

User Manual for SWP Series Corrosion Resistant FRP Pump

SWP系列海水泵说明书

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1. 概括 Introduction

1.1 质量保证 Quality Guarantee

制造商：制造商保证SWP水泵按照标准设计图制造，同时提供电机，底板，连接部件及其保护装置，根据GB标准制作。

统一标准：以上所列举的标准仅保证水泵在说明书或服务合同上所列明的工作环境下正常工作，用户有责任确保水泵在合适的工作环境下工作。

任何对机器进行人为改动的行为或在不恰当的工作环境下使用本水泵均会使此声明无效。

此声明可在制造商认可的工序下安装并使用的水泵，水泵所在的循环系统需根据标准来完成。

如果发生用户需要只带轴的水泵，用户必须根据制造商的说明来完成整个水泵的安装并在水泵运行之前确保符合GB标准。

Manufacturer: The manufacturer guarantees that SWP water pump is manufactured in accordance with standard design drawing and at the same time provides motor, baseboard, connecting parts as well as their protectors, which are all manufactured in accordance with GB standard.

Unified Standards: The standards listed above only ensure that the water pump can work normally in the working environment specified in the specification or service agreement; clients have the responsibility to ensure that the water pump work in proper working environment.

This statement will be invalid if there is any artificial alteration to the machine or if the machine is made to work in improper working environment.

This statement only approves the water pumps being installed and used in accordance with the production processes approved by the manufacturer. The circulation system of the water pump should be done in accordance with standards.

If clients only need water pumps with shaft, they should install the whole water pump in accordance with specifications made by the manufacturer and should ensure that it is in accordance with GB standards before the running of the pump.

1.2 概括信息 General Information

本用户手册旨在保证使用设备的安全。水泵必须按照这个手册提供的指南来保证稳定性及避免不可预见的风险。用户必须根据国家标准以及安全法规来使用设备，尽管这些标准可能没有在手册里标示出来。

本手册必须安放在水泵的附近或者直接附在水泵上。

安装, 使用及维护水泵之前必须要阅读说明书。

如用户不能按照指南来操作可能会对用户造成伤害并且使保修失效。

说明书内的操作指南及信息只对此说明书附着的水泵有效。说明书不适用于所有在同一系统内的水泵。

The purpose of this manual is to ensure that safety use of the equipment. The stability of the water pump is only guaranteed by complying with the guides specified in this manual, and that the same time, unforeseeable risks can only be avoided by doing so.

Clients should use the equipment in accordance with national standards and safety regulations, though it is possible that these standards are not specified in this manual.

This manual should be placed near the water pump or be attached directly on the water pump.

The specification should be read before the water pump being installed, used and maintained.

If clients fail to operate in accordance with the guides, he is possible to get hurt and at the same time the warranty is possible to be invalid.

The operation guides and information specified in the specification is only valid to the type of water pump attached in this specification. It's not applicable to all water pumps in the same system.

1.3 权利和免责声明 Rights and Disclaimer

以本手册内所提供的信息为准。制造商对本手册内的信息缺失不承担责任。用户必须查看包含在此手册内的信息，如有发现任何纰漏请及时联系制造商。

版权所有, 在没有得到制造商允许的情况下，手册内的任何信息均不能以任何形式重新制作，储存以及传输至个人作任何用途。

The information provided in this manual is taken as standard. The manufacturer is not responsible for the information missing in this manual. Clients should read the information contained in this manual, and if there is any mistake, they should contact with the manufacturer in time.

All rights reserved. Without approval from the manufacturer, any information in this manual cannot be re-made in any form, re-stored and transferred to individuals for any purpose.

1.4 标志 Signs

每台水泵均配备铭牌。铭牌上含有根据GB标准所要求的信息，同时也是水泵的便捷鉴别方式。当用户向制造商要求备用零件时，用户应提供铭牌上的相应信息或水泵的序列码。

Each water pump is fitted with a nameplate containing the information required by GB standards. At the same time, it is a convenient way to identify the water pump. When clients ask the manufacturer for spare parts, they should provide relative information on the nameplate or the sequence code of the water pump.

1.5 保修 Warranty

所有公司生产的水泵均享受本公司的质量担保。制造材料缺陷均包含保修条款内。保修期由出厂日期开始算起最多一年（发票日期）或自安装起不超过六个月。在此期间，制造商承担所有的维修及更换部件的费用。制造商仅承担制造纰漏或有材料缺陷的产品。保修提供错误件的替代品，但必须经过检测确认损坏是由制造故障所引起的而不是由不当的操作所造成。

公司不承担所有由缺水或无水运行，错误安装及/或水泵内异物，用于制造商没有标示的液体，流速不稳定，总扬程或温度和交收时的数据比较，水击作用，运输损坏，由不具备资格的人员操作等等所引起的机器损坏。

保修条款不包括为由水泵不正常运行或在水泵维修期间(制造商或第三方)所引起的物品损失及人身伤害提供直接或间接补偿。

如用户在没有经过协商的情况下私自维修产品会被取消保修资格。

所有使用由第三方供应商所提供的零部件的行为视作放弃保修。

保修条款同样需要用户使用适当的包装寄回，在维修或更替部件之后用户需要提供包装及运输费用。

在保修条款下进行的所有工作不影响该产品的保修期。

易损件不包括在保修条款内。

对手册内容的不遵守及不合作将会被取消保修资格。

All water pumps manufactured by the company enjoy the quality guarantee made by the company. Defects of manufacturing materials are included in warranty clause. The warranty period is one year starting from the date of production (the date specified on invoice) or six months starting from the date of installation, during which the manufacturer will undertake all the costs of maintenance and changing parts. The manufacturer is only responsible for careless mistakes in the manufacturing process or the products being made by defective materials. The warranty can replace the defective parts, but it should be certain that the damage is caused by faults in manufacturing process, instead of improper operation.

The company will not be responsible for the damage caused by: Running with little water or without water at all;

Improper installation and/or foreign matters in the water pump;

Using on the liquid that is not listed by the manufacturer;

Unstable flow speed;

Comparison of the data of total pump head or temperature with the date on the time of delivery;

Water hammer effects;

Damaged in transportation;

Damages caused by operated by people without qualification; etc.

Warranty clause doesn't include direct or indirect compensation for loss of goods and physical injury caused by the abnormal running of the water pump, or during the time of maintenance (manufacturer or the third party).

If clients do the maintenance by themselves without consulting with the manufacturer, they will be disqualified for warranty.

Using the parts provided by the third party suppliers will be regarded as giving up the warranty.

The warranty clause requires the clients sending back the parts in proper packaging, and they should pay the cost of packaging and transporting after the parts have been repaired or replaced.

All works done under warranty clause don't affect the warranty term of this product.

The warranty clause doesn't include vulnerable parts.

Those who don't obey the content of the manual and take a non cooperative attitude will be deprived of the qualification of warranty.

1.6 安全 Safety

进行水泵运行，安装，测试及保养的所有工作人员必须有相应资格来进行工作。

如果工作人员没有被授权相应工作的资格，用户必须确保他们获得相应的培训。根据操作员的要求，用户可以正式书面的形式向制造商以合适的价钱寻求合适的培训。

所有标配的零部件均经过测试以保证成品的质量及其在长时间工作下的性能。使用由第三方所提供的零部件可能会对水泵造成性能下降或造成安全问题。任何由于不正当使用所造成的损失均不包括在保修条款内。任何对水泵的改造或原装部件的拆除均

会损害水泵在运行时的安全。

本手册包含具体的安全标识，所有安全标识均标示在下文中。对一个或多个标识有不熟悉的情况可能会使操作者受到伤害。

The staff running, installing, testing and maintaining the water pump should have relative qualifications.

If the staff don't have relative qualifications to do the authorized work, clients should ensure that they get relative training. According to operators' requests, clients can ask the manufacturer in written form for the proper training with reasonable price.

All standard parts have been tested so that the quality of the product and its performance under long time working can be ensured. Using parts supplied by the third party may result in performance degradation of the water pump or causes safety problems. Any damage caused by improper using is excluded from the warranty clause. Any alteration to the water pump or the dismantling of original parts will affect the safety of the running water pump.

This manual contains detailed safety signs, all of which are listed in the following part. Unfamiliar to one or more signs may lead to harm to the operator.

2. 运输及储存 Transportation and Storage

2.1 包装 Packaging

包装的材料及结构均通过货品的形状、尺寸及重量来选择。

用户在接收货物须遵循以下步骤：

- 1) 对照定单及货运清单来清算包装内的物品；
- 2) 检查包装箱是否有在运输途中受损的痕迹；
- 3) 小心的从包装内取出货物。

The material and structure of the packaging will be determined by the goods' shape, size and weight.

Clients should follow the following steps when receiving the goods:

- 1) Checking the goods in the package according to the order and shipping list;
- 2) Checking whether there is any signs of damage of the packaging container during the transportation;
- 3) Taking out goods from the package carefully.

2.2 运输, 货物装卸及升起 Transportation, Loading and Unloading, Raising

运输途中必须对货物多加保护，运输对水泵的正常运作起着非常重要的作用。

装卸货物时，必须考虑货物的形状，重量以及包装的性质。

升起货物时，水泵中最易碎的部分不应当承受额外的压力（如玻璃纤维件及连接件）。包装好的水泵应被缓慢的放下并保证过程中不受到敲击。水泵应当固定在原位并且有足够的支持使其保持包装时的位置。在运输过程中避免强烈的震动。

卸货时需遵循同样的标准。

运输、货物装卸及升起的操作指南：

- 1) 在装卸前，检查货物的重量、尺寸以及重心；
- 2) 如果水泵需要在安装之后移动，确保水泵已排净水泵里的水；
- 3) 从推荐的吊起地方吊起水泵；
- 4) 吊起水泵用的绳子或吊索不得形成超过90度的角；
- 5) 严禁使用单个吊钩吊起整个部件；
- 6) 严禁使用电机的把手来吊起水泵；

During the transportation, goods should be protected carefully; transportation is very important to the normal running of the water pump.

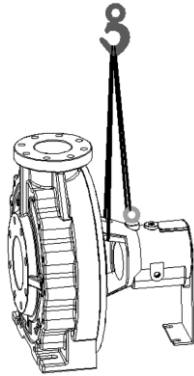
During loading and unloading , the goods' shape, weight and the nature of package should be taken into consideration.

During raising the goods, the most vulnerable parts of the water pump (for example parts made by glass fiber and connecting parts etc.) shouldn't bear additional pressure. The packed water pump should be put down slowly and should ensure that in this process it isn't been knocked. The water pump should be fitted in normal position and there must be enough support to keep it in the position when being packaged. Severe vibrations should be avoided in the process of transportation.

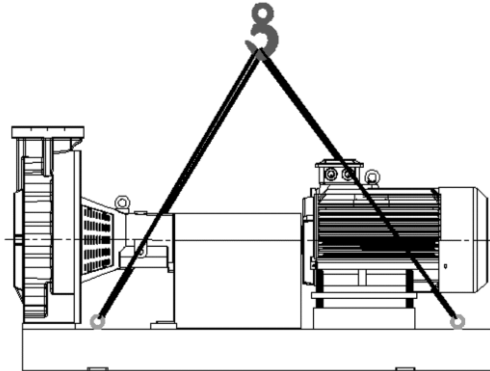
The same standards should be complied with when unloading the goods.

Operating instructions on transportation, loading and unloading the goods and raising the goods:

- 1) Check the goods' weight, size and the center of gravity before loading and unloading the goods;
- 2) If the water pump needs to be moved after it has been installed, please ensure that the water in the water pump has been drained out;
- 3) Hanging the water pump from the suggested place of hanging;
- 4) The string or sling used to hang the water pump shouldn't form an angle greater than 90 degree;
- 5) It is prohibited to hang the whole parts by a single hanger;
- 6) It is prohibited to use the handle of the motor to hang the water pump.



海水泵前端单独安装起吊图
The installation and hanging diagram of the front part of the sea water pump



海水泵起吊图
Hanging diagram of sea water pump

2.3 检测 Testing

- 1) 当货物抵达时收货方应对货物进行全面的检查；
- 2) 制造商对任何在运输对水泵所造成的任何损伤不负责任；
- 3) 当货物受到损伤时，客户应联系相应的物流商。

- 1) The receiver should make the overall checking to the goods when they arrive;
- 2) The manufacturer isn't responsible for any damage to the water pump caused by transportation;
- 3) If the goods are damaged, clients should contact with corresponding logistics company.

2.4 储存 Storage

分散的水泵零部件应在短时间内组装完毕。如果需要长时间储存零部件，存放在干燥、远离震动源、放射源、及可燃或爆炸性材料，同时避免太阳或热源直射，避免在组装前部件受到破坏。

以下为储存水泵部件时所需要遵循的准则：

- 1) 水泵部件带包装储存在室内。如果水泵部件将放置在室外，包装必须要防水及防止湿气的渗透；
- 2) 水平防止水泵部件，并使用防水物料盖好；
- 3) 放置水泵部件在垫木上防止水泵和地面的直接接触，远离地面污染物同时防止变形或弯曲；
- 4) 严禁在带包装的物件上方安置重物；
- 5) 保护水泵部件远离溅泼及腐蚀性物质周边；
- 6) 保持储存温度在5-35摄氏度之间。储存温度应一直高于结冰点；
- 7) 储存期间，应每周旋转轴头5圈。旋转时应注意保持旋转方向与水泵运行时的旋转方向一致。此项措施能有效防止接触面在摩擦力的作用下锁死
- 8) 严禁在未准备安装水泵的情况下移动水泵末端的端口；
- 9) 在安装水泵前清洁水泵，防止外部零件影响水泵的正常运行。

Scattered parts of the water pump should be assembled in a short time. If it is need to store the parts for a long time, they should be stored in a dry place far away from vibroseis, radioactive source, flammable or explosive materials, and at the same time, the direct radiation from the sun or from heat source should be avoided. The damages to the parts should be avoided before assembling.

The following rules of storing the parts of water pump should be complied with:

- 1) The parts of the water pump should be kept in the room in their original package. If the parts of the water pump need to be placed outdoor, their packages should be waterproof and avoid the permeation of dampness.

- 2) The parts of the water pump should be placed horizontally and should be covered with waterproof material;
- 3) Putting the parts of the water pump on the crosser to avoid the direct contacting with the earth; keeping far away from pollutants on the earth and at the same time avoiding deformation or bending;
- 4) It is prohibited to place the heavy on the packed parts;
- 5) Keeping the parts of the water pump far away from splash material and corrosive material;
- 6) The storage temperature should be between 5°C to 35°C and should be always higher than the freezing point;
- 7) In the process of storage, the shaft head should be rotated 5 circles per week. When rotating the shaft head, paying attention to the consistence of the rotating direction and the rotating direction when the water pump is running. This measure can effectively prevent the interface from locking under the function of friction force;
- 8) It is prohibited to move the port at the end of the water pump if the installation of the water pump hasn't been prepared;
- 9) Cleaning the water pump before installation; preventing external parts from affecting the normal running of the water pump.

3. 安装 Installation

 在安装前仔细阅读此部分。完成安装工序的人必须谨记此手册内的信息。如不能按照说明安装可能会对水泵造成不可逆的损害。

Please read this part carefully before installation. People who do the installation should keep in mind the information in this manual. If the installation is not done according to the instructions, it may bring irreversible harm to the water pump.

3.1 水泵安装位置 Installation Position of the Water Pump

水泵应安装在最佳位置以保证：

- 1) 简单的入水管出水管连接安装；
- 2) 在运行过程中保证日常检查的简易型；
- 3) 接近储水池；

The water pump should be installed in the best position to ensure that:

- 1) The water inlet pipe and water outlet pipe can be connected easily;
- 2) The simplicity of daily inspection can be ensured in the process of running;
- 3) Being close to the tank.

 安装时应确保对过路的行人保留足够的安全距离。要确保操作人员的安全，水泵的安放位置应同时考虑到在高压情况下液体泄漏或零部件损坏的情况。

安装水泵前，应确保开关处于关闭的状态，并断开与供电电路的连接避免任何旋转部件的误操作造成伤害。

When installing the water pump, ensure there is adequate safety distance away from pedestrians, and the safety of operators should be ensured. The choosing of installation position of the water pump should also consider the liquid leakage or damages to the parts under high voltage.

Before installation of the water pump, be sure that the switch is off, and at the same time cutting off the connection with supply circuit so that the harm caused by incorrect operations of any rotated parts can be avoided.

3.2 支撑底座 Supporting Base

支撑底座由适当的材料制造而成保证其能稳定的支撑水泵及周边区域。同时推荐在水泥内铺设的地基的方法。底座必须水平放置，使用水平仪检查及用标准螺丝锁紧。为防止水泵与管道不对齐的问题，推荐使用金属垫片来调教保证对齐。

The supporting base is made by proper material to ensure that it can support the water pump and perimeter zone solidly. There are also suggested methods of laying foundations in cement. The base should be placed horizontally, tested with an air level, and fixed with standard screws. It is suggested to use metal gasket to avoid the problem of non alignment between the water pump and the pipes, the using of which can make adjustments and ensure the alignment.

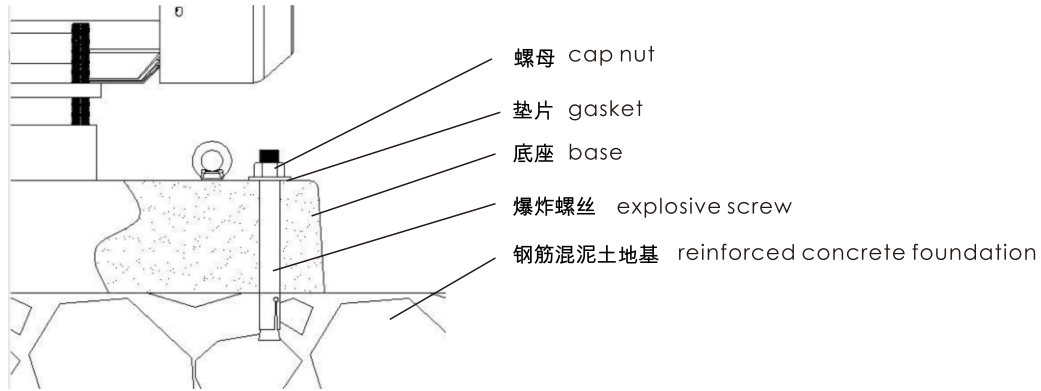
3.3 底座和地基 Base and Foundation

地基必须使用合适的材料，保证底座与其周边地区的稳定。我们高度推荐使用钢筋混凝土作为地基的材料。基面必须保持水平，确保机组与管道之间的准确配合。底座与地基之间使用爆炸螺丝进行稳固。

注意：地基的面积必须大于水泵的底座面积。

The foundation should use proper material to ensure the solidity of the base and its perimeter zone. We highly recommend using reinforced concrete as the materials of the foundation. The surface of the foundations should be kept horizontal to ensure the exact fitness between the assembling unit and the pipes. Explosive screws should be used to fix the base and the foundation.

Note: The area of the foundation should be larger than the area of the base of the water pump



3.4 底座排水管道 Draining Pipes on the Base

制造商在底座上提供了一个螺纹孔位排水孔，用于疏散泄漏在滴水盘中的液体。该排水孔应连接到外部排水系统。

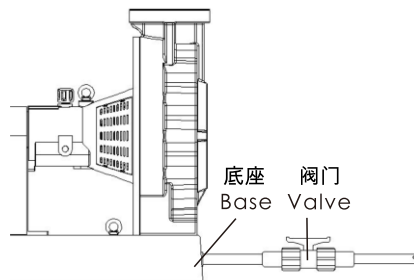
注意：

- 1) 排水管道及配件应采用螺纹连接并使用相同的材料；
- 2) 阀门在运行过程中应该始终保持打开。（阀门可不安装）

The manufacturer provides a threaded hole scupper on the base so as to evacuate the liquid leaked on the drip tray. This scupper should be connected with the exterior drainage system.

Note:

- 1) Draining pipes and their fittings should be connected with screw threads and should use the same kind of material;
- 2) In the process of running, the valve should always be in the state of open. (The valve may not be installed)



3.5 水泵的校准 The Calibration of Water Pump

所有的水泵均由制造商校准。然而在运输过程当中校准有可能失效。所以在水泵的安装完成之后需要再一次进行校准。检查校准情况的最佳办法为使用电子仪器。如果没有可用的电子仪器，使用传统的方法（尺子）也可达到同样的目的。使用游标卡尺检查校准的方法如下：

- 1) 使用游标卡尺测量；
- 2) 在两个联轴器之间的距离为一致时水泵为校准状态。

使用比较仪检查校准的方法如下：

- 1) 手动旋转联轴器部分，保证仪器稳定在联轴器边上的同一点；
- 2) 旋转联轴器90度，重复上述操作。

The calibration of all water pumps are done by the manufacturer. However, in the process of transportation, the calibration may be invalid. Therefore, the calibration should be done again after the installation of the water pump.

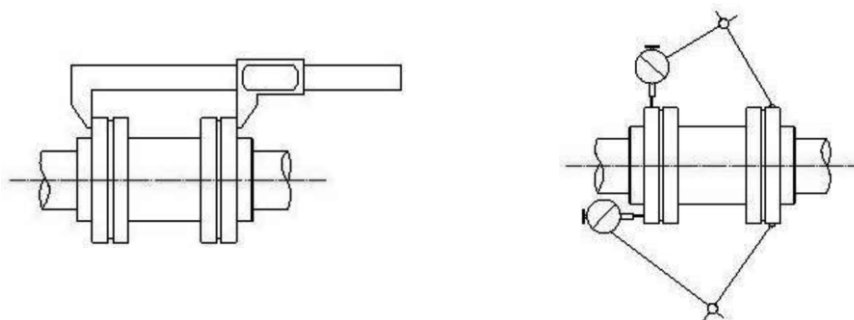
The best way of checking the calibration is using electronic instruments. If electronic instruments are not available, traditional methods (ruler) can be used to achieve the same goal.

The method of checking the calibration by vernier calipers is as followed:

- 1) Use vernier caliper to do the measurement;
- 2) The water pump is in the state of calibration when the distance between the two couplings is the same.

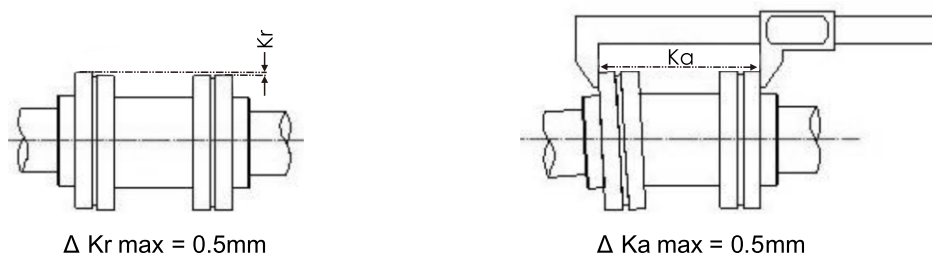
The method of checking the calibration by comparator is as followed:

- 1) Rotate the part of coupling by hand to ensure that the instrument is fixed on the same point at the side of the coupling.
- 2) Rotate the coupling 90 degrees and repeat the above mentioned operation.



如果发现有任何的未对准的情况，应使用底座上的调整系统对准轴

If non alignment is found, please use the adjustment system on the base to align the shaft.



3.6 管道 Pipes

管道系统的设计对水泵的运作有直接影响。吸水池的大小以及进水管和出水管的大小均需被考虑。

The design of the pipe network has a direct influence on the water pumps' operation. The size of the suction tank as well as the sizes of water inlet pipe and outlet pipe should all be taken into consideration.

3.7 进水管 Water Inlet Pipe

进水管的尺寸非常重要。不适当的进水管尺寸会引起许多水泵运行的问题。

遵循以下的准则：

- 1) 进水管应为短管同时避免弯曲；
- 2) 使用支架支撑管道。支架应有涂料可保护支架不受液体或蒸汽损坏；
- 3) 当进水管的尺寸大于入水口的时候，使用变通管来连接水泵；
- 4) 进水管状况决定最大吸水高度。同时应考虑液体的粘稠性、结垢的程度及温度；
- 5) 避免弯头、瓶颈位置、突然的直径减少或其他类型管道。使用大半径的弯头；
- 6) 避免有可能形成气泡的高水位管；
- 7) 安装阀门避免水泵内液体溢出。在水泵运行时保持阀门完全开启，仅在对水泵进行检查的时候关闭；
- 8) 在连接管道处尽量避免任何空气渗透到管道；
- 9) 在进水管的末端安装过滤器，防止外部异物进入到水泵体内。过滤器应及时清洗防止管道堵塞；
- 10) 保持在吸入槽的进水管及其他部分充满液体；
- 11) 在进水管和吸入槽的底部之间保持一个最小距离。最小距离应大于0.5米避免吸入槽底部的固体颗粒影响水泵的正常运行

- 12) 在吸入槽内放入分水墙，防止渗透或旋涡在吸水管内形成；
- 13) 检测自动调节水位箱内的最低水位（如有提供），倾向于使用液位探针连接到电磁阀来保证吸入槽内水位常满。

The size of the water inlet pipe is very important. Improper size will result in many problems on the running of the water pump.

The following rules should be complied with:

- 1) The water inlet pipe should be a short pipe and should prevent it from bending;
- 2) The pipes should be supported by racks. The racks should be covered with coating, so that they can be protected against being damaged by liquid or vapor;
- 3) When the size of water inlet pipe is larger than the water inlet, please use the flexible pipe to connect the water pump;
- 4) The condition of the water inlet pipe determines the maximum suction height. At the same time, the viscosity of the liquid, the level of fouling and the temperature should be taken into consideration;
- 5) Elbow pipe, bottleneck, a sudden decrease in diameter or other types of pipes should be avoided. Elbow pipes of large radius should be used;
- 6) High water level pipe that may form bubbles should be avoided;
- 7) The valve should be installed to prevent the liquid in the water pump from overflowing. In the process of running, the valve should open fully all the time and only closes when checking the water pump;
- 8) In the connection of pipes, try to avoid the air from penetrating into the pipes;
- 9) Install a filter at the end of the water inlet pipe to prevent exterior foreign matters from entering the water pump. The filter should be cleaned promptly so as to prevent the pipe from blocking;
- 10) Keeping the water inlet pipe and other parts in the suction tank fill with liquid all the time;
- 11) A minimum distance should be kept between the water inlet pipe and the suction tank. The minimum distance should be more than 0.5 meters so as to prevent the solid particles at the bottom of suction tank from affecting the normal running of the water pump;
- 12) Put baffle wall in the suction tank so as to prevent penetration or the forming of whirlpool in the suction pipe;
- 13) Test the lowest water level in the automatic regulating water level box (if it is provided); it is suggested to ensure the fullness of water in the suction tank by connecting a liquid level probe to the electromagnetic valve.

3.8 出水管 Water Outlet Pipe

出水管上必须安装一个止回阀及法兰闸阀门，以及性能及温度检测仪器。

遵循以下的准则：

- 1) 使用支架支撑管道。支架应有涂料可保护支架不受液体或蒸汽损坏；
- 2) 设计出水管时应计算摩擦损失。同时应考虑液体的粘稠性、结垢的程度及温度；
- 3) 当出水管的尺寸大于出水口的时候，使用变通管来连接水泵；
- 4) 避免弯头、瓶颈位置、突然的直径减少或其他类型管道；
- 5) 严禁在出水口位置直接放置弯头；
- 6) 避免有可能形成气泡的高水位管；
- 7) 在水泵和止回阀之间安装排气管。排气管的尾端应直通外部环境；
- 8) 如果液体有可能冻结的话，并在液体冷冻之前排净水泵内液体。

A check valve and a flanged gate valve should be installed on the water outlet pipe, and at the same time, performance and temperature testing instruments should be installed.

The following rules should be complied with:

- 1) The pipes should be supported by racks. The racks should be covered with coating, so that they can be protected against being damaged by liquid or vapor;
- 2) The friction loss should be calculated when designing the water outlet pipe, and at the same time, the viscosity of the liquid, the level of fouling and the temperature should be taken into consideration;
- 3) When the size of water outlet pipe is larger than the water outlet, please use the flexible pipe to connect the water pump;
- 4) Elbow pipe, bottleneck, a sudden decrease in diameter or other types of pipes should be avoided;
- 5) It is prohibited to place the elbow pipe directly at the position of water outlet;
- 6) High water level pipe that may form bubbles should be avoided;
- 7) Install exhausting pipe between the water pump and the check valve. The end of the exhausting pipe should

directly open to the exterior environment;

8) If the liquid may freeze, please empty all liquid in the pump before freezing.

3.9 配件 Fittings

为保证水泵在安全环境下的正常运作，水泵系统应配备下列配件：

In order to ensure the normal running of the water pump under safety environment, the following fittings should be equipped in water pump system:

建议配件 Fittings Recommended		
配件名称 Name of the Fitting	用处 Use	适用位置 Applicable Location
支架 Racks	支撑水管 Supporting pipes	所有管道处 All pipes
过滤器 Filter	减少固体颗粒数量 Decreasing the amount of solid particles	进水管的尾端 The end of the water inlet pipe
变通（异径管） Flexible pipe (reducing pipe)	避免气穴的形成 Avoiding the forming of cavitation	吸入口前 In front of the suction mouth
法兰闸阀 Flanged gate valve	维护时把水泵与整个系统分开 Parting the water pump from the whole system when doing the maintenance	进出水管中 In water inlet and outlet pipes
流量调节器 Flow regulator	减小旋涡和湍流 Decreasing whirlpool and turbulence	出水管（法兰闸阀后） Water outlet pipe (behind the flange gate valve)
过滤器 Filter	减少固体颗粒数量 Decreasing the amount of solid particles	进水管位置 At the position of water inlet pipe
软接 Flexible connector	保护管道及水泵 Protecting the pipes and the water pump	稍超出进出水口位置 Slightly beyond the position of water inlet and outlet
止回阀 Check valve	保护水泵不受水击作用及在停止工作后不清空排水管 Protecting the water pump against water hammering; preventing the drain-pipe from	排水管中，在水泵与法兰闸阀之间 In the drain-pipe, between the water pump and the flanged gate valve
流量调节阀 Flow regulating valve	调节水泵的输出 Regulating the output of the water pump	止回阀后 Behind the check valve
阀门 Valve	在启动自吸过程中排出空气 Evacuating air when starting the process of self suction	排气管中 In exhausting pipe

3.10 控制设备 Controlling Equipment

为保证水泵的正确运行，管道系统应配备下列设备：

In order to ensure the normal running of the water pump, the following fittings should be equipped in pipe network:

建议设备 Fittings Recommended		
设备名称 Name of the equipment	用处 Use	适用位置 Applicable locations
最小水位探针 Minimum water level probe	核实水位达到最低值 Verifying that the water level is at a	吸入槽内 In suction tank
真空计 Vacuum gauge	核实吸水管内的压力 Verifying the pressure in water suction tube	距离水泵吸入口直径两倍 The distance between vacuum gauge and the suction mouth is twice the diameter
温度计 Thermometer	检查液体温度 Checking the temperature of liquid	入水管内 In water inlet pipe
温度计 Thermometer	检查液体温度 Checking the temperature of liquid	出水管内 In water outlet pipe
压力计 Manometer	测量工作压力 Measuring the working pressure	距离水泵出水口直径两倍，在止回阀前 In front of the check valve, and the distance between the manometer and the water outlet should be twice the diameter
流量计 Flow meter	测量工作流量 Measuring the working flow	在出水管内法兰闸阀后 Behind the flanged gate valve in water outlet pipe
负载监视器 Workload monitor	防止没水工作 Preventing from working without water	连接电机 Connecting the motor
开关 Switch	开启和关闭水泵 Starting and closing the water pump	控制板 Controlling board
紧急开关 Emergency switch	在紧急情况时停止水泵运行 Stop the running of water pump in emergency	控制板 Controlling board
功率计或电流表 Dynamometer or ammeter	监测能量利用 Monitoring the energy utilization	控制板 Controlling board

3.11 运行前最后检查 The Last Examination before Running

- 1) 检查螺丝是否已经正确上紧；
- 2) 检查出水管口及排水管口的盖是否已经拿掉；
- 3) 检查管道与水泵进、出水口是否平行；
- 4) 检查进水管与出水管均正确锁紧；
- 5) 检查电机根据制造商的指引正确连接；
- 6) 检查地线连接根据当地标准接好；
- 7) 检查电机铭牌确保电源与电机相匹配；
- 8) 检查电机是否在室温情况下安装，避免有震动及灰尘的环境；
- 9) 检查电机的底部是否有足够移动空间，确保空气流通帮助散热；
- 10) 根据当地的要求安装开关及紧急开关；
- 11) 如果电机功率 $\geq 11\text{kW}$ ，需安装软启动来启动电机。

- 1) Check whether the screws have been tightened;
- 2) Check whether the covers of the mouth of water outlet pipe and drain-pipe have been taken off;
- 3) Check whether the pipes are parallel to water inlet and outlet of the water pump;
- 4) Check whether the water inlet and outlet pipes have been screwed correctly;
- 5) Check whether the motor has been correctly connected under the manufacturer's instructions;
- 6) Check whether the ground wire has been connected correctly according to local standards;
- 7) Check the nameplate of the motor so as to ensure that the current source matches with the motor;
- 8) Check whether the motor is installed under room temperature; avoid environments with vibrations and dusts;
- 9) Check whether there is enough movable space at the bottom of the motor so as to ensure the ventilation and to help dissipating heat;
- 10) Install the switch and emergency switch according to local standards;
- 11) If the power of the motor is equal to or greater than 11kw, soft start should be installed to start the motor.

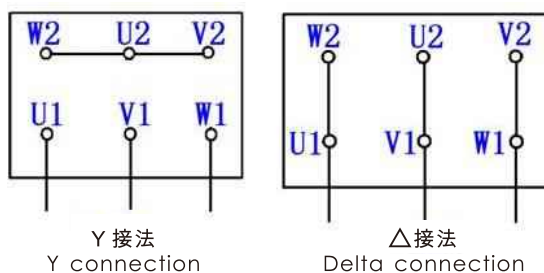
3.12 不同启动方法的接线 Wiring of Different Starting Methods

- 1) 标准单速电机上的接线盒通常包含六个绕组接线端子以及至少一个接地端子。这允许使用DOL-或Y/D-启动;
- 2) 对于双速电机和特殊电机, 必须按照接线盒或电机说明进行电源接线;
- 3) 电机铭牌上印有电压和接线说明;
- 4) 直接启动 (DOL) : 可能需要采用Y或D绕组连接, 例如, 690VY, 400VD表示690V的Y接线和400V的D接线;
- 5) 星形/三角形启动 (Y/D) : 当采用D接线启动时, 电源电压必须与电机的额定电压相等。

- 1) The connecting box on standard single speed motor usually consists of six winding terminals and at least one earth terminal. DOL- or Y/D- starting is allowed;
- 2) For two-speed motor and special motor, the wiring of power supply should be done according to the instructions on the connection box or the motor;
- 3) The voltage and wiring instructions are printed on the nameplate of the motor;
- 4) Direct starting (DOL): Y or D winding connection is probably needed to use. For example, 690VY, 400VD means Y connection of 690V and D connection of 400V;
- 5) Star/Delta starting (Y/D): When using D connection to start, the voltage of power supply should equal to the rated voltage of the motor.

三相电机的连接可以采用下图的两种方式 (图) :

The two methods showed in the following diagrams can be used for the connection of three-phase motor (Diagram):



4. 使用 Use

水泵操作员在进行本章节内的所有操作时应配备相应的工具。橡胶鞋，防酸保护衣及带面部保护罩的头盔均可确保操作员的安全。严禁将手指或身体其他部分伸进到孔口及其他开口内。水泵内含有高速旋转的部件。必须由有经验的操作者来进行以下的操作。

The operator of the water pump should be equipped with corresponding tools when doing the operations specified in this chapter. Rubber shoes, acid-proof protective clothes and the helmet with face protective cover can ensure the operator's safety. It's prohibited to put fingers or other parts of the body into orifice and other mouths. Some parts in the water pump rotate at a very high speed. The following operations should be done by experienced operators.

4.1 旋转方向 Rotating Direction

在启动水泵前应当检查电机的旋转方向。旋转方向在水泵上以永久记号的形式标注，从电机到泵体顺时针方向。检查电机旋转方向时应遵循以下步骤：

- 1) 将开关调节至关；
- 2) 断开电源线；
- 3) 移开联轴器防护罩；
- 4) 移开联轴器间隔装置；
- 5) 重新装上联轴器防护罩；
- 6) 连接电源线；
- 7) 将开关调节至开，使电机转动；
- 8) 观察旋转的方向，和水泵上的旋转方向为一致。看电机散热风扇的旋转方向；
- 9) 如果旋转的方向错误，调换电机位相（在电机开关调节至关之后再行此步骤）；
- 10) 如果旋转的方向正确，重新装回联轴器间隔装置，然后启动电机。

The motor's rotating direction should be checked before starting the water pump. The rotating direction should be marked permanently on the water pump, clockwise from motor to pump body. The following steps should be followed when checking the motor's rotating direction:

- 1) Turn the switch off;
- 2) Disconnect the power line;
- 3) Remove the coupling protective cover;
- 4) Remove the coupling spacer;
- 5) Put on the coupling protective cover again;
- 6) Connect the power line;
- 7) Turn the switch on to start the motor;
- 8) Observe the rotating direction to see whether it is the same as the rotating direction on the water pump;
- 9) If the rotating direction is wrong, exchange the phase of the motor (doing this step after turning the switch off);
- 10) If the rotating direction is correct, re-install the coupling spacer and then start the motor.

4.2 初步水泵测试 Initial Testing of the Water Pump

在启动水泵前，从联轴器的位置手动旋转传动轴，确保轴可以在正确的方向上正常旋转。进行此项工作时，电源线必须和供电电路断开。

Before starting the water pump, rotate the transmission shaft by hand from the position of coupling to ensure that the shaft rotates normally at the right direction. When doing this, the power line should be disconnected with the supply circuit.

4.3 初步电机测试 Initial Testing of the Motor

在开动电机前检查所有的电子连接以及旋转方向。

Check all electronic connections and rotating directions before starting the motor.

4.4 启动 Starting

在启动水泵前须遵循以下步骤：

- 1) 检查所有的轴承是否有足够的润滑；
- 2) 检查电机旋转方向；
- 3) 检查进水管、出水管及垫圈是否正确的连接，所有的螺栓都已上紧；
- 4) 完全打开进水管内的阀门；
- 5) 检查并冲走所有在进水管内的固体异物；
- 6) 使水充满水泵及进水管；
- 7) 打开水泵电源开关；
- 8) 慢慢打开出水管内的阀门（从10%开放开始）；
- 9) 通过出水管内的阀门调整水泵的工作点；
- 10) 检查水泵的输入值并与电机铭牌上的数值进行对比，确认没有超过额定值。

The following steps should be followed before starting the water pump:

- 1) Check whether all bearings have been lubricated adequately;
- 2) Check the rotating direction of the motor;
- 3) Check whether the water inlet pipe, water outlet pipe and gaskets have been connected correctly and whether all threaded bolts have been tightened;
- 4) Fully open the valve in the water inlet pipe;
- 5) Check and clear all solid foreign matters in the water inlet pipe;
- 6) Make the water pump and the water inlet pipe fill with water;
- 7) Switch on the power switch of the water pump;
- 8) Slowly open the valve in the water outlet pipe (starting from 10%);
- 9) Adjust the working point of the water pump through the valve in water outlet pipe;
- 10) Check the input value of the water pump and compare it with the values printed on the nameplate, make sure that it doesn't exceed the rating value.

4.5 工作状态 Working Status

水泵处于工作状态时应注意以下几点：

- 1) 严禁在水泵工作时对水泵部件进行任何的维护或检查工作；
- 2) 严禁在电机未与供电电源断开的时候进行任何的维护或检查工作；
- 3) 监测轴承的温度；
- 4) 防止人或任何物件与水泵的发热部分接触；
- 5) 确保水泵不产生震动以及噪声范围不超过额定值；

水泵禁止无水或缺水运行！

水泵不应在出水阀关闭时运行超过一分钟。

如有水穴形成时立刻关闭水泵。

The following points should be paid attention to when the water pump is working:

- 1) It's prohibited to do any maintenance or checking to the parts of the water pump when it is working;
- 2) It's prohibited to do any maintenance or checking if the motor hasn't been disconnected with the power supply;
- 3) Monitor the temperature of the bearings;
- 4) Prevent people or any object contacting the heating parts of the water pump;
- 5) Ensure that the water pump doesn't vibrate and the noise range doesn't exceed the rating value;

It's prohibited to run the water pump without water or with little water!

When the water outlet valve has been off, the water pump shouldn't run for more than 1 minute.

The water pump should be closed immediately if water holes form.

4.6 温度 Temperature

水泵的工作温度在数据表内有标示。根据液体密度的不同水泵的工作温度或有变化。

The working temperature of the water pump is indicated in data sheet. The working temperature of the water pump may vary by the difference of liquid density.

4.6.1 轴承工作温度 The Working Temperature of the Bearings

应当以固定的周期测量轴承的温度，并与制造商所提供的数据作比较。此项工作有助于发现在工作过程中的任何变化，损耗或旋转部件不平衡。安装环境不符合水泵安装标准或系统有故障时必须作出即时的调整处理。

The temperature of the bearings should be measured regularly and be compared with the data provided by the manufacturer. By doing so, any change in the process of working can be found easily, including the loss and the imbalance of rotating parts. Adjustments should be done immediately if the installing environment doesn't comply with the installing standards of the water pump, or a system failure appears.

组别 Group	轴承温度范围 (2950-3500rpm) Temperature range of the bearings (2950-3500rpm)	组别 Group	轴承温度范围 (1000-1750rpm) Temperature range of the bearings (1000-1750rpm)
4X3 6X4	55 – 75	4X3 6X4	55 – 70
8X6	55 – 80	8X6	55 – 75

轴承的最大工作温度不应超过110摄氏度。

The maximum working temperature of the bearings shouldn't exceed 110°C

4.7 流量范围 Flow Range

制造商根据客户所提供的流量及扬程的数据选择水泵、水叶以及电机的类型。用户应当观察数据表上所标示的工作状况，特别是关于流量、扬程以及水泵液体的数据。

The manufacturer chooses the type of the water pump, the blade and the motor according to the data of flow and pump heads provided by clients. Clients should check the working condition indicated on the data sheet, especially the data of flow, pump head and pump liquid.

4.8 噪声值 Noise Value

水泵一般正常工作噪音不超过80分贝。然而，因为电机功率、工作点、管道材料以及结构等的原因，噪声有可能会超过此数值。大约噪声值标示在下表中：

Generally, the normal working noise of the water pump won't exceed 80db. However, due to the motor's power, working point and the material and structure of pipes, the noise may exceed this value. Estimated noise value is indicated in the following table:

电机功率 (kW) Motor's power(kW)	噪声值 (dB) Noise value (dB)		
	1000RPM	1450RPM	2900RPM
4	62	63	69
5.5	62	65	71
7.5	64	66	72
11	66	68	74
15	67	69	75
18.5	68	70	76

声压 Sound Pressure	解决措施 Measures to be taken to solve the problem
小于70dB Less than 70dB	不需采取任何措施 No measures are needed
大于70dB Greater than 70dB	为水泵附近的工作人员提供保护设施 Providing protective facilities to the staff near the water pump
大于80dB Greater than 90dB	放置标志警示所有在水泵区域工作的人员必须佩戴防噪耳机。水泵上应带隔音材料阻隔噪声。 Warning signs should be put up to warn all staff in the area of the water pump. Anti-noise earphone should be worn. Sound-proof material should be used on the water pump to deafen the noise.

5. 保养 Maintenance

在对水泵进行保养工作时，工作人员应配备适当的设备。橡胶鞋，防酸保护衣，以及带面部保护的头盔均为保障工作人员安全所需的装备。严禁将手指或身体其他部分伸进到孔口及其他开口内。水泵内含有高速旋转的部件。必须由有经验的操作者来进行以下的操作。

The staff should be equipped with proper equipment when doing the maintenance to the water pump. Rubber boots, acid-proof protective clothes and the helmet with protective face mark are all required to ensure the safety of the staff. It's prohibited to put the finger or other body parts into orifice and other mouths. Some parts in the water pump rotate at a very high speed. The following operations should only be done by experienced operators.

5.1 预防性保养 Prophylactic Maintenance

检查水泵所泵液体的各项数值（温度，比重及化学组成）。检查流量及压力值，和设计值进行比较确认没有变化。确保控制组件正常工作及正确接收信号。

Check all kinds of value of the liquid pumped by the water pump (including temperature, proportion and chemical composition). Check flow and pressure value and compare them with designed value to ensure that there is no variation. Ensure that the controlling assembly works normally and correctly receives signals.

5.2 日常检查及维护 Daily Checking and Maintenance

日常水泵运行监测可及时发现故障采取措施避免故障影响水泵的其他部件。下列检查需在每一次水泵运行时进行：

- 1) 检查噪声值，振动，温度及工作情况；
- 2) 检查是否有液体或润滑油的泄漏；
- 3) 检查润滑油的油量；
- 4) 确保水泵不在没有液体的情况下工作；
- 5) 检查底座（排水口）（如果有提供）没有积水。如果有积水，打开阀门排清积水；
- 6) 确保水泵部件均通过螺栓正确锁紧。

Daily monitoring of the running of the water pump can find fault timely and immediately take measures to prevent it from affecting other parts of the water pump. The following checks should be done each time the water pump runs:

- 1) Check noise value, vibration, temperature and Working Status;
- 2) Check whether there is leakage of liquid or lubricant oil;
- 3) Check the volume of lubricant oil;
- 4) Ensure that the water pump doesn't work without liquid;
- 5) Check to ensure that there's no seeper in (scupper) on the base (if it is provided). If there's seeper, open the valve to drain the seeper;
- 6) Ensure that the parts of the water pump have all been tightened by threaded bolts.

5.3 额外保养 Additional Maintenance

如果有发生故障、液体泄漏的状况，马上使用正确的步骤停止水泵的运作。问题或故障的发生原因必须排查清楚。如果不能确定问题所在，立刻联系制造商。在没有制造商的允许情况下，不对水泵进行任何的操作。

If there are faults or leakage, stop the running immediately through corrector steps. The cause of the problem or the fault should be made clear. If the problem can't be identified, contact with the manufacturer immediately. Without the manufacturer's approval, any operation to the water pumps is prohibited.

5.4 润滑油油量 Volume of Lubricant Oil

确保适当的润滑油油量非常重要。不足够的油量会导致轴承得不到足够的润滑提早发生衰退。过高的油量会导致轴承过热或润滑油泄漏。首次更换润滑油的时间为300小时，之后每隔4个月更换一次润滑油。

测量油量时必须保证油温与室温接近，并且水泵不处于运行状态。

选择润滑油时遵循以下准则：

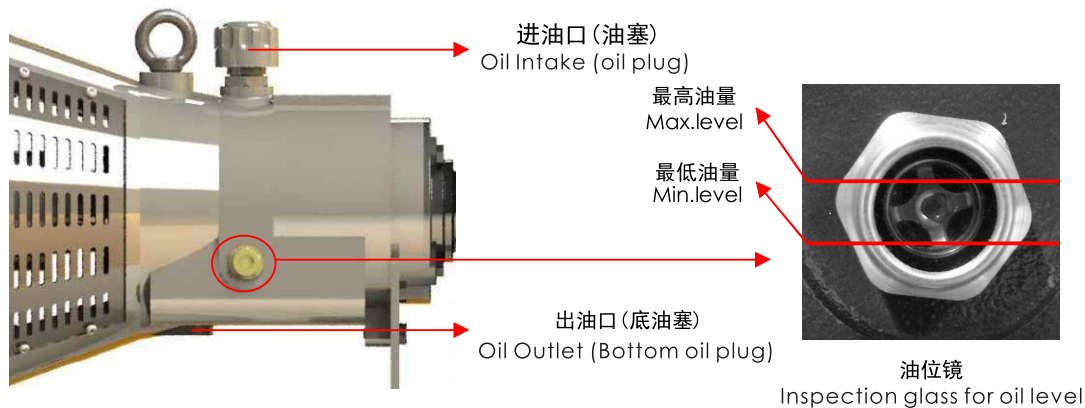
- 1) 润滑油应清洁及没有固体颗粒在内；
- 2) 考虑水泵运行环境的温度；
- 3) 严禁混合不同品牌或不同性质的润滑油使用。(润滑油：美孚 600 XP 68 等级ISO VG 68)

It's very important to keep appropriate amount of lubricant oil. Inadequate lubricant oil cannot lubricate the bearings adequately, which will result in premature wear. Too much lubricant oil can overheat the bearing or causes leakage of the lubricant oil. The initial changing of lubricant oil should be done 300 hour later; after that, it should be changed every 4 months.

When measuring the volume of the oil, ensure that the temperature of the oil is close to room temperature and the water pump doesn't run.

The following rules should be complied with when choosing lubricant oil:

- 1) The lubricant oil should be clean and doesn't contain solid particles;
- 2) The temperature of the operating environment of water pump should be taken into account;
- 3) It's prohibited to mix lubricant oil of different brands or different natures. (Lubricant oil: Mobil 600 XP 68 Grade ISO VG 68)



补充润滑油的步骤如下：

- 1) 旋开油塞；
- 2) 倒入所需的润滑油。检查油量确保不超过最高值或低于最低值；
- 3) 旋紧油塞。

排出润滑油的步骤如下：

- 1) 在底油塞下放置接油装置；
- 2) 旋开底油塞；
- 3) 等待所有的润滑油流出，清洁干净余油；
- 4) 旋紧底油塞。

The steps of adding lubricant oil are as followed:

- 1) Unscrew the oil plug;
- 2) Pour in needed lubricant oil. Check the volume to ensure that it doesn't exceed the maximum value or lower than the minimum value
- 3) Tighten the oil plug.

The steps of discharging lubricant oil are as followed:

- 1) Put oil connection device under the bottom oil plug;
- 2) Unscrew the bottom oil plug;
- 3) Wait until all lubricant oil has been discharged; clear excess oil;
- 4) Tighten bottom oil plug.

5.5 水泵液体的结晶化 The Crystallization of the Liquid in Water Pump

水泵内液体的结晶化是一个不容小视的问题。用户需要清楚的知道水泵所工作的液体在什么温度及情况下会开始结晶，并提前告知制造商。如无法给制造商提供相关的信息将会使保修条款失效。

The problem of crystallization of the liquid in water pump shouldn't be neglected. Clients should know clearly under what temperature and what conditions the liquid in water pump will be crystallized, and inform the manufacturer about it in advance. Failure to provide the relative information to the manufacturer will result in invalidity of warranty clause.

5.6 排清及更换水泵液体 Draining and Changing of the Liquid in Water Pump

如需将水泵用于不同的液体，用户必须提交书面申请给制造商。不同的比重或黏稠度会影响水泵寿命或增加轴负重导致压力减小。

更换水泵内液体时应遵循以下步骤：

- 1) 停止水泵运行；
- 2) 完全清空水泵内液体（如有提供排水口）及入水管；
- 3) 使用清水或相应的液体清洗水泵内部。注意避免任何化学物质反应对水泵或操作人员造成伤害；
- 4) 通过正确的途径处理清洗用的液体。

If it is needed to use the water pump on different liquid, clients should submit a written application to the manufacturer. Different proportion or viscosity will affect the life of the water pump or increase the weight per shaft, which will result in decreasing of pressure.

The following steps should be followed when changing the liquid in the water pump:

- 1) Stop the running of the water pump;
- 2) Completely empty the liquid in the water pump (if there is a drainage port) and the water inlet pipe;
- 3) Wash the inside of the water pump with clean water or relative liquid. Pay attention to avoid any harm to the operators caused by chemical reaction;
- 4) Dispose the liquid used for washing through the right way.

5.7 空转运行 Idling Running

严禁将此系列的水泵空转运行。空转运行会损坏机械密封或水泵的其他部件。

以下为空转运行可能会发生的情况：

- 1) 水泵内没有或只有部分液体；
- 2) 在管道内检测水流的仪器缺失或发生故障；
- 3) 过滤器及底阀没有足够的保养；
- 4) 进水管内法兰闸阀的损坏；
- 5) 因为尺寸不合及管道内不合适的结构引致的气穴或旋涡的形成。

It's prohibited to run the water pump of this series idly. Idling running can damage the mechanical seal or other parts of the water pump.

The following problems may occur if the water pump runs idly:

- 1) No liquid or little liquid in the water pump;
- 2) The missing or breakdown of the instrument in pipes used for testing the water flow;
- 3) Inadequate maintenance to the filter and the bottom valve;
- 4) The damage of the flanged gate valve in the water inlet pipe;
- 5) The forming of cavitation or whirlpool caused by inappropriate size and inappropriate structure in pipes.

5.8 水泵液体的杂质 Impurity of the Liquid in Water Pump

水泵液体应为清洁的。制造商不建议将水泵用以可能有小固体颗粒的液体。如果液体内含有固体，固体的含量、浓度、大小及硬度均需要告知以选取最合适可行的方案。

The liquid of the water pump should be clear and clean. It's not suggested by the manufacturer to use the water pump on the liquid that may contain small solid particles. If the liquid does contain solids, the content, concentration, size and solidity of them should be informed, so that the most applicable plans can be chosen.

5.9 建议备件 Suggested Spare Parts

为确保能保证水泵维护时有随时可用的最小备件数量，用户应该考虑水泵的工作环境以及工作的水泵数量。详细请联系技术部门以了解部件更换的间隔时长。

购买备件时应提供：


- 1) 序列码，名称及水泵类型（在铭牌上）；
- 2) 部件位置号码。


To ensure that there are least amount of spare parts that are ready to use at any time when doing the maintenance to the water pump, clients should consider the working environment of the water pump and the number of working water pump. For detailed information, please contact with the technology department to learn about the interval length of changing parts.

When purchasing spare parts, please provide:

- 1) Sequence code, name and the type of the water pump (indicated on nameplate) ;
- 2) Parts location number.

5.10 水泵送修 Repairing of the Water Pump

-  1) 在将水泵送回给制造商进行维修之前，应该进行泵内水的排清工作以及用水或相应的液体清洗干净。
2) 清洁时注意防止化学反应的产生对水泵和操作人员造成伤害。
3) 清洗完毕之后清洗用液体应被妥善处理。

-  1) Before sending the water pump back to the manufacturer for being repaired, the water in the water pump should be drained out and the water pump should be washed with water or relative liquid.
2) When washing the water pump, pay attention to avoid harm to the water pump and operators caused by chemical reactions.
3) After washing the water pump, the liquid used for washing should be disposed properly.

5.11 水泵拆卸 Dismantling of the Water Pump

警告：不要尝试独自拆解或组装水泵。水泵拆卸步骤应由有经验的专业人士进行或有基本的机械知识及技能。为更好的理解水泵的特性，基础的材料知识也同样需要。

在拆卸水泵之前遵循以下步骤：

- 1) 确保水泵没有处于工作状态；
- 2) 为避免水泵在进行维护的过程中突然启动，水泵及电机均应和供电电源断开连接；
- 3) 关闭进水阀门及出水阀门；
- 4) 等待水泵冷却达到室温；
- 5) 使用水或相应的液体清洗所有与液体接触的部件，清洗用液体应被妥善处置；
- 6) 将水泵从系统中断开。

Warning: Don't try to dismantle or assemble the water pump. The steps of dismantling the water pump should be done by experienced professionals or staff having basic mechanical knowledge and skills. In order to better understand the characteristics of the water pump, basic material knowledge is still needed.

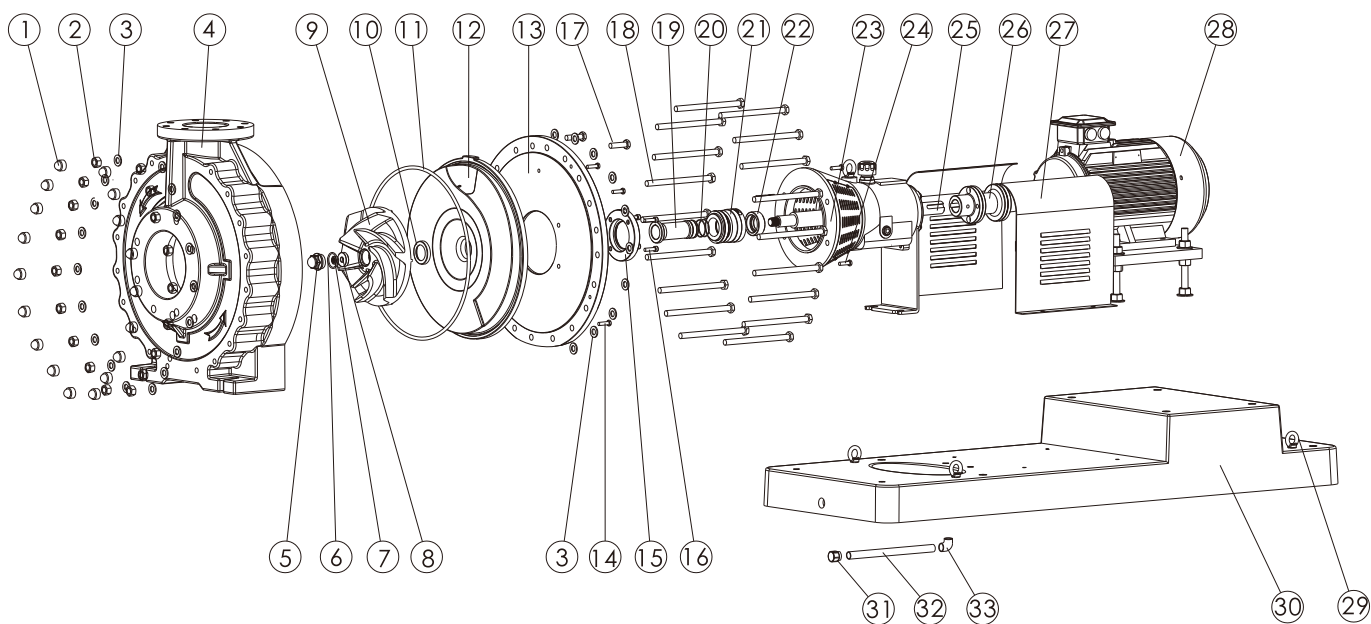
The following steps should be followed before dismantling the water pump:

- 1) Ensure that the water pump isn't in a state of working;
- 2) In order to avoid sudden starting of the water pump in the process of maintenance, both the water pump and the motor should be disconnected with power supply;

- 3) Close water inlet valve and water outlet valve;
- 4) Wait the water pump cools until it reaches room temperature;
- 5) Use water or relative liquid to wash all parts that have contacted with the liquid; the liquid used for washing should be disposed properly;
- 6) Disconnect the water pump with the system.

6. 海水泵描述 Description of the Sea Water Pump

6.1 水泵爆炸图 Exploded Diagram of the Water Pump



6.2 零件清单 Parts List

项目 Key NO.	部件名称 Part Name	水泵型号 Pump Model	数量 QTY
1	M14螺母胶帽 M14 nut cap	4 x 3	12
		6 x 4	14
		8 x 6	18
2	M14螺母 M14 nut	4 x 3	12
		6 x 4	14
		8 x 6	18
3	M14垫片 M14 gasket	4 x 3	24
		6 x 4	28
		8 x 6	38
4	泵体 Pump body		1
5	水叶螺帽 Water leaf nut		1
6	水叶螺帽胶圈 Leaf water ring nut		1

项目 Key NO.	部件名称 Part Name	水泵型号 Pump Model	数量 QTY
7	水叶螺母 Water leaf nut		1
8	水叶垫片 Water leaf gasket		1
9	水叶 Water leaf		1
10	水叶胶垫 Water leaf rubber pad		1
11	法兰胶圈 Flanged rubber ring		1
12	法兰 Flange		1
13	框架法兰 Frame flange		1
14	M10外六角螺丝 M10 hexagon head bolt	4 x 3, 6 x 4只有4粒	5
14A	M8外六角螺丝 M8 hexagon head bolt	8x6无此螺丝 No bolt of 8x6	1
15	定位法兰 Positioning flange		1
16	M8内六角螺丝 M8 hexagon head bolt		4
	M8弹簧垫片 M8 spring gasket		4
17	M14螺丝 M14 bolts	4x3, 6x4无此螺丝 No bolts of 4x3 and 6x4	2
18	M14螺栓 M14 threaded bolt	4x3	12
		6x4	14
		8x6	18
19	轴套 Shaft installing sleeve		1
20	轴套胶圈 The sleeve ring		2
21	机械密封套件 Mechanical seal kits		1
22	定位环 Locating ring		1
23	支撑架 Supporting rack		1
24	M12外六角螺丝 M12 hexagon head bolt		4
	M12垫片 M12 gasket		4
25	机轴 Crankshaft		1
26	联轴器 Coupling		1
27	防护罩 Protective cover		1
28	电机 Motor		1
29	吊环 Hanging ring	4x3无此吊环 No hanging ring of 4x3	4
30	底座 Base	4x3, 6x4无顶台 No top of 4x3 and 6x4	1
31	ø20胶牙嘴 ø20 gum mouth		1
32	ø20胶管 ø20 rubber pipe		1
33	ø20胶弯头 ø20 rubber elbow		1

6.3 主要部件描述 Descriptions of Main Parts

6.3.1 泵体 The Pump Body

泵体包含吸水入口，入水口和出水口均在轴的方向上，符合设备要求。

The pump body contains water suction entrance, water inlet and water outlet, they are all on the direction of the shaft; it complies with the requirements of equipment.

6.3.2 叶轮 The Vain

叶轮为半开型，叶轮背面的叶片可有效减少由水流造成的轴向推力对水泵运行的影响。尺寸根据水泵的输出而有所改变。

The vain is of half-open type; the leaf on the back of the vain can effectively reduce the impacts of the axial thrust caused by the flow on the running of the water pump. The size varies according to output of the water pump.

6.3.3 轴 Shaft

轴传输驱动单元所产生的旋转运动到叶轮上。轴通过一个灵活的连接器和垫片与驱动单元连接。框架和两个轴承同时承托着轴。

The shaft conveys the rotational movements produced by drive unit to the vain. The shaft connects with the drive unit through a flexible connector and gasket. The frame and two bearings bear the shaft at the same time.

6.3.4 密封 Sealing

密封部件包括机械密封，各种胶圈胶垫。

Sealing parts include mechanical sealing and various rubber rings and rubber gasket.

6.3.5 轴承 Bearings

水泵内使用径向圆柱球轴承。这些轴承使用油来充当润滑剂。在水泵运行时，必须要经常检测它们的温度。

Radial cylindrical ball bearings are used in water pump. These bearings use oil as lubricant. Their temperature should be tested frequently when the water pump is running.

6.3.6 机械密封 Mechanical Sealing

机械密封防止液体从水泵里泄漏。不同型号及牌子的机械密封均可以使用。在预定的时候根据水泵的运行环境及与所使用液体的兼容性来作出使用具体型号机械密封的决定。

Mechanical sealing can avoid the leakage of liquid from the water pump. Mechanical sealing of different models and brands all can be used. At the time of booking, the model of mechanical sealing should be determined by the running environment of the water pump and the compatibility of the used liquid.

6.3.7 框架 Frame

框架为一体性结构，可以通过两个轴承来支撑水泵的轴。框架的结构由水泵的型号来决定。

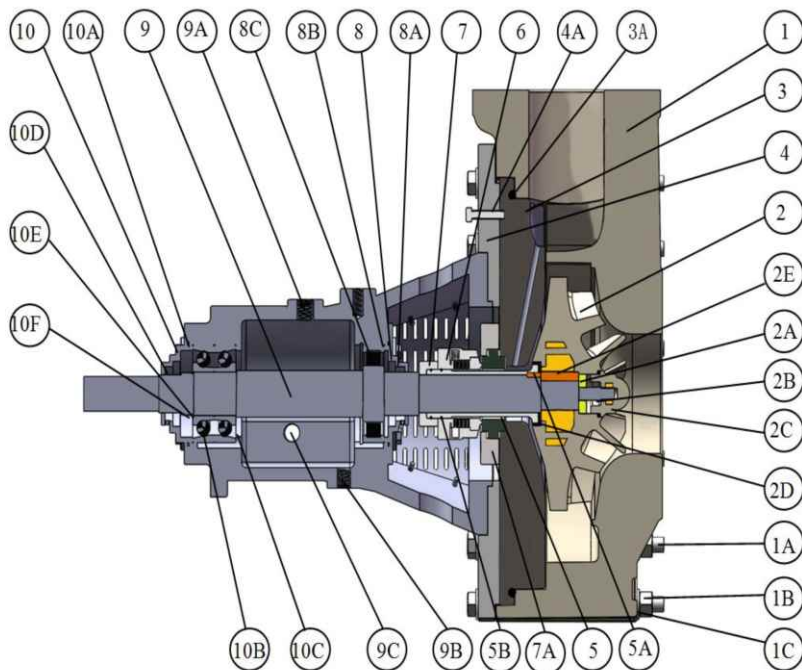
The frame is integrated structure, and the shaft can be supported by two bearings. The structure of the frame is determined by the model of the water pump.

6.3.8 底座、联轴器、联轴器防护罩 Base, Coupling, Coupling Protective Cover

底座完全由玻璃钢所制成，并且配备不锈钢材料的联轴器防护罩。联轴器采用弹性连接的方式同时带垫片。如果版本只是泵体连轴，则需要使用具有同样特点的联轴器。

The whole base is made of glass fiber and is fitted with coupling protective cover made by stainless steel. The coupling uses elastic connection mode and at the same time is equipped with gasket. If the vision is only pump shaft, couplings with the same characteristics is needed.

6.3.9 主要部件剖切图 Break-out Sections of Main Parts

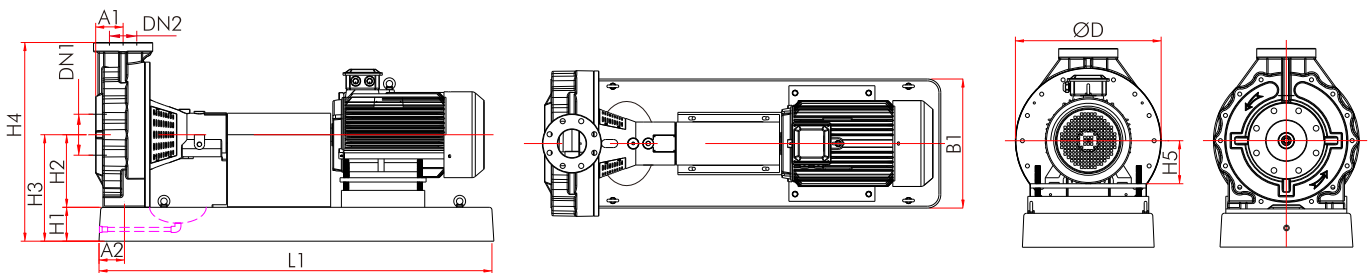


零件号 Parts No.	名称 Name	零件号 Parts No.	名称 Name	零件号 Parts No.	名称 Name	零件号 Parts No.	名称 Name
1	泵体 Pump body	3	法兰 Flange	7A	定位法兰 Retaining flange	10	支撑架后盖 The rear cover of the supporting rack
1A	M14螺栓 M14 bolt	3A	法兰胶圈 Flanged rubber ring	8	支撑架前盖 The front cover of the supporting rack	10A	后盖胶圈 The rubber ring of the rear cover
1B	M14螺母 M14 nut	4	框架法兰 Frame flange	8A	前油封 Front oil seal	10B	后轴承 Rear bearings
1C	M14垫片 M14 gasket	4A	定位螺丝 Set screw	8B	前盖胶圈 The rubber ring of the front cover	10C	卡环 Snap ring
2	水叶 Water leaf	5	轴套 Shaft installing sleeve	8C	前轴承 Front bearing	10D	后油封 Rear oil seal
2A	水叶垫片 Water leaf gasket	5A	轴套键 Key sleeve	9	机轴 Crankshaft	10E	垫圈 Gasket
2B	水叶螺母 Water leaf nut	5B	轴套胶圈 The sleeve ring	9A	进油口 Oil inlet	10F	防松螺母 Lock nut
2C	水叶螺帽 Water leaf screw cap	6	机械密封 Mechanical sealing	9B	出油口 Oil outlet		
2D	水叶胶垫 Water leaf rubber shim	7	定位环 Locating ring	9C	油位镜 Inspection glass for oil level		

7. 海水泵的外形尺寸 The Shape and Size of the Sea Water Pump

7.1 海水泵的主要尺寸 Main Sizes of the Sea Water Pump

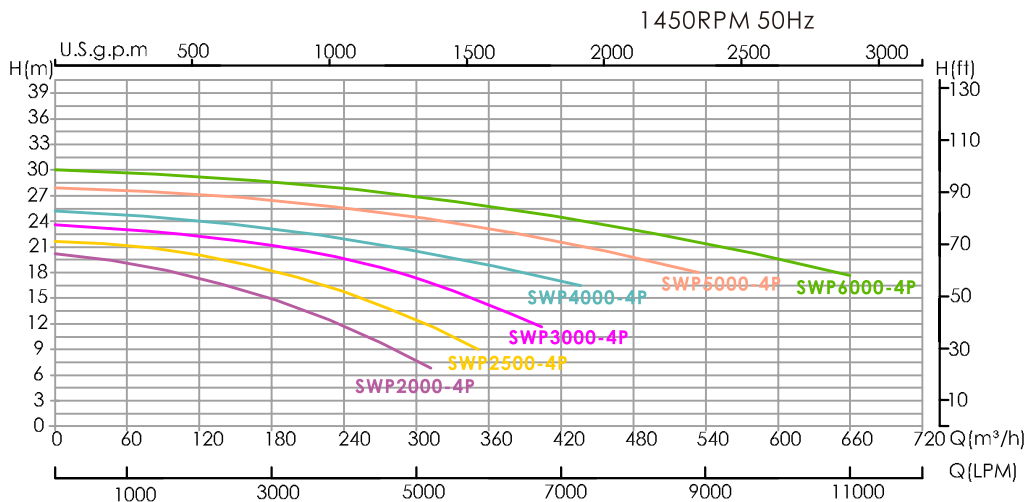
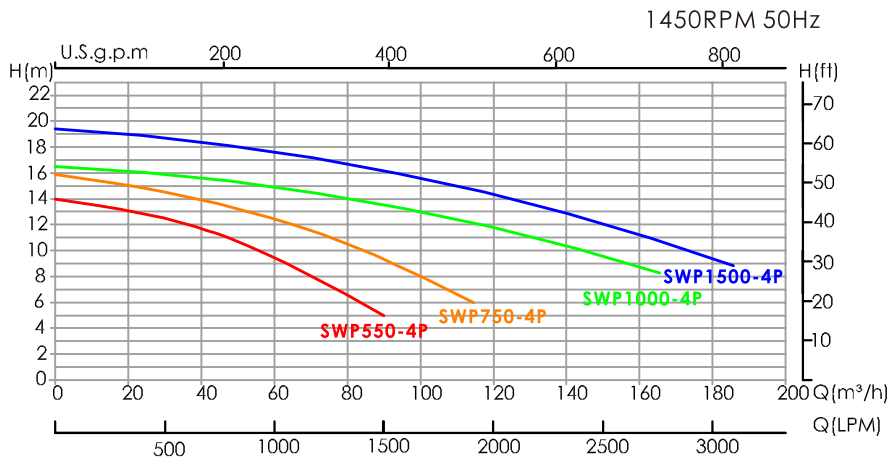
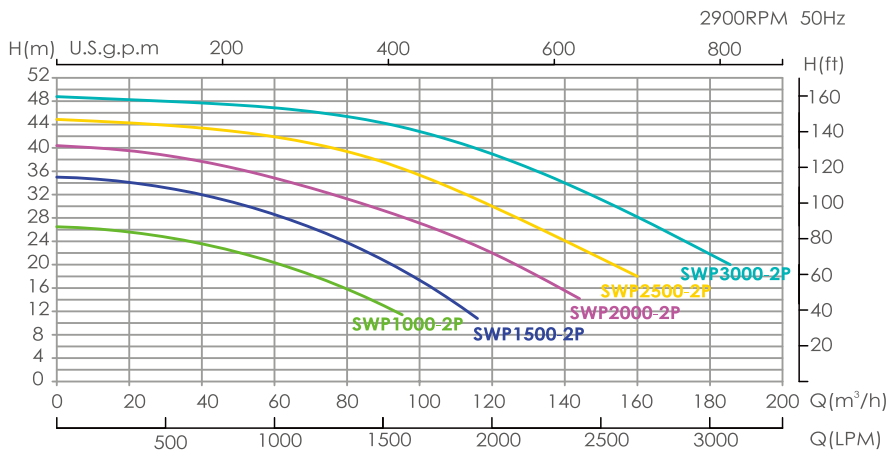
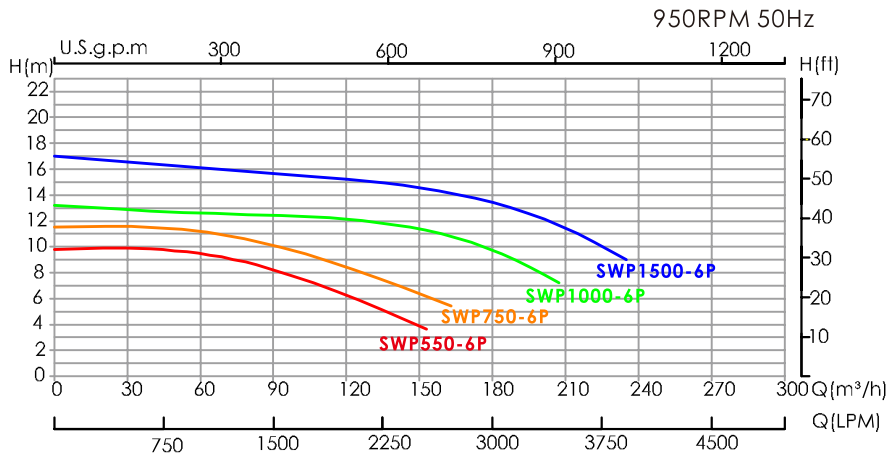
Body (Motor-4P)	L1	B1	H1	H2	H3	H4	H5	DN1	DN2	ØD	A1	A2
	(mm)							inch(mm)		(mm)		
100×80	1200	420	100	210	310	590	112	4"(100)	3"(80)	458	102	78
100×80	1200	420	100	210	310	590	132	4"(100)	3"(80)	458	102	78
150×100	1450	480	100	254	354	697	132	6"(150)	4"(100)	540	102	78
150×100	1450	480	100	254	354	697	160	6"(150)	4"(100)	540	102	78
200×150	1530	570	100	368	468	874	160	8"(200)	6"(150)	700	152	93
200×150	1530	570	100	368	468	874	180	8"(200)	6"(150)	700	152	93



7.2 技术参数 Technical Data

型号 Model	进水口×出水口 ×叶轮直径 Inlet×Outlet× Impeller Dia (mm)	转速 rpm	电机功率 Power		重量 Weight(KG)
			HP	kW	
SWP550-6P	150 X 100 X 250	950	5.5HP	4kW	420
SWP750-6P	150 X 100 X 270	950	7.5HP	5.5kW	435
SWP1000-6P	200 X 150 X 270	950	10HP	7.5kW	643
SWP1500-6P	200 X 150 X 300	950	15HP	11kW	665
SWP550-4P	100 X 80 X 205	1450	5.5HP	4kW	285
SWP750-4P	100 X 80 X 220	1450	7.5HP	5.5kW	300
SWP1000-4P	150 X 100 X 225	1450	10HP	7.5kW	417
SWP1500-4P	150 X 100 X 250	1450	15HP	11kW	480
SWP2000-4P	200 X 150 X 250	1450	20HP	15kW	647
SWP2500-4P	200 X 150 X 265	1450	25HP	18.5kW	677
SWP3000-4P	200 X 150 X 280	1450	30HP	22kW	694
SWP4000-4P	200 X 150 X 295	1450	40HP	30kW	763
SWP5000-4P	200 X 150 X 310	1450	50HP	37kW	796
SWP6000-4P	200 X 150 X 325	1450	60HP	45kW	828
SWP1500-2P	100 X 80 X 170	2900	15HP	11kW	345
SWP2000-2P	100 X 80 X 190	2900	20HP	15kW	358
SWP2500-2P	100 X 80 X 200	2900	25HP	18.5kW	377

7.3 性能曲线 Performance Curve



8. 故障排查 Troubleshooting

8.1 主要问题与排除方法 Main Problems and Troubleshooting Methods

问题 Problem	原因 Cause	排除方法 Troubleshooting method
水泵不工作或在自吸期间吸入速度慢 The water pump doesn't work or the suction speed is low during self-suction	进水管尾端或底阀没有完全浸在液体中 The end of the water inlet pipe or the bottom valve doesn't completely immerse in liquid	根据建议距离将进水管尾端或底阀浸入液体中 Immersing the end of the water inlet pipe or the bottom valve in water according to suggested distance
	底阀太小或没有正确安装 The bottom valve is small or hasn't been installed properly	检查或更换底阀 Check or change the bottom valve
	吸入高度超过所标示的数值 The suction height exceeds the value indicated	检查吸入高度不超过水泵极限或吸入槽内液体高度不太低 Check the suction height to ensure that it doesn't exceed the limit of the water pump or the height of liquid in suction tank isn't too low
	吸水管太长或直径太小 The suction tube is too long or the diameter is too small	检查吸水管的直径大小 Check the diameter of suction tube
	吸水管内有空气泄漏 There's air leakage in the suction tube	检查密封圈及重新锁紧管道间的连接位置 Check the seal ring and re-screwing the connections between pipes
	吸水管内的阀门关闭或部分关闭 The valve in the suction tube is closed or half closed	完全打开吸水管阀门 Fully open the valve of the suction tube
	液体比重，温度及黏性均大于设计值 The proportion, temperature and viscosity of the liquid exceeds the maximum designed value	检查液体的比重，温度及黏性 Check the proportion, temperature and viscosity of the liquid
	外部固体堵塞水叶或出水口 The exterior solids block the water leaf or water outlet	清除堵塞物 Clearing the blockage
	水叶损坏或水叶与外壳间的距离大于建议值 The water leaf damages or the distance between the water leaf and the hull exceeds the maximum suggested value	将水叶与外壳间的距离减少或更换水叶 Decrease the distance between the water leaf and the hull or change the water leaf
	出水口阀门关闭 The valve of the water outlet closes	打开出水管阀门 Open the valve of the water outlet
	电机缺相 Motor phase missing	检查电机的供给电源 Check the supply power of the motor
	转速过低 The rotation speed is too low	检查接线 Check connection lines
	转速感应失效 Speed induction failure	检查接线 Check connection lines
电源频率不适合水泵 The frequency of the current source isn't suitable to the water pump	检查电源频率 Check the frequency of the current source	

问题 Problem	原因 Cause	排除方法 Troubleshooting method
流量或压力不足 Inadequate rate of flow or pressure	管道内有空气 There's air in pipes	检查管道状况 Check the condition of pipes
	液体内有空气或其他气体 There's air or other gas in liquid	检查液体状况 Check the condition of liquid
	外部固体堵塞水叶或出水口 The exterior solids block the water leaf or water outlet	清除堵塞物 Clearing the blockage
	水叶损坏或水叶与外壳间的距离大于建议值 The water leaf damages or the distance between the water leaf and the hull exceeds the maximum suggested value	将水叶与外壳间的距离减少或更换水叶 Decrease the distance between the water leaf and the hull or change the water leaf
	整个系统的总扬程比水泵的总扬程大 The total pumping head of the whole system is larger than the total pumping head of the water pump	检查损耗及整个系统的状况 Check the loss and the condition of the whole system
	液体的黏性比设计值大 The viscosity of liquid exceeds the designing value	检查液体的比重，温度及黏性 Check the proportion, temperature and viscosity of the liquid
	转速过低 The rotating speed is too low	检查接线 Check connection lines
	转速感应失效 Speed induction failure	检查接线 Check the connection line
水泵产生剧烈振动 The water pump vibrates severely	电源频率不适合水泵 The frequency of the current source isn't suitable to the water pump	检查电源频率 Check the frequency of the current source
	水泵气蚀 Cavitation	检查整个系统及气蚀形成原因 Check the whole system to find the cause of cavitation
	工作点不在建议流量值范围内 The working point is not within suggested flow range	根据流量值范围建议调整工作点 Adjust working point according to suggested flow range
	外部固体堵塞水叶或出水口 The exterior solids block the water leaf or water outlet	清除堵塞物 Clearing the blockage
	一个或多个水泵部件损坏 One or more parts of the water pump damage	拆卸水泵并替换损坏的部件 Dismantle the water pump and change the damaged parts
	泵体轴承或电机轴承有磨损 The pump bearings or motor bearings wear	更换磨损的轴承 Change the worn-out bearings
	底座没有固定好 The base hasn't been fixed properly	锁紧底座至强化的水泥底 Screw the base on reinforced cement bottom
	安装螺丝没有锁紧 The mounting screws haven't been screwed	锁紧螺栓 Screw bolts
	联轴器内有弹性的部分磨损 The elastic parts in the coupling wear	更换联轴器内有弹性的部分 Change elastic parts in the coupling
水泵没有正确对准 The water pump doesn't align correctly	检查水泵对准 Check the alignment of the water pump	

问题 Problem	原因 Cause	排除方法 Troubleshooting method
电机过热 Overheating of the motor	所泵液体的比重或黏性超过设计值 The proportion or viscosity of the liquid pumped exceeds the designing value	检查比重及黏性数值 Check the value of proportion and viscosity
	工作环境温度过高 The temperature of the working environment is too high	安装水泵时注意远离其他发热体并给水泵提供适当散热 When installing the water pump, pay attention to be far away from other heating matters, and at the same time, cool the water pump appropriately
	转速过高 The rotating speed is too high	检查接线 Check connection lines
	机械密封上挤压力过大 Squeezing pressure of the mechanical sealing is too large	联系制造商 Contact with the manufacturer
	外壳或电机的轴承有瑕疵 There are flaws on the hull or on the motor bearings	更换水泵或电机的轴承 Change the water pump or the bearings of the motor
	泵体和电机没有正确对准 The pump body and the motor doesn't align correctly	重新对准泵体和电机 Align the pump body and the motor again
机械密封损耗过快 The loss of mechanical sealing is too fast	水泵内液体含有固体颗粒或研磨材料 The liquid in the water pump contains solid particles or abrasive material	检查液体内固体颗粒含量不超过所规定的最大值 Check the content of solid particles contained in liquid to ensure that it doesn't exceed the specified maximum value
	机械密封所用的材料与水泵液体不兼容 The material used for mechanical sealing is incompatible with the liquid of the water pump	联系制造商 Contact with the manufacturer
	水泵液体形成气体 The liquid of the water pump forms gas	联系制造商 Contact with the manufacturer
	工作点不在建议的流量范围内 The working point is not within suggested flow range	根据建议流量值调整工作点 Adjust working point according to suggested flow range
	空转运行 Idling running	检查水泵的安装及运行 Check the installation and running of the water pump
	泵体和电机没有正确对准 The pump body and the motor doesn't align correctly	重新对准泵体和电机 Align the pump body and the motor again

问题 Problem	原因 Cause	排除方法 Troubleshooting method
轴承损耗过快 The loss of bearings is too fast	工作点不在建议的流量范围内 The working point is not within suggested flow range	根据建议流量值调整工作点 Adjust working point according to suggested flow range
	轴承架内没有润滑油 There's no lubricant oil in bearing bracket	添加润滑油 Adding lubricant oil
	润滑油内有固体颗粒 The lubricant oil contains solid particles	确保润滑油清洁 Ensure the cleanness of the lubricant oil
	水或冷凝物出现在轴承架或电机上 Water or condensate appears on the bearings or on motor	联系制造商 Contact with the manufacturer
	机械缺陷所引起轴承过载 Bearing overloading caused by mechanical defects	联系制造商 Contact with the manufacturer
	机械故障或水泵损坏 Mechanical breakdown or damages of the water pump	联系制造商 Contact with the manufacturer
	泵体和电机没有正确对准 The pump body and the motor doesn't align correctly	重新对准泵体和电机 Align the pump body and the motor again

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