NovoCyte Advanteon™ Flow Cytometer and NovoSampler® Q

Maintenance Guide

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Notices

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Printed in P. R. China

Operating Temperature
Operating Temperature: 15-30°C
Storage Temperature: 1-40°C

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In This Guide

This guide covers maintenance of following modules: NovoCyte Advanteon Flow Cytometer and NovoSampler Q.

1  Prologue
This chapter describes the symbols and technical support information.

2  Scheduled Maintenance
This chapter describes the typical scheduled maintenance procedures.

3  Unscheduled Maintenance
This chapter describes the typical unscheduled maintenance procedures.

4  Troubleshooting
This chapter describes general troubleshooting and diagnostic guidelines for NovoCyte Advanteon instrument.

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“NovoCyte Advanteon™ Flow Cytometer and NovoSampler® Q Maintenance Guide”
1 Prologue

Symbols 8
Technical Support 8

This chapter describes the symbols and technical support information.
Symbols

The following table lists the symbols used in this guide:

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
<th>Description</th>
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</thead>
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<tr>
<td>BIOHAZARD</td>
<td>This symbol indicates that certain precautions must be taken when working with potentially infectious biological specimens and materials.</td>
<td></td>
</tr>
<tr>
<td>LASER RADIATION</td>
<td>This symbol indicates that the operation could potentially cause exposure to laser radiation. Protective measures should be taken during the operation.</td>
<td></td>
</tr>
<tr>
<td>WARNING</td>
<td>This symbol indicates that improper or unsafe operation could result in instrument damage, data loss, and personal injury.</td>
<td></td>
</tr>
<tr>
<td>SHOCK HAZARD</td>
<td>This symbol indicates that the operation has a risk of electric shock.</td>
<td></td>
</tr>
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</table>

Technical Support

If there are operating or technical questions, please refer to the sections relating to the instrument operation in this guide. For additional technical support, please contact your local Agilent Technologies representative or distributor. When contacting Agilent Technologies, be sure to provide the following information:

- The product name, product model and serial number.
- Usage history of the instrument.
- Instrument status information on the status bar from the NovoExpress software. Or if there is a warning or error message, please also provide that information.
- Experiment information conducted on the instrument, if not confidential.
- Details of recent instrument QC test.

For support within the US, please call 866-308-2232.
Prologue

For support within China, please call 400-600-1063.

For users in other countries or regions, contact your local Agilent Technologies representatives or distributors, which may be found at www.aceabio.com.

NOTE

When encountering an issue during operation of NovoCyte Advanteon flow cytometer or NovoSampler Q instrument, it is highly recommended to submit a Technical Support Request by clicking Home > Technical Support Request in the NovoExpress main window. The Technical Support Request Creation Wizard automatically collects NovoCyte Advanteon configurations, NovoExpress system logs, current screenshot, current experiment file and other information that helps in the diagnosis and troubleshooting of NovoCyte Advanteon instrument. User can also attach any other files using this function. Please refer to the NovoExpress® Software Guide for detailed information on this function.
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2 Scheduled Maintenance

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This chapter describes the typical scheduled maintenance procedures.
Scheduled Maintenance

The following table lists the regular maintenance to be done on the NovoCyte Advanteon instrument.

Table 2  Scheduled Maintenance and Recommended Frequency

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<tr>
<th>Maintenance</th>
<th>Recommended Maintenance Frequency</th>
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<tr>
<td>Daily Start-up</td>
<td>Daily. Automatic system cleaning during start-up.</td>
</tr>
<tr>
<td>Daily Shutdown</td>
<td>Daily. Automatic system cleaning and decontamination during shutdown.</td>
</tr>
<tr>
<td>Add Instrument Reagents (NovoFlow Sheath Fluid, NovoRinse Solution, and NovoClean Solution)</td>
<td>As needed. Check the instrument reagent volume in the containers before each experiment and add more reagents when necessary.</td>
</tr>
<tr>
<td>Empty Waste</td>
<td>As needed. Check waste volume before each experiment and empty waste container when necessary.</td>
</tr>
<tr>
<td>Preventative Maintenance</td>
<td>Every month.</td>
</tr>
<tr>
<td>• Clean the Sample Injection Probe (SIP)</td>
<td></td>
</tr>
<tr>
<td>• Clean the SIP Cleaning Apparatus</td>
<td></td>
</tr>
<tr>
<td>• Unclog the Flow Cell</td>
<td></td>
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<tr>
<td>• Sterilize Instrument Reagent Containers</td>
<td></td>
</tr>
<tr>
<td>Replacing Fluidic System Consumables</td>
<td>Every two months or prompted by NovoExpress Software.</td>
</tr>
<tr>
<td>• Replace the Sheath Fluid In-Line Filter</td>
<td></td>
</tr>
<tr>
<td>• Replace the Waste Filter</td>
<td></td>
</tr>
<tr>
<td>• Replace the NovoFlow Sheath Fluid Inlet Filter</td>
<td></td>
</tr>
<tr>
<td>• Replace the NovoRinse and NovoClean Solution Inlet Filters</td>
<td></td>
</tr>
<tr>
<td>Replace 0.05 µm Sheath Fluid Ultrafiltration (UF) Filter (Optional)</td>
<td>Every two weeks.</td>
</tr>
</tbody>
</table>

Preventative Maintenance

It is recommended to conduct preventative maintenance once every month to ensure the fluidic system is in good condition.

Clean the Sample Injection Probe (SIP)

If the outer surface of the sample injection probe is dirty, follow the procedure below to manual clean the outer surface of the sample injection probe.

Materials:
Scheduled Maintenance

- Clean soft cloth
- NovoClean solution (1X)
- Milli-Q or 0.2 µm filtered deionized (DI) water

Procedure:
1. Click Instrument > Shut Down on the NovoExpress software.
2. Select Clean sample injection probe option and then click Yes button in the prompted window (Figure 1). NovoExpress software will guide you to conduct the cleaning SIP procedure.

![Figure 1. Message in NovoExpress Software when Shutting down](image)

The instrument will shut down directly if Clean sample injection probe option is not selected.
3. Follow the instruction in the software, remove the sample tube from the tube holder if tube holder is used or remove the tube rack or sample plate if NovoSampler Q is used. Click OK. (Error! Reference source not found., 3).

![Figure 2. Message in NovoExpress Software to Conduct the SIP Cleaning Procedure with NovoSampler Q](image)
Sample injection probe will move downward after clicking the OK button. Do not put your fingers underneath the sample injection probe!

4 After clicking the OK button, the sample injection probe will move downwards. Prepare a cotton swab or a damp soft cloth with NovoClean solution (1X) and gently wipe the outer surface of the sample injection probe. (Error! Reference source not found.)
Scheduled Maintenance

![Image](image.jpg)

Figure 5. Wipe the Outer Surface of the Sample Injection Probe with Tube Holder

**WARNING** Sample injection probe directly contacts the biological samples which may be biohazardous. Wear gloves when handling the sample injection probe.

**WARNING** Sample injection probe is fragile and may be damaged if handled improperly. When cleaning the sample injection probe, please be careful and prevent deforming or bending it.

5 Click OK button after cleaning. (Figure 6).

![Figure 6](image.jpg)

Figure 6. Clean the Surface of Sample Injection Probe

6 If tube holder is used, place a tube of Milli-Q or 0.2 µm filtered DI water or NovoRinse solution (1X) in the tube holder. If NovoSampler Q is used, load a 40 tube rack on the orbital shaker and place a tube of Milli-Q or 0.2 µm
Scheduled Maintenance

filtered DI water or NovoRinse solution (1X) in A1 position. The instrument will shut down automatically after clicking OK button (Figure 8, 8).

Figure 7. Load a Sample Tube with Milli-Q or 0.2 µm filtered DI water or NovoRinse Solution with NovoSampler Q

Figure 8. Load a Sample Tube with Milli-Q or 0.2 µm filtered DI water or NovoRinse Solution with Tube Holder

Clean the SIP Cleaning Apparatus

Materials:
- Clean cotton swab
- NovoClean solution (1X)
- Milli-Q or 0.2 µm filtered deionized (DI) water

Procedure:
1. Turn off the power of the instrument.
Scheduled Maintenance

2 Prepare a cotton swab soaked with NovoClean solution (1X). Wipe the SIP cleaning apparatus’ lower surface back and forth until it is clean. (Figure 9)

![Wipe the SIP Cleaning Apparatus’ Lower Surface](image)

**WARNING**

If NovoSampler Q is connected, please remove NovoSampler Q at first and then wipe the SIP cleaning apparatus’ lower surface.

---

3 Prepare a damp cloth soaked with Milli-Q or 0.2 µm filtered DI water. Wipe the SIP cleaning apparatus back and forth at least five times.

4 Power on NovoCyte Advanteon instrument and start NovoExpress software. After the instrument is Ready, click Instrument > Fluidics Maintenance > Cleaning to finish cleaning the SIP cleaning apparatus.

**WARNING**

SIP cleaning apparatus directly contacts the biological samples which may be biohazardous. Wear gloves when handling the SIP cleaning apparatus.

---

**WARNING**

When cleaning the SIP cleaning apparatus, please be careful to prevent any damages the apparatus and sample injection probe.

---

Unclog the Flow Cell

When the NovoCyte Advanteon is in Ready status, click Instrument > Fluidics Maintenance > Unclog from NovoExpress software, and the Unclog procedure
Scheduled Maintenance

will automatically be executed. The progress of the procedure will be shown in
the NovoExpress status bar.

![Image of NovoExpress status bar]

Figure 10. Unclog the Flow Cell

Sterilize Instrument Reagent Containers

It is very important to keep the instrument reagent free of bacteria for the
cytometer. It is highly recommended to clean and sterilize the instrument reagent
containers once a month or whenever there is a suspected bacteria growth or
possible contamination (e.g. by mishandling the containers). NovoCyte
Advanteon is connected to NovoCyte Fluidics Station II or NovoCyte Fluidics
Cart. The reagent containers need to be properly removed from the fluidics
station or cart and sterilized using the following method respectively.

*NOTE*

Please refer to *NovoCyte Advanteon™ Flow Cytometer Operator's Guide* for
instruction on removing the containers from the NovoCyte fluidics station II or
NovoCyte Fluidics Cart.

Materials:

- Clean soft cloth
- NovoClean solution (1X)
- 70% Ethanol
- Milli-Q or 0.2 µm filtered deionized (DI) water (or NovoFlow solution)

To sterilize instrument reagent containers when NovoCyte Fluidics Station II is
connected:

1. Ensure the container is properly removed from NovoCyte Fluidics Station II.
   Wipe the outer surface of the container using clean soft cloth soaked with
   70% ethanol.

2. Empty the reagent container. Fill the NovoFlow container with at least 300
   mL of NovoClean solution (1X) and cap the bottle. Fill the NovoClean and
   NovoRinse container with at least 100 mL of NovoClean solution (1X) and
   cap the bottle. Shake the container vigorously to let the NovoClean solution
   cover the entire inner surface. Repeat for several times and then soak for 30
   min.

3. Empty the reagent container again. Fill about 500 mL Milli-Q or 0.2 µm
   filtered DI water (or NovoFlow solution) to NovoFlow container and cap the
Scheduled Maintenance

bottle. Fill about 100 mL Milli-Q or 0.2 µm filtered DI water (or NovoFlow solution) to NovoClean and NovoRinse container and cap the bottle. Shake reagent container for at least 2 minutes.

4 Repeat step 3 three times.

5 Fill the reagent container all the way to the neck or close to the brim with Milli-Q or 0.2 µm filtered DI water or NovoFlow sheath fluid. Soak 20 min and empty the reagent container.

6 Wipe the outer surface of the container with a dry and clean soft cloth. The container is ready to use.

To sterilize instrument reagent containers when NovoCyte Fluidics Cart is connected:

1 Ensure the container is properly removed from NovoCyte Fluidics Cart. Wipe the outer surface of the container using medical gauze pads.

2 Empty the reagent container. Fill the NovoFlow container with at least 1.5 L of NovoClean solution (1X) and cap the bottle. Fill the NovoClean and NovoRinse container with at least 100 mL of NovoClean solution (1X) and cap the bottle. Shake the container vigorously to let the NovoClean solution cover the entire inner surface. Repeat for several times and then soak for 30 min.

3 Empty the reagent container again. Fill about 1.5L Milli-Q or 0.2 µm filtered DI water (or NovoFlow solution) to NovoFlow container and cap the bottle. Fill about 100 mL Milli-Q or 0.2 µm filtered DI water (or NovoFlow solution) to NovoClean and NovoRinse container and cap the bottle. Shake reagent container for at least 2 minutes.

4 Repeat step 3 three times.

5 Fill the reagent container all the way to the neck or close to the brim with Milli-Q or 0.2 µm filtered DI water or NovoFlow sheath fluid. Soak 20 min and empty the reagent container.

6 Wipe the outer surface of the container with a clean soft cloth. The container is ready to use.

**WARNING** NovoCyte Fluidics Cart is equipped with a 15 L NovoFlow container. When emptying or adding solution to the NovoFlow container, ensure to remove the big cap only. Please refer to NovoCyte Advanteon™ Flow Cytometer Operator’s Guide for more details.
Scheduled Maintenance

Replacing Fluidic System Consumables

The NovoCyte Advanteon flow cytometer monitors the accumulated running time of the fluidic system consumables to ensure the consumables are changed in a timely manner for optimal flow cytometry results. When the accumulated running time is reached, the NovoExpress software will prompt a message to remind the user to replace the consumables (Figure 11). A similar message will be prompted when the last replacement is 60 days ago as shown in Figure 12.

Click Replace to continue. Clicking the Close button will cancel the process and allow continued use of the system. However, the consumables should be replaced promptly.

Figure 11. NovoExpress Software Message for Replacing Fluidic System Consumables When Accumulated Running Time is Reached

Figure 12. NovoExpress Software Message for Replacing Fluidic System Consumables When Last Replacement is 60 Days Ago

NOTE
The fluidic system consumable replacement process can also be initiated manually at any time by clicking the Instrument > Replace Fluidic System Consumables icon in the NovoExpress software when the instrument is in Ready status.
Scheduled Maintenance

Click the Replace button and a dialog box as shown in Figure 14 will be prompted.

The following fluidic system consumables should be replaced at the same time:

- NovoFlow sheath fluid in-line filter (1pcs) (Cat. No. 2030002)
- Waste filter (1pcs) (Cat. No. 2030003)
- NovoFlow sheath fluid inlet filter (1pcs) (Cat. No. 2030001)
- NovoRinse solution inlet filter (1pcs) (Cat. No. 2030048)
- NovoClean solution inlet filter (1pcs) (Cat. No. 2030049)

Follow the procedure described below to replace all of the fluidic system consumables.

Once all of the fluidic system consumables have been replaced with the new ones, click the Next button to continue.

If Cancel is selected, a dialog box as shown in Figure 15 will be prompted. The process can be aborted by clicking Yes button.
Scheduled Maintenance

Figure 15. NovoExpress Software Message for Cancelling Fluidics System Consumable Replacement

A confirmation message will be prompted (Figure 16). Click Yes button to inform the system that the consumables have been replaced.

Figure 16. NovoExpress Software Message Confirmation for Fluidics Consumables Replaced

After confirmation of fluidics consumables being replaced, the NovoExpress software will prompt a window to remind users to conduct the Priming procedure (Figure 17).
Scheduled Maintenance

Figure 17. NovoExpress Software Message for Priming after Replacing Fluidic System Consumables

During the Priming procedure, the progress of the Priming will be shown in the NovoExpress software (Figure 18).

Figure 18. NovoExpress Software Message for Priming in Process

NOTE

The Priming procedure can also be manually initiated by clicking Instrument > Fluidics Maintenance > Priming on the NovoExpress software when the instrument is in Ready status.
Scheduled Maintenance

Once the Priming procedure is completed, a dialog box will be prompted for conducting the QC Test (Figure 19). Prepare the QC particle sample as described in Section 2.3.1 Prepare QC Particle Sample in NovoCyte Advanteon™ Flow Cytometer Operator’s Guide and place it in the tube holder. Click QC Test to initiate the QC Test. The QC Test will automatically start. Follow the steps and complete the QC Test. A QC Test must be conducted each time when fluidic system consumables are replaced in order to check the performance of the system.

![Figure 19. NovoExpress Software Message for Initiating the QC Test after Completion of Fluidic System Consumables Replacement](image)

The following sections describe the detailed procedure for replacing fluidic system consumables. It is highly recommended to replace all the fluidic system consumables at the same time to ensure the optimal system performance. However, each component can also be replaced individually if necessary. Click Instrument > Replace Fluidic System Consumables in the NovoExpress software to initiate the process. Always conduct the Priming process after the fluidic system consumables have been replaced as prompted by the NovoExpress software or manually conduct the Priming process by clicking Instrument > Fluidics Maintenance > Priming.

**Replace the NovoFlow Sheath Fluid In-Line Filter**

Open the front panel of the NovoCyte Advanteon instrument, and locate the sheath fluid in-line filter shown in Figure 20.
Scheduled Maintenance

Procedure:
1. Make sure the instrument is in Ready or shut down status.
2. Open the front panel of the instrument.
3. Unscrew the Luer connectors at two ends of the filter to disconnect the tubings from the filter.

**WARNING**
Use lint free wipes to gently wipe of the sheath fluid from the tubing and avoid sheath fluid dripping onto the instrument.

4. Replace the old filter with a new one and correctly connect the tubings to the filter.

**WARNING**
Finger tightening the Luer connectors only to avoid damage of the filters and filter leakage.

5. If the instrument is in shut down status, turn on the NovoCyte Advanteon instrument, and automatic start-up cleaning process will be initiated. Observe the sheath fluid flows through the filter properly and make sure there is no leakage through the filter-tubing connections.
6 Once the instrument is Ready, click Instrument > Fluidics Maintenance > Priming to prime the fluidic system.

**WARNING** The ends of the sheath fluid in-line filter are designed to be different on purpose to ensure the in-line filter is connected into the system in the correct direction. Incorrect direction would lead to system malfunction.

**WARNING** When replacing the sheath fluid in-line filter, do not twist or kink the tubing.

Replace the Waste Filter

Open the side panel of the NovoCyte Advanteon instrument and locate the waste filter as shown in Figure 21.

![Figure 21. Waste Filter](image)

**Procedure:**

1. Make sure the instrument is in Ready or shut down status.
2. Open the side panel of the instrument.
Scheduled Maintenance

3 Unscrew the Luer connectors at two ends of the waste filter to disconnect the tubings from the filter.

**WARNING**
Use lint free wipes to gently wipe of the sheath fluid from the tubing and avoid sheath fluid dripping onto the instrument.

4 Replace the old filter with a new one and correctly connect the tubing to the filter. Ensure the side of the filter labeled with "Inlet" is connected to the inlet tubing as shown below.

![Figure 22. Connect the Waste Filter](image)

**WARNING**
The ends of the waste filter are designed to be different on purpose to ensure the filter is connected into the system in the correct direction. Incorrect direction would lead to system malfunction.

**WARNING**
Finger tightening the Luer connectors only to avoid damage of the filters and filter leakage.

5 If the instrument is in shut down status, turn on the NovoCyte Advanteon instrument, and automatic start-up cleaning process will be initiated. Observe the waste flows through the waste filter properly and make sure there is no leakage through the filter-tubing connections.

**WARNING**
When replacing the waste filter, do not twist or kink the tubing.
Scheduled Maintenance

WARNING All biological samples or materials can contain infectious deadly disease. Please be careful and always wear protective clothing, masks, and gloves when handling the waste.

Replace NovoFlow Sheath Fluid Inlet Filter

NovoFlow sheath fluid inlet filter is placed inside the NovoFlow container to filter out micro-particles or impurities in the sheath fluid.

Replace NovoFlow Sheath Fluid Inlet Filter with NovoCyte Fluidics Station II Connected

Procedure:
1. Make sure the instrument is in Ready or shut down status.
2. Press the metal clip on the quick coupler to disconnect the tubing from the NovoFlow sheath fluid container.
3. Unscrew the cap and take the tubing-filter assembly out from the container and put it on a clean lint-free wipe (Figure 23). Figure 23. Change NovoFlow Sheath Fluid Inlet Filter
4. Replace the old filter with a new one and correctly connect the tubing to the filter.

WARNING Please use proper force when tightening the Luer connectors.

WARNING The ends of the sheath fluid inlet filter are different to ensure the filter is connected into the system in the correct direction. Incorrect installation will lead to system malfunction.

5. Click Instrument > Fluidics Maintenance > Priming to prime the fluidic system.
When replacing the sheath fluid inlet filter, do not twist or kink the tubing.

Replace NovoFlow Sheath Fluid Inlet Filter with NovoCyte Fluidics Cart Connected

Procedure:
1. Make sure the instrument is in Ready or shut down status.
2. Locate the NovoFlow sheath fluid inlet filter on the NovoFlow container’s cap. (Figure 244)
3. Replace the old filter with a new one and correctly connect the tubing to the filter.

Please use proper force when tightening the Luer connectors.

The ends of the sheath fluid inlet filter are different to ensure the filter is connected into the system in the correct direction. Incorrect installation will lead to system malfunction.
Scheduled Maintenance

4  Click Instrument > Fluidics Maintenance > Priming to prime the fluidic system.

**WARNING** When replacing the sheath fluid inlet filter, do not twist or kink the tubing.

Replace NovoRinse and NovoClean Solution Inlet Filter

NovoRinse and NovoClean solution inlet filters are placed inside the NovoRinse and NovoClean containers, respectively, to filter out micro-particles or impurities in the solution.

Procedure:
1  Make sure the instrument is in Ready or shut down status.
2  Press the metal clip on the quick coupler to disconnect the tubing from the NovoRinse or NovoClean container.
3  Unscrew the cap and take the tubing-filter assembly out from the container and put it on a clean lint free wipe. Take off the old filter and replace with a new one (Figure 25).

![Figure 25. Change NovoRinse and NovoClean Solution Inlet Filter](image)

4  Click Instrument > Fluidics Maintenance > Priming to prime the fluidic system.

Replace 0.05 µm Sheath Fluid Ultrafiltration (UF) Filter (Optional)

NovoCyte 0.05 µm Sheath Fluid Ultrafiltration Filter is an optional accessory of NovoCyte Quanteon and Advanteon flow cytometer for sterilizing and clarifying biological samples used on flow cytometer. It has 0.05 µm pore size which can reduce the background for small particles detection during sample acquisition. It
Scheduled Maintenance

is recommended to replace this filter every two weeks after the first time use by following the procedures below. These procedures can also be used when installing this filter is needed.

**NOTE**
NovoCyte 0.05 µm Sheath Fluid Ultrafiltration Filter is optional accessory which can be ordered separately. Please contact ACEA local sales representatives for the order information.

Procedure:

**WARNING** Please wear protective gloves and use proper precautions when conducting this procedure.

1. Make sure the instrument is in Ready or shut down status.
2. Gently push and open the instrument front panel.
3. Locate the 0.05 µm Sheath Fluid Ultrafiltration (UF) Filter rack (Figure 26). Disconnect the tubing located inside the rack by unscrewing the Luer connectors if first time installation, or remove the existing filter by unscrewing the Luer connectors at two ends of the filter if this filter is already installed.

**NOTE**
NovoCyte Advanteon instrument is shipped with the filter rack pre-installed.

Figure 26. Locate the 0.05 µm Sheath Fluid Ultrafiltration (UF) Filter rack
Scheduled Maintenance

**WARNING** Use lint free wipes to gently wipe off the sheath fluid from the tubing and avoid sheath fluid dripping onto the instrument.

4 Connect the outlet of the new filter to the female Luer connector, and the inlet of the new filter to the male Luer connector. Secure the filter onto the filter rack by gently sliding it through the open slit on the rack (Figure 27). Ensure the filter is vertically mounted and all the tubing is not twisted.

**NOTE** Under some situation when the Ultrafiltration Filter needs to be removed after initial installation, disconnect the filter from the Luer connectors and connect the male Luer connector directly to the female one.

![Figure 27. Install the 0.05 µm Sheath Fluid Ultrafiltration (UF) Filter](image)

5 Open NovoExpress software. Click Instrument > Fluidic Maintenance > Priming to prime the fluidic system. Ensure no fluidic leakage from the filter’s inlet/outlet.

6 Load a sample tube with 1 mL Mill-Q or 0.2 µm filtered DI water onto the tube holder. Create a new experiment. Set Stop Condition as 500 µL and Flow Rate as 120 µL/min. Click the Run button in Experiment Control panel to start the sample acquisition. This step is to flush sample tubing.

7 Close the front panel. The installation is completed, and the instrument is ready to use.
3 Unscheduled Maintenance

Remove Bubbles 34
Clean the External Surface of the Instrument 35
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Clean the Optical Filters and Mirrors 42
Clean Fluidic System 43
Clean NovoSampler Q 44
Calibrate NovoSampler Q 44

This chapter describes the typical unscheduled maintenance procedures.
Unscheduled Maintenance

The following unscheduled maintenance procedures should be conducted when necessary. The frequency depends on how often the cytometer is used. It is recommended to check all the components of NovoCyte Advanteon instrument periodically for wear and replacement if necessary.

The following table lists the unscheduled maintenance to be done on the NovoCyte Advanteon instrument.

Table 3  Unscheduled Maintenance and When to Perform

<table>
<thead>
<tr>
<th>Unscheduled Maintenance</th>
<th>When to Perform</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remove Bubbles</td>
<td>• The CV of the data is larger than normal&lt;br&gt;• QC test failed&lt;br&gt;• No events showed up after sample collection started for certain period of time&lt;br&gt;• Instrument was not used for over one week</td>
</tr>
<tr>
<td>Clean the External Surface of the Instrument</td>
<td>Keep the external surface of the instrument clean</td>
</tr>
<tr>
<td>Decontamination</td>
<td>Suspected contamination in the system</td>
</tr>
<tr>
<td>Prime Fluidic System before Long-Term Storage</td>
<td>No plan to run the NovoCyte Advanteon flow cytometer for more than two weeks</td>
</tr>
<tr>
<td>Purge Fluidic System before Shipment</td>
<td>The NovoCyte Advanteon flow cytometer needs to be shipped</td>
</tr>
<tr>
<td>Calibrate NovoCyte Fluidics Station II or NovoCyte Fluidics Cart</td>
<td>Abnormal warning about the liquid level in the reagent containers is observed</td>
</tr>
<tr>
<td>Clean the Optical Filters and Mirrors</td>
<td>The optical filters and mirrors are dirty</td>
</tr>
<tr>
<td>Clean Fluidic System</td>
<td>• The CV of the data is larger than normal&lt;br&gt;• QC test failed&lt;br&gt;• Excessive debris in display</td>
</tr>
<tr>
<td>Clean NovoSampler Q</td>
<td>Keep the outer and inner surface of the NovoSampler Q clean</td>
</tr>
<tr>
<td>Calibrate NovoSampler Q</td>
<td>• NovoSampler Q is installed for its first-time use&lt;br&gt;• SIP module is replaced</td>
</tr>
</tbody>
</table>

Remove Bubbles

When the CV of the data is larger than normal or the QC Test fails, there is a possibility that bubbles exist inside the flow chamber. In this case, the following procedure should be conducted to remove the bubbles.
Unscheduled Maintenance

When the NovoCyte Advanteon instrument is in Ready status, click Instrument > Fluidics Maintenance > Debubble from the NovoExpress software to execute the Debubble procedure.

Figure 28. Debubble Function

Clean the External Surface of the Instrument

Keep the external surface of the instrument clean using the following method.

Materials:
- NovoRinse solution (1X)
- Milli-Q or 0.2 µm filtered deionized (DI) water
- Clean soft cloth

Procedure:
1. Turn off the power of the instrument and unplug the power cord.

   NOTE

   To avoid the risk of electrical shock, make sure to power off the cytometer and unplug the power cord from the power outlet.

2. Gently wipe the surface of the instrument with a clean soft cloth soaked with NovoRinse solution (1X).

3. Wipe the surface again using a clean soft cloth.

   WARNING

   The surface of the instrument may be contaminated by biological samples which may be biohazardous. Ensure to wear appropriate personal protective equipment (e.g. gloves, clothing, and eyewear) when cleaning the surface.

   WARNING

   Do not use isopropyl alcohol (IPA) or ethanol to clean the instrument surface.
Decontamination

The decontamination procedure can be used either after a known contamination has occurred, or as a preventative maintenance procedure to minimize or prevent the occurrence of contamination in the NovoCyte Advanteon fluidics system.

A NovoCyte Quanteon and Advanteon Decontamination Kit (Catalog No.2030034) is required to run this procedure.

The Decontamination function is only available by logging into an account with the Decontaminate Instrument privilege.

Procedure:

1. Click Instrument > Fluidics Maintenance > Decontamination from the NovoExpress software.

2. NovoExpress software will prompt a dialog box to guide you conducting the decontaminating procedure (Figure 30). Follow the instructions in each step and click OK to move to the next step until completion.
Unscheduled Maintenance

Figure 30. NovoExpress Dialog Box to Guide the Decontamination Procedure

3 The NovoCyte Advanteon flow Cytometer is ready to use.

NOTE

Contact your local Agilent representative or distributor for any questions regarding this procedure.

Prime Fluidic System before Long-Term Storage

If there is no plan to run the NovoCyte Advanteon flow cytometer for more than two weeks, a thorough cleaning process is recommended to prevent salt crystallization in the fluidic system.

Procedure:

1 When the cytometer is in Ready status, replace all the instrument reagents with Milli-Q or 0.2 µm filtered DI water.
Unscheduled Maintenance

2 Click Instrument > Fluidics Maintenance > Priming from the NovoExpress software. Repeat the procedure two times.

![Figure 31. Priming Function](image)

3 Press the power switch on the front panel of the NovoCyte Advanteon instrument to initiate the automatic shutdown cleaning process.

4 After the shutdown cleaning process is completed, the instrument will power off automatically. The NovoExpress software status bar will show Instrument not Connected message.

5 Empty all the reagent containers and empty the waste. Rinse the containers with Milli-Q or 0.2 µm filtered DI water thoroughly and air dry.

When using the system after long-term storage, follow the procedure below to prepare the system.

1 Sterilize the reagent containers following the procedure described in Sterilize Instrument Reagent Containers of Section 1.1 Preventative Maintenance.

2 Add NovoFlow, NovoRinse, and NovoClean to the corresponding containers.

3 Press the power button on the front panel of the NovoCyte Advanteon instrument. The instrument will start the automatic start-up cleaning procedure.

4 Click Instrument > Fluidics Maintenance > Priming from the NovoExpress software. Repeat the procedure two times.

5 The NovoCyte Advanteon instrument is then ready to use.

NOTE

If NovoCyte Advanteon instrument has not been used for more than two months, it is recommended to replace the fluidic system consumables before use. Refer to Replacing Fluidic System Consumables in this guide for detailed procedure.

Purge Fluidic System before Shipment

If for any reason the NovoCyte Advanteon flow cytometer needs to be shipped, perform the following procedure to purge the fluidic system before packaging and shipping.
Unscheduled Maintenance

NOTE

The Purge function is only available by logging in as account with the Purge Instrument privilege.

Procedure:

1 Click Instrument > Fluidics Maintenance > Purge from the NovoExpress software.

Figure 32. Purge Function

2 NovoExpress software will prompt a dialog box to guide you to conduct the purging procedure (Figure 33). Follow the instructions in each step and click OK to move to the next step until completion.

Figure 33. NovoExpress Dialog Box to Guide the Purge Procedure

3 Power off the instrument. Unplug the power supply and accessories.

4 Sterilize the reagent containers following the procedure described in Sterilize Instrument Reagent Containers of Section 1.1 Preventative Maintenance.

5 Pack the instrument and accessories properly for shipment.

NOTE

If there are operating questions when purging the fluidics system, in order to avoid damaging the instrument, please stop purging and contact your local Agilent representative or distributor.
Calibrate NovoCyte Fluidics Station II or NovoCyte Fluidics Cart

NovoCyte Fluidics station II and NovoCyte Fluidics Cart are calibrated at the factory and should be ready to use when connected to NovoCyte Advanteon instrument after installation. However, in some cases there is a need to recalibrate NovoCyte Fluidics Station II or NovoCyte Fluidics Cart after shipment and movement. When a false warning about the liquid level in the reagent containers is observed, follow the procedures below to recalibrate NovoCyte Fluidics Station II or NovoCyte Fluidics Cart.

**NOTE**

Calibrate Fluidics Station or Calibrate Fluidics Cart function is only available when login as account with the Calibrate Fluidics Station or Calibrate Fluidics Cart privilege.

Procedure:

1. Click Instrument > Operation > Calibrate Fluidics Station (or Calibrate Fluidics Cart) in the NovoExpress software.

![Figure 34. NovoExpress Software Instrument Menu when NovoCyte Fluidics Station II is Connected](image)

2. Follow the instruction in the software, remove the NovoFlow, NovoRinse, NovoClean, and waste containers from NovoCyte Fluidics Station II when NovoCyte Fluidics Station II is connected, or Remove the NovoClean and NovoRinse container when NovoCyte Fluidics Cart is connected. Click the OK button (Figure 36, Figure 37).

![Figure 35. NovoExpress Software Instrument Menu when NovoCyte Fluidics Cart is Connected](image)
Unscheduled Maintenance

Figure 36. Message in NovoExpress Software when Performing Fluidics Station Calibration

Figure 37. Message in NovoExpress Software when Performing Fluidics Cart Calibration

**NOTE**

Do not remove NovoFlow and Waste container when calibrating NovoCyte Fluidics Cart.

3. The software will prompt a dialog box indicating the fluidics station (or cart) calibration is successful. Follow the instructions to place the NovoFlow, NovoRinse, NovoClean, and waste containers back into the fluidics station or place the NovoClean and NovoRinse containers back into the fluidics cart. Click the OK button (Figure 38, Figure 39).

Figure 38. NovoExpress Software Message Indicating Fluidics Station Calibration is Successful
Clean the Optical Filters and Mirrors

In normal operation, the optical filters and mirrors are tightly enclosed inside the optical fixtures and should remain clean. However, it might get dirty if removed from the slot or if it needs replacement. The following method describes how to clean the optical filters or dichroic mirrors when it gets dirty. Maintaining the optical filters and mirrors surface clean is very important to get the good quality data.

When cleaning or replacing optical filters or dichroic mirrors, handle with care to avoid scratching the surface and to prevent the filters from falling out of the holder. Use cotton swabs, optical lens paper, and spectral-grade methanol or analytical grade ethanol in a dropper bottle to clean the optical filters. Acetone should not be used for cleaning the optical filters. Always wear laboratory gloves when handling the optical filter.

Materials:
- Analytical grade ethanol
- Compressed air or a bulb blower
- Lint-free cotton swabs
- Lint-free wipe or lens cleaning tissue

Procedure:
1. Blow off the contaminants

   Many contaminants are just loosely attached to the surface of the optical filters and can be blown off. Wear clean laboratory gloves and hold the filter firmly in one hand. Always use a gentle to moderate air flow and maintain an oblique angle. Slowly move the air steam over the filter surface at an angle to
Unscheduled Maintenance

1. Gently blow off the contaminants. Repeat this process for the other side of the filter.
2. Wrap a triangular-shaped lint-free wipe or lens cleaning tissue around a lint-free cotton swab. Moisten and seal the end with a few drops of alcohol.
3. Holding the cotton swab in a horizontal position, gently clean the surface of the filter with a continuous motion at a constant speed.
4. Allow the solvent to evaporate. Use a room light to inspect the filter to ensure it is clean. If contamination remains, start with a brand-new wipe and swab and repeat step 2-3 again.
5. Repeat step 1-4 for the other side of the filter.
6. Insert the cleaned filter into the filter slot according to the correct orientation and push it all the way in.

NOTE
Always blow the contaminants off the filters before using the wipe or swab to clean the filter surface. Failure to do so may scratch the filter surface.

NOTE
Do not reuse the wipes and swabs. Always use new wipes and swabs for every new cleaning attempt.

Clean Fluidic System

When the CV of the data is larger than normal or the QC Test fails or excessive debris appears, it is possible that the flow cell or sampling tubing is dirty. In this case, the following procedure should be conducted to clean the flow cell or the sampling tubing.

When the NovoCyte Advanteon instrument is in Ready status, click Instrument > Fluidics Maintenance > Cleaning from the NovoExpress software to execute the Cleaning procedure.

Figure 40. Cleaning Function
Unscheduled Maintenance

Clean NovoSampler Q

The NovoSampler Q may get contaminated by the experimental sample. To prevent corrosion of the instrument, periodically clean the outer and inner surfaces of the NovoSampler Q.

Materials

- NovoRinse solution
- Milli-Q or 0.2 µm filtered deionized (DI) water
- Clean soft cloth

Procedure:

1. Turn off NovoCyte Advanteon Flow Cytometer and unplug the power cable.

   **NOTE**
   To prevent possible injury and damage to the instrument, turn off the power of the NovoCyte Advanteon Flow Cytometer and unplug the power cable before cleaning or moving the instrument.

2. Prepare a damp soft cloth with NovoRinse solution. Wipe the top surface of the orbital shaker and accessible outer and inner surfaces of the NovoSampler Q.

3. Prepare a damp soft cloth with Milli-Q or 0.2 µm filtered DI water. Wipe the surfaces again.

4. Wipe the surfaces one more time with a dry soft cloth.

   **NOTE**
   The NovoSampler Q and NovoCyte Advanteon instrument may be contaminated by biological samples which may be biohazardous. Ensure to wear appropriate personal protective equipment (e.g. gloves, clothing, and eyewear) during the cleaning procedure.

   **NOTE**
   Do not wipe the NovoSampler Q using isopropyl alcohol or ethanol.

Calibrate NovoSampler Q

When NovoSampler Q is installed for its first-time use, the software will prompt user to calibrate the NovoSampler Q. Please refer to Installation in NovoSampler® Q Operator’s Guide for details. Under certain situations, for
Unscheduled Maintenance

example, when troubleshooting is required or SIP module is replaced, user can follow the instructions below to manually calibrate NovoSampler Q.

1 Ensure NovoCyte Advanteon and NovoSampler Q is properly installed and powered on. Ensure NovoExpress software is launched.

Refer to Installation in NovoSampler® Q Operator’s Guide for details on properly installing the NovoSampler Q.

2 Click the Instrument > NovoSampler Q > Calibrate on the NovoExpress software.

![Figure 41. Calibrate NovoSampler Q](image)

3 Ensure the cover is closed and there is no plate loaded on the shaker. Click Yes in the prompted window.

![Figure 42. Dialog Box to Calibrate NovoSampler Q](image)

4 Wait until the calibration is complete. Click OK to finish the calibration process.

![Figure 43. Dialog Box for Successful Calibration](image)
Unscheduled Maintenance

If the calibration fails, NovoExpress Software will prompt an error message as shown below. Re-install the NovoSampler Q by following the instructions described in Section 1.2 in NovoSampler® Q Operator’s Guide. Repeat the Step 1-4 in this section to recalibrate the NovoSampler Q. Contact Agilent technical support if the calibration procedure fails three times in a row.

Figure 44. Dialog Box for Failed Calibration
4 Troubleshooting

This chapter describes general troubleshooting and diagnostic guidelines for NovoCyte Advanteon instrument.
Troubleshooting

Follow the procedures described in this section for troubleshooting methods.

For technical support, please refer to Technical Support in this guide.

Refer to the NovoExpress® Software Guide for related issues with the software.

Refer to the NovoSampler® Q Operator’s Guide for NovoSampler Q troubleshooting.

Refer to NovoCyte Advanteon™ Flow Cytometer and NovoSampler® Q Maintenance Guide for maintenance of the NovoCyte Advanteon and NovoSampler Q instrument.

Table 4 provides guidance on troubleshooting the NovoCyte Advanteon instrument and NovoSampler Q. Table 5 lists the message IDs and the associated software prompted messages.

Please contact Agilent Technical Support if issues are not resolved after performing the recommended solutions or if there are any issues which are not listed in these two tables.

Investigate possible causes and perform the recommended solutions in the given order.

### Table 4  Troubleshooting Guide for NovoCyte Advanteon Instrument

<table>
<thead>
<tr>
<th>Observation</th>
<th>Possible Causes</th>
<th>Recommended Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instrument QC test fails</td>
<td>QC particles are expired or not stored appropriately</td>
<td>Prepare a new tube of QC particles and mix them well to run the QC test again.</td>
</tr>
<tr>
<td></td>
<td>Flow cell is dirty</td>
<td>Execute Cleaning function from the NovoExpress software.</td>
</tr>
<tr>
<td></td>
<td>Air bubbles exist in the flow chamber</td>
<td>Execute Debubble function from NovoExpress Software.</td>
</tr>
<tr>
<td>Zero or low number of events detected</td>
<td>Threshold is set too high</td>
<td>Lower the threshold setting and re-collect the sample.</td>
</tr>
<tr>
<td></td>
<td>Sample concentration is too low</td>
<td>Redo sample preparation using an appropriate method to concentrate the sample.</td>
</tr>
<tr>
<td></td>
<td>Sample is not mixed well</td>
<td>Mix the sample well to suspend the cells.</td>
</tr>
<tr>
<td></td>
<td>NovoFlow container is empty</td>
<td>Refill the NovoFlow container following the procedures described in Section 2.1.2 Add Instrument Reagents in NovoCyte Advanteon™ Flow Cytometer Operator’s Guide.</td>
</tr>
<tr>
<td></td>
<td>NovoFlow container is not correctly connected to the instrument and the</td>
<td>Reconnect the NovoFlow quick coupling connectors to ensure the NovoFlow container is correctly connected to the instrument.</td>
</tr>
</tbody>
</table>
Troubleshooting

Table 4  Troubleshooting Guide for NovoCyte Advanteon Instrument

<table>
<thead>
<tr>
<th>Issue</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>NovoFlow solution does not flow through the tubing</td>
<td>• Execute Priming function from the NovoExpress Software.</td>
</tr>
<tr>
<td>Sample Injection Probe is clogged</td>
<td>Execute the Unclog function from the NovoExpress Software.</td>
</tr>
<tr>
<td>Flow cell is clogged</td>
<td>Execute the Unclog function from the NovoExpress Software.</td>
</tr>
<tr>
<td>Sample tubing is leaking</td>
<td>Clean the leaked fluid with wipes and properly reconnect the sample tubing.</td>
</tr>
<tr>
<td>Air bubble in the Sampling Pump</td>
<td>Execute Debubble function from NovoExpress Software.</td>
</tr>
<tr>
<td>High CV</td>
<td></td>
</tr>
<tr>
<td>Air bubbles exist in the flow chamber</td>
<td>Execute the Debubble function from NovoExpress Software.</td>
</tr>
<tr>
<td>Sampling tubing is clogged</td>
<td>Execute the Unclog function from NovoExpress Software.</td>
</tr>
<tr>
<td>Sheath in-line filter is clogged</td>
<td>Replace the sheath in-line filter following the procedures described in Section 1.2 Replacing Fluidic System Consumables in NovoCyte Advanteon™ Flow Cytometer and NovoSampler® Q Maintenance Guide.</td>
</tr>
<tr>
<td>Improper sample preparation</td>
<td>Re-prepare the sample properly.</td>
</tr>
<tr>
<td>The sample flow rate is set too high</td>
<td>Lower the sample flow rate setting in the NovoExpress software.</td>
</tr>
<tr>
<td>Excessive debris in display</td>
<td></td>
</tr>
<tr>
<td>Sheath in-line filter is dirty</td>
<td>Replace the sheath in-line filter following the procedures described in Section 1.2 Replacing Fluidic System Consumables in NovoCyte Advanteon™ Flow Cytometer and NovoSampler® Q Maintenance Guide.</td>
</tr>
<tr>
<td>The threshold is set too low</td>
<td>Increase the threshold setting and re-collect the sample.</td>
</tr>
<tr>
<td>Fluidic system tubing is dirty</td>
<td>• Execute Rinse function from NovoExpress Software.</td>
</tr>
<tr>
<td></td>
<td>• Execute Cleaning function from NovoExpress Software.</td>
</tr>
<tr>
<td></td>
<td>• Execute Decontamination function from NovoExpress Software.</td>
</tr>
<tr>
<td>High event rate</td>
<td></td>
</tr>
<tr>
<td>The threshold is set too low</td>
<td>Increase the threshold setting and re-collect the sample.</td>
</tr>
<tr>
<td>Sample concentration is too high</td>
<td>Re-prepare the sample to appropriate concentration, or dilute the sample.</td>
</tr>
<tr>
<td>Sample flow rate is too high</td>
<td>Reduce the sample flow rate.</td>
</tr>
<tr>
<td>NovoExpress displays Instrument not connected even though the instrument is powered up</td>
<td>Workstation is in hibernation causing the interruption of communication between the NovoCyte Advanteon instrument and workstation.</td>
</tr>
<tr>
<td></td>
<td>Restart NovoExpress Software.</td>
</tr>
<tr>
<td></td>
<td>Improper connection between the NovoCyte Advanteon instrument and workstation</td>
</tr>
</tbody>
</table>
Troubleshooting

Table 4  Troubleshooting Guide for NovoCyte Advanteon Instrument

<table>
<thead>
<tr>
<th>Problem</th>
<th>Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>More than one NovoExpress instances are running.</td>
<td></td>
<td>Only run one instance of NovoExpress software.</td>
</tr>
<tr>
<td>Unstable Signal or gap in the data plot</td>
<td>Air bubble in the flow chamber</td>
<td>Execute the Debubble function from NovoExpress Software.</td>
</tr>
<tr>
<td>Sample tube does not fit the sample tube holder</td>
<td>Wrong type of sample tube is used</td>
<td>Use 12 × 75 mm flow tube or 1.5 mL Eppendorf tube.</td>
</tr>
<tr>
<td>Sample Injection Probe is not properly aligned with the wells or tubes</td>
<td>Plate or tube rack is not loaded correctly. Make sure the plate or tube rack is seated onto the sample tray properly. Click Instrument &gt; NovoSampler Q &gt; Calibrate in the NovoExpress Software to re-calibrate the NovoSampler Q.</td>
<td></td>
</tr>
<tr>
<td>Leakage from the SIP</td>
<td>Waste tubing is deformed or kinked</td>
<td>Reconnect the waste tubing to ensure it is properly connected.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Move the instrument forward as needed to ensure sufficient space between the instrument and wall. Refer to Installation in NovoCyte Advanteon™ Flow Cytometer Operator’s Guide for more information on property installing NovoCyte Advanteon instrument.</td>
</tr>
<tr>
<td></td>
<td>Waste filter is clogged</td>
<td>Replace the waste filter following the procedures described in Section 1.2 Replacing Fluidic System Consumables in NovoCyte Advanteon™ Flow Cytometer and NovoSampler® Q Maintenance Guide.</td>
</tr>
<tr>
<td>Leakage from Sampling Pump</td>
<td>Incorrect tubing connection to the sampling pump</td>
<td>Reconnect the tubing to the sampling pump.</td>
</tr>
<tr>
<td>Leakage from other components of the instrument</td>
<td>Loose fluidic components connection or blocked sheath in-line filter</td>
<td>Power off the NovoCyte Advanteon instrument. Clean the leaked fluid. Replace the sheath in-line filter following the procedures described in Section 1.2 Replacing Fluidic System Consumables in NovoCyte Advanteon™ Flow Cytometer and NovoSampler® Q Maintenance Guide.</td>
</tr>
</tbody>
</table>

Table 5  NovoExpress Prompted Error Messages and Message IDs

<table>
<thead>
<tr>
<th>Message IDs</th>
<th>Software Messages</th>
<th>Possible Causes</th>
<th>Recommended Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x0001</td>
<td>Collision of SIP</td>
<td>The movement of the SIP is blocked by some obstacles</td>
<td>Locate and clear the obstacles. The instrument will automatically start error handling and move the SIP to the home position. This procedure will take about 10 seconds.</td>
</tr>
</tbody>
</table>
# Troubleshooting

## Table 5  NovoExpress Prompted Error Messages and Message IDs

<table>
<thead>
<tr>
<th>Error Code</th>
<th>Description</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incorrect plate selected in plate manager</td>
<td>Select the correct plate in the Plate Manager window.</td>
<td></td>
</tr>
</tbody>
</table>
| Incorrect positioning of plate in NovoSampler Q | • Position the plate on the shaker correctly.  
• Ensure the plate is seated flat on the stage inside the clamps.  
• Re-calibrate NovoSampler Q. |
| Dirty SIP or SIP Cleaning apparatus | Clean the SIP or SIP cleaning apparatus following the procedures described in Section 1.1 Preventative Maintenance in NovoCyte Quanteon™ Flow Cytometer and NovoSampler® Q Maintenance Guide or NovoCyte Advanteon™ Flow Cytometer and NovoSampler® Q Maintenance Guide. |
| 0x0002 Running out of NovoFlow | NovoFlow solution is not sufficient to continue to run any samples | Refill the NovoFlow container following the procedures described in Section 2.1.2 Add Instrument Reagents in NovoCyte Advanteon™ Flow Cytometer Operator’s Guide or NovoCyte Quanteon™ Flow Cytometer Operator’s Guide. |
| 0x0003 Running out of NovoRinse | NovoRinse solution is not sufficient to continue to run any samples | Refill the NovoRinse container following the procedures described in Section 2.1.2 Add Instrument Reagents in NovoCyte Advanteon™ Flow Cytometer Operator’s Guide or NovoCyte Quanteon™ Flow Cytometer Operator’s Guide. |
| 0x0004 Running out of NovoClean | NovoClean solution is not sufficient to continue to run any samples | Refill the NovoClean container following the procedures described in Section 2.1.2 Add Instrument Reagents in NovoCyte Advanteon™ Flow Cytometer Operator’s Guide or NovoCyte Quanteon™ Flow Cytometer Operator’s Guide. |
| 0x0005 Waste container is full | Waste container is too full to continue to run any samples | Empty the waste container following the procedures described in Section 2.1.3 Empty Waste in NovoCyte Advanteon™ Flow Cytometer Operator’s Guide or NovoCyte Quanteon™ Flow Cytometer Operator’s Guide. |
| NovoCyte Fluidics Station II is not working properly | Replace NovoCyte Fluidics Station II. |
## Troubleshooting

### Table 5  NovoExpress Prompted Error Messages and Message IDs

<table>
<thead>
<tr>
<th>Error Code</th>
<th>Description</th>
<th>Type</th>
<th>Action 1</th>
<th>Action 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x0006</td>
<td>System voltage is out of range</td>
<td>System Error</td>
<td>Restart the instrument</td>
<td>Contact Agilent technical support if the error persists</td>
</tr>
<tr>
<td>0x0007</td>
<td>System electric current is out of range</td>
<td>System Error</td>
<td>Restart the instrument</td>
<td>Contact Agilent technical support if the error persists</td>
</tr>
<tr>
<td>0x0008</td>
<td>Firmware configuration error</td>
<td>System Error</td>
<td>Restart the instrument</td>
<td>Contact Agilent technical support if the error persists</td>
</tr>
<tr>
<td>0x0009</td>
<td>.... laser self test error</td>
<td>Specified laser is not functioning properly</td>
<td>The instrument will automatically reset the laser and run a laser self-test. It takes approximately 5 to 10 minutes.</td>
<td></td>
</tr>
<tr>
<td>0x000C</td>
<td>....laser is not connected</td>
<td>Specified laser is not detected</td>
<td>Restart the instrument</td>
<td>Contact Agilent technical support if the error persists</td>
</tr>
<tr>
<td>0x000F</td>
<td>NovoSampler communication lost</td>
<td>The cable between the NovoSampler Q and instrument is not securely connected</td>
<td>Reconnect the cable between the NovoSampler Q and instrument.</td>
<td></td>
</tr>
<tr>
<td>0x0009</td>
<td>NovoSampler Q is not communicating with instrument properly</td>
<td>NovoSampler Q is not installed properly</td>
<td>Restart the instrument</td>
<td>Contact Agilent technical support if the error persists</td>
</tr>
<tr>
<td>0x0010</td>
<td>NovoSampler Q is newly installed or re-connected.</td>
<td>Follow the prompted instructions to calibrate the NovoSampler Q.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0x0011</td>
<td>NovoSampler Q is not installed properly</td>
<td>Re-install and calibrate the NovoSampler Q following the procedures described in Section 1.2 Installation in NovoSampler® Q Operator’s Guide.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0x0012</td>
<td>The movement of plate is out of range</td>
<td>The movement of the orbital shaker is blocked.</td>
<td>Check the path of the orbital shaker to make sure there are no objects blocking the movement. Clear the block if there is any.</td>
<td>Click Instrument &gt; NovoSampler Q &gt; Calibrate in NovoExpress Software to re-calibrate the NovoSampler Q.</td>
</tr>
</tbody>
</table>
Troubleshooting

Table 5 NovoExpress Prompted Error Messages and Message IDs

<table>
<thead>
<tr>
<th>Error Code</th>
<th>Error Description</th>
<th>Remediation</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x0013</td>
<td>NovoSampler Q is not installed properly</td>
<td>Re-install and calibrate the NovoSampler Q following the procedures described in Section 1.2 Installation in NovoSampler® Q Operator’s Guide.</td>
</tr>
<tr>
<td>0x0014</td>
<td>The cover of NovoSampler Q is opened during moving plate</td>
<td>Close the NovoSampler Q cover. NovoSampler Q will automatically reset and be ready for operation.</td>
</tr>
<tr>
<td>0x0015</td>
<td>NovoSampler firmware error</td>
<td>Follow the prompted instructions from NovoExpress to clear the error.</td>
</tr>
<tr>
<td>0x0016</td>
<td>Specified laser is not connected properly or laser is not working properly</td>
<td>Follow the prompted instructions from NovoExpress to clear the error.</td>
</tr>
<tr>
<td>0x0017</td>
<td>Specified laser is not communicating with the instrument properly or the laser is not working properly</td>
<td>Follow the prompted instructions from NovoExpress to clear the error.</td>
</tr>
<tr>
<td>0x0018</td>
<td>Sample injection probe reset failed</td>
<td>Follow the prompted instructions from NovoExpress to clear the error.</td>
</tr>
<tr>
<td>0x0019</td>
<td>Specified laser is not communicating with the instrument properly or the laser is not working properly</td>
<td>Follow the prompted instructions from NovoExpress to clear the error.</td>
</tr>
<tr>
<td>0x001A</td>
<td>Specified laser is not communicating with the instrument properly or the laser is not working properly</td>
<td>Follow the prompted instructions from NovoExpress to clear the error.</td>
</tr>
<tr>
<td>0x001B</td>
<td>Specified laser is not communicating with the instrument properly or the laser is not working properly</td>
<td>Follow the prompted instructions from NovoExpress to clear the error.</td>
</tr>
<tr>
<td>0x001C</td>
<td>Bad connection or optocoupler is not working properly</td>
<td>Click the OK button in the prompted dialog box or wait 10 seconds for the instrument to automatically start the error handling.</td>
</tr>
<tr>
<td>0x001D</td>
<td>Bad connection or optocoupler is not working properly</td>
<td>Restart the instrument. Contact Agilent technical support if the error persists</td>
</tr>
<tr>
<td>0x0020</td>
<td>Liquid level in the reagent containers is not within normal range when instrument is powered up.</td>
<td>Make sure that the instrument reagent containers are placed correctly and the liquid level in the containers is within the normal range. Click OK on the prompted dialog to continue system initialization.</td>
</tr>
</tbody>
</table>
## Troubleshooting

### Table 5  NovoExpress Prompted Error Messages and Message IDs

<table>
<thead>
<tr>
<th>Code</th>
<th>Message</th>
<th>Description</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x0021</td>
<td>Sheath fluid pump reset failed</td>
<td>Bad connection or optocoupler is not working properly</td>
<td>• Restart the instrument • Contact Agilent technical support if the error persists</td>
</tr>
<tr>
<td>0x0023</td>
<td>Resetting NovoSampler to home position failed</td>
<td>NovoSampler Q is not working properly.</td>
<td>Click Reset. Restart the NovoSampler Q.</td>
</tr>
<tr>
<td>0x0100</td>
<td>Instrument cover opened</td>
<td>Instrument cover is opened or not tightly closed</td>
<td>Close the instrument cover.</td>
</tr>
<tr>
<td>0x0101</td>
<td>NovoFlow running low</td>
<td>NovoFlow solution is below the pre-set volume limit</td>
<td>Refill the NovoFlow container following the procedures described in Section 2.1.2 Add Instrument Reagents in NovoCyte Advanteon™ Flow Cytometer Operator's Guide or NovoCyte Quanteon™ Flow Cytometer Operator's Guide. NovoCyte Fluidics Station II is not working properly Replace NovoCyte Fluidics Station II.</td>
</tr>
<tr>
<td>0x0102</td>
<td>NovoRinse running low</td>
<td>NovoRinse solution is below the pre-set volume limit</td>
<td>Refill the NovoRinse container following the procedures described in Section 2.1.2 Add Instrument Reagents in NovoCyte Advanteon™ Flow Cytometer Operator's Guide or NovoCyte Quanteon™ Flow Cytometer Operator's Guide. NovoCyte Fluidics Station II is not working properly Replace NovoCyte Fluidics Station II.</td>
</tr>
<tr>
<td>0x0103</td>
<td>NovoClean running low</td>
<td>NovoClean solution is below the pre-set volume limit</td>
<td>Refill the NovoClean container following the procedures described in Section 2.1.2 Add Instrument Reagents in NovoCyte Advanteon™ Flow Cytometer Operator's Guide or NovoCyte Quanteon™ Flow Cytometer Operator's Guide. NovoCyte Fluidics Station II is not working properly Replace NovoCyte Fluidics Station II.</td>
</tr>
<tr>
<td>0x0104</td>
<td>Waste container is close to full</td>
<td>Waste is above the pre-set volume limit</td>
<td>Empty the waste container following the procedures described in Section 2.1.3 Empty Waste in NovoCyte Advanteon™ Flow Cytometer Operator's Guide or NovoCyte Quanteon™ Flow Cytometer Operator's Guide. NovoCyte Fluidics Station II is not working properly Replace NovoCyte Fluidics Station II.</td>
</tr>
<tr>
<td>0x0105</td>
<td>Cover of NovoSampler is opened</td>
<td>Cover of NovoSampler Q is opened</td>
<td>Close the cover.</td>
</tr>
</tbody>
</table>
### Troubleshooting

<table>
<thead>
<tr>
<th>Error Code</th>
<th>Description</th>
<th>Message Description</th>
<th>Recommended Action</th>
</tr>
</thead>
</table>
| 0x0106     | NovoSampler is disconnected when powered up | The NovoSampler Q is disconnected when powered up | • Shut down the instrument.  
• Reconnect the cable of the NovoSampler Q to instrument.  
• Turn on instrument and follow the prompts to calibrate the NovoSampler Q.  
• Contact Agilent technical support if the error persists |
| 0x0109     | Fluidics station is not connected | Cable between NovoCyte Fluidics Station II and the instrument is not properly connected | • Power down the instrument.  
• Reconnect the cable between NovoCyte Fluidics Station II and instrument.  
• Power up the instrument.  
• Contact Agilent technical support if the error persists |
| 0x010A     | … liquid level sensor failure | Specified liquid level sensor in NovoCyte Fluidics Station II or NovoCyte Fluidics Cart is not working properly | • Reconnect NovoCyte Fluidics Station II or NovoCyte Fluidics Cart cable.  
• Restart the instrument.  
• Replace NovoCyte Fluidics Station II or NovoCyte Fluidics Cart.  
• Contact Agilent technical support if the error persists |
| 0x010B     | 0.05µm sheath fluid ultrafiltration (UF) filter is clogged | 0.05µm sheath fluid ultrafiltration (UF) filter is clogged | Replace the sheath in-line filter following the procedures described in Section 1.2 Replacing Fluidic System Consumables in NovoCyte Quanteon™ Flow Cytometer and NovoSampler® Q Maintenance Guide or NovoCyte Advanteon™ Flow Cytometer and NovoSampler® Q Maintenance Guide. |
| 0x0110     | Recovering collision error | Plate stops at an incorrect position | No action is needed. Instrument will automatically recover the error. |
| 0x0111     | Orbital shaker homing position reset failure | Orbital shaker of NovoSampler Q is not working properly | No action is needed. The NovoSampler Q can be used normally. |
| 0x0112     | 0.05µm sheath fluid ultrafiltration (UF) filter is clogged | 0.05µm sheath fluid ultrafiltration (UF) filter is clogged | Replace the sheath fluid ultrafiltration (UF) filter following the procedures described in Section 1.2 Replacing Fluidic System Consumables in NovoCyte Quanteon™ Flow Cytometer and NovoSampler® Q Maintenance Guide or NovoCyte Advanteon™ Flow Cytometer and NovoSampler® Q Maintenance Guide. |
| 0x1001     | Fluidics procedure run error | Fluidics procedure file is damaged | • Restart the instrument  
• Contact Agilent technical support if the error persists |
| 0x300A     | Calibrating DA coefficient failed | AD board is not working properly | • Restart the instrument  
• Contact Agilent technical support if the error persists |
## Troubleshooting

### Table 5  NovoExpress Prompted Error Messages and Message IDs

<table>
<thead>
<tr>
<th>Message ID</th>
<th>Description</th>
<th>Suggested Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>0x3100</td>
<td>Failed to read optical filter information</td>
<td>Optical filter sensor is not working properly. Replace the appropriate filter following the procedures described in Section 2.1.6 Verify and Modify Instrument Configuration in NovoCyte Advanteon™ Flow Cytometer Operator’s Guide or NovoCyte Quanteon™ Flow Cytometer Operator’s Guide.</td>
</tr>
<tr>
<td>0x3101</td>
<td>Failed to read dichroic mirror information</td>
<td>Dichroic mirror sensor is not working properly. Replace the appropriate mirror following the procedures described in Section 2.1.6 Verify and Modify Instrument Configuration in NovoCyte Advanteon™ Flow Cytometer Operator’s Guide or NovoCyte Quanteon™ Flow Cytometer Operator’s Guide.</td>
</tr>
<tr>
<td>0x3102</td>
<td>Failed to read photodetector information</td>
<td>Photodetector sensor is not working properly. Restart the instrument. Contact Agilent technical support if the error persists.</td>
</tr>
<tr>
<td>0x3103</td>
<td>The optical filter information has been changed</td>
<td>The optical filter has been replaced. Follow the software prompted instructions to perform the appropriate operation.</td>
</tr>
<tr>
<td>0x3104</td>
<td>The dichroic mirror information has been changed</td>
<td>The dichroic mirror has been replaced. Follow the software prompted instructions to perform the appropriate operation.</td>
</tr>
<tr>
<td>0x3105</td>
<td>The photodetector information has been changed</td>
<td>The photodetector has been replaced. Follow the software prompted instructions to perform the appropriate operation.</td>
</tr>
<tr>
<td>0x6100</td>
<td>Communication error between NovoSampler and the orbital shaker</td>
<td>The orbital shaker is not communicating to NovoSampler Q properly or NovoSampler Q is not working properly. Restart the instrument. Contact Agilent technical support if the error persists.</td>
</tr>
<tr>
<td>0x7000</td>
<td>Fluidics cart firmware error</td>
<td>NovoCyte Fluidics Cart firmware is not working properly. Restart the instrument. Replace NovoCyte Fluidics Cart. Contact Agilent technical support if the error persists.</td>
</tr>
<tr>
<td>0x7001</td>
<td>NovoFlow liquid level sensor is not connected</td>
<td>NovoFlow liquid level sensor is not connected or does not work properly. Reconnect the NovoFlow liquid level sensor. Contact Agilent technical support if the error remains after reconnection. The sensor may be damaged and need to be replaced.</td>
</tr>
<tr>
<td>0x7002</td>
<td>Waste liquid level sensor is not connected</td>
<td>Waste liquid level sensor is not connected or does not work properly. Reconnect the waste liquid level sensor. Contact Agilent technical support if the error remains after reconnection. The sensor may be damaged and need to be replaced.</td>
</tr>
<tr>
<td>0x7100</td>
<td>Fluidics cart communication lost</td>
<td>NovoCyte Fluidics Cart is not properly connected to the instrument. Ensure the DVI cable between NovoCyte Fluidics Cart and the instrument is properly connected.</td>
</tr>
</tbody>
</table>
## Troubleshooting

<table>
<thead>
<tr>
<th>Error Code</th>
<th>Prompted Error Message and Message IDs</th>
</tr>
</thead>
<tbody>
<tr>
<td>0xA003</td>
<td>The temperature of the photodetectors is abnormal</td>
</tr>
<tr>
<td></td>
<td>• Ensure to have the instrument working at normal ambient temperatures.</td>
</tr>
<tr>
<td></td>
<td>• Contact Agilent technical support if the error persists</td>
</tr>
<tr>
<td></td>
<td>• Contact Agilent technical support if the error persists</td>
</tr>
<tr>
<td>0xA100</td>
<td>The temperature of the photodetectors is abnormal</td>
</tr>
<tr>
<td></td>
<td>Communication error (code: xx, xx). Please restart NovoCyte and NovoExpress.</td>
</tr>
<tr>
<td></td>
<td>• Turn off the instrument.</td>
</tr>
<tr>
<td></td>
<td>• Restart the instrument.</td>
</tr>
<tr>
<td></td>
<td>• Contact Agilent technical support if the error persists</td>
</tr>
</tbody>
</table>
Troubleshooting

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## Version History

<table>
<thead>
<tr>
<th>Date/Version</th>
<th>Changed by</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2019/10/07</td>
<td>Chuixin Liao</td>
<td>Initial Release.</td>
</tr>
</tbody>
</table>
Version History

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In This Book

The manual describes the following:

- Prologue
- Scheduled Maintenance
- Unscheduled Maintenance
- Troubleshooting
- Version History