Catalog #	Description
12009707	ZE5 External DI Water Carboy Upgrade Kit
12009734	ZE5 External Waste Carboy Upgrade Kit

For research use only.

1. Intended Use

ZE5 Cell Analyzer users interested in increasing the length of time the system can run unattended can have their system equipped with ports enabling external water and waste connections.

The upgrade kits for external DI water and waste fluidics carts each include a 20 L carboy and a fluidics cart, enabling approximately 22 hours of uninterrupted run time. Liquids are hot swappable, and fluidics level warnings inform users that fluidics need attention starting at 2 hours of remaining run time. The waste carboy includes a cap featuring double protection from overflow.

Important: Only Bio-Rad Service personnel are qualified and trained to connect a ZE5 Cell Analyzer to external fluidic sources.

2. Fluidics Cart Details

A fluidics cart is controlled by the touchpad located on the front of the cart.
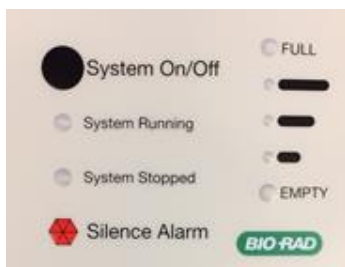
System On/Off button: Press to power the fluidics cart on or off

System Running indicator: When lit, the green LED indicates the fluidics cart is on

System Stopped indicator: When lit, the red LED indicates the fluidics cart is off

Silence Alarm button: Press once to silence the alarm

The following occurrences trigger the audible alarm:

- The carboy is removed from the cart while the cart is powered on
- The DI water carboy is empty
- The waste carboy is full

Note: The default alarm volume is high. Press the button for just over 2 seconds to lower the volume level to medium. Repeat to lower the volume level to low.

### Full and Empty Volume Indicators

At installation, a fluidics cart is calibrated for either DI water or waste. The volume indicator LEDs light up gradually as either the DI water carboy is emptied or the waste carboy is filled.

- The DI water cart tracks the liquid volume from full to empty. The LED next to the word **FULL** is green when the DI water carboy is full; and the volume-tracking LEDs below it are yellow at ¾, ½, and ¼ decrements as the carboy empties. Upon reaching empty, the LED next to the word **EMPTY** flashes red

- The waste cart tracks the liquid volume from empty to full. The LED next to the word **EMPTY** is green when the waste carboy is empty, and the volume-tracking LEDs are yellow at ¼, ½, and ¾ increments as the carboy fills up. Upon reaching full, all volume-tracking LEDs are lit, and the LED next to the word **FULL** flashes red

3. Internal Bulk Fluidics Chamber

When connected to an external DI water or waste carboy, The ZE5 Cell Analyzer must have four large (4 L) and two small (450 ml) bottles in the bulk fluidics chamber. When using external fluidics, the fluidics status in Everest Software indicates the DI source as **External DI**.
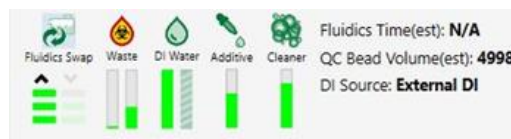
Waste Bottles

Both 4 L waste bottles must be in place and connected to the quick-connect ports (similar to a ZE5 Cell Analyzer that is not connected to an external source of water). At the start of a run, both 4 L waste bottles must be empty.

Important: At the start of the run the upper waste tank should be illuminated in green, indicating it is in use. If the lower waste tank is illuminated instead, click the Fluidics Swap icon to switch the tanks.
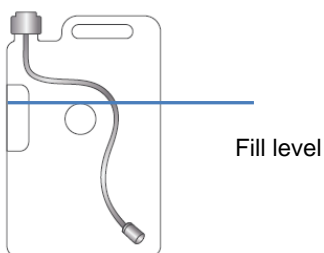

DI Water Bottles

Both 4 L DI water bottles should be in place and connected inside the bulk fluidics chamber.

Tip: Only the upper DI water bottle is used when the ZE5 Cell Analyzer is in external DI water mode.

At the start of the run, fill the **upper** DI water bottle with 2.5–3 L of DI water (leave the lower DI water bottle empty). Use the circular depression on the bottle as a guide and fill the bottle to the top edge of the circle, as indicated in the following image.

Fill level

Important: If the upper DI water bottle contains more than 4 L of DI water, the system might display an **Overfill** error and go into Safe Mode. If the bottle contains less than 2 L of DI water, the low-level sensor might trigger a timeout and display an **Unable to Fill** warning.

4. Using the Fluidics Cart

To set up and connect each fluidics cart:

1. Ensure the internal fluidics compartment contains the necessary bottles, as described in Section 3.

   - Upper DI water bottle, filled to the top of the circular depression, is in place and connected to the quick disconnect port
   - Both waste bottles are empty, in place, and connected to quick disconnect ports
   - Additive and cleaner bottles are filled, in place, and connected to quick disconnect ports

2. Fill the DI water carboy and close it with the supplied white cap.

3. Place the carboy carefully onto the DI water fluidics cart.

4. Connect the tubing with the quick disconnect on the cap.

5. Empty the waste carboy and close it with the supplied black cap.

6. Place it carefully on the waste fluidics cart.

7. Connect the tubing to the quick disconnect on the cap, and then connect the float sensor.

8. Connect the supplied power cord to each fluidics cart, and then to the appropriate electrical outlet.

9. Press **System On/Off** to power on each fluidics cart. The LED next to **System Running** lights green.

5. Hot Swapping Liquids

A ZE5 Cell Analyzer connected to an external fluidics source allows the user to "hot swap" the DI water and waste containers for full or empty ones. This means you can service the DI water and waste containers while the ZE5 Cell Analyzer is running.

Hot Swapping DI Water Carboy

To refill the DI water container:

1. Press **System On/Off** on the touchpad.

   The LED next to **System Stopped** lights red.

2. Disconnect the tubing from the cap using the quick-connect tab.

3. Remove the carboy from the fluidics cart.

4. Fill up the carboy.

5. Carefully replace the carboy onto the fluidics cart.

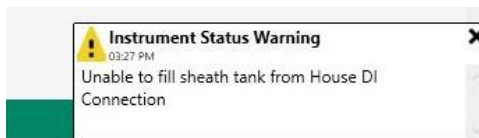6. Reconnect the tubing.

7. Press **System On/Off**.

   The LED next to **System Running** lights green.

Note: Users have approximately 100 minutes to complete the DI water carboy hot swap. When refilling the DI water carboy, the ZE5 Cell Analyzer continues to run using internal bulk DI water.
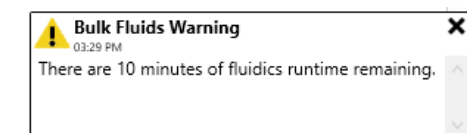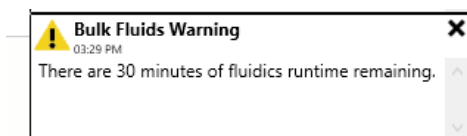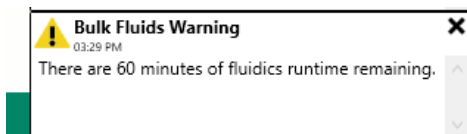
Low DI Water Level Warnings

When the DI water carboy is empty, the following warning appears in Everest Software to indicate that approximately 2 L of DI water remain in the internal DI water tank (or approximately two hours of run time).

> ⚠ **Instrument Status Warning** ✖
> 03:27 PM
> Unable to fill sheath tank from House DI Connection

If the DI water carboy is not filled up during the two hour window, Everest Software (starting at version 2.3) continues to warn the user that the DI water level is low at 60, 30, and 10 minutes of remaining run time.

> ⚠ **Bulk Fluids Warning** ✖
> 03:29 PM
> There are 60 minutes of fluidics runtime remaining.

> ⚠ **Bulk Fluids Warning** ✖
> 03:29 PM
> There are 30 minutes of fluidics runtime remaining.

> ⚠ **Bulk Fluids Warning** ✖
> 03:29 PM
> There are 10 minutes of fluidics runtime remaining.

Soon after the 10 minute warning, Everest Software reports a "Sheath level low" error and puts the instrument into Safe Mode.

> ⛔ **Instrument State Error** ✖
> 06:20 PM
> Sheath reported an error (Check MasterStateStatus/ MasterErrorType)

Hot Swapping Waste Carboy

To empty the waste container:

1. Press **System On/Off** on the touchpad.

   The LED next to **System Stopped** lights red.

2. Disconnect the float sensor, and then disconnect the tubing from the cap.

3. Remove the carboy from the fluidics cart.

4. Empty the waste.

5. Close the empty waste carboy with the cap.

6. Carefully replace the carboy onto the fluidics cart.

7. Reconnect the tubing and the float sensor.

8. Press **System On/Off**.

   The LED next to **System Running** lights green.

Important: The waste liquid collected in the waste carboy may be a biohazard. If desired, add 2 L of household bleach (5% sodium hypochloride) into the empty carboy before placing it back into the fluidics cart. If a spill occurs, do not use the fluidics cart as a secondary form of containment, as it is not designed to contain waste liquid.

6. Decontaminating the System

Bio-Rad strongly recommends that your preventive maintenance program include decontamination of the entire ZE5 Cell Analyzer fluidics system.

Note: When using the external source of DI water, the system begins decontamination using the Decontamination wizard (as described in the ZE5 Cell Analyzer and Everest Software User Guide, (#10000072647), Chapter 12, Maintenance). During this process, Everest Software uses internal bulk water and waste bottles as the fluidics sources. After decontamination is complete, the software automatically re-enables the external water source and standard operation using the external source of DI water can continue.

7. Safe Use Specifications and Compliance

DC Input Requirements
DC 24 V, 15 W

Power Supply Input Requirements
100-240 VAC, 50/60 Hz, 15 W

Operating Conditions
Operating the Fluidics Cart under the following conditions:
- Temperature range 18–28°C
- Relative humidity 20–60%

Hazards
The Fluidics Cart is designed to operate safely when used in the manner prescribed by the manufacturer. If the Fluidics Cart or any associated component is used in a manner other than prescribed, or if modifications to the instrument are not performed by a Bio-Rad or other authorized agent, then the warranty on the system will be voided and the protection provided by the equipment might be impaired. Service of the Fluidics Cart should be performed only by Bio-Rad personnel.

Disposal
The Fluidics Cart contains electronic or electrical materials; they should be disposed of as unsorted waste and must be collected separately, according to European Union Directive 2012/19/EU on waste and electronic equipment — WEEE Directive. Before disposal, contact your local Bio-Rad representative for country-specific instructions.

Biohazards
The Fluidics Cart is a laboratory product. However, if biohazardous samples are present, adhere to the following guidelines and comply with any local guidelines specific to your laboratory and location.

General Precautions
- Always wear laboratory gloves, coats, and safety glasses with side shields or goggles.
- Keep your hands away from your mouth, nose, and eyes.
- Completely protect any cut or abrasion before working with potentially infectious materials.
- Wash your hands thoroughly with soap and water after working with any potentially infectious material before leaving the laboratory.
- Remove wristwatches and jewelry before working at the bench.
- Store all infectious or potentially infectious material in unbreakable leak-proof containers.
- Before leaving the laboratory, remove protective clothing.
- Do not use a gloved hand to write, answer the telephone, turn on a light switch, or touch anything that other people may touch without gloves.
- Change gloves frequently. Remove gloves immediately when they are visibly contaminated.
- Do not expose materials that cannot be properly decontaminated to potentially infectious material.
- Upon completion of the operation involving biohazardous material, decontaminate the work area with an appropriate disinfectant (for example, a 1:10 dilution of household bleach).

Disposal of Biohazardous Material
The Fluidics Cart system includes a waste container that may potentially contain hazardous biological materials, depending on the sample used. Dispose of the following potentially contaminated materials in accordance with laboratory, local, regional, and national regulations:
- Content in waste container
- Reagents
- Used reaction vessels or other consumables that may be contaminated

Chemical Hazards
The Fluidics Cart system includes a waste container that may potentially contain hazardous chemical materials, depending on the sample used.

8. Ordering Information

Catalog#	Item Description
12010480	**ZE5 Waste Carboy**, with biohazard labels and black cap
12010521	**ZE5 DI Water Carboy**, with labels and white cap
12010522	**ZE5 External Waste Carboy Cap**, with quick connector and float sensor, black
12010523	**ZE5 External DI Water Carboy Cap,** with quick connector, white
12010524	**Tubing for ZE5 External Waste Fluidics Cart**
12010525	**Tubing for ZE5 External DI Water Fluidics Cart**
12009734	**ZE5 External Waste Carboy Upgrade Kit,** includes waste fluidics cart with power cord and tubing, black cap with quick connector, and float sensor
12009707	**ZE5 External DI Water Carboy Upgrade Kit,** includes DI water fluidics cart with power cord and tubing, white cap with quick connector

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