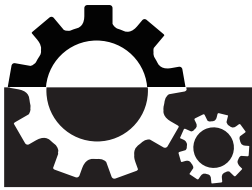
dooch

**DSV** Series

Horizontal Single-stage Single-suction
Centrifugal Pump

# Operation Instruction Manual

www.doochpump.com.cn



# Contents

Dear DOOCH Customers:

We are honored for our customer chosen of DOOCH products! We will provide the best service when you are using of our product. Customer satisfaction is our highest priority. This operation manual describes the structure, installation, operation and maintenance of the DSV series single-stage centrifugal pump and related precautions to facilitate your operation and maintenance. Please read it in detail.

## 1. Introduction

This manual is intended to provide our customers with the basic information, which is necessary to install, operate and maintain the DSV Series pumps. It also provides instructions for troubleshooting of the possible causes, as well as the disassembly and assembly process, which will be helpful to the customers. These are general guidelines, and all relevant local rules and regulations must be strictly observed during operation.

## 2. Main Documents

### 1) Application

DSV series centrifugal pumps are suitable in civil, agricultural and industrial applications for pump chemical or mechanical non-corrosive liquids. Here are some typical applications scope:

- Heating, ventilation and air conditioning
- Irrigation
- Municipal water supply
- Industrial water supply
- Swimming Pool
- Water plant transition and water delivery system
- Main pipeline Pressurization Boosting
- High Building, Hotel Water Pressurization Boosting
- Industrial Water Supply Pressurization Boosting

In case of other application required, Please contact with us

### 2) Instructions

The DSV Series pump is end suction, single stage, rear pull-out centrifugal pump, included 45 standard specifications sizes. The pump is designed according to international standards ISO2858, ISO5199 and ISO2548 and can be interchanged in size with other pumps which has the same specification and the same standards.

- Pump Inlet DIA：50~300mm
- Pump Outlet DID：32~250mm
- Max Flow：1300m³/h
- Max Head：250m
- Medium Temperature：0℃~110℃

△The specifications listed above are based on 50Hz operation. For more detailed information, please contact us. Performance specifications can be found on the nameplate.

△Please contact us if pumping liquid is corrosive or liquid with a temperature higher than 90 °C.

△Pumps prohibit overflow operation.

**3) Structural features**

● The pump casing utilize a highly efficient eccentric spiral. The rear pull-out design makes maintenance easy, not affect pipeline work.

● Standard flange size: Asia ISO7005, 21988 PN16, and BS4504-1989, ISO7005.1-1992 and compatible with DIN2533-1976, EN1092-2.

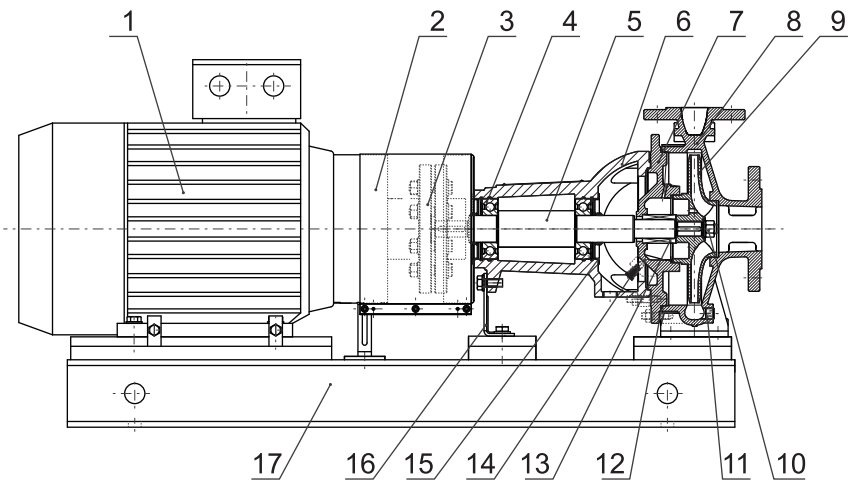
● According to different requirements, other options also available.

● The shaft is stainless steel material with minimal deviation at high speeds.

● The shaft seal is mechanical type with good sealing performance.

● High quality imported bearings are used.

● Bearing lubrication method: self-lubricating bearing, No need oil filling maintenance.




| S/N | Part Name | Material | S/N | Part Name | Material | S/N | Part Name | Material | S/N | Part Name | Material |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Motor | | 6 | Suspension | HT250 | 11 | Drain release plug | 06Cr19Ni10 | 16 | Bracket | Q235-A |
| 2 | Coupling cover | Q235-A | 7 | Pump cover | HT250 | 12 | O-ring | NBR/EPDM | 17 | Base | Q235-A |
| 3 | Coupling | 45/HT250 | 8 | Pump case | HT250 | 13 | Mechanical seal | Silicon carbide/ graphite | | | |
| 4 | Bearing | | 9 | Impeller | HT250/ 06Cr19Ni10 | 14 | Drain release plug | 06Cr19Ni10 | | | |
| 5 | Shaft | 20Cr13 | 10 | Impeller nut | 06Cr19Ni10 | 15 | Bearing end cover | 06Cr19Ni10 | | | |

## 3.Installation, Operation and Maintenance

### 1. Installation

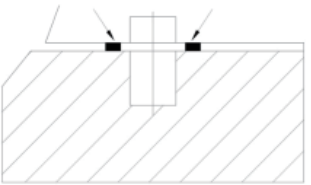
**1) Foundation**

1.1）The foundation must be strong before installation, the surface should be smooth and flat, and must be sufficient to support 1.5 times the unit (package) Including the accessories such as motors, the weight is generally based on reinforced concrete.

1.2）When the foundation is grouted for the first time, the position of the bolt holes of the water pump and the motor should be discharged, and the inspection of one grouting should be carried out. The surface should be 20mm~40mm below the bottom plane of the unit for the second grouting.

**2) Unit installation**

Insert the anchor bolt into the screw hole on the base and place the pump or unit on the base. On the basis of the level, adjust the level at the shaft end or the outlet end, at the base and The spacers must be placed near the anchor bolts between the foundations. If the anchor bolts distance each is over 800mm, and a spacer must be added between the anchor bolts. All spacers must be flat. (As shown below)



Spacers

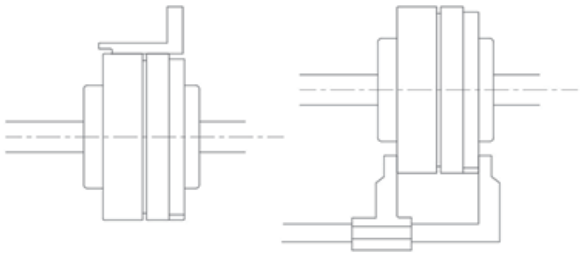
After the pump is adjusted to a good level, grout the anchor bolts when the mortar is firm. Tighten the bolt evenly and re-adjust the level, then grout the base and fill the height of the slurry should be submerged more than 25mm.

***Note:*** Regardless of the first or second grouting, care should be taken to ensure that the grouting is sufficient and there are no voids, and the grouting should not be interrupted continuously. Because the quality of the grout will directly affect the vibration and noise of the unit, and it is extremely difficult to find and eliminate the fault.

**3) Adjustment of Pump and Motor**

It must be ensured that the pump and motor are accurately centered with coupling, even if the pump and motor are supplied as a complete unit.

***Method:*** If the axial direction of the coupling And radial deviation does not exceed 0.1mm, Then you can think that the pump unit is very good alignment, each time in the coupling two uniform rotation gauge with 90°, used Vernier caliper or micrometer inspection, A little toxin deviation value must be within 0.1mm.



**4) Pipe installation**

4.1）Do not use the pump as a support point for the pipeline. The piping should be provided with reliable support points on the pump's accessories. Their weight must not exert any load on the pump. Otherwise it will cause the pump to vibrate and even the pump inlet and outlet pipes will break.

4.2）The suction pipe should be arranged with an upward slope. The eccentric pipe should be straight at the top and the back pipe should be laid down. The eccentric pipe is straight and below.

4.3）For short tubes, the nominal diameter must be at least equal to the nominal diameter of the pump inlet and outlet. For long tubes, the most economical nominal diameter should be as appropriate. Too small pipe diameter if chosen may cause cavitation of the pump.

4.4）When using elbows, the length of the straight pipe before and after the pump inlet and outlet should be 5 to 10 times larger than the pipe diameter.

4.5）The thermal stress deformation caused by the welding of the outer tube flange is one of the most common causes of the breakage of the pump inlet and outlet pipes. After welding, the connecting bolts of the pump should be loosened and tightened after the welding stress is released.

4.6）The expansion joint should be fixed after the pump is installed. Otherwise, the pump will be vibrated due to water tension. In severe cases, it will be dragged to the installation base of the pump, resulting in serious accidents.

4.7）The filter screen installed at the suction port of the pump shall have an effective area larger than the cross-sectional area of the suction pipe.

4.8）In order to prevent the reverse flow caused by the pump stop and the water hammer damage the pump, it is recommended to install a check valve in the outlet pipe. The check valve should be installed between the pump and the gate valve.

**5) Protective cover of coupling**

Safety requirements: The pump must be fitted with a protective cover to operate.

**6) Final inspection**

6.1）Check whether the pump and the prime mover are reliable. Toggle the coupling by hand and rotate the pump rotor for more than one week. The rotation should be uniform, no friction and obvious abnormal noise.

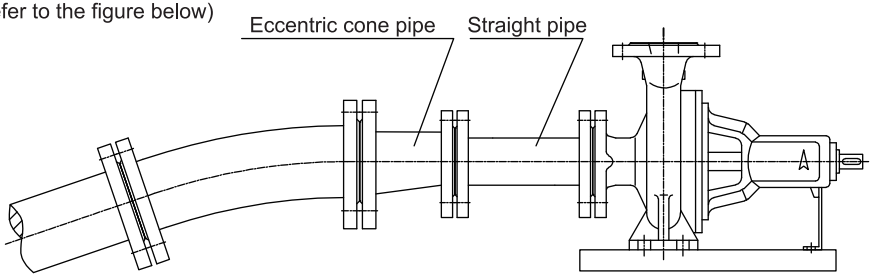
6.2）Confirm that the prime mover is in same with the pump rotation mark.

Note: Do not attempt to connect the pump and check the steering of the prime mover. A short reversal may result in damage to the machine during future operations.

**2) Suction side pipe:**

The suction side pipe must be no leakage. The suction pipe should be of the same size or larger than the suction flange of the pump. Use a larger diameter pipe ,be sure to use a conical eccentric reducer when working.

△In order to prevent air bubbles, the suction pipe from the pump to the liquid source continuously falls. (Refer to the figure below)



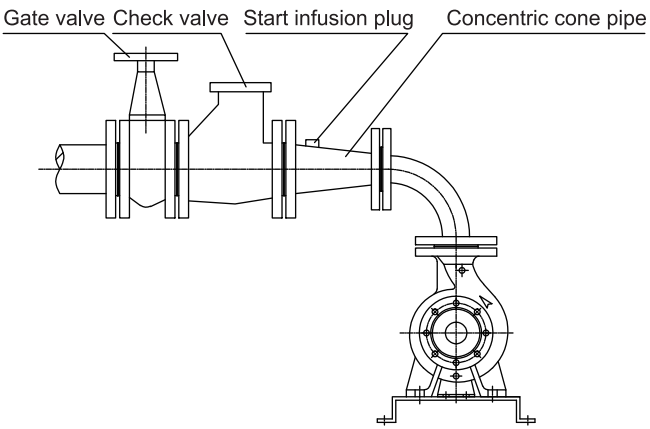

The length of the straight pipe installed in the pump should not be less than three times the diameter of the pipe. Make sure that the end of the suction line is at a sufficient distance below the minimum liquid level to prevent vortex deformation and therefore air from entering the suction line. Where the head is raised, it is basically requested to use a standard bottom valve whose water hole is at least equal to the pipe water hole.

**3) Disassemble the pipeline:**

（1）It is recommended to install a check valve at the discharge side of the pump.

（2）To install a gate valve at the behind of the check valve helps the pump to prime, drain, adjust the flow and maintain the check valve (refer to the figure below).

（3）The discharge pipe should be selected the appropriate size to carry the required capacity so that the generated energy loss will not too much.



**4) Motor**:

△ If the motor is used as a tractor, its installation, electrical connections and protection must comply with all local regulations.

△ In the case of pump in large flow operation, to check whether the motor installed overload protective setting properly or a motor for overload-free operation.

**5) Operation**:

（1）Open the suction valve and the vent plug to ensure that the drain valve is closed. Fill the pump by direct filling or draining (vacuum pump) until the pump casing and suction pipeline are filled with liquid.

（2）Turn the pump shaft slowly by hand to ensure that the mechanical seal is properly lubricated

△ Do not run the pump dry without liquid inside, as this will damage the mechanical seal seriously.

（3）Ensure that the direction of the drive shaft rotation is the same as the direction of the arrow marked on the pump (clockwise when viewed from the rear of the motor)

（4）The pump now can be activated. When the pump reaches the full speed, slowly open the drain valve until the required amount of liquid is drained. If no liquid is discharged, stop the pump and check the causes.

△It must be noted that the current of the motor during operation cannot exceed the rated current.

△When the discharge valve is closed, the pump operation time cannot exceed three minutes.

（5）Check the abnormal noise or operating temperature and check the pump's mechanical seal if have any leakage

（6）It is not necessary to refill the device after the initial perfusion.

（7）Sequence of stopping the device: Close the drain valve until approximately one quarter of the opening, stop the motor. To close discharge valve and suction valve completely when pump is completely stopped.

**6) Maintenance**:

（1）Regularly to check the machine if operating smoothly, if any worn a leak in the mechanical seal. In order to prevent water leakage and cause damage, should replace the seals in time.

（2）To check the temperature of the bearing cap regularly. The maximum temperature should not exceed 80 °C.

（3）To check regularly if there are any debris in the water and observe if the water level is sufficient. To avoid cavitation and thus damage the impeller, stop the pump when the water level is below the minimum water level. If necessary, reduce the emissions by adjusting the gate valve.

（4）Check the pressure gauge and current reading regularly. To take appropriate measures to correct it if not in normal status.

（5）If the pump not to be used for a long period time, need to drain the residual water and remove the rust from the parts. Apply anti-rust paint to the surface of the parts and store it properly

**7) Lubrication**:

△Confirm the bearing lubrication method before proceeding:

（1）If the pump is fitted with a “lifetime sealed” bearing, they are pre-filled for life and cannot be replenished.

## 4.Failure/Trouble diagnosis:

**1) No water is drained or the capacity is below the specified value**

（1）It may be that the suction pipe is too long or the arrangement is unreasonable. Refer to 3.2 to modify the inlet pipe.

（2）It may be the pipe or filter is blocked, the valve is opened unreasonably, and the diameter of the bottom valve is too small.

（3）Leakage happened in the suction pipe or shaft seal.

（4） Pump irrigation is not reasonable

（5） Rotating speed is too slow.

（6）The discharge line is unreasonable, the pipe diameter is too small / the valve is not opened / the pipe is too long

（7）The inlet pressure of the pump is too low, and the pump caused cavitation

（8）Rotating direction is not correct.

（9）The impeller is blocked by debris.

（10）Air or gas in the liquid.

**2) Overheating of the bearing**

（1）The coupling is not well aligned.

（2）Bearing lubrication is lubricated insufficiently or worn too much.

（3）The pump is pulled by an unsupported pipe.

△The hand feels too hot temperature will not probably damage the pump, but pay attention to the sudden rise in temperature.

**3) Power loss is too high**

（1）The entire head is too low caused the pump’s flow too much. To reduce the capacity by mediating the drain valve.

（2）Motor’s rotating speed is too high.

（3）The density of liquid is larger than water.

（4）The motor shaft is not aligned well with the pump or the pump shaft is bent.

（5）Impurities are stuck in the pump.

**4) Too much vibration**

（1）The foundation stiffness is not enough, or the installation unreasonable.

（2）The motor shaft is not aligned with the pump.

（3）The impeller flow portion is blocked, causing the impeller to be unbalanced.

（4）Bearing wear seriously.

（5）The coupling is not installed correctly or not balanced.

**5) Noise happened during operation**

（1）Impurities are stuck inside the impeller or pump body.

（2）Friction between the impeller and the pump body.

（3）Bearing wear seriously or damaged.

（4）Cavitation caused the sound .

（5）Unreasonable pumping.

**6) The serious wear of pump internal**

（1）Air or gas mixed in the liquid to form cavitation.

（2）Wear/friction due to solid particles in the liquid.

（3）The liquid is corrosive.

**7) Disassembly sequence:**

△ To make sure there is no pressure inside the pump, safely isolated from the pipeline operation, and will not unintentionally rotate.

△ To make sure the tractor is reasonably shut down and will not unintentionally start or turn.

Note: For frame-mounted pumps, first to disconnect the coupling according to the manufacturer's instructions.

（1）Remove the joint bolt between the bearing housing and the pump casing, and remove the bearing housing and rotating component.

（2） Unscrew the impeller nut and remove all rotating parts, such as the impeller, key and mechanical seal;

（3）Loosen the joint nut between the pump cover and the bearing housing and take it off. Remove the pump cover and remove the static seal of the mechanical seal.

（4）Remove bearing cap, bearing retaining ring, shaft and bearing.

**8) Assembly sequence**:

The pump assembly sequence is exactly the opposite sequence of the pump disassembly.

△ When handling mechanical seals, be careful to avoid crushing or damaging the seal surface.

△ All matching surfaces of the pump must be cleaned during assembly. Be sure to keep all small parts such as keys and O-rings are not misplaced and no lost.

△ When installing the O-ring to the pump cover, apply a layer of grease to the O-ring to prevent it from falling or folding during assembly.

# Product Warranty Card

Shanghai Sino-Korea Dooch Pump MFG Co., Ltd.

**Free warranty Notes:**

（1）During the warranty period, due to the quality of the product itself, please show the after-sales service card to after-sales service department of Dooch Company

（2）The equipment tracking number will be checked by after-sales service engineer for each repair, and the fault phenomenon will be recorded; after the repair is completed, the maintenance engineer will sign the “maintenance record” of the after-sales service card.

（3）Please keep the after-sales service card properly saved and not lose it.

**Special attentions:**

（1）When Dooch's after-sales service engineer come for service, please prepare the corresponding after-sales service card to avoid affecting the timeliness of maintenance. If you accidentally lose the after-sales service card, please present the original purchase certificate (such as purchase contract, purchase invoice, etc.) at the time of warranty, so that can check the date of delivery of the product in time to provide warranty service. If you do not get valid information about the equipment, Dooch Company will not provide a free warranty service.

（2）If the warranty period is less than three months from the end of the warranty period, the repaired or replaced parts will be free of warranty for three months from the date of repair. At that time, please show an effective original service record.

## Product Information

Product Name:.....

Product Model: .....

Product Tracking No: .....

Product Loading Date: .....

## After-sales Service Record

| S/N | Service Contents | Service Date | Service Engineer Sign |
|---|---|---|---|
| Service-1 | | | |
| Service-2 | | | |
| Service-3 | | | |
| Service-4 | | | |
| Service-5 | | | |
| Service-6 | | | |

## Dooch Company Quality Commitment

It' deeply honor for us that our customers to select Dooch's products! We will try our best to provide the possible satisfied service to our customers during the entire use period of this product.

Dooch company committees to the products sold by us are free from defects in materials and workmanship under normal conditions of handling, storage, installation, operation and maintenance (except for normal wear of consumables items),The warranty period would be one year from the date of delivery or according to the contract stipulation and maintained for lifetime.

During the product quality assurance period specified above, if there are any defects in materials and workmanship, Dooch company will be responsible for free repair or even replacement of defective parts. Dooch's after-sales service engineer shall be responsible for determining to repair or replacement or other methods are available for defective parts according to the product performance and quality requirements.

All commitments in this warranty are immediately invalid under any of the following cases that any abnormal conditions of use, overloading, abuse, illegal operation, rough handling and improper handling of long-term storage, or use of non-original-produced spare parts which are not approved by Dooch Company and so on.

**Shanghai Sino-Korea Dooch Pump MFG Co., Ltd.**
No.239 ZhangLiantang Road, Liantang Industrial Park,Qingpu District,Shanghai City,China.
Tel: +86.21.67679390 Fax: +86.21.67679396

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**Shanghai Sino-Korea Dooch Pump MFG Co., Ltd.**

No.239 ZhangLiantang Road, Liantang Industrial Park,Qingpu District,Shanghai City,China.

Tel: +86.21.67679390 Fax: +86.21.67679396