800™ TS

Absorbance Reader

Instructions for Use

BioTek® Instruments, Inc.

PN 1561011, Rev A

Notices

BioTek® Instruments, Inc.

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Contact Information

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Global Service and Support

BioTek instrument service and repair is available worldwide at one of BioTek's International Service Centers and in the field at your location. To arrange for service or repair of your instrument, contact the office nearest you; visit www.biotek.com for up-to-date contact information. For customer service, sales, and technical assistance, refer to the information below.

Customer Service and Sales

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Phone:	888-451-5171 (toll-free in the U.S.)
	802-655-4740 (outside the U.S.)
Fax:	802-655-7941
Email:	customercare@biotek.com

Service/Technical Assistance Center (TAC)

Phone:	800-242-4685 (toll-free in the U.S.)
	802-655-4740 (outside the U.S.)
Fax:	802-654-0638
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European Coordination Center/Authorized European Representative

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Instructions for Use Requirements

This document fulfills the basic needs of persons operating this device, according to the requirements of the In Vitro Diagnostic Directive for “Instructions for Use.” Some of the device's higher-level functions and features, as well as certain detailed maintenance and qualification routines, are described in the Synergy Neo *Operator's Manual*.

Intended Use Statement

The 800 TS is a single-channel, filter-based absorbance reader designed to perform measurements of samples in a microplate format. 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 charactertistics for the specific assay(s) are met.

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.

Warnings

Operate the instrument on a level, stable surface away from excessive humidity.

Bright sunlight or strong incandescent light can reduce the linear performance range of the instrument.

Measurement values may be affected by extraneous particles (such as dust) in the microplate wells. A clean work area is necessary to ensure accurate readings.

When operated in a safe environment according to the instructions in this document, there are no known hazards associated with the instrument. However, the operator should be aware of certain situations that could result in serious injury; these may vary depending on the instrument model. See **Hazards and Precautions**.

Hazards

The following hazards are provided to help avoid injury:

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.

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

Warning! Lubricants. Do not apply lubricants to the microplate carrier or carrier track. Lubricant on the carrier mechanism or components in the carrier compartment will attract dust and other particles, which may obstruct the carrier path and cause the instrument to produce an error.

Warning! Liquids. Avoid spilling liquids on the instrument; fluid seepage into internal components creates a potential for shock hazard. If a spill occurs while a program is running, abort 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. Contact BioTek TAC for assistance.

Warning! Unspecified Use. Failure to operate the equipment according to the guidelines and safeguards specified in this manual could result in a hazardous condition.

Warning! Software Quality Control. The operator must follow the manufacturer's assay package insert when modifying software parameters and establishing reading methods. Failure to conduct quality control checks could result in erroneous test data.

Warning! Reader Data Reduction Protocol. No limits are applied to the raw measurement data. All information exported via computer control must be thoroughly analyzed by the operator.

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

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

Warning! Potential Biohazards. Some assays or specimens may pose a biohazard. This hazard is noted by the symbol shown here. 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.

Precautions

The following precautions are provided to help avoid damage to the instrument:

Caution: Service. The instrument should be serviced by BioTek-authorized service personnel. Only qualified technical personnel should perform service procedures on internal components.

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 Touchscreen. Do not use sharp implements to operate the touchscreen. Using a sharp stylus or other implement may damage the display.

Caution: Environmental Conditions. Do not expose the system to temperature extremes. For proper operation, ambient temperatures should remain within the range listed in **Appendix A, Specifications**. Performance may be adversely affected if temperatures fluctuate above or below this range. Storage temperature limits are broader.

Caution: Sodium Hypochlorite. Do not expose any part of the instrument to the recommended diluted sodium hypochlorite solution (bleach) for more than 20 minutes. Prolonged contact may damage the instrument surfaces. Be certain to rinse and thoroughly wipe all surfaces.

Caution: Power Supply. Use only the power supply shipped with the instrument. Operate this power supply within the range of line voltages listed on it.

Caution: Shipping Hardware. The shipping hardware must be removed before operating the instrument and reinstalled before repackaging the instrument for shipment.

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

Caution: Warranty. Failure to follow maintenance protocols may void the warranty. See **Chapter 4, Maintenance**.

Caution: Electromagnetic Environment. Per IEC 61326-2-6 it is the user’s responsibility to ensure that a compatible electromagnetic environment for this instrument is provided and maintained in order that the device will perform as intended.

Caution: Electromagnetic Compatibility. Do not use this device in close proximity to sources of strong electromagnetic radiation (e.g., unshielded intentional RF sources), because these may interfere with the proper operation.

CE Mark

Based on the testing described below and information contained herein, this instrument bears the CE mark

Refer to the Declaration of Conformity for more specific information.

Directive 2014/30/EU: Electromagnetic Compatibility

Emissions—Class A

The system has been type-tested by an independent, accredited testing laboratory and found to meet the requirements of EN 61326-1: Class A for Radiated Emissions and Line Conducted Emissions.

Verification of compliance was conducted to the limits and methods of EN 55011 – (CISPR 11) Class A. In a domestic environment it may cause radio interference, in which case you may need to mitigate the interference.

Immunity

The system has been type-tested by an independent, accredited testing laboratory and found to meet the requirements of EN 61326-1 and EN 61326-2-6 for Immunity. Verification of compliance was conducted to the limits and methods of the following:

EN 61000-4-2, Electrostatic Discharge
EN 61000-4-3, Radiated EM Fields
EN 61000-4-4, Electrical Fast Transient/Burst
EN 61000-4-5, Surge Immunity
EN 61000-4-6, Conducted Disturbances from RFI
EN 61000-4-11, Voltage Dips, Short Interruptions and Variations

Directive 2014/35/EU Low Voltage (Safety)

The system has been type-tested by an independent testing laboratory and was found to meet the requirements of this Directive. Verification of compliance was conducted to the limits and methods of the following:

EN 61010-1. "Safety requirement for electrical equipment for measurement, control and laboratory use. Part 1, General requirements."
EN 61010-2-081. “Particular requirements for automatic and semi-automatic laboratory equipment for analysis and other purposes.”
EN 61010-2-010. “Particular requirements for laboratory equipment for the heating of materials.“

Directive 2012/19/EU: Waste Electrical and Electronic Equipment

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

Directive 98/79/EC: In Vitro Diagnostics (if labeled for this use)

- Product registration with competent authorities
- EN 61010-2-101. “Particular requirements for in vitro diagnostic (IVD) medical equipment.”
- Traceability to the U.S. National Institute of Standards and Technology (NIST).

Electromagnetic Interference and Susceptibility

USA FCC CLASS A

RADIO AND TELEVISION INTERFERENCE

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at their own expense.

In order to maintain compliance with FCC regulations, shielded cables must be used with this equipment. Operation with non-approved equipment or unshielded cables is likely to result in interference to radio and television reception.

Canadian Department of Communications Class A

This digital apparatus does not exceed Class A limits for radio emissions from digital apparatus set out in the Radio Interference Regulations of the Canadians Department of Communications.

Le present appareil numerique n'emet pas du bruits radioelectriques depassant les limites applicables aux appareils numerique de la Class A prescrites dans le Reglement sur le brouillage radioelectrique edicte par le ministere des Communications du Canada.

User Safety

This device has been type-tested by an independent laboratory and found to meet the requirements of the following:

- Underwriters Laboratories UL 61010-1, "Safety requirements for electrical equipment for measurement, control and laboratory use; Part 1: General requirements."
- Canadian Standards Association CAN/CSA C22.2 No. 61010-1, "Safety requirements for electrical equipment for measurement, control and laboratory use; Part 1: General requirements."
- EN 61010 Standards, see **CE Mark** starting on page viii.

Safety Symbols

Some of the following symbols may appear on the instrument or accessories:

Alternating current
Courant alternatif
Wechselstrom
Corriente alterna
Corrente alternata

Direct current
Courant continu
Gleichstrom
Corriente continua
Corrente continua

Both direct and alternating current
Courant continu et courant alternatif
Gleich - und Wechselstrom
Corriente continua y corriente alterna
Corrente continua e corrente alternata

Earth ground terminal
Borne de terre
Erde (Betriebserde)
Borne de tierra
Terra (di funzionamento)

Protective conductor terminal
Borne de terre de protection
Schultzleiteranschluss
Borne de tierra de protección
Terra di protezione

Warning, risk of crushing or pinching
Attention, risque d'écrasement et pincement
Warnen, Gefahr des Zerquetschens und Klemmen
Precaución, riesgo del machacamiento y sejeción
Attenzione, rischio di schiacciare ed intrappolarsi

Warning, hot surface
Attention, surface chaude
Vorsicht, heiße Oberfläche
Precaución, superficie caliente
Attenzione, superfice calda

Laser radiation: Do not stare into beam
Rayonnement laser: Ne pas regarder dans le faisceau
Laserstrahlung: nicht in den strahl blicken
Radiación de laser: No mire fijamente al rayo
Radiazione di laser: Non stare nel fascio

Warning, potential biohazards
Attention, risques biologiques potentiels
Warnung! Moegliche biologische Giftsoffe
Atención, riesgos biológicos
Attenziones, rischio biologico

Caution (refer to accompanying documents)
Attention (voir documents d'accompanement)
Achtung siehe Begleitpapiere
Atención (vease los documentos incluidos)
Attenzione, consultare la doc annessa

Installation

Package Contents

Item	Part #
800 TS Operator's Manual on USB flash drive	1561000
Power supply	Non-incubation models: 01281 Incubation models: 02395
Power cord	varies according to country of use
USB cable	75108
Blank 4 GB USB flash drive	01087
Dust cover	7332040
Gen5 RC software	GEN5RC

1. Unpack and Inspect the Reader

Save all packaging materials. If you need to ship the reader to BioTek for repair or replacement, you must use the BioTek-supplied materials. Using other forms of commercially available packaging, or failing to follow the repackaging instructions, may **void your warranty**.

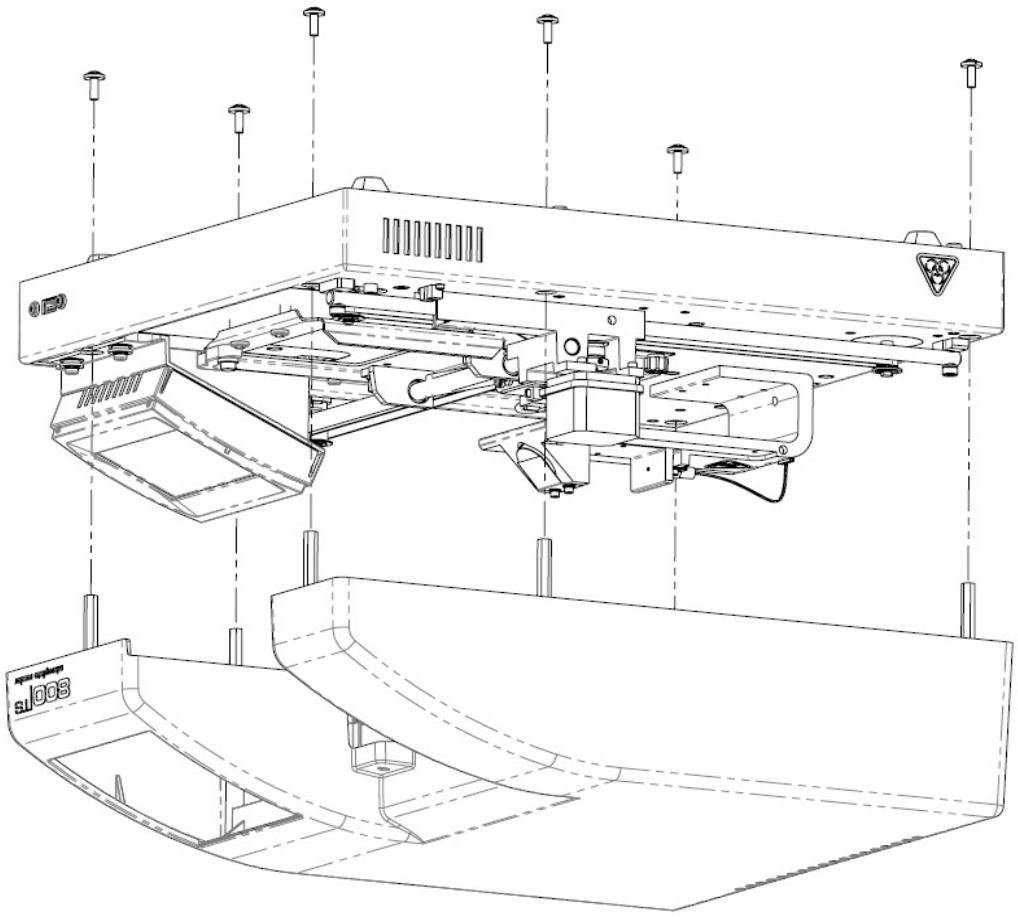
During the unpacking process, inspect the packaging, reader, and accessories for shipping damage. If the reader is damaged, notify the carrier and your BioTek representative. Keep the shipping boxes and the packaging materials for the carrier's inspection. BioTek will arrange for repair or replacement immediately.

1. Place the packaging materials back into the shipping box for reuse if the instrument needs to be shipped again.

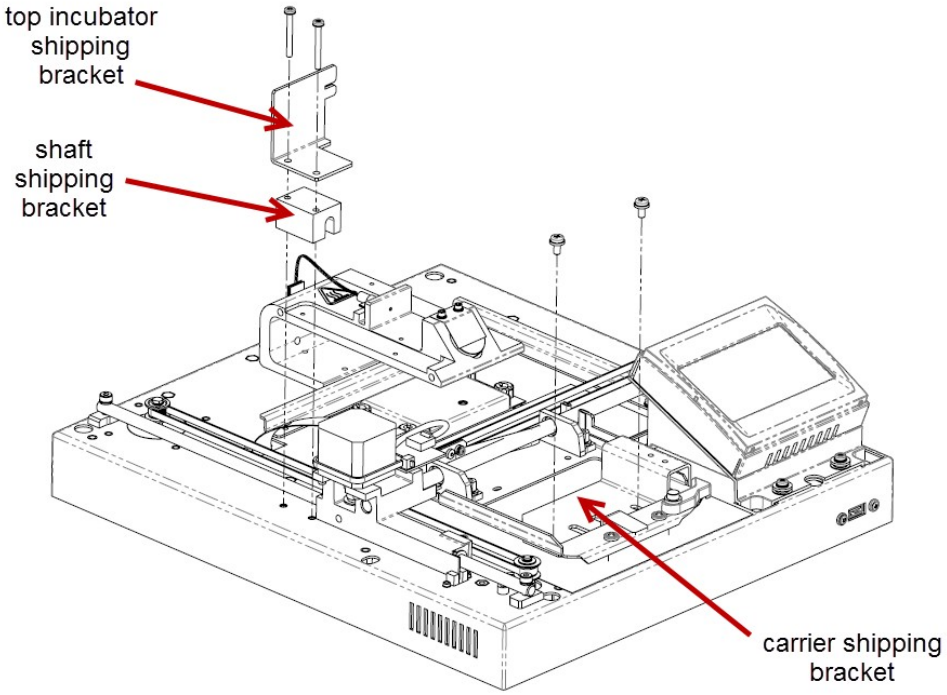
2. Remove the Shipping Hardware

	Remove and store all shipping hardware before you turn on the reader.

1. Carefully turn the reader upside down on a level surface.
2. Remove the six black screws holding the cover to the base, then lift the base off the cover and set it right side up on a level surface.



3. Remove the two screws on each of the shipping brackets, remove the brackets, and store the screws in the holes on the brackets.



4. Store the shipping hardware in a safe place in case it is needed in the future.
5. If applicable (described in the next section), install the door now.

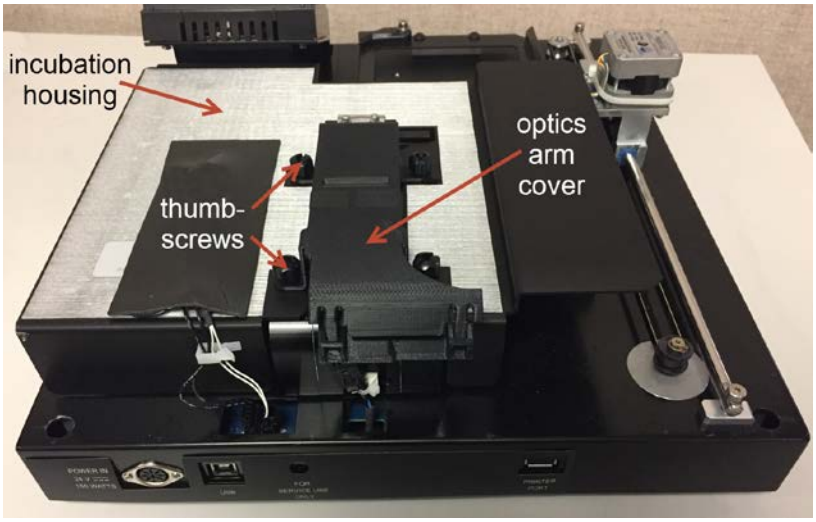
3. Verify the Filter Wheel Contents

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 placement, and to confirm that the software filter table matches the filter wheel's configuration (discussed later). All five locations in the wheel must contain either a filter or a plug.

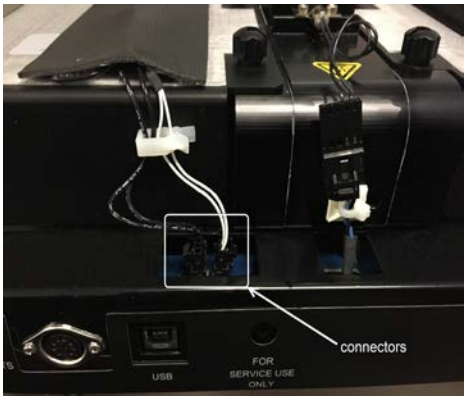
Before continuing, obtain a clean, lint-free cloth.

For models with incubation capability: You must first remove the incubation housing to access the filter wheel.

1. With the top case removed from the reader (see **Remove the Shipping Hardware** on page 3 for directions), remove the four thumbscrews from the optic arm, and lift the optic arm cover off (if equipped).

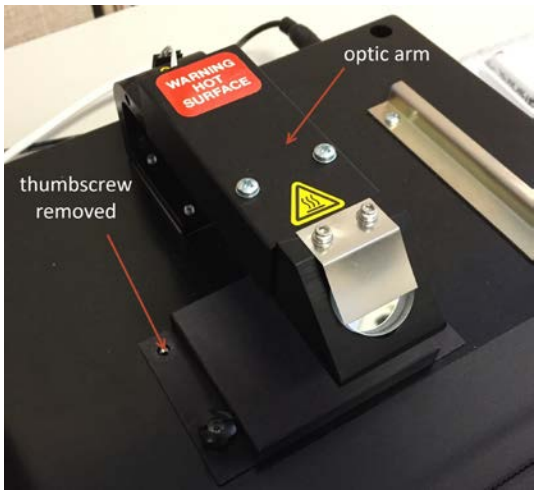


2. Disconnect the two connectors on the back of the incubation housing, then gently lift the housing off of the reader.



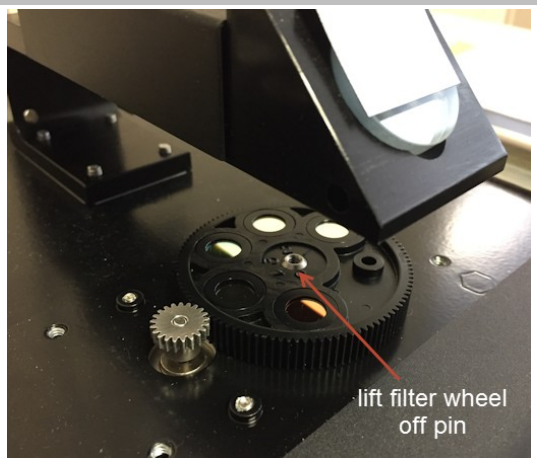
To access the filter wheel:

1. With the top case removed from the reader (see **Remove the Shipping Hardware** on page 3 for directions), remove the four thumbscrews from the filter wheel cover. This cover is directly under the optics arm.



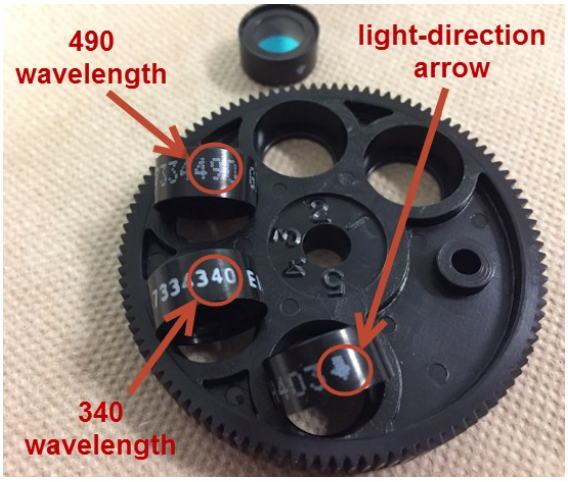
Note: The filters are not held in place and fall out of the wheel easily, so make sure to have a clean, lint-free cloth in place before turning over the filter wheel.

2. Lift the filter wheel off its pin, then 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. You will use this information later to verify/edit the software filter table.



Compare the filters with your model's default filters or with the purchase order if different filters were ordered. Contact BioTek Customer Care if you did not receive the expected filters/plugs.

Each filter is labeled with a wavelength and an arrow showing the light direction. The arrows must point **downward** when the filter wheel is installed on the reader.

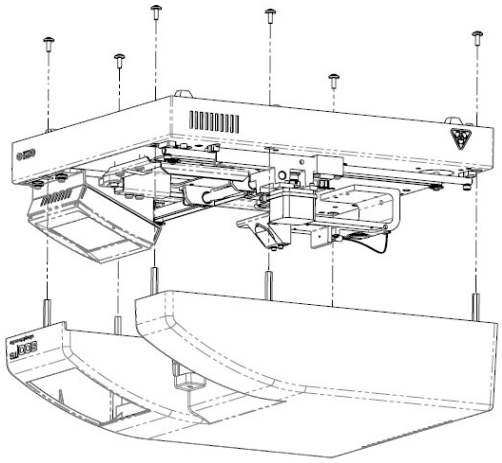


3. When you are finished examining the filters, replace the filters in the filter wheel, being careful to insert them in the correct direction (indicated by the arrow printed on the side of each filter).

4. Replace the filter wheel on its pin, and then replace the filter wheel cover using the four thumbscrews removed during step 1.

5. Tape the door closed, if equipped.

6. Carefully turn the reader upside down over its cover, and reattach the reader to the top cover by replacing the six screws.



4. Select an Appropriate Location

Install the reader on a level, stable surface. Select an area where ambient temperatures between 18°C (71.6°F) and 40°C (104°F) can be maintained.

The reader is sensitive to extreme environmental conditions. Avoid the following:

- **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 (such as dust) in the microplate wells. A clean work area is necessary to ensure accurate readings.

5. Install the Power Supply

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

a. Connect the power cord to the external power supply.

b. Locate the power inlet on the rear of the reader.

c. Plug the rounded end of the power supply's cord into the power inlet.

d. Plug the other end of the power cord into an appropriate power receptacle.

6. (Optional) Install Gen5 on the Host Computer

	There is a certain sequence of events that **must** be followed to ensure that the software is properly installed and configured. Please follow the instructions provided in *Gen5 Getting Started Guide* to install the software.

7. (Optional) Install the USB Driver

Refer to the instructions that shipped with the Gen5 software to install the necessary drivers. The driver must be installed on the computer before you connect the instrument.

8. (Optional) Connect the Host Computer

The USB port is located on the rear of the reader.

1. Turn off the computer. If the reader is on, turn it off.
2. Using the supplied USB cable, connect the square end of the cable to the USB port on the back of the reader.
3. Connect the other end of the cable to an available USB port on the computer.

9. Turn on the Reader

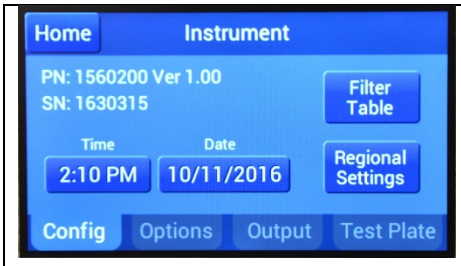
1. Locate the power on/off switch on the right side of the instrument, and turn on the reader. The reader delays any action until the bulb has warmed up: three minutes for narrow beam and UV models, and 30 seconds otherwise. Then the reader performs a power-up system test.

   If using Gen5, do not attempt to communicate with the reader until the system test is finished.

2. When the system test is completed, the touchscreen displays its main screen.

10. Set Date and Time on Touchscreen

The date and time are included in the instrument's system test report. Define these settings now to ensure correct information when you perform step 14.

	1. From the Main Menu, tap **Instrument**, the **Config** tab, then the **Time** button
	**2.** Tap the hour value, and use the keypad to enter the correct time for both the hour and minutes, then click **OK.** Note: You can change just the minutes value: Tap the minutes value and enter the correct time.
	3. Tap the **Date** button. 4. Tap month, day, or year, and use the keypad to set the current date. Tap **OK** when done.

11. Verify the Reader's Filter Table

Before using the 800 TS, verify that the filter table reflects the filters installed in the filter wheel.

Important! The reader's filter table must exactly match the contents of the installed 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. See the **Installation** chapter for instructions for accessing the filter wheel.
3. To change the setting for a filter wheel position, tap its value and use the keypad to enter a wavelength value (in nm), or select **Plug**. Tap **OK** when finished.
4. If you made any changes, tap **Save** in the Installed Filters screen. The filter values are now available for selection in protocols and the absorbance test plate setup screen.

12. (Optional) Establish Communication

NOTE: Instrument must be at the Main Menu screen for Gen5 communication to occur.

1. On the host computer, start Gen5 and log in if prompted. The default System Administrator password is **admin**.
2. From the Gen5 main screen, select **System > Instrument Configuration** and click **Add**.
3. Set the Reader Type to **800 TS**.
4. Perform one of the following steps, as applicable:
   - Select **Plug & Play**.

     An 800 TS must be connected via USB to the computer and turned on to appear in the Available Plug & Play Readers list.

   - Set the Com Port to the computer's COM port to which the reader is connected.

The information can be found via the Windows Control Panel, under Ports in the Hardware/Device Manager area of System Properties (e.g., Serial Port (COM5)).

5. To verify that Gen5 can communicate with the instrument, click **Test Comm**. If the communication attempt is successful, Gen5 displays a success message. Return to Gen5's main screen.

Communication Errors

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 in Gen5?
- Try a different COM Port in Gen5 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 BioTek's Technical Assistance Center.

13. Run a System Test

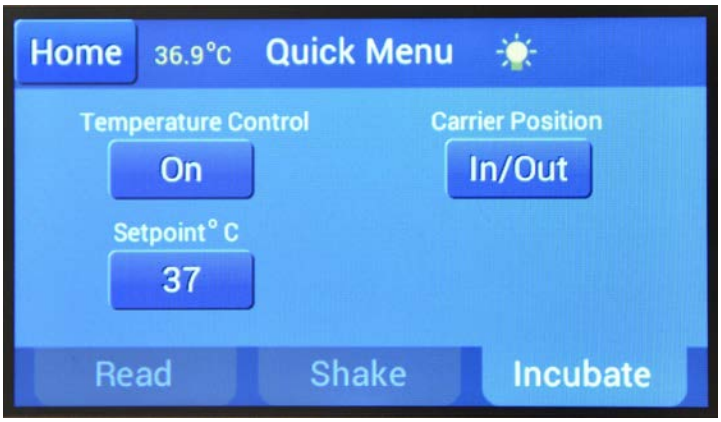
Running a system test will confirm that the reader is functioning properly, or will provide an error code if a problem is detected.

Using the Touchscreen

1. If the reader is equipped with an incubator, turn it on.
   a. On the Main Menu, tap the temperature display (circled in the following image). When the incubator is turned on, the dashes are replaced by the reader's internal temperature, in degrees Celsius.

b. On the Incubate tab of the Quick Menu screen, turn on the Temperature Control and enter a setpoint of at least 37°C, then tap **Home** to return to the Main Menu.

c. Wait for the temperature display to reach the defined setpoint before continuing.



2. From the Main Menu, tap **Instrument > Options**.

3. Under System test, tap **Start**.
4. When the test finishes, tap **USB Report** to save the test results to a USB flash drive, **Print** to print the test results, or **Exit** to close the screen.
5. If applicable, turn off incubator.

Using Gen5

1. If necessary, launch Gen5 and turn on the incubator:
    - From the Gen5 main screen, select **System > Instrument Control > 800 TS.**
    - Click the **Pre-Heating** tab.
    - Enter a Requested temperature of at least 37°C and click **On**.
    - Wait until the incubator temperature reaches the set point before continuing.
2. Return to Gen5's main view and select **System > Diagnostics > Run System Test**. If prompted to select a reader, select **800 TS** and click **OK**.
3. If a message appears, stating that the reader has a pending system test report, click **OK**, then click **Close**.

    The reader ran a "power-up" system test, but that test did not include verifying that the incubator reaches a set temperature. Therefore, you will run another system test.

    Again, select **System > Diagnostics > Run System Test**. If prompted to select a reader, select **800 TS** and click **OK**.

4. When the test is completed, a dialog requesting additional information appears. Enter the information and click **OK**.
5. The results report appears and should contain the text "SYSTEM TEST PASS."
    - If required, print the report and store it with your records.
    - The Gen5 software stores system test information in its database; you can retrieve it at any time.
    - You can save the system test report as a text file: click Save As in the System Test Results dialog.

6. If applicable, turn off the incubator:
    - Select **System > Instrument Control > 800 TS**.
    - Click the **Pre-Heating** tab and click **Off**.
    - Return to Gen5's main view.

Repackaging and Shipping Instructions

Important! Please read all of the information provided below before preparing the 800 TS for shipment.

	If the reader has been exposed to potentially hazardous material, decontaminate it to minimize the risk to all who come in contact with the reader during shipping, handling, and servicing. Decontamination prior to shipping is required by the U.S Department of Transportation regulations. See the **As-Needed Maintenance** chapter for decontamination instructions. Remove any labware from the carrier before shipment. Spilled fluids can contaminate the optics and damage the instrument.
	The instrument's packaging design is subject to change. If the instructions in this section do not appear to apply to the packaging materials you are using, please contact BioTek's Technical Assistance Center for guidance. Replace the shipping hardware before repackaging the instrument. Please contact BioTek if you need to replace any of these items: • Carrier shipping bracket (PN 1560517) • Carrier shipping bracket screws (PN 19668) • Shaft shipping bracket (PN 7332041) • Shaft shipping bracket screws (PN 19337) • If applicable, top incubation shipping bracket (PN 1562072) If you need to ship the 800 TS to BioTek for service or repair, be sure to use the BioTek-supplied packaging materials. 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, contact BioTek to order replacement part number 1563000. The shipping box, accessories box, and foam trays are included as a whole set under this part number and cannot be ordered separately.

Getting Started

Overview

The 800 TS is a compact, filter-based, single-channel absorbance microplate reader. All models are equipped with a touchscreen interface and support endpoint dual-wavelength reads from 400-750 nm on standard 6- to 96-well plates. The narrow beam (NB) model supports 384-well plates. UV models support a measurement range from 340-750 nm. Some models offer incubation to 50˚C and/or linear plate shaking.

Basic data analysis, reporting, and exporting are provided via the touchscreen. With optional Gen5 software, kinetic and well area scanning read modes are supported, along with BioCell and 60-, 72-, and 96-well Terasaki plates. Gen5 also offers extensive data analysis and reporting and exporting capabilities. The reader is available in five models.

The filter wheel contains up to five filters and is user accessible. For models with fewer than five filters, removable plugs are installed in the empty wheel locations.

The 800TS and 800TSI models use a tungsten bulb as their light source. The other models, 800TSUV, 800TSUVI, and 800TSNB, use a halogen bulb.

Refer to the *800 TS Operator's Manual* for recommendation for ensuring optimum performance.

External Components

1	Microplate carrier
2	Touchscreen
3	Power switch
4	USB flash drive port for USB flash drive

Note that the photo does not show the door.

Rear ports on a reader without incubation capability

1	Power port
2	USB port
3	DO NOT USE! For BioTek Service only
4	USB port for printer

Rear ports on a reader with incubation capability

1	Power port
2	USB port
3	DO NOT USE! For BioTek Service only
4	USB port for printer

Operate the Reader Using the Touchscreen

General Information

Do not use a sharp stylus or pencil on the touchscreen. Doing so can damage the touchscreen's surface. You can use a stylus designed for capacitive touchscreens.

When you turn on the 800 TS, the touchscreen turns on automatically and opens to the Main Menu after the start-up system test and bulb warm-up. The length of the bulb warm-up process varies from three minutes for narrow beam and UV models, and 30 seconds otherwise.

- To select a button or check box or to activate a tab, tap the item once.
- To return to the Main Menu from any other screen, tap **Home** in the top-left corner.
- For instructions on cleaning the touchscreen, see the Maintenance chapter.

Note: To preserve the life of the bulb, turn it off when not needed by tapping  in the Instrument or Quick Menu. Note that if you turn off the bulb, the reader will go through the bulb warm-up process when you turn the bulb back on (three minutes for narrow beam and UV models, and 30 seconds otherwise).

Main Menu

800TSI and 800TSUVI models: When the incubator is turned on, the reader's internal temperature is displayed at the top of the screen, as shown above. When the incubator is off, dashes are displayed.

The left side of the Main Menu screen 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 are the following options:

- **Quick:** Define and run a simple 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 (and save), delete, and copy protocols. You can define the protocol name; select the primary and secondary wavelength values, read speed, and plate type; and define blank well(s). If applicable to your reader mode, shake options are available.

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

- **Results:** View and optionally print/export measurement data stored on the reader (for the 12 most recently run protocols).
- **Instrument:** Configure the reader, printer, and USB flash drive settings; define results output criteria; run an Absorbance Plate Test; and more.

Configure Your 800 TS

After you install the reader, and before you use it to create and run protocols, perform the tasks in this section to define important instrument settings.

Set the Time and Date

When you turn on the 800 TS for the first time, set or confirm the date and time at your location.

1. From the Main Menu, tap **Instrument**, the **Config** tab, then the **Time** button.

2. Tap the hour value, and use the keypad to enter the correct time for both the hour and minutes, then click **OK**.

Note: You can change just the minutes value: Tap the minutes value and enter the correct time.

3. Tap the **Date** button.

4. Tap month, day, or year, and use the keypad to set the current date. Tap **OK** when done.

Verify or Change the Reader's Filter Table

Important! The reader's filter table must exactly match the contents of the installed 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. See the **Installation** chapter for instructions for accessing the filter wheel.

3. To change the setting for a filter wheel position, tap its value and use the keypad to enter a wavelength value (in nm), or select **Plug**. Tap **OK** when finished.

4. If you made any changes, tap **Save** in the Installed Filters screen. The filter values are now available for selection in protocols and the absorbance test plate setup screen.

Define Regional Settings

1. From the Main Menu, tap **Instrument**, the **Config** tab, and then **Regional Settings**.

2. Tap to toggle between:

-Time format: AM/PM or 24 hour

-Date format: mm/dd/yyyy or dd/mm/yyyy

-Decimal symbol: period or comma (Note: This setting 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

If you want to send results to a printer connected to the reader:

1. From the Main Menu, tap **Instrument**, then tap the **Output** tab.

2. Toggle the Printer button to **Enabled**, and select the data to be included on the printout (you can select more than one):

- **Raw OD**: The raw measurement value for each well.
- **Delta OD**: Applicable only when a secondary wavelength is selected. This is the calculated value for each well of the primary wavelength measurement minus secondary wavelength measurement.
- **Blanked**. The calculated value for each well, either Raw OD minus the average of the blank wells for single-wavelength reads or Delta OD minus the average of the blank wells for dual wavelength reads.

If you want to send results to a USB flash drive inserted in the reader, on the Output tab, toggle the **USB Flash Drive** button among the options.

- **Report**: Generates a CSV file containing the measurement values (with Raw OD/Delta OD/blanked values, as applicable). This file can be opened in Excel or other spreadsheet software.
- **Gen5 Input**: Generates a text file that can be opened in Gen5 using the Read from File option. This file contains only raw data, not delta ODs or blanks.

See page 92 for sample CSV and text files.

Define and Start a Quick Protocol

Note: This screenshot is from an instrument with incubation and shake capabilities.

1. From the Main Menu, tap **Quick**.
2. In the Quick Menu, set the Primary and, if applicable, Secondary wavelengths and plate type, then tap **Start**.

Note: You cannot define blank wells for a Quick read.

When the read is finished, the results are displayed. Tap **Output** to send results to the printer or USB flash drive.

Create and Save a Protocol

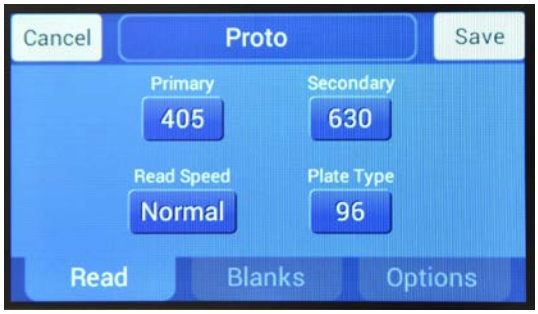
The maximum number of uniquely named protocols that can be saved on the touchscreen at the same time is 40.

Create a Protocol

1. From the home screen, tap **Protocol**, then tap **Create**.

2. Use the onscreen keyboard to enter a name for the protocol, then tap **OK**.

Note: The **<--** key circled in the figure is the backspace key.



Note that the Options tab is not displayed on all instruments.

3. Toggle through the values to set a Primary wavelength.

4. If applicable, toggle through the values to set a Secondary wavelength. Otherwise, leave as "---." Note: The reader automatically performs Delta OD subtraction.

5. Toggle to set a read speed: **Normal**, **Rapid**, or **Sweep**. See the Throughput values associated with each read speed type in the **Specifications** appendix. Note that **Sweep** is not available on the NB model.

6. Toggle to set the plate type: 6-, 12-, 24-, 48-, 96, or 384*-well microplates. **Note:** Only full plate reads are supported on the touchscreen. To read a partial plate, you must use Gen5.

7. If applicable, tap the **Blank** tab to add blank wells.
    a. In the Blank Well screen, use the keypad to enter which well should be blank, then tap **OK**.
    b. Tap **Add** to enter more blank wells, up to 12.

8. If the reader is equipped with shake capability, tap **Options** and define a shake step, if desired. Set the shake's duration using the keypad and intensity by toggling through the options.

9. Tap **Save**. The protocol now appears in the protocol list.

*Not all instruments support 384-well microplates.

Start a Protocol

	For instruments equipped with incubation capability: 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 (in a defined protocol).

The onboard storage for the touchscreen can accommodate data for up to 12 microplate reads. The data is stored by date and time, not by filename. If 12 results are already in onboard storage, the next read data saved will overwrite the oldest of the saved results.

Note that only plate read results are saved. System Test and Absorbance Plate Test results are not saved; they can only be exported to USB flash drive or printed.

1. From the Main Menu, tap the protocol you want to run. The Run Protocol screen opens, displaying the protocol's parameters.

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

Change the Protocol Display Order

1. From the Main Menu, tap **Instrument**, then tap the **Options** tab.
2. In the Protocol display order field, select **Alphabetically** or **Last accessed first**.

Edit, Delete, or Copy a Protocol

Edit a Protocol

1. From the Main Menu, tap **Protocol**.
2. Tap the protocol that you want to modify, then tap **Edit**.
3. Make any desired changes, then tap **Save**.

Delete a Protocol

1. From the Main Menu, tap **Protocol**.
2. Tap the protocol you want to delete, then tap **Delete**.

Copy a Protocol

Copying an existing protocol and then editing it is a quick way to create a new protocol.

1. In the Main Menu, select the protocol you want to copy, then tap **Copy**.
2. You are prompted to enter a name for the copied protocol.
3. Make any desired changes, then tap **Save**.

View or Output Results Stored on the Reader

1. In the Main Menu, tap **Results**, then select the date/time of the read for which you want to view or output results. The results are displayed on the touchscreen.
2. Tap **Output**. The results are printed and/or saved to the USB flash drive, depending on the output format you selected.

Operate the Reader Using Gen5 Software

Gen5 RC (Reader Control) software is supplied with the 800 TS. This edition supports only instrument control and data reporting/exporting. To perform kinetic reads, data reduction, and custom exports, a software upgrade is required; contact BioTek Customer Care.

BioTek Gen5 software supports all 800 TS reader models. Use Gen5 to control the reader; perform data reduction and analysis on the measurement values; print or export results; and more. This section provides brief instructions for working with Gen5 to create protocols and experiments and read plates. Refer to the Gen5 Help system for more information.

Maintenance

Maintenance Overview

A general maintenance regimen for all 800 TS models includes periodically cleaning all exposed surfaces and decontaminating the instrument before storage or shipment.

Schedule

The risk and performance factors associated with your assays may require performing some of all of the procedures more frequently than presented in this schedule.

Task	Daily	Quarterly	As Needed
All models:			
Clean exposed surfaces	x		x
Inspect/clean touchscreen			x
Inspect/clean the wavelength filters			x
Decontamination	Before shipment or storage		

Warnings and Precautions

Read the following before performing any maintenance procedures:

	**Warning! Internal Voltage.** Turn off and unplug the instrument for all maintenance and repair operations.
	**Important!** 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 the BioTek Service Department. **Do not soak the touchscreen!** This will cause damage. Moisten a clean cloth with deionized or distilled water and wipe the touchscreen. Dry immediately with a clean, dry cloth.
	**Important!** Do not apply lubricants to the microplate carrier or carrier track. Lubricant attracts dust and other particles, which may obstruct the carrier path and cause errors.
	**Warning!** 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.

Warning! 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.

Clean Exposed Surfaces

This procedure is for the housing of the 800 TS instrument. See "Clean the Touch Screen" on page 39 for the cleaning procedure for the touchscreen.

Exposed surfaces may be cleaned (not decontaminated) with a cloth moistened (not soaked) with water or water and a mild detergent. You'll need:

- Mild detergent
- Deionized or distilled water
- Clean, lint-free cotton cloths

1. Turn off and unplug the instrument.
2. Wet a clean cotton cloth with water, or with water and mild detergent, then thoroughly wring out the cloth so that liquid does not drip from it.
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 with water.
5. Use a clean, dry, lint-free cloth to dry all wet surfaces.

Clean the Touchscreen

Important! Never spray solutions directly on the touchscreen.

Materials

Use the following products to safely clean the touchscreen:

- Deionized or distilled water
- Dish soap or other mild cleaner
- Lintfree disposable towels

	**Avoid the following cleaning products:** • Strong solvents, such as alcohol, acetone, ammonium chloride, methylene chloride, and hydrocarbons, which can permanently damage the surface of the touchscreen. • Fibrous materials, such as paper towels, which can scratch the touchscreen. Over time, dirt particles and cleaning agents can get trapped in the scratches.

Procedure

Important! Never spray solutions directly on the touchscreen.

Turn off and unplug the instrument.

1. 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.**
2. Wipe the touch screen gently with the moist cloth.
3. If detergent was used, wipe the touchscreen with a cloth moistened with water.
4. Dry the screen gently using another cloth.

Decontamination

Any laboratory instrument that has been used for research or clinical analysis is considered a biohazard and requires decontamination prior to handling.

Decontamination minimizes the risk to all who come into contact with the instrument during shipping, handling, and servicing. 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.

	Turn off and unplug the instrument for the decontamination procedure.
	BioTek Instruments, Inc., 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 BioTek 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.

	Wear prophylactic gloves when handling contaminated instruments. Gloved hands should be considered contaminated at all times; keep gloved hands away from eyes, mouth, and nose. Eating and drinking while decontaminating instruments is not advised.
	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 performing the decontamination procedure.

Decontaminating the Reader Housing

Required Materials

- Sodium hypochlorite (NaClO, or bleach)
- 70% isopropyl alcohol (as an alternative to bleach)
- 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 an aqueous solution of 0.5% sodium hypochlorite (NaClO, or bleach). If the effects of bleach are a concern, 70% isopropyl alcohol may be used.

Check the percent NaClO of the bleach you are using. Commercial bleach is typically 10.0% NaClO; prepare a 1:20 dilution. Household bleach is typically 5.0% NaClO; prepare a 1:10 dilution.

3. Moisten a clean, lint-free cloth with the bleach 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 touch screen (if equipped).

5. Allow the instrument to dry for 20 minutes for thorough decontamination by the bleach.
6. Moisten a cloth with deionized or distilled water and wipe all surfaces of the instrument that have been cleaned with the bleach solution.
7. Use a clean, dry lint-free cloth to dry 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, as described on page 47, 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.

Filter Storage and Handling

To properly store interference filters during extended periods of non-use, package the filters in a light-tight envelope or container, away from high humidity. This will ensure the longest life for the filters. When handling the filters, keep the surfaces clean from fingerprints and debris by simply wiping with a lens tissue or other lint-free cloth.

When changing 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. Also, the reader or Gen5 software filter table must exactly match the contents of the filter wheel.

1. Use a clean, dry lint-free cloth to dry all wet surfaces.
2. Discard the used gloves and cloths, using a biohazard trash bag and an approved biohazard container.

Decontaminating the Touchscreen

When decontaminating the 800 TS, as described on page 47, 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.

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	When changing 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. Also, the reader or Gen5 software filter table must exactly match the contents of the filter wheel.

Instrument Testing

System Test

Each time the 800 TS is turned on, it automatically 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 on the touchscreen.

If any test results do not meet the internally coded Failure Mode Effects Analysis (FMEA) criteria established by BioTek, the reader beeps repeatedly and an error message appears on the touchscreen. If this occurs, tap **OK** on the touchscreen to stop the beeping. If necessary, initiate another system test using Gen5 or the touchscreen to try to retrieve an error code from the reader.

Absorbance Test Plates

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).

Define the Absorbance Test Plate Parameters

Using the Touchscreen

1. Obtain the current Test Plate Calibration Certificate.
2. From the Main Menu, tap **Instrument**, then tap **Test Plate**.
3. Tap **Test Plate Certificate** and enter the plate's serial number and Next Calibration Due date, then tap **Back** to return to the Test Plate tab.
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. Make sure you enter the correct value for each well/wavelength combination.

Using Gen5

1. Obtain the current Test Plate Calibration Certificate.
2. Start Gen5, and select **System > Diagnostics > Test Plates > Add/Modify Plates**.
3. Click **Add**. The Absorbance Test Plate dialog appears.
4. Select the appropriate Plate Type, and then enter the plate's serial number.
5. Enter the Last Certification and Next Certification dates from the calibration label on the Test Plate.
6. If the wavelength values in the top row of the grid in Gen5 are appropriate for your tests, enter the OD Standard values from the Calibration Certificate into the grid. Make sure you enter the correct value for each well/wavelength combination.

If you need to change the wavelength values, click **Wavelength List**. Add, change, or delete the values as needed and click OK.

7. Review all of the values that you entered. When finished, click **OK** to save the information.

Running the Absorbance Plate Test

Using the Touchscreen

1. Place the Absorbance Test Plate on the microplate carrier, with well A1 in the proper location.
2. From the Main Menu, tap **Instrument** and then **Test Plate**.
3. Tap a Wavelength Selection button, then 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.

Using Gen5

1. From the Gen5 main screen, click **System > Diagnostics > Test Plates > Run**. If prompted, select the desired Test Plate and click **OK**.
2. When the Absorbance Test Plate Options dialog appears, enter any required information.
3. Highlight the wavelength(s) to be included in this test.

You need to select only those wavelengths most appropriate for your use of the reader.

4. (Optional) Enter a comment.
5. Click **Start Test**.
6. Place the Absorbance Test Plate on the microplate carrier, with well A1 in the proper location.
7. Click **OK** to run the test.
8. When the test is complete, the results report appears. Scroll through the report; every result should show “PASS”.

Liquid Tests

Be sure to use a new microplate, because fingerprints or scratches may cause variations in readings.

Materials

- New 96-well, clear, flat-bottom microplate (Corning Costar #3590 recommended)
- Stock Solution A or B, which may be formulated by diluting a dye solution available from BioTek (A) or from the materials listed below (B).

Solution A

- BioTek QC Check Solution No. 1 (PN 7120779, 25 mL; or 7120782, 125 mL)
- Deionized water
- 5-mL Class A volumetric pipette
- 100-mL volumetric flask

1. Pipette a 5-mL aliquot of BioTek QC Check Solution No. 1 into a 100-mL volumetric flask.
2. Add 95 mL of DI water; cap and shake well. The solution should measure approximately 2.000 OD when using 200 µL in a flat-bottom microwell.

Solution B

- Deionized water
- FD&C Yellow No. 5 dye powder (typically 90% pure)
- Tween 20 (polyoxyethylene (20) sorbitan monolaurate) or BioTek wetting agent, PN 7773002 (a 10% Tween solution)
- Precision balance with capacity of 100 g minimum and readability of 0.001 g
- Liter volumetric flask
- Weigh boat

1. Weigh out 0.092 gram of FD&C No. 5 yellow dye powder into a weigh boat.
2. Rinse the contents into a 1-liter volumetric flask.
3. Add 0.5 mL of Tween 20, or 5 mL of BioTek's wetting agent.
4. Make up to 1 liter with DI water; cap and shake well.

Procedure

Be sure to use a new microplate. Debris, fingerprints, or scratches may cause variations in readings.

1. Using freshly prepared stock solution (Solution A or B), prepare a 1:2 dilution using deionized water (one part stock, one part deionized water; the resulting solution is a 1:2 dilution). The concentrated stock solution should have an optical density of approximately 2.000 OD or lower.
2. Pipette 200 µL of the **stock** solution into column 1.
3. Pipette 200 µL of the **diluted** solution into column 2.

After pipetting the diluted test solution into the microplate and before reading the plate, we strongly recommend shaking the plate for four minutes. This will allow any air bubbles in the solution to settle and the meniscus to stabilize. Alternatively, wait 20 minutes after pipetting the test solution before reading the plate.

4. Using either the touchscreen or Gen5, read the microplate five times at 405 nm using the Normal Read Speed. When prompted, rotate the plate 180 degrees and read the plate five more time ("Turnaround" plate position), saving the data after each read.
5. Print the ten sets of raw data, (from the touchscreen) send it to the USB flash drive for use in another program, or (from Gen5) export it to an Excel spreadsheet.

Calculations

Absorbance Liquid Test 1

Accuracy Specification:

± 1.0% ± 0.010 OD from 0.000 to 2.000 OD

Repeatability Specification:

± 0.5% ± 0.005 OD from 0.000 to 2.000 OD

1. The plate is read five times in the "Normal" position at 405 nm. Calculate the Mean OD and Standard Deviation of those five reads for each well in columns 1 and 2.
2. For each well in columns 1 and 2, calculate the Allowed Deviation using the Repeatability specification for a 96-well plate (Mean OD x 0.05 + 0.005). For each well, its Standard Deviation should be less than its Allowed Deviation.

Example: Five readings in well A1 of 0.802, 0.802, 0.799, 0.798, and 0.801 result in a Mean of 0.8004 and a Standard Deviation of 0.0018. The Mean multiplied by 0.5% (0.8004 * 0.005) equals 0.004, and when added to 0.005 equals 0.009; this is the Allowed Deviation for well A1. Since the Standard Deviation for well A1 is less than this value, the well meets the test criteria.

3. The plate is read five times in the "Turnaround" position at 405 nm. Calculate the Mean OD of those five reads for each well in columns 11 and 12.

4. Perform a mathematical comparison of the Mean values for each well in its Normal and Turnaround positions (that is, compare A1 to H12, A2 to H11, B1 to G12,… H2 to A11). To pass the test, the differences in the compared Mean values must be within the Accuracy specification for a 96-well microplate.
   Example: If the Mean value for well A1 in the Normal position is 1.902 with a specified accuracy of ±1.0% ±0.010 OD, then the expected range for the Mean of the well in its Turnaround (H12) position is 1.873 to 1.931 OD. 1.902 x 0.010 + 0.010 = 0.029; 1.902 - 0.029 = 1.873; 1.902 + 0.029 = 1.931.

Specifications

General Specifications

Microplates	
The 800 TS accommodates standard 6-, 12-, 24-, 48-, 96-, and (with the NB model) 384-well microplates with 128 x 86 mm geometry and, if using Gen5 software with the NB model, 60-, 75-, and 96-well Terasaki plates and BioCell vessels. Maximum plate height: 0.90" (22.86 mm)	
Hardware and Environmental	
Light Source	800TS/800TSI models: Tungsten gas-filled bulb. 800TSUV/800TSUVI/800TSNB models: Halogen bulb
Dimensions	16.5" D x 15" W x 7" H (41.9 x 38.1 x 17.8 cm)
Weight:	< 22 lbs (10 kg)
Environment:	Operational temperature range: 18° to 40°C
Humidity:	10% to 85% 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 for 800TSI model: 6°C over ambient to 50°C. Temperature control for 800TSUVI model: 8°C over ambient to 50°C Temperature stability and uniformity is ± 0.5°C across the plate @ 37°C.

Absorbance Specifications

Standard Models (800TS/800TSI)

Wavelength Range: 400 nm to 750 nm

Absorbance Measurement Range

Normal Read Mode:	0.000 to 4.000 OD
Rapid Read Mode:	0.000 to 4.000 OD
Sweep Read Mode:	0.000 to 3.000 OD

Absorbance Resolution

0.001 OD when operated in standalone mode

0.0001 OD when operated with Gen5

Accuracy

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

Linearity

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

Repeatability (STD)

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

Throughput

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: 26 seconds

96-Well, Single Wavelength, Sweep Read Mode: 18 seconds

Ultraviolet (UV) Models (800TSUV/800TSUVI)

Wavelength Range: 340 nm to 750 nm

Absorbance Measurement Range

Normal and Rapid Read Mode (340 nm–399 nm): 0.000 to 4.000 OD

Normal and Rapid Read Mode (400 nm–750 nm): 0.000 to 4.000 OD

Sweep Read Mode (400 nm–750 nm): 0.000 to 3.000 OD

Absorbance Resolution

0.001 OD when operated in standalone mode

0.0001 OD when operated with Gen5

Accuracy (340 nm to 399 nm)

Normal Read Mode:	±2.0% ± 0.010 OD from 0.000 to 2.000 OD @ 340 nm
Rapid Read Mode:	±2.5% ± 0.020 OD from 0.000 to 2.000 OD @ 340 nm

Accuracy (400 nm to 750 nm)

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

Linearity (340 nm to 399 nm)

Normal Read Mode:	±2.5% ± 0.010 OD from 0.000 to 2.000 OD @ 340 nm
Rapid Read Mode:	±2.5% ± 0.010 OD from 0.000 to 2.000 OD @ 340 nm

Linearity (400 nm to 750 nm)

Normal Read Mode:	±1.0% ± 0.010 OD from 0.000 to 2.000 OD @ 405 nm
	±3.0% ± 0.010 OD from 2.000 OD to 3.000 OD @ 450 nm
Rapid Read Mode:	±2.0% ± 0.010 OD from 0.000 to 2.000 OD @ 405 nm
Sweep Read Mode:	±1.0% ± 0.010 OD from 0.000 to 1.000 OD @ 405 nm

Repeatability (340 nm to 399 nm)

Normal Read Mode:	±1.5% ± 0.005 OD from 0.000 to 2.000 OD @ 340 nm
Rapid Read Mode:	±2.0% ± 0.020 OD from 0.000 to 2.000 OD @ 340 nm

Repeatability (400 nm to 750 nm)

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

Throughput

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: 26 seconds

96-Well, Single Wavelength, Sweep Read Mode: 18 seconds

Narrow Bean (NB) Models (800TSNB)

Wavelength Range: 400 nm to 750 nm

Absorbance Measurement Range

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

Absorbance Resolution

0.001 OD when operated in standalone mode

0.0001 OD when operated with Gen5

Accuracy

Normal Read Mode (96-well):	±1.0% ±0.010 OD from 0.000 to 2.000 OD @ 405 nm
Rapid Read Mode (96-well)	±2.0% ±0.020 OD from 0.000 to 2.000 OD @ 405 nm
Normal Read Mode (384-well):	±2.0% ±0.020 OD from 0.000 to 2.000 OD @ 405 nm
Rapid Read Mode (384-well):	±2.5% ±0.020 OD from 0.000 to 2.000 OD @ 405 nm

Linearity

Normal Read Mode (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 to 3.000 OD @ 450 nm
Rapid Read Mode (96-well):	±2.0% ± 0.010 OD from 0.000 to 2.000 OD @ 405 nm
Normal Read Mode (384-well):	±2.5% ± 0.010 OD from 0.000 to 2.000 OD @ 405 nm
Rapid Read Model (384-well):	±2.5% ± 0.010 OD from 0.000 to 2.000 OD @ 405 nm

Repeatability (STD)

Normal Read Mode (96-well):	±0.5% ± 0.005 OD from 0.000 to 2.000 OD @ 405 nm
Rapid Read Mode (96-well):	±1.0% ± 0.010 OD from 0.000 to 2.000 OD @ 405 nm
Normal Read Mode (384-well):	±1.5% ± 0.010 OD from 0.000 to 2.000 OD @ 405 nm
Rapid Read Mode (384-well):	±2.0% ± 0.010 OD from 0.000 to 2.000 OD @ 405 nm

Throughput

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