

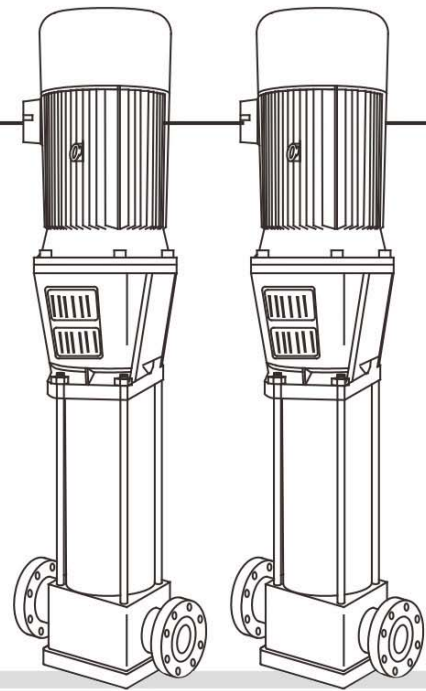


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OPERATION INSTRUCTIONS

Vertical Stainless Steel Multi-stage Pump **VM/VMN Series**

ENG 



You are strongly recommended to confirm the following items first before making any operation on this equipment

- Is it the one you desire to order?
- Is there any damage on the equipment?
- Are all fittings complete?
- In this Operating Instruction, the basic information and precautions for specification of the equipment is described.
- Please read the Operating Instruction carefully before operation so as to ensure use correctly;
- Please keep the Operating Instruction in safe;
- Special statement: Our company shall not responsible for any product failure or accident caused by incorrect installation or use.

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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1 Purpose and applicable scope

The VM and VMN Model Non-self-priming vertical multi-stage centrifugal pump (hereafter referred to as "Pump") is featured in high efficiency, low noise, sound property to withstand mild corrosion, compact structure, beautiful exterior, small volume, light weight, maintenance and use convenience and reliable airtightness and so on.

1.1 Purpose

- The product is suitable for low viscosity, neutral, non-explosive and solid particle or fiber free liquid; meanwhile the liquid transmitted by the pump must be no chemical corrosive to the pump;
- Water supply and condensed liquid system of boiler;
- Water treatment, penetration and filtering system;
- Foodstuff and beverage industry;
- Water supply and drainage of high-rise building;
- Irrigation for agriculture, plant nursery and golf course;
- Fire-extinguishing system;
- Industrial cleaning system;
- Liquid transmission, circulation and lift;
- Hot water and cold water.

1.2 Applicable scope

- Media temperature: Norma temperature type: $-15\text{ C}\sim+70\text{ C}$ Hot water type: $+70\text{ C}\sim+120\text{ C}$
- Flow-rate range: 0.4~180m³/h
- PH acidity scope of media: pH3~9
- Maximal environmental temperature: $+40\text{ C}$
- Maximal height above sea-level-level: 1000m
- Minimal inlet pressure: refer to NPSH curve
- Maximal inlet pressure: See Table 1 (actual input pressure + the valve-closing pressure of pump must be more than the maximal work pressure)
- Maximal work pressure: See Table 2

Table 1

Model	bar Maximal input pressure bar	Model	bar Maximal input pressure bar
1-2 ~ 1-8	6	20-1 ~ 20-3	6
1-9 ~ 1-36	10	20-4 ~ 20-17	10
2-2	6	32-10-1 ~ 32-20-2	3
2-3 ~ 2-11	10	32-20 ~ 32-40	4
2-13 ~ 2-26	15	32-5-2 ~ 32-100	10
3-2 ~ 3-5	6	32-110-2 ~ 32-140	15
3-6 ~ 3-29	10	42-10-1	3
3-31 ~ 3-36	15	42-10 ~ 42-20	4

1 Purpose and applicable scope

Table 1

Model	bar Maximal input pressure bar	Model	bar Maximal input pressure bar
4-2	6	42-30-2 ~ 42-50	10
4-3 ~ 4-10	10	42-60-2 ~ 42-130-2	15
4-12 ~ 4-22	15	65-10-1 ~ 65-20-2	4
8-2/1 ~ 8-6	6	65-20-1 ~ 65-30	10
8-8 ~ 8-20	10	65-40-2 ~ 65-80-1	15
12-2 ~ 12-4	6	85-10-1 ~ 85-10	4
12-5 ~ 12-18	10	85-20-2 ~ 85-30-2	10
16-2 ~ 16-3	6	85-30-1 ~ 85-60	15
16-4 ~ 16-16	10	120, 150	15

Table 2

Model	Curve No.	Model	Curve No.
1-2 ~ 1-23	1	32-10-1 ~ 32-70	1
1-25 ~ 1-36	2	32-80-2 ~ 32-120	4
2-2-5	1	32-130 ~ 32-140	5
2-18 ~ 2-26	2	42-10-1 ~ 42-60	1
3-2 ~ 3-23	1	42-70-2 ~ 42-90	4
3-25 ~ 3-36	2	42-100-2 ~ 42-130-2	5
4-2 ~ 4-16	1	65-10-1 ~ 65-50	1
4-19 ~ 4-22	2	65-60-2 ~ 65-80-1	4
8-2/1 ~ 8-12	1	85-10-1 ~ 85-50-10	1
8-14 ~ 8-20	3	85-50 ~ 85-60	4
12-2 ~ 12-10	1	120, 150	6
12-12 ~ 12-18	3		
16-2 ~ 16-8	1		
16-10 ~ 16-16	3		
20-1 ~ 20-8	1		
20-10 ~ 20-17	3		



If the liquid transmitted by the pump has a specific weight and viscosity higher than the water, the shaft power will go rise; therefore you are strongly recommended to use the motor compatible to the shaft power.



2 Structure description

- The pump comprises of motor, pump head, guide vane, impeller, pressure-proof cylinder, intake and discharge section, pump shaft, mechanical seal and other main components. See Figure 1;
- The key components of pump, such as the guide vane, impeller, pressure-proof cylinder and shaft, are made of stainless steel; the pump head, intake and drainage section and VM pump is made of casted stainless steel;
- The shaft seal used by the pump is the single mechanical seal; the grinding block is made of the carbide-tipped material or graphite; and the inner support of guide vane is made of tungsten carbide;
- The pump and pipe are connected by using round flange; besides, user can use different connecting methods as per the specific demand.

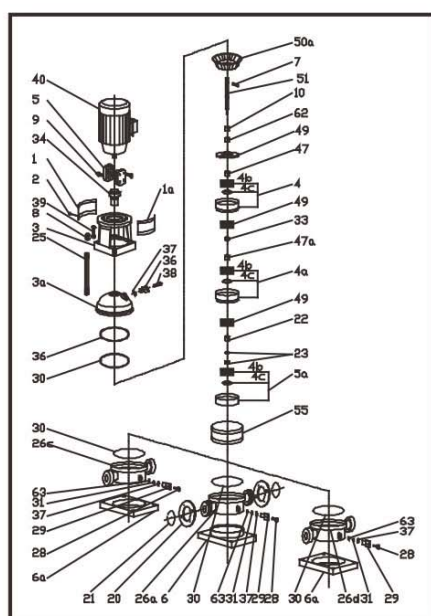


Figure1-A VM2、4、6-080701

S/N	Name	S/N	Name	S/N	Name
1	Protection plate (free of notch)	9	Inner hex screw	34	Mechanical seal
1a	Protection plate	10	Snap ring sleeve	36	Bleeder screw
2	Screw TM4X8	20	Flange	37	O-ring 16×2.65
3	Pump head	21	Snap ring	38	Bleeder bolt
3a	Lining of pump head	22	Prime impeller's gland cover	39	Bolt, washer
4	Guide vane	23	Nut M8, Gasket 8	40	Motor
4a	Support guide vane	25	Pull rod	47	Impeller separating sleeve
4b	Ring cover	26a	Intake and drainage section of flange	47a	Wear-resisting shaft sleeve
4c	Ring	26c	Intake and drainage section of bayonet	49	Impeller
5	Shaft coupling	26d	Pipe thread Intake and drainage section	50a	Drainage guide vane
5a	Deflector	28	Female screw plug M10	51	Pump shaft
6	Foundation of flange	29	Drainage plug screw	55	Pressure-proof cylinder
6a	Foundation of sleeve chuck	30	O-ring 136.5×3.3	60	Steel wire spring
7	Cylindrical pin	31	O-ring 8×2.65	62	Seal separating sleeve
8	Nut M12, Gasket 12	33	Short separating sleeve of impeller	63	O-ring gland cover

2 Structure description

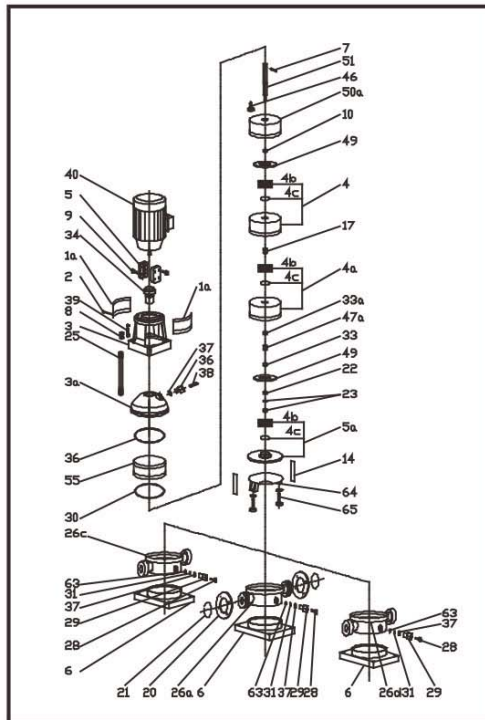


Figure 1-B VM8, 16-080701

S/N	Name	S/N	Name	S/N	Name
1	Protection plate (free of notch)	9	Inner hex screw	34	Mechanical seal
1a	Protection plate	10	Snap ring sleeve	36	Bleeder screw
2	Screw TMX8	20	Flange	37	O-ring 16×2.65
3	Pump head	21	Snap ring	38	Bleeder bolt
3a	Lining of pump head	22	Prime impeller's gland cover	39	Bolt, washer
4	Guide vane	23	Nut M8, Gasket 8	40	Motor
4a	Support guide vane	25	Pull rod	47	Impeller separating sleeve
4b	Ring cover	26a	Intake and drainage section of flange	47a	Wear-resisting shaft sleeve
4c	Ring	26c	Intake and drainage section of bayonet	49	Impeller
5	Shaft coupling	26d	Pipe thread intake section & drainage casing	50a	Drainage guide vane
5a	Deflector	28	Female screw plug M10	51	Pump shaft
6	Foundation of flange	29	Drainage plug screw	55	Pressure-proof cylinder
6a	Foundation of sleeve chuck	30	O-ring 136.5X3.3	63	O-ring gland cover
7	Cylindrical pin	31	O-ring 8X2.65	64	Intake diaphragm
8	Nut M12, Gasket 12	33	Short separating sleeve of impeller	65	Nut M8×20, Washer 8



2 Structure description

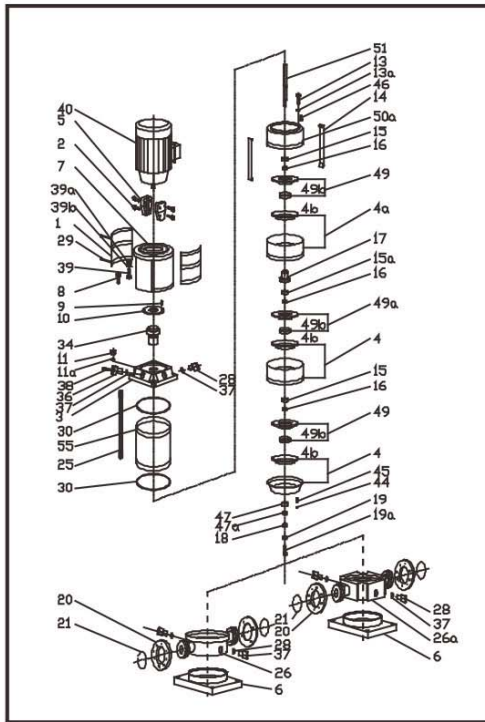


Figure 1-C VM30, 60-080701

S/N	Name	S/N	Name	S/N	Name
1	Protection plate	13a	Plain washer	36	Bleeder screw
2	Inner hex screw	14	Pull belt	37	O-ring
3	Pump head	15	Nut of impeller	38	Bleeder bolt
4	Guide vane	15a	Support nut	39	Screw
	(The 1st class pump is non-available)		(The 1st & 2nd Class pump is non-available)	40	Motor
4a	Support guide vane	16	Taper sleeve	44	Gasket
	(The 1st & 2nd Class pump is non-available)	17	Intermediate taper sleeve	45	Inner hex screw
4b	Ring-stand assembly	18	Screw cover	46	Adjusting pillar
5	Shaft coupling	19	Plain washer	47	Bottom-slide bearing
5a	Deflector	19a	Inner hex screw	47a	Bottom shaft sleeve
6	Foundation	20	Flange	49	Small impeller
7	Rack	21	Snap ring	49a	Large impeller
8	Inner hex screw	25	Pull rod	49b	Ring sleeve
9	Inner hex screw	26	Intake and drainage section	50a	Drainage guide vane
10	Gland cover	28	Screw plug	51	Pump shaft
11	Nut	29	Screw	55	Pressure-proof cylinder
11a	Plain washer	30	O-ring		
13	Inner hex screw	34	Mechanical seal		

2 Structure description

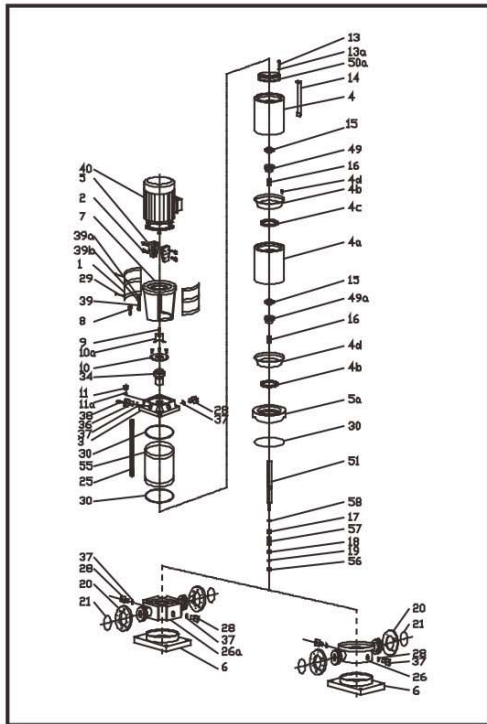


Figure 1-D VM120, 150-080701

S/N	Name	S/N	Name	S/N	Name
1	Protection plate	11	Nut	34	Mechanical seal
2	Inner hex screw	11a	Plain gasket	36	Bleeder screw
3	Pump head	13	Inner hex screw	37	O-ring
4	Guide vane	13a	Plain washer	38	Bleeder bolt
	(The 1st class pump is non-available)	14	Pull belt	39	Screw
4a	Support guide vane	15	Nut of impeller	39a	Nut
	(The 1st & 2nd Class pump is non-available)	16	Shaft sleeve of impeller	40	Motor
4b	Ring cover	17	Shaft sleeve	46	Adjusting pillar
4c	Ring	18	Screw cover	49	Small impeller
5	Shaft coupling	19	Small washer	49a	Large impeller
5a	Deflector	20	Flange	50a	Water-out body
6	Foundation	21	Snap ring	51	Pump shaft
7	Rack	25	Pull rod	55	Pressure-proof cylinder
8	Inner hex screw	26	Intake and drainage section	56	Check nut
9	Inner hex screw	28	Screw plug	57	Separating sleeve of intake impeller
10	Gland cover	29	Screw	58	Support washer
10a	Adjusting gasket	30	O-ring		



3.1 Installation of pump

- The pump is required to install in the ventilated and antifreezing place, keeping a gap between the pump and motor 150mm at least so as to maintain sufficient air around the cooling fan of motor.
- Keep the intake pipe as short as possible so as to minimize the friction loss at the inlet;
- Before installing, please check if the pipe system is installed the check valve (which will be used to block and avoid liquid away from reverse flow); if using to supply water for boiler, please install a check valve on the transmission pipeline between the pump and boiler;
- The pump is required to install on the concrete or the foundation with appropriate height; it can be fixed onto the ground or wall by using fixing rack; In order to keep the pump away from being damaged, please disperse the weight of pipeline on pipe.



Never hang the motor upside down on the horizontal level when installing the pump!

- The “→” symbol at the intake and drainage section shows the direction when liquid passes through the pump; please check if liquid could pass smoothly before starting the pump;
- Please make sure to clean the intake pipeline before installing the pump; please keep the pipeline away from particles; otherwise it will be required to install a filtering net at 0.5~1m before the suction inlet of pump (it is compulsory for the pump with flow-rate less than 8m³/h);
- Keep the intake pipeline away from air bubbles when installing. See Figure 3.

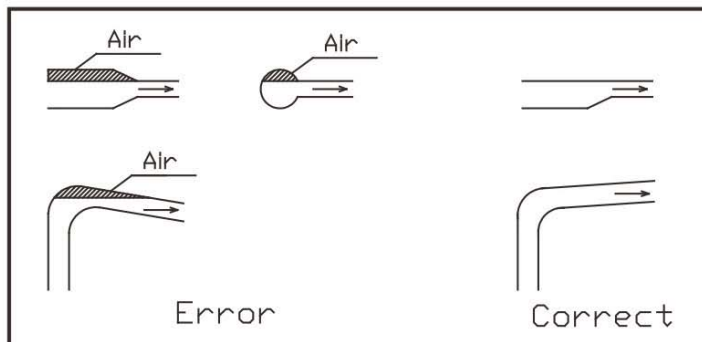


Figure 3

- If the disconnecting valve at the outlet is inclined to close (or the flow declines to zero), please install a bypass pipeline at the outlet pipeline to ensure sufficient lubrication and cooling water to pass the pump.

3.2 Electric connection

- The electric connection must be done by the qualified electricians;
- Make clear if the motor is matchable with the service power source; the leading cable of motor must be connected with power source as per the Wiring Diagram and Motor Nameplate stuck on the terminal box;
- The motor is required to connect with a quick and efficient motor starter to keep it away from damaged caused by insufficient phase, unstable voltage and overload.



Shut the power source off before removing the terminal box of motor and pump.



Please read carefully the Warning Sign on the pressure-proof cylinder before start.

1. The pump is required to start when water is filled (or other liquid to be transmitted);

- Fill the water pump with water in back-flow system;

Close the outlet valve of pump, open the screw plug on the pump head, and then open the intake valve slowly; when the stable water stream comes out from the bleeder screw plug, tighten the bleeder screw plug; afterwards open the check valve on the suction pipe.

- In open system, in case of liquid below the pump to irrigation



Important: There must have a check valve on the suction pipe.

Close the outlet valve of pump, open the screw plug on the pump head, and then inject the liquid into the pump through screw plug hole; when the pump and the suction pipe is filled with water, close the screw plug.



Never start the pump if the pump is not filled with liquid or emptied air!

Please keep focus on the air outlet direction of bleeder screw plug; Keep any people, the pump or any parts of the pump away from being injured or damaged by the water drained. When using in the place where is available hot water, please take care to avoid scalding.

2. Check the rotation direction

Close the power supply and observe the rotation direction (see the fan); the correct rotation direction should be same as the arrow on the pump head, i.e.: when seeing from the driving end of motor, the pump should turn anticlockwisely.

3. Inspections before starting the pump

- To check if the foundation bolt is tightened;
- To check if the pump is filled with water;
- To check if the voltage of grid is normal;
- To check if the rotation direction is correct;
- To check if all pipelines are connected and sealed well and if pipe could supply water normally;
- To check if the valve on the intake pipe is opened completely; the outlet valve should be opened closely when the pump starts;
- To check the work pressure (if there is installed the pressure meter);
- All of required control for normal run. If the pump by a pressure switch control, check, adjust the start-up and disconnect the pressure. Through pressure switch check the motor full load current should not exceed the maximum allowable current.
- To check all controls needed by normal operation. If the pump has pressure switch, please inspect, adjust, start and disconnect pressure; check the full-load current of motor (the full-load current of motor that passes the pressure switch should be less than the maximal allowable current);



4. Start frequency of pump

The pump can not be started frequently. It is suggested to keep the power of motor less than or equal to 4KW, with start frequently less than 100 times per hour; when the power of motor is over 4KW, keep the start frequency less than 20 times per hour. If the pump is started frequently, please adjust the control device to reduce Start-Stop frequency. Under such circumstances, please check the installation status again.

5. The installation made as per the Operation Instruction will ensure the pump to work efficiently and less maintenance.

- Mechanical seal is a self-correction, Sealed in the dynamic and static contact surface grinding block transport of liquid from the pump lubrication and cooling.
- The sliding bearing inside the pump will be lubricated by the liquid transmitted by the pump.

6. Anti-freezing measures

The pump can be used to the system that has been taken anti-freezing measures for water. If the installation place is inclined to ice up, please add moderate amount of antifreeze agent to make the pump away from being damaged by the liquid transmitted by the pump after icing up. If there is no antifreeze agent, please stop the pump when it is possible to freeze or frost. When the pump is not used temporarily, please empty the water from the pump and the system.

7. It is required to inspect the following items regularly, i.e.:

- Work and operation pressure of pump
- Possible leakage;
- Possible overheat of motor;
- Remove, clean or change all filtering net;
- Disconnecting time when the motor is overloaded;
- Start and stop frequency
- All control operations.

If there is any problem, please refer to “Common Problems and Troubleshooting” to check the whole system.

8. If the pump is not used for a long time, please store it in safe after being cleaned.**9. When the pump is in storage, please take measures to prevent rust or other deterioration.****5.1 For VM2, 4 Pump**

- Put the snap ring sleeve on the shaft, and then the separating sleeve, impeller, impeller bushing, guide vane, support guide vane and the last impeller; afterwards put the impeller cover, washer and locking nut on; pay attention to the position of support guide vane; for the low-series pump, the last one is the support guide vane; for the high-series pump, the support guide vane should be added accordingly, keeping gap position average; finally put the support separating sleeve and bearing on.
- Place the deflector on the intake and drainage section and foundation; and then put the assembled part on the deflector;

- Put the pump head that is installed O-ring, lining and rubber adjusting pillar on the pressure-proof cylinder; tighten the four nuts on the pull rods symmetrically;
- Put and tighten the mechanical seal; afterwards put the motor and shaft coupling, screw on the screws on the shaft coupling (do not tighten this moment); pull the shaft coupling and pump shaft to the end towards the foundation, and then move about 1mm towards the reverse direction; afterwards tighten all screws, keeping the gap of engagement surface of two coupling blocks average;
- Tighten the locking screws on the mechanical seal, turn the shaft coupling; ensuring the shaft turn smoothly; when disassembling the pump, please take the reverse steps as per what is mentioned above.

5.2 VM8, 16 Pump

- Put the snap ring sleeve on the shaft, and then the impeller, impeller separating sleeve, guide vane, support guide vane, bearing, support separating sleeve and the last impeller; afterwards put the impeller cover and washer, finally tighten nuts.
- Put the intake and drainage section on the foundation, and then the O-ring, intake baffle, deflector; afterwards put the assembled part on the deflector; finally put the drainage guide vane and pull belt on; then put the pressure-proof cylinder.
- Put the pump head that is installed O-ring, lining and rubber adjusting pillar on the pressure-proof cylinder; tighten the four nuts on the pull rods symmetrically;
- Put and tighten the mechanical seal; afterwards put the motor and shaft coupling, screw on the screws on the shaft coupling (do not tighten this moment); pull the shaft coupling and pump shaft to the end towards the foundation, and then move about 1mm towards the reverse direction; afterwards tighten all screws, keeping the gap of engagement surface of two coupling blocks average;
- Tighten the locking screws on the mechanical seal, turn the shaft coupling; ensuring the shaft turn smoothly; when disassembling the pump, please take the reverse steps as per what is mentioned above.

5.3 VM30, 60, 85 Pump

- Put the intake and drainage section on the foundation; put the flanges at both sides; afterwards put the deflector on;
- Put the first impeller on the shaft, tighten the nuts and put the impeller bushing inside the ring stand of the deflector; afterwards put the guide vane, impeller, support guide vane and the drainage guide vane; finally use the pull belt to fix all guide vanes;
- Shaft component: put the top and bottom shaft bushing, gland cover and washer; tighten all screws; put the bottom sliding bearing on the intake and drainage section, and then the washers; tighten all screws; afterwards, put the shaft components on the intake and drainage section, and the O-ring; finally coat the lubricating grease and cover the pressure-proof cylinder;
- Put the pull rod on the foundation, and then the O-ring, adjusting pillar, screw plug and bleeder screw plug on the pump head; afterwards put the pump head on the pull rod, then the washer, and finally tighten all screws;
- Put the mechanical seal on the pump head, then the gland cover; following, tighten all screws, and then the screws on the mechanical screws; afterwards lift the shaft upwardly, and then install the adjusting gasket;
- Put the rack and motor on the pump head;
- Finally put the shaft coupling and tighten the screws; afterwards, take the adjusting gasket out; turn the shaft coupling; ensuring the shaft turn smoothly; when disassembling the pump, please take the reverse steps as per what is mentioned above.



5.4 VM120. 150 pump

- Put the intake and drainage section on the foundation; put the flanges at both sides; afterwards put the deflector on;
- Put the support washer, shaft bushing, intake impeller separating sleeve, gland cover, washer on the pump shaft; finally tighten all screws;
- Install the impeller shaft bushing and impeller on the shaft; tighten the nuts of impellers, ensuring the dimension of Figure 4, i.e.: 14.3;
- Put the assembled shaft on the deflector, then the support guide vane, impeller shaft bushing and impeller; tighten the nuts of impellers; afterwards install guide vane and impeller and so on; the last one to be installed is a guide vane;
- Install the water-out body, fix all guide vanes by using pull belt; install O-ring on the water section; coat the lubricating grease, and then put the pressure-proof cylinder on;
- Put the pull rod on the foundation; put the O-ring, adjusting pillar and screw plug on the pump head; and then put the pump head on the pull rod; afterwards install the washers and tighten all screws;
- Put the mechanical seal on the pump head, then the gland cover; following, tighten all screws, and then the screws on the mechanical screws; afterwards lift the shaft upwardly, and then install the adjusting gasket;
- Install the rack and motor on the pump head; and then put the shaft coupling and tighten the screws; afterwards, take the adjusting gasket out; turn the shaft coupling; ensuring the shaft turn smoothly; when disassembling the pump, please take the reverse steps as per what is mentioned above.

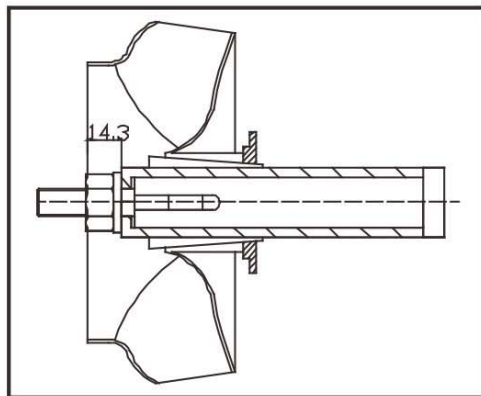


Figure 4

6 Common Problems and Troubleshooting

Shut the power source off before removing the terminal box of motor and the pump.

Problem	Reason analysis	Troubleshooting	Remarks
When starting the starter the motor is failed to start.	1) Power source is in problem; 2) Fuse is broken; 3) Motor is overloaded; 4) Starter is not contacted well or coil goes wrong; 5) The control circuit goes wrong; 6) The motor goes wrong.	1) Check the power source; 2) Change the fuse; 3) Check the system; 4) Change the starter; 5) Check the control circuit; 6) Repair.	

6 Common Problems and Troubleshooting

Problem	Reason analysis	Troubleshooting	Remarks
The overload device of starter is tripped off (it trips off when power switch is closed).	1) The fuse is broken; 2) The overload device is not contacted well; 3) The cable becomes loose or the power is in problem; 4) The motor's coil is in problem; 5) The mechanical part of the pump rub prison	1) Change fuse; 2) Check the starter; 3) Check the cable connection and power source; 4) Change motor; 5) Repair pump.	User is not allowed to repair the items 4) and 5).
The overload device trips off occasionally.	1) The overload is set too low; 2) The cycling power is in problem; 3) The voltage is too low at the electricity peak.	1) Reset; 2) Repair power source; 3) Add stable-pressure device.	
The overload device does not trip off, but the pump does not work.	1) The starter is not connected well or the coil is in problem; 2) The control circuit is in problem.	1) Change starter; 2) Check control circuit;	
The pump drains water unevenly.	1) The intake pipe is too small; 2) There is no sufficient water at the pump inlet; 3) The liquid level is too low; 4) The inlet pressure is too low (comparing with the water temperature, pipe loss and flow); 5) Some intake pipe is blocked by impurities;	1) Enlarge the intake pipe; 2) Improve system and add water volume; 3) Improve the liquid level; 4) Improve system and enlarge inlet pressure; 5) Check and clean;	
The pump works, but no water is drained.	1) The intake pipe is blocked by impurities; 2) The bottom valve or check valve is closed; 3) The intake pipe leaks; 4) There is air in the intake pipe or pump.	1) Check and clean; 2) Check the bottom valve and check valve; 3) Repair inlet pipe; 4) Refill liquid and remove air;	
When power source is disconnected, the pump turns reversely.	1) The intake pipe leaks; 2) The bottom valve or check valve is in problem; 3) The bottom valve is blocked at the opened part; 4) The intake pipe has bubbles.	1) Repair inlet pipe; 2) Repair bottom valve and check valve; 3) Repair bottom valve; 4) Repair inlet pipe and remove air;	
The pump vibrates abnormally and produces noise.	1) The intake pipe leaks; 2) The inlet pipe is too small or part of which is blocked by impurities; 3) There is air in the intake pipe or pump; 4) The device elevation and pump elevation is too low; 5) The mechanical part of pump is rubbed.	1) Repair inlet pipe; 2) Enlarge or repair inlet pipe; 3) Refill liquid and remove air; 4) Improve system or re-select model; 5) Repair pump.	User is not allowed to remove item 5).

7 Precautions

1. The Operation Instruction is subject to change without notice;
2. The pump will have one year warranty if user selects proper model and uses correctly; the easily damaged parts are not covered by the warranty for normal wear;
3. If user disassembles the pump and causes quality problems within the "3-guarantee" period (repair, replace and refund), our company shall not be liable for any responsibilities.



