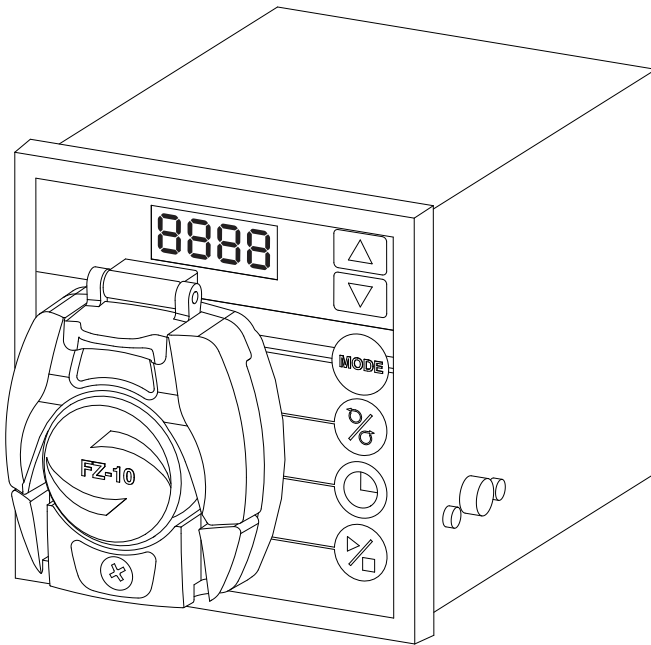




GOLANDER PUMP

BQ80S Microflow Variable-Speed Peristaltic Pump

Operation Manual



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1 Safety Cautions



Danger: Please use correct AC power voltage source shown on the sticker on the equipment to avoid any damage.

Please do not open the case. It may cause malfunction or electric shock.

For maintenance, please contact the manufacturer or distributor directly.

Danger: To install or remove pump head, please turn off the power supply first. Do not touch the rolling roller with hands or cloth.



Warning: Tubing breakage may result in fluid being sprayed from pump. Use appropriate measures to protect operator and equipment.

Warning: Remove power from the pump before attempting any maintenance or any cleaning operation is started.

Warning: Remove power from pump before connecting or disconnecting the external control device or communication interface.

Warning: This product is not designed for, nor intended for use in patient connected applications; including, but not limited to, medical and dental use.

2 Introduction

BQ80S is a portable microflow variable-speed peristaltic pump. It provides flow range from 0.005 to 64 mL/min with variable pump heads and tubing. It offers not only basic functions such as start/stop, reversible direction and adjustable speed, but also Time Dispense Mode to dispense fluid by setting the duration time for each dose. With standard RS485 MODBUS interface, it is easy to communicate with external device, such as PC, HMI or PLC.

3 Functions and Features

- Simple operation, portable size, easy to install. Suitable for equipment as an ancillary device and for laboratory use.
- 0.5% high precision rotating speed control with 0.1 rpm speed resolution. Speed range 0.1-80 rpm.
- The lifetime of the built-in Pharmed BPT tubing is up to 12000 hours for continuous running.

- Four-digit LED displays working speed and control mode.
- Membrane keypad.
- Reversible direction, start/stop, adjustable speed.
- Time dispense function. Repeat dispensing by setting the dispense duration time.
- Plastic housing, embedded design to work independently.
- The circuit board with conformal coating makes it dust-proof and moisture-proof.
- External logic level signal can control start/stop, reversible direction and time dispense function. The control signal is optically isolated.
- External logic level signal: 5V (default), 12V or 24V.
- MODBUS RS485 interface, easy to communicate with external control devices.
- Optional footswitch or timer for dispensing fluid.

4 Components and Connectors

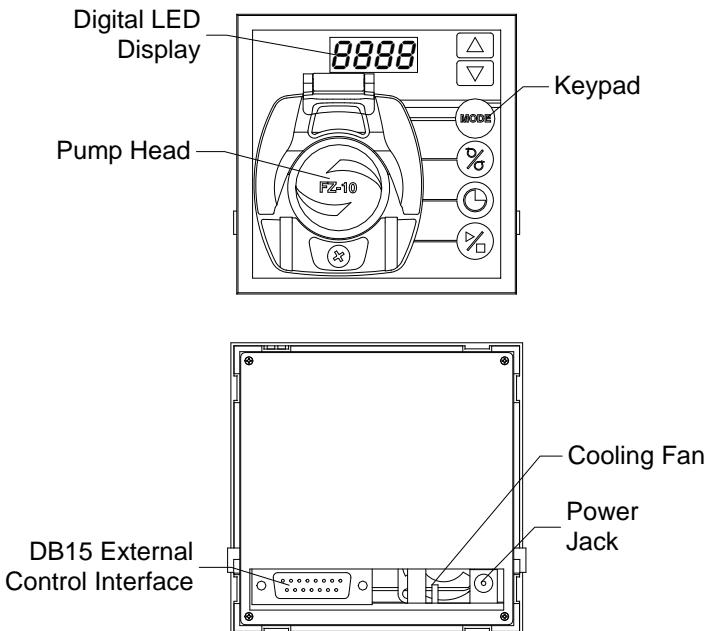


Figure 1. Components and connectors

5 Display Panel and Operating Keypads

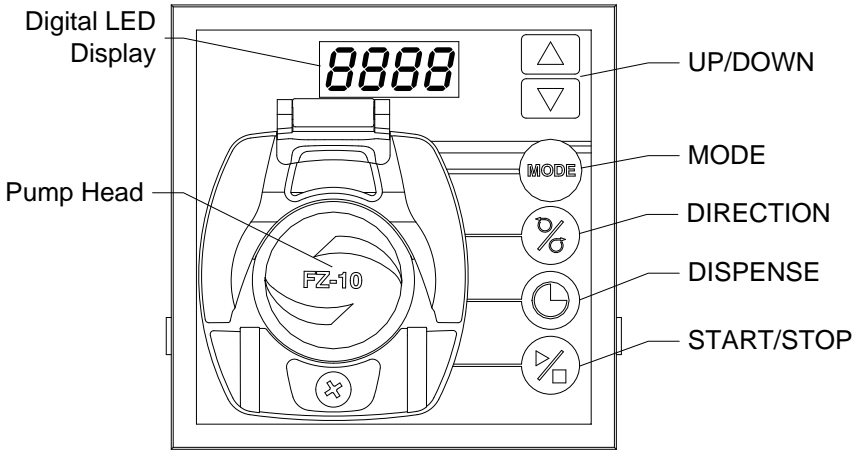


Figure 2. Display panel

5.1 Keypad



UP key. Press once, the last digit of the speed number will increase 1. Press and hold the key to increase the number quickly.



DOWN key. Press once, the last digit of the speed number will decrease 1. Press and hold the key to decrease the number quickly.



MODE key. Change operation mode: Internal Control Mode, External Control Mode, Time Dispense Mode and Logic Level Control Mode. This key is disabled when drive is running.



DIRECTION key. Switch the direction between clockwise and counterclockwise.



DISPENSE key. When on Internal Control or Dispense mode, press it shortly to start dispensing. Press and hold the key to set the dispense time.



START/STOP key. Press the key shortly to start or stop the drive. Press and hold the key to run the drive at full speed.

5.2 Digital Display

The LED display shows the current rpm and working mode.



Figure 3. Internal Control Mode, 3.5 rpm, clockwise

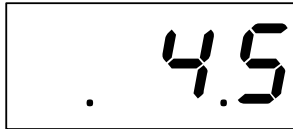


Figure 4. Internal Control Mode, 4.5 rpm, counterclockwise

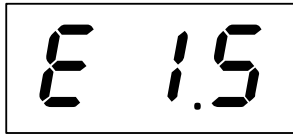


Figure 5. External Control Mode, 1.5 rpm, clockwise

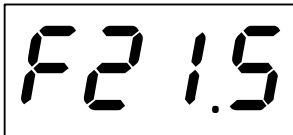


Figure 6. Time Dispense Mode, 21.5 rpm, clockwise

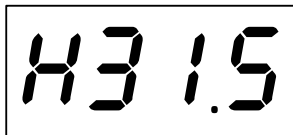


Figure 7. Logic Level Control Mode (high/low), 31.5 rpm, clockwise

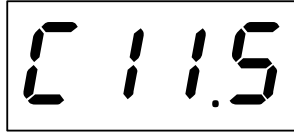


Figure 8. When flashing, it's to set dispense time
dispense time=11.5 seconds



Figure 9. Full Speed

5.3 External Control

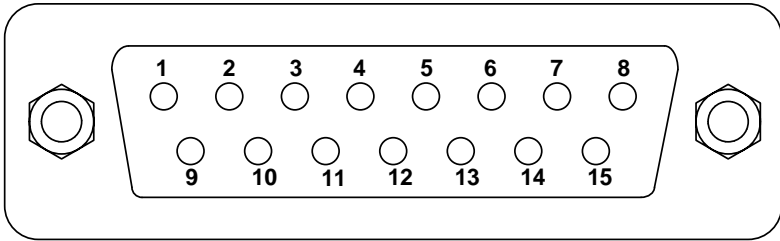


Figure 10. DB15 Connector for External Control

Table 1. DB15 Connector

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 input
5		
6	CW_W	External direction control input
7		

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		
13	RS_W	External start/stop signal input terminal
14		
15	RS	External start/stop signal output terminal (to show the run or start state, same voltage as external power source)

6 Operation Instructions

6.1 Before Operation

- 1) Please check the packing slip to make sure nothing is wrong or damaged in the package. If there is problem, please contact the manufacturer or distributor.
- 2) Read through the instruction.
- 3) There should be more than 200 mm space for the back of the pump when it is running.

6.2 Power Connection

Pump comes with a power adapter. Plug the power supply connector to the power input jack on the rear of the pump.

6.3 Control Mode

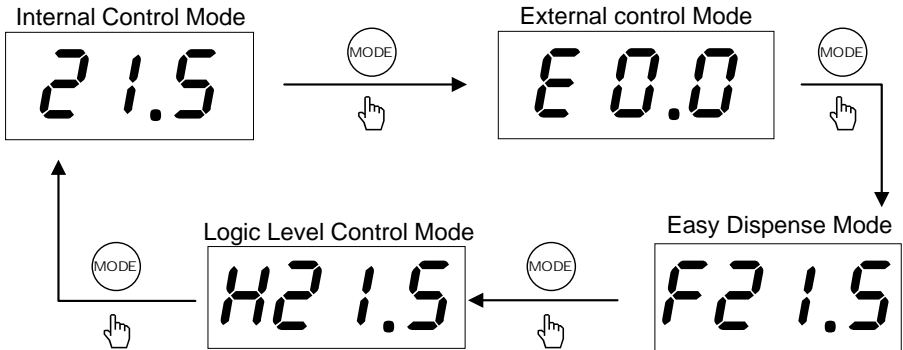


Figure 11. Control Mode Switch

6.3.1 Internal Control Mode

On this mode, use the keypad to operate the pump.

- 1) Turn on the power switch. The digital LED display will be on.
- 2) Press MODE key to change the control mode to internal control.
- 3) Press UP/DOWN key to adjust the rotating speed.
- 4) Press DIRECTION key to change the rotation direction if necessary.

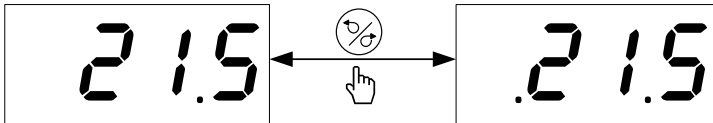


Figure 12. Change Rotating Direction

- 5) Press START/STOP key to start or stop the drive.
- 6) Press and hold the START/STOP key will make the drive run at full speed.

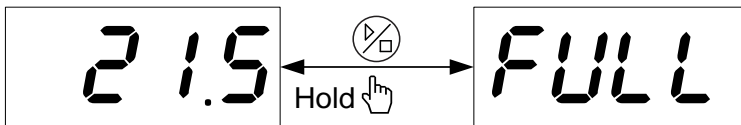


Figure 13. Full Speed

6.3.2 External Control Mode

On this control mode, the external 0-5V, 0-10V or 4-20mA analog signal controls the speed, voltage signal 5V, 12V or 24V controls start/stop. The keypad is disabled.

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

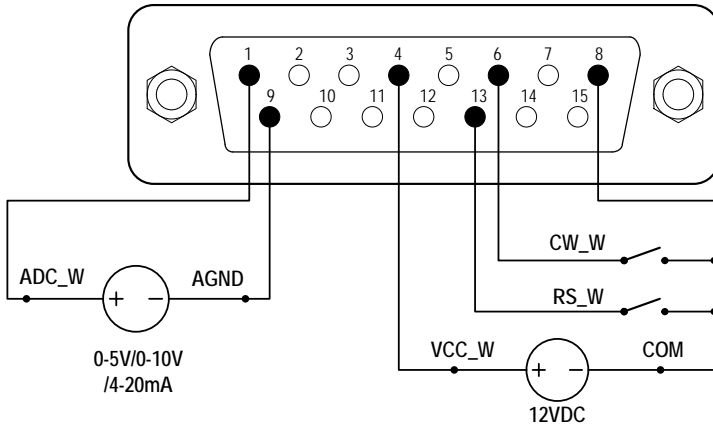


Figure 14. External Control with External 5V or 12VDC Power Source

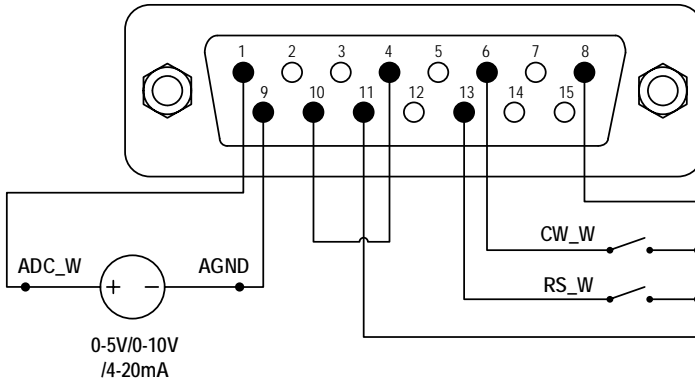


Figure 15. External Control with Internal 12VDC Power Source

- 2) Turn on the power switch. The digital LED display will be on.
- 3) Press MODE key to change the control mode to external control mode.

The external analog signal could be 0-5V, 0-10V or 4/20mA. By default, the signal is 0-5V. For 0-10V or 4-20mA, the jump setting on the analog signal control board has to be changed (*Figure 16*).

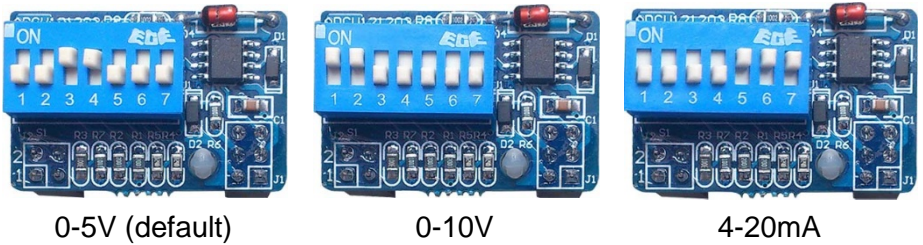


Figure 16. Analog Signal Control Board Setting

4) When RS_W switch is closed and the analog control signal is provided, the rotating speed of the drive will change according to the intensity of the analog control signal. When RS_W switch is open, the drive will stop running.

When CW_W is open, the drive will run in clockwise direction; when CW_W is closed, the drive will run in counterclockwise direction.

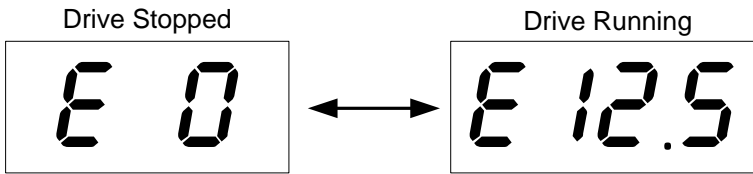


Figure 17. Drive Running State

Note: The external DC power source can be 5V or 12V. If it is 24V, 1.5K resistor is needed to protect internal circuit.

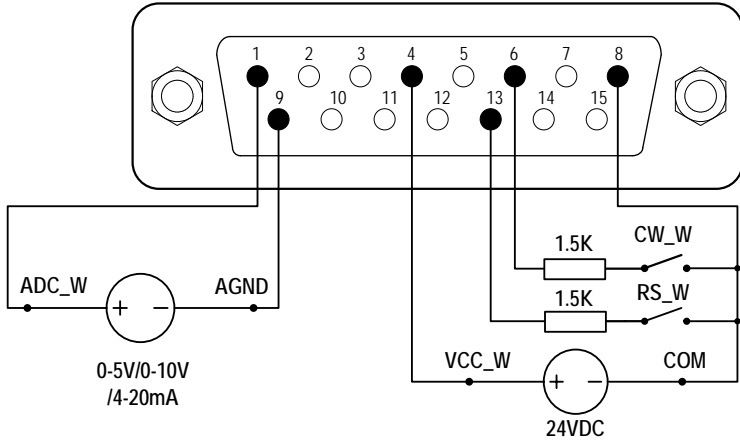


Figure 18. DB15 Wiring with External 24VDC Power Source

6.3.3 Time Dispense Mode

On this mode, pump will dispense fluid by setting the duration for each dose.

- 1) Turn on the power switch. The digital LED display will be on.
- 2) Press MODE key to change the control mode to Internal Control or Time Dispense Mode.
- 3) Press and hold DISPENSE key for 3 seconds, the LED display will be flashing. It is for setting the dispense time.
- 4) Press UP or DOWN key to change the dispense time, the range is from 0.1 to 999 seconds.
- 5) Press DISPENSE key again to exit the dispense time setting.
- 6) Press DIRECTION key to change the rotation direction if necessary.
- 7) Press DISPENSE key, pump will start to run for the set time then stop.
- 8) When drive is running, press the START/STOP key to stop the process anytime.
- 9) When on Time Dispense Mode, a footswitch can be used to start/stop dispensing.

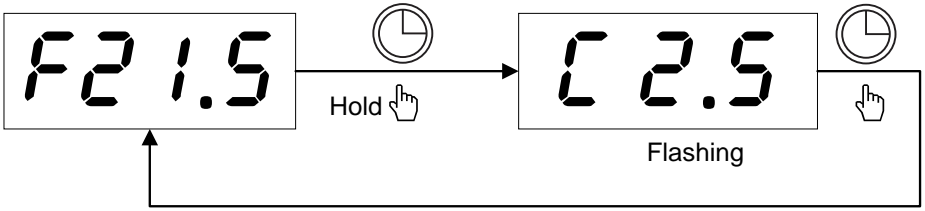


Figure 19. Set Dispense Time

6.3.4 Logic Level Control Mode

On this control mode, the voltage signal controls start/stop.

- 1) Turn the power off. Wire the external signal as shown on [Figure 20](#) or [Figure 21](#), and connect DB15 connector to the DB15 port on the rear of pump.

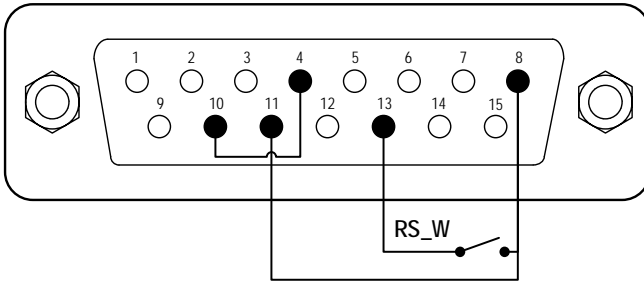


Figure 20. Logic Level Control with Internal 12V Power Source

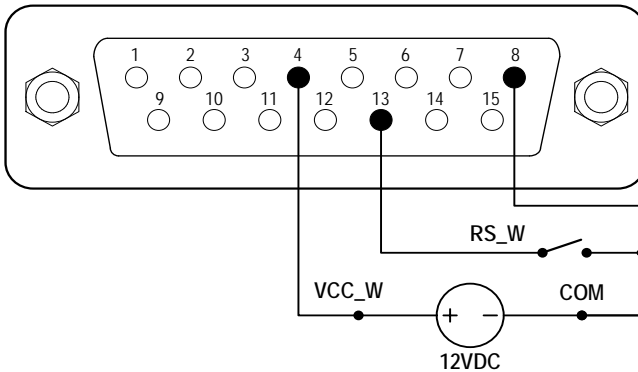


Figure 21. Logic Level Control with External 5V or 12V Power Source

- 2) Turn on the power switch. The LED display will be on.
- 3) Press MODE key to change the mode to Logic Level Control Mode.

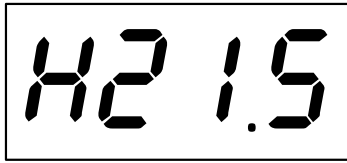


Figure 22. Logic Level Control Mode

- 4) Press UP/DOWN key to adjust the desired rotation speed.
- 5) Press DIRECTION key to change the rotation direction if necessary.
- 6) When RS_W switch is closed, the drive will run at the set speed. When RS_W switch is open, the drive will stop running.

Note: If a dispense timer is used, the control mode should be set to this Logic Level Control Mode.

6.4 Communication Mode

The RS485 interface supports standard MODBUS protocol. Pump can communicate with external device via the communication port. Please refer to the [Communication Instruction Manual](#) for the parameters and their addresses.

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

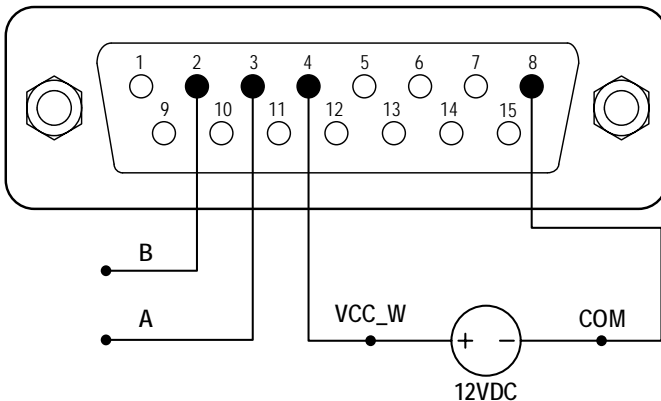


Figure 23. RS485 Communication Wiring

- 2) Turn on the power switch. The digital LED display will be on.

- 3) Press MODE key to change the control mode to Internal Control Mode or Time Dispense Mode.
- 4) Control pump with communication interface.
- 5) Press the START/STOP key to stop the drive when necessary.

6.5 Footswitch Mode

On this mode, a footswitch is used to control start/stop.

- 1) Turn the power off. Wire the DB15 connector as shown below, and connect it to the DB15 port on the rear of pump.

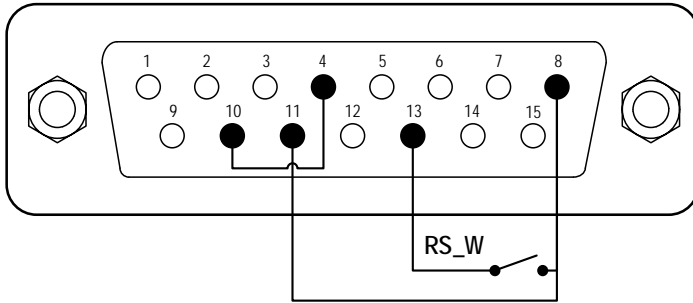


Figure 24. Footswitch Mode Wiring

- 2) Turn on the power switch. The digital LED display will be on.
- 3) Press MODE key to change the control mode to Internal Control Mode. When the external switch RS_W is closed then open, the drive will start to run. When the external switch RS_W is closed then open again, the drive will stop running.
- 4) Press MODE key to change the control mode to Time Dispense Mode. When the external switch RS_W is closed then open, pump will dispense fluid once.
- 5) Press MODE key to change the control mode to Logic Level Control Mode. When the external switch RS_W is closed, the drive will start to run. When open, the drive will stop.

7 Maintenance

7.1 Warranty

The product comes with one-year labor and parts warranty. The limited

warranty does not cover any damage that is caused by improper usage and handling.

7.2 Regular Maintenance

- 1) Always check the tubing and connections to make sure there is no leakage.
- 2) Do not cover the fan in the back of the pump.
- 3) Do not use water to wash the pump. Keep pump head dry.
- 4) Do not use chemical solvents to clean pump and pump head.

7.3 Malfunction Solutions

No.	Malfunction	Description	Solution
1	Hardware	No display	<ol style="list-style-type: none"> 1. Check the power cord 2. Check the internal power cord connection inside the pump.
2	Hardware	Motor does not work	<ol style="list-style-type: none"> 1. Check the indicator of the driver board. 2. Check the wire connection between the motor and the driver board.
3	Hardware	Motor is trembling	<ol style="list-style-type: none"> 1. Check the wire connection between the motor and the driver board. 2. The motor is overloaded. Check the mechanical connection.
4	Hardware	Keypad does not work	<ol style="list-style-type: none"> 1. Check the wire connection between keypad and the main board. 2. Check if the key is broken.
5	Hardware	External control 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

BQ80S Microflow Peristaltic Pump

			external control board.
6	Hardware	RS485 does not work	<ol style="list-style-type: none"> 1. Check the wiring of the connector. 2. Check the connections of the communication board.
7	Hardware	Noisy	<ol style="list-style-type: none"> 1. Check pump head installation make sure it's secure 2. Check the connection between the motor and driver board.
8	Software	External control does not work	Check if pump is on External Control Mode.
9	Software	RS485 does not work	<ol style="list-style-type: none"> 1. Reset the pump address. 2. Check if the address is duplicated on the bus.



If the problem can not be solved, please contact the manufacturer or distributor.

8 Dimensions

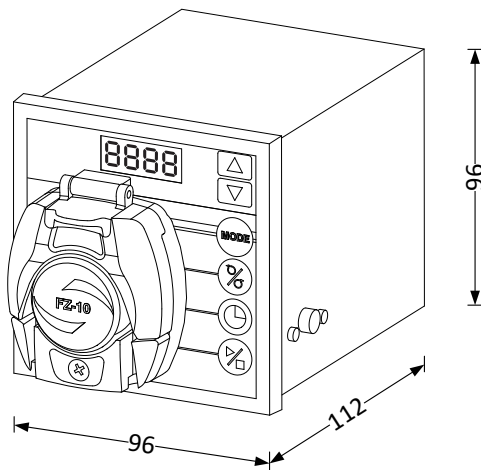


Figure 25. Dimensions (mm)

9 Naming Rule

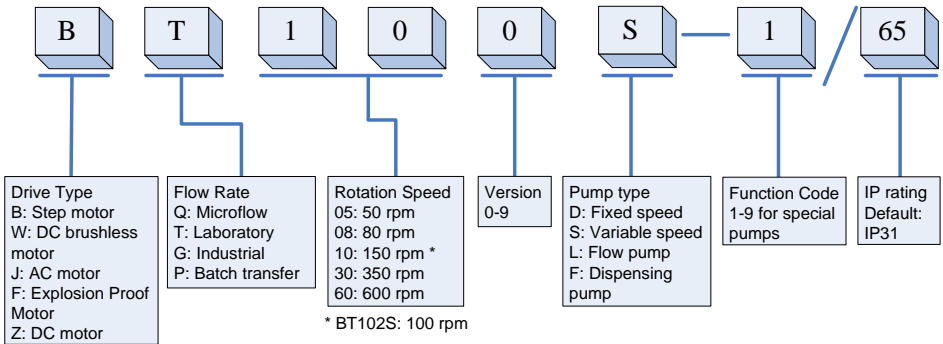


Figure 26. Naming Rule

10 Specifications

- Flow range: 0.005-64 mL/min
- Speed accuracy: 0.5%
- Speed range: 0.1-80 rpm
- Speed resolution: 0.1 rpm
- Power supply: AC 220V \pm 10%, 50Hz/60Hz, AC 110V \pm 10%, 50Hz/60Hz
- Power consumption: < 10W
- External logic level control signal: 5V, 12V (standard), 24V (optional)
- External analog control signal: 0-5V (standard); 0-10V, 4-20mA (optional)
- External communication interface: MODBUS RS485
- Ambient temperature: 0~40 °C
- Relative humidity: < 80%
- IP grade: IP31
- Dimensions (LxWxH): 112mm x 96mm x 96mm (4.4 x 3.8 x 3.8 inch)
- Weight: 0.8 kg (1.8 lbs)

11 Suitable Pump Heads and Tubing

Drive type	Pump head	Ch	Tubing size (mm)	Flow rate per channel (mL/min)
BQ80S (Pump head not inter changeable)	FZ10	1	Wall:0.85~1, ID:1~3.17	0.05~40
	DW10-1	1	Wall:0.8~1, ID:0.5~3.17	0.005~32
	DW10-2	2	Wall:0.8~1, ID:0.5~2.54	0.005~19
	DW10-3	3	Wall:0.8~1, ID:0.5~3.17	0.005~32
	DW15-1	1	13# 14# 19# 16# 25#	0.005~64