



# SERVICE MANUAL

## Mini-type Clean-water Centrifugal Electric Pump

Models: SG(m), SE(m), SS(m), QJD

**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

Electric Submersible Deep Well Pumps(hereinafter referred to the “Electric Pump”) include SG(m), SE(m), SS(m), QJD series. SG(m), SE(m), SS(m) series are oil-filled being composed of two parts i.e. pump body and motor. Pump body is with multistage centrifugal impellers lying upper of the Electric pump, 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.

QJD series is dry-type Electric pump being composed of two parts, i.e. pump body and motor. Pump body is with multistage centrifugal impellers lying upper of the Electric pump, a single-phase dry-type asynchronous motor is at the bottom of the Electric pump; adopting single-ended mechanical seal and double-ended mechanical 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.

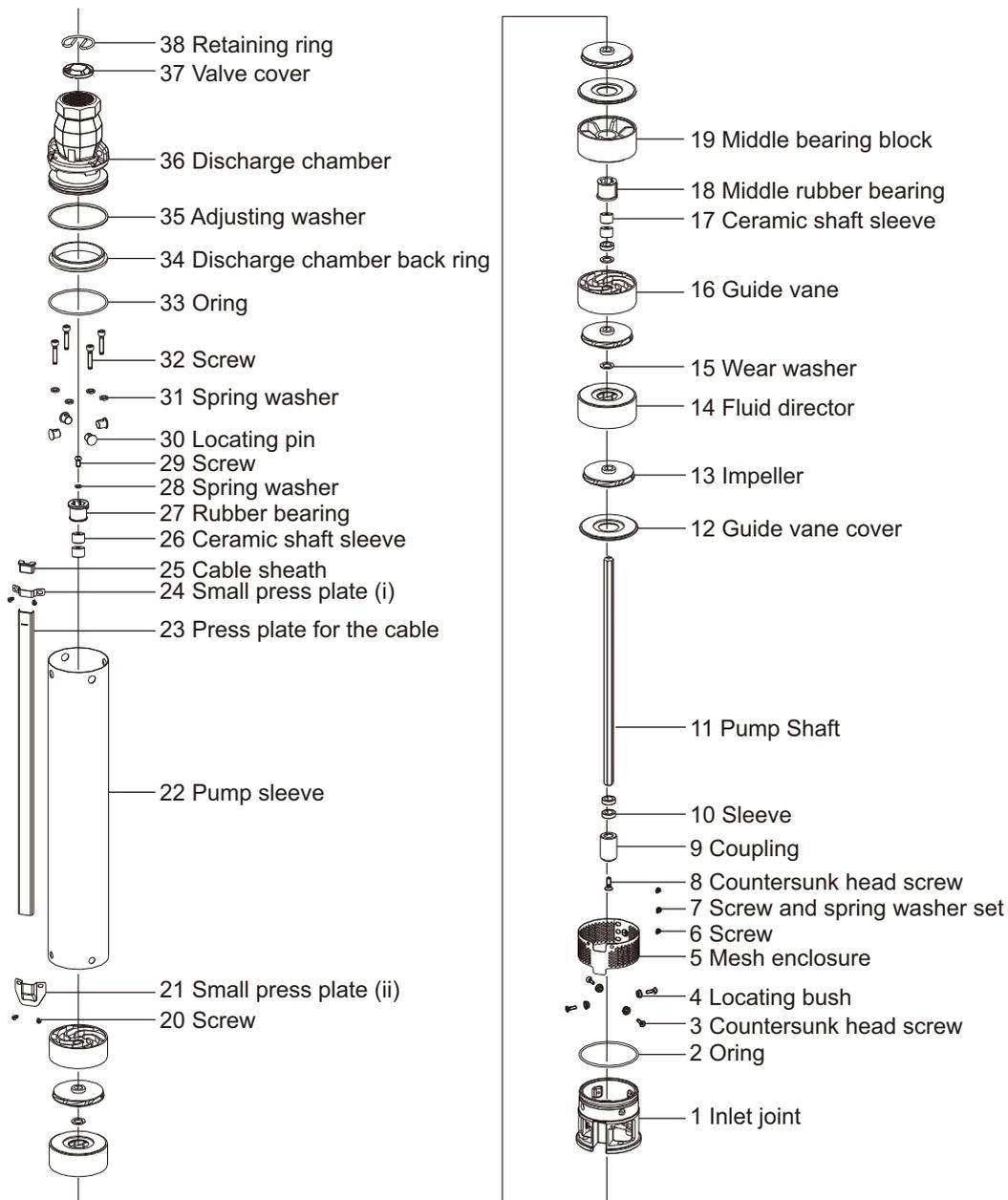
Electric pump is with high head due to its multistage impellers structure, Which are widely applied in irrigation, deep well water lifting, tower water delivery, urban construction, and water supply to industrial and mining enterprises.

## II. Operating Conditions

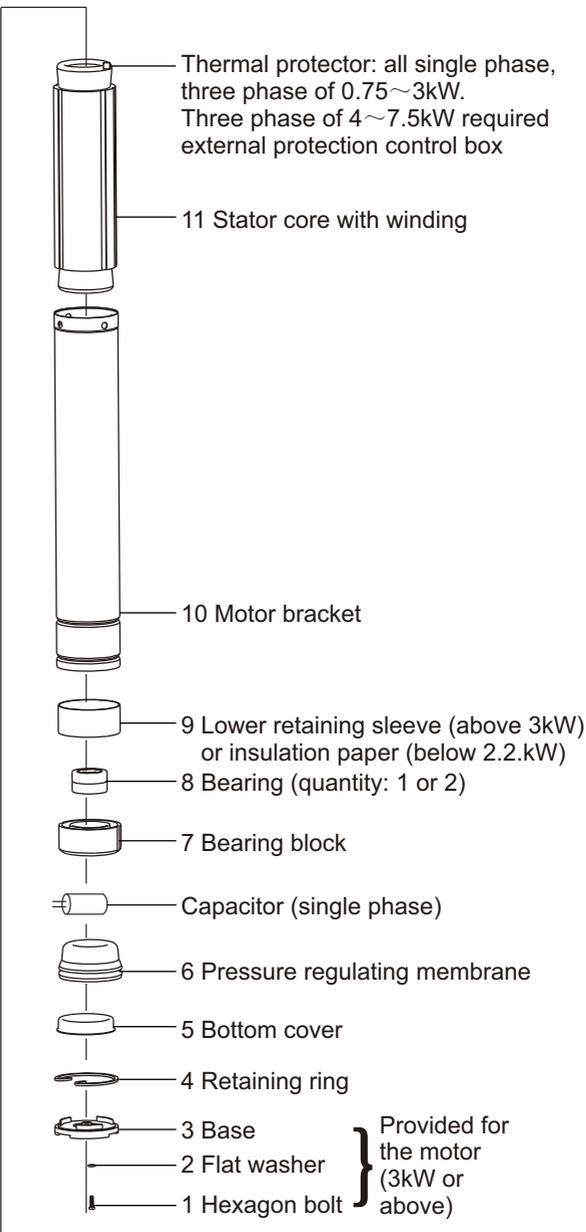
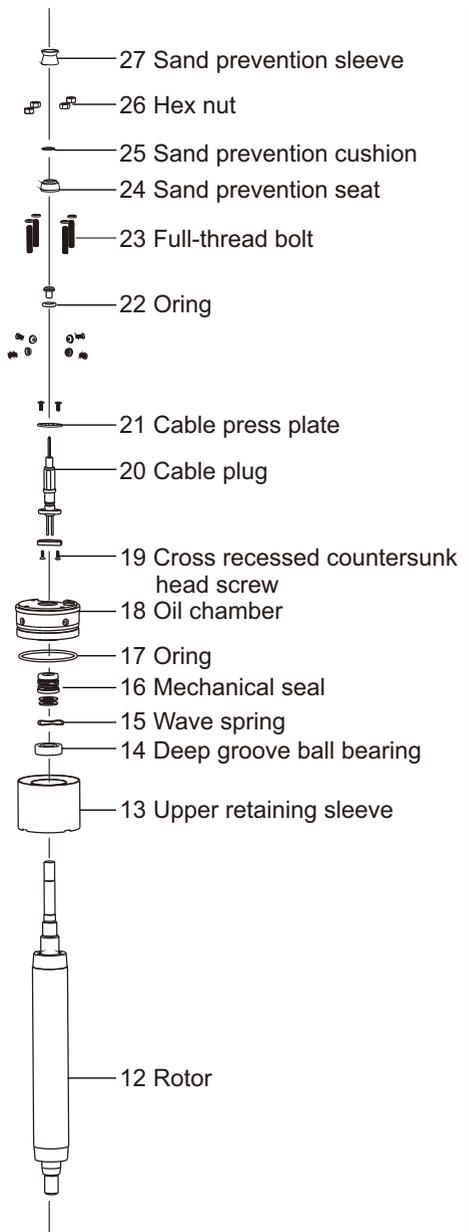
The Electric Pump shall be able to operate continuously and normally in the following operating conditions:

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 0.01% and the particle size is not bigger than 0.2mm;
4. The submersible depth of the Electric Pump in the water is 5~70m, while that of a QJD pump is 5~20m.

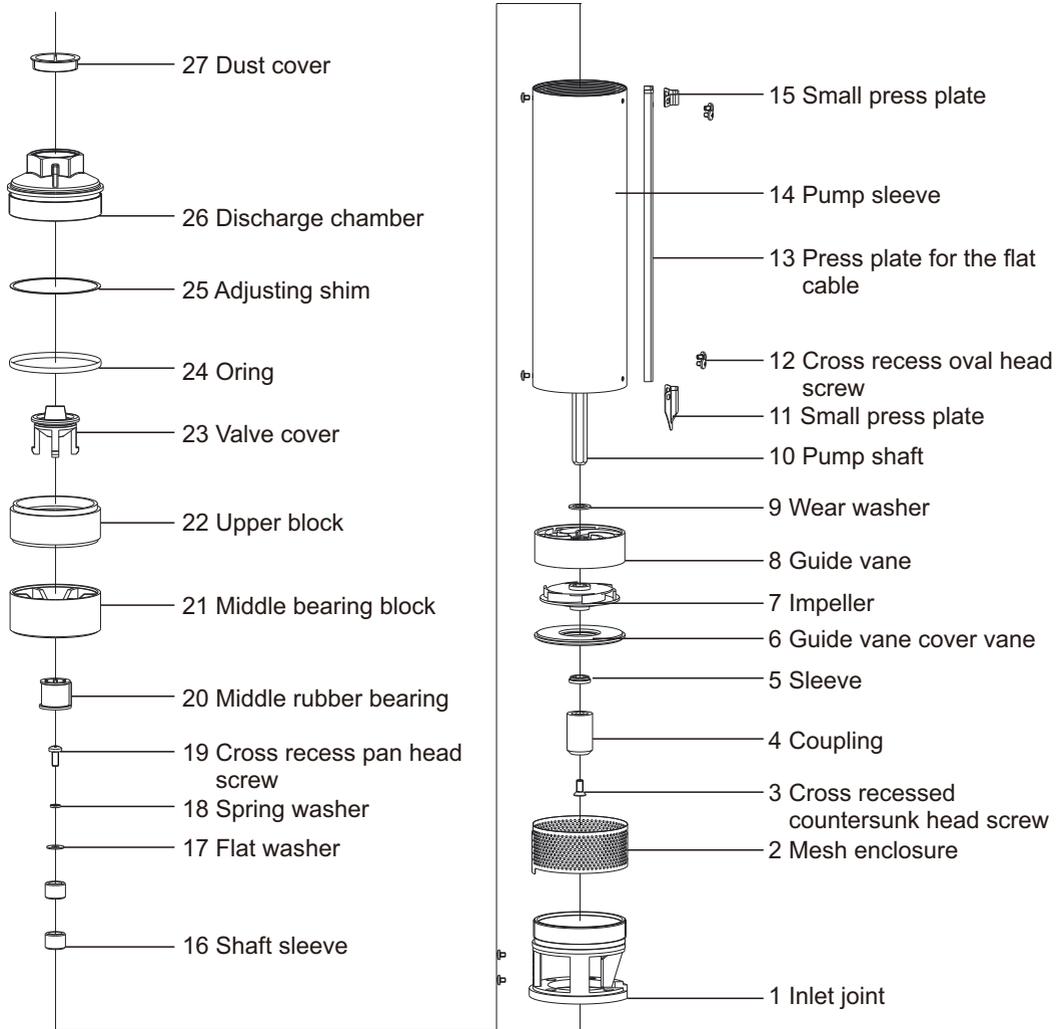
### III. Structure diagram



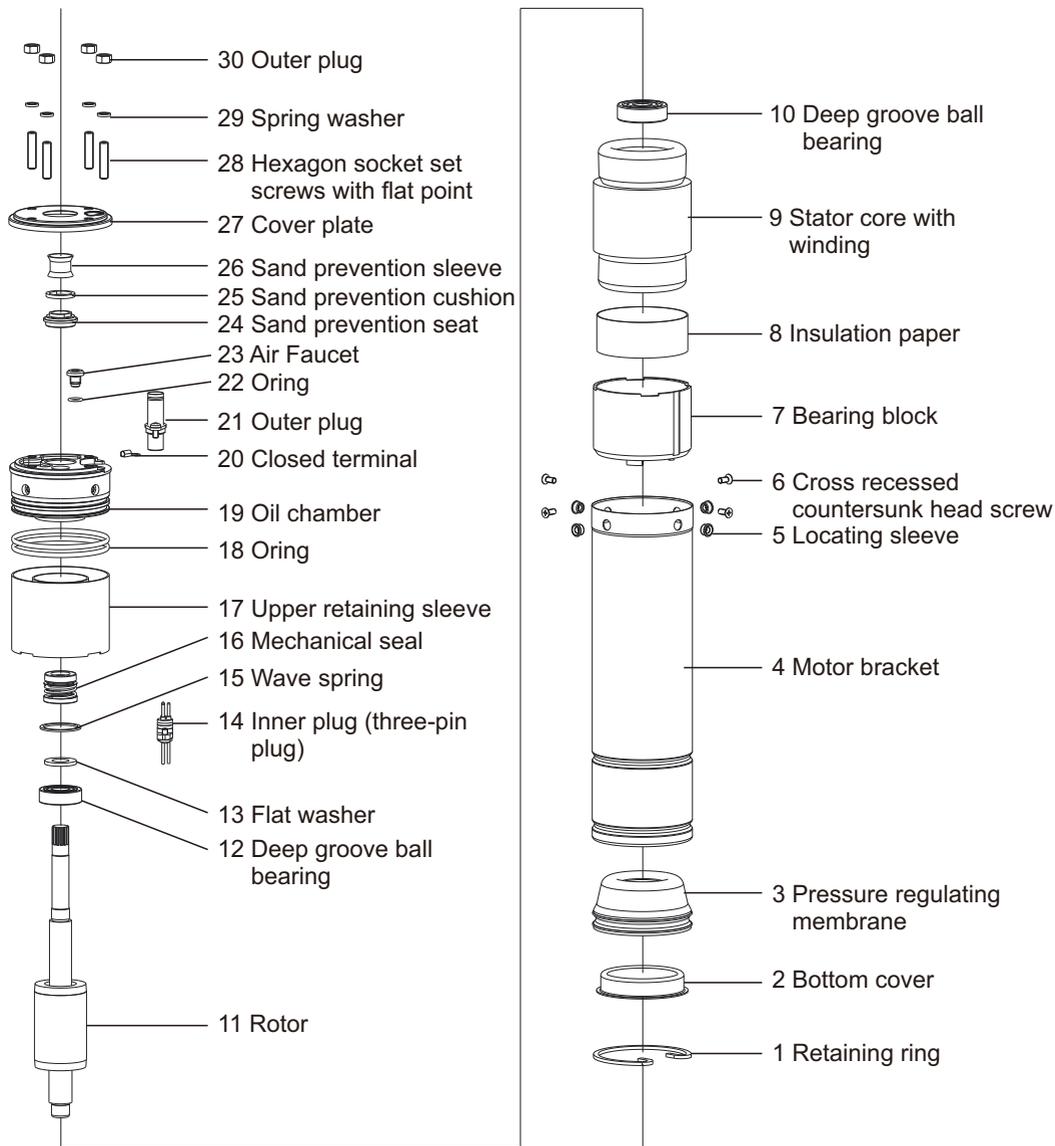
Pump Part of SE (m) Series



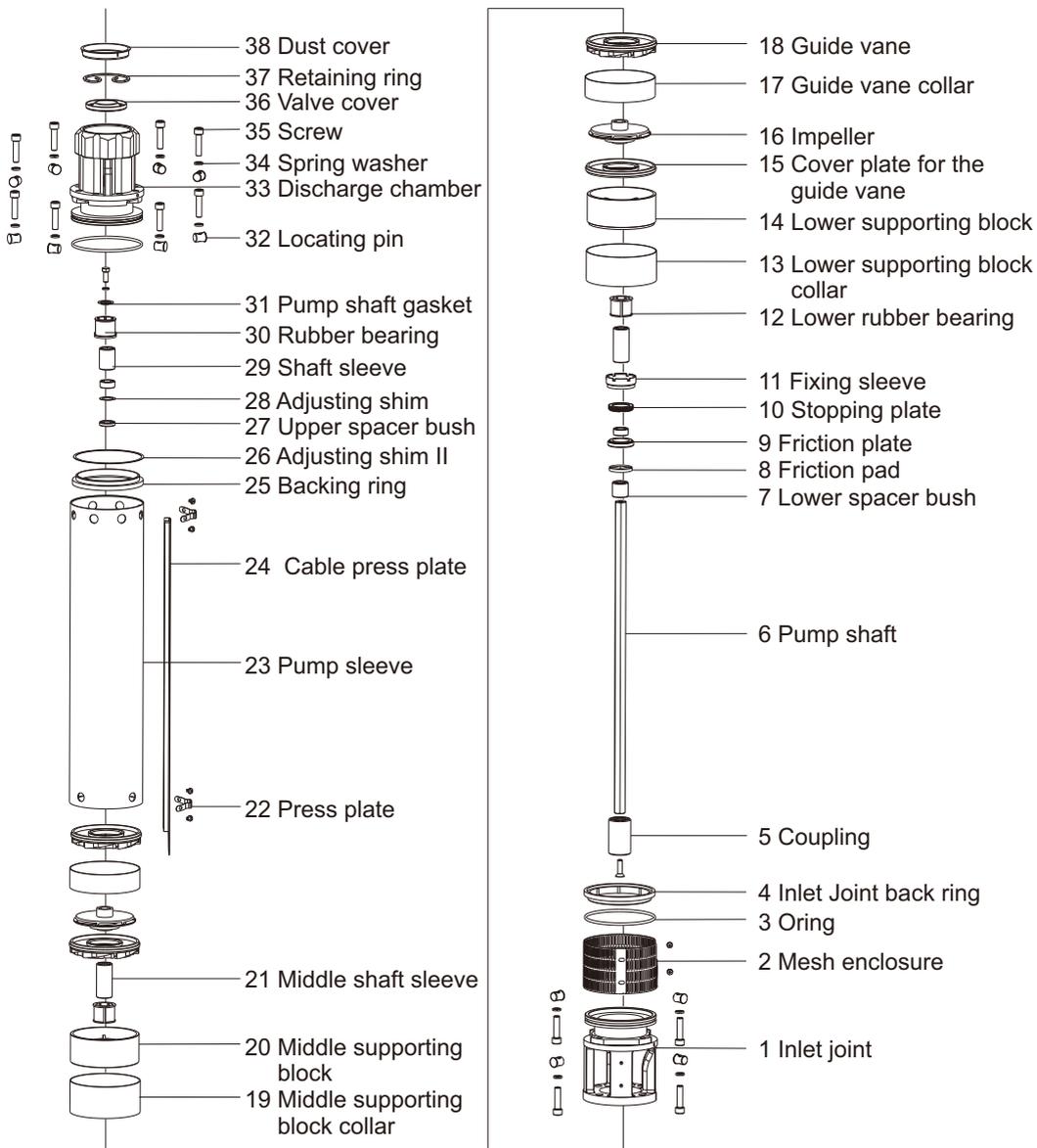
**Motor Part of SE (m) Series**



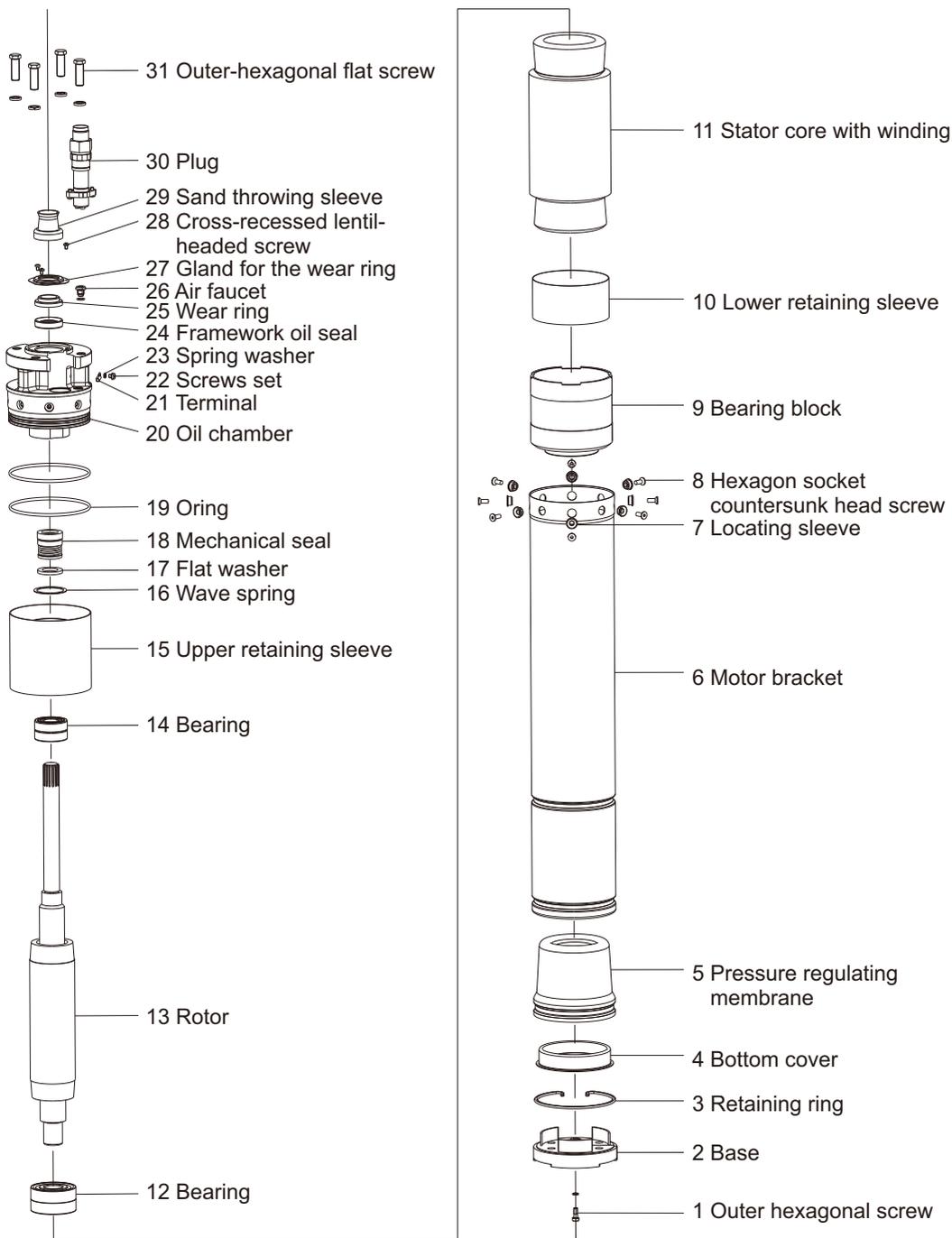
**Pump Part of SG (m) Series**



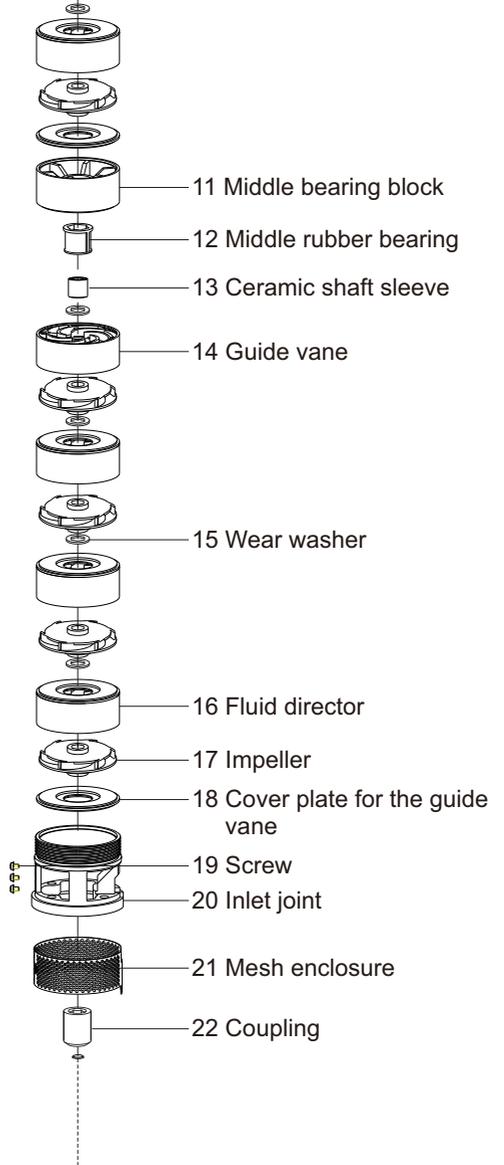
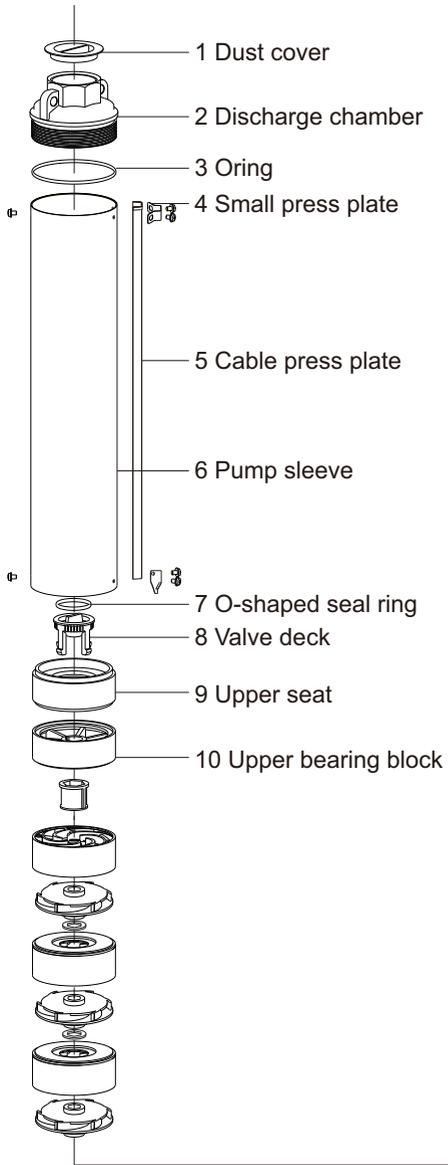
**Motor Part of SG (m) Series**



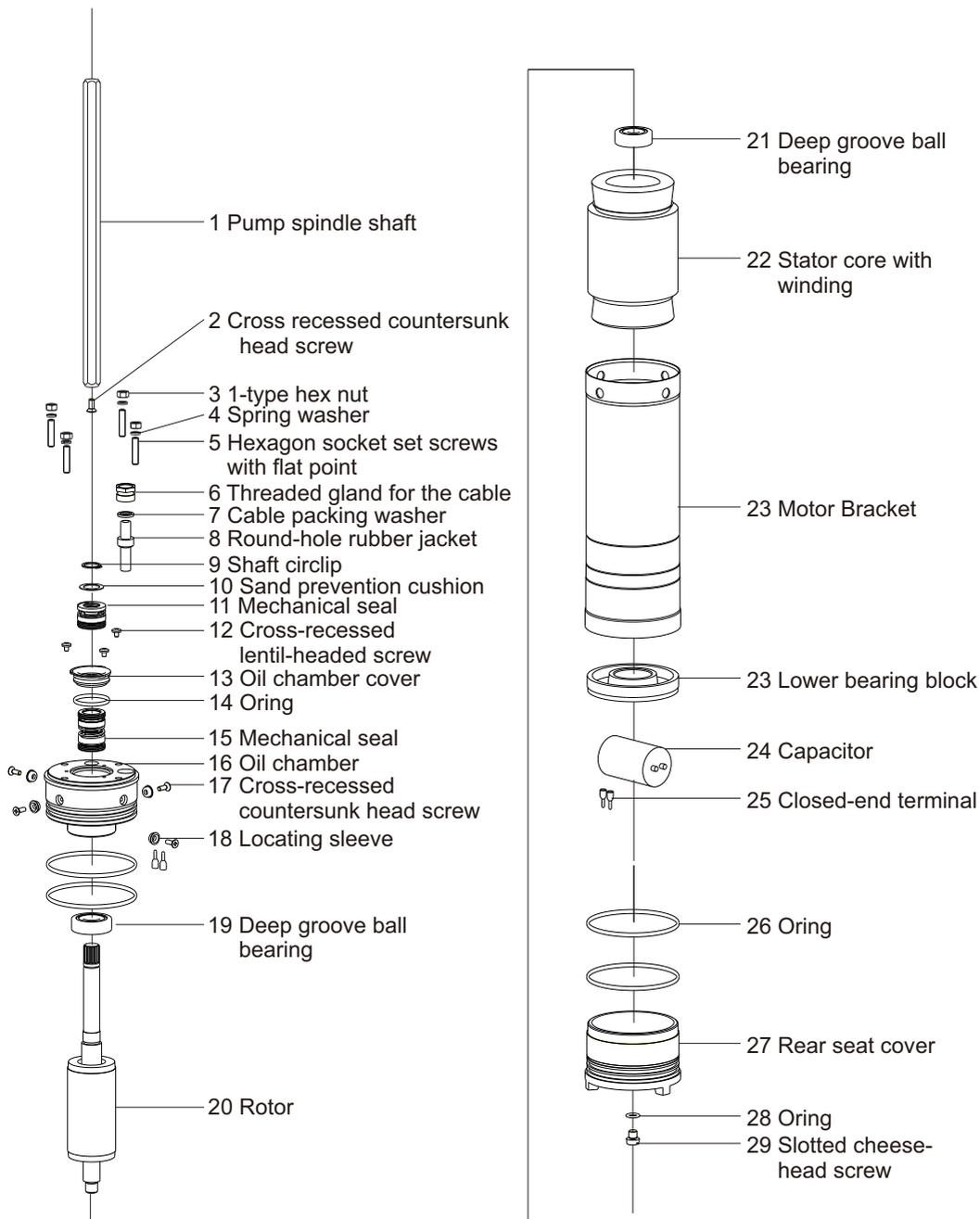
**Pump Part of 6SE-T Series**



**Motor Part of 6SE-T Series**

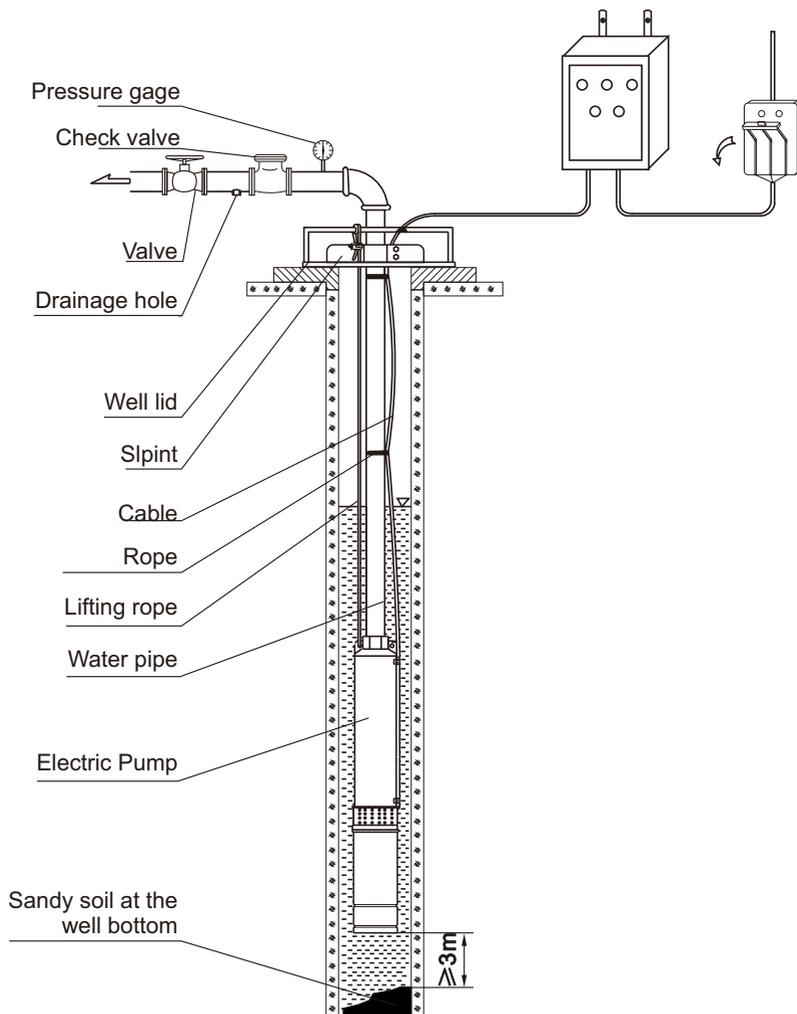


**Pump Part of QJD Series**



**Motor Part of QJD Series**

## IV. Instructions for Installation and Use

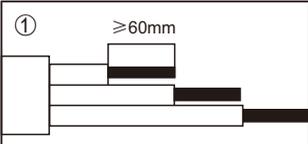
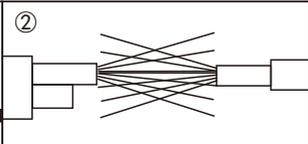
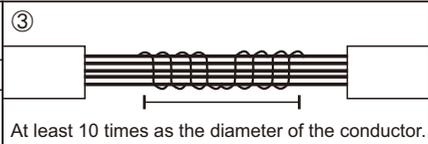
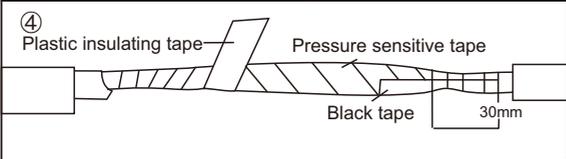
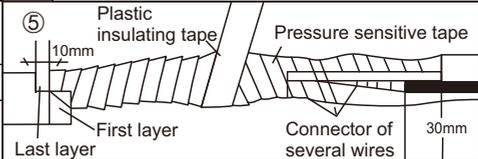
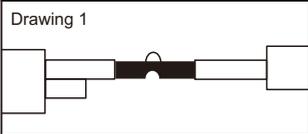
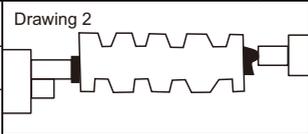
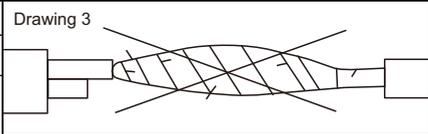


**Installation Diagram**

1. Before installation and use, please fully check whether the Electric Pump is damaged during transportation or storage, for example, whether any cable or terminal box 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 cold insulation resistance of the Electric Pump, which shall be not less than  $100M\Omega$ , or otherwise the corresponding measures shall be taken and operation shall not be allowed until the relevant requirements are met.

3. During the wiring of a three-phase electric pump, please properly install an electrical leakage protection device to the pump. For those pumps provided with control box, please make connecting according to the diagram in the control box or related instruction manual.

		 <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 exists 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 are 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 pliers 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>1.First use the black tape to tightly wrap the connector area and make two layers; do not expose the 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>An electric arc welded joint is preferred.</p>	<p>A joint made by cold welding of casing is also acceptable.</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>

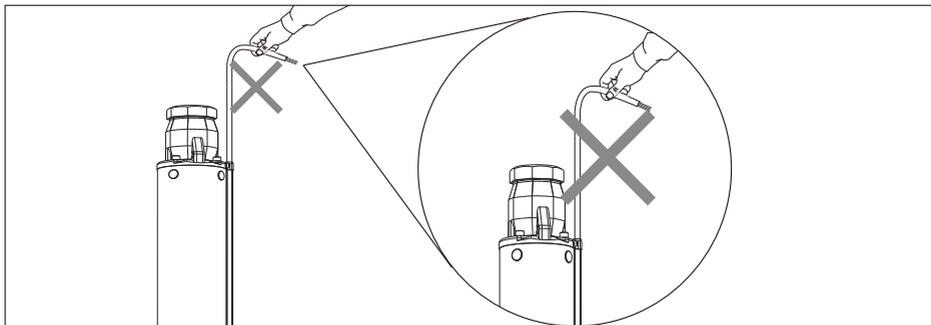
### Cable Connection Diagram

4.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.

5. Before putting the Electric Pump into water, please carry out a test running for no more than 10 seconds and simultaneously check whether the rotational direction of the pump shaft is the same as that indicated by the indicating arrow in the nameplate.

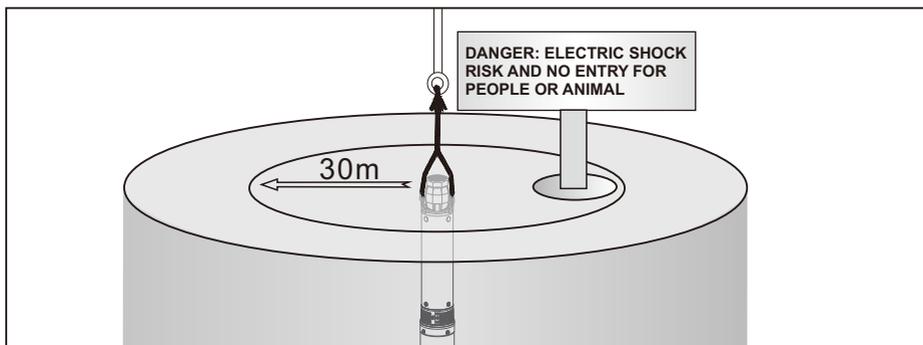
6. Connect a delivery pipe (whose specifications are selected based on Table 1) matching with the discharge chamber. For example, tighten a soft delivery pipe with the iron wire or a clamp or reliably connect a steel-type delivery pipe with the screwed joint, and then tie a rope to the delivery chamber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

7. 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. Upon installation, bind the cable to the delivery pipe or take other proper measures for protection, so as to avoid any tensile deformation due to the great dead-weight of the cable.



8. When the Electric Pump is submerged in water, its depth shall not exceed 70m (20m for QJD series) and shall be at least 3m away from water bottom and it shall not be caught in sludge. Simultaneously keep the mesh enclosure or the impeller 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 make sure that there is enough water to cover 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. Oil-filled electric pumps shall not be filled with any liquid medium other than No. 10 mechanical oil. dry-type structure QJD series shall not be filled with any liquid medium.

11. Oil-filled electric pump 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 a product hereunder, the user shall evaluate the relevant application and the consequence of the use of such a product so as to confirm whether the 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 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.

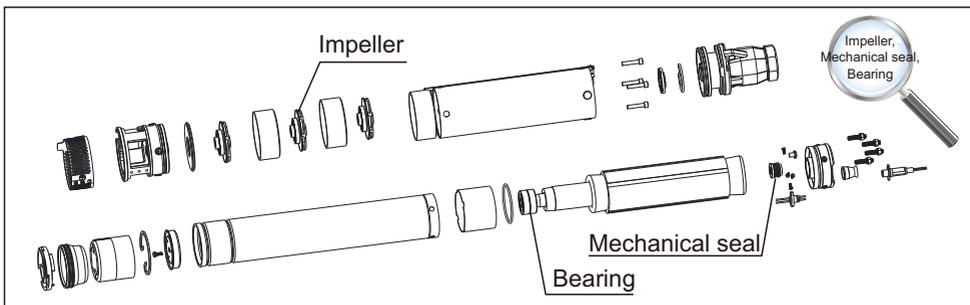
## V. Maintenance

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.

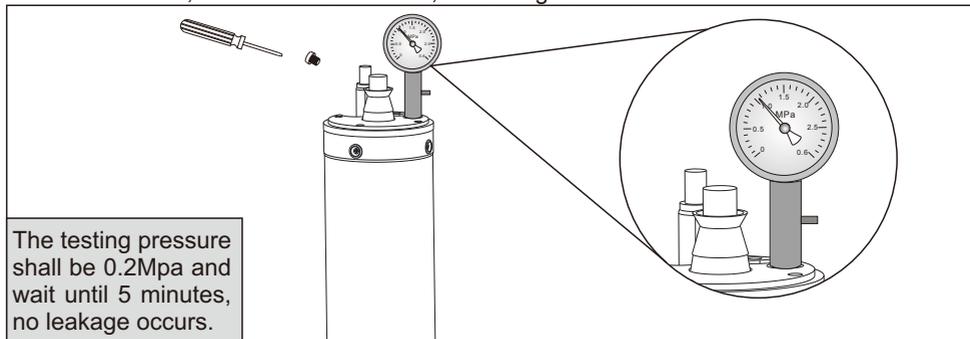
2. Regularly inspect the insulation resistance between the motor bracket and the winding of the Electric Pump, which shall be no less than  $1M\Omega$  when the operating temperature is nearly achieved, or otherwise usage shall not be allowed until the corresponding measures are taken and the relevant requirements are met.

3. After the 2500-hours normal usage of the Electric Pump, the Electric Pump shall be maintained as per the steps below:

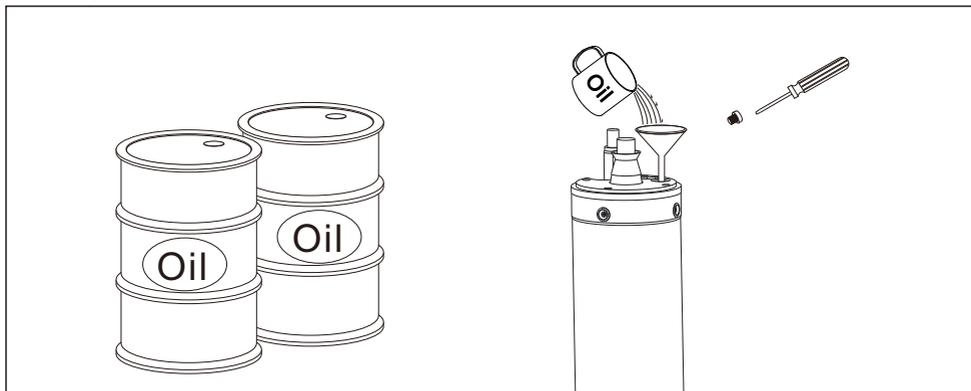
a) inspect various easy broken parts such as the mechanical seal, bearing, and impeller. Please immediately replace in case there are damaged ones.



b) After the completion of inspection and repair, please do an air pressure test under the pressure of 0.2MPa; to wait until 5 minutes, no leakage occurs.



c) When the replacement of No. 10 white food machinery oil for an oil-filled motor, the motor must be fully filled.



3.If the Electric Pump is not used for a long time, it should not be submerged in water. Place it in clean water for energized operation for minutes, clear away the condensate inside and outside the Pump, dry it, and then carry out rust-proof treatment, and finally put it at a well-ventilated dry place.

## 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 impeller is blocked.</li> <li>3. The cable is too thin and the voltage drop is too high.</li> <li>4. 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. Correct the part blocked.</li> <li>3. Select a proper cable.</li> <li>4. Re-insert the winding or carry out overhaul.</li> </ol>
Low water yield	<ol style="list-style-type: none"> <li>1. The head is too high.</li> <li>2. The mesh enclosure is blocked.</li> <li>3. The impeller is seriously worn.</li> <li>4. The submersion depth of the Electric Pump is less than standard and air is absorbed.</li> <li>5. There is leakage at the outlet.</li> </ol>	<ol style="list-style-type: none"> <li>1. Follow the range of head.</li> <li>2. Clear away sundries like water plants.</li> <li>3. Replace the impeller.</li> <li>4. Adjust the submersion depth of the Electric Pump, which shall not be less than 5m.</li> <li>5. Add the Teflon tape to the place of thread for sealing.</li> </ol>
No rotation suddenly	<ol style="list-style-type: none"> <li>1. The switch is disconnected or the fuse is burnt.</li> <li>2. The impeller is blocked.</li> <li>3. The stator winding is burnt.</li> <li>4. The motor is overloaded and the protector acts.</li> </ol>	<ol style="list-style-type: none"> <li>1. Inspect whether the head and the supply voltage used conforms to the relevant provisions and make adjustments accordingly.</li> <li>2. Remove sundries.</li> <li>3. Re-insert the winding or carry out overhaul.</li> <li>4. Check whether the impeller is blocked or the voltage is too low.</li> </ol>

Fault	Cause	Remedy
Stator winding burnt	1. The mechanical seal is damaged and water leakage happens, resulting interturn or interphase short circuit. 2. The impeller is blocked. 3. The Electric Pump starts frequently or operates without water for a long time. 4. The Electric Pump makes overload operation.	Do troubleshooting, 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.

Table on Head Loss per 100m of the Steel Pipe

Flow rate		Inner diameter of pipe [mm]										
m <sup>3</sup> /h	L/S	25	32	38	50	65	75	80	100	125	150	200
3	0.83	16.31	4.9	2.12	0.56	0.16						
4	1.11	27.76	8.35	3.61	0.95	0.26	0.13	0.1				
5	1.39	42	12.62	5.46	1.44	0.4	0.2	0.15				
6	1.67		17.68	7.66	2.01	0.56	0.28	0.2				
7	1.94		23.53	10.19	2.68	0.75	0.37	0.27				
8	2.22		30.13	13.05	3.43	0.95	0.48	0.35	0.12			
9	2.5		37.47	16.23	4.26	1.19	0.59	0.43	0.15			
10	2.78			19.72	5.18	1.44	0.72	0.52	0.18			
12	3.33			27.64	7.26	2.02	1.01	0.74	0.25			
14	3.89			36.78	9.66	2.69	1.34	0.98	0.33	0.11		
16	4.45				12.37	3.45	1.72	1.25	0.42	0.14		
18	5				15.39	4.29	2.14	1.56	0.53	0.18		
20	5.56				18.7	5.21	2.6	1.9	0.64	0.22	0.09	
25	6.94				28.27	7.83	3.92	2.87	0.97	0.33	0.13	
30	8.33					11.15	5.3	4.02	1.35	0.46	0.19	
35	9.72					14.89	7.32	5.34	1.8	0.61	0.25	
40	11.1					18.81	8.38	6.54	2.31	0.78	0.32	
45	12.5					23.39	11.65	8.51	2.87	1	0.4	
50	13.9						14.17	10.32	3.49	1.18	0.48	0.12
60	16.7						19.86	14.5	4.89	1.65	0.68	0.17
70	19.4							19.29	6.5	2.1	0.9	0.22
80	22.2							24.7	8.33	2.81	1.16	0.28
90	25								10.35	3.49	1.44	0.38
100	27.8								12.59	4.25	1.75	0.43

1. Head loss per 100m of the plastic pipe=Head loss per 100m of the steel pipe X 0.7

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. The products involved hereunder are subject to continuous improvements and changes without further notice and a product (including its appearance and color) in kind shall prevail.