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## 1. Forward

We sincerely appreciate your selection of BSV series vacuum pump.


On receiving the product, please check on the model fitting your order and any damage caused by transportation. Please contact with BAOSI or supplier once finding out any damage, defect or lost of spare parts.

Shipment with care.

### Important precautions

The manual instructs the installation, operation and maintenance of BSV175, BSV275. Please strictly follow the manual for the safety and efficient use of the product.

This product must be installed, operated and maintained by trained personnel. And please comply with national and local safety regulations or laws.

	<p style="text-align: center;"><b>WARNING</b></p> <p>Non compliance with the following precautions may result in significant personal injury</p>
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Cut off all electrical power related to the vacuum pump before maintenance and inspection.

The non professional personnel shall not disassemble, repair or alter the vacuum pump. Otherwise the failure may cause fire and injury as well as the abnormal operation of the vacuum pump.

Blocking the discharge hole while the vacuum pump is working will lead to the increasing of internal pressure, which results the break of pump chamber and oil level check window, oil leakage and motor overload.

The vacuum pump is not suitable for extraction of the mixed gas of which oxygen occupy more than 21%, or other easy reactant gas.

Do not use the vacuum pump in the place which can easily catch explosion to avoid injury or fire.

Do not use the vacuum pump in the place which can lead to condensation or is full of powder or granular dry materials to avoid the materials getting into the pump to contaminate oil inside.

Do not use the vacuum pump in the condition of low oil level or oil free to promote the performance and extend the service life of vacuum pump.

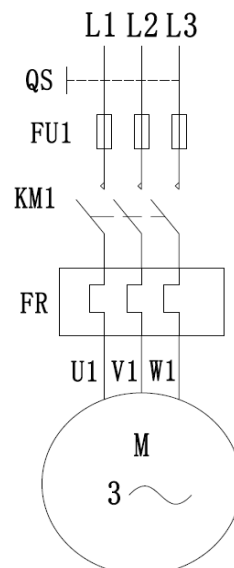
Check the oil level timely when the vacuum pump is working.

The ambient temperature of working condition shall be 5~40°C to ensure the normal heat radiation of the vacuum pump.

Please don't place flammable items around the motor and pump body, so as not to cause fire. Keep adequate ventilation to avoid the rising of temperature causing burn and fire.

Do not touch the vacuum pump when it's working or just halted for the surface temperature can reach 80°C. Please take safety precaution if necessary.

Do equip with the overload protection device for motor.



L1 L2 L3: 3 phases A/C

Qs: air switch

FU1: fuse

KM1: contact

FR: thermal relay

U1 V1 W1: motor terminal

M3~: 3 phases motor

Drawing 1 – Motor electrical wiring (example)

## 2. Product Descriptions

BSV175/BSV275 shown on drawing 2.

BSV175/BSV275 pump is a two stage direct coupling oil rotary vane vacuum pump, which can work in the laboratorial and industrial environment for long time. It is directly driven by a three-phase four pole motor with flexible coupling. The pump is mounted on a steel rail.

Pump is equipped with two high and low vacuum rotors and cylinder assembly, as well as integral vane pump.

The rotor is arranged in an eccentric ground in the pump cylinder, and two rotary vanes separate the chamber into several spaces of which the volume varies periodically with the rotation of rotors.

Vanes driven by the rotors rotates against the wall of chamber with the help from centrifugal force and air spring, which leads to the separation of air inlet and outlet. The air intake cavity inhales as its volume expands periodically. The exhaust cavity compressed the gas periodically as its volume decreases. By the pressure from compressed gas and oil, discharge valve slice is pushed away to obtain vacuum.

Vane oil pump provides lubrication. Oil goes through the oil inlet pipe and is inhaled into the spring distribution valve. The valve will distributes a little pressurized oil into the vacuum chamber and will transport redundant oil to the storage cavity by bypass.

Check the oil level and quality through oil level sight glass(6). There is a oiling plug(2) screw top of the oil cavity and draining plug screw(8) bottom of it.

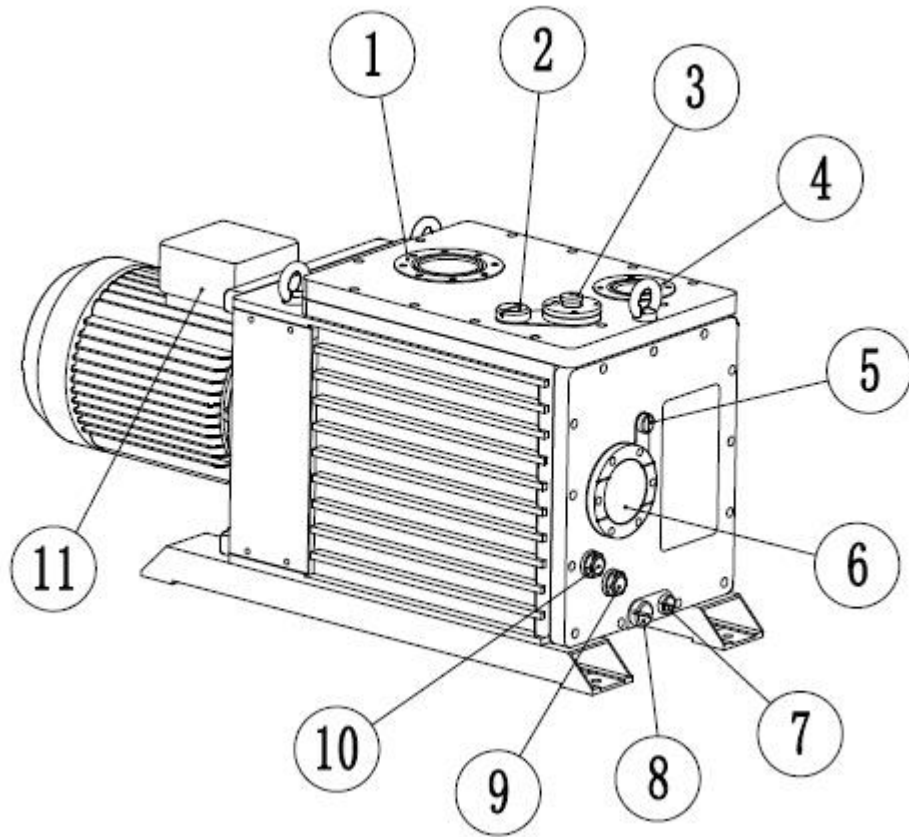
The air inlet is VG80 flange. Gas outlet is VG50 flange. The oil-out port for external oil filter is G3/8. The oil outlet (7) and the oil return port (5) is for external oil filter.

The water cooling system is adopted. Suggest adopting thermostatic control valve to adjust the flow of water so that the vacuum pump can work at optimum working temperature as well as keep water economy to prompt gas ballasting.

## **The function of gas ballasting**

The gas ballast valve (3) should be turned on when discharge or inhale high load steam. The air or inactive gas is fed into the low pressure cavity of the pump through the gas ballast inlet to prevent condensation of vapor carried by the process gas, which can reduce oil pollution and pump corrosion caused by condensation of steam from the process gas.

A filter / muffler is installed in the gas ballast system to prevent dust from entering the pump and to reduce noise.



- |   |   |
|---|---|
| 1. Air inlet                                  | 7. The oil-out port for external oil filter G3/8. |
| 2. Oiling plug screw                          | 8. Draining plug screw                            |
| 3. The gas ballast valve                      | 9. Cooling water outlet G3/8                      |
| 4. Discharge vent                             | 10. Cooling water inlet G3/8                      |
| 5. Oil return port is for external oil filter | 11. Motor terminal                                |
| 6. Oil level sight glass                      |   |

Figure (2) – BSV175[BSV275] rotary vane vacuum pump

### 3. Specifications

#### 3.1 Operation and Location

Ambient temperature range for location 12~40°C

The pump reaches ultimate vacuum when the ambient temperature is 20 °C. The normal surface temperature of the pump is 50~70°C

Maximum humidity for operation is 90%RH

Ambient temperature range for location is -30~70°C

#### 3.2 Performance data

Table 1 - performance data

Items		BSV175	BSV275	Unit
Pumping speed	50Hz	160	255	m <sup>3</sup> /h
	60Hz	196	306	m <sup>3</sup> /h
Motor rotary speed	50Hz	1440	1440	r/min
	60Hz	1720	1720	r/min
Ultimate vacuum	Gas ballasting off	5×10 <sup>-1</sup>	5×10 <sup>-1</sup>	Pa
	Gas ballasting on	2	2	Pa
Maximum outlet pressure (full flow)	Psig	0.5	0.5	bar
	Psia	1.5×10 <sup>5</sup>	1.5×10 <sup>5</sup>	Pa
Air inlet	Flange with O-ring	VG80	VG80	DN
Air outlet	Flange with O-ring	VG50	VG50	DN
Capacity of pump oil	Max	25	28	L
	Min	20	23	L
Noise level	1m away	73	75	dB(A)
Weight	Include motor	230	255	kg

#### Remark

1. The “ultimate vacuum” on table 1 refers to the measurement tested by pirani gage with the using of BAOSI vacuum pump oil BSO-68. The measurement tested by MaLeod gauge is 5×10<sup>-2</sup>Pa.
2. Different vacuum pump oils are different in vapor pressures, dynamic viscosities and quality. Please use BSOAI vacuum pump oil to avoid affecting the performance and service life of the pump.

### 3.3 Mounting Dimensions

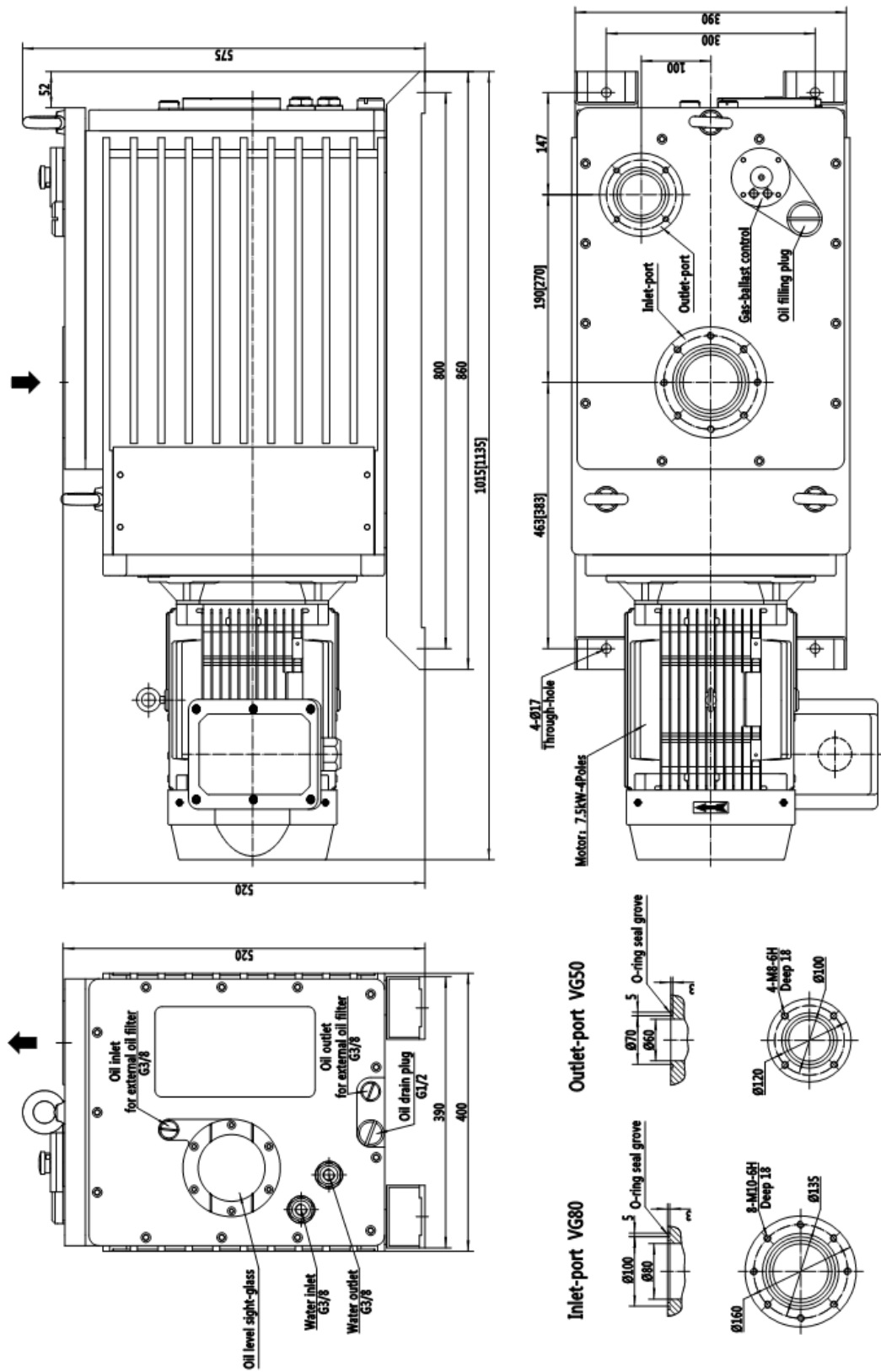



Figure (3) – BSV175[BSV275] installation drawing

## 4. Installation

### 4.1 Safety information

The installation of vacuum pump should be in accordance with the following safety instructions and handled by the trained technical personnel.

- ◆ Cut off all electricity before the installation.
- ◆ Necessary to adopt protection method when touching contaminative parts
- ◆ Exhaustion and purge are needed before the installation.
- ◆ Ensure that the installation personnel should be familiar with the safety procedures related to pump oil and vacuum system. Appropriate preventive measures should be taken to avoid the oil mist and the skin exposing to the pump oil for long-term exposure causing harm.

	<p style="text-align: center;"><b>WARNING</b></p> <p>The maximum weight of the pump is about 255kg. Using proper lifting equipment for installation.</p>
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The ring on vacuum pump should be connected with the mechanical lifting equipment when conveyed.

The vacuum pump should be installed on a horizontal stable platform. Ensure that it's easy access to the oiling plug screw and draining plug screw as well as has a well sight of oil level sight glass.

If the pump is placed within a housing, good ventilation should be guaranteed and the space between the vacuum and the housing should be less than 25mm.

### 4.2 Overview of the system

The following points are considerable when design the vacuum system:

- ◆ Preheat the pump before exhausting and inhaling. Separate the pump and user's vacuum system by specific valves to keep vacuum of the pump before turning off.
- ◆ Prevent processed gases from conveying high heat into the pump to avoid overheating and jammed.
- ◆ The surface temperature of the pump working at high ambient temperature can exceed 70°C with large gas flow. Users should take appropriate precautions to prevent direct contact with the hot surface.
- ◆ Ensure the exhausting pipes unblocked. If the user uses the exhaust isolation valve,



ensure the pump can't be started with valves closing.

- ◆ Cooling water is needed.

### 4.3 Cooling Water Piping

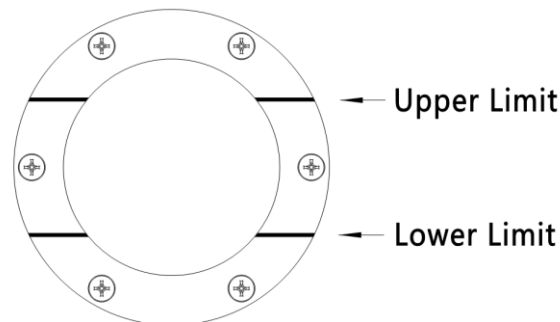
Two G3/8 inch internal screw pipes should be connected with the source of cooling water. Recommended minimum flow of cooling water at 20°C is 120L/h.

If you use a constant temperature control valve to control the temperature, the pump can achieve the best operating temperature and improve work efficiency.

### 4.4 Oiling

Follow these steps to oil the pump. Please refer to figure 1 for the following numbers.


1. Remove the oiling plug screw.
2. Oil the pump till the max level on sight glass(6). Drain the redundant oil through Draining plug screw(8).
3. Check the oil level in several minutes. Add more oil if it not reach the max level.
4. Position the oiling plug screw with hands properly.



Figure(4) - Oil level sight glass

### 4.5 Electrical Wiring

#### The connection between the pump and power source

	<p style="text-align: center;"><b>WARNING</b></p> <p>It is necessary to ensure that the electrical installation of the pump motor meets the requirements of the user and the local safety requirements.</p> <p>The circuit must have proper overload protection devices and must be properly grounded.</p>
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## ATTENTION

If the pump motor can be used in more than one voltage, the user must carry out the correct configuration of the supplied voltage for the motor. Otherwise, the motor will be burned, while there is a risk of fire.

The pump will automatically restart when power restores after interrupted. The adoption of manual reset electric control device does not lead to automatically restart of the pump.

We recommend that the use of motor connected with thermal over-current protection starter or circuit breaker and adjust appropriate current to the over-current protection.

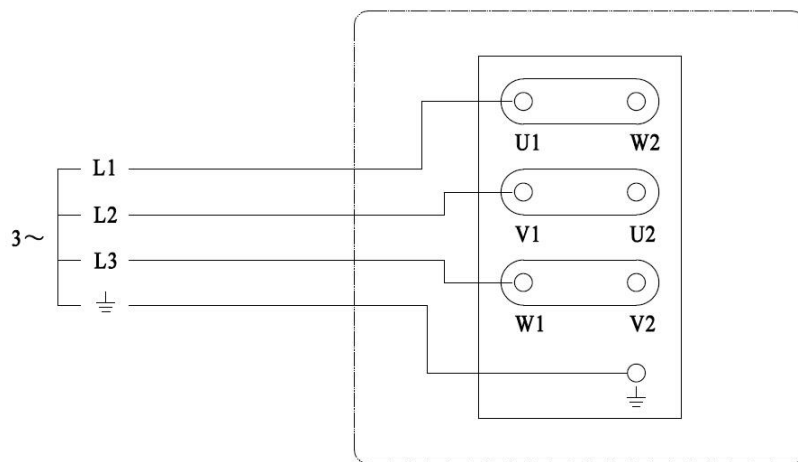


Figure (5) - triangular connection, three-phase motor

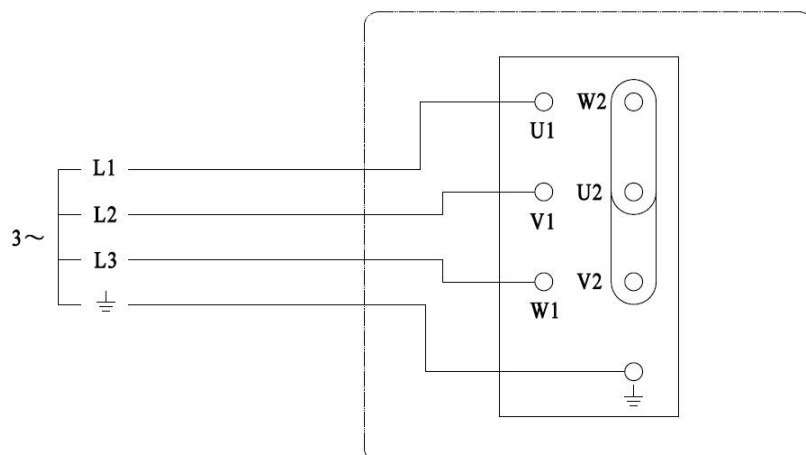


Figure (6) - Y - shaped connection, three-phase motor

## Check Rotary Direction

### **WARNING**

Ensure the correct rotary direction of the motor to avoid damage to the pump and vacuum system.

1. Observe the cooling fan from the fan cover of the motor.
2. Turn on the motor for several minutes then turn it off.
3. Check whether the cooling fan of the motor rotates in the direction shown by the arrow on the motor mounting plate. If the direction is not correct,  
Cut off the power  
Remove cap of terminal box and exchange any two of L1, L2, L3. Then back the cap.  
Turn on the pump and check the rotary direction of fan.

#### **4.6 The connection between air inlet of the pump and user's system**

Use VG80 standard pipe joint to connect the pump with user's system. Pay attention to following points

- ◆ In order to achieve the best pumping speed, make sure that the pipe connecting with air inlet should be as short as possible and less elbow exist. The internal diameter should be smaller than that of air inlet.
- ◆ Hold the vacuum pipes steadily in case of too much stress on the joints
- ◆ If it's necessary, use soft bellows to reduce the vibration and stress on joints. The withstanding pressure of soft bellows should be higher than the maximum pressure produced by the vacuum system. If the pump is installed on the shock absorber, the soft bellows must be used.
- ◆ Use proper valves to separate the pump from user's system if vacuum status is needed with the pump off.
- ◆ Equip with the filter on air inlet of the pump if the pump is used for the exhausting and inhaling of condensing steam or placed in dusty occasion.
- ◆ Ensure that the surface of seals are clean and free of scratch.

#### **4.7 The connection between gas outlet and user's system**



#### WARNING

Connect the exhaust port of the pump with the proper treatment device to prevent dangerous gases and vapors from discharging directly.

Use standard VG50 Flange pipe connect the gas outlet with proper treatment device. Pay attention to the following points.

The exhaust system must be properly configured to ensure that the highest exhausted pressure in full flow does not exceed 0.5bar (psia 1.5bar,  $1.5 \times 10^5$ Pa)

In the following situations, we recommend that users install oil mist filter at the pump's exhaust port:

- ◆ In the situation that the pump works with the gas ballast on
- ◆ In the situation that the inlet pressure exceeds 1000Pa for long
- ◆ In the situation that the pump starts working at atm.

Oil mist filter will trap the oil in the pump. If the oil is not contaminated, it can be reused.

### 4.8 Gas ballasting

The vacuum pump has two gas ballasting inlet(two G1/4 internal screws). Either can be used while the other one has to be blocked.

The gas ballasting inlet can be open or installing a gas ballasting control valve to adjust the inlet air volume remotely.

### 4.9 The leakage testing

Carry out the leakage test after the completion of the vacuum pump installation. Any leakage should be blocked.

## 5. Operation

### 5.1 Start



#### WARNING

Never stem the outlet of the pump or allow the exhausting pressure higher than 0.5 bar psig, or it can cause the explosion of oil tank and hurt people around.

1. Connect the cooling water system.
2. Turn on the power.
3. The level of oil drops by 3-5mm through oil level sight glass, which means the vacuum pump has working with oil circulation.
4. If the pump is working without oil circulation, let the pump works with the air inlet connected with atm. for 30 seconds. Then check the oil level to see whether it drops by 3-5mm.
5. The pump can run continuously for a long time in the normal condition. However we suggest that customer should regularly check the vacuum pump every two weeks. If the vacuum pump often work in heavy load or the gas ballasting controller connects with atm. all the time, check the pump more often.

## 5.2 The gas ballasting controller

### WARNING

The consumption of oil and noise would increase while the gas ballasting is connecting with the atmos.

Use the gas ballast controller (3) to change the amount of air (or inert gas) into the pump's low vacuum section. Using gas ballast controller can prevents steam inside of pump from condensing which would lead contamination to the pump.

Close the gas ballast controller by clockwise rotation. Open it by anticlockwise rotation.

## 5.3 Condensing steam in the pump

Gas ballast should be open when the processed gases contain large portion of condensing steam.

1. Close the isolation valve of the vacuum system.
2. Open the gas ballast controller by anticlockwise fully and let the pump works for 30 minutes to preheat the oil, which helps to prevent the steam from condensing inside.
3. Open the isolation valve of the vacuum system and let the pump work with gas ballast controller open.

## 5.4 The decontamination of oil pump

The pump oil is supposed to be clear. If there is turbidity or discoloration, the oil has been contaminated by the processed steams

1. Check the oil quality through the oil level sight glass.
2. Close the isolation valve if the oil is turbid or discolored.
3. Fully open the gas ballast controller by anticlockwise rotation.
4. Start the pump till the oil gets clear.

## 5.5 Halting

When the gas ballast controller is on, Halting or accidental shutdown may lead to the reverse rotation of the pump's drive shaft and the rise of system pressure. The gas ballast control valve should be adopted to avoid this situation.

We suggest decontamination of the oil before halting to avoid the contaminant damaging the pump.

1. Carry out the decontamination according to need.
2. Close the isolation valve.
3. Close the gas ballast controller by clockwise rotation.
4. Cut off the power.
5. Close the cooling water valve.

## 6. Maintenance

### 6.1 Safety information



#### WARNING

The following safety instructions must be comply with and adopt appropriate precautions. Otherwise the injury to personnel and damage to machine may happen.

1. The maintenance job must be completed by trained technical personnel in the condition that obey the national and local safety regulations.
2. Ensure that the maintenance personnel are familiar with the safety procedures related to pump oil and vacuum system.
3. Check the completeness of necessary spare parts before working.
4. Cut off all the power connected with the vacuum pump.
5. Cool the pump to safe temperature.
6. No further use of the broken O-rings and seals
7. Check the rotary direction of the pump again after maintenance.
8. Fluorinated materials are safe in normal use. However if the pump is used improperly or subject to fire, it may overheat to more than 310°C with the decomposition of fluoride materials into dangerous substances like hydrofluoric acid.
9. If the user has connected or disconnected the vacuum joint or exhaust joint, leakage test should be carried out after maintenance. Seal the leakage if it exists.

10. The process chemicals will pollute the pump and pump oil when the pump is working. Decontaminate the pump after maintenance if there is contamination as well as adopt necessary precaution to protect personnel.
11. Ensure the stability of protective device before restart the pump.

## 6.2 The maintenance plan

Table (2) shows the routine maintenance plan for the vacuum pump. If the vacuum pump often inhale and exhaust corrosive gases or the gas ballasting controller connects with atm. all the time, maintain the pump more often. Adjust the maintenance plan if necessary.

Operation items	Period
Check oil level	Every week
Replace oil	Every 6 months
Replace gas ballast filter	Every 3000 hours
Check and clean air inlet filter	Every year
Clear the cover of motor	Every year
Clean and overhaul the pump	Every year
Test the motor	Every year
Replace the vanes	Every 3 years

Table 2 Maintenance plan

## 6.3 Check the oil level

1. Check the oil level regularly when the pump is running. Halt the pump before adding oil.
2. Adding oil timely when the oil level is near or below the minimum oil level. Drain the redundant oil if the oil level exceed the maximum level.
3. If the pump oil is contaminated and can't be cleaned, which affecting the performance of the pump, replace the oil.

## 6.4 Replacement of the oil

1. Start the pump for 10 minutes to preheat the oil (Reduce the viscosity of the oil to make it easy to flow out), then halt it.
2. Cut off the power. Isolate the pump from the vacuum system.
3. Remove oiling plug screw.
4. Put a proper container under the drain port and remove the drain plug screw so that

the oil can flow into the container.

5. If the discharged oil the pump is contaminated, add clean oil from drain port and let it flow out from the pump.

Repeat this step until the pump's oil storage tank is flushed clean.

6. Position the drain plug screw. Adding clean oil from the oiling port till the oil level reach the maximum level.
7. Position the oiling plug screw.
8. Connect the pump with vacuum pump.

## 6.5 Check and clean the air inlet filter

Air inlet filter can keep micro particles away from the pump cavity, thereby reducing the wear of pump parts. Check the air inlet filter before replacing the oil. Clean the filter if necessary. Steps as follows:

1. Disconnect the power source from the pump.
2. Disconnect the pump from the vacuum system.
3. Remove the filter from air inlet.
4. Clean the filter in proper cleaning solution then dry it.
5. Position the filter on air inlet.
6. Reconnect the pump with the vacuum system.
7. Reconnect the power source with the pump.

## 6.6 Clean the cover of motor

Keep the motor cover clean. If the air flowing through the motor is blocked, the pump will overheat.

1. Disconnect the pump from power source
2. Clean the cover of motor with brush and dishcloth
3. Reconnect the pump with the vacuum system.

## 6.7 Clean and overhaul the pump

Disassemble and clean the vacuum pump thoroughly. Replace the spare parts according to main replaceable parts list.

## 7. Storage

### WARNING

The seals in the pump can get permanent damaged if the pump is stored at  $-30^{\circ}\text{C}$ . Check the pump thoroughly before use if the pump has been stored more than 1 year. Clean or overhaul the pump if necessary.

The steps as follows,

1. Halt the pump
2. Disconnect the pump from the power source.



3. Close the cooling water valve
4. Disconnect the joints of cooling water from the pump and discharge water from the pump.
5. Disconnect the pump from the vacuum system
6. Replace the clean oil
7. Install protective covers on air inlet and outlet.
8. Store the pump in the cool and dry environment.

## **Disposal**

The disposal of the pump and spare parts should be accordance with the national and local safety rules and regulations. Notice the items contaminated by hazardous production materials.

No burning of fluorine rubber seals and O-rings.

## **8. Warranty**

### **8.1 Warranty clause**

The product has been inspected strictly before shipment and the warranty lasts 1 year since the date of delivery. Any breakdown out of quality happens during the warranty, our company is responsible for free repair and replacement.

### **8.2 Exception from liability**

1. Past the warranty period
2. Damage made by man or external factors (natural disasters, war, etc.)
3. Not follow the instruction manual and the breakdown caused by operation in improper way.
4. Any transformation, decomposition and repair to the product without our consent.
5. Breakdown caused by working in abnormal situation (Strong electromagnetic, strong radiation, high temperature, high humidity, flammable gas environment, corrosive gas environment, dust, etc.)
6. Breakdown caused by working in the improper conditions.
7. Breakdown caused by noise.
8. Breakdown caused by consumables

## 9. Troubleshooting

Table 3 Failure analysis and troubleshooting

Breakdown	Probable cause	Solution
The pump can't start	Power fuse burned	Replace the power fuse
	Supplied voltage not match motor rating voltage	Check the electrical source and connection
	Breakdown of motor	Overhaul or replace the motor
	Ambient temperature is too low, the viscosity of oil increased	Raise the temperature or replace the low viscosity oil
	Pump oil is contaminated and it's viscosity increase	Replace the clean oil
	Exhaust filter or pipe blocked	Clean the filter and pipe
	The pump jammed	Overhaul the pump
The pump can't reach ultimate vacuum	The error of motor rotary direction	Check the rotary direction
	The gas ballast valve is open	Close the gas ballast
	Intake pipe diameter is too small or too long.	Make the correct configuration of the air inlet pipe
	The leakage of vacuum system and pipes	Block the leakage
	Air inlet filter blocked	Clean the air inlet
	Air inlet pipe or filter blocked	Clean air inlet pipe or filter
	Oil is contaminated or inappropriate	Replace the oil
	The quantity of oil is insufficient	Replenish pump oil timely
	Low the pumping rate	Adopt the pump with proper pumping rate
	Measurement technique or instrument is not suitable	Use the correct measuring instrument and calibration
Pump oil circuit blocked	Disassemble the pump and clean the circuit.	
Low pumping rate	The air inlet is too small or too long	Correct configuration of air inlet pipe
	Air inlet pipe or filter blocked	Clean air inlet pipe or filter
	Air inlet filter blocked	Clean air inlet filter
	Leakage of vacuum system or filter	Block the leakage
	Pumping rate is relatively low	Adopt the pump with proper

		pumping rate
	Oil is contaminated or inappropriate	Replace the oil
Abnormal noise	“KA TA” noise when start or halt	Transient irregular motion of the vanes
	The loose of motor coupling	Check the coupling
	Breakdown of the motor	Overhaul or replace the motor
	Oil is contaminated by solid particles	Replace the clean oil
	The vanes jammed or damaged	Check and replace the vanes
	Spare parts inside of pump broken	Check and replace the broken spare parts
High temperature of pump	High ambient temperature	Lower the temperature
	Insufficient flow of cooling water	Supply sufficient cooling water
	High power voltage	Correct the power configuration
	Oil is contaminated or inappropriate	Replace the pump oil
	Insufficient oil quantity	Replenish pump oil
	Discharge filter or pipe blocked	Clean discharge filter or pipe
	High temperature of inhaled gas	Lower the temperature of inhaled gas
	Continuous operation under high pressure	Larger the flow of cooling water
External leakage of pump	Seal wear or aging	Replace the seal
	Oil tank seal gasket damaged	Replace the seal gasket
	The leakage of gas ballast controller	Replace the gas ballast filter
	Loose of sealing plug	Tighten sealing plug
	O-ring of sealing plug aging	Replace O-ring
Fail to completely keep the vacuum	Gas ballast open	Close gas ballast controller then halt the pump
	seal components broken or lost	Check seal components
	Broken Anti suction valve	Replace anti suction valve
	Seal broken	Replace seal
	Exhaust valve broken	Replace exhaust valve

## 10. Main replaceable parts list

Location	Items	Specification	Material	Quantity
Coupling	Elastomer	GR38	-----	1
Bearing	Grease seal	30*40*7	FKM	1
	Grease seal	40*52*7	FKM	3
First cylinder	First exhaust valve	-----	FKM	1
Second cylinder	Second exhaust valve	-----	FKM	1
Upper cover plate	Sealing gasket	-----	Cork pad	1
Front cover plate	Sealing gasket	-----	Cork pad	1
Gas ballast	Filter element	-----	Felt	2
Cylinder	O-ring	A-111, AS568	FKM	1
	O-ring	A-114, AS568	FKM	1
	O-ring	A-216, AS568	FKM	2
	O-ring	A-331, AS568	FKM	1
	O-ring	A-341, AS568	FKM	1
	O-ring	132*2, M	FKM	1
	O-ring	165*2, M	FKM	2
	O-ring	S9, JIS	FKM	2
	O-ring	S16, JIS	FKM	2
	O-ring	S120, JIS	FKM	1
	O-ring	S145, JIS	FKM	1
	O-ring	P9, JIS	FKM	1
	O-ring	P15, JIS	FKM	2
	O-ring	G45, JIS	FKM	1
	O-ring	G85, JIS	FKM	1
	O-ring	G115, JIS	FKM	1
	O-ring	G200, JIS	FKM	1
Plug screw	O-ring	P18, JIS	FKM	2
	O-ring	P24, JIS	FKM	1
	O-ring	P36, JIS	FKM	1
Oil level sight glass	O-ring	G100, JIS	FKM	1
Exhaust port	O-ring	V100, JIS	FKM	1
Air inlet port	O-ring	V70, JIS	FKM	1

<b>Application</b>					
Model		Serial No.		Purchase date	
Customer					
Address					
Contact			Tel		
<p>1. Maintenance/overhaul</p> <p><input type="checkbox"/> Regular maintenance</p> <p><input type="checkbox"/> Breakdown:</p> <p><input type="checkbox"/> Ultimate pressure insufficient   <input type="checkbox"/> Abnormal noise   <input type="checkbox"/> Abnormal motion   <input type="checkbox"/> Oil leakage   <input type="checkbox"/> Others</p> <p>Description:</p> <p><input type="checkbox"/> Others:</p>					
<p>2 service condition</p> <p>✓ Used or not: <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>Utility time: <input type="checkbox"/> 24hr service <input type="checkbox"/> Interval service</p> <p>✓ Contaminate or not: <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>Product name and chemical name of the contaminant :</p> <p>Types and characteristic of the contaminant:</p> <p>Cleaning solvent and method of contaminant:</p>					
<p>3 Content:</p> <p><input type="checkbox"/> Warranty   <input type="checkbox"/> Paid   <input type="checkbox"/> Others</p>					
<p>4 Other terms:</p>					
Assignment of applicant			Date		