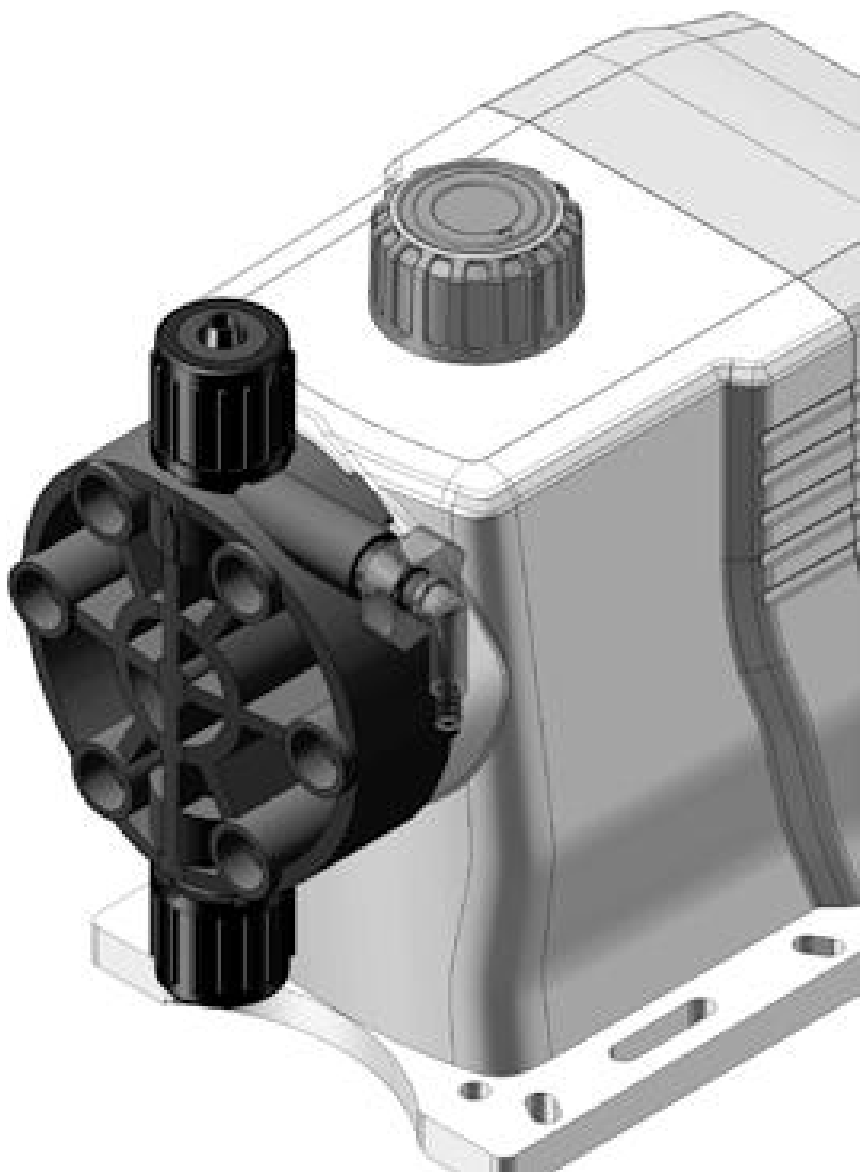


NEWDOSE

Motor-X Series

Metering Pump Introduction



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Important Statements


- ★ Be sure to carefully read the Operating Manual before the installation and use; The following contents with forbidden sign  and warning sign , should be carefully read. If

Here are the meanings of signs:

 Note the usage which is neglected or wrong

 The noted operation would cause an irreversible damage or broken

 Forbid the operation which is neglected or wrong

 The forbidden operation would cause a serious accident or personal or property damages, including death or severe injuries

- ★ The installation of pumps and electrical equipment must comply with the standards and regulations of the country where they are located;
- ★ If the pump fails or is damaged, it must be repaired by technicians and the original factory accessories must be used. Ignoring this will affect the safe use of the pump;
- ★ Maintenance of the internal structure of the metering pump must be carried out by professionally qualified or manufacturer-authorized personnel, and the manufacturer will not assume all responsibility for neglecting this point;
- ★ The pump power must be turned off before the pump is being maintained or cleaned and the connection of the pump power to the main supply is disconnected;
- ★ Avoid using pumps where ambient temperatures exceed 0 - 40 °C , or where pumps and pipes are directly exposed to the sunlight;
- ★ Do not use the metering pump in an environment outside the power supply specified by the nameplate, otherwise it may cause pump damages or cause a fire.
- ★ Don't pull, break or reconnect wires, otherwise it may cause pump damages or cause a fire.
- ★ Note: This Manual is subject to change without prior notice.

1. Overview

Please read carefully about this section on how to properly install and safety usage MOTOR-X series micro motor drive diaphragm metering pump.

When designing the structure of metering pump, it takes fully into account the occasion where it is possible to use. With proper usage and normal maintenance, the reliability and service life of its electrical and mechanical components can be improved accordingly.

1.1 Warnings

Only professional or manufacturer-authorized personnel can inspect or repair the internal components of the metering pump. The damage caused by improper operation by other personnel is not within the responsibility of the manufacturer.

Warranty period: the warranty period is one year. Damage caused by abnormal operation is not covered by warranty.

1.2 Storage and transportation

Metering pump must be placed horizontally during storage and shipping.

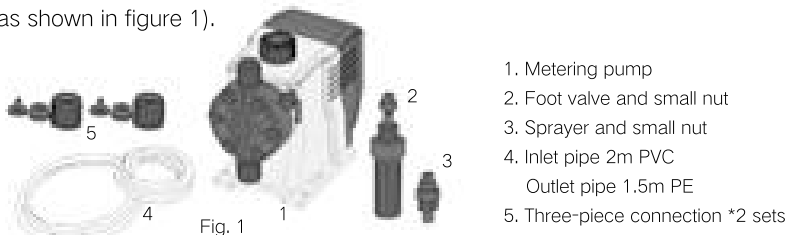
In cases where the storage period is longer than 12 months, the following steps should be followed in addition to the above measures:

Power up the motor and open the pump for more than one hour every 12 months. There is no need to add liquid to the pharmaceutical end assembly during operation, but it is important to open the suction and discharge outlet so that it leads directly to the air

After 12 months of storage, the quality of components, such as seals and electronic components, which will deteriorate due to time factors, will not be guaranteed. If the pump has a storage life of more than 12 months, it is recommended to replace these parts before starting operation.

1.3 Unpacking

Open the package of metering pump, check whether the metering pump is in good condition (as shown in figure 1).



If an abnormal condition is found, please do not use it and inform the manufacturer of the situation. Please put the unpacked material in the place beyond the children, so as to prevent the children from eating by mistake.

1.4 Precautions

- ⚠️ Verify that the local power supply parameters are consistent with the metering pump nameplate during electrical connection.
- ⚠️ Do not start metering pump, without connecting the upper- and lower-line connectors, or it may lose parts from the upper and lower valves.
- ⚠️ Electrical installation shall be in accordance with local electrical installation standards, in addition to the following common knowledge:
 - 🚫 Do not touch metering pump with wet hands or feet!
 - 🚫 Do not operate metering pump with bare feet!
 - 🚫 Without guidance, children or people who are not familiar with metering pump should not operate metering pump without authorization!
 - 🚫 If there is a sudden problem with the metering pump during the work, please turn off the power supply immediately and do not repair it yourself without the help of the manufacturer's technician.
- ⚠️ If the metering pump is not in use for a long time, use metering pump to cycle clean water for 10~20 minutes, turn off the power supply and place it in a cool and dry place.

1.5 Assembly and disassembly

- ⚠️ There is no need for the user to assemble it because the metering pump is delivered after the overall assembly.

The following preparation work should be done before the disassembly of the unit that needs to be disassembled and repaired.

- ① Turn off the metering pump
- ② Remove the pipeline connected to the metering pump head (Drain the pipeline before detaching it).
- ③ Discharge the residual liquid in the metering pump head (invert metering pump or remove pump head).

After completing the above steps, the authorized personnel will carry out the repair work.

- ⚠️ **Please do not lose any accessories of valves.**
- 🚫 **The unauthorized opening of metering pump, by non-factory authorized personnel will cause irreversible damage to metering pump, fluid flow, leakage of electricity and even endanger the safety of the operator's life**

1.6 Measurement of toxic or dangerous liquids

- ⚠️ Noted that the metering pump are used for delivering the selected liquids, because the material of pump's contact parts is not suitable for some chemical liquids, such

as some toxic or dangerous liquids. Please confirm this before select the pumps, or contact the manufacturer to check, then follow the operation rules:

Noted that the manufacturer is not responsible for the damage by non-normal uses.

- ⚠ When deliver the toxic or dangerous liquids, please remember the following rules:
 - Comply with all specifications formulated by the liquid manufacturer for liquid operation;
 - Ensure adequate ventilation of the operation site;
 - Ensure that all pressure parts of metering pump are in good condition before use;
 - Select the proper material of the liquid contact parts, such as hoses, inlet and outlet valves, sealing rings, etc.
- ⊘ Before disassembling the metering pump, the pressure of the discharge pipe must be released, and the residual liquid in the metering pump must be neutralized or flushed with the relevant liquid.

2. Introduction of Motor-X series pump

2.1 Working principle of motor driven metering pump

A steady-running motor is installed in MOTOR-X series metering pump. When the motor is powered on, the rotation of the motor is transferred from the drive mechanism to the eccentric mechanism on the spindle. The front end of the push rod contacted by the eccentric mechanism is provided with a pure PTFE diaphragm, which moves forward and discharges the liquid in the metering pump head out of the metering pump through the outlet valve. Then the eccentric mechanism carries on the return stroke, and the push rod and PTFE diaphragm return under the action of the spring. The liquid is inhaled into the metering pump through the inlet valve of the metering pump to complete a working cycle. The same pump, when the stroke adjustment knob is not turned, the volume of the liquid measured at each stroke is the same. When the running range of the adjusting knob lever is reduced, the deformation of the diaphragm is reduced, that is to say, the purpose of regulating the flow rate is achieved. It recommends the long-term use of flow regulation ia at 10-100% flow range when backpressure exceeds 0.7kg.

- ⚠ **The actual flow rate of the metering pump varies depending on the back pressure of the external pipeline, and users can roughly calculate the current flow rate of the metering pump based on the pressure flow curve of the metering pump. If the measurement is accurate, users must calibrate the flow rate of metering pump according to the actual working condition.**

2.3 Technical specifications

Parameter Table (maximum flow under maximum lift 220V 1ph 50Hz)

Note: The maximum flow rate of the metering pump and the flow labeled in the parameter table may result in a deviation of less than 50% due to the limitations of the processing equipment properties. Please consider it when selecting the type.

| Specification and model | | Capacity | Pressure | Stroke length | Diaphragm Diameter | Pump Speed | Motor |
|-------------------------|-------|----------|----------|---------------|--------------------|------------|-------|
| | | L/h | Bar | mm | mm | spm | W |
| MX30 | 01-07 | 1 | 7 | 1 | 35 | 115 | 28 |
| | 02-07 | 2 | 7 | 2 | 35 | 80 | 28 |
| | 03-07 | 3 | 7 | 2 | 35 | 115 | 28 |
| | 05-05 | 5 | 5 | 2.5 | 35 | 115 | 28 |
| | 08-03 | 8 | 3 | 3 | 35 | 115 | 28 |
| MX40 | 09-07 | 9 | 7 | 2 | 47 | 115 | 41 |
| | 12-06 | 12 | 6 | 3 | 47 | 80 | 41 |
| | 15-04 | 15 | 4 | 3 | 47 | 115 | 41 |
| | 18-02 | 18 | 2 | 4 | 47 | 115 | 41 |

Flow rate-pressure chart

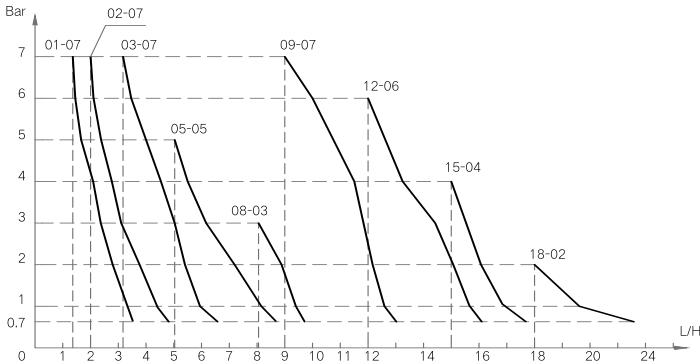


Fig. 2

Material of Accessory Kit

| | Standard | Other Optional Material | | |
|------------------------|----------|-------------------------|----------|----------------|
| | | PTFE | PU | UPVC Hard Tube |
| Inlet Pipe | PE | PTFE | PU | / |
| Outlet Pipe | PVC | PTFE | PU | / |
| Three-piece connection | PVC | PTFE | PVC | / |
| Big nut | PVC | PTFE | PVC | PVC |
| Foot valve | PP(FRPP) | / | PP(FRPP) | / |
| Sprayer | PP(FRPP) | / | PP(FRPP) | / |
| Small nut | PP(FRPP) | / | PP(FRPP) | / |
| Hard Pipe Connectors | / | / | / | PVC |

Dimension Drawings

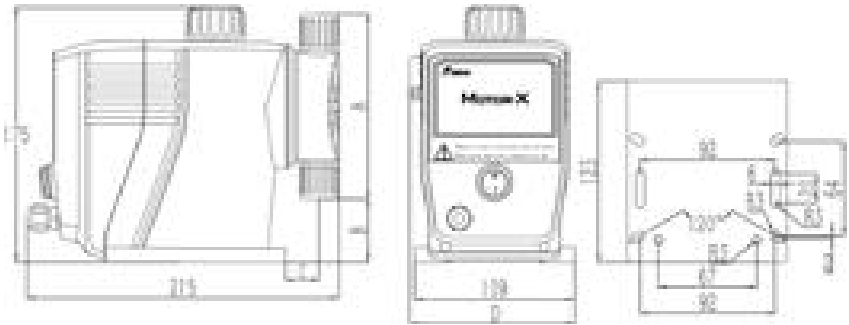


Fig. 3

| Model | Size (mm) | | | |
|-------|-----------|----|----|-----|
| | A | B | C | D |
| MX30 | 126 | 43 | 23 | 113 |
| MX40 | 144 | 34 | 19 | 119 |

3. Installation

3.1 Installation condition

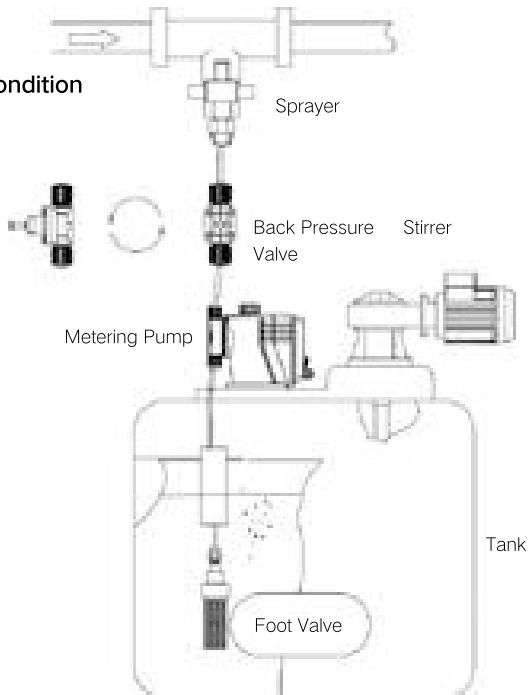
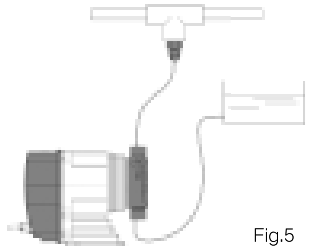
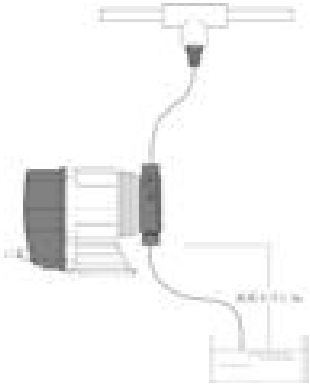
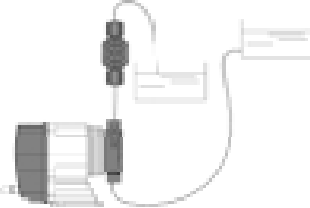


Fig. 4 Typical installation diagram

Location: The place where the metering pump is installed should be dry, and away from the heat source and the ambient temperature should not exceed 0 / 40 °C ;

Installation mode: When metering pump is installed, there are usually the following situations:

| | | |
|----------|---|--|
| <p>A</p> | <p>The installation position of the metering pump is lower than the liquid level in the dosing box, and the position of the dosing point is higher than the liquid level in the dosing box: It's an ideal way to install pumps. In this case, the liquid can flow directly into the head of the metering pump, and empty the air inside the metering pump, so that it is easy to start the metering pump. This installation mode is recommended for liquids that are prone to bubbles, such as sodium hypochlorite, hydrogen peroxide, etc., or liquids with high viscosity.</p> |  <p>Fig.5</p> |
| <p>B</p> | <p>The installation position of the metering pump is higher than the liquid level in the dosing box, but lower than the location of the dosing point. For such installation mode, we should pay attention to the height difference between the metering pump head and the liquid level that is related to the suction range of metering pump. The dry suction range of MOTOR-X series metering pump is 1.5m (no liquid in pump head). If the height difference between the pump head and the liquid level is greater than 1.5m, the metering pump will not work properly for the first time. The difference between the liquid level and the height of metering pump should be less than 3 m when the liquid is filled in metering pump and inhaled into metering pump. The difference more than 3 meters will have an impact on the accuracy of the metering pump, even normal use. So, the height difference of both should be minimized when installing the metering pump. In addition, if the standard hose configured by metering pump is not selected, the use of thinner suction pipeline is beneficial to the start-up of metering pump as far as possible.</p> |  <p>Fig.6</p> |
| <p>C</p> | <p>The liquid level in the tank is higher than the liquid level at the dosing point: When the metering pump is installed in such a situation, siphoning will occur between the medicine box and the dosing point, and even if the metering pump stops working, the liquid will flow directly from the tank to the dosing point. There are two solutions for this case:</p> <ol style="list-style-type: none"> 1) Install the back-pressure valve on the outlet line of the metering pump and adjust the back pressure to such an extent that the above conditions do not occur (Figure 7). 2) Damage siphon: install a vent valve or leave a vent hole at the highest point of the system pipeline. |  <p>Fig.7</p> |

⚠ Note: The above suction height is valid under the standard atmospheric pressure. Please consult the manufacturer under the non-standard atmospheric pressure condition.

Standard atmospheric pressure reference: 101.325kpa/14.696psi.

⚠ Note: Avoid sharp bends and kinks in and out of the pipeline and do not cause the pipeline to be scratched or truncated by sharp edges and corners.

⚠ The specification of thread for the check valve is 1/2 G " straight pipe thread. Even when it is wrapped with raw materials, leakage will occur over time. If the liquid has strong corrosiveness, it will have a great influence on metering pump.

⚠ It is strictly forbidden to link with 1/2 G " internal thread connector directly after wrapping raw material belt in and out of pump head. We have the right not to guarantee this kind of metering pump in the process of use when there are some malfunctions such as the broken valve box feed and so on.

⚠ If the working condition must use PVC hard pipe to connect metering pump, should pick the special hard pipe connector which is inserted directly with DN15 (internal diameter 15mm) PVC hard pip without additional fittings.

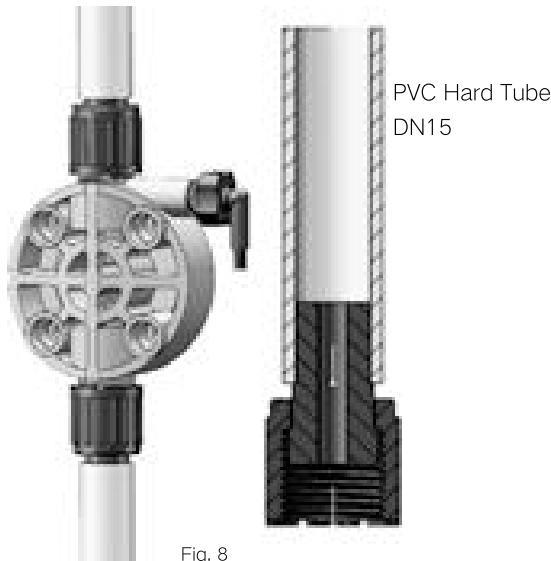


Fig. 8

3.2 Electrical wiring

The pump is equipped with 1.5m cable. The user can extend it by himself or provide it when supplied by the manufacturer. When do the electric connection, an air switch shall be installed between the pump and the power supply, and shall conform to the local electrical installation code.

⚠ Note: Make sure the power supply circuit is disconnected when wiring.

3.3 Pipeline connection

Standard fittings contain: 2m PVC transparent inlet hose; 1.5m PE translucent outlet hose; foot valve (PP) and sprayer (PP); power cord (1.5m)

Connecting method: one end of inlet hose is connected to the foot valve and the other end is connected to the suction valve of metering pump; one end of outlet pipe is connected to the outlet valve of metering pump and the other end is connected to the injection valve (Figure 9).

The thread of injection valve is 1/2G"(quartered). It can be connected directly into other pipe valve parts with wrapped raw tape (Figure 10).



Fig. 9

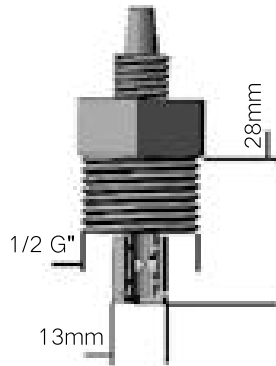


Fig.10

3.4 ⚠ Operation warning

- ⊘ Do not let the pump run under the condition that the outlet line is completely closed. Otherwise, it could lead to a liquid leak or a pipe rupture. So make sure the valve in the outlet line is fully open before the metering pump is opened.
- ⊘ Don't leave metering pump idle for a long time. Although pump idling does not lead to diaphragm damage and pump burning, the repeated or long-term idling will cause metering pump temperature to increase and accelerate aging of electrical components and electromagnetic components, thus reducing the service life of metering pump.

3.5 Liquid inlet

Install and start the metering pump according to the above requirements, adjust the stroke knob to 100%. If the pump head is fitted with an exhaust valve, first open the exhaust valve in half a circle, and the liquid will enter the pump head quickly. Close the exhaust valve when the liquid begins to exhale from the exhaust valve.

⚠ If the pump head does not have an exhaust valve, remove the vent pipe from the injection valve at the injection point. Turn off the pump and reconnect the line back to the injection valve when the liquid enters the exhaling tube.

3.6 The regulation and calibration of flow rate

The nameplate data on the pump are measured in clear water at normal temperature. The actual data will vary depending on the different conditions, such as pipes and liquids. It's necessary to adjust or calibrate the flow of the metering pump before using, the followings are the steps.

Calibration method:

- ① Place the foot valve in a calibrated container with a sufficient amount of water.
- ② Start the pump, unscrew the exhaust valve and discharge air bubbles, tighten the screw, and stop the pump.
Stop the pump and write down scale A (mL) at this time.
- ③ Start the pump and start the timing to calculate a certain time T (min) (it is recommended not to be less than 5 min).
Stop the pump and write down the scale at this time B (mL).
- ④ Flow rate=V (L/H).
- ⑤ The figure of metering pump knob (panel display) is N %.
- ⑥ The actual required flow is G (L/H)
- ⑦ The percent of the stroke length that the pump actually needs to adjust, that is, the number (stroke length) to be adjusted on the knob (panel).

$$V=(B-A)/1000T \text{ (L/H)} \quad X=(G \times N)/V(\%) \quad \text{Or } X=1000 \times G \times T \times N/(B-A)(\%)$$

3.7 Inspection and Maintenance

- Install a pipe return cartridge on the exhaust valve, or other collection containers.
- Check and clean the one-way valve and filter bottom valve regularly to ensure that the fluid flow part is free of impurities.
- Check and fasten pump head bolt regularly, keep pump head fastened. If the connection bolt of pump head is loose, it will lead to leakage of pump head.

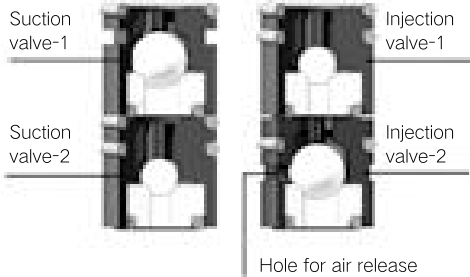


Fig. 11

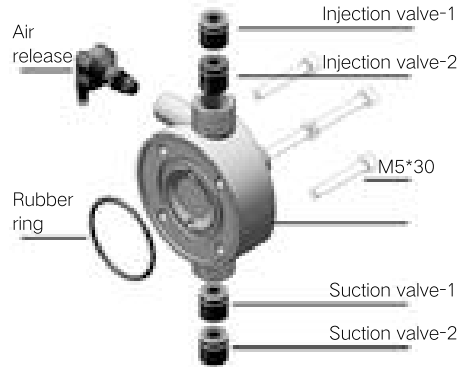


Fig. 12

- Recommended regular check time: Run for continuous 500 hours or cumulative 1,000 hours:

⚠ The bolt pretightening force : 2.16N.m.

4. Debugging and operate

Control Elements Overview

There is a switch button on the panel. When the light is on, indicating metering pump has been powered up; press the switch to stop the metering pump.

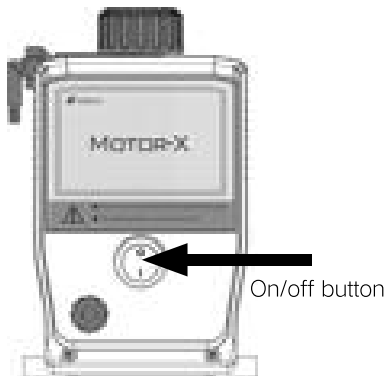


Fig. 13

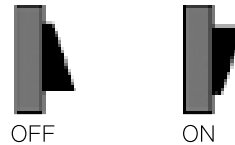


Fig. 14

The switch indicator is off, and the top regulation knob displays the current stroke length.

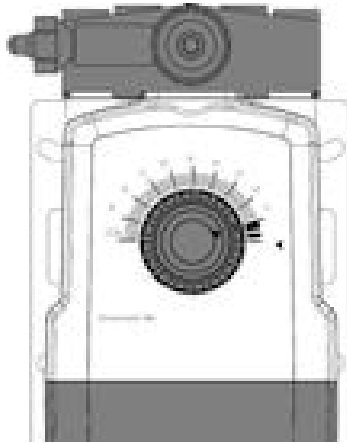


Fig. 15

⚠ Note—Adjust the flow rate

- When adjust the Motor-X pump, should confirm the pump is being working. It's forbidden to adjust the stroke length while the pump is not working.
- Motor X pump, regulate it's the interval volume through the reciprocating movement of the diaphragm, thereby change the single discharge capacity in order to regulate the pump's capacity. When regulating the knob, rotate clockwise is decreasing the capacity, rotate anticlockwise is increasing the capacity.



Fig. 16



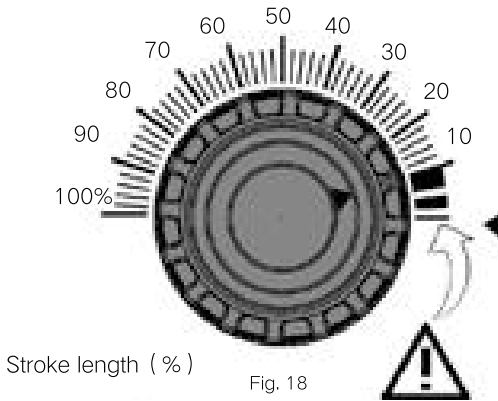
Fig. 17

⚠ Note: Stop rotate the rotary knob when the pointer be 100%. Because when the stroke length is 100%, there will be few room for the rotary knob assembly. The regulation device will be damaged if continue to rotate the rotary knob.

⚠ Note—Regulating range

Please do not the rotary knob as a switch at 0%. Please turn off the pump when do not use it.

The recommended stroke length range is 10%-100%. Do not let the pump work at 10% and less than 10% for long time, which would lead to decrease the accuracy. It's better to pick one smaller pump when delivering less liquids.



5. Maintenance

- Regularly check liquid level in chemical tank to prevent metering pump from running without load.
- The idling operation of metering pump will no damage the metering pump, but it will affect the system due to do not dosing. A liquid level switch may be installed. When the liquid level is lower than the set level, automatically disconnect the metering pump to prevent no-load operation.
- Check that the bolts on the head of the metering pump are fastened and that the seals are intact every at least once every six months. If the liquid being transported is corrosive, the check times should be added. In addition, attention should be paid to the following situations:
 - ① Whether the indicators of panel work normally.
 - ② Whether the concentration of liquid added to the system is normal. If the concentration is reduced, check that the one-way valve and filter are working properly and clean or replace it.
 - ③ **⚠** We recommend regularly clean the unidirectional valves and filters. Because the medium is different, we have no way to give the exact cleaning cycle, and the user can decide on the basis of the actual situation.

6. Common troubleshooting and treatment methods

| Fault | Possible causes | Correction method |
|-------------------------|---|--|
| pump cannot start | wiring error | check and correct wiring |
| | wrong voltage | set the right voltage by nameplate |
| | on/off button damaged | replace the button |
| pump cannot suck liquid | the liquid suction end is not sealed well | check whether the seals and quick links are in good condition |
| | wrong valve assembly | check and reassemble according to the instructions |
| | suction too high | reduce the installation height of the pump |
| | suction pipe blocked | open the exhaust valve to remove gas |
| | the liquid is too viscous or easily produces bubbles. | set the installation position which is lower than the liquid level |
| | foot valve blocked | clean filter plate and bottom valve |
| | pump head blocked or impurities | clean pump head and components |
| unstable capacity | there are impurities body in pump head | clean pump head and components |
| | diaphragm damage | replace diaphragm |
| lower capacity | impurities in pump head | clean pump head and components |
| | outlet pressure is too high | check nameplate and replace metering pump with higher pressure |
| | liquid viscosity is too high | please contact the manufacturer, change high viscosity check valves if necessary |
| | driven unit damaged | return to factory for replacement |
| larger capacity | small outlet pressure | set a back pressure valve to the outlet pipe or change one smaller capacity pump |
| Liquid leakage | upper and lower valve nuts loose | tighten |
| | pump head become loose | tighten bolts M/HX: 2.16N.m NX/GX: 2.41N.m EX: 2.90N.m |
| | diaphragm damage | replace diaphragm |
| | missing seal | replace the seal |
| | seal parts or pump head is corroded | please contact the manufacturer |
| | the outside temperature or liquid temperature is too high | Please contact the manufacturer |