BOMBA PERISTÁLTICA SERIE BW, 100 RPM
BW SERIES PERISTALTIC PUMP, 100 RPM
POMPE PÉRISTALTIQUE SÉRIE BW, 100 RPM

REF. - CODE - RÉF. - MPD001

Este manual es parte inseparable del aparato por lo que debe estar disponible a todos los usuarios del equipo. Le recomendamos leer atentamente el presente manual y seguir rigurosamente los procedimientos de uso para obtener las máximas prestaciones y una mayor duración del mismo.

This manual should be available for all users of these equipments. To get the best results and a higher duration of this equipment it is advisable to read carefully this manual and follow the processes of use.

Ce manuel est une partie indissociable de l'appareil et doit être mis à la disposition de tous les utilisateurs de l'équipement. Nous vous recommandons de lire attentivement ce manuel et de suivre scrupuleusement les procédures d'utilisation afin d'obtenir des performances maximales et une plus longue durée de vie de l'appareil.

LANGUAGE INDEX

IMPORTANT NOTES

■Please read this operation manual carefully before using the product.
■The manufacturer reserves the right to change the product (design or specification) without prior notice.

SAFETY WARNING

■Before any cleaning or maintenance work, be sure to cut off the power supply.
■The tube may have cracks due to wear and tear, causing liquid to overflow from the tube, which may cause harm to the human body and equipment, so check it frequently and replace the tube in time!
■Please connect the power cord directly to the wall outlet and avoid using extension cords
■If the power cord is damaged, unplug it (remove the AC/DC adapter by hand, do not pull on the cord).
■If the following situations occur, turn off the pump and unplug it:
1.Fluid is spilled on the machine
2.You think this machine needs maintenance or repair
■The power supply must have a reliable grounding.
■The foot switch or other external control plug must be installed and unloaded when the power is off to prevent the external control interface from being burned.

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PART 1 MATTERS NEEDING ATTENTION

■ **Safety:**

1. The staff responsible for the installation or maintenance of this equipment should have the experience and ability to carry out related work.
2. This product is not applicable to the ATEX explosion-proof directive and cannot be used in flammable and explosive environments.
3. When pumping dangerous liquids, please follow safety precautions.
4. Please determine whether you need to wear personal protective equipment when operating the pump in accordance with the nature of the transfer fluid and industry specifications.
5. Non-professionals should not install this pump with other equipment to reduce safety risks.
6. For hazardous fluids, a dedicated operation process must be specified to prevent personal injury.
7. The power plug can disconnect the power supply and drive in an emergency. Do not place the pump in a workplace where it is difficult to cut off the power supply, otherwise it will affect the emergency stop operation.

■ **Tube:**

1.In the event of a tube failure, ensure that the fluid in the pump tube of the pump head can be discharged to a suitable container or drain.
2.A ruptured tube may cause fluid to splash. Please take appropriate protective measures.
3. When disassembling the tube, it is necessary to drain the medium and cut off the power supply to ensure that the pipeline is pressure-free.
4. Ensure that the chemicals to be handled are compatible with the pump head, tubes and accessories.

■ **Rollers:**

1. Do not touch the rollers while the pump is running.
2. Keep the rollers clean and dry to reduce tube wear.
3. Do not lubricate the pump head rollers by yourself. Improper operation may cause the tube to run out or the pump head shell to corrode.

■ **Pump:**

1. There are no user-serviceable parts in the pump.
2. The surface of the driver and the pump head are not resistant to organic solvents and strong corrosive fluids. If the liquid is splashed or accumulated, please remove and clean it in time.
3. After the pump enters the external control mode, the external control icon in the upper right corner of the LED screen lights up, and the pump can realize start&stop/direction/speed control in the external control mode.

PART 2 UNBOXING

2.1 Unpacking inspection

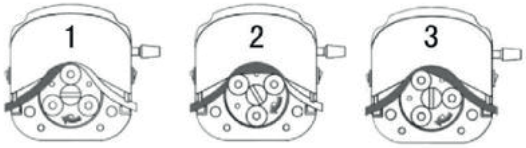
Confirm that the product is correctly packaged. When unpacking, check that all contents are in good condition and that no damage has occurred during transport. If you have any questions, please contact your dealer immediately.

2.2 Product storage

This product can be stored for a long time, but before putting it into operation, please confirm that the drive, pump head, tubes and other accessories can be used normally.

PART 3 PRODUCT DESCRIPTION

3.1 Principle of Peristaltic Pump Operation



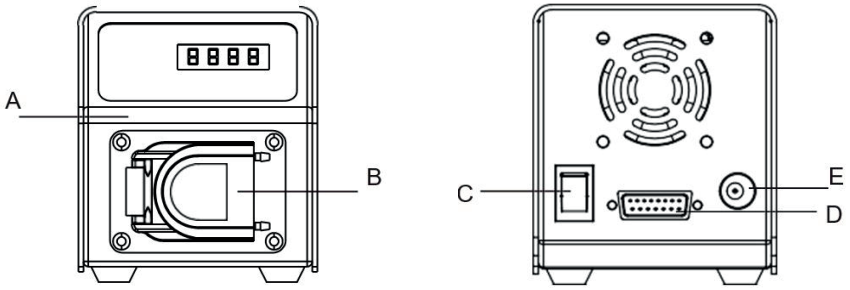
The peristaltic pump uses the rotor to alternately squeeze and release the tube to transfer fluid, just like squeezing a tube full of fluid with a finger. As the finger slides forward, when a negative pressure is formed in the tube, the liquid flows with it.

3.2 Product features

- 4-digit LED display with indication of speed and flow
- Button “Full speed”: convenient button for quickly filling or emptying the pipe
- Easy to operate: adjust the parameters by pressing the buttons; the direction of flow can also be changed by pressing a button
- External control function: support RS485/MODBUS communication protocol, the protocol can also be customized according to customer needs
- When switched off, it automatically saves the operating parameters and retrieves them when it is switched on again
- Flow calibration function allows pumping with higher precision

3.3 Product structure

- **Pump**



A: Drive B: Pump head
C: Power switch D: External interface E: Power interface

■ **Pump head/tube/reference flow**

Pump head	Model	Rollers	Tube	ID*wall thic-kness (mm)	Max Speed (rpm)	Max flow (ml/min)
	WP110	3	1*1	1*1	100	5,16
			2*1	2*1	100	17,01
			2,5*1	2,5*1	100	26,45
		4	1*1	1*1	100	4,63
			2*1	2*1	100	16,50
			2,5*1	2,5*1	100	24,42
		6	1*1	1*1	100	3,75
			2*1	2*1	100	13,02
			2,5*1	2,5*1	100	17,9

Note: The test environment for flow data is normal temperature and pressure, and the test fluid is water. The values are for reference only, please refer to the actual situation.

3.4 Technical parameters

Model	BW Series, 100 rpm
Max speed	100 rpm (reversible)
Speed resolution	0.1 rpm
Max □ow	26.45 ml/min
Operation panel	Membrane keyboard
Display	4-digit LED type, displays current speed/flow
Suction speed	10-100 rpm
Power supply	100-240VAC, 50/60Hz (AC/DC adapter)
Power	< 22W
Working ambient temperature	0-40 ºC
Dimensions (LxWxH)	150x128x110 mm
External control	Start control / direction control / speed control (0-5V, 0-10V, 4-20mA optional) RS485 serial communication

PART 4 PRODUCT INSTALLATION

4.1 Installation suggestions and precautions

■ Suggestions

>> Application accessories such as foot switch, countersunk head, check valve, filling nozzle, connector, etc. can be selected according to actual conditions.
>> For the selection of tube, please refer to 3.3 Pump head/tube/reference table.
>> For pump head variants, please refer to 3.3 Pump head/tube/reference table.

- Before installing, cleaning and maintaining the equipment, be sure to disconnect the power supply.
- The driver should be placed on a flat and rigid surface.
- The ambient temperature must not exceed 40°C and air circulation must be guaranteed to ensure dissipation of the heat generated in the pump.
- The Start/Stop key on the operation panel can quickly stop the pump functioning, but it is recommended to install an emergency stop device on the main circuit of the power supply to ensure higher safety.
- Make sure that the inner wall of the tube is clean and free of foreign matter before use. The shorter the pipeline, the better; the suction and lift should not be too long.
- Determine the pump running direction (left or right) depending on the specific location of the liquid to be pumped.
- In order to meet the requirements of flow rate, a peristaltic pump tube with matching diameter is required.
- The pump itself has self-priming characteristics, which can effectively prevent the backflow of liquid. Generally, there is no need to install valves at the outlet and inlet of the tube. You can also install a one-way valve in the pipeline according to actual needs to avoid fluid leakage when the pump head and tube fail.

■ Precautions

- The diameter of the pipeline at the inlet should be not less than the inner diameter of the pump tube, and a delivery pipe with a diameter ≥ the inner diameter of the pump tube should be selected.
- When transferring viscous liquids, it is necessary to maintain a low-speed operation to improve the filling efficiency. It is recommended to connect a flexible tube no less than 1 meter between the inlet and the outlet to reduce the pulse and the pulse loss.
- Try to put the pump at the same level or a lower level of the liquid to be transferred to improve the transfer efficiency of the pump.
- To replace a new tube or liquid, re-calibrate the liquid volume to ensure the accuracy of liquid transmission.
- When the peristaltic pump is running, all valves in the pipeline must be opened normally.
- Control wires and power wires are not allowed to have sharp bends, and it is not recommended to bundle them together.
- This product cannot be used for the transmission of any chemical substance incompatible with the pump head and tube.

PART 5 PRODUCT OPERATION

5.1 Line connection

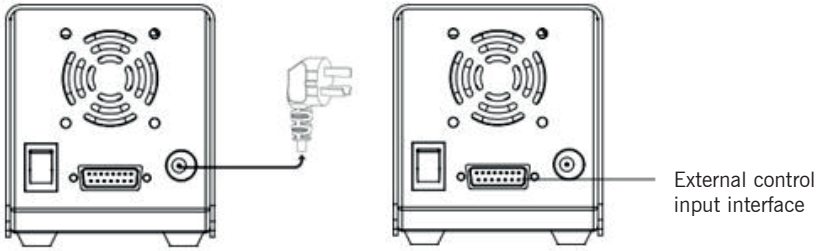
Power connection:

⚠ 100-240VAC, 50/60Hz (AC/DC adapter).

⚠ Ensure that all power supplies are matched to equipment power and are well grounded.

⚠ The position of the pump must ensure, if necessary, the disconnection of the power supply when the equipment is in use.

Power supply wiring diagram: **External control wiring diagram:**



5.2 Power-on

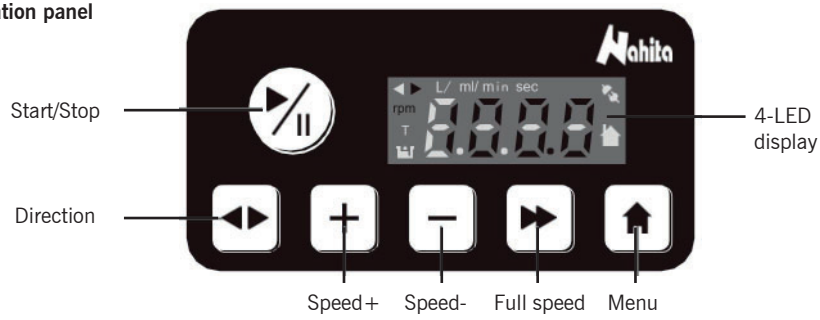
■ **Power-on inspection**

1. Check whether the pump pipe has been installed correctly, and whether the tube inlet pipe and outlet pipe have been correctly connected.
2. Check whether the pump is connected to a matching power supply.
3. Check whether the pump has been installed according to 4.1 “Installation suggestions and precautions”.

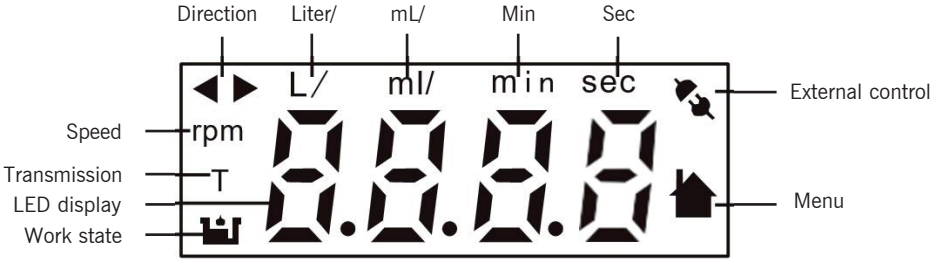
After the pump is turned on, the LED display will light up and you can start specific operations and settings.

5.3 Operation panel and display

■ **Operation panel**



■ **Digital Display**



LED screen shows different icons light up and the current working status of the pump.

5.4 Quick operation

■ **Switch**

After confirming that the power plug is installed correctly, press the switch on the back of the driver , "I" means power on, and "0" means power off.

■ **Start/Stop control**

When the pump is stopped, press the Start/Stop button pump starts.With the pump running, press the Start/Stop button to stop the pump.

■ **Speed control**

Press + button, LED speed/flow display increments; Press − LED speed/flow display decreases.

■ **Menu function**

When the pump is stopped, press the button o enter menu; press + − to select the corresponding option and press the Menu key to confirm.

■ **Full speed function**

When the peristaltic pump is running at the displayed speed, press the full speed button Pump runs at maximum speed (100rpm), Show "FULL". Complete quick emptying, filling or cleaning operations. Press the full speed button again ,the pump resumes operation as it did before entering full speed.

■ **Direction switching function**

When the pump is stopped and running, press the direction button ,the pump runs in the opposite direction, the LED shows the direction of change,Press the directional button again ,the pump switches to the original direction, and the LED shows the change direction.

5.5 Application cases

Application 1: speed mode (Fluid transmission with rotation speed of 80 rpm)

1. Press the Menu key to  (display mode selection)
2. Press Menu, press “+” or “-” to  (speed display mode)
3. Press the Menu key to confirm that the current mode is the speed display mode
4. Press “+” or “-” to adjust to  and press the Menu key (return to the main interface)
5. Press “+” or “-” to adjust to 
6. Press the Start/Stop button, the peristaltic pump runs at 80 rpm 

Application 2: flow mode (Fluid transmission with a flow rate of 8 ml/min)

1. Press the Menu key to enter  (display mode selection)
2. Press Menu, press “+” or “-” to  (flow display mode)
3. Press the Menu key to confirm that the current mode is the flow display mode
4. Press “+” or “-” to adjust to  and press the Menu key (return to the main interface)
5. Press “+” or “-” to adjust to 
6. Press the Start/Stop button, the peristaltic pump runs at 8 ml/min 

Application 3: calibration function (With a flow rate of 8 ml/min)

1. To access this function, the pump must be set to flow mode
2. User needs to choose the number of pump head rollers and pump tube correctly according to their own situation. If the user chooses the 3-roller WP110 pump head and 2*1 tube, then first to display  select A210, then  and select -2.0-.
3. After returning to the main interface, adjust the flow to 8ml/min. If the accuracy cannot meet the user’s needs, flow calibration is required.
4. Press the Menu key to enter  ; press Menu, 8.000ml is displayed at this time.
5. Press the Start/Stop button, the peristaltic pump will carry out liquid transfer, and will automatically stop and display after the timer expires 
6. Press the Start/Stop button to display 8.000ml, at this time adjust the actual test liquid volume by pressing the buttons “+” or “-” (eg: 8.500ml), then press the Menu key to confirm, show 
7. Press “+” or “-” to make the screen display ESC, press the Menu button to confirm the return to the main interface; completed calibration.

Note: If the actual liquid volume accuracy does not meet the requirements, you can enter E0-- and repeat the calibration several times.

Application 4: foot switch (only controls start and stop)

(The liquid is transferred at a flow rate of 20 ml/min, and the foot switch controls the start and stop)
1. Press the Menu key to enter A0--0 (display mode selection)
2. Press Menu, press "+" or "-" to A0-1 (flow display mode)
3. Press the Menu key to confirm that the current mode is the flow display mode.
4. Press "+" or "-" to adjust to ESC and press the Menu key (return to the main interface)
5. Press "+" or "-" to adjust to 20
6. Press the Menu key and press "+" or "-" to A1--0 (External control, system settings)
7. Press the Menu key to enter A1-0 (speed control selection) Press "+" or "-" to adjust to C0-4 (internal control speed)
8. Press the menu key to enter A1-2 (start and stop control selection) Press "+" or "-" to adjust to C2-1 (external control start and stop)
9. Use the direction keys on the operation panel to control the running direction
10. Press the menu key to return to the main interface

■ **Default factory settings**

Factory setting: Display mode is speed mode, pump head model is WP110, tube model is 2.5*1
Note: The factory settings can be adjusted according to the actual needs of user
Instructions for Menu function operation are given in 5.6
If it is not necessary, please do not adjust the parameter items at will

Device address selection	1	Boot display
Default display mode	Speed mode	A0-0
External control speed mode	Internal control	A1-0: C0-4
External control direction mode	Internal control	A1-1: C1-0
External control Start&Stop mode	External control	A1-2: C2-1
Start-stop signal mode	Pulse mode	A1-3: C3-1
Signal action mode	Low level/Falling edge start	A1-4: C4-0
Initial state of pulse signal	Stop	A1-5: C5-0
Communication baud rate	9600	A1-6: 9600
Suck back speed selection	10 rpm	A1-8: 10
Suck back angle selection	0° (No suck back)	A1-9: 0
485 enable selection	485 disabled	A1-o: Co-0
External control output setting	No output	A1-b: Cb-4
External control start-stop line selection	1 is valid	A1-d: Cd-0
Pump head setting	WP110	A2-0: A210
Pump tube setting	2.5*1	A2-1;-2.5*1-

*After the pump is turned on, it runs according to the default setting. All operating parameters can be changed, by accessing them via the Menu button (read 5.6)

5.6 Menu function operation

1. Press the menu button to enter the first-level menu from the main interface: A0- - / A1- - / A2- -
2. Press “+” or “-” to adjust, press the menu key to confirm, enter the secondary menu AX-X (If the operation option is up to level 2, select and confirm, that is, the function setting is completed. To exit, press “+” or “-” to adjust to ESC, and press the menu key to exit.).
3. Press “+” or “-” to adjust the selection, press the menu key to confirm, and enter the third-level Menu.
4. Press “+” or “-” to adjust the selection, press the menu key to confirm, complete the function setting, then press “+” or “-” to adjust to ESC, and then press the menu key to exit step by step.

Boot display, device address (1)

Boot display 

Main interface **First level menu** → **second level menu** → **third level menu**

→ **Display mode selection: A0- -**

1. Speed display  → 
2. Flow display → 

→ **External control, system settings: A1--**

1 Speed control method selection  →  →
- C0-0 0-5V control
- C0-10-10V control
- C0-2-4-20mA control
- C0-3 0-10kHz control
- C0-4 Internal control speed
- ESC

2 Direction control method selection  →  →
- C1-0 Internal control direction
- C1-1 External control direction
- ESC

3 Start&stop control method selection  →  →
- C2-0 Internal control direction Start and Stop
- C2-1 External control direction Start and Stop
- ESC

4 Start-stop signal mode selection  →  →
- C3-0 Level mode
- C3-1 Pulse mode
- ESC

5 Signal action mode  →  →
- C4-0 Low level/Falling edge start
- C4-1 High level/Rising edge start
- ESC

6 Initial state pulse signal  →  →
- C5-0 Stop
- C5-1 Run
- ESC

7 Communication baud rate selection

A1--. → A1-6. →
· 1200 · 2400
· 4800 · 9600
· ESC

8 Device address selection

A1--. → A1-7. →
· 01- Choose address as (1)
· -30- Choose address as (30)
· ESC

9 Suck back speed selection
Resolution 1 rpm

A1--. → A1-8. →
· 10-100
· ESC

10 Suck back angle selection
Resolution 1°

A1--. → A1-9. →
· 0, 10-720 °
· ESC

11 485 enable selection

A1--. → A1-10. →
· Co-0 (485 disabled)
· Co-1(485 enable)
· ESC

12 External control output setting

A1--. → A1-b. →
· Cb-0 (0-5V output) · Cb-3 (0-10kHz output)
· Cb-1 (0-10V output) · Cb-4 (no output)
· Cb-2 (4-20mA output) · ESC

13 Restore factory settings

A1--. → A1-C. →
· Cc-0 (Restore calibration K value)
· Cc-1 (Restore factory settings)
· ESC

14 External control start-stop line selection

A1--. → A1-C. →
· Cd-0 (valid)
· Cd-1 (Invalid)
· ESC

 → **Pump head and pump tube setting: A2--**

Note: This menu is displayed in flow mode

1 Pump head setting

A2--. → A2-0. →
· A210 (3 rollers)
· A211 (4 rollers)
· A212 (6 rollers)
· ESC

2 Pump tube setting

A2--. → A2-1. →
· -1*1-
· -2*1-
· -2.5*1-
· ESC

→ **Calibration function: E0--**

Calibration function

· Set the calibration fluid volume
· Start/Stop key operation
· Actual volume value input
· Press the Menu button to confirm
(Section 5.5, Application 3)

→ **Display de salida: ESC**

Exit display

Notes:
* When A0-0 (speed display) mode is selected, A1 option menu (external control, system setting) can be opened.
* When A0-1 (flow display) mode is selected, the A1 option menu (external control, system setting), A2 (pump head and pump tube setting), E0 (calibration function) can be opened.

■ **Accessories**
The following accessories are included with the pump

Accessory	Image	Features
AC/DC adapter		100-240VAC, 50/60Hz
Foot switch		With 15-pin RS485 connector Control of peristaltic pump start and stop
Straight connector		Connects 2 tubes of the system
Silicone tube		Inner diameter: 2.5 mm Wall thickness: 1 mm

PART 6 TROUBLESHOOTING AND MAINTENANCE

Note: If the pump needs to be repaired, please contact your distributor

6.1 Troubleshooting

No response at boot	>> If a circuit protection device is installed, confirm that the circuit has not tripped >> Confirm that the AC/DC adapter is inserted into a working socket >> Check whether the power cord plug is firmly inserted in pump socket
The fan and display screen are normal, but cannot be started	>> Check if the device is in external control mode >> Check if the keys are working
The pump is turned on and the pump head cannot run	>> After cutting off the power, manually check whether the pump head is rotating normally >> Check if the coupling is damaged
Low or no flow when the pump is running	>> Check whether the material supply is normal >> Check if the tube is entangled or blocked >> Check that all valves are open >> Check if the tube is in the middle of the roller >> Check whether the tube is cracked or damaged >> Check the running direction >> Check whether the pump head rollers can rotate flexibly
Pump cannot be controlled in external control mode	>> Check whether the external control icon in the upper right corner of the LED display is on >> Check whether the external control settings are correctly connected >> Check if the signal source is normal

6.2 Product maintenance

■ **Basic maintenance and cleaning**

Basic maintenance

- Open the pump head when it is not working to avoid tube deformation caused by prolonged extrusion.
- Keep the pump head rollers clean and dry to prevent surface damage and reduce tube wear; if there is splashing liquid, please wipe it dry as soon as possible.
- Check the wear of the tube regularly and replace it in time to prevent leakage.
- The pump head roller does not need to add lubricating oil, and improper operation may cause the tube to shift or damage.
- Not used to deal with chemical substances incompatible with the pump head or tube.
- The pump head is not resistant to organic solvents and strong corrosive liquids. Please deal with it in time if there is effusion.

Cleaning

Warning: Before attempting any cleaning, be sure to cut off the power to the pump.
When there are stubborn stains on the pump housing, please use a mild detergent to scrub the surface. Do not immerse the pump in liquid or use too much liquid to clean it.