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eDNA Sampler User Manual

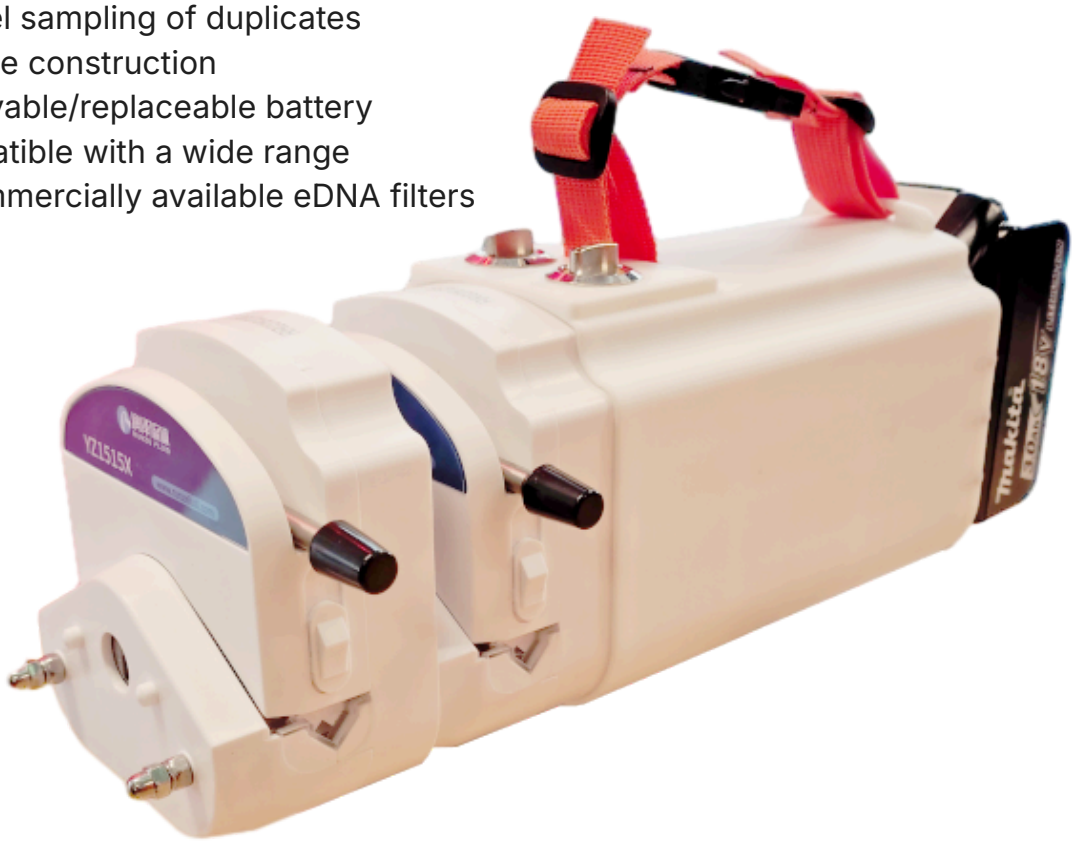
This manual provides instructions for operating and maintaining the eDNA sampling pump built by F & Z Solutions.

Introduction

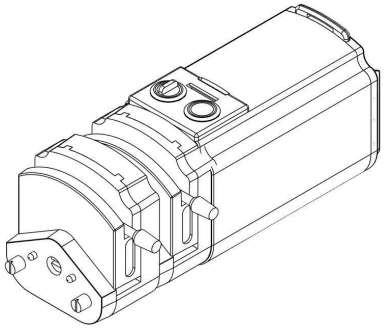
The eDNA sampler is designed to pump water through a silicone or rubber tube.

Key Features

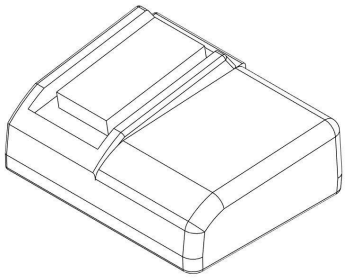
- Speed control via bluetooth and physical switches
- Reversible flow direction
- Parallel sampling of duplicates
- Durable construction
- Removable/replaceable battery
- Compatible with a wide range of commercially available eDNA filters



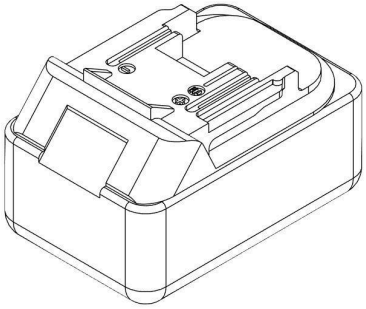
Contents



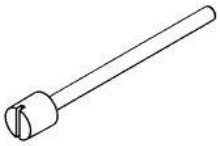
Dual head pump



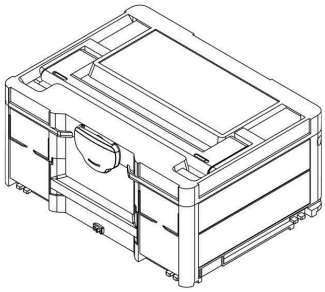
Charger



Battery (2 pcs)



Single head bolts (2 pcs)



Transport case

Set of manuals

Basic operation:

Materials:

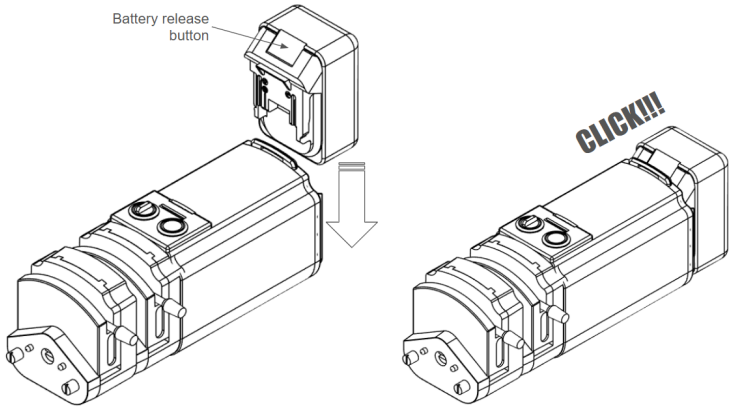
- Pump
- Charged battery
- Short peristaltic tubing (included)
- Tubing for intake/outlet (not included)
- eDNA filter (not included)

Start:

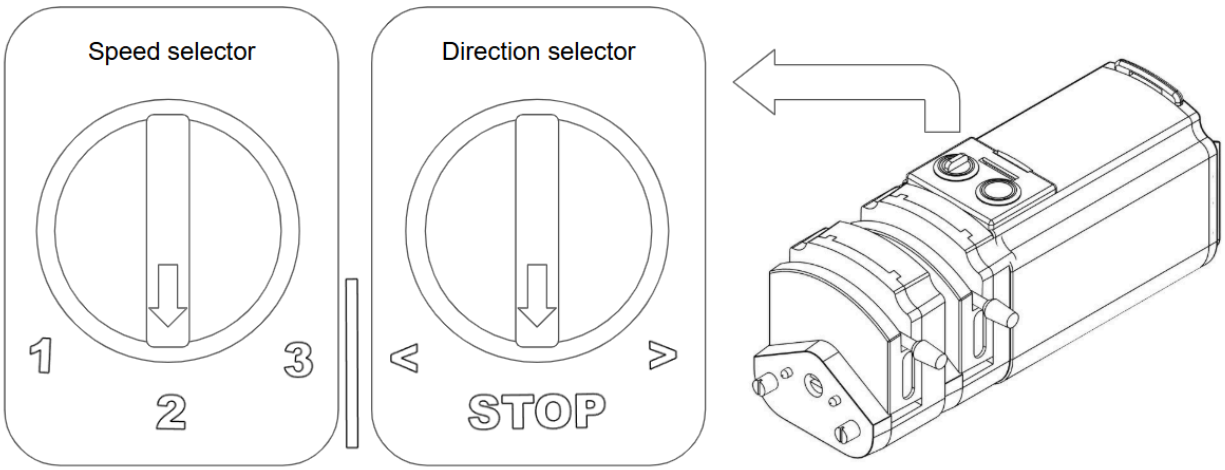
1. Insert peristaltic tubing
    a. Lift the rod with the black plastic tip and move it 180 degrees to open access to the rollers.
    b. Insert peristaltic tubing (either the short piece provided or other appropriate tubing) into the opening, lifting the tabs at the sides of the pump to thread the tubing through the rollers and out the sides of the pump.
    c. Return the rod to its original position, locking the tubing in place.
    d. Scan the QR to the right for a video demonstration of the installation process.

Warning: always remove the battery to install or remove the peristaltic tubing, and ensure there are no objects obstructing the rollers - keep hands away from the rollers during operation.

2. Insert the battery by sliding it into place, listening and feeling for a distinct click.



3. Initiate pumping using the physical switches on the pump:
    a. There are two physical switches on the pump, one controls direction (indicated by arrows) with “STOP” in the center, the other controls speed where the number 1 indicates the lowest speed, and the number 3 indicates the highest speed.
    b. Ensure that the direction selector is at the “STOP” position when inserting the battery. If the direction selector is not at the “STOP” position when the battery is inserted, the pump will not start until the direction selector is first switched back to “STOP” and then a new direction.



Light signals

Light signals can be used to interpret the condition of the pump.

Speed selector	Direction selector	Both	Meaning
–	–	Flashing rapidly	Battery connected, system starting up
–	Rapid flashing	–	Safety stop: Battery inserted with the direction dial in an active position or Bluetooth control interrupted. Turn the direction dial to “stop”.
–	Slow flashing	–	Pump is ready to use
–	Solid light	–	Clockwise rotation
–	1 flash per second	–	Counterclockwise operation
Single flash	–	–	Lowest speed setting
Double flash	–	–	Medium speed setting
Triple flash	–	–	Highest speed setting
–	–	Alternating	Bluetooth control: can be overridden by turning any dial

Mobile app control

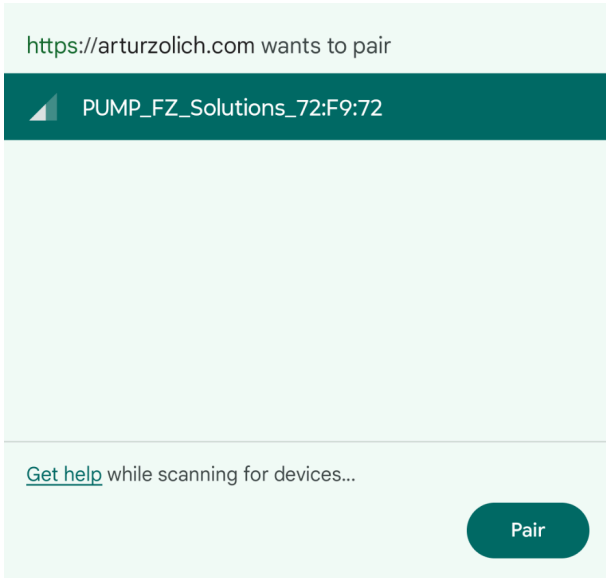
The pump can be controlled from a mobile application via bluetooth connection. The mobile application also allows reprogramming of the speeds assigned to steps 1, 2 and 3 on the physical switch. Always use *either* the mobile application *or* the physical switches when controlling the pump.

Note: as a safety measure, changing the position of either switch during bluetooth operation will cause an emergency stop.

1. Ensure bluetooth is enabled on your phone.
2. Ensure the pump is on (battery connected).
3. Open the **Google Chrome** browser on your phone.
4. Open the Pump control software link using the web address: https://arturzolich.com/citizen

   or scan the code on the right.
5. A pop-up should appear giving the option to "**Install**" - accept to enable offline operation.
6. If no pop-up appears, go to the settings in the chrome browser (⋮) and select "add to home screen" - choose "install" (**Note:** the app can also be used on a PC).
7. Click "**Connect**" on the home screen as shown below:

8. A Bluetooth pairing window will appear. Select the pump from the list, and click "**Pair**".



9. After pairing, you will see the control menu, described on the next page.

Control Menu:

Emergency stop button: stops the pump at any time. In addition, using the physical switches during the Bluetooth operation causes an emergency stop.

Battery voltage: displays current battery voltage

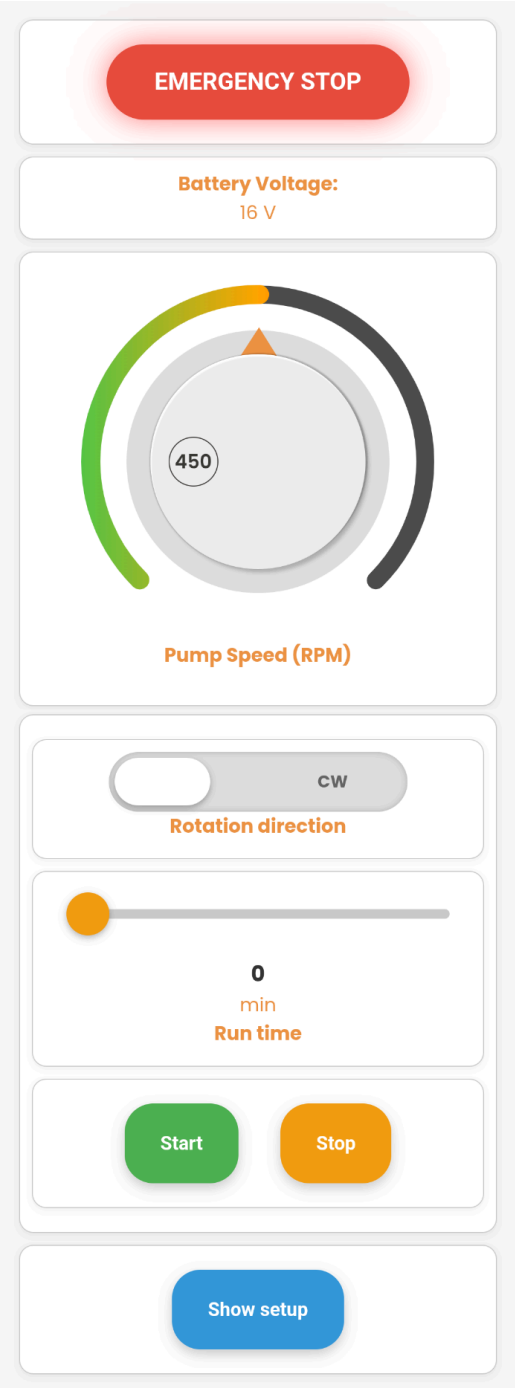
Pumping speed dial: Drag the orange arrow around the dial to select pumping speed (in RPM)

Rotation direction selector: Choose Counterclockwise (CCW) or clockwise (CW) operation, when looking towards the pump heads

Run time: If desired, set a run time with the slider (minutes). If set to 0, the pump will run continuously

Start: begins pumping
Stop: ends pumping

Show setup: Navigates to a new pane for programming preset speeds



Setup menu:

This menu is for programming the three speeds on the physical switch (for manual operation).

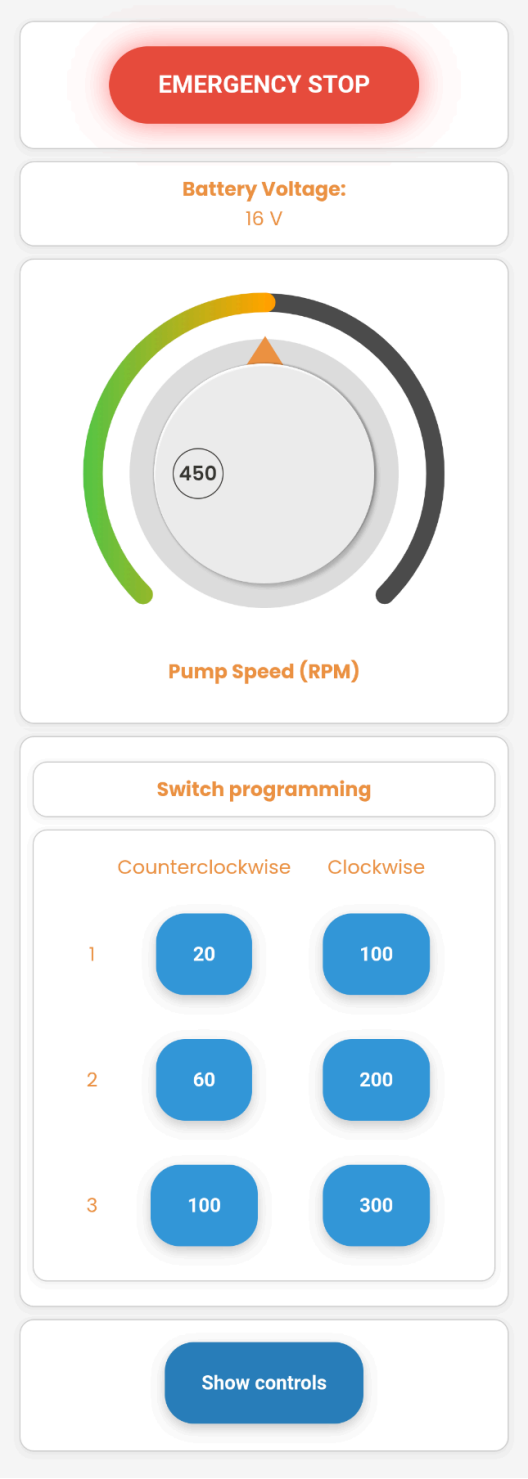
To change preset speeds for the physical switch:

1. Select a speed using the main dial
2. Click the blue button corresponding to the direction and number you want to change.
3. **Wait for a few seconds.** The selected speed should now appear on the blue button.

Each speed can be different for clockwise/counterclockwise operation.

The speed is shown in RPM.

Show controls: returns to control menu



Peristaltic pump head technical details

The peristaltic pump head is model YZ1515X provided by Runze Fluid. The following table provides basic information about the operating limits and compatibility of the pump head.

Model No.	**YZ1515X-3B/3H/6B/6H** YZ2515X-3B/3H/6B/6H
Pump Roller	**SST 3**/6 rollers
Pump Head	ABS engineering plastic
Fast Tubing	YES
Pump Color	**White**/Black
Compatible Motor	stepper motor/DC motor/AC motor
Motor Speed	0-400rpm
Flow Range	0-1700ml/min
Tubing Size	ID1.6-8.0mm WT1.6-2.5mm OD≤11.4mm
Tubing Life	Silicone≥200H BPT Rubber≥1000H
Pressure Rating	Up to 3 bar (0.3Mpa)
Working Environment	0-40°C,＜80% non-condensing
Max DB	65db
Suction	5 meters
Head	8 meters
Dimension (L*W*H)	122.1*106*73.5mm
Net Weight	**373g (3 roller)** / 433g (6 roller)

Further information can be found at:
www.runzefluid.com/products/peristaltic-dosing-pump.html

Safety features and considerations

1. Mechanical damage or impingement can occur with moving parts. Keep obstructions away from the rollers while the pump is on and under operation.
2. Emergency stop can be activated through:
    a. physical switches
    b. mobile app
    c. removing the battery (last resort)
3. The pump generates vibrations while pumping. Ensure that the pump is supervised under use, and consider securing it in place for handsfree operation during longer periods of use.
4. If the pump only runs for 1-2 seconds, then stops, the battery voltage is too low. Charge the battery and replace.