



# BenchTop Pipettor

*Accelerate Liquid Transfers*

250 $\mu$ l, 96/384 bench top pipettor for use with OneTouch tips

## Instruction Manual

Catalog # 73960, 73970 (with hardshell shipping case)

73960 rev. Jul2011



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## **WARRANTY**

### **Limited One Year Product Warranty**

This Sorenson BioScience, Inc. instrument is warranted to be free of defects in materials and workmanship for a period of ONE (1) YEAR from the date of delivery. At its discretion, Sorenson BioScience, Inc. will repair or replace all defective components during this warranty period. Sorenson BioScience, Inc. reserves the right to use new, repaired, or refurbished instruments or components for warranty replacements. Repair or replacement of products or components under warranty does not extend the original warranty period.

### **Warranty Exceptions**

The above warranty does not apply to defects resulting from misuse, neglect, or accident, including without limitation: operation with incompatible solvents or samples aspirated beyond the volume of the disposable pipette tips; operation outside of the environmental or use specifications; failure to follow recommended operating instructions; failure to use compatible accessories; improper or inadequate maintenance by the user; installation of the instrument or use of products not authorized by Sorenson BioScience, Inc.; use with incompatible liquids or other materials; and modification or repair of the instrument not authorized by Sorenson BioScience, Inc. In addition, the warranty is void if the serial number has been altered or defaced.

Maintenance is the owner's responsibility. Promptly wipe and remove any chemicals, solutions or samples when spilled on this instrument. Keep the *Bearing Rail* clean of spills and debris to ensure easy side-to-side motion.

### **Warranty Claims**

Warranty claims must be submitted during the warranty period. Submit claims promptly to Sorenson BioScience, Inc. Technical Support at 801-266-9334 or email [sorbio@corning.com](mailto:sorbio@corning.com). Upon approval, you will be supplied with the name and address of an authorized service center as to where to ship the instrument. A repaired or replaced instrument will be returned as promptly as feasible. Proper shipping, packaging, and handling charges to the service center are the responsibility of the owner. Shipping charges back to the owner are the responsibility of the service center.

### **Extended Warranty and Maintenance Agreement**

An extended warranty or service and maintenance agreements are available through your salesperson or distributor. Please call for details.

### **General Service**

If your instrument has exceeded the warranty period, or repairs are not covered due to warranty exclusions or exceptions, contact Sorenson BioScience, Inc. Technical Support at 801-266-9334 or email [sorbio@corning.com](mailto:sorbio@corning.com). An authorized service center will reply with a non-binding good faith estimate and a shipping address.

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## **IMPORTANT SAFEGUARDS**

READ ALL INSTRUCTIONS BEFORE USING INSTRUMENT. SAVE THIS INSTRUCTION MANUAL.

The BenchTop Pipettor has been engineered for maximum functionality as well as safety; however, basic safety precautions and common sense must always be demonstrated when using any electrical product. Do not attempt to modify any part of the BenchTop Pipettor. If you experience problems with or have questions about your BenchTop Pipettor, contact Technical Support at Sorenson BioScience, Inc. at 801-266-9334 or email [sorbio@corning.com](mailto:sorbio@corning.com).

### **DANGER**

- DO NOT allow the instrument to be submerged in any liquid.
- DO NOT use in any environment other than an indoor laboratory.

### **WARNING**

To reduce the risk of burns, electrocution, fire, injury or damage to the instrument:

- Use only for its intended purpose as described in this manual. Do not use attachments and accessories not recommended by the manufacturer.
- DO NOT operate this instrument if it is damaged in any way.
- Keep this instrument away from heated surfaces.
- DO NOT turn the unit upside down: the BenchTop Pipettor must always rest on its *Base* to avoid damaging internal components or breaking the housing.

## GENERAL INFORMATION

This instruction manual includes all required information regarding unpacking, installing, operating, programming, and maintaining the BenchTop Pipettor.

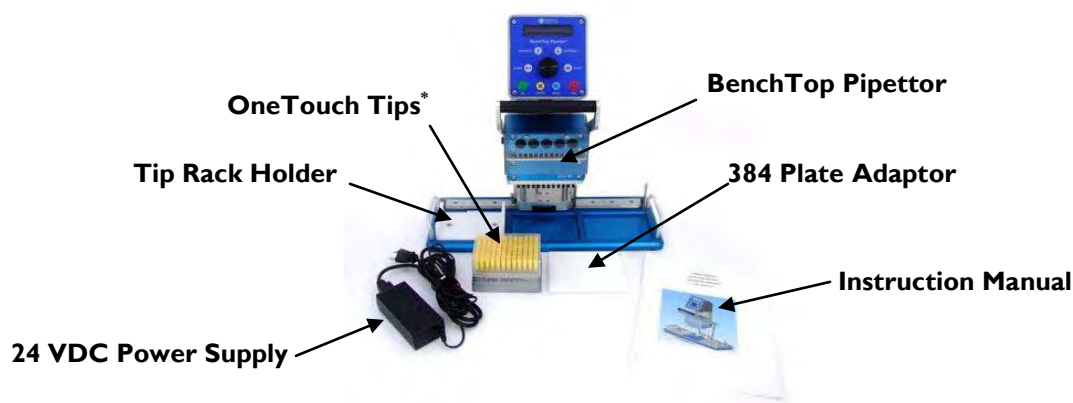
This instrument is UL compliant and CE certified. For compliance certification, see The **DECLARATION OF CONFORMITY** on page 22 in the **APPENDIX**.

**RISK OF ELECTRIC SHOCK:** Although this equipment is fully insulated and grounded, it is important for all users to be aware of the potential hazard of using liquids close to electrical equipment. If any liquids are spilled, immediately disconnect the instrument from the main power source and clean the equipment and the surrounding area. **DO NOT** reconnect the equipment until it has been fully inspected.

**CAUTION:** The protection afforded by this equipment may be impaired if used in a manner not specified by the manufacturer. Use only accessories and disposables recommended by the manufacturer. Accuracy and operating lifetime may be affected if alternative products are used. Any damage caused by non-recommended products are not covered by the manufacturer's warranty.

## UNPACKING THE BENCHTOP PIPETTOR

Prior to operation, carefully remove instrument and accessories from the shipping container using the handles on the base and inspect for damaged or missing items. If any parts are found to be damaged or missing, contact Sorenson BioScience, Inc. at 801-266-9334 or email [sorbio@corning.com](mailto:sorbio@corning.com).



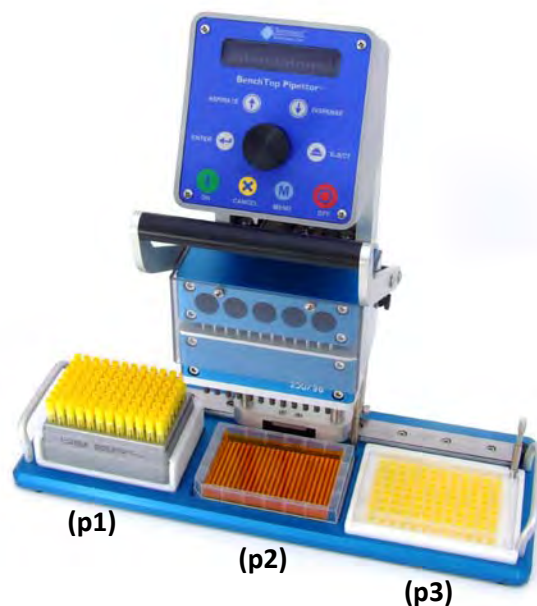
\*OneTouch tips are sold separately.

**NOTE:** Save all packaging included with the shipping container to use if a return is necessary. The BenchTop Pipettor must be shipped in an approved container to avoid damage which may invalidate the warranty. Additional packaging containers may be purchased for a minimal charge. Alternatively, the BenchTop Pipettor may be purchased with a protective hard shell shipping case (catalog # 73970) to prevent damage during subsequent transportations. For shipping inquiries, contact Sorenson BioScience, Inc. at 801-266-9334 or email [sorbio@corning.com](mailto:sorbio@corning.com).

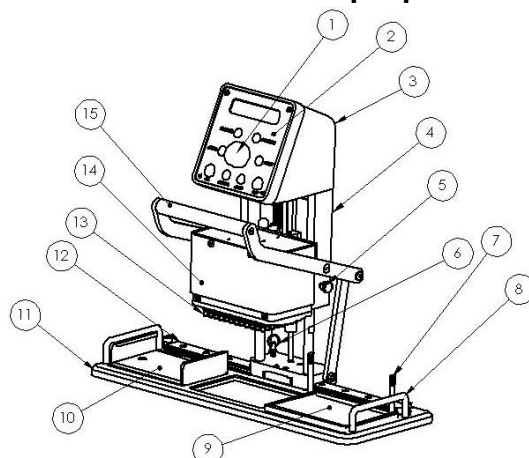
## DESCRIPTION AND INSTRUMENT OVERVIEW

The BenchTop Pipettor is a highly precise and accurate, 250 $\mu$ l, 96/384-well pipettor designed to conveniently process an entire microplate on a laboratory bench top. Supplied with a high performing electric motor and circuit unit, the BenchTop Pipettor ensures precise control in aspirating and dispensing volumes with the touch of a button. Tips are effortlessly picked up and ejected using uniquely designed Sorenson OneTouch pipette tips. Three work positions (p1, p2, and p3) are available to conveniently perform multiple combinations of processing. Each position is automatically centered by manually sliding the pipette *Head Assembly* horizontally. Raising and lowering pipette tips into the microplates is performed by simply moving the *Levered Handle* vertically. The head and tip assembly is precisely counter-balanced to make vertical motion effortless. The entire process, including picking up tips, aspirating from one location, and dispensing to another is accomplished without the hassles associated with adding and removing items from the pipetting platform. The 3-position workstation is light enough to carry from one bench top to another and can accommodate work at any location. Advantages of the BenchTop Pipettor include:

- **Portable bench top processing**
- **User friendly operation**
- **Accurate and precise liquid handling**



## Parts of the BenchTop Pipettor



### PARTS

Prior to operation, carefully remove instrument from the shipping container and inspect for damaged or missing parts. If any parts are found to be damaged or missing, contact Sorenson BioScience, Inc. at 801-266-9334.

<b>Part No.</b>	<b>Description</b>	<b>Function</b>
1	<b>Control Wheel</b>	Rotate clockwise and counter clockwise to select values
2	<b>Control Panel</b>	Contains the keypad and display screen
3	<b>Electronics Enclosure</b>	Houses the 24 VDC electronic components
4	<b>Chassis Assembly</b>	Couples the electromechanical linear actuator to <i>Head Assembly</i>
5	<b>Locking Thumb Screws (2)</b>	Use to lock <i>Head Assembly</i> in low position when shipping or transporting
6	<b>Locking Key Ring</b>	Spring-loaded plunger engages for shipping and/or transporting
7	<b>Height Adjustment Posts (2)</b>	Sets depth of pipettor <i>Head Assembly</i>
8	<b>Side Handles (2)</b>	Use to pick up the instrument (located on each side of the <i>Base</i> )
9	<b>384 Plate Adaptor</b>	Use when pipetting into 384-well plates. Otherwise, remove from platform.
10	<b>Tip Rack Holder</b>	Secures OneTouch tip rack
11	<b>Base</b>	Three-position base
12	<b>Bearing Rail</b>	For easy horizontal positioning
13	<b>Tip Fittings</b>	Designed for use with OneTouch tips ONLY
14	<b>Head Assembly</b>	96-channel pipettor <i>Head Assembly</i> shown
15	<b>Levered Handle</b>	Use to raise and lower the <i>Head Assembly</i>



## ACCESSORIES

The BenchTop Pipettor includes the following *Base* accessories:

- **Tip Rack Holder:** To place and pick up OneTouch tips, simply:
  1. Slide a rack of 200ul OneTouch tips into the *Tip Rack Holder* and push it all the way back **(a)**.
  2. Using the *Levered Handle*, slide the *Head Assembly* over the rack of tips. The *Head Assembly* will automatically center itself. Pull the *Levered Handle* down to engage with the OneTouch tips **(b)**.
  3. Lift the tips up and out of the rack **(c)** and continue processing.



**Caution:** For your safety, keep both hands on the *Levered Handle* when moving the *Head Assembly* to avoid accidental pinching and injury.

- **384 Plate Adaptor:** The *384 Plate Adaptor* allows use of this 96-channel BenchTop Pipettor with 384-well microtiter plates. Simply place the *384 Plate Adaptor* into one of the three plate positions on the *Base*. Insert a 384-well microtiter plate into the *384 Plate Adaptor*, aligning two edges of the plate marked with a single dot. Aspirating and dispensing are performed using four manual "passes" of the pipettor in order to accommodate all 384 wells. For the first pass, aspirate and/or dispense as usual. For the second pass, slide the microplate to the side with two dots and continue aspirating and/or dispensing. Repeat aspirating and/or dispensing for the third and fourth passes at the three- and four-dot locations respectively.



## RECOMMENDED PIPETTE TIPS

The BenchTop Pipettor has been designed for use ONLY with Sorenson OneTouch pipette tips.

Sorenson OneTouch tips are uniquely designed to create a leak-proof seal requiring far less force than standard tips, making them ideal for the proper sealing fit necessary for optimal performance with the BenchTop Pipettor.

**CAUTION:** The BenchTop Pipettor has been designed for use ONLY with OneTouch tips. Other pipette tips are not recommended and may result in inferior performance. Use only accessories and disposables recommended by the manufacturer. Accuracy and operating lifetime may be affected if alternative products are used. Any damage caused by non-recommended products is not covered by the manufacturer's warranty.

OneTouch tips are not recommended for repeated use. Use once and discard.

The following OneTouch tips are compatible with the BenchTop Pipettor and may be purchased from an authorized distributor of Sorenson BioScience, Inc. products:

<u>Cat. No.</u>	<u>Description</u>	<u>Maximum Volume*</u>	<u>Quantity</u>
10330	Non-Sterile, 200µl Pipette Tip	250µl	960/pk; 5 packs per case
10340	Sterile, 200µl Pipette Tip	250µl	960/pk; 5 packs per case
10350	Sterile, Barrier 200µl Pipette Tip	250µl	960/pk; 5 packs per case

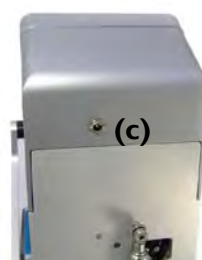
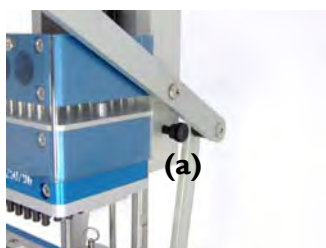
\*The maximum volume for the BenchTop Pipettor is 250µl. The actual tip volume range is 1-330µl.

# SET UP AND INSTALLATION

## INSTALLING THE BENCHTOP PIPETTOR

The BenchTop Pipettor has been shipped in the locked horizontal and vertical positions. To unlock and power up the instrument, follow these steps:

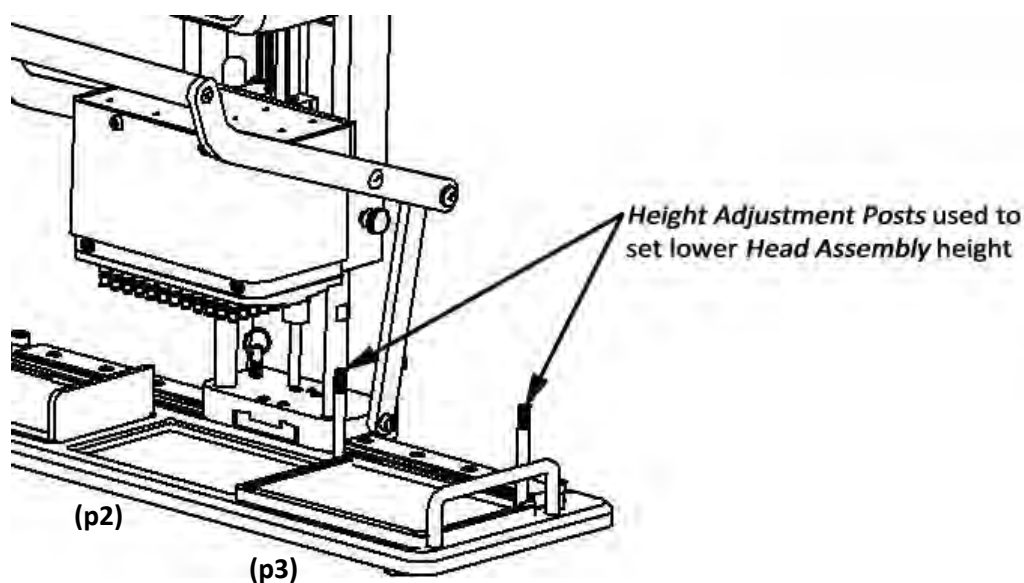
- **Unlock Vertical Motion:** Place the instrument on a clean, horizontal, and stable bench top. Loosen both black plastic *Locking Thumb Screws (a)* enough to easily move the pipettor *Head Assembly* up and down. Leave the loosened *Locking Thumb Screws* on the instrument for future use. The instrument is now free to move up and down.
- **Unlock Horizontal Motion:** Pull up on the *Locking Key Ring (b)* and rotate it 90°. This places the spring-loaded plunger in the unlocked position. The instrument is now free to move side-to-side.
- **Power Up:** Plug the 24 VDC power supply into an AC electrical outlet. Insert the plug on the back of the instrument **(c)** and screw the plug collar onto the threaded jack for positive engagement. The instrument will immediately "home" itself. The instrument is now ready for use.



## ADJUSTING PIPETTOR HEAD ASSEMBLY

The BenchTop Pipettor *Head Assembly* is easily positioned vertically and horizontally by adjusting the *Locking Thumb Screws* and sliding the *Levered Handle*.

- **Vertical Height Adjustment:** Set the height that stops the *Head Assembly* when lowered with the *Levered Handle* by adjusting the two *Height Adjustment Posts* located under the *Chassis Assembly*. Place a microtiter plate in either the center (p2) or right (p3) plate position and lower the *Head Assembly* using the *Levered Handle* until the desired height is achieved. Rotate the *Height Adjustment Posts* until they touch the *Chassis Assembly*.



- **Horizontal Motion:** Once the vertical height has been adjusted, the *Head Assembly* is automatically aligned and perfectly centered over each well position. Grab the *Levered Handle* and gently move left or right. Motion is effortless.

## ADJUSTING ASPIRATION AND DISPENSING SPEEDS

To choose the aspiration and dispensing speed on the BenchTop Pipettor:

- Select **MENU** on the *Control Panel*.
- Rotate the black plastic *Control Wheel* until "**Options**" appears on the display screen, then select **ENTER**.
- Rotate the *Control Wheel* to "**Motor Speed**", and then select **ENTER**.
- Rotate the *Control Wheel* to select one of the three speeds ("**Fast**", "**Medium**", or "**Slow**"), then select **ENTER** to activate the selected speed.

### The BenchTop Pipettor Control Panel



## BASIC OPERATION

### BASIC OPERATING BUTTONS

Once the BenchTop Pipettor has been properly installed and plugged in, the buttons on the *Control Panel* are ready for the following one-touch keypad operations:

<u>Operation</u>	<u>Action</u>
<b>ON</b>	Powers up instrument and begins a "homing" sequence
<b>OFF</b>	Stops all motion, anytime. Acts as an emergency shut-off button.
<b>ASPIRATE</b>	Requires user to enter a liquid aspirating volume ( $\mu$ l). Turn black <i>Control Wheel</i> to select a value between 0 and 250. Adjust volumes slowly using 1 $\mu$ l increments or more quickly using 5 $\mu$ l increments up to 250 $\mu$ l maximum. Press <b>ENTER</b> to store the value.
<b>ENTER</b>	Performs the following: <ul style="list-style-type: none"> <li>• Use to enter <b>ASPIRATE</b> and <b>DISPENSE</b> volumes dialed in</li> <li>• Activates the last command while displaying the total volume of liquid/air inside the OneTouch pipette tips. For example, if multiple 20 <math>\mu</math>l dispenses are necessary, pressing <b>ENTER</b> will repeat the last 20 <math>\mu</math>l dispense. This will continue until all of the aspirated liquid has been dispensed.</li> <li>• Clears the display screen when an error message appears</li> <li>• Saves programs created in the program menu</li> <li>• Saves options selected in the "<b>Options</b>" menu, such as "<b>Motor Speed</b>"</li> </ul>
<b>DISPENSE</b>	Requires user to enter a liquid dispensing volume ( $\mu$ l). Turn black <i>Control Wheel</i> to select a value between 0 and 250. Adjust volumes slowly using 1 $\mu$ l increments or more quickly using 5 $\mu$ l increments up to 250 $\mu$ l maximum. Press <b>ENTER</b> to store the value.
<b>EJECT</b>	Ejects tips from <i>Head Assembly</i> . This action is terminated when there is liquid in the pipette tips; display screen instructs user to dispense liquid before ejecting pipette tips.
<b>CANCEL</b>	Performs the following: <ul style="list-style-type: none"> <li>• Use as a go-back button to bring user to previous command. Press repeatedly to go back several steps, one step at a time as necessary when programming.</li> <li>• Pauses an action</li> </ul>
<b>MENU</b>	When pressed, displays the following actions (select action by turning black <i>Control Wheel</i> ): <p><b>"Mix"</b> Requires user to enter a mixing volume (0-250 <math>\mu</math>l) and number of mixing cycles (0-25). Turn black <i>Control Wheel</i> to select the desired value. Adjust value slowly using 1 <math>\mu</math>l increments or more quickly using 5 <math>\mu</math>l increments. Press <b>ENTER</b> to store the value.</p> <p><b>"Options"</b></p> <ul style="list-style-type: none"> <li>• "<b>Motor Speed</b>" — Press <b>ENTER</b> to adjust speed to "<b>Slow</b>", "<b>Normal</b>", or "<b>Fast</b>". Press <b>ENTER</b> once again to save option.</li> <li>• "<b>Pipettor Operating System</b>" — Select to view the current software version.</li> </ul> <p><b>"Service"</b> Hidden service menu used for calibrating volume and speed. Use only when working with a certified Sorenson BioScience, Inc. technician. For more information, contact Sorenson BioScience, Inc. Technical Support at 801-266-9334 or email sorbio@corning.com.</p> <p><b>"Program"</b> Use to create and save an individual pipetting program into memory. A maximum of 100 individual steps can be stored in the program. Further programming information is located under <b>BASIC PROGRAMMING INSTRUCTIONS</b> on page 14 and 24.</p>

## BASIC PIPETTING INSTRUCTIONS

To ensure safe and accurate liquid handling, follow these simple instructions to operate the BenchTop Pipettor:

### General Pipetting Setup

Ensure *Levered Handle* is in the upright vertical position.

Slide OneTouch tip rack into secure *Tip Rack Holder* and push completely back.

Using the *Levered Handle*, adjust the horizontal slide to position the pipettor *Head Assembly* over the tip rack.

Using the *Levered Handle*, fully engage 96 pipette tips onto nozzles using firm downward pressure. Raise the *Levered Handle* to the highest position.

Set the tip depth for the reservoir position (p2) using the *Height Adjustment Posts*. Set the tip depth for the plate/block loading position (p3) using the *Height Adjustment Posts*.

Place the desired reservoir into position two (p2).

Move the pipettor *Head Assembly* to the second position (p2). The instrument will "seat" into the appropriate notch.

### Aspirating Liquid into the Pipette Tips

Select the **ASPIRATE** button on the *Control Panel*. Rotate the *Control Wheel* (in 1 or 5 $\mu$ l increments) to the desired volume (0 to 250 $\mu$ l maximum). The display screen will display:

**"Aspirate"** – the desired aspirating volume

**"Current Volume"** – tracks the volume of liquid aspirated and/or dispensed in each of the OneTouch tips

Using the *Levered Handle*, lower the tips into the vessel. The tips automatically stop at a depth defined by the *Height Adjustment Post* setting. Tips should immerse into liquid at a depth of ~4mm.

Press the **ENTER** button on the *Control Panel* to aspirate the selected volume.

**"Current Volume"** appears on the display screen to indicate the selected volume.

Once the pipette tips contain the aspirated sample volume, raise the pipettor *Head Assembly* to the highest position using the *Levered Handle*.

Slowly slide the pipettor *Head Assembly* into the notched guide at position three (p3) so that it "seats" over the target plate.



Slowly and carefully lower the pipettor *Head Assembly* so that the ends of the tips **do not** touch the bottom of the wells (the *Height Adjustment Post* settings prevent bottoming out).

### Dispensing Liquid from the Pipette Tips

Select the **DISPENSE** button on *Control Panel*. Rotate the *Control Wheel* to the desired dispensing volume. Press **ENTER** on the *Control Panel* to begin dispensing. The display screen will display:

**"Dispense Volume"** – the amount to be dispensed from each tip

**"Current Volume"** – the volume remaining in each tip

Once all liquid has been dispensed from the pipette tips and **"Current Volume"** reaches zero, **"Raise Tips"** will appear on the display screen.

Using the *Levered Handle*, raise the pipettor *Head Assembly* upward to the highest position. Press **ENTER** once again to return the instrument to the "ready position." **"Ready"** appears on the display screen.

### Mixing Liquids using the BenchTop Pipettor

Ensure pipette tips are empty. Fully submerge tips into liquid by lowering the pipettor *Head Assembly* until the tips are deep within the wells of the microplate (or other vessel). Using **MENU** on the *Control Panel*, select **"Mix"** and press **ENTER**. Rotate the *Control Wheel* to the desired mixing volume (approximately half the volume in the wells; 0-250 $\mu$ l) and press **ENTER**. Next, rotate the *Control Wheel* to the desired number of mixing cycles (0-25 cycles). The display screen will display:

**"uL"** – the mixing volume or the amount of liquid to be mixed by each tip

**"Cycles"** – the number of desired mixing cycles

Press **ENTER** to begin the mixing cycles. While the pipettor is mixing, the display screen will indicate the action until all mixing cycles have completed.

Once mixing has finished, press **ENTER** to return the instrument to the "ready position." **"Ready"** appears on the display screen.

Repeat aspiration, dispensing, and mixing steps as necessary.

### Ejecting Tips

With the pipettor raised to the highest position, slide the pipettor *Head Assembly* into the notched guide in position one (p1) above the empty tip rack. Lower the tips so they are positioned half way into the holes of the rack. Press **EJECT** on the *Control Panel*.

Once the pipette tips have been ejected, lift the pipettor *Head Assembly* to the highest position.

This ends the basic pipetting operation.

To adjust the aspiration and dispensing speeds on the BenchTop Pipettor, see **ADJUSTING ASPIRATION AND DISPENSING SPEEDS** on page 9.

## BASIC PROGRAMMING INSTRUCTIONS

The BenchTop Pipettor is easily programmed. A program containing up to 100 individual steps can be created and saved into the internal flash memory. The program may be stored and retrieved by pressing **MENU** on the *Control Panel*, then choosing "**Program**" using the *Control Wheel* as shown here:

- "**Program**" — Rotate the *Control Wheel* to choose the desired command, then press **ENTER**. Select one of the three upper level commands: "**Run**", "**Delete**", or "**Edit**":

"**Run**" — Press **ENTER** to run the program stored in memory.

```
Program:      Run
Select & press enter
```

"**Delete**" — Use this command to remove the stored program.

```
Program:      Delete
Select & press enter
```

"**Edit**" — Modify or view the existing program, one line at a time.

```
Program:      Edit
Select & press enter
```

For further details on creating and running programs, see additional **PROGRAMMING COMMANDS AND ACTIONS** in the **APPENDIX** on page 24.

## View, Edit, and Save a Program

- From the "**Program**" menu, select "**Edit**" and press **ENTER**. Line "0" displays the command previously entered for that line.

```
0          Cls
```

- Press **ENTER** again and a blinking cursor appears under line "0" indicating that the entry may be modified. Turn the black *Control Wheel* to view the line numbers. Preprogrammed lower level commands (such as "**Print**" below) are also displayed. For additional lower level commands, see **APPENDIX** page 24.

```
4      Print          Line 1
Dispense:
```

- Once the desired line number to edit appears, press **ENTER** and rotate the black *Control Wheel* to scroll the cursor into the adjacent command prompt:

```
4      Print          Line 1
Dispense:
```

- Press **ENTER** again. The cursor beneath the command ("**Print**") begins blinking, indicating that the command may be modified. Rotate the black *Control Wheel* to scroll through the lower level command values.
- Press **ENTER** again and the cursor stops blinking. Now rotate the *Control Wheel* to move the cursor into the next command prompt, pressing **ENTER** to select the desired values when prompted. Repeat the last three steps until the program has been fully edited.
- When done, press **CANCEL** and select "**Yes**" or "**No**" to either save or delete the program.

```
Save Changes?  Yes
Select & press enter
```

## Delete and Create a New Program

- First, clear the existing program by using the "**Delete**" command from the "**Program**" menu. This will delete all lines from the program.

```
Program:      Delete
Select & press enter
```

- To create a new program, rotate the *Control Wheel* to select the upper level command "**Edit**".

- Follow the same steps as in "**To View, Edit, and Save a Program**" above. The only difference is that the existing program is first deleted to clear all commands from the program line numbers.

**NOTE:**

- 1) See **APPENDIX**, pages 24 and 25 for available lower level programming commands along with additional programming examples.
- 2) When creating or editing a program, a solid cursor appears under one command prompt at a time. Pressing the **ENTER** button causes the cursor to blink. A blinking cursor under a command indicates that a value can be modified by rotating the *Control Wheel*. If the cursor is not blinking, then rotating the *Control Wheel* will select an adjacent entry on the display screen.

## MAINTENANCE

### REGULAR MAINTENANCE

To assure longevity and ease-of-use of the BenchTop Pipettor, wipe off any spills or splashes as soon as they occur. The *Bearing Rail* (12) should be free of dust and debris. To allow easy horizontal motion at all times, wipe the *Bearing Rail* gently with a clean tissue once a month. Periodically check for loose screws and tighten if necessary. Alternatively, contact Sorenson BioScience, Inc. Technical Support at 801-266-9334 or email [sorbio@corning.com](mailto:sorbio@corning.com) and request regular maintenance service or repair.

To ensure user safety and to avoid warrantee invalidation, use only factory-installed (OEM) parts and follow proper maintenance and handling instructions. The protection afforded by this equipment may be invalidated or impaired if used in a manner not specified by the manufacturer.

### CLEANING AND DECONTAMINATION

The BenchTop Pipettor can be cleaned with a sponge or a damp cloth moistened with water or 70% ethanol.

#### WARNING:

- **DO NOT** spray water or alcohol directly on the unit.
- **ALWAYS** disconnect the power cord before cleaning.
- **DO NOT** use any type of scrapers.
- **DO NOT** use caustic solvents or acetone.

### Decontamination Procedure

The decontamination procedure is the sole responsibility of the user. Parts that may have been contaminated can be cleaned with a sponge or a damp cloth moistened with a 10% bleach solution or other appropriate disinfectants. Contact Sorenson BioScience, Inc. Technical Support at 801-266-9334 or email [sorbio@corning.com](mailto:sorbio@corning.com) if additional or alternative decontamination procedures are required to ensure the compatibility of the new procedure with the instrument.

Should an instrument or component that has been used with radioactive or pathogenic material require factory or field service, comply with the following procedure to ensure the safety of service personnel:

- Clean the parts to be serviced of all encrusted material and decontaminate them. Radioactivity must not be detectable by survey equipment.
- Complete the **DECONTAMINATION CERTIFICATION FORM** (located in the **APPENDIX** on page 23) and FAX to 801-262-0433. Include a copy of this form when shipping any returned item.

If a Decontamination Certification Form is not attached, and a potential radioactive or biological hazard is detected or suspected by Sorenson BioScience, Inc., the instrument will not be serviced until proper

decontamination and certification are completed. The sender will be contacted for instructions as to the disposition of the instrument. Disposition costs will be charged to the sender.

**WARNING:** It is a violation of federal law to transport biologically hazardous or radioactive materials without proper packaging, labeling, and appropriate warnings.

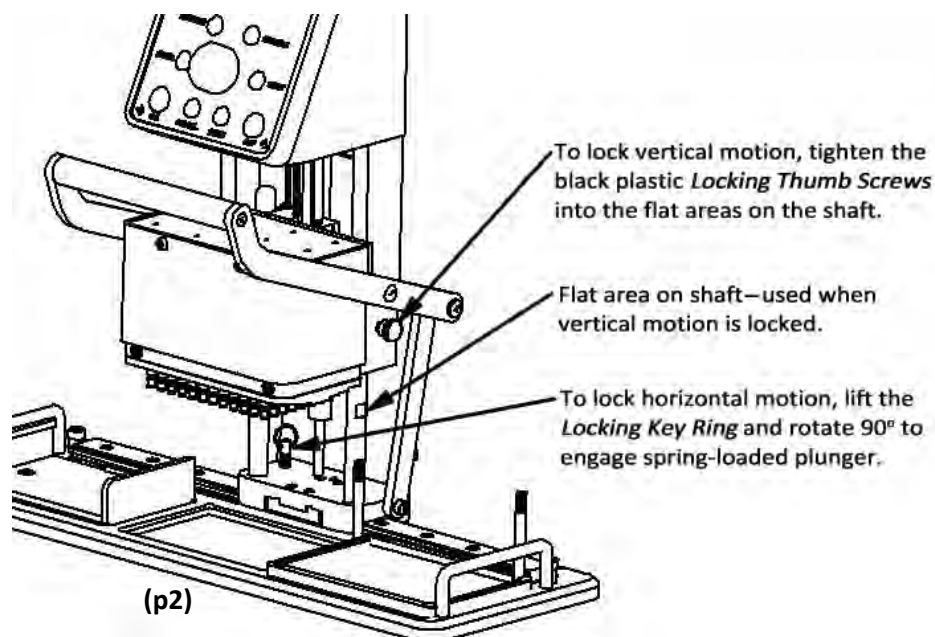
## TRANSPORT AND STORAGE

**WARNING:** Follow these instructions to prevent violent shock and sudden motion during instrument movement. Instability and uncontrolled handling can cause instrument damage and/or bodily harm.

### TRANSPORTING THE BENCHTOP PIPETTOR

Transporting the BenchTop Pipettor is easy, but simple safety precautions are necessary to stabilize it while moving or shipping. The instrument must be locked to prevent the *Head Assembly* from shifting weight horizontally or vertically, potentially causing instability. To ensure safety, follow these steps:

- 1) Move the *Head Assembly* to the center position (p2), and then slightly left of center. Lift the *Locking Key Ring* and engage the spring-loaded plunger into the hole on the *Base* by rotating it 90°. Check to assure the horizontal motion is locked and secure.
- 2) Lower the 96-channel pipettor *Head Assembly* by gently pulling down on the *Levered Handle* nearly all the way. Turn the two black plastic *Locking Thumb Screws* on each side of the *Chassis Assembly* until they touch the flat areas on the shaft. Verify the vertical motion is locked.
- 3) Using the *Side Handles*, lift the instrument to transport to a new location or to place into shipping container.
- 4) To unlock, reverse the transporting procedure outlined in 1) through 3) above. To continue installation, refer to **INSTALLING THE BENCHTOP PIPETTOR** on page 7.





**NOTE:** The BenchTop Pipettor must be shipped in an approved packaging container to avoid damage which may invalidate the warranty. Containers may be purchased for a minimal charge. For additional service and shipping inquiries, contact Sorenson BioScience, Inc. Technical Support at 801-266-9334 or email [sorbio@corning.com](mailto:sorbio@corning.com).

**WARNING:** It is a violation of federal law to transport biologically hazardous or radioactive materials without proper packaging, labeling, and appropriate warnings. Returned instruments and/or parts must always include a completed **DECONTAMINATION CERTIFICATION FORM (APPENDIX, page 23)**.

## **STORAGE**

The BenchTop Pipettor must be stored in a dry area at a temperature ranging from 10-37 °C (50-99 °F).

# Appendix

## SPECIFICATIONS

**Dispensing Precision:** <2% at 25-250 $\mu$ l; <10% at 5-20 $\mu$ l

**Dispensing Accuracy:** +/- 4% at 25-250 $\mu$ l; +/- 6% at 5-20 $\mu$ l


**Resolution:** 1  $\mu$ l and 5  $\mu$ l using the *Control Wheel*

**Pipette Volume:** 1-250 $\mu$ l

**Dimensions:** 45.7cm(L) x 21.6cm(W) x 43.2cm(H); 18"(L) x 8.5"(W) x 17"(H)

**Weight:** 9.5 Kg; 21 lbs.

**Power Supply:**

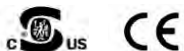
Input: 24 V , 2.7A, 65 Watts Max



**Operating Temperature:** 10-37 °C; 50-99 °F

Conforms to: UL/CSA/EN 61010-1-NRTL / CE Marking

**Compliance:**



**DECLARATION OF CONFORMITY**

**DECLARATION OF CONFORMITY**

CE, UL & CSA Standards

**Corning Incorporated**  
**HP-AB-02**  
**Corning, NY 14831**

We declare that the product,  
**BenchTop Pipettor**

is in conformity with:

EU Directives:

89/336/EEC Electromagnetic Compatibility Directive,  
amended by 92/31/EEC & 93/68/EEC  
73/23/EEC Low Voltage Directive

Standards to which conformity is declared:

EMI/EMC

Emissions Testing: FCC Part 15 / EN 55011 (Class A)  
Immunity Testing: - EN 61326-1  
EN 61000-3-2 Harmonics / EN61000-3-3 Flicker

Product Safety

UL/CSA/EN 61010-1

Valid for all Serial Numbers starting from S/N 00100.

The technical documentation required to demonstrate that the product meets requirements has been verified by Bureau Veritas, and is maintained by a representative of Corning and is available for inspection upon request or by contacting:

EU contact information:

Mr. Edmund Lonnergan

Carrig Tohill, Cork Ireland

Tel: + 603 769 0963 (USA cell direct line)



**DECONTAMINATION CERTIFICATION FORM**



**RA#:** \_\_\_\_\_

**Date:** \_\_\_\_\_

**Company name:** \_\_\_\_\_

**Decontamination performed by (please print):** \_\_\_\_\_

**Name of unit: BenchTop Pipettor—Sorenson BioScience, Inc. Catalog # : 73960, 73970 (with hard shell carrying case)**

**Unit serial# / lot#:** \_\_\_\_\_

Check this box if the instrument / equipment listed above has not been removed from the original packaging **AND** has not come in contact with any substances or chemicals. If checked, skip to "Other comments" section below.

**Substances / chemicals used with unit:**

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**Important note:** Review Decontamination Procedure on page 17 of this instruction manual for important notes regarding decontamination and transport.

**Decontamination procedure used (required for equipment / instruments before return):**

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**Other comments (attach additional comments if needed):**

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**Complete this form and fax to (801) 262-0433. Please also include a copy with the returned item.**

**Signature:** \_\_\_\_\_

**Date sent:** \_\_\_\_\_

**Print name:** \_\_\_\_\_

I hereby state that the above information is true and the item I am returning has not been tampered with and/ or contaminated. If during Sorenson BioScience, Inc. decontamination testing, it is found that the product has been tampered with and/ or contaminated, I understand that I will not receive a refund or a credit to my account.

## PROGRAMMING COMMANDS AND ACTIONS

There are three upper level commands: "**Run**", "**Delete**", and "**Edit**". For further details on using these basic commands, see page 14.

A program containing up to 100 individual lines (numbered from 0 to 99) can be saved into the internal flash memory. Each line consists of one command and up to two parameters. The following commands are entered using the **MENU** button on the *Control Panel*:

<b>Command &lt;parameter&gt;:</b>	<b>Action:</b>
<b>Nop</b>	No operation command. The line is ignored and execution continues on the following line. This is useful to effectively remove one or more lines of a program by overwriting with this command.
<b>Cls</b>	Clears the screen.
<b>Wait</b>	Waits until user presses the <b>ENTER</b> button.
<b>Pause &lt;time delay&gt;</b>	Adds time delay in milliseconds (0-50,000).
<b>Print &lt;display line&gt; &lt;message&gt;</b>	Displays a line of text on the screen. The first parameter specifies which line is displayed (line 1 or line 2). The second parameter specifies which predefined string (message) is displayed: <b>Predefined Strings:</b> "Enter to continue" "Prepare to Aspirate" "Prepare to Dispense" "Done." "Aspirate:" "Dispense:"
<b>Asp &lt;volume&gt;</b>	Aspirates liquid as specified by the parameter (0-250 $\mu$ l).
<b>Disp &lt;volume&gt;</b>	Dispenses liquid as specified by the parameter (0-250 $\mu$ l).
<b>Eject</b>	Pushes the pipette tips off of the nozzles; same effect as pressing the <b>EJECT</b> button on the <i>Control Panel</i> .
<b>Repeat/Next &lt;repetitions&gt;</b>	Repeats a block of line executions. The parameter specifies how many times the block of line executions are repeated (0-250). The block of lines begins with the line following the " <b>Repeat</b> " command, and ends with the " <b>Next</b> " command.
<b>End</b>	This is the last line of the program. Program execution halts. Once the program has ended, the <i>Head Assembly</i> returns to the "ready position" and the display screen returns to the main menu.

## PROGRAMMING EXAMPLES

### Simple Programming Example

Enter the BenchTop Pipettor's programming mode by first selecting **MENU** from the *Control Panel*. Now select "**Program**" using the *Control Wheel* and press **ENTER**. Erase the existing program by selecting "**Delete**" and **ENTER**. To begin entering a new program, select **MENU** and **ENTER**, "**Program**" and **ENTER**, and finally, "**Edit**" and **ENTER**. The following is a simple program using lower level commands. Comments (which are not part of the program) are shown to the right of each line for clarity.

0 Cls	Clears the screen
1 Print Line1 Enter to continue	Displays the predefined string (message)
2 Wait	Pauses until user presses <b>ENTER</b> button
3 End	Program execution ends

This simple program clears the screen and displays "**Enter to continue**" on the first line of the display screen. Pressing **ENTER** ends the program and returns the display screen to the upper level menu.

Below is the same program detailing the steps necessary to enter and create the new program using **MENU** on the *Control Panel*. The actual screen display follows.

- Press **MENU** and rotate the *Control Wheel* to display the following:

```
Menu:      Program
Select & press enter
```

To create a new program or to edit an existing program:

- Rotate the *Control Wheel* to select "**Edit**" and then press **ENTER**.

```
Program:   Edit
Select & press enter
```

- A blank program beginning at line 0 is displayed as follows:

```
0  Cmd?
```

Begin programming by entering the **Simple Programming Example** outlined above:

- Enter "**0 Cls**" into the first line. This clears the screen. With the solid cursor under line 0, rotate the *Control Wheel* to scroll the cursor under the "**Cmd?**" prompt and press **ENTER** to activate the line (Note: the cursor begins to blink when activated). Now rotate the *Control Wheel* to scroll until "**Cls**" appears. Press **ENTER** to select that command. The first line of programming is now complete and saved into memory.

```
0  Cls
```

- The second line of the program reads, "**1 Print Line1 Enter to continue**". This line displays a predefined string of text. To program, rotate the *Control Wheel* counterclockwise

to scroll back to line 0, then press **ENTER** to activate that line. The underlined number will begin blinking. Rotate the *Control Wheel* until the number "1" appears, then press **ENTER**. Rotate the *Control Wheel* over to the "**Cmd?**" prompt.

```
1  Cmd?
```

- Press **ENTER** and rotate the *Control Wheel* until "**Print**" appears. Press **ENTER** and a third selection "**Line**" appears.

```
1  Print  Line?
```

- Rotate the *Control Wheel* to "**Line?**" and press **ENTER**. Rotate the *Control Wheel* to choose "**Line1**" and press **ENTER**. "**Line1**" appears on the display screen.

```
1  Print      Line1  
String?
```

- A new command, "**String?**" appears in line 2. Rotate the *Control Wheel* to "**String?**" and press **ENTER**. Rotate the *Control Wheel* to select "**Enter to continue**" and then press **ENTER** to save this line into memory.

```
1  Print      Line1  
Enter to continue
```

- To enter the 3rd line "**2 Wait**", rotate the *Control Wheel* back to the number "1" and press **ENTER**. Rotate the *Control Wheel* to select "2" and press **ENTER** to save into memory.

```
2  Cmd?
```

- Rotate the *Control Wheel* to "**Cmd?**" and press **ENTER**. Then rotate the *Control Wheel* to select "**Wait**" and press **ENTER** to save into memory. The "**Wait**" command pauses a program until the user presses the **ENTER** button.

```
2  Wait
```

- To enter the last line "**3 End**", rotate the *Control Wheel* back to "2" and press **ENTER**. Then rotate the *Control Wheel* to select "3" and press **ENTER** to save into memory.

```
3  Cmd?
```

- Rotate the *Control Wheel* to the "**Cmd?**" line and press **ENTER**. Select "**End**" and press **ENTER** to save into memory. The program is now complete.

```
3  End
```

- Press the **CANCEL** button to exit the programming menu. "**Save Changes**" is displayed.

- Rotate the *Control Wheel* to select "**Yes**" or "**No**". Select "**Yes**" and **ENTER** to save the program into non-volatile memory.

```
Save Changes?  Yes
Select & press enter
```

*To test the program:*

- Press **MENU** and then select "**Program**".

```
Menu:          Program
Select & press enter
```

- Press **ENTER** and then select "**Run**".

```
Program:       Run
Select & press enter
```

- Press **ENTER** to run the program. "**Enter to continue**" appears on the display screen until the user presses **ENTER** again. Once **ENTER** is pressed, the program ends and the display returns back to the main display screen.

```
Enter to continue
```

- Press **ENTER** to return back to the main display screen.

```
Ready
Vol: 0 uL
```



## Standard Pipetting Program Example

The following program contains multiple steps and is intended to be used as a teaching tool to understand the step-based programming method used with the BenchTop Pipettor. A program containing up to 100 individual lines can be saved into the internal flash memory. Keep in mind that when modifying an existing program, it is often beneficial to use the "**Edit**" upper level command (see page 14).

```
0 Repeat 5
1 Cls
2 Print Line1 "Prepare to Aspirate"
3 Print Line2 "Enter to continue"
4 Wait
5 Print Line1 "Aspirate:"
6 Asp 15
7 Cls
8 Print Line1 "Prepare to Dispense"
9 Print Line2 "Enter to continue"
10 Wait
11Print Line1 "Dispense:"
12 Disp 15
13 Next
14 Cls
15 Print Line1 "Done."
16 Print Line2 "Enter to continue"
17 Wait
18 End
```