CLEANING PROCEDURE

FLOW UNIT

The following document describes the steps to perform the cleaning of the **FLOW UNIT,** depending on your application.

This protocol should be performed daily. For biological applications, we recommend conducting **a more thorough cleaning every two weeks** to ensure optimal reliability and accuracy.

Following these cleaning procedures is essential to **maintain the device's precision** and **achieve optimum results**.

MANDATORY PRACTICES

- **Always clean** the sensor **between experiments** or at the **end of each day**.
- **Always filter the solutions used,** including the cleaning solutions with proper filters (usually <20 µm pore size, at least < 5µm for the FLOW UNIT XS) and with the appropriate solvent compatibility.
- **Never** let a **solution dry in the sensor.**

GENERAL RECOMMENDATIONS

- Use **clean tubing** upstream of the FLOW UNIT. This procedure can also be used to clean the tubing if they are reused for extended periods of time.
- Use tubing that have a **smaller iner diameter** (ID) than the **FLOW UNIT** to clean. This will ensure that no clogging occurs due to unfiltered particles, as tubing can be cut or replaced.

CLEANING PROCEDURE

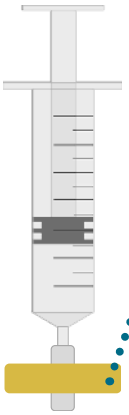
DAILY PROTOCOL FOR BIOLOGICAL APPLICATIONS

6 steps

Step 1: Filter your solutions

Select a cleaning solution compatible with the wetted materials and the liquids used that will dissolve likely contaminants. Filter the cleaning solution.

Always filter your solutions before introducing them into the microfluidic system . This step removes particulates and impurities that could block channels, affect flow accuracy, or damage sensitive components.



Filter

- For **FLOW UNIT XS**, please use 5 µm pores
- For other **FLOW UNIT**, please use 20 µm pores

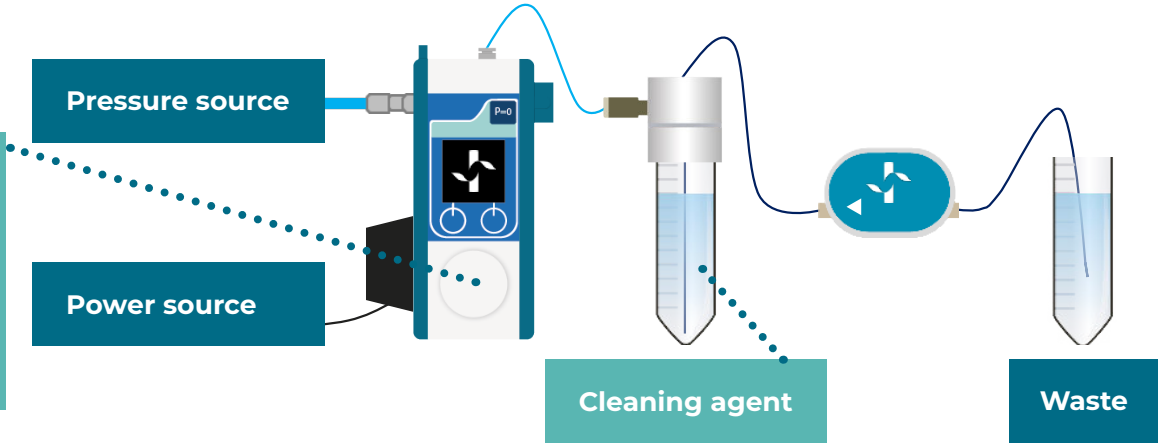
Step 2: Rinse with water or your solution

Rinse the system with the liquid solution that you were using during the experiments for **1 min**. Do not use biologicals. The **recommend flow rate** will depend on your flow sensor. Recommendations are at the end of this document.

1 min

Flow EZ™ pressure controller

Adjust the pressure so that the flow rate reaches the recommended value (please refer to the table).



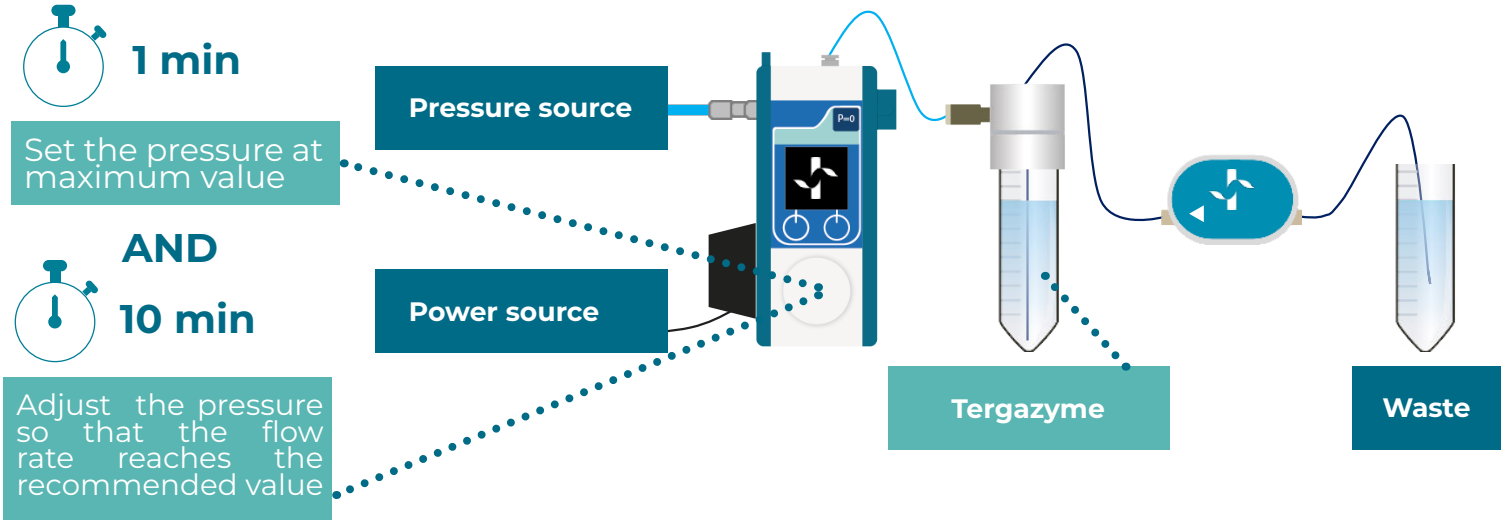
CLEANING PROCEDURE

Step 3: Wash with a Detergent solution

Change the solution to a **detergent solution or other solution that will dissolve likely contaminants** that is compatible with the device wetted materials.

If you're working with **cells or any biologicals**, use an enzyme detergent. We highly recommend using **Tergazyme** for this step (1% fresh solution in DI Water).

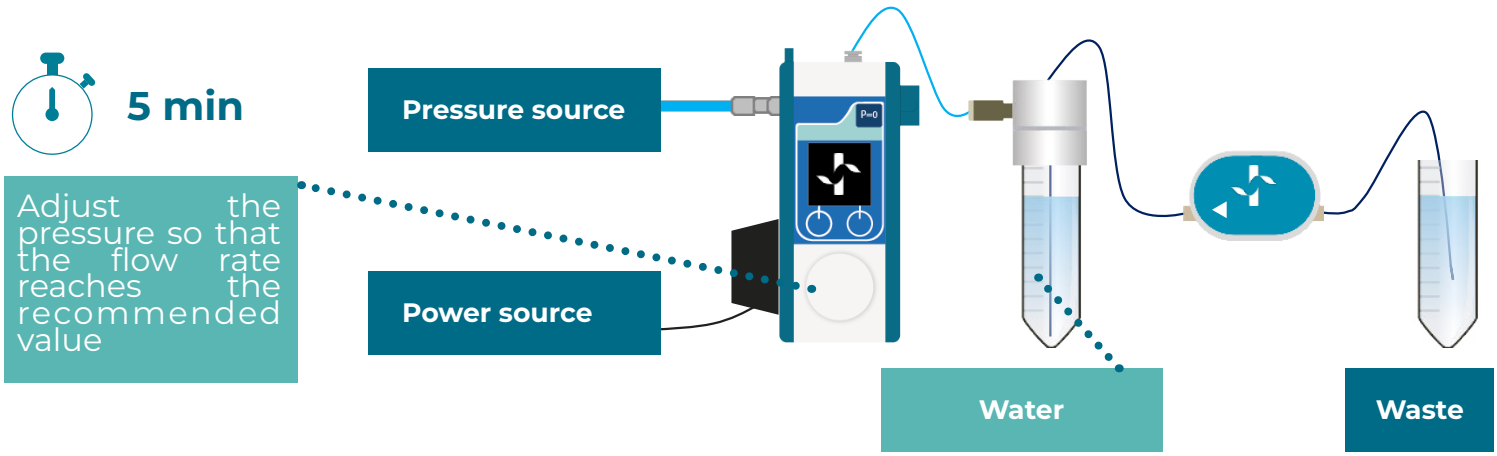
Clean during **1 min at maximum pressure** followed by **10 min at the recommended flow rate** for your sensor (refer to the table at the end of this document).



If you are using a **Flow UNIT XS**, we recommend extending the washing time to 15 minutes instead of 10 for the detergent step.

Step 4: Wash with DI Water

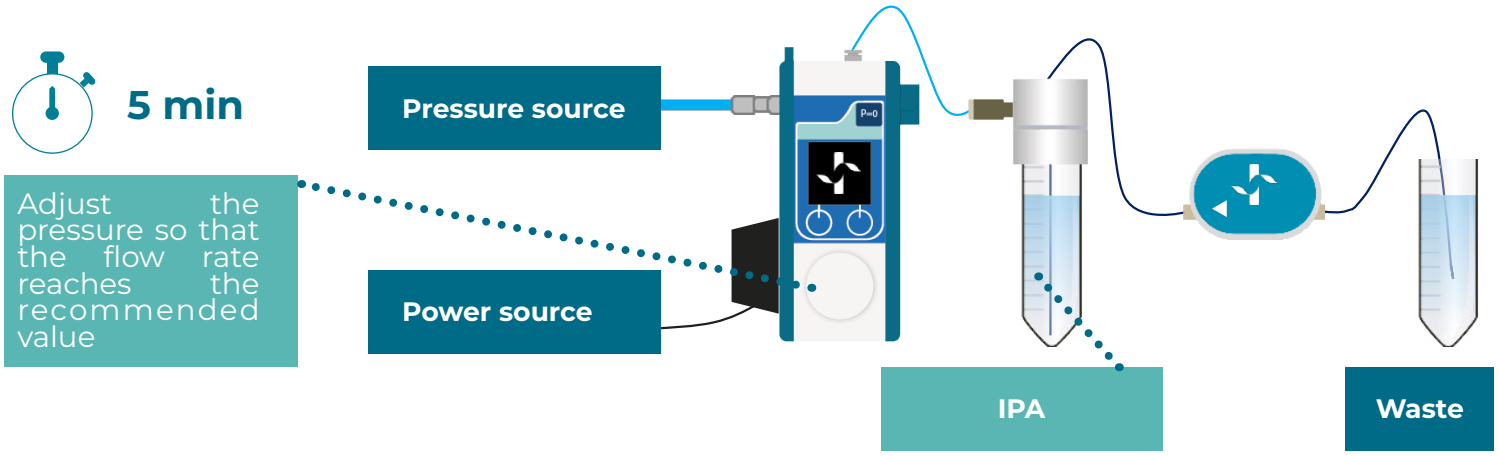
Fill your reservoirs with **DI water** and rince the system at the **recommended flow rate for 5 min** (refer to the table at the end of this document).



CLEANING PROCEDURE

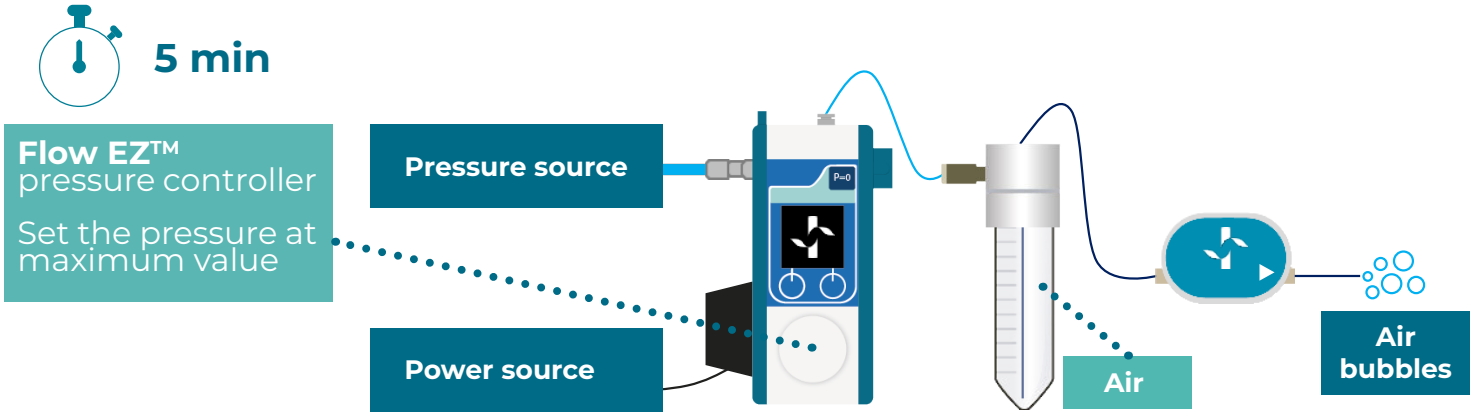
Step 5: Flush with Isopropanol

Change the solution in your reservoir for **isopropanol.** Wash for **5 min at the recommended flow rate** (refer to the table at the end of this document).



Step 6: Air Dry

Empty the reservoir. **Dry the Flow UNIT** at **maximum pressure** until air comes out **for at least 5 min.** This will evaporate the IPA inside the capillary to **avoid building up deposits** that can degrade the Flow UNIT's performance.



Place the yellow plugs on the sensor if it is to be stored.

CLEANING PROCEDURE

DAILY PROTOCOL FOR OTHER APPLICATIONS
(DROPLET, CHEMICAL...)

4 steps

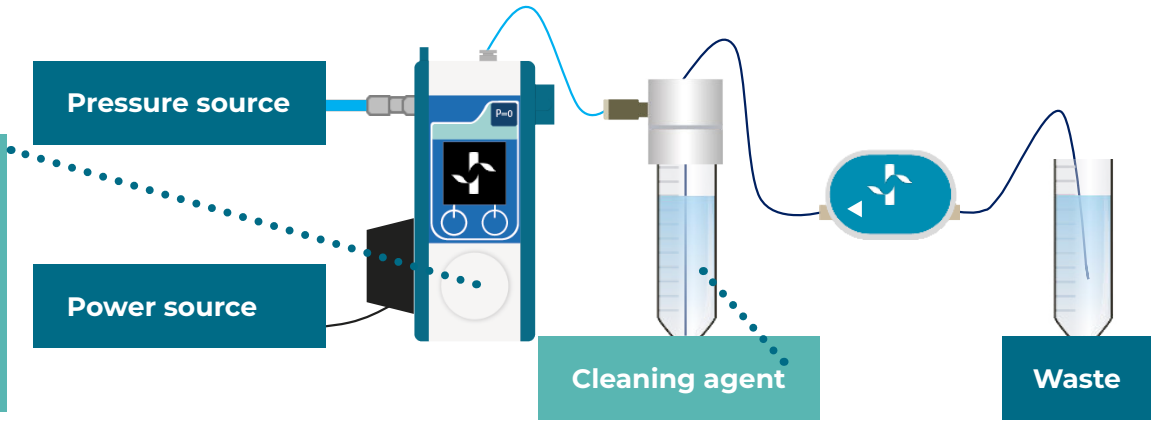
Step 1: Rinse with your liquid

Rinse your system with the solution in use during the experiments for **1 min**. The **recommend flow rate** will depend on your flow sensor. Recommendations are at the end of this document.

1 min

Flow EZ™ pressure controller

Adjust the pressure so that the flow rate reaches the recommended value (please refer to the table).



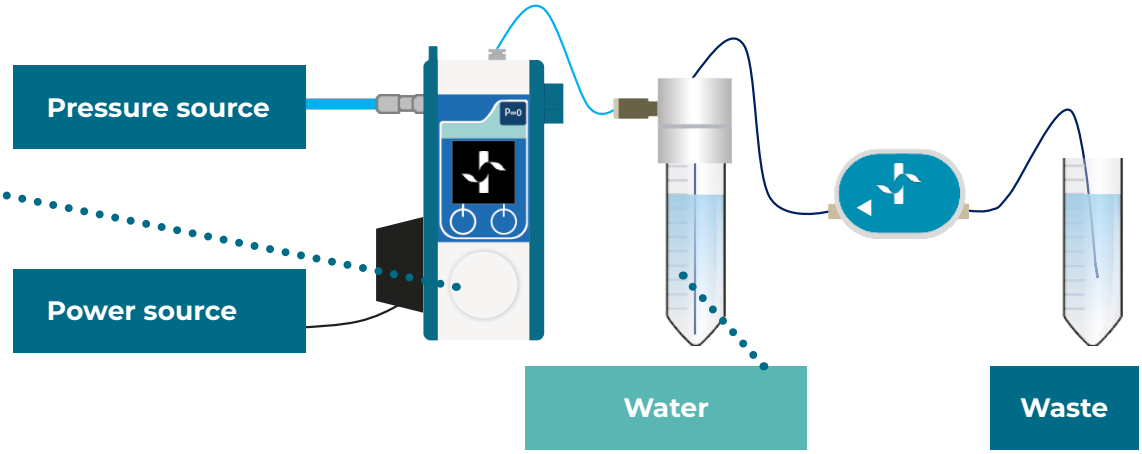
Step 2: Wash with DI Water

Fill your reservoirs with **DI water** and rinse the system at the **recommended flow rate for 5 min** (refer to the table at the end of this document).

If working with oils, this step is unnecessary. Go to step 3 and wash your system directly with IPA or ethanol.

5 min

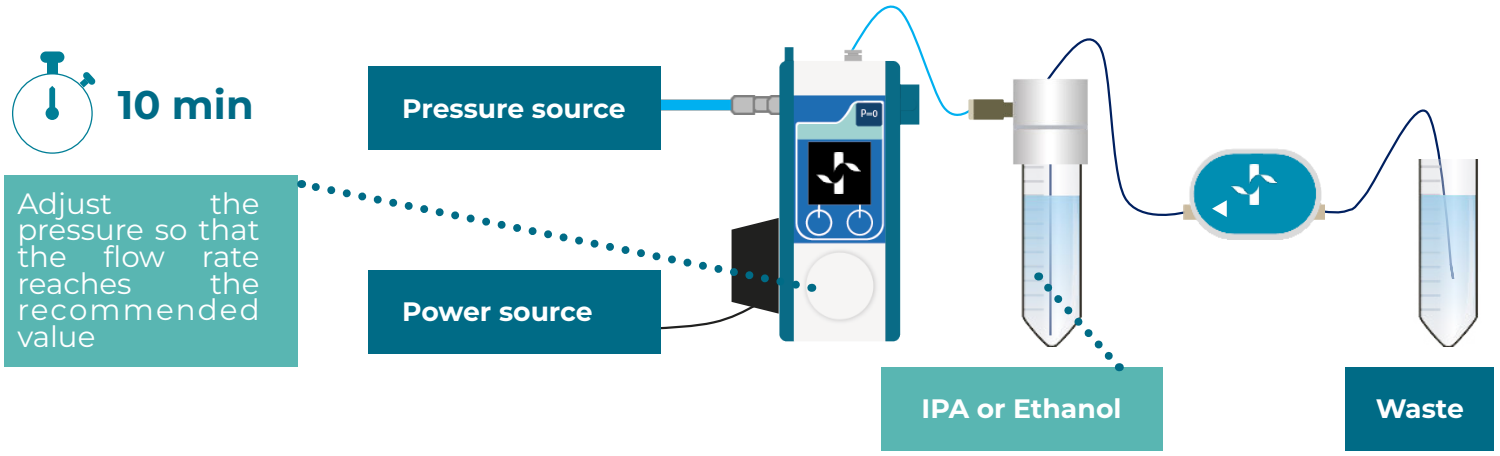
Adjust the pressure so that the flow rate reaches the recommended value



CLEANING PROCEDURE

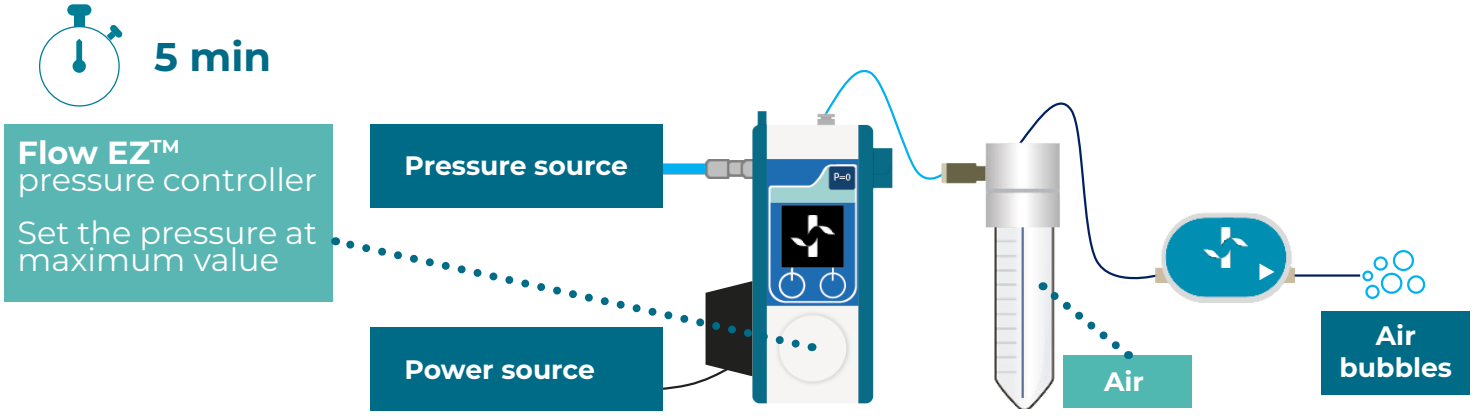
Step 3: Wash with Isopropanol or Ethanol

Change the solution in your reservoir for **isopropanol or Ethanol.** Wash for **10 min at the recommended flow rate** (refer to the table at the end of this document).



Step 4: Air Dry

Empty the reservoir. **Dry the Flow UNIT** at **maximum pressure** until air comes out **for at least 5 min.** This will evaporate the IPA inside the capillary to **avoid building up deposits** that can degrade the Flow UNIT's performance.



Place the yellow plugs on the sensor if it is to be stored.

CLEANING PROCEDURE

ADVANCED CLEANING PROTOCOL

When working with **cells or biological content**, we recommend performing this protocol **twice a month**. Regular cleaning ensures the removal of residues and contaminants, maintaining the accuracy and reliability of the device.

Following this protocol is essential if you notice **any deviation in your sensor readings over time,** which is likely due to the formation of a biofilm.

The main steps are the same as the daily protocol. The main difference resides in the exposure times of the sensor to the different solutions.

PROTOCOL

1. **Filter** your solutions

2. Rince the system with your **liquid** at recommended flow rate for **5 min.**

3. Fill with your **detergent solution** (Tergazyme) and **let stand without flow for 2 hours.**

4. Rinse with **DI Water** at recommended flow rate for **30 min**.

5. Wash the system with **Isopropanol** at recommended flow rate for **30 min**.

6. **Dry** properly your system with **air** at **maximum pressure** for **10 min**.

Details of the Step 3: Wash with Tergazyme

Prepare a **1% fresh Tergazyme solution**. Fill the entire system, including the sensor, with the Tergazyme solution.

Once the system is filled, **stop the flow** to allow the **solution to remain static**. If necessary, close the circuit during this step. Let the Tergazyme solution sit in the system for **2 hours.** This allows the detergent to dissolve and remove contaminants effectively.

RECOMMENDED FLOW RATE

The following table provides the recommended flow rates for each sensor to ensure optimal performance and efficiency during the cleaning process.

Sensor model	Recommended Flow Rate
Flow UNIT XS	750 nL/min
Flow UNIT S	3,5 µL/min
Flow UNIT M	40 µL/min
Flow UNIT L	500 µL/min
Flow UNIT XL	1 mL/min
Flow UNIT M+	500 µL/min
Flow UNIT L+	1 mL/min

VERSION
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afaq ISO 9001 Qualité AFNOR CERTIFICATION

FLUIGENT