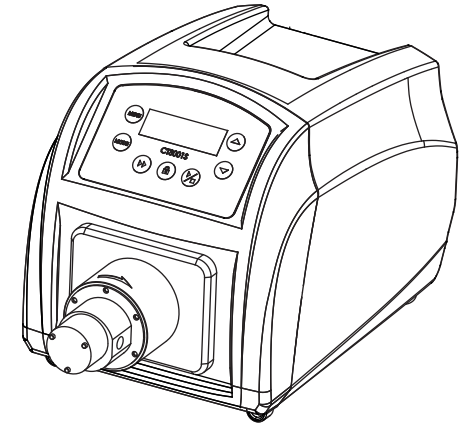
U.S. SOLID®

Manual No.

CT3001S
Speed Variable Micro Gear Pump
Operation Manual



CE

Website: www.ussolid.com
Customer Support: service@ussolid.com

Safety Precautions

Important information:

Be sure to read the manual carefully before operation!

	This icon warns: Keep fingers away from moving parts.
	This icon warns: Be careful.
	This icon warns: Be careful, the surface is hot.
	This icon warns: Be careful, electric shock hazard.
	This icon warns: To recycle this product.
	This icon warns: Personal protective equipment (PPE) must be worn.

Danger:

	Please use the same power supply as that on the nameplate of the machine, otherwise the equipment will be damaged!
	Please do not disassemble the shell or modify the interior of the equipment by yourself, otherwise it may cause malfunctions or even electric shock accidents! Please contact the dealer or our company directly regarding product repair matters.
	This product is not suitable for explosion-proof environment, and it should not be used in explosive environment.
	When installing and removing the pump head, please turn off the power. The flange of the pump head must be handled carefully and cannot be clamped with pliers, which may cause the misalignment of the inner core magnetic core or even cause permanent damage to the pump.

Warning:

	When connecting the external control or communication interface, please cut off the power inlet and the filter is large enough to avoid pressure loss in the circuit.

	The pump tube may be damaged and cause liquid spillage, please take necessary protective measures and check the pump tube regularly! When installing and removing external control devices, please be sure to turn off the power to prevent damage to the equipment!
	Please connect the protective ground of the machine to the ground, otherwise, there will be danger of electric shock or electromagnetic interference!
	This product is not intended for medical use.
	It is recommended to remove the two protective covers of the inlet and outlet of the pump only before installing the pipe joints and pipelines, so as to avoid any accidental foreign solid foreign matter entering the pump and damaging the internal components of the pump
	Special care must be taken when connecting the pump to the tubing to avoid leaks. If sealant or Teflon tape is used at the interface, it must be avoided to enter the pump.
	It is strongly recommended, especially for the inlet, that the inside diameter of the pipe should correspond to the capacity of the pump, so that insufficient liquid supply causes cavitation instead of normal wear. In any case the sum of inlet and outlet pressure shall not exceed 20bar/290PSI.
	It is strongly recommended to add a filter to the pump to filter out impurities with particles larger than 10um, so as not to accelerate the abnormal wear of internal components. The filter element needs to be checked regularly to make the filter effective. It is best to install a vacuum gauge at the rear end of the filter. When the vacuum increases over 0.1bar, the filter element should be cleaned or replaced.
	The gear pump can only transmit liquid in one direction, so pay attention to the position of the inlet and outlet when connecting the tube.
	Due to the fact that the actual working environment conditions (including temperature, humidity, acid, alkali, organic solvent and other corrosive environment, dust environment, power supply voltage, etc.) exceed our technical specifications and the machine is damaged, our company is responsible for the paid warranty, which is not within the scope of normal warranty.

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Gear Pump Introduction

Gear pump is a positive displacement (PD) pump. Gear pumps use the action of rotating gears and gears to move fluid. The rotating gear forms a liquid seal with the pump casing and creates a vacuum at the pump inlet, fluid that is sucked into the pump is enclosed in the cavity of the rotating gear and transferred to the discharge port. Gear pumps provide smooth, low-pulse flow proportional to the rotational speed of their gears.

Description

CT3001S is a high-performance, low-noise micro-gear pump, which uses a brushless motor and a magnetically driven pump head to achieve fluid control with low pulsation and constant flow. The driver uses LCD screen display with Chinese and English language, and key operation, which can easily set parameters. Featuring real-time RPM monitoring and timed dispensing, this pump is designed for versatile laboratory applications. It offers multiple external control interfaces for seamless integration with peripheral equipment, while built-in MODBUS protocol support significantly reduces system development complexity.

The working speed range of CT3001S is 50-3000rpm, and the speed resolution is 1.

Functions and Features

- 128*32 dot matrix LCD, Chinese and English switching, simple parameter setting, intuitive status display.
- It has multiple working modes of internal control, external control, time dispensing and level mode.
- It has the functions of start and stop, full speed, speed regulation, state memory (power-off memory), etc.
- External analog speed regulation, external control signal control start and stop, external control signal photoelectric isolation.
- The external control signal supports 5-24V wide voltage input.
- The type of external speed regulation signal (voltage or current) can be switched on the control panel.
- RS485 communication, support MODBUS protocol, a variety of communication parameters can be set, easy to connect with various control equipment.
- Multiple control parameters can be recompose, suitable for OEM custom applications.
- The circuit board is sprayed with conformal coating to achieve the effect of dustproof and moistureproof.
- Super anti-interference characteristics, wide voltage design, suitable for complex power supply environment.
- Streamlined plastic shell.

Components and Interfaces

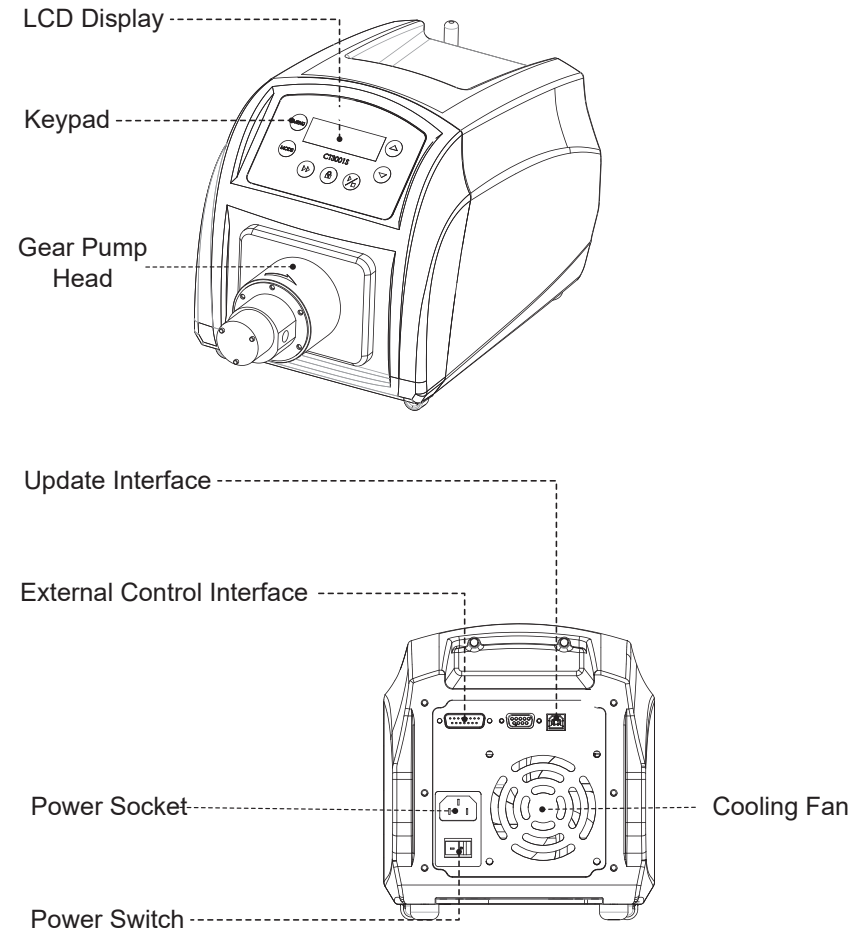


Figure 1 Components and Interfaces

Display Panel and Operating Keypad

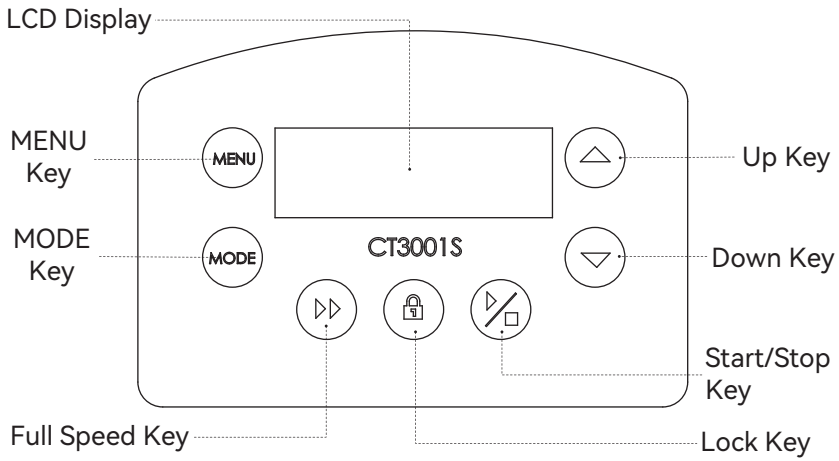


Figure 2 Operating Keypad

◆Keypad

Up Key: Value increase key. Press the key once, the lowest digit of the value will increase by 1, long press the key, the value will increase rapidly.

Down Key: Value decrease key. Press the key once, the lowest digit of the value will be reduced by 1. Long press this key, the value will decrease rapidly.

MENU Key: In the main interface, press this key to enter the menu interface. In the menu interface, press this key to return to the main interface. It is invalid during operation.

MODE Key: Switch between control mode internal control, external control,timing, and level 1 mode. It is invalid during operation.

Full Speed Key: Press this key to switch between the highest speed and the original state.

Lock Key: Press this key to switch the lock/unlock state of the pump.

Start /Stop Key: Control the start and stop of the pump, press this key in the menu mode to enter the sub-menu.

◆Show Icon Description

Icon	Function	icon	Function
	Start		Stop
	Pause		Direction of rotation
	Tone on		Tone off
	Locked		Unlocked
#1	Show pump number in communication		Communication disconnected
>>>>>>	Full speed		

Table 1 Description of Display Icons

◆LCD Display

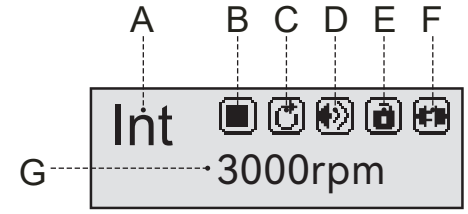


Figure 3 LCD Display

A.Control State: Display the current control mode, press MODE to switch, which are internal control, external control, timing, and level 1 in turn.

- Internal Control: Through the key control on the panel, and the external pulse signal controls the start and stop.
- External Control: The speed is controlled by an external analog quantity and the start and stop are controlled by an external level signal.

- Timing: Set the running time, interval time, and cycle times to realize the regular transmission of liquid.
- Level 1 (Original Foot Switch): The start and stop are controlled by an external level signal, and the speed adjustment is operated by the panel.

B. Running Stvate: Display the current running state.

Stopped state Running state Paused state

C.Direction of Rotation: Shows the direction in which the pump rotates.

Clockwise rotation

D.Tone: Display the switch state of the key prompt sound.

Tone on Tone off

E.Lock State: Displays whether the current state is locked. In the locked state, only the start and stop key on the panel work, and other keys are invalid.

Unlocked state Locked state

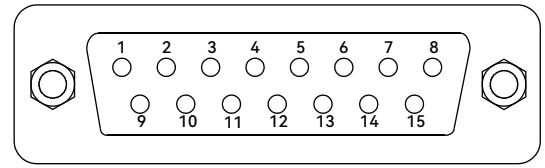
F.Communication State: Displays whether the communication is currently in progress.

Communication interrupted

#1 Communication showing pump number

G.Rotational Speed Display: Display the current rotational speed, the unit is RPM. When >>>>>> is displayed, it is at full speed.

External Control Interface Description



DB15 number	English Notes	Description
1	ADC_W	Positive input of external analog signal
2	B	Communication interface, B Pole of RS485
3	A	Communication interface, A Pole of RS485
4	VCC_W	External voltage VCC input terminal
5	-	-
6	-	-
7	-	-
8	COM	Ground of external power
9	AGND	Negative input of external analog signal
10	+12V	Positive of internal +12V power source
11	GND	Ground of internal power source
12	-	-
13	RS_W	External start stop signal input
14	-	-
15	RS	Internal start stop signal output

Table 2 Definition of External Control Pins

Note: Follow the legend pins to provide the correct signal. Do not exceed the specified range of the signal value. Please pay attention to the specified voltage range when connecting to an external power supply, otherwise it may cause permanent damage and will not be covered by the warranty.

Note: Low voltage signals must be isolated from mains power. Use a separate shielded ground input wire.

Note: Use a qualified protective wire sleeve at the end of the multi-strand cable, otherwise there will be a risk of damage to the equipment.

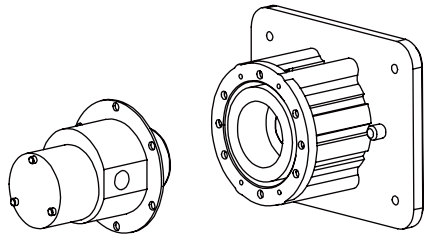
Installation Instructions

◆Before Operation

- Please compare the packing list to check whether all accessories are wrong or damaged when you open the outer package of the pump. Please contact us in time, if you find any problems.
- Read the operation manual carefully, and keep it at hand, or keep it in a fixed place for reference at any time.
- Place the pump on a level table with the rear at least 20 cm away from obstacles.

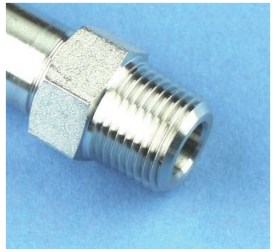
◆Install Pump Head

- Push the pump head into the pump head bracket, keeping the inlet and outlet level.
- Align the pump head with the mounting holes of the pump head bracket, and fix the pump head on the bracket with M3*8mm stainless steel screws and nuts.

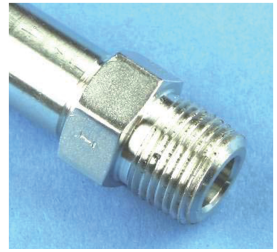


◆Tube Connection

- Choose 1/8 NPT stainless steel or plastic fittings, take care to clean the internal and external threads without leaving residue, and ensure that the internal and external threads are not weakened or deformed.



Qualified



Disqualified

- Use Teflon tape to wrap the thread clockwise from the second pitch, wrap it tightly twice, and finally cut it short and stick it on the thread.

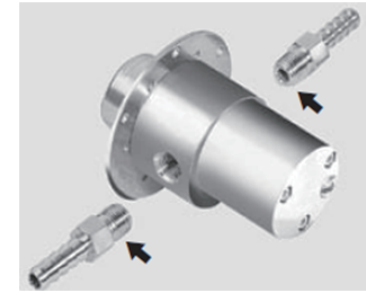


This one is qualified.



This is disqualified, the tape is wrapped too close to the edge, which may cause the tape to enter the interior of the pump.

- Screw the joint into the threaded hole of the inlet and outlet of the pump head, and tighten it with a wrench.



Note: Do not tighten too much, otherwise parts may be damaged.

◆Power Connection

Plug the supplied power cord into the power socket on the rear of the drive.

⚠	Note: Make sure all power supply wires are rated for equipment wattage.
⚠	Note: The pump must be located so that it can be easily disconnected from the power source when the equipment is in use.
⚠	Note: Please use the same power supply as that on the nameplate of the machine, otherwise the equipment will be damaged!

Operation Instructions

◆First Run Wizard

The pump has preset default operating parameters, as shown in the table below:

Parameter	Default Setting
Run Time Unit	Second
Dispense Time	1.0 second
Pause Time Unit	Second
Pause Time	1.0 second
Cycles	1 time
Maximum Speed	3000rpm
Pump Number	#1
Tone Setting	Enable
Language	Chinese
Contrast Setting	10
Baud Rate	9600
Stop Bit	1
Parity Check Mode	Even Parity
Pulse Trigger Mode	Falling Edge Trigger
Level Trigger	High Level Trigger
External Control Mode	Voltage Mode 0-5V
Acceleration Time	0.6S
Deceleration Time	0.6S
Stall Protect	Disable

Table 3 Device Default Parameter List

◆Setting Menu

In the main interface, press the MENU key to enter the menu setting interface. In the setting interface, press the ▲ and ▼ key to select parameters, press the ⚙ key to enter the submenu, and press the ▲ and ▼ key to adjust the parameters in the submenu. If you want to return to the main interface, you can press and hold MENU to return or press MENU continuously until you return to the main interface. Refer to Figure 3 for specific operations:

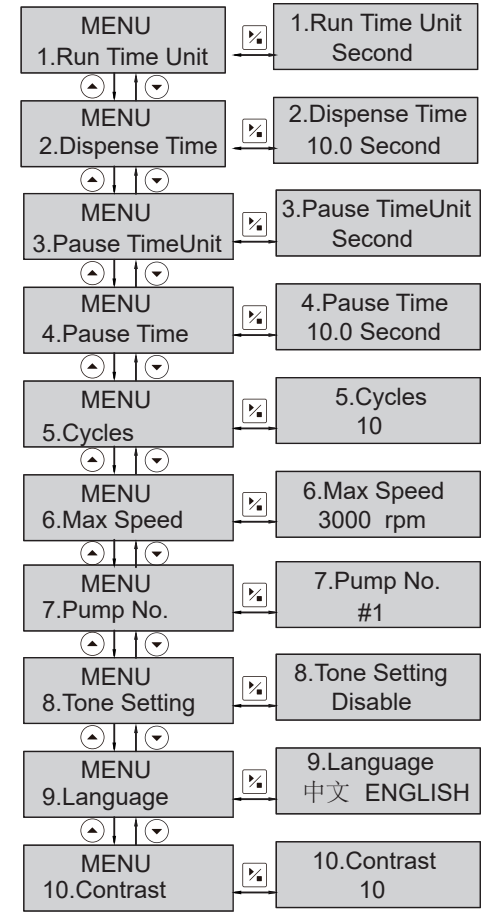


Figure 3 Menu Setting Flow Chart

1. Run Time Unit: In the timing mode, set the running time unit, which can be set in days, hours, minutes, and seconds.
2. Dispense Time: In timing mode, set the running time, the setting range is 0.1 -999seconds\minutes\hours\days.
3. Pause TimeUnit: In the timing mode, set the interval time unit, which can be set in days, hours, minutes, and seconds.
4. Pause Time: In timing mode, when the number of cycles is not 1, set the pause time between each operation, the setting range is 0.1-999 seconds\ minutes\hours\days.
5. Cycles: In the timing mode, set the number of repeated operations, and the setting range is 0-999 times. When the set value is 0, the device will run infinitely until the stop key is pressed. When the set value is other, the device will automatically stop after running the set number of cycles.
6. Max Speed: In the external control mode, set the upper limit of the analog controllable speed.
7. Pump No.: In the communication mode, set the communication address of the pump.

⚠	Note: The drive needs to be restarted to take effect.

8. Tone Setting: Set whether to turn on or off the key prompt sound.
9. Language: Switch the system language to Chinese or English.
10. Contrast: Set the contrast of the LCD screen.

◆System Advanced Parameter Setting

In the main interface, press the MENU key and ▲ key to enter the advanced parameter setting interface of the system. In this interface, press the ▲ key+ ▼ the key to select advanced parameters, press the ⏯ key to enter thesubmenu, and press the ▼ ▲ key to adjust the parameters in the submenu. If you want to return to the previous menu, press the ⏯ key. If you want to return to the main interface, press the MENU key. Refer to Figure 4 for specific operations:

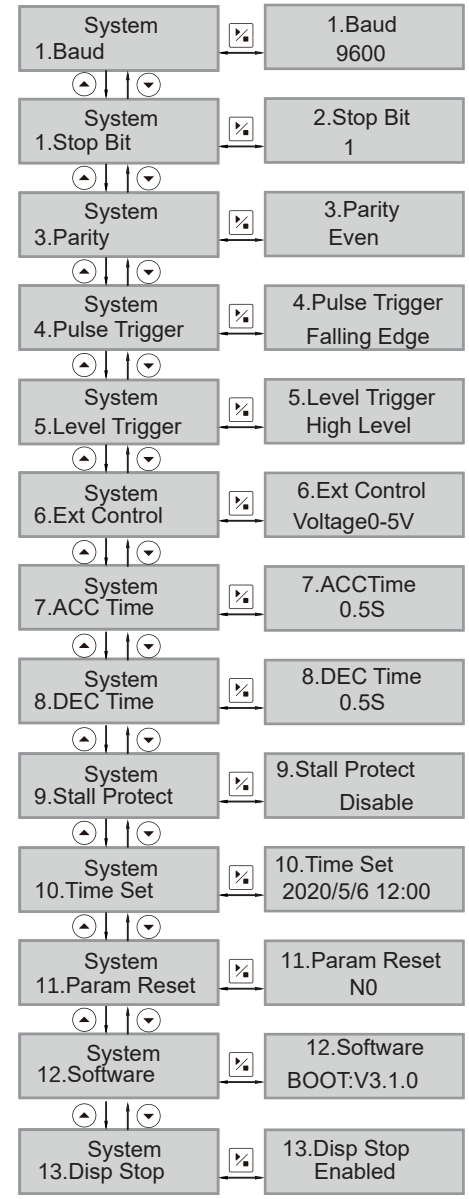


Figure 4 Flow Chart of System Advanced Parameter Setting

1. Baud Rate: In the communication mode, set the size of the baud rate, which can be set to 4800, 9600, 19200 and 38400 (the default is 9600).
2. Stop Bit: In the communication mode, set the size of the stop bit, which can be set to 1 or 2 (the default is 1).
3. Parity: In the communication mode, set the type of check mode, which can be set to odd check, even check and no check (the default is even check).
4. Pulse Trigger: In internal control or timing mode, set the trigger type in which the driver is controlled by an external pulse signal to start and stop. It can be set to rising edge trigger or falling edge trigger (the default is falling edge trigger).
5. Level Trigger: In the external control or level mode, set the level trigger type when the drive is controlled externally, which can be set as high level trigger or low level trigger (the default is high level trigger).
6. External Control: In the external control mode, set the parameter type of the drive speed controlled by the analog quantity, which can be set to voltage mode 0-5V, voltage mode 0-10V, current mode 4mA-20mA (with the change of the external control analog quantity, the drive speed will change linearly).
7. ACC Time: Set the acceleration time when the driver starts running, the unit is second (the default value is 0.6 seconds).
8. DEC Time: Set the deceleration time when the driver stops running, the unit is second (the default value is 0.6 seconds).
9. Stall Protect: the switch setting of the drive out-of-synchronization protection, which is turned off by default (the WIFI version has this function).
10. Time Set: the customer can customize the date and time when using, press ⏩ to change the set parameter type, press ▲ ▼ to adjust the size, press ⏯ to save and exit.
11. Param Reset: restore all parameters to default values.
12. Software: View the software version number. Press the ▲ ▼ buttons to scroll through the information.
13. Disp Stop: In timer mode, whether external control signals are allowed to trigger shutdown.

◆Mode Switch

- Turn on the power switch, the LCD screen will display a welcome message and enter the main interface.
- Press MODE the mode key once to switch the mode once. For specific information display logic, refer to Figure 5:

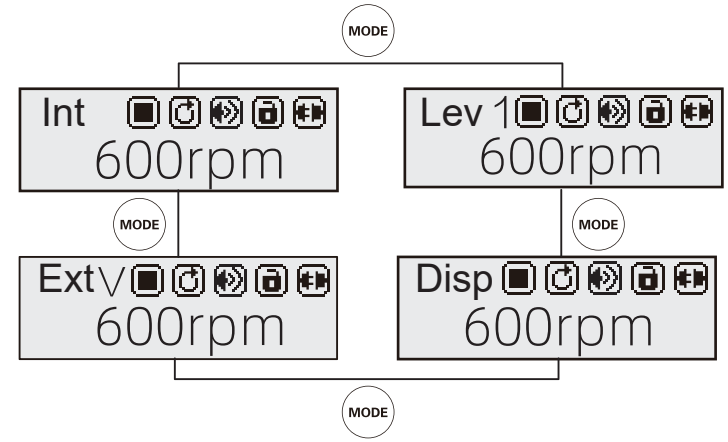
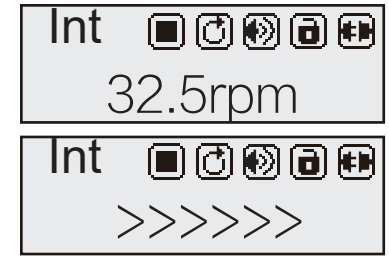


Figure 5 Mode Switching

◆Internal Control Mode

The operation of the pump is controlled by the keys on the front panel of the pump.

- urn on the power switch, the LCD screen will display a welcome message and enter the main interface.
- Press MODE key to switch the mode to internal control mode, as shown in the figure below:



Normal State

Full Speed State

Figure 6 Internal Control Mode

- ▲ ▼ Up key and down key. Press to adjust to the speed to be set.

- Lock key. Press to lock or unlock the device.
- Start/stop key. Press to start or stop the pump.
- Full speed key. Press it and the pump will run at maximum speed.

◆External Control Mode

The speed is controlled by the external input analog quantity, and the start and stop are controlled by the external level. The keys on the control panel do not work.

- In the case of cutting off the power supply, connect the circuit according to the wiring diagram below, and connect the DB15 interface to the corresponding interface on the back of the pump.

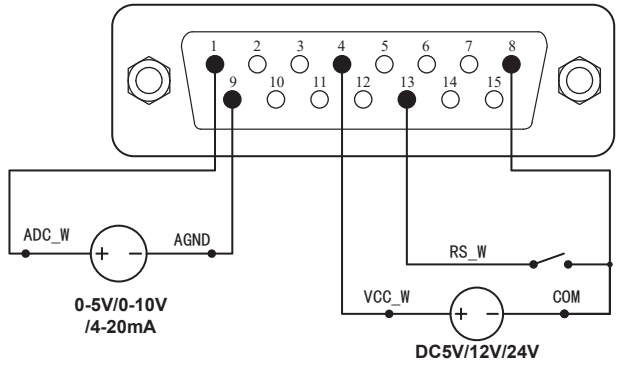


Figure 7 Wiring Diagram for Connecting External Power Supply in External

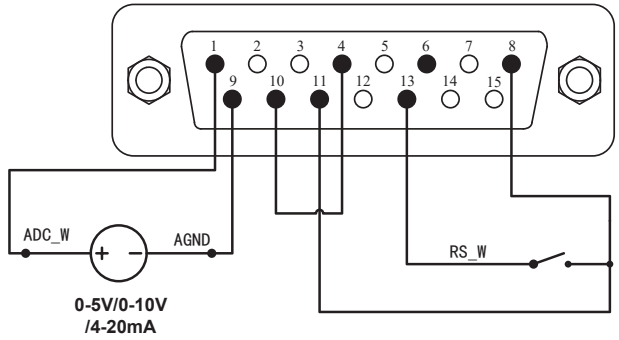


Figure 8 Wiring Diagram for Connecting Internal Power Supply in External

- Turn on the power switch, the LCD screen will display a welcome message and enter the main interface.
- Press MODE vthe mode key to switch the mode to external control mode, as shown in the figure below:



Voltage mode
0-5V/0-10V

0-5V/0-10V



Flow Mode
4-20mA

4-20mA

Figure 9 External Control Mode

- Close the switch of the external RS_W, turn on the analog power supply, the pump will change the speed with the change of the analog value, disconnect the switch of the external RS_W, the pump will stop running.

⚠	Note: Follow the legend pins to provide the correct signal. Do not exceed the specified range of the signal value. Please pay attention to the specified voltage range when connecting to an external power supply, otherwise it may cause permanent damage and will not be covered by the warranty.
⚠	Note: Low voltage signals must be isolated from mains power. Use a separate shielded ground input wire.
⚠	Note: Use a qualified protective wire sleeve at the end of the multi-strand cable, otherwise there will be a risk of damage to the equipment.

◆Timing Mode

Liquid volume dispensing is performed by timing operation.

Setting parameters

- Turn on the power switch, the LCD screen will display a welcome message and enter the main interface.

• Press MODE the mode key to switch the mode to timing mode, as shown in the figure below.

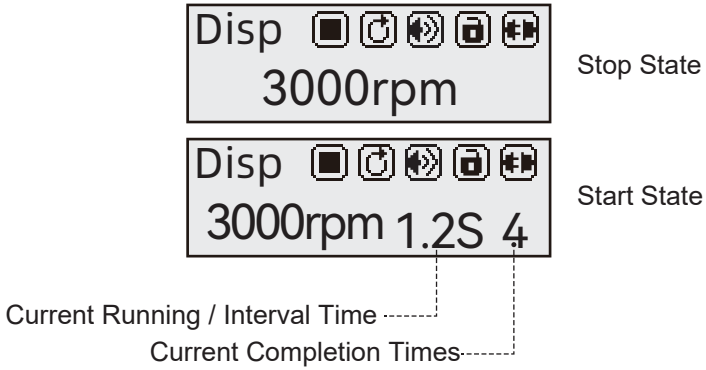


Figure 10 Timing Mode

• Press MENU the menu key to enter the parameter setting interface.
• Set the timing unit, running time, interval time and cycle times respectively.
• Back to Home page.

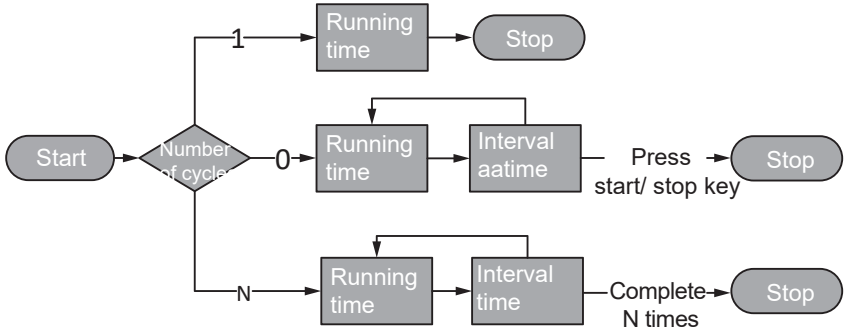


Figure 11 Timing Operation Flow Chart

• Press the start/ stop key to run the set process.
• During the operation, press the start/stop key to stop the operation.
• In timing mode, a foot switch can also be used to start a run.
• During the running, the run time, interval time and number of runs are displayed.

◆Level 1 Mode (Original Foot Switch Mode)

The start and stop of the pump is controlled by the external high and low levels.
• When the power is cut off, connect the circuit according to the wiring diagram below, and connect the DB15 interface to the back interface of the pump.

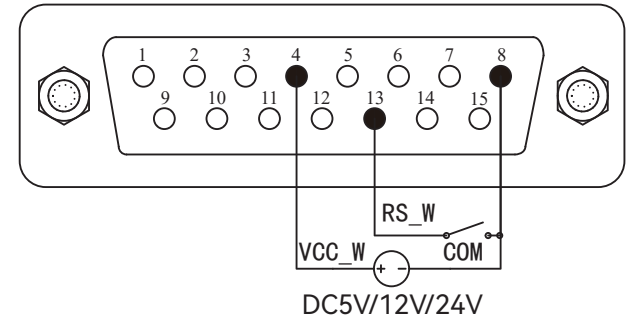


Figure 12 Wiring Diagram of External Power Supply in Level Mode

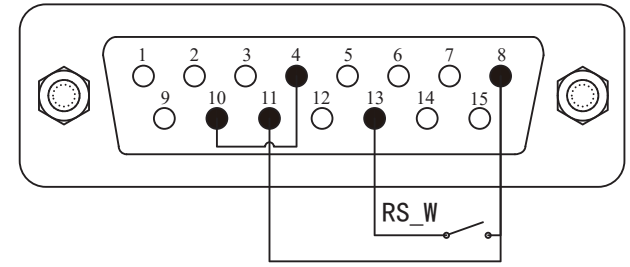


Figure 13 Wiring Diagram of Internal Power Supply in Level Mode

• Turn on the power switch, the LCD screen will display a welcome message and enter the main interface.
• Press MENU the mode key to switch to level 1 mode, as shown in the following figure:

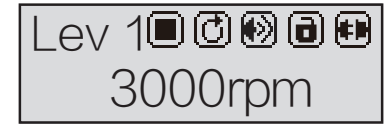


Figure 14 Level 1 Mode

- Press ▲ ▼ up key and down key to adjust to the speed to be set.
- When the foot switch is connected, the pump runs. When the foot switch is disconnected, the pump stops.

> Note: Use this mode when the dispensing is controlled by an accessory called dispensing controller.

◆Communication Mode

RS485 communication supports MODBUS protocol, which can control various functions of the pump. For specific parameter addresses and support instructions, refer to the technical standard of Raffle Communication.

- With the power cut off, connect the circuit according to the wiring diagram below, and connect the DB15 interface to the back interface of the pump.

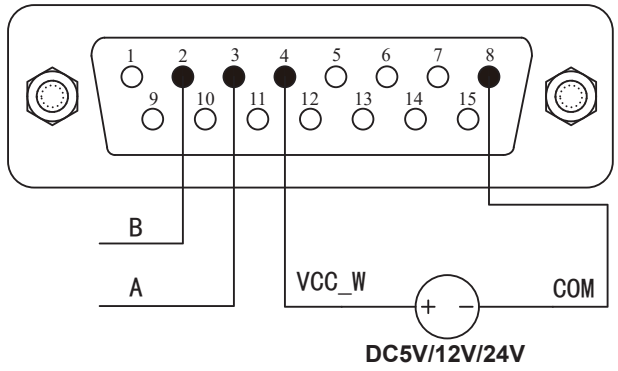


Figure 15 Communication External Power Supply Wiring Diagram

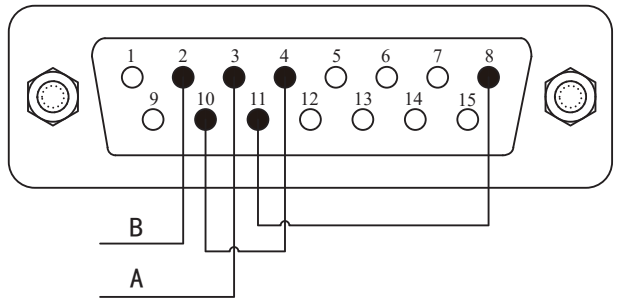


Figure 16 Communication Internal Power Supply Wiring Diagram

- Turn on the power switch, the LCD screen will display welcome information and display the main interface.
- Press MODE the mode key to switch the mode to internal control mode or timing mode, as shown in the figure below:

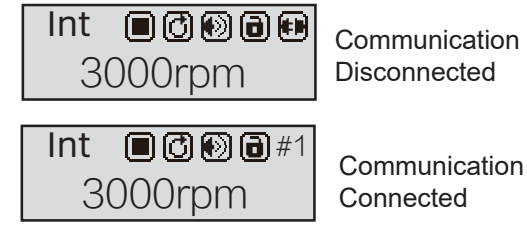


Figure17 Communication Mode

- Control the functions of the pump through communication.
- Press ▶/■ the start and stop key to stop the pump.

◆Speed Setting

In the main interface, it can be set through ▲ ▼ the up key and down keys. Each time the lowest digit of the speed is added or minus one, long press ▲ ▼ the up key and down key to increase or decrease rapidly and continuously.

Press ▶▶ and hold the full speed key, and then press ▲ the up key to directly set the speed to the highest.

Press ▶▶ and hold the full speed key, and then press ▼ down key to directly set the speed to the lowest.

Malfunction and Maintenance

◆Drive Spare Parts

Spare Parts	Model	Spare Part Number
Blown fuses	1A	3020200100004
Power cable	250V 10A	3022300200016

Table 4 Drive Spare Parts

◆Daily Maintenance

- Regularly check the seal of the pipeline for leakage.
- Regularly check whether the filter needs to be replaced.
- When the tube line is not in use or not in use, please seal the inlet and outlet of the pump head with a sealing plug.



Note: Always disconnect the pump from the mains before replacing lines, or performing any assembly, disassembly, or maintenance activities.

◆Maintenance Worksheet

Carrying out regular maintenance on the pump according to the maintenance worksheet will help reduce the damage to the components of the pump, thereby ensuring the safety of people and property.

Maintenance Tasks	Frequency	Actions After Exception
Check if the pumpleaks and damage	1. Check before starting each time. 2. Daily visual inspection. 3. Periodic inspection during pump operation.	1. Before operating the pump, repair leaks and damage. 2. Replace parts when necessary. 3. Clean up all spilled liquid.
Check for abnormal temperature or noise during pump operation	1. Daily visual inspection. 2. Periodic inspection during pump operation.	1. Check and replace worn parts.
Do you need to replace the filter	1. Check flow rate at most every three days.	Please replace the filter in the following situations: 1. When the flow rate is lower than 75% of the original value. 2. Whether the filter is blocked.

Table 5 Maintenance Work List

◆Malfunction Solutions

NO.	Malfunction Type	Malfunction Description	Solutions
1	Hardware	No display	1. Check whether the power cord is connected properly. 2. Check whether the fuse is blown. If it is blown, please contact the manufacturer for replacement.
2	Hardware	Key does not work	1. Whether it is locked.
3	Hardware/ software	Communication does not work	**First check the software:** 1. Whether the mode is communication mode. 2. Reset the machine address. 3. Check if there are two machines on the bus using the same address. **If the problem is not resolved, continue to check the hardware:** 4. Check if the connection is correct 5. Check whether the external control power supply supplies power.
4	Hardware/ software	External control does not work	**First check the software:** 1.Whether the mode is external control mode. **If the problem is not resolved, continue to check the hardware:** 2. Check if the connection is correct Check whether the external control power supply asupplies power.

Table 6 Malfunction Solutions Reference Table

⚠	Note: This product is not medically certified. When used as a component in a medical device, the medical device itself must have medical certification.

⚠	Note: There are no parts in the pump that can be repaired by the user. If the user repairs by himself, the warranty of the pump will be invalid. If there is a fault that cannot be solved after checking the software and connecting the external hardware, please contact us, and do not repair by yourself.

Dimensions

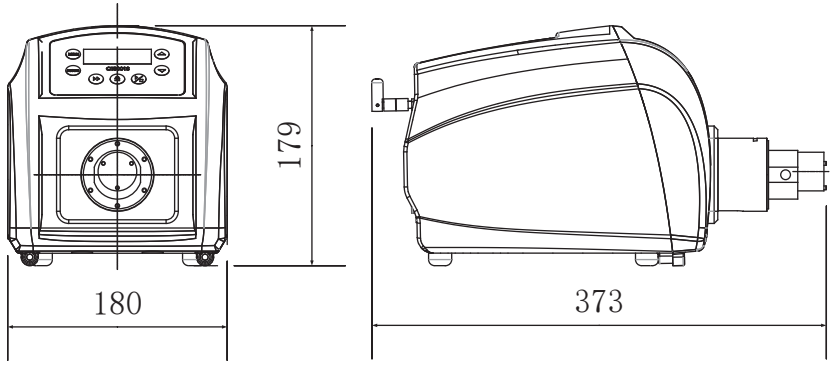


Figure 18 Dimensions(mm)

Ordering Information

Product Mode	Description	Order Number
CT3001S		

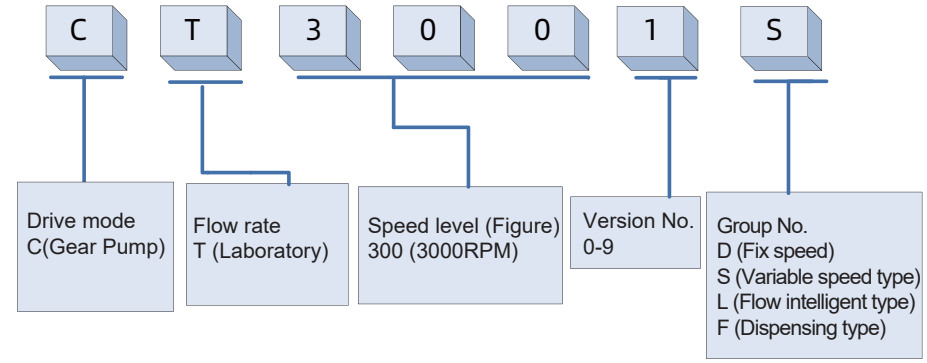
Table 7 Table of Optional Accessories

Optional Accessories Table

Accessories list	Description	Order Number
Foot switch		1060200100017

Table 8 Table of Optional Accessories

Naming Rules



Technical Parameters

Function

Suitable Pump Heads	MG204,MG209,MG213
External Control Function	Key control start and stop, full speed, state memory (power-off memory), foot switch control, external control start and stop, photoelectric isolation, 5V/12V/24V level input optional. 0-5V/0-10V/4-20mA speed adjustment optional, time dispensing
Communication Function	RS485, MODBUS communication protocol
Display Function	Display speed and mode
Direction Control	CW/CCW

Performance

Flow Range	15-2700mL/min
Speed Range	50-3000 rpm
Speed Resolution	1 rpm
Adjustment Method	Mask and key
Display Method	128*32 LCD
Applicable Power Supply	AC 100-240V 50-60Hz
Wattage	<50W
Working Environment	Temperature 5~40℃ Relative humidity<80%
Dimensions	373X180X179mm
Drive Weight	3.8kg
Degree of Protection	IP31

◆Flow Rate Chart of the Pump

Pump Head Model	Gear Material	Outlet Pressure Water (MPa)	Flow Range (mL/min)	Liquid Temperature °C
MG204XD0PT00000	PEEK	0.8	15-900	-45 ~ 120
MG209XD0PT00000	PEEK	0.8	30-1800	-45 ~ 120
MG213XD0PT00000	PEEK	0.3	45-2700	-45 ~ 120

Note: The data of the flow range shown above are all obtained from the test of pure water under normal temperature and pressure in the laboratory. This data is for reference only. due to the influence of specific factors such as pressure, temperature, and medium characteristics in actual use,deviations may occur. For specific information, please contact us.

◆Appendix

Schematic diagram of gear pump assembly

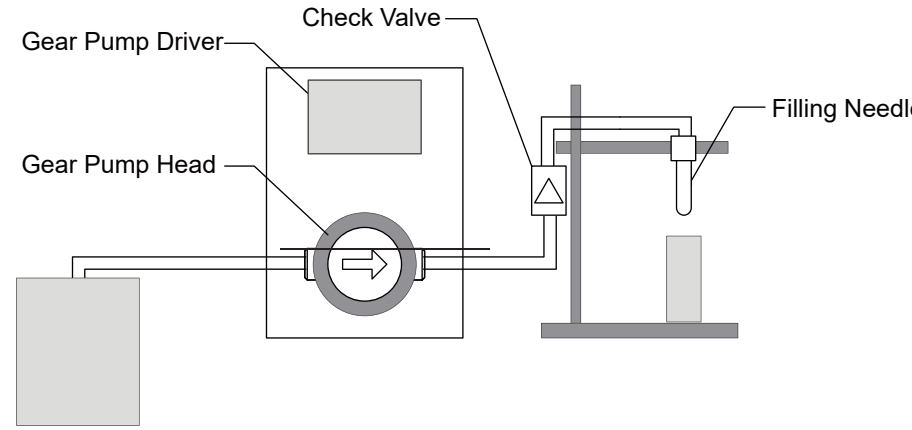
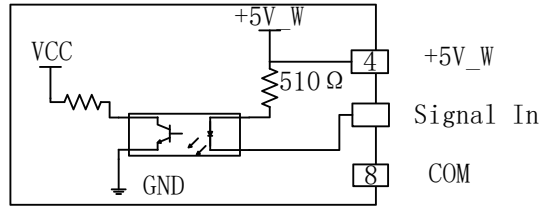
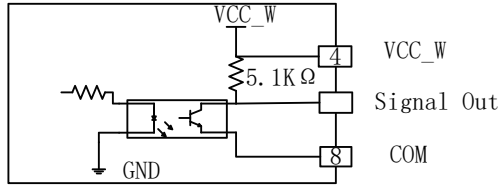


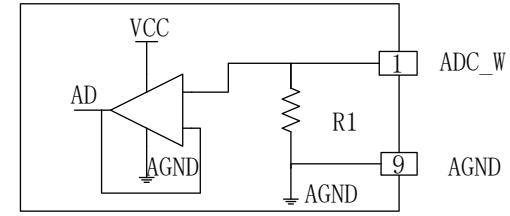
Figure 22 Schematic Diagram of Gear Pump Dispensing

1. The check valve must be installed in the vertical direction of the flow direction, and there is an arrow on the check valve, and the arrow must be upward.
2. The liquid level in the container on the inlet side of the pump must be below the check valve. Ideally, the suction line is placed horizontally or slightly upwards from the pump head.
3. Moving the tube will generate tension, which will affect the amount of liquid transferred and have a negative impact on the repeatability of liquid transfer, so we recommend fixing the tube and check valve at the output end on the outlet bracket.
4. In order to prevent the liquid from dripping, we further recommend installing a filling needle on the tube.

External Control Input and Output Performance

Input Switch Value or OC Gate Specification		
Project	Parameter	
Input Interface Principle		
Single Signal Input ON Current	$5.5mA < I_{on} < 15mA$	
Single Signal Input OFF current	$I_{off} < 1.5mA$	
Signal Input Method	Switch (closed, open) or NPN transistor OC gate	
External Control Input Voltage	5V 12V 24V	Input loop requires no series resistors
Isolation Method	Optoelectronic isolation	

IOutput Specification	
Project	Parameter
Principle of Output Interface	
Output Method	NPN transistor OC gate with internal pull-up
Isolation Method	Optoelectronic isolation

Input Analog Specifications		
Project	Parameter	
Interface Principle		
Input Impedance (<100HZ)	0-5V	R1=4KΩ
	0 -10V	R1=4KΩ
	4-20mA	R1=248Ω
Allowable Error	0-5V,0-10V, 4-20mA	±1%
Resolution	0-5V	5mV
	0-10V	10mV
	4-20mA	16uA

Internal Output Power Specifications	
Project	Parameter
The Output Voltage	DC12V ± 1V
Allowable Output Current	< 130mA

External input Power Specification	
Project	Parameter
Allowable Input Voltage	DC5-25V
Allowable Input Current	> 350mA