

JONENG VALVES CO.,LIMITED

**ROTARY PUMP (LOBE PUMP)
MANUAL**

JONENG VALVES

DIRECTORY

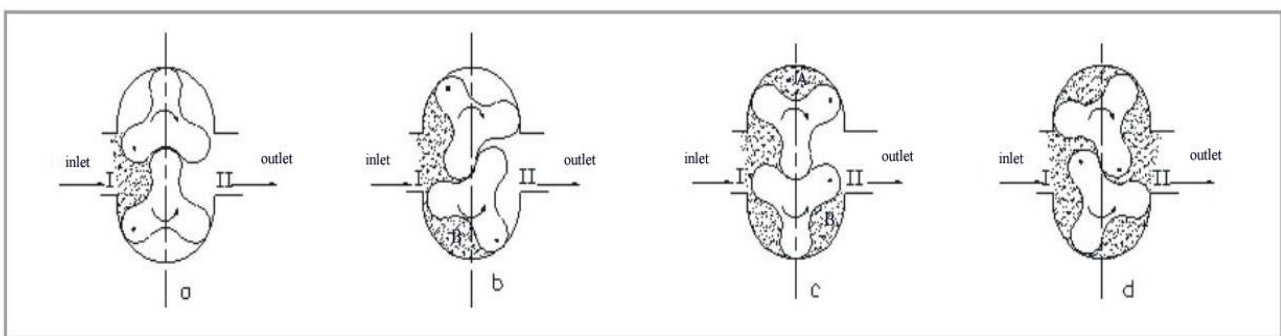
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1. Abstract

Stainless steel lobe pumps (also called as colloid pumps, rotor pumps, threeleaf pumps and etc.), are widely used on beer, food, dairy, beverage, chemical and medical industry and so on. For the special shape of the rotor and the high precision, we make rotor curve program composition by C Language and then input in machining centre to process, which confirms the high precision of the key parts and the strict requirement.

2. Working Principle

The synchron and reversing rotated rotors (2-4 gears) generate suction (vacuum degree) when rotate to the inlet, thereby inhale the material transferred. The two rotors divide the interior into several little room, and operate according to sequence of a - b - c - d . When turn to "a", only I room is full of material; when to "b", B room closes some material; when turn to "c", A room closes some material too; when to "d", room A and B connect with II room, then material is sent to the outlet. The material is sent out continuously by this way.



3. Characteristic

1) compared with centrifugal pump (milk pump): centrifugal pump is used widely for its simple construction and low cost. There are several main differences compared with lobe pump:

a) Lobe pump belongs to positive displacement pump, flow can be controlled accurately and can change to variable pump conveniently. But the flow of centrifugal pump can not be controlled and falling as the increase of resistance; lobe pump has rather strong suction capacity but centrifugal pump has to be filled of liquid before operating.

b) The rotation speed of lobe pump is very low, normally between 100rpm and 500rpm, the material is sent out smoothly and the component is not changed. The rotation speed of centrifugal pump is very high, the material is impacted strongly and for the effect of the centrifugal pull, the component is often different when transfer mixture, it will decrease the quality of the finish product. So the lobe pump is the best choice to solve this problem, it is most suitable to used on transfer mixture even material that contains solid particles.

c) Lobe pump can transfer high viscosity material, so it also called colloid pump. But centrifugal pump has no this characteristic.

d) Lobe pump can be made as rather high output pressure conveniently, suitable to long distance or high resistance dosing transfer.

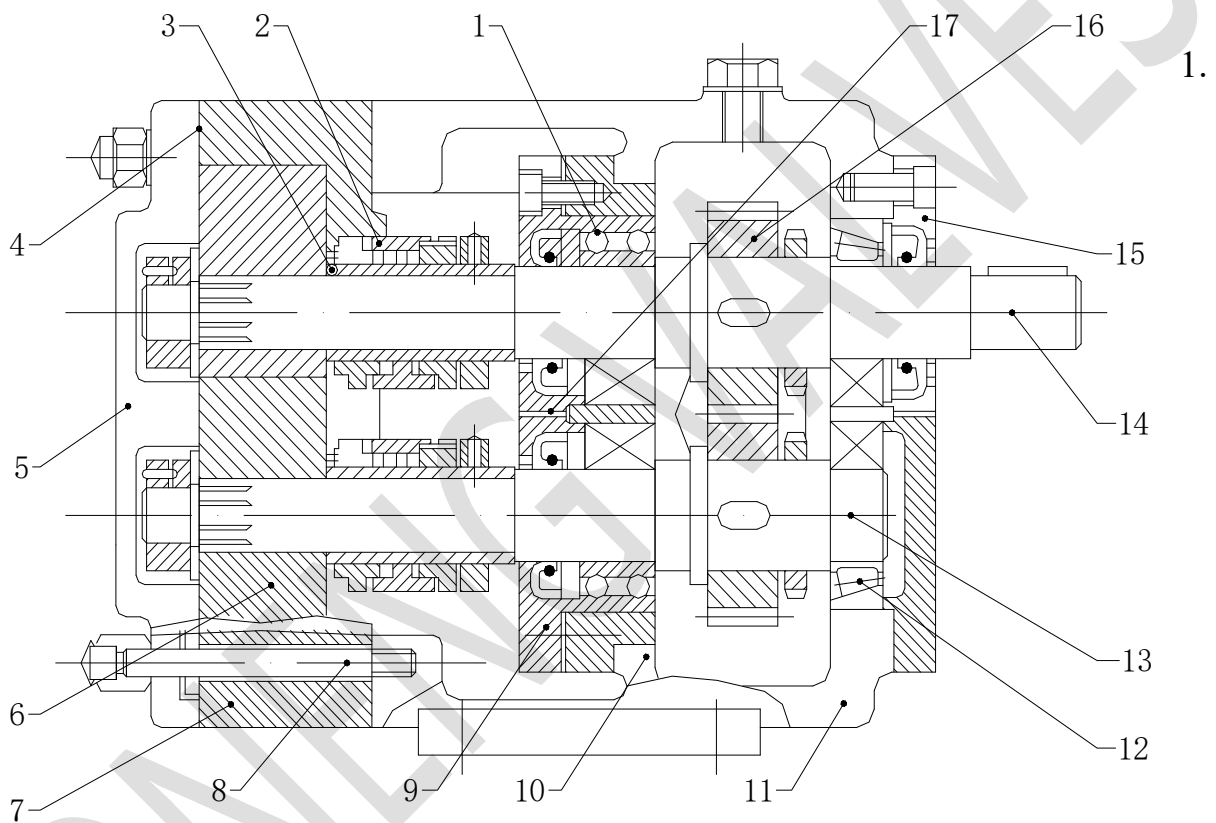
e) The production of lobe pump is more complicated, the cost is higher, it is the biggest defect compared with centrifugal pump.

2) Compared with screw pump (underflow pump):

They all belong to positive-displacement pump, so they have similar performance—— can transfer high viscosity material smoothly, have high discharge pressure. But the

biggest defect of screw pump is it is not sanitary grade, the abrasion of parietal rubber may pollute the material. Lobe pump has streamline construction and there are no dead center and non-metal element in the rotor room, so it is more suitable to industries of higher hygiene requirement. Particularly as automatic degree of the production line is higher, and the adoption of CIP, it is better to choose lobe pump.

4. Construction Sketch Map



- | | | |
|----------------------|------------------------------|----------------------------|
| Two-row ball bearing | 2. Mechanical seal for pumps | 3. "O" type gasket |
| 4. "O" type gasket | 5. Pump cover | 6. Rotor (a pair) |
| 7. Pump body | 8. Double-screw bolt | 9. Gland bush of bearing |
| 10. Bearing seat | 11. Gear box | 12. Conical roller bearing |
| 13. Drive shaft | 14. Principal drive shaft | 15. Rear cover of gear box |
| 16. Skew gear | 17. Oil seal | |

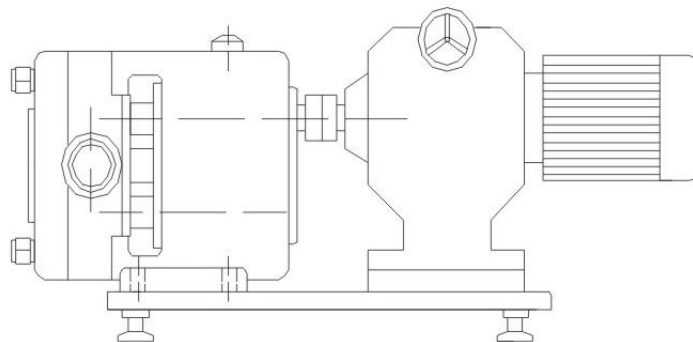
5. Application

- 1). Food and beverage: dairy, chocolate, syrup, cream, cereal mash, beer and latex.

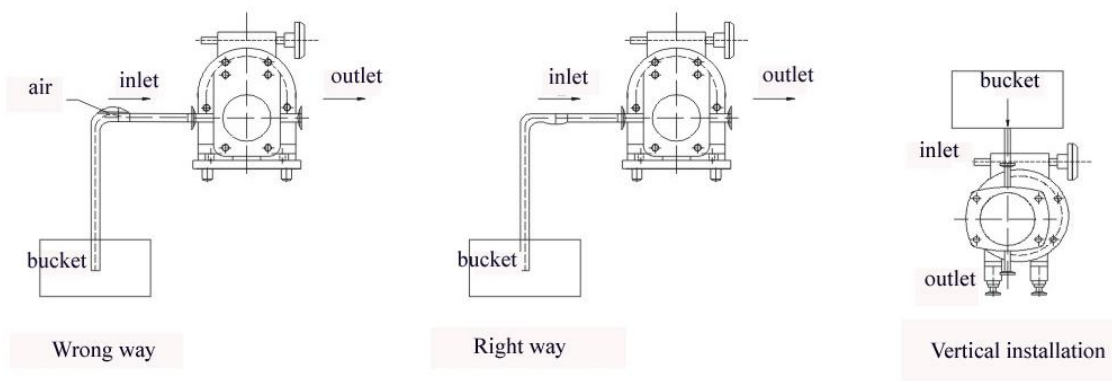
- 2). Fruit concentration: tomato paste, pudding, juice, jam and jelly.
- 3). Paste products: fats, grease and etc..
- 4). Cosmetic: face cosmetic, abluent, fixature, spice and so on.
- 5). Medicine: extract, emulsion and pill plasm.
- 6). Chemical industry: dyes, grease, dissolvant, resin and polymer.

6. Installation

- 1) While installation, should consider about the space needed for maintenance;



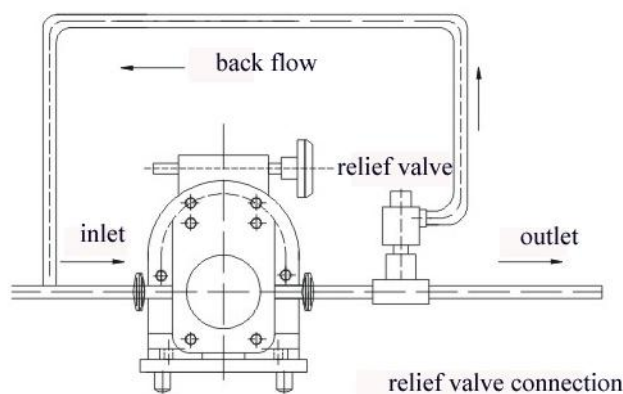
- 2) Adjust the foot screw to keep the pump be horizontal;
- 3) When connect the pipeline, pls note tips below:
 - (1) connection of feeding pipeline:
Keep horizontal to avoid air remaining, or it will affect normal working;



To high viscosity material, better to use high-order feeding to increase feeding pressure. The higher viscosity, feeding bucket should be higher, vertical feeding is suggested.

(2) Installation of relief valve:

In the process of production, sometimes need to transfer the material directly to can packing machine or high pressure pump (homogenizer) or some kind of these batching output equipments, if directly connect the outlet of lobe pump to the inlet of next equipment without any medial processing, the conveying capacity may be bigger than the usage of the next equipment. Then the pressure in outlet of the lobe pump will be too big to swell, sometime it will damage the lobe pump. To solve this problem is install relief valve in the pipeline. If there is cut-off valve in the outlet pipe, installing relief valve is more necessary.



(3) Direction of inlet and outlet:

The inlet and outlet of lobe pump are specified when leave factory. Pls arrange inlet/outlet pipeline strictly according to the mark on the equipment, reverse connection is not allowed. If customers have special requirement, pls declare when order.

(4) Specified turning of motor:

The turning of motor is specified when leave factory, there is obvious mark on the pump case, pls connect strictly according the mark, reverse turning is not allowed (because the input and output direction of stepless reducing machine is reversed, pls note the turning of motor is opposite to the mark).

(5) About mechanical seal:

Lobe pump's gland seal is mechanical seal, rotating seal ring and stationary seal ring are hard alloy or nicalon. Because hard alloy and nicalon is hard-to-hard contact, the pump can not operate without material, or else the mechanical seal will be damaged.

7.Operation

1) Preparation work

- (1) Check whether there is enough lubricant inside the case.
- (2) Check the two screws on mechanical seal rotating ring. If not loose, tighten it more; if loose, disassemble rotor room and adjust mechanical seal.
- (3) Start motor, make sure the right turning.

2) Starting up

- (1) Open valve on inlet;
 - (2) Check inlet, make sure there is material and then start up motor;
 - (3) when material is transferred, adjust motor rotation speed to change the flow.
- (Adjustment method depending on speed regulation form, if adopt mechanical friction

stepless transmission, refer to its speed regulation instruction; if adopt frequency control, refer to frequency-converter instruction to adjust rotation speed of motor.)

3) Maintain

To driving motion part, refer to its operating instruction manual.

To main part of the pump, pay attention to below:

- (1) don't start up without material, otherwise mechanical seal will be damaged;
- (2) make sure rotors rotate as the arrow notation on the mark, avoid contrarotation;
- (3) to transfer material smoothly, rotation speed should be below 400rpm.
- (4) if mechanical seal leaks out, check rotating / stationary seal ring so that to find out parts need to changed;
- (5) if change the rotor, pls make sure there is enough space between rotors, and between rotor and rotor cavity (axial and radial). After installation, hand tray is running well and after running in low speed for some time, it can be regular service.

8. Change Mechanical Seal

- 1) Disassemble pump cover (construction sketch map No. 5), rotor (construction sketch map No. 6) and rotor room (construction sketch map No. 7).
- 2) Install stationary seal ring and gasket on the pump body (construction sketch map No. 7).
- 3) Put the total rotating seal ring assembly to shaft from the axle head, let back side abut against shaft shoulder.
- 4) Install rotor room on the shaft, let rotating and stationary seal ring fitting surfaces contact(attention: no foreign body between two surfaces) each other and keep good condition.

9. Trouble and Exclusion

- 1) No material discharge and pump is not running:

- Trouble: (1) motor is not running; (check motor)
- (2) key of shaft coupling is damaged; (change the key)
- (3) bearing gnawing; (change bearing)
- 2) No material discharge but pump is running:
- (1) motor turning wrong; (adjust connection, change turning direction)
- (2) no feeding; (add material)
- (3) feeding valve is closed; (open feeding valve)
- (4) feeding pipeline clogging; (opening up pipeline)
- (5) there is air in pipeline or leakage on connection; (collision, exhaust)
- 3) Flow not enough:
- (1) motor rotation speed too low; (adjust speed upward)
- (2) pipeline connection leak out or damaged; (collision, repair pipeline)
- (3) outlet pressure too high; (reduce outlet valve, elbow)
- (4) screen clogging; (clean and opening up)
- 4) Discharge material gasified;
- (1) screen, feeding valve and feeding pipeline clogging; (clean and opening up)
- (2) feeding pipe too small and too long, elbows and valves too many or screen too thin; (enlarge pipe, reduce length, reduce elbow and valve, enlarge screen diameter)
- (3) feeding pressure too low; (adopt high-level feeding)
- (4) material viscosity too high, exceed conveying capacity; (lower speed; choose bigger flow pump)
- 5) Too much noise:
- (1) rotor mounting loose; (fix rotor)
- (2) speed reducer damaged; (repair speed reducer)
- (3) shaft coupling loose; (change shaft coupling or key)
- (4) rotation speed too high; (lower rotation speed)
- (5) bearing damaged; (change bearing)
- (6) rotor damaged; (change rotor)
- 6) Leakage:

(1)sealing face of mechanical seal damaged; (change mechanical seal)

(2)sealing face of mechanical seal is not well adjusted; (re-adjusted)

10. Spare Parts

1) Rolling bearing list:

Serial No.	Name & Spec.	Qty.	Mounting place
1	Ball-bearing()	2	Refer to sketch map No. 1
2	Bearing()	2	Refer to sketch map No. 12

2) Standard bought-in components list:

Serial No.	Name & Spec.	Qty.	Mounting place
1	Mechanical seal ()	2	Refer to sketch map No. 2
2	O type gasket()	2	Refer to sketch map No. 4(silicone)
3	O type gasket()	1	Refer to sketch map No. 3
4	Rubber oil seal()	3	Refer to sketch map No. 17

Attached: MB Series Friction-type Variable-speed

Machine Construction and Operation

1) MB series friction-type variable-speed machine construction and variable principle:

This machine is composite by electric motor, friction drive gear, pressure device and speed setting controller. Friction drive gear working process: a group of tapered planetary friction pulley, between stationary ring and speed regulation cam outside, between action wheel and platen inside, when action wheel is driven by electric motor, friction pulley does pure rolling. Because stationary ring and speed regulation cam is

stable, friction pulley does revolution operation when autogiration, through axle and rolling bearing of friction pulley, planet carrier moving. Pressure device is composite by a group of disk springs, it forces axial force on platen and action wheel; Speed setting controller working process: turn hand wheel to make speed regulation cam change angular position, and through stationary cam curve surface. Speed regulation cam moves axially, accordingly change space between speed regulation cam and stationary ring, then friction pulley radial moves. In this case, the working radius of planetary wheel, platen and stationary ring and speed regulation cam friction are changed, finally realize smooth stepless speed change.

2) Use and maintenance:

(1) before using speed change part, should add traction liquid, the oil level much exceed centre line, so that it can be on ordinary bath lubrication.

(2) MB stepless variable-speed machine traction liquid should be changed periodically. At the beginning, change after 500 hours, then once a year. Normally it is special made by the manufacturer of the machine. Customers could buy from the manufacturer or purchase themselves. The model No. is UB-1 type friction plate special traction liquid.

(3) speed regulation only allowed when the machine is running, or else will damage the machine.

(4) working temperature can not higher than 40° C, surface temperature can not exceed 75° C.

