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Installation, Operation & Maintenance Manual

Model: MSS Submersible Slurry Pump



Milestone Pump Company

INTRODUCTION OF SUBMERSIBLE SLURRY PUMP

1. The whole machine is dry submersible pump, and the motor adopts oil chamber seal mode and is provided with mechanical seal inside, so that high pressure water and impurities are effectively prevented from entering inner cavity of the motor.
2. Besides the main impeller, there is the agitation impeller which can agitate the sludge deposited on the water bottom into turbulent flow and pump the sludge out.
3. The overflowing parts such as the impeller and the agitation impeller are made from high-hardness high chromium cast steel, have wear resistance, corrosion resistance and strong drainage capacity, and allow big solid particles to pass.
4. The motor is submerged in water, is not limited by suction stroke, and has high sludge suction rate and thorough desilting.
5. The integral device is simplified, needs no auxiliary stirrer device or ejector device, and has simple and convenient operation and low total investment of the unit.

MAIN APPLICATION OF SUBMERSIBLE SLURRY PUMP

Pumping tailing slurry for industrial and mining organizations, clearing silt in sedimentation basin, pumping silty sand or fine sand for seashore or port, pumping powdery iron ore for foreign countries, etc.

The overflowing parts adopt wear-resistant alloy material and have long service life. In suitable construction environment, the mating is simple and convenient in operation and application. If the sand is large, high pressure gun can be added to increase the medium concentration.

SERVICE CONDITION

1. **Power supply** The power source is 50Hz/380V three-phase alternating-current supply,
2. **Temperature of the medium:** The temperature of the medium cannot exceed 60Celsius, and the medium does not contain inflammable or explosive gases.
3. **Max weight density of the solid particle** The maximum weight concentration of the solid particles in the medium: the maximum weight concentration of the ash is 45% and the maximum weight concentration of the slag is 60%.
4. **Submerged depth:** not more than 20 meters, and not less than 1 meter.
5. The unit works in the medium vertically, and the working status is continuous.

MSS

ELECTRO-SUBMERSIBLE SLURRY PUMPS

Durable, electro-submersible slurry pumps. Versatile and rugged solution for the transfer of abrasive and high density slurries in mining, civil construction, industry and other heavy duty applications.

VERSATILE HEAVY DUTY SOLUTION

Milestone MSS series are a heavy duty, electro-submersible slurry pumps designed to handle a wide range of slurries and abrasive particles in submersible applications in mining and industry.

MSS pumps feature a rugged construction using the highest quality materials to ensure reliable performance and excellent service life. The high quality electric motors incorporate multiple protection features to detect the ingress of water or excessive temperatures to shut off the pump and prevent damage.

Pumps are available in 72 different models in sizes ranging 3.15 - 16 inches discharge and are capable of flow rates from 100 to 10560 USGPM and heads up to 210 ft. Pumps can pass solids up to 2.4 inches in diameter enabling them to transfer dense slurries with large abrasive particles.



Major Components & Specifications

Standard configuration

LARGE CUT WATER CLEARANCE

The pump casing features a large cut water clearance which allows the easy passage of large solids and reduces wear and erosion to improve service life and prevent loss of efficiency.

INTEGRAL AGITATOR

The 27% chrome white iron agitator assists in the pumping of slurries by breaking up large particles and agitating high concentrations of solids.

HEAVY DUTY CONSTRUCTION

The pump casing, impeller, backplate and agitator are manufactured from high quality 27% chrome white iron. This extremely tough construction material can withstand continuous use in heavy duty applications and allows the SS pumps to transfer abrasive and dense slurries with minimal wear. The pumps feature a replaceable backplate allowing for simple servicing and easy replacement of worn components.

F CLASS MOTOR INSULATION

F class motor insulation is used to ensure reliable operation in heavy duty applications in temperatures up to +40°C. In applications where higher temperatures are expected, H class motor insulation can be used to allow operating temperatures up to +70°C.

SUPPORT FRAME AND STRAINER

A heavy duty mild steel frame with round base and strainer provide excellent stability and durability whilst

DOUBLE MECHANICAL SEAL

A double mechanical seal provides excellent shaft sealing between the electric motor and wet end. The seals are oil bath lubricated and feature carbon/ceramic seal faces in the wet end and tungsten ceramic faces in the drive end to provide excellent durability and service life across a wide range of duties and applications.

Optional Components

OIL CHAMBER LEAKAGE PROBE

The oil chamber incorporates a water leakage probe which detects when the water-to-oil ratio is too high and automatically shuts down the motor to prevent damage.

MOTOR FLOAT SWITCH

A float switch is located in the bottom of the motor to detect the ingress of water and shut down the motor to prevent damage due to shorting out.

MOTOR TEMPERATURE SENSORS

Temperature sensors are located in the motor stator to detect excessive temperatures and can shut down the motor to prevent damage due to overheating.

THRUST BEARING SENSORS

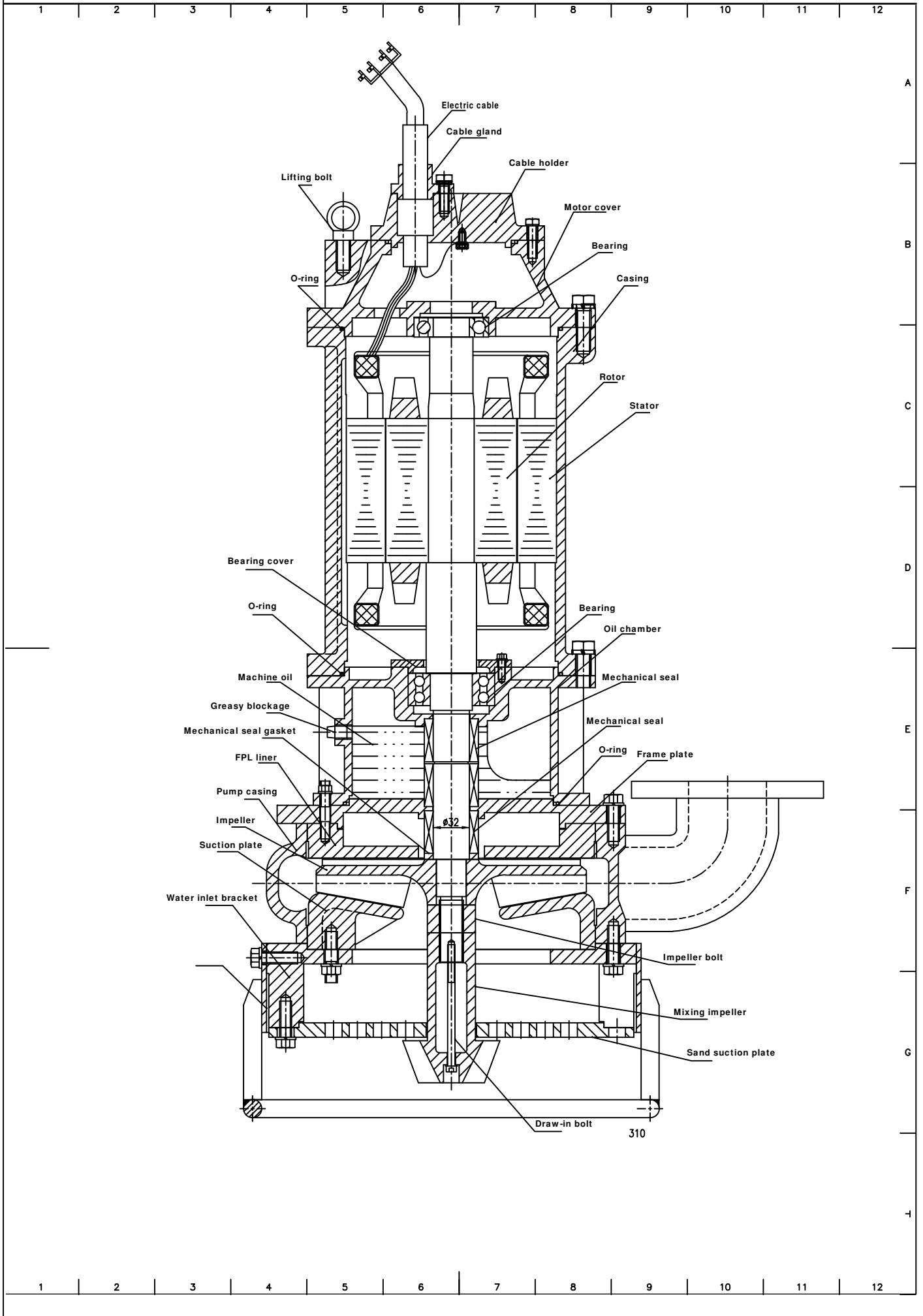
Temperature and moisture sensors are located in the motor thrust bearings to detect excessive temperatures and the ingress of water and shut down the motor to prevent bearing failure.

OPTIONAL EXTERNAL COOLING

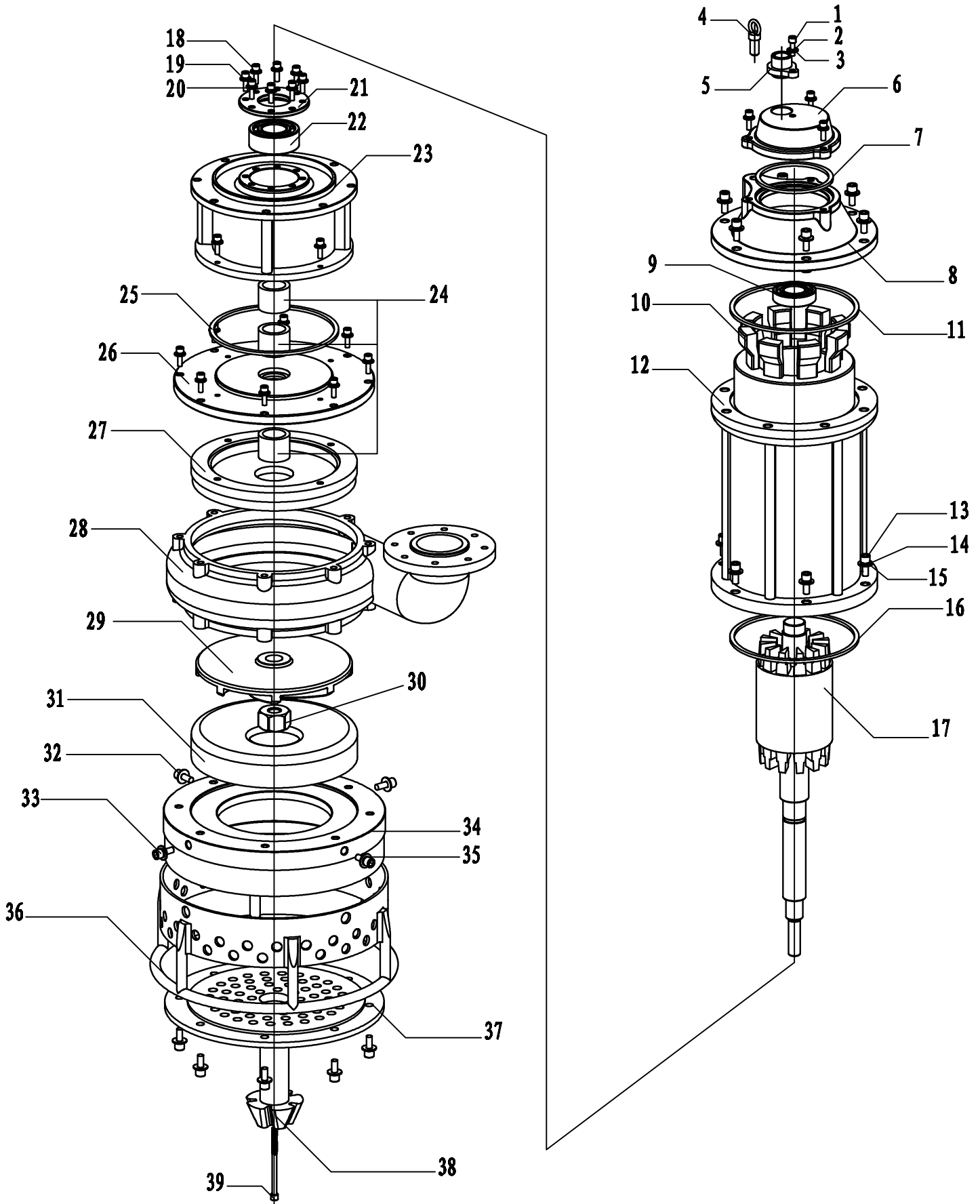
Cooling jackets can be provided with external water supply in high temperature applications to keep motor temperature down and prevent excessive stator and bearing damage



SECTIONAL DRAWING



EXPLODED VIEW



No.	Name	Material		Quantity	Notes
1	Bolt (M8×20)			2	
2	Spring washer (Φ6)	65Mn	65Mn steel	2	
3	Washer	Q235	Low-carbon steel(A3)	1	
4	Lifting bolt (M12)			2	
5	Cable gland	HT200	Gray iron (GG 20)	1	
6	Cable holder	HT200	Gray iron (GG 20)	1	
7	O-ring	NBR	Nitrile Rubber	1	
8	Motor end cover	HT200	Gray iron (GG 20)	1	
9	Bearing			1	
10	Stator			1	
11	O-ring	NBR	Nitrile Rubber	1	
12	Motor casing	HT200	Gray iron (GG 20)	1	
13	Bolt (M12)			6	
14	Spring washer (Φ6)	65Mn	65Mn steel	6	
15	Washer	Q235	Low-carbon steel(A3)	6	
16	O-ring	NBR	Nitrile Rubber	1	
17	Rotor			1	
18	Bolt (M6)			3	
19	Spring washer (Φ6)			3	
20	Washer	Q235	A3 steel	3	
21	Bearing cover	HT200	Gray iron (GG 20)	1	
22	Bearing			1	
23	Oil chamber	HT200	Gray iron (GG 20)	1	
24	Mechanical seal			3	
25	O-ring	NBR	Nitrile Rubber	1	
26	Frame plate	HT200	Gray iron (GG 20)	1	
27	FPL liner	KmTBCr27	27% chrome white iron	1	
28	Pump casing	KmTBCr27	27% chrome white iron	1	
29	Impeller	KmTBCr27	27% chrome white iron	1	
30	Impeller bolt			1	
31	Suction plate	KmTBCr27	27% chrome white iron	1	
32	Bolt (M12)			4	
33	Washer (Φ12)			4	
34	Water inlet bracket	HT200	Gray iron (GG 20)	1	
35	Washer	Q235	Low-carbon steel(A3)	4	
36	Frame			1	
37	Sand suction plate	Q235	Low-carbon steel(A3)	1	
38	Mixing impeller	KmTBCr27	27% chrome white iron	1	
39	Draw-in bolt			1	

INSTALLATION & APPLICATION INSTRUCTION

1. PREPARATION BEFORE INSTALLATION

- 1) Carefully check whether the electric pump is deformed or damaged in the processes of transport, storage and installation and whether the fastening pieces are loosened or fallen off before starting.
- 2) Check whether the cable is damaged or broken, if yes, replace the cable to avoid electric leakage.
- 3) Check whether the power source device is safe and reliable and that the rated voltage should accord with the nameplate.
- 4) Use a megohmmeter to check that the motor stator winding cold ground insulation resistance should not be less than 50MΩ.
- 5) Check whether the oil quantity in the oil chamber is appropriate and that the oil level of the unit in the vertical position should be flush with the oil filling opening.
- 6) Make sure that clear cold water is filled continuously when the submersible pump with the cooling shield is started, and make sure that the outlet is smooth and the cooling water flows in from one side of the lower end and flows out from the upper end of the other side.

2. NOTICES

After the pump is operated normally, please observe whether the voltage of the power source, the working current, the flow rate of the pump and the vibration of the pump are normal at any time. If one of the following conditions occurs, please immediately stop the machine to check:

- 1) The working current exceeds the rated current.
- 2) In the rated pump lift, the flow rate is reduced by more than 20% or the water outlet is discontinuous.
- 3) The voltage of the power source is over high or too low.
- 4) The pump has obvious vibration or noise.

3. INSTALLATION NOTICES

- 1) Electrical connection: the electrical connection should be carried out by professional electrician according to the circuit diagram, the insulation resistance should be detected at any time in the installation process, and the motor insulation resistance should not be less than 5MΩ after the installation is over. The pump is hung and subjected to inching turning, so as to observe its rotation direction, and the pump is rotated clockwise if a person looks downward from the motor direction. If the rotation direction is wrong, please replace any two connectors of the three phase power supply.
- 2) Prohibit using the cable of the pump as a rope for installation and hoisting, so as to avoid dangers.
- 3) The pump should be vertically submerged in water, should not be horizontally placed and fall into sludge, and

the power source should be cut off when the pump is moved.

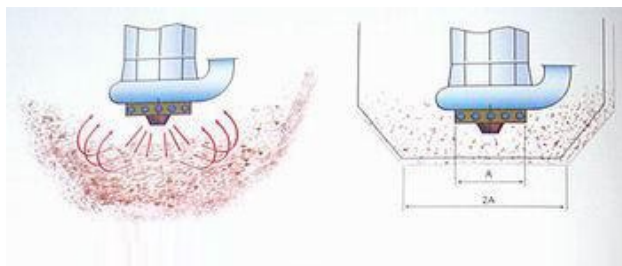
4. STORAGE NOTICES

- 1) The electric pump should be placed into clear water to rotate for several minutes after being used for many times, so as to prevent sediment from remaining in the pump and ensure the cleanness of the electric pump.
- 2) The electric pump should be taken out from water if not used for a long term, so as to reduce the occasion that the motor stator winding is affected with damp and prolong the service life of the electric pump.
- 3) Under normal working conditions, the electric pump should be maintained after working for a year, the worn wearing parts should be replaced, the tightening status should be checked, and the lubricating grease of the bearing and the insulating oil in the oil chamber should be replenished or replaced, so as to ensure good operation of the electric pump.

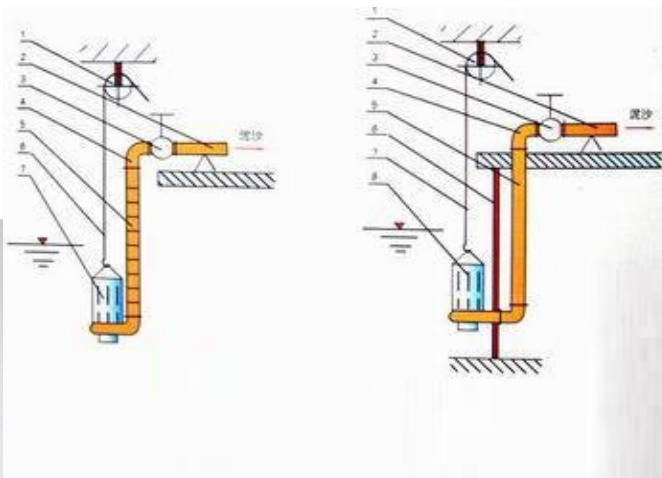
CAUSES OF FAULTS AND COUNTERMEASURES

Faults	Possible Causes	Solution
The current is over high and exceeds the rated current.	1. The pump is friction-resistant.	1. adjusting the clearance
	2. The pump lift of the device is too low and the pump is operated in larger flow rate.	2. controlling the flow rate by the valve or replacing a pump with proper pump lift
	3. The bearing is damaged.	3. replacing the bearing
The motor does not rotate and has noise when started.	1. The voltage is too low	1. adjusting the voltage to the rated value
	2. The motor is rotated with single phase.	2. checking the lines and connecting the broken lines
	3. The pump is blocked by foreign matters.	3. removing the foreign matters
	4. The impeller rubs with the inner pump cover or the water suction plate.	4. adjusting the clearance of the impeller to normal value
The insulation resistance is reduced to below 0.5 MΩ.	1. Cable connector is damaged.	1. treating the cable connector again
	2. The stator winding insulation is damaged.	2. replacing the stator winding
	3. Water enters the cavity of the motor.	3. removing the water content and drying the winding
	4. The cable is damaged.	4. repairing the cable
The pump does not output water or output a small quantity of water	1. The impeller rotates reversely.	1. changing any two phase power cords
	2. Water strainer is blocked.	2. removing the blockage
	3. The water inlet is exposed out of the water surface.	3. adjusting the pump to submerge the pump
	4. Water pipe leaks or are leaked.	4. replacing the water pipe or removing the sludge
	5. The actual pump lift is too high.	5. selecting a pump with proper pump lift
The pump has unstable operation and serious vibration.	1. The impeller is worn seriously.	1. replacing the impeller
	2. Impurities block the rotating parts.	2. clearing the impurities
	3. The bearing is damaged.	3. replacing the bearing

APPLICATION EXAMPLE



Sketch Map of Agitation Effect in Water



Installation Example

