



**DBM**  
Pumps

**SUBMERSIBLE MOTOR 6" 8"**  
**water cooling**

USA NEMA STANDARD



**Germany & Italy New Technology**

Patented products

Please read this operation manual  
thoroughly before using this motor

**N O T I C E !**  
**The vertical Movement**

The submersible pumps matched with the motor must have an amount of vertical move and the amount of move should not be less than 1.5mm. Motor and pump can move flexibly and vertically after assembly, and the amount of vertical move is about 1.5~3mm. In order to ensure.

Transportation safety, the rotor has been fixed before it packs. To avoiding thrust bearing seizure caused by being fasted too long, the flexibility of rotation and move must be checked after being fully filled with water, and then the motor can be used.

The motor must be fully filled clean water before using it and it is also allowed to add appropriate antifreeze fluid. Tighten the water injection plug, water drain plug and exhaust plug, otherwise it is not allowed to use it. It must be equipped with control box as it is using, and meanwhile the Control switch should be reliable operation when the motor is in the state of overload or phase failure.

**WARNING!!!**

Motor and control box must be a reliable connection with the ground terminal of power supply, so the standard of ground wire should not be less than the motor cables'.

The motor must be cut off the power before moving, maintenance or cleaning it.

The motor does not be allowed to use in swimming places!!!

Drop off the water of inside motor entirely and place it in a dry, ventilated and non-corrosive material place for long-term storage.

**Germany & Italy New Technology**

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## 1 Summary

The EG Motor Brand DMA6 and DMA8 water - filling well - used water-submersible three-phase asynchronous motor introduce the technology from the United States, Germany and Italy into producing and developing, with characteristics of advanced structure, low noise, excellent performance, reliable, convenient maintenance and so on. The motor adopts new patent technology of bearing structure and high-tech materials, so it can withstand a large axial force. There are lots of advantages, such as elegant appearance, safety and reliability, long life, etc. According to the U.S. "NEMA" standards to produce, our productions are in line with the European CE safety standards and "ROHS" directive environmental requirements.

## 2 Technical Data

### 2.1 Model Description

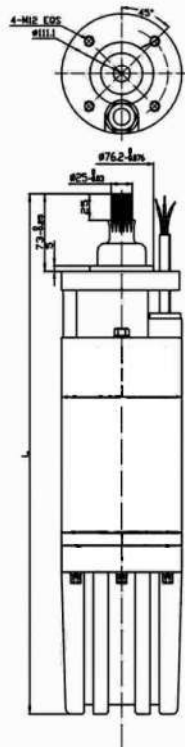
Model consists of capital letters and Arabic numerals, as follows:



Model of DMA 6-15 represents water-filling well-used water-submersible asynchronous motor with 6-inch frame number and 15KW of rated power.

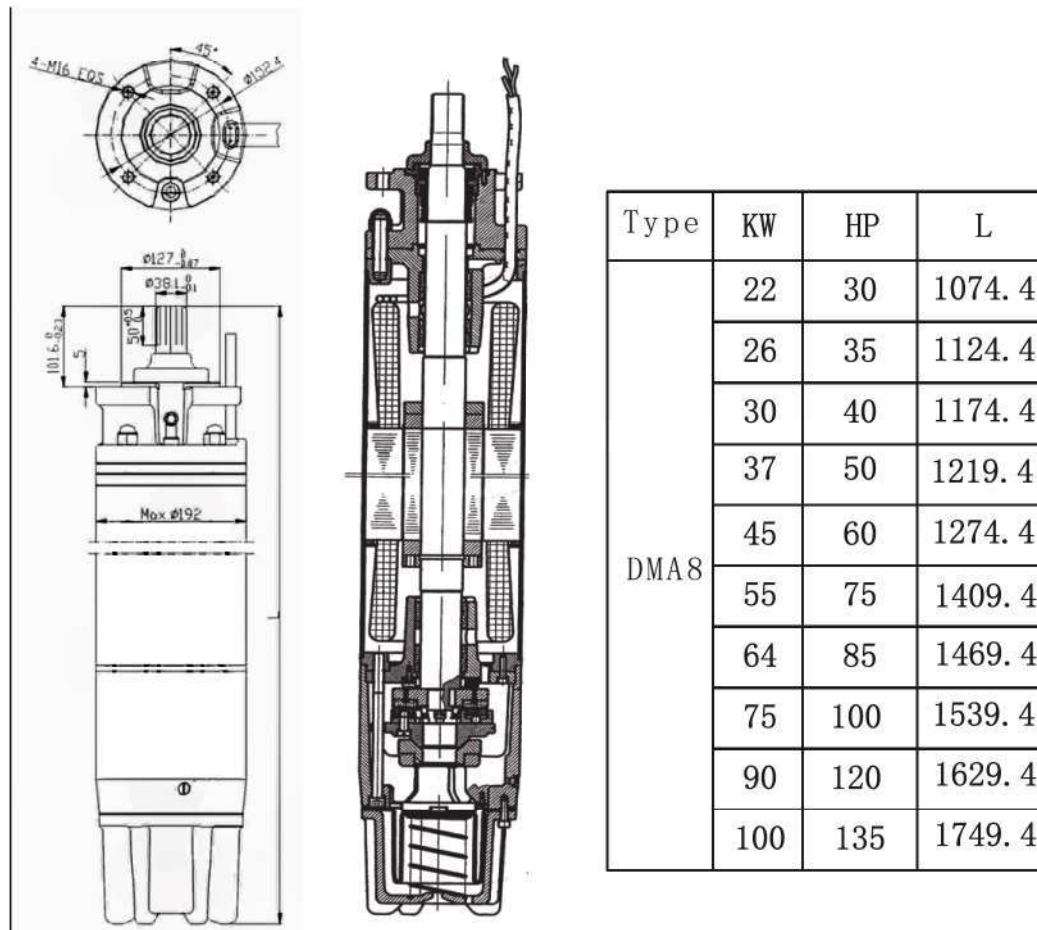
### 2.2 Motor appearance and installation dimension

#### 2.2.1 Three-phase and 6-inch motor form factor and installation dimensions



Type	KW	HP	L
DMA6	4	5.5	688
	5.5	7.5	728
	7.5	10	763
	9.2	12.5	793
	11	15	818
	13	17.5	848
	15	20	903
	18.5	25	993
	22	30	1040
	26	35	1095
	30	40	1150
	37	50	1240

## 2.2.2 Three-phase and 8-inch motor form factor and installation dimensions



### 3 motor structure description

Motor is composed of stator, rotor, connecting segment, the upper and lower guide bearing pedestal, the upper and lower guide bearings, thrust plate, thrust bearing, bed, sealing devices, etc. Its structure shows in Figure 3.

The structure of the motor is sealed water-filled wet type. Inside the motor is full of clean fresh water (preferably soft water) for cooling and lubrication of motor bearings. Stator windings with high-quality plastic insulated winding wire have good water insulation. Inner of motor uses a special anti-corrosion treatment. Upper the motor is equipped with mechanical seals and a rejection sand ring, forming a reliable anti-sand body. The lower part has a highly flexible, tough and durable rubber capsule for regulating the change of volume caused by thermal expansion and contraction in the motor, and balancing the pressure between inside and outside of the motor.

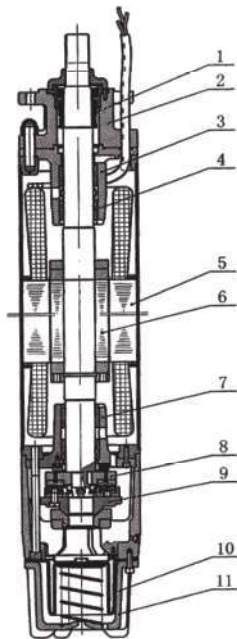


Fig. 3

No.	Name
1	sealing equipment
2	Connecting segment
3	Upper guide bearing pedestal
4	Guide bearing
5	Stator
6	Rotor
7	Lower Guide Bearing pedestal
8	thrust plate
9	thrust bearing
10	Rubber surge capsule
11	bed

## 4 Motor Installations

### 4.1 Motor Inspection

(1) Check whether the fasteners of motor is loose, whether cable is break and whether the power supply voltage and frequency is accord with the brand requirements.

(2) Rotate and pull the rotor, also check the flexibility of its rotation and movement and shifting amount of the motor is 1.5mm ~ 2.5mm.

(3) Unscrew air drain plug and water drain plug on the electric motor, and then inject clean water into the motor until the cavity is filled with water. Tighten the air drain plug and the water drain plug when water flows from the hole of air drain plug. Six hours after soaking, with 500V-class megohm meter check the resistance value of motor winding insulation the value is not less than 50M $\Omega$ , and also check whether the interfaces of motor is leakage.

(4) According to conditions of use, check the water quality and water temperature. If the water quality beyond the required scope, it will affect life of motor and pump.

### 4.2 Motor and submersible pump assembly

(1) Motor and size of pump are examined to be sure that they are consistent with their respective requirements before motor and pump assembly. The submersible pumps matched with motor must have upward movement

amount which is not less than 1.5mm. Generally, the submersible pumps moves up and down from the range of 4mm to 7mm.

(2) When electric pump is assembled, it must be tightened up the connections for each bolt. After it is finished, check whether the crew rotation is flexible and whether the upper movement of pump is appropriate (about half the amount of the original pump movement).

### 4.3 Unit down hole

(1) Check one more time whether there is leak on the surface of motor and whether inner cavity of motor is full of clear water before unit down hole. If the inner of motor is not filled with clear water, motor will immediately damage at the moment of starting it. If there is leakage of water, it should be coated sealant 7302 on the leak spot.

(2) In the whole process of unit down hole, insulation resistance to ground must be examined at all times. The value of insulation resistance to ground is not less than  $20M\Omega$

(3) Cable must be firmly tied to water pipes, and be fixed within the gap in the flange.

## 5 Motor Use

### 5.1 Motor use conditions

(1) Water temperature is not higher than  $30^{\circ}\text{C}$ .

(2) The proportion of solids content (by mass terms) in water does not exceed 0.01%.

(3) There is no strong chemical corrosive water; PH value should be in range from 6.5 to 8.5.

(4) The water does not contain oil.

(5) Motor should be completely immersed in water, the highest location should be immersed in moving water below 1m, the level of motor immersed in static water should not exceed 70m, and the lowest position from the bottom of the well shall not be less than 3m.

(6) Used in large ponds or rivers, it is necessary to install diversion jacket outside the motor to enhance motor cooling.

### 5.2 Three-phase submersible motor overload protection

The property of submersible motor is different from normal motor performance, so it needs specific overload protection. Provided protection relays must have the following characteristics:

---- When electrical current is in 500% rated current, the turn-off time is less than 10 seconds,

---- Each phase of motor access to protection

---- Electric current in 120% of rated current must be cut off.

### 5.3 Cable Selection

Cables of submersible motor must be applied in diving operations, and its size should be adapted to operate at rated temperature and maintain adequate motor voltage. At the maximum rated current, motor voltage can be maintained at over 95% of the supply voltage, while maintaining an acceptable starting voltage and cable temperature.

Three-phase three-wire motor with cable length and cross-section table (GB Copper)

rated values of motor			mm <sup>2</sup> /m								
Voltage V	Power KW	Power HP	6	10	16	25	35	50	70	95	120
380 V 50 Hz (for 415 V & 440V can be used 115% in the)	5.5	7.5	260	440	690	1060	1450	2030			
	7.5	10	200	340	530	810	1110	1560			
	11	15	130	230	360	550	750	1060			
	15	20	100	170	270	410	570	800			
	18.5	25	80	140	210	330	450	630	860	1090	1350
	22	30	70	120	180	280	380	540	740	930	1150
	30	40		90	130	210	280	400	540	680	840
	37	50			110	170	230	320	440	550	680
	45	60				140	180	270	360	460	570
	55	75				120	160	220	310	390	480
	75	100						170	230	300	370
90	125							170	220	270	
110	150								190	230	

Three-phase six-wire motor with cable length and cross-section table (GB Copper)

rated values of motor			mm <sup>2</sup> /m										
Voltage V	Power KW	Power HP	2.5	4	6	10	16	25	35	50	70	95	120
380 V 50 Hz (for 415V & 440V can be used 115% value in the)	5.5	7.5	160	260	390	670	1040	1590	2180	3040			
	7.5	10	120	200	300	510	800	1210	1670	2430			
	11	15	80	130	200	350	540	820	1130	1590			
	15	20	60	100	150	260	410	620	850	1190			
	18.5	25	50	80	120	210	320	490	680	950	1300	1640	2030
	22	30	40	70	100	180	280	420	580	810	1110	1400	1740
	30	40			80	130	200	310	430	600	810	1020	1260
	37	50			60	100	160	250	340	480	650	830	1020
	45	60				90	140	210	290	400	550	690	850
	55	75					110	170	240	340	460	580	720
	75	100					90	130	180	260	350	440	550
90	125							140	190	260	330	400	
110	150								160	220	280	350	

#### 5.4 Special requirements - using frequency converter

Submersible motor possibly produce more power consumption when using the inverter; the rated power of motor must have at least 10% of the back-up power.

The lowest operating frequency is:  $f_{min} = 30\text{Hz}$ .

The maximum operating frequency is:  $f_{max} = \text{motor nominal frequency}$ .

The current and power of motor in run-time can not exceed the rated current and rated power of it.

#### 5.5 Using one-way valve

Recommend that all of the submersible pump equipment use one-way valve and non-return valves is installed in the appropriate location of water pipelines to prevent water hammer swing and to avoid damage of the pump and motor.



### 5.6 Starting Times

Pump stops running after power is off, and then starting again has to wait for more than 20 minutes.

### 5.7 Arrester Grounding

Arrester must be grounded with metal to metal connections. Meanwhile, arresters with all paths of water layer must be valid and reliable.

### 5.8 Motor usage regular records

There should be professional staff monitor the change of water level to ensure motor operating at normal point when motor is in motion. When it runs stably, the running state should be recorded and checked. Recorded data should contain the pressure of well-head of water, flow, voltage and current.

## 6 Motor and power cable connect methods and insulated handle

### 6.1 Wire connection method

(1) When the motor shows a single 3-core cable or three single-core cables, outlet side of submersible motor has a sign. Its marks as follows:

stator-winding name	outlet terminal marks
PHASE I (Khaki cable)	U
PHASE II (Periwinkle cable)	V
PHASE III (Black cable)	W

The connection mode as following:

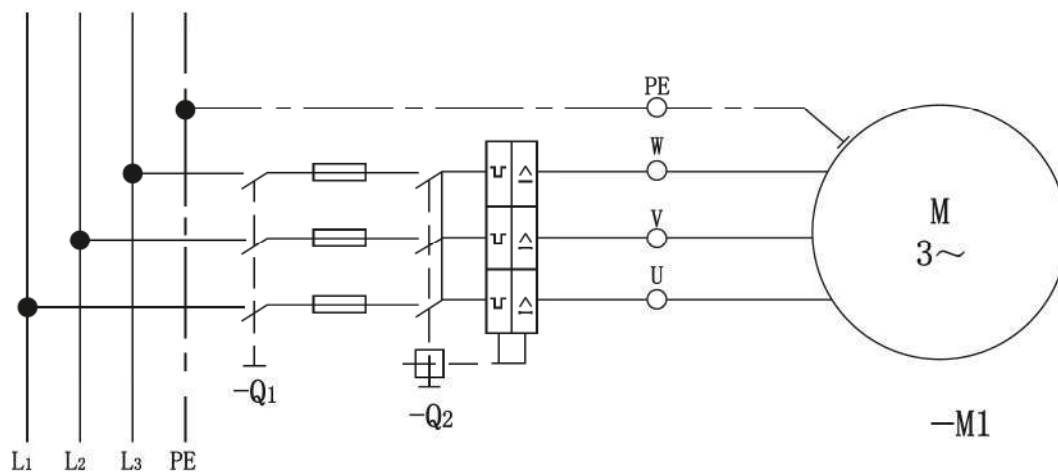


Fig. 4

## 6.2 Handling of cable connector

(1) Electrical wire of motor connecting to cable should clean copper wire oxides, pre-tin processes, pack tightly enclose with bare copper wire with  $\varphi$  0.5 mm, and then tin welding process. The joint dimensions shown in Figure:

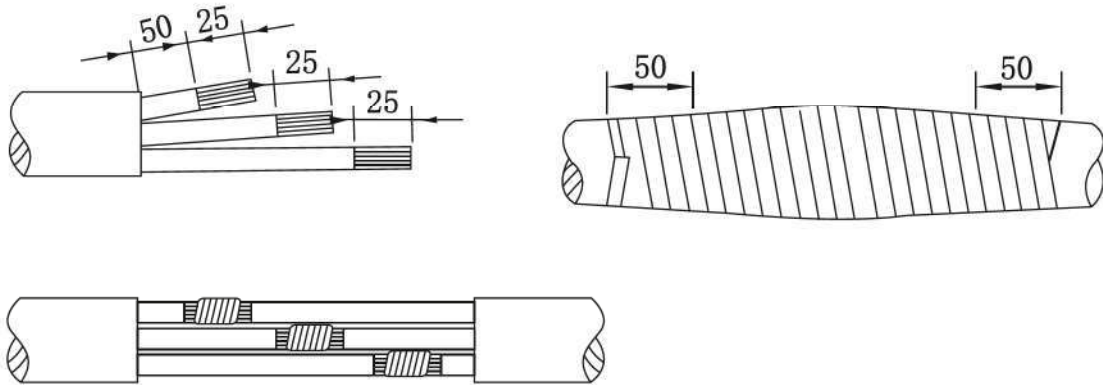


Fig. 7

These connect to head part. Following processes must be done before insulation treatment:

- A. Clean-up bits of welding slag welding; cut sharp-rag and burr.
- B. Scrub the surface of welding, the near wire and insulation surface of cable with gasoline or alcohol
- C. Natural dry

(2) Approach of insulation of cable connector:

- A. Bottom is bandaged 2-layers with self-adhesive butyl rubber tape by half-stack bind up, and then bandaged 2-layer with self-melt ethylene-propylene rubber (Scotch product 23, made by 3M Co.) by half-stack bind up (stretching while wrapping), and each layer gradually extends outwards. Packing must be firmly and solid and.
- B. Out layer is bandaged 3-layers with high-quality polyvinyl chloride rubber (Scotch product 23, made by 3M Co.) and Packing must be firmly and solid.

## 7 Period of motor repair

Motor running a year or running less than a year, but the diving time having two years, should be lifted from the underground to carry out preventive inspections, cleaning inside of motor and the plan maintenance.

## 8 Storage of motor

8.1 Short-term storage: The motor will remains down hole within a week since it is hanged out the wellhead, we should put them vertically.

8.2 Long-term storage: First, drain the water in the motor, and then open the electrical motor and clean each component. Let the stator windings natural dry. Finally re-assemble the motor as it was. Shaft extension flange tops coat anti-rust oil. Store it in the absence of dust and non-humid areas. There is no water in motor, or it will easily damages motor. Temperature of storage place is not lower than  $-5^{\circ}\text{C}$ .

(2)When the outlet side of submersible motor shows two three-core cables, outlet side of submersible motor has a sign. Its marks as follows:

Stator-winding name	Start end	Terminal
PHASE I (Khaki cable)	U1	U2
PHASE II (Periwinkle cable)	V1	V2
PHASE III (Black cable)	W1	W2

The connection mode as following:

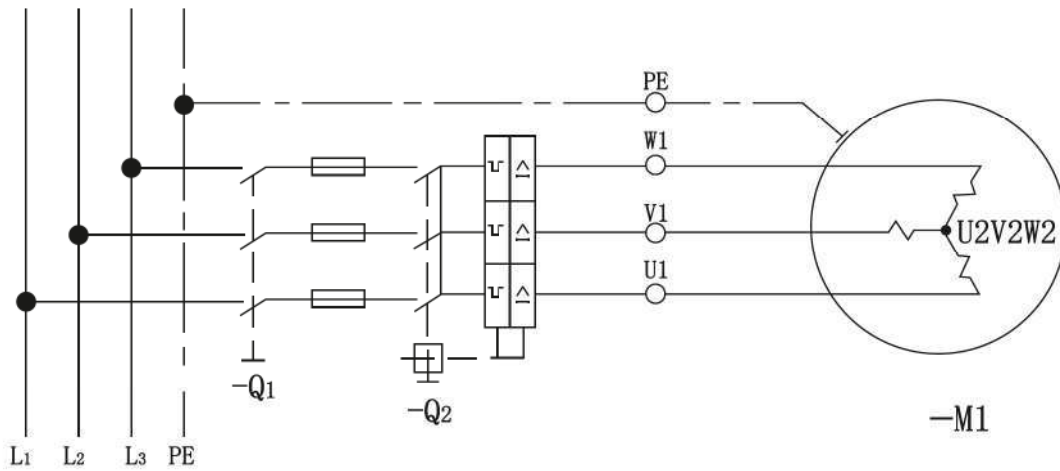


Fig. 5 Star Connection

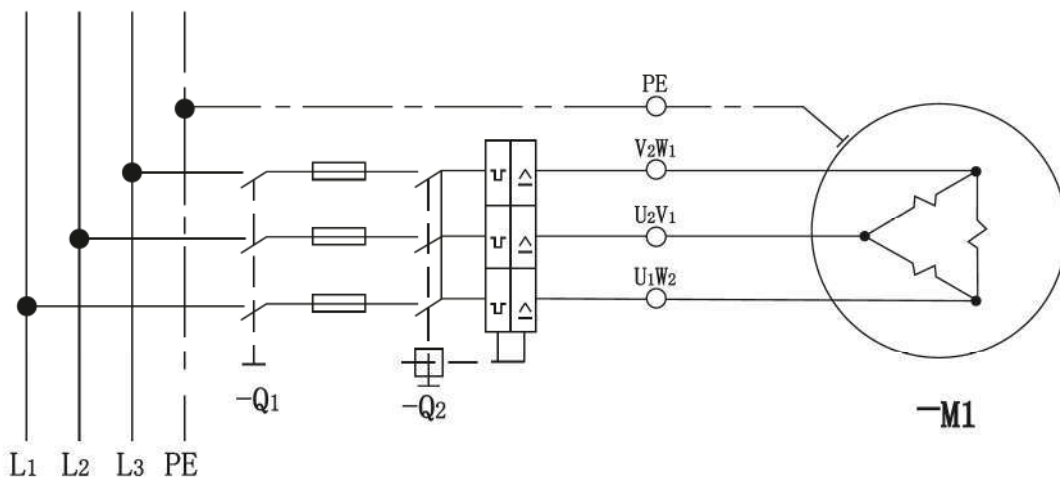


Fig.6 Triangle Connection

Breakdown phenomenon	Cause	Elimination Method
Not start	<ol style="list-style-type: none"> <li>1. Power supply voltage is too low</li> <li>2. The wire of phase breaks or the wire of starting equipment break.</li> <li>3. Rotor stuck</li> </ol>	<ol style="list-style-type: none"> <li>1. Adjust the voltage</li> <li>2. Repair broken wire</li> <li>3. Open and check</li> </ol>
Electric current too large	<ol style="list-style-type: none"> <li>1. Pump flow is excessive, overload operation</li> <li>2. Bearings or impeller wear and tear</li> <li>3. Motor bearing wears and tears</li> </ol>	<ol style="list-style-type: none"> <li>1. Turn down valve to reduce the flow</li> <li>2. Overhaul water pumps, or replace parts</li> <li>3. Overhaul motor</li> </ol>
<ol style="list-style-type: none"> <li>1. Motor runs unstably.</li> <li>2.No-load current is large.</li> <li>3.Ammeter pointer swing too much.</li> </ol>	<ol style="list-style-type: none"> <li>1. Unit has a mechanical problem.</li> <li>2. Dynamic water level down to pump intake, resulting discontinuously water</li> <li>3. Bearing of motor seriously wears and tears</li> </ol>	<ol style="list-style-type: none"> <li>1. Lift unit to carry out maintenance</li> <li>2. Reduce flow of water, increase infiltrated depth, or change a bigger water pump</li> <li>3. Overhaul motor and replace parts.</li> </ol>
Low insulation resistance	<ol style="list-style-type: none"> <li>1. Connector of electrical cable seals badly.</li> <li>2. Cable leaded is damaged.</li> <li>3. Insulation of motor stator winding is damaged.</li> </ol>	<ol style="list-style-type: none"> <li>1. Re-pack connector of cable.</li> <li>2. Repair of damage of cable.</li> <li>3. Replace stator windings.</li> </ol>
Motor windings are burned.	<ol style="list-style-type: none"> <li>1. Motor is overloaded.</li> <li>2. The water inner motor is not filled, which reduces the effect of cooling and lubricating</li> <li>3. Motor runs in Single-phase state.</li> <li>4.Thrust bearing of motor is damaged, resulting in motor overload</li> <li>5. Pipeline is shut down and long-term operation</li> </ol>	<ol style="list-style-type: none"> <li>1. To prevent overload.</li> <li>2. Must be filled with water inside the motor.</li> <li>3. Check wiring and integrated protection device of motor .</li> <li>4. Overhaul motor and replac parts.</li> <li>5. The power is shut down immediately after the pump gate .is closed.</li> </ol>

Installation Diagram of Submersible Pump Typical

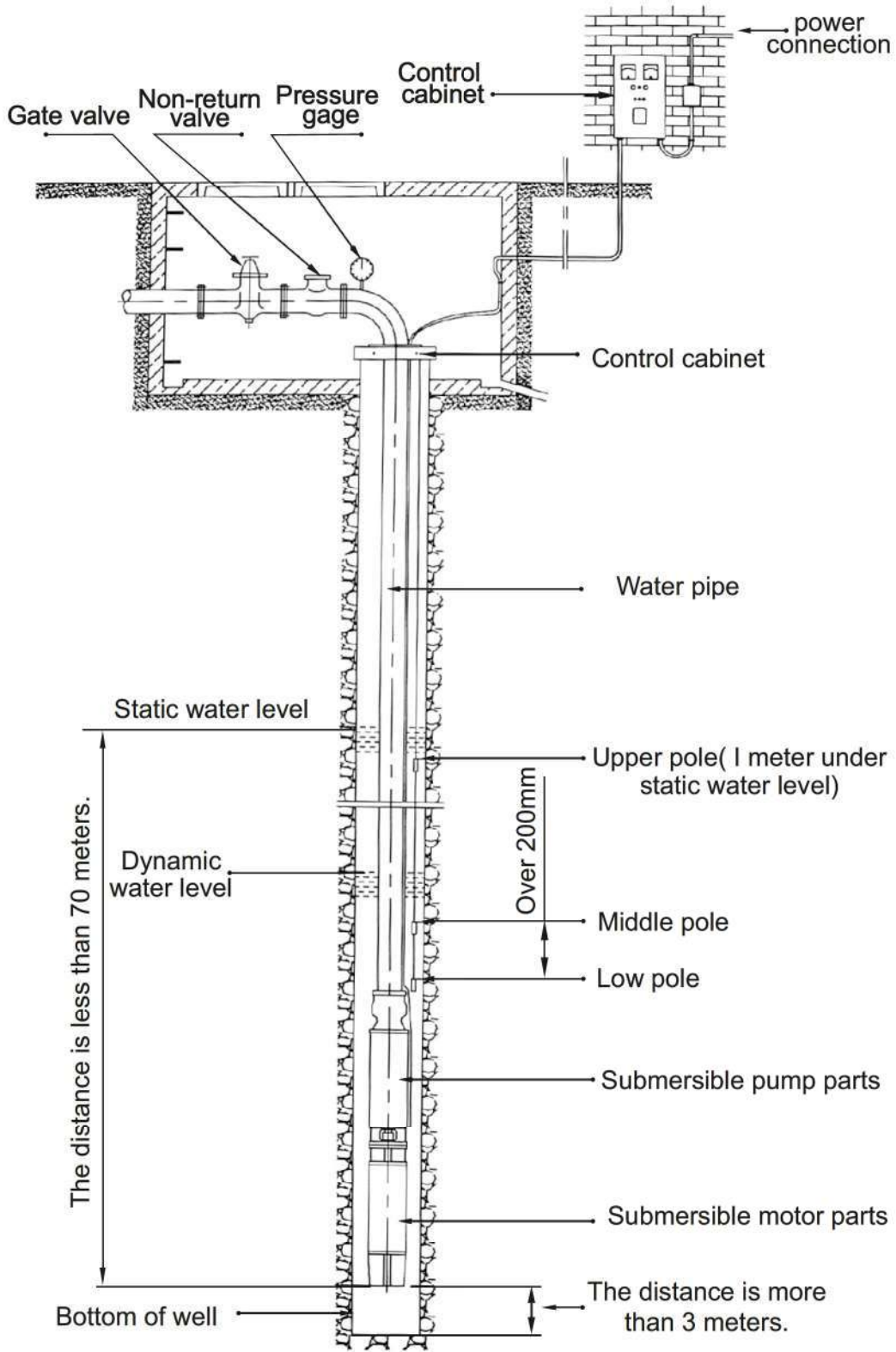


Fig. 8

The advise for the product's quality

To provide customer's satisfaction of products is our unswerving pursuit please give your opinions and demands about quality of our products by writing a letter or sending E-mail to our company after-sales service department. We'll really appreciate that.

User Name					Contact Person	
Phone			Fax			
Website			E-mail			
Motor Type		Manufacturing Date		Manufacturing Number		
Supply Merchants					Purchasing Date	
Place of Use						
Service Conditions	Well/Hole Gauge		Static Water Level		Dynamic Water Level	
	Sand-carrying Capacity		PH value			
	Mounting Depth		Flow		Delivery Lift	
After-use Condition						
Advice						

# **water cooling MOTOR**

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