# USER MANUAL
## Peristaltic Pump

**Document version: YLW.18.11.25**


Yellow Labware

# 1. INTRODUCTION

Thank you for choosing the Inovenso Peristaltic Pump. This user manual has been carefully prepared to help you get the best performance, safety, and reliability from your device. Within these pages, you will find essential information about the pump's features, working principles, installation, operation, and maintenance.

Peristaltic pumps are widely recognized for their clean and contamination-free fluid handling, precise flow control, and ease of use. By combining this proven pumping principle with advanced automation and robust engineering, Inovenso delivers a versatile solution designed to meet the needs of laboratories, research facilities, and industrial environments.

We encourage you to read this manual thoroughly before operating the pump. Doing so will ensure safe operation, extend the lifespan of the equipment, and allow you to fully benefit from the advanced functions built into your Inovenso Peristaltic Pump.

# 2. DECLARATION OF CONFORMITY

CE

**Name of Manufacturer** : Inovenso Teknoloji Ltd.
**Adress of Manufacturer** : YTU İkitelli Teknopark, 2B02, Başakşehir, İstanbul, Türkiye
**Type of Product** : Peristaltic Pump
**Name of Series** : IPS Series
**Model of Device** : IPS-20 Peristaltic Pump System

This declaration of conformity is issued under the sole responsibility of the manufacturer. The object of the declaration described above is in conformity with the relevant Union harmonization legislation:

- **2014/35/EU** — Low Voltage Directive (LVD)
- **2014/30/EU** — Electromagnetic Compatibility Directive (EMC)
- **2011/65/EU** — Restriction of Hazardous Substances Directive (RoHS)
- **2012/19/EU** — Waste Electrical and Electronic Equipment Directive (WEEE)
- **2006/42/EC** — Machinery Directive (where applicable, for mechanical safety)

**Place and Date of Issue:**
İstanbul, 19 June 2025

**Signatory:**
Faik Midik
Chief Executive Officer
Inovenso Teknoloji Ltd.

# 3. PRODUCT DESCRIPTION

Peristaltic pumps are positive displacement pumps that transfer fluids through flexible tubing using a series of rotating rollers. As the rollers compress and release the tubing, fluid is gently propelled forward in a controlled manner, without ever coming into direct contact with the pump's internal components. This mechanism ensures contamination-free operation, making peristaltic pumps ideal for applications where cleanliness, precision, and chemical compatibility are essential. They are widely used in laboratories, industrial processes, and scientific environments due to their ability to deliver accurate flow rates, handle a wide range of liquids, and simplify cleaning and maintenance.

The Inovenso Peristaltic Pump is engineered to bring these advantages to the next level, offering a high-performance, microprocessor-controlled solution for demanding fluid transfer tasks. With a wide speed range of 0.1–600 RPM and a maximum flow rate of 2280 ml/min, it provides unparalleled control over both micro- and high-volume operations. The built-in flow calibration mode, cumulative volume display, and precise 0.1 RPM resolution ensure repeatability and accuracy in every application.

Equipped with advanced automation features such as a 4.3" color touchscreen interface, recipe save & recall, learn & repeat mode, and reversible flow direction, the Inovenso Peristaltic Pump streamlines complex processes while reducing operator workload. Its fast-run mode further enhances efficiency by allowing quick rinsing and filling of tubing.
Built for durability, the pump features a PPS (Polyphenylene Sulfide) pump head housing that is resistant to heat, solvents, and corrosion, complemented by 304 stainless steel rollers for long-lasting performance. Its wide tubing compatibility—supporting sizes from 13# to 18#—allows flexible adaptation to various flow requirements, from as low as 0.006 ml/min to as high as 2280 ml/min.

Compact and lightweight at 4.5 kg, with dimensions of 403 × 238 × 270 mm, the Inovenso Peristaltic Pump is designed for ease of use in real-world conditions. It operates reliably in environments of 0–40°C and humidity levels below 80% RH, and is compatible with both AC 220V and AC 110V power supplies.
With its combination of precision, automation, and robust design, the Inovenso Peristaltic Pump is a versatile and reliable choice for laboratories, research centers, and industrial applications that demand accurate, contamination-free, and efficient fluid handling

# 4. LAYOUT AND FUNCTION

### 4.1. Principle of Peristaltic Pumping

Peristaltic pumps operate on the principle of positive displacement. A set of rotating rollers compresses a flexible tube against the pump housing, creating a moving zone of occlusion (compression). This motion propels the liquid forward in discrete volumes, similar to how the human gastrointestinal system moves food through the intestines — a process known as peristalsis, from which the pump takes its name.
Unlike centrifugal or diaphragm pumps, the fluid never comes into contact with any moving mechanical parts. Instead, it is fully contained within the tube, ensuring a contamination-free transfer. This makes peristaltic pumps particularly suitable for:

- Sterile or hygienic applications (biotechnology, pharmaceuticals, laboratories).
- Aggressive or corrosive fluids (chemical handling, waste treatment).
- Shear-sensitive materials (cell suspensions, polymer solutions).

### 4.2. Functional Layout

A typical peristaltic pump consists of the following major components:

- Pump Head Housing (PPS material) – Rigid support structure that holds the rollers and tubing in position.
- Rollers (Stainless Steel 304) – Mounted on a rotating rotor, they compress and release the tubing sequentially.
- Flexible Tubing – The only component in contact with the fluid. Its elasticity allows repeated compression and recovery.
- Drive System – A precision-controlled motor (microprocessor-driven) that sets the roller rotation speed, and thus the flow rate.
- Control Interface – A touchscreen panel provides operators with speed, flow, and automation settings.

As the rotor turns, each roller squeezes the tube, pushing a “plug” of liquid forward. Behind the roller, the tubing returns to its natural round profile, creating suction that draws more liquid in. Continuous rotation generates a steady flow.

### 4.3. Characteristics of Peristaltic Movement

- Positive Displacement Action
  Each roller movement displaces a fixed volume of liquid. The flow rate is proportional to the rotation speed and tube inner diameter. This ensures highly repeatable and precise dosing.

- Reversible Flow
  By reversing the motor direction, flow can be instantly reversed. This feature is especially useful for purging, rinsing, and bidirectional transfer.

- Self-Priming Capability

# 4. LAYOUT AND FUNCTION

The suction generated during tube recovery allows the pump to lift fluids from below its inlet (typically up to 8 meters depending on tubing and liquid properties).

- Dry Running
  Since there are no seals, valves, or immersed moving parts, peristaltic pumps can run dry without damage — unlike many other pump types.

- Low Shear Stress

Fluids are gently transported without turbulence, making the pump suitable for biological samples or polymers sensitive to shear degradation.

### 4.4. Advantages of the Peristaltic Principle

- No risk of cross-contamination, since fluid only contacts the tubing.
- Accurate and repeatable flow control, ideal for laboratory dosing and industrial metering.
- Easy tubing replacement — no need for cleaning internal pump parts.
- Broad chemical compatibility determined by tubing material selection.
- Safe for abrasive, viscous, or particulate-laden fluids.

### 4.5. Performance Factors

The performance of a peristaltic pump depends on several variables:

- Tubing Inner Diameter (ID) – Larger diameters deliver higher flow but require more torque.
- Tubing Material & Elasticity – Determines chemical compatibility, suction capability, and lifespan.
- Motor Speed & Control Accuracy – Defines resolution, repeatability, and precision of dosing.
- Number of Rollers – More rollers reduce pulsation and provide smoother flow.
- Operating Pressure – Typically limited to 2–3 bar, as tubing deformation increases at higher backpressures.

**Note:** For maximum tubing life, it is recommended to avoid excessive roller pressure, chemical incompatibility, or continuous operation near maximum rated flow/pressure.

# 5. PERISTALTIC PUMP FEATURES

**High-Precision Speed & Flow Control**
Gain unmatched control over your processes:

- Speed Range: 0.1–600 RPM
- Speed Resolution: 0.1 RPM
- Flow Rate: Up to 2280 ml/min
- Flow Calibration Mode for precise dispensing
- Cumulative Volume Display for accurate monitoring

**Advanced Automation Features**
Maximize efficiency with smart technology:

- 4.3” Color Touchscreen Interface
- Microprocessor Controller for automated operation
- Reversible Flow Direction for fast cleaning
- Recipe Save & Recall for repeatable processes
- Learn & Repeat Mode for batch tasks
- Fast-Run Mode to rinse and fill tubing quickly

**Robust, Chemical-Resistant Design**
Built to withstand tough environments:

- Pump Head Housing: PPS (Polyphenylene Sulfide)
- Resistant to heat, solvents, corrosion, and flame
- Offers high mechanical strength and insulation
- Rollers: Made from durable 304 stainless steel

**Wide Tubing Compatibility & Easy Installation**
Compatible with various tubing sizes to match your application:

| Tubing Size | Flow Range (ml/min) | ID (mm) | Max Flow (ml/min) |
|---|---|---|---|
| 13# | 0.006 – 38 | 0.8 | 42 |
| 14# | 0.025 – 150 | 1.6 | 162 |
| 19# | 0.042 – 250 | 2.4 | 306 |
| 16# | 0.077 – 460 | 3.1 | 492 |
| 25# | 0.16 – 960 | 4.8 | 1020 |
| 17# | 0.26 – 1600 | 6.4 | 1740 |
| 18# | 0.36 – 2280 | 7.9 | 2280 |

- Quick & easy tube installation
- Multiple flow configurations from micro to high-volume

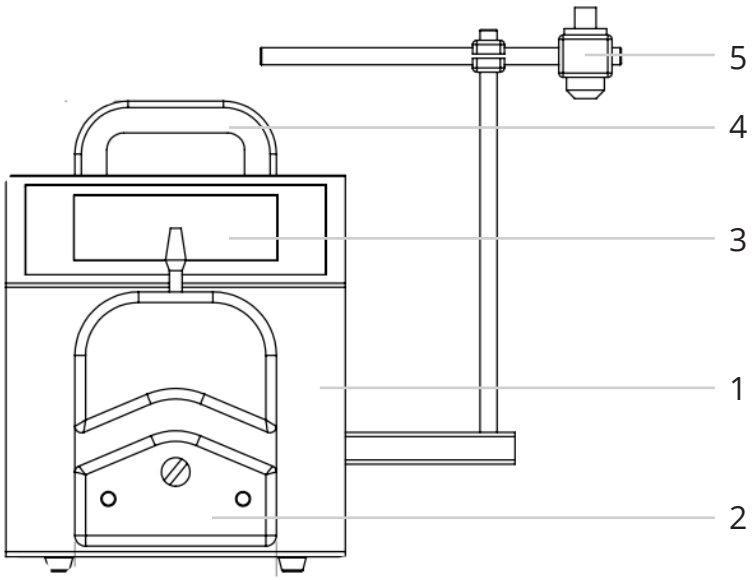
**Engineered for Real-World Conditions**
Made for everyday use in professional environments:

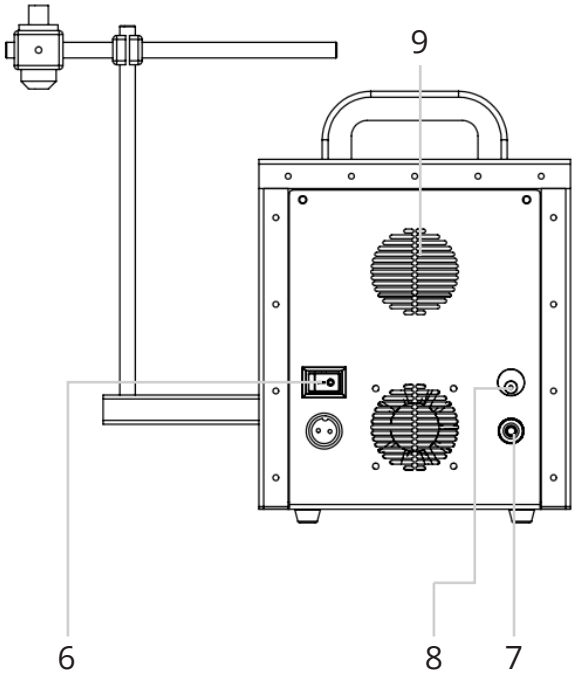
- Operating Temperature: 0–40°C

- Humidity Tolerance: <80% RH
- Power Supply:
  AC 220V ±10%, 50/60Hz
  AC 110V ±10%, 50/60Hz
- Compact, Lightweight Design: 4,5 kg in weight

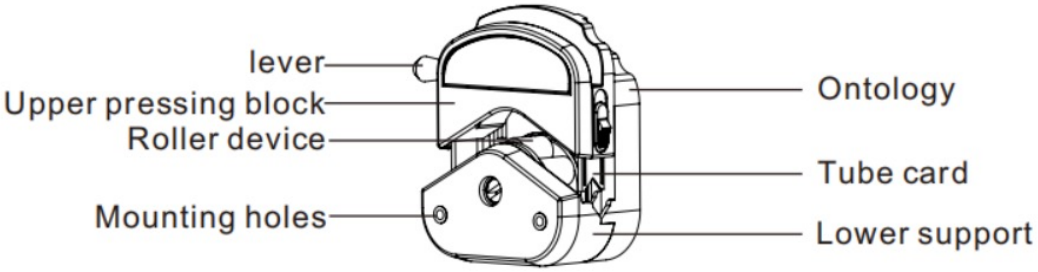
Dimensions (L x W x H ): 403 x 238 x 270 (mm)

## 5.1. Component Definition

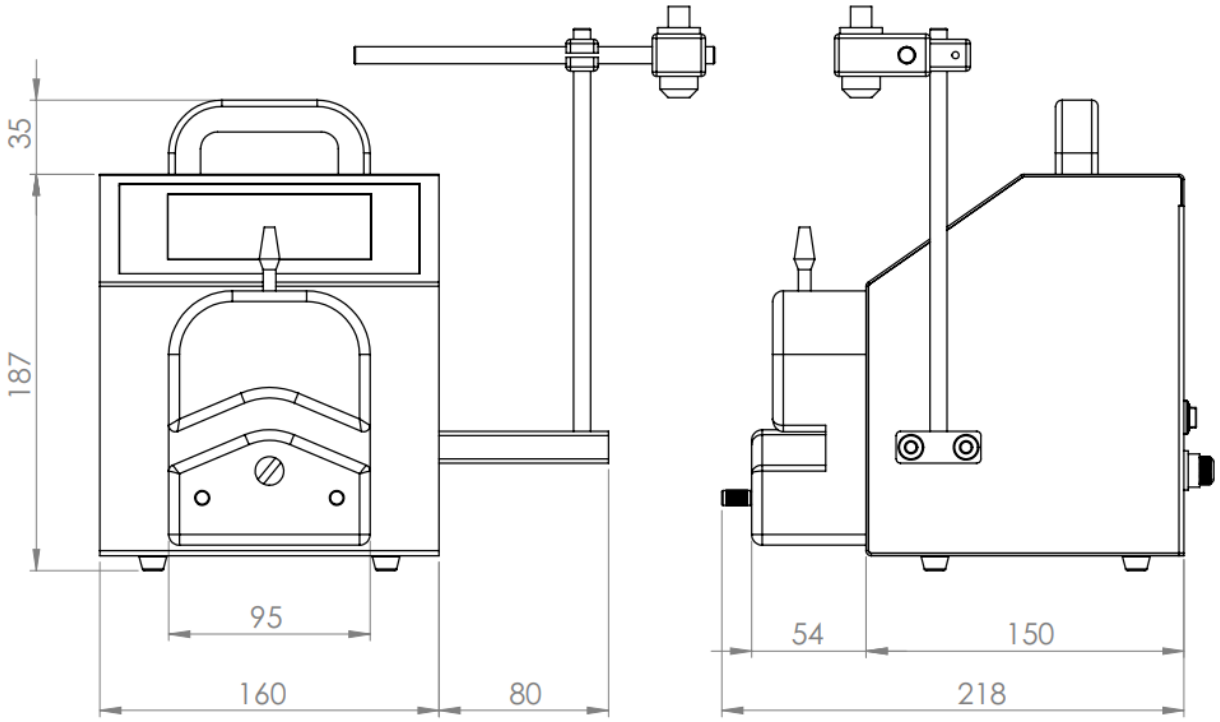



1. Machine case
2. Peristaltic pump head
3. Touch screen
4. Lift handle
5. Filling head clamper
6. Power switch
7. Power socket
8. Grounding cable connection
9. Cooling fan



## 5.2. Pump Dimensions (mm)



# 6. SAFETY INSTRUCTIONS

The following precautions are essential for the correct installation, operation, and maintenance of the **Inovenso Peristaltic Pump**. Failure to follow these instructions may result in injury, equipment damage, or compromised performance.**Safety Symbols and Warnings**

**Warning** – Hazardous situation that could result in serious injury, death, or major equipment damage.

**Caution** – Condition that may cause minor injury, equipment malfunction, or reduced performance.

**Note** – Helpful information or recommendations for correct operation and maintenance.

## 1.1. General Safety

**Warning:** Only trained and qualified personnel should install, operate, or maintain this equipment.

**Warning:** This product is **not ATEX-certified** and must not be used with flammable or explosive fluids.

**Warning:** Ensure the pump is installed in a location where the power can be quickly disconnected in case of emergency.

**Caution:** Do not allow untrained individuals to modify or connect this pump with other equipment.

**Note:** Always assess the need for PPE (gloves, goggles, lab coat) depending on the transferred fluid.

## 1.2. Electrical Safety

**Warning:** Confirm the correct power supply (AC 220V ±10% or AC 110V ±10%, 50/60 Hz) before operation.

**Warning:** Damaged or wet power cords must not be used; replace them immediately.

**Warning:** Disconnect the plug immediately in case of malfunction or emergency.

**Caution:** Replace fuses only with the same rating and type.

**Caution:** Do not attempt to open the driver housing—there are no user-serviceable parts.

## 1.3. Tubing Safety

**Warning:** A ruptured tube may cause fluid to splash. Always wear protective gear when handling hazardous fluids.

**Warning:** Ensure tubing is depressurized and the pump is disconnected from the power supply before replacing or disassembling.

**Caution:** Improper tubing installation may cause leaks or pump malfunction.

**Caution:** Use only tubing materials compatible with the pumped fluid.

**Note:** Regularly inspect tubing for cracks, swelling, or wear to prevent unexpected failures.

## 1.4. Roller & Pump Head Safety

**Warning:** Never touch rollers or the rotating spindle while the pump is running.

**Caution:** Do not attempt to lubricate or disassemble the rollers—this may lead to leakage or damage.

**Note:** Keep rollers clean and dry to extend tubing life.

**Note:** Immediately clean up spilled liquids to avoid corrosion of the pump head housing.

## 1.5. Chemical Safety

**Warning:** Do not use with fluids that may chemically attack PPS pump head housing or stainless steel rollers.

**Caution:** Prolonged exposure to strong acids, alkalis, or solvents may damage the pump or tubing.

**Note:** Always confirm chemical compatibility with the pump head, tubing, and accessories before operation.

## 1.6. Operating Environment

**Warning:** Operate only within the specified environmental conditions:

Temperature: 0–40 °C

Humidity: <80% RH (non-condensing)

**Caution:** Do not use outdoors or in excessively dusty, humid, or vibrating environments.

**Note:** Place the pump on a stable, level surface for quiet and reliable operation.

# 7. TRANSPORT, STORAGE, AND DISPOSAL

Proper transport, storage, and disposal procedures are essential to maintain the performance, safety, and service life of your Inovenso Peristaltic Pump.

## 1.1. Transport

- Always transport the pump in a horizontal position to avoid mechanical stress.
- Use the original packaging or equivalent protective materials to prevent vibration, shock, or moisture ingress.
- Avoid exposure to rain, direct sunlight, and extreme temperatures during transport.

## 1.2. Unpacking and Inspection on Delivery

1. Carefully unpack the pump and accessories.
2. Inspect for mechanical damage or missing items.
3. Report any damage immediately to the manufacturer or distributor.
4. Retain all packaging for future transport or return shipment.

**Note:** Tubing should remain in its original wrapper until use. Store away from direct sunlight, ozone sources, and heat to prevent premature aging.

## 1.3. Storage

- Store the pump in a clean, dry, dust-free environment.
- Storage temperature: –10 °C to +50 °C.
- Relative humidity: <80% RH, non-condensing.
- Avoid exposure to corrosive vapors, vibration, or direct sunlight.
- If stored for more than 6 months, run the pump briefly before use to ensure roller mobility.

## 1.4. Interim Storage After Use

**Caution:** After each use, remove the tube from the pump head to prevent permanent deformation.

- Wash out the pump head with a suitable cleaning fluid (compatible with PPS and stainless steel).
- Allow the pump head to dry fully.
- Remove any external buildup of product from the housing and rollers.

## 1.5. Interim Storage Before Use

**Warning:** Pump damage may occur if the pump is operated immediately after removal from cold storage.

- Allow the pump to reach ambient room temperature before use.
- Observe tubing storage recommendations (temperature, humidity, chemical compatibility, and manufacturer's use-by dates).

**Note**: Tubing that has exceeded its storage life should not be used for precision applications, as elasticity and chemical resistance may degrade.

## 1.6. Disposal

**Warning**: With prolonged use, pump components (tubing, rollers, housings) may be contaminated by hazardous fluids. Cleaning may not fully remove residues.

Risk of poisoning or environmental damage from contaminated components.

Before disposal:

- Use suitable personal protective equipment (PPE) when handling used pumps and tubing.
- Collect and dispose of any leaked or residual pumped liquid according to local hazardous waste regulations.
- Neutralize chemical residues where applicable.
- Dispose of tubing, accessories, and contaminated parts as chemical waste.

## 1.7. Regulatory Compliance

- This device must not be disposed of with regular household waste.
- Comply with WEEE (Waste Electrical and Electronic Equipment Directive) and equivalent local legislation.
- Components must also meet RoHS (Restriction of Hazardous Substances) requirements.
- Return units to the manufacturer or authorized service provider for environmentally responsible recycling.

### Environmental Responsibility

At Inovenso, we are committed to minimizing environmental impact throughout the product life cycle:

- Pump housing and electronic parts are recyclable through WEEE-compliant facilities.
- Stainless steel rollers and metallic parts can be reclaimed through metal recycling.
- Tubing and accessories should be disposed of as per chemical compatibility guidelines to prevent environmental contamination.

**Note:** Customers are encouraged to support sustainable practices by returning end-of-life pumps to Inovenso or certified recycling partners.

# 8. INSTALLATION AND OPERATION

This section provides detailed instructions for the correct installation, setup, and operation of the **Inovenso Peristaltic Pump**. Please read carefully before using the pump for the first time. Proper installation ensures optimal performance, prolongs tubing life, and prevents damage to the equipment.

Warning: Before installation, make sure you have read the *Safety Instructions* chapter. Operating the pump without understanding the safety guidelines may result in injury or equipment damage.

## 1.1. Before You Begin

Before installing the pump, verify the following:

- The pump and accessories are intact and undamaged after transport.
- The power supply voltage matches the pump's requirements (AC 220V ±10% or AC 110V ±10%).
- The installation area is clean, dry, stable, and meets environmental requirements (0–40°C, <80% RH).
- The selected tubing is compatible with the fluid you intend to pump.
- The tubing size matches the pump head specifications listed in the product description.
  **Caution:** Using incompatible tubing or fluids may cause leakage, premature wear, or pump malfunction.

## 1.2. General Installation Precautions

- Install the pump on a stable, horizontal surface to minimize vibration.
- Keep the pump away from corrosive chemicals, vapors, and heat sources.
- Ensure the power plug remains easily accessible for emergency disconnection.
- Do not operate the pump with the enclosure open or components removed.

## 1.3. Positioning the Pump

Correct positioning is essential for safe and reliable operation.

1. Select a Suitable Surface
   - Place the pump on a stable, horizontal, and vibration-free surface.
   - Ensure the surface can support the pump's weight and any connected tubing or containers.
2. Environmental Conditions
   - Operate only within specified limits:
     - Temperature: 0–40 °C
     - Relative humidity: <80% RH, non-condensing
   - Keep the unit away from:
     - Direct sunlight or heat sources (ovens, radiators, hot plates)
     - Sources of strong vibration or mechanical shock
     - Corrosive, flammable, or explosive atmospheres

3. Accessibility and Ventilation

    - Leave sufficient space (at least 10 cm recommended) around the pump for air circulation.
    - Ensure that the rear panel, power socket, and main switch are easily accessible for emergency disconnection.
    - Position the pump so that the touchscreen and pump head are clearly visible and reachable by the operator.

4. Arrangement of Tubing and Containers

    - Route the tubing so it is not kinked, crushed, or under tension.
    - Position inlet and outlet containers securely to avoid accidental spillage.
    - Avoid trip hazards: do not leave tubing or cables stretched across walkways.

**Caution:** Do not place the pump directly under dripping lines, open faucets, or where liquids may spill onto the housing.

**Note:** For applications involving hazardous liquids, consider placing the pump in a secondary containment tray to capture possible leaks or spills.

## 1.4. Connecting Power

**Warning:** Electrical connections must comply with local regulations. If you are unsure, ask a qualified electrician or technical staff to perform the installation.

1. Verify Supply Voltage

    - Check the rating label on the pump to confirm the allowed input (AC 220 V ±10% or 110 V ±10%, 50/60 Hz).
    - Make sure the wall outlet voltage corresponds to one of these values.

2. Grounding (Earthing)

    - Connect the pump only to a properly grounded mains outlet.
    - Do not remove or bypass the earth connection of the power plug.

3. Connecting the Power Cord

    - Ensure the power switch is in the OFF position (if present) before plugging in.
    - Insert the IEC connector of the power cord firmly into the power inlet on the rear panel.
    - Plug the other end into an easily accessible wall socket.

4. Using Power Strips or Surge Protection

    - If using a power strip, verify that it is rated for the pump's current and is properly grounded.
    - A surge protector is recommended in laboratories or industrial environments with unstable mains supply.

5. Initial Power-On Check

    - Switch the power to ON.
    - Confirm that the display lights up and the pump completes its startup sequence without error messages.
    - If any abnormal noise, smell, or message appears, switch off immediately and

disconnect the power supply.

**Caution:** Do not operate the pump if the power cord, plug, or housing is damaged. Contact service personnel.

**Note:** Keep the area around the wall socket clear so the plug can be quickly removed in an emergency.

### 1.5. Tubing Installation (Lever-Type Compression Block)

The pump head used in this model features a **180° rotating lever** that opens and closes the compression block. This mechanism allows quick tubing installation while ensuring stable occlusion and reliable flow.

**Warning:** Always switch **OFF** the pump and disconnect power before installing or removing tubing. Never touch rollers while the pump is running.

### 1.6. Selecting the Correct Tubing

Before installation, verify the following:

- Tubing size matches intended flow rate (13#, 14#, 16#, 19#, 25#, 17#, 18#).
- Tubing material is chemically compatible with the pumped fluid.
- Tubing surface is free of cracks, flattening, or aging.
- Tubing is at room temperature and within its recommended shelf life.

**Caution:** Do not stretch or pull tubing excessively. Reduced elasticity shortens tubing life and affects occlusion.

### 1.7. Installing the Tubing

Follow these steps carefully:

**Step 1 — Prepare the Pump**

1. Ensure the pump is switched **OFF**.
2. Confirm the rollers are completely stopped.
3. If needed, manually rotate the rotor slightly to move the roller away from the tube channel for easier placement.

**Step 2 — Open the Compression Block**

- Rotate the lever 180° counter-clockwise to fully open the compression block.
- The rollers and tubing channel will now be accessible.

**Step 3 — Position the Tubing**

1. Lift or slide the **tubing clamps** on both sides of the pump head into the **open** position.
2. Insert the tubing into the pump head by laying it **between the rollers and the compression block**.
3. Ensure the tubing is:
    - Centered inside the channel
    - Not twisted
    - Routed smoothly on both inlet and outlet sides

- Free from tension or sharp bends

**Caution:** Do not use tools (pliers, forceps) to force the tubing in place. This can permanently damage the tubing surface.

**Step 4 — Close the Compression Block**

- Rotate the lever 180° clockwise to close the compression block and engage roller pressure.
- You should feel a firm stop when the compression block is fully locked.

**Step 5 — Secure the Tubing with the Clamps**

- Adjust the tubing clamps on both sides of the pump head so they hold the tubing in place.
- The clamps are designed to:
    - Prevent tubing from sliding during operation
    - Maintain stable flow
    - Reduce mechanical stress at entry and exit points

**Caution:** If the clamps are too tight, tubing deformation and premature wear may occur. Adjust only until the tubing is held securely.

## 1.8. Alignment Check

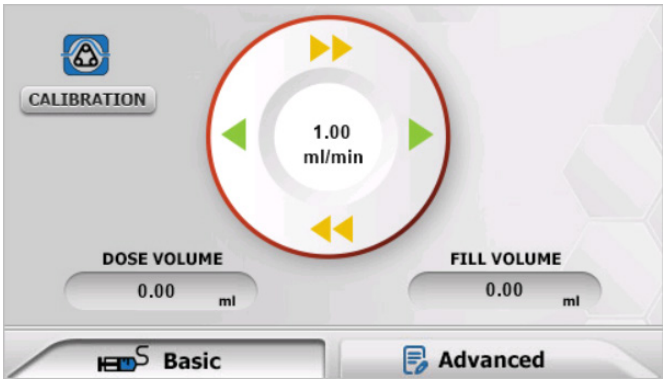
After installing the tubing:

- Inspect that the tubing follows a smooth curve without stretching.
- Ensure there is enough tubing length on both sides to avoid tension during operation.
- Both clamps should hold the tubing firmly but without applying excessive compression.

**Warning:** Incorrectly placed or misaligned tubing may rupture during operation, leading to spills or exposure to hazardous fluids.

## 1.9. Basic Operation via Touchscreen

The Inovenso Peristaltic Pump is equipped with a **4.3" color touchscreen interface** that provides intuitive control over speed, direction, flow rate, and operating modes. This section explains how to perform basic operations and navigate the main functions.




**Mode Tabs (Bottom of Screen)**

- Basic Mode – Direct manual control (flow rate, direction, start/stop).
- Advanced Mode – Access advanced features:
    - Learn & Repeat Mode
    - Multi-step dosing
    - Timed functions and automation

**Flow Rate Display (Center Circle)**

- Shows the current operating flow rate in ml/min, L/hr or RPM
- This value changes in real-time as you adjust speed.
- When calibration is performed, the displayed value matches the true flow rate.

**Dose Volume Field**

- Allows setting a specific volume (ml) for automatic dispensing in dosing mode.
- Displays the current dose progress when dosing is active.

**Fill Volume Field**

- Shows the total line filling volume used when executing a filling operation.

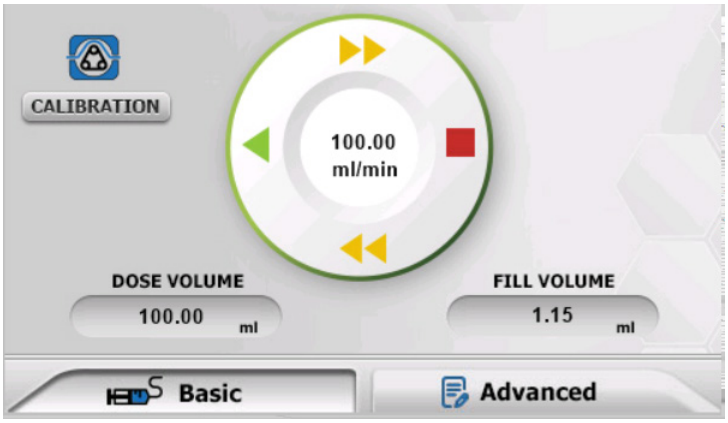
**Direction and Speed Adjustment Arrows**

The four directional arrows around the circle allow rapid adjustments:

- Green Arrows: Starts pumping with the flow rate given in the middle of the circle.
- Yellow Double Arrows: Purges the liquid with the given direction.

## 1.10. Dosing Operation (Volume-Controlled Pumping)

Dosing mode allows the pump to automatically dispense a **precise, predefined volume** of liquid. This function is ideal for laboratory dosing, sample preparation, and applications requiring repeatable and accurate fluid delivery.




When dosing begins, the **outer ring** surrounding the central circle changes color to indicate pump status:

- Red Ring: Pump is stopped
- Green Ring: Pump is running

This color change provides an immediate visual confirmation of the operating state.

### 1.10.1. Dose Volume (Target Volume)

- The desired total volume to be dispensed is entered into the DOSE VOLUME field.
- This value represents the target volume that the pump will deliver before stopping automatically.

**Warning:** For accurate dosing, ensure that the **Flow Calibration** procedure has been performed before using this feature.

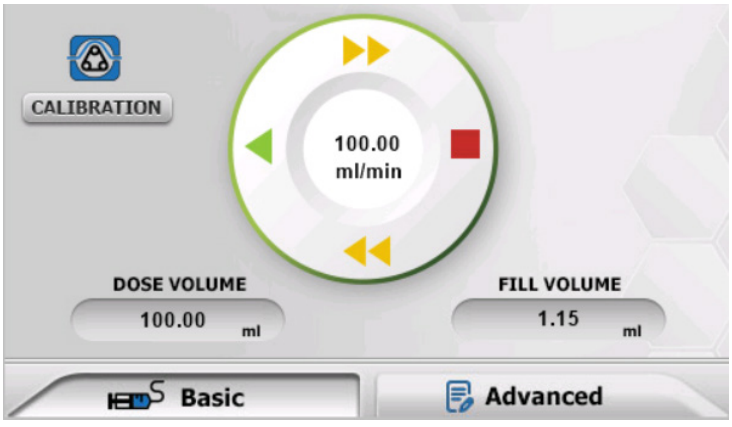
### 1.10.2. Fill Volume (Real-Time Progress)

- The FILL VOLUME field displays the real-time pumped volume during operation.
- As the pump runs, the Fill Volume value increases steadily, allowing the operator to monitor progress at any moment.

### 1.10.3. Completion of the Dosing Cycle

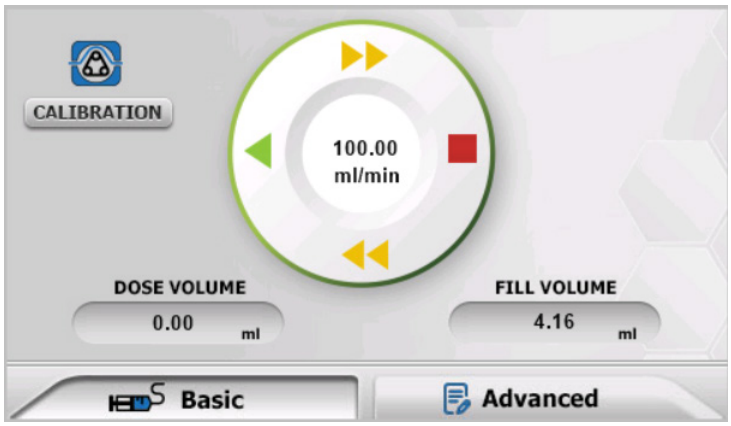
When the **Fill Volume value reaches the Dose Volume value**:

- The pump automatically stops.
- The outer ring returns to red, indicating that the dosing cycle is complete.
- The system is now ready for the next operation.



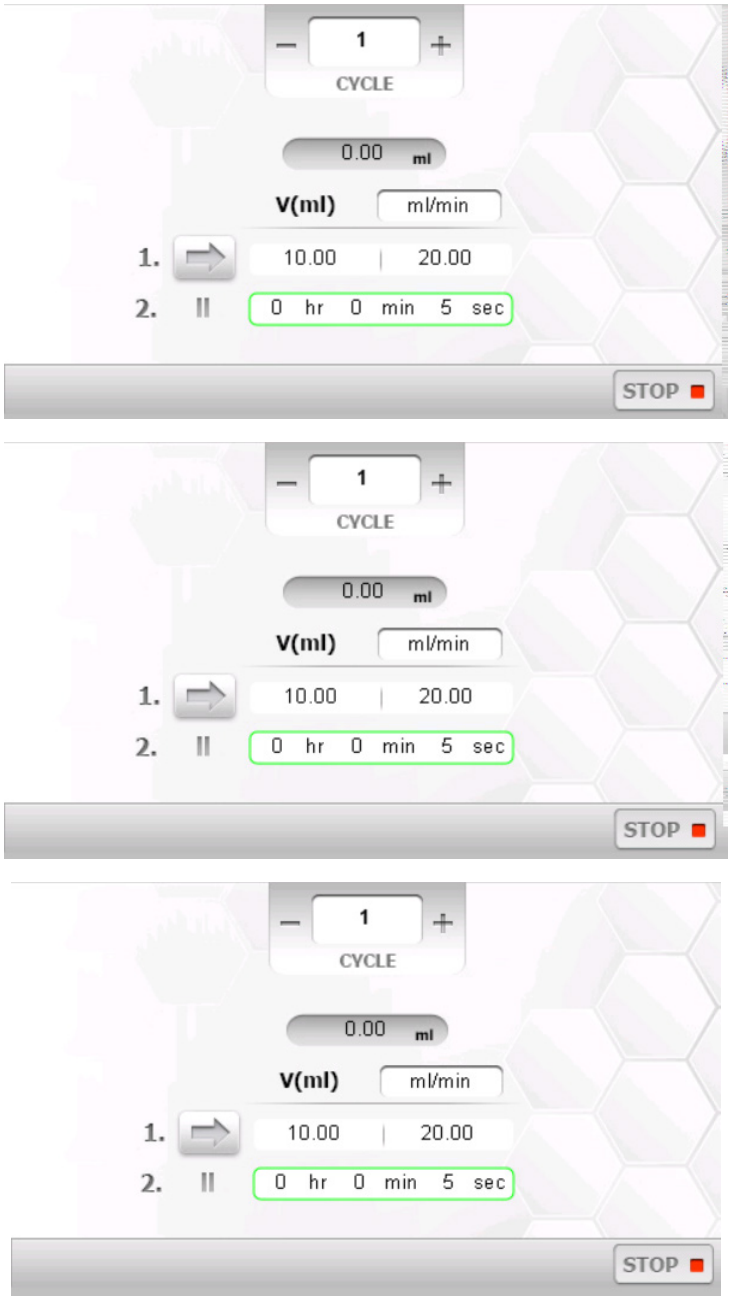

The pump supports bidirectional operation, allowing fluid transfer in both forward and reverse directions as required by the application.

## 1.11. Continuous Transfer Mode




If no value is entered in the **Dose Volume** field (i.e., it remains at zero), the pump will operate in **continuous transfer mode**, delivering fluid indefinitely in the selected direction. The amount of transferred liquid can be monitored in real time through the **Fill Volume** display.

## 1.12. Advanced Mode – Cycled Pumping Operation




In **Advanced Mode**, the pump can perform **repetitive pumping cycles** consisting of two

programmable steps. This mode is ideal for automated dispensing, periodic dosing, batching, and time-controlled fluid transfer operations.

**CYCLE Setting**

- The CYCLE value defines how many times the sequence of Step 1 and Step 2 will be repeated.
- You can increase or decrease the cycle count using the + / – buttons.
- When the cycle value is set to 1, the sequence runs once.
- Higher values allow continuous repeated operation.

**Step 1 – Pumping Step**

Step 1 determines the **volume to be pumped** and the **flow rate** at which it is delivered.

- V (ml): The total volume to be pumped in Step 1.
- ml/min: The pumping speed (flow rate) at which the volume will be transferred.
- During operation:
- The indicator bar directly under the CYCLE field displays the remaining volume for Step 1.
- This value counts down from the programmed volume to zero, decreasing in real time at the selected flow rate.
- When the remaining volume reaches 0 ml, Step 1 is completed and the pump automatically transitions to Step 2.

**Note:** Fluid transfer can be performed in **both directions**, depending on the arrow selected in Step 1.

**Step 2 – Waiting Step**

Step 2 defines the **waiting time** between two consecutive pumping actions.

- Enter the desired delay time in hours, minutes, and seconds.
- During Step 2, the pump remains idle and waits for the programmed duration before restarting Step 1.

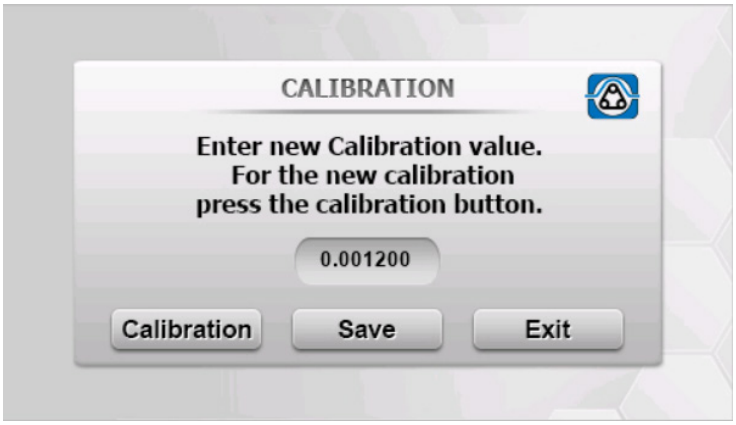
This allows the pump to perform **periodic dispensing** cycles automatically without user intervention.

## 1.13. Flow Calibration Procedure

Flow Calibration is used to ensure that the pump displays and delivers **accurate flow rate and volume values**. Due to variations in tubing elasticity, fluid viscosity, roller pressure, and environmental conditions, calibration should be performed periodically—especially before precision dosing applications.

**Warning:** Always use clean, bubble-free tubing and ensure that the pump is properly primed before starting the calibration process

### 1.13.1. Starting Calibration




1. Press the **CALIBRATION** button on the main screen.
2. The screen titled **"Enter new Calibration value"** will appear.
3. If you already know a previously determined calibration value, you may **enter it directly** and press **Save**.
4. To perform a **new calibration**, tap the **Calibration** button to begin the guided 4-step procedure.

### 1.13.2. Step 1/4 – Purging the Tubing


- Install the tubing into the pump head as described in the tubing installation section.
- On the Step 1/4 screen, press the Fast-Run arrows (>>) to purge the system.
- Continue purging until:
    - The tubing is completely filled with liquid
    - All air bubbles are removed

- Once the line is air-free, press Next.

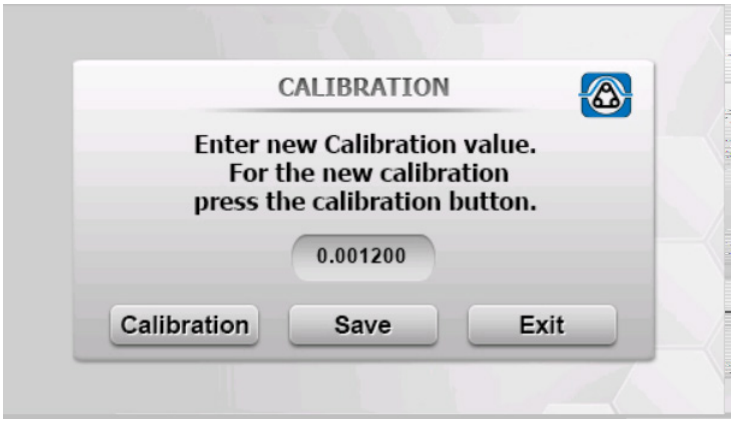
**Caution:** Any trapped air will negatively affect calibration accuracy.

### 1.13.3. Step 2/4 – Pumping for a Measured Time


- Enter the calibration duration (minutes and seconds).
- Enter the RPM value at which calibration will be performed.
- A longer calibration time generally improves accuracy.
- Press the green Start arrow to begin pumping.
- Collect the dispensed liquid into a precise graduated cylinder or volumetric measurement device.
- When the preset time ends, the pump stops automatically.
- Press Next to continue.

**Warning:** Use a properly positioned container to avoid spills or splashing.

### 1.13.4. Step 3/4 – Enter Measured Volume

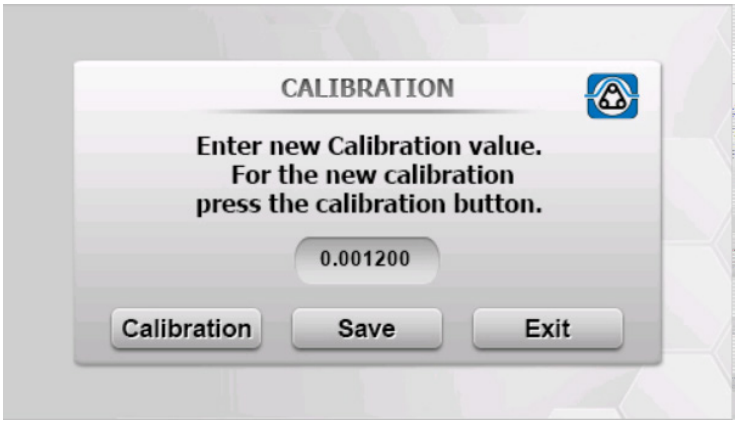



- Read the exact liquid volume collected in the measuring cylinder.
- Enter this value into the displayed field labeled with “ml”.
- Press Next to proceed.

**Tip for accuracy:** For best results, use:

- A Class A graduated cylinder
- Low-viscosity calibration fluid (typically water)
- A steady pumping environment (no vibrations)

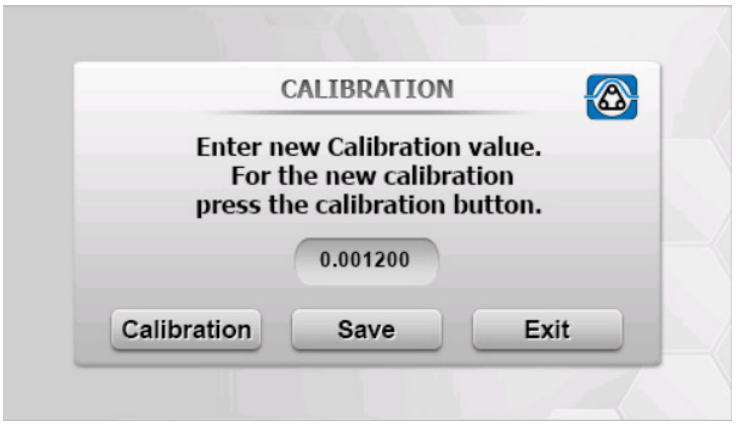
### 1.13.5. Step 4/4 – New Calibration Value




- The pump automatically calculates a new calibration factor based on the measured data.
- The new calibration value is displayed on the screen.
- Press Next to continue.

This value will now be used to convert pump RPM into accurate flow rate and volume readings.

### 1.13.6. Saving the Calibration




1. After completing Step 4/4, you will return to the calibration home screen.
2. Press **Save** to store the new calibration value in memory.
3. Press **Exit** to leave the calibration menu and return to the main screen.

### 1.13.7. Notes and Recommendations

- Calibration should be repeated whenever:
    - New tubing is installed
    - A different tubing size is used
    - A change in fluid viscosity occurs
    - High precision dosing is required
    - Tubing elasticity changes over time
- For best stability, perform calibration at the same RPM you plan to operate.
- Calibration values are saved in the pump's internal memory and remain stored even after power-off.

# 9. TROUBLESHOOTING

This section provides guidance for identifying and resolving common issues that may occur during installation, calibration, or operation of the Inovenso Peristaltic Pump. If a problem persists after following these instructions, discontinue use and contact authorized service personnel.

**Warning:** Before performing any troubleshooting steps, always switch **OFF** the pump and disconnect it from the power supply.

**Pump Does Not Start**

- No power supply
    - Check the power cable connection.
    - Verify the main switch is set to ON.
    - Ensure the wall outlet is functioning.
- Blown fuse
    - Replace the fuse only with the same rating and type.
- Emergency stop or error state
    - Reset the pump by switching OFF and ON again.
    - Check for error messages on the display.

**Pump Starts but No Fluid is Moving**

- Tubing not properly installed
    - Reinstall the tubing and make sure it is correctly placed between the rollers and the compression block.
    - Ensure the lever is fully closed and clamps are properly adjusted.
- Air inside the tubing
    - Purge the system using Fast-Run mode until all air is removed.
- Inlet container is empty
    - Refill or reposition the container.
- Tubing is kinked or crushed
    - Straighten the tubing and remove bends or obstructions.

**Inaccurate Flow Rate or Volume Delivery**

- Calibration not performed
    - Perform the full Flow Calibration Procedure (Section 5.11).
- Incorrect tubing size
    - Ensure the correct tubing number (#13, #14, #16, etc.) is used.
- Tubing wear or loss of elasticity
    - Replace tubing if swollen, flattened, or stiff.
- Fluid viscosity different from calibration conditions
    - Recalibrate using the same fluid or at the same RPM as planned for operation.

**Tubing Slips or Moves During Operation**

- Clamps not tightened correctly
    - Adjust tubing clamps so that the tubing is held firmly without being crushed.
- Lever not fully locked

- Rotate the compression block lever fully clockwise to the locked position.
- Tubing surface is wet or oily
  - Clean the tubing and pump head before reinstalling.

**Excessive Vibration or Noise**

- Tubing incorrectly aligned
  - Reinstall tubing in the correct channel position.
- Operation at very high RPM
  - Reduce RPM and check if vibration decreases.
- Pump placed on unstable surface
  - Relocate the pump to a stable and horizontal platform.
- Rollers need cleaning
  - Wipe rollers with a clean, dry cloth (never lubricate).

**Pump Leaks or Fluid Spills from Tubing**

- Tubing rupture due to wear or incorrect installation
  - Replace tubing immediately.
  - Ensure proper installation and locking of the compression block.
- Chemical incompatibility
  - Verify tubing material compatibility with the pumped liquid.
  - Replace tubing with a suitable material.
- Excessive backpressure
  - Ensure the outlet side is not blocked or raised too high.
  - Reduce RPM or use larger diameter tubing.

**Warning:** If hazardous fluid is spilled, follow appropriate chemical safety procedures.

**Calibration Screen Shows Wrong or Unexpected Values**

- Incorrect volume measurement during calibration
  - Recalibrate using an accurate graduated cylinder and steady flow conditions.
- Air bubbles during calibration
  - Repeat Step 1/4 and ensure all air is purged.
- Calibration entered in the wrong unit
  - Verify the ml measurement is entered correctly in Step 3/4.

**Touchscreen Does Not Respond**

- Screen locked or frozen
  - Restart the pump from the main switch.
- Moisture on the screen
  - Wipe with a soft, dry cloth.
- Electrical noise or external interference
  - Ensure grounding is correct.
  - Remove nearby sources of electromagnetic interference.
- Internal error
  - Restart; if still unresponsive, contact service.

**Overheating**

- Continuous operation at maximum RPM or torque
  - Reduce load; allow cooling time.
- Ambient temperature too high

    - Ensure the environment is within the 0–40°C range.
- Ventilation obstructed
    - Make sure the pump sides and back are not blocked.

**When to Contact Technical Support**

Contact authorized service if:

- The pump repeatedly stops unexpectedly
- Calibration cannot be completed accurately
- Display or electronics malfunction
- Abnormal sound persists after reinstalling tubing
- Mechanical damage is observed

**Provide the following information when contacting support:**

- Pump model and serial number
- Description of the issue
- Operating conditions (RPM, tubing size, fluid type)
- Photos or videos if possible


Yellow Labware

46 Concord Ln,
Cambridge, MA 02138,
USA
www.yellowlabware.com