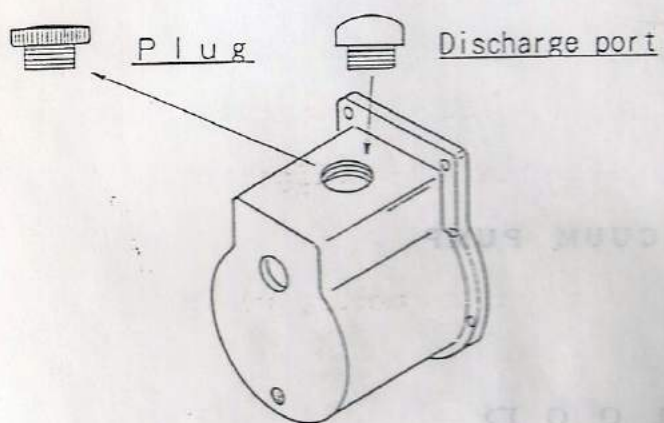
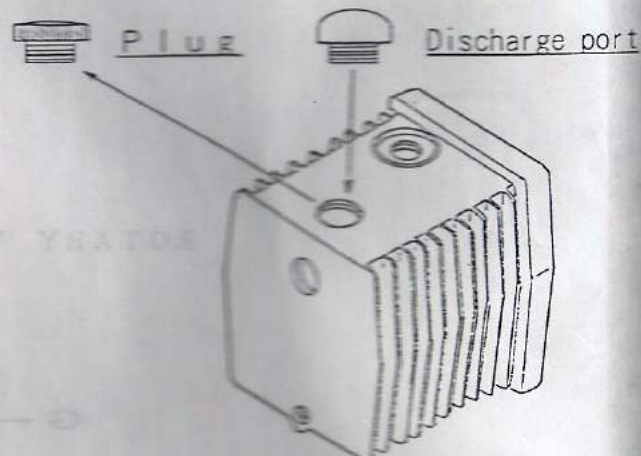


CAUTION

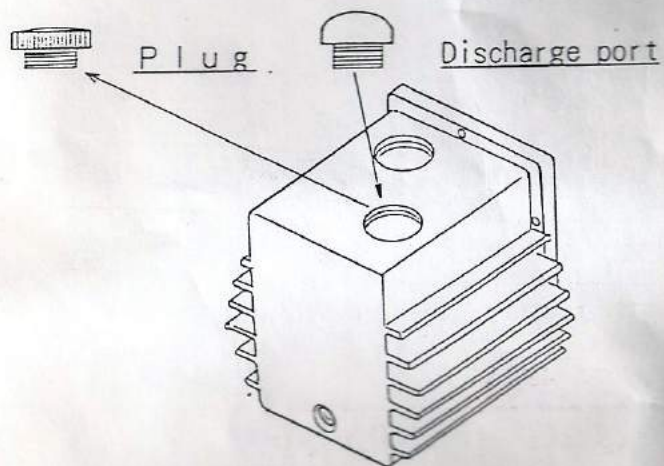
Exchange the plug to discharge port before operation.



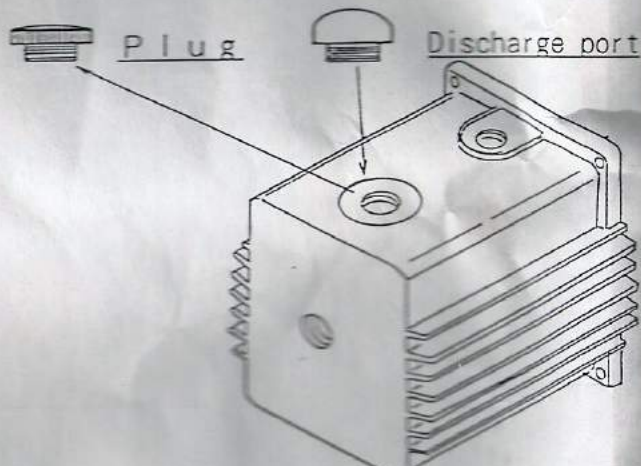
G-5D, G-20D, G-50D, GC-20D, GC-50D
G-10D, G-25S, G-50S, GC-25S



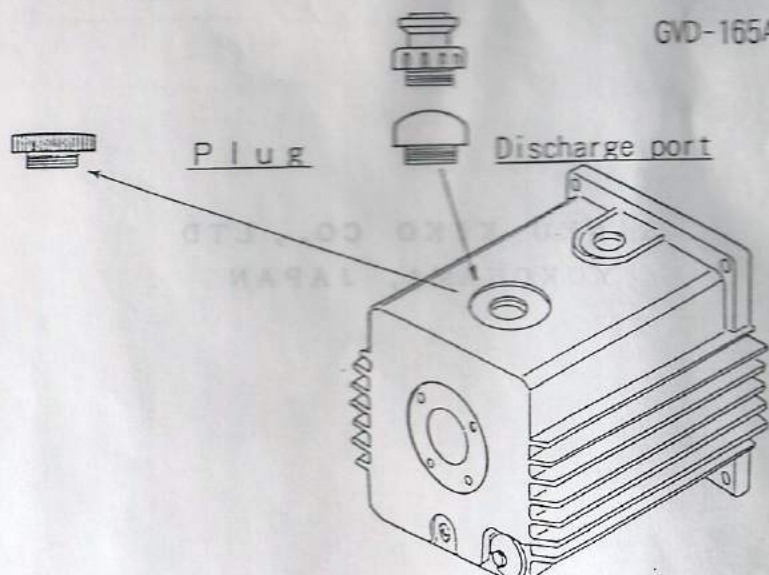
G-100D, G-100S
GC-100D



GVD-050A



GVD-100A, GVD-135A
GVD-165A, GVD-200A



GLD-050, 100, 135, 165, 200
GCD-050XA, 135XA, 200XA

Introduction

This pump is suitable for use to vacuum pumping system in laboratories and especially to evacuate a refrigeration system.

This type is directly coupled with the motor, well proven in reliability and quiet in operation.

This pump is extra small size and light weight. It is recommended to use the good quality mechanical pump oil.

Specifications

Items	50Hz	60Hz
Pump speed	100 l/min	120 l/min
Ultimate pressure	5×10^{-4} Torr (6.7×10^{-2} Pa)	
Motor	115 V 4P 1 ϕ condenser start 400W[200V 4P 3 ϕ	
Motor speed	1430 r.p.m.	1720 r.p.m.
Oil capacity	SMR-100.8 0 0 cc	
Weight	23.5 kg	
Overall dimension (L x W x H)	169 X 461.5 X 264 mm	
Accessory	Oil	

Ultimate pressure is measured by "McLeod Gauge".

I Inspection

When unpacking, check the following items.

- 1) Is the pump received of the exact model you have ordered ?
- 2) Visually inspect if there is any damage to the pump and the parts caused by transportation.
- 3) Check for any looseness of screws or nuts or for any disconnection of parts.

Note: Should you have noticed any troubles or damages with the pump or its accessories, please contact to us.

II Mounting

Please set the pump horizontally on a rigid floor, as this pump is handy-type. This is almost free from vibration during operation and has no need of anchor bolts in mounting.

The base of pump should be, however, installed reasonably flat to avoid possible rattling of the pump.

III Oil filling

- 1) Remove the discharge pipe (see Fig. 1) and make sure that oil drain plug is closed.

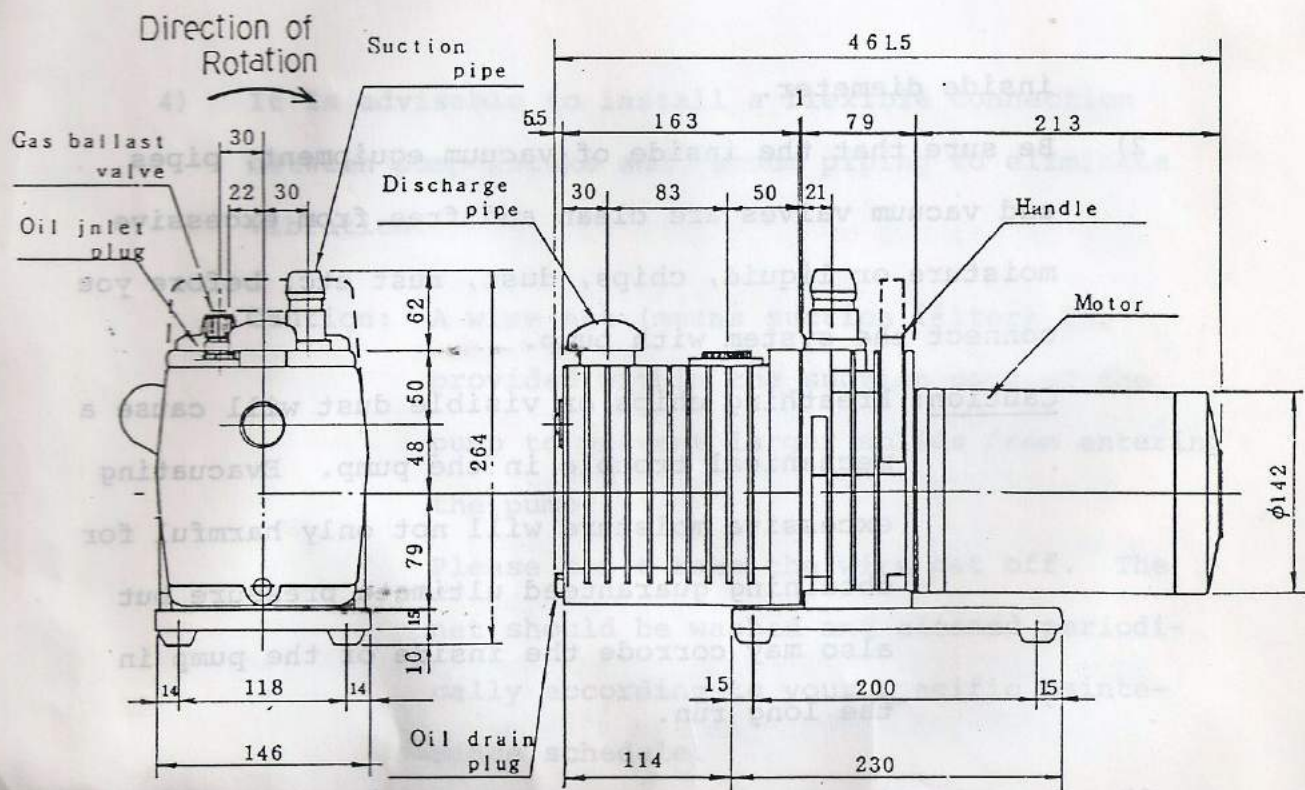


Fig. 1

- 2) Fill the rotary vacuum pump oil until the oil can be observed at the oil level window attached to a side of the pump.

Level will change depending on suction pressure.

IV Connection with vacuum system

- 1) Connection with an evacuation pipe is usually made by using a vacuum grade rubber tubing. Application of thin layer of high vacuum grease at the joint will often be helpful for keeping vacuum tightness.

Please use a vacuum grade rubber tube of $\phi 18 \sim \phi 25 \text{mm}$

inside diameter.

- 2) Be sure that the inside of vacuum equipment, pipes and vacuum valves are clean and free from excessive moisture or liquid, chips, dust, rust etc. before you connect the system with pump.

Caution: Breathing chips or visible dust will cause a mechanical trouble in the pump. Evacuating excessive moisture will not only harmful for obtaining guaranteed ultimate pressure but also may corrode the inside of the pump in the long run.

- 3) Installation of a vacuum valve and a leak valve between the equipment and the vacuum pump is required.

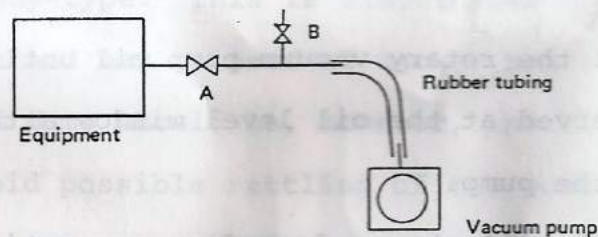


Fig. 2

When the pump stops, shut the vacuum valve (A) to keep the equipment in vacuum, then open the leak valve (B) and let air into the pump to prevent from counter-flow of the rotary vacuum pump oil.

- 4) It is advisable to install a flexible connection between pump intake and vacuum piping to eliminate vibration.

Caution: A wire net (means suction filter) is provided within the suction port of the pump to prevent larger solids from entering the pump.

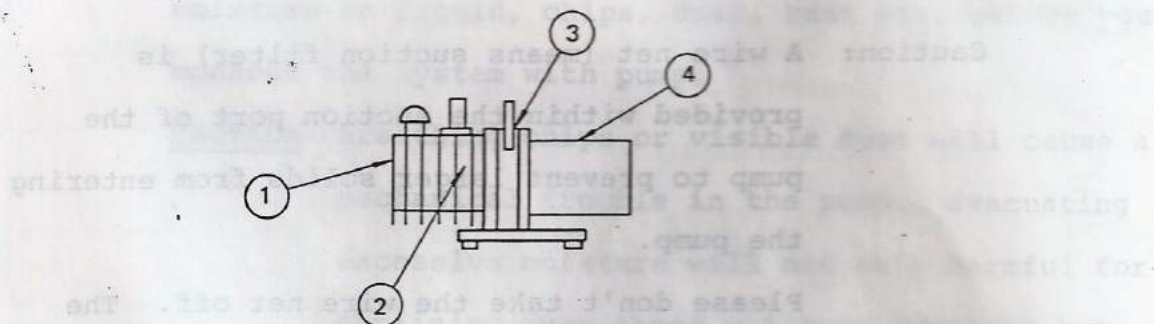
Please don't take the wire net off. The net should be washed and cleaned periodically according to your specific maintenance schedule.

V OPERATION

5-1 Pump start

Re-check prescribed installations once more and operate your pump; in accordance with the following procedures to obtain the specific performance of the pump.

- 1) Close the vacuum valve (A) (as shown in Fig. 2) and open the leak valve (B).
- 2) Turn the motor-switch on.
- 3) Close the leak valve (B) when the pump is rotating at a constant speed.



Suction Pressure: 1.3×10^3 Pa (10 Torr)

Ambient Temperature: 26°C

Temperature rise (deg.)

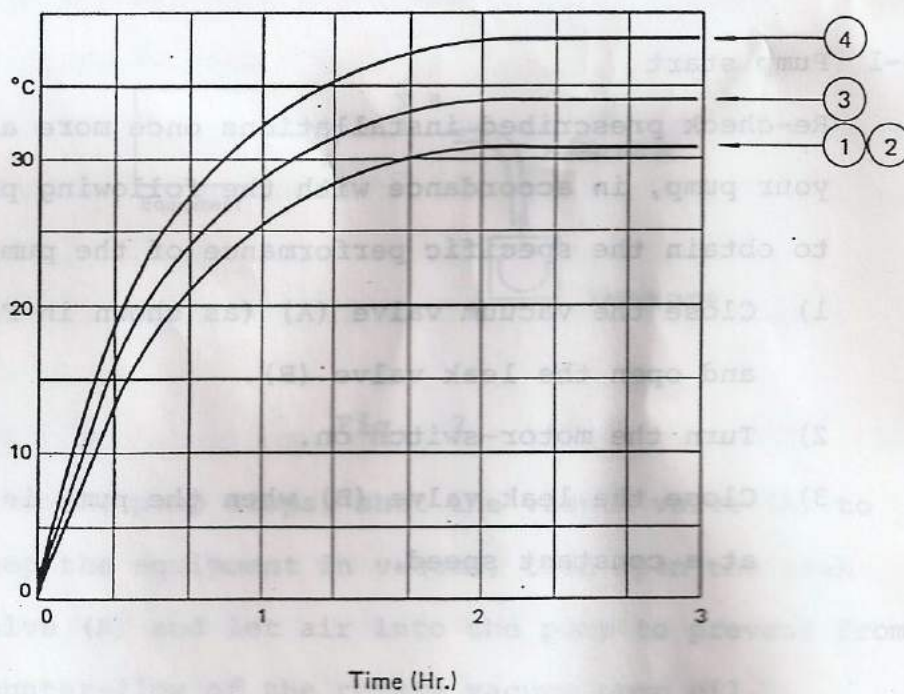


Fig. 3

Note: a) If the pump does not rotate under the above procedures, contact us.

b) Temperature rise of pump running at 1450 r.p.m. (50Hz) is shown in Fig. 3.

c) Evacuated Gas

i) Normally our pumps are used to evacuate clean air, and should not evacuate excessive moisture, organic solvents, corrosive gas, etc.

ii) Breathing chips or visible dust will cause a mechanical trouble in the pump.

d) Temperature

i) The viscosity of the pump oil is varied with the environment temperature.

When these are used under a lower temperature, the viscosity of the pump oil will become higher, and the starting load should be increased.

Please do not use under a room temperature of 6°C.

ii) When the pump is kept running, the temperature of the pump will rise.

Please do not use above a room temperature of 30°C.

e) Sources of Electricity

Suitable voltage is 115 volts, and the allowable limitation of voltage is $\pm 10\%$.

5-2 Pump stop

- 1) Close the vacuum valve (A) to system.
- 2) Stop the motor and break vacuum (open the leak valve (B)).

Note: Make sure the leak valve is opened when the pump is stopped or in case of power failure.

VI ULTIMATE PRESSURE

"Ultimate pressure" means the lowest attainable pressure of the pump. Therefore, this pressure should be measured under the most favourable condition using new specified pump oil, by means of a vacuum gauge installed at the suction pipe of the pump; the rest of the vacuum system should be functionally disconnected from the pump.

The measured values of the ultimate pressure of the rotary vacuum pump may slightly depending upon the kind of the vacuum gauge used. According to "Japan Industrial Standard (JIS)" the ultimate

pressure is measured by means of a McLeod gauge which is capable of measuring the partial pressure of air only.

If the ultimate pressure is measured without disconnecting the vacuum equipment, the observed pressure may be higher than the specified ultimate pressure of the pump due to the influence of the vapor or various kinds of gas produced from water drops or rust adhering to the inner wall of the equipment. If any other gauge except McLeod gauge is used, the above mentioned difference may be very large.

VII PERIODICAL CHECKING

Check the following points periodically.

- 1) Check for looseness of bolts and nuts.
- 2) Check for leakage of oil and air from the shaft seal portion or any other portions.
- 3) Replace vacuum pump oil periodically. Check the oil turbidity through the oil level window. It is very preferable to replace oil for the performance of the pump. It is recommended to replace oil 5 ~ 6 times a year.

VIII OIL REPLACEMENT

It might be necessary to replace oil when the ultimate pressure of the pump itself is unsatisfactory or the oil becomes too dirty. Although the oil becomes somewhat black during operation, it can be operated so far as good vacuum is obtained. It is often the case where the ultimate pressure is not attained by simple one-time replacement of oil.

Especially, and in case any low boiling point substance (water or solvents) is contained in the oil or any solidified muddy content is accumulated on the bottom of the oil basin, it is necessary to wash out them by repetition of the oil replacement. Please replace oil in accordance with the following procedures:

- 1) Remove the drain plug and drain almost all oil. Operate the pump for 2 ~ 3 seconds, the remaining oil will then be completely drained. During the operation, it is advisable to let a small amount of leak out of the suction side. However, be careful about possible scattering of oil from the drain port.
- 2) Close the drain plug and fill new oil from the suction pipe. (means inlet). After running for a minute, drain the oil in the same way as the above step.

3) Repeat steps 1) 2) two or three times; the pump will be almost clean.

4) Finally, close the drain plug and fill the specified amount of new oil.

NOTE: 1) Vacuum pump oil

Please use NEOVAC MR-100 or the equal quality of mechanical vacuum pump oil. (See Table 1)

Specific Gravity (15/4°C)	0.89 max.
Reaction	neutral
Flash Point (°C)	210 min.
Viscosity 50°C (CST)	24.0/31.5
" (RW No. 1)	100/130
Viscosity Index	95 min.
Pour Point (°C)	-10 max.
Color (union)	1 1/2 max.
Acid. Value (mgKOH/g)	0.01 max.
Emulsion Characteristics	40-40-0 (5 max.)
Copper Corrosion	1 max.
Loss for Heating 98°C x 5Hr(%)	0.01 max.
Vapour Pressure 50°C (Torr)	1×10^{-4} max.
Heat Stability 170°C x 12Hr.	Pass

TABLE 1. "NEOVAC MR-100"

2) In case of some low boiling point substance
(water or solvents) is contained in the oil,
open the G.V. to eliminate them.

NOTE: 1) Vacuum pump oil
Please use HVOAC MR-100 or the equal quality of

mechanical vacuum pump oil. (See Table 1)

Specific Gravity (15°C) 0.89 max.

Flash Point (°C) 100 min.

Viscosity (50°C) 100-150 cSt

Viscosity Index 100 min.

Color (union) 1 max.

Acid Value (mgKOH/g) 1 max.

Corrosion Characteristics (see Table 1)

Copper Corrosion (see Table 1)

Base for Heating 300°C (max)

Base for Heating 300°C (max)

Base for Heating 300°C (max)

Base for Heating 300°C (max)

Base for Heating 300°C (max)

Base for Heating 300°C (max)

Base for Heating 300°C (max)

Base for Heating 300°C (max)

Base for Heating 300°C (max)

Base for Heating 300°C (max)

Base for Heating 300°C (max)