Atrandi BIOSCIENCES | Droplet Genomics

ONYX SYSTEM

USER GUIDE

CONTENTS

TERMS AND CONDITIONS

Limited Use Label License: Research Use Only

Notice to Purchaser: The purchase of this product conveys to the purchaser the limited, non-transferable right to use the product for droplet microfluidic research applications for the sole benefit of the purchaser. No right to resell this product or any of its components is conveyed expressly, by implication, or by estoppel. For additional information please contact info@atrandi.com, D. Poškos 55-4, LT-08114, Vilnius, Lithuania.

LIMITED LIABILITY

Atrandi Biosciences does not accept liability for unsafe product use and does not provide any specific quality assurances.

WARRANTY TERMS

Atrandi Biosciences provides 12 calendar months of full warranty, during which the device will be repaired free of charge in the event of failure. The warranty does not include improper use and is voided if the casing is opened. Buyer is responsible for covering shipping expenses for product return. Valid from the date of sale (invoice issue date).

ONYX BY ATRANDI BIOSCIENCES

Droplet microfluidics as a research field focuses on improving the throughput and efficiency of molecular biological analysis workflows. The core step of any droplet microfluidics-based process is the droplet generation step. The Onyx instrument is designed to provide a reliable platform for any droplet microfluidics workflow. The instrument was designed focusing on reliability and flexibility. To ensure robust operation the platform combines industry-standard syringe pumps with high-speed microscopy and image analysis for process control. To provide full research flexibility the instrument is compatible with glass, plastic and PDMS chips. This means that there are no lock-ins for the Onyx users.

ONYX FEATURES

The Onyx is designed to be used as a platform without being optimized for a specific application. The emphasis is therefore placed on optimizing technical characteristics, such as pump accuracy, microscopy and software. Furthermore, the compact format means, that the instrument can be used in different environments including cold rooms, clean rooms and biological safety cabinets. The constant-flow syringe pumps ensure experiment reproducibility and provide a greatly reduced risk of clogging, as compared to pressure pumps. The use of disposable syringes and needles eliminates the risk of cross-contamination between different samples and runs. Overall, the instrument is optimized to adapt to the constantly changing requirements of droplet microfluidics research.

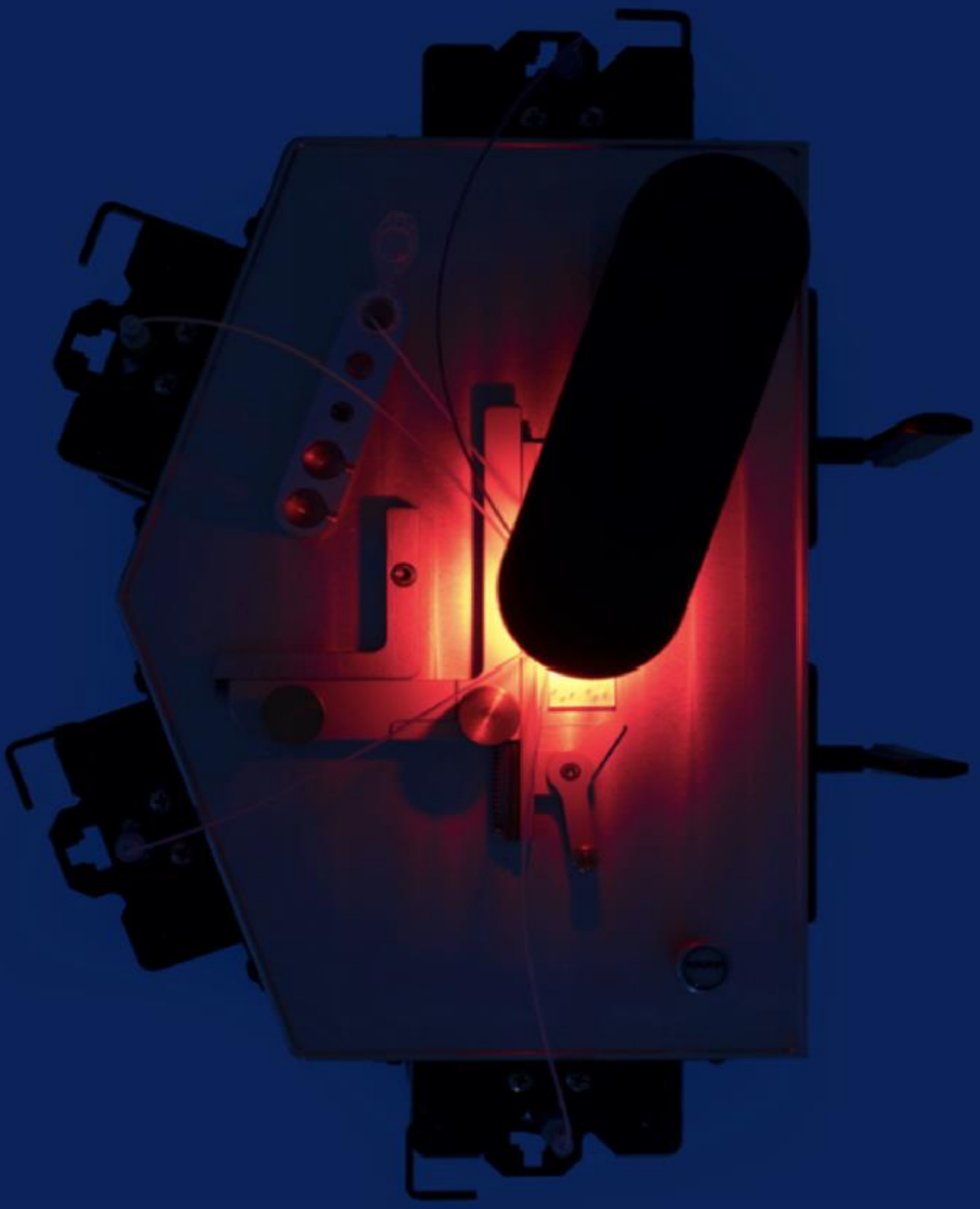
SEMI-PERMEABLE CAPSULES

The Onyx system can be used to generate Semi-Permeable Capsules (SPCs). The hydrogel shell of SPCs works like a size-selective membrane and enables a steady exchange of small molecular weight components while retaining large molecules and cells inside the capsules this way maintaining sample compartmentalization. This makes multi-step workflows, compartmentalized liquid culture, and labeling and selecting molecular and cellular species of interest possible. The hydrogel polymer is highly biocompatible with both eukaryotic and prokaryotic cells. The SPCs are compatible with FACS instruments and can be gently disrupted to recover material or cells.

CUSTOM WORKFLOWS

The Onyx platform capabilities can be further expanded with an additional external pump. This means, that the Onyx platform offers control over five independent flow channels even for the most demanding applications. Furthermore, the platform has a built-in signal generator and is compatible with external high-voltage amplifiers. This makes the Onyx ideal for active droplet manipulation workflows like droplet merging and pico-injection assays. Flexibility is at the core of the instrument meaning that you will always be free to design and tune your custom workflows.

SYSTEM OVERVIEW



ONYX TECHNICAL SPECIFICATIONS

INTEGRATED MICROSCOPY

Optical magnification: *1µm/px, (0.5 – 2 µm/px customizable)*
Illumination source: *0 - 3W LED, 650nm monochromatic*
Illumination type: *brightfield, diaphragm adjustable collinearity*
Microfluidic chip dimensions: *25 x 75mm, 50 x 75mm glass slides*
Focal plane adjustment: *manual, up to 6mm*

SYRINGE PUMPS

Independent pumps: *4*
Maximum flow rates: *25 mL/h (1mL syringe), 26.6mL/min (50mL syringe)*
Minimum flow rates: *1 µL/h (1mL syringe), 0.001 mL/h (0.5µL syringe)*
Flow rate accuracy: *0.5%*
Pump function: *Infuse/Withdraw*
Average force: *11kg*

HIGH-SPEED CAMERA

Resolution: *1440 x 1080*
Minimum exposure time: *25 µs*
Maximum exposure time: *2 ms*
Maximum recording framerate: *3500 frames/s (region size dependent)*
Maximum recording buffer size: *500 frames*
Video playback rate: *1 - 30 frames/s*

ARTIFICIAL INTELLIGENCE SYSTEM

GPU: *512-core NVIDIA Volta, 32 TOPs*
CPU: *8-core NVIDIA Carmel Arm®v8.2 64-bit CPU 8MB L2 + 4MB L3*
Memory: *32 GB 256-bit LPDDR4x 136.5GB/s*
Chip detection rate: *<2.0s*
Droplet analysis rate: *500 events/s*
Droplet size accuracy: *±5µm (for nominal 100 µm size)*

FORCEFIELD GENERATOR

Mode of operation: *continuous*
Signal frequency range: *40-70 kHz (2 channels)*
Signal amplitude range: *100-1000 Vpp*

ONYX COMPONENTS

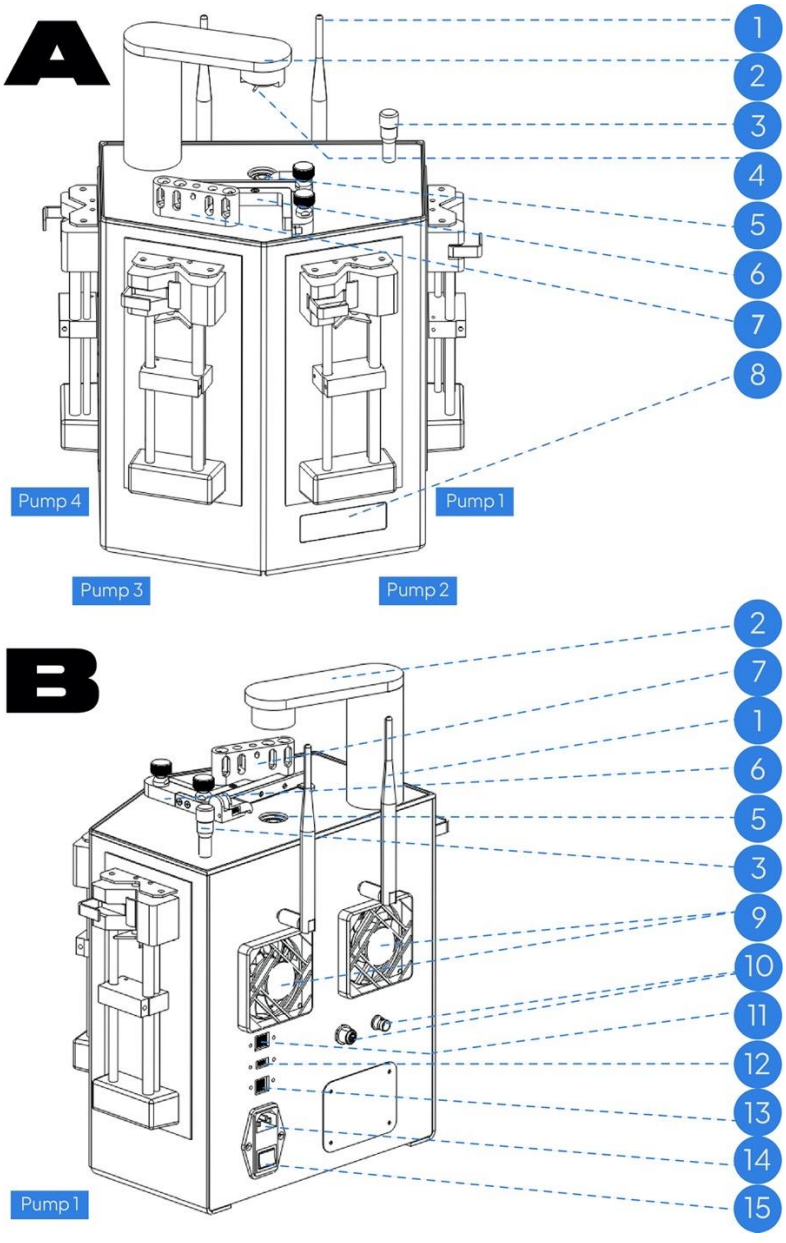


Figure 1. Instrument components

PLATFORM COMPONENTS

1. Wi-Fi antennas
2. Microscope illuminator
3. Focus adjustment dial
4. Contrast adjustment
5. Microscope objective
6. Chip holder
7. Sample tube holder
8. Screen
9. Ventilators
10. Signal generator output
11. External syringe pump connection port
12. USB 3.0 port
13. Ethernet port
14. Power cable connection
15. Power on/off button

To achieve the best microscopy images, adjust the illumination pinhole using the diaphragm (4) and adjust objective focus using dial (3).

SAFETY NOTICE!

Do not lift the device by microscope illuminator (2).

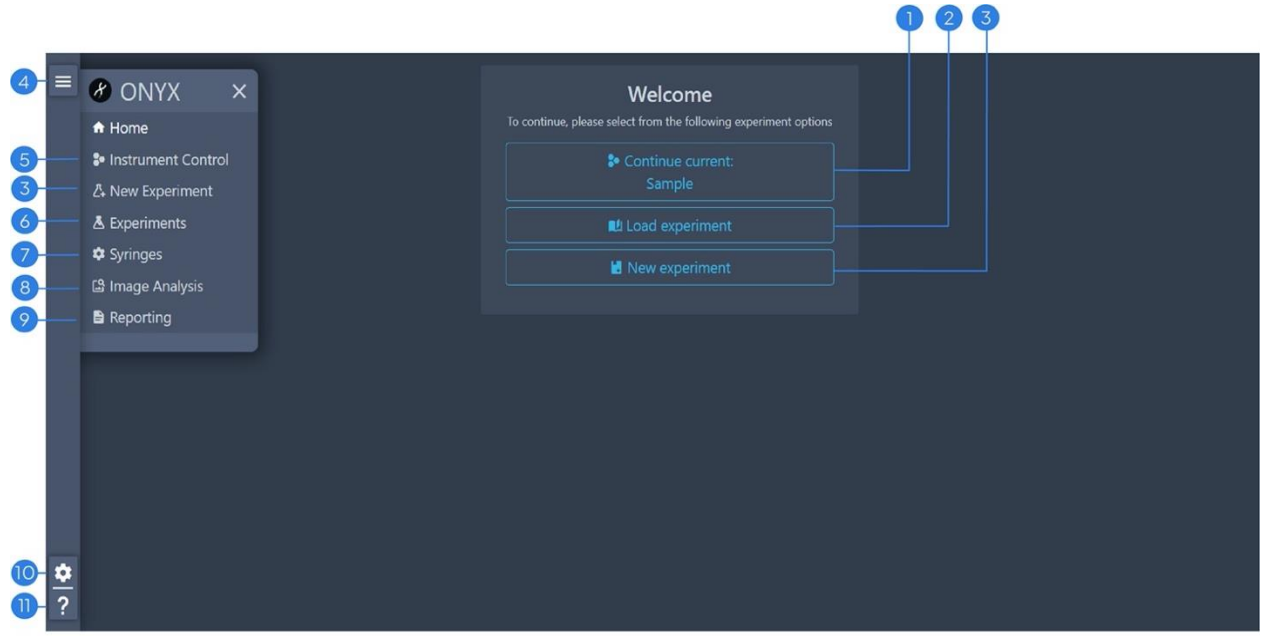
ONYX USER INTERFACE

The listed User Interface controls are applicable to the software version **3.14**. In case of software updates please contact Atrandi Biosciences for the most up to date User Interface controls.

HOME WINDOW

SELECT EXPERIMENT OPTIONS:

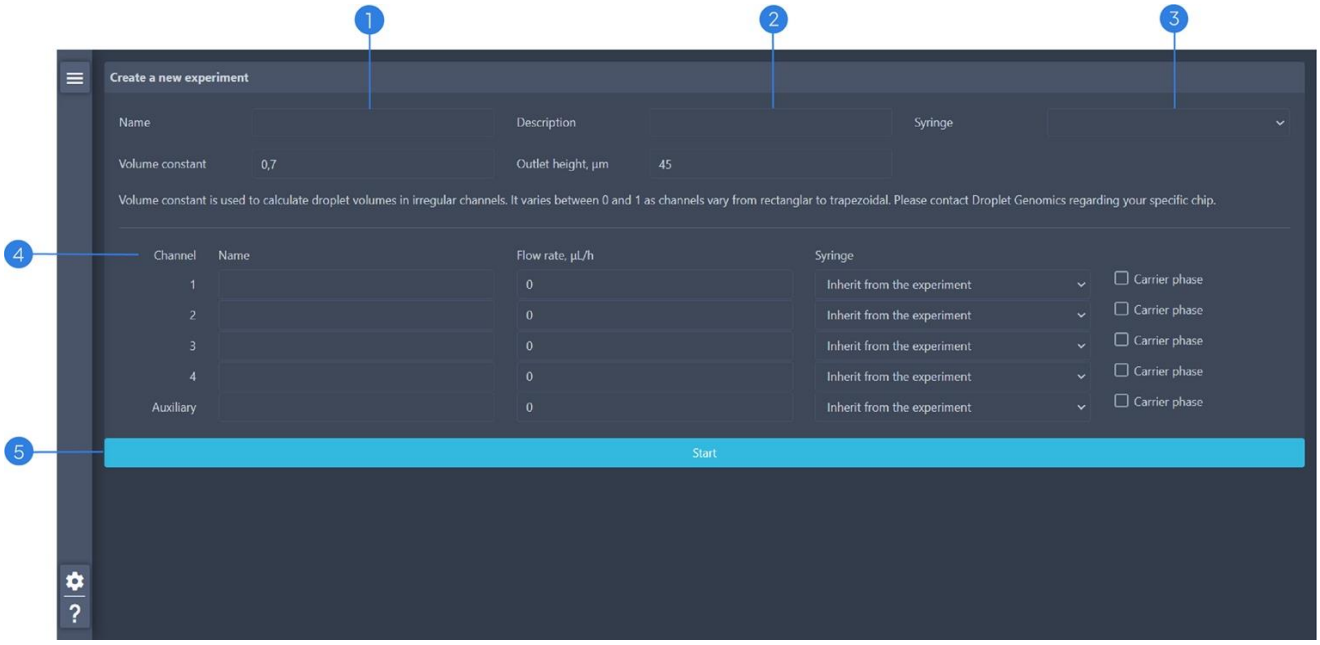
1. Continue previous experiment. *Continue the last loaded experiment.*
2. Load experiment. *Choose and continue saved experiments.*
3. New Experiment. *Set up a new experiment.*
4. Control Menu.
5. Instrument Control. *Main window to monitor and control experiments.*
6. Experiments. *List of previous saved experiment settings.*
7. Syringes. *Edit and create syringe presets.*
8. Image analysis. *View image analysis information.*
9. Reporting. *View and download reports of completed experiments.*
10. Settings. *List of adjustable instrument settings.*
11. Shortcuts, Updates and File names. *List of additional customizable options.*



NEW EXPERIMENT WINDOW

PROVIDE THE REQUIRED INFORMATION TO SETUP A NEW EXPERIMENT

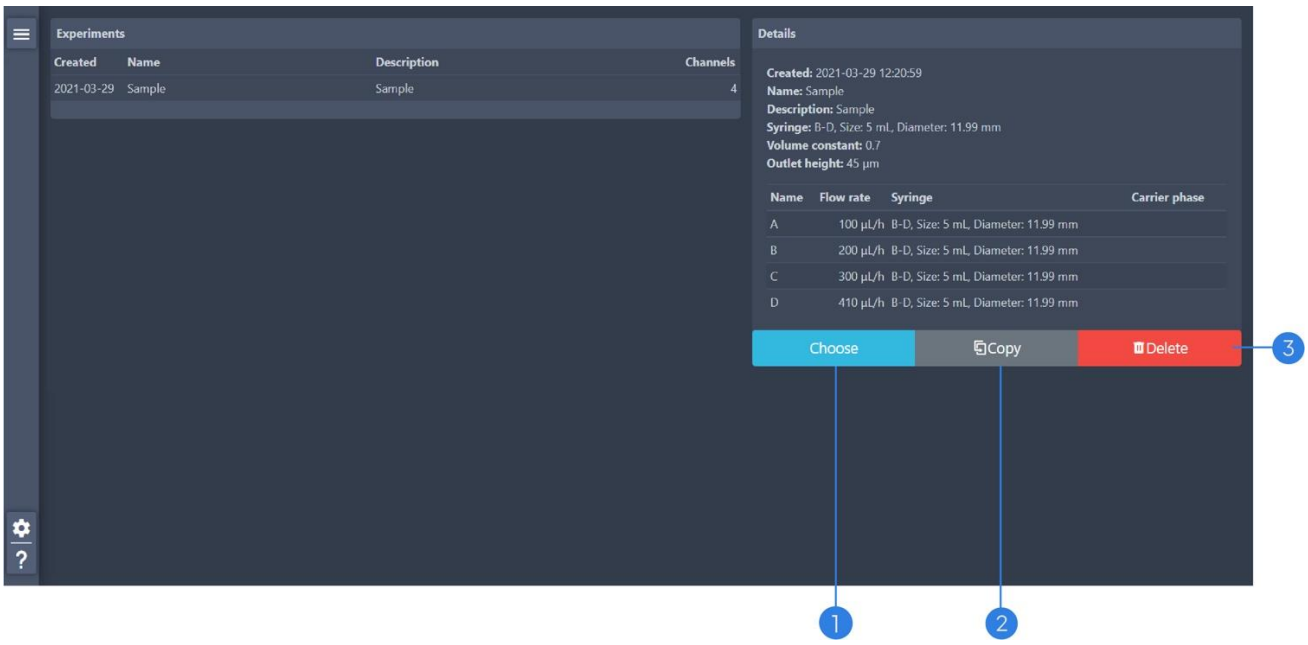
1. Experiment name.
2. Experiment description.
3. Syringe. *Choose syringe for the experiment from the dropdown menu.*
4. Experiment details. *Name channels used in experiment, set flow rates and choose syringes.*
5. Submit all information and proceed to experiment.
   Note: Carrier phase selection is optional and is only used in reporting.



EXPERIMENT WINDOW

CHOOSE AND CONTINUE OR DELETE PREVIOUS EXPERIMENTS

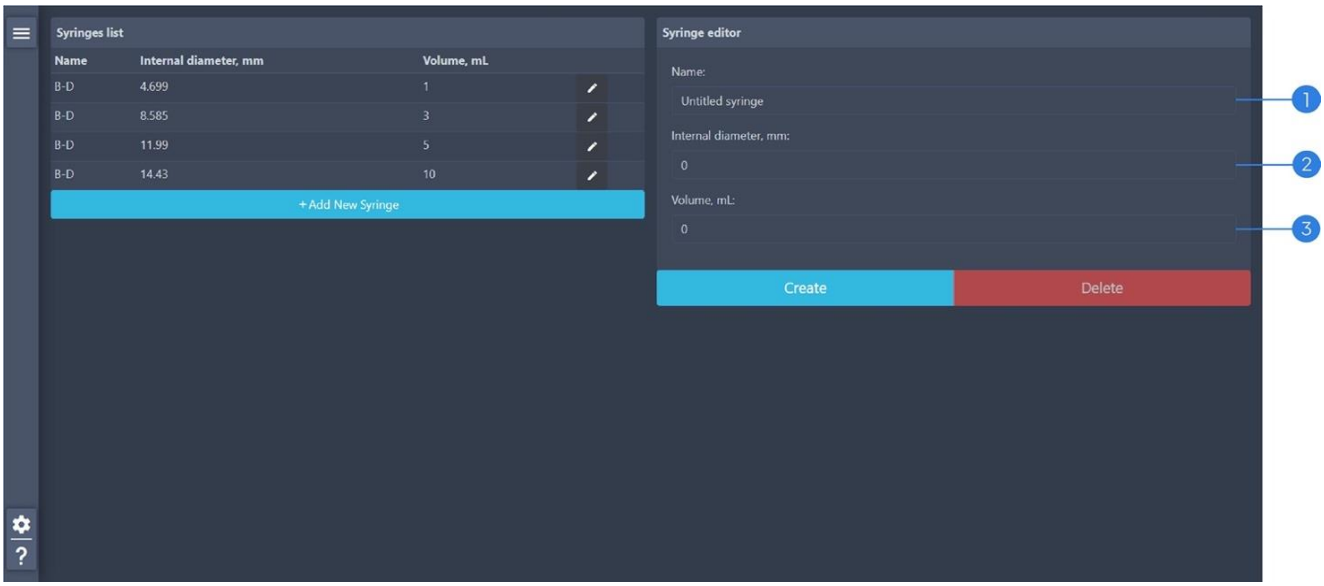
1. Choose this experiment.
2. Copy experiment information and create a new one.
3. Delete this experiment.



SYRINGES WINDOW

VIEW AND CREATE SYRINGE PRESETS

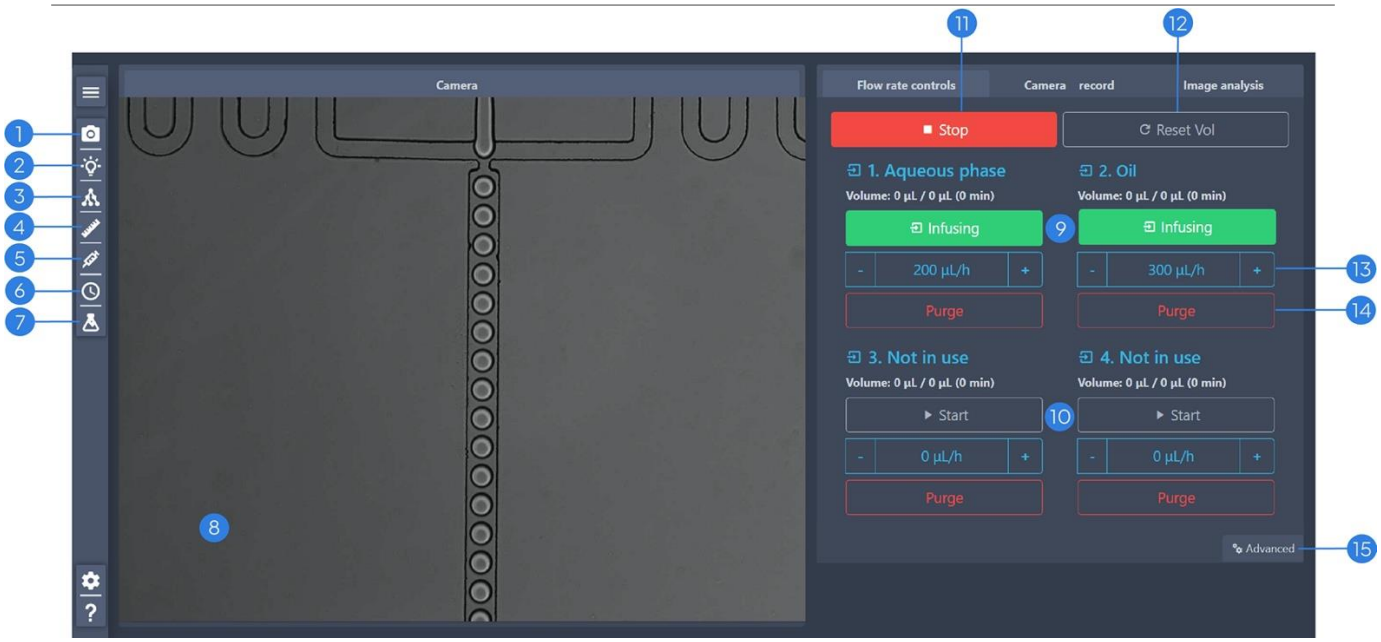
1. Name a new syringe.
2. Specify the internal diameter of the syringe.
3. Specify total volume of the syringe.



INSTRUMENT CONTROL

MONITOR AND CONTROL CURRENT EXPERIMENT

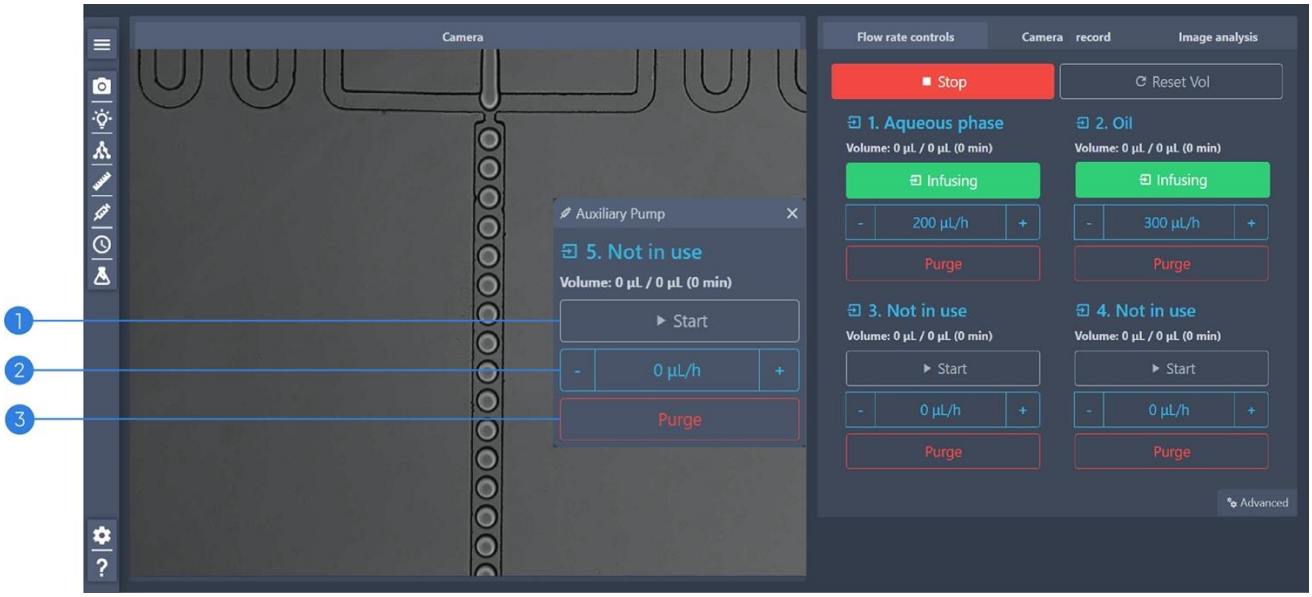
1. Camera settings.
2. Illumination settings.
3. Signal generator. *Adjust signal generator output.*
4. On-screen measurements. *Draw a line or a box and measure droplet volume and diameter.*
5. Auxiliary pump.
6. Time. *Keep track of experiment run time or set a timer and stop the experiment when the timer expires.*
7. Experiment. *Change experiment name and description and/or save it.*
8. Camera live view.
9. Pumps that are currently used in the experiment.
10. Pumps that are currently inactive.
11. Start/stop all pumps in the experiment.
12. Reset the current infused volume count.
13. Adjust flow rate. *Click to enter flow rate manually.*
14. Purge pump to prime the syringe. *Use with caution – sample loss may occur.*
15. Advanced flow controls. Conveniently adjust flow rates of all active channels. Create groups and control flow rates of channels that are in a specific group.



AUXILIARY PUMP

MONITOR AND CONTROL CURRENT EXPERIMENT USING EXTRA PUMP

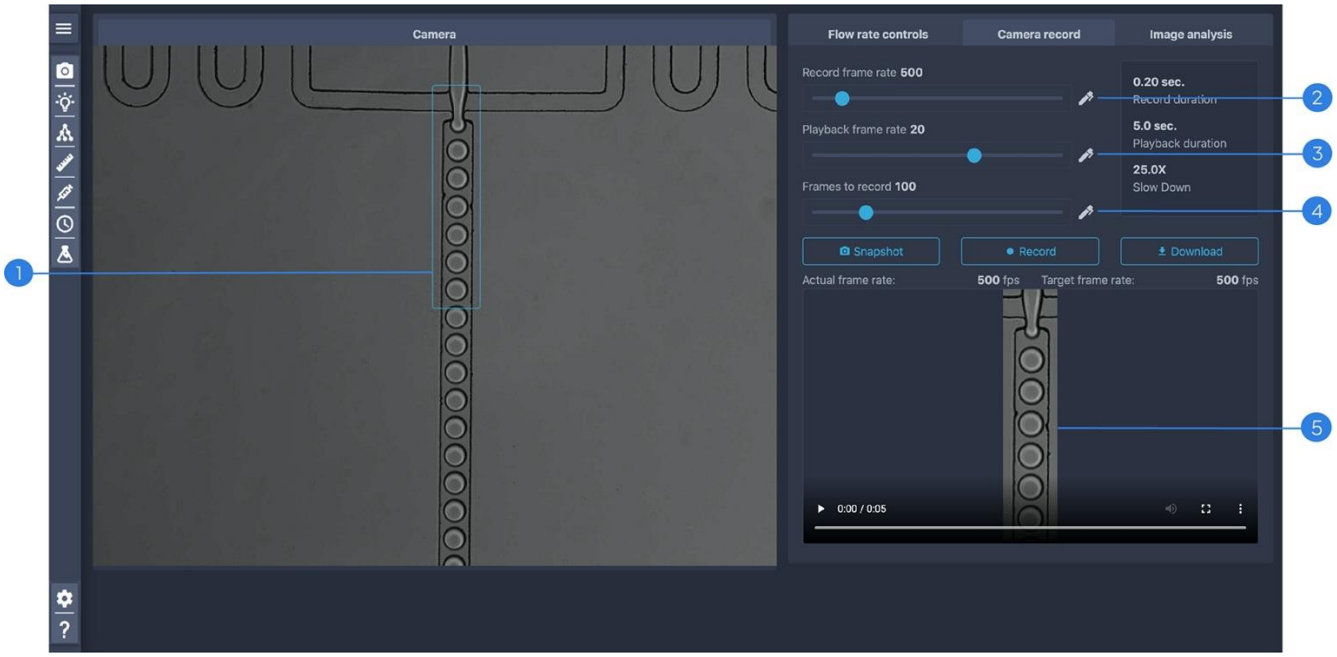
1. Start/Stop the pump
2. Adjust flow rate. *Click to enter flow rate manually.*
3. Purge pump to prime the syringe. *Use with caution – sample loss may occur.*



TAKE A SNAPSHOT AND RECORD A CLIP

TAKE A SNAPSHOT OR RECORD A CLIP OF MICROSCOPE VIEW AND DOWNLOAD IT

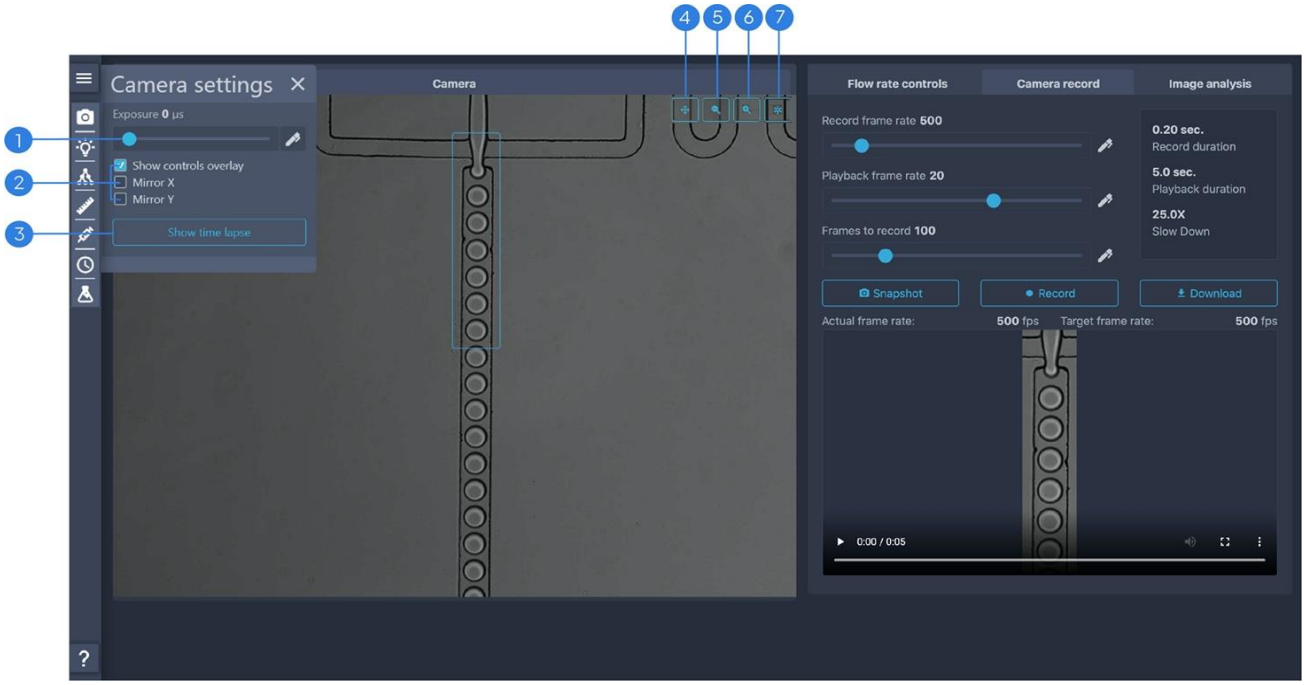
1. Select recording area. *Select by clicking left mouse button and dragging it.*
2. Set the recording framerate value. *The maximum framerate depends on the recoding region.*
3. Set playback framerate value.
4. Set frames to record.
5. Recorded video preview.



CAMERA SETTINGS

CONTROL CAMERA SETTINGS

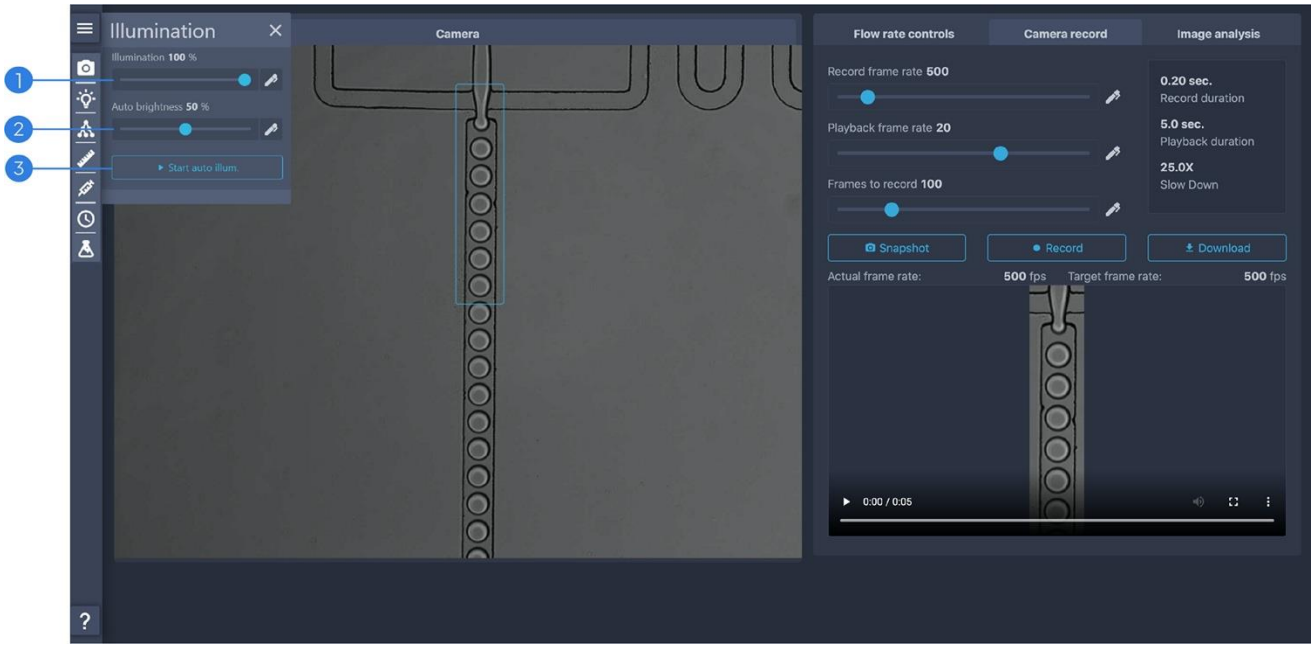
1. Adjust camera exposure (µs).
2. Enable additional options and control the camera view direction.
3. Record time lapse. *Adjust parameters, record and download video.*
4. Drag camera view. *Accessible when "Show control overlay" option is selected and camera view is zoomed in.*
5. Zoom out camera view. *Accessible when "Show control overlay" option is selected.*
6. Zoom in camera view. *Accessible when "Show control overlay" option is selected.*
7. Freeze/Unfreeze camera view. *Accessible when "Show control overlay" option is selected.*



ILLUMINATION

CONTROL ILLUMINATION SETTINGS

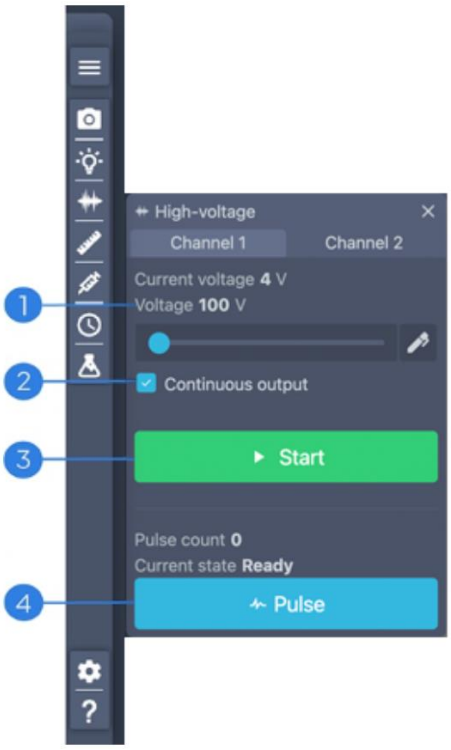
1. Adjust camera illumination (%).
2. Adjust auto brightness (%).
3. Start/Stop auto illumination. *When started the instrument will automatically adjust illumination to keep it at the set value.*



FORCEFIELD GENERATOR

CONTROL FORCEFIELD GENERATOR OUTPUT

1. Adjust signal amplitude (V).
2. Choose between continuous output and pulsing.
3. Start/stop forcefield generator.
4. Send an electrical pulse with selected parameters.
   NOTE: channels can be switched at the top of the control window.



SAFETY NOTICE!

USING HIGH-VOLTAGE POWER SUPPLY MIGHT RESULT IN ELECTROCUTION IF HANDLED INCORRECTLY. PLEASE ENSURE THAT APPROPRIATE SAFETY PRECAUTIONS HAVE BEET MET BEFORE PROCEEDING.

IMAGE ANALYSIS

CONTROL AND MONITOR IMAGE ANALYSIS

1. Start/Stop droplet image analysis algorithm.
2. Reset analysis data.
3. Open/close image analysis controls window.
4. Adjust confidence filter (%).
5. Adjust histogram bin count that is displayed in histogram (12).
6. Open/close event collage window.
7. Download accumulated collage pictures.
8. Switch to Droplet Volume view.
9. Switch to Droplet Diameter view.

1. Various detected droplet characteristics.
2. Real-time plot of droplet diameter/volume.
3. Histogram of droplet count per diameter/volume.

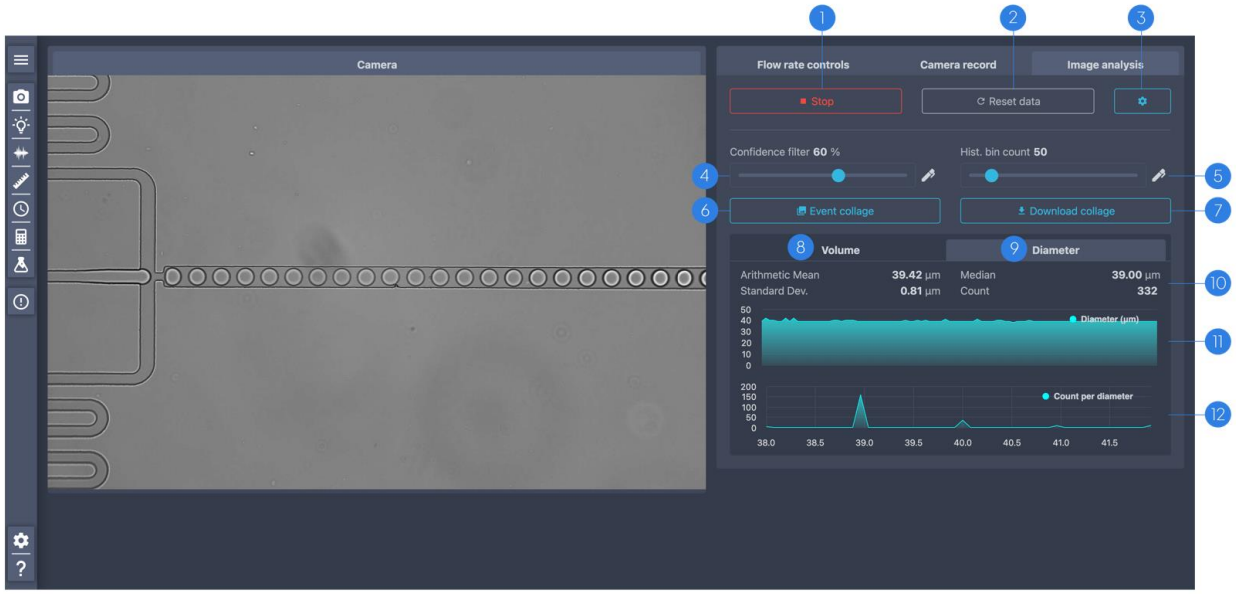


IMAGE ANALYSIS CONTROLS

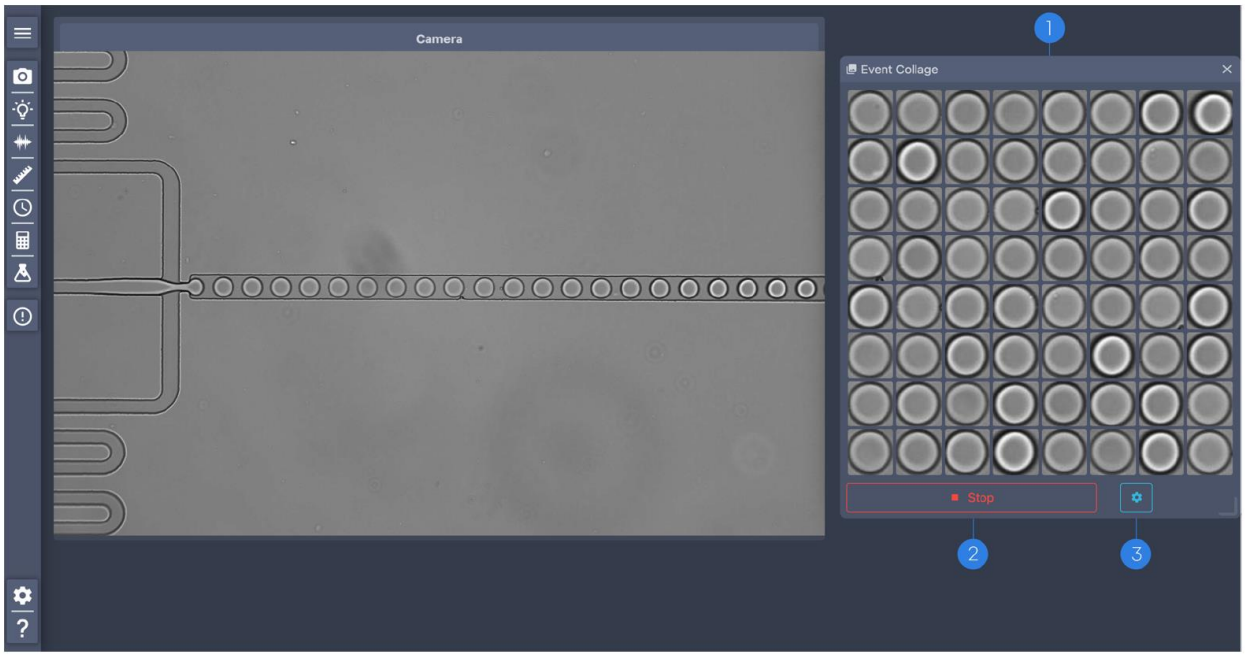
CONTROL AND MONITOR IMAGE ANALYSIS

4. View single image analysis.
5. Detected droplets. *Visible only when a single image is analyzed.*
6. Detected droplet characteristics. Visible only when hovered on detected droplets.
7. Annotate image. *Use this function to annotate droplets in images when the image analysis software fails to recognize droplets. To annotate the image draw boxes on the image. For each new box a new line with annotation info will appear. Visible only when a single image is analyzed. Please submit annotated images to Atrandi Biosciences for algorithm improvement.*
8. Resume live view.
9. Adjust Channel height (µm).
10. Adjust Volume constant (an empirical constant that characterizes the cross-section of the chip outlet channel; provided by chip manufacturer).
11. Adjust Analysis frequency (frequency of capturing and analysing images).
12. Analysis details.

EVENT COLLAGE

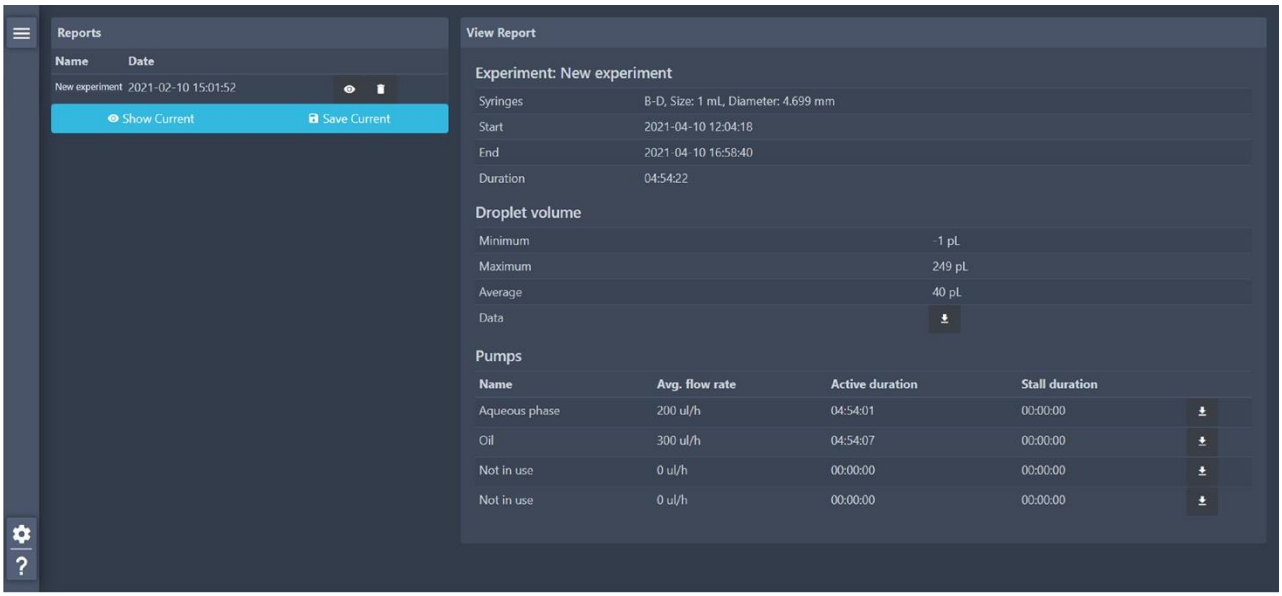
MONITOR CROPPED OUT DROPLETS AND OCCUPANCY

1. Event collage window.
2. Start/Stop event collage generation.
3. Adjust event collage parameters.



REPORTING

VIEW AND DOWNLOAD REPORTS OF COMPLETED EXPERIMENTS



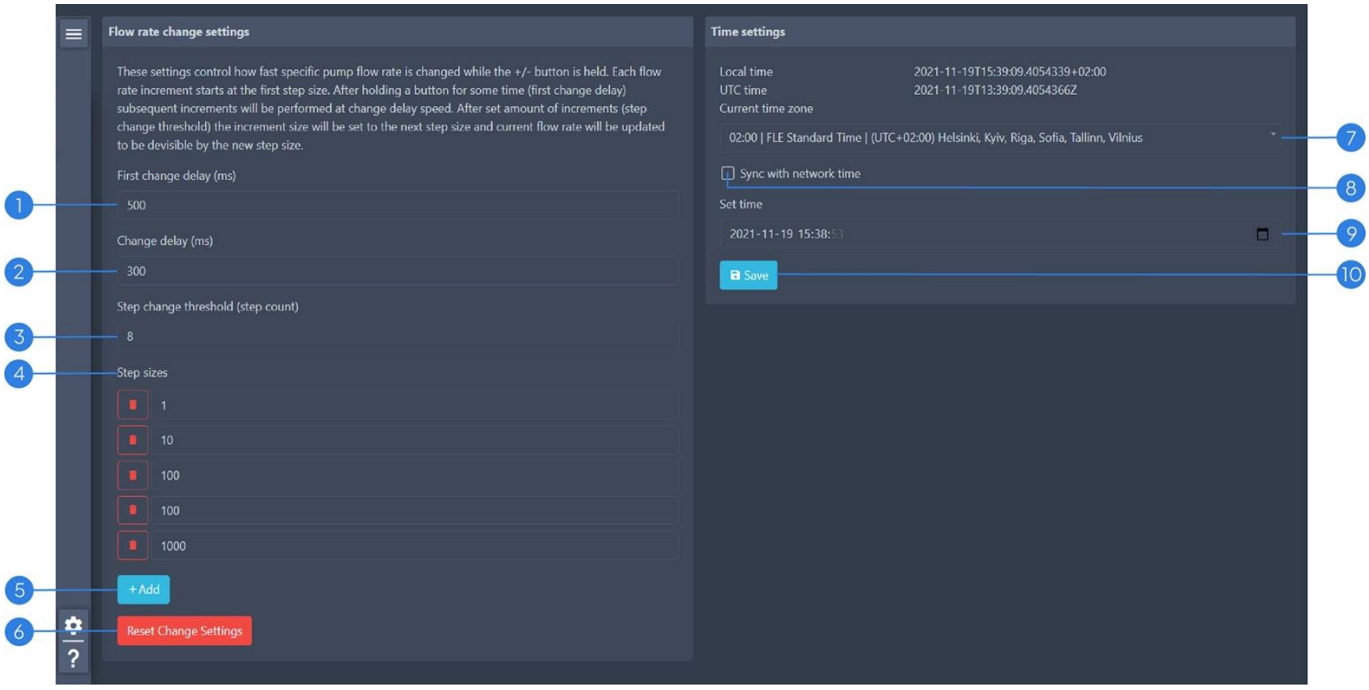
ADVANCED SETTINGS

ADJUST FLOW RATE BUTTON CONTROL SETTINGS

1. First click delay (ms).
2. Click delay (ms). *Adjust the delay speed that subsequent increments will be performed at.*
3. Step change threshold (step count). *Set the number of increments.*
4. Step sizes.
5. Add step sizes.
6. Reset settings.

ADJUST TIME SETTINGS

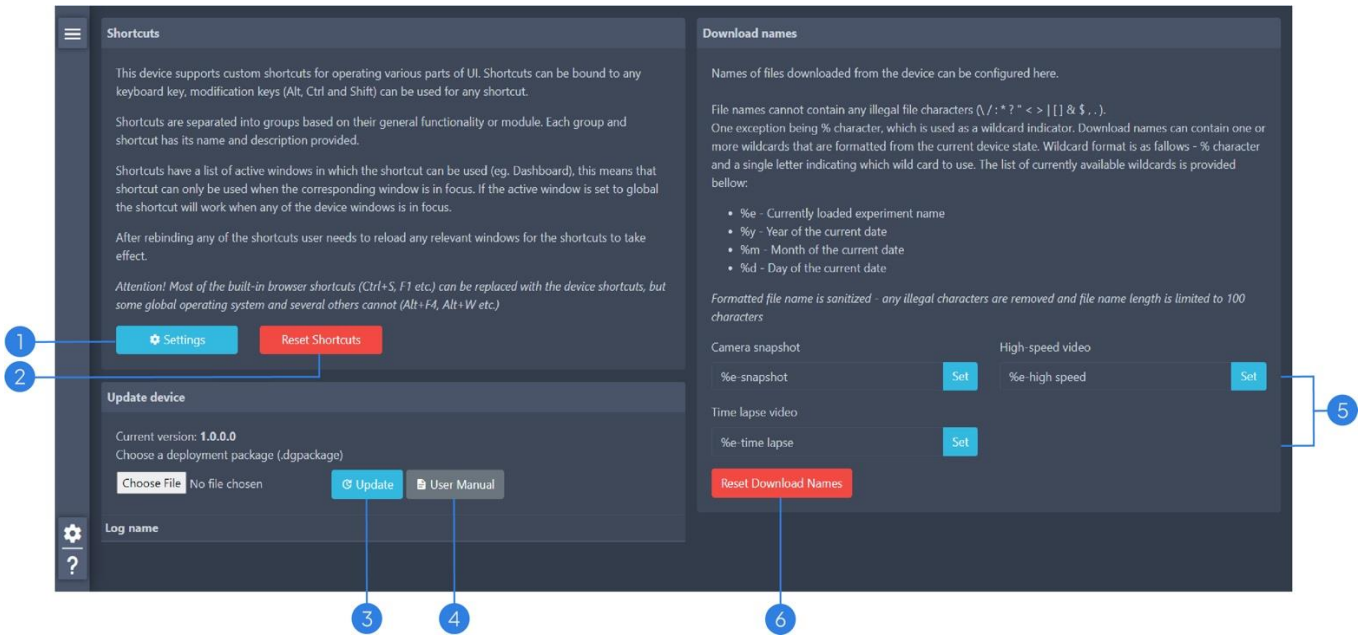
7. Choose a current time zone.
8. Sync device with network time.
9. Set date and time manually.
10. Save all changes.



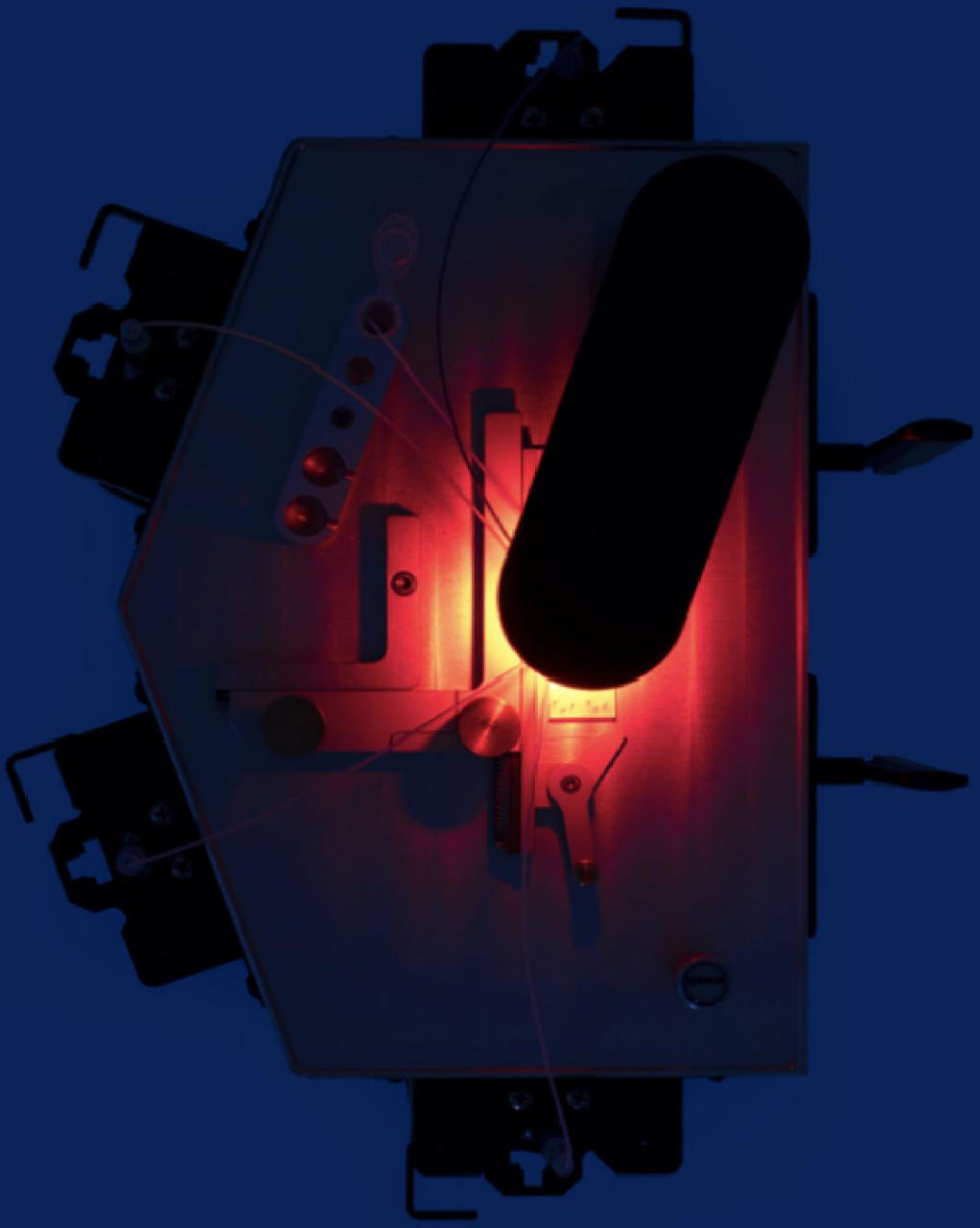
SHORTCUTS, UPDATES AND FILE NAMES

MANAGE KEYBOARD SHORTCUTS, UPDATE DEVICE SOFTWARE AND CONFIGURE FILE NAMES

1. Shortcut settings. *Set device control keyboard shortcuts.*
2. Reset shortcuts.
3. Update device. *Choose a device update file and start the update procedure.*
4. Download the user manual.
5. Download names. *Configure names of files downloaded from the device.*
6. Reset download names.



OPERATING INSTRUCTIONS



BEFORE STARTING AN EXPERIMENT

1. Read these instructions to familiarize yourself with the workflow
2. Remove any dust from the microfluidics instrument
3. Inspect microfluidic chips for any potential defects
4. Make sure to have all the necessary consumables

SETTING UP

Estimated time: 3 min.

1. Before first use attach the Wi-Fi antennas to the back of the instrument (*Fig. 1*)
2. Before first use and once every month lubricate the microfluidic pumps using the included lubricant.
3. Use the provided power cable to plug the instrument into a power outlet.
4. Power on the instrument.
5. Turn on the computer or tablet.
6. Connect to the "Onyx-*serial_number*" Wi-Fi access point (password: *droplets*).
7. Find your device IP address on the screen which is located on the front of the device (*Fig. 2*).
8. Type in the displayed IP address in the browser and launch the Onyx user interface.

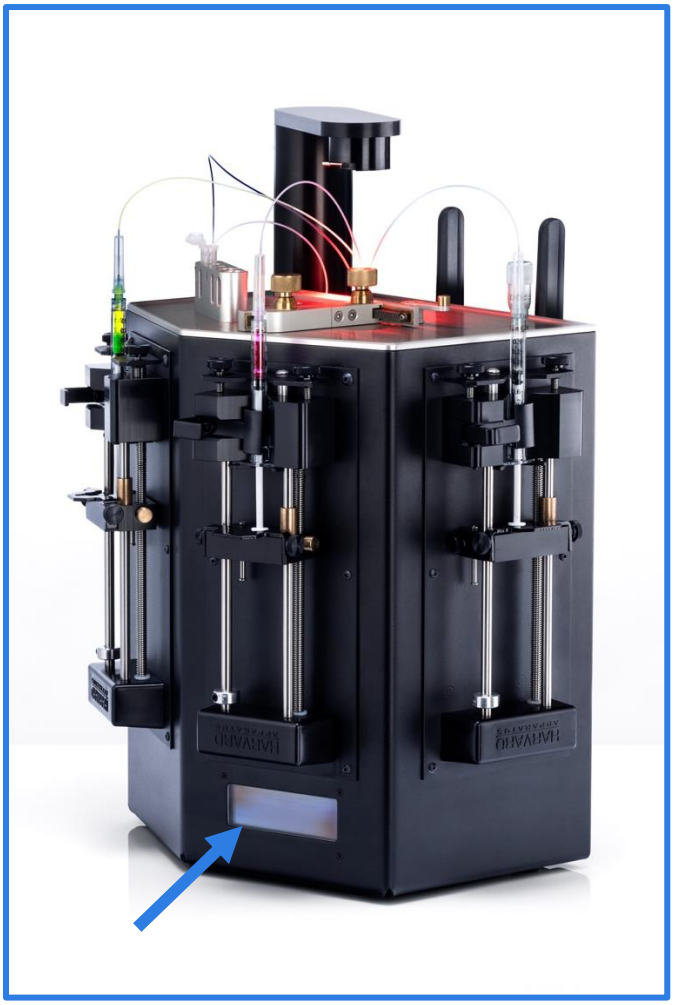


Figure 2. Onyx platform. Blue arrow indicates screen.

NOTE

To improve connectivity in cases of Wi-Fi signal crowding please use a direct connection to a computer via a router. The IP address on the screen will apply to the active wired connection.

ADJUSTING THE MICROSCOPE SETTINGS

Estimated time: 2 min.

1. Place a microfluidic chip in the slide holder.
2. Click on *New Experiment* and provide the required information to setup a new experiment.
3. Use the focus dial and adjust the stage position to bring the microfluidic device into focus.
4. Use *Camera settings* and *Illumination settings* (*Fig. 3*) to reach the desired image quality.

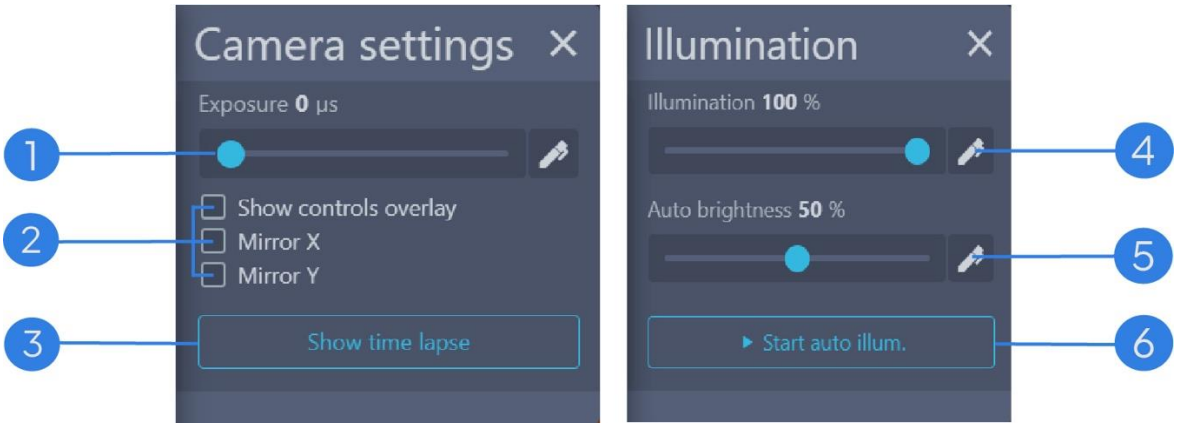


Figure 3. Camera settings window

CAMERA VIEW CONFIGURATION INTERFACE COMPONENTS

1. Camera exposure, (µs)
2. Enable additional options and control the camera view orientation
3. Toggle time lapse controls
4. Illumination, (%)
5. Auto brightness, (%)
6. Start/Stop auto illumination

LOADING SAMPLES INTO SYRINGES

Estimated time: 10 min.

SAFETY NOTICE!

USE NEEDLES GUARDS AND FORCEPS TO AVOID INJURY WHEN MOUNTING TUBING ONTO THE NEEDLES.

Recommended for large sample volumes > 0.3 mL

1. Load your sample to the syringe using a pipette as shown in Figure 4 A.
2. After loading your sample, connect the syringe to tubing with an attached needle and gently push the plunger to remove most of the air in the system, Figure 4 D.

Recommended for small sample volumes < 0.3 mL

The tubing may contain up to 50µL of dead volume. To ensure complete sample injection into the chip sample loading oil has to be used.

1. Load 200µL of sample loading oil into a syringe as shown in Figure 4 A.
2. Add your sample to the syringe using a pipette, Figure 4 B.
3. Carefully remove any air bubbles.
4. Connect the syringe to tubing with an attached needle and remove most of the air in the system, Figure 4 D.

Recommended for suspensions and very small volumes < 0.05 mL

In the case of very small sample volumes they can be loaded directly into the tubing as described below.

1. Load 200µL of sample loading oil into a syringe, Figure 4 A.
2. Connect the syringe to tubing with an attached needle and push the plunger to remove all of the air from the tubing.
3. Insert tubing into your sample and load it by slowly drawing the syringe plunger, Figure 4 C.

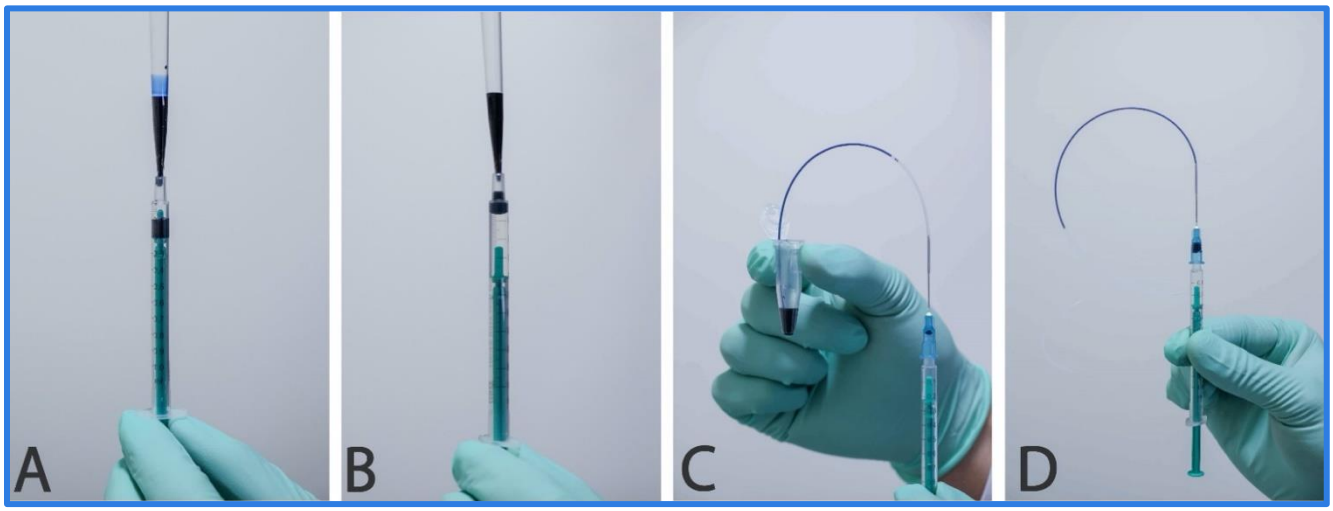


Figure 4. Loading liquid samples into syringes and tubing. A) Loading large volumes. B) Loading small volumes. C) Loading suspensions and very small volumes. D) Complete assembly with sample, syringe, needle and tubing.

ATTACHING SYRINGES TO MICROFLUIDIC PUMPS

Estimated time: 2min.

SAFETY NOTICE!

AVOID TOUCHING THE MOVING SYRINGE PUMP PARTS TO AVOID PINCH RISK.

1. To make space for the syringe, push the latch release button (4) and move the pusher (5) downwards making space for the syringe with an extended plunger (*Fig. 5*).
2. Lift the syringe clamp (2) (*Fig. 5*).
3. Place the syringe in the holder (3) and tighten the holder screws (1) for a secure fit (*Fig. 5*).
4. Secure the syringe clamp (2) as shown in Figure 5.
5. Push the latch release (4) and move the pusher (5) close to the syringe plunger (*Fig. 5*).

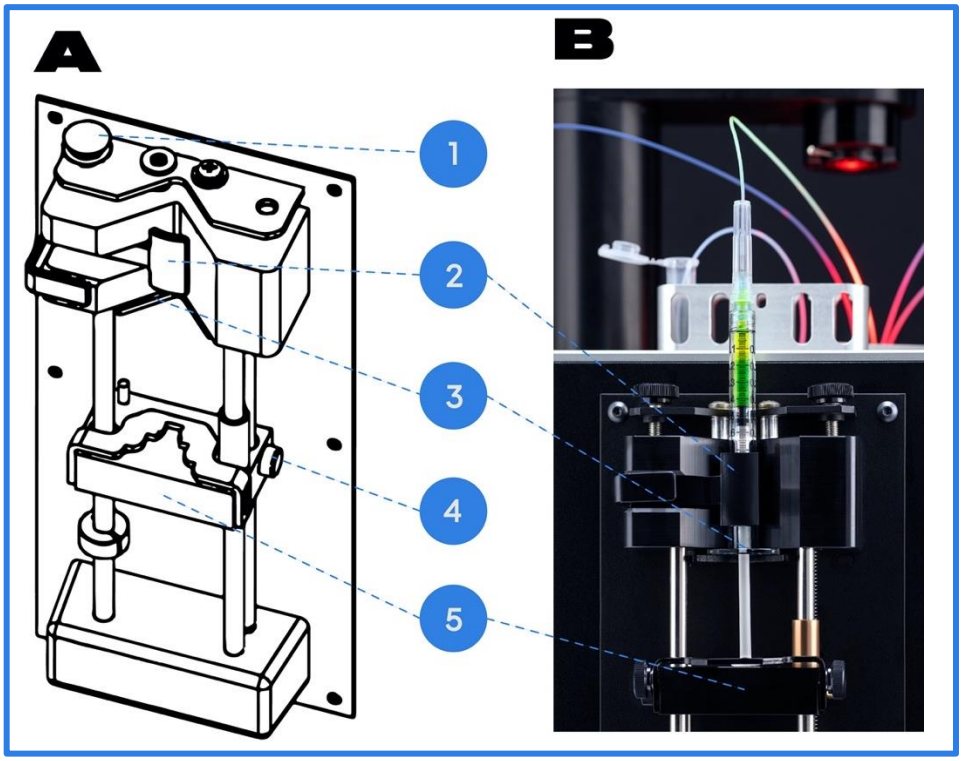


Figure 5. Syringe pump schematic (A) and view with attached syringe (B).

SYRINGE PUMP COMPONENTS

1. Syringe holder adjustment
2. Syringe clamp
3. Syringe holder
4. Syringe pusher latch
5. Syringe pusher

STARTING THE EXPERIMENT

Estimated time: 5-10 min.

1. Carefully prime each pump. To speed priming use the *Purge* (*Fig. 7-7*) function in the *Flowrate controls* window (*Fig. 7-3*) and wait until the syringe pusher reaches the syringe and all air is removed from tubing (*Fig. 6*). Repeat this for all pumps.
2. Use forceps to insert each tubing into the corresponding microfluidic chip port (*Fig. 6).*
3. Connect a piece of microfluidic tubing to the outlet port and make sure it is placed in the collection tube.
4. Verify that the correct flow rate configuration is loaded and click *Start* (*Fig. 7-4*) to start all the pumps in the experiment or start each pump separately (*Fig. 7-5*).
5. Observe the flow and droplet formation and adjust the flow rates as necessary (*Fig. 7-6*).
6. Navigate to *Camera settings* (*Fig. 7-1*) and *Illumination settings* (*Fig. 7-2*) to adjust camera exposure, illumination, and brightness and freeze the live view.

Figure 6. Microfluidic device connection diagram

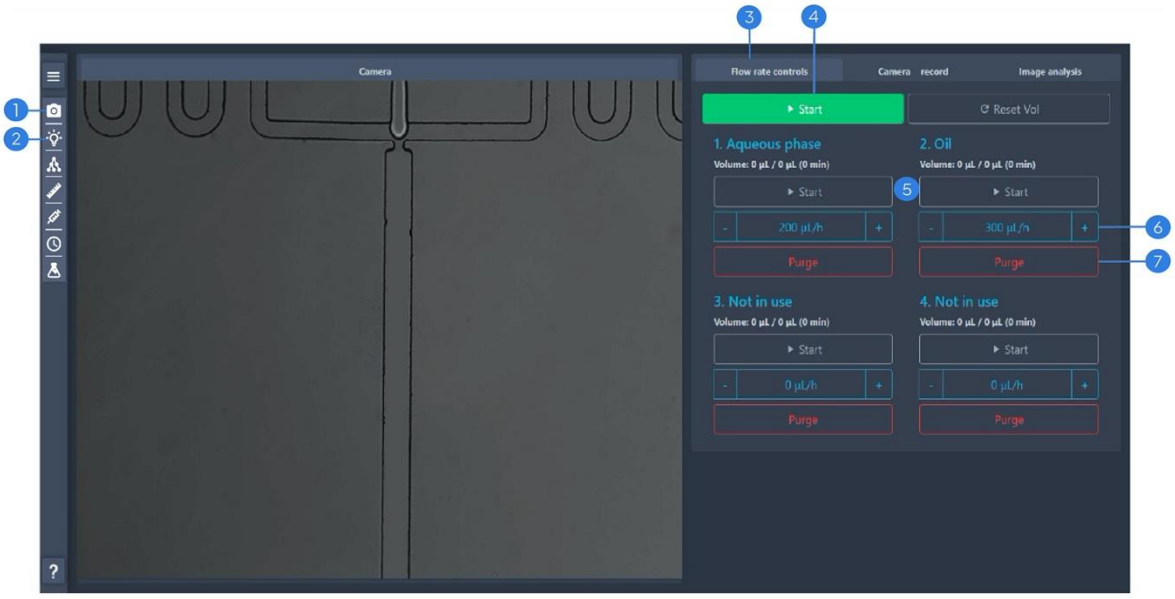


Figure 7. Instrument control dashboard

FINISHING THE EXPERIMENT

Estimated time: 2min.

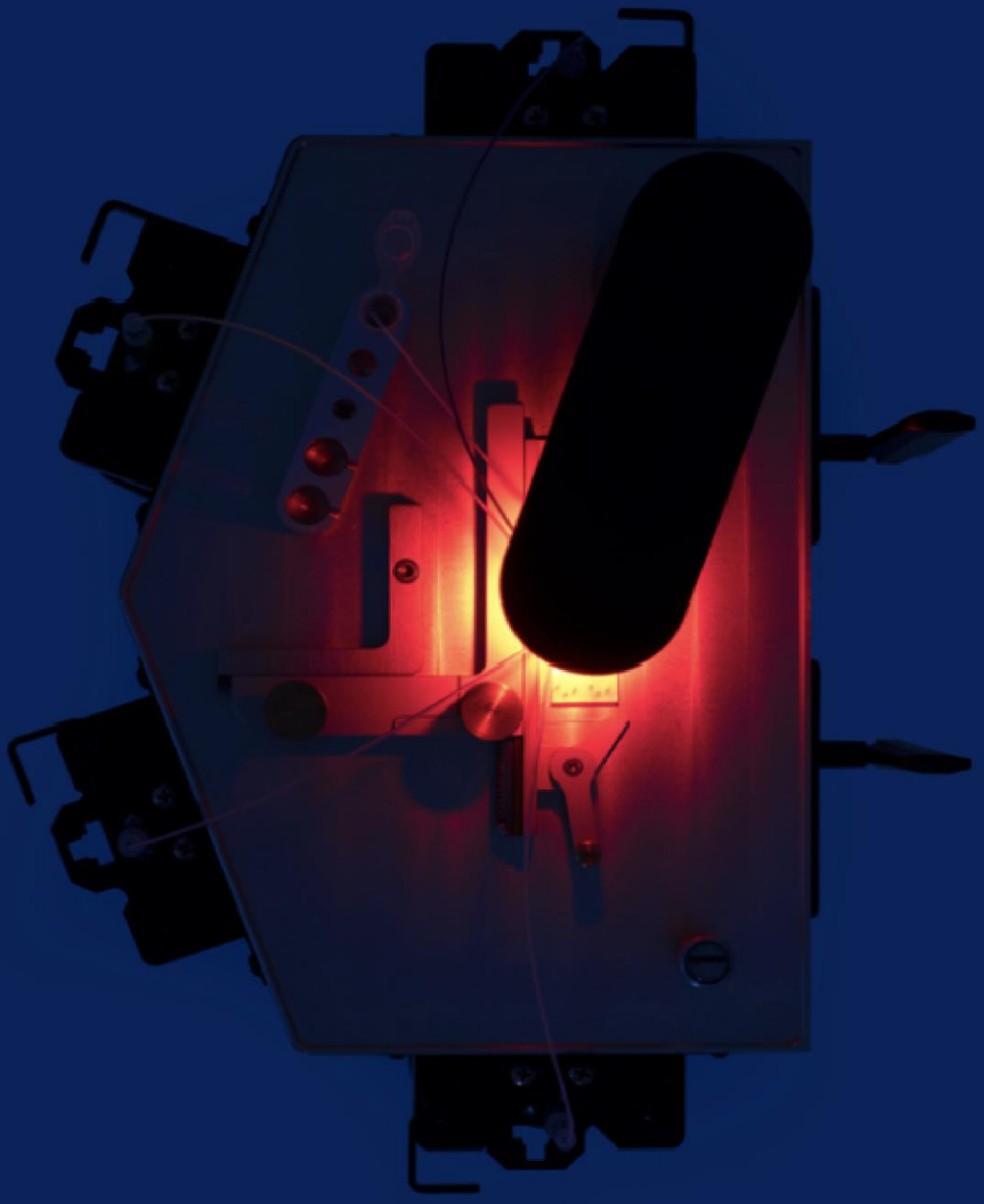
1. Click the *Stop* button to stop all the pumps used in the experiment.
2. Save experiment details and the last recorded video.
3. Close the user interface software by closing the browser window.
4. Remove the tubing from the sample collection tube.
5. Remove all tubing from the chip and remove the chip from the holder.
6. Remove syringes from all syringe pumps.
7. Shut down the computer or tablet.
8. Power off the instrument.

WASTE DISPOSAL!

Dispose of the used syringes and needles in a dedicated Sharps bins.

Droplet stabilisation oil and sample load oil contain fluorinated materials, which should be disposed of in an environmentally friendly manner.

TECHNICAL SPECIFICATIONS



TROUBLESHOOTING

A LIST OF FAILURE MODES LISTED BY FREQUENCY OF OCCURRENCE

ERROR INDICATION	POSSIBLE CAUSES	SOLUTIONS
NO SIGNS OF INSTRUMENT OPERATION	No power.	Check if there is AC power in your power outlet. Check fuses in the back panel located near the AC connector. If fuses are intact – contact Atrandi Biosciences for servicing.
PUMPS ARE SQUEAKING DURING OPERATION OR GETTING STUCK	Lack of lubrication.	Lubricate exposed pump mechanical parts involved in the operation with solid grease. Do not use liquid oil for lubrication. Make sure that instrument is lubricated at least once a month, depending on the intensity of the operation.
NO ILLUMINATION OR LIGHT IS FLICKERING	Illumination LED or controller failure.	Contact Atrandi Biosciences for servicing.
PUMPS ARE NOT RESPONSIVE AFTER AN INSTRUMENT IS RESTARTED	Internal pump driver failure.	Contact Atrandi Biosciences for repair assistance.
VIDEO IS LAGGING	Wi-Fi interference.	Connect the instrument to a router via the wired connection. If the router supports it, use 5GHz Wi-Fi to avoid crowded 2.4GHz wireless bands. Alternatively, connect a computer to this router via a wired connection. You may also reduce image quality to reduce Wi-Fi bandwidth requirements.

ARTIFACTS ON THE VIDEO, E.G. SPOTS, DUST, CRACKS	The microscope window became dirty or scratched.	Clean the camera window with a microfiber cloth soaked in rubbing alcohol. If the microscope window is badly scratched or broken, contact Atrandi Biosciences for a replacement.
	CCD matrix degradation.	Contact Atrandi Biosciences for instrument servicing.
IMAGE ANALYSIS ALGORITHM FAILURES	Chip outlet not visible	Ensure that the rectangular portion of the chip outlet is visible and focused.
	Chip not in focus or poorly illuminated	Droplet analysis algorithms are tolerant to small changes in focus and illumination, but in extreme cases of over or under exposure will fail to detect droplets.
	Droplets are too small	In extreme cases, algorithms will fail to measure droplets smaller than 20 µm in diameter. Contact Atrandi Biosciences for a custom higher magnification objective for monitoring such droplets.
DROPLET VOLUME IS INACCURATE	Wrong chip height and/or volume constant parameters	If droplet detection accuracy is verified visually but the volume is not correct, get in touch with your chip manufacturer to adjust chip height and volume constant parameters.

TECHNICAL CHARACTERISTICS TABLES

TABLE 1: GENERAL CHARACTERISTICS

SAMPLE REQUIREMENTS:	
SAMPLE TYPE	Liquids and stable suspensions
SAMPLE VOLUME	0.01 – 50.0mL
OPERATING CONDITIONS AND INSTRUMENT DIMENTIONS:	
OPERATING	- 4 – 40 °C, non-condensing
DIMENSIONS (H x D x W)	430mm x 250mm x 350mm
WEIGHT	12.5 kg

TABLE 2: POWER SUPPLY ELECTRICAL DATA

SPECIFICATIONS:	
INPUT VOLTAGE RANGE	110 ~ 240VAC (Withstand 300VAC surge for 5sec. Without damage)
MAXIMUM CURRENT RATING	2A @ 115VAC, 1.2A @ 230VAC
FREQUENCY	47 ~ 63Hz
MAXIMUM POWER RATING	246W
APPLICABLE SAFETY STANDARDS	UL60950-1, TUV EN60950-1

TABLE 3: OPERATING CHARACTERISTICS

SYRINGE PUMPS:	
FLOW RATES	1 – 50,000 µL / hour
FLOW ACCURACY	0.5%
SYRINGE DIAMETER	0.1 mm – 50.0 mm
INTEGRATED MICROSCOPE:	
IMAGE RESOLUTION	0.5 – 2 µm/px
ILLUMINATION INTENSITY	10-15mW/cm^2
CAMERA EXPOSURE	0.025 – 100 ms
RESOLUTION RANGE	1440 x 1080, 16 x 2
MAXIMUM FRAME RATE	220FPS@1440 x 1080, 3500FPS@16 x 2
ILLUMINATION TYPE	Brightfield, 650nm LED

DECONTAMINATION METHODS

ULTRAVIOLET (UV) IRRADIATION

Compatible.

NOTE: prolonged exposure to very intensive UV light might degrade plastic parts.

ISOPROPANOL/ETHANOL SPRAY

Compatible.

NOTE: avoid getting liquid inside the instrument (use as little spray as possible)

OZONE STERILIZATION

Compatible.

CHEMICAL DISINFECTANTS

Incompatible.

Chemical disinfectants like hydrogen peroxide, iodophor, bleach and other compounds might oxidize metal parts or leave residue on optics.

GAMMA RADIATION

Incompatible.

Gamma radiation might damage electronics.

AUTOCLAVING

Incompatible.

Autoclaving will damage electronics and deform plastic parts.

DRY HEATING

Incompatible.

Dry heating will damage electronics and deform plastic parts.

ETHYLENE OXIDE

Incompatible.

Ethylene oxide might damage electronics.

MAINTENANCE

BEFORE/AFTER EVERY USE

MAINTAIN THE CLEANLINESS OF THE SYSTEM

1. Wipe the surface of the instrument with a lint-free tissue. Use 2-propanol for cleaning if needed.
2. Wipe the protective glass with a lint-free tissue.

EVERY QUARTER

LUBRICATE MOVING PARTS

1. Use provided grease to lubricate the metal parts of syringe pumps (threaded syringe pusher guide and metal rods).
2. Use provided grease to lubricate the slide holder gear track.

NOTE: lubrication can be done at any point if the stage of the pump or the slide holder gear track is not moving smoothly or starts to exhibit noise during operation.

ONCE A YEAR

SERVICE THE INSTRUMENT

CONTACT ATRANDI BIOSCIENCES REPRESENTATIVE

Service includes:

Calibration of syringe pumps
Cleaning of internal components
Cleaning of the optical system
Calibration of the forcefield generator module
Software & firmware updates

DECLARATION OF CONFORMITY

Atrandi Biosciences declares that the system:

Microfluidic system Onyx, consisting of a combination of four syringe pumps, a highspeed microscope and a portable computer, to which this declaration relates is in conformity with the following regulations.

EMC Directive Standards:
EN 61326I1:2006 – electrical equipment for laboratory use
IEC 61000312 (emission)
IEC 61000I313 (emission)

IEC 61000I412 Electrostatic discharge immunity
IEC 61000I413 Radiated RF Electromagnetic Field Immunity
IEC 61000I414 Electrical Fast Transient Immunity

FCC EMC Compliance:
Emissions comply with the Class B Limits of FCC Code of Federal Regulations 47, Par 15, Subpart B.

EC declaration of conformity, Low Voltage:
Low Voltage Directive 2006/95/EC (Replaces 73/23/EEC, amended by 93/68/EEC)
EN 61010I1:2001 Safety Requirements for Electrical Equipment for Laboratory use. Part 1: General requirements.

RoHS:
All components and manufacturing procedures are compliant with RoHS standards.

A copy of the technical file is available upon request from the company.

Doc. No. DGPM02323160001

Revision history

Revision	Date	Description
V1	9 June 2023	Manual corrected to reflect company rebranding.