a protocol. Tap **Edit**.
3. Make the changes. Tap **Save**.

Delete a Protocol

1. From the Main Menu, tap **Protocol**.
2. Tap a protocol. Tap **Delete**.

Copy a Protocol

1. In the Main Menu, select a protocol. Tap **Copy**.
2. Enter a name.

3. Make the changes. Tap **Save**.

View or Output Results Stored on the Reader

1. In the Main Menu, tap **Results.** Select the date/time of the saved set of results. The results will display.
2. Tap **Output**. The results are printed and/or saved to the USB flash drive, depending on the selected output format.

Operate the Reader Using Gen5 Software

Gen5 software supports all 800TS reader models. This section provides brief instructions for creating a protocol and running an experiment. For more information, refer to publications provided with Gen5 and the Gen5 help system (**Help > Help Topics**).

In Gen5, a **protocol** contains instructions for controlling the reader and (optionally) instructions for analyzing the data retrieved from the reader. At a minimum, a protocol must specify the procedure you wish to run. After creating a protocol, create an **experiment** that references the protocol. You will run the experiment to read plates and analyze the data.

1. In the Gen5 Task Manager, select **Protocol > Create New**.
2. Open the Procedure dialog. If prompted to select a reader, select **Epoch** and click **OK**.
3. Select a Plate Type.

Gen5 stores measurements and other characteristics for individual plate types in a database. It is essential that you select (or define) the plate type to match the assay plate. Otherwise, results may be invalid. See the "Plate Type Database" topic in the Gen5 Help for instructions.

4. Add steps to the procedure for reading the plate. Click **Validate** to verify that the reader supports the defined steps, and then click **OK**.
5. Optionally, perform any of these steps to analyze and report the results:
   - Open the Plate Layout dialog and assign blanks, samples, controls, and/or standards to the plate.
   - Open the Data Reduction dialog to add data reduction steps. Categories include Transformation, Well Analysis, Curve Analysis, and Qualitative Analysis.
   - Create a report or export template via the Report/Export Builders.
6. Select **File > Save** and give the protocol an identifying name.
7. In the Gen5 Task Manager, select **Experiment > Create using an existing protocol**.
8. Select the desired protocol and click **OK**.

9. Select a plate in the menu tree and click  .
10. When the read is complete, measurement values appear in Gen5. Select the desired data set from the Data list.
11. Select **File > Save** and give the experiment an identifying name.

Verify the Gen5 Filter Table

CAUTION **Filters.** The reader's internal filter table must exactly match the contents of the installed filter wheel. When changing, cleaning, or replacing filters, it is critical that the filters be placed in the filter wheel in the correct orientation, with the light-direction arrow pointing downward. The Gen5 software filter table must exactly match the contents of the filter wheel.

1. From the Gen5 main screen, select **System > Instrument Configuration**, highlight the **800 TS**, and click **View/Modify**.
2. Click **Setup** and then click the **Absorbance** tab.
3. Verify that the values match the contents of the filter wheel. See page 16 for instructions for accessing the filter wheel.
4. To change the setting for a filter wheel position, enter the new value and click **Send Wavelengths**.
5. Click **Close** when you are finished.

Maintenance

Warnings and Precautions

WARNING **Internal Voltage.** Always turn off the power switch and unplug the power supply before cleaning the outer surface of the instrument.

WARNING **Liquids.** Avoid spilling liquids on the instrument; fluid seepage into internal components creates a potential for shock hazard or instrument damage. If a spill occurs while a program is running, stop the program and turn off the instrument. Wipe up all spills immediately. Do not operate the instrument if internal components have been exposed to fluid.

CAUTION **Liquids.** Do not immerse the instrument, spray it with liquid, or use a dripping-wet cloth on it. Do not allow water or other cleaning solution to run into the interior of the instrument. If this happens, contact Technical Support. Do not soak the touchscreen.

CAUTION **Lubricants.** Do not apply lubricants to moving parts. Lubricant on components in the carrier compartment will attract dust and other particles, which may cause the instrument to produce an error.

WARNING **Potential Biohazards.** Wear protective gloves when handling contaminated instruments. Gloved hands should be considered contaminated at all times; keep gloved hands away from eyes, mouth, nose, and ears.

Mucous membranes are considered prime entry routes for infectious agents. Wear eye protection and a surgical mask when there is a possibility of aerosol contamination. Intact skin is generally considered an effective barrier against infectious organisms; however, small abrasions and cuts may not always be visible. Wear protective gloves when handling contaminated instruments.

Schedule

Task	Frequency
Clean touchscreen	As needed
Clean exposed surfaces	As needed
Inspect/clean filters	As needed
Decontamination	Before shipment, storage, or disposal

Clean the Touchscreen

CAUTION **Touchscreen.** Avoid strong solvents, such as alcohol, acetone, ammonium chloride, methylene chloride, and hydrocarbons. These will permanently damage the touchscreen. Avoid fibrous materials, such as paper towels, which can scratch the touchscreen. Dirt particles and cleaning agents will get trapped in the scratches. Never spray solutions directly on the touchscreen.

Materials

- Deionized or distilled water
- Dish soap or mild cleaner
- Lint-free disposable towels

Procedure

1. Turn off and unplug the instrument.
2. Moisten a clean, lint-free disposable cloth with water, or with water and mild detergent, then thoroughly wring it out so that liquid does not drip from it. **Do not soak the cloth.**
3. Wipe the touchscreen gently with the moist cloth.
4. If detergent was used, wipe the touchscreen with a cloth moistened with water.
5. Dry the screen gently using another cloth.

Clean Exposed Surfaces

This procedure is for the housing of the 800 TS instrument. See the previous section for the cleaning procedure for the touchscreen.

A regular cleaning regimen is recommended to keep the instrument free from dust and particulates that can cause erroneous readings. Exposed surfaces may be cleaned (not decontaminated) with a cloth moistened (not soaked) with water or water and a mild detergent.

1. Turn off and unplug the instrument from the power supply.
2. Moisten a clean, lint-free disposable cloth with water, or with water and mild detergent, then thoroughly wring it out so that liquid does not drip from it. **Do not soak the cloth.**
3. Wipe the plate carrier, the inside of the plate carrier door (if equipped), and all exposed surfaces of the instrument.
4. If detergent was used, wipe all surfaces with a cloth moistened, not soaked, with water.

5. Use a clean, dry, lint-free cloth to dry all wet surfaces.

   If liquid is spilled inside the reader, contact Technical Support.

Inspect/Clean Filters

CAUTION **Filters.** The reader's internal filter table must exactly match the contents of the installed filter wheel. When changing, cleaning, or replacing filters, it is critical that the filters be placed in the filter wheel in the correct orientation, with the light-direction arrow pointing downward. Gen5 users: The Gen5 software filter table must exactly match the contents of the filter wheel.

1. See *Verify the Filter Wheel Contents* on page 16 for instructions for accessing the filters in the filter wheel.
2. The filters can be cleaned of fingerprints and debris by wiping with a lens tissue or other lint-free cloth.

Decontamination

- The 800 TS requires decontamination prior to shipping, storage, and disposal.
- Decontamination is required by the U.S. Department of Transportation regulations.
- Persons performing the decontamination process must be familiar with the basic setup and operation of the instrument.
- Agilent recommends the use of the following decontamination solutions and methods based on our knowledge of the instrument and recommendations of the Centers for Disease Control and Prevention (CDC). Neither Agilent nor the CDC assumes any liability for the adequacy of these solutions and methods. Each laboratory must ensure that decontamination procedures are adequate for the biohazard(s) they handle.

Required Materials

- Sodium hypochlorite (NaClO)
- 70% isopropyl alcohol (as an alternative to sodium hypochlorite)
- Deionized or distilled water
- Safety glasses
- Surgical mask
- Protective gloves
- Lab coat
- Biohazard trash bags
- 125-mL beakers
- Clean, lint-free cotton cloths

Procedure

1. Turn off and unplug the reader from the power supply.
2. Prepare a disinfecting solution: an aqueous solution of 0.5% sodium hypochlorite (NaClO). If the effects of sodium hypochlorite are a concern, 70% isopropyl alcohol may be used.
3. Moisten a clean, lint-free cloth with the disinfecting solution, then thoroughly wring it out so that liquid does not drip from it. Do not soak the cloth.
4. Wipe the plate carrier and all exposed surfaces of the instrument, except the touchscreen.
5. Wait 20 minutes.
6. Moisten a cloth with deionized or distilled water and wipe all surfaces of the instrument that have been cleaned with the disinfecting solution.
7. Use a clean, dry lint-free cloth to wipe all wet surfaces.
8. Discard the used gloves and cloths, using a biohazard trash bag and an approved biohazard container.

Decontaminating the Touchscreen

When decontaminating the 800 TS, do not spray the bleach solution on the touchscreen. Avoid fibrous materials that can scratch the surface. Do not use a stronger bleach solution or cleaning solvent than recommended.

Replacing and Aligning the Bulb

WARNING

Hot Surface. The lamp assembly is hot when the instrument is turned on. Turn off the reader and allow the bulb to cool for at least 15 minutes before attempting to replace it.

WARNING

Bulb replacement. The alignment procedure requires you to observe the light path while the bulb is turned on. To prevent possible vision impairment, avoid looking directly at the bulb while it is on.

The tungsten or halogen bulb used on the various models of the 800 TS is user replaceable. The intensity of each type of bulb will slowly drop over time until the start-up self-check detects a low signal level and the instrument displays an error message. The bulb should be replaced and aligned at this time.

- For the 800TS-SI and 800TSI-SI models, order replacement bulb kit PN 1560532.
- For the 800TSUV-SI, 800TSSUVI-SI, and 800TSNB-SI models, order replacement bulb kit PN 1560533.

The kits contain complete instructions for replacing and aligning the bulb.

Instrument Testing

Schedule

Recommendations for an 800 TS used two to five days per week:

Test	Frequency
System Test	Monthly
Absorbance Tests	Monthly

System Test

Each time the 800 TS is turned on, it performs a series of tests on the reader's motors, lamp, and optical systems. If all tests pass, the microplate carrier moves to its forward position and the Main Menu appears.

See also Run a System Test on page 23.

If the test fails, an error message indicating the problem appears. If the problem is something you can fix, turn off the instrument, fix the problem, and turn the instrument back on. If the test continues to fail, contact Technical Support.

Absorbance Tests

Absorbance Test Plate PN 7260522 uses NIST-traceable neutral density filters to confirm absorbance specifications in the visible range (400–800 nm). This test plate also contains precision-machined holes to verify mechanical alignment.

Absorbance Test Plate PN 7260551 uses NIST-traceable neutral density filters to confirm absorbance specifications in the UV range (340 nm).

Note: If a higher-OD well reports "#N/A" for Min/Max Limit and Result, the measured OD is beyond the specified range for Accuracy or Repeatability used with this test, and therefore no pass/fail determination is made. It does not indicate a test failure.

The instructions below apply to the touchscreen. This test can also be run from Gen5 by selecting **System > Diagnostics > Test Plates** and from by clicking **Diagnostics** and selecting the **Test Plates** tab.

Define the Absorbance Test Plate Parameters

1. Obtain the current Test Plate Calibration Certificate.
2. From the Main Menu, tap **Instrument > Test Plate > Test Plate Certificate.**

3. Enter the plate's serial number and Next Calibration Due date. Tap **Back**.
4. The wavelength selection buttons reflect the filters installed in the reader. Tap each button and enter the **OD Standard** values from the Calibration Certificate into the grid. Enter the correct value for each well/wavelength combination.

Run the Absorbance Plate Test

1. Place the Absorbance Test Plate on the microplate carrier, with well A1 in the proper location.
2. From the Main Menu, tap **Instrument** > **Test Plate**.
3. Tap a **Wavelength Selection** button. Tap **Start**.
4. When the test is complete, choose an **Output** option (Print or USB Report), or tap **Exit** to return to the Main Menu.

If any test fails:

- Make sure the information entered into Gen5 matches the Test Plate's Certificate.
- Verify that the Test Plate is within its calibration certification period. If it is out of date, contact Technical Support to schedule a recertification.
- Ensure that the Test Plate is correctly seated in the microplate carrier.
- Check the alignment (corner) holes on the Test Plate to ensure they are clear of debris.
- Check the filters on the Test Plate to ensure they are clean. If necessary, clean them with lens paper. Do not remove the filters from the test plate. Do not use alcohol or other cleaning agents.

Specifications

General Specifications

Microplates
Standard 6-, 12-, 24-, 48-, 96-, and (NB model) 384-well microplates, with 128 x 86 mm geometry. If using Gen5 with 800TSNB-SI, also: 60-, 75-, and 96-well Terasaki plates and BioCell vessels. Maximum plate height: 22.86 mm

Hardware and Environmental	
Light Source:	800TS-SI/800TSI-SI: Tungsten gas-filled bulb 800TSUV-SI/800TSUVI-SI/800TSNB-SI: Halogen bulb
Dimensions:	41.9 cm x 38.1 cm x 17.8 cm
Weight:	< 10 kg
Environment:	Operational temperature range: 18° to 40°C Storage temperature range: -25°C to 50°C
Humidity:	Operational: 10% to 85% relative humidity (non-condensing) Storage: 10% to 80% relative humidity (non-condensing)
Power Supply:	24-volt DC power supply compatible with 100–240 V AC @50–60 Hz
Power Consumption:	40W maximum, non-incubated models 150W maximum, incubated models
Incubation:	Temperature control: 800TSI-SI: 6°C over ambient to 50°C 800TSUVI-SI: 8°C over ambient to 50°C Temperature stability: ± 0.5°C @ 37°C Temperature uniformity: ± 0.5°C @ 37°C

Absorbance Specifications

Where noted: Normal, Rapid, and Sweep refer to Read Modes.

800TS-SI / 800TSI-SI Models

Wavelength Range: 400–750 nm

Measurement Range

Normal/Rapid: 0.000–4.000 OD
Sweep: 0.000–3.000 OD

Resolution

0.001 OD (touchscreen)
0.0001 OD (Gen5)

Accuracy

Normal: ±1.0% ±0.010 OD from 0.000 to 2.000 OD @ 405 nm
Rapid: ±2.0% ±0.020 OD from 0.000 to 2.000 OD @ 405 nm
Sweep: ±1.0% ±0.020 OD from 0.000 to 1.000 OD @ 405 nm

Linearity

Normal: ±1.0% ±0.010 OD from 0.000 to 2.000 OD @ 405 nm
±3.0% ±0.010 OD from 2.000 to 3.000 OD @ 450 nm

Rapid: ±2.0% ± 0.010 OD from 0.000 to 2.000 OD @ 405 nm

Sweep: ± 1.0% ± 0.010 OD from 0.000 to 1.000 OD @ 405 nm

Repeatability

Normal: ± 0.5% ± 0.005 OD from 0.000 to 2.000 OD @ 405 nm
Rapid: ± 1.0% ± 0.010 OD from 0.000 to 2.000 OD @ 405 nm
Sweep: ± 2.0% ± 0.020 OD from 0.000 to 1.000 OD @ 405 nm

Throughput

Carrier start to carrier stop (96-well):

Single Wavelength, Normal: 39 seconds
Dual Wavelength, Normal: 73 seconds
Single Wavelength, Rapid: 26 seconds
Single Wavelength, Sweep: 18 seconds

800TSUV-SI / 800TSUVI-SI Models

Wavelength Range

340nm to 750nm

Measurement Range

Normal / Rapid (340nm - 399nm): 0.000 to 4.000 OD
Normal / Rapid (400nm - 750nm): 0.000 to 4.000 OD
Sweep (400nm - 750nm): 0.000 to 3.000 OD

Resolution

0.001 OD (touchscreen)

0.0001 OD (Gen5)

Accuracy

340nm-399nm

Normal (340nm - 399nm): ± 2.0% ± 0.010 OD from 0.000 to 2.000 OD @ 340nm
Rapid (340nm - 399nm): ± 2.5% ± 0.020 OD from 0.000 to 2.000 OD @ 340nm

400nm-750nm

Normal (400nm - 750nm): ± 1.0% ± 0.010 OD from 0.000 to 2.000 OD @ 405nm
Rapid (400nm - 750nm): ± 2.0% ± 0.020 OD from 0.000 to 2.000 OD @ 405nm
Sweep (400nm - 750nm): ± 1.0% ± 0.020 OD from 0.000 to 1.000 OD @ 405nm

Linearity

Normal (340nm- 399nm): ± 2.5% ± 0.010 OD from 0.000 to 2.000 OD @ 340nm
Normal (400nm - 750nm): ± 1.0% ± 0.010 OD from 0.000 to 2.000 OD @ 405nm
± 3.0% ± 0.010 OD from 2.000 OD to 3.000 OD @ 450nm

Rapid (340nm - 399nm): ± 2.5% ± 0.010 OD from 0.000 to 2.000 OD @ 340nm
Rapid (400nm - 750nm): ± 2.0% ± 0.010 OD from 0.000 to 2.000 OD @ 405nm

Sweep (400nm - 750nm): ± 1.0% ± 0.010 OD from 0.000 to 1.000 OD @ 405nm

Repeatability

340nm-399nm

Normal (340nm - 399nm): ± 1.5% ± 0.005 OD from 0.000 to 2.000 OD @ 340nm
Rapid (340nm - 399nm): ± 2.0% ± 0.020 OD from 0.000 to 2.000 OD @ 340nm

400nm-750nm

Normal (400nm - 750nm): ± 0.5% ± 0.005 OD from 0.000 to 2.000 OD @ 405nm
Rapid (400nm - 750nm): ± 1.0% ± 0.010 OD from 0.000 to 2.000 OD @ 405nm
Sweep (400nm - 750nm): ± 2.0% ± 0.020 OD from 0.000 to 1.000 OD @ 405nm

Throughput

Throughput is measured from carrier start to carrier stop.

96-Well, Single Wavelength, Normal Read Mode: 39 seconds
96-Well, Dual Wavelength, Normal Read Mode: 73 seconds
96-Well, Single Wavelength, Rapid Read Mode: 26seconds
96-Well, Single Wavelength, Sweep Read Mode: 18 seconds

800TSNB-SI Model

Wavelength Range

400nm to 750nm

Measurement Range

Normal & Rapid Read Mode (96-well): 0.000 to 4.000 OD
Normal & Rapid Read Mode (384-well): 0.000 to 4.000 OD

Resolution

0.001 OD (touchscreen)

0.0001 OD (Gen5)

Accuracy

96-Well Plates

Normal (96-well): ± 1.0% ± 0.010 OD from 0.000 to 2.000 OD @405 nm
Rapid (96-well): ± 2.0% ± 0.020 OD from 0.000 to 2.000 OD @405 nm

384-Well Plates

Normal (384-well): ± 2.0% ± 0.020 OD from 0.000 to 2.000 OD @405nm
Rapid (384-well): ± 2.5% ± 0.020 OD from 0.000 to 2.000 OD @405nm

Linearity

96-Well Plates

Normal (96-well): ± 1.0% ± 0.010 OD from 0.000 to 2.000 OD at 405 nm
± 3.0% ± 0.010 OD from 2.000 OD to 3.000 OD @ 450 nm

Rapid (96-well): ± 2.0% ± 0.010 OD from 0.000 to 2.000 OD @ 405 nm

384-Well Plates

Normal (384-well): ± 2.5% ± 0.010 OD from 0.000 to 2.000 OD @ 405nm
Rapid (384-well): ± 2.5% ± 0.010 OD from 0.000 to 2.000 OD @ 405nm

Repeatability

96-Well Plates

Normal (96-well): ± 0.5% ± 0.005 OD from 0.000 to 2.000 OD @ 405 nm
Rapid (96-well): ± 1.0% ± 0.010 OD from 0.000 to 2.000 OD @ 405 nm

384-Well Plates

Normal (384-well): ± 1.5% ± 0.010 OD from 0.000 to 2.000 OD @ 405nm
Rapid (384-well): ± 2.0% ± 0.010 OD from 0.000 to 2.000 OD @ 405nm

Throughput

Throughput is measured from carrier start to carrier stop.

96-Well, Single Wavelength, Normal Read Mode: 38 seconds
96-Well, Single Wavelength, Rapid Read Mode: 26 seconds
384-Well, Dual Wavelength, Normal Read Mode: 3 minutes, 40 seconds
384-Well, Dual Wavelength, Rapid Read Mode: 2 minutes

In This Book

This document contains installation, operation, maintenance, and qualification information for all models of the 800 TS.

Document Revision History			
Part Number	Revision	Date	Modifications
1561011I	C	May 2022	Added Agilent brand information. Updated content and symbols to support 2017/746 – In Vitro Diagnostic Regulation. Replaced the Notices section with Copyright information. Added Customer Care contact information. Removed the Warranty and Product Registration section. Corrected the replacement bulb part numbers.

Original Language – EN

Manufactured by Agilent Technologies, Inc.
5301 Stevens Creek Blvd.
Santa Clara, CA 95051