U-flo®

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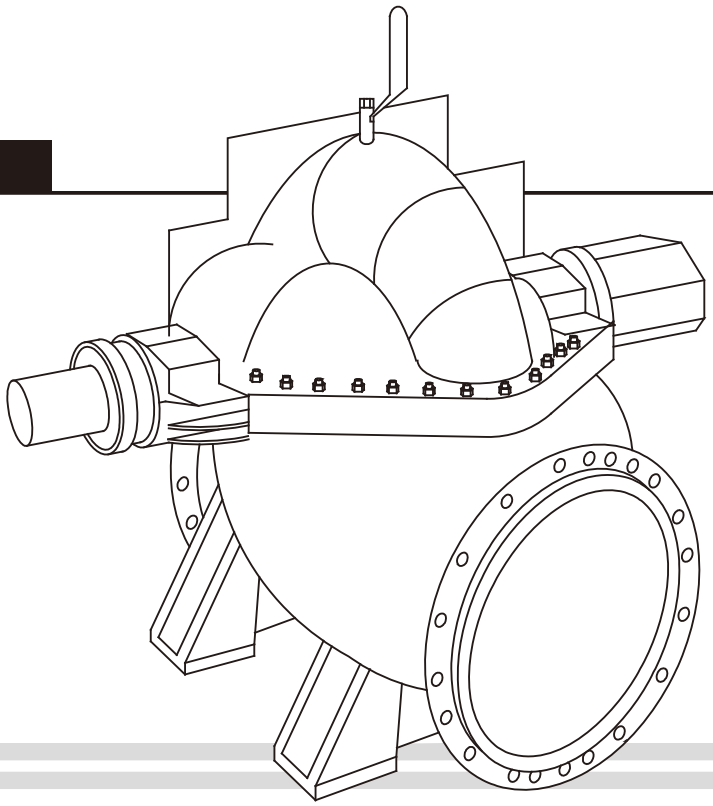
OPERATION INSTRUCTIONS

Single-Stage Double Suction
Centrifugal Pump

FS Series

ENG



Please check the following points before installation.

- The product is meeting with the specifications ordered.
- Defective or damages, if any.
- All related accessories and tools are ready.
- These instructions contain fundamental information and precautionary notes.
- Please read the manual thoroughly prior to installation of unit for proper operation.
- Keep these instructions near location of operation for easy access.
- Any failure or accidents caused by erroneous installation and/or wrong operation.Non-compliance with the instructions will not be warranted.

General

The pumps have been developed in accordance with state-of-art technology. They are manufactured with utmost care and subject to continuous quality control. These instructions are intended to facilitate familiarity with the pumps and its designated use. The manual contains important information for reliable, proper and efficient operation. Compliance with the operating instruction is of vital important to ensure reliability and a long service life of the pump and to avoid any risks.

Safety

These instructions contain fundamental information, which must be complied with during installation, operation and maintenance. Therefore the manual must be read and understood both by the installing personnel and the responsible trained personnel/operators prior to installation and commissioning, and it must always be kept close to the location of the unit for easy access. Marking of Safety sign in the instructions.The safety instructions contained in this manual non-compliance of which might cause hazards to person are specially marked with the common hazard sign, namely,

（Safety Mark）

Non-compliance with Safety instructions. Non-compliance with safety instructions can jeopardize the safety of personnel, the environment and the machine itself. Non-compliance with these safety instructions will also lead to forfeiture of any and all rights to claim for damages.

In particular, non-compliance can, for example, result in;Failure of important machine / unit functions,

- Failure of prescribed maintenance and servicing practices,
- Hazard to persons by electrical, mechanical and chemical effects.

Safety awareness

It is imperative to comply with the safety instructions contained in this manual, the relevant national and safety regulations and operator's own internal work, operation and safety regulations.

Safety instructions for maintenance, inspection and installation work

The operator is responsible for ensuring that all maintenance, inspection and installation work be performed by authorized, qualified specialist personnel who are thoroughly familiar with the manual.Working on machine must be carried out only during standstill. The shutdown procedure described in the manual for taking the machine out of service must be adhered to without fail. Pump handling media injurious to health must be decontaminated. Immediately following completion of work, all safety-related and protective devices must be re-installed and/or re-activated.

Unauthorized modification and manufacture of spare parts

Modification or alterations of the machine are only permitted after consulted with the manufacturer. Original spare parts and accessories authorized by the manufacturer ensure safety. The use of other parts can invalidate any liability of the manufacturer for consequential damage.

CONTENTS

1. Safety 1
1.1 Safety sign 1
1.2 Qualifications and training of personnel 1
1.3 Hazards from negligence on safety rules 1
1.4 Operation, Maintenance, Inspection & Safety Rules 1
1.5 Operations to improve or make spare parts without approval 2
1.6 Illegal operation 2
1.7 Transport & Storage 2
2. Technical Description 3
2.1 Product summarization 3
2.2 Bearing 4
2.3 Pump model description 4
2.4 Technical Data 4
3. Pump installation and pipe connection 5
3.1 Installation of pump 5
3.1.1 Pre-installation preparations 5
3.1.2 Installation procedures of pump 6
3.2 Connection of flushing fluid 6
3.2.1 Inner connection 6
3.2.2 Outer connection 6
3.3 Pipe connection 7
3.4 Power and wiring of motor 9
4. Start and stop 9
4.1 Start 9
4.2 After start 10
4.3 Stop 10
5. Maintenance of pump 10
5.1 Lubrication 10
5.2 Operation & maintenance 11
5.3 Replace the seal 11
5.3.1 Filling seal 11
5.3.2 Single-end mechanical seal 11
5.4 Alignment of coupling 12
5.5 Replace the bearing 13
5.6 Maintenance, Inspection and Operation Space 13
6. Assembly and dismantling 14
6.1 Filling seal structure 14
6.2 Mechanical seal structure 15
7 . Common problems and troubleshooting 16

1 Safety

This Operation Instruction contains the precautions for installation, use and maintenance of FS single/double-suction centrifugal pump. The installer and operator is required to read the Operation Instruction carefully before installing or operating; Keep this Operation Instruction near to the pump for frequent use if possible

1.1 Safety sign

This Operation Instruction introduces the information how to operate the pump to ensure safe operation. The operator and maintenance staff must become familiar with the operation steps. Herein it lists some common safety signs used by the product, i.e.:

⚠	You are involved in personal safety, please abide by the relevant operation rules;
!	Your operation may cause the pump damaged, please abide by the relevant description to avoid the situation;
➤	This is the helpful description or suggestion to user. Please specially pay attention to the Bold Font.

The rotation direction arrow on the pump body must be readable.

1.2 Qualifications and training of personnel

People who are in charge of maintenance, inspection and installation must have relevant professional qualification; people who are liable for monitoring must be appointed by user; any of such person who lacks the required skill must be trained and instructed. Besides, user is required to ensure people involved to understand the content of Operation Instruction very well.

1.3 Hazards from negligence on safety rules

If neglecting the safety rules, it will possibly damage the pump, endanger personal safety and pollute the environment. The danger it results in is listed as follows:
The significant function of pump or other equipment goes wrong;
The given maintenance method does not work;
People are shocked by electricity, injured by machine or chemicals;
The leakage when transmitting dangerous media will endanger the ambient environment.

1.4 Operation, Maintenance, Inspection & Safety Rules

If components of the pump get hot, it will cause some hidden troubles. User should take necessary safety protection measures;
Never remove the protection cover from moving parts (such as the union coupling) when the pump starts;
If the dangerous substances transmitted from the shaft seal seep, it is required to deal with the drainage well; otherwise it will cause hazard or pollution to human body or environment;

User should maintain all jobs related to maintenance, inspection and installation to be done only by professional staff;
Basic principle: It can only make maintenance or inspection after pump stops as per the Operation Instruction;
After maintaining or inspecting the pump, please recover all protection devices immediately; otherwise it is not allowed to start the pump;
When working in the work area of pump, please be careful of skid.
Please follow by the stipulations made by “Start” before re-starting the pump.

1.5 Operations to improve or make spare parts without approval

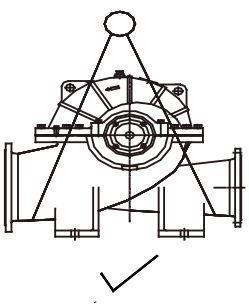
Any operation to improve or rebuild the pump must be approved by the manufacturer. The spare parts of original producer and the parts and components authorized by manufacturer have safety guarantee. The manufacturer shall not liable for any loss caused by using other components.

1.6 Illegal operation

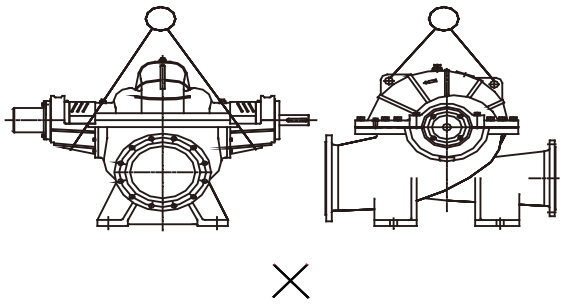
The work safety is subject to the correct use, i.e.: the pump is only used for the given purpose as per the stipulations contained in the Operation Instruction. If user installs or operates the pump without following the stipulations, the manufacturer shall not liable any problem caused.

1.7 Transport & Storage

Transport
General speaking, it can not move the FS series pump set by manpower only. Therefore it is required to use correct transport and hoisting equipment. The weight of pump (set) is indicated on the nameplate. For the dimension of pump set, please see the relevant documents.
When hoisting single pump or whole pump set, the hoisting position is shown as follows:



Correct



Wrong

Lift description:
1) This Figure is the schematic diagram for the position of lifting rope when hoisting the whole pump;
2) It is preferred to select safe crane and lifting rope as per the hoisting weight;
3) When hoisting, all positions where the lifting rope may contact with the pump should be lined with sufficient cloths to protect the pump from being damaged on appearance.

1 Safety

⚠ When hoisting, keep any people away from the place below the pump.

Storage

If the equipment will be stored for future use, please check the environmental condition （temperature: -40℃~+70℃; relevant humidity: 95%，non-frosting）.

2 Technical Description

2.1 Product summarization

FS model Pump is the single/double suction centrifugal pump produced by our company recently. As the new generation pump developed by using the latest hydromechanics calculation method and computer-aided design method, the pump is featured in high efficiency, energy conservation, low pulse, robust and durable property, easy maintenance and so on. Besides, the pump uses the structure of single-suction, double-suction, horizontal split of volute casing and end-support. In accordance with the different bearing, the whole system is divided into two structures. The small dimensional pump uses the inner chamber of bearing body as the bearing bore and the positioning pin between the bearing body and pump to position. The large dimensional pump uses the combined inner chamber of bearing body and bearing cover as the bearing bore and ring ridge between the bearing body and pump to position. Herein we define the above-mentioned two structures as the Structure 1 and Structure 2. For the specific structure form and pump specification, please see the following table.

Structure 1: Pump specifications

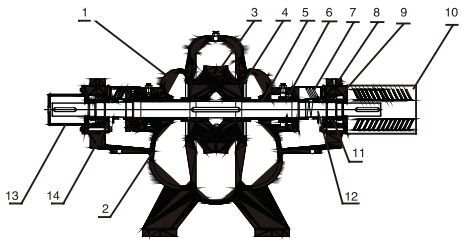
10–300	10–500	15–200	20–250	20–350	20–400	25–200	25–300	30–100
30–150	30–250	35–300	35–350	45–150	45–200	50–100	50–350	65–150
70–150	70–250	75–250	80–100	90–200	95–125	125–200	130–200	140–150

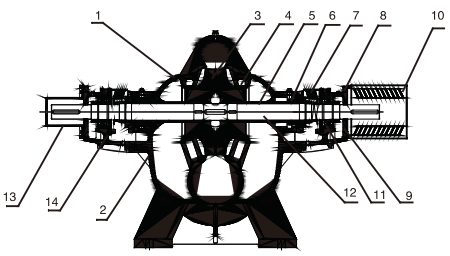
Structure 2: Pump specifications

20–600	20–700	50–500	50–700	50–900	50–1000	60–500	70–400	70–700
70–800	90–900	105–700	115–500					

Structure diagram

1. Pump cover
2. Pump body
3. Impeller
4. Double-suction seal ring
5. Shaft sleeve
6. Shaft seal
7. Shaft seal cover
8. Bearing cover
9. Bearing
10. Coupling cover
11. Bearing
12. Shaft
13. Shaft cover
14. Bearing cover





2 Technical Description

All in all, FS series product is suitable for the clean, think or lightly-polluted liquid. The maximal pressure, temperature and rotation speed of system is subject to the pump model and design. For such data, please refer to the relevant documents. For other information related to application and selection of pump, please see the Order Confirmation or relevant datasheet.

In our opinion, please do not use the pump out of its design purpose without the approval of supplier.

> ⚠ If it is not the original system (medial, system pressure, temperature and so on), the application of the pump will cause danger to user.

Product standard: ISO9906-1999;
Flange standard: ISO9906-1999;
Work pressure: 1.0Mpa： nominal head＜95m
1.6Mpa： 95m≤ nominal head＜130m
2.5Mpa： nominal≥130m
Work temperature: -15℃~104℃， Please specify in details if exceeding 80℃ when ordering.
Pumping media: the clean water or the nontoxic, non-explosive and nonflammable liquid that is free of solid particle, short fiber (PH is 5~10), toxicity and crystal.

2.2 Bearing

The pump uses two imported top-quality heavy-load bearings to support. For the Structure 1, the bearing is lubricated by lubricating grease; whereas for the Structure 2, the bearing can be lubricated by lubricating grease or oil; normally it is lubricated by lubricating oil.

2.3 Pump model description

FS 50 - 1000

- Pump outlet diameter: 1000mm
- Nominal head of pump: 50m
- FS Model Series Single/Double-suction Centrifugal Pump

2.4 Technical Data

U-FLO PUMPS CO.,LTD can provide 40 types of FS Model Series Single/Double-suction Centrifugal Pumps with different sizes; the main technical data is just as follows:

Flow	50~18000 m /h^3	Pump diameter	100~1200 mm
Head	8~150 m	Rotating speed	490~2900 r/min

Each pump is available a nameplate; from which, you can see some important information related to the pump, such as the performance data and so on.

2 Technical Description

> ⚠ Note: keep the nameplate readable always.

It is an economic and safe method if keeping the pump running in high-efficient area. User is preferred to select the proper pump model or consult with us.

> ⚠ Note: If selecting the inappropriate model, it will not only waste energy, but also other hidden safety troubles or fail to meet the given demand.

3 Pump installation and pipe connection

3.1 Installation of pump

Safety

The installation quality of water pump set is very important to operation, safety and service life of pump; therefore you are strongly recommended to take care when involving in such procedures.

Summarization

Please read carefully the Installation and Operation Instruction before installation or commissioning. You will damage the pump seriously if disobeying the Instruction herein; However all failures arising from which shall be out of our warranty. You are strongly recommended to follow up the following procedures:

Never start the pump if the rotor is not protected or you are now being involved in installation process.

If the pump set has to work in the condition with a temperature over 70°C, user should take measures or stick warning sign to prevent people from being burnt.

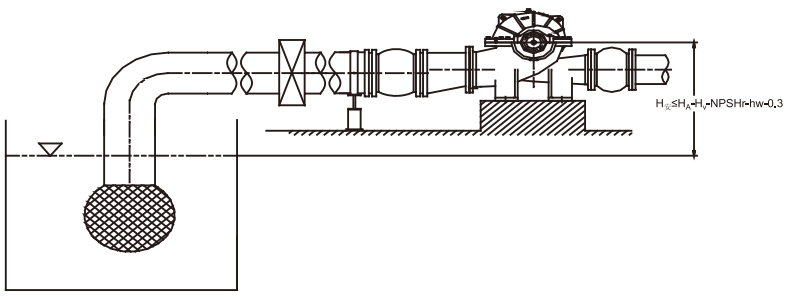
If there is static danger, please keep the whole pump set contact with ground.

If the liquid to be pumped out is harmful to human body or environment, please take appropriate measures to drain the liquid safely.

3.1.1 Pre-installation preparations

a) Check if pump set components are complete in accordance with the Packing List; check if the pump or motor is damaged or if some bolts loosen in transit or handling;

b) Installation height of pump should make the device provide net positive suction head value; the installation height will be calculated as per the following formula, i.e.: H安≤HA-HV-NPSHr-hw-0.3， where HA is the surface pressure of the liquid to be pumped (liquid column); HV is the vaporization pressure of the liquid to be pumped (liquid column), NPSHr is the net positive suction head of pump; hw is the total resistance loss of suction pipe; unit: m.



c) The suction and outlet pipe must be clean, and free of particles or other impurities;

d) It must verify the foundation as per the foundation diagram (see the appendix) and the pump to ensure its correctness;

e) The pump foundation is required to be solid, level and flat;

f) The site to install the pump must be ventilated very well; if there is high temperature, or high humidity, or plenty of dirt, it will damage the motor seriously.

> ⚠ Never start the pump if the rotor is not protected or you are now being involved in installation process.

3.1.2 Installation procedures of pump

a) Put the equipment in the original position, put the foundation bolt into the foundation hole of motor (if it has a public stand, it will be the foundation hole of the stand); put a nut on the top and bottom of the foundation hole separately; place a support rail (about 50mm high) beneath the foundation foot or stand, and then align the inlet or outlet flange of pump with the pipe flange.

b) Place an adjusting iron cushion under the foundation foot or stand, calibrate the level and axial line. For the coaxiality and the different axiality of motor shaft and pump shaft on the outer circle of coupling, as well as the unevenness of end surface gap along the circumference, please see “Alignment of coupling”.

c) When placing grouting firstly, please do not touch or hit the pump; keeping the foundation bolt upright in the foundation hole;

d) After the concrete cures completely, use the upper and lower nut on the foundation bolt to adjust the levelness and calibrate the axial line; after adjusting, tighten the nut and remove the support rail; if the one having a stand, please do not bend the stand;

e) When placing grouting secondly, it will be enough if submerging the nut on the foundation bolt.

> ⚠ Note: The coupling has been aligned before delivery, however before starting or commissioning, you are strongly recommended to re-calibrate the coupling; otherwise it will cause certain hidden troubles for safety.

3.2 Connection of flushing fluid

All filling seal or mechanical seal must be connected with a flushing pipe inside or outside. It can use the media to be pumped for flushing; if the media is inappropriate for flushing, it can use other water source.

3.2.1 Inner connection

It can use four-way joint on the vent hole on the top of pump to connect the high pressure water to rinse.

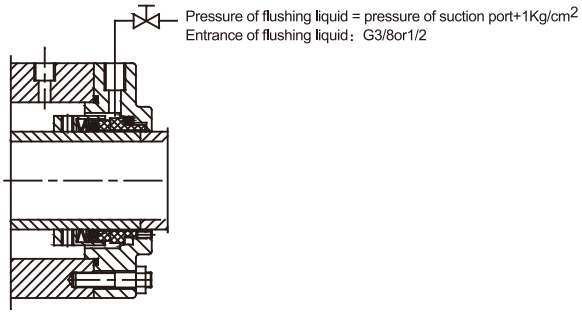
3.2.2 Outer connection

Filling seal

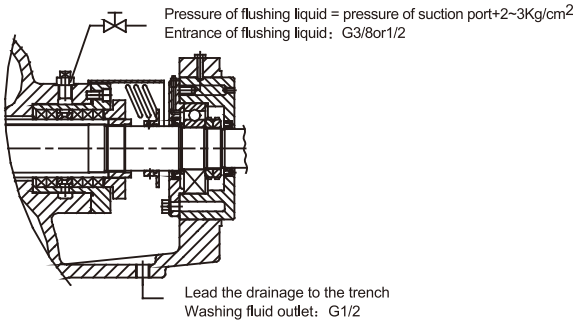
It needs to connect a high-pressure flushing pipe to lead the leakage to the trench, See the following Figure.

Single-end mechanical seal

It needs to connect a high-pressure flushing pipe. See the following Figure.



Single-end mechanical seal



Filling seal

> ⚠ Note: The mechanical seal or filling seal must be connected with flushing liquid. Otherwise it may burn such seals or enlarge the shaft power.

3.3 Pipe connection

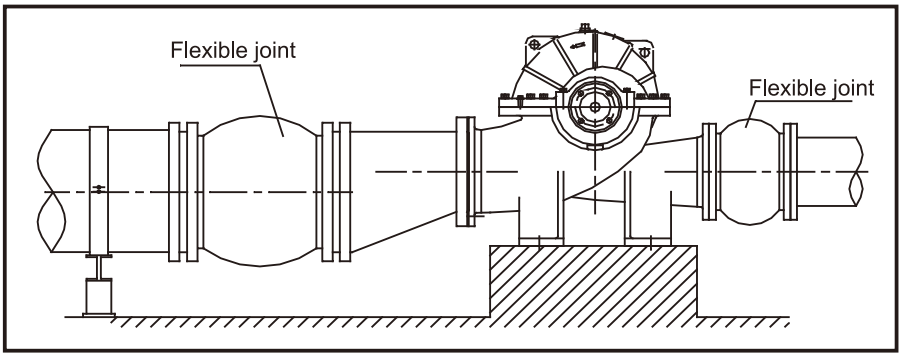
After connecting the suction and conveyer pipe uprightly, check if the equipment is aligned well; turn the rotating parts to see if it turns smoothly.

The mating surface between the pump and pipeline should have a sound airtightness; especially the intake pipe; keep the intake pipe away from air leakage and the device away from air collection.

> ⚠ Note: Each pump is preferred to use an independent suction pipe, keeping it as short as possible and elbow as less as possible; never make it turn suddenly. The elbow and connecting pipe should be over and equal to 90°, making the bending place smooth as much as possible and away from the pump inlet. The installation of horizontal suction pipe should be made downwards against the water flow; in order to prevent air collection, it is better to use conical eccentric reducing pipe.

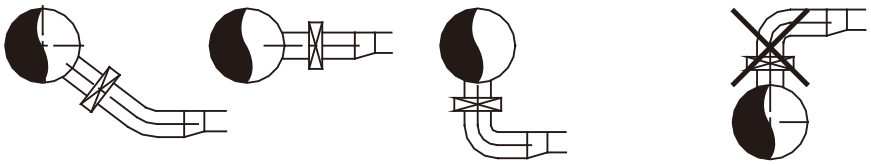
> ⚠ Note: When installing the pipe, the inlet and outlet pipe must be fixed by rack; otherwise the overmuch tension will break the flange of pump; besides it can avoid the pump from vibrating even though the pipe vibrates.

Install the flexible joint at the inlet and outlet pipe of pipe as much as possible so as to prevent vibration transfer between pipe and pipeline.



3 Pump installation and pipe connection

If it is necessary to make a branch on the header pipe at the pump inlet (i.e.: connecting multiple pumps on one header pipe), the pump inlet must have a positive pressure, and the centerline of pipe branch and the theoretical joint should not be over the centerline of the header pipe.



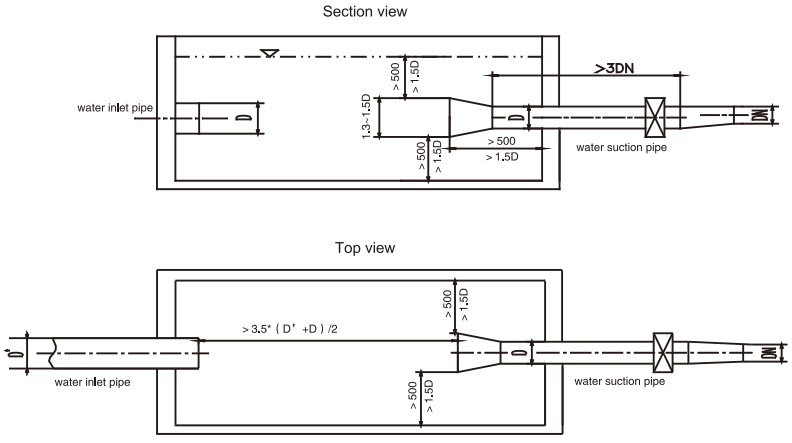
Correct Wrong

> The suction pool and suction pipe arrangement is vital to the one if pump can turn normally and serve end user better. Please abide by the following principles:

1) If pumping water from water pool, it is better use overflow method Feed into the pool sucked the overflow to ensure a slow and stable water flow in the water pool; the efficient volume of water pool (disregarding if it is lower than the center of suction pipe) is the pump discharge for 3~5min;

2) The length of the straight pipe section before the pump inlet should be over 3 times of the inlet diameter, with an ascending grade of 0.5% at least; the suction pipe should be designed a horn mouth, with the diameter about 1.3~1.5

Sectional & Top View of Water pool



times of diameter of suction pipe, and the depth in water should be over 1.5 times of the diameter and not be less than 500mm; the distance between the suction pipe port and pool wall should be over 1.5 times of diameter, whereas the distance to the pool bottom should be over 1.5 times of diameter and not less than 500mm; besides it is preferred to add an appropriate filtering net.

3) The net distance between the inlet pipe and suction pipe is preferred to be over 3.5 times of pipe diameter (if the pipe diameter is different, use the average);

3 Pump installation and pipe connection

If install the pump over the inlet level, it is better install a bottom value; or it can use the full-automatic KENFLO vacuum priming device to get water. In order to adjust the flow and make maintenance easily, and in order to prevent the water hammer to damage the pump when the pump stops or power shuts down, it is preferred to install a gate valve and check valve between the pump and outlet pipe.

The diameter of pump inlet and outlet pipe should be as large as possible, which is subject to the flow demand. When making long-distance transmission, it is suggested to refer to the following table to select the maximal flow speed:

mm Pipe diameter	Pump outlet pipe				Pump inlet pipe			
	<80	80–150	200–400	>400	<80	80–150	200–400	>400
m/s Flow speed	2	2.5	3	3.5	1.5	2	2.5	3

3.4 Power and wiring of motor

The power and wiring of motor is requested to be same as the Operation instruction provided by motor manufacturer. In order to keep motor run safely and reliably, please design an overload protection device at place where the switch is set.

> ⚠ Note: The normal supporting motor is the indoor motor, so it can not be used outdoor; if the pump set is used outdoor, please make a special statement when ordering.

> ⚠ Danger: The wiring connection and wiring maintenance between water pump set and power source is required to done by professional and qualified personnel.

4 Start and stop

4.1 Start

Before starting the pump, please check if there are foreign matters inside; otherwise which will damage the axial seal and impeller.

Inject the lubricating oil or grease and turn the rotor of pump to see if it can turn smoothly;

Check if the coupling is aligned;

Check if the rotation direction of motor is correct; under the normal condition, the motor should be installed at the left end of pump (looking from the suction port of pump towards the outlet port); at this time, the motor shaft turns anticlockwisely (viewing from the motor towards the motor); if the installation position of motor is desirous to be contrary to the normal requirement, please make a special statement when ordering. At this time the rotation direction of motor is rightly contrary to the normal requirement.

Open the intake gate valve fully (if it is installed);

Close the drainage gate valve and inject water towards the pump (or vacuum injection) to make the suction pipe of pump fill of water and free of air collection;

Open the seal supply valve;

Start the motor.

4 Start and stop

Note: Never make the pump do idle rotation; otherwise it will damage the shaft seal and friction ring inside the pump.

Note: If your pump is installed a flushing pipe outside, please supply water to the seal before start.

Note: It is prohibited to run the pump if closing or turning down the intake valve.

4.2 After start

Open the drainage gate valve;
Check if the seal leaks water; if it is the filling seal, it must drop the water at the filling place;
Check if the temperature and sound of bearing is normal;
Check if the inlet and outlet pipe of pump is sufficient to be supported and fixed and if it vibrates sharply;
Check if the pump vibrates;
If there are something wrong, please close the motor to check and solve problem.

4.3 Stop

Stop the gate valve on the outlet pipeline;
Shut the power supply off;
Close the water valve;
If the place where the ambient temperature is low, please drain the seeper from the pump to avoid freezing;
If the pump is out of use for a long time, please turn the rotor of pump regularly to keep the pump start easily;
If it is not used for a long time, please dismantle the pump and dry the components, and coat anti-rust oil to store safely.
Noise
The working noise of pump is subject to the operating condition. The given value is made by driving the motor at the normal working condition. If the pump is used for normal outdoor environment, it will produce a high flow and air corrosion and the noise will exceed 85db(A). At this time it must take preventative measures, for instance install acoustic filter around the pump set or wear ear defender.

5 Start and stop

5.1 Lubrication

Check the lubrication of bearing regularly; when the one to be lubricated by grease works 1500 hours and the one to be lubricated by oil works 4000 hours, please replenish or change the lubricating oil or grease; if the environment is worse, the lubricating cycle should be shortened; when using the lubricating oil, it should be replaced completely when working 10 hours firstly.
The lubricating grease is the 3# Lithium Complex; the lubricating oil is the ISO VG46 mechanical oil.

The lubricating grease is the 3# Lithium Complex; the lubricating oil is the ISO VG46 mechanical oil.
It will be appropriate if adding the lubricating oil to the centerline of oil immersion lens. The model of the pump that uses the lubricating oil is as follows, i.e.: 20-600, 20-700, 50-500, 50-700, 50-900, 50-1000, 60-500, 70-400, 70-700, 70-800, 90-900, 105-700, 115-500.
The injection volume of the lubricating grease will is 1/2 ~ 2/3 of the whole volume of the bearing chamber; please refer to the following table, i.e.:

S/N	Reference volume of lubricating grease （mm^3）	Appropriate pump model
1	6700-8900	15-200、30-100、30-150、50-100、80-100
2	14100-18800	10-300、20-250、25-200、45-150、70-150、95-125
3	21200-28300	10-500、20-350、25-300、30-250、45-200、65-150
4	29000-38600	20-400、35-300、35-350、70-250、90-200、140-150
5	62500-83400	50-350、75-250、125-200、130-200

The point flow at the operating condition will be appropriate if it is between 60% and 120% of the rated value.

5.2 Operation & maintenance

The point flow at the operating condition will be appropriate if it is between 60% and 120% of the rated value.

> ⚠ Note: If the drainage gate valve is closed, please do not let the pump run continuously for 3 minutes or more.

If the filling is worn, please compact the filling cover further; if it is worn seriously, please change accordingly.
When working normally, the place where the filling seal is designed is preferred to drop water, but not continuously.
Please check the shaft bearing temperature rise of motor and motor.

> ⚠ Note: When the ambient temperature is less than 30℃, please keep the temperature of the bearing of pump and motor less than 80℃; when the ambient temperature is higher, the temperature of bearing is preferred to be less than 90℃.

5.3 Replace the seal

5.3.1 Filling seal

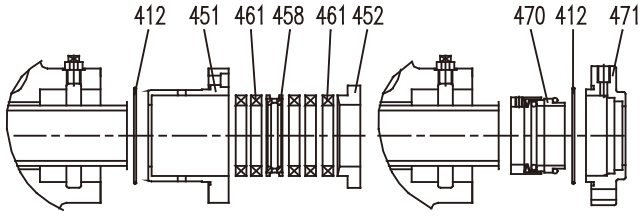
Dismantle the packing gland(452), move the filling box outwards (451); please do not damage O-ring (412).
Replace the filling (461);
Install as per the contrary sequence.

5.3.2 Single-end mechanical seal

Remove the bearing component (refer to “Change the bearing” section) and fluid deflector (507);
Remove the cover (471) and the static ring of mechanical seal, remove the moving ring of mechanical seal from the shaft sleeve;

Coat Vaseline on the shaft sleeve (524), put the new moving ring of mechanical seal; make the screw align with the positioning hole on the shaft sleeve and tighten accordingly;
Press the static ring of mechanical seal into the cover of mechanical seal (471), and tighten the cover of mechanical seal

> Note: Make sure a sound working length of mechanical seal, verticality of the end surface of moving and static ring and the axial lead; if the O-ring (412) on the mechanical seal cover is damaged, please replace immediately.



Filling seal Single-end mechanical seal

> Note: If the O-ring (412) on the mechanical seal cover and mechanical seal box is damaged, please replace immediately.

> Note: Never burn the rubber or plastic sealing members inside the pump, such as the auxiliary sealing member, O-ring and so on; otherwise it will produce harmful gas to pollute the environment and endanger the health of human being.

5.4 Alignment of coupling

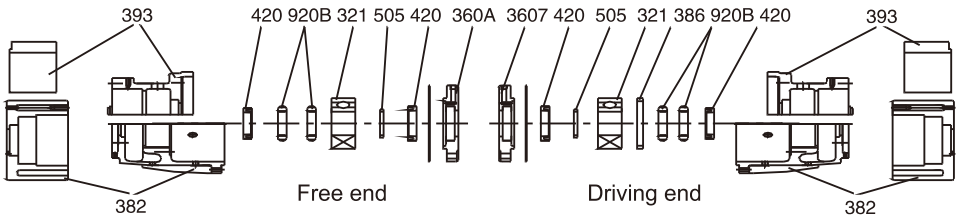
It can use the Dial Indicator to align through two steps, i.e.:
Primary alignment: use the straight edge ruler or steel ruler on the four points of the outer circle of coupling (0°，90°，180°，270°) to check the deviation of coupling; adjust the motor by using the cushion beneath the motor; adjust the alignment based on visual inspection.
Fine adjustment: fixing the Dial Indicator onto the outer circle of coupling at the end of pump, turn the coupling to measure the axial and radial deviation; the deviation should be less than the allowable value; adjust by using the cushion beneath the motor. Before making adjustment, please keep the contact point of the Dial Indicator at the normal working condition and remove the diaphragm from coupling.

> Note: After the first operation for 10 hours, please align the coupling again.

Outer circle diameter of coupling mm	120~250	250~500
Maximal axial deviation mm	0.2	0.25
Maximal radia deviation mm	0.1	0.12

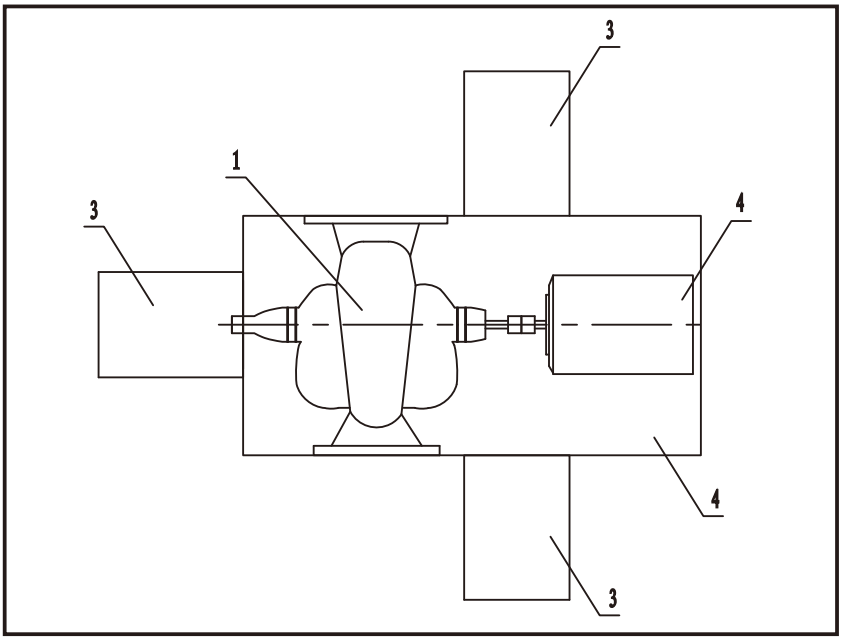
5.5 Replace the bearing

For the pump of Structure 1:
Remove the coupling cover and coupling at the pump end;
Remove the bearing cover (393)
Remove the rotating part from pump body
Unscrew the bearing cover (360Z or 360A)
Use the puller to remove the bearing (382) and remove the oil seal (420);
Remove the nut (920B) from the shaft; use the puller to pull the bearing out slowly (321); pull the inner ring of bearing only;
Remove the check ring (505) from the shaft shoulder and bearing cover (360Z or 360A) and the oil seal (420);
Replace bearing, oil seal and seal cushion; and then install as per the contrary sequence;
For the pump of Structure 2:
Remove the coupling cover and coupling at the pump end;
Unscrew the bearing cover (360Z or 360A) and remove the bearing cover (393);
Remove the rotating part from pump body
Remove the oil seal from the bearing;
Remove the nut (920B) from the shaft; use the puller to pull the bearing out slowly (321); pull the inner ring of bearing only;
Remove the check ring (505) from the shaft shoulder and bearing cover (360Z or 360A) and the oil seal (420);
Replace bearing, oil seal and seal cushion; and then install as per the contrary sequence;



Note: when installing the shaft, it can heat it to make it go in or use hammer and sleeve to hit; when using the latter method, it can only apply force on the inner ring.

5.6 Maintenance, Inspection and Operation Space



1 - KPS Pump, 2 - Motor, 3 - Operation/Maintenance/Inspection Space, 4 - Pump foundation

6.1 Filling seal structure

Assemble the rotor, i.e.: put the impeller (234), bearing (524), O-ring (412), shaft sleeve nut (921), filling box (451), filling (461), filling ring (458), fluid deflector (507) on the pump shaft (210); and then put the double-suction seal ring (502); finally put the bearing on (See the “Change the bearing” section).

Put the rotor on the pump (118) and adjust the impeller, making the axial position in the middle of the double-suction seal ring at both sides, and fix accordingly.

Cover the middle-split surface with the put the pump cover (117), and then tighten the conical pin at the end of screw; afterwards tighten all nuts and put the filling cover (452).

> Note: Do not press the filling too much; otherwise it will heat the shaft sleeve and consumer large power; but it is too loose, it will leak liquid too much and reduce working efficiency of pump.

After assembling, turn the pump shaft to see if it turns smoothly;

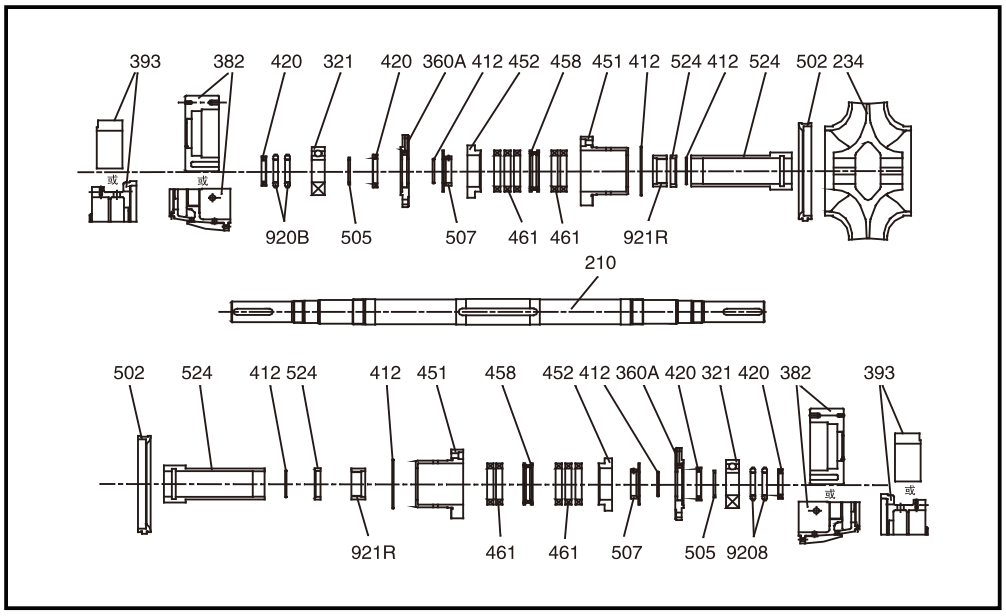
If it is needed to dismantle, please follow the reverse sequence.

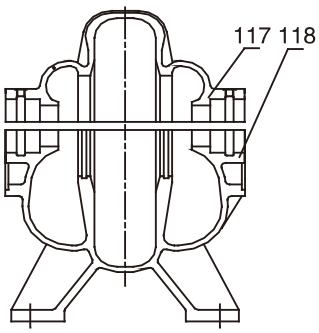
Before dismantling, please clean the pump completely.

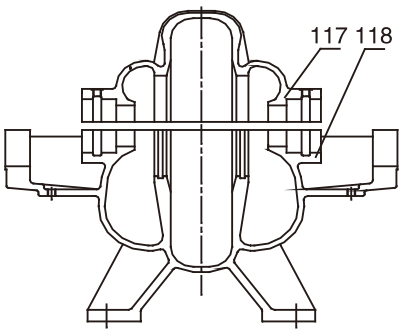
> If the pump is used to transmit hot liquid, it should make the liquid cool before operating; if the one to be pumped off is the hot liquid and contains unknown components, please do not use the pump! Before dismantling, please close the outlet pipe and shaft seal, cool the valve of flushing pipe, and remove the hex screw plug or open the drainage valve (if available) on the pipe to drain the liquid inside.

If the one to be pumped off is a kind of harmful liquid, please take the following preventative measures, i.e.:

- Wear the protective gloves, shoes and glasses;
- Clean the pump properly;
- Keep the working liquid from leakage;
- Re-install the hex screw plug or close the drainage valve







6.2 Mechanical seal structure

Assemble the rotor, i.e.: put the impeller (234), bearing (524), O-ring, shaft sleeve nut (921), mechanical seal (See the “Change the bearing” section), fluid deflector (507) on the pump shaft (210); and then put the double-suction seal ring (502); finally put the bearing on.

The rest is same as the structure of filing seal..

7 Common problems and troubleshooting

Failure

Determine what the failure is and remember the pressure involved by the working pump, i.e.: the working liquid may be the hot, toxic, strong, inflammable one. So please take correct measures to protect yourself (wear gloves, protective glasses and so on). Make sure to make sufficient safety measures for working area or surroundings of the pump (convergence slot, fire blanket, eye wash and so on).

If the pump goes wrong, it may be caused by multiple reasons, for instance the reasons of pipe system or operating condition. Firstly, please inspect if the installation job is done as per the instruction; besides, it must ensure the operating condition to be same as the given description.

Basically, the reasons are listed as follows;

1）Inherent defect of pump;

2）Pipe system failure;

3）The installation or commissioning is made improperly;

4）The model of pump is selected improperly.

The common problems and reasons are as follows:

Problem	Reason	Troubleshooting
The pump does not suck water, and pressure meter and vacuum meter vibrates intensely.	The water to be injected into the pump is insufficient; the suction pipe leaks air.	Re-inject water into the pump and block the air leakage.
The pump does not suck and vacuum meter indicates high vacuum.	The bottom valve is failed to open and blocked; the suction pipe involves in a large resistance; the suction height is too high.	Calibrate or clean the bottom valve; clean or replace the suction pipe and reduce the suction height.
No water comes from the pump and the pressure meter indicates normally	The outlet pipe involves in a large resistance, the rotation direction of pump is wrong, impeller is blocked and rotation speed is under the rated value.	Check or shorten the outlet pipe; correct the rotation direction; clean the impeller and improve rotation speed.
Insufficient flow or low head	The impeller, inlet and outlet pipe is blocked; the double-suction seal ring is worn too much; the impeller involves in air corrosion or damage; the rotation speed is far less than the rated value.	Clean the impeller or pipe, replace the damaged parts, remove air corrosion; adjust to the rated rotating speed.
Pump consumes overmuch power.	The filling is pressed too much; the impeller rubs with the double-suction seal ring; the flow is too much.	Unscrew the filling cover, remove mechanical friction, adjust the drainage gate valve, and reduce flow rate.

7 Common problems and troubleshooting

Problem	Reason	Troubleshooting
Pump sends abnormal sound and no water comes from the pump.	The suction pipe involves in a large resistance, the suction height is too high, the suction pipe leaks air and the flow is too high and involves in air corrosion.	Clean the suction pipe, bottom valve; reduce the suction height; block the leakage; reduce the temperature of liquid. Adjust the drainage gate valve and reduce the flow rate.
Pump vibrates abnormally.	The pump involves in air corrosion; the pump shaft and motor shaft is not homocentric; the foundation bolt becomes loose.	Remove the air corrosion; calibrate pump shaft and coaxiality of motor shaft and pump shaft; tighten the foundation bolt.
Bearing is too hot.	The lubricating oil is insufficient or deteriorated; the pump shaft and motor shaft is not homocentric.	Check the lubricating oil amount or clean the bearing; replace the lubricating oil and calibrate the coaxiality of both shafts.

Ordering instruction:

In order to ensure user to use the product safely, you are strongly recommended to give details about your environmental condition where the product will be used; such as the transmitting media and temperature; any conditions out of the given stipulations in the Operation Instruction should be stated clearly when ordering or consult with us.

Note: Please keep the Installation and Operation Instruction in safe for further use. If you have any queries about the Instruction, please revert to our company directly.

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