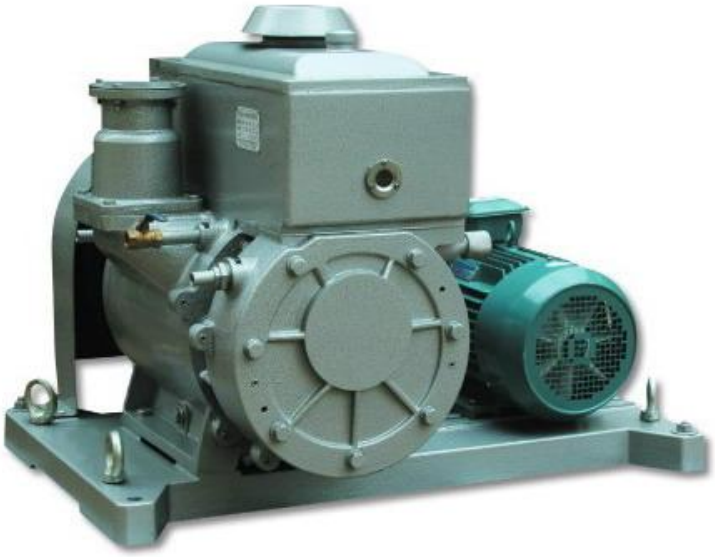
2X-70B

Rotary Vane Vacuum Pump

Operating Instructions



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I. Introduction

This type of pump is used for exhausting gas inside seal container to obtain high vacuum degree. It can be used alone or as backing pump of diffusion pump, blower pump and modular pump, etc, widely applicable in vacuum industrial operations including metallurgy, welding, forge, dryness as well as chemical medicine and electrical equipment.

The pump is not applicable to exhaust gas with high-oxygen content, poisonous, explosive, corrosive to ferrous metal, causing chemical reaction to vacuum oil or with granular dust, nor can it be applied as conveying pump delivering gas from one container to another.

The meaning of the model:

For example: 2X-70B

2-double stages

X-represents rotary vane vacuum pump (stands for the first phonetic alphabet of "XUAN")

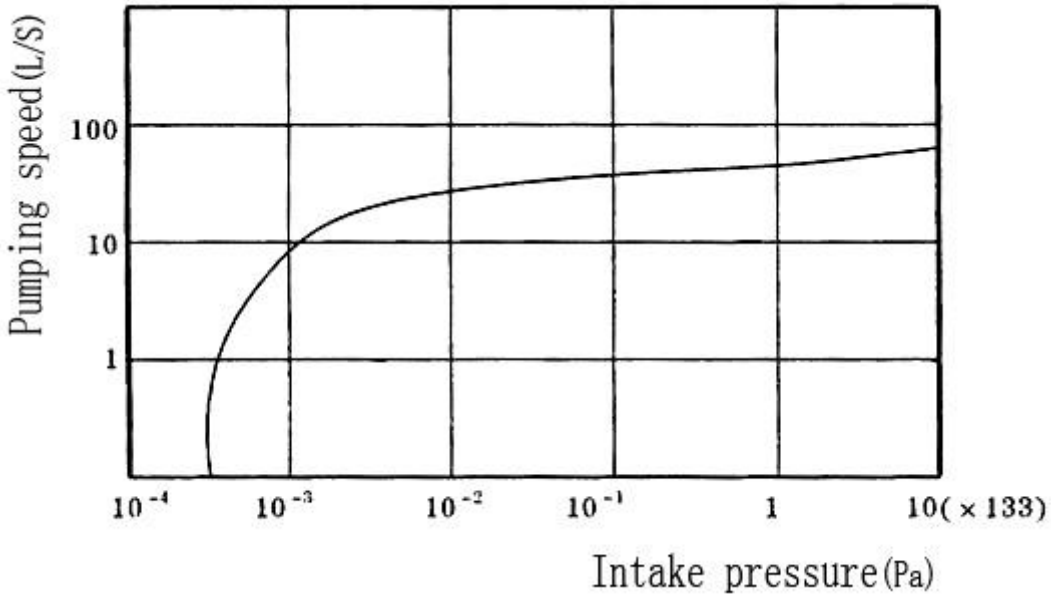
70-represents the geometrical pumping speed of 70L/S

B-represents a second generation.

II. Standards of Functions

Performance \ Type	2X-70B	Remarks
Pumping Speed(L/S)	70	Measured at pump port with compression gauge.
Ultimate Pressure(Pa)	$\leq 6X10^{-2}$	
Extreme total pressure (Pa)	1	Measured with thermocouple vacuum gauge.
Motor Power (kw)	5.5	
Temperature Increase	≤40	
Rotating Speed (r/m)	360	
Noise dB (A)	≤85	JB/T 6533-2017
Inlet Diameter (mm)	90	
Outlet Diameter (mm)	G3''	
Lubricating Oil	NO.100	
Oil Consumption (L)	8	
External Dimension (mm)	1000X769X735	
Cooling water(L/min)	＞2	

Pumping speed - intake pressure of pump



III. Installing and Operating

1. The pump should be installed at places that is dry, clean and with sound ventilation.

2. The pump and motor will share the same base plate, free of any large offset amount and thus enjoy even operation. If there is still some slight vibration, make sure the installing surface is firm and flat, installation is stable, and then fasten the machine with foundation bolt.

There should leave some space for later maintenance and dismantle around. If the pipe connected with the pump is metal pipe, add a section of tube like rubber tube or bellow to improve seal performance at the joint and reduce vibration.

3. The rotary direction of motor should follow what the pump indicates; check inspiration status of air admission port. Normal operation can then be carried out after everything is checked all right. Otherwise, the pump may rotate in the reversal direction and be damaged.

Mount thermal relay on motor line and fuse to protect the motor.

4. Put through inlet and outlet water pipe.

5. If the outlet gas is harmful to the working environment, please mount pipe to lead away the gas or oil mist filter at the exhaust port.

6. The diameter of inlet pipe should not be less than the inlet caliber; the pipe should be as short as possible with less turns, so as to reduce the pumping speed loss, especially during 10-10-1 Pa intake pressure.

7. Vacuum break valve should be mounted on the intake pipe so as to separate the pump with the

pumped system when the pump stops. In order to slow the oil return when the pump stops, mount air release valve between pump port and break valve.

8. The pump port may start up hermetically. If the start up is not so easy, please start up through pumping the atmosphere. Installed with gas release valve, the pump may stop under vacuum status and immediately release the gas into the pump.

IV. Application Instruction

1. Put through cooling water, the temperature of inlet water should be less than 30℃,while temperature difference between inlet water and outlet water should be less than 3℃.

2. The oil level should be in the vicinity of oil scale center, never too high or too low.

3. If the pump fails to start up when the ambient temperature is lower than 5℃, take pump oil out to heat until 15-30℃ and then refill into the pump, or heat with electric oven beside the pump: Pay attention to safety and don't bring damage to the paint.

4. When pumping certain condensable gas with small amount of water vapor, open gas ballast valve during the operation, so as to prolong oil's utility time.

5. The temperature difference of oil temperature and ambient temperature should be within 40℃, otherwise increase rate of cooling water flow, or ventilation heat emission.

6. When the intake gas is higher than 40℃, pre-cooling should be carried out. If the intake gas will do damage to pump body or oil, pre-treatment is needed before entering into the pump.

7. Turn off gas ballast valve to avoid oil leakage and cooling water after the pump stops working. During cold weather, internal-stored water should be thoroughly let out to avoid frost crack.

V. Maintenance

1. Keep the pump and its surroundings clean.

2. Pay attention to the oil level, which should be in the middle of oil scale line during normal operation. When the oil is lower than the line, add oil. On the other hand, when the oil level surpasses the scale line or the oil takes on emulsion, it indicates that water or other substances is mixed with the oil. Then the gas ballast valve should start to work or release the water so that the oil level can drop to its original position, to avoid oil injection next time when atmosphere is get through. Due to the decline of oil scale, there may still leave a small amount of gas in the top,

which can not be released even the oil level is higher than eye hole of oil scale, please don't make any misunderstanding.

3. Pump Oil

(1) Duration to change oil generally depends on application condition and performance requirement, which may be decided by the user according to actual condition. For a new pump, it is recommended to change oil after l00 hour operation. It is only when no black metal powder is found in the oil can the duration to change oil be prolonged. When pumping dray and clean gas, it is recommended to change oil after 500~1000 hour operation.

（2）If the gas under pumping is corrosive to the pump or may deteriorate the oil, lower vacuum degree, please shortens oil change duration apart from treating the gas before it entering into the pump.

（3）As for the pump fails to reach required vacuum degree due to long-time storage, please shut off the pump port and open gas ballast valve for 2~4 hours, or change oil when it necessary.

（4）Method for oil change: seal the intake port and start up the pump for half an hour, release the polluted oil from oil outlet hole. Get gas through intake port for about 30 seconds, add a little clean oil into the oil filling aperture to exhaust the inside deposit oil and keep lubrication, then release it. Finally screw tight oil outlet bolt, add clean oil into the oil filling aperture, and make sure not to mix any particle substances.

(5) The oil generally adopts NO.100 vacuum oil, which should not be mixed with other oil.

4. Inspection

Inspection should be carried out after 2000 hour operation. As for the places that is apt to incur the pollution of pump oil (color change, thickening, or even deposit), aging of rubber due to the high oil temperature, chemical reaction to rubber or other parts, please shorten repair duration as per actual condition and timely replace damaged parts. If abnormal exhaust noise and oil fluctuation arises, please check whether the valve plate is loose, aged or damaged, whether valve seat pad is not well sealed, then clean the oil box, get rid of polluted oil and deposit, so as to avoid additional stress, which may bring damage to rotary vane, rotor and pump body.

The discharge valve will encounter its first repair after 500 hour operation; the later repair duration may be prolonged or shorted as per actual condition.

5. Disassemble and assemble procedures

(1) Release oil as per oil change process, dismantle the shell, triangle belt, and then dismantle the

pump from the base plate.

(2) Dismantle the lower pump cover and pull out the lower rotor.

(3) Take out the lower rotary vane, spring, pin and flat key (rotate the pump belt wheel to make the center line of vane groove is around the “point of tangency”)

(4) Dismantle belt wheel, flat key, higher pump cover to pull out higher rotor and higher rotary vane, make sure not to bring any bruise to the rotor during the pulling motion.

（5）Dismantle the side covers, oil box and other spare parts one by one.

（6）Assemble the machine again in reverse: it is recommended to underlay with wood when assembling higher rotor and pump cover, put the pump body's lower surface on it, install the lower rotor to cling to the cylinder wall. Make clearly the location of the dismantled parts, which should be installed as per former location. It is allowable to dismantle axle-sided pump cover and rotor.

（7）Assembly method: dismantle the oil box cover, lay horizontally the pump, put the oil box downwards, it is allowable to take advantage of the self-weight of rotor to cling with the inner wall of pump chamber and at the same time help alignment, thus avoid to affect extreme vacuum during too large clearance.

（8）Notice during dismantle

A. Higher rotor assembly should be regarded as a whole part, so that it should not be dismantled. The medial wall is positioned press-in, no dismantle too. Pay attention to the influence of axle movement to the surface clearance of two cylinders. Eliminate burrs or paint when installing belt wheel and flat key, no heavy strike.

B. Check the abrasion condition of each spare part, adjust or replace as per actual condition.

C. Keep clean the pump body surface and parts inside the pump, generally white yarn waste or gauze can be adopted for wiping. If metal sludge, sand slime or corrosion is found, cleaning agent can be used to rinse the surface and then dry the surface, gasoline is another choice. Never immerse the rotor into the gasoline, so as to avoid the oil filtering into the inner chamber of rotor body from screw and pin, difficult in dryness and pollute the pump oil and finally influence the vacuum degree.

D. Fasteners should be screw tights without any loosening.

E. When assembling the two rotors, please hold the belt wheel with hand to make sure no remarkable light or weight or retardarce. Install the valve plate, which may reduce the influence of exhaust pressure.

F. Trial operation after installation, make sure the operation and extreme vacuum is up to requirement before the machine is put into use. Otherwise check the cause, readjust the machine and assemble it again.

G. During the inspection, please may equal attention to pipe valve and motor.

H. Please special attention to rubber oil seal during assembly, so as to avoid oil leakage, which may result from bruise from knife-edge, more attention should be thrown to the medial wall oil seal.

VI. Fault and Removals

1. How to judge low vacuum degree and removal methods

(1) If the total pressure is not high enough, screw off the oil plug to inspect pumping hole of new pump, if no obvious air leakage is found, it is may be the water vapor enters into the pump due to long-time reservation. Seal the pump port and gas ballast valve for 2- 4 hours. The pressure is deemed to increase. Or change new oil to gain more obvious changes. If there is no air leakage and open-up ballast valve or oil change fails, please check whether the oil hole on the valve seat near short valve plate is blocked.

(2) If the vacuum degree is not high enough after connected with the system due to leakage in connectors, pipe or containers, please find out the source and eliminate them.

(3) If there suddenly occurs impact noise and drop of vacuum degree before the pump is dismantled for clean, please check whether the spring is broken or certain substance enters into the pump.

(4) After long application, the vacuum degree of the pump may slightly decrease, which may result from condensable gas mixed in pump oil, oil degeneration, rubber article aging, please try one by one with methods like changing oil or rubber article.

(5) When large gas leakage occurs after the pump is cleaned and re-assembled, it may result from improper rubber article or damage, please adjust or change it.

(6) Abnormal gas exhaustion or remarkable surface fluctuation will occur when the valve plate ages, deforms, is damaged or with loose screw, which may also affect the vacuum degree, please change the valve plate.

(7) If the pump temperature is too high, especially when the total pressure is affected, please enhance cooling process.

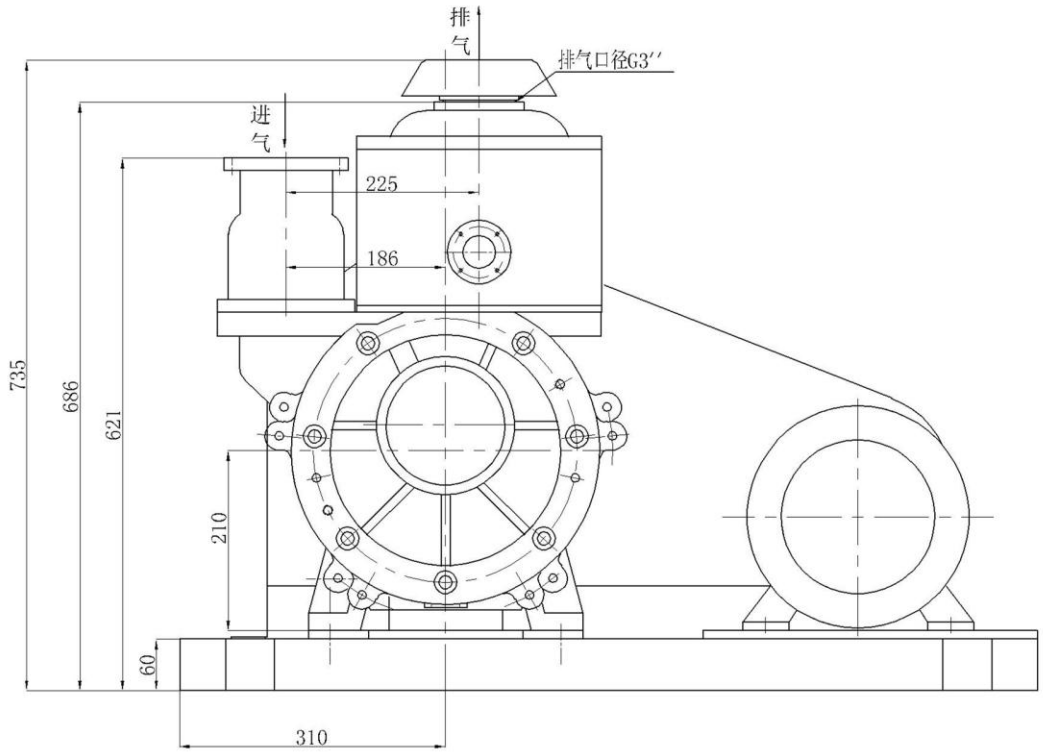
(8) If none of above measures take effect and no gas leakage is found, the causes may refer to parts' abrasion or corruption due to long use, or rotor's deformation and low precision, or damages in rotor and rotary vane, please dismantle the pump for check, adjust and change with new parts.

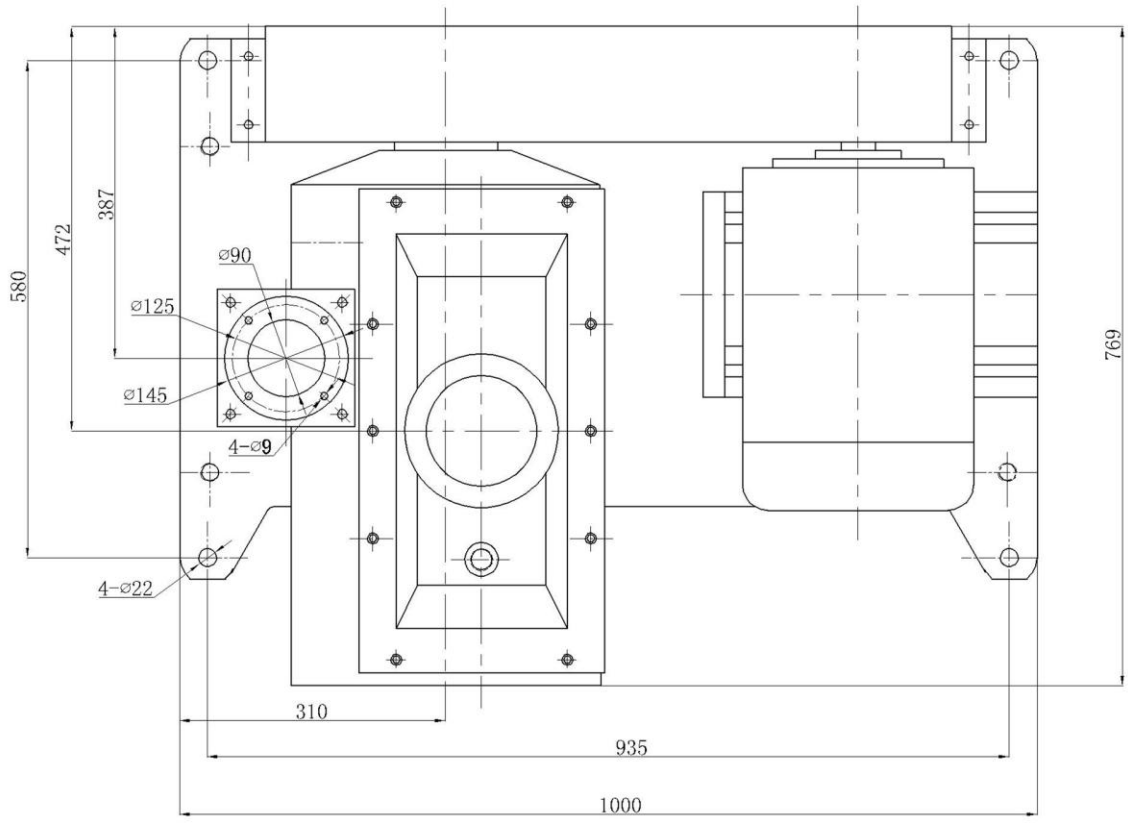
2. Oil injection, oil leakage and removals

(1) Oil injection may result from too high oil level, or oil box or oil deflector improper assembly, please check one by one.

(2) Oil leakage may result from the shell or bruise of oil-seal spring or damage of oil release screw and pad, or improper placement of side cover pad, or failure in shut off gas ballast after the pump stops, please check one by one or change some spare parts.

VII. External Dimension of Pump





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