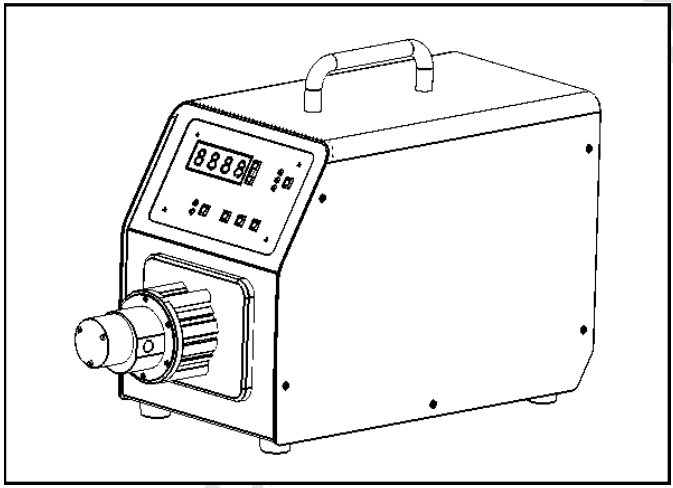
CT3000S Basic Speed Gear Pump

Operation Manual



Safety Cautions

Danger: Please use the correct AC power voltage source shown on the sticker attached on the equipment to avoid any damage.
Please don't 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. The flange of the pump head must be handled carefully. Please don't use pliers to clamp it. It may cause inner core displacement, or even permanent damage of the pump.

Warning: Tubing breakage may result in fluid being spayed 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 the pump before connecting or disconnecting the external control device or communication interface.

Warning: The pump is provided with a grounded plug, it must be well–grounded at all times.

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

Warning: Avoid any foreign bodies, including sealant or Teflon tape if they are used to seal the tubing, to get into the pump. Only remove the two covers on the pump head when installing connector or tubing,

Warning: It is strongly recommended that when using the pump, especially for the entrance, tubing size should be corresponding to the competency of pump to avoid cavitation which are caused by inadequate fluid for abnormal wear. In any case the pressure between the inlet and outlet shall not exceed 20 bar / 290 psi.

Warning: it is strongly recommended to add a filter to the inlet of the pump to filter out the particles bigger than 10 μm, to avoid the internal components to wear and tear abnormally. The filter surface area should be large enough to avoid pressure loss in the loop. It is also important to regularly check the filter to make sure it works effectively. If a vacuum gauge is installed after the filter, when the vacuum increases more than 0.1 bar, the filter needs to be cleaned or replaced.

Warning: Gear pump can only transfer liquid in one direction.

Contents

1. Introduction

CT3000S is a high performance and low noise micro gear pump. The brushless servo motor, stainless steel magnetic drive pump head can transfer fluid continuously and smoothly. The driver adds the stainless steel , LED display, keypads operation, can easy set up the parameters. Shows the speed, indicator shows the working status, suitable for different lab use. With standard MODBUS RS485 interface, the pump is easy to be controlled by external device, such as computer, human machine interface or PLC.

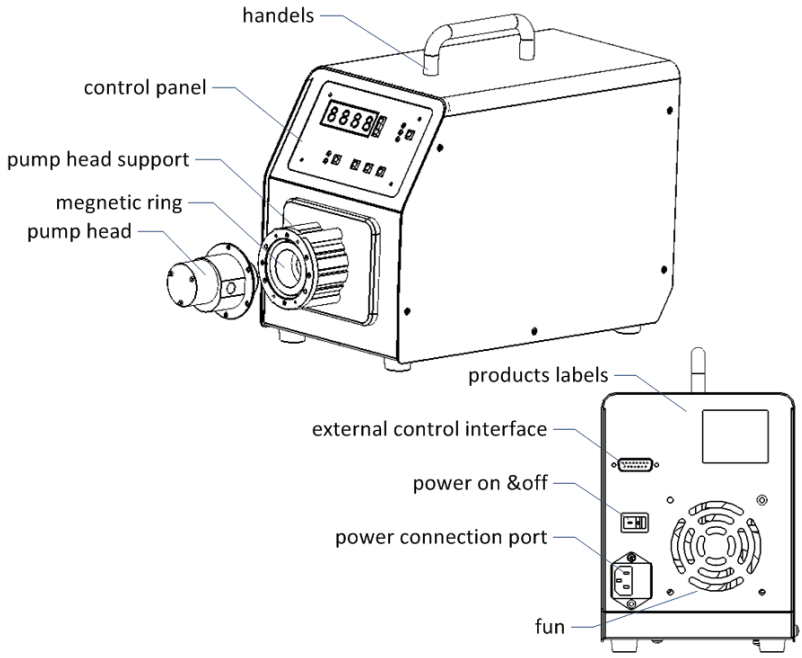
CT3000S provides speed range from 300 to 3000 rpm, with 1 rpm resolution

2.Function and Features

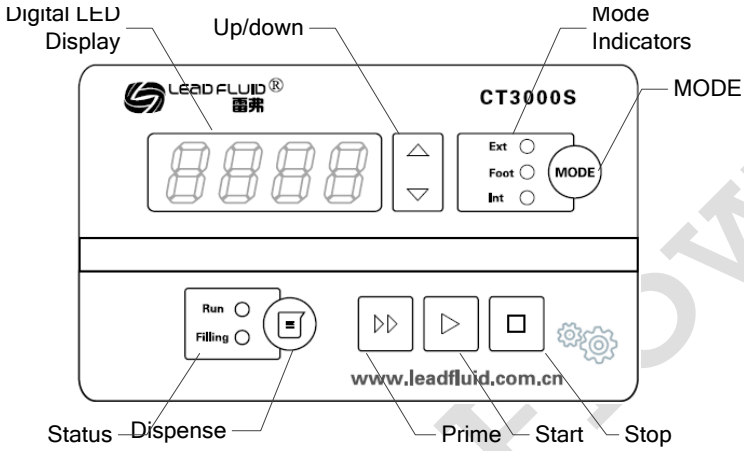
1) Work with variable pump heads
2) Suitable for high viscous and pressure liquid transfer
3) No pulse, low noise
4) Magnetic coupling drive, easy to maintain
5) Brushless servo drive, high efficiency, maintenance free
6) LED display, keypads operation
7) Display and control speed
8) Time dispenser
9) External signal controls start/stop/dispensing; external analog signal adjusts speed

10) RS485 MODBUS interface
11) Stainless steel case
12) Switching power supply, 85~260VAC/50~60Hz

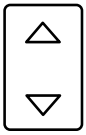
3.Components and Connectors



4.Display Panel and Operating Keypads



4.1 Keypad



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

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

MODE key. When the drive is not running, use the **MODE** key to change the working mode: keypad control, footswitch control and external control .

Beaker keypad：Time dispense, When drive is not running, long time press to start this function.

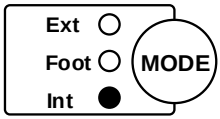
PRIME key. Press the key to run pump at maximum allowed speed. Press again to return to the previous state.

START key. Press the key to start the drive.

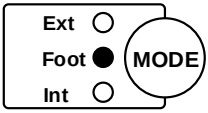
STOP key. Press the key to stop the drive.

4.2 Digital LED and Indicators

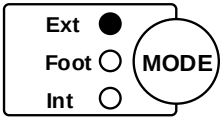
4.2.1 Indicators



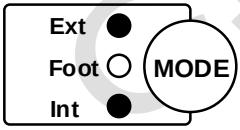
Int: *6.4 Internal* Control Mode. Use the keypad to operate the pump. Footswitch can be used to control start /stop.



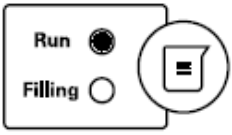
Foot: *6.6 Easy* Dispense Mode. Use footswitch to start or stop dispensing. Use the keypad for other operations.



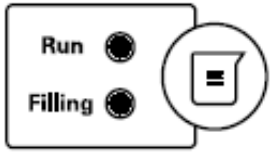
Ext: ***Chyba! Nenalezen zdroj odkazů.***. Use external analog signal to control rotating speed. Use External logic level signal to control direction, start and stop. The keypad is disabled.



Int+Ext: *6.7 Logic Level* Control Mode. External logic level signal controls start and stop. Use the keypad control direction and speed.



Run：The Motor working.



Filling: Filling working.

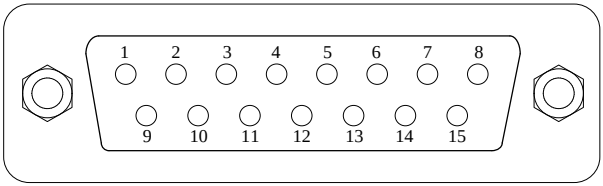
4.2.2 Digital LED Display

The digital LED displays the rotating speed and working mode.

When flashing, pump is on Time Dispense Setup Mode,
C115 shows dispense time is 115 seconds.

Drive is running at full speed.

5. 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	+12V_W	External 12V input
5		
6		
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		

6.Operation Instructions

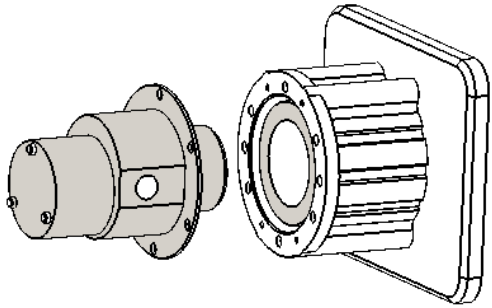
6.1Before operation

1) Please check the packing slip to make sure nothing is wrong or damaged in the package. If there's 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's running.

6.2 Install pump head and tubing

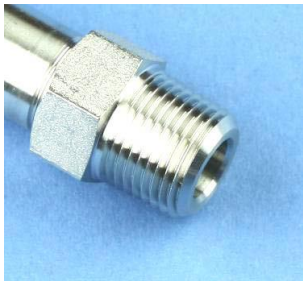
6.2.1 Install pump head

1) Put the pump head into the pump head holder, keep the entrance horizontal.
2) Align the pump head and bracket mounting holes. Use provided M3x8 mm stainless steel screws and nuts to tighten pump head on the bracket.



6.2.2 Install tubing

1) Screw 1/8NPT threaded stainless steel or plastic joints on the pump head. Please pay attention that the internal and external thread is in good shape and there's no residue left.



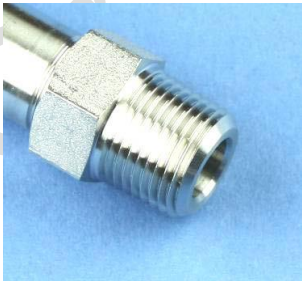

Good **Defective**

2) Wrap two layers Teflon tape clockwise on the threads. Make sure there will be no tape entering the inner part of the pump.



6.2.3 Install tubing

3)Screw 1/8NPT threaded stainless steel or plastic joints on the pump head. Please pay attention that the internal and external thread is in good shape and there's no residue left.




Good **Defective**

4)Wrap two layers Teflon tape clockwise on the threads. Make sure there will

be no tape entering the inner part of the pump.

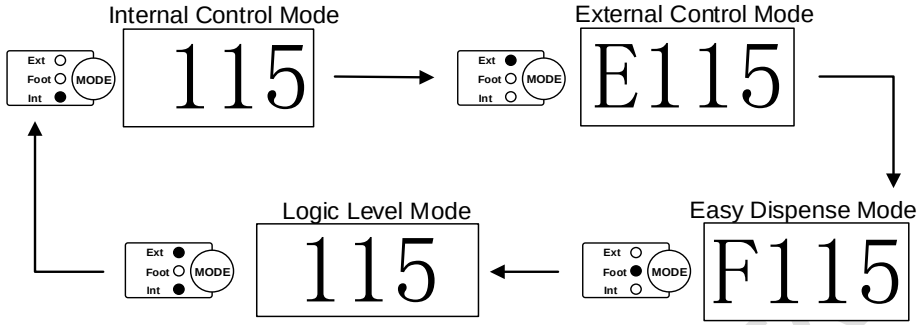


6.2.4 Connect power supply

The voltage of the power supply should be marked on the sticker of the pump. Please make sure to use the right power source for the pump.

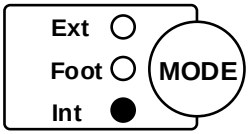
6.3 Mode Change

Turn on the power switch. The display will be on. Press MODE key to change the working mode.

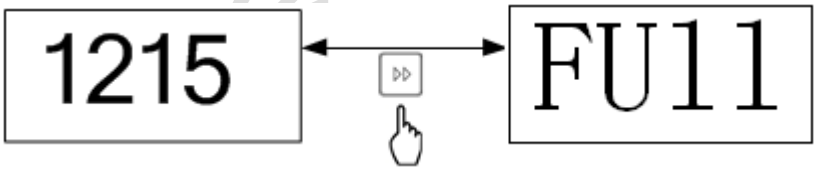


6.4 Internal Control Mode

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



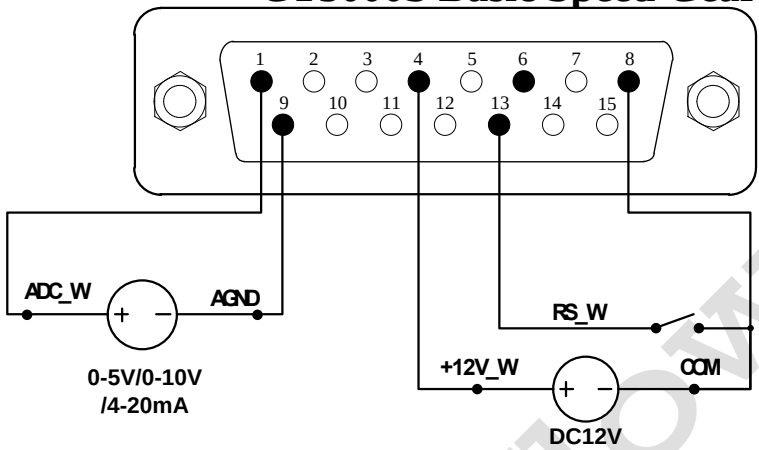
1) Turn on the power switch. The display will be on.
2) Press MODE key to change the mode to Internal Control Mode.
3) Press UP or DOWN key to set the speed.
4) Press DIRECTION key to change the rotating direction.
5) Press START/STOP key to start or stop the drive.
6) Press PRIME key to run the drive at full speed



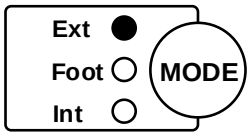
6.5 External Control Mode

In this control mode, the external analog input controls the speed, external voltage signal controls Start/Stop. The front panel buttons are disabled.

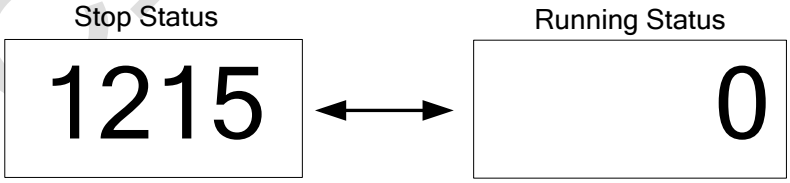
1) When power is off, connect the external signal as shown below, and connected DB15 connector to the DB15 port at the back of pump.



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



1) Press MODE key to change the mode to External Control Mode.
2) 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 to stop the drive.
3) Open CW_W switch, then the drive will run in clockwise direction; close the CW_W switch, then the drive will run in counterclockwise direction.



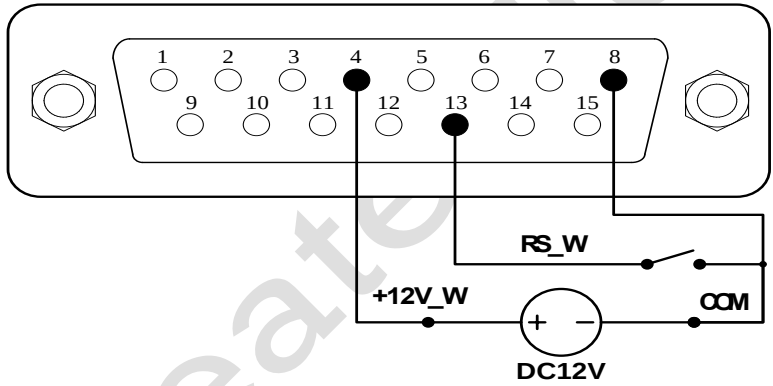
Note: The external DC power source DC24V to control the start/stop and direction. 1/4W 1.5K resistor is needed to protect internal circuit.

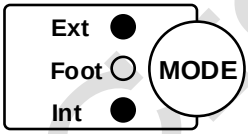
6.6 Easy Dispense Mode

6.7 Logic Level Control Mode

Use external logic level signal to control start and stop. The keys on the front panel can control direction and speed.

Switch the power off. Wire the DB15 connector as shown on and connect it to the DB15 port on the rear of the pump.





1) Turn on the power switch. The display will be on.
2) Press MODE key to change the mode to Logic Level Control Mode.
3) Press UP or DOWN key to set the speed.

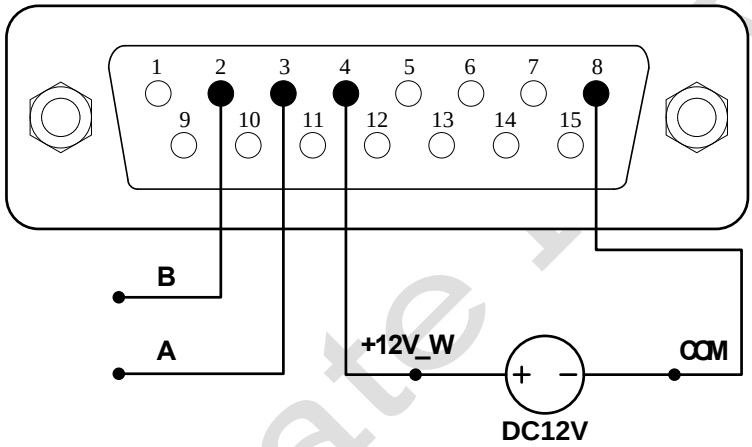
6.8 Communication Mode

The RS485 interface supports standard MODBUS protocol. Pump can be controlled by external device via the communication port. Please refer to the Communication Instruction Manual for the parameters and supported

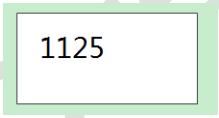
commands.

1) When the power is off, wire the DB15 connector as shown on ***Chyba! Nenalezen zdroj odkazů.***, and connect it to the DB15 port on the rear of the pump. External DC power source is recommend to avoid electrical interference.

2)



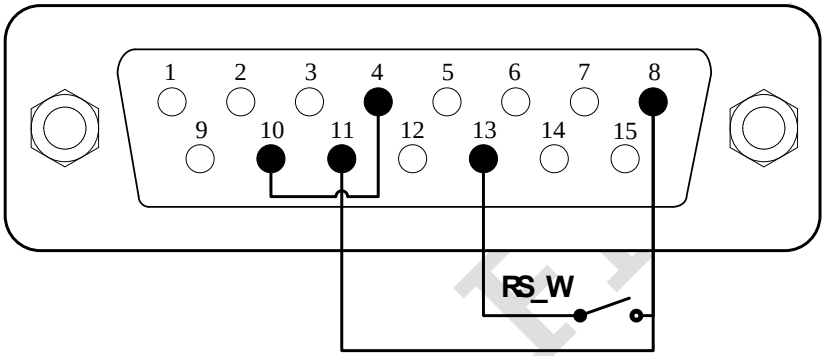
3) Turn on the power switch. The LED display will be on.



4) Press MODE key to change the mode to Internal Control Mode or Footswitch Control Mode.
5) Control pump with communication interface.
6) Press the START/STOP key to stop the drive anytime.

6.9 Footswitch Control

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



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

- On Internal Control Mode, when the switch RS_W is closed then open, the drive will start; when the switch RS_W is closed then open again, the drive will stop.
- On Time Dispense Mode, when the switch RS_W is closed then open, pump will dispense one dose then stop.
- On Logic Level Control Mode, close the switch RS_W to start the drive; open the switch to stop the drive.

7.Maintenance

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.

Regular Maintenance

1) Always check the tubing and connections to make sure there's no leakage.
2) If a filter is used, check and replace it regularly.
3) When tubing is not installed, cover the inlet and outlet of the pump head by a sealing plug.

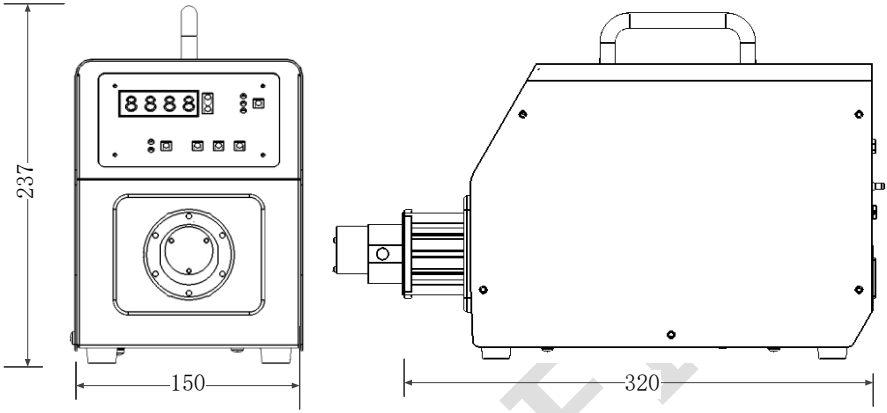
Malfunction Solutions

NO.	Malfunction	Description	Solution
1	Hardware	No display	1. Check the power cord 2. Check the fuse is. If it was blown, replace it with a 3A slow–blow fuse 3. Check the internal power cord connection inside the pump. 4. Check the wire connection between the LCD panel and the main control board.
2	Hardware	Motor does not work	1. Check the indicator of the driver board. 2. Check the wire connection between the motor and the driver board. 3. Check the wire connection between the driver and the main board. 4. Check the voltage shown on the sticker attached on the pump.
3	Hardware	Motor is trembling	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	1. Check the wire connection between keypad and the main board. 2. Check the key if it's broken.
5	Hardware	External control does not work	1. Check the wiring of the connector. 2. Check if the external control power voltage is provided. 3. Check the connections of the external control board.
6	Hardware	RS485 does not work	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.
7	Software	External control does not work	Check the settings for the external control mode.
8	Software	Dispensing volume is not correct	Run calibration
9	Software	RS485 does not work right	1. Check if the display shows the communication is ready. 2. Reset the address of the pump. 3. Check whether on the bus there are two pumps using the same address

If the problem can't be solved, please contact the manufacturer.

8.Dimensions



9.Specifications

Suitable Pump Heads	MS204,MS209,MS213
Main function	Keypad to control start/stop, full speed, memory (power–off memory); Footswitch/external voltage signal to control start/ stop, with physical isolation. Optional external control signal 5V, 12V or 24V. Optional external analog control signal 0–5V, 0–10V or 4–20 mA to control speed; Fluid transfer, time dispensing
Communication	RS485, standard MODBUS protocol
Display	LED
Direction	CW/CCW

11.Main Features

Flow rate range	90–2700 mL/min
Rotating Speed range	50–3000 rpm
Speed resolution	1 rpm/min
Display	LED
Power supply	AC 88~264V 50Hz/60Hz
Power consumption	< 150W
Working environment	Working temperature: 5~40 °C Relative humidity <80%
Dimensions	320x237x150mm
Weight	5.5kg
IP rating	IP31

12.Suitable Pump Heads

Pump head model	Gear material	Outlet pressure (MPa)	Flow rate (mL/min)	Fluid temperature (°C)
MS204XD0PT00000	PEEK	1.4	90-900	–45~120
MS209XD0TT00000	PEEK	0.9	180-1800	–45~120
MS213XD0PT00000	PEEK	0.8	270-2700	–45~120
MS204XD0TT00000	PTFE	1.4	90-900	–45~50
MS209XD0PT00000	PTFE	0.9	180-1800	–45~50
MS213XD0TT00000	PTFE	0.8	270-2700	–45~50