

BioDuo

Small | Smart | Specific
Elevating Bio Processing Excellence!



TABLE OF CONTENTS

1. Introduction	1
1.1. Overview.....	1
1.2. Purpose.....	1
1.3. Safety Precautions and Warnings	2
2. Product Description	3
2.1. Brief description of the peristaltic pump.....	3
2.2. Technical specifications	3
2.3. Components and accessories included in the package	4
3. Installation and Setup	4
3.1. Unpacking and inspection.....	4
3.2. Installation guidelines.....	5
3.3. Electrical connections.....	5
3.4. Tubing selection and installation.....	5
4. Operating Instructions	6
4.1. User interface overview	6
4.2. Powering on/off the pump	22
4.3. Setting up parameters (flow rate, speed, direction).....	22
4.4. Loading and unloading tubing.....	23
4.5. Changing tubing and maintenance intervals.....	24
4.6. Changing Head / Head Replacement.....	26
4.7. Remote Control and Communication with BioDuo.....	27
5. Calibration and Calibration Verification	32
5.1. Importance of calibration.....	32
5.2. Calibration procedure	33
5.3. Verification of calibration accuracy.....	36
6. Maintenance and Cleaning	37
6.1. Routine maintenance tasks	37
6.2. Cleaning procedures for various components	38
6.3. Tube replacement and maintenance.....	39
7. Troubleshooting	40
7.1. Common issues and their possible causes	40
7.2. Contact information for technical support.....	41
8. Safety Precautions	41
8.1. Safety guidelines during operation	41
8.2. Electrical safety precautions.....	43
8.3. Disposal of waste materials.....	44

TABLE OF CONTENTS

9. Warranty	45
9.1. Contact details for customer support or service centres.....	45
9.2. FAQs.....	45

1. Introduction

1.1. Overview

Peristaltic pumps are a type of positive displacement pump that operates by squeezing & releasing a flexible tube to move fluids for either transferring, dispensing, dosing & filtration purpose. Basic operation of peristaltic pump involves a rotating roller that compress & create a wave-like motion along the flexible tube, propelling the fluid in one direction.

► **Following are the advantages of peristaltic pump:**

- **Gentle Fluid Handling** : The pumping action does not cause shearing or damage to sensitive fluids, making it suitable for delicate or shear-sensitive applications.
- **Prevent Contamination** : The fluid remains contained within the tubing, minimizing the risk of contamination and cross-contamination.
- **Versatility**: Peristaltic pumps can handle a wide range of fluids, from viscous and abrasive substances to corrosive or sterile fluids.
- **Repeatability and Accuracy**: Peristaltic pumps offer precise control over flow rates, enabling accurate dispensing or continuous flow for consistent results.
- **Easy Maintenance**: Tubing replacement is often the only maintenance required, making peristaltic pumps simple to maintain and clean.

► **Peristaltic pumps are commonly used in following industries:**

- **Biotechnology and Pharmaceutical**: Peristaltic pumps are used for cell culture, fermentation, chromatography, media and buffer transfer, Fluid filtration, tablet coating, injectables, syrups, suspensions, ear drop and eye drop filling, drug discovery and other bio-processing applications.
- **Food and Beverage**: Peristaltic pumps are utilized for gentle transfer and dosing of food and beverage ingredients, flavourings, additives and colours.
- **Chemical**: These pumps are suitable for metering and transferring corrosive chemicals, abrasive slurries, wastewater, fertilizers, herbicides/insecticides, perfume filling and other industrial fluids.
- **Environmental and Water Treatment**: Peristaltic pumps can handle the dosing of chemicals for water treatment processes, as well as sample collection and analysis in environmental monitoring.

1.2. Purpose

The purpose of this manual is to provide comprehensive guidance and instructions for proper installation, operation, maintenance, and troubleshooting of the peristaltic pump. It serves as a valuable resource for users to understand and utilize the pump effectively and safely. The manual aims to help users maximize the performance and capabilities of the peristaltic pump. By following the instructions and recommendations provided, users can achieve optimal results, accurate fluid control, and reliable operation.

The manual includes important safety precautions and guidelines to ensure the safe operation of the peristaltic pump. It outlines potential risks, hazards, and safety measures to protect both users and the equipment. Additionally, the manual may address regulatory or compliance requirements, such as those related to electrical safety, fluid handling or hazardous materials.

The manual serves as a troubleshooting guide, providing users with step-by-step instructions to diagnose and resolve common issues that may arise during the operation of the peristaltic pump. It helps users identify the cause of problems and offers solutions to minimize downtime and maintain smooth operation.

The manual serves as a valuable reference tool for users, providing technical specifications, diagrams, and other information necessary for proper operation and maintenance of the peristaltic pump. It may also include contact details for customer support or service centres, enabling users to seek assistance, if needed.

1.3. Safety Precautions & Warnings

This section covers

a. General Safety Precautions:

- i. Read the entire manual before operating the pump.
- ii. Follow all safety instructions and guidelines provided.
- iii. Only operate the pump in accordance with its intended use.
- iv. Do not modify or alter the pump without proper authorization.
- v. Keep the pump and surrounding area clean and free from hazards.
- vi. Use personal protective equipment (PPE) as required.

b. Electrical Safety:

- i. Ensure that the pump is connected to a properly grounded electrical power source.
- ii. Use the appropriate power source and voltage specified for the pump.
- iii. Avoid using the pump in wet or damp environments unless specifically designed for such conditions.
- iv. Do not touch electrical components with wet hands or while standing on a conductive surface.
- v. Unplug the pump from the power source before performing any maintenance or cleaning.

c. Fluid Handling Safety:

- i. Always use compatible tubing and fittings recommended by the manufacturer.
- ii. Take precautions when handling hazardous or corrosive fluids, following appropriate safety protocols and using proper PPE.
- iii. Be aware of the pressure and flow rate limits of the pump and avoid exceeding them.
- iv. Ensure that the tubing is properly installed, secured and in good condition to prevent leaks or spills.
- v. When changing or replacing tubing, use caution to avoid contact with the fluid.

d. Operator Safety:

- i. Do not operate the pump if you are fatigued, under the influence of drugs or alcohol or otherwise impaired.
- ii. Familiarize yourself with the pump's control panel and user interface before operation.
- iii. Do not touch moving parts of the pump while it is in operation.
- iv. Keep hands, clothing, and other objects away from the pump's rollers or other rotating components.
- v. Follow the recommended start-up and shutdown procedures provided by the manufacturer.

e. Emergency Situations:

- i. In case of an emergency, immediately disconnect the power supply to the pump and remove the tubings
- ii. Have a clear understanding of the emergency stop procedures and locations.
- iii. Know the location of fire extinguishers or other safety equipment in the vicinity of the pump.
- iv. Have a plan in place for handling spills, leaks or other potential emergencies.

2. Product Description

2.1. Brief description of the peristaltic pump

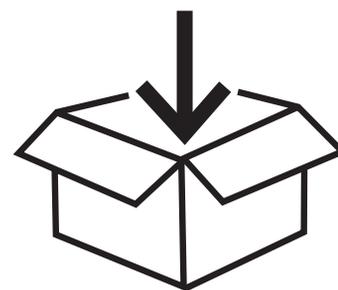
BioDuo, the advanced dual head peristaltic pump by Resolve Biotech. With its compact design and durable construction, BioDuo delivers precise fluid control and consistent flow rates for a wide range of bio processing applications. Equipped with an intuitive touch screen display, users can easily configure settings, monitor real-time data, and optimize their bio processing with ease. The dual head configuration ensures enhanced fluid control and efficiency, while the variable speed control allows for flexible handling of different fluids by using different tube size. BioDuo's small footprint and versatile capabilities make it the ideal choice for laboratories and research facilities seeking reliable and high-performance bio processing solutions.

2.2. Technical specifications

Control Range (turndown ratio)	0-200 rpm (0.1 step interval)
Power Supply DC input	24V @ 3A
Enclosure rating	Designed to IP31 (Equivalent to NEMA 2, suitable for indoor use. Protected from dripping water & dirt. Can be wiped but should not be immersed).
Accuracy	0.1% @ 100 mL (using tube ID: 4mm)
Tubing options	Silicone Tubing only
Operating Temperature	5°C to 40°C, (41°F to 104°F)
Weight	5 kgs

2.3. Components and accessories included in the package

Components/Accessories	Quantity	UOM
Drive	1	No
Heads	2	Nos
User Manual	1	No
Power Adapter	1	No
Silicone Tubing	5	Meters



3. Installation and Setup

3.1. Unpacking and Inspection

When you receive your peristaltic pump, it is important to follow the unpacking and inspection procedures to ensure that the pump is in good condition and all components are accounted for. Follow these steps:

3.1.1. Unpacking:

- Carefully remove the peristaltic pump from its packaging, taking care not to damage any components or accessories.
- Inspect the packaging for any signs of damage during shipping. If the packaging is damaged, take photographs as evidence for potential insurance claims.

3.1.2. Component Check:

- Check that all components and accessories listed in the user manual or packing list are present.
- Verify the integrity of each component, ensuring there are no visible signs of damage or missing parts.
- If any components are damaged or missing, contact the supplier or manufacturer for assistance.

3.1.3. Documentation Review:

- Review the user manual and any accompanying documentation provided by the manufacturer.
- Familiarize yourself with the product specifications, safety precautions, and recommended operating procedures.
- Pay attention to any special instructions or warnings related to the unpacking and initial setup of the pump.

3.1.4. Power Requirements:

- Confirm that the power requirements (voltage, frequency, and power cord specifications) of the peristaltic pump match the electrical supply available in your location.
- If there are any discrepancies, consult the user manual or contact the manufacturer for guidance.

3.1.5. Visual Inspection:

- Inspect the peristaltic pump for any signs of physical damage or loose components.
- Check that all buttons, switches, connectors, and display screens are intact and functioning properly.
- Ensure that all labels, markings and safety signs are legible and clearly visible.

3.1.6. Calibration Verification:

- If calibration is required for your specific pump model, ensure that it has been calibrated and verified by the manufacturer or supplier.
- Check for any documentation provided with the pump.

3.1.7. Safety Precautions:

- Familiarize yourself with the safety precautions outlined in the user manual.
- Ensure that you have the necessary personal protective equipment (PPE) as recommended by the manufacture for safe operation.

By following these unpacking and inspection procedures, you can verify the condition of your peristaltic pump and ensure that it is ready for safe and reliable operation. If you have any questions or concerns during the unpacking and inspection process, contact the manufacturer or supplier for assistance.

3.2. Installation guidelines:

- This device needs to be placed in a dry area.
- The BioDuo pump is an easy plug & play device(Engineer's presence for installation is not needed. In case, needed, online support is always available).
- Once the device is started you can browse through the menu & start

3.3. Electrical connections

- The pump runs on 24V DC adapter.
- Use only the manufacture approved adapter.

3.4. Tubing selection and installation

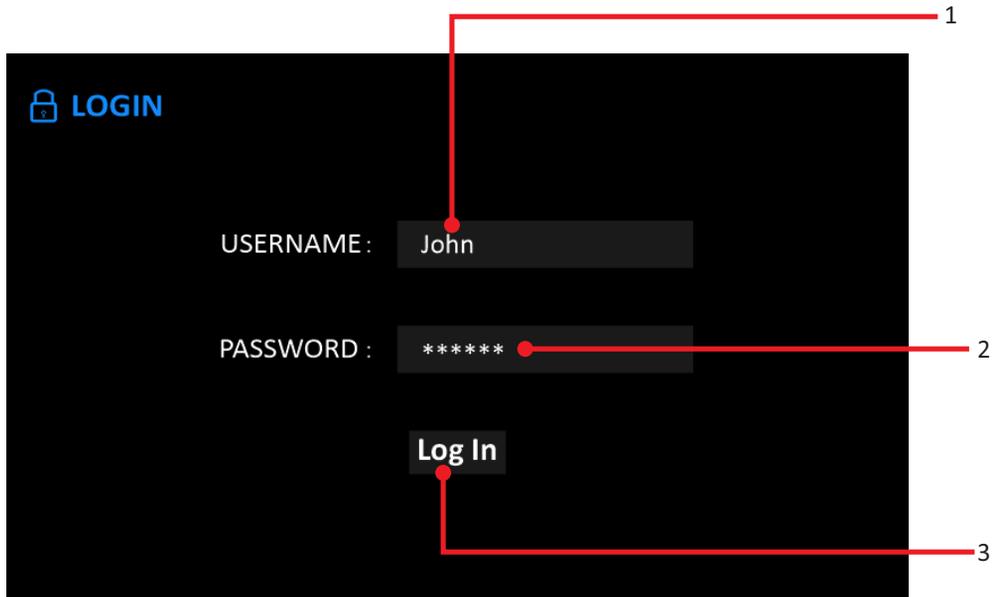
- Use manufacture approved tubing for best output.
- Silicon tubing (60-65 Shore A) with thickness of 1/16" (1.58mm) is to be used along with the pump.
- **Adjustment for the rollers need to be done using a screwdriver to nullify the tolerances of the tubing.**

4. Operating Instructions

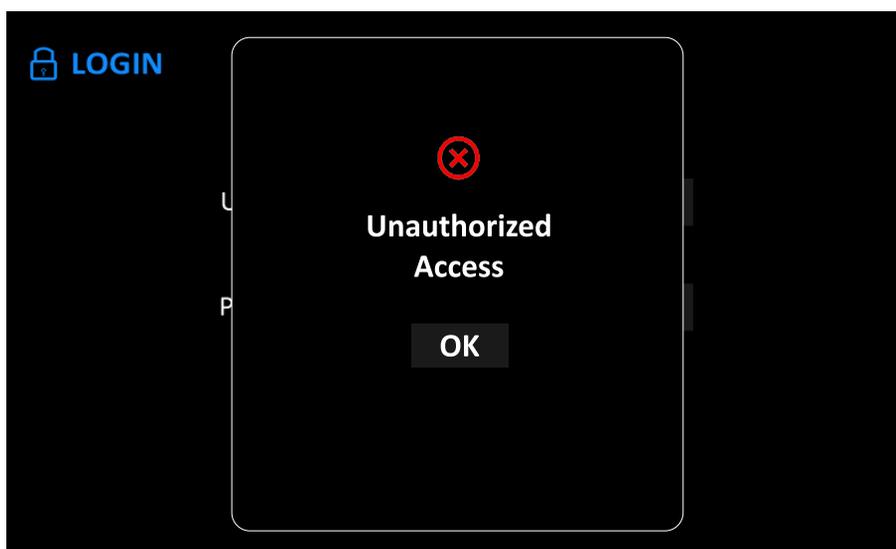
4.1. User interface overview

4.1.1. Login Screen

If your pump comes with Security enabled, you'll be presented with a login screen when the device boot is completed.

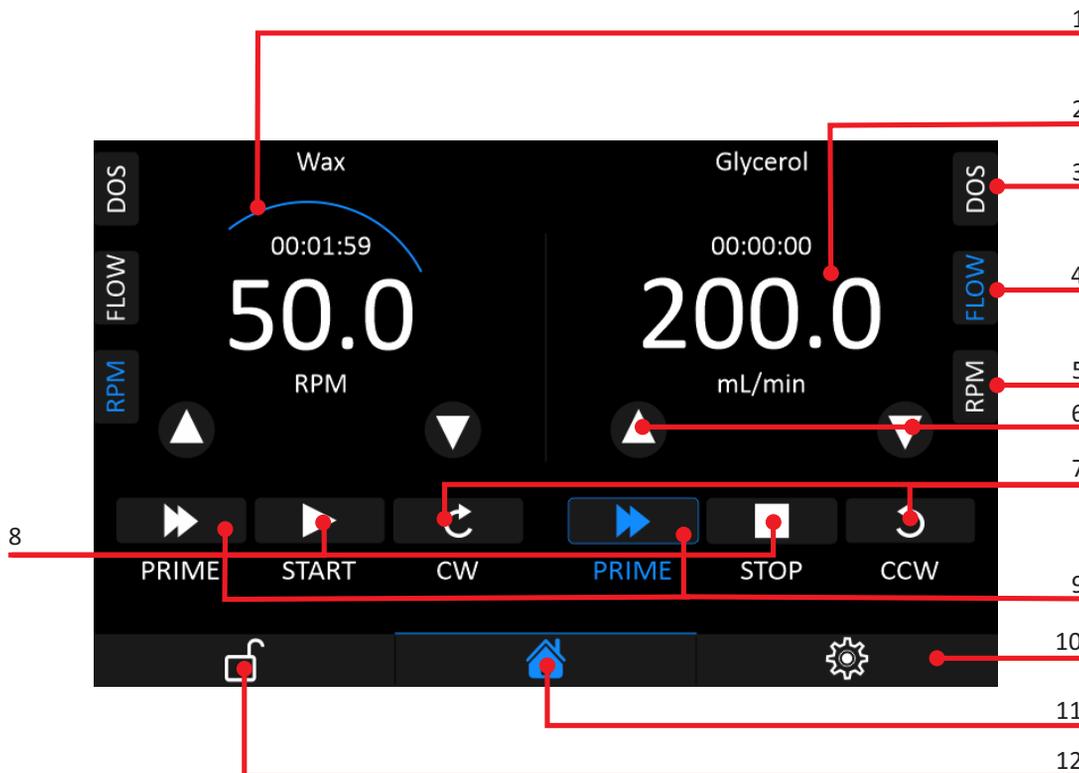


1. **Username:** Any authorized user will be given a username by the admin. Tap on this field and a keyboard shall be displayed. Username is case-sensitive.
2. **Password:** Authorized user can enter the password in the keyboard that appears after tapping on this field. Password shall be displayed only in keyboard and will be masked by (*) when enter is pressed on the keyboard. Password is case-sensitive. (Default User Name: admin & password admin)
3. **Login Button:** When both the fields have been filled, user can press this button to operate the pump upon successful authorization. If the user is unauthorized then a pop up with an error will be displayed. <Unauthorized Access pop up>



4.1.2. Home Screen

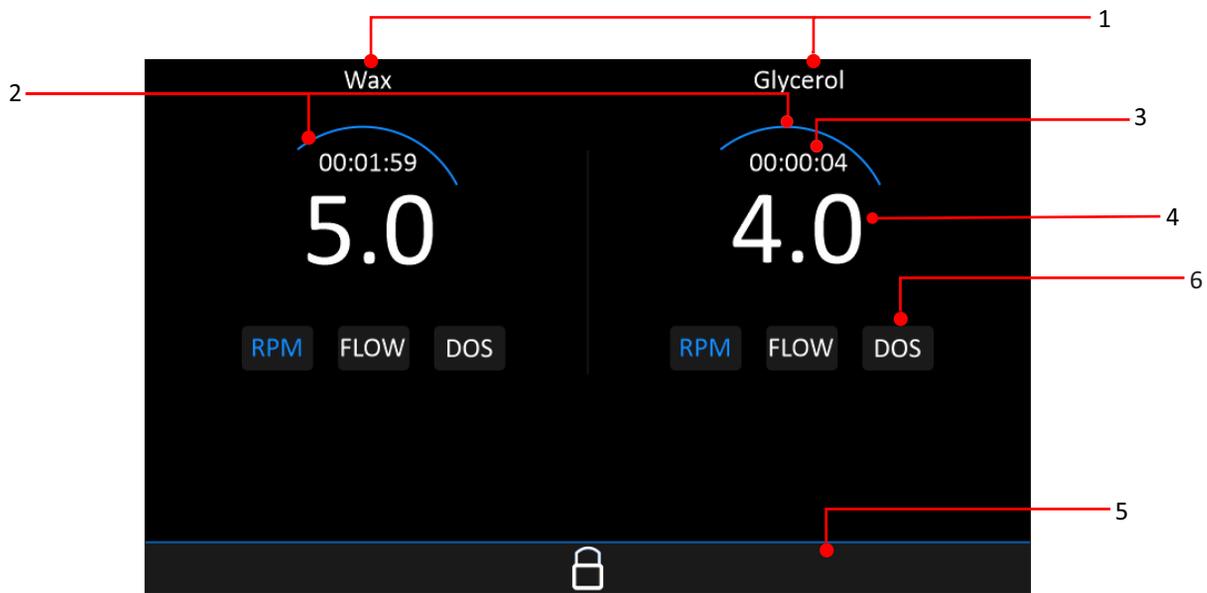
As soon as the pump is turned On, you will be presented with the Home screen after animation is complete. If you have Security enabled pump then this will be displayed after successful login.



1. **Direction:** Shows the direction of rotation of the pump.
2. **Value:** Displays the Current Value of **RPM/FLOW/DOS**.
3. **DOS (Dosage Screen):** Use this screen to use the pump as dosage control to dispense a set volume of fluid in millilitres. Default the volume and time settings are done in “Dosing Settings” screen.
4. **FLOW (Flow Control):** Use this screen to use the pump as a fluid dispenser at a specified flow rate in millilitres Default per minute. Touch the number to open a keyboard screen that allows you to enter the flow rate at which the fluid has to be dispensed.
5. **RPM:** Use this screen to independently control the RPM of the motor.
6. **UP/DOWN:** Button to increase/decrease value of RPM/FLOW
7. **CW/CCW:** Button to toggle rotation of motor between Clockwise/Anti-Clockwise
8. **START/STOP:** Button to toggle START/STOP running the motor
9. **PRIME:** Button to run motor at highest rated speed
10. **SETTING:** Button to go to settings screen
11. **HOME:** Button to go to home screen
12. **LOCK:** Button to lock the screen

4.1.3. Lock Screen

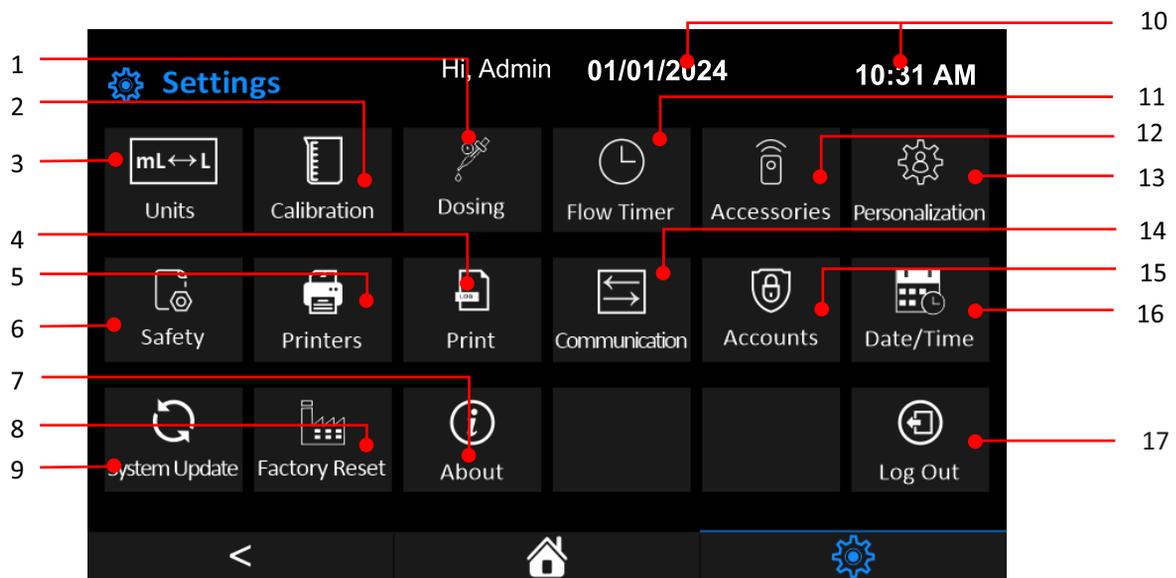
The lock screen shows the following Display/Image:



1. **Liquid Name:** These labels display the name of liquids for the selected profile.
2. **Direction:** This shows the direction (CW / CCW) for the motor's rotation.
3. **Timer:** This shows the time remaining (if set) for the cycle to be completed.
4. **Set Value:** This label shows the set value for the selected mode.
5. **Unlock Button:** Use this button to unlock.
6. **Pump Active Mode:** Displays in which mode the respective pump head is active.

4.1.4. Setting Screen

The setting screen contains the following menu Display/Image.

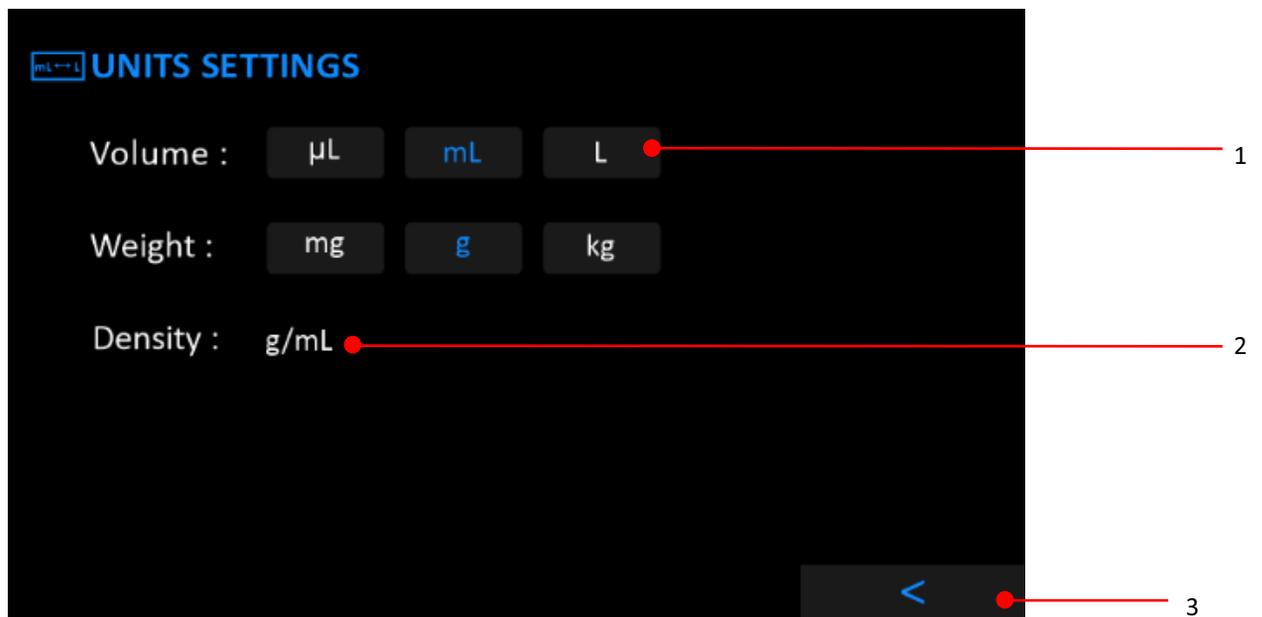


1. **Dosing Settings:** This setting is to be used to enter the volume and time is given by the pump for dosing.
2. **Fill Volume Calibration:** This setting is used to perform calibration and enter the required values.
3. **Units:** This setting is used to change units from μL -> mL -> L / mg – g – kg.
4. **Print:** This setting is used to print the saved logs.
5. **Printers:** This setting is used to pair a Bluetooth printer.

7. **About:** This screen shows the Hardware and Software version.
8. **Factory Reset:** This is used to clear all the profiles & reset the settings to default values.
9. **System Update:** For Future Use.
10. **Current Date/Time:** This will show the current date & time.
11. **Flow Timer:** This setting is used to set the timer wait time & batch size for the RPM or Flow mode.
12. **Accessories:** This setting is used for accessories connected to the pump.
13. **Personalization:** This setting is used to create profiles. (100 profiles can be created)
14. **Communication:** This setting is used to enable Serial (RS232) / Analog (4-20mA).
15. **Security:** This setting is used to Add/ View/Modify/Delete users.
16. **Date/Time:** This setting is used to set the date & time. This date / time will be used for logging.
17. **Logout:** This logs out current user and brings the pump to Login screen.

4.1.4.1. Units

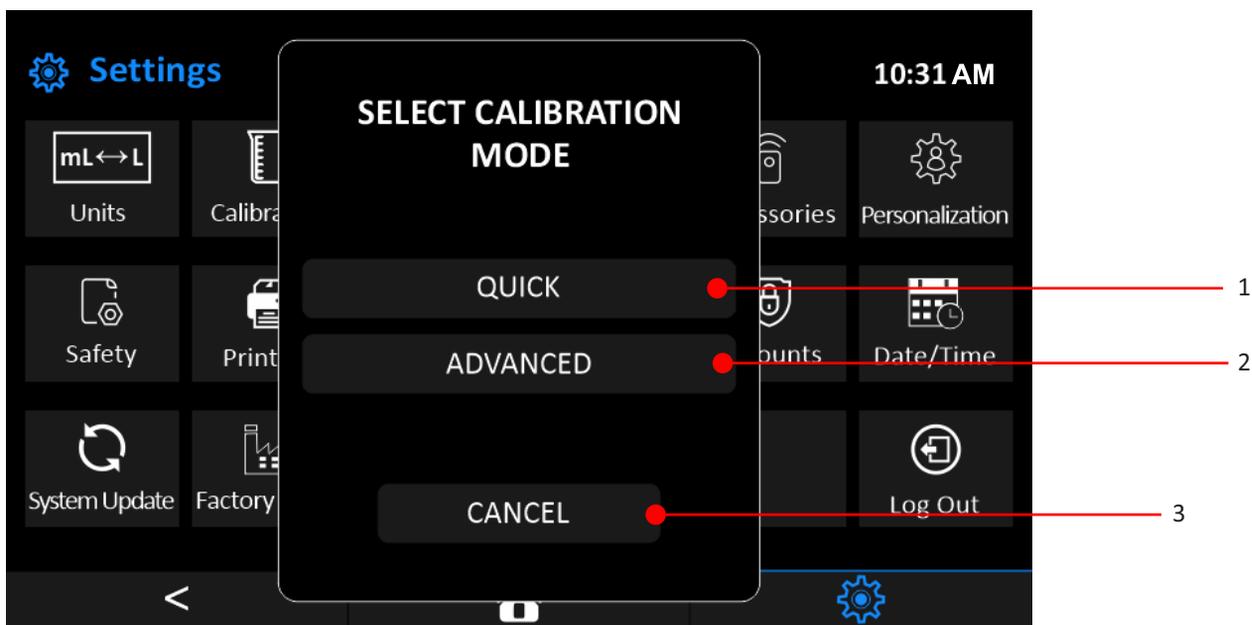
The units screen allows you to set the working units to either $\mu\text{L}/\text{mg}$ or mL/g or L/kg .



1. **Unit Selector:** Operating unit group of the pump can be changed here. This unit change applies to the entire pump drive.
2. **Density Unit:** Indicates the applied unit system.
3. **Back Button:** This button will take you back to the settings screen.

4.1.4.2. Calibration

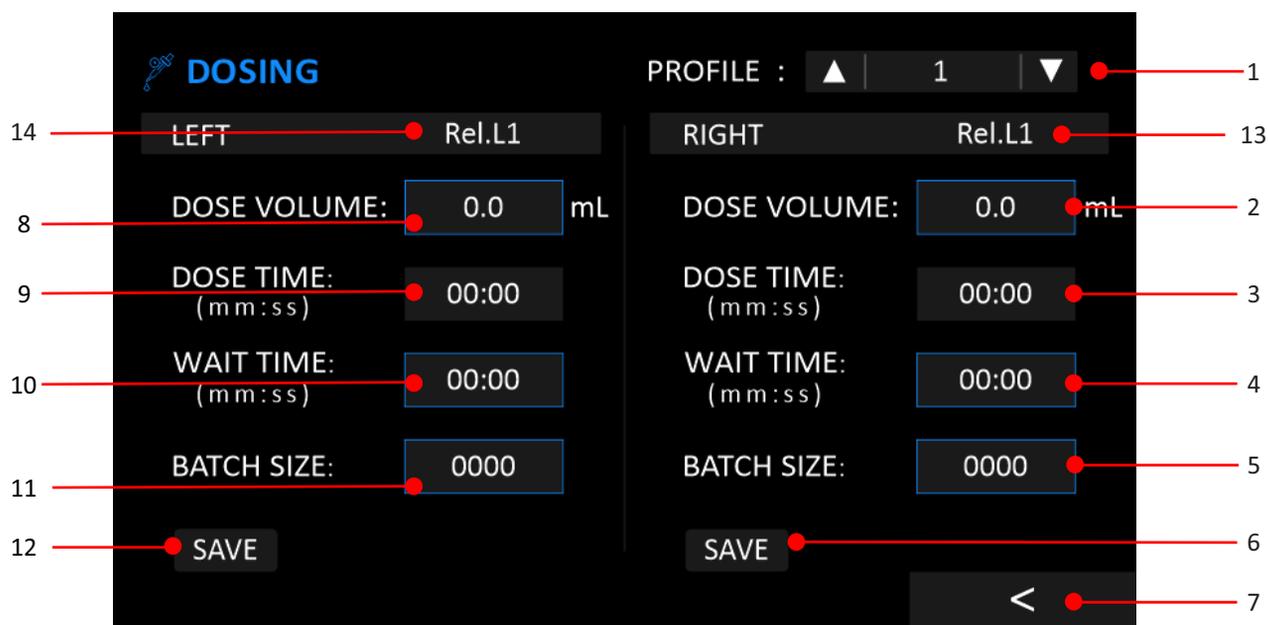
Select calibration mode



- 1. **Quick Mode:** For adjusting already calibrated liquids for tube size change or to account for calibration instrument tolerances.
- 2. **Advanced Mode:** For full calibration of the fluid for the first time.
- 3. **Cancel:** This closes the pop up and returns the user to settings screen.
For information regarding Calibration refer section 5.2.2.

4.1.4.3. Dosing

The dosing screen contains the following menu items.

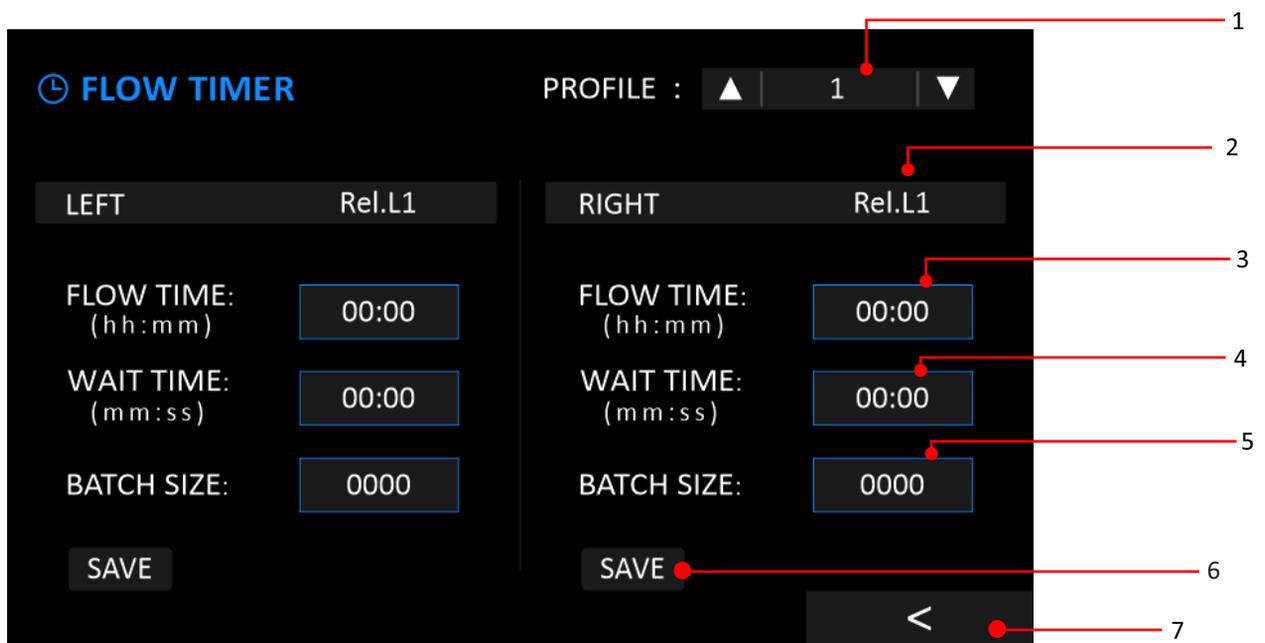


- 1. **Profile Selector:** Select the required liquid profile for dosing for profile creation, refer section 4.1.4.6
- 2. **Dose Volume (Right):** Set Dose volume which need to be dispensed in mL for Right side. This volume can be in uL and L as well depending upon operating units.

3. **Dose Time (Right):** Dose time will be calculated as per maximum speed in mm: ss for Right side. This field is updated when Save(Right) button is pressed with a valid volume.
4. **Wait Time (Right):** Wait time is the time gap between two cycles of dosing for Right side. Should be set to zero when performing filling operations using other devices.
5. **Batch Size (Right):** Batch size to be set from 0001 to 9999 for Right side. It is only applicable to 1D variants.
6. **Save (Right):** Save the dosing settings for Right side.
7. **Back Button:** Takes you back to the settings screen.
8. **Dose Volume (Left):** Set Dose volume which need to be dispensed in mL for Left side. This volume can be in uL and L as well depending upon operating units.
9. **Dose Time (Left):** Dose time will be calculated as per maximum speed in mm: ss for Left side. This field is updated when Save (Left) button is pressed with a valid volume.
10. **Wait Time (Left):** Wait time is the time gap between two cycles of dosing for Left side. Should be set to zero when performing filling operations using other devices (foot pedal/filling gum).
11. **Batch Size (Left):** Batch size to be set from 0001 to 9999 for Left side. It is only applicable to 1D variants.
12. **Save (Left):** Save the dosing settings for Left side.
13. **Profile Name (Right):** This displays the name of the liquid for which the settings are being saved and would be used on the Right Head of the pump.
14. **Profile Name (Left):** This displays the name of the liquid for which the settings are being saved and would be used on the Left Head of the pump.

4.1.4.4. Flow Timer

The flow timer can be used to set the total flow time, wait interval & total number of batches for the selected profile. These settings are brought in effect in RPM or FLOW mode. The screen is shown as below. The settings should be zero when using pump in Auto Mode.

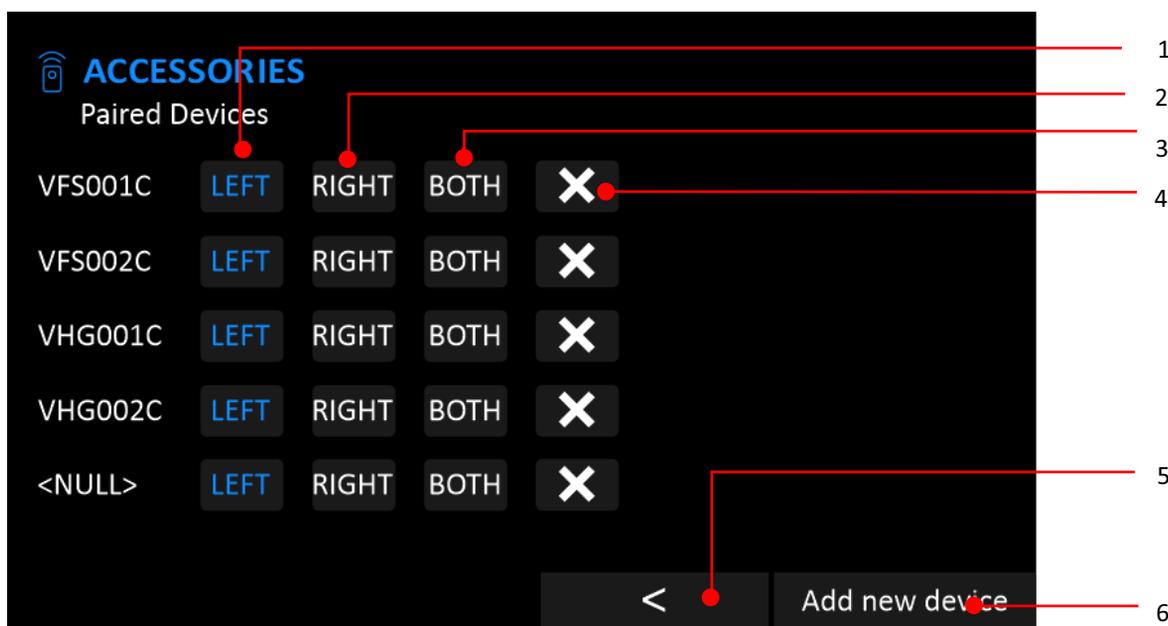


1. **Profile Selector:** Select the profile for which you want to set/modify the flow timer settings. For profile creation, refer section 4.1.4.6

2. **Profile:** When profile is selected the name of fluid automatically appears on RIGHT/LEFT available space.
3. **Flow Time:** Enter the hours & minutes for which the pump needs to run for each batch. Set to zero ('0') if it needs to run continuously.
4. **Wait Time:** Enter the minutes & seconds for which the pump needs to wait between batches. Set to zero ('0') if it needs to run continuously.
5. **Batch Size:** Enter the number of cycles for which this should be repeated. Set to zero ('0') if it needs to run continuously.

4.1.4.5. Accessories

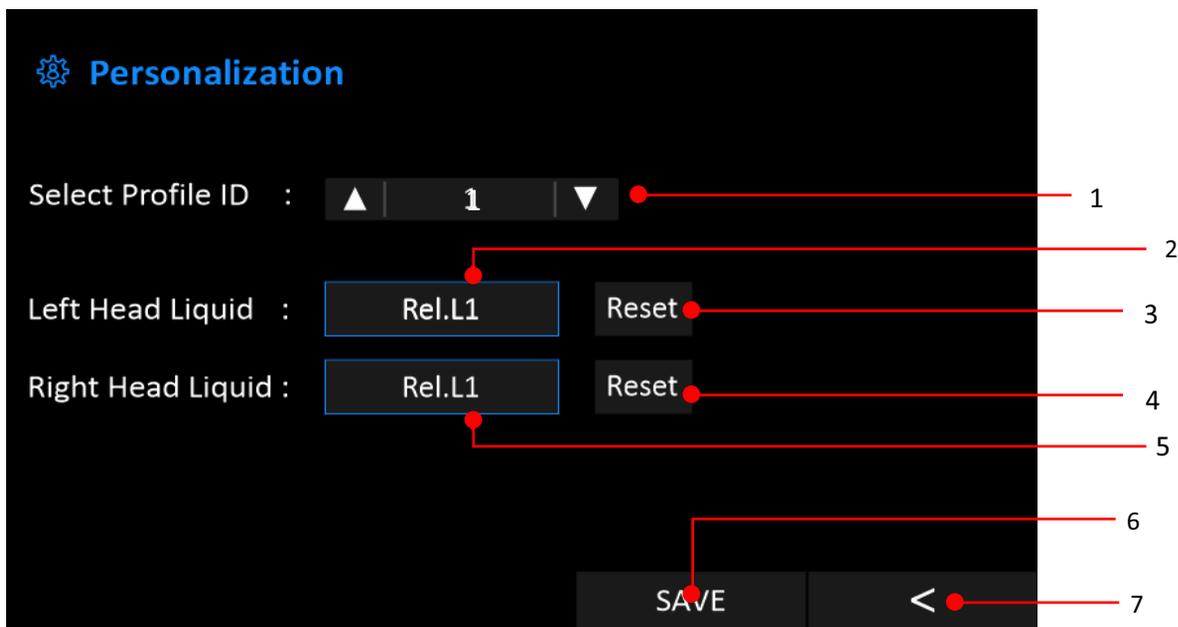
The accessories screen is shown as below.



1. **Left:** If selected the accessory is paired with Left head.
2. **Right:** If selected the accessory is paired with Right head.
3. **Both:** If selected the accessory is paired with Both heads.
4. **'X':** Press this button to unpair and remove the accessory.
5. **'<':** Press this button to go to previous menu.
6. **Add New Device:** You can add new accessory using this button. *(Only for Compatible Accessories)*

4.1.4.6. Personalization

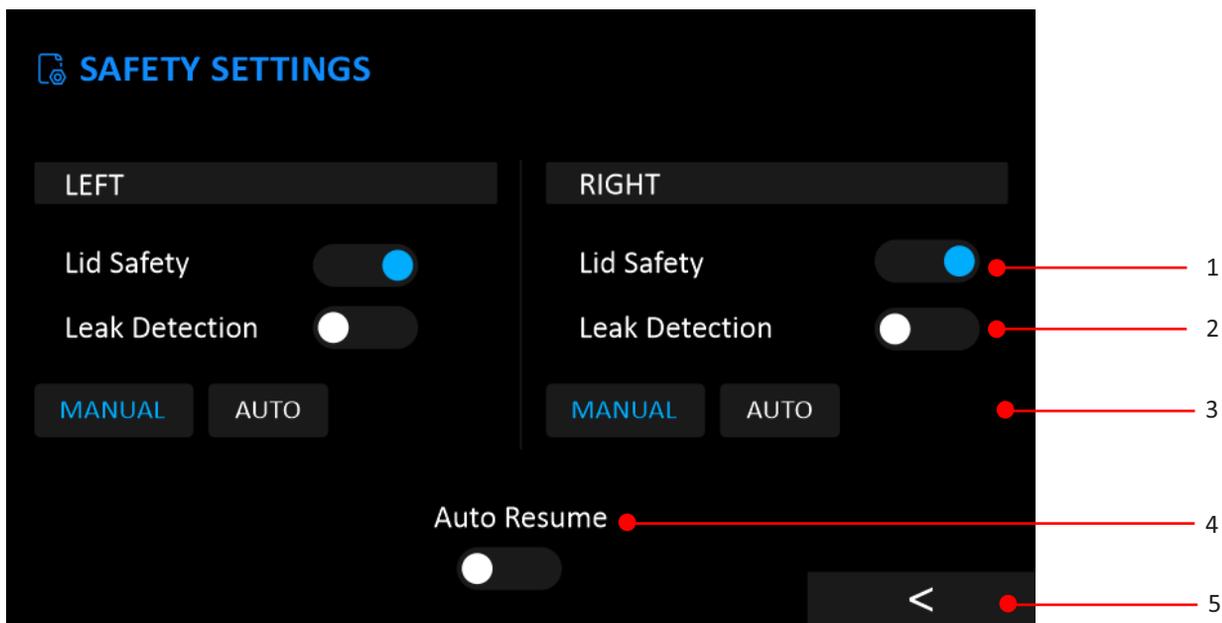
User can save names for different profiles for reminiscence.



1. **Profile ID:** Select the available profile index from (1-100).
2. **Left Head Liquid:** Tap to Enter the name of the Liquid “ Rel.L1” as above which is assigned to the left head of the pump.
3. **Left Profile Reset:** Upon pressing this button, User can clear the Left liquid profile upon pressing “Yes” on the confirmation pop up screen.
4. **Right Profile Reset:** Upon pressing this button, User can clear the Right liquid profile upon pressing “Yes” on the confirmation pop up screen.
5. **Right Head Liquid:** Tap to Enter the name of the Liquid “Rel.L1 as above which is assigned to the right head of the pump.
6. **Save:** Profile names entered in both the fields will be saved on the Profile ID selected, as above.
7. **Back:** Takes the user back to Settings screen.

4.1.4.7. Safety

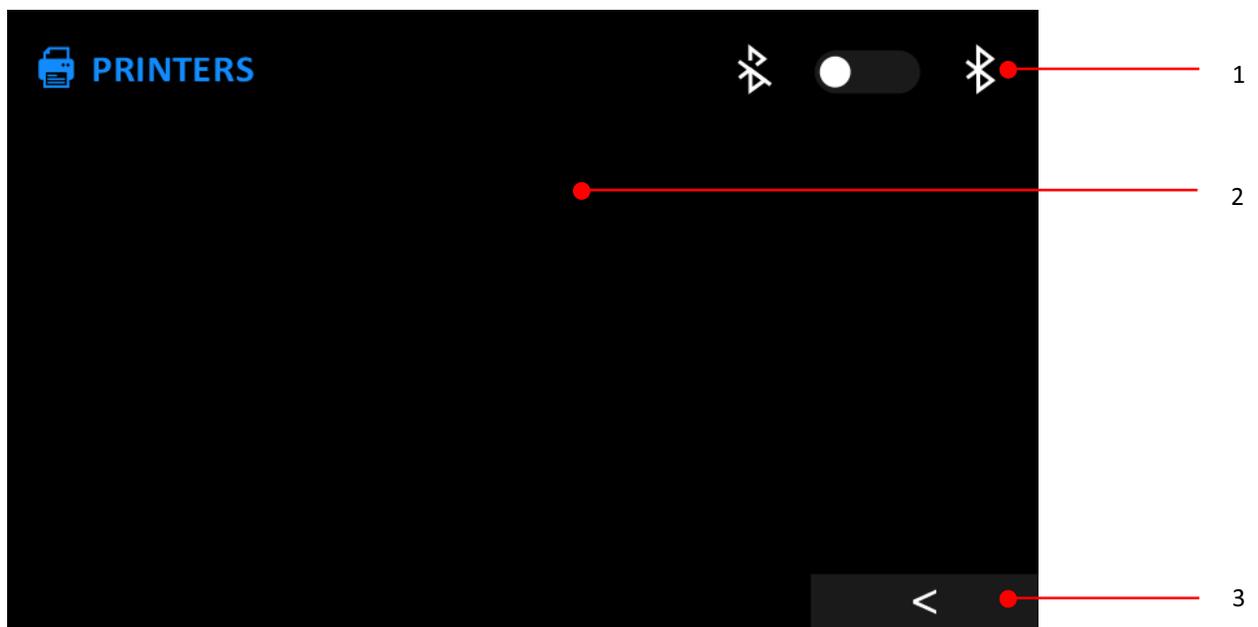
Users can enable/disable safety features using this setting.



1. **Lid Safety:** If Enabled the pump will stop running when the lid is opened and pump running at RPM more than 1 Except for Prime mode.
2. **Leak Detection:** If Enabled the pump will stop running on detecting leakage on the separate accessory attachment.
3. **Mode Of Operation:** If switched to MANUAL the pump will start only when user provides an input. If switched to AUTO the pump will start as per value set in SERIAL or ANALOG tab in Communications Settings. Please refer communication section 4.1.1.10.
4. **Auto Resume:** If switched on, the pump will automatically resume on-boot or successful login (if Security mode is available) whatever operations were being conducted before an event of power failure.
5. **Back:** This button will take user back to the settings screen.

4.1.4.8. Printers

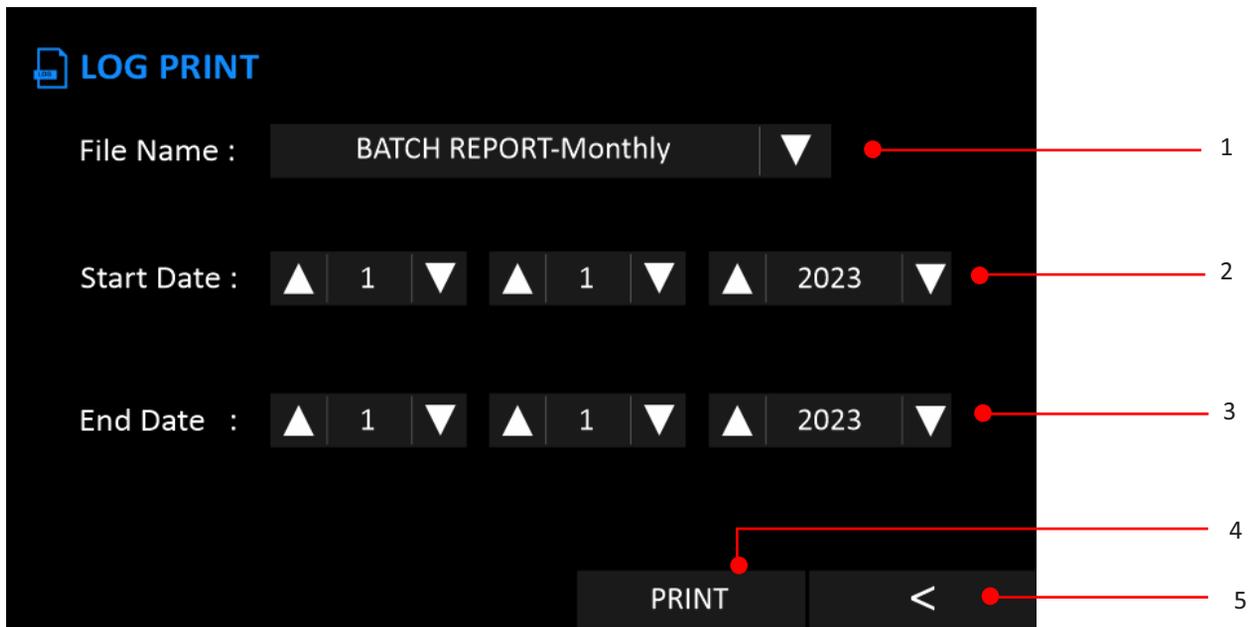
The printers' screen will allow the user to connect to the compatible Bluetooth printers.



1. **On/Off Bluetooth:** Use this button to switch the Bluetooth On / Off.
2. **Printers List:** This area lists the available printers.
3. **Back:** Takes user back to settings screen.

4.1.4.9. Log Print

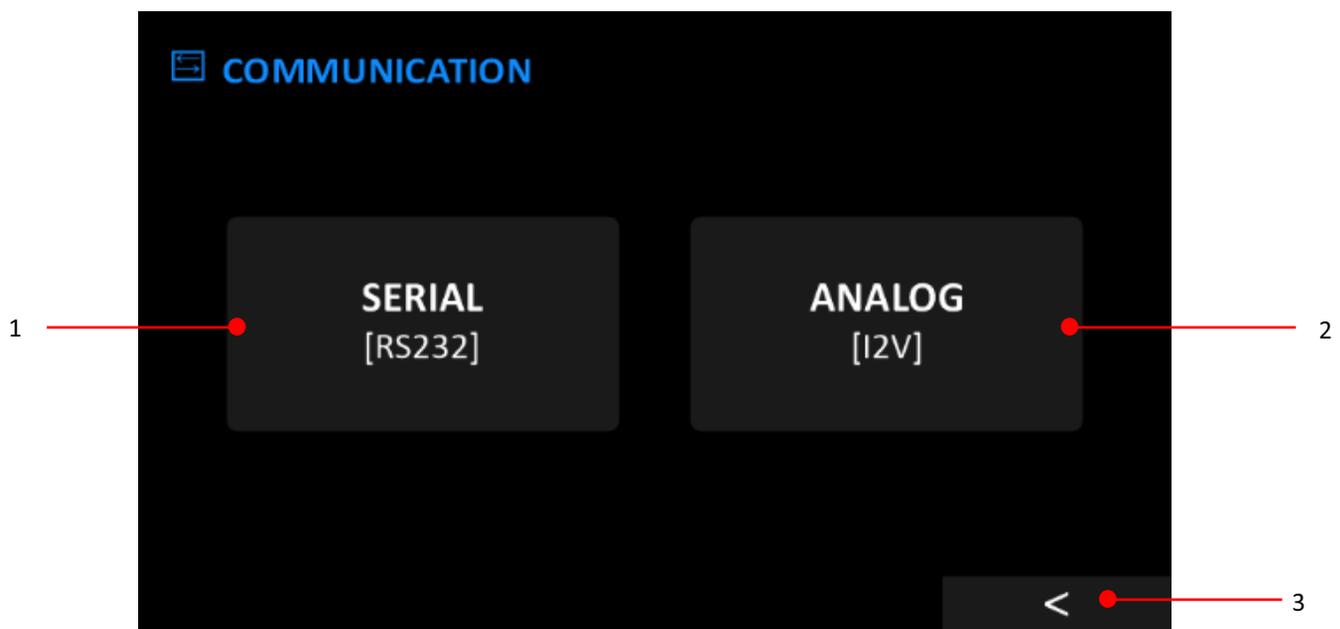
This screen is used to print the logs.



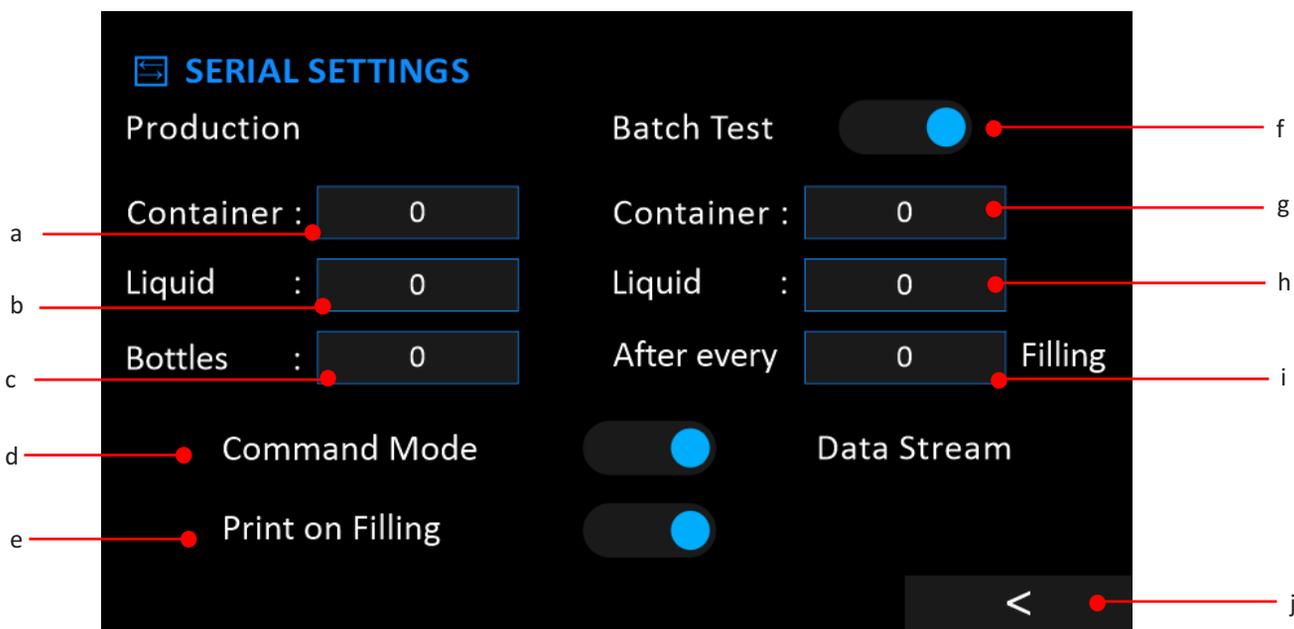
1. **File Name:** Select the type of logs to be printed.
2. **Start Date:** Select the start date of Logs to be printed.
3. **End Date:** Select the end date of Logs to be printed.
4. **Print:** Logs available in the selected dates will be printed from the selected Bluetooth printer.
5. **Back:** Takes the user back to Settings screen.

4.1.4.10. Communication

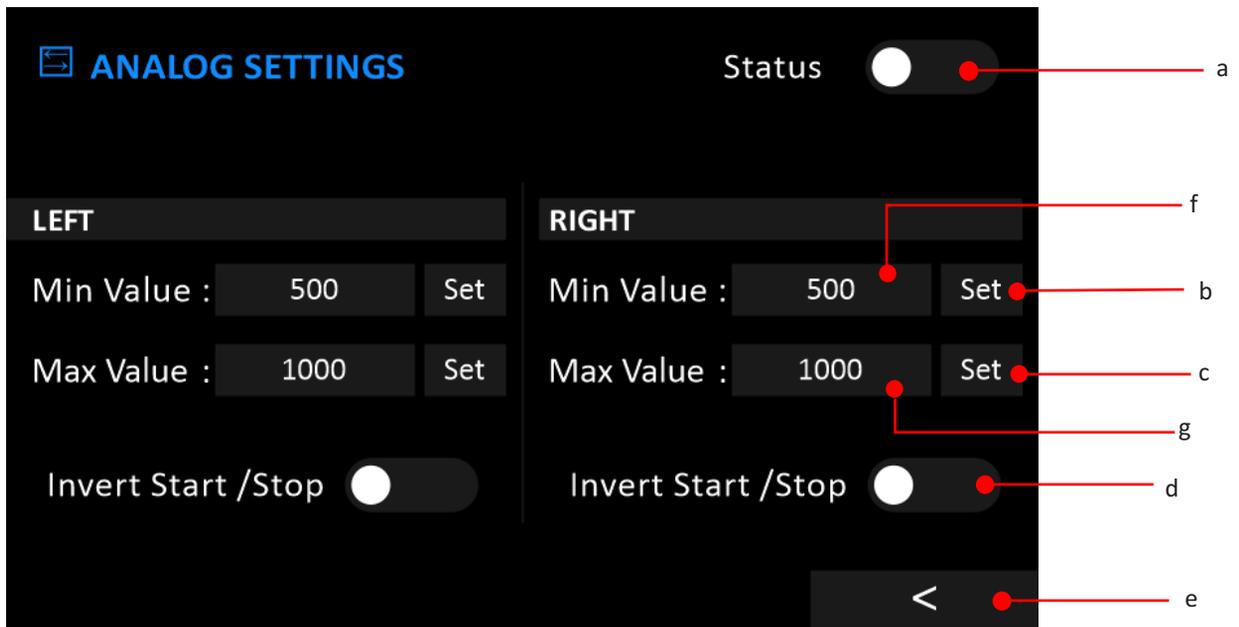
This screen is used to configure the settings for Serial or Analog Communication provided to the pump. Pump needs to be set in Auto mode in safety settings Please refer safety section 4.1.4.7 to bring these values into action.



1. **Serial:** This button is used to open a tab to configure settings for Serial communications.



- a. **Container:** User should fill the weight of the empty production container
 - b. **Liquid:** User should fill the weight of the Liquid to be filled exclusive of container weight.
 - c. **Bottles:** This sets the production batch size.
 - d. **Command Mode/Data Stream:** Command mode if for RS232 communications (Circle selector turns white). Data Stream mode is for weight-based filling (Circle selector turns blue).
 - e. **Print on Filling:** If turned on (Circle selector turns blue), every bottle filling will be printed from the connected Bluetooth printer.
 - f. **Batch Test:** This option is for the user who needs to check the quality of liquid after a fixed number of bottles while production is taking place. If enabled (Circle selector turns blue), only then the parameters under it will come into effect.
 - g. **Batch Test Container:** This field is to input the weight of empty container used for batch testing.
 - h. **Batch Test Liquid:** This field is to input the weight of the liquid to be filled for batch testing of the liquid.
 - i. **Batch Test Interval:** Input the number of bottles after which pump should fill the batch test bottle.
 - j. **Back:** Tap this button to return to the settings screen.
2. **Analog:** This button is used to open a tab to configure settings for Analog communications.

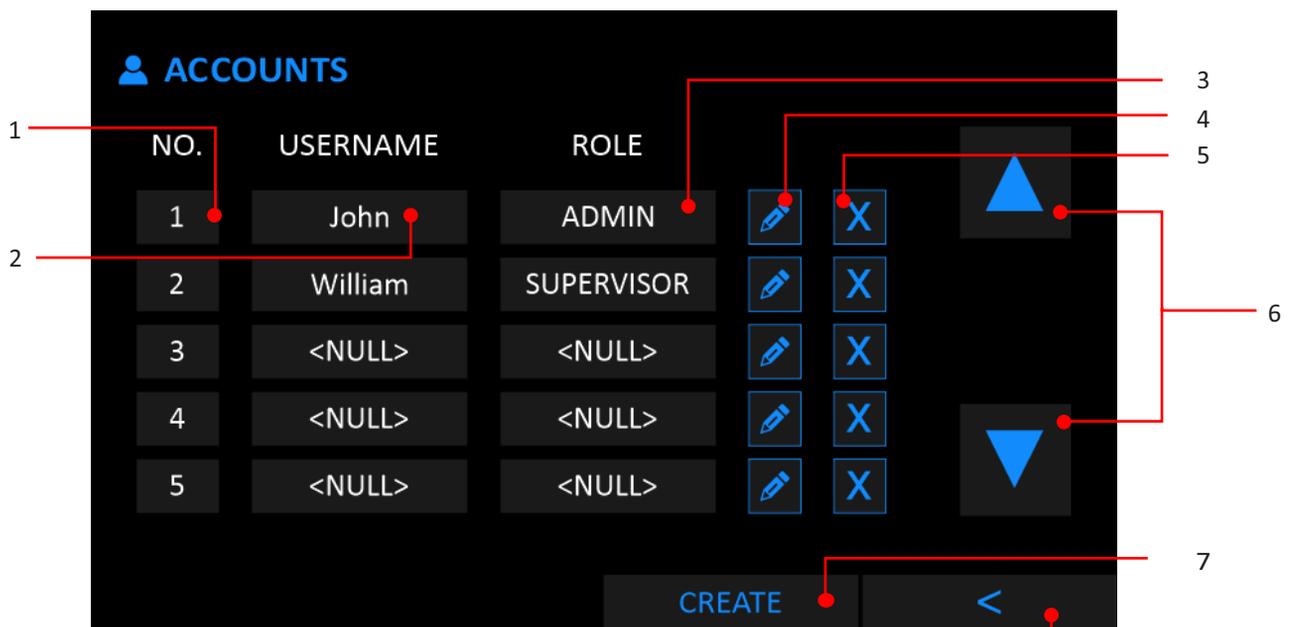


- a. **Status:** If turned on (Circle is blue), the pump heads which are set in auto mode will be operating in I-2-V mode.
- b. **Min Value Set:** Press this button to set the displayed Min Value as ZERO reference point.
- c. **Max Value Set:** Press this button to set the displayed Max Value as FULL reference point.
- d. **Invert Start/Stop:** Invert the signal process that turns on the pump head.
- e. **Back:** In order to go back to settings screen, tap this button.
- f. **Min Value:** Shows the zero-reference count value which is set.
- g. **Max Value:** Shows the full reference count value which is set.

3. **Back:** Takes user back to Settings screen.

4.1.4.11. Accounts

This tab allows the user to add/modify/delete users.



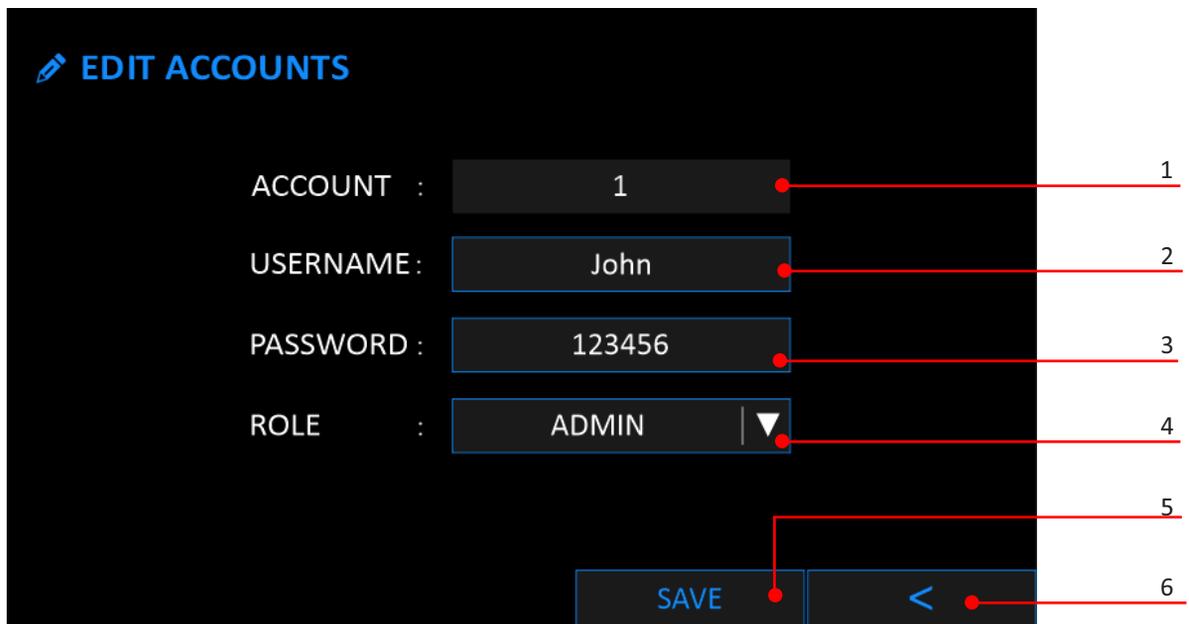
- 1. **Account Serial:** Shows the index of the usernames saved.
- 2. **Username:** Displays the Usernames saved.
- 3. **Role:** Displays the role of the corresponding user.

ROLE	PERMISSION
Admin	All Rights
Supervisor	Calibration/Dose Settings/Flow/Printer Configuration
Operator	Only START/STOP

- 4. **Edit Account:** Helps to edit the username, password and role of the user.
- 5. **Remove Account:** Deletes the corresponding account which it represents.
- 6. **Navigate Accounts:** Scroll through accounts, showing 5 accounts on one press.
- 7. **Create New Account:** Create a non-existing account.
- 8. **Back:** Sends user back to settings screen.

4.1.4.12. Edit/Create Account

On this page user can edit an existing account or create a non-existing account. This page is displayed when the user taps on “Create” button



- 1. **Account Index:** Indicates the row index this account occupies in the database.
- 2. **Account Username:** When creating a new Account this field shall display <NULL> indicating creation of a new account. If the field is pre-filled with an existing username the pump has entered into account edit mode.
- 3. **Account Password:** When creating a new Account this field shall display <NULL> indicating creation of a new account. If the field is pre-filled with an existing Password the pump has entered into account edit mode.
- 4. **Role:** This field defines the level of authority this user has over the pump's functionality. Wherein ADMIN

has the highest rights followed by SUPERVISOR and lowest is the OPERATOR. User can select the role of user from the drop-down list displayed.

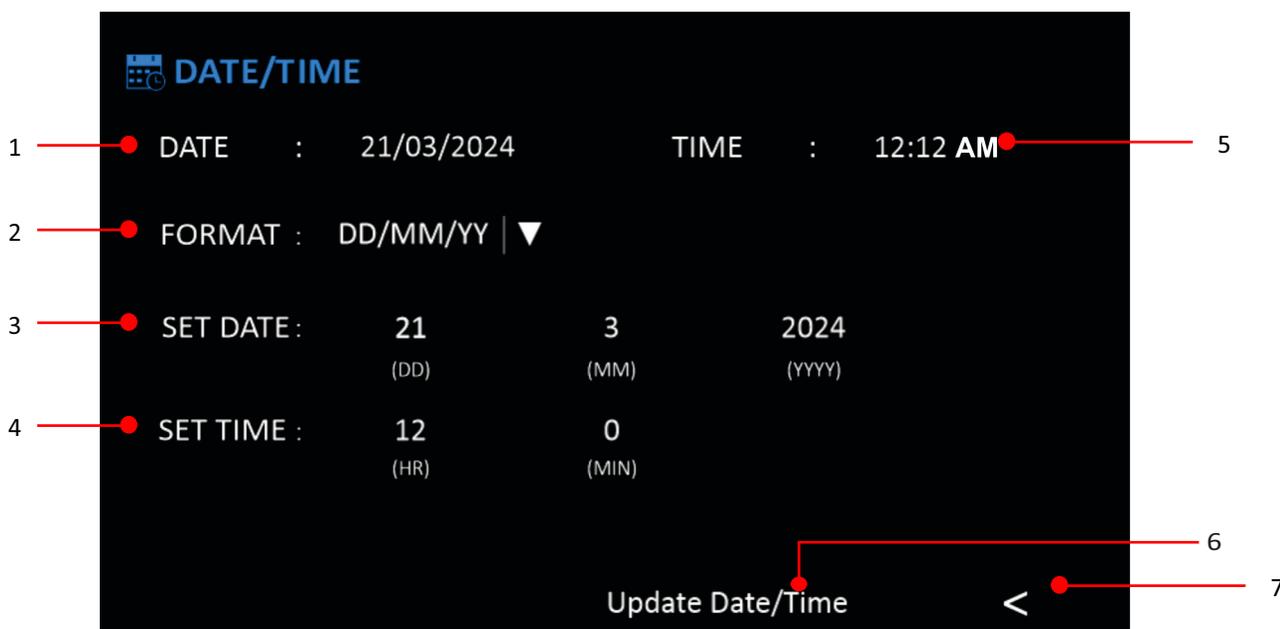
5. Save: When all the required details are filled in as expected the account is saved on the database.

6. Back: Takes the User back to the accounts screen.

Note: Min Character Limit: 3 Characters, Max Character Limit: 8 Characters. No spaces allowed. This applies to both Username and Password.

4.1.4.13. Date / Time

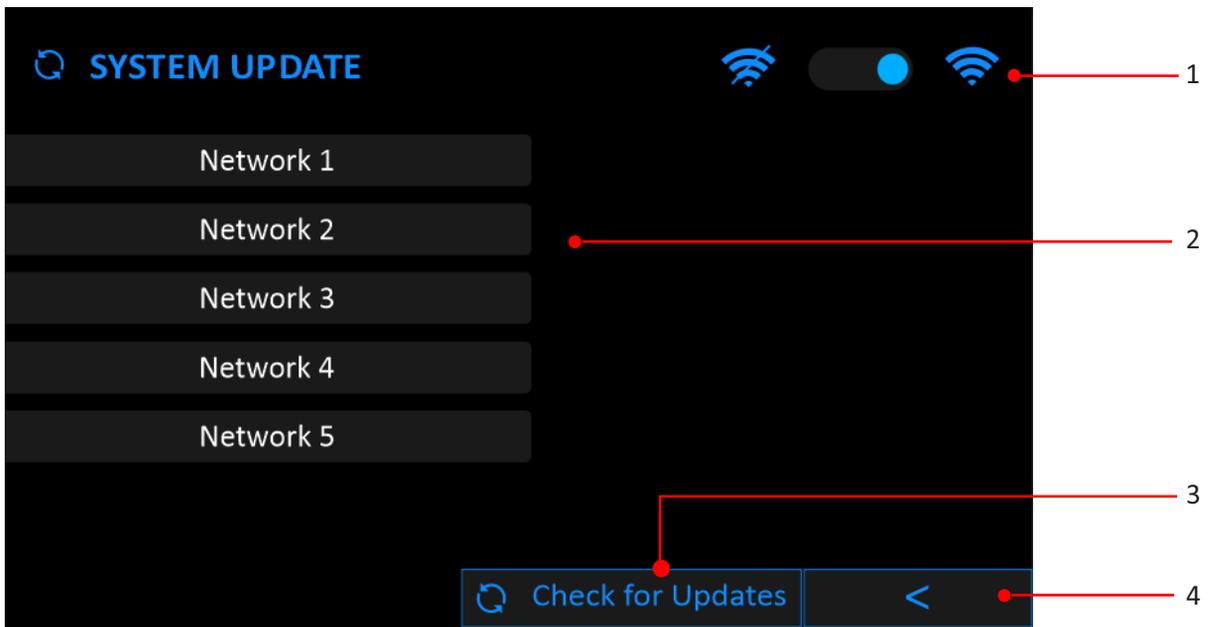
This tab allows the user to set / update the Date / Time of BIODUO.



- 1. **Current Date:** Shows the current date.
- 2. **Format:** The user can set the required visible date in DD/MM/YYYY or MM/DD/YYYY format.
- 3. **Set Date:** User can set the required date in DD-MM-YYYY.
- 4. **Set Time:** User can set the required time in hh: mm: ss.
- 5. **Current Time:** Shows the current time.
- 6. **Update Date/Time:** After entering the correct date and time values press this button to update the system Date and Time.
- 7. **Back:** Exit Date/Time screen and return to Settings screen.

4.1.4.14. System Update

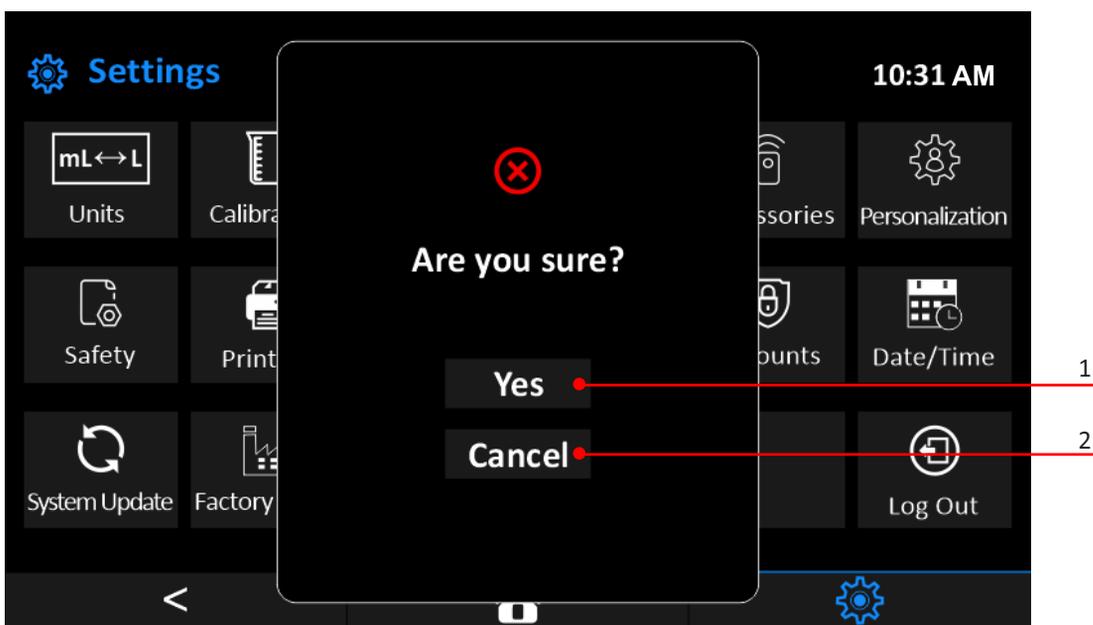
This setting is used to update or upgrade the firmware. Connect to the Wi-Fi network from the available networks using relevant password. The pump will automatically check if there is any firmware upgrade available, download & install. While installation uninterrupted power supply will be required.



- 1. **Wi-Fi Status:** Enable/Disable Wi-Fi scanning.
- 2. **Network Display Area:** Networks available around the pump will be displayed here when Wi-Fi scanning is enabled (Range: Within 2m).
- 3. **Check for Updates:** When connected to a network, firmware updates will be checked for upon pressing this button. If available, the updates will proceed automatically.
- 4. **Back:** Takes the user back to the settings screen

4.1.4.15. Factory Reset

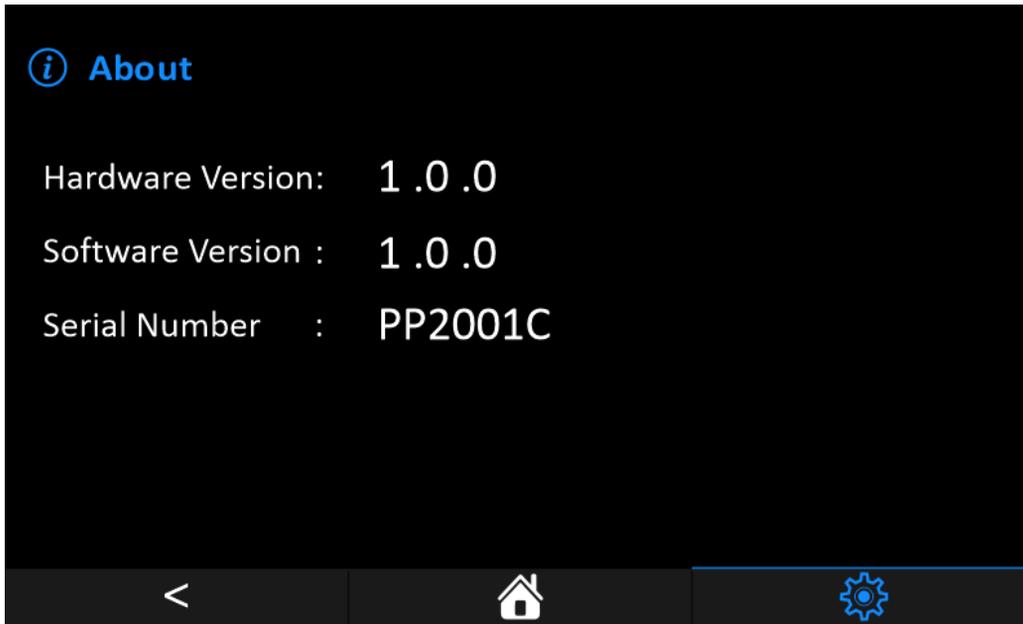
This setting is used to erase all the logs & reset the settings (profiles, calibrations, etc). When the factory reset icon is pressed, a pop up appears as shown below.



1. **Yes:** On pressing this, pre-loaded parameters such as Profiles, Auto Resume, Safety Settings, Accessories, Printers and Networks will be removed permanently.
2. **Cancel:** Factory reset will be cancelled and user will be returned to the settings screen.

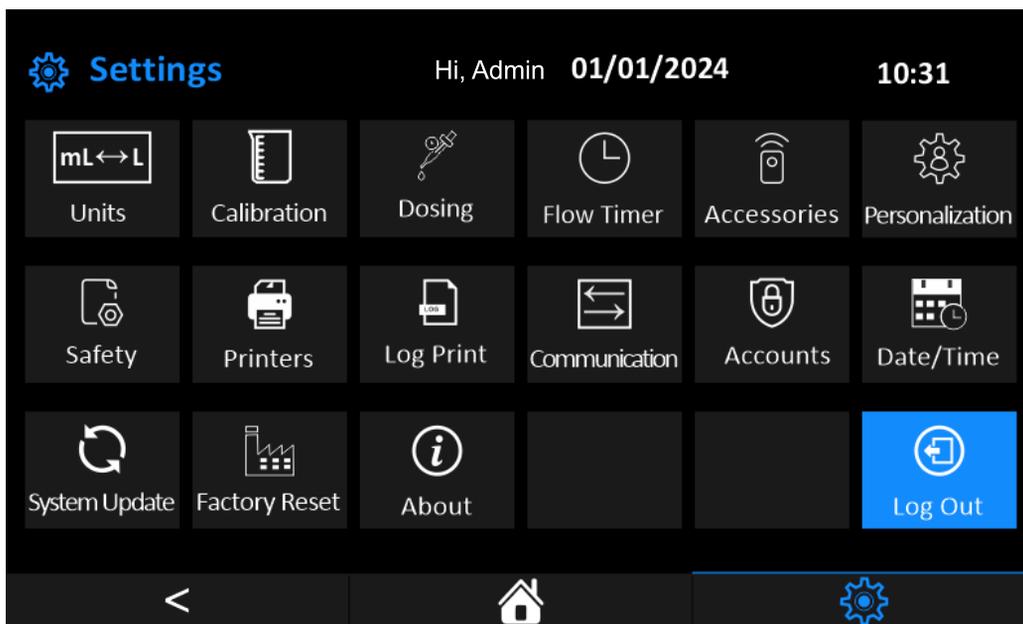
4.1.4.16. About

The about screen shows hardware & software versions of the pump. This page also displays the serial number of device user is handling.

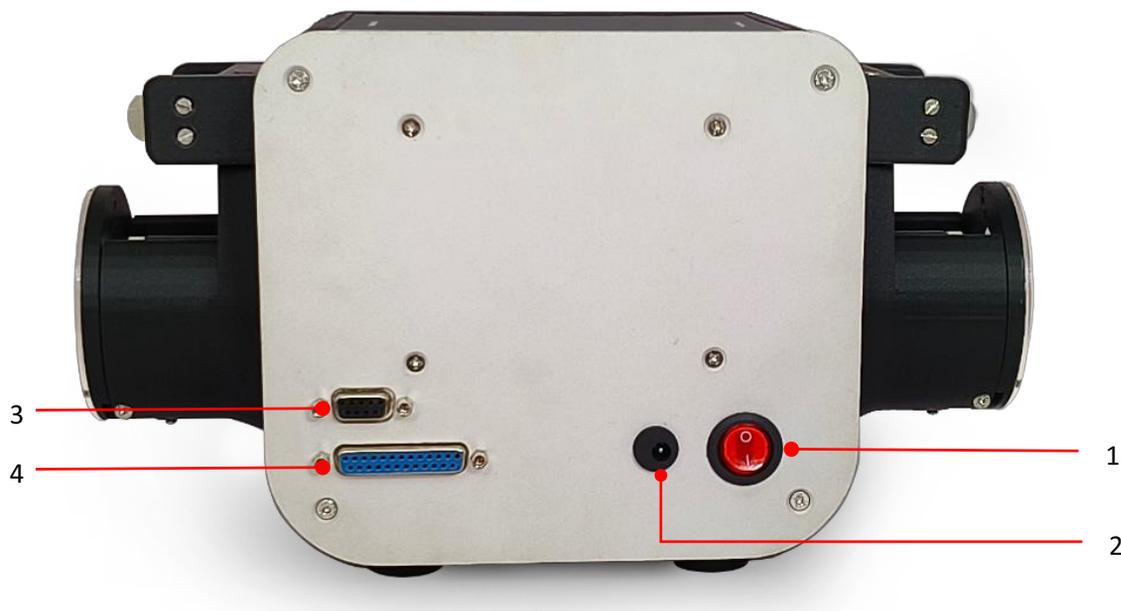


4.1.4.17. Logout

This button is used to logout of the current user session.



4.2. Powering on/off the pump



1. **Power On/Off Button:** Use this button to power on/off device.
2. **Power Input:** Insert the power adapter (given with the pump) here to provide power supply (24VDC, 3Amp).
3. **Serial I/P (via RS232) (optional):** This interface is used for providing serial commands to the printer for its functioning. This port can also be used with other peripherals like a weighing scale.
4. **Analog I/P (via 4-20mA, 0-10V) (optional):** This interface is used to operate the pump remotely by providing analogue signals at each pin.

4.3. Setting up parameters (flow rate, speed, direction)

1. RPM: (for Model 1S, 1F, 1D)

- This is the default mode on start, if Auto Resume is not selected.
- Set the desired RPM by clicking on the value area.
- Set the desired direction by clicking on CW/CCW button.
- Press play button to start.

2. Flow Rate: (for Model 1F, 1D)

- Go to flow mode by clicking on the FLOW button.
- Set the desired flow rate by clicking on the value area.
- Set desired direction by clicking on CW/CCW button.
- Press play button to start.

3. Multi-Dosing Mode: (for Model 1D)

- Go to dosing mode by pressing the DOS button.
- Set the desired Dosage volume in the SETTINGS -> DOSING SETTINGS menu.
- Press play button to start.

4.4. Loading and unloading tubing

Follow the steps mentioned below for Loading & unloading tubing easily:



- Power off the pump.
- Open the lid of that pump head.

- Start placing the tube open one side of the clamp & in between the clamp from one side, & close the clamp start to traverse the whole head.



- Clamp the tubing in the clamps provided.

- Make sure that the tube is not too tight or too slack. Check by rotating the rotor around the tube by hand.





- Close the Lid of that pump head.

- Press the clamp to ensure Anti-Slip.



4.5. Changing tubing and maintenance intervals

Regular maintenance and timely tubing replacement are essential for ensuring optimal performance and longevity of your peristaltic pump. Follow these guidelines for changing tubing and recommended maintenance intervals:

4.5.1. Tubing Replacement:

- The tubing in a peristaltic pump should be replaced periodically to maintain accurate fluid flow and prevent contamination.
- Follow the manufacturer's recommendations for the specific tubing material and model used in your pump.
- Observe the tubing for signs of wear, discoloration, or damage, such as cracks, kinks, or loss of elasticity.
- Replace the tubing immediately if any abnormalities are detected, even if it is before the recommended maintenance interval.

4.5.2. Recommended Maintenance Intervals:

- The recommended maintenance intervals may vary depending on factors such as the type of pump, application nature liquid (Hot/Cold), speed (RPM) at which the pump is run and frequency of use.

- Typical maintenance interval should be after every 120hrs of usage or if the pump gives errors in dispensing, whichever is earlier.
- Typically, regular maintenance may include cleaning, of moving parts, inspection of components, and calibration checks.
- Adhering to the recommended maintenance intervals helps ensure optimal pump performance and minimizes the risk of unexpected breakdowns.

4.5.3. Tubing Replacement Procedure:

- Ensure that you have the appropriate replacement tubing compatible with your pump and the fluid being transferred.
- Open the clip on one side, insert the appropriate tubing & close the clip.
- Traverse the tubing through the head by rotating the rotor by hand.
- Clamp the tubing on the other side of the clip.
- Before clamping double check that the tubing is neither too tight nor too loose.
- Take care to properly align the tubing with the pump head and ensure secure connections to prevent leakage or disruption in fluid flow.
- After tubing replacement, it is recommended to calibrate the pump for flow rate & dosing settings.

4.5.4. Cleaning:

- The pump is designed for a clean wipe down using IPA 70%.
- Use approved cleaning agents or solutions as recommended by the manufacturer.
- Take precautions to avoid damage to electronic components or sensitive parts during the cleaning process.

4.5.5. Record Keeping:

- It is advisable to maintain a record of tubing replacement dates, maintenance activities performed and any issues or abnormalities encountered.
- It is advisable to keep a log of any calibration checks or adjustments made to ensure accurate and consistent pump performance.
- This recordkeeping will help you track maintenance intervals, troubleshoot recurring issues, and plan future maintenance activities effectively.

Adhering to the recommended tubing replacement and maintenance intervals will help prolong the lifespan of your peristaltic pump and ensure reliable performance. Regular maintenance and timely tubing replacement contribute to accurate fluid transfer, minimize downtime, and optimize the efficiency of your operations. Always follow the manufacturer's instructions and guidelines for tubing replacement and maintenance specific to your pump model.

4.6. Changing Head / Head Replacement

BioDuo is designed in such a way that the same pump/drive is compatible with different head sizes. User on their own will can change the Heads on either side of the pump. The procedure for the same is very simple & just takes a couple of minutes.

► Following is the procedure to change the head:



- Unscrew the rotor as shown below.

- Unscrew & remove the head as show using an Allen key of appropriate size.



- Place the new head such that all 4 screws match. User should note that the head should be aligned such that the tube locking clips are located upwards.
- Once the head is screwed tightly, insert the rotor on the motor shaft. While inserting the shaft make sure to match the 'D' shape of the shaft & rotor. After inserting the shaft, screw the shaft firmly.



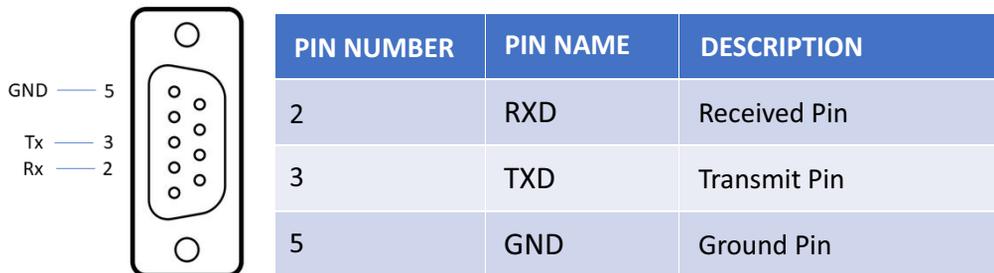
- After attaching the rotor on the motor shaft, insert the tubing, follow the steps of Tubing Loading as per section 4.4

4.7. Remote Control and Communication with BioDuo

If your BioDuo model includes, external control source the Pump can be operated remotely in either of the two modes, namely SERIAL or ANALOG. In SERIAL mode, the pump can be controlled via a remote computer connected to the 9-pin D connector available at the rear of the pump. In ANALOG mode, the pump can be controlled via a PLC (for example) using a 4 to 20 mA signal connected to the 25-pins D connector available at the rear of the pump. In ANALOG mode, the speed control is achieved using 4 to 20 mA signal and direction control using simple potential free switches.

4.7.1. SERIAL communication mode

The pinout for 9-pins D connector available at the rear of the pump is as shown below. This connector implements standard RS232 serial protocol.



**NEVER APPLY MAINS VOLTAGE TO THE 9-WAY D CONNECTOR.
ONLY RS232 SIGNALS MAY BE APPLIED TO PINS 2,3 & 5.
DO NOT APPLY VOLTAGE ACROSS OTHERS PINS.
PERMANENT DAMAGE, NOT COVERED BY WARRANTY.**

RESERVED

The SERIAL communication mode allows the BioDuo pump to be accessed over the serial port. The serial port configuration has to be done with the following settings.

PARAMETER	VALUE
Baud Rate	115200
Data bits	8
Stop bits	1
Parity	None
Flow Control	None

The commands sent to pump over the serial have to be sent in a particular format. The format is |COMMAND| OR |COMMAND_VALUE|. Notice that the commands are enclosed within pipes (“|”) and are sent as streams of String. Let us first see the commands that can be sent to the pump and the corresponding action the pump takes.

Table 4.1 shows the commands and their respective meanings and action.

COMMAND	EXPLANATION	ACTION
LMD	Left Mode Dose	Left head switches to DOS mode
LMF	Left Mode FLOW	Left head switches to FLOW mode
LMR	Left Mode RPM	Left head switches to RPM mode
RMD	Right Mode Dose	Right head switches to DOS mode
RMF	Right Mode Flow	Right head switches to FLOW mode
RMR	Right Mode RPM	Right head switches to RPM mode

Table 4.1: MODE Selection in SERIAL communication mode

Table 4.2 shows that the profile to use can be selected by sending the following command

COMMAND	EXPLANATION
PRO_value	Select the profile (value) to use. For example, PRO_5 to choose 5 th profile.

Table 4.2: Profile Selection

Table 4.3 shows that the dose setting can be done by sending the following commands

COMMAND	EXPLANATION	ACTION
DLV_value	Dose LEFT Value	Set dose volume for LEFT head as “value”
DLW_value	Dose LEFT Wait Time	Set dose wait time for LEFT head as “value”
DLB_value	Dose LEFT Batch	Set dose batch size for LEFT head as “value”
DRV_value	Dose RIGHT Value	Set dose volume for RIGHT head as “value”
DRW_value	Dose RIGHT Wait Time	Set dose wait time for RIGHT head as “value”
DRB_value	Dose RIGHT Batch	Set dose batch size for RIGHT head as “value”

Table 4.3: Dose setting

Table 4.4 shows that the Flow setting can be done by sending the following commands

COMMAND	EXPLANATION	ACTION
FLT_value	Flow LEFT Value	Set flow time for LEFT head as “value”
FLW_value	Flow LEFT Wait time	Set flow wait time for LEFT head as “value”
FLB_value	Flow LEFT Batch	Set flow mode batch size for LEFT head as “value”
FRT_value	Flow RIGHT Value	Set flow time for RIGHT head as “value”
FRW_value	Flow RIGHT Wait Time	Set flow wait time for RIGHT head as “value”
FRB_value	Flow RIGHT Batch	Set flow mode batch size for RIGHT head as “value”

Table 4.4: Flow Settings

When the Pump is set to operate in Continuous FLOW/RPM mode, the following commands can be used to set the respective values. Table 4.5 shows the list of such commands.

COMMAND	EXPLANATION	ACTION
LV_value	Left Value	Set the value for LEFT head For example, LV_30
RV_value	Right Value	Set the value for RIGHT head For example, RV_30

Table 4.5: Set value for Left/Right head

Pump Priming can be done using the commands shown in Table 4.6.

COMMAND	EXPLANATION	ACTION
LP1	Left Prime Start	Begin Priming for Left head
LP0	Left Prime Stop	Stop Priming for Left head
RP1	Right Prime Start	Begin Priming for Right head
RP0	Right Prime Stop	Stop Priming for Right head

Table 4.6: Pump Priming

Pump START/STOP can be done using the commands shown in Table 4.7.

COMMAND	EXPLANATION	ACTION
LS1	Left Start	Start Left head
LS0	Left Stop	Stop Left head
RS1	Right Start	Start Right head
RS0	Right Stop	Stop Right head

Table 4.7: Pump Start/Stop

Pump direction can be set using the commands as shown in Table 4.8.

COMMAND	EXPLANATION	ACTION
LD1	Left Direction CCW	Set Left head direction to rotate counter clockwise
LD0	Left Direction CW	Set Left head direction to rotate clockwise
RD1	Right Direction CCW	Set Right head direction to rotate counter clockwise
RD0	Right Direction CW	Set Right head direction to rotate clockwise

Table 4.8: Set pump head direction

The commands shown until now were to set changes. The commands shown now will be to read various important values from the pump.

Table 4.9 shows the command to read the mode of each head of the pump.

Table 4.9 shows the command to read the mode of each head of the pump.

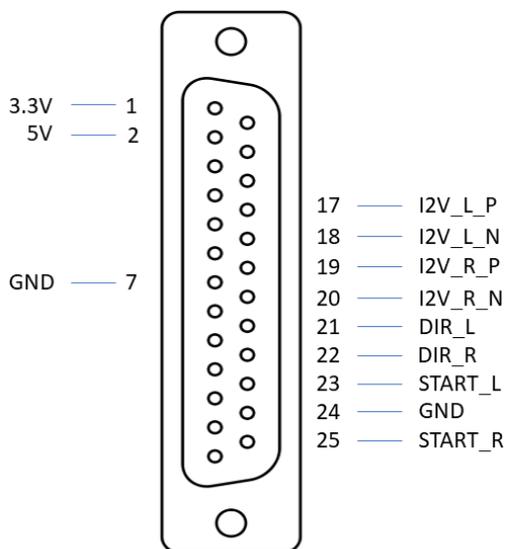
COMMAND	EXPLANATION	ACTION
READ_MODE	Read mode	Returns a string reading the current mode set for both heads

Table 4.9: Read the mode set for right and left head

The |READ_MODE| commands returns a string in the format

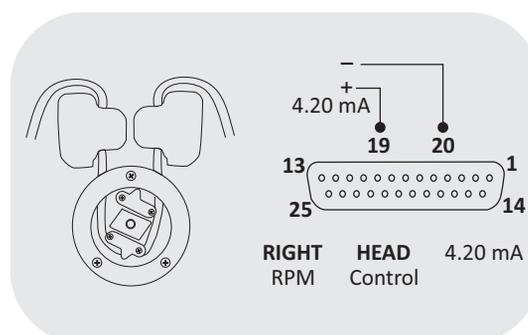
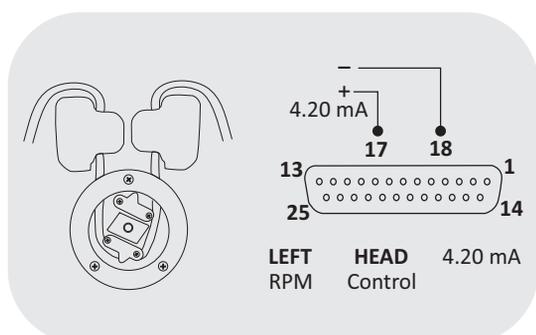
4.7.2. ANALOG communication mode

The pinout for 25-pins D connector available at the rear of the pump is as shown below. Given that the BioDuo has two heads, they are referred to as LEFT HEAD and RIGHT HEAD..

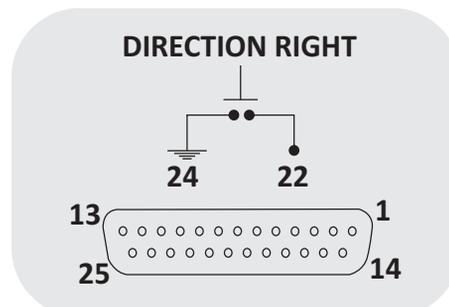
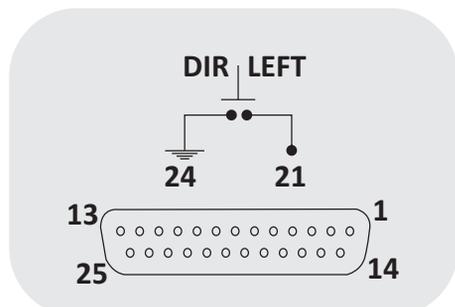


PIN NUMBER	PIN NAME	DESCRIPTION
1	3.3 Volts	Power Pin
2	5 Volts	Power Pin
7	GND	Ground Pin
17	12V_L_P	4 to 20mA Left Head +
18	12V_L_N	4 to 20mA Left Head -
19	12V_R_P	4 to 20mA Right Head +
20	12V_R_N	4 to 20mA Right Head -
21	DIR_L	Direction Left Head
22	DIR_R	Direction Right Head
23	START_L	START/STOP Left Head
24	GND	Ground Pin
25	START_R	START/STOP Right Head

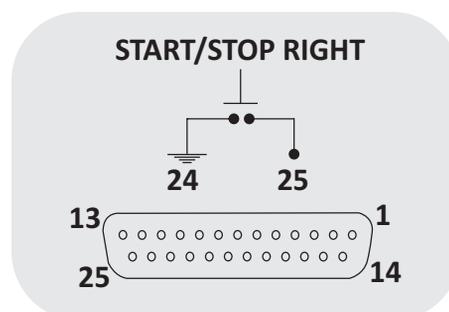
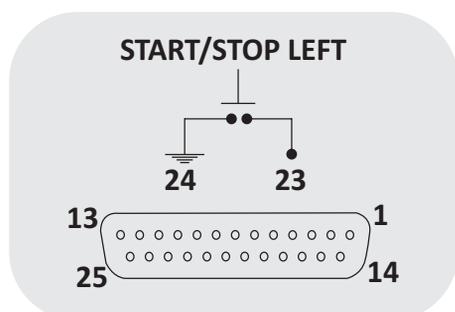
The 4 to 20 mA signal is referred to as I2V (I to V). This externally generated I2V signal is used to change the RPM of the respective heads. The pin 17 and pin 18 of 25-pins D connector can be used to connect the I2V signal in order to change the RPM of the Left Head. Similarly, the pin 19 and pin 20 of 25-pins D connector can be used to connect the I2V signal in order to change the RPM of the Right Head.



The direction of the individual head can also be changed. Connect one end of a potential free switch to pin 21 of 25-pins D connector and another end to pin 24. This switch can then be used to switch the direction of Left head from CCW to CW and vice versa. Connect one end of a potential free switch to pin 22 of 25-pins D connector and another end to pin 24. This switch can then be used to switch the direction of Right head from CCW to CW and vice versa.



Individual heads can also be START/STOP. Connect one end of a potential free switch to pin 23 of 25-pins D connector and another end to pin 24. This switch can then be used to switch Left head START/STOP. Connect one end of a potential free switch to pin 25 of 25-pins D connector and another end to pin 24. This switch can then be used to switch the Right Head START/STOP.



5. Calibration and Calibration Verification

5.1. Importance of calibration

Calibration plays a crucial role in ensuring the accuracy and precision of your peristaltic pump. It involves the adjustment of pump parameters to align with the desired flow rates and dispense volumes. Proper calibration is essential for several reasons:

5.1.1. Accuracy and Precision:

Calibration ensures that the pump delivers the intended flow rates and dispenses the desired volumes accurately. By calibrating the pump, you can achieve precise control over the fluid flow, minimizing variations and enhancing the reliability of your bio processing results.

5.1.2. Consistency and Reproducibility:

Calibration establishes a baseline for consistent performance. It allows you to reproduce specific flow rates and dispense volumes, enabling the reliable replication of experiments and processes. Consistent and reproducible results are crucial for maintaining the integrity and validity of your bio processing operations.

5.1.3. Optimal Performance:

Calibrating the pump optimizes its performance, ensuring that it operates within its specified parameters. It helps identify any deviations or inaccuracies in flow rates, allowing corrective measures to be taken promptly. Proper calibration maximizes the efficiency and effectiveness of the pump, improving the overall productivity of your bio processing workflow.

5.1.4. Quality Control and Compliance:

Calibration is an essential aspect of quality control in bio processing. It ensures that the pump meets the required standards and regulatory guidelines. By calibrating the pump regularly, you can demonstrate compliance with relevant regulations and maintain the highest level of quality and accuracy in your bio processing operations.

5.1.5. Safety and Reliability:

Properly calibrated pumps provide reliable and consistent performance, reducing the risk of errors or inaccuracies in fluid dispensing. This enhances the safety of your bio processing operations and minimizes the chances of compromising experimental results or product quality.

It is recommended to follow the manufacturer's instructions and recommended calibration intervals provided in this manual. Regular calibration and verification of your peristaltic pump's performance are essential for achieving optimal results, maintaining quality, and ensuring the accuracy and reliability of your bio processing endeavours.

5.2. Calibration procedure

To ensure accurate and precise fluid control, regular calibration of your peristaltic pump is essential. Follow these steps to calibrate your pump effectively:

5.2.1. Preparation:

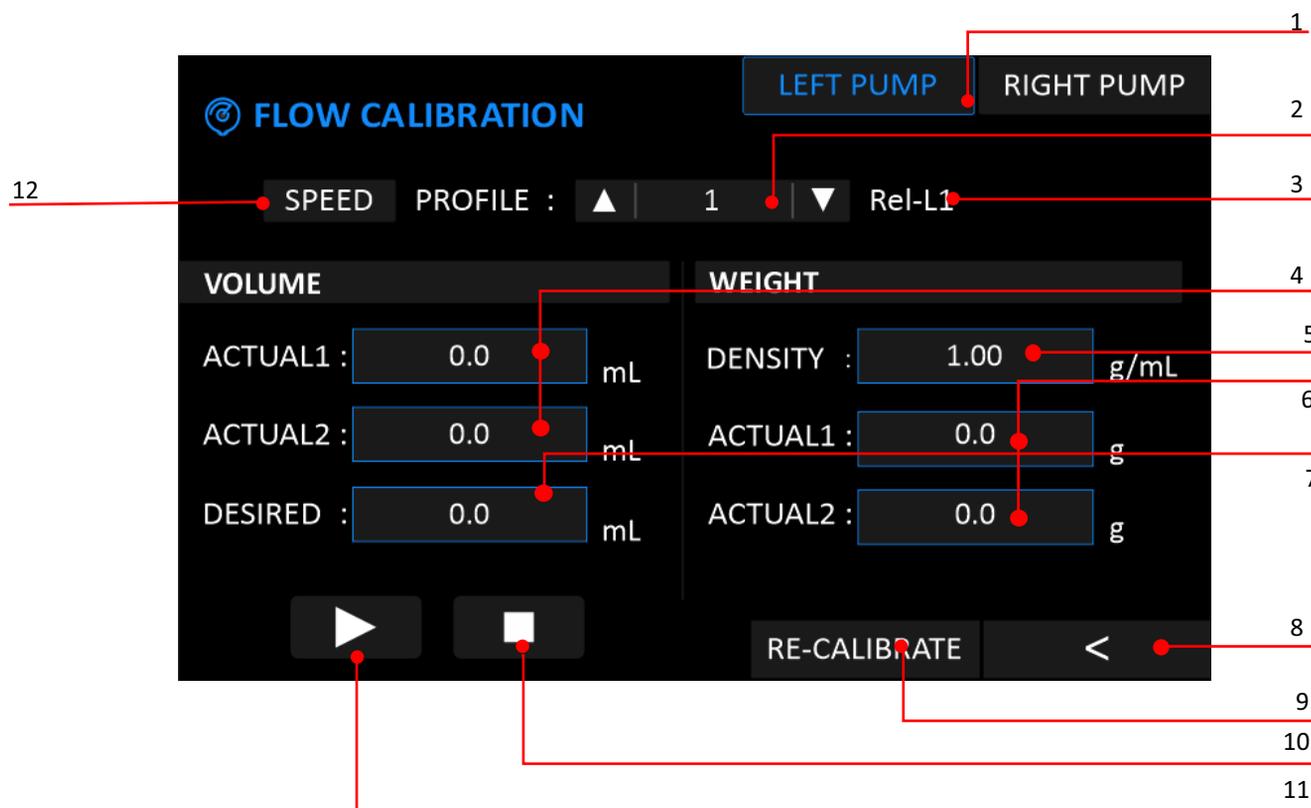
- Ensure that the pump is powered off and disconnected from the power source.
- Prepare the calibration equipment, including a calibrated measuring device by volume or by weight.
- Have the appropriate tubing installed and primed according to the manufacturer's guidelines.

5.2.2. Setting Up:

- Power on the pump and navigate to the flow calibration menu on the touch screen display.
- Select the desired calibration mode (Quick or Advanced).

5.2.2.1. Advance Flow Calibration Screen

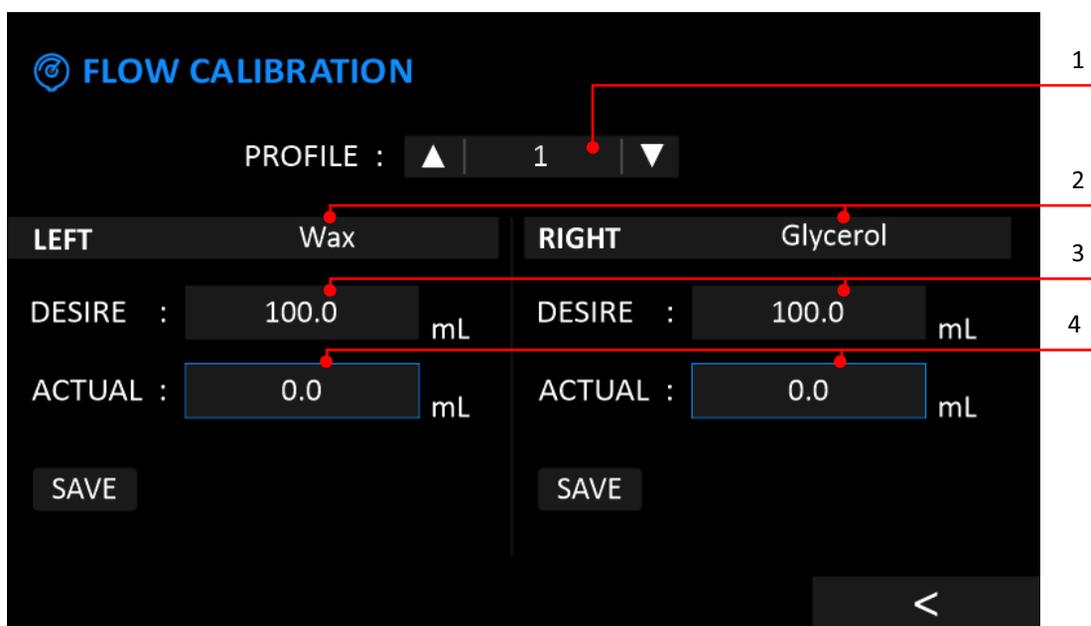
The flow calibration screen contains the following items.



1. **Pump Select:** Select between Left/Right Pump.
2. **Profile Up / Down:** Select the required profile for calibration.
3. **Liquid Name:** This label shows the name of the liquid for calibration, so user can confirm whether the correct profile is selected.
4. **Actual Volume 1 & 2:** Actual volume dispensed after first & second calibration cycle respectively, if calibrating by volume.
5. **Density:** User needs to enter density if calibrating using weight.
6. **Actual Weight 1 & 2:** Input the Actual weight of the dispensed liquid after first & second calibration cycle, if calibrating by weight.
7. **Desired Volume:** Desired volume to be dispensed for calibration cycle.
8. **Back:** Press this button to go to previous menu screen.
9. **Re-Calibrate:** Press this button to recalibrate as per new values.
10. **Stop:** Press this button to stop dispensing.
11. **Start:** Press this button to start dispensing.
12. **Speed:** This button is used to select the speed of dispensing.

5.2.2.2. Quick Flow Calibration

The quick flow calibration settings screen contains the following items:



1. **Profile Up / Down:** Select the required profile for calibration.
2. **Liquid Name:** This label shows the name of the liquid for calibration, so user can confirm whether the correct profile is selected.
3. **Desired Volume:** Desired volume to be dispensed for calibration cycle.
4. **Actual Volume:** Actual volume dispensed after calibration cycle respectively, if calibrating by volume

5.2.3. Flow Rate Measurement:

- Start the calibration process, and the pump will begin dispensing fluid at the specified flow rate.
- Collect the dispensed fluid in the calibrated measuring device or flow meter.
- Measure and record the actual flow rate displayed by the measuring device, in space “Actual”.

5.2.4. Comparing and Adjusting:

- Compare the measured flow rate with the desired flow rate for calibration.
- If there is a discrepancy, use the pump's calibration settings to adjust the flow rate accordingly.
- Repeat the measurement and adjustment process until the desired flow rate is achieved.

5.2.5. Verification and Documentation:

- After the calibration adjustments, verify the accuracy of the flow rate by performing multiple measurements.
- Document the calibration results, including the measured flow rates and any adjustments made.
- Maintain a calibration log or record for future reference and quality assurance purposes.

5.2.6. Regular Calibration:

- Follow the recommended calibration intervals provided by the manufacturer.
- Ensure that the pump is calibrated regularly to maintain accurate and reliable performance.
- Consider recalibrating the pump if any significant changes occur, such as head replacement, tubing replacement, fluid change or system modifications.

Always refer to the specific instructions provided by the pump manufacturer for detailed calibration

procedures and any specific considerations related to your peristaltic pump model. Proper calibration ensures the accuracy and precision of your pump's fluid control, enhancing the quality and reliability of your bio processing operations.

5.3. Verification of calibration accuracy

After performing the calibration procedure, it is essential to verify the accuracy of the calibration to ensure reliable fluid control. Follow these steps to verify the calibration accuracy of your peristaltic pump:

5.3.1. Stable Environment:

Ensure that the pump is operating in a stable environment with consistent temperature and pressure conditions. Avoid significant fluctuations that could impact the accuracy of the verification process.

5.3. Verification of calibration accuracy

After performing the calibration procedure, it is essential to verify the accuracy of the calibration to ensure reliable fluid control. Follow these steps to verify the calibration accuracy of your peristaltic pump:

5.3.1. Stable Environment:

Ensure that the pump is operating in a stable environment with consistent temperature and pressure conditions. Avoid significant fluctuations that could impact the accuracy of the verification process.

5.3.2. Multiple Measurements:

- Perform multiple measurements of the flow rate using a calibrated measuring device or flow meter.
- Record the measured flow rates for each measurement.

5.3.3. Calculation of Deviation:

- Calculate the deviation between the measured flow rates and the desired flow rate specified during calibration.
- Determine the average deviation by summing the individual deviations and dividing by the number of measurements.

5.3.4. Acceptance Criteria:

- Compare the average deviation with the acceptable tolerance or deviation limit established by your specific application or regulatory requirements.
- If the average deviation falls within the acceptable range, the calibration can be considered accurate and reliable.

5.3.5. Adjustments if Necessary:

- If the average deviation exceeds the acceptable tolerance, it may indicate the need for further adjustment or recalibration.
- Consult the pump manufacturer's instructions or contact technical support for guidance on resolving any

calibration issues.

5.3.6. Documentation:

- Document the verification results, including the measured flow rates, deviations, and whether the calibration is within the acceptable tolerance.
- Maintain a verification log or record for future reference, quality assurance, and regulatory compliance purposes.

Regularly verifying the calibration accuracy of your peristaltic pump is important to ensure ongoing reliable and accurate fluid control. Depending on your specific requirements and regulations, establish a frequency for performing verification checks to maintain the highest level of confidence in your pump's performance.

6. Maintenance and Cleaning

6.1. Routine maintenance tasks

Regular maintenance of your peristaltic pump is essential to ensure its optimal performance, longevity, and reliability. Follow these routine maintenance tasks to keep your pump in excellent working condition:

6.1.1. Tubing Inspection and Replacement:

- Regularly inspect the tubing for signs of wear, damage, or degradation.
- Replace the tubing at recommended intervals or if any abnormalities are detected, such as cracks, leaks, or loss of flexibility.
- Follow the manufacturer's guidelines for selecting and installing the appropriate tubing.

6.1.2. Cleaning:

- Clean the pump exterior regularly using a mild, non-abrasive detergent and a soft cloth.
- Pay special attention to areas prone to dirt, debris, or fluid spills.
- Avoid using harsh chemicals or solvents that may damage the pump's surfaces.

6.1.3. Roller Cleaning and Maintenance:

- Periodically clean the rollers and the tubing bed to remove any residue or build-up.
- Use a lint-free cloth dampened with a mild cleaning solution to wipe the rollers gently.
- Ensure the rollers rotate freely and are properly aligned with the tubing.

6.1.4. Motor and Drive Maintenance:

- Keep the motor and drive components free from dust, debris, or obstructions.
- Check for any loose connections, springs and tighten them

6.1.5. Calibration Verification:

- Regularly verify the calibration accuracy of the pump, as outlined in the calibration verification section of this manual.
- Perform this verification at recommended intervals or as specified by your application requirements.

6.1.6. Safety Checks:

- Inspect all safety features, such as emergency stop buttons, safety lid sensor, to ensure they are in proper working condition.
- Test these safety features periodically to confirm their functionality.

6.1.7. Documentation and Record Keeping:

- Maintain a comprehensive maintenance log, documenting all routine maintenance tasks performed, including dates, tasks performed, and any observations or issues encountered.
- Keep records of any replacement parts used, calibration results, and verification reports.

Following these routine maintenance tasks will help ensure the continued performance, reliability, and longevity of your peristaltic pump. Always refer to the manufacturer's instructions and guidelines for specific maintenance procedures and recommended intervals.

6.2. Cleaning procedures for various components

Regular cleaning of the various components of your peristaltic pump is important to maintain its performance and prevent contamination. Follow these cleaning procedures for different components:

6.2.1. Tubing:

- Disconnect the tubing from the pump and remove it from the pump head.
- Rinse the tubing with clean water or a mild cleaning solution to remove any residue or contaminants.
- Gently brush the exterior of the tubing with a soft brush if necessary.
- Allow the tubing to air dry completely before reinstalling it.

6.2.2. Pump Head and Rollers:

- Power off the pump and disconnect it from the power source.
- Open the pump head according to the manufacturer's instructions.
- Wipe the pump head and rollers with a lint-free cloth dampened with a mild cleaning solution.
- Pay attention to any residue or build-up on the rollers and remove it carefully.
- Ensure the rollers are dry and clean before closing the pump head.

6.2.3. Control Panel and Touch Screen Display:

- Power off the pump and disconnect it from the power source.
- Clean the control panel and touch screen display with a soft, lint-free cloth.
- If necessary, dampen the cloth with a mild cleaning solution or use screen-safe wipes.
- Gently wipe the control panel and touch screen display, avoiding excessive moisture.
- Ensure the control panel and touch screen display are completely dry before powering the pump back on.

6.2.4. Exterior Surfaces:

- Power off the pump and disconnect it from the power source.
- Clean the exterior surfaces of the pump with a soft cloth dampened with a mild cleaning solution.
- Pay attention to any areas with visible dirt, stains, or spills.
- Avoid using abrasive cleaners or solvents that may damage the surfaces.

- Wipe the exterior surfaces dry with a clean cloth.

6.2.5. Accessories and Attachments:

- Clean any accessories or attachments used with the pump according to the manufacturer's instructions.
- Refer to specific cleaning recommendations for items such as tubing connectors, fittings, or filters.
- Use appropriate cleaning solutions or methods recommended by the manufacturer.

6.2.6. Safety Precautions:

- Always follow safety precautions when cleaning the pump components.
- Ensure the pump is disconnected from the power source before cleaning.
- Avoid immersing electronic components in water or exposing them to excessive moisture.
- Use mild cleaning solutions and non-abrasive materials to prevent damage to the components.

Regular cleaning of the various components will help maintain the performance, integrity, and longevity of your peristaltic pump. Refer to the manufacturer's instructions for any specific cleaning considerations or recommendations for your specific model.

6.3. Tube replacement and maintenance

Regular maintenance and timely replacement of tubing are essential for the optimal performance and reliability of your peristaltic pump. Follow these guidelines for tube replacement and maintenance:

6.3.1. Tube Inspection:

- Regularly inspect the tubing for signs of wear, damage, or degradation.
- Check for cracks, leaks, discoloration, or loss of flexibility.
- If any abnormalities are detected, replace the tubing promptly.

6.3.2. Tube Replacement:

- Power off the pump and disconnect it from the power source.
- Follow the manufacturer's instructions to access the pump head and remove the existing tubing.
- Ensure that the appropriate tubing size and material are used as recommended by the manufacturer.
- Cut the new tubing to the required length, ensuring clean and straight cuts.

6.3.3. Tubing Installation:

- Follow the manufacturer's instructions to properly install the new tubing into the pump head.
- Align the tubing with the rollers and ensure it sits securely in the tubing bed.
- Ensure there are no twists, kinks, or blockages in the tubing.

6.3.4. Priming:

- Prime the tubing according to the manufacturer's guidelines.
- Use the recommended priming fluid or solution, ensuring the tubing is completely filled and free from air bubbles.
- Follow the priming procedure to expel any trapped air and ensure smooth fluid flow.

6.3.5. Regular Replacement:

- Establish a routine tubing replacement schedule based on the manufacturer's recommendations or as per your specific application requirements.
- Consider factors such as the type of fluid being pumped, frequency of use, and environmental conditions.
- Replace the tubing at the recommended intervals, even if no visible signs of wear or damage are apparent.

6.3.6. Proper Storage:

- Store additional tubing in a clean and dry environment, away from direct sunlight and extreme temperatures.
- Follow the manufacturer's recommendations for storing unused tubing.
- Avoid bending or twisting the tubing excessively during storage to prevent deformation.

6.3.7. Documentation:

- Maintain a record of tubing replacements, including dates, types of tubing used, and any relevant notes or observations.
- Keep track of the total running hours or usage to ensure timely replacement.

Regular tube inspection, replacement, and proper maintenance practices will help maintain the efficiency, accuracy, and longevity of your peristaltic pump. Refer to the manufacturer's instructions and guidelines for specific recommendations on tube replacement and maintenance for your particular pump model.

7. Troubleshooting

7.1. Common issues and their possible causes

If you encounter any issues or abnormalities with your peristaltic pump, refer to this troubleshooting guide for potential causes and solutions. Please note that this is a general guide, and specific troubleshooting steps may vary depending on your pump model and configuration. If the problem persists or you are unsure about any troubleshooting steps, contact the manufacturer's technical support for further assistance.

7.1.1. Pump Does Not Start:

- Check the power connection and ensure that the pump is properly plugged into a functioning power outlet.
- Verify that the power switch is in the ON position.
- Check for any tripped circuit breakers or blown fuses in the electrical supply.
- Ensure that the adapter is properly plugged in to the pump's back-panel.

7.1.2. Flow Rate Inconsistency:

- Inspect the tubing for any deterioration in flexibility, kinks, blockages, or leaks. Replace the tubing if necessary.
- Verify that the tubing is correctly installed and aligned with the pump head and rollers.
- Check that the tubing is not slack neither too stretched.
- Check the pump head for any tubing debris or residue that may be affecting the tubing compression. Clean the pump head if needed.
- Confirm that the pump is calibrated correctly according to the manufacturer's instructions.

- Check if the anti-slip locks are properly inserted.

7.1.3. Excessive Noise or Vibration:

- Check for any loose or improperly installed components. Tighten or reposition them as necessary.
- Inspect the tubing for any irregularities or damage that may cause increased friction.
- Verify that the pump head is securely closed and properly aligned.
- Ensure that the pump is placed on a stable surface and that it is not in direct contact with other vibrating equipment.
- Contact technical support if the noise or vibration persists, as it may indicate a mechanical issue.

7.1.4. Error Messages on Display:

- Follow the recommended actions or troubleshooting steps provided for each error.
- Reset the pump and clear the error by following the manufacturer's instructions, if applicable.
- If the error message persists, record the error and contact technical support for further assistance.

7.1.5. Tubing Leakage:

- Ensure that the tubing is properly installed and seated in the pump head.
- Verify that the tubing connectors and fittings are secure and free from damage.
- Check the tubing for any cuts, punctures, or wear that may cause leakage. Replace the tubing if necessary.
- Confirm that the pump head is closed and tightened securely.
- Review the tubing compatibility with the fluids being pumped. Incompatible fluids can cause tubing degradation and leakage.
- Confirm that the tubing has not become hard over continuous usage.

Remember to follow the manufacturer's instructions and guidelines for troubleshooting specific to your peristaltic pump model. Always prioritize safety and avoid performing any repairs or maintenance tasks that are beyond your level of expertise. When in doubt, consult the manufacturer's technical support for professional assistance.

7.2. Contact information for technical support

If you are unable to troubleshoot the issue, you can write to us at sales@resolvebiotech.com

8. Safety Precautions

8.1. Safety guidelines during operation

To ensure the safe and proper operation of your peristaltic pump, it is important to follow these safety guidelines:

8.1.1. Read the Manual:

- Carefully read and understand the user manual and all safety instructions provided by the manufacturer before operating the pump.
- Familiarize yourself with the pump's features, controls, and recommended operating procedures.

8.1.2. Power Source and Grounding:

- Ensure that the pump is connected to a properly grounded power source that meets the electrical requirements specified in the user manual.
- Use appropriate power cables and connectors as recommended by the manufacturer.
- Avoid using damaged or frayed power cords.

8.1.3. Location and Environment:

- Place the pump on a stable and level surface, away from sources of excessive heat, moisture, or vibration.
- Provide adequate ventilation around the pump to prevent overheating.

8.1.4. Personal Protective Equipment (PPE):

- Use appropriate personal protective equipment, such as gloves, safety goggles, or lab coats, as recommended by the manufacturer or in accordance with your specific application requirements.
- PPE should be worn when handling potentially hazardous substances or when there is a risk of splashes or contact with fluids.

8.1.5. Fluid Compatibility:

- Ensure that the fluids being pumped are compatible with the tubing.
- Consult the user manual or contact the manufacturer for guidance on fluid compatibility.
- Avoid pumping corrosive, toxic, or volatile substances that could pose a risk to personnel or damage the pump.

8.1.6. Emergency Stop:

- Familiarize yourself with the location and operation of the emergency stop button or switch on the rear side of pump.
- In case of an emergency or if any abnormality occurs during operation, immediately press the emergency stop to halt pump operation.

8.1.7. Maintenance and Servicing:

- Power off and disconnect the pump from the power source before performing any maintenance, cleaning, or servicing tasks.
- Follow the recommended maintenance procedures outlined in this manual and adhere to the specified intervals for routine maintenance.
- Only qualified personnel should perform any repairs or servicing on the pump.

8.1.8. Training and Supervision:

- Ensure that operators are adequately trained on the proper use and operation of the peristaltic pump.
- Supervise inexperienced operators until they are fully familiar with the pump's operation and safety protocols.
- Encourage operators to report any safety concerns or incidents to the appropriate personnel.

8.1.9. Disposal:

- Follow local regulations and guidelines for the proper disposal of used tubing, packaging materials, or any other waste generated during the operation or maintenance of the pump.
- Dispose of any hazardous or contaminated materials in accordance with applicable laws and regulations.

Adhering to these safety guidelines will help ensure the safe and reliable operation of your peristaltic pump. Prioritize safety at all times and take appropriate precautions to protect yourself, others, and the equipment.

8.2. Electrical safety precautions

To ensure safe operation and prevent electrical hazards, it is crucial to follow these electrical safety precautions while using your peristaltic pump:

8.2.1. Power Requirements:

- Ensure that the pump is connected to a power source that meets the voltage and frequency requirements specified in the user manual.
- Use the appropriate power cord and plug that are compatible with the electrical specifications of the pump.

8.2.2. Grounding:

- Connect the pump to a properly grounded electrical outlet or power supply to minimize the risk of electrical shock.
- Check the grounding integrity periodically and ensure that the grounding wire is securely connected.

8.2.3. Power Cord:

- Inspect the power cord regularly for any signs of damage, such as fraying, cuts, or exposed wires.
- If the power cord is damaged, replace it immediately with a suitable replacement provided by the manufacturer.
- Avoid bending or pinching the power cord, and ensure that it is positioned away from sharp edges or areas with excessive heat.

8.2.4. Water and Moisture:

- Keep the pump and electrical components away from water, moisture, and other liquids.
- Do not operate the pump in wet or damp environments unless it is specifically designed and approved for such conditions.
- If water or any liquid comes into contact with the pump, disconnect it from the power source and contact technical support for assistance.

8.2.5. Overloading:

- Avoid overloading the electrical circuits by connecting additional devices or equipment to the same power source as the pump.
- Consult the user manual or the manufacturer's guidelines to determine the maximum power load that the pump can safely handle.

8.2.6. Unattended Operation:

- Do not leave the pump unattended while it is powered on.
- When not in use, turn off the pump and disconnect it from the power source.
- Unplug the pump during extended periods of non-use or when performing maintenance or cleaning tasks.

8.2.7. Qualified Personnel:

- Only qualified personnel should perform any electrical repairs, modifications, or troubleshooting on the pump.

- If you encounter any electrical issues or malfunctions, contact the manufacturer's technical support or a certified service technician for assistance.

8.2.8. Compliance with Electrical Standards:

- Ensure that the pump complies with relevant electrical safety standards and regulations applicable in your region.
- Follow all local electrical codes and regulations when installing, operating, and maintaining the pump.

Adhering to these electrical safety precautions will help ensure the safe operation of your peristaltic pump and minimize the risk of electrical hazards. Always prioritize safety and consult the manufacturer's guidelines for specific electrical safety considerations related to your pump model.

8.3. Disposal of waste materials

Proper disposal of waste materials generated during the operation and maintenance of your peristaltic pump is essential to minimize environmental impact and ensure compliance with local regulations. Follow these guidelines for the responsible disposal of waste materials:

8.3.1. Tubing and Packaging:

- After replacing tubing, discard used tubing according to local waste disposal regulations.
- Consider recycling options for tubing materials, if available and appropriate.
- Dispose of packaging materials, such as cardboard boxes or plastic wrapping, in accordance with local recycling guidelines or waste disposal practices.

8.3.2. Chemicals and Fluids:

- Dispose of any used chemicals or fluids in accordance with local regulations and guidelines for hazardous waste disposal.
- Do not pour chemicals or fluids down the drain or dispose of them in regular waste bins.
- Contact local waste management authorities or environmental agencies for guidance on proper disposal methods for specific chemicals or fluids used with the pump.

8.3.3. Electronic Waste:

- In accordance with local regulations, dispose of any electronic waste generated during the maintenance or replacement of electronic components.
- Contact authorized recycling centres or e-waste collection points for proper disposal methods for electronic waste.

8.3.4. Environmental Considerations:

- Whenever possible, choose environmentally friendly alternatives and minimize the generation of waste materials.
- Follow recycling guidelines for materials such as plastic, metal, or paper whenever feasible.
- Consider reducing waste by implementing sustainable practices, such as reusing or repurposing materials whenever possible.

8.3.5. Compliance:

- Ensure compliance with all applicable waste disposal regulations and guidelines in your region.
- Familiarize yourself with local waste management practices and consult relevant authorities for specific disposal instructions.

By adhering to proper waste disposal practices, you contribute to environmental protection and help minimize the impact of waste materials generated during the use of your peristaltic pump. Stay informed about local regulations and guidelines to ensure responsible waste management.

9. Support

9.1. Contact details for customer support or service centres

Kindly contact sales@resolvebiotech.com for any customer support or service enquiry.
Office Timings: Monday to Friday, 9am – 5 pm.

9.2. FAQs

- **What is the warranty period for the peristaltic pump?**

The warranty period varies depending on the manufacturer and model of the pump. *Refer Invoice
Refer to the warranty documentation or contact the manufacturer for specific warranty information.

- **How do I initiate a warranty claim?**

If you believe your peristaltic pump is experiencing a warranty-related issue, contact the manufacturer or authorized distributor to initiate a warranty claim.
Be prepared to provide details about the issue, purchase information, and any relevant documentation.

- **What is not covered under the warranty?**

The warranty typically does not cover damage caused by misuse, improper maintenance, unauthorized modifications, or normal wear and tear.
Refer to the warranty documentation or contact the manufacturer for a comprehensive list of exclusions.

- **How can I troubleshoot common issues with the peristaltic pump?**

Refer to the troubleshooting section of the user manual for guidance on addressing common issues
Follow the recommended steps to diagnose and resolve problems.
If the issue persists or you are unsure about any troubleshooting steps, contact the manufacturer's technical support for assistance.

- **How often should I perform routine maintenance on the peristaltic pump?**

Routine maintenance intervals may vary depending on the pump model, usage frequency, and application.
Consult the user manual or contact the manufacturer for the recommended maintenance schedule specific to your peristaltic pump model.

- **Can I use third-party tubing with the peristaltic pump?**

It is recommended to use tubing recommended or supplied by the manufacturer to ensure optimal performance and compatibility.
Using third-party tubing may affect pump performance, accuracy, and reliability.

- **Where can I find replacement parts or accessories for the peristaltic pump?**

Contact the manufacturer or authorized distributors for genuine replacement parts and accessories for your specific peristaltic pump model.

Using genuine parts ensures proper fit, function, and compatibility.

- **How can I contact technical support for assistance?**

Refer to the user manual or the manufacturer's website for contact information of their technical support team.

Follow the specified channels (phone or email) to reach out for assistance with troubleshooting, repairs, or general inquiries.

Remember, these FAQs provide general information and may not cover all possible questions or scenarios. For more specific inquiries or concerns, always consult the manufacturer's support resources, user manual, or contact their technical support directly.



RESOLVE BIOTECH PRIVATE LIMITED

📍 4th Floor, Jet Prime, 39-B, Suren Road, Andheri (East), Mumbai - 400 093

☎ +91.90040.87254 | +91.22.6689.2407 | ✉ sales@resolvebiotech.com | 🌐 www.resolvebiotech.com