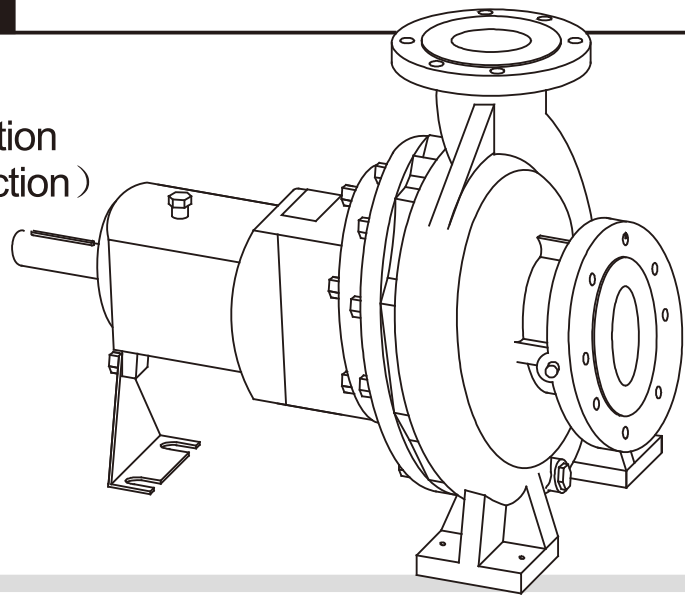


OPERATION INSTRUCTIONS

Horizontal Single-stage End Suction
Pump (Standard/Direct Connection)

FH/FHC 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.



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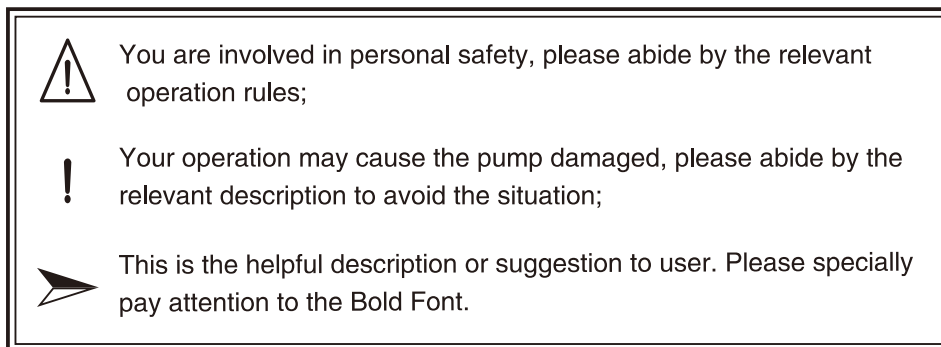
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This Operation Instruction contains the precautions for installation, use and maintenance of FH (FHC) series centrifugal pump. The installer and operator is required to read the Operation Instruction carefully before installing or operating; Keep this 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.:



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:

- 1) The significant function of pump or other equipment goes wrong;
- 2) The given maintenance method does not work;
- 3) People are shocked by electricity, injured by machine or chemicals;
- 4) The leakage when transmitting dangerous media will endanger the ambient environment.

1.4 Operation, Maintenance, Inspection & Safety Rules

- 1) If components of the pump get hot, it will cause some hidden troubles. User should take necessary safety protection measures;
- 2) Never remove the protection cover from moving parts (such as the union coupling) when the pump starts;

- 3) 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;
- 4) User should maintain all jobs related to maintenance, inspection and installation to be done only by professional staff;
- 5) Basic principle: It can only make maintenance or inspection after pump stops as per the Operation Instruction;
- 6) After maintaining or inspecting the pump, please recover all protection devices immediately; otherwise it is not allowed to start the pump;
- 7) When working in the work area of pump, please be careful of skid.

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

1、 Transport

When the machine set is transported, it should ensure the pump or machine set to be placed horizontally in the transit process, and no any slide will occur; when lifting the pump or machine set, please do not use the hoisting device to lift the free end of pump shaft or motor's lifting lug. Preferably it is suggested to hoist as per the Figure 1 & 2 as follows.

When lifting single pump or whole machine set, the lifting position should be determined as per the following Figure, i.e.:

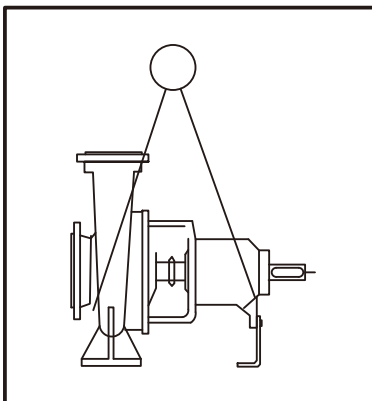


Figure 1

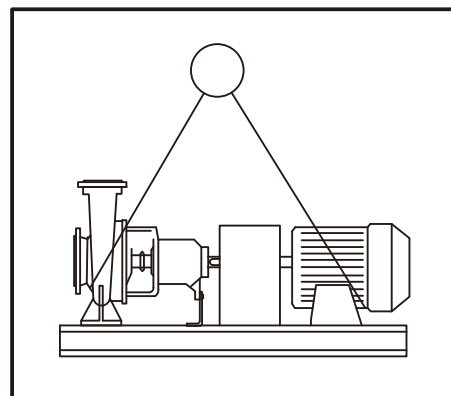


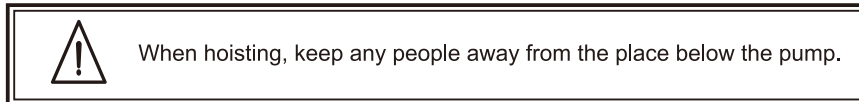
Figure 2



1 Safety

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.



2 Storage

If the equipment has to be stored for a while before making commissioning, it should store the equipment indoor or in shed; the maximal storage duration is 12 months; the equipment is only stored in dry place, and turn the rotor one time every month.

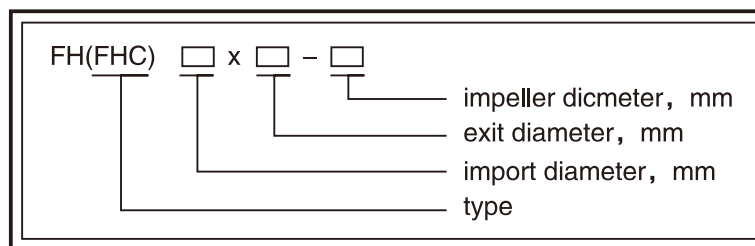
2 Technical Description

a) Product summarization

FH (FHC) series centrifugal pump is the high efficient, low maintenance rate and new generation pump designed and developed by U-FLO Pumps (Nanjing) Co., Ltd by using the high & new technologies; with the excellent hydraulic model and structural characteristics, the series pump may guarantee user to reduce operation cost efficiently.

b) Technical data

Model expression method and description:



For instance: If the specification for FH (FHC) pump is as follows, i.e.: outlet diameter is 150mm, intake diameter is 200mm and the nominal diameter of impeller is 500mm, the model number will be expressed as FH (FHC) 200 X 150 -500. Under this series, there are totally 29 types of pumps, thus it is available to provide different impeller diameter, different rotation speed and hundreds of mechanical properties for selection.

Diameter: Intake port: 50~250mm; outlet port: 32~200mm;

Flow: Maximal 900m³/h

Pump lift: Maximal 160m

Pressure to be burdened by enclosure: Maximal 1.6Mpa (20°C)

(Pressure to be burdened by enclosure = inlet pressure + shut-off head)

Media temperature: -15°C~+104°C



Note: All above are the main technical parameters for the series pumps when the current is 50Hz; for detailed performance of each specific pump, please claim FH (FHC) pump sample from our company; On the nameplate of the pump, you will the specific technical parameters and the performance.



Note: If the conveyer belt is used to contact with corrosive media or when the media has a temperature over 130°C, please give special description when ordering.



Warning: Never burn the rubber 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.

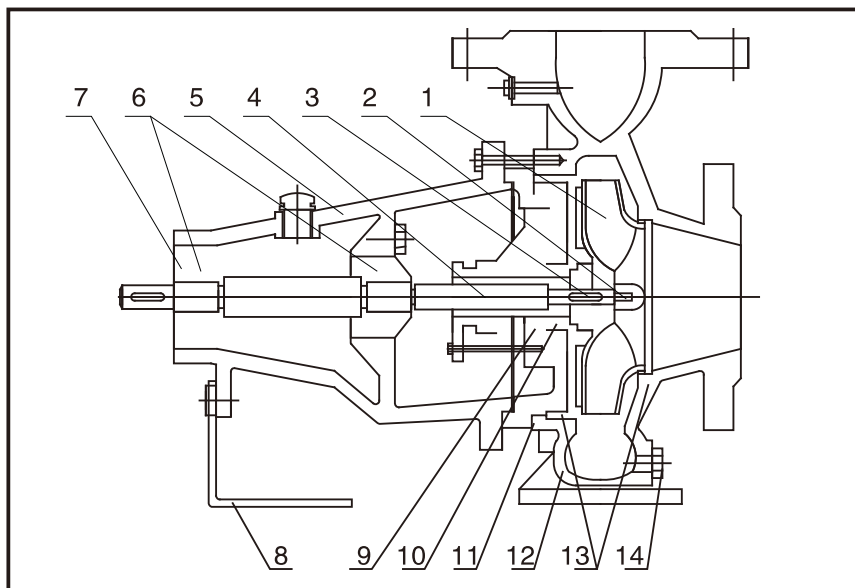


Danger: The wiring connection between the pump set and power supply and the wiring maintenance should only be done by the person who has special qualifications.

c) Structure of pump

The appearance and installation size, design, manufacturing and acceptance specification of pump must comply with ISO2858, ISO9908, ISO9906 and other national standards; the pump to be designed and manufactured under such national standards can be interchanged with other products that comply with such standards.

The pump body uses high efficient volute casing, with the flange connection size complying with GB/T 17241.6-1998 (casting iron) and GB/T9113.1-2000 (steel) PN1.6MPa; which is used together with the flange at the corresponding level that complies with the following standards, i.e.: BS 4504:1989, ISO7005.1:1992, DIN 2533:1976, ISO7005.2:1988.



Schematic view



2 Technical Description

No.	Name
1	Impeller
2	Impeller NUT
3	Woodruff key
4	Axis
5	Suspension
6	Bearing
7	Skeleton oil seal

No.	Name
8	Bracket
9	Pump bonnet
10	Mechanical Seal
11	O-ring
12	Pump
13	Seal ring
14	Plug

Impeller – uses the closed structure;

Pump cover – The rear-opening design makes pump maintenance easier;

Shaft – oversized pump shaft makes pump run more reliably;

Shaft seal – uses sound mechanical sealing;

Bearing – uses the famous import brand; the grease-free sealing bearing can make the bearing free of maintenance and meet the environmental protection requirements within the service life. When it is designed for operation around the clock and media has a temperature over 130°C, it is better use the bearing to be lubricated by oil bath or by the grease to be added outside; if using the bearing to be added the lubricating grease or oil outside, a special statement is required to make when ordering.

3 Installation, Operation and Maintenance of Pump Set

3.1 Installation

- 1) Before installing, please check if the Packing List is in just accord with the Delivery Note and Nameplate of Pump;
- 2) Installation position: It is preferred to install the pump in the place near to the liquid to be transmitted; place the pump at the part where is available a minimal suction height or shortest suction pipe; keep the pump away from direct sunshine and rain.



Note: Keep the machine set and ambient barriers away from 150mm at least, making the motor fan obtain sufficient air;

The installation height of pump, length, diameter and flow of pump is required to meet the calculation value; please make every efforts to reduce unnecessary loss.

The installation height of pump is subject to the calculation by considering the factors, i.e.: atmosphere pressure, liquid surface pressure, saturation vapor pressure of transmitting media at different temperature (Pv).

$$H \leq H - H - \Delta h - NPSHR - 0.5(m)$$

3 Installation, Operation and Maintenance of Pump Set

Where: H_{g} —Installation height of pump, i.e.: the distance from the centerline of pump shaft to the suction surface; if the calculation value is positive, it proves the centerline of pump shaft is higher than the suction surface; the installation height of pump can only be less than or equal to the calculation value; when the calculation value is “-”, it shows the perfusion status of the liquid and the distance that the suction surface is higher than the centerline of pump shaft. When installing, the liquid surface of back-flow liquid should be larger or equal to the absolute value of calculated value.

H_A — Liquid level pressure of the liquid to be pumped in, m (liquid column);

H_V — Resistance loss of liquid at the transmitting temperature, m (liquid column);

Δh_s — The total resistance loss of suction pipeline, m (liquid column);

The saturation vapor pressure said above can be referred to the relevant manual or obtained from our company.

It can use the following formula to calculate under the standard atmospheric pressure of clear water at the normal temperature:

$$H_{\text{g}} \leq 10 - \Delta h_s - \text{NPSHR} - 0.5(\text{m})$$

Installation foundation: place the pump set on the solid foundation; the foundation should be made from concrete, with capacity to support the pump set;

Calibrate the axial line: when assembling the union coupling, it can use the level ruler, plug gage or dial Indicator to check the calibration tolerance.

Type of union coupling	Radial displacement between two axis centers	Inclination of two axial lines	Cross-section gap
Pin with elastic sleeve	0.04~0.05	0.2/1000	2~4
Claw-type, plum	0.05~0.1	1/1000	2~3

Suction & Drainage Pipeline: All pipelines must be installed at the proper position to be connected with the pump, and fixed with respective racks. In order to keep the pump away from overmuch additional external torque, please use the flexible joint to connect the inlet and outlet pipeline (the connection method of pipeline is very sensitive to vibration intensity of pump set).

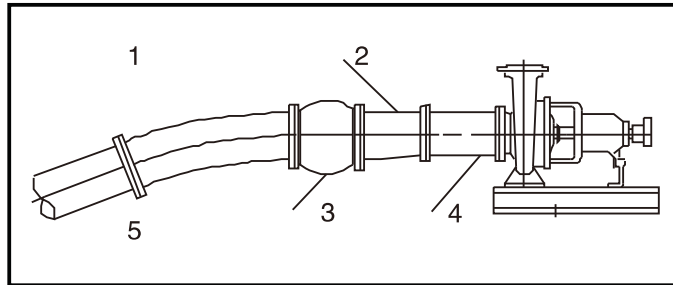


Note: When installing the pipeline, especially the suction pipeline, please remove the welding slag, rust and dirt from the pipe first.

Suction pipeline: If pumping water from water pool, the length of the straight pipe before the pump suction port should be of 3 times of the inlet diameter or more, and the depth of the suction pipe beneath the water level should be of 1.5 times of the inlet diameter and over 500mm at least. The distance from the pipe suction port to the pool wall should be of 1.5 times of pipe diameter, with the distance to the pool bottom over 1.5 times of the pipe diameter, and larger than 500mm at least; besides it should add filtering net, with the total square of the filtering net over 2~3 times of the square of the suction pipe.



3 Installation, Operation and Maintenance of Pump Set

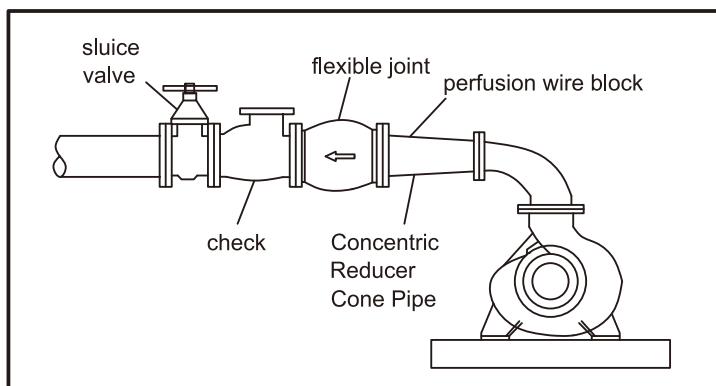


- 1) The suction pipe diameter should be larger or equal to the pipe diameter of flange of pump;
- 2) Eccentric reducer
- 3) Flexible joint
- 4) Put a piece of straight pipe at the pipe inlet.
- 5) From the pump to the water source, the suction pipe should be a continuous inclined pipeline.



Note: In order to prevent air from being blocked, please keep the horizontal suction pipeline downwards a bit against the water flow direction.

Drainage pipeline: the path of drainage pipeline should meet the demand of flow; if so the hydraulic friction loss of pipeline will be minimal. When the drainage pipeline is fixed onto the uneven floor, the high place inside the pipeline shall produce bubbles. If so, please add vent valve at such position to remove air timely; otherwise it will influence the pump flow.



Safety measures: In order to ensure the motor work reliably, it is preferred to install an overload protector on the electric switch.



Warning: If there is no overload protector, the current may boost suddenly when outlet valve is opened fully or under certain circumstances; furthermore it will damage the motor possibly.

3.2 Operation

- 1) Open the import valve and outlet plug, close the outlet gate valve, and close the release plug after filling the pump with water or pump it to vacuum;
- 2) Turn the pump (motor) before start to make the lubricating liquid go into the end surface of mechanical seal; never make the pump do idle operation or start suddenly, otherwise it will damage the moving or static ring;
- 3) Itch the motor to check if the rotation direction is same as the arrow indication (looking from the end of motor, it should turn clockwise).



Note: Read carefully and note the warning sigs before start!



Warning: it is prohibited to run the pump if there is no water inside; otherwise it will damage the mechanical seal.

- 4) When the inlet gate valve opens fully and discharging gate valve is closed, start the water pump and open the pressure meter; open the outlet gate valve till the needed operating condition is available; when the outlet gate valve is closed, the operation time should be less than 3 minutes. If no liquid is pumped out, please stop for inspection immediately. Note: the current when the motor works should be less than then rated value.



Note: The point flow at the operating condition will be appropriate if it is between 20% and 60% of the rated point flow of product sample; when operating, the time head, i.e.: $H = (P_{\text{Out}} - P_{\text{in}}) / 0.0098$, should be larger than the head of the large flow point given by the performance table (where P_{out} is the value of the pressure meter at the outlet, P_{in} is the value of the vacuum pressure meter at the flange of pump inlet, pressure unit: MPa; head unit: m). The ideal and efficient operating condition is the middle point given by the performance table; it can be controlled by observing the (vacuum) pressure meter at the outlet through adjustment.


- 5) Stop sequence: Close the gate valve, motor and pressure meter on the discharging pipe.

3.3 Maintenance

- 1) It should check if the pump is stable, if the mechanical seal is worn or leaks when the pump works; if yes, it should replace the sealing element timely and prevent the pressure water from going into bearing.
- 2) It should inspect the temperature change of exterior enclosure of bearing frequently; the maximal temperature should be less than 80°C (GB50275-98);



- 3) Check if there are any floating objects in the inlet pool and observe the change situation of water level; if the inlet pool reduces to the minimal water level, it should stop running the pump to avoid air corrosion or damage to impeller; if necessary, it can adjust the outlet gate valve to reduce water yield of pump and make water level of inlet pool get rise;
- 4) Observe the change of pressure meter and current meter; if something goes wrong, please take the corresponding measures;
- 5) If the pump is out of use for a long time, please drain water from the pump and remove rust and water scale, and then coat anti-rust oil.


 Note: Before repairing or replacing the components, or assembling or re-assembling the motor, it should shut the power source off of the motor assuredly.

3.4 Lubrication

- 1) For the bearing with dirt shield (seal) on both sides, the bearing has been filled with the lubricating grease, so it does not need to add the lubricating grease additionally;
- 2) For the suspension frame with grease-adding hole, it should add moderate amount of 3# compound lithium base grease by using high pressure oil gun when it works every 500~1000 hours;
- 3) For the suspension frame with oil-adding hole, it should add the bearing oil before operation; keep the oil level height less than the center of oil immersion lens, and less than 2/3 of the oil immersion lens; the first time to replace oil is 500 hours; after which, it should replace then oil every half a year.

The lubricating oil of bearing is preferred to select as per the following table, i.e.:

Range of operating temperature of bearing	Suitable lubricating oil designation
- 30℃~ 0 ℃	ISO VG15, 22, 32 refrigeration oil
- 30℃~ 1 ℃	ISO VG32、 46、 68 Bearing oil
- 30℃~ 2 ℃	ISO VG100、 150、 220 Bearing oil
- 30℃~ 3 ℃	ISO VG320、 460 Bearing oil
Note: The lubricating oils with different brands are not allowed to mix for use.	

 Note: The change cycle of lubricating grease and oil will be shortened along with the rise of working temperature of bearing.

4 Installation sequence

1. If the driving connection is of "coupling with the intermediate section", it should remove the intermediate section; and then it can remove the pump rotor; if there is no the intermediate section, it should remove the foundation bolt of motor, and then move the motor backward;
2. Remove the connecting bolt of pump cover (or suspension frame) and pump body, remove the suspension frame and pump cover and impeller from the pump body together;
3. Unscrew the connecting bolt of pump cover and suspension frame; remove the pump cover, and use wood to hit to remove the static mechanical ring;
4. Remove the connecting bolt of bearing cover and the suspension frame; take the bearing cover, shaft and bearing away.



Note: If the impeller or seal ring is worn, please contact our Sales Department of our company.

The installation sequence is rightly contrary to the dismantling sequence.



Note: In the process to install, it should keep the floor clean always; some small pieces, such as the key, water ring, O-ring and so on, are easy to be missed or installed wrongly.



Note: When installing the mechanical seal, it should check if all seals are damaged or not; the rubber products and the sealing side should be maintained clean; when inserting the sealing element, it should use professional lubricating oil (such as: silicon oil and so on), ethylene propylene rubber; No mineral oil is allowed to use.

For instance: The main parameters on the nameplate of pump (Sample)

TYPE:FH(FHC)200x150-500
FLOW:400m³/h Rpm:1450rpm
HEAD:90m Impeller dia:547mm

The nameplate shows the pump type, configuration, operation data and product number. When making repeated orders or ordering the spare parts, please furnish such information in details. If extra information out of the Operation Instruction is needed or the Operation Instruction is damaged, please contact your local U-FLO Pumps Service Center.



Pipeline Loss Estimate Table

Pipe Diameter	Flow (l/s)											
	1	2	4	6	8	10	15	20	25	30	40	50
mm												
25	3.27	13										
38	2.8	11	55									
50	0.8	3.1	13	29								
65		0.8	3.2	7.1	13	20						
75		0.4	1.6	3.3	5.9	9.6	21.6					
100			0.4	0.8	1.3	2.1	6.8	8.6	13	19.4		
125				0.23	0.4	0.63	1.3	2.7	4.1	5.9	10.7	
150					0.16	0.26	0.58	1.1	1.6	2.3	4.2	6.4
175						0.11	0.27	0.5	0.74	1.05	1.9	2.9
200							0.13	0.26	0.37	0.53	0.93	1.5
250								0.07	0.12	0.18	0.3	0.48
300										0.07	0.12	0.19

Pipe Diameter	Flow (l/s)												
	60	70	80	90	100	110	120	130	140	160	180	200	
mm													
25													
38													
50													
65													
75													
100													
125													
150	9.4												
175	4.3	5.8	7.7	9.6									
200	2.1	2.9	3.7	4.7	6.1	7.2	8.5						
250	0.68	0.93	1.2	1.5	1.9	2.3	2.8	3.3	3.7	4.9	6.5		
300	0.27	0.37	0.49	0.61	0.76	0.9	1.1	1.3	1.5	2	2.4	3	

Note: This table is straight pipe friction loss table (for estimate only). The length of the straight pipeline to be lost every 100m is subject to the new cast iron pipe; but it should be doubled if it is an old pipe.

6 Failure reason and troubleshooting

Type	Multiples for converted pipe diameter	Note
Full-opened gate valve	13	Double if it is not opened fully.
Standard bending pipe	25	
Check valve	100	
Bottom valve	100	Double if some of it is blocked.

Note: Taking the straight pipe with a length of 100mm as an example, the bottom valve is converted to 100 times diameter, i.e.: the length of the straight pipe (10m); if the flow is 8l/s; refer to the table, the straight pipe will lose 1.30m every 100; so every 10 m it will lose 0.13m; for 100mm bottom valve, when flow is 8l/s, the loss head will be 0.13m.

Maximal flow limit of pipeline with given diameter

Pipeline diameter (mm)	Maximal flow (l/s)	Maximal flow speed (m/s)
25	1	2.04
38	2.5	2.2
50	4.17	2.12
65	6.67	2.01
75	10	2.26
100	18.4	2.33

Pipeline diameter (mm)	Maximal flow (l/s)	Maximal flow speed (m/s)
125	30	2.44
150	43	2.45
175	60	2.49
200	83.3	2.69
250	133.3	2.72
300	192	2.72

Note: If exceeding the pool, the pipeline loss will increase.



6 Failure reason and troubleshooting

Failure	Reason	Troubleshooting
Insufficient flow	1. The outlet pressure of pump increases.	Adjust the outlet gate valve, making pump pressure comply with the operating condition.
	2. The head of device is too high or resistance is too high.	Add rotating speed or remove the foreign matters from the pipeline.
	3. The pump or suction pipe is not removed the air inside completely or it is not filled with water.	Empty or fill with water.
	4. The suction pipe diameter is too small or blocked by foreign matters.	Enlarge pipe diameter and remove foreign matters.
	5. The suction pipe makes air stay easily.	Design the suction pipe and arrange a vent valve.
	6. The suction height is too high.	Reduce the installation height of pump or improve the liquid level.
	7. The suction pipe has large resistance.	Open the intake pipe valve fully and enhance suction pipe diameter.
	8. NPSHA is too small.	Increase the square of the filtering net at the suction port.
	9. The shaft seal leaks.	Adjust or replace the shaft seal.
	11. The suction pipe is not dipped sufficiently or leaks air.	Increase immersion depth and repair pipe to block the leakage.
	11. The rotation direction is wrong.	Change rotation direction of motor.
	12. The density and viscosity of media is inconsistent with the Purchasing Order	Re-select the model.
	13. The seal ring is worn too much or damaged.	Replace new sealing ring.
Motor overload	1. There is friction between the rotating component and the fixing component.	Check if there are foreign matters inside the pump or check the reason why it rubs.
	2. The operating condition is inconsistent with the Purchasing Order but running with large flow.	Use the outlet gate valve to adjust the operating condition or re-select model.
	3. The density and viscosity of media is inconsistent with the Purchasing Order	Re-select the model.
	4. The rotating speed is too high.	Check the rotating speed and current of motor as per the nameplate of motor.
	5. The operating voltage is too low.	Enhance the voltage.
High outlet pressure	1. The rotating speed is too high.	Check the rotating speed and current of motor as per the nameplate of motor.
Quick temperature rise of bearing	1. The pump is deformed or the pump resonates with pipeline together under the influence of additional force.	Check the pipeline connection and keep the pipeline away from applying force on the pump; if necessary, reduce the supporting gap of pipe and use the vibration-proof material to support.
	2. The moving parts rub with the fixing components.	Check if there are foreign matters or the reason why it rubs each other.
	3. Added axial force.	Calibrate the coaxiality of pump shaft and motor shaft.
	4. The flow under the pump operating condition is too low.	Increase flow of pump or arrange a bypass diversion pipe.
	5. The pump shaft is not centered with the motor shaft.	Check and readjust the coaxiality of the two couplings.
	6. The lubricating grease or oil deteriorates or is improper.	Add moderate amount of the appointed lubricating grease and oil into the bearing chamber.

6 Failure reason and troubleshooting

Pump leaks	1. The bolt is not tightened, the sealing glue and sealing washer does not work.	Tighten the bolt, use appropriate sealing glue and replace the sealing washer.
Shaft seal leaks seriously	1. The pump is deformed or the pump resonates with pipeline together under the influence of additional force. 2. The material for shaft seal is not selected properly.	Check the pipeline connection and keep the pipeline away from applying force on the pump; if necessary, reduce the supporting gap of pipe and use the vibration-proof material to support. Select the appropriate material.
	3. The mechanical seal is damaged.	Replace by new bearing
	4. The pump vibrates when working.	Improve the suction condition, increase suction pressure of pump; re-adjust the coaxiality of pump and motor and re-balance the impeller
	5. The pump shafts not centered with the motor shaft.	Check and readjust the coaxiality of the two couplings.
Pump vibrates overmuch	1. The pump or suction pipe is not removed the air inside completely or it is not filled with water.	Empty or fill the pump with liquid.
	2. The pump is deformed or the pump resonates with pipeline together under the influence of additional force.	Check the pipeline connection and keep the pipeline away from applying force on the pump; if necessary, reduce the supporting gap of pipe and use the vibration-proof material to support.
	3. The suction height is too high.	Reduce the installation height of pump or improve the liquid level.
	4. The suction pipe has large resistance.	Open the intake pipe valve fully and enhance suction pipe diameter.
	5. NPSHA is too low	Increase the square of the filtering net at the suction port.
	6. The moving parts rub with the fixing components.	Check if there are foreign matters inside the pump or check the reason why it rubs.
	7. The bearing is worn or damaged.	Replace by new bearing
	8. The flow is too low when pump runs.	Increase flow of pump or arrange a bypass diversion pipe.
	9. The operating condition is inconsistent with the order, running with large flow.	Use the outlet gate valve to adjust the operating condition or re-select model.
	10. The material for shaft seal is not selected properly.	Select the appropriate material.
	11. The rotating speed is too high.	Check the rotating speed and current of motor as per the nameplate of motor.
	12. The mechanical seal is damaged.	Replace by new bearing
	13. The pump vibrates when works.	Improve the suction condition, increase suction pressure of pump; re-adjust the coaxiality of pump and motor and re-balance the impeller
	14. The pump shaft is not centered with the motor shaft.	Check and readjust the coaxiality of the two couplings.
Pump temperature rise is too much	1. The pump or suction pipe is not removed the air inside completely or it is not filled with water.	Empty or fill the pump with liquid. Reduce the installation height of pump or improve the
	2. The suction height is too high.	liquid level.
	3. The suction pipe has large resistance.	Open the intake pipe valve fully and enhance suction pipe diameter.
	4. NPSHA is too small.	Increase the square of the filtering net at the suction port.
	5. The moving parts rub with the fixing components.	Check if there are foreign matters inside the pump or check the reason why it rubs.
	6. Added axial force.	Calibrate the coaxiality of pump shaft and motor shaft.
	7. The flow under the pump operating condition is too low.	Increase flow of pump or arrange a bypass diversion pipe.
	8. The operating condition is inconsistent with the Purchasing Order	Use the outlet gate valve to adjust the operating condition or re-select model.



