

**SHIMGE**<sup>®</sup>  
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# SERVICE MANUAL

Oil-filled Submersible Screw Pump

Models: QGY(D)

**SHIMGE PUMP INDUSTRY GROUP CO., LTD.**

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Thank you very much for choosing our products, and please read over the Operating Manual and keep it properly before the installation and use.



Warning

- The Electric Pump must be grounded reliably before use, and shall be equipped with an electrical leakage protection device;
- It's strictly prohibited to touch the Electric Pump during operation;
- It's strictly prohibited to run the Electric Pump without water;
- It's strictly prohibited to run the Electric Pump with the valve closed;
- For three phase-motors with integrated thermal protector shut down due to overload or overheating, it is NOT allowed to re-connect the power until motor cooling for more than 10 minutes.

## I. Product Introduction

A QGY(D) oil-filled electric submersible screw pump (hereinafter referred to the “Electric Pump”) is composed of two parts :pump set and motor. Pump set is lying upper of the Electric pump, the main components are screw and rubber stator, which constitute an internally-engaged sealed-rotor positive displacement pump with the operating principle of driving the screw via the universal joint to make a rotational planet motion around the rubber stator with the eccentric distance  $e$  as radius. A single-phase or three-phase asynchronous motor is at the bottom of the Electric pump, adopting single-ended mechanical seal as dynamic seal in the motor, and at the place of sealing of each fixed spigot is an O-shaped rubber seal ring used as the static seal.

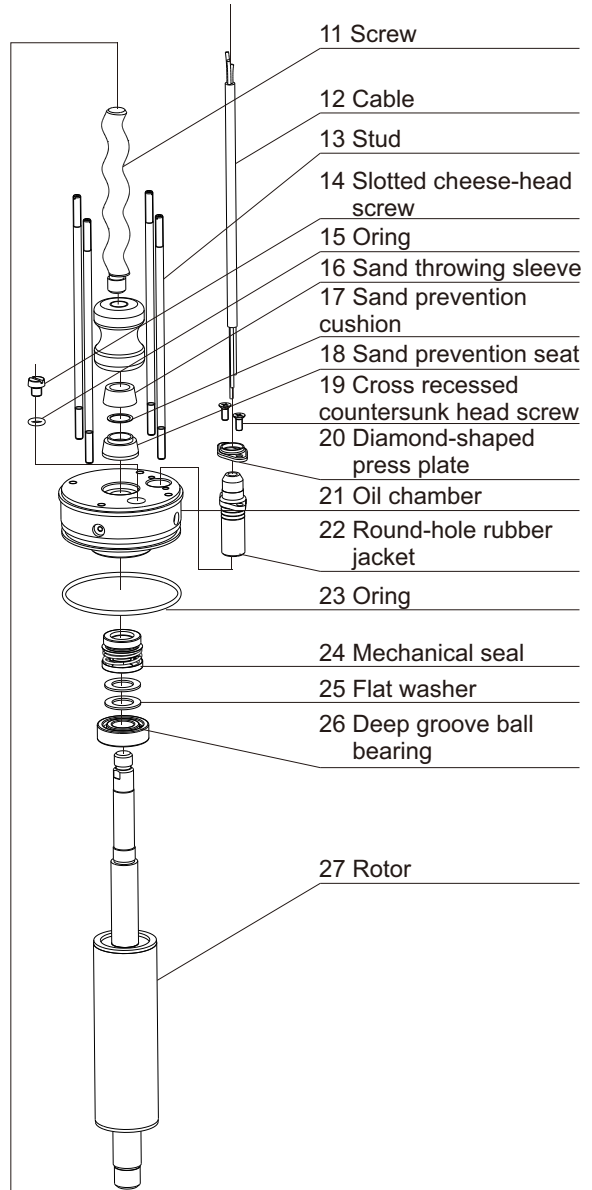
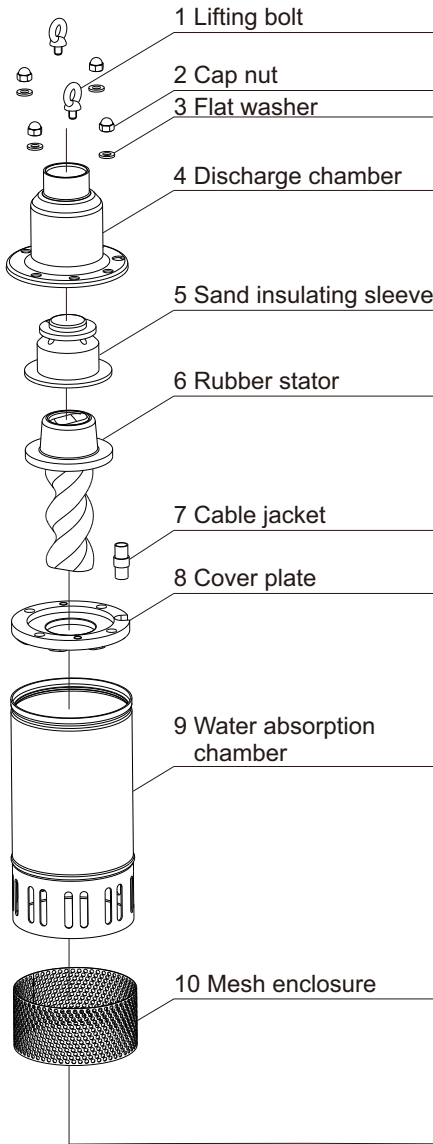
The Electric Pump of this series, with no limit of minimum head, is able to operate as long as above max head, its features like high head, high efficiency and wide high efficiency area make it widely used in long-distance farm irrigation, spray irrigation, garden irrigation, deep well water lifting, tower water delivery,, water supply and drainage for breeding industry, and efficient oxygenation application, etc.

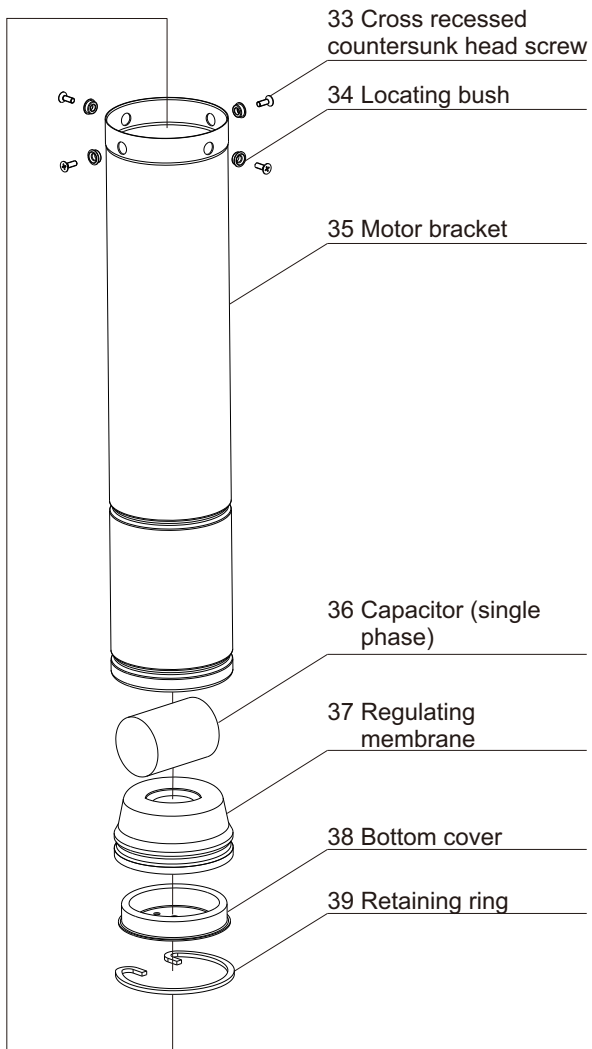
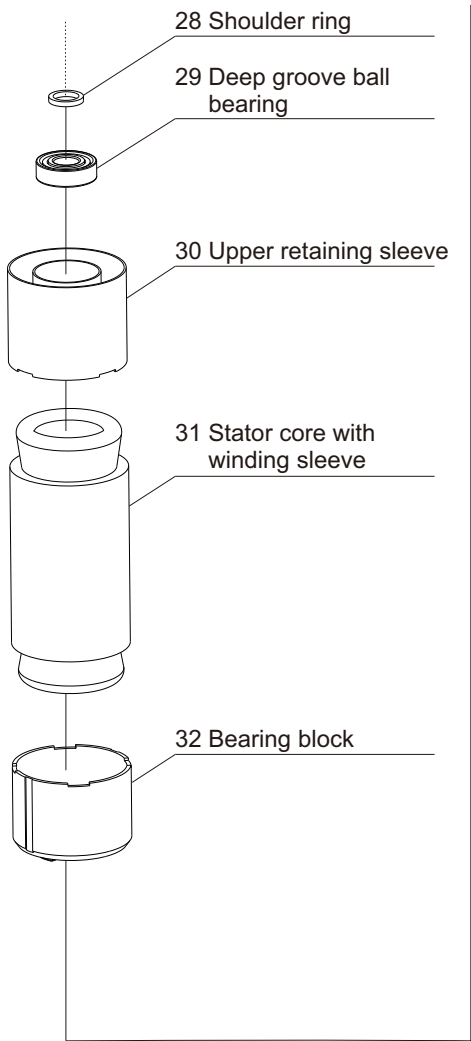
## II. Operating Conditions

The Electric Pump shall be able to operate continuously and normally in the following operating conditions:

1. The temperature of the medium does not exceed 40°C;
2. The pH value of the medium is 6.5~8.5;
3. The mass ratio of the solid impurities contained is not more than 3%, the particle size is not bigger than 0.2mm, and the fiber length is not more than 0.3 time the screw pitch of the rotor;
4. The maximum submersible depth of the Electric Pump is not more than 70m, while the minimum depth is 0.5m.

### III. Structure diagram

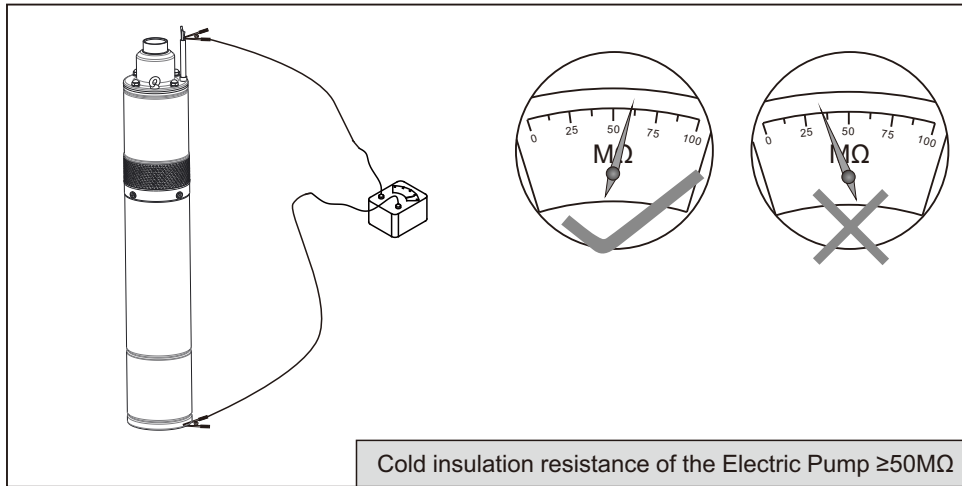




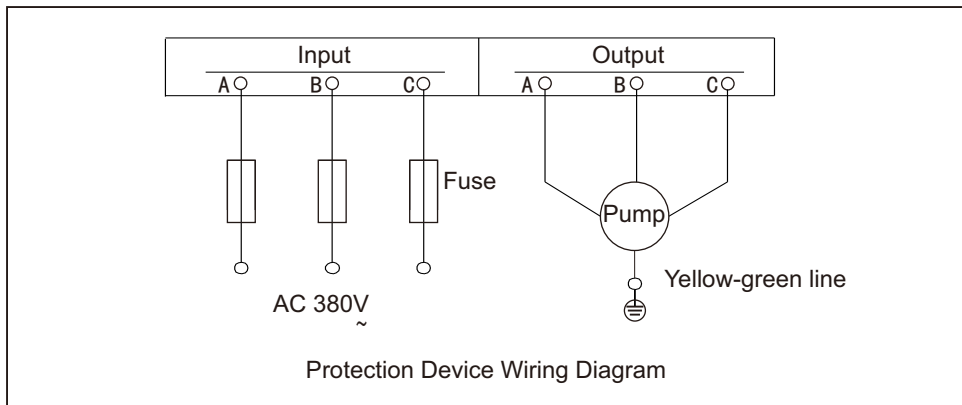
#### IV. Instructions for Installation and Use

1. Before installation and use, please fully check whether the safety or performance of the Electric Pump is affected or damaged during transportation or storage, for example, whether any cable or plug is in a perfect condition. In case of any damage, please have a specialized person making replacement or repair.

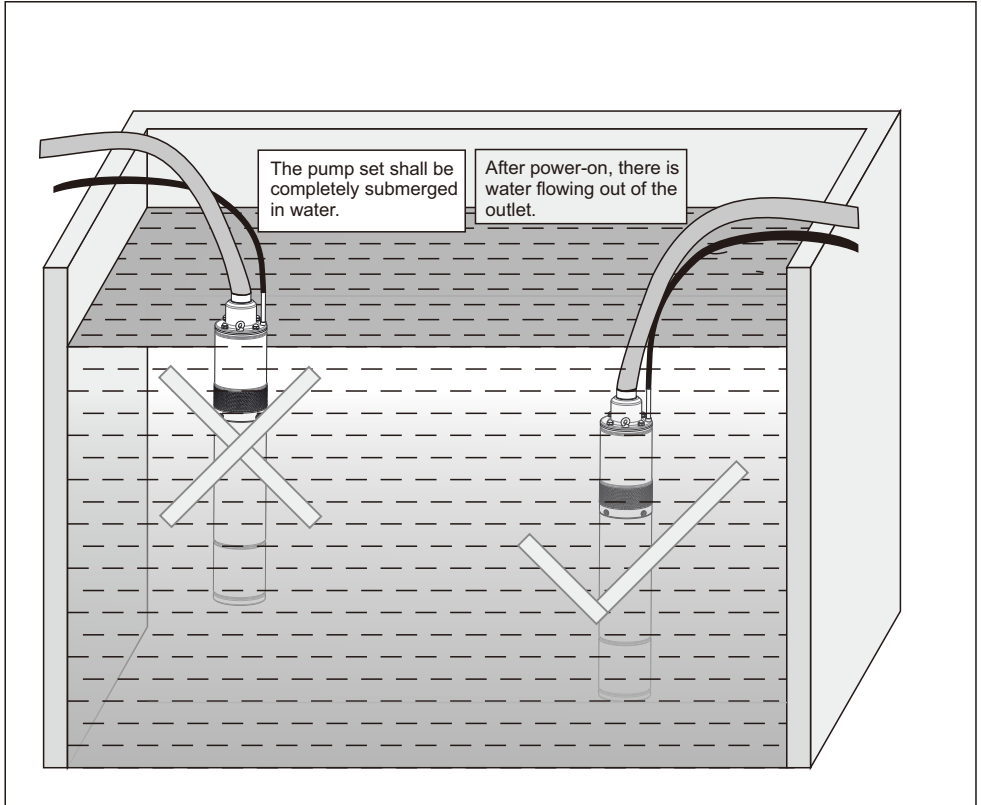
2. Before the Electric Pump operates, please completely inspect the insulation resistance of the Electric Pump, of which the cold insulation resistance shall not be less than 50MΩ.



3. During wiring, please correctly install an electrical leakage protection device (Suppose the device does not come with the pump, user should buy it by himself ) to the Electric Pump. In case that the Electric Pump is a three-phase one, please draw the yellow-green line with the grounding symbol, out of the cable involved, and ground this line reliably. Carry out the wiring as shown in the following diagram. Ground in a reliable way the patch panel to be used with the Electric Pump which is provided with a plug upon delivery.

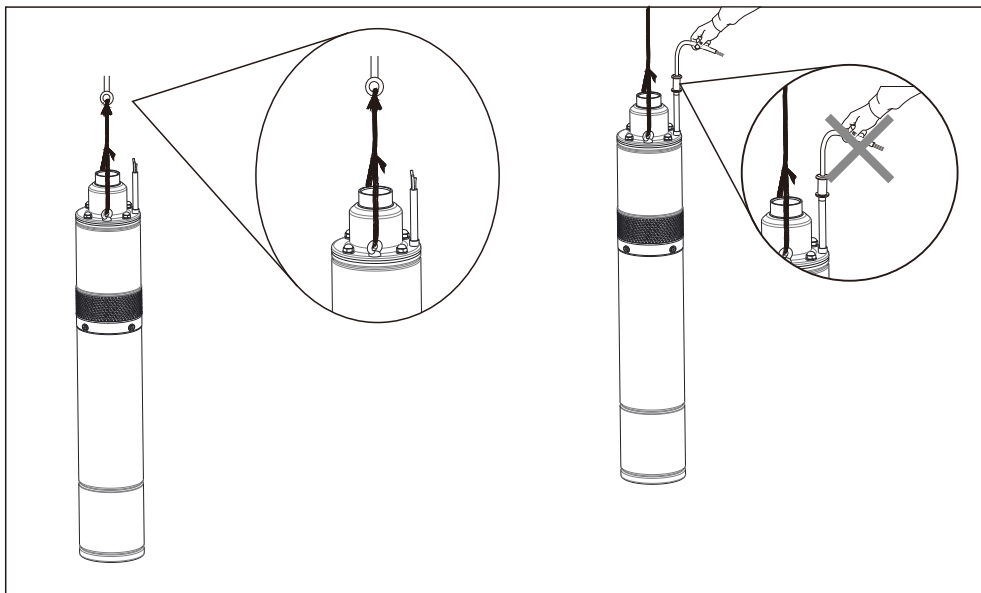


4. Before putting the Electric Pump into water, please do a test run. Do not perform dry running without water. Place the Electric Pump horizontally in a ditch or tank (bucket) (make sure that the pump set is submerged in water) and check whether the Electric Pump works normally and whether the rotational direction of the pump is the same as that of the indicating arrow. When finding any reverse rotation of a three-phase electric pump (no water will be pumped upwards when a three-phase electric pump operates reversely), please cut off the power supply and exchange any two phases of the three-phase pump, or otherwise the rubber stator will be worn out.

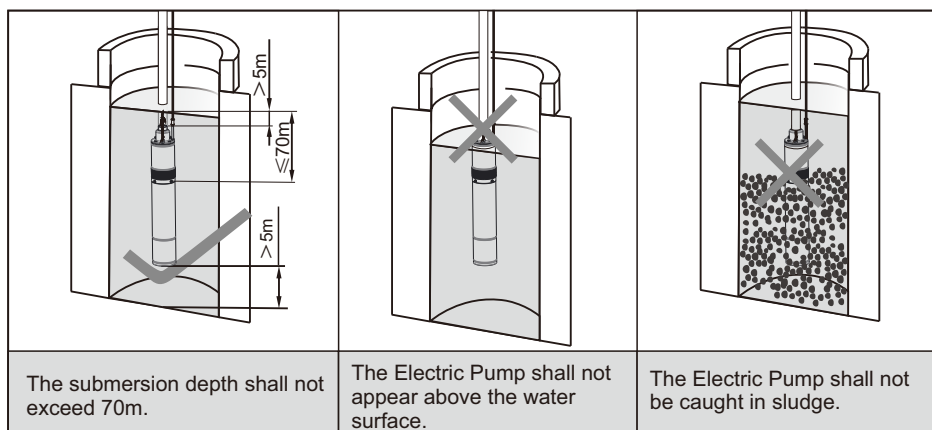


5. Connect a delivery pipe (whose specifications are selected based on Table 1) matching with the discharge chamber. For example, tighten a soft delivery pipe with the iron wire or clamp or reliably connect a steel-type delivery pipe with the screwed joint, and then put a rope through the lifting ring and tie it down for the purpose of lifting and placing.

**6. Do not strike or press the cable or use it as a lifting rope. When the Electric Pump is operating, do not arbitrarily pull the cable, so as to prevent the cable from being damaged and causing any electric shock accident.**



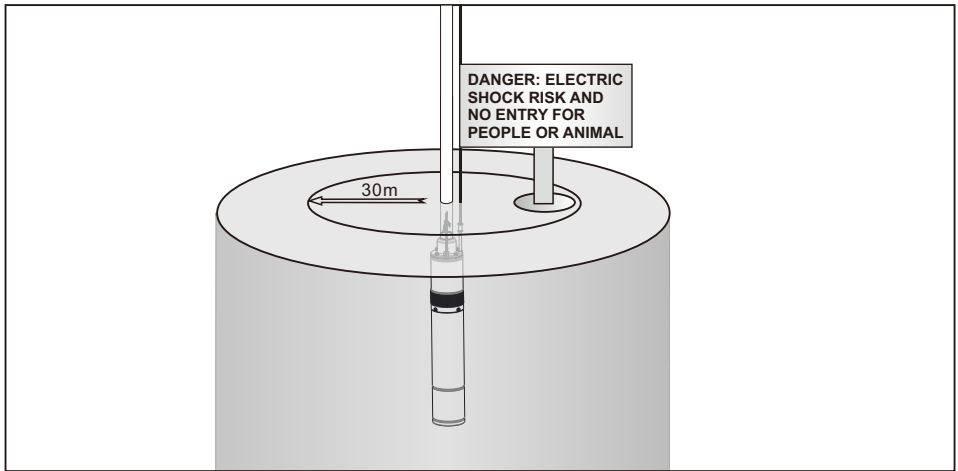
7. When the Electric Pump is submerged in water, its depth shall not exceed 70m and shall be at least 5m, and it shall not be caught in sludge. Simultaneously keep the mesh enclosure or the inlet from being blocked by water plants or sundries, for such blocking may result in the Electric Pump's failure to operate normally. During operation, please frequently check the water level and do not make the operating Electric Pump appear above the water surface.



8. When the Electric Pump to be used is far away from the power supply, cable should be thickened according to the distance (the diameter of the cable line shall be bigger than that of the Electric Pump)

9. Please arrange a safety warning sign on the site where the Electric Pump is operating, which reads **“DANGER: ELECTRIC SHOCK RISK AND NO ENTRY FOR PEOPLE OR ANIMAL”**, so as to prevent any accident.





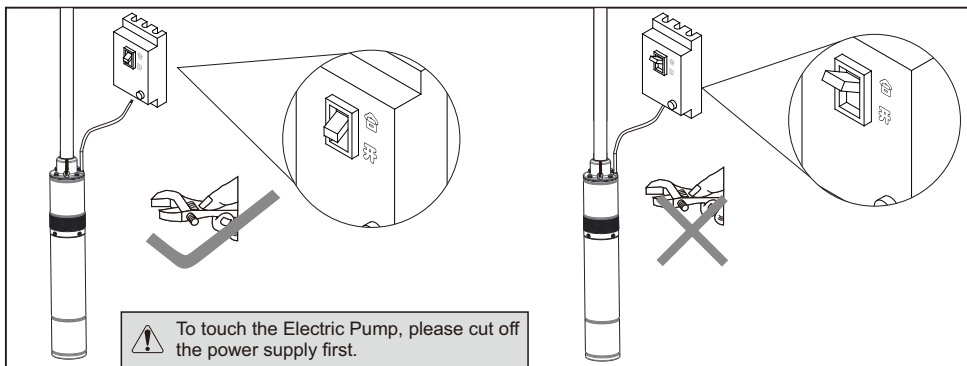
10. A single-phase electric pump with integrated automatically-reset thermal protector, when the thermal protector works, automatic reset will happen after the temperature of the motor decreases to a certain value, In the event of frequent protection actions, please cut off the power supply and find out the causes and then operate the Electric Pump until the relevant trouble is cleared.

For a three-phase electric pump with integrated power failure-reset thermal protector, upon the protection action of the protector, please first cut off the power supply and turn on the power supply again after 10 minutes, Electric Pump will operate normally. In the event of frequent protection actions, please cut off the power supply and find out the causes and then use the Electric Pump until the relevant trouble is cleared.

11. This series is filled with No. 10 white food machinery oil so as to ensure that the mechanical seal is effectively lubricated and cooled, which might leak in case of any damage or fault of the Electric Pump. The leaked white oil might damage the botany planted or the animal bred or pollute the drinking water or food involved in any application relating to planting, breeding, or delivery or processing of drinking water or food. To select this product, the user shall evaluate the relevant application and the consequence of the use of this product so as to confirm whether this product is suitable and even invite a related specialized person to do such confirmation when necessary. In case of any leakage of white oil, please immediately stop using and properly dealing with it.

12. When the content of solids in the medium pumped exceeds the specified one, the flow rate of the Electric Pump will obviously decline, the screw and the rubber stator shall be replaced in time if such dramatic decline continues, make sure that the screw properly fits with the rubber stator.

13. When the Electric Pump is being used, please first cut off the power supply in case that the Electric Pump is to be relocated or touched, so as to avoid any accident.



14. When the Electric Pump is operating, its cable head or plug board shall not be put into water; when such submersion is necessary due to the addition of a cable, the connection shall be sealed strictly to prevent water seepage and electrical leakage. pply in case that the Electric Pump is to be relocated or touched, so as to avoid any accident.

		<p>At least 10 times as the diameter of the conductor.</p>
<p>1.Remove the insulating layer without damaging the conductor. 2.Stagger long and short wires. 3.Ensure that no oil, water or any other pollutant exist at the connection.</p>	<p>1.Divide each connector into several strands evenly (no less than 6 ones) and tighten them. 2.Cross the two connectors so that the overlapping length will make the two ends aligned with the insulating layer.</p>	<p>1.Clench each strand. First get one strand from the middle and make it wind to one end (the wound core wire shall include the remaining strands) and then make each of the remaining strands wind successively as well. 2.Follow the same procedure at the other end. 3.Use plier to tighten the connectors. The best effects can be achieved by wrapping the connectors with tin. 4.Remark: For other methods, please refer to the attached Drawing 1 and Drawing 2.</p>
<p>Plastic insulating tape Pressure sensitive tape Black tape 30mm</p>	<p>Plastic insulating tape Pressure sensitive tape 10mm First layer Last layer Connector of several wires 30mm</p>	
<p>1.First use the black tape to tightly wrap the connector area and make two layers; do not expose copper wire head. Please see the attached Drawing 3. 2.Then use the pressure sensitive tape (self-adhesive tape) to make a three-layer wrapping, 10mm longer at the two ends should be needed based on previous layer wrapping. Do not do wrapping until the length of the tape drawn out is twice the original length. 3.Finally apply the plastic insulating tape (yellow transparent) to make the last layer wrapping.</p>	<p>1.Properly arrange the connectors of core wires and make a four-layer wrapping by use of the pressure sensitive tape with two ends wrapping a length of 30mm on the cable sheath and 10mm longer at the two ends should be needed based on previous layer wrapping 2.Then make a three-layer wrapping with the plastic insulating tape with the next layer about 10mm longer than the first layer at the two ends.</p>	
<p>Drawing 1</p> <p>An electric arc welded joint is preferred.</p>	<p>Drawing 2</p> <p>A joint made by cold welding of casing is also acceptable.</p>	<p>Drawing 3</p> <p>When the first layer of the black tape is made, no copper wire shall be exposed or the tape shall not be punctured.</p>

Cable Connection Diagram

15. Do not lift the Electric Pump out of water immediately after the power supply of the Electric Pump is cut off, so as to ensure safety.

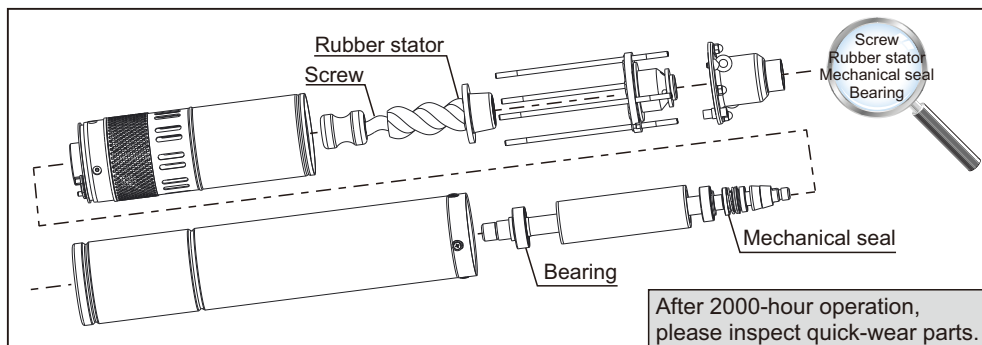
## V. Maintenance

1. The matters needing attention prior to the disassembly of the motor for maintenance: First wait until the motor is cool, then unscrew the oil filler hole, to release the high-pressure gas generated inside due to burn-in, for the purpose of preventing the upper cover from jumping out to hurt people.

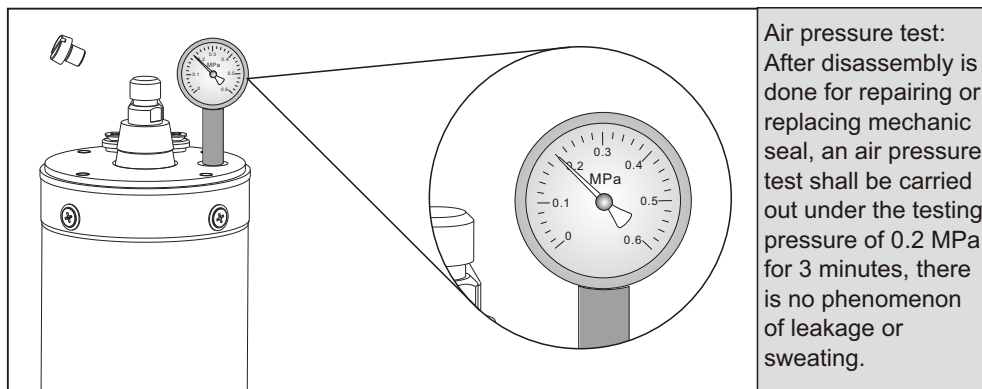
2. Regularly inspect the insulation resistance between the motor bracket and the winding of the Electric Pump, which shall be greater than  $1M\Omega$  when the operating temperature is nearly achieved, or otherwise usage shall not be allowed until the relevant inspection and maintenance is completed.

3. After 2000-hours normal usage of the Electric Pump, the Electric Pump shall be maintained as per the steps below:

Disassemble the Electric Pump and inspect various easy broken parts such as the roller bearing, mechanical seal, screw, and rubber stator. Please immediately replace those in case there are damaged ones.



**Air pressure test:** After disassembly is done for repairing or replacing mechanic seal, an air pressure test shall be carried out under the testing pressure of 0.2 MPa for 3 minutes, there is no phenomenon of leakage or sweating.



## VI. Troubleshooting

Fault	Cause	Remedy
Difficulty in startup	<ol style="list-style-type: none"> <li>1.The supply voltage is too low.</li> <li>2.The Pump suffers a phase loss.</li> <li>3.The screw is blocked.</li> <li>4.The voltage drop of the cable is too high.</li> <li>5.The stator winding is burnt.</li> </ol>	<ol style="list-style-type: none"> <li>1.Adjust the voltage to <math>\pm 10\%</math> of the rated value.</li> <li>2.Inspect the plug, the cable, and the head of the outgoing line of the switch.</li> <li>3.Correct the part blocked.</li> <li>4.Use a thickened cable.</li> <li>5.Re-insert the winding or carry out overhaul.</li> </ol>
Low water yield	<ol style="list-style-type: none"> <li>1.The mesh enclosure is blocked.</li> <li>2.The screw or rubber stator is seriously worn.</li> <li>3.The submersion depth of the Electric Pump is less than standard and air is absorbed.</li> <li>4.The screw rotates reversely.</li> </ol>	<ol style="list-style-type: none"> <li>1.Clear away sundries like water plants.</li> <li>2.Replace the screw or rubber stator.</li> <li>3.Adjust the submersion depth of the Electric Pump, which shall not be less than 0.5m.</li> <li>4.Exchange any two phases of a three-phase electric pump.</li> </ol>
No flow suddenly	<ol style="list-style-type: none"> <li>1.The switch is disconnected or the fuse is burnt.</li> <li>2.The power supply is cut off.</li> <li>3.The screw is blocked.</li> <li>4.The stator winding is burnt.</li> <li>5.The protector trips.</li> <li>6.The outlet pipe falls off.</li> <li>7.The impact by backwater exists in the pipeline and the screw gets loose.</li> </ol>	<ol style="list-style-type: none"> <li>1.Inspect whether the head range or the voltage of the power supply conforms to the relevant provisions and make adjustments.</li> <li>2.Find out the cause of power failure and clear the relevant fault.</li> <li>3.Clear away sundries.</li> <li>4.Re-insert the winding or carry out overhaul.</li> <li>5.Find out the relevant cause (too low supply voltage, overload, or blocked screw) and remove the fault.</li> <li>6.Re-connect the pipeline.</li> <li>7.Disassemble the Electric Pump and re-tighten the screw, and add a check valve to the pipeline.</li> </ol>
Stator winding burnt	<ol style="list-style-type: none"> <li>1.The Electric Pump suffers from a phase loss and operates for a long time.</li> <li>2.Water leakage occurs due to the damaged mechanical seal, causing the interturn or interphase short circuit.</li> <li>3.The screw is blocked.</li> <li>4.The Electric Pump start frequently or operates without water for a long time.</li> <li>5.The Electric Pump makes overload operation.</li> </ol>	<p>Disassemble the winding and re-insert the winding as per the concerned technical requirements as well as immerse and dry the insulating varnish or deliver the winding to the repair station for repair.</p>

### Notes:

1. All the diagrams in this Operating Manual shall be only for reference, the Electric Pump purchased and its accessories might be different from those indicated in this Operating Manual. Your understanding is really appreciated.

2. This series of products is subject to continuous improvements and changes without further notice and a product (including its appearance and color) in kind shall prevail.