

Ailipu J-X Series Plunger Metering Pump

Operating Instructions



ZheJiang AILIPU Technology Co.,Ltd

Head Office: T1-9 Changhe Road, Binjiang District, Hangzhou

Production Base: No.2 Jinyuan Road, Binhai NewCity, Sanmen County, Taizhou, Zhejiang

Website: WWW.AILIPU.COM

Hotline: 400-728-1118

Version No.: ALP-190315-01/A

Table of contents

I、 Outline.....	3
1.1 Product Code.....	4
II、 Pump Structure and Working Principle.....	4
2.1 Working Principle of Driving End.....	5
2.2 Hydraulic End.....	7
2.3 Flow Adjustment.....	8
III、 Installation.....	8
IV、 Operating Guide.....	9
4.1. Preparation Before Operating the Pump.....	9
4.2. Flow Adjustment (See above 2.3 Flow Adjustment).....	9
4.3. Operation.....	10
4.4 Flow Calibration.....	10
4.5. Shut Down the Pump.....	10
V、 Maintenance, Disassembly and Reassembly.....	10
5.1 Maintenance.....	10
5.2 Disassembly and reassembly.....	11
VI、 Fault-finding and Troubleshooting Checklist.....	14
VII、 After Sales Service.....	15

Notes:

If you encounter any problems when using the Ailipu metering pump, please first refer to the operation and maintenance manual for trouble removal.

If the problem can't be resolved, please contact your local Ailipu sales representative or our Technical Services Department.

Trained technicians can diagnose your problems and arrange related solutions.

The solution may include buying replacement parts or returning the product to the factory for repair.

Please read the safety instructions carefully before installing and operating the metering pump:

Safety Instructions

When using a metering pump, basic safety warnings must be observed in case of fire, electric shock or personal injury. Failure to comply with the following requirements may result in death or serious injury.

General Principle for Safety

Wear work clothing including gloves and safety glasses when operating or approaching the metering pump.

Keep potions and pumps away from children and pets.

Check the anti-corrosive property of the materials of the flow end of the pump when measuring the corrosive liquid. In case of compatibility problems, the user shall be responsible for personal injury and pump damage.

The metering pump with determined working scope shall be used in accordance with the requirements of the instruction manual, and shall not be used beyond the scope to avoid personal injury or pump damage.

Don't cut electric wires or ground wires (consult a qualified electrician for proper installation).

Don't return pumps to Ailipu company once they have been used for radioactive chemicals.

Shut down the pump, cut off the power supply, and hang the warning signs during the installation or maintenance, so as to avoid mis-operation that may result in casualties and property damage.

Don't modify the pump or use accessories that are not purchased from Ailipu company. Otherwise, the user shall be responsible for the related personal injury and pump damage caused thereby.

Safe Operation Rules

Cut off the power and relieve the pressure at the hydraulic end before repairing or moving the pump.

When connecting or disconnecting the metering pump, make sure that the valve between the system pipe and the pump is closed.

When inspecting the liquid end, if harmful or unknown liquid is measured at the liquid end, please wear

appropriate protective equipment for operation, empty and clean the liquid end at the same time.

All pumps are inspected with water before delivery. If the liquid transported reacts with water, make the pipes of the pump fully dry before use.

When equipment doesn't transfer liquid for a long time, please shut down the pump and cut off the power supply. If the liquid is easy to crystallize and solidify, please promptly clean up the liquid pump end.

Before starting up the metering pump, ensure that the valve between the system pipe and the pump is open and the whole pipe is in a smooth state.

Install an appropriate number of filters at the end of the inlet pipe of the metering pump to avoid the pipe blockage or pump valve blockage.

To ensure the accuracy of measurement, calibration must be performed in any service environment.

Manufacturer's Warranty

The manufacturer warrants that the product is free from defects in material and manufacture, that such warranties are limited in duration and scope, and that the warranty for the pump that is returned for repair or parts that are required to be replaced (which have been inspected and the defect is confirmed) is limited. The warranty doesn't cover the cost of installation and repair. In any event the manufacturer warrants that costs will not exceed the selling price of the pump parts. The manufacturer will not be responsible for any damage caused by improper installation, use or unauthorized repair.

These warranties supersede all other warranties, whether formally stated or implied, and the manufacturer makes no warranties of fitness or specification, nor is any agency authorized to extend warranties beyond the foregoing scope.

I、 Outline

Zhejiang Ailipu Technology Co., Ltd. mainly researches, develops, produces and sells plunger metering pumps, mechanical diaphragm metering pumps, hydraulic diaphragm metering pumps and other special pumps. The technical parameters, testing rules, and others of our metering pumps are in strict accordance with GB7782-2008 Metering Pump and API std 675-2014 Positive Displacement Pumps-Controlled Volume.

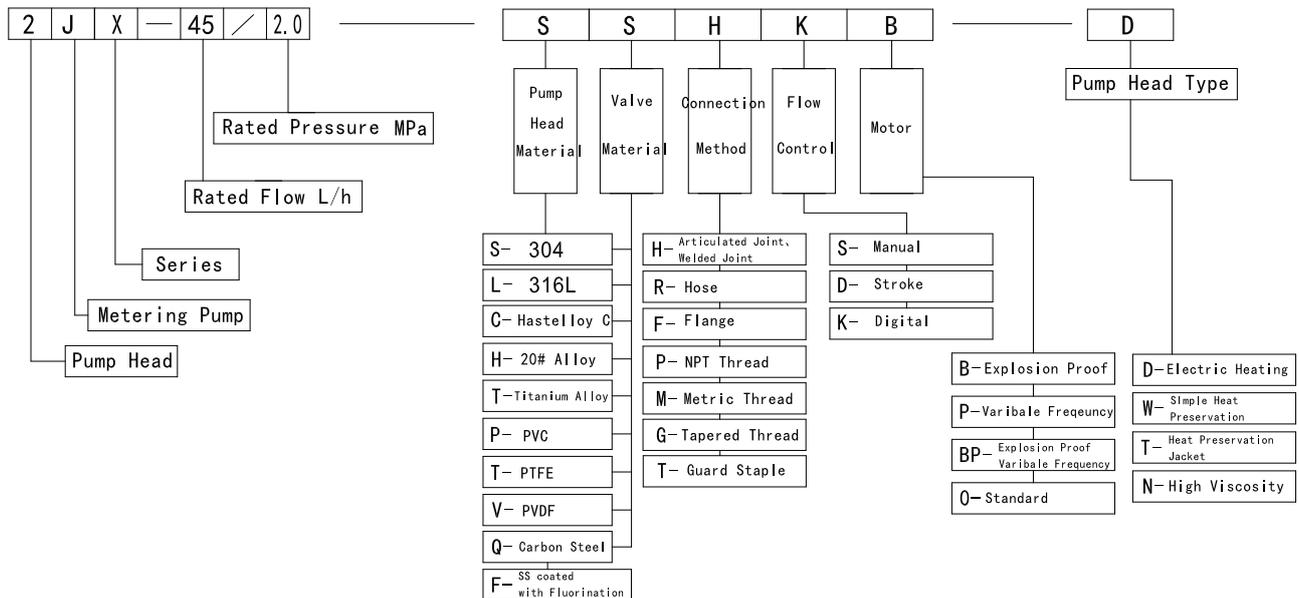
Two flow regulation modes are available for metering pumps: 1. To change the stroke of the plunger (optimal stroke: 30-100%) of the pumps during shutdown or operation, in which the measurement accuracy is controlled within $\pm 1\%$. Therefore, the measuring pump can be used as a measuring instrument (for manual regulation, the relative stroke of the pumps is indicated by a stroke scale and micrometer; for automatic control, remote control and computer based flow control, see also the regulation instructions); 2. To regulate the pump speed by changing the power frequency through frequency conversion for remote control and computer-based management on flow regulation.

Our metering pumps are used to pump liquids with a temperature of $-30\sim 250^{\circ}\text{C}$, a viscosity of $0.3\sim 2,000\text{mm}^2/\text{s}$ and solid particle size not more than 0.1 mm . Regular plunger metering pump are used in the temperature of $-30\sim 200^{\circ}\text{C}$ and a viscosity of $0.3\sim 800\text{mm}^2/\text{s}$. (if exceed this range, please advice AILIPU company). Plunger metering pump has the characteristics of simple structure, convenient maintenance, and high cost-effectiveness, which can transport high viscosity medium. The range of its working pressure is wide, and the highest pressure is up to 80 MPa , so it can be widely used in chemical, petrochemical, metallurgy, electric power, medicine, food, plastic foam, mining machinery and other fields, which has become an indispensable modern industrial dosing pump.

The Instructions are only applicable to J-X Plunger metering pumps.

1.1 Product Code

Metering Pump Production Code



II、 Pump Structure and Working Principle

The metering pump generally consists of a pump motor, a driving end, and a hydraulic end (see Figure 1).

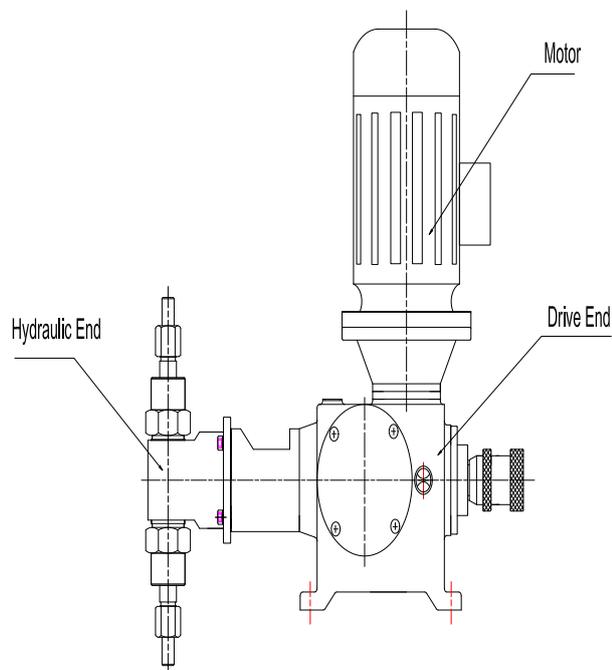


Fig.1 Metering Pump Outside Drawing

2.1 Working Principle of Driving End

The transmission box is composed of an arch cam mechanism, a stroke adjustment mechanism and a worm gear reduction mechanism.

Working Principle

A high-speed rotating motor shaft, which transmits torque through an elastic worm coupling (20), slows down by a worm (22) and a worm gear (8), and rotates the cam (6) on the worm gear bearing through the rotation motion of the worm wheel. Cam contacts and pushes the front and rear prop blockers to realize the forward-and-back linear motion of the arch prop (27), thus turning the rotation motion into a straight-line reciprocating motion of the cross head. Structure diagram of the driving end (see Fig. 2).

23	GB/T297-2015	Tapered roller bearing 30204	1		46	JX-046	Prop blocker	1	
22	JX-010	Worm	1		45		Hexagon socket head cap screw M6×20	4	
21	JX-012	Top bearing seat	1		44		O ring Ø60×Ø3.1	1	
20	JX-011	Worm coupling	1		43	JX-013	Bottom bearing seat	1	
19		Key C5×5×15	1		42	JX-015	Regulating screw	1	
18	JX-040	Motor coupling	1		41	JX-016	Locking cap	1	
17		Key A4×4×8	1		40	JX-017	Locking cover	1	
16		Hexagon socket head cap screw M6×20	4		39	JX-014	Bearing block	1	
15		Hexagon socket head cap screw M6×35	4		38	GB/T297-2015	Tapered roller bearing 30204	1	
14		Hexagon socket head cap screw M6×12	8		37	JX-006	Adjusting rod sleeve	1	
13		O ring Ø90×Ø3.1	2		36		Grub Screw Ø5×12	1	
12		Key A6×6×17	1		35		Cross bullhead screw M6×16	4	
11	JX-021	Outer cover _{e1}	2		34	JX-005	Adjusting rod	1	
10	GB/T276-2013	Deep groove bearing 6304	2		33		O ring Ø14×Ø2.1	1	
9	JX-019	Round nut M30×1.5	1		32	JX-004/1	Graduated sleeve	1	
8	JX-022	Worm gear _{ear}	1		31	JX-008	Graduated disc	1	
7	JX-018	Eccentric gear	1		30	JX-007	Adjusting Handwheel	1	
6	GB/T276-2013	Deep groove bearing 6008	1		29		Key C4×4×11	1	
5	JX-020	Spacer bush	1		28	JX-044	Pad	1	
4	JX-023	Motor bracket	1		27		Cross bullhead screw M5×10	1	
3	JX-001	Transmission box	1		26	JX-004	Adjusting rod seat	1	
2	JX-002	Arch prop	1		25		O ring Ø60×Ø3.1	1	
1	JX-030	Plunger set cap	1		24		Key A8×45	1	
No.	Code	Name	Q	Notes	No.	Code	Name	Q	Notes

Table 2 Driving end parts list of the J-X plunger metering pump

J-X Structure diagram of the driving end

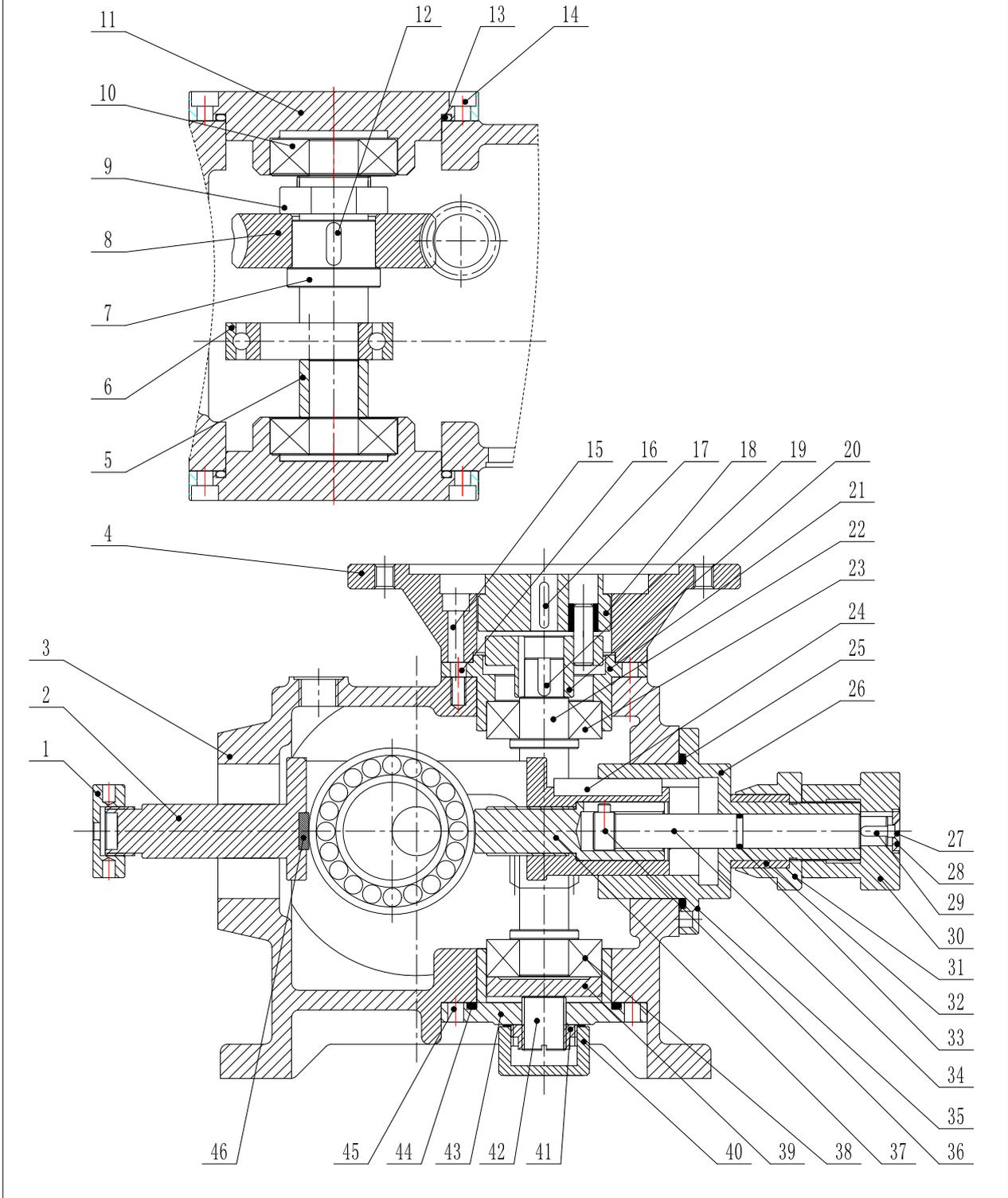


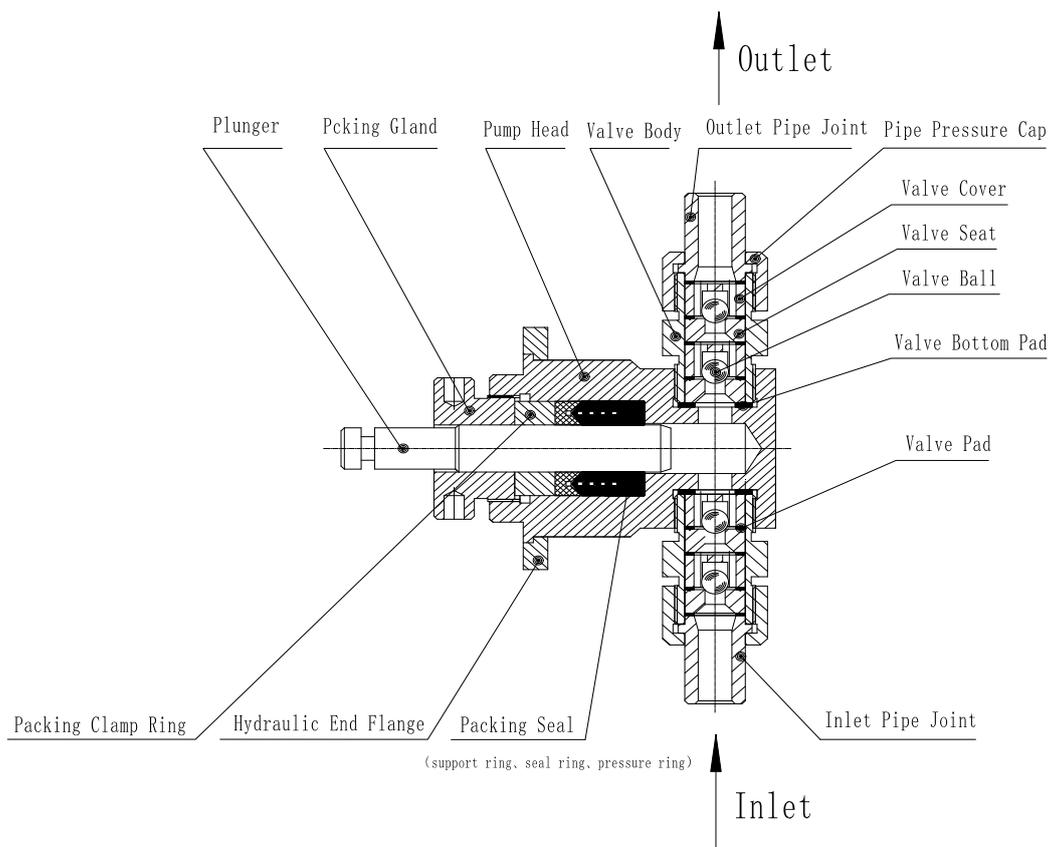
Fig.2 Structure diagram of the driving end of the J-X plunger metering pump

2.2 Hydraulic End

The structures of hydraulic ends for the plunger metering pump (shown in Figure 3) mainly consists of the plunger, the pump head, the inlet and outlet valves and the seal packing.

Working Principal:

The plunger is mechanically connected with the cross head (arch prop head) and simultaneously makes the straight reciprocating motion together with the cross head. When the plunger moves leftward (namely, suction stroke), The volume cavity gradually increases to form a certain vacuum and the pressure inside the pump head is reduced. When the pump head pressure is lower than the suction line pressure, the inlet check valve will be “pushed” upwards, allowing the medium contained in the inlet line to enter the pump head cavity. At the end of the suction stroke, the plunger motion stops instantly. When the pump head pressure is equal to the inlet line pressure, the inlet check valve ball will be reset. In discharge stroke, the plunger starts to move forward (rightward), and the pump head pressure rises instantly. When the pump head pressure is higher than the outlet line pressure, the outlet check valve ball will be “pushed” upwards, allowing the medium contained in the pump head to enter the discharge line. At the end of the discharge stroke, the plunger motion stops instantly again. When the pump head pressure is equal to the outlet line pressure, the outlet check valve ball will be reset. Then, the next cycle begins.



J-X Structure diagram of the liquid end

Fig.3 Structure diagram of the liquid end

2.3 Flow Adjustment

Rotate the adjusting handwheel (30) and with the help of the stroke adjusting rod (34) and the adjusting rod sleeve (37) to change the distance between the front and rear prop blockers (2) and the center of the cam, thereby changing the stroke length of the cross head (plunger).

The stroke adjustment of the pump can be carried out when stopping or running. Adjust the handwheel for axial movement, the position indicated by the handwheel on the scale is the relative stroke length value (%). After the stroke adjustment is completed, the pump flow needs about 1~2min to be stable. The greater the change of stroke length, the longer it takes to stabilize the flow.

Before the delivery, each metering pump is tested by the normal temperature clean water, and a complete test report is formed. The user must re-test the pump and re-calibrate the flow curve according to the actual working conditions, so as to adjust the flow according to the re-calibrated flow curve in operation.

III、 Installation

3.1 The pump shall be installed on a special spare concrete foundation or cast iron platform and fixed with foundation bolts after re-calibration, and the concrete foundation shall be 50~100mm above the ground to prevent being washed by water. At the same time, it needs to reserve enough space around the pump to facilitate the maintenance and adjustment of the pump.

3.2 The diameters of the suction and discharge pipe should not be less than the diameter of the inlet and outlet pipe of the pump, and the suction pipe should be as short as possible. If the inlet pipe of the metering pump is too long or the viscosity of the medium is larger, the diameter of the inlet pipe should be increased, otherwise it will affect the normal operation of the pump.

3.3 The connecting pipe shall be equipped with measuring instruments, such as pressure gauges.

3.4 Filter devices shall be installed at the end of the suction pipe.

3.5 The discharge pipe shall be fitted with a safety valve or a safety-relief valve (provided by the user). If you need to reduce the pressure fluctuation at the outlet, please install a pressure stabilizer (such as a buffer) near the discharge pipe.

3.6 Safety valve and buffer tank of the pipe are important accessories of the metering pump. The pipe safety valve is usually installed in the discharge pipe behind the centralized liquid pipe, which has the function to prevent the pressure of the outlet pipe being too high, so as to protect the safe operation of the pump. The buffer tank is used to reduce the non-uniformity of the flow in the pipe and then to reduce the flow fluctuation. It is an auxiliary equipment for the purpose of reducing the non-uniformity of the flow in the pipe by using the compression and expansion of the gas to store or release a part of the liquid.

3.7 Pumps installed outdoor should be sheltered by rain cover.

3.8 When the pressure of the outlet pipe is less than 0.3MPaG or the inlet pressure is greater than the outlet pressure (there is artesian phenomenon), the counterbalance valve should be installed at the outlet pipe of the metering pump to ensure the accuracy of the fluid dosing of the metering pump.

IV、 Operating Guide

4.1. Preparation Before Operating the Pump

- 1) Before running, please check the bolts and nuts at the connection parts, these bolts and nuts are not allowed to be loose. When cleaning the anti-corrosive grease or dirt on the new pump, please use kerosene to scrub, and do not use a knife to scrape them.
- 2) We suggest using medium-load industrial gear oil with the oil grade of L—CKC-N150(or N220) for the transmission box, the volume of oil shall be based on the midline of the oil leveler. The lubricating oil in the transmission box is installed by the user.
- 3) The oil capacity of the transmission box for the J-X plunger metering pump: Transmission box: 0.9L.
- 4) Turn the motor blade by hand to make the plunger move to and fro the whole stroke without any jamming. Turn on the power, start the motor, check whether the rotation direction of the motor and the rotation direction of the pump is consistent. The inlet and outlet valves on the pipes shall be fully open.

4.2. Flow Adjustment (See above 2.3 Flow Adjustment)

4.3. Operation

Upon completion of the above preparatory work and confirmation, start the motor and put it into operation. The operation process should be stable, and there should be no abnormal noise, otherwise please shut down the pump to check. After finding the source of noise, please put it into operation again.

4.4 Flow Calibration

Pump flow calibration test should be carried out in the initial pump operation, so as to confirm the exact flow under specific operating conditions. The stroke is usually set when the flow is 100%, 75%, 50%, 30%, 10% respectively. By calibrating the pump flow, it is sufficient to indicate the performance of the pump in the whole regulating range.

4.5. Shut Down the Pump

The outlet valve should be in the full open state to reduce the discharge pressure of the pipe to normal pressure, and then cut off the power supply to stop the motor operation.

V、 Maintenance, Disassembly and Reassembly

5.1 Maintenance

- 5) Observe the oil level in the transmission box periodically, so as to avoid that the oil level is too high or low. Keep lubricating oil clean and free of impurities, and replace oil as appropriate. The oil replacement period is shown in the table below:

Lubricating Oil Replacement Period

Service Life	Replacement Frequency
In the 1 st month	Once
After 6 months	Once every 6 months

- 6) Temperature of main parts of the pump are set as follows: the maximum allowable temperature of the motor shall be 70 °C ; the temperature of lubricating oil in the transmission box shall not exceed 65 °C . After 5,000~8,000h operation, disassemble the pump for inspecting internal parts, and inspect and replace the vulnerable parts by properly adjusting the fit clearance.
- 7) If the pump is out of service for a long time, empty media from the hydraulic cylinder, clean the surface, and apply anti-rust oil on the exposed machining surface. During storage, place and cover the pump in a dry place

- 8) Before maintenance, stop the metering pump, release the system pressure, and close pump inlet and outlet valves connected to the system. During maintenance, avoid any action leading to an accident, post a notice of under maintenance on the power switch, and immediately disconnect power during operation in case of any fault

5.2 Disassembly and reassembly

5.2.1 Disassembly of components for hydraulic end

- 1) Shut down the pump and cut off the power, remove the connection of the inlet and outlet pipe and the pump, remove the parts of the inlet and outlet valves including valve flange, inlet and outlet pipe (flange) and valve sleeve, valve ball, valve seat, etc.
- 2) Turn the motor fan so that the plunger moves forward to the dead point (that is, the longest extension), and loosen the plunger locking cap so that the plunger is disconnected from the cross head.
- 3) Unscrew the bolts on the fixed flange of the pump head and pull out the pump head body, so that it is completely removed from the pump head bracket.
- 4) Pull out the plunger, unscrew the padding pressing cap, remove the padding packing seal ring and other components to complete the disassembly of the hydraulic end of the plunger pump.

5.2.2 Disassembly of components for the driving end

- 1) Empty the lubricating oil from the transmission box
- 2) According to the structure in the Fig. 2, remove the motor and motor bracket 4, discharge the top bearing seat 21 from the worm, then can be removed from the transmission box with worm 22 .
- 3) Turn the adjusting handwheel 30 to the "0" scale position until the last point, unscrew the fixed screws at the outer cover 11 on both sides of the box body, remove the outer cover, and pull out the eccentric gear assembly (including eccentric gear, worm wheel, bearing, etc.) from the side of the box body.
- 4) Remove the adjusting parts of the pump: unscrew the screw 27, take off the pad 28, pull out the adjusting handwheel, pull out the adjusting rod 34; remove the coupling screw between the adjusting rod seat 26 and the transmission box, and pull out the adjusting rod seat.

- 5) Disassemble the coupling screws between the pump head bracket and the transmission box body, pull out the bracket horizontally.
- 6) Pull out the arch prop 2 from the front of the box body, then complete the disassembly.

5.2.3 Reassembly of the transmission box

Clean and inspect all parts before assembly, and replace new parts for worn-out parts that cannot be repaired. Reassemble the transmission box in the reverse sequence according to the disassembly sequence. Please pay attention to the following things:

- 1) When installing or replacing a new worm or a worm gear, please re-measure and re-adjust the meshing center position of the worm gear and the worm. The correct meshing position should be: the center of the worm and the center plane of the gorge circle of the worm gear is on the same central plane. The adjusting method is as follows: apply a thin layer of red lead on the working teeth surface of the worm gear, rotate it several times with the hand, observe the position of the meshing point, and increase or decrease the thickness of sealing paper pad on the bottom bearing seat to make the meshing point reach the correct position.
- 2) Because the movement of the metering pump bears the alternating load, the wear of the load on the worm gear in discharge stroke is greater than the suction stroke. Therefore, when disassembling the pump for inspection, according to the worn-out degree of the worm gear teeth, the worm gear can be rotated 180 degrees around the axis relative to the original assembly position and then installed back, so as to prolong the service life of the worm gear.
- 3) When installing back the cross head and the oil seal of the cross head, pay attention to observe that there should be no scratch and damage on the surface of the cross head, otherwise it will affect the sealing effect of the isolation between the transmission box and the bracket.
- 4) After all parts of the transmission box are assembled and restored by the reverse sequence method, check the fan blades of the motor first, and the fan shall be rotated freely without any jamming. While moving the impeller of the motor, turn the adjusting handwheel outward (away from the box body); when the pump stroke being adjusted to 0 position (i.e., the cross head is fixed), install and adjust the scale on the dial to the 0 position, and then lock and adjust the handwheel fixed screw.

5.2.4 Reassembly of the hydraulic end components

Clean and inspect all parts before assembly, and replace new parts for worn-out parts that cannot be repaired. Reassemble the hydraulic end components in the reverse sequence according to the disassembly sequence. Please pay attention to the following things:

1) Sealing inspection of the inlet and outlet valves

Flow accuracy of the metering pump depends largely on the sealing contact accuracy between the valve balls and valve seats of the inlet and outlet valves. Please use kerosene leakage test to check the sealing property of the valve balls and valve seats. If there is no leakage in 3min, the sealing property is good and the valve balls and valve seats can be installed back to use, otherwise we need to replace with the new parts.

2) Replacement or cleaning of one-way inlet and outlet valves

- a. Remove the flange of the inlet and outlet pressure relief valve as shown in Fig. 3, remove valve sleeve, valve ball, and valve seat for replacement, cleaning and inspection; no pits and damage are allowed on the surface of the valve ball and seal position of the valve seat orifice;
- b. After installing back all the parts of inlet and outlet one-way valves (such as pressure relief valve) as shown in figure 3, take out the valve sleeve, valve ball, and valve seat; one-way valve should have a check valve function, the sequence cannot be reversed after installation, otherwise the liquid will not be discharged.

VI、Fault-finding and Troubleshooting Checklist

Fault	Causes	Troubleshooting
The motor cannot be started	<ol style="list-style-type: none"> 1. Power failure 2. One-phase or two-phase power failure; 3. The thermal overload protection device is on; 4. The motor is damaged; 	<ol style="list-style-type: none"> 1. Check the power supply; 2. Check whether the fuse and contactor contacts are in good conditions; 3. Reset the overload; 4. Replace the motor;
No liquid or insufficient liquid is discharged from the pump	<ol style="list-style-type: none"> 1. The suction pipe is blocked or the suction pipe valve is not opened; 2. The suction line leaks; 3. The suction pipe is too long with excessive sharp turns; 4. The surfaces of inlet and outlet valves are damaged or foreign matters fall into it, resulting in that the valve surface is not tightly sealed; 5. Severe wear on seal packing or plunger, untight seal 6. The rotating speed of motor is unstable; 7. The suction level is too low. 	<ol style="list-style-type: none"> 1. Check the suction pipe and pipe filter, and open the valve; 2. Check the seal leakage; 3. Increase the diameter of the suction pipe and reduce sharp turns; 4. Check the airtightness of valve surface and replace the valve ball and valve seat if necessary; check whether the liquid is insoluble, crystallizable or solid; 5. Replace seal packing or plunger; 6. Provide stabilized power supply; 7. Improve the technology, and adjust the height of suction level.
The pump pressure does not meet the performance parameters	<ol style="list-style-type: none"> 1. The suction valve and discharge valve are damaged; 2. Severe wear on seal packing or plunger, untight seal 	<ol style="list-style-type: none"> 1. Replace the valve; 2. Replace seal packing or plunger;
The measurement accuracy of pump is lower	<ol style="list-style-type: none"> 1. The same as items 2-6 for fault 2 2. Plunger zero point is shifted; 3. The liquid temperature is too close to its boiling point. 4. The pump is flow automatically when stopped or outlet pressure $\leq 0.3\text{MPa}$ 	<ol style="list-style-type: none"> 1. Refer to corresponding treatment method; 2. Readjust the zero point of plunger; 3. Reduce the temperature or increase the suction pressure. 4. Add back pressure valve on the outlet
The parts are hot and oil temperature is too high	<ol style="list-style-type: none"> 1. There is too much or insufficient oil in the transmission box; 2. The moving pairs are poorly lubricated; 3. The clearance between moving parts is too narrow due to excessive 	<ol style="list-style-type: none"> 1. Replace oil and fill oil to a level indicated by the oil level sight glass; 2. Check the supply of lubricating oil; 3. Appropriately adjust the sliding clearance;

	<p>compression;</p> <p>4. The bearing is overheated.</p> <p>5. The parts are under excessive pressure.</p>	<p>4. Check the lubrication and adjust the clearance.</p> <p>5. Decrease pressure.</p>
Impact sound is heard during operation	<p>1. The moving pairs are severely worn out;</p> <p>2. The valve ball is lifted too high;</p> <p>3. There is air in the medium or cavitation occurs in the pump valve;</p> <p>4. The fit clearance between the worm gear and the worm is too large;</p> <p>5. A sound is heard when the pipeline safety valve is opened.</p>	<p>1. Adjust or replace the parts;</p> <p>2. Adjust and reduce the lift height of valve ball;</p> <p>3. Empty the air in the medium or increase the diameter of suction pipe;</p> <p>4. It is unnecessary to replace parts if no damage occurs;</p> <p>5. Check and clean the safety valve, and adjust its opening pressure.</p>
The flow regulation mechanism does not work	<p>1. The threads of adjusting screw and adjusting nut are galled;</p> <p>2. The driving mechanism is internally jammed.</p>	<p>1. Remove the parts for repair or replacement;</p> <p>2. Disassemble and check, and observe the movement of connecting rod, eccentric gear, crosshead, and crosshead sleeve in the bracket.</p>

VII、 After Sales Service

If you encounter any problems during use, please dial our after-sales service phone number (each metering pump has a unique factory number on the nameplate, please inform us of this number when contacting our after-sales service personnel, so that we can verify the corresponding model and technical parameters of the product.)

Our after-sales service phone number: 0086-576-83371857

**All rights reserved.
Plagiarism is not allowed.**

Add: No.2 Jinyuan Road, Binhai NewCity, Sanmen County, Taizhou, Zhejaing

Tel: 0086-576-83351188 0086-576-83351225

Fax: 0086-0576-83351093 0086-0576-83351522

E-mail:alp@ailipu.com

Poster code:317100

Web: <http://www.ailipu.com>



The company reserves the right of final interpretation