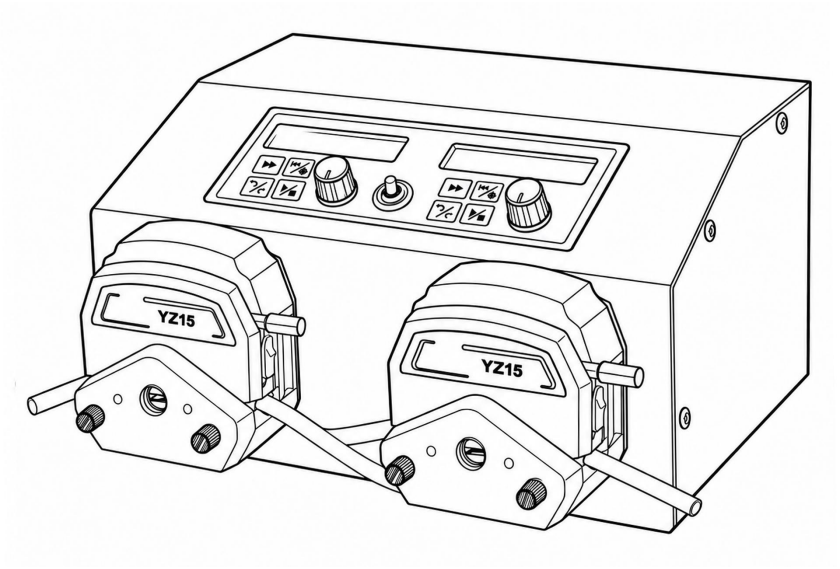
BT600L2

Peristaltic Pump Operating Manual



Contents

1. Precautions for Peristaltic Pump Use

- The hose may crack due to wear, causing liquid leakage which may result in injury to personnel or equipment. Inspect frequently and replace hoses in a timely manner. When the peristaltic pump is idle, release the pressing block compressing the hose or remove the hose, to avoid plastic deformation or inner-wall adhesion/blockage caused by long-term compression which shortens hose service life.
- Keep pump-head rollers clean and dry. Contamination or moisture accelerates hose wear, shortens hose service life and causes premature roller failure.
- The driver surface and some pump heads are not resistant to organic solvents and highly corrosive liquids. Special attention shall be paid during application.
- When you consider that the unit needs maintenance or repair, power off the unit and unplug the power cord.
- Reliably connect the protective earth ground of the power cord before use, to ensure personal safety in humid environments.
- Power off the driver before installing any external-control equipment.

2. Product Features

- BT600L2 is a dual-channel independently-controlled peristaltic pump.
- Parameters of both channels can be set simultaneously and calibrated independently.
- Flow range: 0.07 mL/min – 2400 mL/min (per channel).
- Two operating modes are available: Flow Mode and Timed Mode. Flow Mode is suitable for continuous liquid delivery; Timed Mode stops automatically upon reaching the set time.
- Flow display and flow calibration are available for simple and convenient operation. The pump can be controlled by external signals through the standard external-control interface.
- Compatible with multiple pump heads: YZ15, YZ25 and DMD15.
- Rotary encoder combined with membrane keys for more convenient user operation.
- Independent full-speed key for rapid line filling and emptying.
- LCD display for intuitive and comprehensive information presentation.
- RS485 communication control adopting the Modbus protocol for easy commissioning and use.

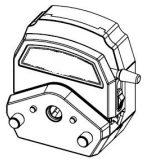
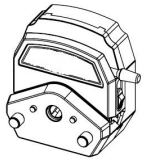
3. BT600L2 Driver Performance Specifications

Table 1. BT600L2 driver specifications

Item	Description
Product Model	BT600L2
Product Features	Dual-channel independent control with separate parameter configuration

Item	Description
Speed Adjustment Range	0.01–600 RPM
Speed Resolution	0.1 (<100 RPM), 1 (≥100 RPM)
Display Function	128×32 graphic dot-matrix LCD, simultaneous display of flow rate and rotational speed
Direction Control	Reversible rotation function
Operation Mode	Rotary encoder combined with membrane keys for user-friendly operation
Full-speed Function	Rapid pipeline filling and emptying via full-speed button
Power-off Memory Function	Resume operation from pre-power-off status after power-on
Calibration Function	Automatic flow calibration for quick and convenient operation
External Control Function	Optional external-control modules support start-stop control, direction control and flow-rate control. Four optional module types: 0–5 V, 0–10 V, 4–20 mA, 0–10 KHz
Communication Function	Optional communication module for RS485 communication control (adopts general Modbus protocol)
Foot-switch Function	Optional foot switch for start-stop control
Power Consumption	150 W
Power Supply	Wide-voltage AC 90-260 V, 50 Hz/60 Hz
Operating Environment	0-40 ℃, humidity < 80% non-condensing
Driver Weight	8 KG
Ingress Protection	IP31

Table 2. Driver, pump-head and hose compatibility

Driver	Compatible Pump Head	Tubing	Flow Range (mL/min)	Remarks
BT600L2	 YZ15A / YZ15B	13#, 14#, 19#, 16#, 25#, 17#, 18#	0.07-2400	Multiple hose options; quick hose replacement; wide flow range
BT600L2	 YZ25A / YZ25B	15#, 24#	1.7-1600	
BT600L2	 DMD15	13#, 14#, 19#, 16#, 25#, 17#	0.13-3200	Special low-pulsation pump head for higher accuracy

Proper selection of pump head and hose is particularly important for improving flow accuracy or dispensing accuracy.

4. Operation Instructions

4.1 Glossary

- **Short Press —** Press and immediately release a key; press duration < 1 s.
- **Long Press —** Hold down a key for more than 3 seconds and then release. The operation takes effect at the moment of release.
- **Operating Modes —**
  - **Flow Mode:** Marked "L". This mode operates continuously at the set flow rate.
  - **Timed Mode**: Marked "T". This mode automatically stops when the set time is reached.
  - **Calibration Mode**:In Flow Mode, long-press the Return key to enter Calibration Mode.
- **Focus —** The editable/modifiable parameter position, highlighted in reverse video on the LCD. Except for the flow rate, which can be adjusted directly by rotating the knob in Flow Mode, all other parameter changes require switching to a focused state. Each focus position has descriptive text on the screen; the position of this prompt may change with the focus location.
- **Edit State —** The state in which system parameters can be modified, i.e. values can be changed by rotating the knob.
- **Non-edit State —** The state in which values cannot be changed by rotating the knob.

4.2 Front-panel Operation Panel Introduction

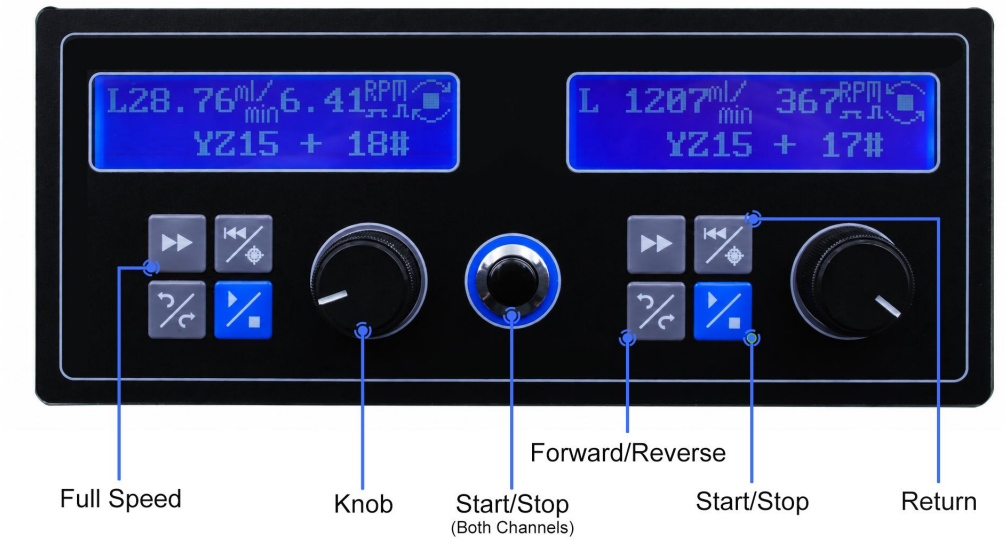


Figure 1. Front-panel operation panel

Definitions of each control element shown in the figure:

- **Knob —** Short-press or long-press to switch the current editable focus. If currently in non-edit state, the pump enters edit state. Rotation: in edit state, rotate to adjust the value at the current focus or select different modes; clockwise increases or selects forward, counter-clockwise decreases or selects backward. Note: in Flow Mode without focus, knob rotation directly adjusts the flow-rate value.
- **Full-speed Key —** Mainly used for emptying or cleaning. Under normal conditions, short-pressing the full-speed key runs the pump at maximum speed; if the pump was stopped before pressing, it enters running state. Short-pressing again in full-speed state returns to the original state. In full-speed state, all other keys are disabled.
- **Start/Stop Key —** Toggles between running and stopped states. Valid for both short-press and long-press.
- **Return Key —** Short-press: exit Edit State if in Edit State; in Timed Mode, exit Edit State before pressing the Start/Stop key. In Calibration Mode, calculate and correct the calibration coefficient, then exit Calibration Mode. Long-press: enter Calibration Mode from the Flow Mode screen.
- **Forward/Reverse Key —** Cycles the motor rotation direction. Valid for both short-press and long-press.
- **Power Switch —** Connects or disconnects the power supply.

4.3 Rear-panel Interface Introduction

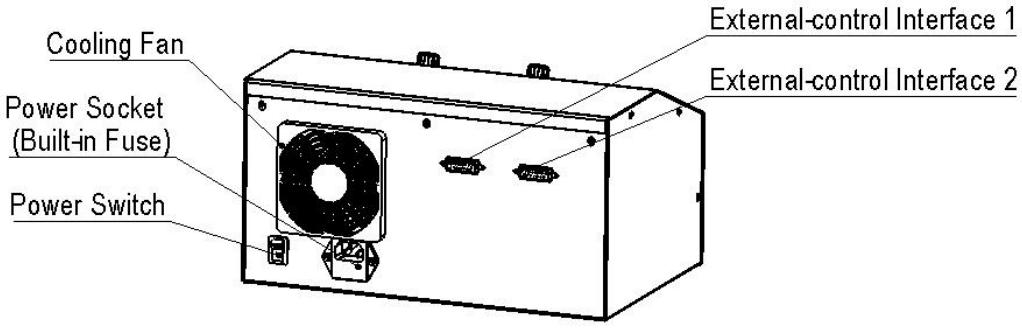


Figure 2. Rear-panel interfaces

4.3.1 Power Socket (Built-in Fuse)

AC power inlet. The power socket contains two 250 V/1 A glass fuses, including one spare fuse.

If a power abnormality occurs, check whether the fuse is blown. If blown, use the spare fuse, and afterwards place a new spare fuse in the socket for future use.

4.3.2 External-control Interface

The two interfaces control the two channels independently. The external-control interface uses a standard DB15 male connector and can be used with our external-control module (DB15 female connector on one end, screw-type terminal block on the other), or with our foot switch.

The external-control module is shown below:

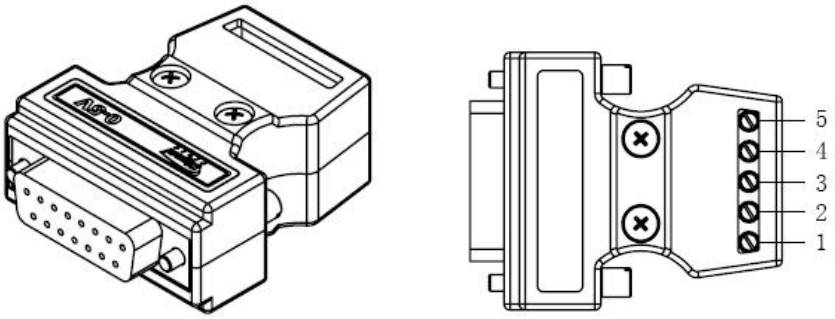


Figure 3. External-control module (left: DB15 male connector; right: terminal numbering)

Available external-control module types and their terminal definitions are listed below (NC = not defined, may be left floating):

Table 3. External-control module pin definitions

Module Type	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5
0–10 KHz frequency module	NC	Low level: start; high level: stop	Low level: forward; high level: reverse	0–10 KHz input	Common ground for pins 2, 3, 4
0–5 V voltage module	Analog input (+)	Low level: start; high level: stop	Low level: forward; high level: reverse	Analog input (−)	Common ground for pins 2, 3
0–10 V voltage module	Analog input (+)	Low level: start; high level: stop	Low level: forward; high level: reverse	Analog input (−)	Common ground for pins 2, 3
4–20 mA current module	Analog input (+)	Low level: start; high level: stop	Low level: forward; high level: reverse	Analog input (−)	Common ground for pins 2, 3
RS485 communication module	485-A	485-B	NC	NC	NC
Foot switch	No external terminal	No external terminal	No external terminal	No external terminal	No external terminal

Table 4. Electrical limits for external-control modules

Item	Range
Linear input-to-output correspondence	Yes
Minimum high-level voltage for 0–10 KHz frequency module	1.5 V
Maximum high-level voltage for 0–10 KHz frequency module	24 V

Item	Range
Maximum voltage for start-stop forward logic	0.5 V
Minimum voltage for start-stop stop logic	1.5 V
Maximum voltage for start-stop stop logic	24 V
Maximum voltage for forward-reverse forward logic	0.5 V
Minimum voltage for forward-reverse reverse logic	1.5 V
Maximum voltage for forward-reverse reverse logic	24 V
Maximum number of devices controlled by one host via RS485	254
Communication protocol	Modbus

Note: To activate the external-control module, set the external-control status icon to "⎍". The pump's communication address can be set via RS485 commands. For the communication protocol, contact the us.

4.3.3 Cooling Fan

The cooling fan, fitted with a dust-proof cover, dissipates heat for the peristaltic pump.

4.3.4 Power Switch

Used to connect or disconnect the power supply.

4.4 Basic Operation Instructions

The two channels can be configured with independent parameters and calibrated independently. Each channel can run individually via its own start/stop key; pressing the simultaneous-start key starts both channels, which stop automatically upon completion of the set time.

4.4.1 Focus Switching

Short-press the knob to cycle the focus position on the current screen.

4.4.2 Value Adjustment

Rotate the knob while a parameter is in focus to change its current value.

Except for the operating mode, external-control status, foot-switch mode and dispensing cycles, which support cyclic switching, all other items (such as pump head, hose and numeric values) do not cycle.

4.4.3 Calibration Execution

In Flow Mode, long-press the Return key to enter the flow-calibration mode.

4.5 Flow Mode Interface

Short-press the knob repeatedly until the mode selection screen is displayed, showing "L = Flow, T = Time". Rotate the knob to select "L" or "T". When "L" is displayed in the upper-left corner, short-press the Return key to exit the Edit State and enter Flow Mode.

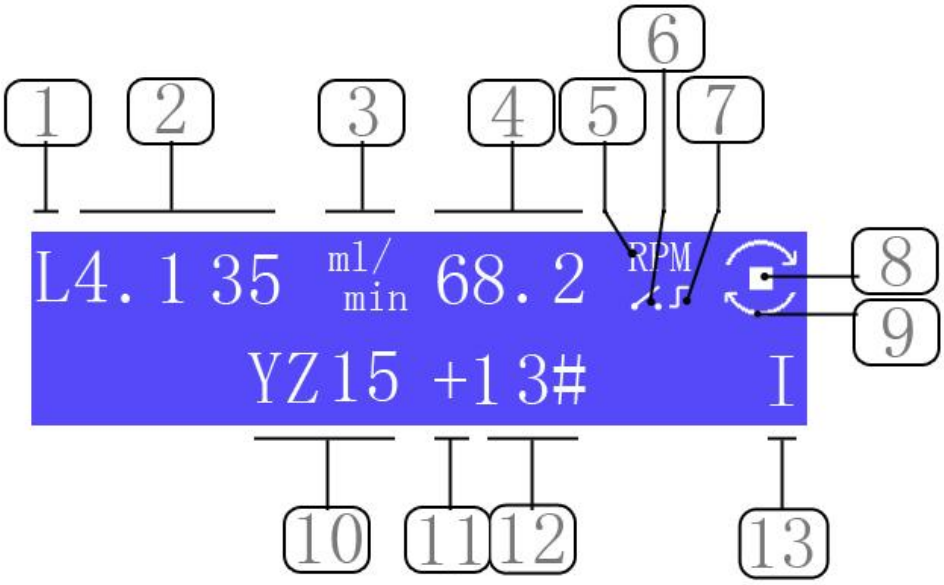


Figure 4. Flow-Mode screen

Definitions of the items in the Flow-Mode screen:

1: Mode identifier. "L" denotes Flow Mode.

2: Flow-rate value. In Flow Mode, this value can only be changed directly by rotating the knob in non-edit state. This item cannot receive focus.

3: Flow-rate unit. Auto-updated according to the flow-rate value; non-editable. Possible units are "uL/min", "mL/min" and "L/min", denoting microliters, milliliters and liters per minute respectively.

4: Rotational-speed value. Non-editable; calculated from the flow rate for reference only. Displays "---" when the system is running at full speed.

5: Speed unit. Non-editable. RPM = revolutions per minute.

6: External-control status (editable). Indicates external control disconnected (module inactive, "⊸⊸") or enabled (module active," ⊓⊔").

7: Foot-switch status (editable). Level-triggered ("⌐ "): the motor runs while the foot switch is released and stops while pressed. Pulse-triggered ("⌐⌐"): each press-and-release of the foot switch toggles the pump start/stop state once — a running pump stops and a stopped pump starts.

8: Run-stop / full-speed indicator (running ▶ / stopped ■ / full speed ▶▶). Cannot be changed via the knob; it can be changed by the Start/Stop key, the Full-speed key, or external control.

9: Forward/reverse indicator. The arrow direction indicates clockwise or counter-clockwise rotation. Cannot be changed via the knob; it can be changed by the direction key or external control.

10: Selected pump-head model (editable). Options: YZ15, YZ25, DMD15. After changing the pump-head model, the system automatically selects the first compatible hose model from its database.

11: Pump-hose connection symbol, non-editable.

12: Hose used by the current pump head (editable). Only hoses compatible with the selected pump head are listed.

13: External-control module-type indicator. Non-editable; the displayed value changes with the module type. "U", "I", "Hz" and "RS" denote voltage-type, current-type, frequency-type and communication-type external-control modules respectively.

A communication-type external-control module is recognized by the system only after one complete communication command has been sent after insertion; other module types are recognized automatically upon insertion. A communication-type module cannot recover automatically after being disconnected — power cycling is required. Other module types automatically revert to the no-external-control state after being disconnected.

4.6 Timed Interface

Short-press the knob repeatedly until the mode selection screen is displayed, showing "L = Flow, T = Time". Rotate the knob to select "L" or "T". When "T" is displayed in the upper-left corner, short-press the Return key to exit the Edit State and enter Timed Mode.

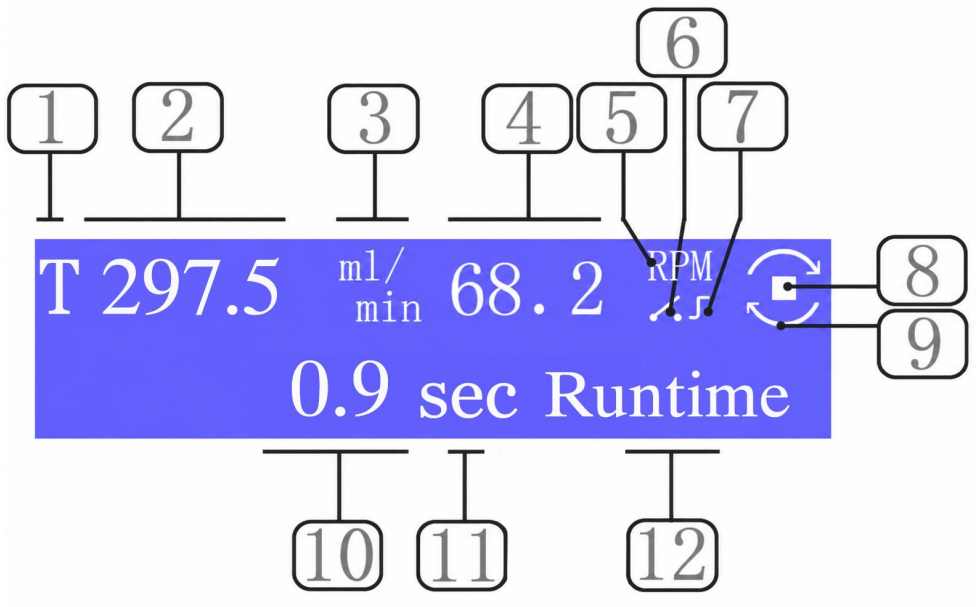


Figure 5. Timed mode screen

Definitions of the items in the Timed-Mode screen:

1: Mode identifier. "T" denotes Timed Mode.

2-9: Refer to the corresponding numbered descriptions under **4.5 Flow Mode Interface**.

10: Runtime Value: editable in the timed interface. Minimum resolution 0.1 s.

11: Runtime unit, non-editable, auto-updated according to the runtime value.

12: Runtime: Fixed label. Indicates that the editable value before it is the runtime value.

4.7 Flow Calibration Interface

Long-press the Return key in the Flow-Mode screen to enter the flow-calibration interface.

The calibration interface is shown below:

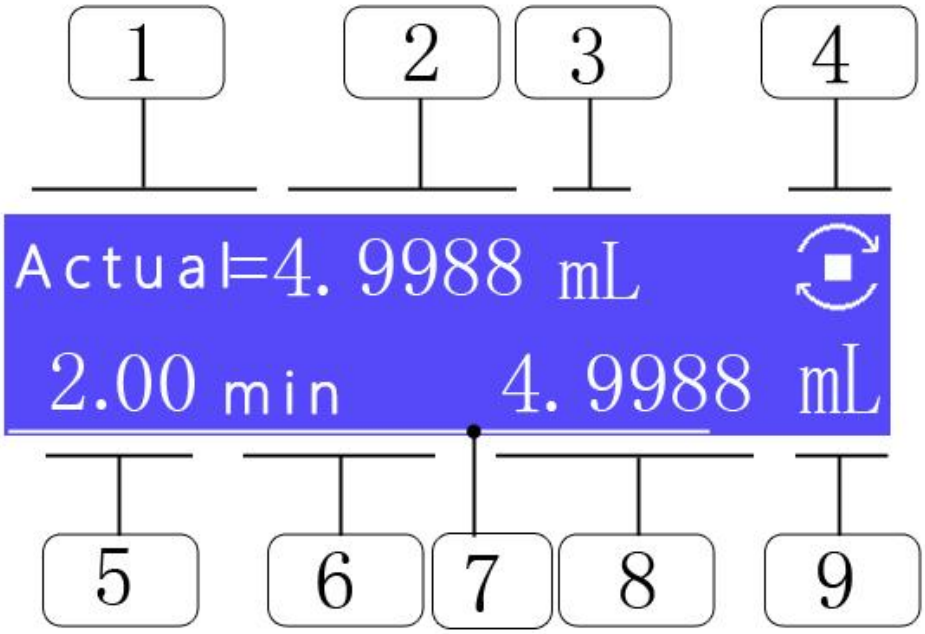


Figure 6. Flow-calibration screen

Definitions of the items in the calibration screen:

1: Prompt information, indicating that the following data are measured data. Non-editable.

2: Measured liquid volume (editable). Enter the actual liquid volume measured after one calibration run.

3: Measured-volume unit, non-editable, auto-updated with the measured value.

4: Direction and run-stop indicator.

5: Test runtime, default 1 minute. Editable in the flow-calibration interface to improve test accuracy. Range: 0-24 h, minimum resolution 0.1 s.

6: Runtime unit, non-editable, auto-updated according to the runtime value.

7: Calibration progress bar showing the progress of the current task within the total test runtime. Not displayed before dispensing starts, and disappears automatically after a single calibration run completes.

8: Theoretical liquid volume, non-editable. This value is the calculation result based on the pre-calibration data; if the runtime is adjusted, the theoretical volume is recalculated from the flow rate.

9: Theoretical-volume unit, non-editable. May display "uL", "mL" or "L", denoting microliters, milliliters or liters.

The flow-calibration procedure should be performed in the following order:

1. In the Flow-Mode screen, set the flow rate for which higher accuracy is desired.
2. Long-press the Return key to enter the calibration mode.
3. If a longer test time is desired, short-press the knob twice to move the focus to item 5, then rotate the knob to adjust the test time. After adjustment, short-press the Return key to exit edit state and verify that the displayed value is set correctly. This step can be skipped if the test time need not be changed.
4. Short-press the Start/Stop key to perform a single dispensing run.
5. Measure the total volume of the liquid pumped.
6. Short-press the knob to enter the measured-volume edit state, then rotate the knob to input the measured total volume.
7. Short-press the Return key to exit the calibration interface and return to the Flow-Mode screen. Upon exit, the system automatically calculates and corrects the parameters.