

Operation Manual



Series 2AB

Vacuum Pump

Thank you for Choosing Biolab products. Please read the “Operating Instructions” and “Warranty” before operating this unit to assure proper operation.

Index

1. Field of Application.....	03
2. Main Specifications.....	04
3. Installation.....	04
4. Maintenance.....	05
5. Troubleshooting.....	07
6. Section View.....	08
7. Dimensions.....	09

01 Field of Application

1. The pump is one of the basic equipment's to exhaust a sealed vessel. It can be used either independently as main pump and can also be served as forepump for booster pump, diffusion pump and molecular pump or as holding pump for a Vacuum system and as a pre-pumping for different, kinds of ion pump. So that it can be applied in electro-vacuum industries, Vacuum flask manufacturing, Vacuum welding and as an accessory to those fine gauges or meters where Vacuum is required. It is more suitable for laboratory use because of its small size, less weight and quiet operation.
2. The pump is allowed to work continuously for many hours at a stretch under atmospheric temperature of 5-40°C and intake pressure below 1330pa. While the pumped gas containing moisture of a relative humidity of more than 90% gas-ballast valve should be open.
3. With the inlet port widely opened to atmosphere the pump is not allowed to work more than three minutes.
4. The pump is not suitable for pumping overoxidized, explosive and corrosive gas as well as gases which react chemically with the pump oil or contain particles of dust.

02 Main Specifications

Model	Ultimate Pressure (pa)		Pumping Speed (l/s)	Rotary Speed (r.p.s)	Inlet Diameter (mm)	Motor Power (kw)	Weight (kg)	Dimensions (mm)	Temperature rise of pump oil (°C)	Oil filling (l)
	Gas-ballast									
	open	close								
2AB-1	6×10 ⁻²	13×10 ⁻¹	2	1440	Φ25	0.37	27	480×140×255	≈45	0.48
2XZ-4	6×10 ⁻²	13×10 ⁻¹	4	1440	Φ25	0.55	30	510×140×255	≈45	0.55

03 Installation

1. The pump should be erected on a dry airy and clean place.
2. The pump, with a handle at top and with four rubber pillarets at footings, is of portable type. Therefore in most case the pump is merely placed at a flat and stable surface.
3. To wire the motor, note the direction of rotation Viewing from the fan end of the motor, the rotation should be clockwise.
4. The diameter of the pipe, which joints the Vessel to be exhausted and the pump, should not be smaller than that of the inlet port of the pump. The pipe should be short and should have as few bends as possible in order to reduce the loss of pumping speed. Mean time leakage of the pipe should be noticed.
5. When the pump is started with the inlet port widely opened to atmosphere, little amount of oil mist will be brought out.

6. It might affect the working environment, use plastic pipe to lead it away to open air .
7. The pump is equipped with such device which can prevent suck-back of oil when it is stopped. Therefore it is not necessary to mount a magnetic operated valve on the inlet port.
8. Unscrew the oil filler plug to fill oil to the middle of glass. This operation should be carried out with the pump off, it is quite normal to lift oil level when the pump is rotating. If the oil level is too low no sealing affect to the exhaust valve is provided, if the oil level is too high, spraying of oil may be happened while the pump is started with its inlet port widely opened to atmosphere SY1654-65 No.100 vacuum oil is recommended The oil should be filtered before filling in order to prevent impurities mixed with it to clog oil hole .
9. The pump can be started with inlet port widely open to atmosphere of under any degree of vacuum. If magnetic valve is provided on the inlet port, it should be started simultaneously with the pump.

04 Maintenance

1. General Remarks:

- i. The pump should always be kept clean to prevent any impurities entering the pump.
- ii. The oil level should always kept at middle of the sight glass.
- iii. Due to the improper storage of the pump, water or any other impurities are introduced into the pump. The ultimate vacuum of the pump will be impaired. Open gas-ballast valve to provide the purification of oil , then observe the promotive effect on ultimate vacuum. In case of that no improvement of ultimate vacuum is observed after several hours, oil should be renewed and even renew the oil twice again if necessary.

Process of renewing of oils:

Let the pump operate about half an hour to raise the temperature of oil as well as to decrease the Viscosity of oil, stop the pump and drain out the oil. Restart the pump and let it operate about 1-2 minutes with inlet port widely opened.

In this interval slowly fill little amount of clean oil into the pump through the inlet port to replace oil originally presented in the pump housing.

- iv. Diesel oil, gasoline and other oil of higher saturated Vapor pressure are

forbidden to mix with the vacuum oil in order to avoid the impairment of its ultimate vacuum. Generally cotton cloth is used to wipe the parts to be cleaned To wash the parts with metal chips sand and other impurities gasoline is employed. Reassembly should be carried out after they are dried.

v. If the pump should be disassembled in order to clean or to inspect the interior parts. Attention should be paid to the process of disassembly and reassembly to avoid impairment of the parts.

The processes are as follows:

2. Disassembly

i. Drain oil.

ii. Screw out the bolts on inlet flange, take out the inlet pipe Screw out the bolts on gas-ballast flange, take out the gas-ballast valve.

iii. Take off the oil box

iv. Take off the split-pin on the oil check valve and the impeller to the check valve.

v. Screw-out the tight bolts of the frame and pump body, take off the pump body.

vi. Screw out the cover plate bolts, take off the cover and then pull out the two rotors and their respective Vanes .

3. Assembly

i. wipe all parts.

ii. Put vanes into the respective slots of the rotor then put the rotor of high stage into the stator, put the cover plate on the stator and mount the pins, bolts, key and sleeve on their originally plate. The rotor should be rotated by hand freely and evenly.

iii. Repeat the same process once again for lower stage rotor.

iv. Put back the impeller of check valve and check valve to their original place.

The flat surface of valve head should be point to the oil hole. Stop the impeller by hand while rotate the rotor, the oil hole should be alternately closed and opened by the valve, then adjust the max. Height of opening of the flat surface. of the valve of 0.8-1.2mm.

v. Put the exhaust valve and oil baffle plate on the top of the pump body.

vi. Mount the pump body, key, bushing and motor on the frame.

vii. Set up the pump body with oil box.

viii. Insert the inlet pipe and gas-ballast valve and screw on their flanges to fix them.

05 Troubleshooting

1. Failures to obtain the specified ultimate vacuum and their remedies:

- i. The oil level is too low, exhaust valve can not be sealed and sound of exhausting is loud, fill in more oil.
- ii. The failure maybe due to the contamination of the oil by the condensable vapor, widely open the Gas-ballast valve to purify the oil or renew the oil.
- iii. Air leak at the joint of pipe, pipe itself and vessel, take measure to eliminate the leak.
- iv. Improperly placing of the rubber seals of the inlet pipe or gas-ballast valve or deterioration of them readjustment or replacement of them should be made.
- v. Clogging of the oil hole, drain oil, dismount the oil box, clear the oil holes.
- vi. The vacuum system, including vessel and pipe, is seriously contaminated. Cleaning of them should be made.
- vii. Breaking of vane springs, replace them by new springs.
- viii. Vanes, stators or copper bushing may be worn out. Check them and make replacement or readjustment.
- ix. Overheating of the pump. It causes not only the drop of viscosity of the oil and rising of the saturated vapor press of the oil, ventilate the air and cooling to decrease ambient temperature. If the temperature of gas pumped is too high, it should be cooled before sucked by the pump.

2. Oil Splash

Check the oil level, whether it is too high. Are there any oil or Sundries clog the oil separator. The oil batffle is right positioned and firmly fixed,

3. Oil Leakage

Check the oil plug, sight glass and oil box shim. Replace them if necessary.

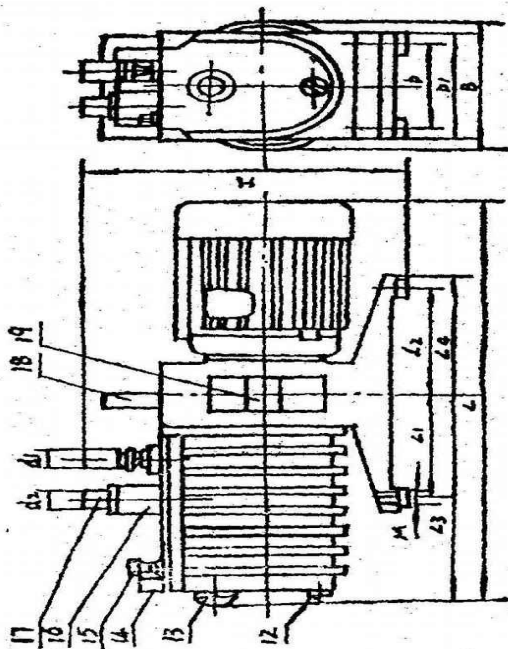
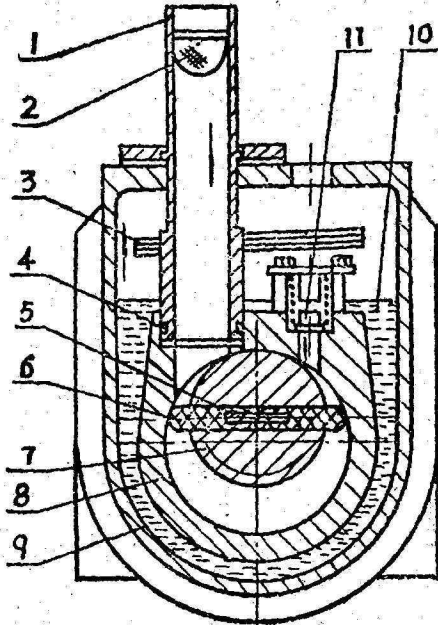
4. Noise

The noise may be caused by breaking of vanes, too much oil, worn out of bearing, deterioration of parts. Check them and readjust or replace them if necessary.

5. Suck back of oil

- i. Oil check valve can not tightly close, oil level drops fast after pump stops. Check the variation of oil level by starting and stopping the pump again and again.
- ii. Oil seals in two cover plates are improperly place or worn out, replace them.
- iii. The end surfaces of stator or cover plates are scraped to be uneven. Repair them.
- iv. The exhaust valve plate is worn out, a new plate is replaced.

06 Section View



- 1 inlet port
- 2 Fitter net
- 3 Oil baffle
- 4 "o" ring
- 5 Spring
- 6 Vane
- 7 Rotor
- 8 Stator
- 9 Oil box
- 10 Vacuum oil
- 11 Exhaust valve plate
- 12 Screw plug for oil drain
- 13 oil glass
- 14 Screw plug for oil filling
- 15 Gas ballast valve
- 16 Mist arrester
- 17 Outlet port
- 18 Handle
- 19 flexible Coupling

07 Dimensions

type	L	L1	L2	L3	L4	B	b	b1	d1	d2	M	H
2AB-1	478	135	135	223	150	148	96	126	19	23	M6	277
2AB-2	518	135	135	263	150	148	96	126	19	23	M6	277



Email: contact@biolabscientific.com
Website: www.biolabscientific.com