



# iQue<sup>®</sup> SCREENER

## hardware manual

October 2014



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# Introduction

## Intellicyt iQue Screener Hardware Manual

Part Number: 10554 Rev. C – Updated October 2014

### Published By

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### Copyright

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Other products or company names mentioned in this document may be trademarks or registered trademarks of their respective owners and are treated as such.

The iQue screener uses ForeCyt® and IntelliCyt Data Manager software which require licensing before use.

### Statement of Proper Use

The iQue® Screening System is designed to acquire samples in a multi-well microplate to perform high-throughput flow cytometry. The iQue Screening System is designed for use in a temperature-controlled laboratory environment that is free of conductive contaminants.

# End User Use Agreement for iQue Screening System

- 1. Parties.** This Product Use Agreement (“Agreement”) is between IntelliCyt Corporation, a Delaware corporation with offices at 9620 San Mateo NE, Albuquerque, NM 87113 USA (“IntelliCyt”) and the end user organization (“Customer”) using the proprietary iQue Screening System and other IntelliCyt products identified in the Invoice (“Products”). Customer’s use of the Product constitutes its acceptance of the terms and conditions of this Agreement. If the Customer does not agree to the terms and conditions of this Agreement it may not use the Product.
- 2. Effective Date.** This Agreement is effective as of the date of the Customer’s purchase order. This Agreement is made pursuant to Customer’s opportunity to review IntelliCyt’s “iQue Screening System Use Terms and Conditions” (via written communications with IntelliCyt) and (a) Customer’s issuance of a purchase order, (b) and/or Customer’s payment of IntelliCyt’s invoice (the “Invoice”), (c) and/or Customer’s use of the Product.
- 3. Nature of Agreement.** This Agreement contains all the terms and conditions relating to IntelliCyt’s provision of, and Customer’s use of the Product. Customer may contract IntelliCyt to receive technical support for the Product, including software upgrades and maintenance. Such additional services will be pursuant to a separate written agreement.
- 4. Customer’s Licensed Use of Product.** Customer is granted a license to IntelliCyt’s Product for the purposes of processing data for Customer’s own use. Customer shall not: (i) subcontract or otherwise allow use of the Product and associated documentation by third parties; (ii) use the Product and associated documentation to analyze, separate, isolate or otherwise process third party samples or specifications, including fee for service activities, contract research or service bureau activities; (iii) use the Product and associated documentation for human in-vitro diagnostic applications; (iv) remove or destroy any proprietary rights marks or legends on or in the Product or associated documentation; (v) adapt, translate, modify, enhance, or create derivative works of the software component of the Products or associated documentation; (vi) reverse engineer, disassemble, decompile, or otherwise attempt to derive the source code of the software component of the Product; (vii) assign, distribute, sublicense, rent, lease, sell, post on the Internet, or otherwise transfer the Product or associated documentation, in print or through any electronic or other medium; or (viii) make copies of the software component of the Product or associated documentation other than for archival and backup purposes.
- 6. Acceptance.** The Product is deemed accepted ten (10) days after the date of installation by IntelliCyt unless, within that time period, Customer provides IntelliCyt documentation that the Product delivered does not conform to the specifications in the Invoice or the written description provided by IntelliCyt with the Product (the “Documentation”). If the Product does not perform as set forth above for reasons inherent in the Product (and not, for example, third party hardware, software, equipment, damage by Customer or improper system configuration), IntelliCyt will promptly repair or replace the Product with a conforming Product. If the Product still does not materially conform to its written description or specifications, Customer may accept the Product AS IS or return the Product and receive a refund of fees paid for the Product.
- 7. Limited Warranties; Exclusion of Certain Warranties.**
  - 7.1 Limited Warranty.** IntelliCyt warrants that for one (1) year after the date of shipment, the Product will perform in substantial conformance with the Documentation, provided that the Product has been used as specified by IntelliCyt. IntelliCyt will use reasonable efforts to correct any material nonconformance within thirty (30) business days after receipt of written notice of such nonconformance and Customer’s provision of any data, output, or other documentation or description of the nonconformance.
  - 7.2 Voiding the Product Warranty.** This limited warranty applies only to the Product used in accordance with this Agreement and the Documentation and does not apply if the Product (a) has been subject to accident or misuse; or (b) has been repaired, reassembled, or modified by a party other than IntelliCyt; or (c) has not been maintained in accordance with the Documentation; or (d) if the Product’s serial number has been removed or defaced; or (e) has been incorporated into a system without IntelliCyt’s review and written approval.
  - 7.3 Exclusive Remedies.** IntelliCyt does not warrant that the Product will meet Customer’s specific needs, industry requirements, be error-free, or operate without interruption. The remedies in this Section 7 are the sole and exclusive remedies provided to Customer by IntelliCyt relating to the Product.
  - 7.4 Disclaimers.**
    - 7.4.1** INTELLICYT MAKES NO WARRANTIES ON BEHALF OF ITS LICENSORS TO INTELLICYT’S CUSTOMER IN CONNECTION WITH THE PRODUCT AND DISCLAIMS ALL STATUTORY, EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSES AND NON-INFRINGEMENT OF THIRD PARTY RIGHTS.
    - 7.4.2** INTELLICYT AND ITS LICENSORS SHALL HAVE NO LIABILITY TO CUSTOMER FOR ANY SPECIAL, INDIRECT, CONSEQUENTIAL, INCIDENTAL OR PUNITIVE DAMAGES, LOSS OF ANTICIPATED PROFITS OR BUSINESS, LOSS OF DATA OR SAMPLES OR FOR INTERRUPTIONS IN BUSINESS WITH RESPECT TO ANY CLAIM OF ANY KIND RESULTING FROM THE PRODUCT.
- 8. Product Intellectual Property.** IntelliCyt or its licensors retain all right, title and interest in the Product and associated documentation, including all intellectual property rights therein and any derivations thereof.
- 9. Limitations of Liability for Damages.** Neither party shall be liable for indirect, incidental, consequential, special, punitive or exemplary damages, or for lost profits or business interruption losses, in connection with the Product or this Agreement, regardless of whether such party has been made aware of their possibility. Other than amounts due to IntelliCyt for purchase of the Product, the indemnification obligations of Section 11, and the breach of the provisions of Sections 4 and 10, in no event shall either party be liable to the other, under any theory of recovery, including contract, negligence, strict liability, warranty, misrepresentation, or products liability, in an amount in excess of ten thousand dollars (\$10,000). Any claims relating to this Agreement shall be brought within one (1) year after the occurrence of the event giving rise to the cause of action.
- 10. Confidentiality.** IntelliCyt and Customer may have access to information that the other considers to be confidential, private, or a trade secret. This information may include, but is not limited to, data, technical know-how, technical specifications, results of testing, new product designs, strategic plans, and competitive intelligence (“Information”). Each party shall use the other’s Information only to perform its

obligations under, and for the purposes of, this Agreement. Neither party shall use the Information of the other for the benefit of a third party. Each party shall maintain the confidentiality of all Information in the same manner in which it protects its own information of like kind, but in no event shall either party take less than reasonable precautions to prevent the unauthorized disclosure or use of the Information. Upon termination of this Agreement, or upon a party's request, each party shall return to the other all Information of the other in its possession. All provisions of this Agreement relating to confidentiality, ownership, and limitations of liability shall survive the termination of this Agreement.

## **11. Indemnification.**

**11.1 Product Intellectual Property Indemnification.** IntelliCyt agrees to defend, and hereby indemnifies and agrees to hold harmless, Customer from all damages, losses, fees, and expenses awarded by a court of competent jurisdiction, or reached through a settlement, arising out of Customer's use of the Product when such claim is based upon a third party claim that the Product infringes a U.S. patent, trademark, copyright or trade secret; provided that (a) Customer promptly notifies IntelliCyt in writing of such claim; (b) IntelliCyt has sole control over the investigation, litigation and negotiation of such claim; (c) Customer is current in its payments of fees to IntelliCyt and is in compliance with its obligations under this Agreement; and (d) Customer reasonably cooperates in the defense or settlement of such claim. This indemnification applies only to the Product delivered by IntelliCyt and shall not apply if the Product has been modified by a party other than IntelliCyt, or if the Product has been combined with (or used in connection with) other products and used as a part of an infringing process or method which, but for the combination, would not infringe the intellectual property rights of such third party.

**11.2** If the Product becomes, or in IntelliCyt's opinion is likely to become, the subject of such a claim, then IntelliCyt may either (a) procure (at its expense) Customer's right to continue using the Product, or (b) replace or modify the Product to avoid the claim of infringement. If neither of the foregoing alternatives is reasonably available to IntelliCyt, then IntelliCyt may terminate this Agreement and refund the balance of the Product fee which, for purposes of this Section 11, shall depreciate over a period of three (3) years. This states the entire liability of IntelliCyt with respect to third party claims of intellectual property infringement.

**11.3 Customer Indemnification.** Customer agrees to defend, and hereby indemnifies and holds harmless, IntelliCyt and its licensors from any damages, losses, fees, expenses, and claims asserted by third parties against IntelliCyt arising out of Customer's use of the Product, provided that (a) IntelliCyt promptly notifies Customer in writing of such claim; (b) Customer has sole control over the investigation, litigation and negotiation of such claim; (c) IntelliCyt is in compliance with its obligations under this Agreement; and (d) IntelliCyt reasonably cooperates in the defense or settlement of such claim.

**12. Termination.** Either party may terminate this Agreement if there is a material breach by either party that is not cured within thirty (30) days after receipt of written notice of such breach. If IntelliCyt terminates this Agreement because of Customer's material breach that is not cured, Customer is still liable for all payments related to the Product or this Agreement. Upon termination of this Agreement for breach by Customer, Customer shall promptly discontinue using the Product and return it to IntelliCyt.

**13. Assignment.** Customer shall not assign any of its rights or obligations under this Agreement without IntelliCyt's prior express written consent, which may be granted or withheld at IntelliCyt's sole discretion. Any attempted assignment without such consent shall be void. Subject to the foregoing, this Agreement is binding upon and shall inure to the benefit of each party's successors and authorized assigns.

## **14. General.**

**14.1 Notices.** All required communications shall be in writing and addressed to the recipient party at its address as set forth on the first page of this Agreement, addressed to the person who signed this Agreement on behalf of such party, or to such address and person as may be designated by such party in writing. All communications will be deemed given when hand-delivered; or if mailed, by registered mail with verification of receipt, upon date of mailing; or if by electronic mail or facsimile, when received (with verification of transmission sent promptly to the receiving party along with a hard copy of the communication).

**14.2 Severability.** Any part of this Agreement held to be invalid or unenforceable shall be revised so as to make it valid and enforceable and consistent with the intent of the parties expressed in that provision. All other provisions of this Agreement will remain in full force and effect.

**14.3 Export.** All orders accepted for export are subject to issuance of an export license by the United States Government for export of the Product(s), and subject to Customer providing IntelliCyt with the relevant import certificate or any other document necessary to secure such export license and/or to permit the import of the Product into the country of destination. Customer shall not re-export the Product, and shall comply with all laws, statutes, regulations, and Executive Orders relating to export, including the U.S. Export Administration Act.

**14.4 Distribution and/or resale.** The Product and associated documentation are for final end use by the Customer and are not for distribution and/or resale to third parties.

**14.5 Governing Law and Venue.** The Agreement shall be governed exclusively by the laws of the USA and the State of New Mexico and will not be governed by the United Nations Convention of Contracts for the International Sale of Goods, or by the Uniform Commercial Code, the application of which are expressly excluded. Any action brought by either party related to this Agreement shall be initiated and maintained in Bernalillo County, New Mexico, or in the United States District Court of the District of New Mexico, and the parties expressly submit to the exclusive personal jurisdiction and venue of these courts.

**14.6 Entire Agreement.** This Agreement and the Invoice, and any addenda expressly identified as amending this Agreement, constitute the entire understanding of the parties with respect to the subject matter of this Agreement and replaces all prior and contemporaneous written and oral communications, promises, or understandings. This Agreement may be amended only by a writing signed on behalf of both parties. Electronic mail shall not be deemed to constitute a signed writing for purposes of this modification provision unless expressly identified as an amendment. No waiver of any right or remedy will be effective unless given in writing and signed on behalf of the party making such waiver. No purchase order or other administrative document will amend this Agreement unless signed by a representative of both parties and identified as an amendment to this Agreement, even if accepted by the receiving party without objection. IntelliCyt hereby objects to any additional or different terms and conditions contained in Customer's purchase order, none of which shall be binding upon IntelliCyt unless specifically agreed to in writing signed by an officer of IntelliCyt. Failure by IntelliCyt specifically to object to provisions contained in Customer's purchase order shall not in any way be deemed an alteration to or waiver of these terms and conditions.

# IntelliCyt Corporation Software License Agreement

This Software License Agreement (“Agreement”) for the iQue Screener System software is entered into in conjunction with the purchase of the license to the Software. By installing and using the Software, Licensee accepts the Software and agrees to be bound by the terms of this Agreement.

1) License Grant: IntelliCyt Corporation (“Licensor”), grants the purchaser (“Licensee”) a non-exclusive, non-transferable license (“License”) to use the Software, and associated manuals and documentation, in conjunction with hardware configurations authorized by IntelliCyt Corporation, at the designated Licensee’s business location until this License is terminated in accordance with the terms and conditions specifically set out in the Agreement. This License permits the Licensee to make one copy of the Software in machine-readable form for backup purposes only.

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6) Miscellaneous: Licensee may not assign this Agreement or any rights or obligations hereunder, directly or indirectly, by operation of law or otherwise, without the prior written consent of Licensor. Subject to the foregoing, this Agreement shall inure to the benefit of and be binding upon the parties and their respective successors and permitted assigns. No waiver or modification of this Agreement shall be valid unless in writing signed by each party. The waiver of a breach of any term hereof shall in no way be construed as a waiver of any other term or breach hereof. If any provision of this Agreement is held to be unenforceable, such provision shall be reformed only to the extent necessary to make it enforceable. This Agreement shall be governed by United States and New Mexico law (except for conflict of laws principles). United States law shall supplement New Mexico law where United States law is non-exclusive (e.g., trademark, trade secret, and unfair competition laws), and shall be exclusive where United States law is exclusive (e.g., copyright and patent laws). This Agreement contains the complete agreement between the parties with respect to the subject matter hereof, and supersedes all prior or contemporaneous agreements or understandings, whether oral or written. The undersigned warrants that they have actual authority to bind Licensee as to the subject matter of the Agreement.



## Declaration of Conformity

# DECLARATION OF CONFORMITY FOR CE MARKING

Application Of Council Directive(s)	European Directive 2006/95/EC (Low Voltage Directive) 2004/108/EC EMC Directive
Manufacturer's Name	IntelliCyt Corporation
Manufacturer's Address	9620 San Mateo Blvd Albuquerque, NM 87113
Model Name	iQue™ Screener
Conformance to Directives Product Standards	IEC 61010- 2 - 081:2001 (1st Edition) + A1:2003 In conjunction with IEC 61010-1:2001 (2nd edition)  EN 61326-1:2006 Class A emissions EN 61326-1:2006 Immunity (minimum table) EN 61000-3-2:2006, A1:2009, A2:2009 Harmonics EN 61000-3-3:2008 Voltage Fluctuations
Equipment Type/Environment	Electrical Laboratory Equipment
Beginning Serial No.	B0002
Year of Manufacture	2012

I, the undersigned, hereby declare that the equipment specified above conforms to the above Directive(s).

  
Signature

R. Terry Dunlay, President  
Name

March 27, 2013  
Date

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# Using This Manual

## Conventions

This guide assumes basic knowledge of computers using Microsoft Windows operating systems and familiarity with windows, menus, commands, buttons, tabs, dialog boxes, and other Microsoft Windows elements. The terminology, conventions, and symbols used in this guide are described next.

## Terminology



Term	Definition
<b>Click</b>	Place the mouse pointer over the item, then depress and release the primary mouse button (usually the left button) in one quick motion.
<b>Right-click</b>	Place the mouse pointer over the item, then depress and release the secondary mouse button (usually the right button) in one quick motion.
<b>Double-click</b>	Place the mouse pointer over the item, then depress and release the primary mouse button twice in quick succession.
<b>Drag</b>	Place the mouse pointer over the item, depress and hold down the left mouse button, then move the pointer (and the object) to some target location and release the mouse button.
<b>Press</b>	Push and release a key on the keyboard.
<b>Shift, Ctrl, Alt</b>	When any of these terms appear before any of the above terms, it means to hold down the specified keyboard key while taking the hyphenated action.
<b>Shortcut menu</b>	A menu that appears when an item has been right-clicked.

## Text Conventions

- Menus, menu items, drop-down lists, text boxes, buttons, and options that require user action appear in bold type. For example: Click **Run**.
- Window titles and dialog box names begin with uppercase letters. For example: Sampler Control window.

## Text Symbols

Symbols are used in iQue documentation to draw attention to important information, such as operating tips and suggestions, as well as the presence of hazards.

Symbol	Description
 <b>NOTE</b>	A tip, suggestion, or additional information.
 <b>WARNING</b>	Indicates information that is necessary for proper Instrument or software operation.

## Safety Symbols

The following symbols may appear adjacent to safety precaution statements.



### **DANGER**

Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury.



### **WARNING**

Indicates a moderately hazardous situation that, if not avoided, may result in death or serious injury. When this symbol appears on equipment, consult product documentation to identify the nature of any potential hazard and determine the actions to perform.



### **CAUTION**

A cautionary statement, which, if not followed, may result in instrument damage or corruption of data.



Risk of Fire.



Biohazard.



Moving Parts – Risk of body parts, clothing, hair, jewelry, etc. encountering or catching in moving parts.



Hazardous Voltage – Risk of shock injury.

## Accessing Tech Support

For help with a technical question that is not addressed within the documentation, please contact [support@intellicyt.com](mailto:support@intellicyt.com) or IntelliCyt Customer Service at (505) 345-9075 Opt 2.

Before contacting us, please be prepared to answer the following questions:

- What were you doing when the problem occurred?
- Did you try to follow the steps in this guide, but they didn't work? If so, what pages?
- Can you reproduce the problem?
- Did you try to solve the problem? If so, what steps did you take and what did you observe?
- Which error messages, if any, appeared?

Your answers to these questions help us provide you with a solution as quickly as possible.

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## General Precautions

### WARNING



Use this product only in the manner described in this guide. When used other than as specified, the safety protections may be impaired. Failure to adhere to safety precautions and/or procedures outlined in this document may result in system failure or personal injury. IntelliCyt Corporation shall not be held liable under any circumstances.

### WARNING



#### BIOHAZARD!

- Use proper laboratory practices when handling any hazardous materials.
- Make sure that biohazards do not contaminate iQue® System components.
- In the event that system contamination occurs, contact Customer support for applicable cleanup procedures.

### DANGER



If smoke, abnormal noise, or strange odor is present, immediately shutdown the system and notify Customer support. It is dangerous to continue using the system.

### WARNING



For safe operation of the iQue® System, the system must be connected to an IntelliCyt approved uninterruptable power supply.

## General Warnings

THE iQue SCREENING SYSTEM IS INTENDED FOR GENERAL LABORATORY AND RESEARCH USE ONLY. IT IS NOT INTENDED FOR IN VITRO DIAGNOSTIC TESTING. READ THE ENTIRE FLOW iQue® SCREENER SYSTEM USER GUIDE BEFORE ATTEMPTING TO OPERATE THE INSTRUMENT. DO NOT ATTEMPT TO PERFORM ANY PROCEDURE BEFORE CAREFULLY READING ALL INSTRUCTIONS. ALWAYS FOLLOW PRODUCT LABELING AND MANUFACTURER'S RECOMMENDATIONS. IF THERE IS ANY QUESTION AS TO HOW TO PROCEED, CONTACT INTELLICYT.

IF THIS INSTRUMENT IS USED IN A MANNER NOT SPECIFIED BY THE MANUFACTURER, THE PROTECTION PROVIDED BY THE INSTRUMENT MAY BE IMPAIRED.

COMPLY WITH ALL NATIONAL HEALTH AND SAFETY STANDARDS SUCH AS THE USE OF BARRIER PROTECTION. THIS MAY INCLUDE, BUT IS NOT LIMITED TO, PROTECTIVE EYEWEAR, GLOVES, AND SUITABLE LABORATORY ATTIRE WHEN OPERATING OR MAINTAINING THIS INSTRUMENT.

The information in this user guide is subject to change at any time without notice. Products may change in response to technological advancements.

# Operator Safety

## **WARNING: There is a risk of operator injury if:**

- The covers are not opened and/or closed with care.
- All covers and panels are not closed and secured in place prior to and during instrument operation.
- Contact is made with moving parts.
- Broken parts are mishandled.
- Improper tools are used for troubleshooting.
- The integrity of safety interlocks and/or sensors is compromised.
- Instrument alarms and error messages are not acknowledged and acted upon.

## **To avoid injury:**

- Open and close the covers with care.
- Keep covers and panels closed and secured in place while the instrument is in use.
- Keep away from moving parts.
- Report any broken parts to the manufacturer.
- Use the proper tools when troubleshooting.
- Take full advantage of all safety features and do not defeat safety interlocks and/or sensors.
- Acknowledge and act upon instrument alarms and error messages.

IF THIS INSTRUMENT IS USED IN A MANNER NOT SPECIFIED BY THE MANUFACTURER, THE SAFETY PROTECTION PROVIDED BY THE INSTRUMENT MAY BE COMPROMISED LEADING TO OPERATIONAL FAILURE AND/OR OPERATOR INJURY.

## **To help ensure compliance with intended use:**

- Operate the instrument as described in this user guide.
- Only operate with an original copyrighted version of software.
- Install, update, and run anti-virus protection software on a regular basis.

If this product was purchased from anyone other than an authorized distributor and if it is not presently under a service contract, there is no guarantee that the product is fitted with the latest mandatory engineering revisions or that the user will receive the most current information bulletins concerning the product.

**The Flow Cytometer System is a Class 1 laser device.**

## Safety Symbols and Labels

Safety symbols and labels draw attention to potentially dangerous conditions. These symbols, together with text, apply to specific procedures and appear as needed on the instrument and throughout this user guide. Do not remove these labels.



**Biohazard/Biological Risk:** Consider all materials (specimens, reagents, controls, etc.) and the areas these materials come into contact with as being potentially infectious and/or life threatening. Wear appropriate laboratory attire, follow universal laboratory safety protocols, and adhere to local regulations.



**Electrical Shock Hazard:** There is the possibility of electrical shock when the instrument is plugged into the power source.



**Laser Radiation Hazard:** Consider the laser source as being potentially hazardous to eyesight. Wear the proper protective eyewear to avoid damage to eyes from the laser. Never look directly into laser light.



**Laser Aperture Hazard:** Directed laser light is emitted from the aperture indicated with this label. Follow all laser radiation/hazard warnings.



**General Caution:** Indicates a potentially dangerous area of the system. Consult the user manual before using the system.

## Biological Handling Precautions

Biological samples are potentially dangerous and/or life threatening. Adhere to proper handling procedures for samples and reagents at all times.

Depending on the laboratory environment, there could be a risk of biological, chemical, or radiological contamination resulting from contact with samples, sample tubes, sample waste, the waste container, and/or associated tubing. Handle all samples as if potentially infectious or life threatening. Wear protective clothing, gloves, and eyewear. Never pipette by mouth. Clean up all spills immediately. Dispose of all samples and waste according to proper handling procedures and local regulations.

- Always treat waste with decontamination solution before disposal. Dispose of waste according to local regulations.
- Always empty the waste bottle daily or when prompted by software to prevent spillover and possible biohazard risk.
- Consult appropriate Material Safety Data Sheets when necessary.

Always protect the Detector Inlet with a tube of HPLC reagent grade filtered, distilled water (0.22  $\mu\text{m}$  filter), or equivalent, when the cytometer is not running samples. The screening system is programmed for automatic decontamination of the fluidics system during shut down.

## Laser Precautions

The flow cytometer contains a solid state 488nm laser and a 640nm diode laser under the outer and secondary covers. The instrument, therefore, may pose certain hazards associated with this laser, if misused.

- Eye and skin exposure to direct and reflected laser light is hazardous and may be extremely harmful. Never remove or attempt to remove the internal covers.
- Ensure that all optical filters are securely positioned. Prevent stray reflections from other surfaces. Never place any foreign object in the path of the laser beam.
- Only authorized personnel can install, remove, or repair the laser. Do not open the laser head enclosure for any reason. Always return the instrument for repair.
- Never operate the unit in the presence of flammable gases or fumes.
- Turn off the cytometer when not in use.
- The laser interlock deactivates the laser when the top cover is lifted up. There is a risk of personal injury if the laser safety interlock is bypassed. Never attempt to override the interlock.



# Operational Precautions

## Ambient Temperature and Humidity

Operating temperature is between 15 °C and 30 °C (59 °F and 86 °F) and < 80% relative humidity.

## Area of Use

- The iQue Screening System is designed to fit on a laboratory bench top.
- Provide a safety perimeter of 15 cm (6 inches) around the instrument and computer to allow proper ventilation and to protect the instrument and computer from accidental liquid spills.
- Take special care while handling fluids around the instrument.
- Do not allow uncontained fluids to enter the interior of the instrument or computer.
- Immediately clean up spills.
- Do not place anything on top of the flow cytometer, including sample tubes and racks.
- Before manually cleaning the system, turn off the instrument and unplug the power cord.

# Electrical Precautions



Electrical devices pose the risk of an electric shock. To reduce the risk of an electric shock, do not open the back or side service panels while the system is plugged in. Allow only authorized personnel to remove any other panels from this device.

Always use the provided power cords, power supplies, and cables. Do not abuse the cords. Never use the cords to pull the plug from an outlet. Keep cords away from heat, oil, or sharp edges. Damaged cords increase the risk of electric shock.

**CAUTION:** The instrument must be plugged into an IntelliCyt approved uninterruptable power supply (UPS). The UPS must be plugged into a standard, grounded, or earthed mains electrical outlet, conforming to local codes. Non-grounded or non-earthed mains outlet adaptors must not be used.

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# Getting to Know the iQue

## Overview

IntelliCyt's iQue® Screener and iQue Screener HD are platforms for screening suspension cells, beads, microbes and mixtures. These systems consist of a robotic plate rail with an orbital shaker, robotic plate sampler, detector, and ForeCyt® software to design, run, and analyze screening assays.

## Requirements

<b>Power</b>	<p>120 VOLT CONFIGURATION AC Input: 120 VAC, 50-60Hz, less than 3A Fuses are 5mm x 20 mm Glass-Tube Fuse, Time Delay, 250 VAC, 5 Amp</p> <p>220 VOLT CONFIGURATION AC Input: 220 VAC, 50-60HZ, less than 2A Fuses are 5mm x 20 mm Glass-Tube Fuse, Time Delay, 250 VAC, 5 Amp</p> <p>The instrument must be plugged into an IntelliCyt approved uninterruptable power supply (UPS). The UPS must be plugged into a standard, grounded, or earthed mains electrical outlet, conforming to local codes. Non-grounded or non-earthed mains outlet adaptors must not be used. The iQue Screener is provided with an approved UPS.</p>
<b>Power Cable Between UPS and Electrical Outlet</b>	<p>Minimum ratings: 6A , 250 V, 70°C, PVC H03VVF or equivalent, 3 x 0.75 mm<sup>2</sup> cable,</p> <p>Female Connector Type: IEC 60320 C13,</p> <p>Male Plug: European Type CEE 7/7, or Certified equivalent Plug for other countries.</p>
<b>Environment</b>	<p>20-30 °C, less than 80% relative humidity (Non-Condensing)</p> <p>Altitude up to 2000 meters</p> <p>Transient overvoltage Category II</p> <p>Condensation Pollution Degree 2</p>
<b>Instrument Size</b> <b>Height x Width x Depth (does not include computer and UPS)</b>	<p>65.5 x 98.6 x 62.5 cm (25.8 x 38.8 x 24.6 inch)</p> <p>96.5 x 109.2 x 96.5 cm (38 x 43 x 38 inch) with all doors open.</p>
<b>Dry Weight</b>	<p>82 kg (180lb)</p>

# Specifications

Feature	Specification
<b>Screening Detection Method</b>	Automated Flow Cytometry
<b>Laser Power</b>	14.7 mW 640 nm Diode Red Laser 20 mW 488 nm Solid State Blue Laser
<b>Multicolor Detection</b>	4 Simultaneous Color Channels using PMTs
<b>Label Free Object Detection</b>	2 Light Scatter Channels for Size and Granularity
<b>Sensitivity</b>	7 Decade Dynamic Range using Fixed Optics
<b>Sample Formats</b>	iQue Screener: 96- and 384-Well Microplates, Tubes iQue Screener HD: 384- and 1536-Well Microplates, Tubes
<b>Sample Volumes, Sampling Rate</b>	1µL and Higher (no dead volume), 10,000 Objects/Second
<b>Plate Processing Speed</b>	As Low as 3 Minutes/96-Wells, 12 Minutes/384-Wells
<b>Control &amp; Analysis Software</b>	Forecyt® version 4.x
<b>File Export:</b>	FCS, CSV, and Forecyt® Experiment File Format (IEX)
<b>PC Operating System</b>	Microsoft Windows 7 or Windows 8 64-Bit
<b>Configurations</b>	Stand Alone Workstation, or Fully Integrated
<b>Options</b>	iDM™ Data Storage Database with Distributed Clients Selectable Detector Sets (SDS) Automation Interface, CFR 21 Part 11

## Fluorescence Channels

The following table lists the configurations of the four fluorescent channels of the iQue Screener in its default laser and filter configuration along with examples of some fluorophores that can be used with the iQue. Note that this is not meant to be a comprehensive list of all available fluorophores that work with the iQue. Also note that alternate laser and filter configurations are possible using the Selectable Detector Sets optional feature.

Channel Position	Filter	Example Fluorophores
<b>FL1</b>	533/30	<ul style="list-style-type: none"> <li>• FITC</li> <li>• GFP</li> <li>• eGFP</li> <li>• YFP</li> <li>• Alexa Fluor® 488</li> <li>• DiO</li> <li>• ToTo®1</li> <li>• YoYo®1</li> <li>• Bodipy</li> <li>• CFSE</li> </ul>
<b>FL2</b>	585/40	<ul style="list-style-type: none"> <li>• PE</li> <li>• PI</li> <li>• PE-Texas Red®</li> <li>• DSRED</li> <li>• Cy3</li> <li>• DiL</li> </ul>
<b>FL3</b>	670LP	<ul style="list-style-type: none"> <li>• 7-AAD</li> <li>• PI</li> <li>• PerCP</li> <li>• PerCP-Cy5.5</li> <li>• PerCp-eFluor®710</li> <li>• PE-Cy™5</li> <li>• PE-Cy7</li> </ul>
<b>FL4</b>	675/25	<ul style="list-style-type: none"> <li>• APC</li> <li>• Alexa Fluor® 633/647/670/700</li> <li>• DiD</li> <li>• ToPro®3</li> <li>• Draq5™</li> <li>• Cy5</li> </ul>

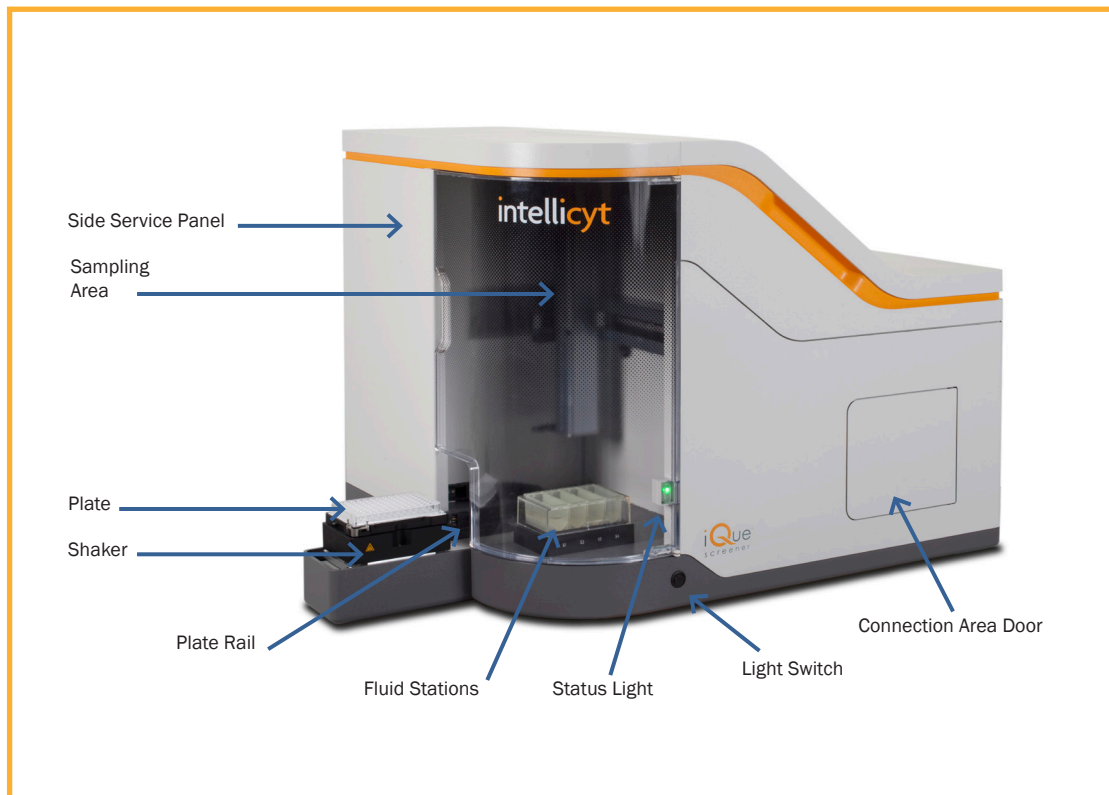
# Variations

There are three variations of the iQue:

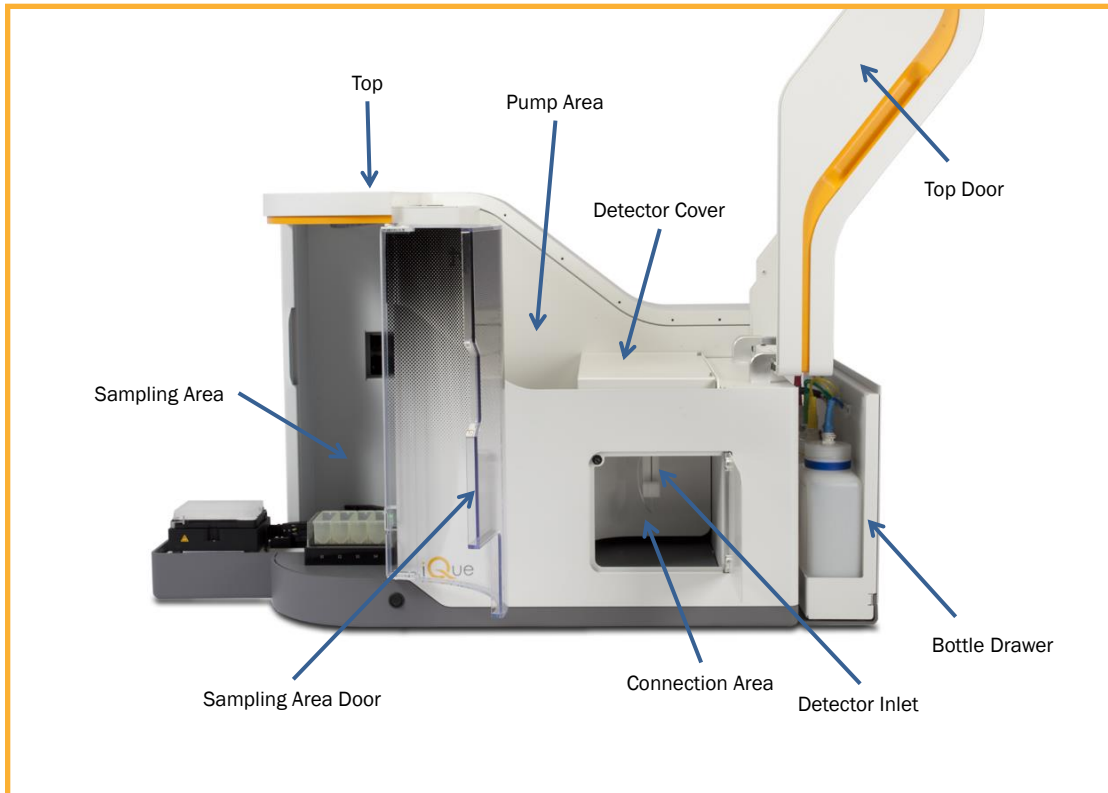
Variation	Distinguishing Features
<b>Gen 1 iQue</b>	Non-contact sensing 8" probe assembly. Four fluid stations marked S1, S2, S3 and S4. 96- and 384-well plate capable.
<b>Gen 2 iQue</b>	Contact sensing and piercing probe assembly. Fluid stations labeled Buffer, Markers, Decon, Clean and Water. 96- and 384-well plate capable.
<b>iQue HD</b>	Gen 2 iQue plus high-RPM shaker and advanced workstation. 384- and 1536-well plate capable

The procedures in this manual are intended for use with all three variations, except where noted.

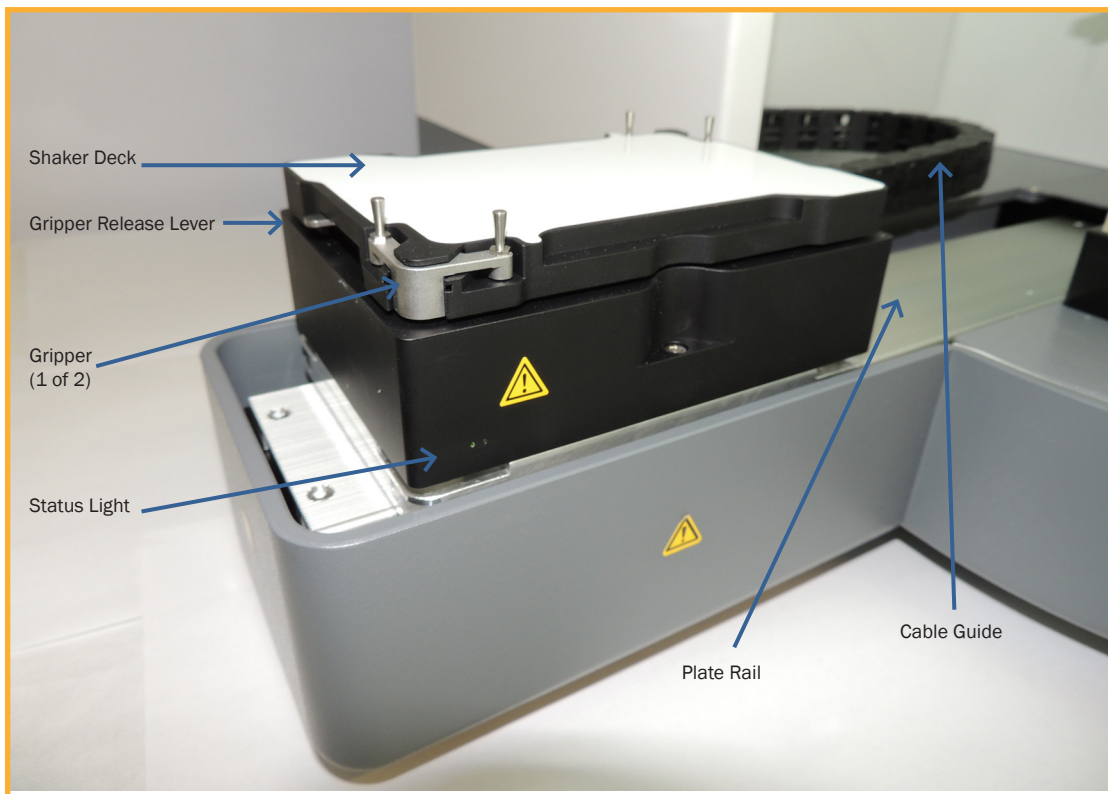
## Front View



## Doors Open View

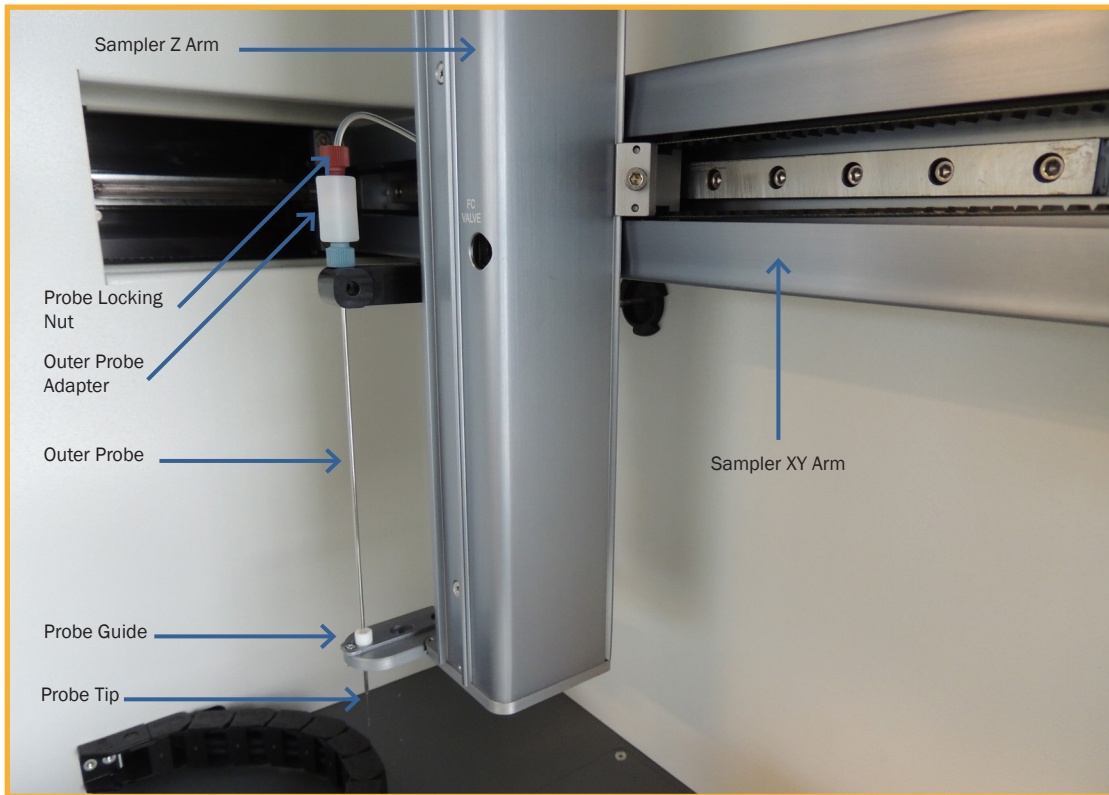


## Shaker Detail View

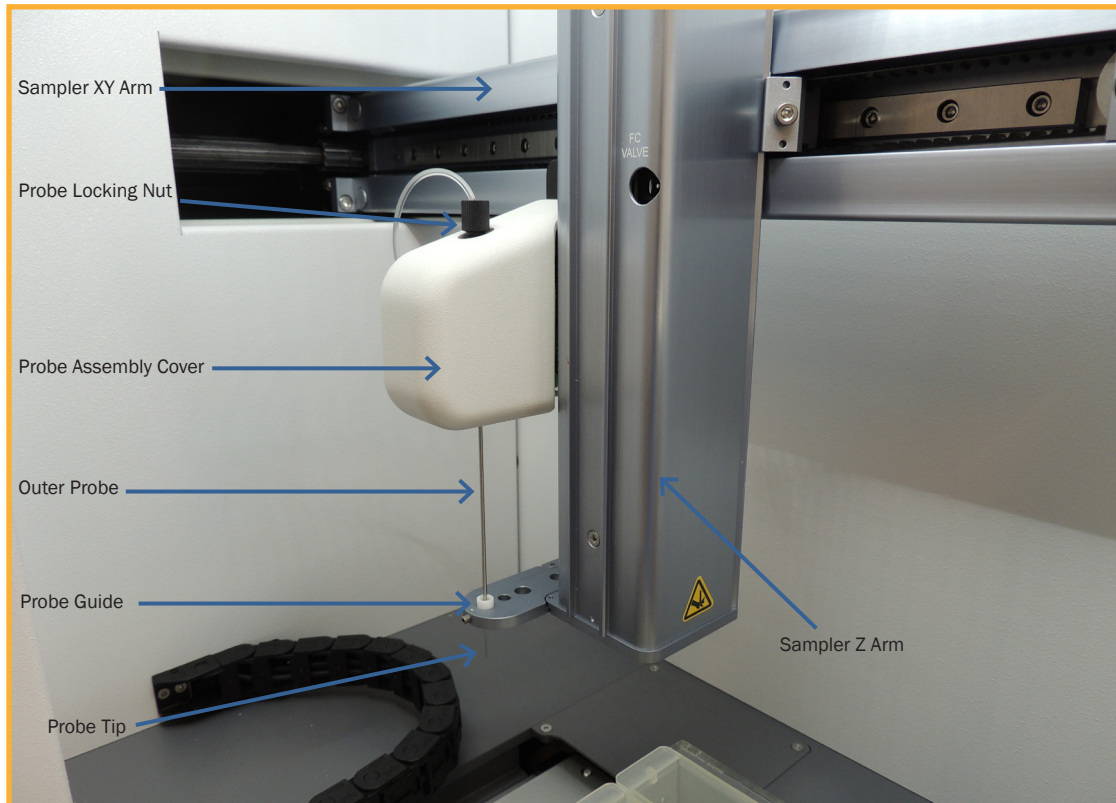




## Sampler Detail View – Gen 1

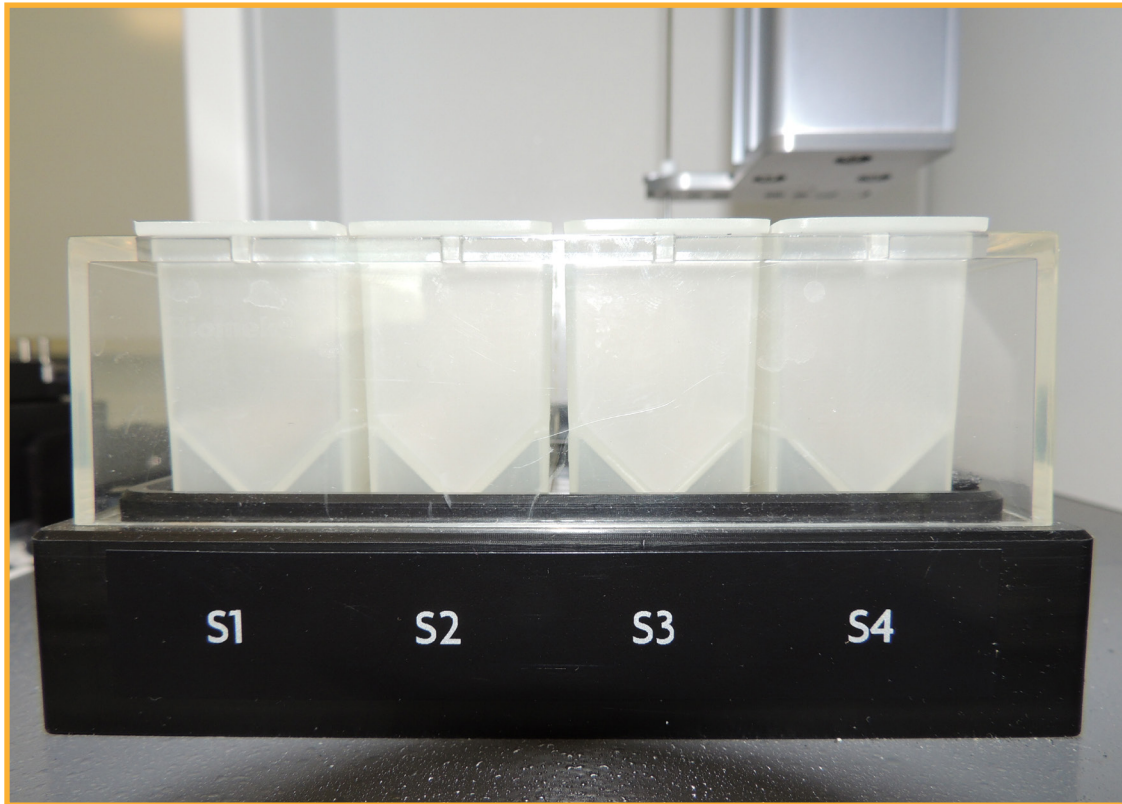


## Sampler Detail View – Gen 2

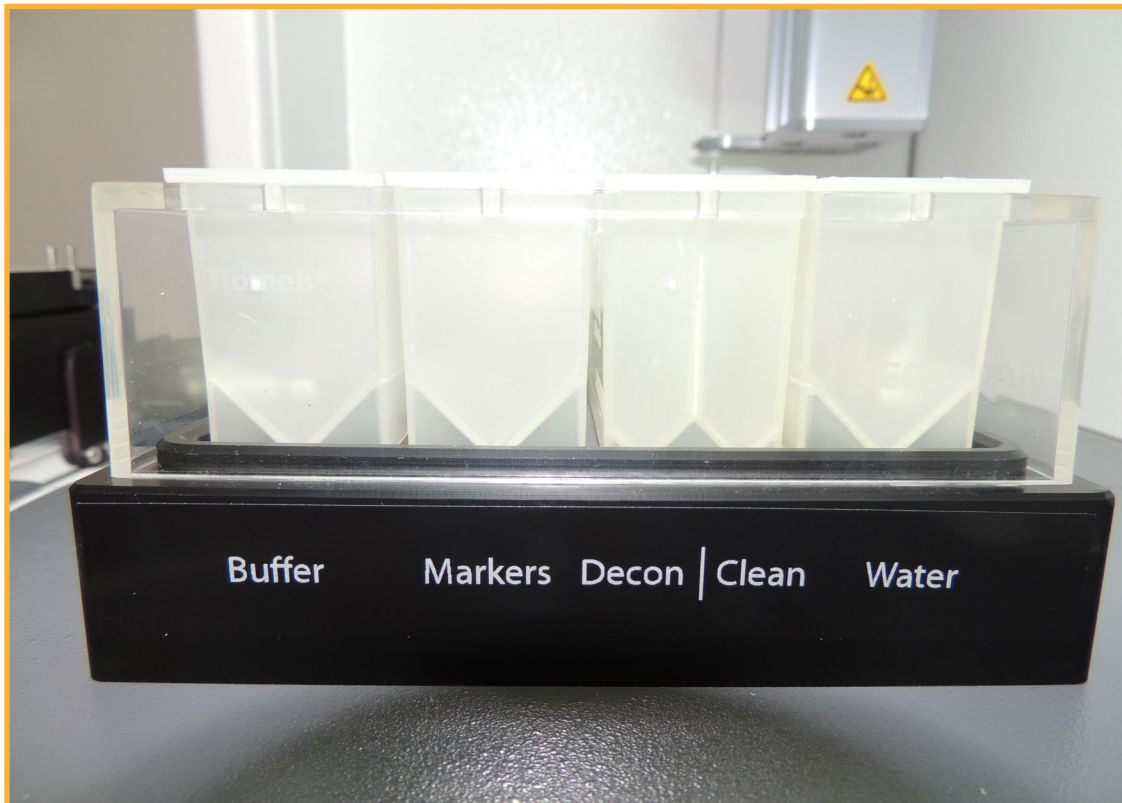




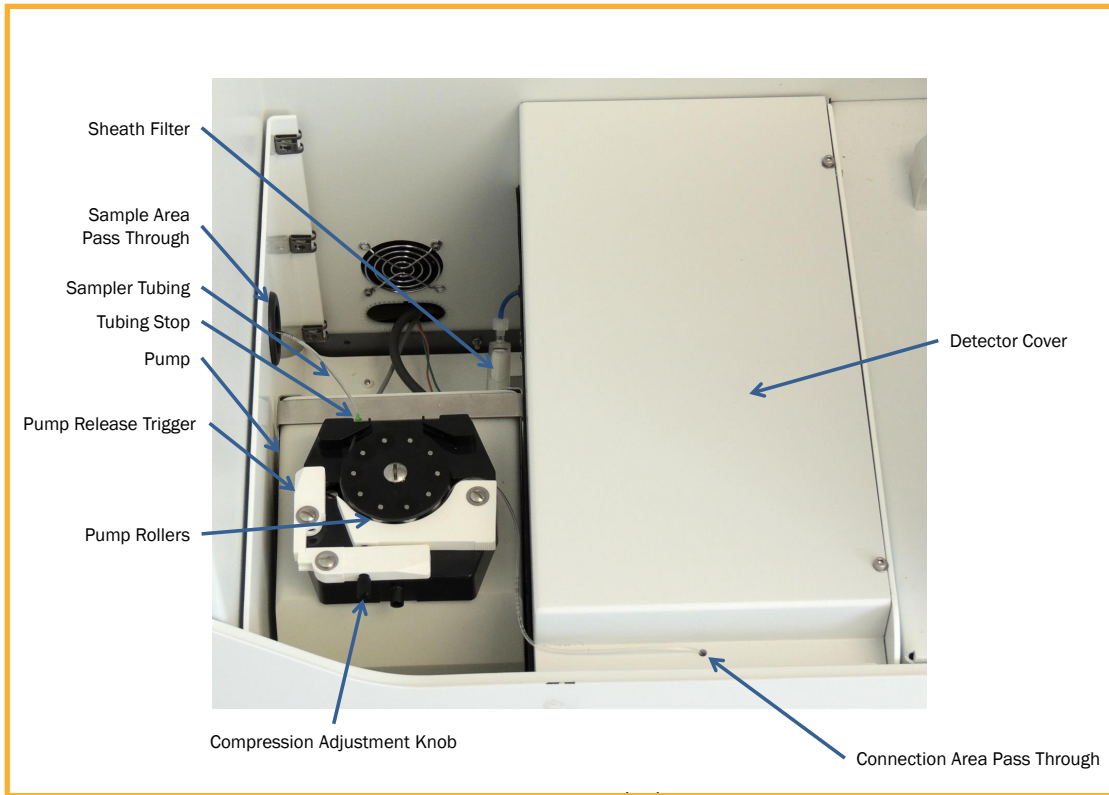
## Fluid Station View – Gen 1



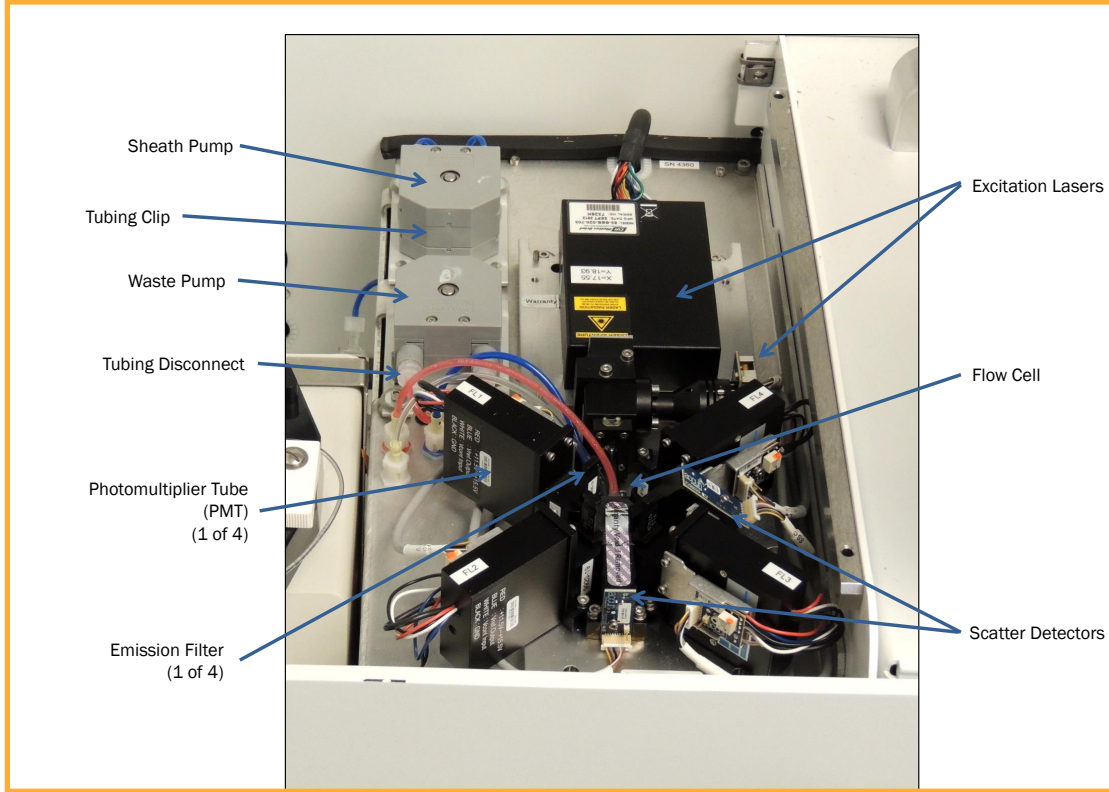
## Fluid Station Detail View – Gen 2



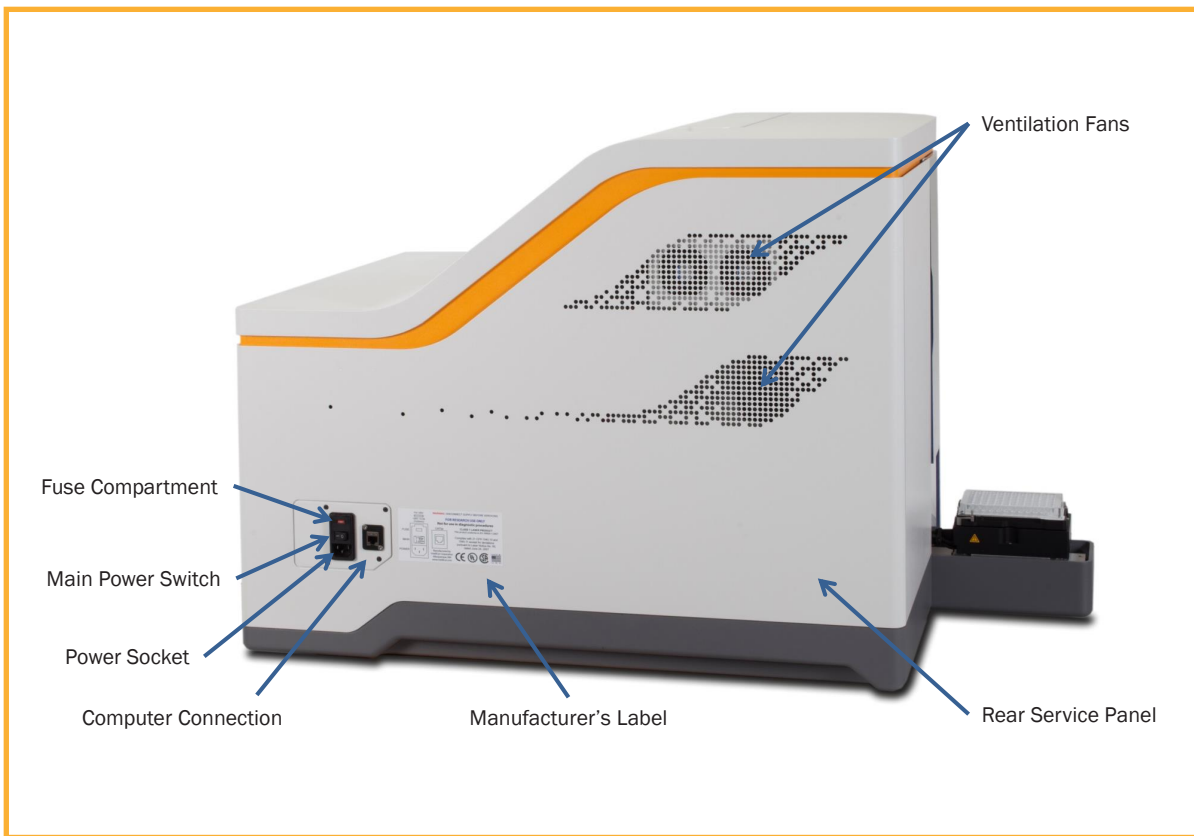
## Top Down View



## Detector Area Detail View

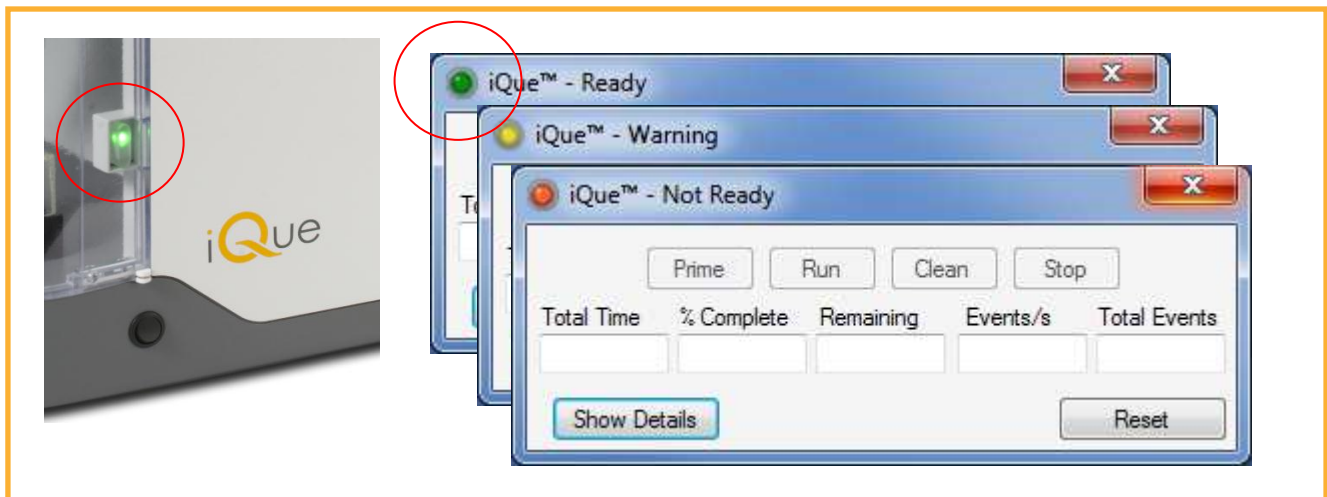


## Back View



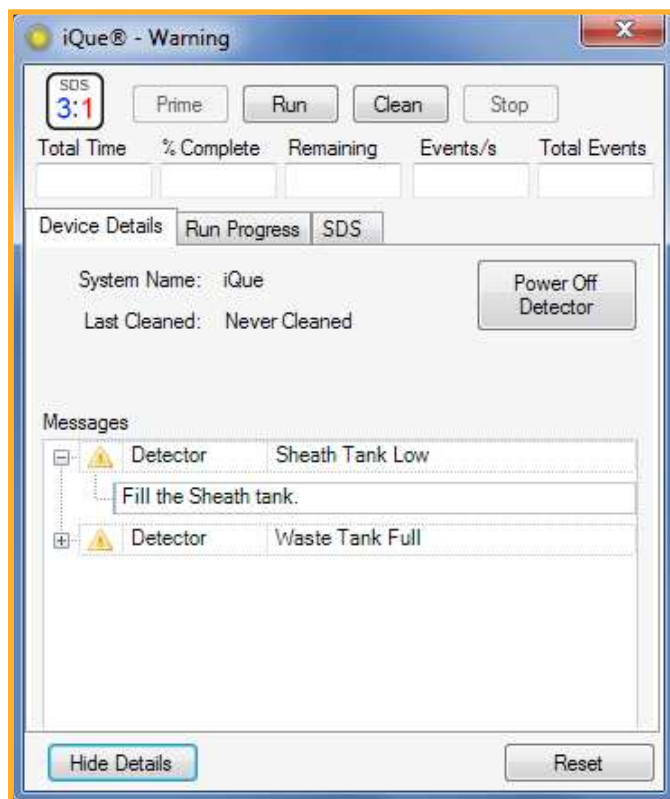
## System Status Light

The iQue system status is displayed on the hardware and in the ForeCyt software. The system status light can be one of three colors (green, yellow, or red) that corresponds to the current state of the iQue (ready, warning, and not ready).



Indicator	System Status	Description
●	Ready	The system is ready to prime, run, or clean
●	Warning	The system has warnings that may prevent priming, running, or cleaning but is not faulted
●	Not Ready	The system cannot prime, run, or clean due to a fault

For detailed messages about the system status press the **Show Details** button on the Controller console. Status messages will appear in the Messages grid including the component of the system that is effected and a brief description of the problem. Additional details about how to resolve the issue can be shown and hidden by using the + and - buttons next to the message.





# iQue Operation

## Introduction

The following articles provide detailed instructions for the day-to-day operation of the iQue.

## Cleanliness and Best Practices

Proper start-up, shut-down, and adherence to other best practices are necessary to maximize instrument performance and to minimize clogs and repairs. Please become familiar with these procedures and implement laboratory protocols to ensure that the following best practices are followed.

## Safety

Always wear appropriate safety attire, such as protective gloves and eye wear when performing operations where contact with chemical or biological agents is possible.

## Articles

- [iQue Fluids](#)
- [Daily Startup](#)
- [Daily QC](#)
- [Daily Shutdown](#)

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# iQue Fluids

## Overview

This procedure explains how to prepare the fluids that are required for iQue operation and how to properly fill the iQue's fluid bottles and troughs.

## Preparing the Fluids

The iQue requires three special fluids. The first is Sheath Fluid, which is used to hydrodynamically focus the samples. The second and third solutions are Decontamination and Cleaning Solution. These are always used in combination and followed by water.

Fluid	Description	Preparation
Sheath Fluid Part #: 90078	Used to hydrodynamically focus the samples.	1L water* + 1 bottle IntelliCyt Bacteriostatic Concentrate
Decontamination Solution Part #: 90077	A mildly basic solution used to clean and decontaminate the system.	180 mL water* + 1 bottle IntelliCyt Decontamination Concentrate
Cleaning Solution Part #: 90079	A mildly acidic and surfactant solution used to neutralize the decontamination solution and clean the system.	200 mL water* + 3 mL pipetted IntelliCyt Cleaning Concentrate

\* For all iQue fluids, HPLC reagent grade filtered, distilled water (0.22 µm filter), or equivalent is recommended. Unfiltered distilled water is acceptable.

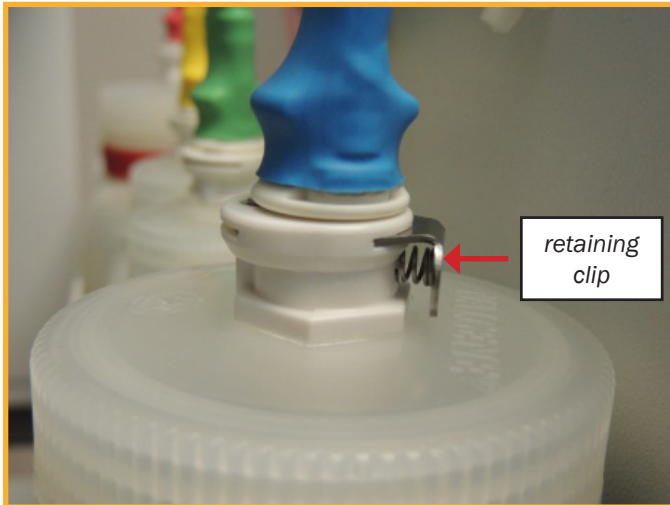


**CAUTION**

Use **only** IntelliCyt approved fluids in the iQue screener. Use of unapproved fluids can damage the instrument. In particular, the use of sheath fluid or cleaners designed for other flow cytometers as well as the use of household bleach or other caustic agents are strictly prohibited.

## Filling the Bottles

1. Open the bottle drawer.
2. Unplug each bottle by pressing the retaining clip on the bottle-tubing connector and firmly pulling up on the plug in connector.



3. Empty the waste bottle and any residual sheath.
4. Thoroughly rinse empty bottles with distilled water.

**NOTE**


Sheath bottle contamination is a common cleanliness issue. Be sure to rinse the bottle thoroughly with distilled water. The bottles are not autoclavable.

5. Fill the sheath bottle (labeled blue) with properly prepared Sheath Fluid.






6. Fill the decontamination bottle (labeled yellow) with properly prepared Decontamination Solution.
7. Fill the cleaner bottle (labeled green) with properly prepared Cleaning Solution.
8. Put 100–200 mL of full-strength bleach in the empty waste bottle.
9. Close the bottles and place them back in the drawer. Reconnect the fluid lines, matching the color of the connector to the color of the bottle.

**NOTE**  Close bottles securely, but do not over-tighten. The iQue screener is a non-pressurized system.

10. Carefully close the drawer making sure that the bottle lines are not pinched.

**NOTE**  Be sure that the bottle connectors are securely plugged in and that the tubing has not been pinched in the drawer.

### Filling the Troughs

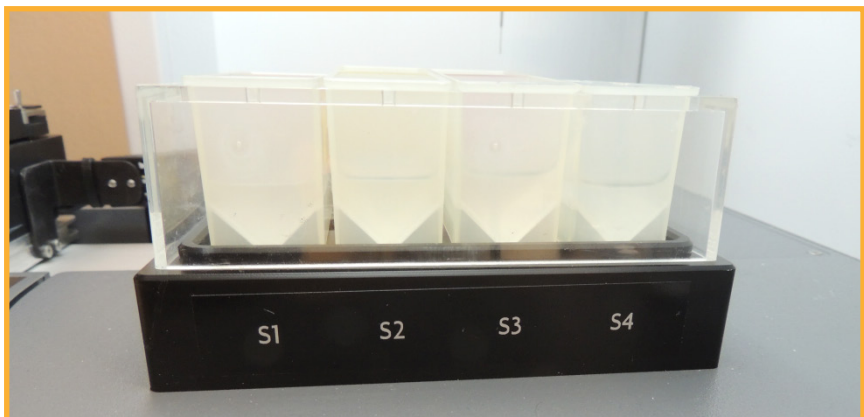
1. Replace or thoroughly rinse the fluid troughs.
2. Fill each trough with the appropriate fluid as shown below:



*Second Generation Trough Format*

**Legend**

- Buffer = Sample Buffer (e.g. PBS + .1% BSA)
- Markers = Between-well marker bead cartridge
- Decon = Decontamination Solution
- Clean = Cleaning Solution
- Water = Filtered, distilled water



*First Generation Trough Format*

**Legend**

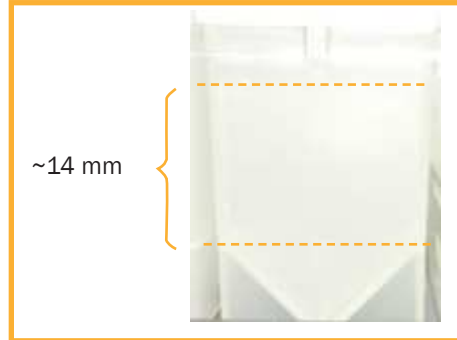
- S1 = Sample Buffer (e.g. PBS + .1% BSA)
- S2 = Decontamination Solution
- S3 = Cleaning Solution
- S4 = Filtered, distilled water



Dirty fluid troughs are a common source of contamination. Replace troughs as needed and always use fresh fluids.

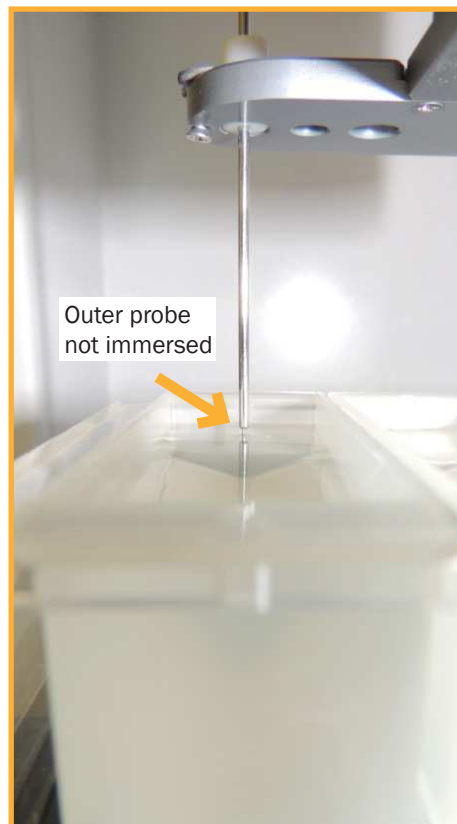
### A Note on Fluid Fill Level

With a Gen 2 probe, the probe depth in the fluid stations is pre-set. Fluid stations should be filled to approximately 14 mm above the top of the “V” of the trough:



*Gen 2 Trough Fill Line*

With a Gen 1 probe, the probe depth in the fluid stations is user-adjustable. Fluid stations should be filled to a level where the inner probe tip is fully immersed but that the outer probe is not. This will vary from system to system depending on how the fluid stations have been calibrated.



*Gen 1 Trough Fill Level*

# Daily Startup

## Overview

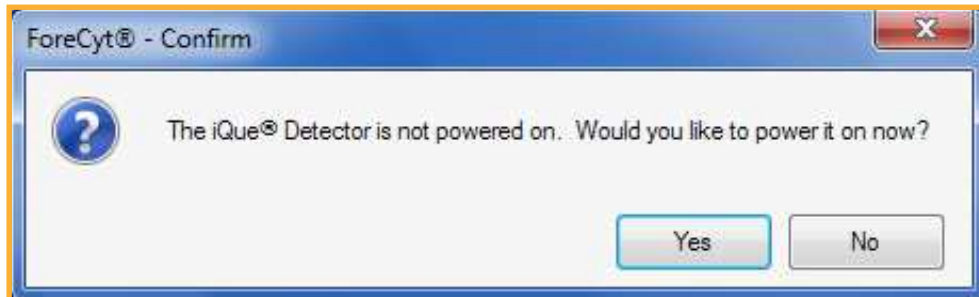
This procedure explains how to perform a proper daily startup. This entire procedure should take no longer than 20 minutes assuming the system was shut down properly and all the required fluids are prepared.

## Referenced Procedures

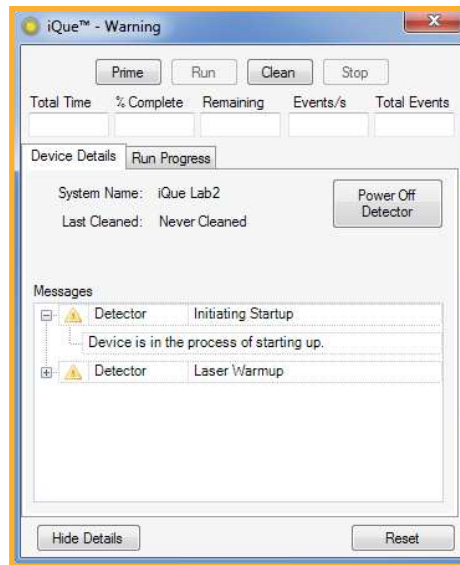
- [Fluidics Maintenance](#)
- [Daily QC](#)
- [Changing the Probe and Tubing](#)

## Steps

1. Ensure all bottles and troughs are filled according to the [iQue Fluids](#) procedure.
2. Launch the ForeCyt software if it is not already running. When prompted to power on the detector, click **Yes** to power it on. Alternately, click the **Power On Detector** button in the Controller Console window.



3. Follow the Power On Detector wizard by disconnecting the tubing from the detector inlet and placing a tube of filtered distilled water on the detector inlet.
4. As the detector starts, the lasers and fluidics will go through a series of initialization steps which should take about five minutes. It is possible to monitor the progress in the Controller Console window by clicking the **Show Details** button. Once the detector is powered on, the system will show a status of Ready (green light).



#### NOTE



If the iQue detector takes longer than 5 minutes to reach the Ready state, this indicates either an improper shutdown or possible fluidics issues such as clogging.

5. Perform Daily QC as described in the [Daily QC](#) procedure.
6. Attach the sampler tubing to the Detector Inlet.
7. Click **Prime** and allow the system to prime for 3 minutes. Verify that the sample slugs are well formed and adjust the peristaltic pump head tension if needed. See [Changing the Probe and Tubing](#).

# Daily QC

## Overview

Running daily quality control is highly recommended for the iQue Screener. A daily QC check not only ensures that system performance is within specifications, but is also a useful diagnostic tool if issues arise. IntelliCyt makes the QC process easy by providing reagents and pre-configured analysis templates. A daily QC check will take about 10 minutes to complete.

## Required Materials

Part Number	Description
90295	6 peak Validation Beads (for Red Laser and FL4 Detector)
90296	8 peak Validation Beads (for Blue Laser and FL1, FL2, FL3 Detectors)

### NOTE



Daily QC procedure assumes the standard 3:1 laser configuration and default filters.

## Preparing QC Samples

1. Prepare the Water Test sample
  - Add 1 mL of 0.22  $\mu$ m filtered, distilled water or equivalent to a tube.
  - It is important to use clean water for an accurate test.
2. Prepare the 8-Peak Beads sample
  - Vortex the black 8-peak validation bead bottle.
  - Dilute 4 drops of the 8-peak validation beads in 500  $\mu$ L of filtered, distilled water in a tube.
  - Vortex the tube.
3. Prepare the 6-Peak Beads sample
  - Vortex the two white 6-peak validation bead bottles.
  - Dilute 4 drops each of the 6-peak validation beads (for 8 drops total) in 500  $\mu$ L of filtered, distilled water in a tube.
  - Vortex the tube.



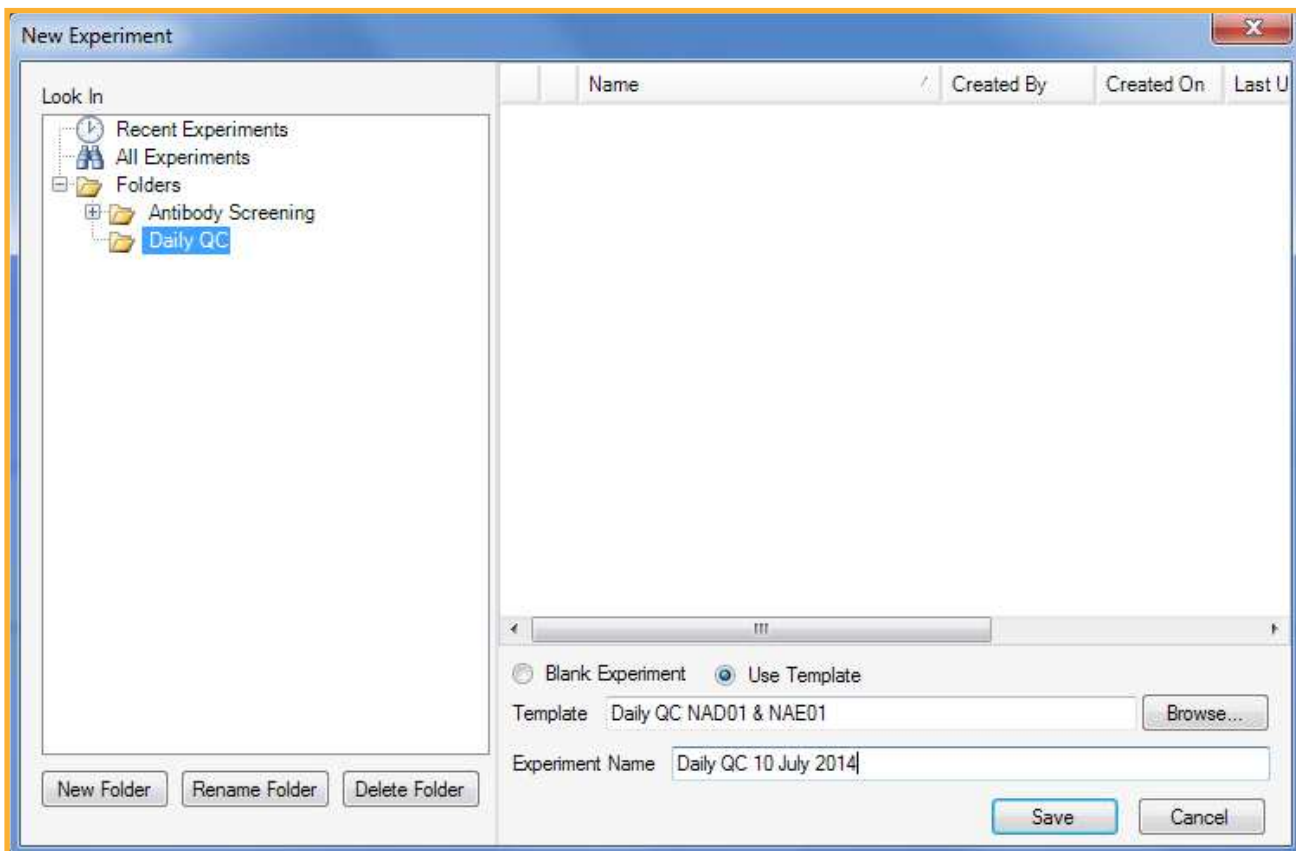
### NOTE



Be sure to vortex the bottles of validation solutions before use and to use clean tubes and water to ensure a proper bead preparation.

## Creating the Daily QC Experiment

1. In ForeCyt, click **File > New Experiment**.
2. In the New Experiment dialog, select the option **Use Template** to create an experiment using a predefined template.
3. Click the **Browse** button and choose the Daily QC template that matches the bead lot being used.



### NOTE



Contact IntelliCyt Tech Support to obtain the latest Daily QC Template for any specific bead lot.

4. Give the Daily QC experiment a name and click **OK**.

## Running the Water Test

1. Perform a Backflush by clicking the **Clean** button on the controller console, choosing the **Backflush** option, and following the wizard.
2. Place the Water Test sample on the detector inlet.
3. Select the Water Test tube in the experiment.
4. Click **Run**. The experiment will run for just over 2 minutes.

## Interpreting the Water Test

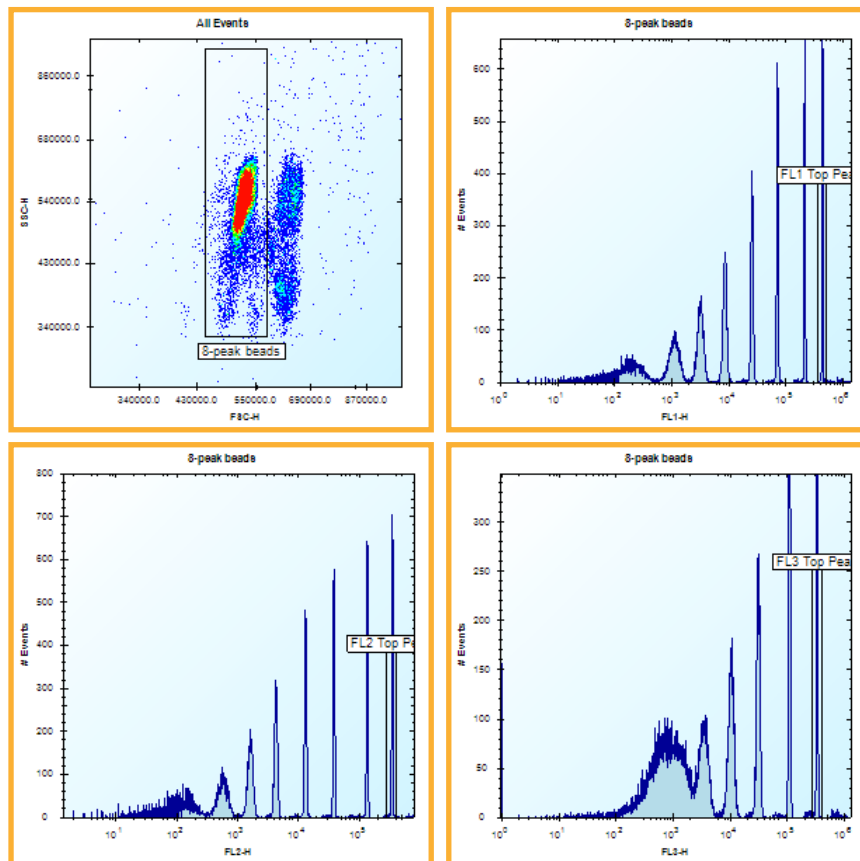
The Water Test is a gauge of system cleanliness. Use the following guidelines to interpret the results.

Event Count for 2 Minute Water Run	
0	System Clogged
1-250	Clean
251-1000	Operational
> 1000	Needs Cleaning

If the system appears to need cleaning see [Standard Cleaning Procedures](#).

## Running the 8 Peak Beads Test

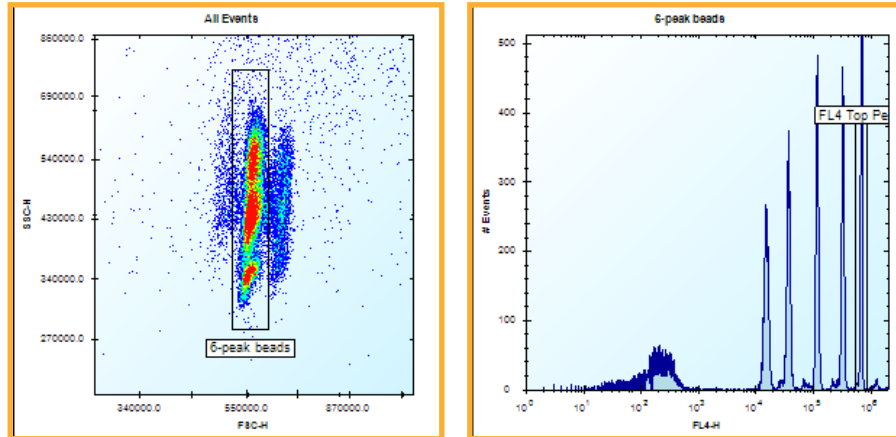
1. Perform a Backflush by clicking the **Clean** button on the controller console, choosing the **Backflush** option, and following the wizard.
2. Place the 8 Peak Bead sample on the detector inlet.
3. Select the 8 Peaks Bead tube in the experiment.
4. Click **Run**. The experiment will stop after collecting 50,000 events which should take approximately 2–4 minutes.
4. If necessary, adjust the 8 Peak Bead rectangular gate so that it encompasses at least 75% of the singlet bead population.
5. If necessary, adjust the FL1, FL2, and FL3 Top Peak range gates so that they encompass the top fluorescence peak on each channel.



Properly gated 8 Peak Beads

## Running the 6 Peak Beads Test

1. Perform a Backflush by clicking the **Clean** button on the controller console, choosing the **Backflush** option, and following the wizard.
2. Place the 6 Peak Bead sample on the detector inlet.
3. Select the 6 Peak Beads tube in the experiment.
4. Click **Run**. The experiment will stop after collecting 50,000 events which should take approximately 2–4 minutes.
4. If necessary, adjust the 6 Peak Bead rectangular gate so that it encompasses at least 75% of the singlet bead population.
5. If necessary, adjust the FL4 Top Peak range gate so that it encompasses the top fluorescence peak on the channel.



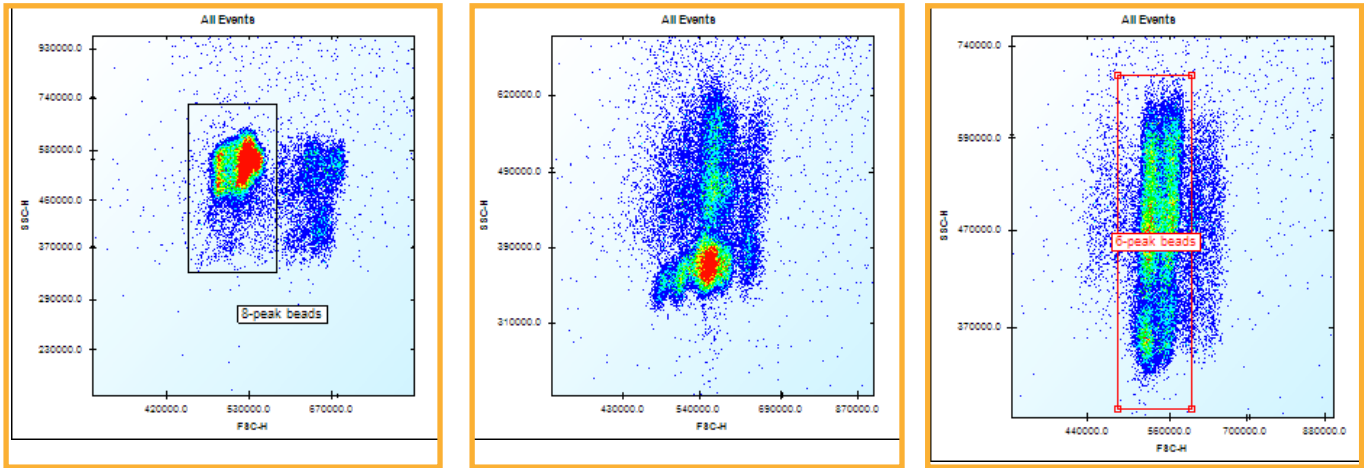
*Properly gated 6 Peak Beads*



## Interpreting the 6 and 8 Peak Bead Tests

The 6- and 8- peak bead tests measure overall system performance, laser alignment and the performance of the four fluorescence channels.

1. Take note of the shape of the main 6 and 8 peak bead populations. If the shape of the population is doubled, blurred or contains unexpected tails, the system may contain an air bubble or other source of fluidic instability.



Examples of poor scatter for both 6 and 8 Peak Beads

Performing a Quick Clean, Hydrocycle Clean, or a [Wetting Procedure](#) will often resolve poor scatter. If not, contact IntelliCyt Tech Support.

2. On each plate, switch to the Metrics tab and note the values of the Test Metrics. For each Metric, 1 means pass and 0 means fail. If any of the tests fail, contact IntelliCyt Tech Support.

Well	TEST - Bead %	TEST - FSC CV	TEST - FL4 Top Peak Mean	TEST - FL4 Top Peak CV
A01	1	1	1	1

Passing 6 Peak Beads QC Metric

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# Daily Shutdown

## Overview

This procedure explains how to properly shut the iQue down at the end of the day. This procedure can be initiated and left to run unattended. It takes approximately 45 minutes to complete.

## Steps

1. Click **Clean** in the ForeCyt Controller Console window.
2. In the Clean wizard, select **Clean Type = Daily Clean** and check **Shutdown after Clean** and then click **Next**.

Fluid Station	Duration (min)
Decon	5
Clean	5
Water	10

3. Verify that the tubing is connected to the detector inlet and click **Start**.



**NOTE** It is not necessary to attend the system during the shutdown. It is not necessary to physically power the system off or to unclamp the peristaltic tubing from the pump head on a daily basis.

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# iQue Maintenance

## Introduction

The following chapters provide detailed instructions for the routine maintenance procedures required to keep the iQue running.

## Cleanliness and Best Practices

Regular cleaning and maintenance are necessary to maximize instrument performance and to minimize clogs and repairs. Please become familiar with these procedures and implement laboratory protocols to ensure that the following best practices are followed.

## Safety

Always wear appropriate safety attire, such as protective gloves and eye wear when performing operations where contact with chemical or biological agents is possible.

## Articles

- [\*Recommended Maintenance Schedules\*](#)
- [\*Standard Cleaning Procedures\*](#)
- [\*Changing the Probe and Tubing\*](#)
- [\*Fluidics Maintenance\*](#)
- [\*Wetting Procedure\*](#)
- [\*Managing Plate Models\*](#)
- [\*Clog Prevention and Management\*](#)

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# Recommended Maintenance Schedule

## Overview

iQue Maintenance involves several procedures that need to be performed regularly. What follows are guidelines for typical usage scenarios. **Moderate Usage** is defined as less than 15 hours of run time per week. **Heavy Usage** is defined as more than 15 hours of run time per week. These guidelines can be adjusted to account for the specific conditions in any given laboratory.

## Typical Usage Scenarios

Procedure	Moderate Usage	Heavy Usage
<b>Daily QC</b>	Daily at startup	Daily at startup
<b>Daily Clean</b>	Daily at shutdown	Daily at startup Daily at shutdown
<b>Quick Clean</b>	As needed	As needed
<b>Hydrocycle Clean</b>	As needed	As needed
<b>Change Probe and Tubing</b> <i>(after 15 hours of run time)</i>	Weekly	Every other day
<b>Long Clean</b>	Weekly	Every other day
<b>Empty and Decontaminate All Bottles</b>	Monthly	Every two weeks
<b>Monthly Clean</b>	Monthly	Every two weeks
<b>Fluidics Maintenance Kit</b>	Bi-Monthly	Monthly

## Working with Samples that are Prone to Aggregation

Some samples can present special problems with clogging due to their tendency to aggregate. When working with such samples the following additions can be made to the standard maintenance schedules:

- Perform [Quick Clean](#) daily after startup
- Perform [Long Clean](#) daily prior to shutdown

See also, [Clog Prevention and Management](#).



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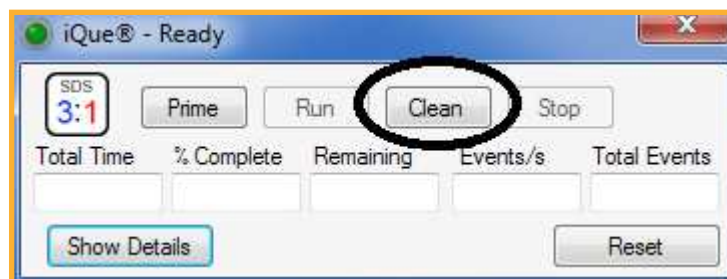
# Standard Cleaning Procedures

## Overview

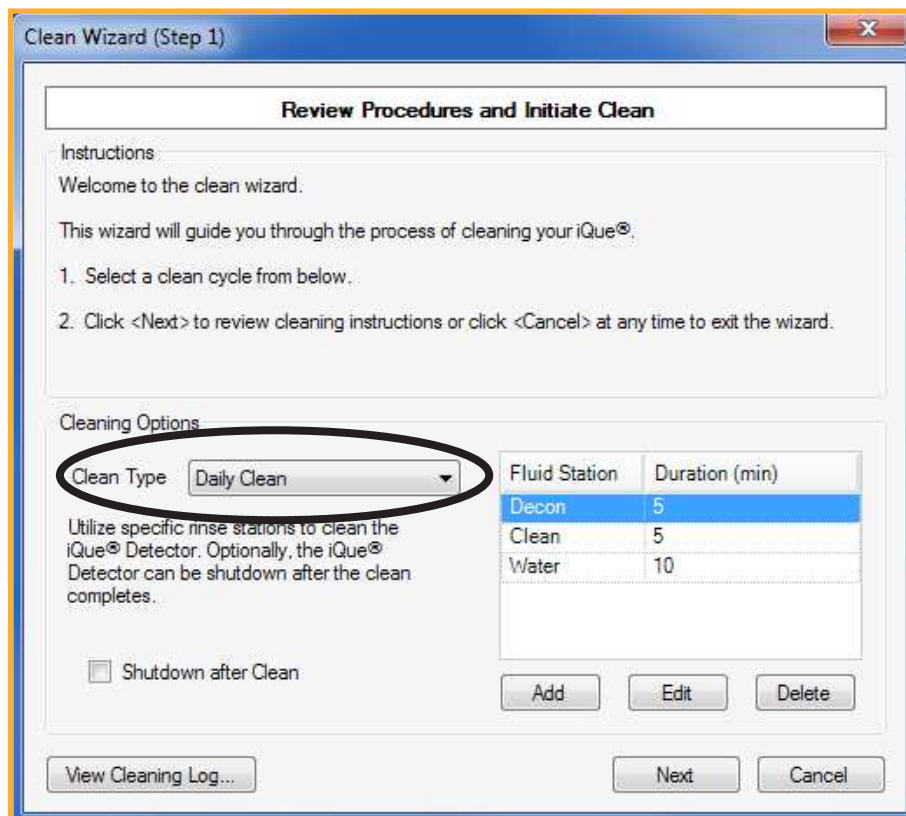
The ForeCyt software supports several standard cleaning procedures. This article explains what each one does and when to use it. All of the standard cleaning procedures are accessed by clicking the Clean button and using the Clean wizard.

## Accessing the Clean Wizard

To perform any standard cleaning operation, click the Clean button in the Controller Console window.



This brings up the Clean wizard. To perform a specific clean, choose the appropriate clean in the Clean Type dropdown, click Next and then follow the directions in the wizard.



## Daily Clean

The Daily Clean is performed daily, typically at the end of the day during the shutdown procedure. Unlike the other cleaning cycles, this clean is done with the tubing attached and it cleans the entire fluidics path from probe to detector.

In the default configuration (recommended) the Daily Clean runs 5 minutes of Decontamination Solution

followed by 5 minutes of Cleaning Solution followed by 10 minutes of water. It is possible to customize this, but be sure to keep the overall ratio of Decon to Clean to water the same. Never run Decontamination Solution without following it with Cleaning Solution and water.

If the **Shutdown after Clean** option is selected, the Detector shutdown procedure will be done after the main cleaning cycle. This adds approximately 15 minutes to the clean and powers off the detector.

The screenshot shows the 'Cleaning Options' dialog box. The 'Clean Type' is set to 'Daily Clean'. Below the dropdown, there is a text box explaining that specific rinse stations are used to clean the iQue® Detector, and optionally, the detector can be shutdown after the clean completes. There is a checkbox labeled 'Shutdown after Clean' which is currently unchecked. To the right, there is a table with two columns: 'Fluid Station' and 'Duration (min)'. The table contains three rows: 'Decon' with a duration of 5 minutes, 'Clean' with a duration of 5 minutes, and 'Water' with a duration of 10 minutes. At the bottom right of the dialog, there are three buttons: 'Add', 'Edit', and 'Delete'.

Fluid Station	Duration (min)
Decon	5
Clean	5
Water	10

## Quick Clean

The Quick Clean is a short procedure that cleans the detector inlet, flow cell, and fluidics paths in the detector. It is performed as needed, for example, when Daily QC shows a higher than normal event count or when working with samples prone to aggregation.

To perform a Quick Clean, select the **Quick Clean** Clean Type. Place a tube of Cleaning Solution on the detector inlet and follow the wizard instructions. This clean takes about 10 minutes.

The screenshot shows the 'Cleaning Options' dialog box. The 'Clean Type' is set to 'Quick Clean'. Below the dropdown, there is a text box explaining that the standalone iQue® Detector clean (~10 minutes) will be run.

## Long Clean

The Long Clean is a longer procedure used to clean and decontaminate the detector inlet, flow cell, and fluidic paths. It is performed as needed, for example, prior to shutdown at the end of the week.

To perform a Long Clean, select the **Long Clean** Clean Type. Place a tube of Decontamination Solution on the detector inlet and follow the wizard instructions. This clean takes about 15 minutes.

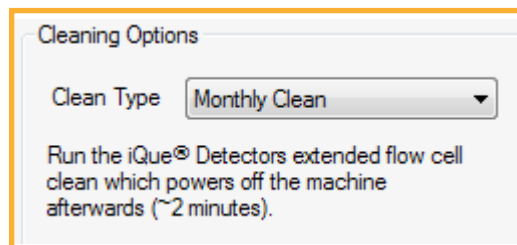
The screenshot shows the 'Cleaning Options' dialog box. The 'Clean Type' is set to 'Long Clean'. Below the dropdown, there is a text box explaining that a decontamination cycle on the iQue® Detector (~15 minutes) will be run.

## Monthly Clean

The Monthly Clean is a special cleaning procedure that should be done once a month. This clean works by filling the flow cell with an enzymatic cleaner and letting it soak overnight.

To perform the Monthly Clean, choose **Monthly Clean** for the Clean Type. Place a tube of Extended Flow Cell Cleaner on the detector inlet and follow the wizard instructions. Note that the Extended Flow Cell Cleaner is used without dilution. Once the clean has started, the detector will slowly aspirate the cleaning solution until the flow cell is filled. Then the detector will shut down.

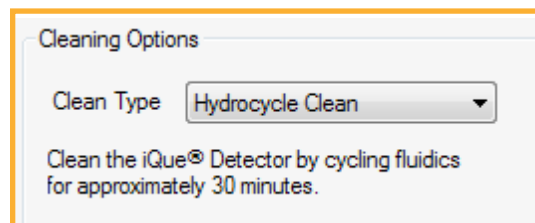
At that point, a tube of filtered distilled water is placed on the detector inlet and the instrument is left to sit overnight. When the detector is subsequently powered on, a longer water rinse cycle is automatically performed prior to the normal startup.



## Hydrocycle Clean

The Hydrocycle works by starting and stopping the detector fluidics several times in succession. This creates pressure changes that are effective in moving both debris and air through the system. The Hydrocycle Clean is performed as needed, for example, when Daily QC shows a higher than normal event count.

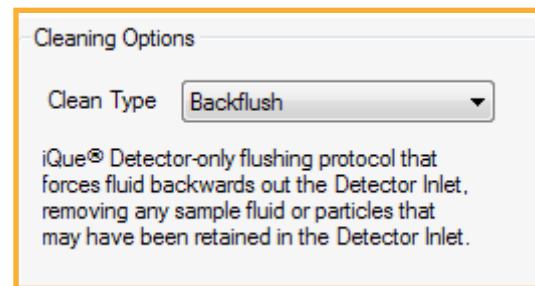
To perform a Hydrocycle Clean, select the **Hydrocycle Clean** Clean Type. Place a tube containing at least 3 mL of filtered, distilled water on the detector inlet, and follow the wizard instructions. This clean takes about 30 minutes.



## Backflush

The Backflush operation is used on-demand to clear a sample from the detector inlet.

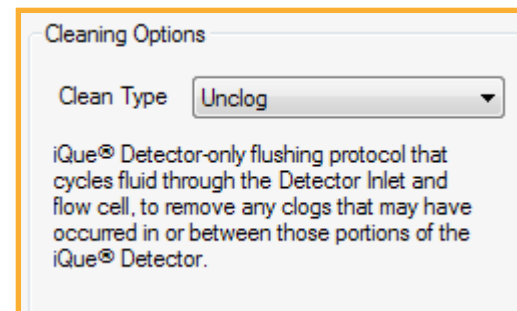
To perform a Backflush, select the **Backflush** Clean Type. Place an empty tube on the detector inlet to catch the waste and follow the wizard instructions.



## Unclog

The Unclog operation is used on-demand to clear a clog from the flow cell or detector inlet.

To perform an Unclog, select the **Unclog** Clean Type. Place an empty tube on the detector inlet to catch the waste and follow the wizard instructions.



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# Changing the Probe and Tubing

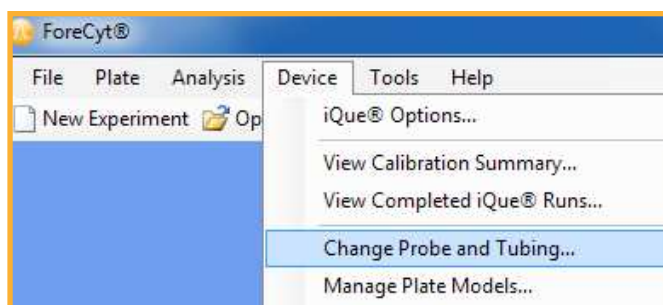
## Overview

As the iQue runs, the main sample tubing is worn by the rollers of the peristaltic pump. To ensure proper sample collection, IntelliCyt recommends that the probe and tubing assembly be changed after 15 hours of usage. This article describes the proper way to perform this procedure.

## Required Materials

Part Number	Description
90659	iQue® Probe & Tubing Assy for Gen 2 iQue® & iQue® HD - 5 Pk
90660	iQue® Probe & Tubing Assy for Gen 2 iQue® & iQue® HD - 10 Pk
90293	iQue® Probe & Tubing Assy for Gen 1 iQue® (8" Probe) - 5 Pk
90163	iQue® Probe & Tubing Assy for Gen 1 iQue® (8" Probe) - 10 Pk

## Launch the Change Probe and Tubing Wizard



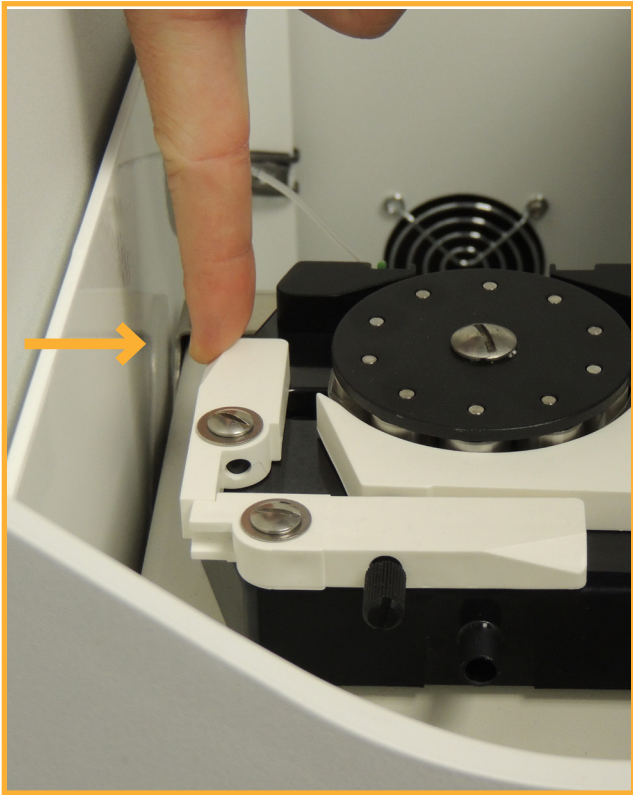
To begin changing the Probe and Tubing, click **Device > Change Probe and Tubing ...**

Follow the Change Probe and Tubing wizard to complete the process. Some details may be slightly different depending on which generation probe the instrument is equipped with, but the overall process is the same.

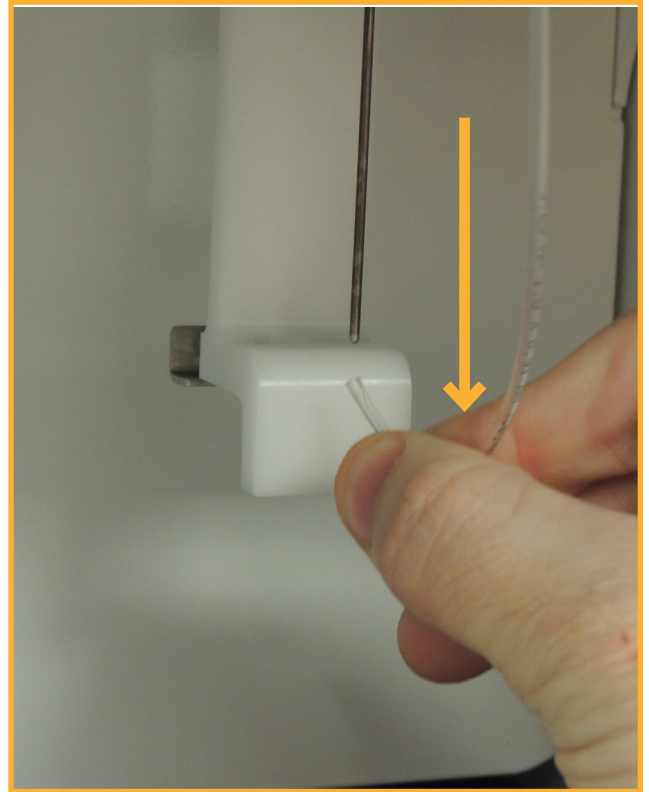


## Detach the Old Tubing

1. In the Pump area, press the pump head release trigger to unlock the pump head.



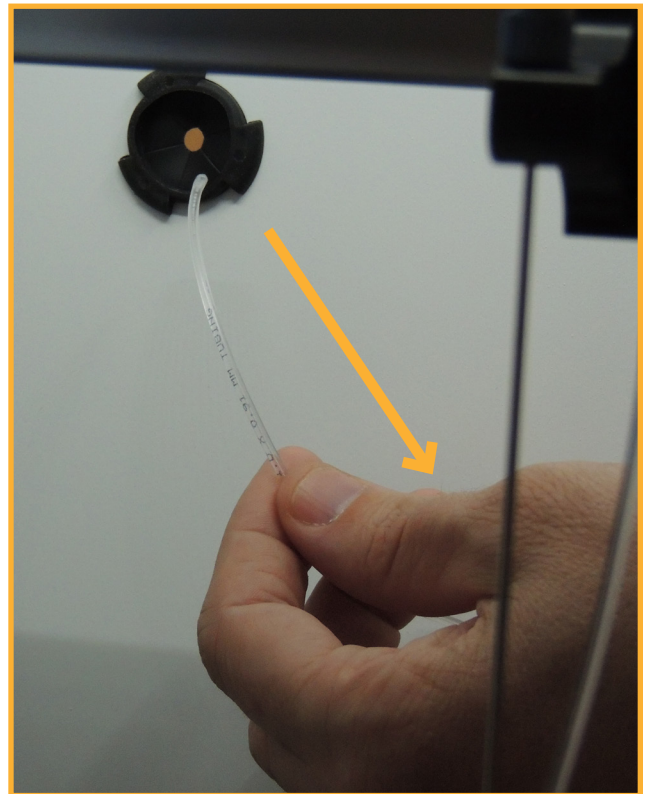
2. In the Detector area, disconnect the tubing from the detector inlet.



3. Draw the loose end of the tubing up out of the Detector area



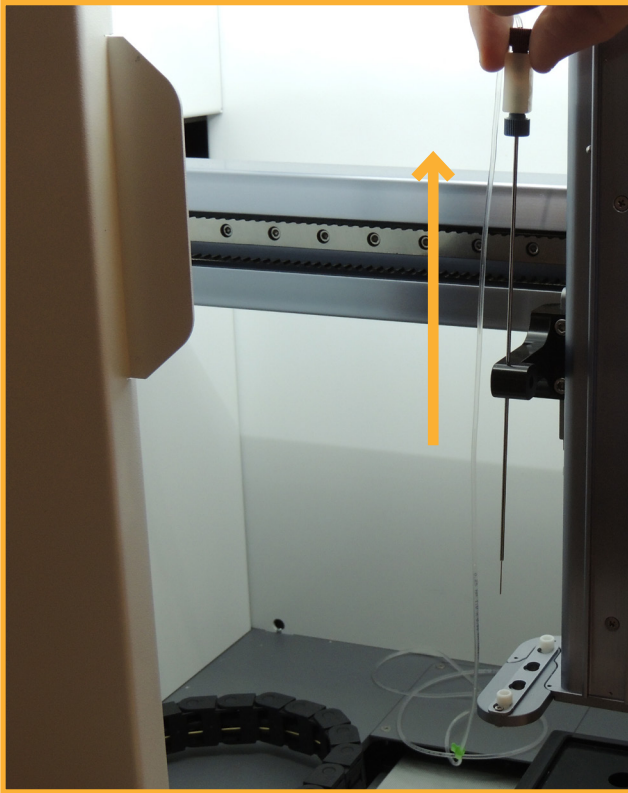
4. Working in the main sampling area, draw the tubing through the sampler area pass-through. Pull firmly for the tubing stop to come through.



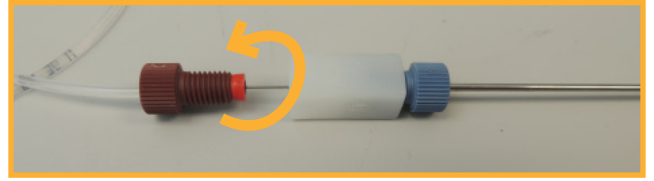


## Replacing the Probe: Gen 1 Probe Assembly

1. Lift the probe and tubing assembly out of the upper probe guide.



2. Unscrew the brown fitting from the probe holder assembly.



3. Pull the inner probe out of the probe holder and discard, using appropriate disposal container.
4. Carefully insert a new inner probe into the probe holder and finger tighten the brown fitting.
5. Replace the whole probe assembly into the probe guide, taking care not to bend the probe tip.

## Replacing the Probe: Gen 2 Probe Assembly

1. Unscrew the black fitting from the probe holder assembly.



2. Remove the old probe and tubing assembly and discard it into appropriate waste container.



3. Carefully insert the probe from the new probe and tubing assembly into the probe holder.

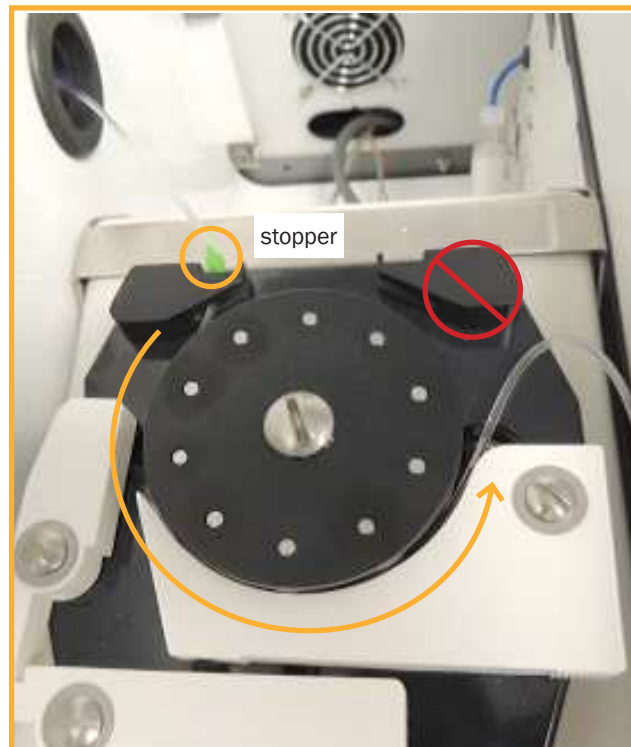


4. Screw the black fitting into the probe holder and finger tighten. Do not use a tool to tighten.



### Attaching the New Tubing

1. Thread the new tubing back through the sampler area passthrough into the pump area.
2. Route the tubing into the pump head as shown. Tubing should be positioned across the middle of the rollers. Holding gentle tension on the tubing, close the pump head locking mechanism. Note that the green stopper is pulled fully against the tubing guide on the left and that the tubing does not need to be routed through the guide on the right.



3. Feed the tubing down through the hole leading into the detector area.



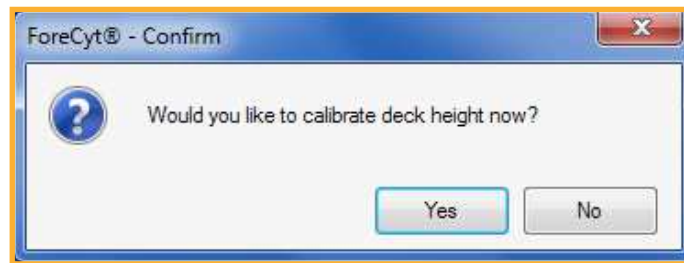
4. Re-attach the tubing to the detector inlet.





## Re-Calibrating Deck Height

Whenever the probe and tubing is changed, it is important to re-calibrate the deck height to account for any possible variation in probe lengths. At the end of the Change Probe and Tubing wizard, a prompt will appear:



Click **Yes** and follow the Deck Height Calibration wizard.

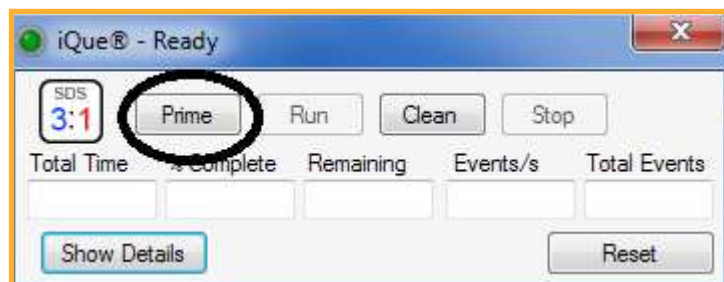
## Cleaning the New Tubing

After replacing the probe and tubing, the new tubing should be cleaned to remove any particulate left over from the manufacturing process. To do this, run a Daily Clean (without the shutdown option).

## Adjusting Pump Head Tension

After replacing the probe and tubing it is important to check sample slug formation and adjust the pump head tension if needed.

1. Ensure that the Buffer station (S1 in Gen 1 systems) is full.
2. Close any open experiment and, in the Controller Console window, click **Prime**:

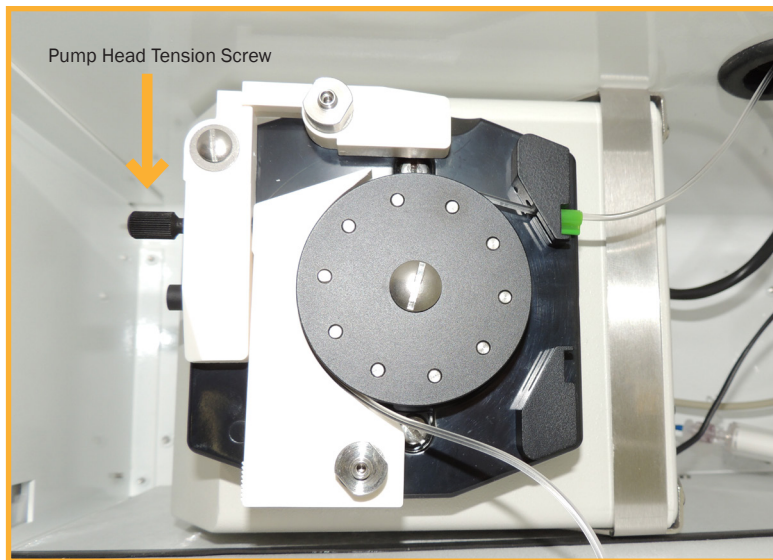


3. Check the formation of the sample slugs by watching them as they pass through the tubing downstream of the peristaltic pump head. The sample slugs should move steadily (some pulsation is acceptable) and should be contiguous (without break or trailing bubbles).



If the sample slugs are not well formed, continue with the following steps to adjust the pump head tension.

4. Locate the pump tension screw on the pump head



5. Slowly loosen the screw by turning in a counterclockwise motion until the sample slugs appear to stop.
6. Then slowly tighten the screw until the movement towards the iQue detector resumes. Note that changes in screw tension can take up to 30 seconds to appear. Make small adjustments and wait to see their effect.
7. Loosen the screw again very slowly until sample just starts to stop.
8. From this inflection point, tighten the screw one half turn (180 degrees clockwise). This should provide enough tension so that the samples move evenly without breaking up and without overly wearing the tubing.
9. If this does not improve the quality of sample slugs, release and reset the pump head locking mechanism, making sure the tubing is correctly seated, and repeat the tensioning procedure.

**WARNING**



The pump tension screw is NOT fully removable. Applying too much force in a counterclockwise direction beyond the intended range of movement may cause it to break.

**NOTE**



Over-tensioning the pump tension screw will cause the tubing to wear prematurely. Set the pump tension screw to have just enough tension for proper sample slug formation.

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# Fluidics Maintenance

## Overview

The iQue detector has several parts that are designed to be regularly replaced in order to keep the system running in optimal condition. These include various filters as well as the peristaltic pump tubes.

## Frequency

At a minimum, fluidics maintenance should be performed every two months (bi-monthly). In a heavy usage situation, this maintenance may need to be performed more frequently. See below for instructions on inspecting parts for wear to determine if fluidics maintenance is overdue.

## Required Materials

Part Number	Description	Works With
90075	iQue®/HTFC® Fluidics Maintenance Kit	Gen 1, Gen 2
90083	iQue®/HTFC® Fluidics Maintenance Kit 10 pack	Gen 1, Gen 2

Components in a Fluidics Maintenance Kit:

- In-Line Sheath Filter
- Peristaltic Pump Tubing
- Sheath Bottle Filter
- Decontamination/Cleaning Bottle Filters

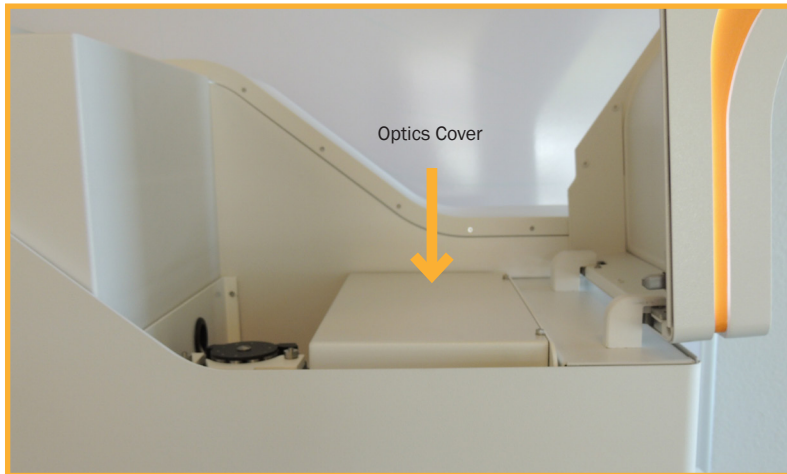


Contents of the Fluidics Maintenance Kit

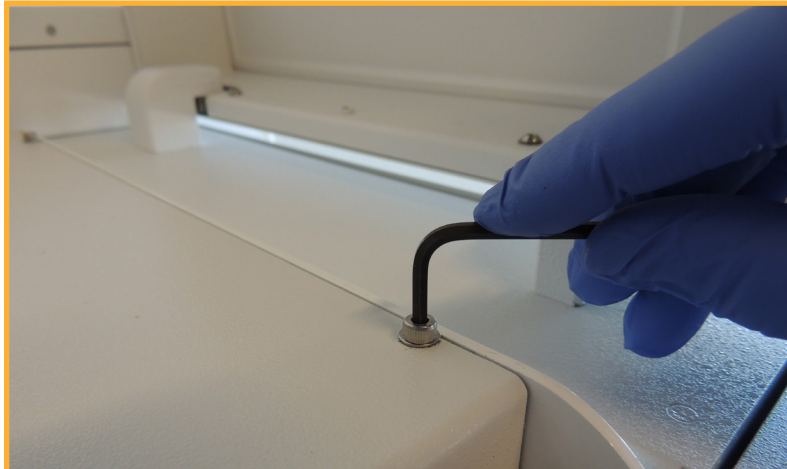
## Removing the Optics Cover

Prior to performing the first two steps of the fluidics maintenance procedure, the optics cover must be removed from the detector. It is not necessary to shut down the detector before doing this as the optics cover contains an interlock that automatically keeps the system from running when the cover is off.

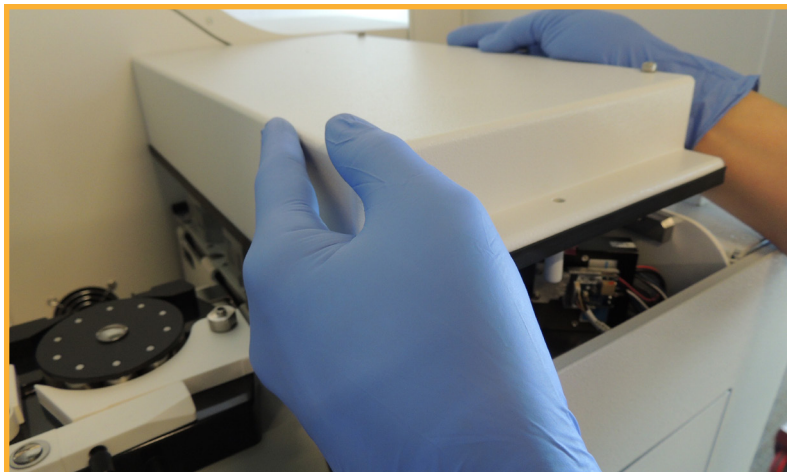
1. Open the lid of the iQue to expose the detector area. Locate the optics cover.



2. Using the 3mm hex key that came with the system, loosen the two captive screws that secure the optics cover.



3. Gently lift the optics cover off the detector area.





## Changing the In-Line Sheath Filter

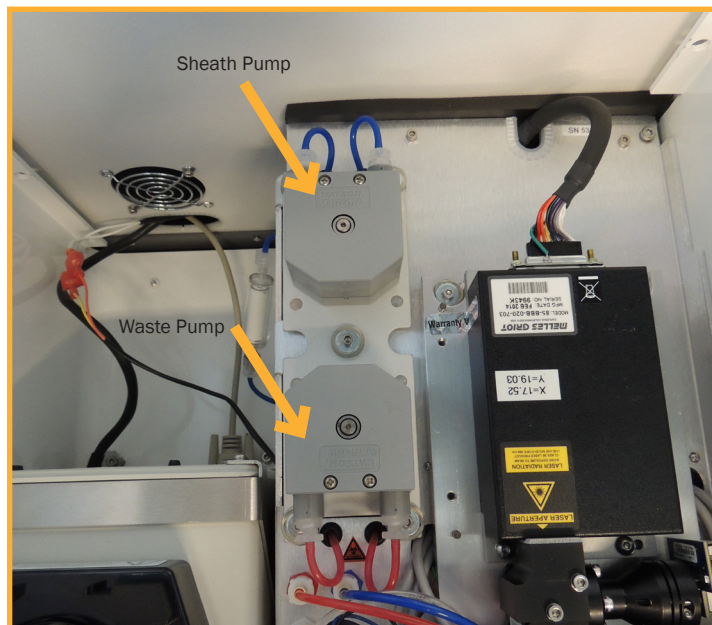
1. Locate the in-line sheath filter on the left of the detector.



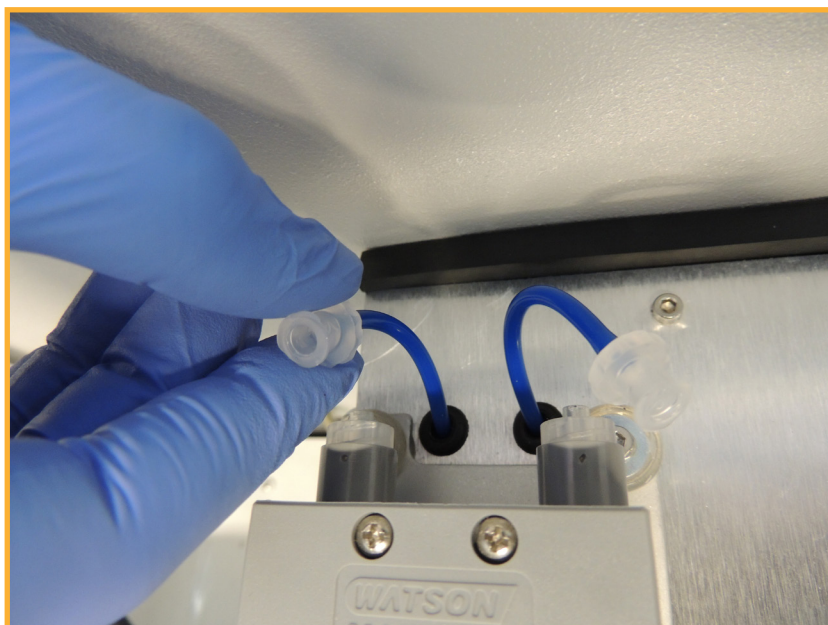
2. Untighten the Luer lock fittings. Remove and dispose of the old filter.
3. Remove the new in-line sheath filter from its package and write the current date on the filter with a permanent marker.
4. Install the new filter. The Luer locks are male and female, so it cannot be installed backwards.

## Changing the Detector Peristaltic Tubes

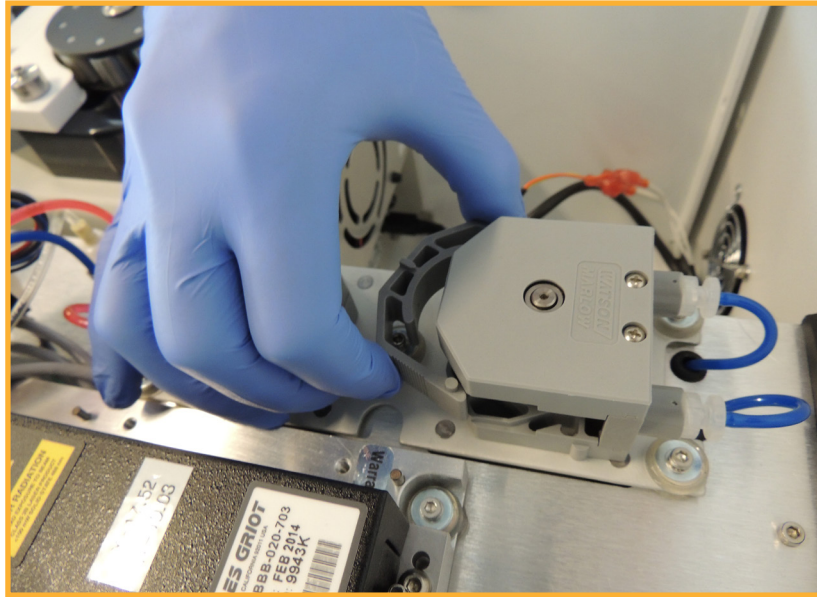
1. Locate the sheath and waste pumps on the top of the detector.



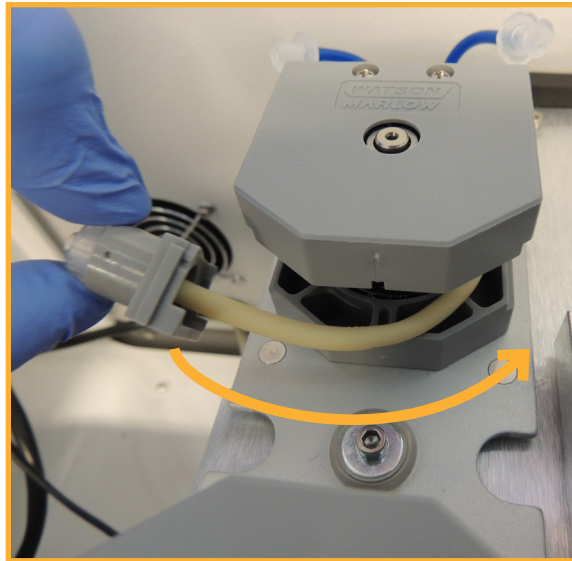
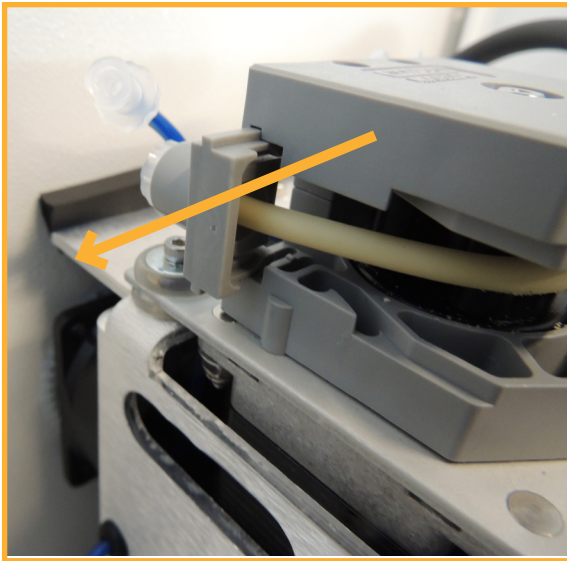
2. Disconnect the Luer locks to the tubing on the outside of the peristaltic pumps by unscrewing them. The blue tubing is connected to the sheath pump and the red tubing to the waste pump.



3. Squeeze the grip marks on the pump element retainer clip and slide the clip to remove it.



4. Slide the Luer lock fittings laterally out of the grooves holding them to the pump head and remove the peristaltic tubing assembly. Discard the old tubing assembly.



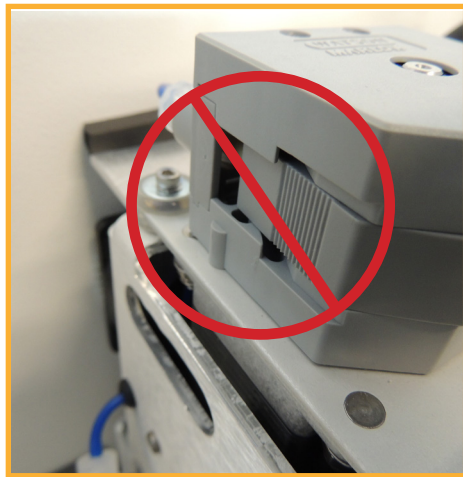
5. Remove the new peristaltic tube assembly from its package and write the current date on the side with a permanent marker.
6. Slide one end of the peristaltic tube assembly into the slot on the pump head. Route the tubing around and secure the other side.
7. Re-attach the Luer lock fittings taking extra care to make sure that the connected tubing is not kinked or pinched.
8. Replace the pump element retainer clip taking extra care that it is installed properly and not impinging on the tubing underneath.



**NOTE**

Improperly installed peristaltic tube assemblies are a common cause of repairs. Avoid the common mistakes shown below.





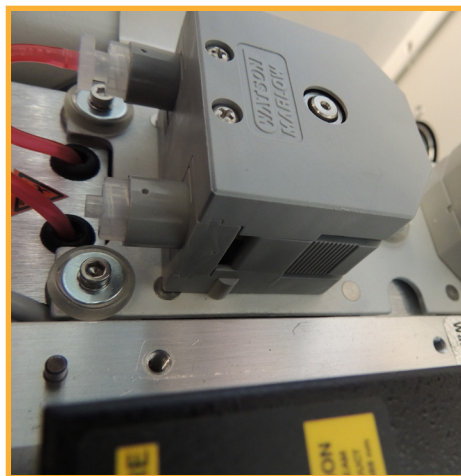
**Impinging**



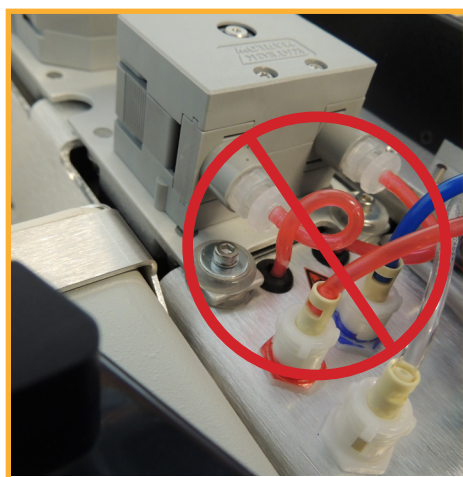
**Correct**



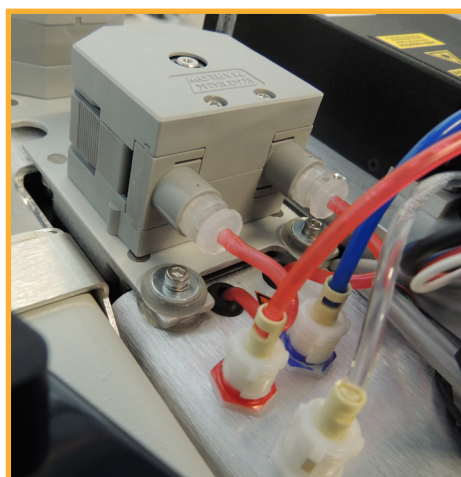
**Cross Slotted**



**Correct**



**Kinked**



**Correct**

*Examples of improperly and properly installed peristaltic tube assemblies*

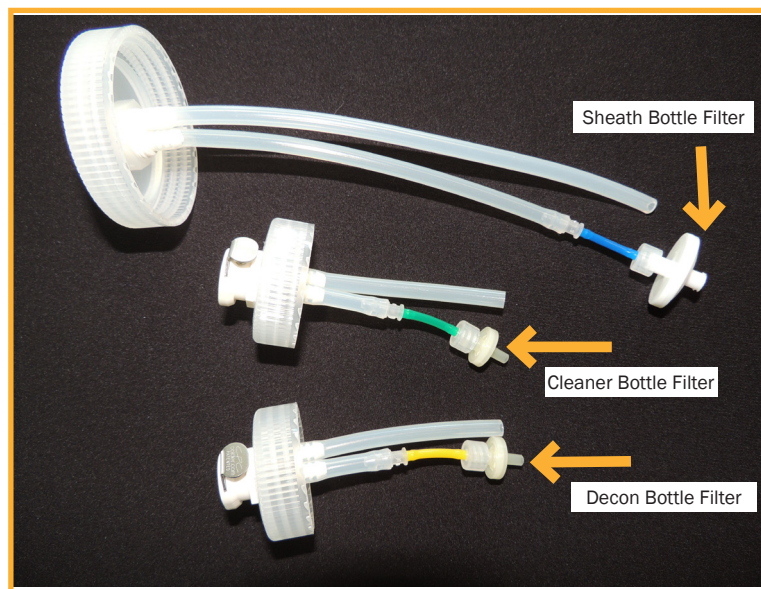
## Changing the Bottle Filters

1. Remove the Sheath, Decontamination Fluid and Cleaning Fluid bottles from the bottle drawer.
2. Carefully remove the lid from each bottle.
3. Unscrew the three filters and discard them in the same way as a biological sample.
4. Locate the new sheath filter. This is the large disk filter. Install the new sheath filter with the printing side down.



**NOTE** Take care to install the sheath filter with the proper flow direction: inlet (printed side) down.

5. Locate the Cleaner and Decon bottle filters and install them. These are the small disk filters.



6. Replace the bottle lids, top of the fluids, and reinstall the bottles in the drawer.

## Wetting the System

Fluidics maintenance can introduce air into the system. After performing fluidics maintenance it is important to thoroughly wet the system using the [Wetting Procedure](#).

## Signs that Fluidics Maintenance may be Required

Any of the following signs or symptoms may indicate that fluidics maintenance is overdue.

- In-line sheath filter has visible accumulation of sediment or sludge.
- System takes a long time (over 30 seconds) to begin acquiring data after pressing **Start**.
- Daily QC shows increasing CVs on all fluorescence channels.
- Water Test shows consistently high event counts.

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# Wetting Procedure

## Overview

The Wetting Procedure is used when starting up an iQue for the first time or when starting an instrument that has not been used for a while. It is also used following fluidics maintenance or in other situations when air has been introduced into the system.

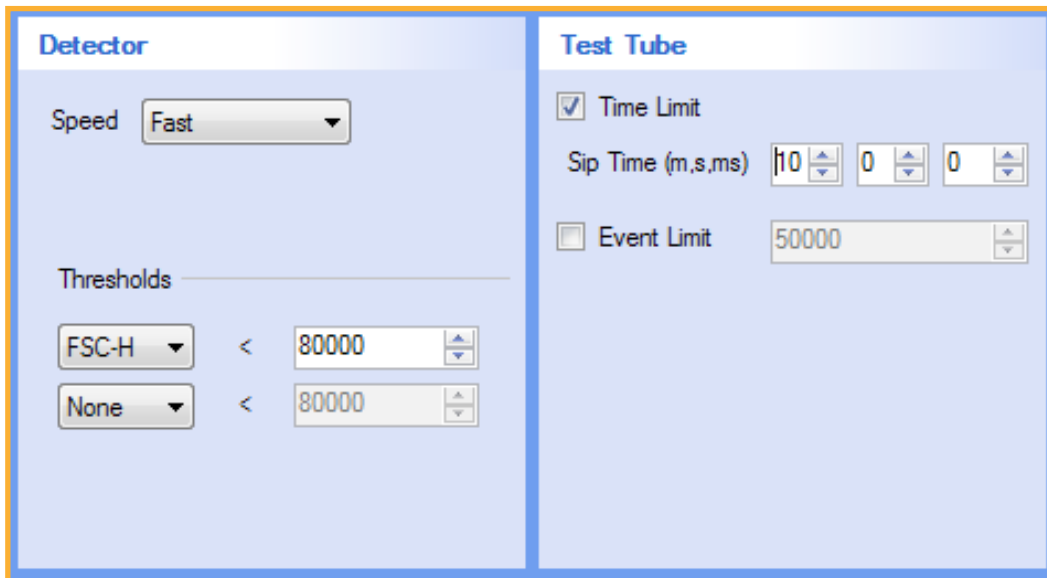


### NOTE

If this procedure is being used with an instrument that has been out of use for a while and the in-line sheath filter has dried out, the in-line sheath filter will need to be replaced before wetting.

## Running Ethanol on Fast for 10 minutes

1. Place a 5 mL tube containing 3 mL of 70% reagent grade ethanol on the detector inlet.
2. Create a new Test Tube experiment.
3. On the Protocol tab, set the IntelliCyt Cytometer Speed to **Fast**
4. Set The Test Tube Time Limit to **10 minutes**.
5. Run the experiment.



The screenshot displays the software interface for configuring a Test Tube experiment. It is divided into two main sections: 'Detector' and 'Test Tube'.

**Detector Section:**

- Speed:** A dropdown menu is set to 'Fast'.
- Thresholds:** Two rows are visible. The first row has 'FSC-H' selected in a dropdown, followed by a less-than sign (<) and a numeric input field set to '80000'. The second row has 'None' selected in a dropdown, followed by a less-than sign (<) and a numeric input field set to '80000'.

**Test Tube Section:**

- Time Limit:** A checkbox is checked, and the 'Sip Time (m,s,ms)' is set to '10' minutes, '0' seconds, and '0' milliseconds.
- Event Limit:** A checkbox is unchecked, and the 'Event Limit' is set to '50000'.

## Running Water on Fast for 10 minutes

1. Place a 5 mL tube containing distilled water on the detector inlet.
2. Add another test tube to the experiment and set the Test Tube Time Limit to 10 minutes.
3. Run the experiment.

## Backflush

1. Click the **Clean** button.
2. In the Clean wizard, choose Clean Type = **Backflush**.
3. Click **Next** and then **Start** to run the Backflush.

## Unclog

1. Click the **Clean** button.
2. In the Clean wizard, choose Clean Type = **Unclog**.
3. Click **Next** and then **Start** to run the Unclog.



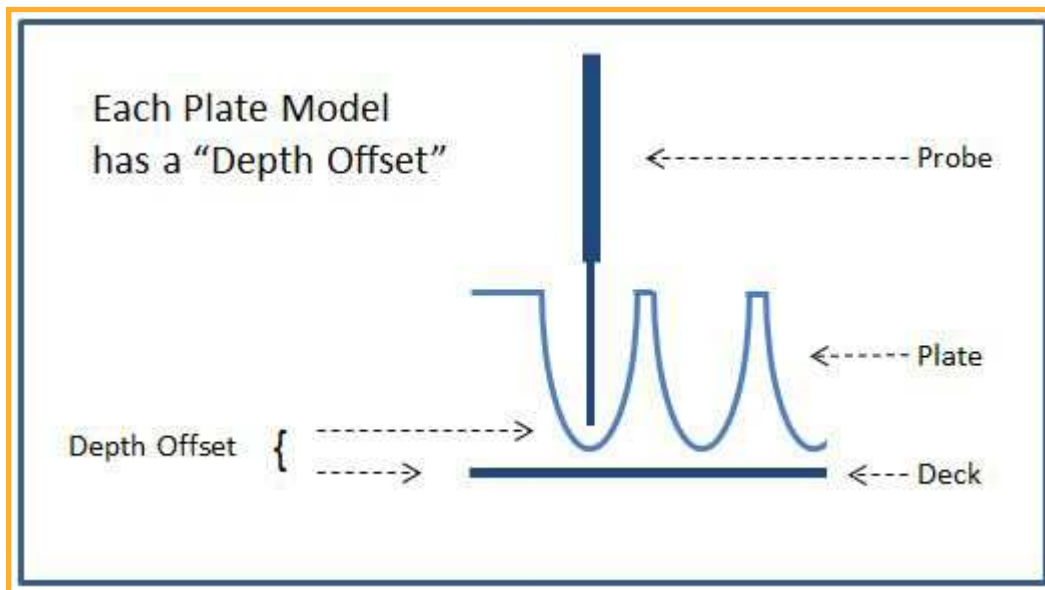
# Managing Plate Models

## Overview

For different experiments, researchers use different kinds of plates with different shapes, depths and characteristics: v-bottom vs. round-bottom vs. flat bottom; shallow vs. deep; circular vs. square. This article discusses how to set up and maintain a “library” of plate models that can be used when defining an experiment protocol.

## Understanding Plate Model Calibration

The plate model controls the sampling depth. Each plate model has a *depth offset* which determines the probe position during sampling. This offset is a measure of how far above the deck the probe should go. Sampling Height is calculated as follows: Deck Height + Depth Offset = Sampling Height.



With the Gen 1 probe assembly, a single depth offset is calibrated for each plate model. With the Gen 2 probe, the Plate Model is mapped generating a series of Depth Offsets which provides the more precise sampling required for 1536 well formats and also which accounts for possible variations in the alignment of the sample arm and the shaker deck.

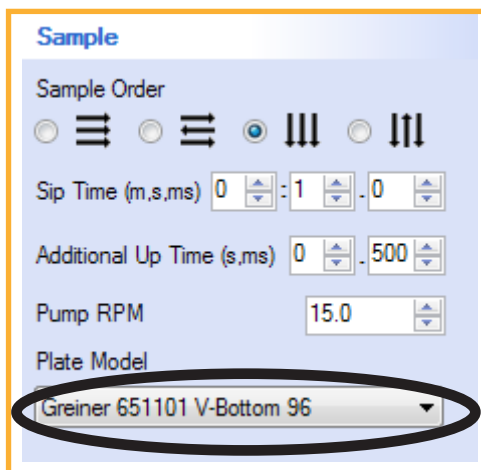
In either case, proper plate model calibration is required for accurate sampling.



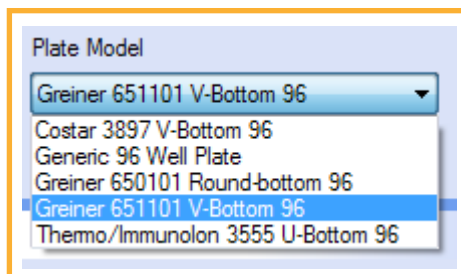
**NOTE** Proper plate model calibration is essential. If the probe hits the bottom of the well during sampling, it is possible that no sample will be aspirated, probe tip clogging, or that probe damage could occur.

## Plate Model Selection is Part of Protocol

Each plate on each experiment has a set of Protocol settings that control how the plate is run. On the Sample section, there is a field for Plate Model. This is where the plate model is selected:



By default, the system comes with only two plate models listed: the Generic 96 Well Plate and Generic 384 Well Plate models. Additional plate models may be added to this list for each format.

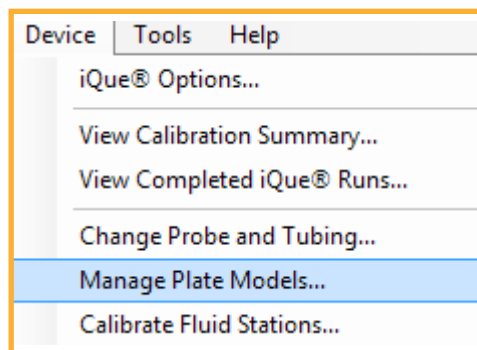


Note that in a multi-instrument installation, each plate model is only set up and calibrated once. Plate models are global and are shared among multiple instruments.

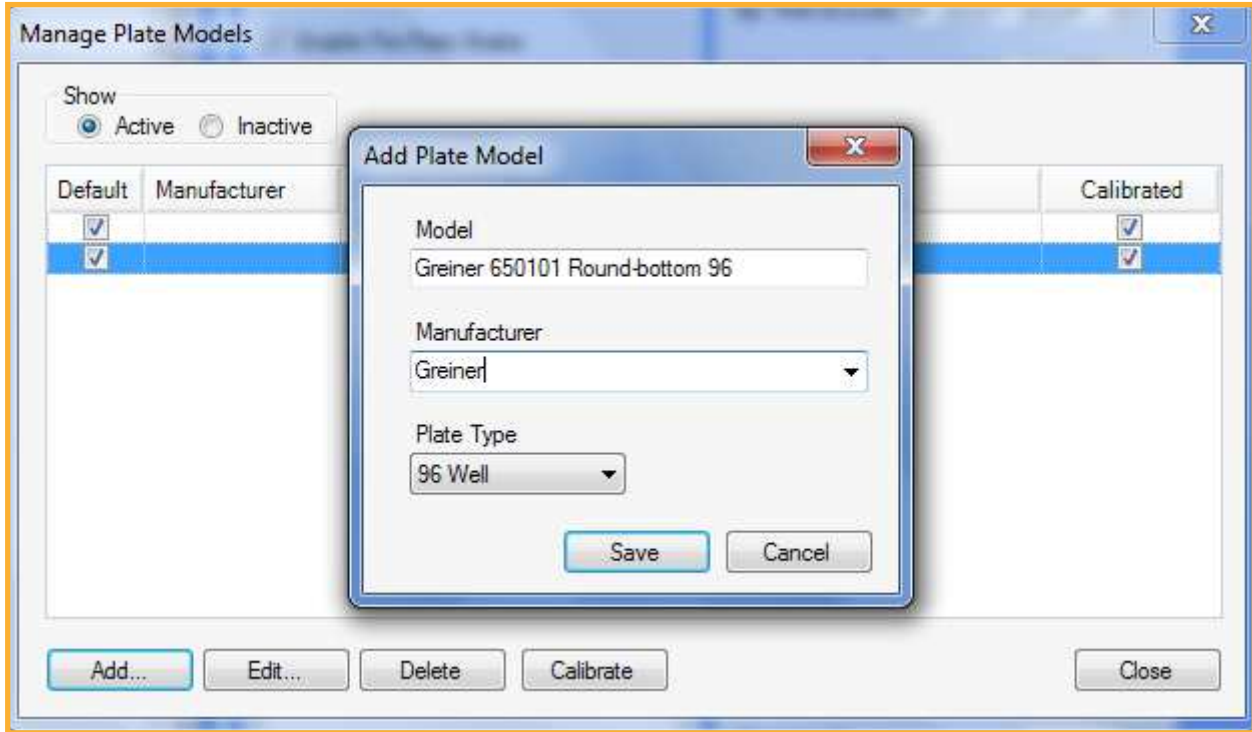
The next sections detail adding, editing, calibrating and managing a library of plate models.

## Adding a New Plate Model

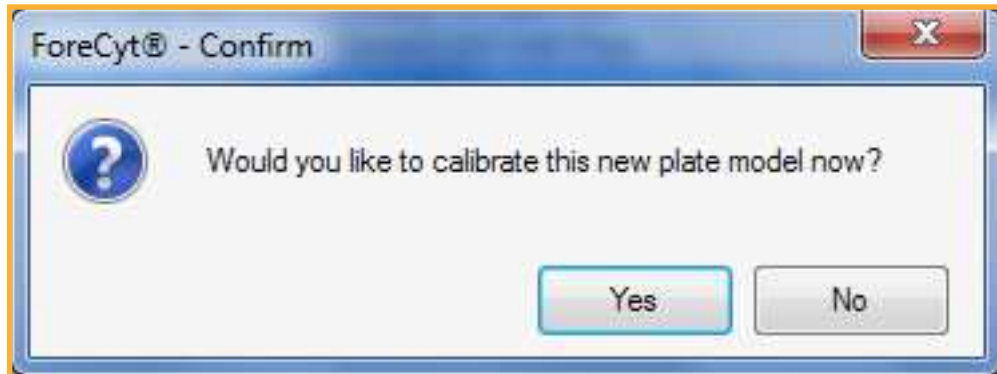
1. Click **Device > Manage Plate Models**.



- In the Manage Plate Models screen, click **Add** and enter the name, manufacturer and type for the new plate model.

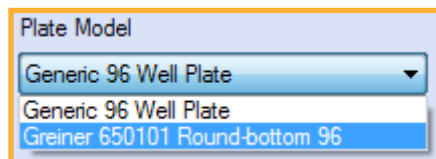


- Click **Save**. A confirmation prompt will appear for calibrating the plate model. Click **Yes**.



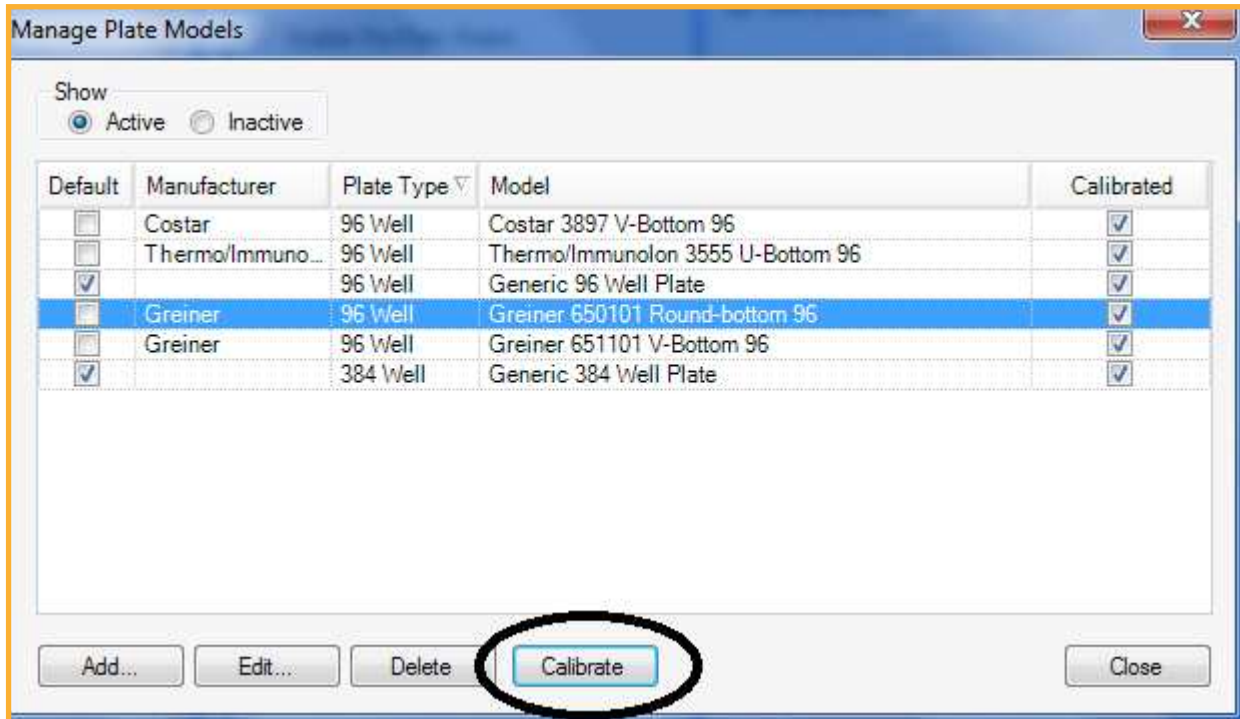
- Follow the instructions in the Plate Model Calibration wizard. Once the plate model is calibrated, it will show up in the Manage Plate Models screen and will be available as a choice in the Experiment Protocol.

Default	Manufacturer	Plate Type ▾	Model	Calibrated
<input checked="" type="checkbox"/>		96 Well	Generic 96 Well Plate	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>		384 Well	Generic 384 Well Plate	<input checked="" type="checkbox"/>
<input type="checkbox"/>	Greiner	96 Well	Greiner 650101 Round-bottom 96	<input checked="" type="checkbox"/>

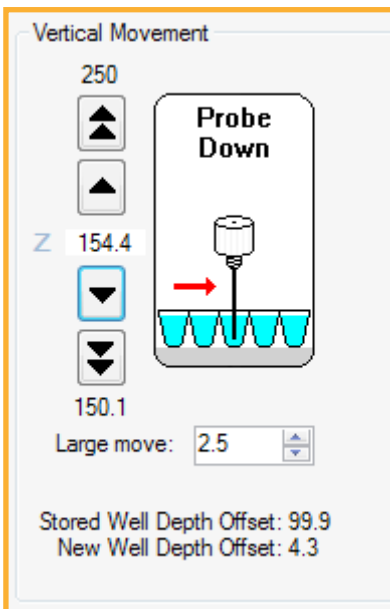


## Calibrating a Plate Model: Gen 1 Probe Assembly

1. Click **Device > Manage Plate Models**.
2. Highlight the Plate Model to be calibrated and click **Calibrate**.

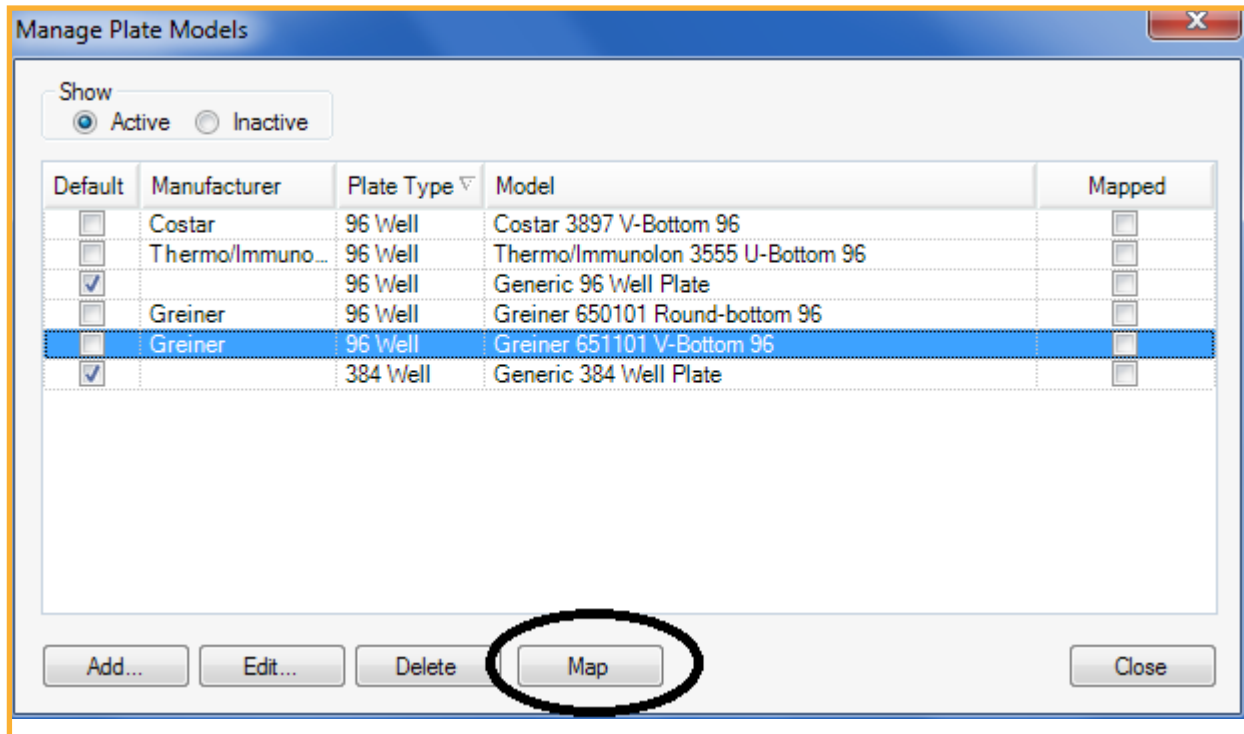


3. This will bring up the Plate Model Calibration wizard. Follow the wizard instructions carefully.
4. Place the plate being calibrated on the deck and click **Next**.
5. Use the Vertical Movement controls to lower the probe to the proper sampling depth. The recommended sampling depth is as close to the bottom of the well as possible without touching.
6. Click **Finish** to save the new well depth offset.



## Calibrating a Plate Model: Gen 2 Probe Assembly

1. Click **Device > Manage Plate Models**.
2. Highlight the Plate Model to calibrate and click **Map**.

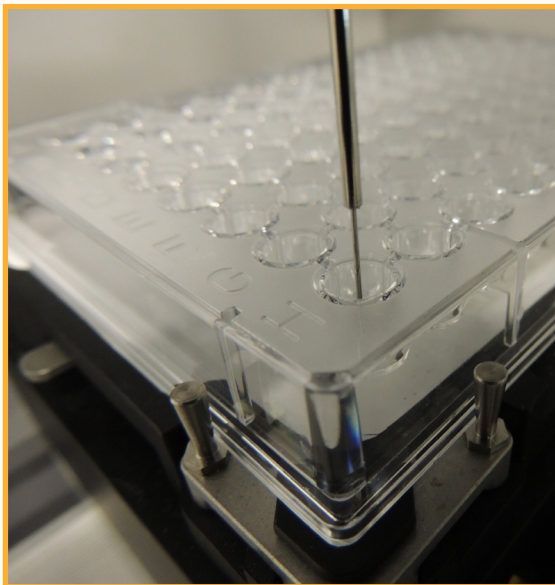
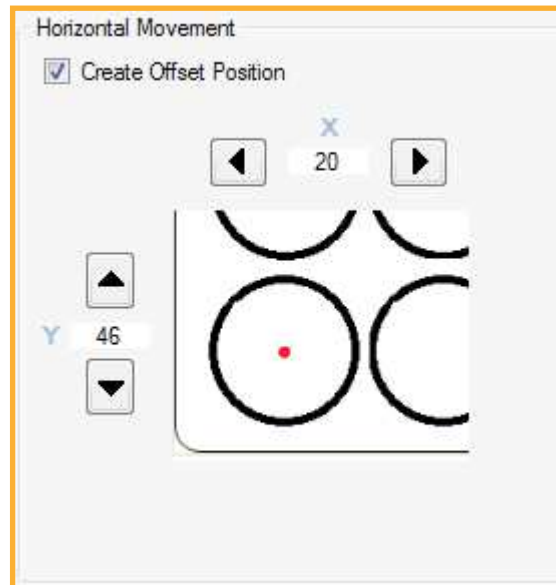


3. This will bring up the Plate Model Mapping wizard. Follow the wizard instructions carefully.
4. Place the plate being calibrated on the deck and click **Next**.
5. The next step in the wizard allows for the configuration of an optional X-Y offset. See below for discussion of X-Y offsets.
6. Click **Next** to begin automatic mapping of the plate. The rail will retract and the contact sensing probe will automatically test the depth of a series of wells on the plate to generate an overall depth profile.
7. Click **Finish** to save the mapped values and exit the wizard.

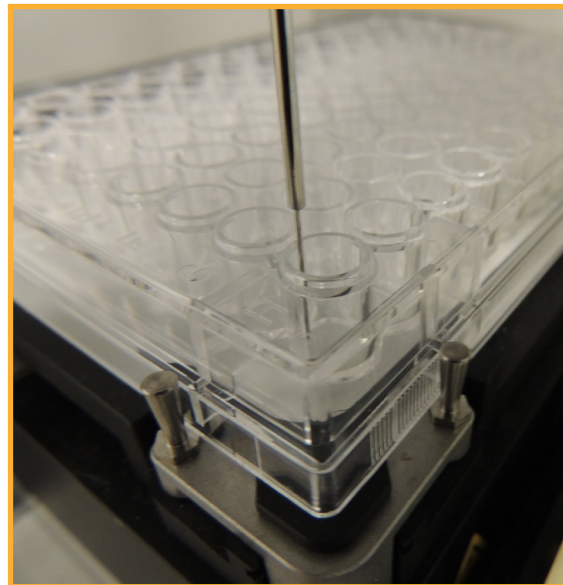
## Optional X-Y Offset

The normal sample position is from the center of the well. When using flat bottom plates, however, the vortexing action of the shaker causes sample to accumulate on the edges of the well so it becomes necessary to sample from the side or corner of the well. The optional X-Y offset on a plate model makes this possible.

To calibrate an X-Y offset for a flat-bottom plate, check the **Create Offset Position** check box within the Horizontal Movement controls at the appropriate place in the Plate Model Mapping or Calibration wizard. Then use the Horizontal Movement controls to set the required offset.



*No XY-Offset: probe samples from center of well (96 Well v-bottom plate shown)*



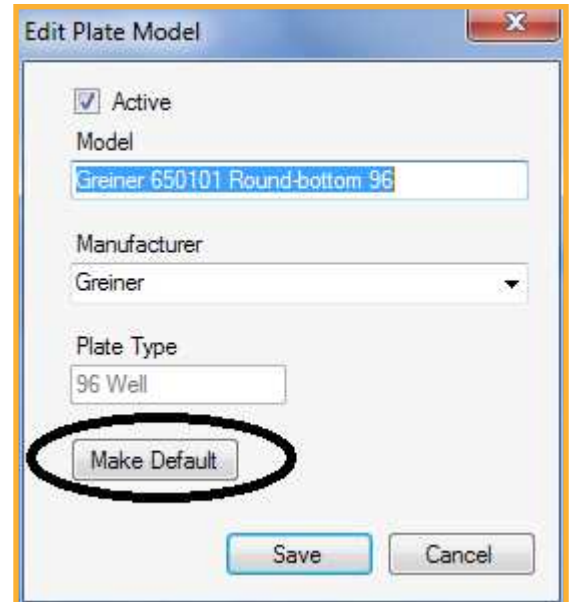
*XY-Offset: probe samples from edge of the well (96 well flat bottom plate shown)*



## Setting the Default Plate Model for each Plate Type

When creating a blank experiment (i.e., not from a template) a default plate model for the format (96 or 384 well) is chosen. To customize which plate model is used as the default follow the steps below.

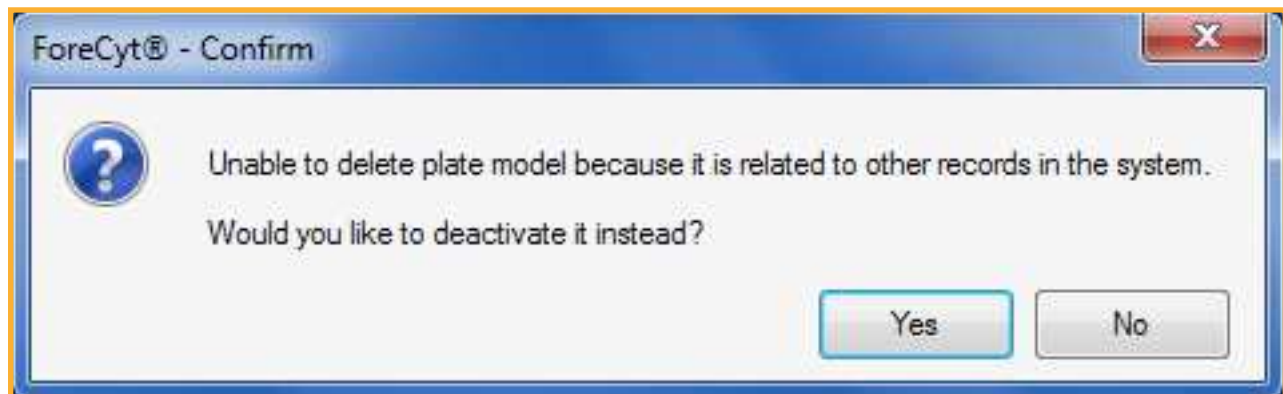
1. Click **Device > Manage Plate Models**.
2. Highlight the desired default plate model and click **Edit**.
3. In the Edit Plate Model window, click **Make Default**.
4. A confirmation prompt will appear. Click **Yes**.
5. Click **Save** in the Edit Plate Model screen. The Plate Model is now the default and will be used on new Experiments unless they are created from a template that specifies a different Plate Model.



## Deleting a Plate Model

To delete a plate model that should no longer appear in the lookup list in the Sample Settings, simply locate the Plate Model in the Manage Plate Models screen and click **Delete**.

If the plate model has been used on one or more experiments, it cannot be deleted, but it can be deactivated. In this case, choose to deactivate it instead.



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# Clog Prevention and Management

## Overview

It is important to take steps to avoid clogs. This article talks about the main reasons for clogging and steps to take for clog avoidance. It also describes how to recognize when a clog may be developing and how to take steps to troubleshoot a clog.

## Clog Prevention

iQue best practices are designed to minimize clogs. These best practices include:

- Proper system startup and shutdown.
- Proper daily, weekly and monthly cleaning and maintenance.
- Proper sample preparation using the recommended sample concentrations.
- The use of cleaning cycles between plates and within a plate as needed.

## Recommended Sample Concentrations

For rapid sampling using common suspension cell lines, IntelliCyt recommends a final cell concentration of between  $1-3 \times 10^6$  cells/mL. Cell densities that are higher or lower are possible, but should be tested and optimized.

Certain cell types, particularly some kinds of adherent cells, are prone to aggregation. It may be necessary to include small amounts of cell detachment reagent in the sample buffer to minimize this effect, or to take additional precautions to prevent and monitor aggregation. Adequate re-suspension of the cells using the iQue shaker is one such technique.

## Cleaning Between Plates

By default, every new iQue Experiment has a post-plate clean enabled in the Protocol of every plate:

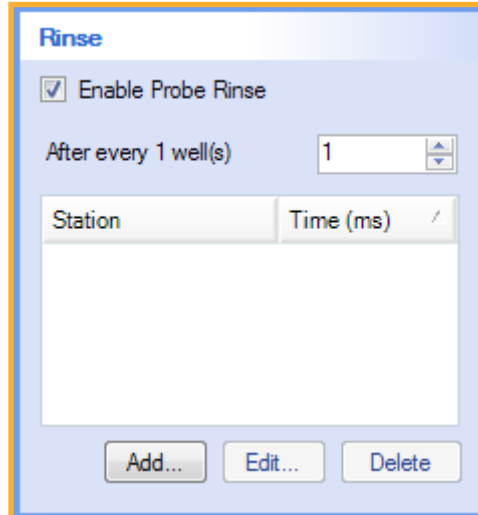
This runs a standard 30 seconds of Decontamination solution followed by 30 seconds of Cleaning Solution and 60 seconds of water at the end of the plate. If the samples are prone to clogging, extend the times of this post-plate clean. IntelliCyt does NOT recommend disabling the post-plate clean.

Station	Time (s)
Decon	30
Clean	30
Water	60

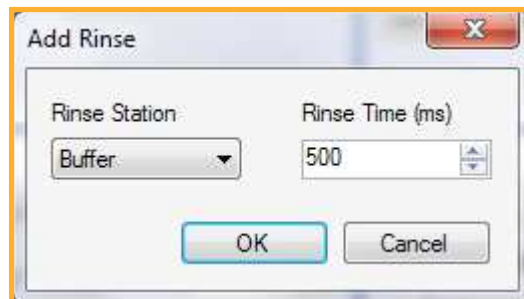
## Rinsing During a Plate

It is possible to configure a rinse at regular intervals while sampling wells on a plate. To configure a rinse, follow these steps:

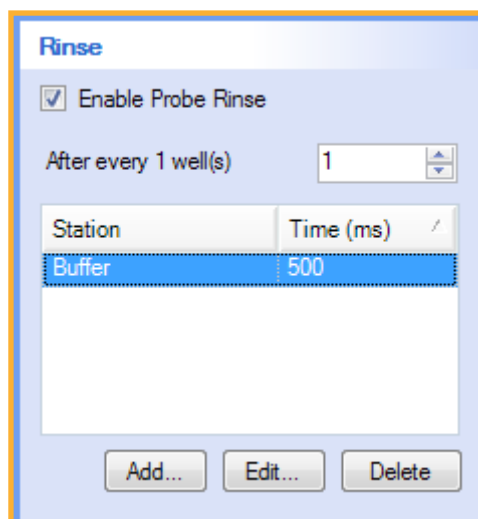
1. In the Rinse section of the Protocol tab, check the box to **Enable Probe Rinse** and set the amount of wells after which a rinse should occur. For example, to run a rinse after every well, choose **After every 1 well(s)**.



2. Click the **Add** button. In the Add Rinse dialog, make sure the Rinse Station is set to **Buffer** and adjust the Rinse Time (in milliseconds) as desired.



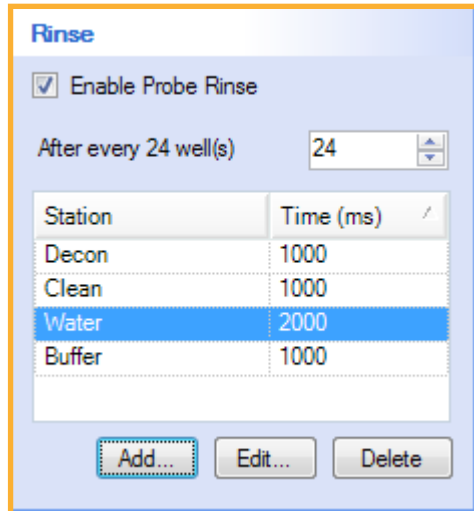
3. Clicking **OK** will close the dialog. The Rinse Station and Time(ms) will now be displayed in the table.



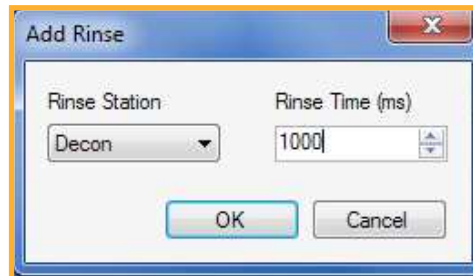
## Cleaning During a Plate

It is possible to configure a “mini-clean” to happen at various intervals within a plate. To configure a clean within the plate, follow these steps:

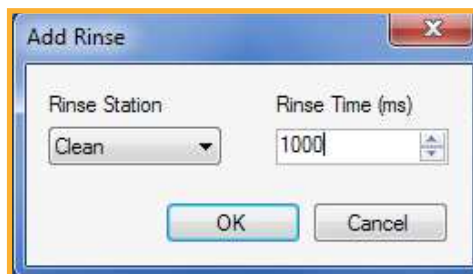
1. In the Rinse section on the Protocol tab, check the box to **Enable Probe Rinse** and set the amount of wells after which a clean should occur. For example, to run a clean at the end of each row on a 384 well plate, choose after every 24 wells.



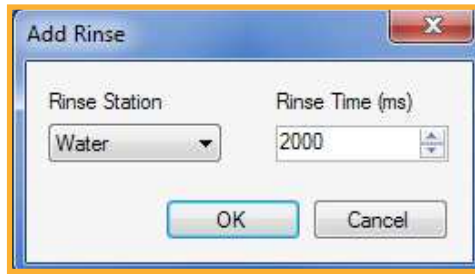
2. Click the **Add** button. In the Add Rinse dialog, set Rinse Station to **Decon** and Rinse Time (ms) to **1000**.



3. Repeat step 2 selecting **Clean** for **1000** ms (1 second):

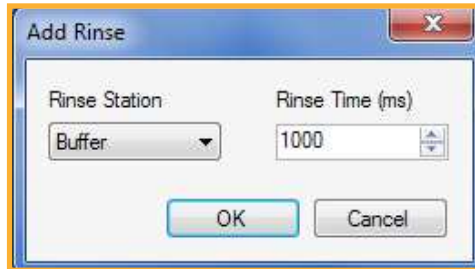


4. Repeat again selecting **Water** for **2000** ms (2 seconds):



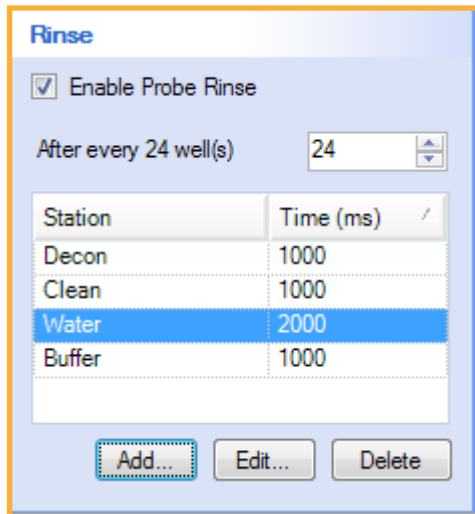
Dialog box titled "Add Rinse" with fields for "Rinse Station" (Water) and "Rinse Time (ms)" (2000). Buttons for "OK" and "Cancel" are present.

5. Repeat one last time selecting **Buffer** for 1000 ms (1 second):



Dialog box titled "Add Rinse" with fields for "Rinse Station" (Buffer) and "Rinse Time (ms)" (1000). Buttons for "OK" and "Cancel" are present.

This will create a standard Decon-Clean-Rinse mini-clean. The purpose of the final rinse in Buffer is to re-prime the line and make sure that proper pH and osmality are maintained prior to running the next sample.



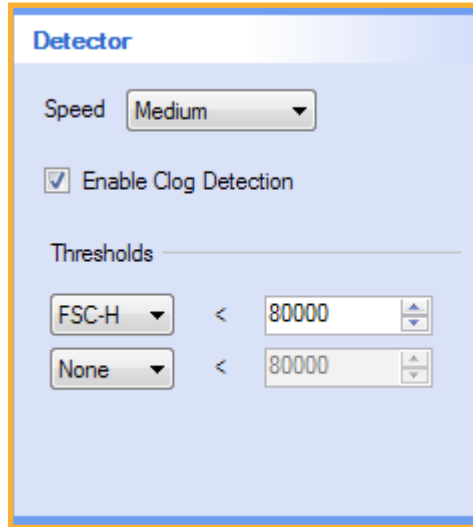
Configuration window titled "Rinse" with a checked "Enable Probe Rinse" checkbox and a spinner for "After every 24 well(s)" set to 24. A table lists the rinse sequence:

Station	Time (ms)
Decon	1000
Clean	1000
Water	2000
Buffer	1000

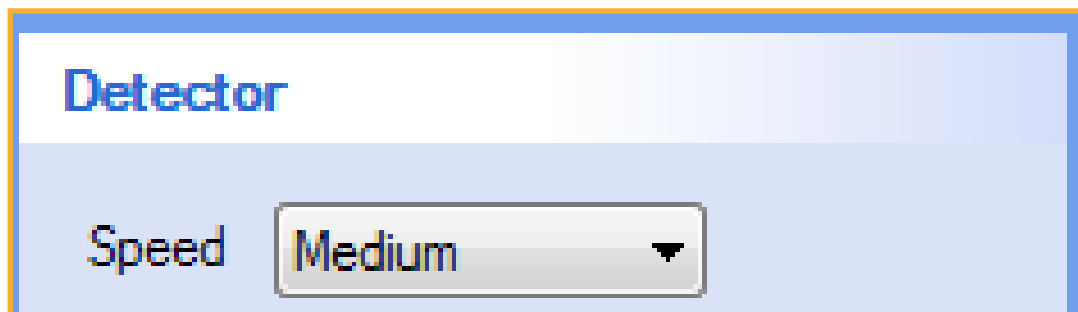
Buttons for "Add...", "Edit...", and "Delete" are present at the bottom.

## Using the Clog Detection Feature

By default, every new iQue Experiment has the Clog Detection feature enabled in the Protocol of every plate:



This is a software feature that works by monitoring the event rate during data acquisition. If the event rate fall below a certain threshold for longer than expected, taking into account shakes and cleans which naturally lower the event rate, then the clog detector triggers a warning:



Click **Yes** to stop the run immediately. Click **No** to dismiss the dialog and allow data acquisition to continue.

At this time, data acquisition does NOT stop unless the user chooses to end the run. If the clog detector warning is going off frequently where there is no clog (false positives) the experiment protocol should be modified and the Enable Clog Detection option unchecked.

## Signs and Symptoms of Clogging

In addition to the Clog Detection feature, there are several signs and symptoms of incipient clogging or other cleanliness issues.

- System appears to be operating normally but no events are being recorded.
- Events are being recorded but, when data is analyzed, blocks of wells appear to be missing.
- After clicking **Run**, the system takes well over a minute to begin acquiring data.
- At the end of a run, or after clicking **Stop**, the system takes well over a minute to fully stop.
- When running a sample from a tube, the sample is being consumed at an unusually fast rate and the sheath pump is running abnormally fast.

## Troubleshooting a Clog

The first step in troubleshooting a clog is to contact IntelliCyt tech support so that we may help assess the seriousness and nature of the problem and recommend remediation steps. These may include performing standard cleaning procedures such as the *Backflush*, *Unclog*, *Quick Clean* and *Long Clean* procedures.



# Special Topics

## Introduction

The following articles provide detailed instructions for handling special situations that may arise with an iQue. It is strongly recommended that iQue users contact IntelliCyt Tech Support prior to performing any of these procedures.

## Safety

Always wear appropriate safety attire, such as protective gloves and eye wear when performing operations where contact with chemical or biological agents is possible.

## Articles

- [\*First Time Startup Checklist\*](#)
- [\*Long Term Shutdown Checklist\*](#)
- [\*Connecting iQue Power and Data Cables\*](#)
- [\*Moving an iQue\*](#)
- [\*Re-Calibrating Deck Positions\*](#)



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# First-Time Startup Checklist

## Overview

This is a quick-start guide for first time startup. It should be used the very first time an iQue is installed and started and also when re-commissioning an instrument that has been idle or setting an instrument up after it has been moved.

## Referenced Procedures

- [Connecting iQue Power and Data Cables](#)
- [iQue Fluids](#)
- [Wetting Procedure](#)
- [Daily QC](#)
- [Changing the Probe and Tubing](#)
- [Re-Callibrating Deck Positions](#)

## Steps

1. Connect the power and data cables as shown in [Connecting iQue Power and Data Cables](#).
2. Prepare fluids and fill the bottles and troughs as shown in [iQue Fluids](#).
3. Place a tube of filtered, distilled water on the detector inlet.
4. Turn the iQue main power switch on.
5. Launch the ForeCyt software.
6. When prompted to Power on the Detector click **Yes**.
7. Follow the Power on Detector software wizard until the detector is powered on.
8. Run tubes of ethanol and water as shown in [Wetting Procedure](#).
9. Perform a QC test as shown in [Daily QC](#).
10. Connect a new probe and tubing as shown in [Changing the Probe and Tubing](#).
11. Verify all sampler calibrations as shown in [Re-Callibrating Deck Positions](#).
12. Create and run a simple plate-based experiment to verify operation of all components.

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# Long-Term Shutdown Checklist

## Overview

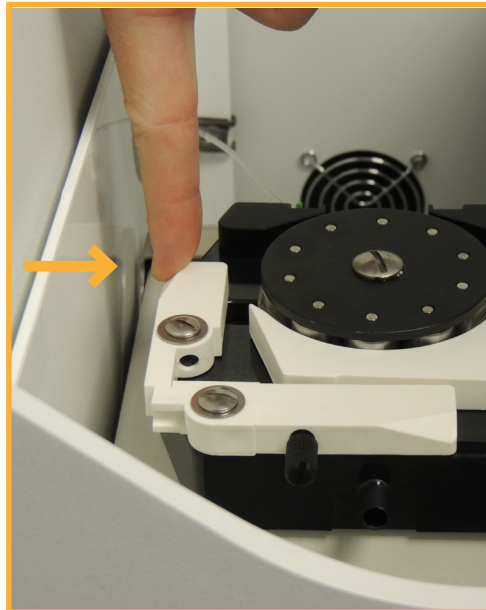
Use this procedure when shutting down the iQue prior to a pause in operation of more than a week.

## Referenced Procedures

- [Standard Cleaning Procedures](#)

## Steps

1. Perform the [Daily Clean](#) as shown in [Standard Cleaning Procedures](#) but DO NOT select the Shutdown Detector option.
2. Perform a [Long Clean](#) as shown in [Standard Cleaning Procedures](#) to fully decontaminate the system.
3. Click **Power Off Detector** in the Controller Console window and follow the wizard instructions. Be sure to use a fresh tube of filtered, distilled water during this step.
4. Empty and clean all of the fluid troughs.
5. Empty the waste bottle.
6. Unclamp the main peristaltic pump head thereby releasing pressure on the peristaltic tubing.



7. Turn off ForeCyt.
8. Turn off the main iQue Power using the power switch on the back.

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# Connecting iQue Power and Data Cables

## Overview

This procedure shows the proper way to connect the iQue power and data cables. It is used as part of first time startup and also any time that the instrument needs to be physically moved to a new location.

## The iQue Uninterruptible Power Supply

Each iQue comes with an Uninterruptible Power Supply (UPS). This UPS is required equipment and the instrument's CE Mark is invalid unless the iQue Screener power connection is connected to the UPS.

The iQue comes with one of two UPS units depending on the power system of the target locale.

110V Locales



APC BR1500G UPS

220V Locales



APC BR900GI

## Connecting iQue Power Cables

1. Plug the UPS into a grounded socket.
2. Check the UPS for warnings or alarms that indicate faulty or inadequate power or a defective UPS batter.
3. Plug the iQue main power into one of the protected and battery backed up sockets on the UPS as shown in the diagram below.
4. Turn the main iQue power on using the switch on the back of the instrument.
5. Plug the iQue workstation into another protected and battery backed up sockets on the UPS (this is not required for safety, but having the computer on battery backup can prevent work interruption in the case of a power outage).

### CAUTION



The iQue's UPS is required equipment. Failure to properly connect the iQue power can result in severe instrument damage and invalidates the instruments CE mark.

## Connecting iQue Data

1. Connect the iQue workstation to the corporate LAN using the primary Network Interface Card (NIC) on the workstation.
2. Connect the iQue to the iQue workstation using a standard Ethernet cable plugged into the secondary Network Interface Card (NIC) on the workstation.

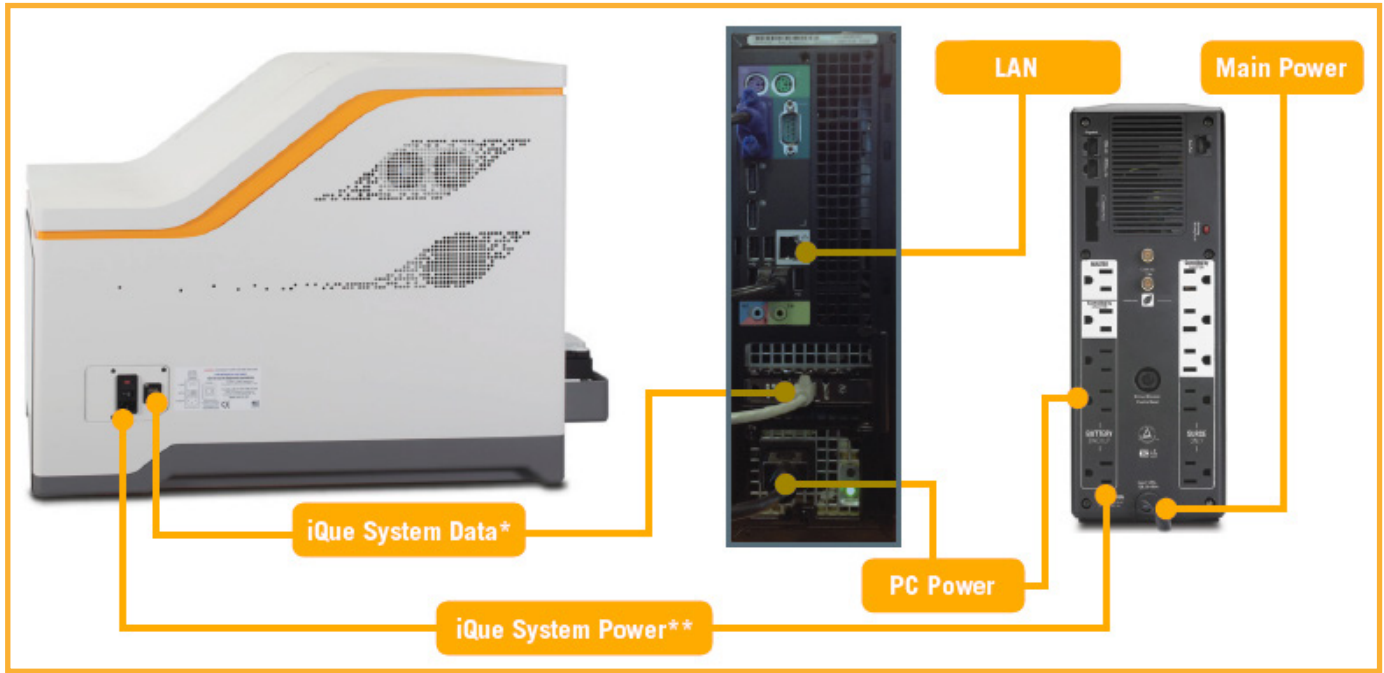
### CAUTION



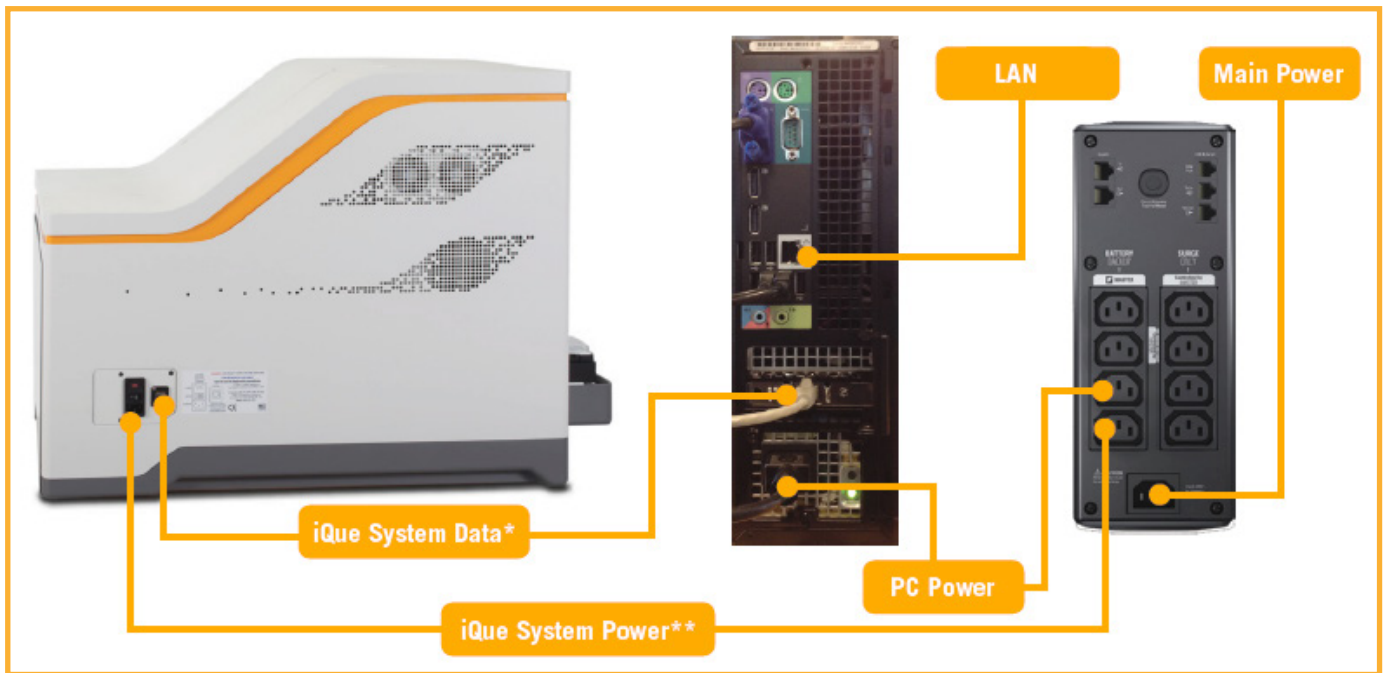
Never connect the iQue directly to the corporate network. The iQue's internal computer runs a DHCP server.



## 110V Power and Data Connection Diagram



## 220V Power and Data Connection Diagram



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# Moving an iQue

## Overview

Described the procedure for safely moving an iQue from one location to another within the same lab or building. This does not include instructions for packaging the iQue for shipment. If the need to package and ship an iQue arises, contact IntelliCyt Tech Support.

## Referenced Procedures

- [Standard Cleaning Procedures](#)
- [Daily Shutdown](#)
- [First Time Startup Checklist](#)

## Shutting Down before a Move

1. Perform a [Long Clean](#) as shown in [Standard Cleaning Procedures](#).
2. Perform [Daily Shutdown](#).
3. Empty all bottles and troughs.
4. Remove all tubes from detector inlet area.
5. Wipe work surfaces down with disinfectant.
6. Turn off ForeCyt and shut down the computer.
7. Unplug power and data cables.

## Moving the Instrument

1. Prepare the destination location. Make sure there is adequate space, ventilation and power.
2. Avoid shocks to prevent disturbing the optics.
3. Use a cart with cushioned tires if possible. Alternatively, place the unit on a thick piece of foam.
4. Be gentle when setting the system down.
5. Lift by gripping the base tray *using the recessed cups* near each of the four feet.
6. Do NOT lift by the bottle drawer or plate rail extension.
7. Do NOT tip the system when moving. Keep the system in its normal orientation.



*iQue lift points*

## After a Move

1. Follow all the steps in the [First Time Startup Checklist](#).
2. Be sure to properly follow the guidelines in [Connecting iQue Power and Data Cables](#).
3. Perform [Daily QC](#) to verify instrument performance.

# Re-Calibrating Deck Positions

## Overview

iQue instruments are calibrated during their initial installation. But situations may arise where various points on the deck need to be recalibrated. This procedure describes how to properly re-calibrate all the deck positions on an iQue.



### NOTE

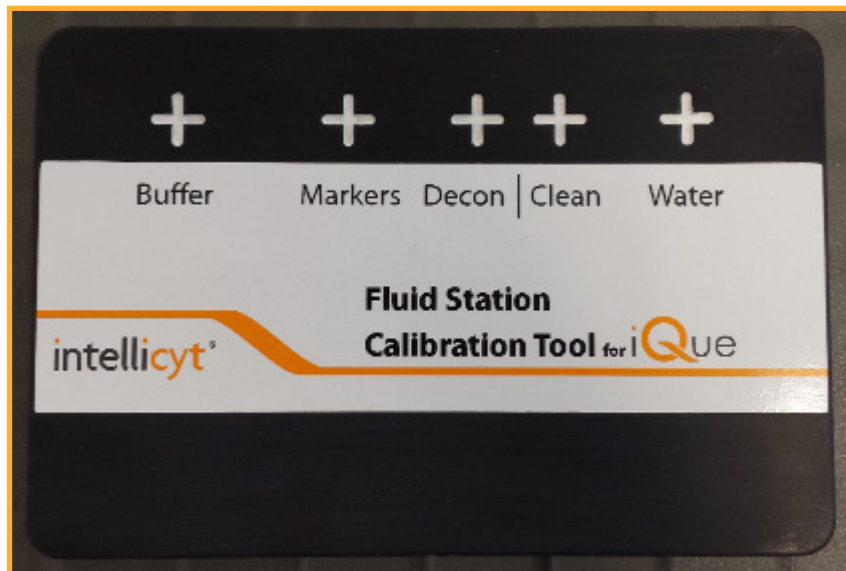
Deck positions should not normally need to be re-calibrated in the field. Before performing deck position calibration, contact IntelliCyt Tech Support for assistance to be sure that the problem is not a result of another issue such as an improperly calibrated Plate Model or an improperly installed probe.

## Required Materials

The iQue Screener comes with a special Calibration Tool which is required for recalibrating deck positions. One side of the tool is for calibrating the well positions used for sampling a plate. The other side is used for calibrating fluid station positions.



Calibration Tool – Plate Calibration Side



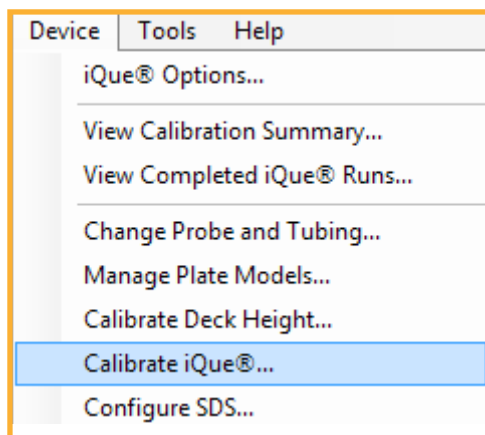
Calibration Tool – Fluid Station Side

## Gen 1 vs. Gen 2 Calibrations

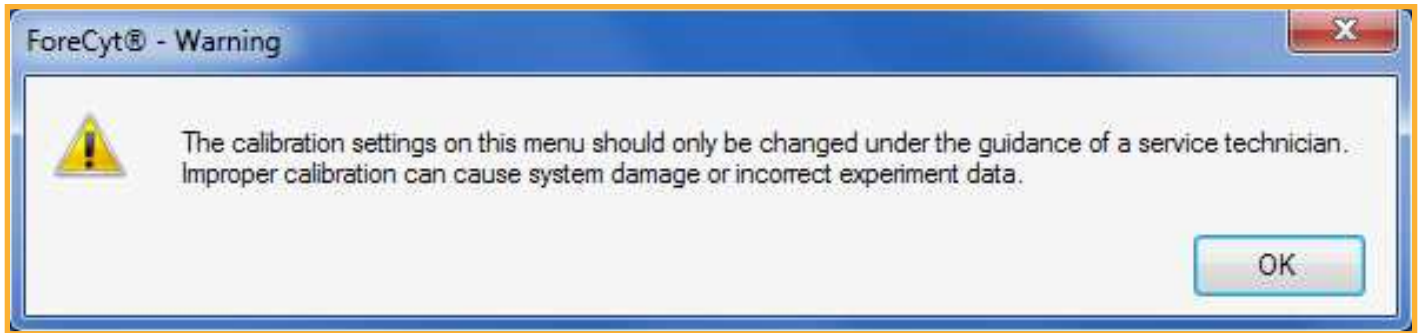
The Gen 2 iQue is equipped with a contact sensing probe which simplifies the calibration process. With a Gen 2 iQue, the contact sensing probe will automatically determine the proper Z position at many of the calibration points. With a Gen 1 iQue, the user must lower the probe manually in order to determine the proper Z position. In all other respects, deck position calibration is the same for Gen 1 and Gen 2 iQue instruments.

## Launching the Calibration Tools

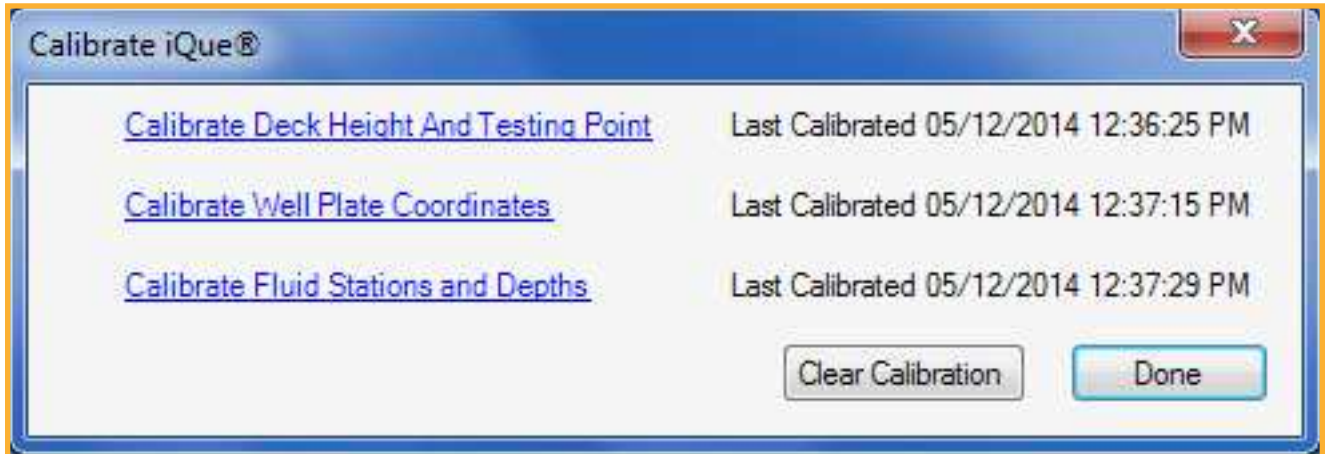
1. Hold down the CTRL key and click the **Device**. This will expose the special Calibrate iQue menu item. Click this menu item.



2. A confirmation prompt will appear warning that this procedure that needs to be done with the assistance of a technician. If this procedure has not been performed previously, contact IntelliCyt Tech Support for assistance. Click **OK**.



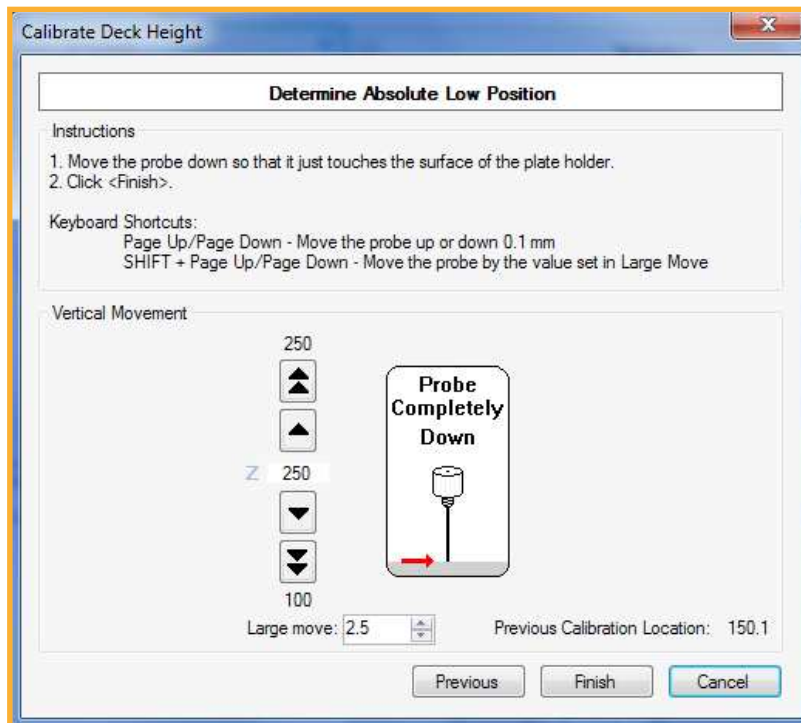
3. This brings up the Calibrate iQue screen which contains links for the various deck locations that can be calibrated.



Note that for a Gen 1 iQue, there is no Testing Point and the first menu item only says Calibrate Deck Height.

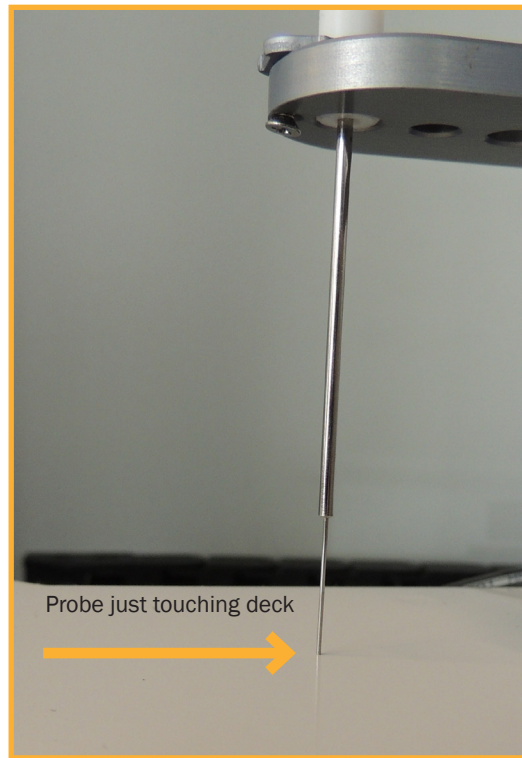
## Deck Height Calibration: Gen 1 Probe

The Calibrate Deck Height wizard begins with this screen:

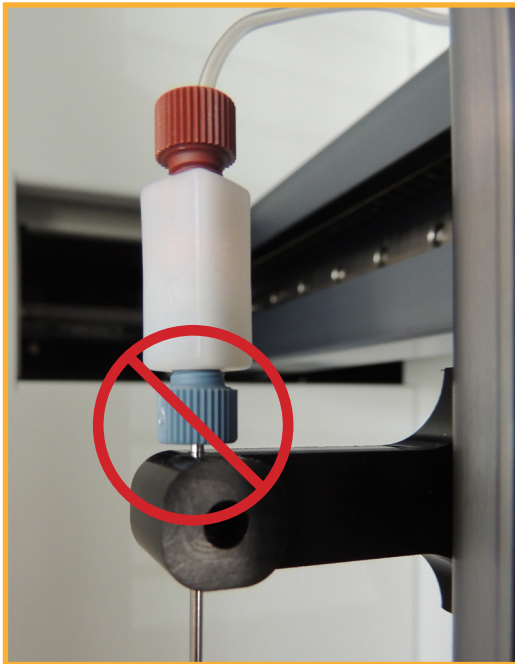




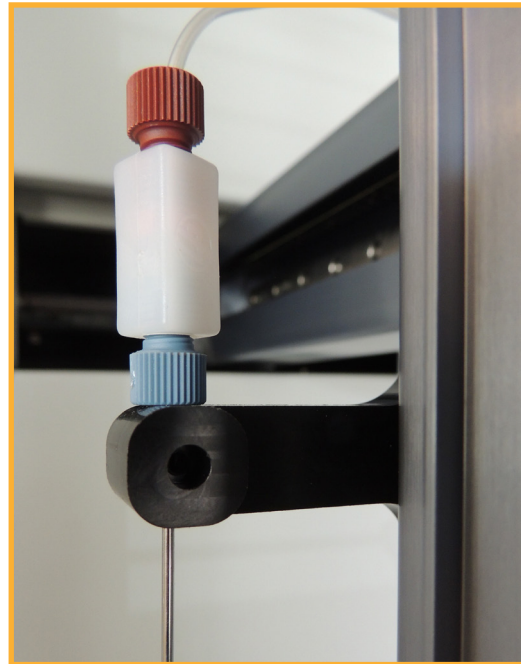
Use the vertical movement controls to lower to probe until it just touches the shaker deck surface as shown:



Be sure that the probe itself is not sliding up in the guide. If the probe has been pushed upward, the deck height calibration value will be incorrect (too low) which will cause the probe to strike the bottom of the plate during sampling.



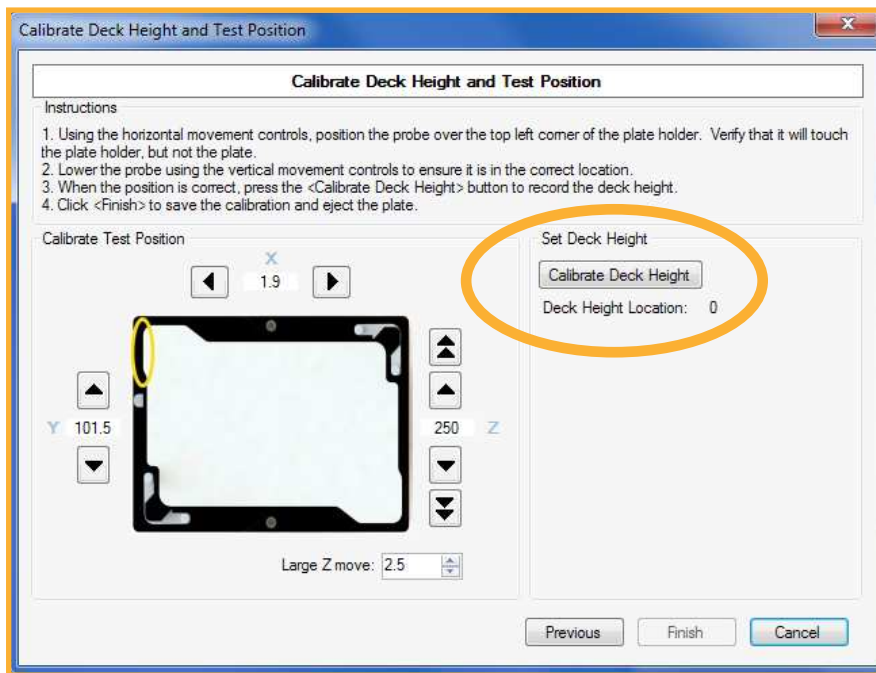
Incorrect: Probe pressed upward



Correct

## Deck Height Calibration: Gen 2 Probe

The Calibrate Deck Height and Test Position wizard begins with this screen:



The Test Position will have already been calibrated. To set the deck height, simply click the **Calibrate Deck Height** button. The contact sensing probe will descent and measure the deck height.

### CAUTION



Proper test point calibration is essential for proper iQue functioning. Do not attempt this procedure without assistance from IntelliCyt Tech Support or proper training.

## Calibrate Well Plate Coordinates

1. Click **Calibrate Well Plate Coordinates** and carefully follow the wizard instructions.
2. Place the custom calibration tool in the plate gripper with the Plate Calibration Tool side up.

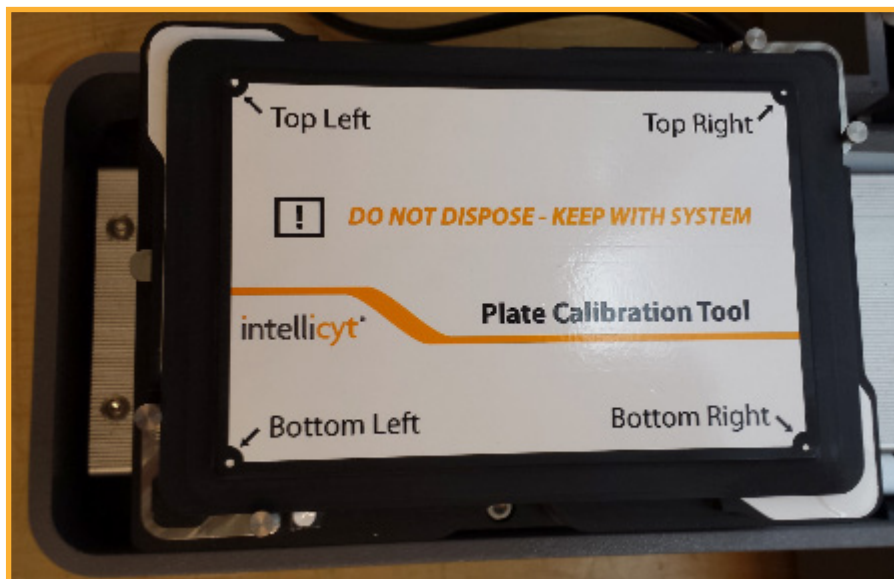
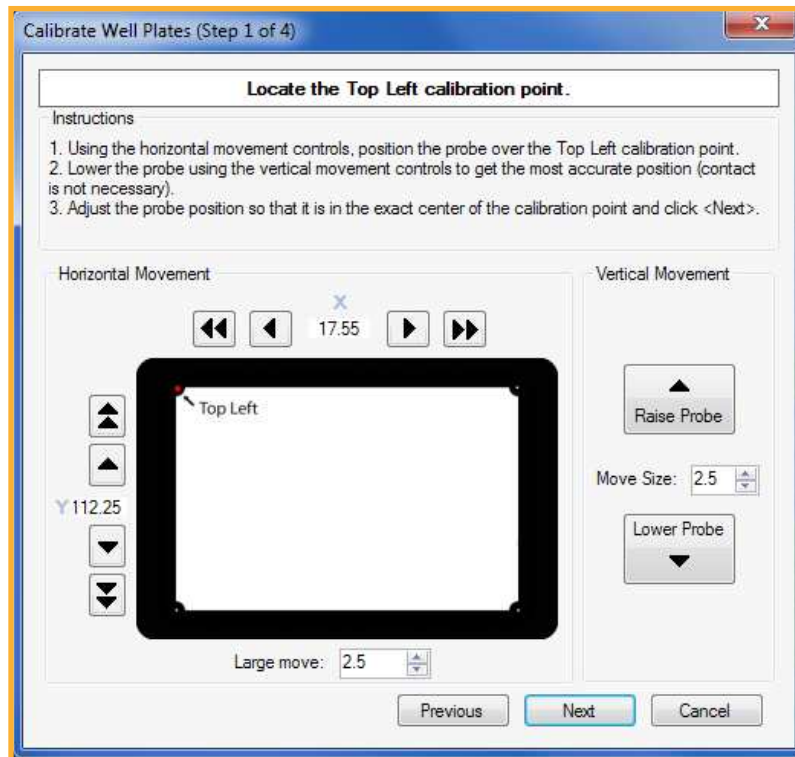


Plate Calibration Tool Loaded in the Grippers

3. Follow the wizard to locate the four calibration points on the deck, Top Left, Top right, Bottom Left and Bottom Right. These points must be defined exactly to ensure proper sampling, particularly in higher density formats.



Note that during Well Plate calibration, depth is not recorded. Sampling depth is a function of deck height and Plate Model. (See Managing Plate Models above).

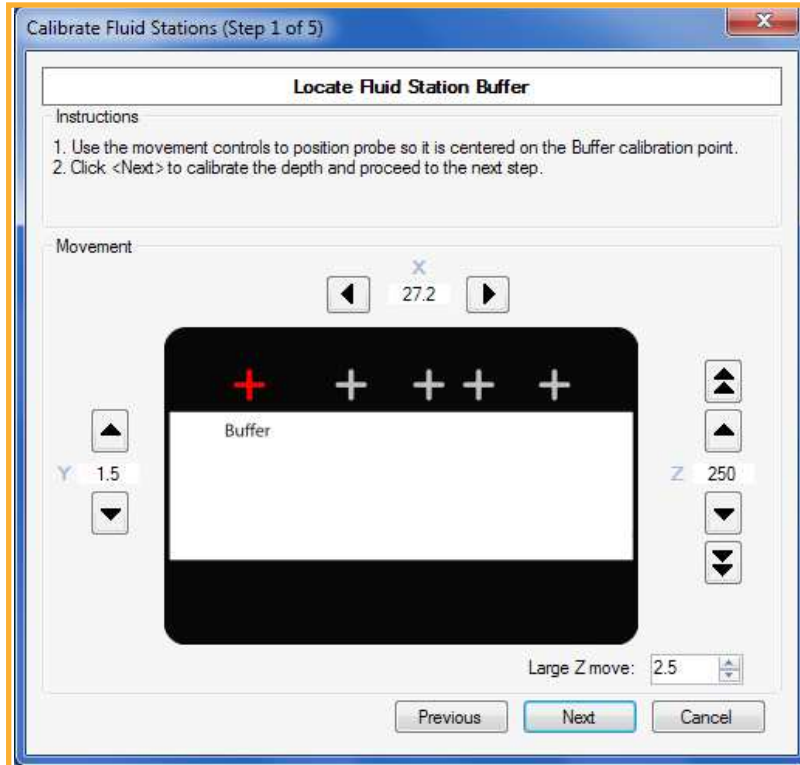
## Calibrate Fluid Stations and Depths

1. Click **Calibrate Fluid Stations and Depths** and carefully follow the calibration wizard.
2. Place the custom calibration tool into the fluid station holder with the Fluid Station Calibration Tool side up.



*Fluid Station Calibration Tool Placed on the Fluid Station Holder*

3. Move the probe to a position over each one of the test points in turn until all the wizard steps are completed.



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## **IntelliCyt Tech Support**

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