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# WQ系列潜水排污泵 安装、操作及维护手册

WQ Series Sewage Pump  
Manual Book for Installation, Operation and Maintenance

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## 安全预防措施 Safety precaution

### 1. 总则

- (1) 在通电的状态下,请勿打开包括电机在内的电气设备终端盖,可能有触电的危险。
- (2) 除服务工程人员以外,不允许其它任何人参与拆卸、维修或者改装的工作。
- (3) 泵在维护时需佩戴安全帽、安全防护眼镜、安全鞋等安全防护用品。
- (4) 在执行任何如焊接之类的飞溅火星的工作之前,应确保无火灾和爆炸危险。
- (5) 在开始工作之前,请检测可能会释放有毒气体或氧气不足的地方,确保安全。如:深坑。
- (6) 当进行对中检查、拆卸等工作时,确保将电机开关转至“OFF”并在开关上粘贴标有“禁止通电”字样的标签。
- (7) 在开始工作之前,请检查滑动装置,例如起重机、钢丝绳等没有失效。
- (8) 因为任何溅到地面通道等地方的油将可能导致滑倒意外,请立即将其擦净。
- (9) 不要轻易靠近旋转部件,旋转部件的破损物可能会飞溅到人体。

### 2. 转运

泵和电机被组装成整体,请勿使用电机的电缆起吊泵,也不可将电缆用于固定泵。另外请不要在悬吊着的泵下面停留。

### 3. 维护

当替换机械密封工作时,将电机开关转至“OFF”并在开关上粘贴标有“禁止通电”字样的标签,以免被错误地调到“ON”上。

### 4. 拆卸与重装

- (1) 在执行拆卸工作之前,确保将电机开关转至“OFF”并在开关上粘贴标有“禁止通电”字样的标签,以免被错误地调到“ON”上。
- (2) 关闭出口侧的阀门,处理高温液体的情况下,当泵壳温度下降到室温左右时将泵的内部液体从排水阀排出。
- (3) 泵排出的液体为化学溶液时。请确保泵内液体已全部排放。
- (4) 当拆开零件和部件组装的部件时,请依照说明手册中指示位置悬挂吊索。
- (5) 当装卸像滚珠轴承高温部件时,请确保佩戴防护手套。

### 1.Summary

- (1)When in an energized state, do not open the motor terminal cover within electrical equipment, may have a risk of electric shock.
- (2)Except for the service engineers, it is not allowed any other person involved in disassembly, maintenance or modification work.
- (3)When the pump during maintenance status, it would be wearing safety helmets, safety glasses, safety shoes and other security products.
- (4)Before performing any work such as welding spatter Mars and the like, should ensure no fire and explosion hazard.
- (5) Before starting work, check the possible release of toxic gas or oxygen deficiencies, ensure safety. Such: pit.
- (6)When the inspection, disassembly and other work, ensure the motor switch to "OFF" and the switch paste "prohibit energized" on the label.
- (7)Before starting work, check the sliding device, such as cranes, wire rope, ensure there is no failure.
- (8)Because any spilled oil of the ground path may lead to an unexpected slip, please immediately wipe.
- (9)Do not close to rotating parts, rotating parts damage might splash into the body.

### 2. Transport

Pump and motor are assembled into a whole; do not use the motor cable lifting pump, nor the cable for securing the pump. Also, please do not stay in the below of suspended pump.

### 3. Maintenance

When replacing the mechanical seal work, the motor switch to "OFF" and the switch paste labeled "prohibit energized" on the label, to avoid being incorrectly transferred to "ON" on.

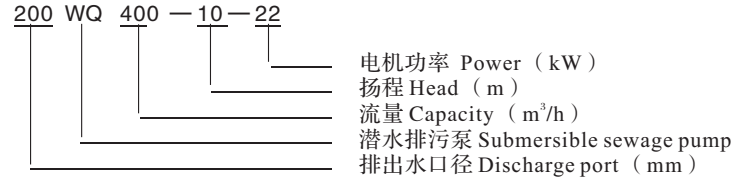
### 4. Remove and reinstall

- (1)Before performing the disassembly work, to ensure the motor switch to "OFF" and the switch paste labeled "Prohibition power"on the label, to avoid being incorrectly transferred "ON" on.
- (2)Closing the outlet side of the valve, under the condition of high temperature liquid, when the temperature dropped to room temperature, please discharge internal liquid from the drain valve.
- (3)When discharge liquid is chemical solution. Make sure all liquid has been discharged within the pump.
- (4)When the disassembled parts and assembled components, please follow the instructions manual sling hanging position.
- (5)When handling hot parts like ball bearings, make sure to wear protective hand.

## 1、概述 Overview

本操作说明书包含了设备的安装、操作及维护保养的重要内容，因此，安装技术人员与负责人员/操作人员在安装和开始操作之前，必须阅读本操作说明书。在设备、机器的操作区内本说明书始终有效。如果出现问題，请与我方联系。在担保期内，泵只能由我方打开。

### 1.1 型号意义 Model



### 1.2 安全

本操作手册给出了泵在安装、操作和维护保养期间必须遵守的基本规则，因此，负责人员在安装及投产前必须阅读本手册。在安装地点这些规则始终有效。



——如果不遵守本标志内容，会使设备出现危险和影响它的功能。

**注意!**

——必须将固定在设备上的旋转方向符号保留好并清楚可见。

### 1.3 操作人员的资格及培训

负责操作、维护保养、检验及安装的工作人员必须具有足够的资格，工作人员的责任和管理范围必须由站场操作者确切地制定。如果工作人员不具备所需的知识，就必须进行培训。这项工作可以由设备制造厂家或供货商代替站场操作人员完成，并且设备操作人员要确保工作人员完全理解操作手册中的内容。

### 1.4 产品用途及使用条件

WQ系列潜水排污泵主要用于市政工程、工业、医院、建筑、宾馆、饭店等行业，用于排送含固体颗粒及各种长纤维的淤泥、废水、城市生活污水等。

使用条件：1、水温不超过60℃。

2、被抽送液体的PH值为6~9。

### 1.5 潜水排污泵的结构

本公司开发的WQ系列潜水排污泵为单级单吸式离心泵，电机和泵头通过联接座结合成整体，联接座与泵盖之间设油室，油室内设第二级密封，强化密封效果，确保电机安全可靠工作。

This operation manual contains the installation, operation and maintenance, so installation technicians/responsible person / operators must read the instruction manual before start operation. The manual is always valid during operating area in the device, if have problems, please contact us. During the warranty period, the pump can be opened only by us.

### 1.2 Safety

This operating manual indicate pump installation, operation and maintenance of the basic rules ,therefore, responsible person must read the manual before installation and commissioning. At the installation site these rules are always valid.



If operator is not comply with the content of the flag, make the device dangerous and affect its function.

**注意!**

The direction of rotation must be fixed on the device and keep a good sign clearly visible.

### 1.3 Qualifications and training to operators

Responsible for the operation, maintenance, inspection and installation personnel must have sufficient qualifications, responsibility and management of the staff must be established exactly by the station operator. If staff does not have the required knowledge, they must be trained. This work can replace the station operator completed by the equipment manufacturer or supplier, and the device operator must ensure that staff fully understands the contents of the operating manual.

### 1.4 The use purpose and conditions

W Q series submersible sewage pump is mainly used in municipal engineering, industry, hospitals, buildings, hotels, restaurants and other industries, for the carriage of solid particles and a variety of long fiber sludge, waste water, municipal sewage.

Conditions of use:

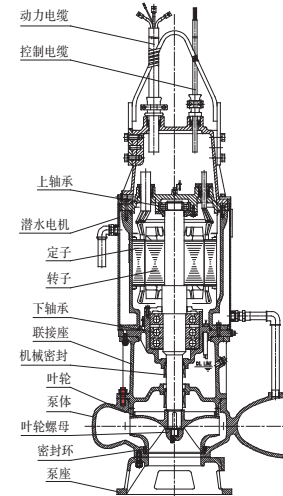
1. The water temperature is not exceed 60℃.

2. The liquid PH is 6~9.

### 1.5 The structure of submersible sewage pump

We developed the W Q series submersible sewage pump is single stage single suction vertical centrifugal pump, motor and pump casing through the coupling combine into a whole, provided the oil chamber between the coupling and pump cover, oil chamber provided the second sealed, to strengthen sealing effect, ensure safe and reliable operation.

潜水排污泵上部的潜水电机防护等级IP68，设温度保护、双重漏水保护，电机运行非常安全、可靠。在联接座下部有集水孔，收集电机腔内结露水，保证电机安全运行。



### 电机功率18.5kw<P<160kw结构图

The motor power 18.5kw<P<160kw structure

#### 1. 泵壳

泵盖和联接座用不锈钢内六角螺钉和泵壳连接在一起,这些螺钉均布在泵壳上。密封件安装在泵壳和泵盖之间的密封面上,保证泵送液体的紧密密封。

泵壳装有可更新的泵壳耐磨环。

#### 2. 叶轮

轴向推力由双列角接触球轴承所承担。叶轮采用最新设计理论用三维造型方法设计，效率高，耐磨损，叶轮的通过能力强。

#### 3. 轴封

轴封采用双重机械密封类型

#### 1.6 电泵的组装

泵在组装前应对电机按以下步骤进行检测

1.用500V兆欧表测量U、V、W三相，对地的冷态绝缘电阻应大于50MΩ（低压）。

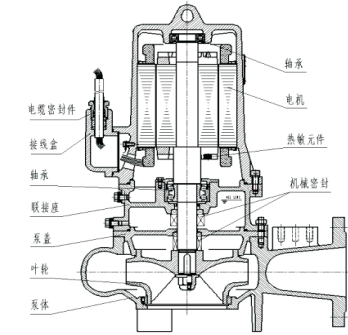
2.用双臂电桥测量三相直流电阻值，各线端间的电阻值与三个线端电阻的平均值之差满足以下要求：

a.星型接法，绕阻的直流电阻不大于平均值的2%。

b.三角形接法，绕阻的直流电阻不大于平均值的1.5%。

3.用万用表测量（R×1kΩ档）控制电缆芯线的电阻值是否符合下表要求。

The upper part of the diving submersible sewage pump motor protection class IP68, set temperature protection, dual leakage protection, motor runs is very safe and reliable. In the lower part of the seat has a catchment coupling hole, collect the motor cavity dewdrop, to ensure safe operation of motor.



### 电机功率小于15kw结构图

The motor power is less than 15 kw structure

#### 1. Pump Casing

Pump cover and coupling are connected together by stainless steel hex screws and casing, these screws are distributed on the casing. Sealing element is mounted between the pump casing and pump cover sealing surface, to ensure a tight seal of the pumped liquid.

Pump casing fitted renewable casing wear rings.

#### 2. Impeller

By double row angular bearing axial thrust. The design theory of Impeller is using the latest three-dimensional modeling methods design, high efficiency, wear resistance, strong impeller capacity. 3. Shaft Sealing

Shaft sealing adopts double mechanical seal type.

#### 1.6 Electric pump assembly

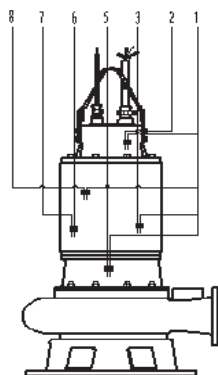
Refer to the following processing of motor test before the pump assembly.

1. 500V mega meter measure U, V, W 3phase, and ground the cold insulation resistance should be greater than 50M (low pressure).

2. Use the double-arm bridge measure the DC resistance of the three-phase, the resistance between the ends of each line is not greater than 1%, relative resistance of less than 2%

3. Control measured with multi meter (R × 1k file) Resistance cable core meets the following requirements.

监控部位及功能 Monitoring position and function	绕组过热 Winding over heat	接线盒进水 Junction box	电机进水 Motor inlet	油室进水 Oil inlet	轴承温度 Bearing temperature
控制电缆标号 Control cable label	1-8	1-2	1-3	1-5	6-7
元件名称 Component name	PTC	电极 Electrode	电极 Electrode	电极 Electrode	PT100
正常状态 Normal state	0	$\geq 120k\Omega$	$\geq 120k\Omega$	$\geq 30k\Omega$	0℃时 $\approx 100\Omega$
故障状态 Fault state	$\infty$	$< 120k\Omega$	$< 120k\Omega$	$< 30k\Omega$	80℃时 $\approx 130\Omega$



注意：此表为低压电机所有的控制元件，可根据客户要求更改。

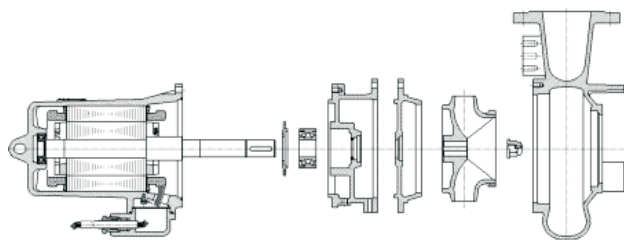
按下图示组装泵端部分

1. 更换所有的密封圈，保证所有的端面是清洁。
2. 将角接触球轴承在油浴中加热到大约100℃，然后将其装在轴上。
3. 将角接触球轴承装配到联接座的轴承室中，装好轴承压盖。
4. 将联接座及电机转子装入电机上，拧紧螺栓，安装油室中机封。
5. 电机腔做0.2MPa气压试验，不得有漏气现象。
6. 将泵盖安装到联接座上，安装第二道机封，油室做0.2MPa气压试验，不得有漏气现象。
7. 联接座试验不漏气后在油室中加入足量32#机油。
8. 安装叶轮及叶轮螺母。
9. 最后将整机装入泵体，拧紧螺栓。

Note: This table is low-voltage motors all controlled elements; it can be changed according to customer requirements.

Refer to below shown the end portion of the pump assembly.

1. Replace all sealing rings, to ensure that all end surfaces are clean.
2. The angular contact ball bearings at heated in an oil bath to about 100oC, then mounted on the shaft.
3. The angular contact ball bearing assembly to join at the seat of the bearing housing, bearing gland installed.
4. The coupling and motor rotor mounted on the motor, tighten the bolts, the mechanical seal installed in oil chamber.
5. The motor chamber do 0.2MPa pressure test, without leakage phenomenon.
6. The pump cover is mounted to the coupling seat, installs a second mechanical seal, oil chamber do 0.2MPa pressure test, without leakage phenomenon.
7. Add 32 # engine oil in the oil chamber after coupling seat test without leakage..
8. Install the impeller and impeller nut.
9. Finally, the motor unit into the casing and tighten the bolts.



## 2、安装 Installation

泵应该由有经验的人员安装。在安装泵时,如果不能准确的安装和对中,泵可能会出现各种各样的故障。

WQ潜水排污泵有多种安装方式,常用的有耦合安装、移动安装、固定底座安装等。

Pump should be installed by experienced staff. When install the pump, if staff cannot accurate installation and alignment, the pump may be a variety of failures.

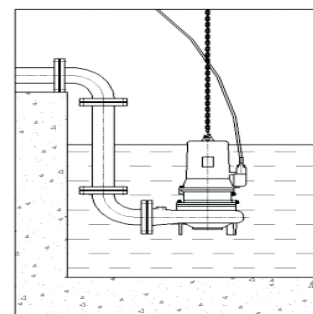
WQ submersible sewage pump has a variety of installation methods, commonly used coupling installation, mobile installation, and fixed base installation.

### 2.1 移动式安装

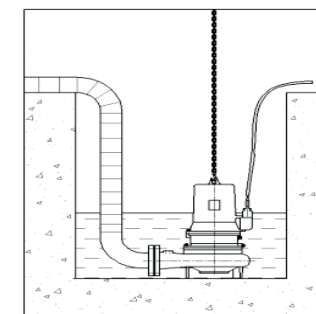
移动式安装用于排出口径不大于φ150mm且电机功率不大于22KW的泵。将泵直接置于池底，连接好出水软管或硬管即可工作。这种方式主要用于救急、维修或施工的需要。当泵出水口接硬管时，如果管道有足够的强度和刚性，也可以将泵悬挂在管路上使用。

### 2.1 Skid mounting

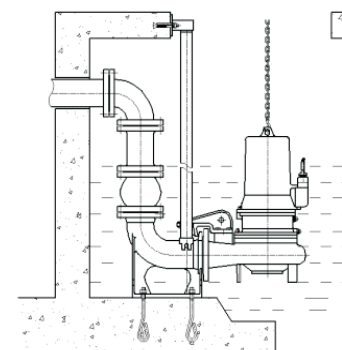
Skid mounting is used for discharge diameter not more than 150mm and the motor power less than 22KW pump. The pump is placed directly on the bottom, then connect the water hose or tube to work. This approach is mainly used in an emergency, repair or construction required. When the pump outlet connected to hard pipe, if the pipe has sufficient strength and rigidity, the pump may be hanging in the pipeline.



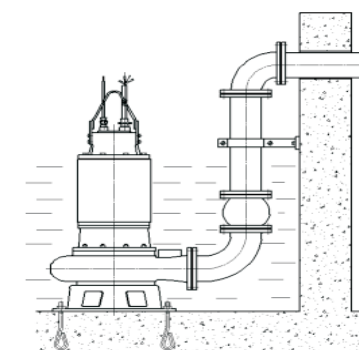
钢管安装  
Steel pipe installation



软管安装  
Soft pipe installation



耦合式安装  
Coupling installation



固定式底座安装  
Stationary installation

## 2.2 固定式底座安装

1. 为泵安装提供平垫和斜垫铁组。

2. 基础混凝土凝固后,沿着地脚螺栓,确定平垫铁的位置,这样可以使泵的安装应力最小。每一块平垫铁的顶面应找平。

3. 当泵安装后用斜垫铁调节平垫铁的高度,使泵保持垂直状态,这样泵受力最小。

4. 完成上述步骤后,安装出水管。为保证泵安全可靠运行,在泵出口最好安装软接头。软接头可以安装在水面上。

## 2.3 耦合式安装

耦合式安装最大优点之一是安装方便,在安装泵之前将耦合部分安装在水池内,因此在泵安装时,操作人员无需下到水池可将泵通过导杆安装。耦合安装方式需保证基础水平。请按以下步骤对中泵和电机。

1. 为泵安装提供平垫和斜垫铁组。

2. 基础混凝土凝固后,沿着地脚螺栓确定平垫铁的位置,这样可以使出水管座的应力最小。每一块平垫铁的顶面应找平。

3. 当出水管座安装后,用斜垫铁调节平垫铁的高度使出水管座出水口中心线保持垂直。

4. 在地脚螺栓孔中浇注混凝土。

5. 当浇注到地脚螺栓孔中的混凝土完成凝固后,请牢固地拧紧地脚螺栓螺母。

6. 完成上述步骤后,安装出水管。在出水管座出水口安装软接头,为方便维修,软接头可以安装在水面以上。

7. 安装导轨。

8. 将泵吊起,调整泵姿态直至耦合架的半圆型导槽套入导轨。

9. 将泵顺导轨缓慢放下直至与耦合座完全耦合。

10. 检查泵姿态,如泵不是在垂直状态,用吊链调整至垂直状态。使吊链处于不受力状态,在池边将吊链固定好。

## 2.4 管道布置注意事项

(1) 管道尺寸按输送介质的流速不超过3m/秒来确定。

(2) 出水管必须安装固定支撑,这样管道上的力就不会作用在泵上。当泵承受管道附加外力作用时可能会出现故障。

(3) 阀门安装在出口侧,安装位置尽可能靠近泵出口法兰。

(4) 当压送介质的温度较高或处于不稳定状态时,因为管道会由于温度的变化而出现膨胀或收缩。在管线中提供弹性管道或其它适合的设备,这样由于管道膨胀或收缩而产生的力不会作用在泵上。

## 2.2 Stationary installation

1. Prepare the flat and taper iron gaskets.

2. After the foundation concrete is set, find the position for flat iron gaskets along the anchor bolts. Level the top face of every gaskets.

3. After pump is installed, adjust the height of the flat gaskets by using taper gaskets to make the pump be vertical.

4. Install the outlet pipeline. Assemble a soft connector at the end of outlet pipeline for convenient maintenance. The soft connector can be placed above the water.

## 2.3 Coupling installation

One of the biggest advantages of coupling installation is convenience. The coupling system is installed in the pool, so operation people can lay down the pump along the guide rail without stepping into the pool. For coupling installation, make sure the foundation is leveled.

1. Prepare the flat and taper iron gaskets.

2. After the foundation concrete is set, find the position for flat iron gaskets along the anchor bolts. Level the top face of every gaskets.

3. After outlet pipe is installed, adjust the height of the flat gaskets by using taper gaskets to make the centerline of outlet connecting pipes be at same line.

4. Pour the concrete into the holes for the anchor bolts.

5. After the concrete in the holes is fully set, strictly fasten the anchor bolts.

6. Install the outlet pipeline. Assemble a soft connector at the end of outlet pipeline for convenient maintenance. The soft connector can be placed above the water.

7. Install the guide rail.

8. Lift and adjust the pump until the semicircle guide frame is set into guide rail.

9. Slowly lay down the pump along the guide rail until fully connected with coupling base plate.

10. Adjust the pump to vertical position by using lifting chain. Make the lifting chain be not in force state and then fasten it near the pool.

## 2.4 Pipeline layout

(1) Choose the dimension of the pipeline according to the flow of the liquid which is not above 3 m/s.

(2) Install a support frame on the outlet pipeline to avoid the force from pipeline on pump. When the pump bears the force, it might be into failure.

(3) Install the outlet valve as near to the outlet flange as possible.

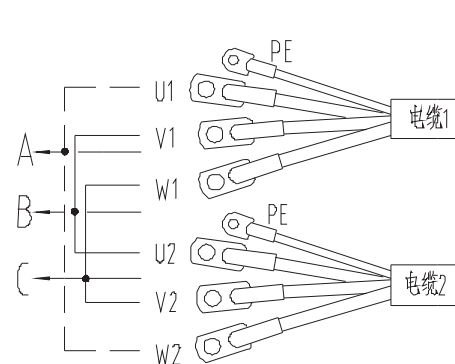
(4) When the temperature of the liquid is too high or not stable, the pipeline will expand or shrink. So install the flexible pipeline or other device to avoid the force of expand or shrink on the pump.

## 3、操作 Operation

### 3.1 动力电缆接线

WQ系列潜水排污泵可采用直接启动、自藕减压启动或软启动,根据用户电源容量进行选择。电泵动力电缆有三根、两根或一根与电源的连接方式如下图所示。

注意:每根动力电缆有“PE”的一根较细的黑色芯线与电机外壳直接连接用以安装时接地,用户应注意可靠接地,以确保安全。



(两根动力电缆与电源接线)  
(Two power lines connecting with power)

### 3.2 启动

泵启动之前,必须遵守以下几点:

1. 电机的旋转方向是否正确?

2. 监控装置信号应指示正常,最低水位应高于电泵蜗壳表面,启动时出口阀门完全关闭。

当这些条件都满足时,可启动电机。当达到额定转数时,应将出口管线上的阀门打开调节至电泵设计工况点位置。泵只能短时间在低流量运行,泵的最小流量见特性曲线。

### 3.3 监控系统

泵启动后应作短时间的试运行,通常以3分钟为宜,检查是否有摩擦、异常振动和异常噪音等,检查电流值与铭牌上标的值不应出入太大,各种测量仪表指针摆动不大。如出现异常应立即停机并检查。

### 3.4 停机

下面的停机程序能够确保操作和工作人员的安全,因此必须严格遵守这些程序。

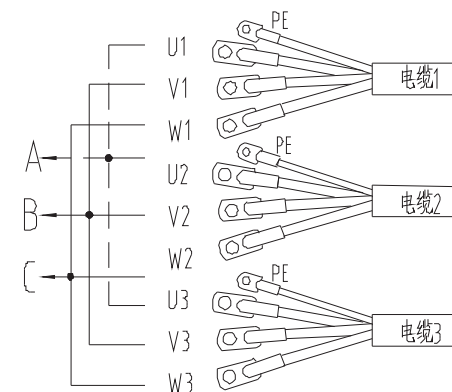
关闭出口管线上的截流阀。

按开关关闭电机。然后检查泵的旋转速度减速是否平稳和泵是否能柔和的降到半速。

### 3.1 Power line connecting

WQ type submersible pump can direct start, auto coupling voltage reduced start or soft start according to user's power volume. See the following connecting drawing.

Notes: Every power cable has a thin black line connecting with pump casing for grounding using. User should make the pump properly grounded for safety operation.



(三根动力电缆与电源接线)  
(Three power lines connecting with power)

### 3.2 Start of pump

Start the pump strictly abiding by the following points:

1. If the rotation direction is correct;

2. If the system monitor signal is normal, the lowest liquid level is above the pump casing and the outlet valve is closed.

If all the points are met, then start the pump. When rotation speed is reaching to rated speed, adjust the valve on the outlet pipeline to reach to rated flow point.

The pump should not run at small flow for long. See the min. flow at the performance curve drawing.

### 3.3 Monitor system

Test running the pump for 3 minutes to check if there is any friction, abnormal vibration or noise, and check the electricity current which should not be different too much. The pointers of all the measuring instrument should not swing too much. Otherwise, the pump should be stopped and checked.

### 3.4 Stop of pump

Stop the pump strictly abiding by the following procedures to make sure the safety of operation people.

Close the throttle valve.

Press the stop button and then check if the rotation speed can reduce steadily.

## 4、维护检查 Maintenance

为保证泵机组无故障运行，必须定期检查，保证系统的安全装置正常运行。

建议电泵运行累积时间每3个月给油室补充一次N32润滑油。

建议在正常工作条件下电泵运行一年后对电泵进行一次检修，更换机械密封件、易损件、补充或更换轴承润滑脂（封闭轴承在使用寿命内不必更换润滑脂）。

发现叶轮和密封环之间的最大距离超过2mm时应以更换。

电泵长时间放置不用时宜将电泵从水中取出以减少定子绕组的受潮机会，增加电泵的使用寿命。当气温较低时，也应将泵提出，防止冰冻。

电泵在移动时应轻拿轻放。

Regularly check the pump to make sure the pump set and safety device is normally running.

Add N32 lubrication oil after running for 3 months.

Suggest doing maintenance after 1 year normal running, including replacing mechanical seal, easy-wear part, adding or replacing the lubrication grease of bearing. Closed bearing doesn't need to replace grease within service lifetime.

When the maximum distance is 2 mm between the impeller and seal ring, the wearing should be replaced.

When the pump is not in use for a long time, lift the pump out of the water to keep the stator winding from moisture and increase pump's service lifetime. And when the ambient temperature is low, lift the pump out water to avoid cold injury.

Gently lift the pumps.

## 5、拆卸 Disassembling

WQ型泵为潜水排污泵，电机在水下工作，防护等级要求IP68，为避免泵在拆卸、装配过程中对泵造成损坏，发生不必要事故甚至人员伤亡，所以最好由护专业人员进行拆卸。

拆卸泵时，请特别注意不要损坏部件或使部件受到振动。

WQ type pump is submersible sewage pump and the motor works underwater, IP68 protection grade requirement. In order to avoid the damage of pump in the process of disassembly and assembly and unnecessary accidents or injuries, so it's best to disassemble by professionals.

When disassembling the pump, please pay attention not to damage the parts or vibrate components.

## 6、技术问题、原因和排除方法

泵的主要故障已在下表列出。如果出现故障，请立即关闭泵，尽可能对产生的故障进行仔细检查，并向距离最近的我公司销售服务中心告知有关故障的情况，以便于更快捷的为您提供解决方案。

在排除故障之前，必须保证电机不会被随意启动。

## Failures, causes and solutions

The main failures are listed in below table. If failure occurs, the pump should be stopped immediately. Check the pump carefully and inform the nearest the sale center for them to quickly offer our best solutions.

Make sure the motor can not start randomly before dealing with the failure.

故障现象	故障原因	排除方法
不能启动	1.直接启动。可能是空气开关或电流保护的设定值太小。本潜水泵全电压启动时间约（）S，启动电流≤（）A	1.重新整定空气开关或过电流保护的整定值 2.从设计上审查供电系统的启动状态下电压降落 $\Delta U \leq 15\%UN$ ，UN为额定电压
	2.采用自藕减压启动。切除自藕变压器时，空气开关或过电流保护跳闸	1.自藕减压启动应选择“闭路转换型”，减小二次电流冲击 2.有65%和80%的自藕减压变压器。优先选择80%的电压，提高转换时的转速降低二次电流冲击
	3.采用软启动启动器。启动时，不能启动或启动时间太长	1.在软启动器生产厂商配合下，正确选择启动电流的限值。建议启动电流限值为额定电流的400%，约（）A 2.启动时间控制7秒以内较合理，启动时间过长会导致绕组过热

故障现象	故障原因	排除方法
不能启动	4.电泵内部传感闭锁（或切断）主接触器的控制回路	1.检查潜水电泵内部传感器与潜水电泵专用保护器接线是否正确，如有误应纠正，并作模拟动作再投入运行 2.检查内部传感器阻值(用万用表的1K档)是否与表1的数据相接近，如显示故障则应进一步检查
长期运行电机绕组温度过高，引起电机内部温控传感器报警	1.泵实际扬程超过设计扬程，引起功率增大，电流增大，温升过高引起线圈温控传感器报警	1.应在控制回路中设置过电流继电器，整定值为1.05倍额定电流为长期允许工作电流，应尽量避免线圈超温而强制分闸，绝缘超温会影响绝缘寿命 2.如有可能应从降低几何扬程，减少管道损失，减小功率。如无法做到则应把电泵从连续运行改变为间断运行工作制。如建议以2h为间隙进行运行
	2.冷却水套的进出水管道塞阻，冷却水流动不畅，散热条件变坏，即使不超功率，也导致温升过高	1.为观察进出水流道是否畅通，最有效的办法是将冷却水管从向下的位置改变到向上位置，直接观察喷出冷却水量的大小，如果喷出水流过小或无水喷出，则应清理冷却水管的进水管内的滤网是否阻塞，其次检查出水管
推力轴承温度高于限值80℃	1.轴承装配后，刚开始运行，轴承没有进入自由定位状态 2.推力轴承本身出现故障，一般伴有“咕、咕”的噪声，而温度持续上升，而且在扬程、流量没有变化前提下，功率、电流上升且摆动	1.继续运行2-3h后，温度会下降到限值以下，则不属故障现象 2.应更换同型号轴承，更换油(脂)更换轴承一般应在本厂专业技术人员指导下进行
接线盒进水电极报警	1.动力电缆或控制电缆磨破，水从电缆线芯之间或芯内渗入接线盒 2.接线盒斗的“V”型橡胶密封失效，水从填料函进入接线盒 3.电机上端盖法兰“O”型圈失效引起漏水	1.提起电泵检查电缆，仔细观察电缆有无磨损、磨破现象。如发现有此现象，应通知本厂专业技术人员，在其指导下按“现场电缆接续、绝缘、防水工艺手册”进行检修 2.打开接线盒盖，排除积水重新装配和密封 3.如果仅仅是进水报警，测量绝缘电阻 $R \geq 5M\Omega$ ，可判定为轻缺陷，在必须开泵的情况下，允许开机，但应每天检查绝缘电阻。并在紧急情况解除报警 4.更换法兰“O”型圈
电机内腔电极报警	1.电机法兰“O”型圈失效引起漏水	1.更换法兰“O”型圈
电泵不正常振动和噪声	1.发现不正常振动噪声应同时观察记录电压、电流、电功率、压力表读数、特别是电流是否摆动及摆动幅度 a.振动时同时伴有电流摆动。主要原因是淹没深度不够，使空气进入泵腔或管道 b.振动时不伴有电流摆动，或摆动幅度很小。主要原因发生在藕合系统 C.观察振动与电泵的声音相互关系与新安装泵相比较，如在振动同时有磨擦的“咕、咕”声，主要原因按叶轮螺母松动、叶轮下沉、推力轴承损坏叶片被硬物打坏的顺序进行分析和排查，找出主要原因	1.观察分析进出水池水位，调整运行方式，提高进水池水位 2.提泵检查藕合面上是否有漏水，提泵让配合面紧密贴合 3.提泵按顺序进行分析，紧固松动零件并及时更换受损零部件

故障现象	故障原因	排除方法
在例行检查中发现电泵的绝缘电阻低于50MΩ	1.接线盒内漏水传感器或电机腔内漏水传感器已发出漏水报警信号。此时应采用备用传感器予以校核,如证实漏水,则绝缘电阻低,很可能是因漏水引起的。 2. 其它部位可能进水	1.提泵检查,按以下顺序进行。以厘米为单位仔细检查动力电缆、控制电缆有无磨破、针孔等现象,如有,则应按《现场电缆接头工艺》对受损电缆进行处理。拧开接线盒放水螺塞及电机腔放水螺塞,放尽内部积水,重新密封,再度检查绝缘电阻,当绝缘电阻>50MΩ时可投入使用。 2.提泵后,检查电缆,如没有破损等缺陷,应按以下顺序检查。 A.本泵设计蜗壳与叶轮为“后开门”式。拧开电机油室与泵壳的螺柱上的螺母,吊出带叶轮的电机组件。 B.卸下叶轮检查首道机械密封,如有故障,应予以更换。 C.将带油室的电机轴向下,垂直竖立在足以承受电机重量及足够高度的架子上稳定放好。 D.拧开电机与油室的螺栓,吊出电机。 E.检查油室内上下机械密封,有故障予以更换。 F.按以上相反的顺序重新装配电泵。有条件时,应对油室进行0.2Mpa的气密试验。5min不得有任何泄露气体现象发生。如没有条件,要严格按工艺进行,可以不做气密试验。 3.拧开电机与下法兰的螺栓,做记号后拧开定子组件观察有无油水漏出,找出故障点。如更换“O”型密封圈,涂密封胶7302重新装配。必要时烘干或晾干定子,待绝缘电阻恢复后重新装配。此项工作技术性较强。用户、技术人员应经培训方可进行,或在我公司专业技术人员的指导下进行。 特别说明:由于该潜水电机的线圈是防潮云母连续绝缘并经VPI处理,有良好的防潮性能,在应急情况下,尽管漏水点未被查出(不包括电缆及其密封漏水)有少量渗漏,仍不影响泵的安全运行,简单的处理方法,即拧开接线盒或电机腔放水螺塞,绝缘电阻即会回升,水放掉后,重新拧紧放水螺塞。只要加强对绝缘电阻的监测,即能投入应急使用。
电流高出额定值或超功率	1.伴有严重的振动噪声 2.叶轮反转是相序接错引起的,同时不出水或水量很小 3.叶轮被硬质异物卡位。其现象是电流突然上升 4.电流缓慢上升或波动性地上升,流量同时减小	1.见第6条 2.调换三相相序中的两相,即可纠正,这一错误在试泵或检修电源开关柜时才可能发生。 3.提泵检查,并排除泵内或机坑内的异物。 4.纤维状物质沉淀在进水池的栏污栅或阻塞叶轮,应进行彻底清理,处理同前。
流量减小	1.流量减小但扬程不提高(压力表指示不提高) 2.流量减小,扬程提高 3.电压过低,低于额定电压 4.电机缺相运行,流量突然减小,伴有电磁噪声,且电流表(三相)明显反映 5.所需的总压头过大 6.吸水管或叶轮堵塞	1.见前款处理,同时检查电压是否符合说明书的规定,电压低应于纠正。 2.查核进出水池的水位,如几何扬程提高,流量相应减小,属正常;如几何扬程不提高,应查出出水管道受阻的原因,并纠正;检查出水阀门开度。 3.调整变压器台步,提高电压,符合本说明书的要求。 4.是一种危险的运行工况,有可能引起电机的烧坏线圈的严重故障,应在控制和监视系统有可靠的保护措施,绝对避免缺相运行。 5.如果实际总压头超过计划量,那么增加泵的转速或使用更大的叶轮。 6.需要清洗管道或者卸下叶片进行清洗。

Failure	Failure causes	Solutions
Can not start	1.Direct start: Possibly the air switch or current protection set value is too small. The start time is about __s and start current is less than __A	1.Reset the set value of air switch and current protection 2.Check if $\Delta U \leq 15\%UN$ ( $\Delta U$ is the decrease voltage at the start state; UN is the rated voltage)
	2.Auto-coupling start: When cutting off the auto-coupling transformer, the air switch or current protection trips	1.For auto-coupling start, should choose the close circuit transition to reduce the shock of twice electricity 2.There are two types auto-coupling transformer, 65% and 80%. Preferentially choose 80% to improve the speed and reduce the shock of twice electricity
	3.Soft start: Can not start or start time is too long	1.Under the guidance of the soft starter manufacturer, correctly choose the limit value of start current. 400% of rated current is suggested, about __A 2.Start time should be controlled to 7 s. Too long start time may cause too much heating of winding
	4.Cut off the control circuit of motor inside contactor	1.Check if the connection line of motor inside sensor and protector is correct. Correct it if it is wrong and start running after simulation running 2.Use the multimeter 1K value to check the inside sensor if the data is similar to table 1. If the data is failure to display, should further check it.
Temperature control sensor inside motor alarms because of the high temperature of motor winding	1.The actual head is above the rated head which results in the increase of power, current and temperature rise	1.Set 1.05 times of rated current be allowable long time work current in the control circuit to avoid high temperature of winding 2.Decrease head if possible and reduce pipe loss to decrease power. If not, change the continuous running to intermittent running. 2 hours is suggested.
	2.in and out water pipe of cooling jacket is jammed. Cooling condition is bad. Even though the power is not exceeding, temperature rise is still too high	Observe if the water pipe is blocked. If the flow is too small, clean the filter screen of inlet pipe and then check the out water pipe.
The temperature of thrust bearing is above 75 °C	1.Bearing just starts running and haven't been into the state of free location 2.The thrust bearing is broken with noise and temperature rising while the flow and head remain the same , power and current increase or fluctuate	1.After running for 2 to 3 hours and if the temperature is back to normal state, it is not a failure phenomenon 2.Replace the bearing and grease under the guidance of our professional clerk
Alarm from terminal box electrode	1.Power or control cable is worn-out and water get in. 2.The V rubber seal of the terminal box is broken and water gets into it 3.O ring of motor end cover flange is broken	1.Lift the pump and check if there is any wear. Inform the our professional clerk and solve the problem under their guidance 2.Open the terminal box, drain the inside water, assemble and seal again 3. If the it is only water entering alarm, and the insulation resistance $\geq 5 M\Omega$ , it can be judged to slight defects. Allow to start the pump in emergency using, but should check the insulation resistance every day and cancel the alarm in an emergency using 4.Replace O ring of motor end cover flange

Failure	Failure causes	Solutions
Alarm from motor cavity electrode	O ring of motor flange is broken	Replace O ring of motor flange
Abnormal vibration and noise	1.Observe and record the voltage, current, power, pressure, especially the reading of current a.Current fluctuates, then the main reason is the submerged depth of pump is not enough to let the air get into the pump b.Current does not fluctuate or slightly fluctuates, then the main reason is the problem of the coupling system c.Comparing with new pump, if it is friction noise, then check the from impeller nut, impeller position, thrust bearing, to impeller appearance, and find the reason step by step	1.Observe the liquid level of the inlet water pool, adjust the running mode and increase the liquid level 2.Lift the pump and check if there is leakage at the coupling and make sure the connecting faces are tight 3.Analyze, replace and tighten the broken parts.
The insulation resistance is below 5MΩat the routine test.	1.The terminal box leaking sensor or motor chamber leak sensor has a leak alarm signals. Use spare sensors to check the leakage. If the leakage is confirmed, the low insulation resistance is likely caused by leakage. 2.Other parts possibly leaks	1. Inspect the pump in the following order. Carefully check whether there is any wear or pinhole on power cable, control cable, if any, should deal with the damaged cable according to the "site cable joint technology". Unscrew the junction box drain plug and motor chamber drain plug to drain the water out, and seal again. Check the insulation resistance again, it can be put into use when the insulation resistance $\geq 5 M\Omega$ . 2.If there is no defects on the cable, should check the pump in the following order. A. the volute and impeller of the pump is designed as open-back type. Unscrew the nut on the motor oil chamber and the pump casing and hang out with the motor components with impeller. B. Remove impeller and check the mechanical seal first. If there is any defects, it should be replaced. C. vertically place the motor with oil chamber on a shelf and make sure the motor shaft is downward. The shelf can bear the motor weight and height of it is enough in height. D. Unscrew the bolt of motor and the oil chamber and hang out motor. E. check the oil chamber mechanical seal, replace it if there is any defects. F. Assemble the pump in reverse order. 0.2 Mpa air test the oil chamber. Air leakage should not occur in 5 minutes. If it is not convenient to do air test , should strictly check it according to its technique.3. Unscrew the bolts between motor and flange. Unscrew the stator component after marking the position. Check if there is any oil or water leakage. Find out the failure point, change the O seal ring, smear sealing glue 7302 and assemble again. When it is necessary, dry stator and assemble after the insulation resistance is applicable to use. This is a strong technical work. User, technical personnel should be trained, or under the guidance of professional and technical personnel in our company. Special note: Since the submersible motor coil is moistureproof mica insulation and continuously after the VPI treatment, it has good moistureproof property. In emergency cases, although the leak point was not detected (not including cable and its seal leakage) has a small leakage, still does not affect the safe running of the pump. Simple processing method, namely unscrewed junction box or motor chamber drain plug, insulation resistance will rebound, after the water drains, to tighten the drain plug. As long as to strengthen the monitoring of insulation resistance, the pump can be used for emergency using.

Failure	Failure causes	Solutions
The electricity or the power is above rated	1.Serious vibration noise occurs 2.The impeller reversely rotates, or no water or small water get out 3.Impeller is jammed by foreign objects and the current suddenly increases 4.Current increases slowly and flow decreases at the same time.	1.See item 6 2.Exchange the motor phases 3.Check and remove the foreign objects in the pump 4.Fiber material precipitates at the screen trash of the water pool or blocks the impeller.
Flow decreases	1.The flow decreases while the head doesn't increase 2.The flow decreases while the head increases 3.Voltage is 10% lower than the rated 4.Motor is phase loss running with electromagnetic noise. Flow suddenly decreases. 5.The total head is too high 6.Inlet pipeline or the impeller is jammed	1.Refer to previous item and also check the if the voltage complies with the provisions of the manual 2.Check the liquid level of the water pool. It is normal if head increases while flow decreases. Otherwise, check if the outlet pipeline is jammed or adjust the valve on the outlet pipeline 3.Adjust the transformer and increase the voltage 4.It is a dangerous working condition which will result in burnout of the motor coil. Phase loss running is absolutely prohibited 5.Increase the pump speed or use bigger impeller if the total head is above the rated 6.Clean the pipe line or disassemble the impeller to clean it

## 7、备件 Spare parts

从投产开始起就应备足备件，一旦需要可取出备件进行更换。当需要订货时，请给出以下内容：

- 泵的货号
- 泵的类型及尺寸
- 备件单中的编号
- 剖面图中的零件编号
- 数量
- 材质

如果改变参数(例如:扬程,流量等)或材质等,请向离您最近的销售中心咨询。

推荐满足两年以上连续运行所需备件数量如下：

备件名称 Name	数量 Quantity	备注 Remarks
叶轮 Impeller	1只 piece	
泵盖 Pump cover	1只 piece	
叶轮密封环 Impeller seal ring	1只 piece	
机械密封 Mechanical seal	1套 set	不同型号机封各配1套 Every model with 1 set of mechanical seal
轴承 Bearing	1套 set	不同型号轴承各配1套 Every model with 1 set of bearing

备件的存储：  
将备件存储在原始包装内  
最好储存在一个干燥的地方  
每6个月检查一次备件的腐蚀情况及包装状态

Prepare enough spare parts when starting production. So can replace the broken part Once it is needed. Give the following information when ordering goods:

- Pump serial Number
- Pump type and dimension
- Item NO. of spare parts list
- Parts NO. of sectional drawing
- Quantity
- Material

If the parameters, such as flow, head, material, are changed, please contact the nearest sales center for consultation.

Recommended spare parts for 2 year continuous operation:

The storage of spare parts.  
Place the spare parts inside the original package.  
Store the spare parts at dry place.  
Check the corrosion and packing condition of the spare parts every 6 months.