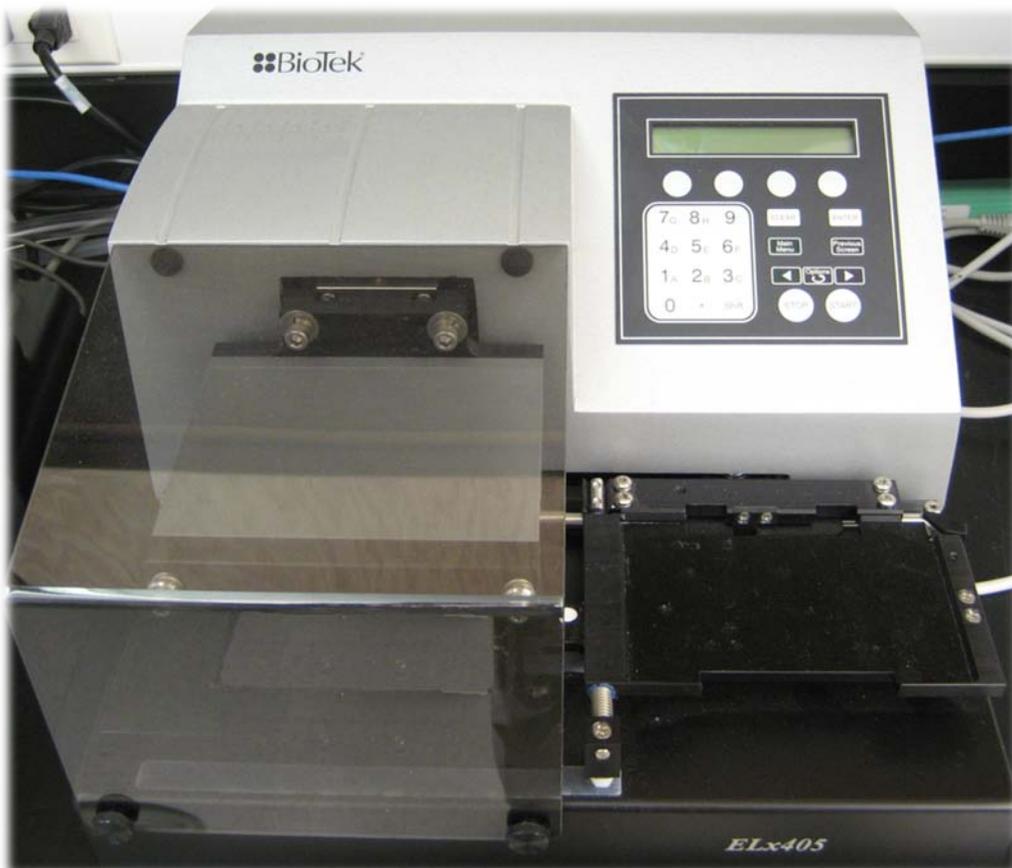




BioTek ELx405 Microplate Washer

Bergen County Technical Schools
Biotechnology Lab





BioTek ELx405 Microplate Washer Information

The BioTek ELx405 Microplate washer is a precise, fast, and easy to use user-programmable, fully automated microplate washer. The instrument functions to remove sample liquid from the wells of a 96 well plate, washes the wells with a wash buffer, and allows for soaking and shaking of the volume in the wells. The instrument also allows these options to be cycled into a user-programmed protocol for plate washing. The instrument can be used for a wide range of washing capabilities, from gentle washing for cellular assays, to vigorous washing for ELISA. The instrument has been shown to be most effective for washing a number of microplate assays, including ELISA, fluorescence, chemiluminescence, Radioimmunoassay (RIA), DNA probes, and cellular assays.

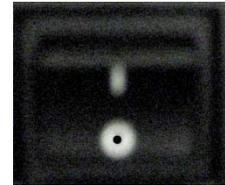
All of the instrument's functions are controlled through an easy to follow set of instructions on the instrument's LCD display. On the LCD screen are the menu functions. These menu functions can be used to wash, prime, dispense, and aspirate the wells. The intuitive menu-driven software allows users to create and store up to 75 washer programs. In addition, the built-in fluid flow, fluid detection, and vacuum sensing provide complete protection for unattended operation of the instrument.

The ELx405 only supports washing of 96 well plates, so any other plates should not be used on this instrument.



BioTek ELx405 Microplate Washer Quick Start Guide

1. Turn on the BioTek ELx405 Microplate Washer by flipping the **Power Switch** located on the rear, top right of the instrument.
- a. Allow the instrument to perform its start-up procedure before proceeding. The channel carrier and microplate carrier will move during this procedure.



- i. The LCD screen will first show "Powerup Sequence V1.03 Initializing..." while starting up.



- ii. The instrument will then perform a system self test.



Note: There is not a computer or software associated with this instrument. Once the initial start-up and self-test are complete, all operations are controlled via the **Front Panel** and **LCD screen** of the instrument.

Creating a Protocol

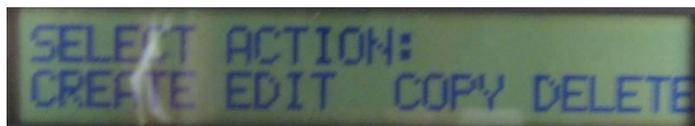
If a protocol is already established and does not need to be created, skip to the section **Running a Protocol**.

Creating a Wash Protocol

Once the instrument is ready to be used, the **Main Menu** will show up.



1. Press the soft key under **Define**.
 - a. The **Soft Keys** will be used to select between the choices on the LCD screen.
2. On the next screen, select **Create**.



3. Select the **Program Type** on the next screen. Choose **Wash**.

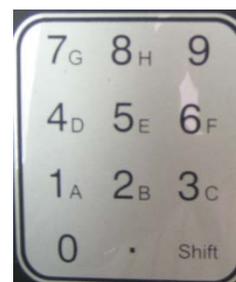


4. Enter a **Name** for the wash protocol being created.

Note: The name can be no more than 16 characters. Simply define the protocol being created.



- a. Use the soft keys to add **Punctuation** if needed.
- b. Enter **Numbers** by pressing the numbers on the **Alphanumeric Keypad**.



c. To enter the **letters A – H**, hold **Shift** and **the letter** on the Alphanumeric Keypad.

d. For the **letters I - Z**, use the **Option Button** to scroll through a list of letters.



e. Press the **Enter Button** once the name is entered.

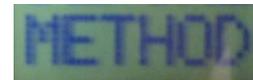


5. Next the user will have to **Define a Wash Component**.



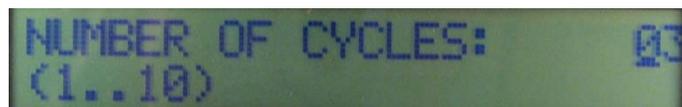
a. The user can choose between **Method**, **Dispense**, and **Aspirate**.

Note: All 3 will be used to create a complete wash protocol. To only create a dispense, aspirate, or soak protocol, proceed to the next section.

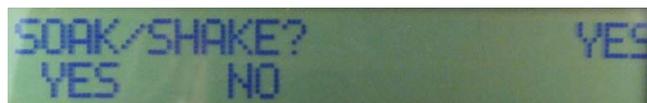


6. Select **Method** by pressing the soft key below it.

a. Choose a **Number of Cycles**. This will tell the instrument how many times to repeat the dispense and aspirate procedure that will be set up. Press **Enter**.

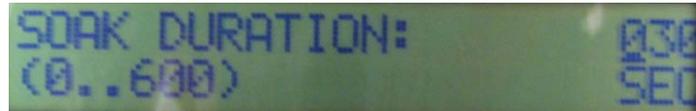


b. Next, select if there should be any **Soak/Shake** steps after the buffer is dispensed into the wells. Select **Yes** or **No**.

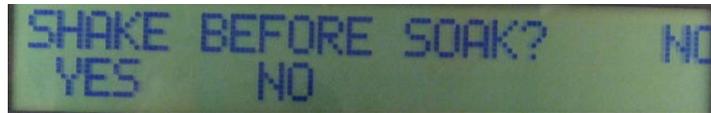


c. If **Yes** was selected:

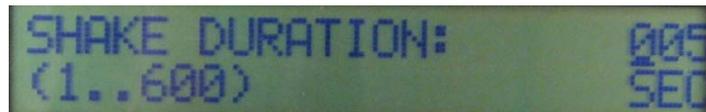
- i. Enter the **Soak Duration** on the next screen. The value can be **0** to **600 seconds**. Press **Enter**.



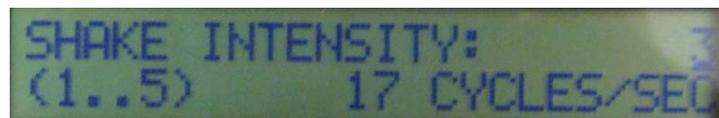
- ii. Select **Yes** or **No** for **Shake Before Soak**. This is used to aid in dispersal within the wells.



- iii. Enter the **Shake Duration**. This value can be between **1** and **600 seconds**. Press **Enter**.



- iv. Enter a value between **1** (least intense) and **5** (most intense) for **Shake Intensity**. Press **Enter**.



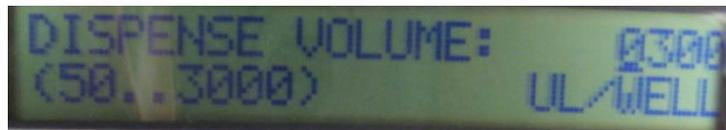
- d. Finally, select whether to **Prime After Soaking**. Priming is done routinely to keep the instrument functioning normally, so it does not need to be done. Select **No**, and press **Enter**.



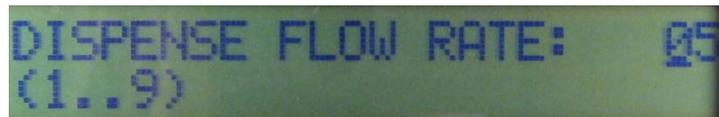
7. After completing the setup of the method procedure, the instrument will return to the **Define a Wash Component Screen**. Here, select the **Dispense (DISP)** option by pressing the soft key below it.

A rectangular soft key with the text "DISP" in blue on a dark background.

- a. First, the user must enter the **Dispense Volume** using the **Alphanumeric Keypad** (The volume entered should always be 250 μ L for the 96 well plates). Press **Enter**.

A screen showing "DISPENSE VOLUME:" with a range of "(50..3000)" and a value of "0300" followed by "UL/WELL".

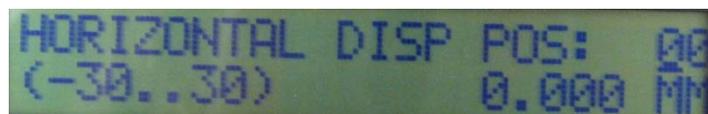
- b. Next, enter the **Dispense Flow Rate**. The flow rate can range from **1** to **9** for normal washes. The value can be left as **5** (middle rate) for most samples. For samples that need a delicate wash, choose between **10** or **11**. Press **Enter**.

A screen showing "DISPENSE FLOW RATE:" with a range of "(1..9)" and a value of "05".

- c. Next, enter the **Dispense Height**. The height ranges from **12** to **180**. The value entered should be **120**. Press **Enter**.

A screen showing "DISPENSE HEIGHT:" with a range of "(12..180)" and a value of "120" followed by "15.240 MM".

- d. Next, enter the **Horizontal Disp Position**. The range for the dispenser position is **-30** to **30**, The value should be set as **0**. Press **Enter**.

A screen showing "HORIZONTAL DISP POS:" with a range of "(-30..30)" and a value of "00" followed by "0.000 MM".

- e. Next, select whether or not a **Bottom Wash** step needs to be added to the dispense procedure. This is used to create a cleaning turbulence for vigorous cleaning. Select **Yes** or **No**.



- f. Finally, select whether or not the instrument should be **Primed** before the protocol starts. Priming is done routinely to keep the instrument functioning normally, so **No** can be selected.

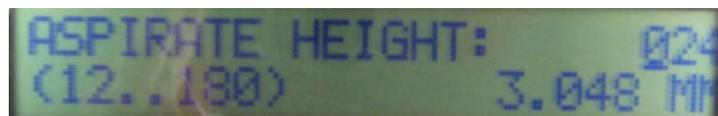


8. Again, after completing the setup of the dispense procedure, the instrument will return to the **Define a Wash Component Screen**. Here, select the **Aspirate (ASPIR)** option by pressing the soft key below it.

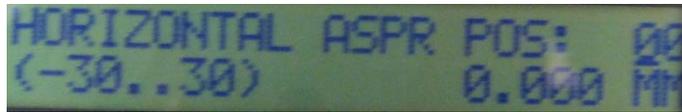


Note: For a normal aspiration protocol, no changes need to be made to the aspiration procedure. This section can be skipped unless any of the following changes need to be made for a specific protocol.

- a. First, the user can change the **Aspirate Height**. This value ranges from **12** to **180**, with 12 being the closest to the bottom of the wells. Enter **12** for most assays, and press **Enter**.

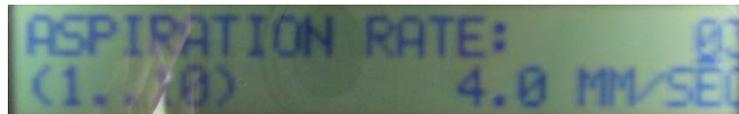


- b. Next, select the **Horizontal Aspiration Position**. The values for the position range from **-30** to **30**. This value should be set as **0**. Press **Enter**.



HORIZONTAL ASPR POS: 00
(-30..30) 0.000 MM

- c. Next, select the **Aspiration Rate**. The values range from **1 – 10**. Choose from **1** (slowest) to **5** (fastest) for most non-cellular based assays. Choose **7 – 10** for delicate cell-based assays. Choose **6** for the most delicate aspiration. Press **Enter**.



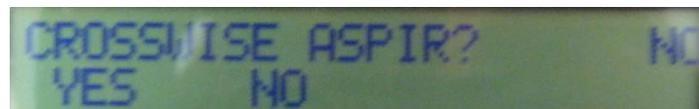
ASPIRATION RATE: 00
(1..10) 4.0 MM/SEC

- d. Next, select the **Aspirate Delay**. This ranges from **0 – 5,000 milliseconds**. For most assays, no delay is needed, so the value can be set to **0**. Press **Enter**.



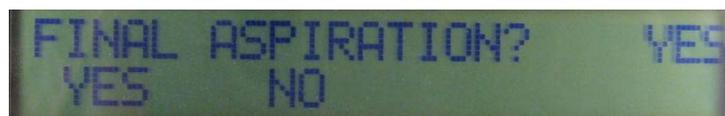
ASPIRATE DELAY: 0000
(0..5000) MSEC

- e. Next, select whether or not to perform a **Crosswise Aspiration**. Most assays do not need to perform this step. Select **Yes** or **No**.



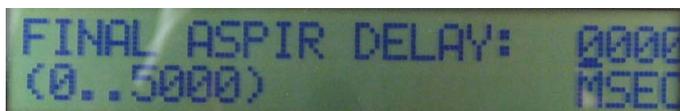
CROSSWISE ASPIR? NO
YES NO

- i. This procedure will aspirate the center of the wells and then move around the edge of the wells to get rid of any residual buffer.
- f. Next, select whether or not to perform a **Final Aspiration**. Select **Yes** or **No**.

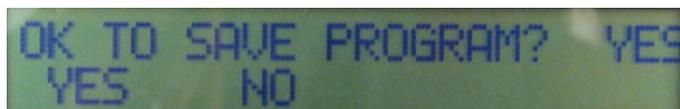


FINAL ASPIRATION? YES
YES NO

- i. If **No** is selected, the wash buffer will remain in the wells at the end of the plate wash cycle. If **Yes** is selected, the buffer will be aspirated and the wells will be empty after the final wash.
- g. Finally, if **Yes** was selected, enter how long of a **Final Aspiration Delay** there should be. The range is **0** to **5,000** milliseconds. Press **Enter**.



9. After completing the aspiration procedure steps, again, the instrument will return the user to the **Define a Wash Component Screen**. Press the **Main Menu Button**. The user will be asked to **Save** the protocol. Press **Yes**, and then **Enter**.



Create a Dispense, Aspirate, or Soak Only Protocol

If the user only wants to setup a single dispense, aspirate, or soak protocol:

1. On the **Main Menu Screen** select **Define**.
2. Select the **Program Type** to be used.
3. Follow **Step 4**, and then follow the appropriate steps for either the dispense (Step 7), aspirate (Step 8), or soak (Step 6c) procedure from the section Creating a Wash Protocol listed above.

Editing, Copying, or Deleting a Protocol

To edit, copy and then edit, or delete a protocol:

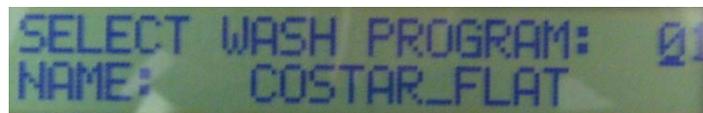
1. Select **Define** on the **Main Menu Screen**.



2. Select **Edit**, **Copy**, or **Delete**.



3. Use the **Arrow Buttons**, or the **Option Button**, to scroll through the list of protocols. Once the desired protocol is found, press **Enter**.



- a. For deleting, the instrument will ask if the user is sure they want to delete the protocol.
- b. To edit, follow the procedure listed above for each part of the protocol to be changed.

Running a Protocol

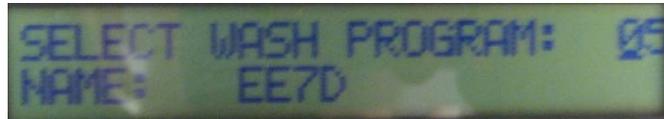
To run a protocol that has already been created:

1. Make sure that the appropriate **Wash Buffer** is in the **Wash Buffer Containers** attached to the instrument.
2. Make sure that the **Aspiration Liquid Container** and **Overflow Liquid Container** are empty.

3. Select **Run** from the **Main Menu Screen**.



4. Select the type of program to run from the **Program Type Screen**.



5. Use the **Arrow Buttons** or the **Option Button** to select the name of the protocol that is to be run.



Press **Enter**.

- a. The instrument will tell the user to make sure that the reagent bottle is attached, and to press the start key.



6. Press the **Start Key** on the instrument keypad.

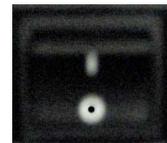


7. Allow the instrument to complete running the established protocol. If the wash needs to be stopped, press the **Stop Key** on the keypad.



Shutting Down the Instrument

1. Turn off the ELx405 Microplate Washer by flipping the **Power Switch**, located on the rear, top right.



2. Empty the **Aspiration Liquid Container** and **Overflow Liquid Container** of any liquid from the washes.

3. **Make sure the station is neat before leaving the instrument!**

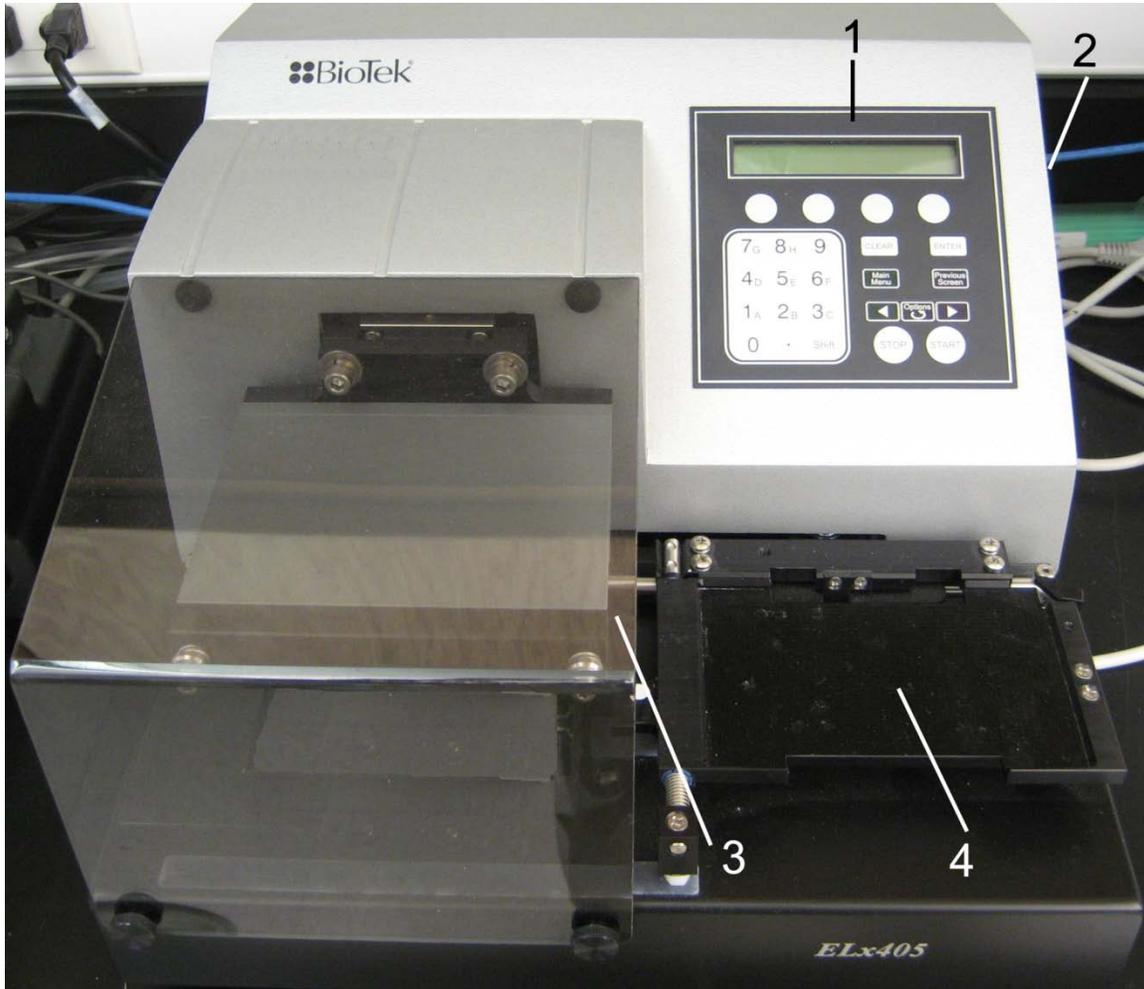


BioTek ELx405 Microplate Washer Safety Sheet

1. Samples should be handled according to good laboratory procedures and methods in order to prevent accidents.
2. Only operate the instrument on a flat surface, and away from excessive humidity.
3. The instrument has moving parts:
 - a. Do not attempt to exchange microplates while the instrument is operating.
 - b. Keep the work area around the instrument clear to avoid obstruction of the moving parts.
 - c. Do not touch the vacuum or dispenser needles. They are precisely aligned for the microplates, and could be damaged or broken.
4. Ultrasonic energy is present in the ultrasonic cleaner reservoir when Autoclean programs are running. Avoid putting your fingers in the bath. Ultrasonic energy can be destructive to human tissue.
5. Do not remove any panels or cords from the instrument to avoid electrical shock.
6. If any liquid should fall near the instrument, do not operate the instrument. Fluid seepage into internal components creates a potential shock hazard, and can cause the instrument to not work properly.
7. Cleaning the workstation around the instrument is necessary. Never attempt to clean any internal spaces of the instrument.
8. Food and drinks should not be placed on or near the instrument.

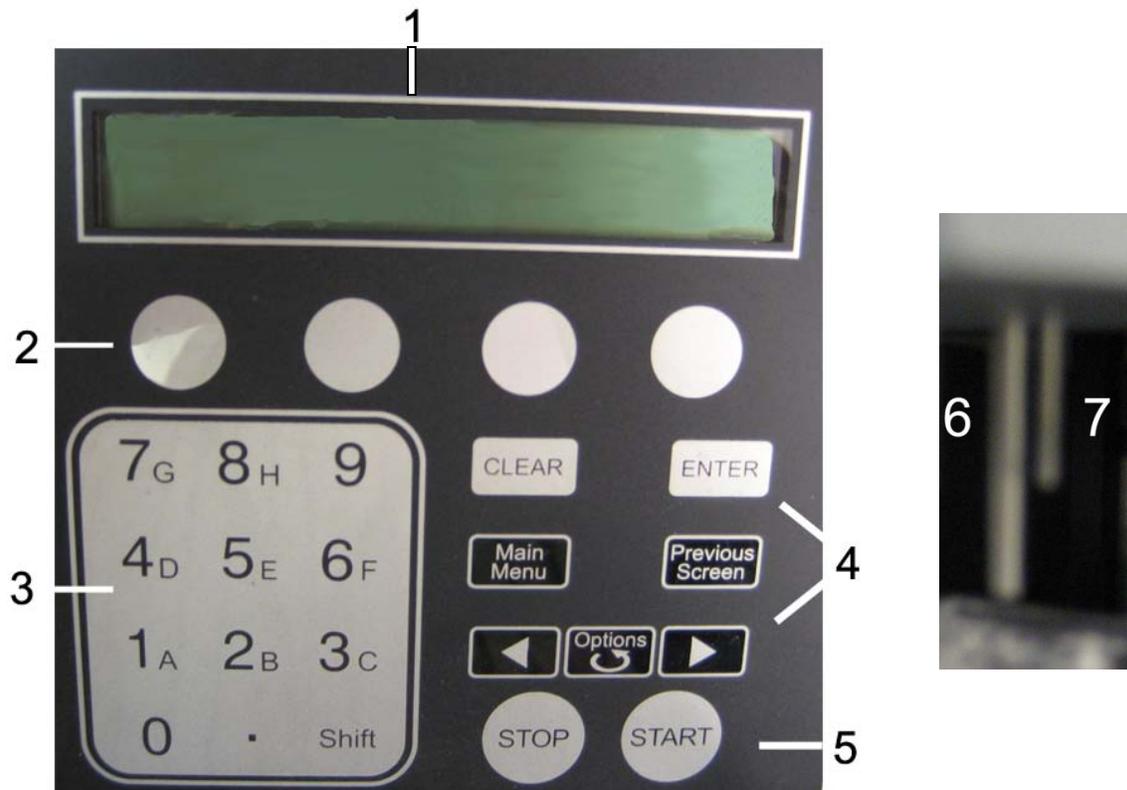


BioTek ELx405 Microplate Washer Instrument Information



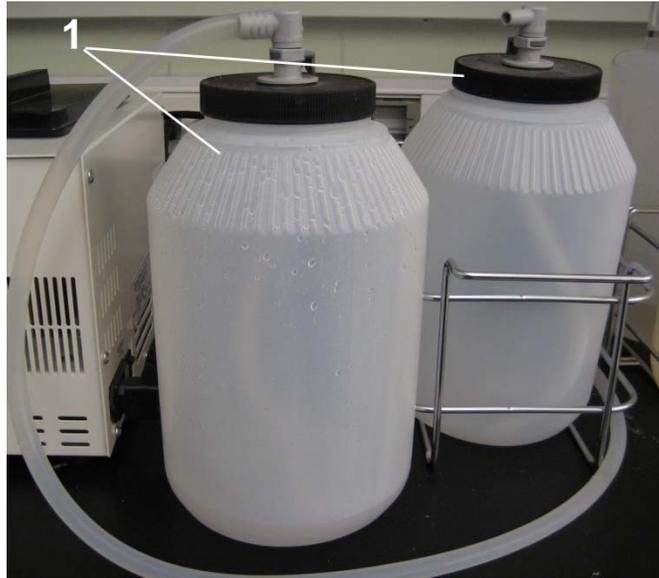
1. Instrument keypad and LCD display
2. Power switch (in back)
3. Aspiration and dispenser channel ends
4. Microplate carriage

The Instrument Keypad and Washer Channels



1. LCD display and menu functions
2. Soft keys (used to select menu functions on the LCD)
3. Alphanumeric keys
4. Special function keys
5. Wash start and stop keys
6. Aspiration channel end (1 of 96)
7. Dispenser channel end (1 of 96)

Dispense and Aspiration Bottles



1. Wash Buffer Containers
2. Aspiration Liquid Container
3. Overflow Liquid Container