

Manual of M6 Series Peristaltic Pump



This manual shall be made available to all users of this peristaltic pump. To ensure the best results and maximum durability of this U.S. SOLID LLC (here after U.S. SOLID or The Company) product, read and follow all instructions carefully. Failure to do so may lead to serious bodily injury and catastrophic damage to the pump, supplies, or surrounding area. All safety suggestions must be followed closely and precautions must be taken to guarantee this pump is only used by qualified personnel who have understood this guide.

Contents

I. Pump Safety Instructions	3
II. Pump Appearance	3
III. Pump Control Panel	4
IV. Pump External Control Interface Guide	6
V. Pump Parameters	8
VI. Pump Dimension Drawings	9
VII. Pump Maintenance	10
VIII. Pump Troubleshooting	11
IX. Pump Head Safety Instructions	12
X. Pump Head Parameters	12
XI. Pump Dimension Drawings	13
XII. Pump Head Installation Instructions	15
XIII. DZ25 Pump Heads	15
XIV. YZ35 Pump Heads	19
XV. Pump Head Flow Rate Reference Table	25
XVI. Pump Head Maintenance	26
XVII. Pump Head Troubleshooting	27

I. Pump Safety Instructions

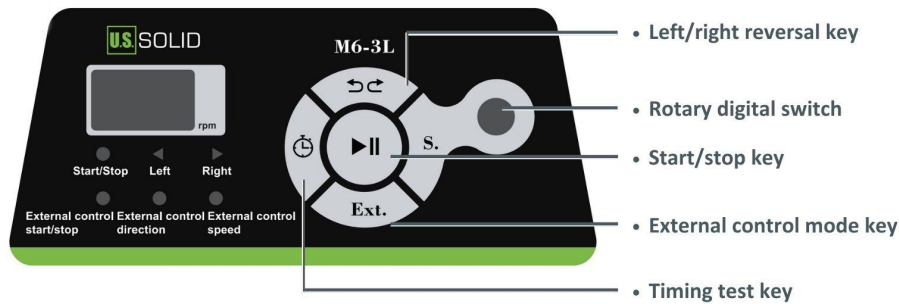
- Please read the manual carefully before operating the product.
- Connect the power cord to the wall socket directly, and avoid using the extended electric wire.
- If the power cord or plug had wear and other damage, please disconnect the plug (Hold the plug instead of the wire).
- If fluid splashes on the pump or if you think the pump need to maintain or repair, please turn off the power supply and disconnect the plug (Hold the plug instead of the wire).
- The user’s power socket must have ground wire, and have reliable grounding.
- **Note:** The foot pedal switch and other external control plugs must be connected or disconnected in the power-off status to prevent the external control interface from being burned.

II. Pump Appearance



A	Drive	C	External control interface
B	Pump head	D	Built-in fuse
		E	Power socket
		F	Power switch

III. Pump Control Panel



- Left/right reversal key

Control the drive working direction, press the button once, the drive work status changes once. When the drive runs left, the left indicator light is on. When the drive runs right, the right indicator light is on.

- Rotary digital switch

Turn it left or right is to adjust the motor speed when displays the speed.

At the stop status, press down the knob then release it, enter RS485 address setting interface, then a number occurs and flashes, now rotate the knob to change address, press the knob again to confirm and escape from this setting.

In internal control mode, keep pressing this knob, the pump runs with full speed, LED display “FULL”. Release the knob, it displays the pump return to normal speed.

- Start /stop key

Control the drive start and stop, press this button once the drive work status changes once. When the drive runs, the start/stop indicator light is on. When the drive stops, the start/stop indicator light is off.

- External control mode key

The external control mode button is enable only when the pump stops working. It used for changing between different external control modes that is 7 different modes in total. In internal control mode, the external control mode indicators all light off.

(1) Only external control start/stop mode: the external control start/stop indicator light is on, external control direction and speed indicator lights are off.

- (2) Only external control direction mode: the external control direction indicator light is on, external control start/stop and speed indicator lights are off.
- (3) Only external control speed mode: the external control speed indicator light is on, external control start/stop and direction indicator lights are off.
- (4) External control start/stop and direction mode: the external control start/stop and direction indicator lights are on, external control speed indicator light is off.
- (5) External control start/stop and speed mode: the external control start/stop and speed indicator lights are on, external control direction indicator light is off.
- (6) External control direction and speed mode: the external control direction and speed indicator lights are on, external control start/stop indicator light is off.
- (7) External control start/stop, direction and speed mode: the external control start/stop, direction and speed indicators all lights are on.

Note: When external control indicator light is on, the relative internal control buttons can not be used.

- Timing test button

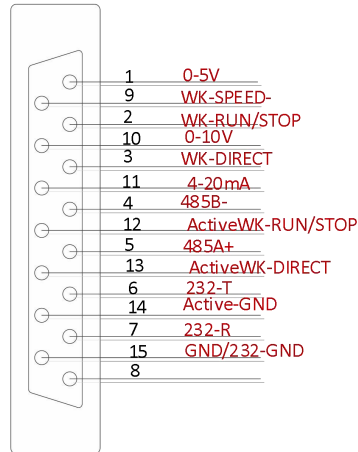
At the internal control mode and the drive stops working status, press Timing test button, the drive will run 60s (the default time is 60s) with current speed and stop automatically. It is used to flow rate calibration and test (If press the start/stop button during test process, the pump will stop running, and test again, the drive will re-time).

At the internal control mode and the drive stops working status, you can set the timing time, press the timing button more than 5s, the number will occur and flash. Rotate the digital knob to right or left, to increase or decrease the timing time (keep pressing the digital knob to increase or decrease rapidly). The set range is 0.5s-999s. After setting, press the timing button again back to speed display interface.

At external control speed mode, press timing button to switch external control analog signal 0-5V, 0-10V, 4-20mA (Distinguish the analog signal according to the different flashing frequency of the external control speed control indicator light: 0-5V always on, 0-10V flashes one time per 1s, 4-20mA flashes one time per 0.3 s).

IV. Pump External Control Interface Guide

The 15 pin connector on the back of pump control the pump through external signals, the wiring definition as below:

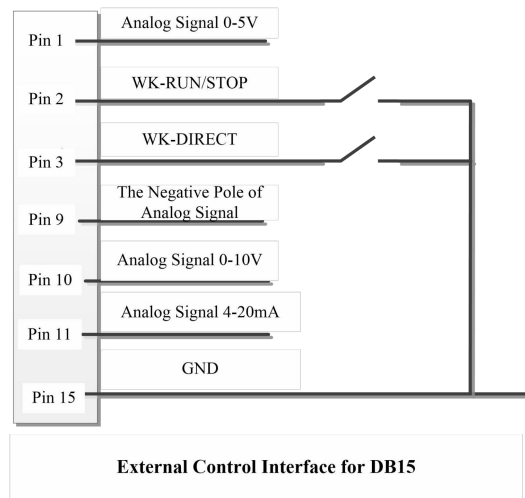


- (1) **Pin 1, 0-5V:** Externally connecting signal positive pole of controlling the motor speed, 0-5V connecting wiring port.
- (2) **Pin 2, WK-RUN/STOP:** External control start/stop input port (Passive signal: Motor runs in normal off status, motor stops in normal on status. Hand-held dispenser, foot pedal interface equipped by our company).
- (3) **Pin 3, WK-DIRECT:** External control motor running direction signal input port (Passive signal: Motor runs in right in normal off status, motor runs in left in normal on status).
- (4) **Pin 9, WK-SPEED-:** Externally connecting signal negative pole of controlling motor speed.
- (5) **Pin 10, 0-10V:** Externally connecting signal positive pole of controlling motor speed, 0-10V connecting wiring port.
- (6) **Pin 11, 4-20mA:** Externally connecting signal positive pole of controlling motor speed, 4-20mA connecting wiring port.
- (7) **Pin 15, GND:** Ground wire.

Note:

- 1) External control start/stop, direction signal all are passive signal.
- 2) The external control plugs must be connected or disconnected in the power-off status to prevent the external control interface from being burned.

DB15 external control port regular wire sequence as below:



RS232 Communication Pin Definition

- (1) **Pin 6, 232-T:** The host computer sends data port, connects to DB-9 connector Pin 3.
- (2) **Pin 7, 232-R:** The host computer receives data port, connects to DB-9 connector Pin 2.
- (3) **Pin 15, GND:** Ground wire, connects to DB-9 connector Pin 5.

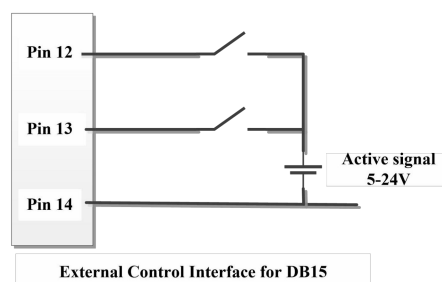
RS485 Communication Pin Definition

- (1) **Pin 4, 485-B-:** 485 communication signal port, connects with 485 converter B-.
- (2) **Pin 5, 485-A+:** 485 communication signal port, connect with 485 converter A+.

Isolated External Control Pin Definition

- (1) **Pin 12 ActiveWK-RUN/STOP:** Isolated external control start/stop signal input port (Active signal: 5-24V).
- (2) **Pin 13, ActiveWK-DIRECT:** Isolated external control direction signal input port (Active signal: 5-24V).
- (3) **Pin 14, Active-GND:** Isolated external control signal input ground wire.

Isolated External Control Wiring Diagram



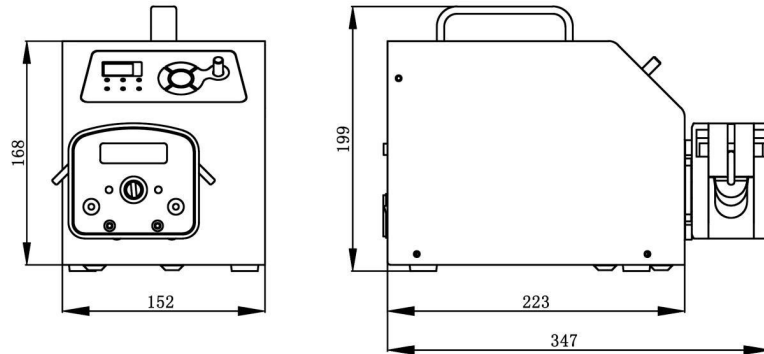
V. Pump Parameters

Model	USS-PP00024	USS-PP00093	USS-PP00025	USS-PP00026
Number of channel	1	2	1	1
Flow rate range	0.211-3600 ml/min		0.3-6000 ml/min	0.69-12000 ml/min
Flow rate accuracy	<±0.5%			
Display	3-bit LED			
Control	Mechanical key pad			
External control	Switch signal			
Speed range	0.1-600rpm			
Speed control	Digital knob			
Speed resolution	0.1rpm (0-100rpm), 1rpm (100-600rpm)			
Communication	RS232, RS485			
Timing test range	0.5s-999s			
Power supply	AC 110V±10% 50Hz/60Hz			
Temperature	0-40°C			
External speed control signal	0-5V ,0-10V, 4-20mA (optional)			
IP rate	IP31			
Relative humidity	< 80%			
Power consumption	< 80W		< 180W	< 300W

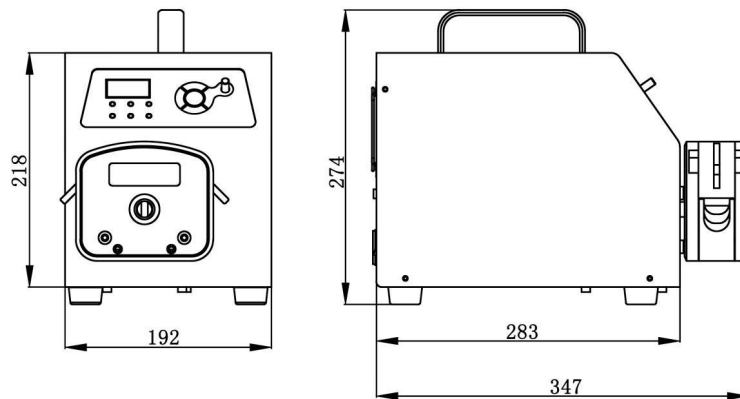
VI. Pump Dimension Drawings

Unit: mm

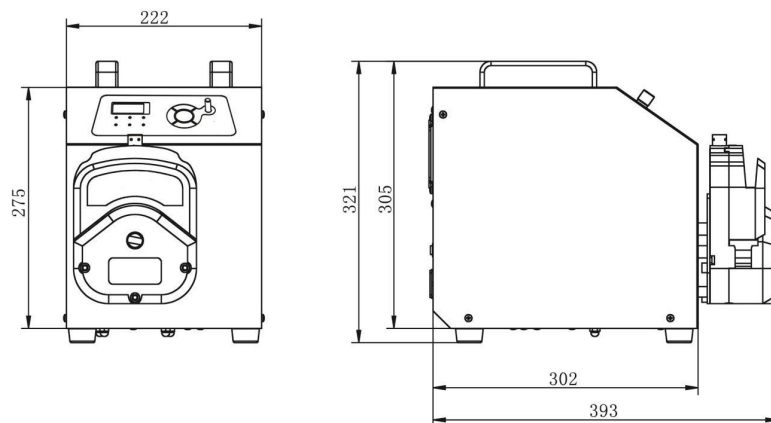
M6-3L + DZ25-3L



M6-6L + DZ25-6L



M6-12L + YZ35



For each additional pump head, the longitudinal dimension will be increased by 60mm.

VII. Pump Maintenance

- Check the running status of machine before starting it, normal operation can be put into use.
- Check for leakage, and correct fault which can be appeared.
- Clean liquid overflowed from the pump in time.
- Please turn off the power supply and unplug the power socket (Hold the socket instead of power cord) when liquid splashed on pump. Check whether liquid flows into the machine, if it does, please contact the manufacture.
- The foot pedal switch and other external control plugs must be connected or disconnected in the power-off status to prevent the external control interface from being burned.
- The user's power socket must have ground wire, and have reliable grounding.
- This product has no waterproof measures. Please take protective measures when using in water environment.
- This product does not have special certification such as medical certification. When it needs to be used in special fields such as medical and military, please self-certify.
- If the pump does not use for a long time, please clean it and keep it in dry and ventilated environment.
- This product comes with a one-year warranty (excluding the hose). During the warranty period, the company is not responsible for warranty in cases of direct or indirect losses caused by improper operation or maintenance by the user. For repairs beyond the warranty period, only the repair costs will be charged.

VIII. Pump Troubleshooting

Problem:

- Screen does not light up when the switch is turned on.

Solutions:

- Check if the power cable is properly and securely connected.
- Confirm that there is power supply.
- Check if the fuse is damaged.

Problem:

- Pump head does not rotate when the start button is pressed.

Solutions:

- Check if the pump head screws are tightened.
- Check for any foreign objects blocking the pump head rollers.
- Check if the roller bearings are severely corroded and unable to rotate (check after power off).
- Confirm if the machine is in external control mode (refer to External Control Interface Instruction)

Problem:

- No fluid transfer during operation.

Solutions:

- Check if the hose installed is compatible with the pump head.
- Confirm if there is enough fluid at the inlet (fluid level above the pipe inlet).
- Check if there is any damage or leakage in the pipe and replace or seal it.
- Check if any solid material is blocking the pipe.

Problem:

- Actual fluid output does not match the preset value.

Solutions:

- Check if the hose settings for the pump head match the actual installation and usage.
- If using external control, confirm if the external control signal is complete or has attenuation..

IX. Pump Head Safety Instructions

- Tubing may crack from wear, causing fluid overflow and potential damage to the body and instruments. Regular checks and timely tubing replacements are essential.
- When changing tubing or its position, make sure to stop the pump head from rotating to prevent accidents with fingers or clothes.
- Solid substances in the liquid can damage the tubing.
- Before opening the upper block of the pump head, follow these steps: Disconnect the pump from the power supply, release any pressure in the tubing, drain any liquid in the tubing to a safe location, and wear protective clothing and eye gear if handling hazardous liquids.

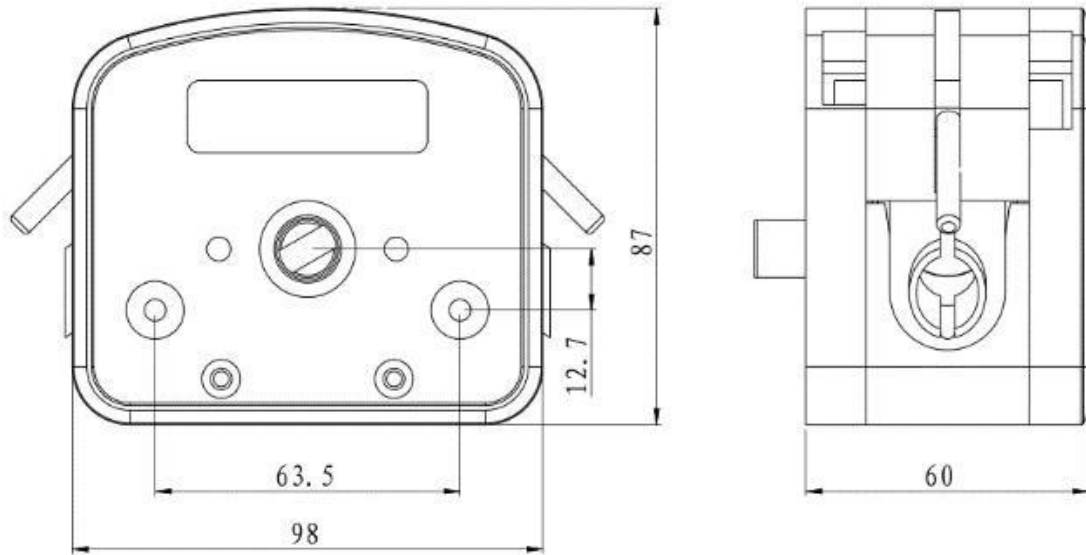
X. Pump Head Parameters

Pump Head	Tubing Size	ID*Wall Thickness (mm)	RPM	0.1-600rpm Flow range (ml/min)	Weight (kg)	
					PPS	Aluminum alloy
DZ25-3L	15#	4.8*2.4	2.11	0.211-1264	0.5	1.16
	24#	6.4*2.4	3.85	0.385-2310		
	35#	7.9*2.4	5.08	0.508-3050		
	36#	9.6*2.4	6	0.6-3600		
DZ25-6L	15#	4.8*2.4	3	0.3-1800	0.85	1.87
	24#	6.4*2.4	5.5	0.55-3300		
	35#	7.9*2.4	8	0.8-4800		
	36#	9.6*2.4	10	1-6000		
YZ35	26#	6.4*3.3	6.9	0.69-4200	1.5	4.36
	73#	9.6*3.3	12.3	1.23-74..		
	82#	12.7*3.3	20	2-12000		

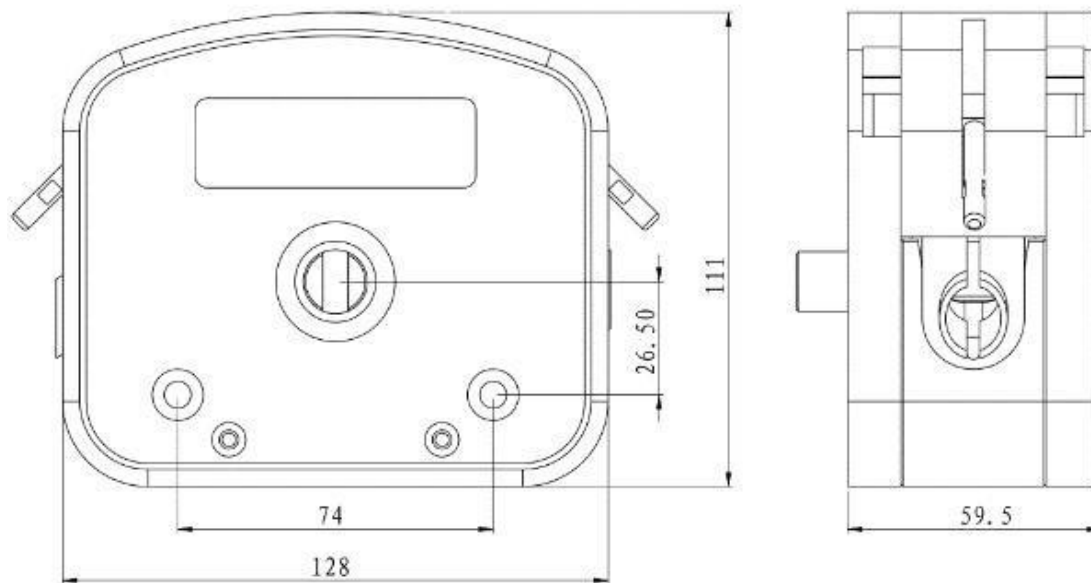
XI. Pump Dimension Drawings

Unit: mm

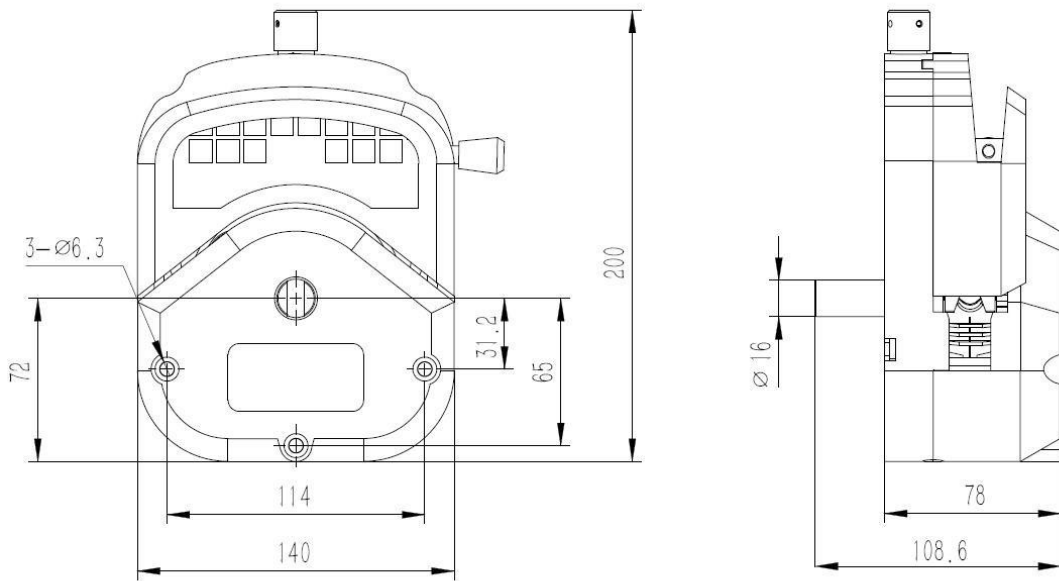
DZ25-3L Pump Head



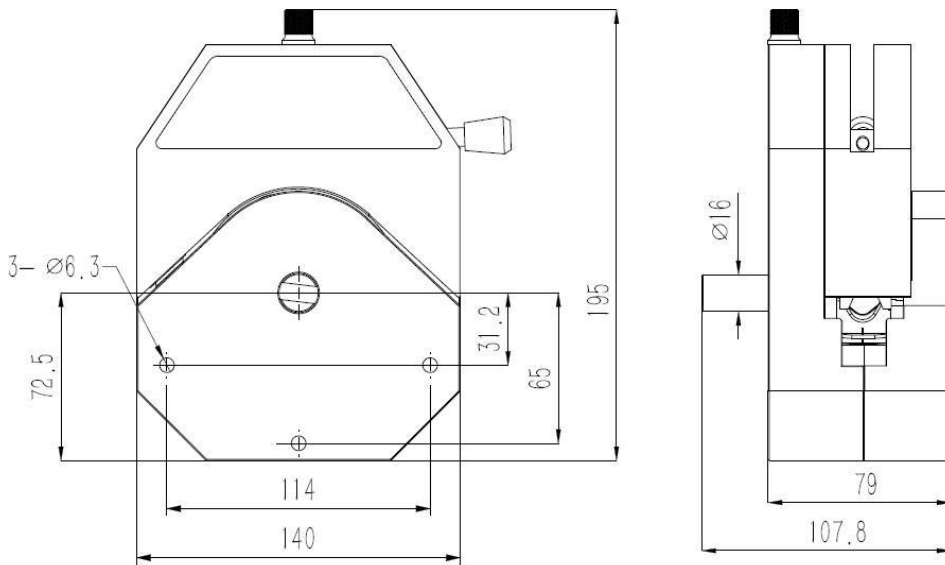
DZ25-6L Pump Head



YZ35 Pump Head (PPS)



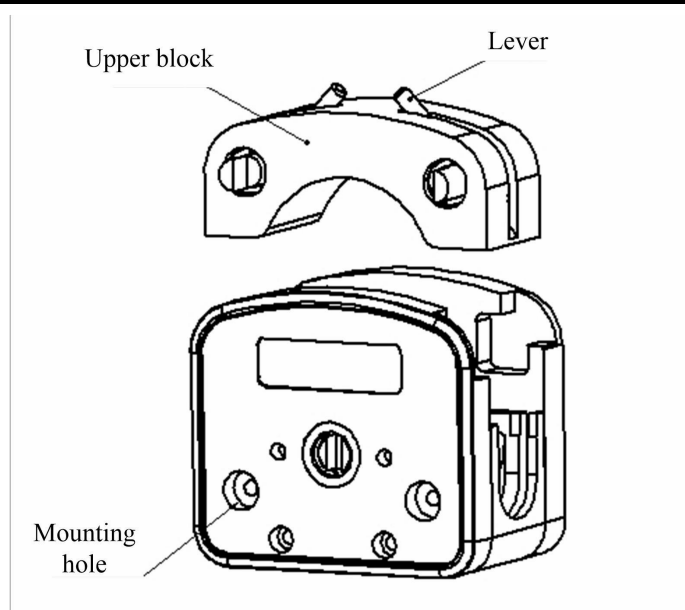
YZ35 Pump Head (Aluminum Alloy)



XII. Pump Head Installation Instructions

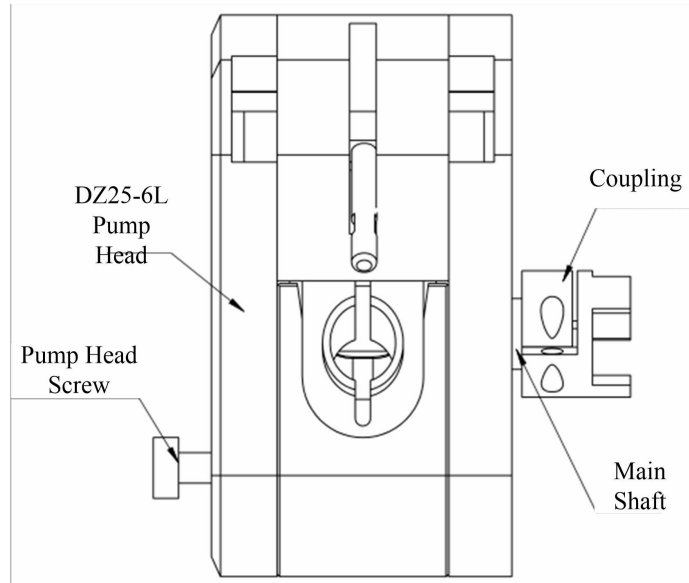
- Try to install the pump head at or just below the liquid level end of the liquid to be transferred to ensure the most efficient liquid transfer.
- Do not install the pump in a confined location without adequate air circulation around the pump.
- Be sure to keep all moving parts of the pump head clean and free of contamination and debris.
- The tubing diameter used on the suction and delivery ends of the pump must be equal to or larger than the tubing diameter in the pump head. Especially when transporting viscous liquids, the tubing diameter used at the suction end is preferably several times larger than the tubing diameter in the pump head.
- When transferring viscous liquids, be sure to run at low speed.

XIII. DZ25 Pump Heads



1. Single Pump Head Installation

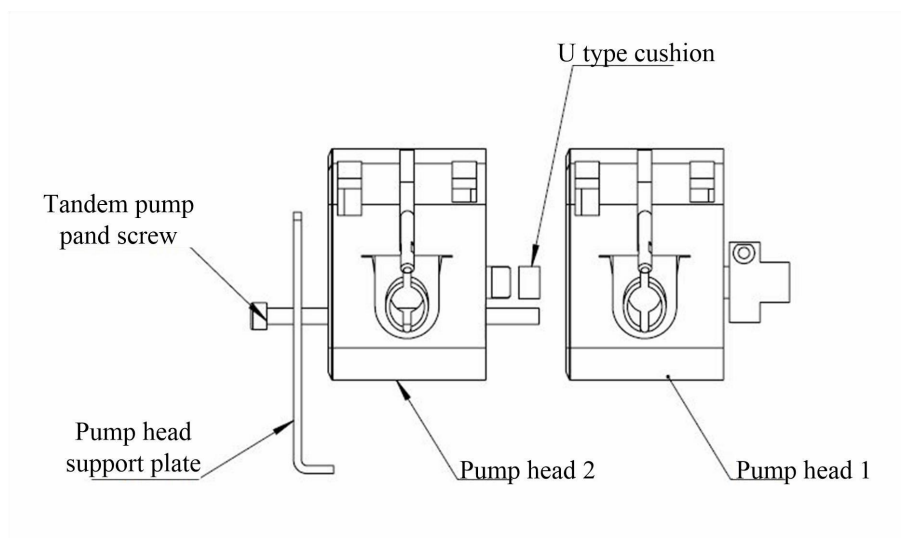
Firstly, install the coupling on main shaft of the DZ25 pump head, fasten the coupling screws, as shown in the figure, and then connect the pump head to the driven motor shaft through the coupling, then fasten the pump head to the drive with the pump head screw.



2. Multiple Pump Head Installation

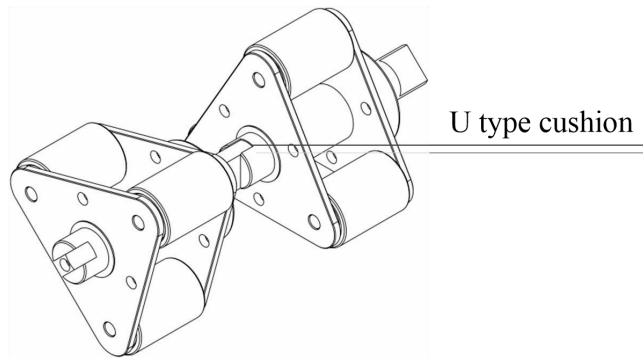
A plurality of DZ25 pump heads are used with extended screws in tandem, with 2 pump heads as an example. First, install the coupling on the main shaft of the tandem pump head 1, tighten the screws, and then install the U type cushion on the shaft head of the pump head 2, next insert the shaft end of pump head 2 into the shaft groove of pump head 1. Connect the serial connected pump head to the drive with extended screws as shown below.

Note: Double pump heads and above are connected in series, it is recommended to install the pump head support plate to improve the stability of the pump head operation.



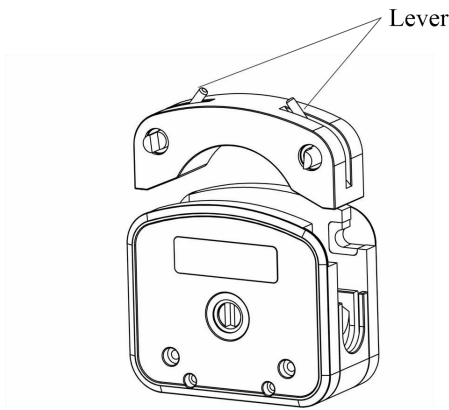
3. Precautions for Installation of Multiple Pump Heads in Series

When install the pump, the entire pump head is disassembled into two separate pump heads as shown in the picture above. The two pump head roller assemblies should be staggered and installed in sequence. The wheel status is as shown in the figure below. Adjacent 2 between the pump head connection to be installed on the U type cushion as shown in the figure. Failure to do so will result in abnormal operation of the pump head.

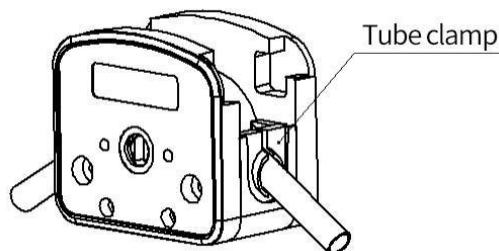


4. Tubing Installation

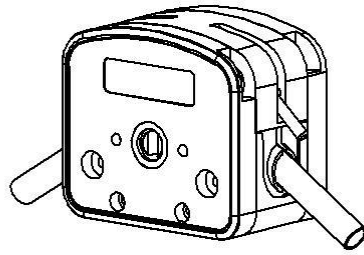
(1) Lift both side levers, take off the upper block, see below.



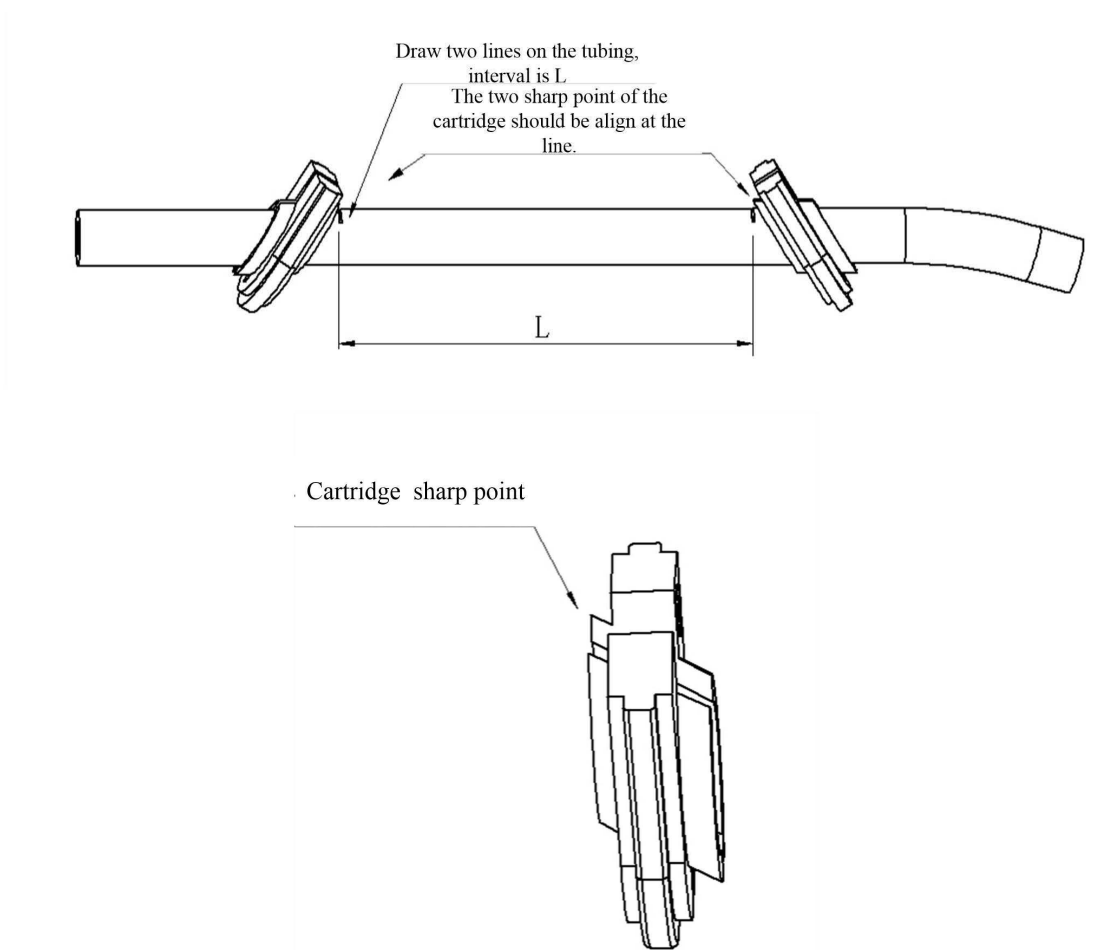
(2) Press the connector with tubing or tubing clamp into the grooves at both ends of the pump housing, see below.



(3) Install the upper clock, put down the levers to lock the block, see below.



5. Tubing Structure Instruction



Draw two lines on the tubing, interval is L (as shown above).

The two sharp point of the cartridge should be align at the line (**note:** when put the cartridge into the bottom of the groove, they should also be align at the line).

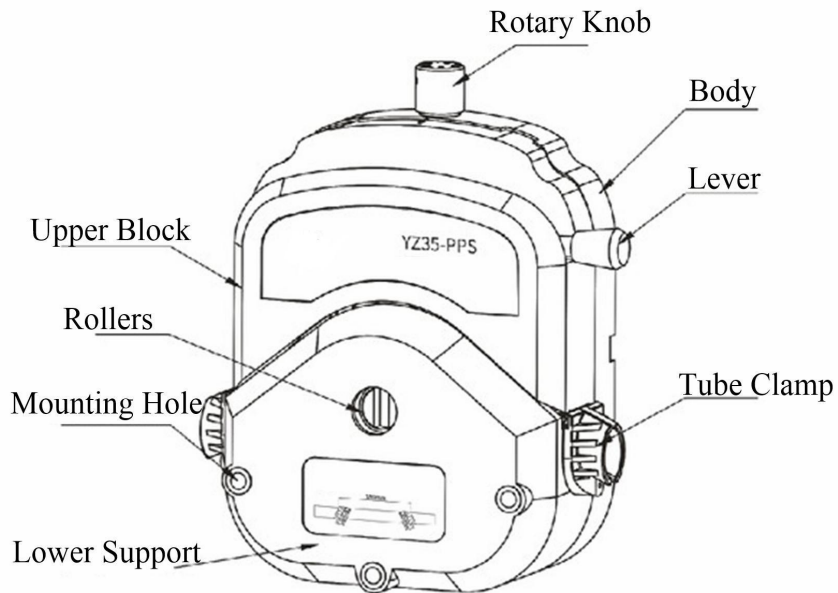
The interval distance of the two lines is L:

DZ25-3L: 90mm

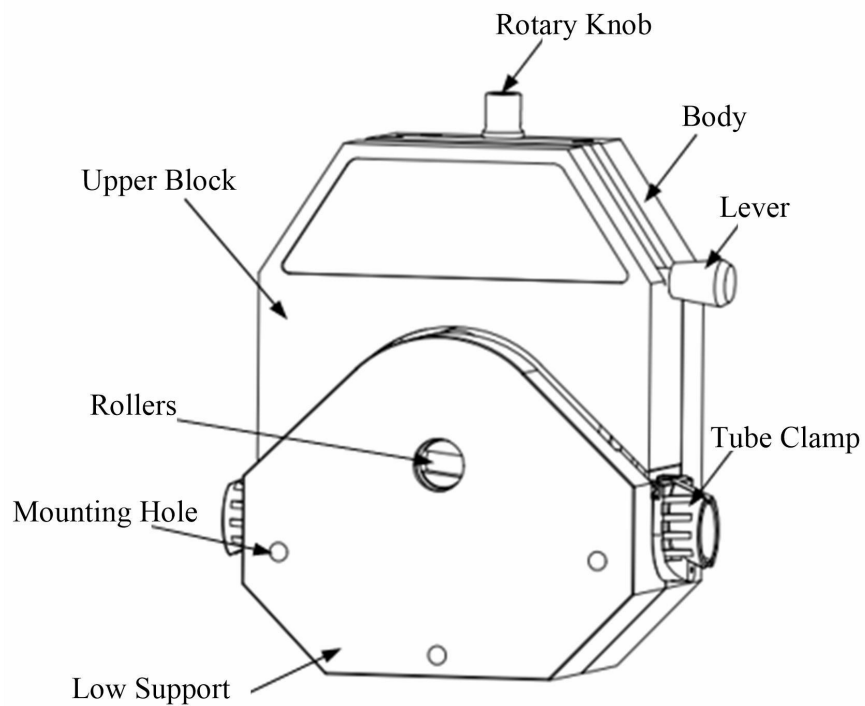
DZ25-6L: 125mm

XIV. YZ35 Pump Heads

YZ35(PPS)

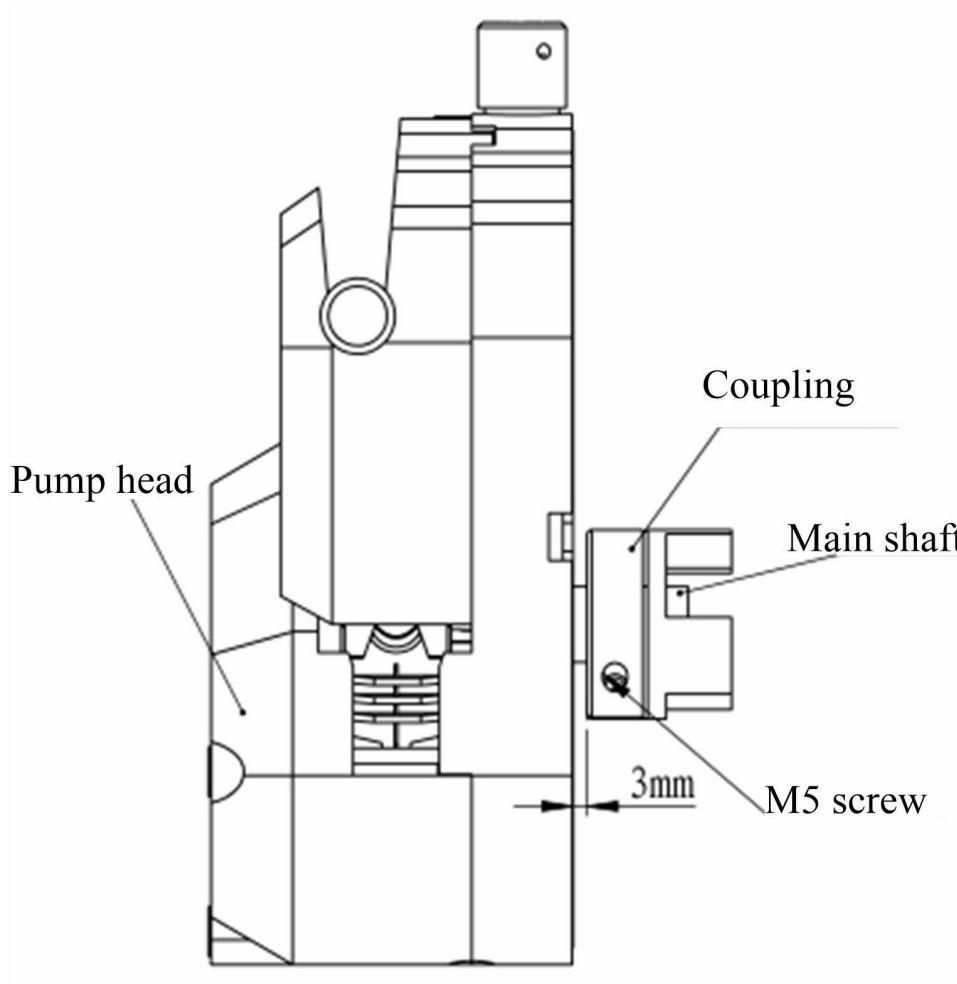


YZ35 (Aluminum Alloy)



1. Single Pump Head Installation

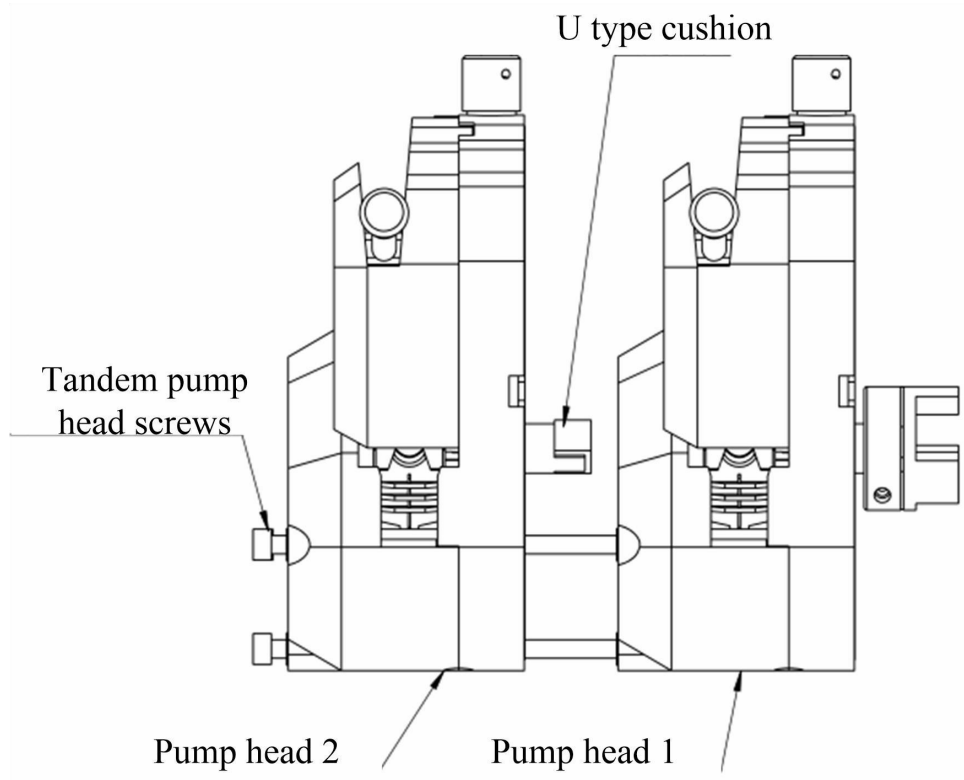
First the install the coupling on main shaft of the pump head, tighten the M5 screws after positioning according to the size shown in the figure, as shown, and then connect the pump head to the drive through the coupling.



Note: Users need to fasten the screws with similar force, and can't be too tight, to avoid the lower support deform and make working noise.

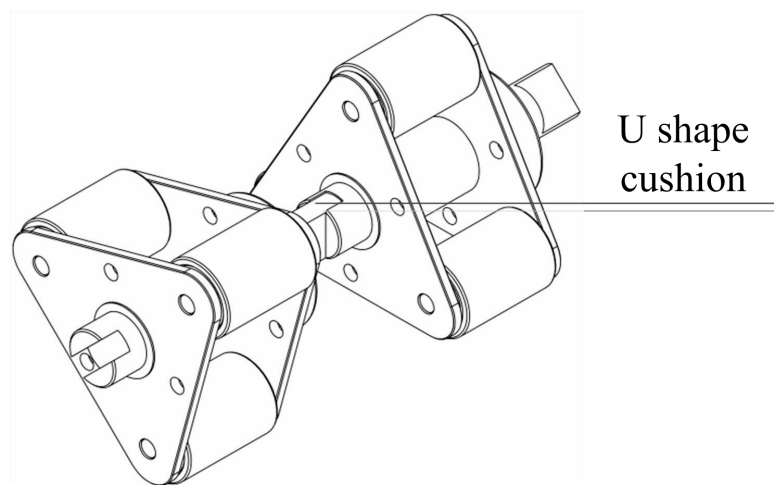
2. Multiple Pump Head Installation

A plurality of YZ35 pump heads are used with extended screws in tandem, with 2 pump heads as an example. First, the coupling is mounted on the main shaft of the tandem pump head 1, tighten the M5 screws, and then install the U type cushion on the shaft head of the pump head 2, then insert the shaft head of pump head 2 into the shaft groove of pump head 2. Connect the serial connected pump head to the drive with extended screws as shown below.



Note: When install the pump, the entire pump head is disassembled into two separate pump heads as shown in the picture above. The two pump head rollers assemblies should be staggered and installed in sequence. The wheel status is as shown in the figure below.

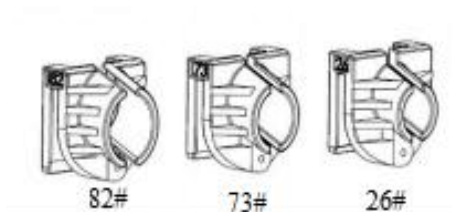
The main shaft connection between two adjacent pump heads needs to install a U shape cushion as shown in the figure. Failure to do so will result in abnormal operation of the pump head.



3. Tube Clamp

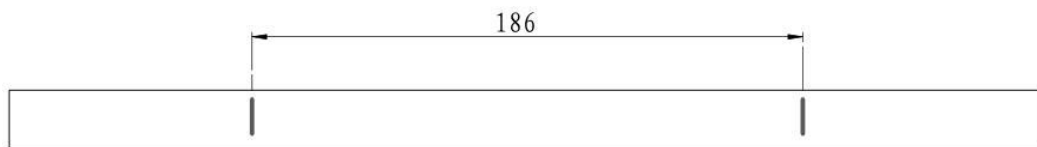
Function of the tube clamp: It can better fix the tube and reduce tube shaking, besides improve the transmission stability and transmission accuracy. Effectively reduce tube wear and extend tube life.

Tube Clamp Type: 26#, 73#, 82#, as below:

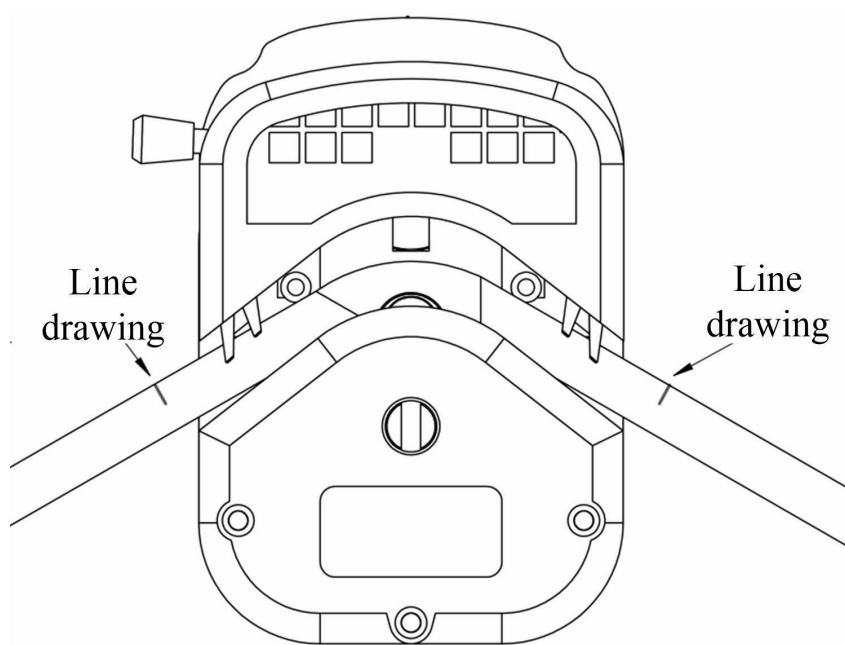


4. Tube Installation

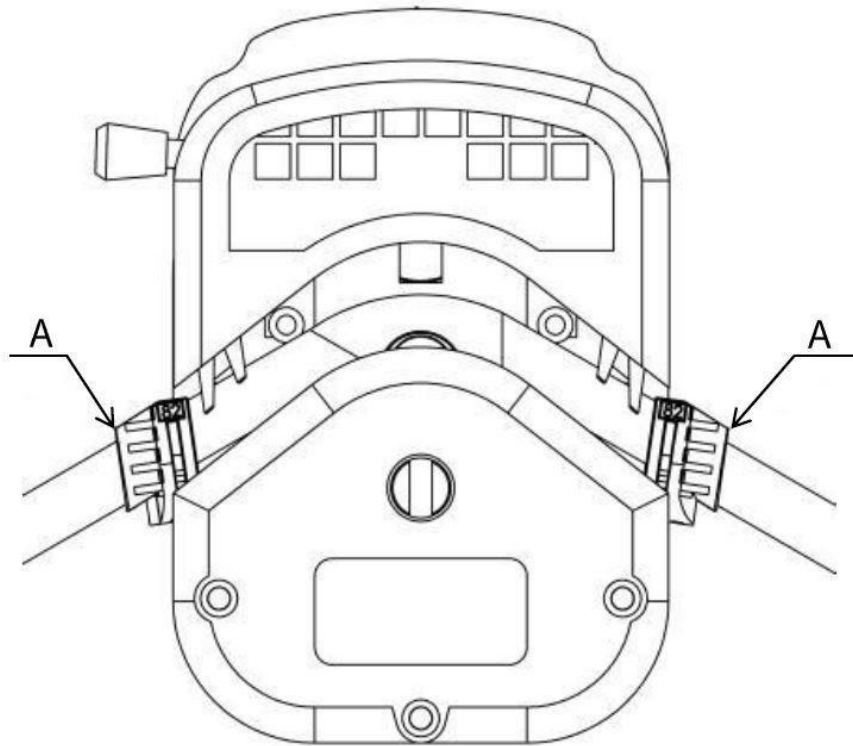
- (1) Pull the lever anti-clockwise 180°, open the upper block.
- (2) Draw two lines with a distance of 186mm on the tube.



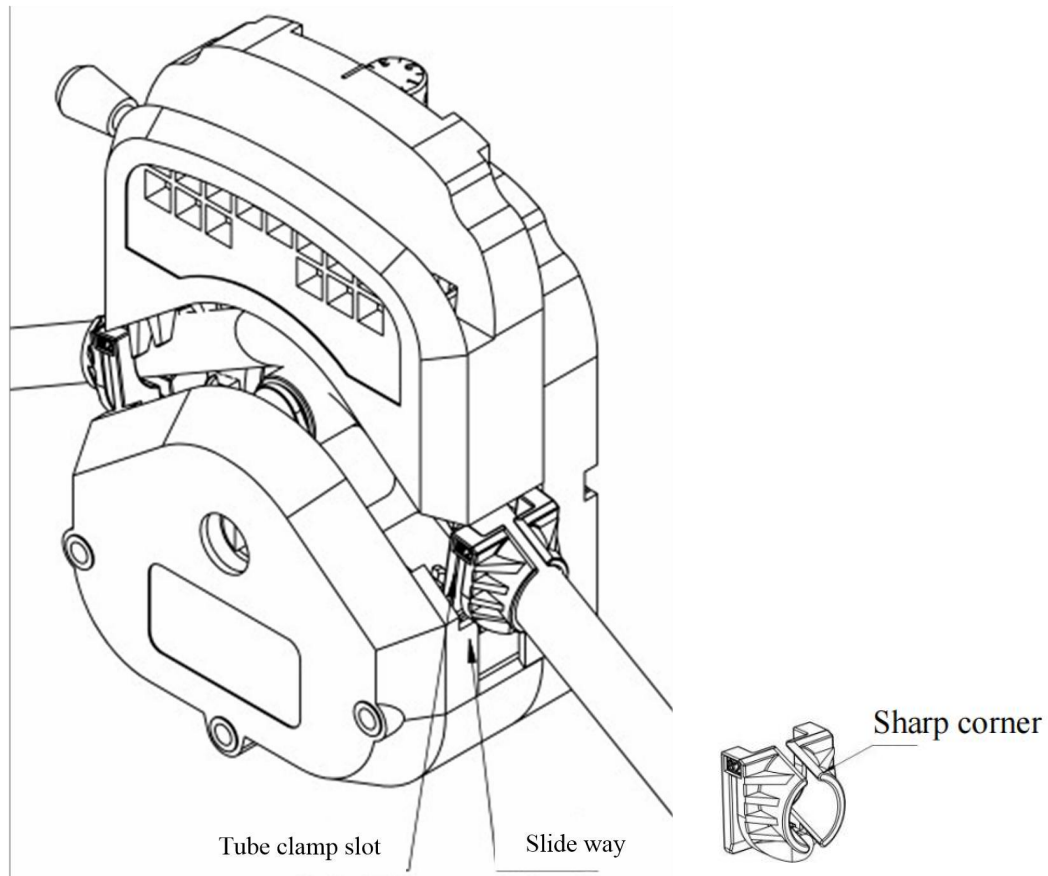
- (3) Put the tube between rollers and upper block, the line faces up.



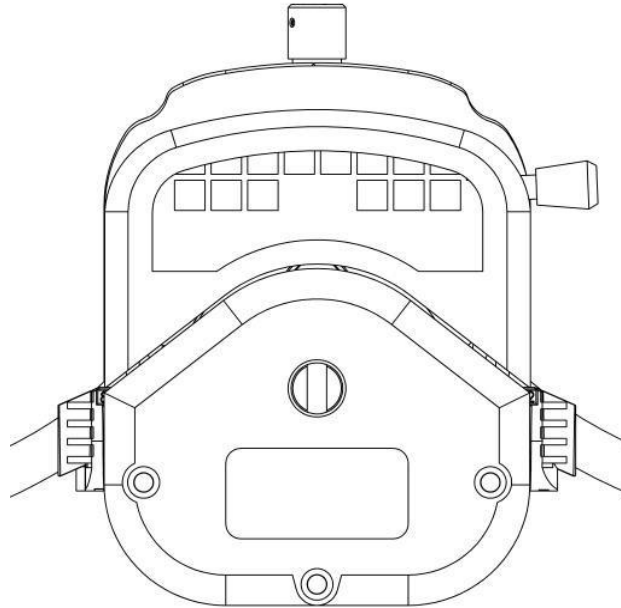
- (4) Sleeve the tube into the tube clamp, the sharp point of the tube clamp should be align at the line. Pay attention to ensure that the split surfaces of the two tube clamps are parallel and parallel to the installation surface of the pump head.



- (5) Clip slot of two tube clamps into the sideway of the pump head, press hard until it can't be pressed. At this time, the tube clamp is not installed in place.



- (6) Pull the lever clockwise and slowly press down until the upper block is pressed down. At this time, the tube clamp is also installed in place.

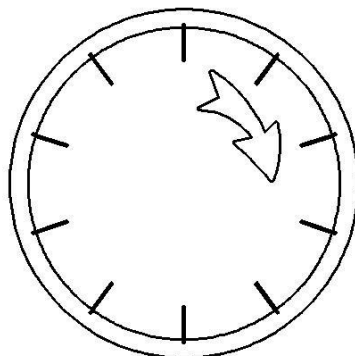


5. Pressure Adjustment

YZ35 series pump head can adjust pressure of the tube outlet by the rotary knob on pump head body, because the YZ35 (PPS) pump head and the YZ35 (aluminum alloy) pump head have different pressure adjustment structures, the pressure adjustment methods are different.

➤ YZ35 (PPS) Pump Head

Rotate in the direction of the arrow, the pressure increases, otherwise the pressure decreases.

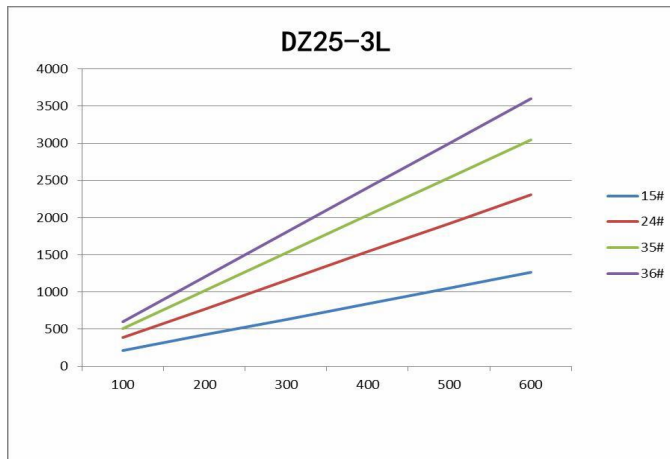


➤ YZ35 (Aluminum Alloy) Pump Head

When adjusting the pressure, loosen the inner hexagonal fastening screw in the middle of the knob, and tighten the screw after the adjustment is completed.

XV. Pump Head Flow Rate Reference Table

Note: The following mentioned flow reference data is measured under the conditions of no pressure and no suction lift at room temperature under standard atmospheric pressure with pure water as the transmission medium, In actual use, it is affected by many factors such as transmission medium, inlet and outlet pressure, tube material and error, working environment, etc. The flow rate may vary, this data is for reference only.



XVI. Pump Head Maintenance

- When pump does not work, please loose the cartridges of pressing the tubing for avoiding changing the shape of tubing because of longtime extrusion.
- Keep the rollers of pump head clean and dry, otherwise it can quicken the tubing wearing, reduce the useful life of tubing and lead the rollers to damage in earlier.
- Before the peristaltic pump start running each time,check the tubing carefully if it is damage.
- If the pump head in water accidentally, use soft cloth and other absorbent soft cloth to wipe dry to prevent damage to the pump head.
- After replacing the tube, fluid or any connecting tube, must be re-calibrated the pump. It is recommended to re-calibrate the pump regularly to maintain accuracy.
- Pump head can not resist organic solvent (Except for special indication) and strong corrosion liquid, please be attention when use it.
- The inner diameter and wall thickness of tubing may have some deviations due to its tolerance and different bathes. That may make influence on product flow accuracy, please leave a margin when choose it.
- It will affect the flow rate, causing decreasing flow when input port and output port change small or there are suction and lift.
- The data tested in a short time in this manual may change for using a long time.
- We shall not bear the direct and indirect losses caused by the malfunction or improper operation of this product.

XVII. Pump Head Troubleshooting

Problem:

- The pump head is running but the flow is small or no flow.

Solutions:

- Check whether the pump is supplied with transmission liquid;
- Detect whether the suction side pipeline of the pump is blocked by suction wall;
- Check if the tube is cracked;
- Check for blockages or kinks in the tube;
- Check whether the wall thickness of the tube used is correct;
- Check whether all valves in the tube are open;
- Check whether the rotation direction of the pump is correct.



Contact

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