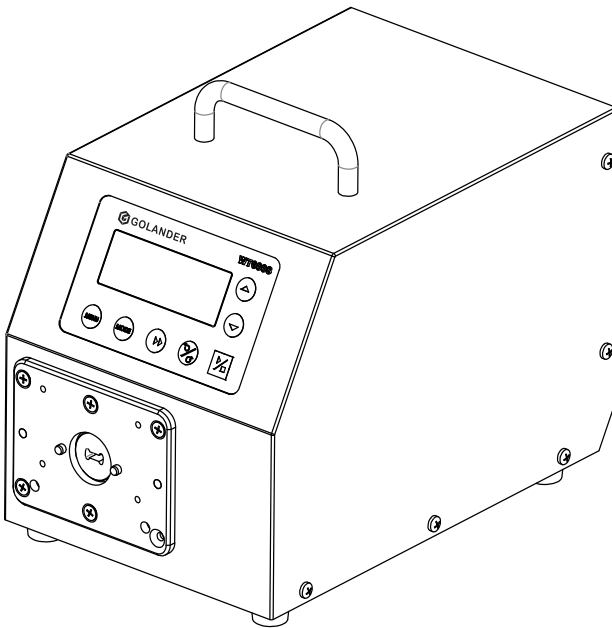




WT300S/WT600S (V3)

Variable-Speed Peristaltic Pump

Operating Manual



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Safety Precautions



Danger

- To avoid damage, use the correct voltage indicated on the rating plate label of the pump.
- Make no unauthorized dismantling, changes, or modifications to the pump. This may result in malfunctions or potential accidents.
- Turn off the pump drive before installing or removing tubing, attempting any maintenance, cleaning, or repair of the drive, or connecting or disconnecting external control devices or a communication interface. Fingers or loose clothing may get caught in the drive mechanism.



Warning

- Ensure no chemical reactions occur between the handled fluid and pump head/tubing material before use.
- Check tubing regularly to avoid breakage. Breakage may result in fluid being sprayed from the pump. Use appropriate measures to protect the operator and equipment. The operator is solely liable for damages resulting from tubing breakage, particularly the leakage of toxic or valuable liquids.
- The pump is equipped with a plug which must be well grounded.
- This device is not designed nor intended for usage in patient-connected applications, including but not limited to medical and dental use.
- Comply with all other applicable regulations regarding workplace safety, environmental protection, and relevant local guidelines.

(DE) SICHERHEITSHINWEISE



Gefahr

- Verwenden Sie die richtige Spannung, die auf dem Typenschild der Pumpe angegeben ist, um Schäden zu vermeiden.
- Nehmen Sie keine unbefugten Demontagen, Änderungen oder Modifikationen an der Pumpe vor, die zu Fehlfunktionen oder sogar zu Unfällen führen könnten.
- Schalten Sie den Pumpenantrieb aus, bevor Sie Schläuche ein- oder ausbauen, Wartungs-, Reinigungs- oder Reparaturarbeiten am Antrieb vornehmen oder externe Steuergeräte oder eine Kommunikationsschnittstelle anschließen oder trennen. Finger oder lose Kleidungsstücke können sich im Antriebsmechanismus verfangen.



Warnung

- Vergewissern Sie sich vor der Verwendung, dass keine chemischen Reaktionen zwischen dem Fördermedium und dem Material des Pumpenkopfs und der Schläuche auftreten können.
- Die Schläuche sollten regelmäßig überprüft werden, um Brüche zu vermeiden. Ein Schlauchbruch kann dazu führen, dass Flüssigkeit aus der Pumpe spritzt. Ergreifen Sie geeignete Maßnahmen zum Schutz des Bedieners und der Ausrüstung. Der Betreiber haftet allein für Schäden, die durch einen Schlauchbruch entstehen, insbesondere für das Austreten von giftigen oder wertvollen Flüssigkeiten.
- Die Pumpe ist mit einem geerdeten Stecker ausgestattet, der stets korrekt an eine abgesicherte Netzsteckdose angeschlossen sein muss. Dieses Gerät ist nicht für Anwendungen ausgelegt oder vorgesehen, die im Zusammenhang mit der Behandlung von Patienten stehen. Medizinische bzw. zahnmedizinische Anwendungen sind nicht bestimmungsgemäß.
- Beachten Sie alle anderen geltenden Vorschriften zur Arbeitssicherheit, zur Betriebssicherheit, zum Umweltschutz sowie die einschlägigen örtlichen Vorschriften.

1 Description

The WT-S series of variable-speed peristaltic pumps features a high-quality brushless servo motor drive with high torque, offering precise speed control across a broad range for high-precision flow transmission. In addition to basic functions like start/stop, reversible direction, and adjustable speed, it also includes Time Dispense Mode and Anti-Drip functionality. The high-torque brushless drive can accommodate multiple pump heads. Equipped with a MODBUS RS485 interface, the pump facilitates easy communication with external devices such as PCs, HMIs, or PLCs.

This pump series includes:

- **WT300S**, flow rate 0.31-3850 mL/min, speed: 0.1-350 rpm
- **WT600S**, flow rate 0.31-6600 mL/min, speed: 0.1-600 rpm

2 Functions and Features

Peristaltic pumps excel in handling abrasive, corrosive, and viscous fluids without encountering issues like seal contact or valve clogging. Fluid contacts only the tubing or tube material. These pumps can achieve suction lift and prime up to 8m water column at sea level. They can effectively handle shear-sensitive fluids like latex or firefighting foam with minimal shearing. Moreover, peristaltic pumps can operate without liquid, making them suitable for pumping fluids with significant amounts of entrained air, such as black liquor soap. Their high volumetric efficiency makes them ideal for metering or dosing applications that require exceptional accuracy. Additionally, tubing and tube materials specifically designed for food and pharmaceutical applications are readily available.

- LCD displays speed and working mode.
- Membrane keypad.
- Reversible direction, start/stop control, and adjustable speed.

- Time dispense mode: automatically dispense by setting the duration for each dose, pause time between doses, and the number of cycles.
- 0.1 speed resolution when the speed is 0-100 rpm, 1 rpm speed resolution when the speed is 100-600 rpm.
- An external logic level signal can control start/stop, direction, and dispense functions; an external analog signal can adjust the rotating speed. The signal is optically isolated.
- The RS485 MODBUS interface allows easy communication with external devices.
- Internal double-layer isolation structure; circuit board with conformal coating makes the pump dust- and moisture-proof.
- Anti-electromagnetic interference feature; wide input voltage range for complex power environment.
- Stainless steel enclosure, easy to clean, resistant to the corrosion of acid, alkali, sodium, and organic solvents.

3 Components and Connectors

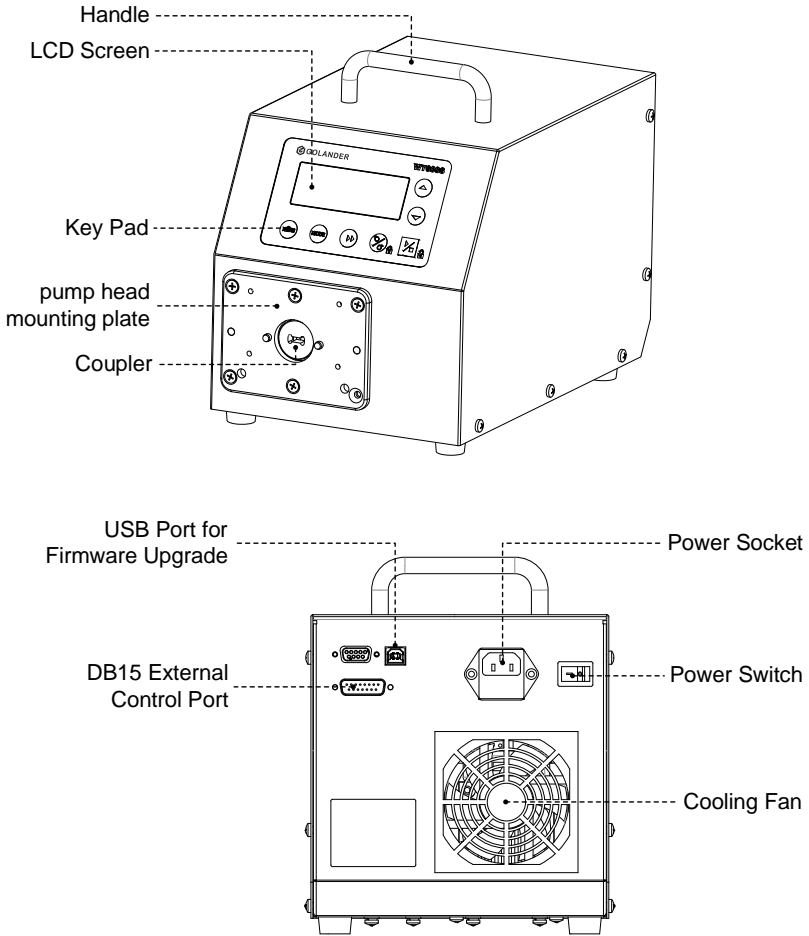


Figure 1. Components and Connectors

4 Display Panel and Operating Keypads

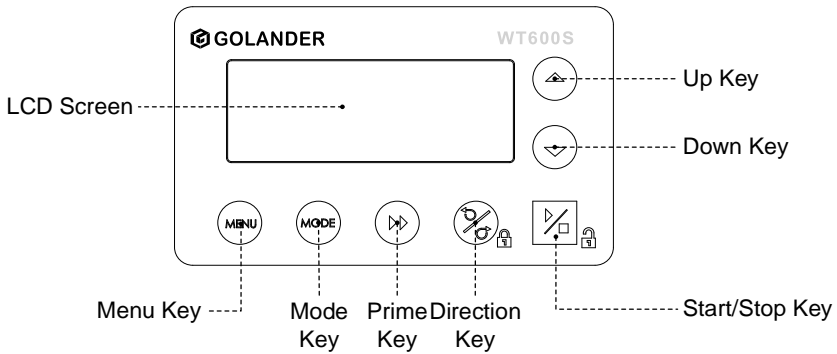


Figure 2. Display panel

4.1 Keypad



UP Key. When pressed shortly, the last digit of the value will increase by 1. Hold the key to increase the value quickly.



DOWN Key. When pressed shortly, the last digit of the value will decrease by 1. Hold the key to decrease the value quickly.



MENU Key. When on the main screen, press the MENU key to enter the settings menu. When on the settings menu, press the **MENU** key to switch between the different menus. Press and hold it to return to the main screen. When the drive is running, this key is disabled.



DIRECTION Key. Press to key to change the drive rotating direction, clockwise or counterclockwise.



MODE key. When the drive is not running, use the MODE key to change the working mode: Internal Control mode, External Control mode, Time Dispense mode, Logic Level 1 control mode, or Logic Level 2 Control mode.



PRIME key. Press the key to run the pump at the maximum allowed speed in the direction shown on the display. Press again to return to the previous state.



START/STOP key. Press to start or stop the drive.

4.2 LCD Screen Display

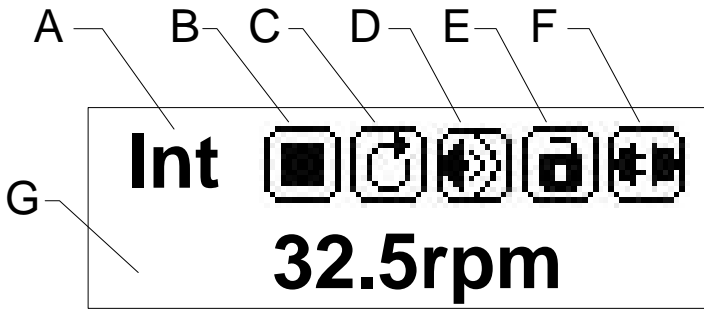


Figure 3. Display screen

A. Control Mode

It displays the current control mode. Press the MODE key to switch the control mode:

- Int (Internal Control Mode): Use the keypad to operate the pump. Use an optional external pulse signal to control the start and stop.
- Ext (External Control Mode): Use an external analog signal to control rotation speed. Use an external logic level signal to control direction, start and stop. The keypad is disabled.
- Disp (Time Dispense Mode): Dispense fluid automatically by setting the duration for each dose, pause time between doses, and the number of cycles.
- Lev1 (Logic Level 1 Control Mode-footswitch): Use an external logic-level signal to control the start and stop. Use the keypad to control direction and speed.
- Lev2 (Logic Level 2 Control Mode-footswitch and direction switch): Use an external logic level signal to control start, stop, and direction. Use the keypad to adjust the speed.

B. Running State

It shows the current drive running state.



Stop



Running



Pause

C. Direction



Clockwise



Counterclockwise

D. Key Tone



Tone on



Tone off

E. Keypad Lock

When the keypad is locked, only the START/STOP key will work. On the main screen, press and hold the DIRECTION key to lock the keypad; press and hold the START/STOP key to unlock the keypad.



Keypad unlocked



Keypad locked

F. Communication

The current RS485 communication state is displayed.



Communication
disconnected

#1

Connected, pump
number is set to 1

G. Rotating Speed

It shows the current rotating speed, rpm. When the drive is running at full speed, the display will be >>>>>>.

5 Parameter Settings

On the main screen, press the MENU key to access the settings menu. Press the UP or DOWN key to choose the parameter you wish to adjust. Press the START/STOP key to display the current value of the parameter, and use the UP or DOWN key to modify the value. Press the START/STOP key to confirm the changes, and then press the MENU

key to return to the main screen.

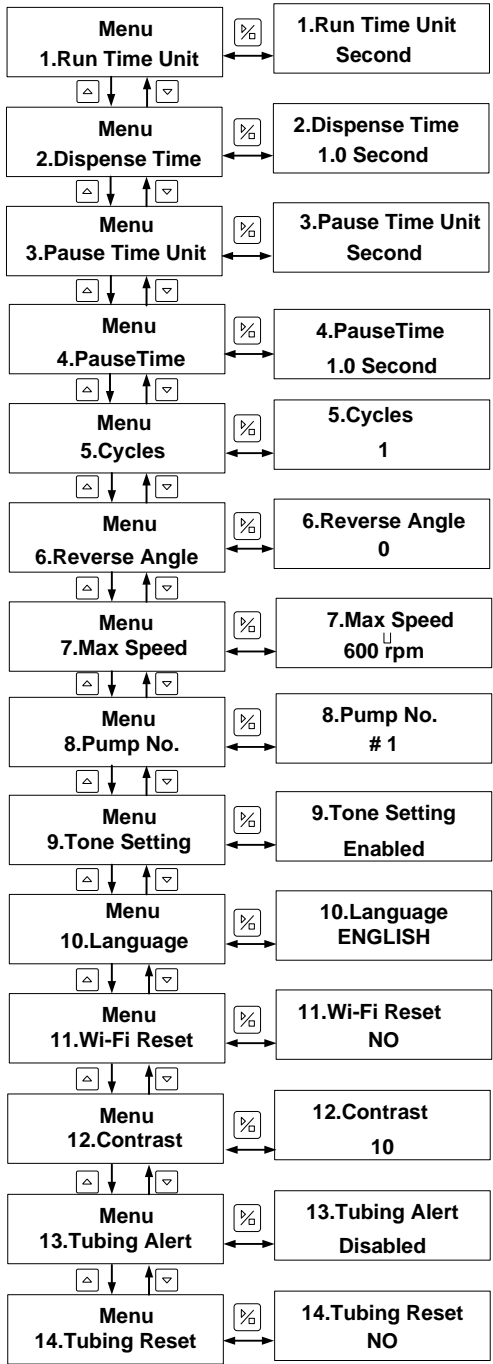


Figure 4. Parameter Setting Flow Chart

1. Run Time Unit: Time unit for the dispense duration in Time Dispense mode, configurable in days, hours, minutes, or seconds.
2. Dispense Time: It is the dispense duration for each dose in Time Dispense mode, adjustable within the range of 0.1 to 999 seconds/minutes/hours/days.
3. Pause Time Unit: Time unit for the interval time in Time Dispense mode, selectable in days, hours, minutes, or seconds.
4. Pause Time: Pause time between doses in Time Dispense mode. It is the lag time between successive doses when the number of cycles is set to more than 1, with a range of 0.1 to 999 seconds/minutes/hours/days.
5. Cycles: Number of cycles in Time Dispense mode, ranging from 0 to 999 cycles. When set to 0, dispensing continues until manually stopped; when set to any other value, the pump stops after the specified number of cycles (Figure 12).
6. Reverse Angle: Adjust the angle (0 to 720 degrees) at which the drive reverses direction to minimize dripping after dispensing. Disabling the anti-drip function by setting it to 0.
7. Max Speed: Maximum speed for External Control Mode. It is the maximum speed that the external analog signal can control.
8. Pump No: It is the pump's communication address for the communication mode. Restart the drive to take effect.
9. Tone Setting: Set the key tone on or off.
10. Language: System language setting, English or Chinese.
11. Wi-Fi Reset: Reset the Wi-Fi (the WIFI version is not available in North American and European markets).
12. Contrast: LCD backlight contrast setting.
13. Tubing Alert: Alert for tubing replacement.
14. Tubing Reset: Recount tubing life after a tubing is installed or replaced.

6 Advanced System Parameter Settings

In the main interface, press the MENU and UP keys to enter the system parameter setting interface. In this interface, press the UP and DOWN

keys for advanced parameter selection, press the START/STOP key to enter the submenu, and press the UP or DOWN key to adjust the parameters. To return to the previous menu, press the START/STOP key. To return to the main interface, press the MENU key.

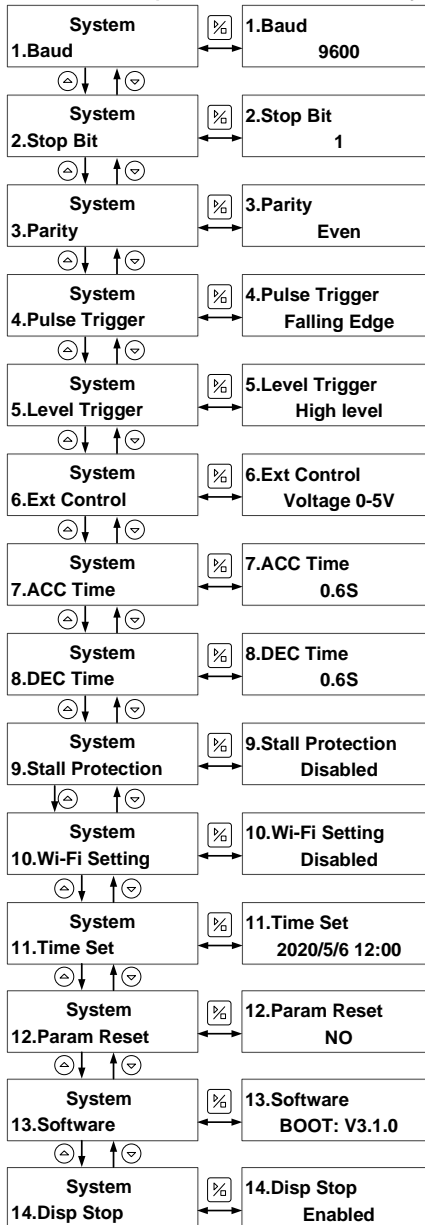
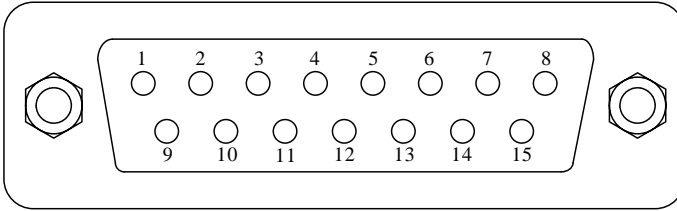


Figure 5 System advanced parameter setting flow chart

1. Baud: In communication mode, set the baud rate to 4800, 9600, 19200, 38400 (default is 9600).
2. Stop Bit: In communication mode, specify the stop bit size, options are 1 or 2 (default is 1).
3. Parity: In communication mode, set the parity type to odd parity, even parity, or none parity (default is even parity).
4. Pulse Trigger: In Internal Control or Time Dispense mode, set the pulse trigger type of external control start/stop signal of the drive, and choose between the rising edge trigger and falling edge trigger (default is falling edge trigger).
5. Level Trigger: In External Control or Level mode, set the level trigger type when the drive is controlled externally, options include high-level trigger and low-level trigger (default is the high-level trigger).
6. Ext Control (External Control): In External Control mode, the parameter type of analog signal to control the drive speed can be set to voltage mode 0-5V, voltage mode 0-10V, and current mode 4-20mA (drive speed changes linearly with the change of external control analog signal).
7. ACC Time (Acceleration Time): Set the acceleration time when the drive is started and running. The unit is in seconds (the default value is 0.5 seconds).
8. DEC Time (Deceleration Time): Set the deceleration time when the drive stops running. The unit is in seconds (the default value is 0.5 seconds).
9. Stall Protect: The setting of stall protection is off by default (the WIFI version has this function).
10. Wi-Fi Setting: The Wi-Fi is off by default (the WIFI version has this function).
11. Time Set: Set the current date and time. Press the PRIME key to change the set parameters, press the UP or DOWN key to adjust the time, and press the START/STOP key to save and exit.
12. Param Reset: Restores parameters to their original factory settings. Restart the pump to apply the change.
13. Software: Information on the current software used.

14. **Disp Stop:** In dispensing mode, enabling the function ensures that the dispensing process remains unaffected by other external control signals.

7 External Control Interface



DB15	Mark	Note
1	ADC_W	Positive of external analog input
2	B	Communication interface, B pole of RS485
3	A	Communication interface, A pole of RS485
4	VCC_W	External DC power input
5	-	-
6	CW_W	External input signal to control the direction
7	PWM	Pulse output
8	COM	Ground of external power
9	AGND	Negative of analog signal input
10	+12V	Positive of internal +12V power source
11	GND	Ground of Internal power source
12	CW	Internal direction signal output
13	RS_W	External start/stop signal input terminal
14	PWM_W	External pulse signal input
15	RS	Internal start/stop signal output

8 Operating Instructions

8.1 Before Operation

- 1) Check the packing slip to ensure all parts are included and in good condition. Contact the manufacturer or distributor if there are any

issues.

- 2) Read the instructions thoroughly.
- 3) Check the power supply voltage and ensure it matches the pump's requirements.
- 4) Ensure the pump head is properly installed and securely tightened.
- 5) Ensure the tubing is correctly installed and secured in the pump head before starting the pump. Inspect the tubing for any cracks or defects before operation.
- 6) Ensure the pump is placed on a stable surface to prevent it from moving during operation. Maintain a minimum clearance of 200mm behind the pump during operation.
- 7) Remove any obstacles or debris around the pump that may interfere with its operation.

8.2 Power Connection

The voltage of the power supply should match what is indicated on the rating plate label of the pump. Please plug the power cord into the IEC Power Connector on the rear of the pump and plug the opposite end of the power cord into an electrical outlet. Flip the power switch located on the rear of the pump.

8.3 Speed Setting

The speed resolution is 0.1 rpm when the speed is between 0.1 and 100 rpm; the speed resolution is 1 rpm when the speed is between 100 and 600 rpm. On the main screen, the speed can be set by pressing the UP or DOWN key. Pressing the UP or DOWN key shortly, the last digit of the value will change by 1. Hold the UP or DOWN key to change the value quickly.

Hold the PRIME key and press the UP key to set the speed to the maximum directly. Hold the PRIME key and press the DOWN key to set the speed to the minimum (0.1 rpm) directly.

8.4 Mode Change

Turn on the power switch. The display will show a welcome message then the main screen. Press the MODE key to change the working mode.

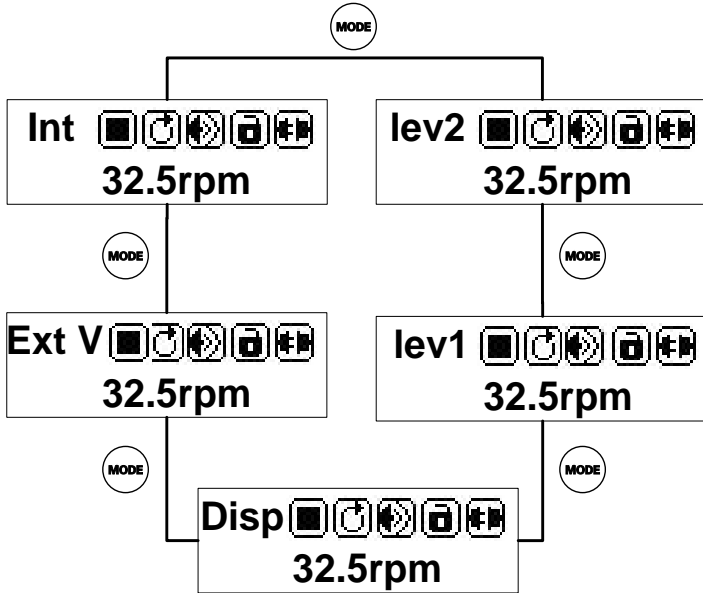


Figure 6. Change Working Mode

8.5 Internal Control Mode

Use the keypad to operate the pump. Use an optional external pulse signal to control the start/stop.

- 1) Turn on the power. The pump will display the main screen.
- 2) Press the MODE key to change the mode to Internal Control mode ("Int" shown on the screen).
- 3) Press the UP or DOWN key to adjust the speed.
- 4) Press the DIRECTION key to change the rotating direction.
- 5) Press the START/STOP key to start or stop the pump.
- 6) Press the PRIME key, and the pump will run at the maximum allowed speed.

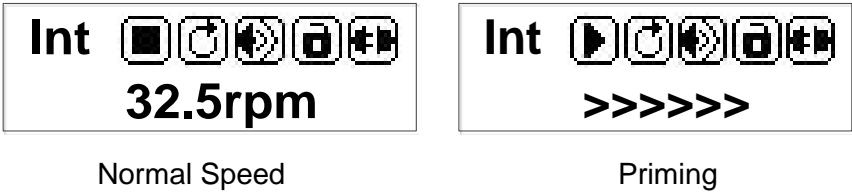


Figure 7. Normal vs Priming

8.6 External Control Mode

In this mode, use an external logic level signal to control direction, start, and stop; use an external analog signal to control rotation speed. The keypad is disabled.

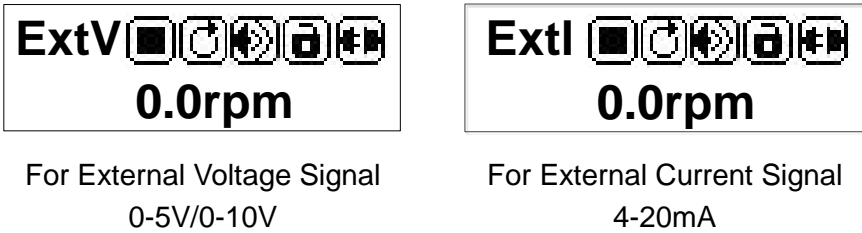


Figure 8. External Control Mode

- 1) Turn off the power. Wire the DB15 connector as shown in [Figure 9](#) or [Figure 10](#). Connect it to the DB15 port on the rear of the pump.

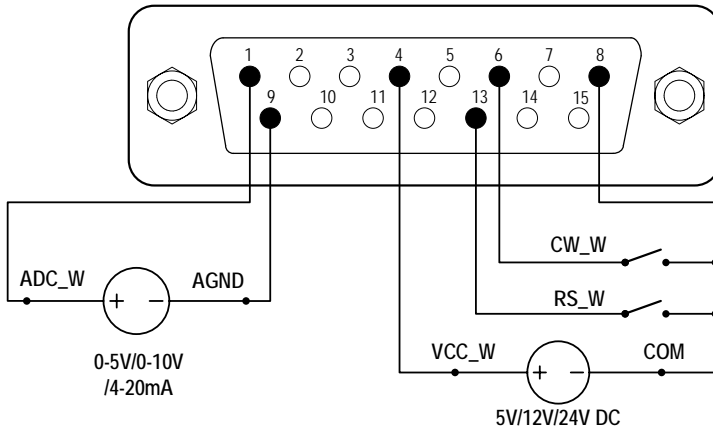


Figure 9. DB15 Wiring with an External Power Source

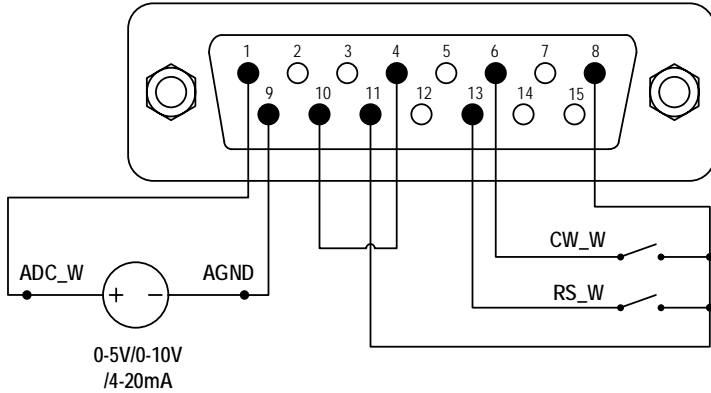
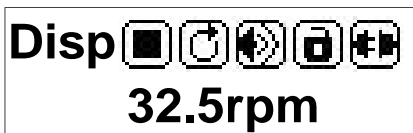


Figure 10. DB15 Wiring with the Internal 12VDC Power Source

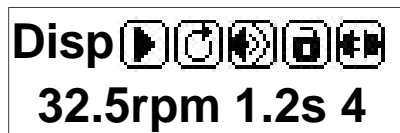
- 2) Turn on the power. The pump will display the main screen.
- 3) Press the MODE key to change the mode to External Control mode (“Ext V” or “Ext I” shown on the screen).
- 4) Close the external RS_W switch, and turn on the external analog signal power source. The speed will change according to the intensity of the input signal. Open the RS_W switch to stop the drive.
- 5) Opening the CW_W switch, the pump will run clockwise. Closing the CW_W switch, the pump will run counterclockwise.

8.7 Time Dispense Mode

The pump will dispense fluid automatically by setting the duration for each dose, the pause time between doses, and the number of cycles. When dispensing, the display will show the dispensing time or pause time (1.2s in [Figure 11](#)), and the total cycles that have been dispensed (4 in [Figure 11](#)).



Dispense Stopped



Dispense Running

Figure 11. Time Dispense Mode

To set the Time Dispense Mode

- 1) Turn on the power. The pump will display the main screen.
- 2) Press the MODE key to change the mode to Time Dispense mode (“Disp” shown on the screen).
- 3) Press the MENU key to enter the settings menu.
- 4) Set duration for each dose, pause time between doses, and number of cycles.
- 5) Return to the main screen.

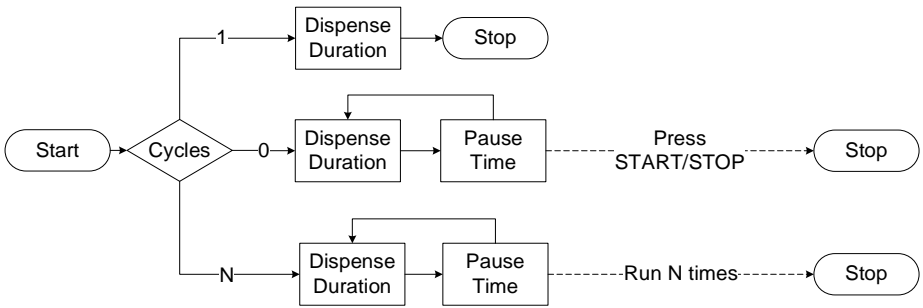


Figure 12. Dispense Cycle Setting

To run the Time Dispense mode

- 1) Press the DIRECTION key to change the running direction, clockwise or counterclockwise.
- 2) Press the START/STOP key to start dispensing.
- 3) When the pump is running, press the START/STOP key to stop it at any time.
- 4) A footswitch can be used to start/stop the pump.

8.8 Logic Level 1 Control Mode (footswitch)

Use an external logic-level signal to control the start and stop. Use the keypad to control direction and speed.

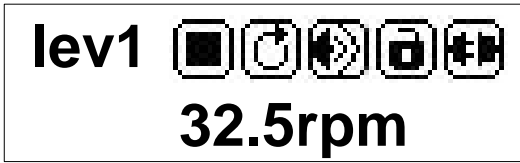


Figure 13. Logic Level 1 Control Mode

- 1) Turn off the power. Wire the DB15 connector as shown in [Figure 14](#) or [Figure 15](#), and connect it to the DB15 port on the rear of the pump.

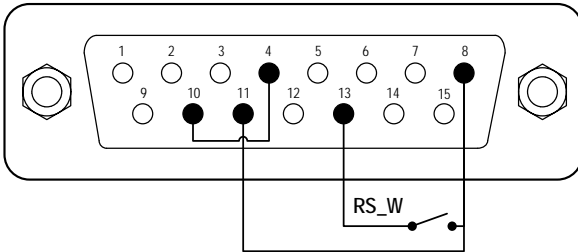


Figure 14. Logic Level 1 Control with Internal 12V Power Source

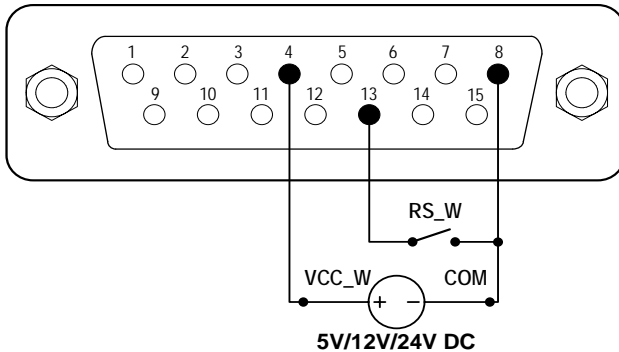


Figure 15. Logic Level 1 Control with an External Power Source

- 2) Turn on the power. The pump will display the main screen.
- 3) Press the MODE key to change the mode to Logic Level 1 control mode (“Lev1” shown on the screen).
- 4) Press the UP or DOWN key to adjust the speed.
- 5) Press the DIRECTION key to change the rotating direction.
- 6) When the switch is closed, the drive will start running; when the

switch is opened, the drive will stop.

Note: Use this mode to work with a TIME CONTROLLER.

8.9 Logic Level 2 Control Mode (footswitch and direction switch)

Use an external logic-level signal to control start, stop, and direction. Use the keypad to control speed.



Figure 16. Logic Level 2 Control Mode

- 1) Turn off the power. Wire the DB15 connector as shown in [Figure 17](#) or [Figure 18](#), and connect it to the DB15 port on the rear of the pump.

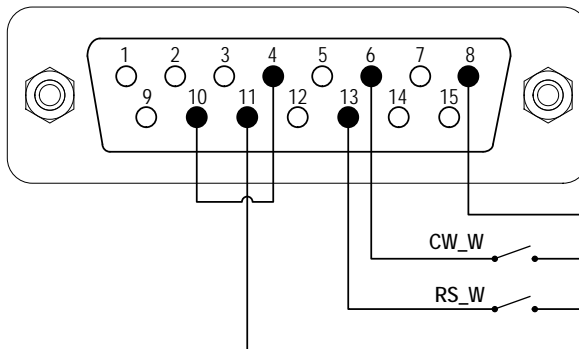


Figure 17. Logic Level 2 Control with the Internal 12V Power Source

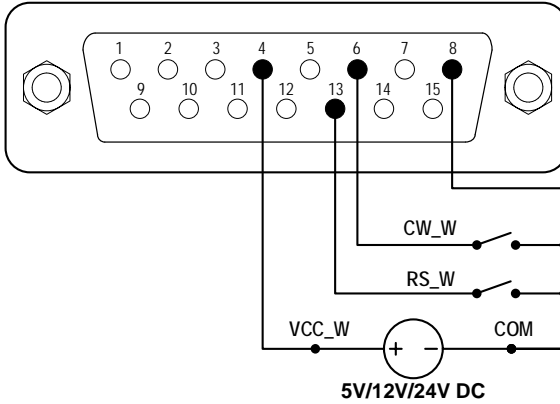
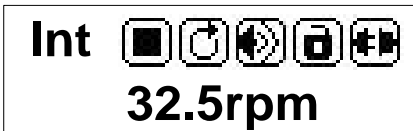


Figure 18. Logic Level 2 Control with an External Power Source

- 2) Turn on the power switch. The pump will display the main screen.
- 3) Press the MODE key to change the mode to Logic Level 2 control mode (“Lev2” shown on the screen).
- 4) Press the UP or DOWN key to adjust the speed.
- 5) When the RS_W switch is closed, the drive will run at the set speed; when the RS_W switch is opened, the drive will stop.
- 6) When the CW_W switch is opened, the drive will run clockwise. When the CW_W switch is closed, the drive will run counterclockwise.

8.10 Communication Mode

The RS485 interface supports the standard MODBUS protocol. The pump can communicate with external devices via the communication port. Please refer to the [Communication Instruction manual](#) for the parameters and supported commands.



Communication Disconnected



Communication Connected
The pump number is set to 1.

Figure 19. Communication Mode

- 1) When the power is off, wire the DB15 connector as shown below and connect it to the DB15 port on the rear of the pump. An external DC power source is recommended to avoid electrical interference.

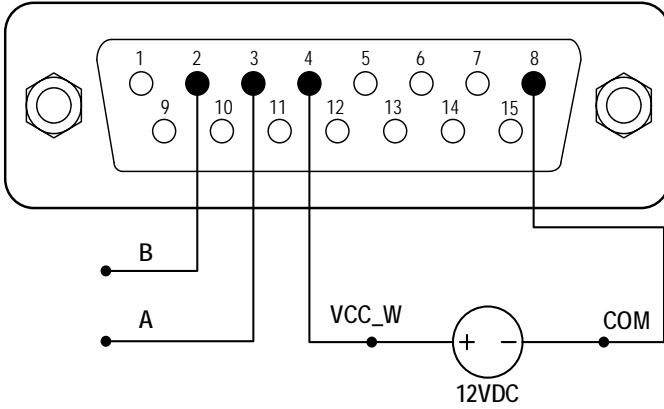


Figure 20. RS485 MODBUS Wiring

- 2) Switch on the power. The pump will display the main screen.
- 3) Press the **MODE** key to change the mode to Internal Control mode or Time Dispense mode.
- 4) Control pump with the communication interface.
- 5) Press the **START/STOP** key to stop the drive at any time.

9 Maintenance

9.1 Warranty

The pump drive has a three-year warranty and the pump head comes with a one-year warranty. The limited warranty does not cover any damage that is caused by improper usage and handling.

9.2 Regular Maintenance

- 1) Regularly check the tubing and connections to avoid leakage.
- 2) Do not cover the fan on the rear of the pump.
- 3) Do not use water to wash the pump. Keep the pump head dry.
- 4) Do not use chemical solvents to clean the pump and pump head.

9.3 Malfunction Solutions

No.	Mal-function	Description	Solution
1	Hardware	No display	<ol style="list-style-type: none"> 1. Check the power cord 2. Check the fuse. If it was blown, replace it with a 1A slow-blow fuse 3. Check the internal power cord connection inside the pump.
2	Hardware	The motor does not work	<ol style="list-style-type: none"> 1. Check the indicator of the drive board. 2. Check the wire connection between the motor and the drive board. 3. Check the wire connection between the drive and the mainboard. 4. Check the power voltage for the pump.
3	Hardware	Motor vibrates	<ol style="list-style-type: none"> 1. Check the wire connection between the motor and the drive board. 2. The motor is overloaded. Check the mechanical connection.
4	Hardware	Motor only runs in one direction	Check the connection between the drive board and the main control board.
5	Hardware	The keypad does not work	<ol style="list-style-type: none"> 1. Check the wire connection between the keypad and the mainboard. 2. Check if the key is broken.
6	Hardware	Noisy when running	<ol style="list-style-type: none"> 1. When the pump operates between 70 and 120 revolutions per minute, noise may occur due to the motor's resonance frequency. This is considered normal. 2. Check the screws and levers on the pump head to make sure they are secure.
7	Hardware/ software	External control does	<ol style="list-style-type: none"> 1. Check the wiring of the connector. 2. Check if the external control power

WT300S/WT600S (V3) Variable-Speed Peristaltic Pump

		not work	<p>voltage is provided.</p> <ol style="list-style-type: none"> 3. Check the connections of the external control board. 4. Check if the pump is on External Control Mode.
8	Hardware/ Software	RS485 com does not work	<ol style="list-style-type: none"> 1. Check the wiring of the connector. 2. Check if the external control power voltage is provided. 3. Check the connections of the communication board. 4. Check if the display shows that the communication is ready. 5. Reset the address of the pump. 6. Check whether on the bus there are two pumps using the same address



If a problem persists, please contact the manufacturer or distributor.

10 Dimensions

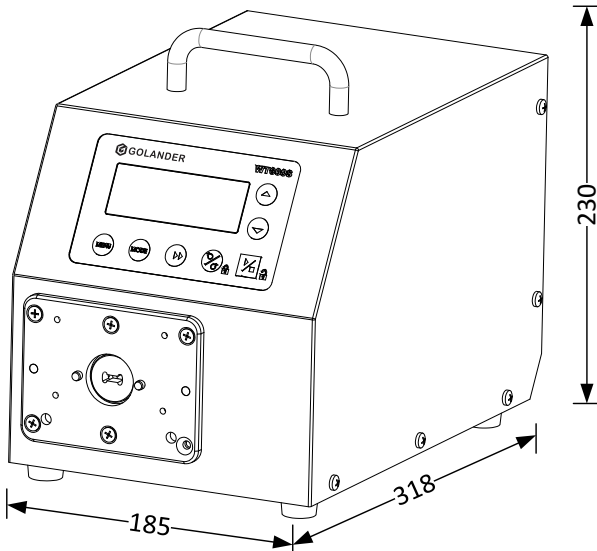
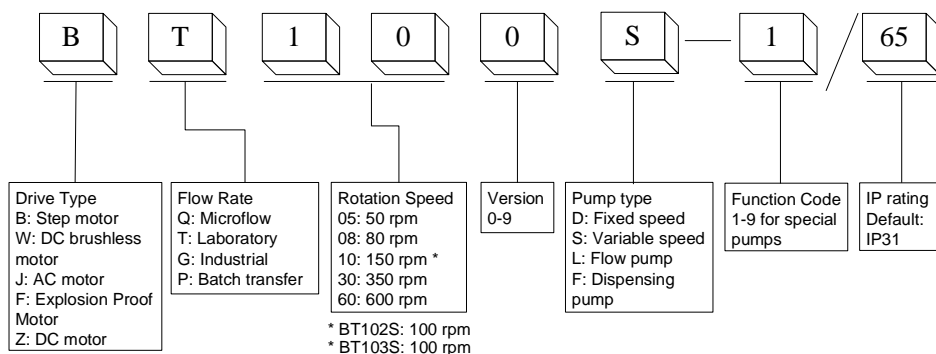


Figure 21. Dimensions (mm)

11 Naming Rule



12 Specifications

Speed resolution	0.1rpm (speed ≤ 100rpm) 1rpm (speed > 100rpm)
Speed accuracy	0.5%
Power supply	AC180-264V, 50Hz/60Hz AC90-132V, 50Hz/60Hz (CE)
Power consumption	< 170W
External logic level control signal	5V, 12V (standard), 24V (optional)
External analog control signal	0-5V (standard), 0-10V, 4-20mA (optional)
Communication interface	RS485 MODBUS
Operating condition	Temperature 0-40°C Relative humidity <80%
IP grade	IP31
Display	LCD
Dimensions (LxWxH)	318x185x230 mm (12.5x7.28x 9.06 inch)
Weight	5.9 kg (13 lbs)

WT300S Suitable Pump Heads and Tubing, Flow Parameters

Pump head	No. of channels	Tubing size	Flow rate per channel (mL/min)
KZ25	1	15# 24# 35# 36#	0.31-3850
2 x KZ25	2	15# 24# 35# 36#	0.31-3850
KZ25-L	1	15# 24# 35# 36#	0.31-3850
GN10	1	2.48x0.76	0.004-12
	1	4.48x0.76	0.022-65

WT600S Applicable Pump Heads and Tubing, Flow Parameters

Pump head	No. of channels	Tubing size	Flow rate per channel (mL/min)
KZ25	1	15# 24# 35# 36#	0.31-6600
2 x KZ25	2	15# 24# 35# 36#	0.31-6600
KZ 25-L	1	15# 24# 35# 36#	0.31-6600

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