INNOVAPREP

PREANALYTICAL TOOLS FOR MODERN MICROBIOLOGY

FLUIDPREP™

CONCENTRATING PIPETTE SELECT™
USER GUIDE

Table of Contents

1 PRODUCT OVERVIEW

This Section contains a product description of the InnovaPrep Concentrating Pipette Select and a brief look at its applications.

1.1 PRODUCT DESCRIPTION

The InnovaPrep Concentrating Pipette Select (CP Select), shown in Figure 1.1, quickly and efficiently concentrates particles of interest from large liquid sample volumes into liquid volumes as small as 200 microliters (smaller volumes are attainable in some applications). The CP Select uses a novel elution method to recover particles that have been captured onto a disposable porous membrane filter with high recovery efficiencies.

FIGURE 1.1 INNOVAPREP CONCENTRATING PIPETTE SELECT

1.2 APPLICATIONS

The patented InnovaPrep concentration technology (US Patents 8,110,112; 8,584,535; 8,758,623; 9,593,359; 9,574,977; 9,738,918; D688,805; and other patents awarded and pending - see www.innovaprep.com/patents) has application anywhere that enrichment of low concentrations of particles is needed. The primary area of application is for preparing and concentrating particles of biological origin, including pathogens in liquid samples, for subsequent analysis by traditional microbiological methods, such as plating, or with rapid molecular analytical devices.

1.3 DEVICE SPECIFICATIONS

Input Current - 1.0 Amp
Certifications - CE, TUV
Output DC Voltage - 12 V (External Power Supply)
Output Current - 3 Amps
Operating Temperature (Recommended) - 15 - 30 deg C

Operating Temperature (Absolute) - 0 - 40 deg C
Humidity - 0 - 85% N.C.
Dimensions (H x L x W) - 13.9in x 11.5in x 6.2 in
Height with Head Raised - 16.3 in
Weight - 8.8 Lbs
Interface - USB 2.0 compatible, Micro B

1.4 ACCESSORIES INCLUDED WITH THE CP SELECT

An image and list, including part numbers, of the accessories that are provided with the CP Select is provided below.

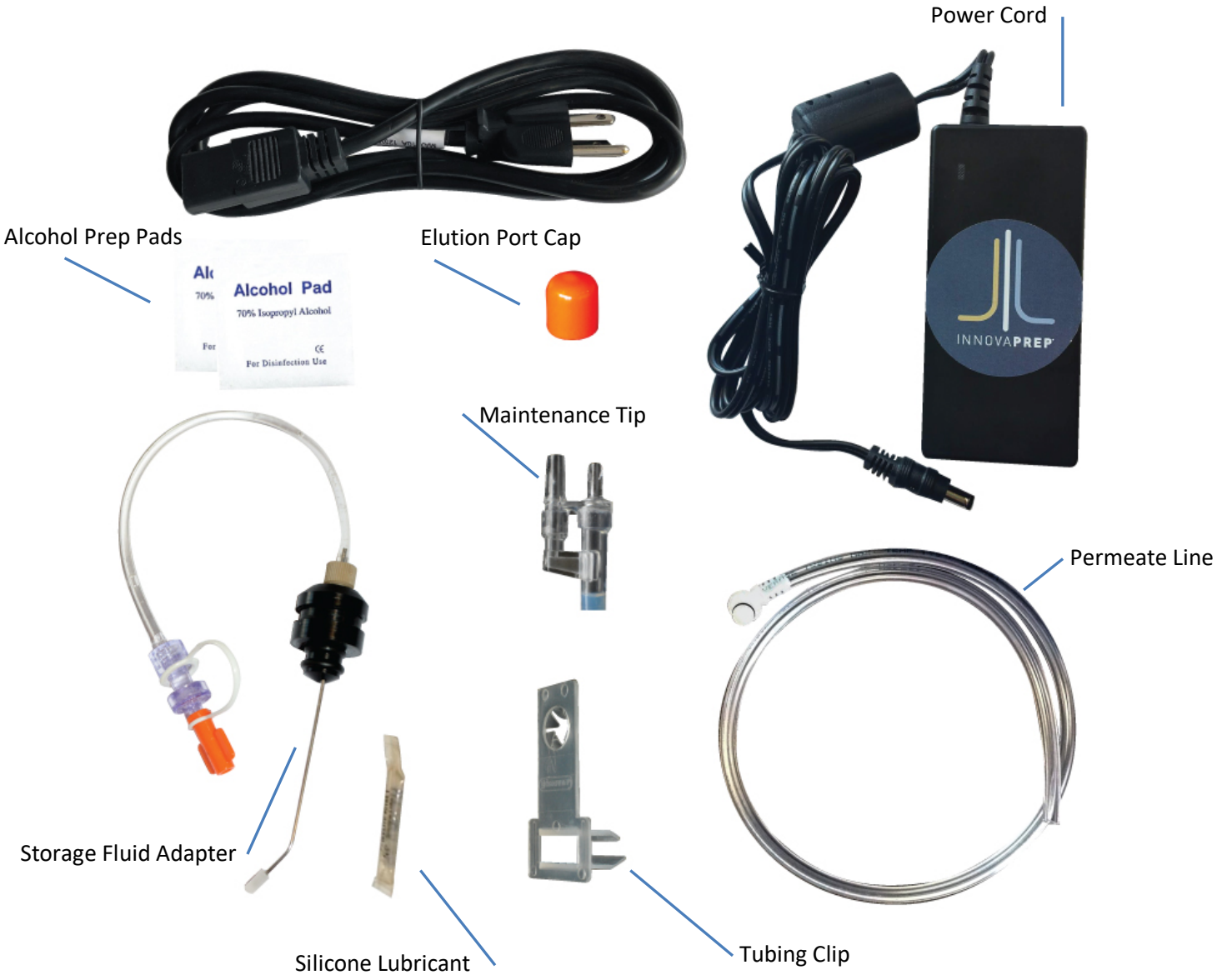


FIGURE 1.2 ACCESSORIES

- **AC Power Cord and Power Supply** – North America and 12V Power Supply (HC03019, HC03093) - Power supply for CP Select. See Section 4.1 (Power Cord available for North America (HC03019), EU (HC03208), and UK (HC03209).
- **Tubing Clip** (HC08017) – Keeps permeate line secure to waste container.

- **Permeate Line** (HC08006) – Directs filtered fluid to waste container. See Section 4.2.
- **Silicone Lubricant** (HC08535) – Used for required, periodic lubrication of O-rings in the Tip Interface Port. See Section 4.5.
- **Storage Fluid Adapter** (HC08560) – Connects storage fluid bottle, required in daily Shut Down maintenance procedure. See Section 4.3.
- **Maintenance Tip** (HC08005) – This reusable tip is inserted into the Tip Interface Port during the **Start Up, Shut Down** and **Prime** maintenance procedures. DO NOT USE WITH THE ELUTE OR RUN PROTOCOL-DAMAGE CAN OCCUR TO THE INSTRUMENT. See Section 6.
- **Alcohol Prep Pads** (HC08529) – Used for periodic cleaning of the tip and elution fluid ports.

2 CONCENTRATING PIPETTE METHOD OF OPERATION

The InnovaPrep concentration process uses dead-end filtration to capture particles onto the surface of a porous membrane filter. A novel Wet Foam Elution™ process is then employed to wash the particles off of the membrane surface into very small liquid volumes.

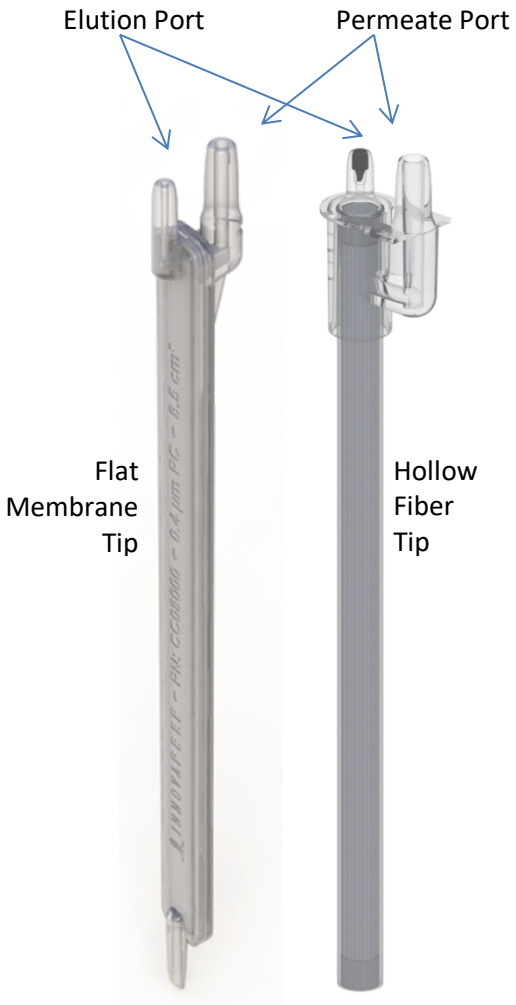


FIGURE 2.1 FLAT AND HOLLOW FIBER CONCENTRATING PIPETTE TIPS

2.1 CONCENTRATION PROCESS

The concentration process of the CP Select requires single-use Concentrating Pipette Tips (CPTs). The Pipette tips have internal filter(s) made with either a flat membrane or a bundle of hollow fiber membranes. The sample is drawn through the CPT, and once all the fluid has passed, it elutes the concentrated particles through the sample port of the filter tip. The sample is prevented from coming in contact with the instrument fluidics, decreasing the need for between-sample decontamination and eliminating cross-contamination or "carryover".

The filters are hydrophilic, meaning that air is allowed to flow through only when the membrane is dry. Once the filter has been wetted, the surface tension of the liquid trapped in the pores of the membrane prevents air (or any other gas) from passing through the membrane. Thus the CPTs cannot be re-used since air trapped inside the housing cannot be pulled through the filter prior to processing a second sample.

The concentration process is performed in the following steps:

1. The main pump draws a vacuum on the Permeate Port. The air inside the filter housing is drawn out and the liquid sample is pulled up through the Sample Port.
2. As the sample is drawn through the filter, particles larger than the chosen membrane pore size are captured on the pores; while liquids, dissolved solids and particles smaller than the chosen pore size pass through the filter and into the permeate.
3. Once the sample container is empty, air is drawn up behind the liquid and the membrane "locks up"; leaving only the target particles on the membrane and ending the run.
4. When the user performs an elution, InnovaPrep's patented Wet Foam Elution™ process is utilized. The Permeate Port valve closes and the elution valve opens, allowing the foam to enter the Elution Port. The foam travels tangentially down the surface of the membrane as it washes the particles from the surface. The concentrated sample is then pushed out of the sample port into a cuvette or other container where the foam quickly breaks back down into a small liquid volume.

2.2 *Wet Foam Elution*

The Wet Foam Elution process is much more efficient than liquid rinsing for the following reasons:

Volume Expansion

When rinsing a filter with liquid, most of the liquid volume is used to fill the dead space inside the filter housing; or inner bore of the membrane for hollow fiber tips. Thus, only a small portion of the fluid is actually in contact with the filter surface. This can be minimized to an extent by reducing the cross-sectional area of the fluid path across the filter, but a large portion of the liquid is still underutilized. Foam, however, is 80-90% gas, which fills the empty space without contributing to the final sample volume.

Increased Viscosity

Liquid has a tendency toward "channeling" when flowing across a surface; that is, there is an area of high flow in the center of the fluid path while the portion of flow in contact with the filter surface is much slower. The higher viscosity of foam prevents channeling and creates a more uniform flow across the filter surface.

Bubble Dynamics

The micro-bubbles in the foam behave as deformable solids. As they travel across the surface of the filter they move as a rigid body with a narrow lubricating layer, effectively squeegeeing the particles off of the surface.

Exfoliating Action

As the micro-bubbles in the foam impact against each other and burst, the turbulence and energy produced helps to lift particles that are adhering to the membrane.

2.3 *Foam Generation*

The Wet Foam Elution™ process requires very specific high-quality foam in order to be effective. The elution fluid is composed of water, a low concentration surfactant (usually less than 0.1%), and a pH buffer. This solution is carbonated with carbon dioxide (CO_2) gas. During the elution process, the fluid passes through a valve to a low pressure environment, causing the dissolved CO_2 to expand and come out of solution to form microbubbles. These micro-bubbles increase the volume of the fluid sixfold or more.

An additional benefit of Wet Foam Elution is the clean buffer exchange. In many situations, the starting sample matrix is not the most desirable for the chosen analysis method. Wet Foam Elution allows the user to select the fluid that the particles will be suspended in after concentration, which reduces inhibition and maximizes the chances of detection.

2.4 *CP Filter Tips*

For selecting the proper CPT please refer to the filter selection matrix presented in Table 2.1.

TABLE 2.1 CONCENTRATING PIPETTE SELECTION GUIDE

Part Number	**Filter Tip** Media Type	Pore Size	Membrane Surface Area cm^2	Input Sample Volume (Varies by Matrix)	Final Concentrated Sample Volume (User Selectable)	Processing Rate (Varies by Matrix) mL/min	Notes
CC08000-10	**Flat Membrane** Polycarbonate Track Etch	0.4 µm	8.5	Up to 1 Liter*	200 - 1000 µL	Up to 100 mL /min.	Recommended for concentrating bacteria, whole cells, spores, pollen, and parasites from food and beverage matrices or samples containing proteins and polysaccharides
CC08001-10	**Flat Membrane** Polyethersulfone	0.1 µm	8.5	Up to 1 Liter*	200 - 1000 µL	Up to 100 mL /min.	Recommended for concentrating bacteria, whole cells, spores, pollen, and parasites from environmental samples
CC08018-10	**Hollow Fiber** Polysulfone	0.45 µm	98	Up to 5 Liters*	150 - 1000 µL	Up to 150 mL/min	Recommended for concentrating bacteria, whole cells, spores, pollen, and parasites from high fouling matrices
CC08022-10	**Hollow Fiber** Polysulfone	0.2 µm	98	Up to 5 Liters*	150 - 1000 µL	Up to 150 mL/min	Recommended for concentrating bacteria, whole cells, spores, pollen, and parasites from all sample types
CC08020-10	**Hollow Fiber** Polysulfone	0.05 µm	98	Up to 3 Liters*	150 - 1000 µL	Up to 90 mL/min	Recommended for virus concentration. The addition of Tween 20 to the sample is recommended to aid recovery efficiency (add 10% solution of Tween 20 in a 1/100 ratio to the sample)
CC08003-10	**Hollow Fiber** Polysulfone	Ultra - Filtration	98	Up to 500 mL*	150 - 1000 µL	50 mL/min with Tween 20	

* With regards to starting sample volume, it is recommended that the entire sample should be processed within 30 minutes. It has been observed that there is a reduction in the recovery when processing times exceed 30 minutes. The recommended upper-end run volume as shown in the concentrating pipette tip selection guide and time of 30 minutes is a general recommendation and may be dependent on sample matrix and target organism. See Section 10 for full part number list.

3 COMPONENTS OF THE CONCENTRATING PIPETTE

The following Section describes the components of the InnovaPrep Concentrating Pipette Select.

FIGURE 3.1 CONCENTRATING PIPETTE COMPONENTS - RIGHT SIDE

Fluidics Head – This component contains the bulk of the fluidic components in the instrument. The Head can be raised and lowered to position the Concentrating Pipette Tip in the sample container. LED lights in the head will glow blue when the instrument is on, red when the instrument is concentrating and green when the instrument is eluting.

Tip Interface Ports – This is the point of installation for the consumable Concentrating Pipette Tips. The foam Elution Port is in front where the foam is introduced into the tip at the time of elution. The sample fluid exits the rear Permeate Port during a sample run.

Concentrating Pipette Tip (CPT) – This consumable component is the only part of the instrument that will come in contact with the sample.

Canister Latch – This latch holds the Elution Fluid canister in place.

Elution Fluid (Foam) Canister – Each canister contains enough elution fluid for up to 30 elutions.

Maintenance Tip – This reusable component is installed in the Tip Interface Port during the Start Up, Shut Down, and Prime Maintenance Protocols. It is stowed on the bracket located on the right side of the instrument. DO NOT USE WITH THE ELUTE OR RUN PROTOCOL - DAMAGE CAN OCCUR TO THE INSTRUMENT.

Storage Fluid with Adapter – This assembly is for use with the Shut-Down protocol. It conveniently stows on the bracket located on the right side of the instrument.

Canister Interface Port – This spring-loaded port keeps the proper pressure on the valve of the fluid canister (sometimes referred to as Can); it contains a check valve, which keeps the instrument pressurized when changing canisters. The Storage Fluid Adapter also interfaces with this port during the Shut Down Maintenance Protocol.

Control Panel – The LCD display is navigated by the **Up** (▲), **Down** (▼), and **Enter** (⏎) keys. Certain menus may also be entered by pressing and holding **Enter** (⏎) down for approximately 1 second.

Sample Platform – The sample container is placed here during sample processing.

FIGURE 3.2 INSTRUMENT COMPONENTS – LEFT SIDE

Tension Knob – This knob is used to adjust the tension on the positioning arms for the Fluidics Head.
USB Port – A standard 'Micro-B' USB cable can be connected to the instrument from a computer to download periodic software updates from the manufacturer.
12V DC Power Jack – Port for the included power supply.
Power Switch – The up position (|) turns the instrument on and the down position (○) turns the instrument off.
Permeate Line Port – This quick connect fitting is where the filtered fluid (Permeate) exits the instrument. This port is valved to prevent fluid from being pumped out without the permeate tubing attached.

4 INSTALLATION OF THE INSTRUMENT COMPONENTS

This Section will guide the user through setting up the instrument.

4.1 INSTALLING THE POWER SUPPLY

Plug the power cord and power supply together, plug the power supply into the 12VDC port on the side of the unit, then plug the power cord into an available power outlet. It is not necessary to select the correct voltage; the sensor accepts line voltage of 100 to 240 VAC, 50-60 Hz, single phase. The connection is self-regulating. WARNING: DO NOT USE ANY POWER SUPPLY OTHER THAN THE ONE SUPPLIED WITH THE CP SELECT INSTRUMENT-DOING SO MAY CAUSE DAMAGE TO THE INSTRUMENT AND VOID THE WARRANTY. **(NOTE: THE POWER SUPPLY FOR THE PREVIOUSLY RELEASED CP - 150 CONCENTRATING PIPETTE INSTRUMENT IS NOT COMPATIBLE WITH THE CP SELECT)**

4.2 INSTALLING AND REMOVING THE PERMEATE LINE TUBING

Included with the instrument is a Section of clear PVC tubing with a right angle quick connect fitting; this is the permeate line tubing. To install the Permeate Line, first make sure that the metal button on the Permeate Port is pushed down on the instrument. Then, insert the quick connect fitting on the Permeate Line into the Permeate Port. When the fitting is fully seated the metal button will pop up, thus locking it in place. Place the open end of the permeate line tubing into a waste container of adequate volume relative to your sample volume.

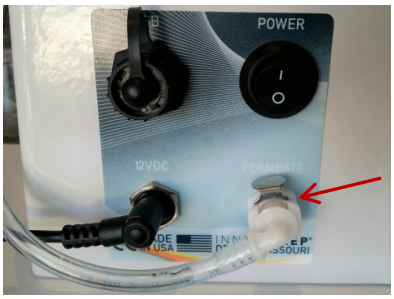


FIGURE 4.1 PERMEATE LINE INSTALLATION

To remove the Permeate Line, simply press the metal button on the Permeate Port and it will be released.

4.3 INSTALLING THE STORAGE FLUID AND FLUID ADAPTER

A daily Shut-down Maintenance Procedure is described in Section 6.3. The procedure requires the use of the following items:

- Storage Fluid (HC08558)
- Reusable Storage Fluid Adapter (HC08560)
- Reusable Maintenance Tip (HC08005)

These items are conveniently stowed on a bracket on the right side of the instrument as pictured at right in Figure 4.2. Figure 4.4, below, provides a closer view of the Storage Fluid and Storage Fluid Adapter.

FIGURE 4.2 STORAGE FLUID BRACKET

To install the Storage Fluid Adapter, remove the orange rubber cap (save for later use-used for transport and shipping) from the Canister Interface Port and clean the port using an Alcohol Prep Pad. Remove the sealed cap from the Storage Fluid bottle, and install the metal sipper tube portion of the Fluids Adapter into the bottle. The metal portion of the assembly can be adjusted up or down in the bung to reach the bottom of the fluid bottle by loosening the fitting located on the top of the bung. The Bung can now clip onto the bracket as shown, with the Fluids Adapter tubing clipped into the bracket behind the bottle. The Maintenance Tip also stows on the bracket in the 1st position. See Section 6 for detailed instructions for use.

FIGURE 4.4. STORAGE FLUID AND STORAGE FLUID ADAPTER

FIGURE 4.3 STORAGE FLUID AND STORAGE FLUID ADAPTER STOWED ON CP SELECT BRACKET

4.4 *Installing and Removing An Elution Fluid Canister*

To install an elution fluid canister into the instrument, first hold the canister with the valve pointing down. Then place the canister valve into the Canister Interface Port located on the right side of the instrument. Now press the canister down and hook the edge under the Canister Latch as shown in Figure 4.5.

FIGURE 4.5 INSTALLING AND REMOVING FLUID CANISTERS

Removing a Fluid Canister

To remove an Elution Fluid Canister, push down on the top of the canister pulling it away from the instrument to unlatch.

When the instrument is new, the elution fluid canister valve will tend to stick in the Canister Interface Port. Simply grab the canister with your hand and press your thumb against the Canister Latch to leverage it up and out of the Canister Interface Port.

If a canister is removed before it is completely empty, a small amount of fluid (approximately 100 µL) may be expelled from the can, this is normal.

The Canister Interface Port is the first place where contamination can enter the instrument's fluidics. Never let dust or dirt enter the port and use good lab practices to prevent bacterial contamination. This would include not touching the stem of the Elution Fluid Canister, the storage fluid interface fitting, or the Canister Interface Port with fingers or other non-sterile objects. Protect the Canister Interface Port from contaminants by leaving the Storage Fluid Adapter connected to the port when the instrument is not in use. Utilize the protective orange cap (HC03173) included with the unit for long term storage. Clean the Canister Interface Port using an Alcohol Prep Pad prior to installing a new elution fluid canister.

4.5 *INSTALLING AND REMOVING CONCENTRATING PIPETTE TIPS*

Figure 4.6 shows how the CPT ports are aligned with the ports in the Fluidics Head.

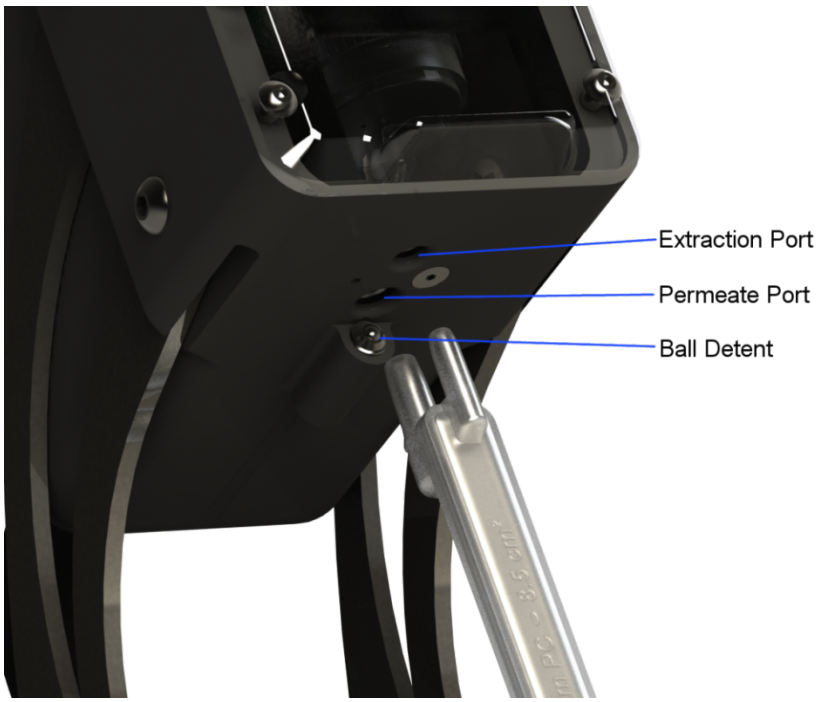


FIGURE 4.6 TIP INTERFACE PORT DETAIL

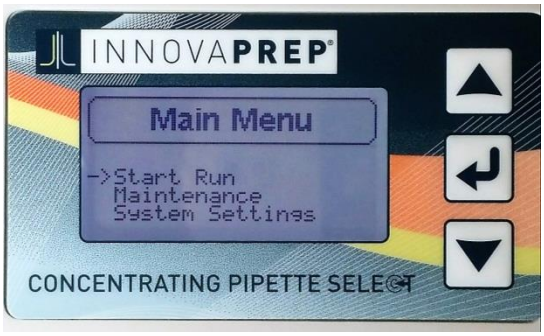
To install a CPT, first raise the Fluidics Head all the way up. The two ports on the top of the CPT are different sizes; the larger port is the permeate port facing the rear of the instrument. The CPT can only be installed one way and should slide easily up into the ports on the underside of the Fluidics Head. When the CPT is fully seated, you should feel it "click" into place. You can also verify that that the CPT is fully seated by looking through the clear fluidics manifold.

The rubber O-rings in these ports should be occasionally lubricated with the Silicone lubricant (item HC08535-20), provided with the instrument, to maintain a tight seal. With a gloved finger, rub a very thin layer of lubricant on both ports of the Maintenance Tip periodically (monthly) to ensure the O-rings remain flexible and leak free.

To remove the CPT, grasp it with your hand then use your thumb to press up on the underside of the Fluidics Head. The "thumbs up" technique eliminates the need to hold the Fluidics Head with your free hand while you pull down on the CPT.

5 NAVIGATING THE MENU

This Section will guide you through the instrument's LCD menu instrument on the Control Panel. The three keys on the right side of the Control Manual (symbols for **Up** (▲), **Down** (▼), and **Enter** (⏎), as shown in Figure 5.1) are used to navigate the menu.



Up (▲)

Enter (⏎)

Down (▼),

FIGURE 5.1 MAIN MENU DISPLAY

5.1 THE MAIN MENU

When the instrument is first turned on, a Welcome screen will be displayed as soon as the unit boots up (about 5 seconds). Press **Enter (⏎)** to continue to the Main Menu screen.

The Main Menu consists of three selections: **Start Run, Maintenance,** and **Instrument Settings.**

5.2 THE RUN PROTOCOL MENU

Selecting **Start Run** from the Main Menu will display the Run Protocol screen. This screen displays:

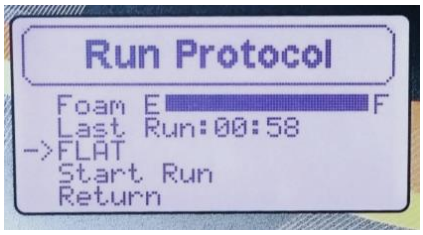


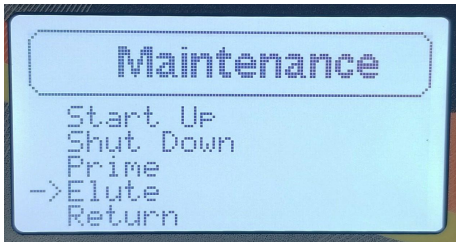
FIGURE 5.2 RUN PROTOCOL DISPLAY

Foam Volume Gauge (E = empty / F = full)
Last Run process time (mm:ss)
Name of the selected concentration run protocol (defaults to **FLAT**)
Start Run
Return

- Selecting the named protocol (**FLAT)** will navigate to the **Protocol Setup** screen where another protocol can be selected, created (see Section 8.5 *Creating and Saving a Concentration Run Protocol),* or deleted. There are three protocol options that have been preprogrammed by the factory named FLAT, HOLLOW, and ULTRA. These have been named according to the three main types of CPTs available for use with the instrument: **FLAT** for use with the flat CPTs (items CC08000 and CC08001), **HOLLOW** for use with the hollow fiber tips (items CC08018, CC08022, CC08020), and **ULTRA** for use with the ultrafilter tips (item CC08003). See Table 2.1 CPT Selection Guide for a full description.
- Selecting **Start Run** on the Run Protocols screen will immediately start the sampling process using the sample protocol notated above.
- **Return** will lead back to the Main Menu.

5.3 THE MAINTENANCE MENU

Selecting **Maintenance** from the Main Menu will display instrument procedures (see Section 6 *Maintenance Procedures*):



Start Up
Shut Down
Prime
Elute
Return

FIGURE 5.3 MAINTENANCE DISPLAY

- Selecting **Start Up** will take the user through a series of prompts for the daily Start Up procedure (see Section 6.2 *Start Up Procedure*).
- Selecting **Shut Down** will take the user through a series of prompts for the daily Shut Down procedure (see Section 6.3 *Shut Down Procedure*).
- **Prime** is for priming the elution fluid lines when a new elution fluid canister is installed in the unit. This ensures that there is no air in the fluid path (see Section 6.4 *Priming the Elution Fluid*).
- **Elute** performs a foam elution according to the current instrument settings. This can be used at any time to test the elution settings (see Section 8 *The Elute Function*).
- **Return** will lead back to the Main Menu.

5.4 THE INSTRUMENT SETTINGS MENU

There are seven instrument settings. A description of each are listed below:

- **Beep volume** changes the volume of the beeps that occur at the end of concentration cycles and elutions. The four options are **low**, **med.**, **high**, and **off**. Default = low
- **Power LED** turns the blue LED light in the Fluidics head on and off. Default = on
- **Run LED** turns the flashing red LED light in the Fluidics head on and off. Default = on
- **Elute LED** turns the flashing green LED light in the Fluidics head on and off. Default = on
- **Set Password** allows the user to set a password that must be entered before a custom protocol can be created, modified, or deleted.
- **Protocol** allows the user to set the instrument to standard (**Std**) or advanced (**Adv**) options. If set to **Std**, the user will have access to two standard set points - **Valve Open** and **Pulse Count**. If set to **Adv,** the user will have access to 11 advanced settings during Protocol Creation. Once set, the options are accessed in the Protocol Setup menu under Create Protocol. Default = Std
- **Fluid Gauge** turns the Elution Fluid Volume gauge on and off. Default = on
- **Return** will return you to the Options menu.

6 MAINTENANCE PROCEDURES

This Section will guide the user through the daily maintenance procedures including how to perform the Start Up and Shut Down routine and priming the elution fluid. Section 6.1, below, provides a Start Up procedure for the first time the instrument is used. Sections 6.2 and 6.3 provide the standard Start Up and Shut Down procedures which should be followed at the start and end of each day of use. Sections 6.4 and 6.5 describe the Prime and Elute functions. The operation check list below, and also found in Section 8.9, should be performed before the first use and can be performed any time if there is a question about the function of the instrument.

To ensure that the Concentrating Pipette was not damaged during shipping, the following procedure can be performed.

1. Check for pressure leak:
    a. Insert Maintenance Tip, Elution Fluid Canister and Permeate Line. Insert the end of the Permeate Line in water and **Start Run.**
    b. Check that no bubbles are seen exiting the Permeate Line between 4 and 10 seconds.
2. Check Canister Interface Port and prime CP unit:
    a. Insert an Elution Fluid Canister into the Canister Interface Port and check for leaks.
    b. From the Main Menu select **Maintenance>Prime** and follow the menu prompts. Check for production of foam.
    c. Remove Elution Fluid Canister.
    d. Ensure there is no leakage from the Canister Interface Port.
    e. Re - install Elution Fluid Canister.
3. Check flow rate:
    a. From the *Run Protocols* menu select **FLAT**.
    b. Using the Filter-less Tip provided with the instrument, perform a 200 mL distilled water concentration run. The run time should not exceed 1:30.
    c. Perform an elution.
4. Look inside the head of the unit and check for any visible fluid leaks or moisture inside the head.

Failure in any of the above tests indicates a return of the Concentrating Pipette for repair may be necessary.

6.1 STARTING UP THE INSTRUMENT FOR THE FIRST TIME

FIGURE 6.1
MAINTENANCE TIP

Step 1 – Remove the instrument from the box and packaging. Place on a clean surface and remove the orange rubber cap from the Canister Interface Port.

Step 2 – Follow instructions for installation of the instrument components as described in Section 4: Install Power Supply (Section 4.1) and Permeate Line (Section 4.2), and stow the Storage Fluid and Adapter in the bracket on the right side of the instrument (Section 4.3).

Step 3 – Power instrument on.

Step 4 – Advance to the Main Menu by pressing **Enter (⏎)** on the control panel.

Step 5 – Select **Maintenance>Prime**

Step 6 – Follow the menu prompts: *Place the Maintenance Tip into the Tip Interface Port* as shown in Figure 6.1 using the same procedure described in Section 4.5 for installing a CPT. Select **Continue**.

Step 7 – Follow the menu prompt: *Place Foam Can* (Elution Fluid Canister) *Into Position.* Use the installation instructions described in Section 4.4. Make sure the open end of the permeate line is secured in a waste container. Select **Continue**. The instrument will purge elution fluid from the canister through to the permeate. The instrument is now ready for use.

6.2 THE START UP PROCEDURE

Biological contaminants or salts from evaporated elution fluid can be damaging to the instrument if they are allowed to produce particles large enough to clog the fluid path. The daily Shut Down and Start Up Maintenance Protocol is used to clean and flush contaminants from the fluid path of the instrument.

The Start Up Procedure is accessed by selecting **Main Menu > Maintenance > Start Up**. The selection will guide the user through a series of prompts. The prompts assume the user followed the Shut Down procedure, following the last instrument use, which instructs the user to leave the Storage Fluid Adapter installed in the Canister Interface Port.

Step 1 – Ensure the required instrument components have been installed: Power Supply (Section 4.1), Permeate Line (Section 4.2), Storage Fluid and Adapter (Section 4.3).

Step 2 – Power instrument on. Advance to the Main Menu by pressing **Enter (⏎)** on the control panel.

Step 3 – Select **Maintenance>Start Up**

Step 4 – Follow the menu prompt: *Place the Maintenance Tip into Tip Interface Port* as shown in Figure 6.1 using the same procedure described in Section 4.5 for installing a CPT. In practice, the Maintenance Tip should already be in position in most cases, because it should be in place during periods of non - use. Select **Continue**.

Step 5 – Follow the menu prompt: *Remove Storage Fluid Line from Can Interface Port.* Cap the adapter fitting and stow the tube set in the notch on the storage bracket as shown in Figure 4.3. Double check that the open end of the permeate line is secured in a waste container. Select **Continue**. The instrument will purge the storage fluid from the instrument's fluidics. NOTE: DO NOT INSTALL AN ELUTION FLUID CANISTER UNTIL PROMPTED TO DO SO IN STEP 6.

Step 6 – Follow the menu prompt: *Place Foam Can into Position* (see Section 4.4). Select **Continue**. The instrument will prime the foam line with elution fluid. The instrument is now ready for use.

6.3 THE SHUT DOWN PROCEDURE

It is important to perform the Shut Down procedure at the end of each day of operation for the maintenance of the instrument. The Shut Down procedure performs two important functions, instrument decontamination and the prevention of salt crystals forming in the fluidics due to evaporation of the elution fluid.

Step 1 – From the Main Menu select **Maintenance>Shut Down.**

Step 2 – Follow the menu prompt: *Remove Foam Can*. Select **Continue.**

Step 3 – Follow the menu prompt: *Place Maintenance Tip into Tip Port***.** Select **Continue.**

Step 4 – Follow the menu prompt: *Insert Storage Fluid Line into Can Port.* To do so, remove the orange cap from the Storage Fluid Adapter and insert the tube fitting into the Canister Interface Port by pressing it firmly in place (the fitting will only go in about 1/8th - inch). Select **Continue.** The fluid will rinse through the instrument to the permeate.

Step 5 – Follow the menu prompt: *Power Off Unit or Restart.* Leave the Maintenance Tip and Storage Fluid Adapter in place for the entire time that the instrument is not in use. For long term storage it is recommended that the orange rubber port cap that arrives with the instrument be used in place of the storage fluid. Instructions for preparing the instrument for transport or shipment are provided below in Section 6.5.

6.4 *PRIMING THE ELUTION FLUID*

A manual elution fluid prime is required when installing a new Elution Fluid Canister. Its function is to purge the foam line of air or any fluid that may have lost carbonation.

Step 1 – From the Main Menu select **Maintenance>Prime.**

Step 2 – Follow the menu prompt: *Place Maintenance Tip into Tip Port.* Select **Continue.**

Step 3 – Follow the menu prompt: *Place Foam Can* (Elution Fluid Canister) *Into Position.* Select **Continue.** Fluid from the Canister will rinse through to permeate. The Run Protocol menu will be displayed upon completion so use can be resumed.

6.5 *PREPARING THE INSTRUMENT FOR TRANSPORT OR SHIPMENT*

It is important to prepare the instrument before transporting or shipping the instrument, or for returning the instrument for repair or service. The Shut Down procedure should first be performed to decontaminate the instrument. A modified second Shut Down procedure is then performed to flush the Storage Fluid from the system.

Step 1 – From the Main Menu select **Maintenance>Shut Down.**

Step 2 – Follow the menu prompt: *Remove Foam Can*. Select **Continue.**

Step 3 – Follow the menu prompt: *Place Maintenance Tip into Tip Port***.** Select **Continue.**

Step 4 – Follow the menu prompt: *Insert Storage Fluid Line into Can Port.* To do so, remove the orange cap from the Storage Fluid Adapter and insert the tube fitting into the Canister Interface Port by pressing it firmly in place (the fitting will only go in about 1/8th - inch). Select **Continue.** The fluid will rinse through the instrument to the permeate.

Step 5 – At the menu prompt: *Power Off Unit or Restart.* Leave the Maintenance Tip and Storage Fluid Adapter in place and Power Off the unit.

Step 6 – Allow the instrument to sit for 30 minutes to ensure complete decontamination of the fluidics.

Step 7 – Power up the unit and from the Main Menu select **Maintenance>Shut Down.**

Step 8 – At the menu prompt: *Remove Foam Can* – instead, remove the *Storage Fluid Line from Can Interface Port.* Cap the adapter fitting and stow the tube set in the notch on the storage bracket as shown in Figure 4.3. Ensure that the open end of the permeate line is secured in a waste container. Select **Continue**.

Step 9 – Remove the Wash Solution bottle from the Storage Fluid Adapter and cap tightly. **(Warning: contents will spill if the unit is shipped with the Wash Solution bottle installed onto the adapter)**

Step 10 – At the menu prompt: *Place Maintenance Tip into Tip Port***.** Select **Continue** (Maintenance Tip is already in place)**.**

Step 11 – Continue past the menu prompt: *Insert Storage Fluid Line into Can Port* Select **Continue.** The canister port must remain open to allow fluid to be flushed out of the permeate port.

Step 12 – At the menu prompt: *Power Off Unit or Restart.* **Power Off** the instrument.

Step 13 – Place the orange Canister Interface Port cap that came with the instrument over the Canister Interface Port.

Step 14 – Remove and drain the Permeate Line.

Step 15 – Use the original Foam Packaging and Box for all transport and shipments.

6.6 *RECOMMENDED GENERAL MAINTENANCE FOR CP SELECT*

Recommendation	Part Number	Frequency	Tips	Reason
Perform Start Up Routine Daily	N/A	Before day's use	Main Menu > Maintenance > Start Up	Eliminates "salt crystals" in CP Select fluid lines.
Perform Shut Down Routine Daily	N/A	After day's use	Main Menu > Maintenance > Shut Down	Eliminates " salt crystals " in CP Select fluid lines.
Lubricate O - rings	HC08535	Every 2 weeks	Available at www.Innovaprep.com or your local distributor	Maintains a tight seal to the tips, conditions the O-rings.
Replace Permeate Line	HC08006	As Needed	Available at www.Innovaprep.com or your local distributor	Buildup can occur in the permeate hose after extended use.
Replace Maintenance Tip	HC08005	After Approx. 50 Shut Down and/or Start Up Routines	Available at www.Innovaprep.com or your local distributor	Wear over time will cause Maintenance Tips to fit loosely which may cause leakage or insufficient uptake of the storage fluid.
Replace Tube Set for Storage Fluid Adapter	HC08613	As Needed	Available at www.Innovaprep.com or your local distributor	Plastic components, although durable, may wear over time. Inspect this tube set regularly for proper operation during startup and shutdown routines.
Annual Maintenance and Calibration	N/A	12 Months	Contact InnovaPrep or your distributor for return material authorization.	The pressure transducer should be calibrated every 12 months.

7 PERFORMING A SAMPLE CONCENTRATION RUN

Once the instrument is set up, performing and repeating sample concentration runs is straightforward.

Step 1 – Ensure the instrument components have been installed: Power Supply (Section 4.1), Permeate Line (Section 4.2), and Elution Fluid Canister (Section 4.4).

Step 2 – Power instrument on. Advance to the Main Menu by pressing **Enter** (⏎) on the control panel.

Step 3 – Select the CPT of choice (See Table 2.1 Concentrating Pipette Tip Selection Guide) and insert the CPT into the Tip Interface Port as instructed in Section 4.5).

Step 4 – Check the protocol listed on the Run Protocol screen. Does the listed protocol match the CPT type you have chosen? If so continue to step 5. If not, review Section 5.2 for the appropriate selection.

Step 5 – Place your sample fluid container on the sample platform and lower the CPT into the sample fluid. Make sure the tip is all the way to the bottom of the container. Select **Start Run.** The vacuum pump will immediately start to draw the sample through the CPT. After several seconds, fluid will be seen flowing from the permeate line into the waste container. Once all of the fluid in the sample container has been drawn through the CPT, the flow sensor in the fluidics head will detect that the flow has stopped and the instrument will conclude the run automatically. The menu will display the Run complete screen which shows the processing time, and gives the option to *Elute*, *Wash*, or *Return* to the Main Menu.

Step 6 – Select **Elute.** Follow the menu prompt: *Position Elution Cup Under Tip.* Raise the Fluidics Head out of the sample container and hold the desired final sample container under the tip of the CPT. Select Elute on the screen and press **Enter** (⏎), the concentrated sample will be dispensed from the CPT into the final sample container. Wait until the progress bar on the screen has filled up before removing the sample vial. Additional elutions may be performed by selecting "Elute Again".

After the desired elutions of the CPT have been performed, remove the CPT and dispose as appropriate for the type of sample that was processed. Periodically clean the CPT Interface Ports on the underside of the Fluidics Head using an Alcohol Prep Pad and re - lubricate them with silicone using the Maintenance Tip as explained in Section 4.5.

Alternate Wash Function. Alternatively, the *Wash* function may be selected to allow the user to perform a wash step. A wash step can be used to improve the efficiency of the buffer exchange and remove additional material that may interfere with subsequent analysis.

Alternate Step 6 – Select **Wash.** Follow the menu prompt: *Add Wash Solution.* Raise the Fluidics Head out of the sample container and replace the container with a new container holding the wash solution, or pour the wash solution directly into the original sample container. Continue with the Wash step as you would with a normal concentration run and follow the prompts to perform an Elute step or a second Wash step.

7.1 CONTROLLED COLLECTION OF PERMEATE

In cleanroom settings, the Concentrating Pipette user may desire to collect the permeate fluid in an enclosed container fitted with a vent filter. This eliminates the remote possibility of airborne contamination. InnovaPrep has a Permeate Bottle with a Vent Filter available for this use (item HC08530). It comes with a 2-port closure consisting of a 0.2 µm vent

filter and an 18-inch length of tubing. To use the Permeate Bottle, remove the permeate tubing from the quick connect fitting that was included with the unit and slide the end of the tubing associated with the Permeate Bottle over the barbed end of the quick connect fitting. To re-install the quick connect fitting, first make sure that the metal button on the Permeate Port is pushed down on the instrument. Then, insert the quick connect fitting on the permeate tubing into the Permeate Port. When the fitting is fully seated the metal button will pop up, thus locking it in place. Replacement Permeate Vent Filters are also available from InnovaPrep in packs of five filters (item HC08532-5).

8 CONCENTRATION RUN PROTOCOLS

Concentration Run Protocols are defined by a combination of menu parameters including standard and advanced options. The parameters allow precise optimization of the elution process; its timing, force, volume, etc. A detailed description of each parameter is described below in Section 8.1 and 8.2. Nearly all concentration runs can be performed by using only the standard options. In some cases, however, using the advanced options may be useful in the optimization of the process for certain matrices and certain applications. **It is important to note that complex interactions occur between many of the advanced option settings and as such the advanced options should be used only when absolutely necessary. When changes are made to the advanced options significant time may be required to develop a robust new protocol.**

8.1 STD. OPTIONS

The final volume of your sample is controlled primarily by the elution fluid valve open time. Under "STD Options" you can precisely control the number of milliseconds (ms) the valve is open, as well as the number of pulses the valve performs. The longer the open time and the more pulses performed, the larger the elution volume.

Valve Open ms controls the length of time that the elution valve is open, per pulse, in milliseconds. Increasing the valve open time will increase the elution volume. Min = 25 ms, Max = 999 ms.

Pulse Count is the number of cycles that the elution valve will open and close. Multiple pulses are usually used when larger (>200 µL) final volumes are desired. For example; in some situations, recovery may be more efficient if two 100-ms pulses are performed rather than one 200-ms pulse while maintaining the same final elution volume. Min = 1 ms, Max = 25 ms

8.2 ADV. OPTIONS

Complex interactions occur between many of the advanced option settings and as such the advanced options should be used only when absolutely necessary. When changes are made to the advanced options significant time may be required to develop a robust new protocol.

Foam Factor sets the release frequency of the foam valve during elution. If set to 10, the foam valve will power on for 5 ms, then off for 5 ms, repeatedly for the duration of the valve on time. If set to 5, the foam valve will power on for 2.5 ms, then off for 2.5 ms, repeatedly for the duration of the valve on time. Changes to the foam factor may result in improved recovery with certain matrices.
Min = 0 ms, Max = 100 ms

Valve Open ms controls the time that the elution valve is open for each pulse, in milliseconds. The valve open time provides the most straightforward way to increase or decrease the elution volume. Min = 25 milliseconds, Max = 999 ms

Valve Close ms controls the time that the elution valve is closed between each pulse, in milliseconds. If the pulse count is set to 1, then this setting is irrelevant. Changes to the valve closed time may result in improved recovery with certain matrices. Min = 100 ms, Max = 999 ms

Pulse Count is the number of cycles that the elution valve will open and close. Multiple pulses are usually used when larger (>200 µL) final volumes are desired. For example; in some situations, recovery may be more efficient if two 100-ms pulses are performed rather than one 200-ms pulse while maintaining the same final elution volume. Min = 1ms, Max = 25ms

Flow Start determines the flow sensor sensitivity needed to establish liquid "flow" on the CP. As the liquid is processed through the CP, a sensor detects the liquid. This sensor is used along with a time stamp "Flow Start" to establish that there is flow. The lower the number the less liquid required to establish flow. If there is no established flow the unit will run until the *Flow Min Start* time is reached. See below for *Flow Min Start*. Flow Start may need to be adjusted when working with very small sample volumes (i.e. <10 mL). Min = 0.0 seconds, Max = 5.0 seconds

Flow End determines the flow sensor sensitivity needed to establish "no flow." Once "no flow" is established the unit will shut down. The lower the number the quicker the unit will shut down after the fluid is processed. CPT types (eg. Ultrafilter CPTs) and sample matrices that run at low flow rates may require a lower setting to ensure that the instrument shuts down at the end of the sample concentration run. A setting of 0.0 may be used to allow the user to manually end the sample run using the menu. Min = 0.0 seconds, Max = 20.0 seconds

Flow Min Start determines the length of time that the unit will run without liquid flow before the unit times out. The lower the value the quicker the unit will timeout if it does not see flow at the start of a run. Viscous fluids and lower flow rate CPTs, such as the ultrafilter CPTs. may require a higher set point. Min = 1 second, Max = 60 seconds

Ext Delay Sec This sets the delay time between the vacuum relief and the foam valve opening. The delay allows the pressure on the permeate side of the membrane in the CPT to achieve equilibrium. Changes to the Valve Open time and Pulse count should be considered first. Min= 0.1 seconds, Max = 10.0 seconds

Pump Power This sets the pump duty cycle. A setting of 50 is 50% power. A lower power setting may increase efficiency and reduce fouling with some matrices, however the initial process flow rate will be reduced.
Min= 25%, Max = 100%

Ext Pump Delay This sets the delay after the foam valve open time before the permeate pump is turned on to remove residual fluid. Changes to the Valve Open time and Pulse count should be considered first. seconds, Min= 0.1 seconds, Max = 10.0 seconds

Reset all defaults resets *all* settings on the unit to the factory defaults, and custom protocols will be lost.

Return will return to the Select Protocol menu.

8.3 DEFAULT CONCENTRATION RUN PROTOCOLS

There are three default Concentration Run Protocols that have been programmed in the instrument by the factory: FLAT, HOLLOW, and ULTRA. These settings are specific to the type of CPT being used. The FLAT protocol is for use with the flat membrane CPTs (items CC08000 and CC08001), HOLLOW is for use with hollow fiber CPTs (items CC08018, CC08022, CC08020), and ULTRA is for use with the hollow fiber ultrafilters (item CC08003). Table 8.1 shows the standard set points (shown in blue) and advanced menu set points (shown in orange) for each protocol:

TABLE 8.1 DEFAULT PROTOCOL MENU PARAMETERS

Protocol Name	Valve Open ms	Pulse	Foam Factor	Valve Closed ms	Flow Start sec.	Flow End sec.	Flow Min Start sec.	Ext Delay sec.	Pump %	Ext Pump Delay sec.
FLAT	275	1	0	100	3.0	0.2	20	3	100	1
HOLLOW	575	1	10	100	3.0	0.2	20	3	100	1
ULTRA	800	2	10	100	3.0	0.2	40	3	100	1

8.4 SELECTING A PROTOCOL

8.4.1 SELECTING A PROTOCOL TO RUN

Step 1 – From the Run Protocol Menu select **FLAT** (or the last protocol name). This will advance you to the Protocol Setup menu.

Step 2 – Select **Select Protocol.** Using the **Up** arrow (▲) and **Down** arrow (▼) you may now go to each available Protocol and then select the desired Protocol by pressing the **Enter** (⏎). You will then be returned to the Run Protocol menu.

8.4.2 SELECTING A PROTOCOL TO VIEW

Step 1 – From the Run Protocol Menu select **FLAT** (or the last protocol name). This will advance you to the Protocol Setup menu.

Step 2 – Select **Select Protocol.** Using the **Up** arrow (▲) and **Down** arrow (▼) you may now go to each available Protocol and then select the desired Protocol by pressing and holding **Enter** (⏎). You will then be taken to a menu with the Protocol name at the top and standard or advanced settings for the protocol below. Standard settings will be shown if Protocol: Std has been previously selected in the System Settings. Advanced settings will be shown if Protocol: Adv has been previously selected in the System Settings. This process is described in Section *5.4 The Instrument Settings Menu*.

8.5 CREATING A CUSTOM PROTOCOL

8.5.1 NAMING A CUSTOM PROTOCOL

Step 1 – From the Run Protocol menu select **the default protocol named for the tip type you plan to use for your custom protocol (this will ensure that the appropriate advanced options will transfer to the new protocol)** This will advance you to the Protocol Setup menu.

Step 2 – Select **Create Protocol.** You will be prompted to create a name for your protocol. Using the **Down** arrow (▼) on the control panel to cycle through numerical and alpha characters sequentially from 1.9 followed by A – Z. The **Up** arrow (▲) will cycle through these options backwards. To select a character, press **Enter** (⏎). Advance to the next menu by pressing and holding **Enter** (⏎).

8.5.2 CREATING THE CUSTOM PROTOCOL SETPOINTS

Step 1 – You will then be taken to a menu with the created Protocol name at the top and standard or advanced settings for the protocol below. Standard settings will be shown if Protocol: Std has been previously selected in

the System Settings. Advanced settings will be shown if Protocol: Adv has been previously selected in the System Settings. This process is described in Section *5.4 The Instrument Settings Menu*.

Step 2 – Using the **Up** arrow (▲) and **Down** arrow (▼) you can now go to each setting listed under the Protocol name and then select the setting that you wish to change by pressing **Enter** (⏎). The **Up** arrow (▲) and **Down** arrow (▼) are then used to change the setting as desired and **Enter** (⏎) is used to enter the setting into the protocol.

Step 3 – When all changes to the protocol have been made select Save & Return. The user is then returned to the Protocol Setup menu.

Step 4 – Select **Select Protocol**. The user is now able to select and run the created Protocol.

8.6 EDITING A CUSTOM PROTOCOL

Custom protocols can be edited after creation.

Step 1 – Advance to the Select Protocol Menu and select the name of the custom protocol and hold **Enter** (⏎). A menu will appear that displays the protocol name at the top of the screen followed by standard or advanced settings for the protocol below. Standard settings will be shown if Protocol: Std has been previously selected in the System Settings. Advanced settings will be shown if Protocol: Adv has been previously selected in the System Settings. This process is described in Section *5.4 The Instrument Settings Menu*. Make the needed edits.

Step – 2 Select **Save & Return.** The user is then returned to the Protocol Setup menu.

8.7 DELETING A PROTOCOL

Step 1 – From the Run Protocol menu select **FLAT** (or the last protocol name). This will advance you to the Running Protocols menu.

Step 2 – Select **Delete Protocol.** If custom protocols have been created**,** Using the **Up** arrow (▲) and **Down** arrow (▼) you may now go to each available Protocol and then select the desired Protocol for deletion by pressing **Enter** (⏎). Select **Return** to be returned to the Run Protocol menu.

8.8 PASSWORD PROTECTION

In order to allow users to control the creation, modification, or deletion of custom protocols, a password protection is provided with the CP Select. Passwords can be setup by selecting **Systems Settings>Set Password** from the Main Menu. If a password has not been previously set up then the user will see the Set Password screen and can create a password. Using the **Down** arrow (▼) on the control panel to cycle through numerical and alpha characters sequentially from 1-9 followed by A-Z. The **Up** arrow (▲) will cycle through these options backwards. To select a character, press **Enter** (⏎). Advance to the next menu by pressing and holding **Enter** (⏎). If a password was previously created then the user will see the Old Password screen and will be required to enter the password before updating to a new password or deleting the old password. To delete the password, simply do not enter any characters and then press and hold **Enter** (⏎).

Once a password is set, you cannot edit, delete or create new protocols without the password. You can run the custom protocols and factory set protocols without the password. You cannot turn the password function off without the password. It is possible to perform a *Reset Defaults* function to remove the password function without a password however; doing so will remove all custom protocols. Custom protocols lost by the *Reset Defaults* function are not

retrievable. As such, it is suggested that a record of all custom protocols be kept in a safe location. This can be done using the form provided in Section 13 Custom Protocol Records.

8.9 CONCENTRATING PIPETTE OPERATION CHECK LIST

To ensure that the Concentrating Pipette was not damaged during shipping, the following procedure can be performed.

5. Check for pressure leak:
    a. Insert Maintenance Tip, Elution Fluid Canister and Permeate Line. Insert the end of the Permeate Line in water and **Start Run.**
    b. Check that no bubbles are seen exiting the Permeate Line between 4 and 10 seconds.
6. Check Canister Interface Port and prime CP unit:
    a. Insert an Elution Fluid Canister into the Canister Interface Port and check for leaks.
    b. From the Main Menu select **Maintenance>Prime** and follow the menu prompts. Check for production of foam.
    c. Remove Elution Fluid Canister.
    d. Ensure there is no leakage from the Canister Interface Port.
    e. Re - install Elution Fluid Canister.
7. Check flow rate:
    a. From the *Run Protocols* menu select **FLAT**.
    b. Using a Filter-less Concentrating Pipette Tip, perform a 200 mL distilled water concentration run. The run time should not exceed 1:30.
    c. Perform an elution.
8. Look inside the head of the unit and check for any visible fluid leaks or moisture inside the head.

Failure in any of the above tests indicates a return of the Concentrating Pipette for repair may be necessary.

9 TIPS AND SUGGESTIONS

This Section contains some dos and don'ts, tips, tricks and important notes to remember while using the CP Select.

- The instrument can concentrate and elute with the Fluidics Head in any position.
- Never run alcohol > 15% through the instrument as it may damage internal components.
- Use the Arm Tension Knob on the left side of the arm to adjust how tightly the Fluidics Head is held in place.
- Use the Up (▲) and Down (▼) arrows to highlight options on the Control Panel and press Enter (⏎) to select. To adjust settings, press enter and use the up and down keys to select the value desired. Then press the enter key again. At the bottom of each menu tree, the option “Return” is displayed; selecting this option will return you to the previous menu.
- The final volume of your sample is most easily controlled by the elution fluid Valve Open Time. The longer the open time and the more pulses performed, the larger the elution volume.
- Be sure that the CPT is firmly “clicked” into position; it will snap into the detent indicating that it is fully seated.
- Once a CPT has been used to concentrate a sample it cannot be reused.
- Protect the Canister Interface Port from contaminants by keeping an Elution Fluid Canister or the Storage Fluid Adapter in place. The port should be wiped with alcohol when changing fluids.
- Before processing any samples other than aqueous solutions, refer to the chemical compatibility chart in Section 2 of the User Guide.
- If the instrument has been idle for an extended period, the quality of the foam may be reduced due to off-gassing of CO_2 in the fluid lines. The Start Up procedure and Prime functions should be used prior to the first sample run of the day.
- Ensure the Permeate Line fitting is fully seated in its quick-connect port on the side of the instrument; otherwise the fluid will not flow through the instrument.
- Clean CP Select’s surface areas with damp cloth-10% bleach solution or 3% hydrogen peroxide.
- Use a 70% isopropyl alcohol prep pad to wipe down the CPT interface ports on the underside of the Fluidics Head between CPTs and the Canister Interface Port between Fluid Canisters.
- Biocidal fluid may be added to the container that catches the permeate fluid to reduce the potential for bacterial growth.
- Lubricate the Tip Interface Ports on a regular basis by applying a film of vacuum grease to the Maintenance Tip ports and installing. At a minimum this should be done monthly.
- Maintenance Tips wear out after approximately 50 uses, if a Maintenance Tip becomes too loose or is damaged please contact InnovaPrep for a replacement.
- Prior to transporting or shipping the instrument refer to Section 6.5.
- Please keep the custom foam packaging insert for use in the event a return shipment is necessary.

10 SAFETY PRECAUTIONS

Use of the InnovaPrep Concentrating Pipette in the laboratory is subject to general safety provisions for use of microbiological instrumentation. Please refer to your laboratory’s current SOPs and the guidance located in the Biosafety in Microbiological and Biomedical Laboratories, 6th Edition (BMBL}: https://www.cdc.gov/labs/pdf/CDC-BiosafetyMicrobiologicalBiomedicalLaboratories-2020-P.pdf

Further guidance, and safety information specific to work with samples potentially containing SARS-CoV-2, including wastewater, are located at https://www.cdc.gov/coronavirus/2019-ncov/lab/lab-biosafety-guidelines.html#environmental

Clean the instrument with an agent on the EPA's approved disinfectant List N https://cfpub.epa.gov/giwiz/disinfectants/index.cfm that is also approved for use on the instrument in the User's Guide (see page 33): https://uploads-ssl.webflow.com/57aa3257c3e841c509f276e2/5f8626f9e4f54e0ba93d6fc1_CP%20Select%20User%20Guide%20022420-compressed.pdf

For work with BSL2 samples, refer to and follow your laboratory's SOPs. Wear proper personal protective equipment; gloves, lab jacket, safety glasses or face shield. A respirator or mask is recommended. The Concentrating Pipette Select fits conveniently within a biosafety cabinet; use of such containment is recommended.

For work with BSL3 or BSL4 samples, refer to and follow your laboratories SOPs for use and care of laboratory equipment.

11 CONCENTRATING PIPETTE SUPPLIES

THE FOLLOWING TABLE CONTAINS A LIST OF THE SUPPLIES THAT CAN BE PURCHASED FROM INNOVAPREP FOR USE WITH THE CONCENTRATING PIPETTE. ALL OF THESE ITEMS CAN BE PURCHASED DIRECTLY FROM THE INNOVAPREP WEBSITE, HTTP://INNOVAPREP.COM/STORE OR BY CONTACTING CUSTOMER SERVICE CUSTOMERSERVICE@INNOVAPREP.COM 816 -619-3375.

TABLE 11 - 1. CONCENTRATING PIPETTE SUPPLIES

Part Number	Item
CC08001-10	**0.1-micron Polyethersulfone (PES)** Single - use Concentrating Pipette Tips available in packages of 10 and 60.
CC08000-10	**0.4-micron Polycarbonate Track Etch (PCTE)** Single - use Concentrating Pipette Tips available in packages of 10 and 60.
CC08018-10	**0.45-micron Hollow Fiber Polysulfone (HFPS)** Single - use Concentrating Pipette Tips available in packages of 10 and 60.
CC08022-10	**0.2-micron Hollow Fiber Polysulfone (HFPS)** Single - use Concentrating Pipette Tips available in packages of 10 and 60.
CC08020-10	**0.05-micron Hollow Fiber Polysulfone (HFPS)** Single - use Concentrating Pipette Tips available in packages of 10 and 60.
CC08003-10	**Ultrafiltration Hollow Fiber Polysulfone (HFPS)** Single - use Concentrating Pipette Tips available in packages of 10 and 60.
HC08000	**PBS Elution Fluid** 0.075% Tween/PBS. Recommended for classical analytical methods. One canister provides up to 30 elutions. Available in single or six pack.
HC08001	**Tris Elution Fluid** 0.075% Tween 20/25 mM Tris. Recommended for rapid analytical methods. One canister provides up to 30 elutions. Available in single or six pack.
HC08558	**Storage Fluid** 30 mL storage fluid bottle for daily shut down protocol. Each bottle provides sufficient volume to perform about 10 daily cycles.
HC08558-5	**Storage Fluid, 5pk (Maintenance Tip Included)** Five 30 mL storage fluid bottles for daily shut down protocol. Each bottle provides sufficient volume to perform about 10 daily cycles. Includes a Reusable Maintenance Tip.
HC08016	**Pipette Mesh Filter Sleeve 25pk** **The sleeves** are made to slide over a Concentrating Pipette Tip for use as a pre-filter to prevent solids from plugging the tip of the Concentrating Pipette Tip when sampling liquids that may contain solid particles. One side of the sleeve is made of a polyethylene 330 micron filter and the other side is solid 3.0 mil (0.075 mm) polyethylene. 25 sleeves per package.
HC08528	**1 Micron Pre-Filter Bag** **10 - inch glazed polypropylene felt bag** rated for 1-micron filtration. Makes an effective pre-filter for very difficult sample matrices prior to concentration with the Concentrating Pipette.
HC08547	**Be Flat Degassing Jar with Vented Lid** For degassing carbonated beverages prior to concentration
HC08017-3	**Tubing Clip 3pk** **Set** of three polypropylene clips. Holds permeate line tubing securely in place over edge of beakers or other containers with a wall thickness of up to ¼ inch.
HC08529	**Alcohol Prep Pads, Box** of 100 Recommended for cleaning the elution fluid canister interface and Concentrating Pipette Tip interface ports.
HC08530	**2 Liter Permeate Bottle with Vent Filter** Ensures no aerosol release from the permeate liquid.
HC08531-5	**Permeate Vent Filters 5pk** 0.2-micron filters prevent aerosol release from the 2-L Permeate Bottle vent.

Part Number	Item
HC08584	**External Power Supply – CP Select** 12v Power supply for field use.
HC08535-20	**Silicone Lubricant - 1cc Tube, 20pk**
HC03173	**Elution Port Cap** Protects the fluid canister interface port while the Concentrating Pipette is not in use.
HC08006	**Permeate Line**
HC03093	**Power Supply 12V 36W - CP**
HC08005	**Maintenance Tip**
HC03019	**AC Power Cord 3 - wire**

12 Chemical Compatibility Guide

When performing concentration cycles, it is important to know the sample matrix. This chart details how compatible the Concentrating Pipette fluidics and the membrane material in the CPT are with certain chemicals.

R=Recommended L= Limited Exposure NR=Not Recommended U=Unknown	0.1 µm Polyethersulfone CPTs	0.4 µm Polycarbonate Track - Etched (PCTE) CPTs	Polysulfone Hollow Fiber CPTs (0.45 µm, 0.2 µm, 0.05 µm and Ultrafiltration)
5% Acetic acid	R	R	R
25% Acetic acid	L	L	L
Acetic acid (glacial)	NR	NR	NR
Acetone	NR	NR	NR
Acetonitrile	NR	U	NR
0.1 N Ammonium hydroxide	R	R	R
Conc. Ammonium hydroxide	NR	NR	NR
Amyl acetate	NR	NR	NR
Amyl alcohol	NR	NR	NR
Aniline	NR	NR	NR
Benzene	NR	NR	NR
Butyl acetate	NR	NR	NR
Butyl alcohol	L	L	L
Carbon tetrachloride	NR	NR	NR
Chloroform	NR	NR	NR
Chromic acid	NR	NR	NR
Cresol	NR	NR	NR
Cyclohexanone	NR	NR	NR
Diacetone alcohol	NR	NR	NR
Dimethyl formamide	NR	NR	NR
Dimethyl sulfoxide	NR	NR	NR
Ethers	NR	NR	NR
Ethyl acetate	NR	NR	NR
Ethyl Alcohol	L	L	L
Fuels	U	U	U
50% Ethyl alcohol	L	L	L
95% Ethyl alcohol	NR	NR	NR
Ethylene dichloride	NR	NR	NR
Ethylene glycol	R	R	R
10% Formaldehyde	R	R	L
30% Formaldehyde	L	L	L
50% Formaldehyde	NR	NR	NR
Glycerin	R	R	R
Hexane	NR	NR	NR
5% Hydrochloric acid	L	L	L

R=Recommended L= Limited Exposure NR=Not Recommended U=Unknown	0.1 µm Polyethersulfone CPTs	0.4 µm Polycarbonate Track - Etched (PCTE) CPTs	Polysulfone Hollow Fiber CPTs (0.45 µm, 0.2 µm, 0.05 µm and Ultrafiltration)
25% Hydrochloric acid	NR	NR	NR
Conc. Hydrochloric acid	NR	NR	NR
3% Hydrogen peroxide	L	L	L
30% Hydrogen peroxide	NR	NR	NR
Isopropyl alcohol	L	L	L
Methyl acetate	NR	NR	NR
50% Methyl alcohol	NR	NR	NR
95% Methyl alcohol	NR	NR	NR
Methyl chloride	NR	NR	NR
Methyl ethyl ketone	NR	NR	NR
Methylene chloride	NR	NR	NR
Mineral spirits	NR	NR	NR
5% Nitric acid	L	L	L
25% Nitric acid	NR	NR	NR
Conc. Nitric acid	NR	NR	NR
Perchloroethylene	NR	NR	NR
0.5% Phenol	NR	NR	NR
10% Phenol	NR	NR	NR
0.1 N Sodium Hydroxide	R	R	R
Conc. Sodium Hydroxide	NR	NR	NR
Sodium hypochlorite (10% bleach solution)	L	L	L
5% Sulfuric acid	L	L	L
25% Sulfuric acid	NR	NR	NR
Conc. Sulfuric Acid	NR	NR	NR
Toluene	NR	NR	NR
Trichloroethane	NR	NR	NR
Trichloroethylene	NR	NR	NR
Triton (surfactant solution)	R	R	R
Tween (surfactant solution)	R	R	R
Water	R	R	R

13 Custom Protocol Records

Keeping a record of your custom protocols is highly recommended in case of loss due to a reset of factory defaults or in the instance of a lost password.

Protocol Name: ____

Date: ____________________ Created by: ____

Created for: ____

Protocol Name	Valve Open ms	Pulse	Foam Factor	Valve Closed ms	Flow Start Sec.	Flow End Sec.	Flow Min Start Sec.	Ext Delay Sec.	Pump %	Ext Pump Delay Sec.

Protocol Name: ____

Date: ____________________ Created by: ____

Created for: ____

Protocol Name	Valve Open ms	Pulse	Foam Factor	Valve Closed ms	Flow Start Sec.	Flow End Sec.	Flow Min Start Sec.	Ext Delay Sec.	Pump %	Ext Pump Delay Sec.

Protocol Name: ____

Date: ____________________ Created by: ____

Created for: ____

Protocol Name	Valve Open ms	Pulse	Foam Factor	Valve Closed ms	Flow Start Sec.	Flow End Sec.	Flow Min Start Sec.	Ext Delay Sec.	Pump %	Ext Pump Delay Sec.

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14 Revision History

Revision	Date	Author
Rev 1	September 2017	A. Packingham
Rev 2	October 2017	A. Packingham
Rev 3	January 2018	A. Packingham
Rev 4	March 2018	A. Packingham
Rev 5	April 2018	D. Alburty
Rev 6	February 2020	J. Birkenholz