

1011315-2-02-1

**MODEL**  
**G-100DA**  
**G-100DB**  
**G-100DC**  
**G-100DD**

**DIRECT DRIVE OIL ROTARY VACUUM PUMP**  
**INSTRUCTION MANUAL**

*Before Use*

*For safe and efficient use of this system, be sure to read this manual before use.*

*After reading the manual, keep it in your file for future reference. The specifications of this system are subject to change without notice for improvement in future.*

**SINKU KIKO Co., Ltd**

**-For Safe Operation ! -**

1. Do not use this pump for pressurization.
2. This pump is not explosion-proof. Do not use it in an atmosphere where there is a risk of ignition.
3. Do not plug the discharge port during operation.
4. Never touch a rotating part by hand or with any object.
5. Do not touch the electrical wiring when power is put to work.
6. Do not insert finger or object into the suction port nor look into it.
7. The pump is hot during operation or immediately after it is shut down.
8. Do not forget to fill the pump with oil.
9. Do not use the pump to suck compressed air.
10. When carrying the pump, securely hold the handle. Use care not to drop the pump. The pump is heavy enough to injury you if you drop it.
11. Before holding the handle, be sure to shut down the pump.
12. Connect the power cable to the rated power outlet specified on the pump motor.
13. Do not damage the power cable. When unplugging the cable, remove it by the plug.
14. Do not give an impact to the pump.
15. If you witness or perceive any unusual phenomenon like unusual sound or smell, immediately unplug the power cable and contact your local SINKU KIKO representative.
16. Dispose of the used oil that is drained by oil charge according to your local laws and regulations.
17. Always use the pump in a horizontal position.
18. Use this pump indoors.

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## 1. INTRODUCTION

This pump is designed exclusively for evacuation. Improper operation can lead to a trouble or failure of the pump. Carefully read this manual before operation and give thorough consideration to inspection/maintenance and safety.

This manual contains general information about the pump. For the operation not given in this manual, consult with us in advance.

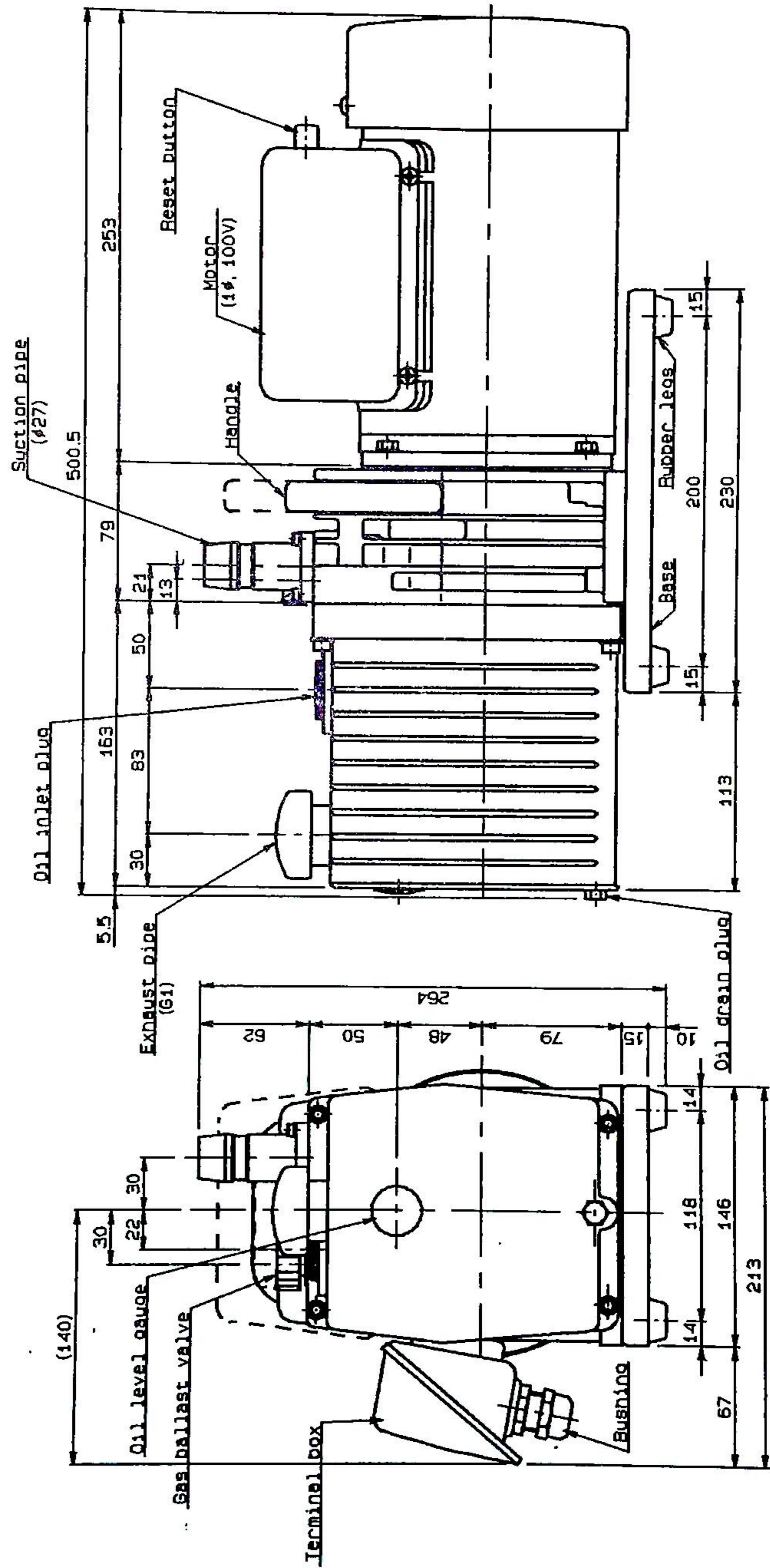
## 2. SPECIFICATIONS

Model		Unit	G-100D	
			50 Hz	60 Hz
Type			Sliding vane type, 2 stages	
Pumping speed		L/min	100	120
Ultimate pressure (Inlet pressure)	G.V. close (Note)	Pa	$6.7 \times 10^{-2}$	
	G.V. open (Note)		6.7	
Motor used	Single phase (G-100DA) (G-100DB)		100V, 400W (Out put), 4poles, IP44 Capacitor start & run	
		A	6.1	5.3
		rpm	1450	1745
	Single phas (G-100DC)		200 V, 400 W (Out put), 4poles, IP44 Capacitor start & run.	
		A	3.1	2.7
		rpm	1450	1745
	Three phase (G-100DD)		200 V, 400 W (Out put), 4 poles, IP44	
		A	2.3	2.0
		rpm	1445	1735
Suction pipe dia.		mm	$\phi 27 \times \square 40$	
Discharge pipe thread			G1	
Oil requirement		mL	800	
Type of oil			SMR-100	
Weight	Single phase	kg	23.6	
	Three phase		18.6	
Operating ambient temperature		°C	7 to 40 (May be difficult to start pump when oil temperature is 7°C or less at start)	
Noise value		dB (A)	70 or less	
Maximum dimensions	Single phase	W × L × H (mm)	221 × 500.5 × 264	
	Three phase		216 × 490.5 × 264	

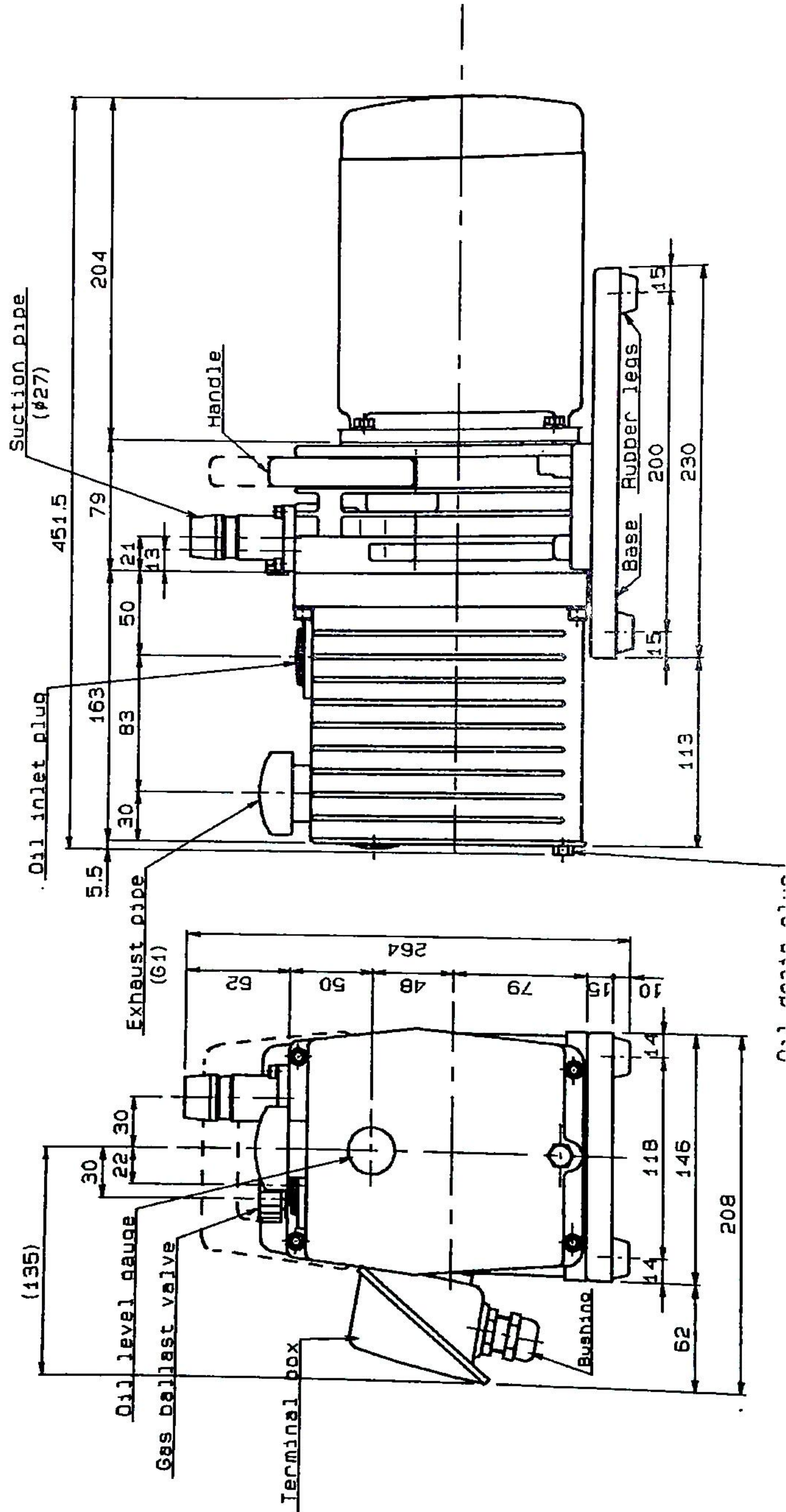
**NOTE :** G. V. stands for gas ballast valve.

# DIMENSIONAL DRAWING

## Model G-100D(Single phase)



el G-100D(Three phase)



## INSTALLATION AND OPERATION

- (1) Remove the cap from the suction pipe of the pump before use.
- (2) Oil has been drained to prevent oil leak in transit. Fill the pump with the supplied vacuum pump oil. Remove the oil inlet plug and fill oil until the oil level comes between the MAX. and MIN. levels of the oil level gauge.

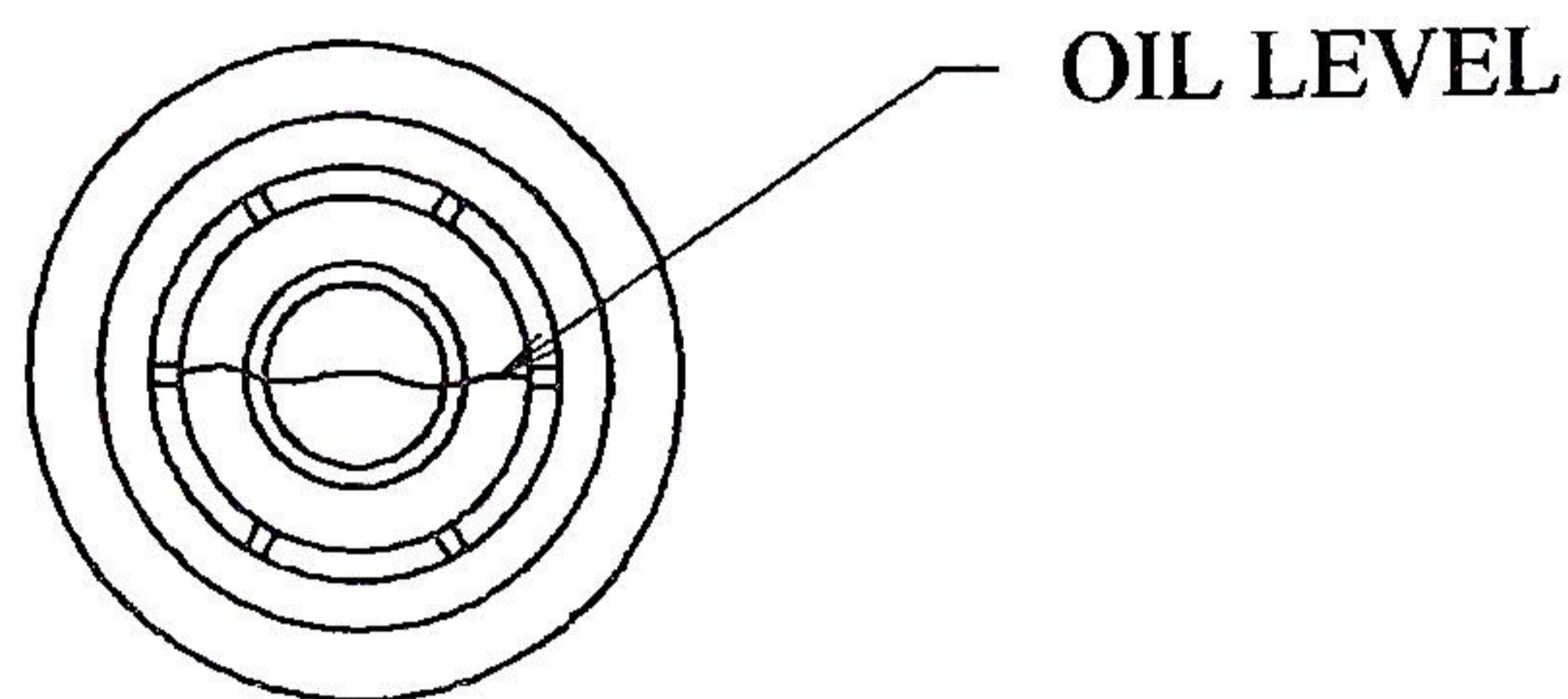


Fig. 1 Oil level

- (3) Install the pump in a clean, dry place indoors where inspection and maintenance can be conducted easily.
- (4) Always use the pump in a horizontal position.
- (5) Use the pump within the ambient temperature range from 7°C to 40°C.
- (6) If the pump is incorporated in a system, take care to the environment temperature. Float the pump from the system using a rubber vibration isolator so that pump vibration is not transmitted to the system.
- (7) To connect pump and power outlet, use the power cable conformed with the motor rating current and voltage.
- (8) This pump has no power switch. For a motor, provide a switch that switches off all wires at the power outlet.
- (9) Connect the power cable to a suitably fused or protected power outlet compatible with the motor rating.
- (10) If the motor is changed with a motor for use on three phase power, turn ON the power switch after plugging the power code to the terminal block of the motor and check if the motor rotates



counterclockwise as viewed from the back of the motor. At this time, noise will be heard from the pump which is operated in atmospheric, but this is not a trouble.

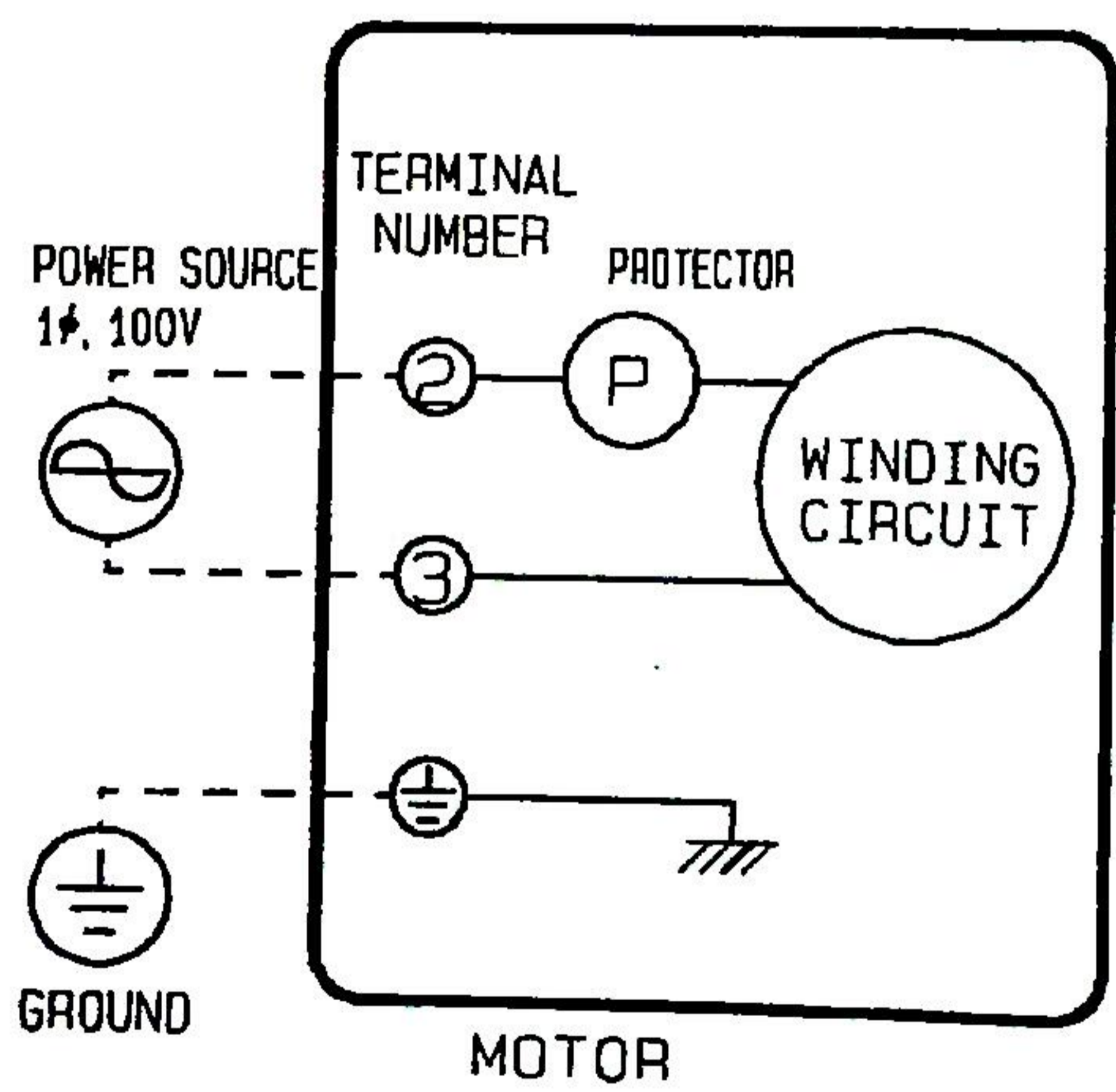
(11) (Thre phase motor) If the motor rotates in the reverse direction, unplug the power cable and interchange two of the three phases. If the pump rotates in the reverse direction, oil will be diffused from the suction port and the pump may fail.

(12) Make piping arrangement so that there is no leak in the suction pipe. The connection can be securely sealed by applying silicon grease. Do not use a long hose for evacuation. Use as short a hose as possible as the piping.

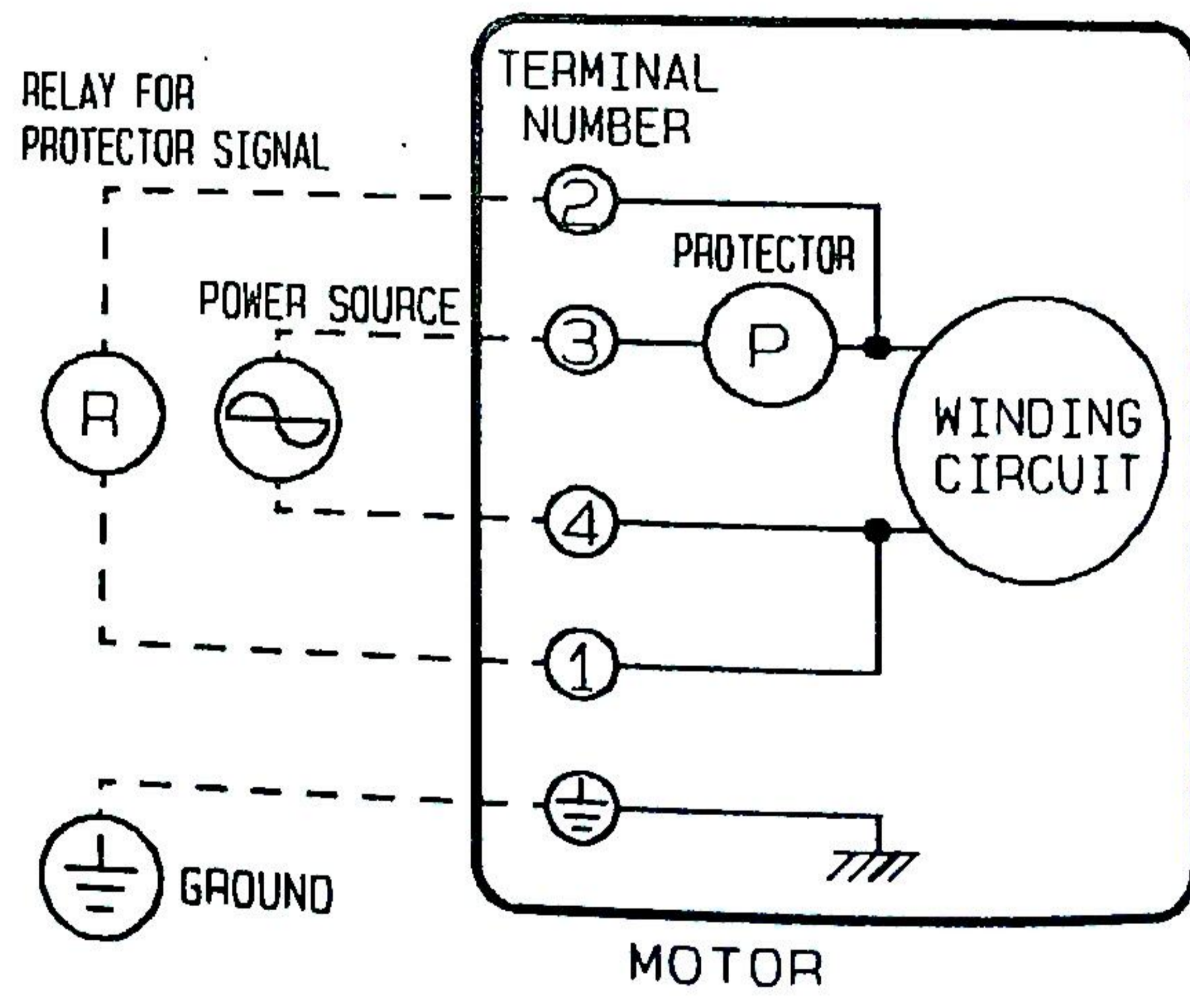
(13) If the pump is filled with the sucked gas, the level gauge will pop up, which can be dangerous.

When a duct or other is connected to the exhaust side, make piping arrangement so that back pressure is not applied to the front cover.

(14) Wiring diagrams for each models are shown bellow. Ensure statements (7),(8),(9),(10),(11) in this clause.



G-100DA



G-100DB, G-100DC

Fig. 2 Wiring Diagrams

(15) When evacuating a chamber, provide a shutoff valve between the pump and the chamber to keep the chamber in vacuum after completion of operation. Also provide a vent valve between the shutoff valve and pump as shown in the figure 3 below to prevent oil from flowing back after completion of operation.

(During pump operation : shutoff valve open, vent valve closed)

(When pump is shut down : shutoff valve closed, vent valve open)

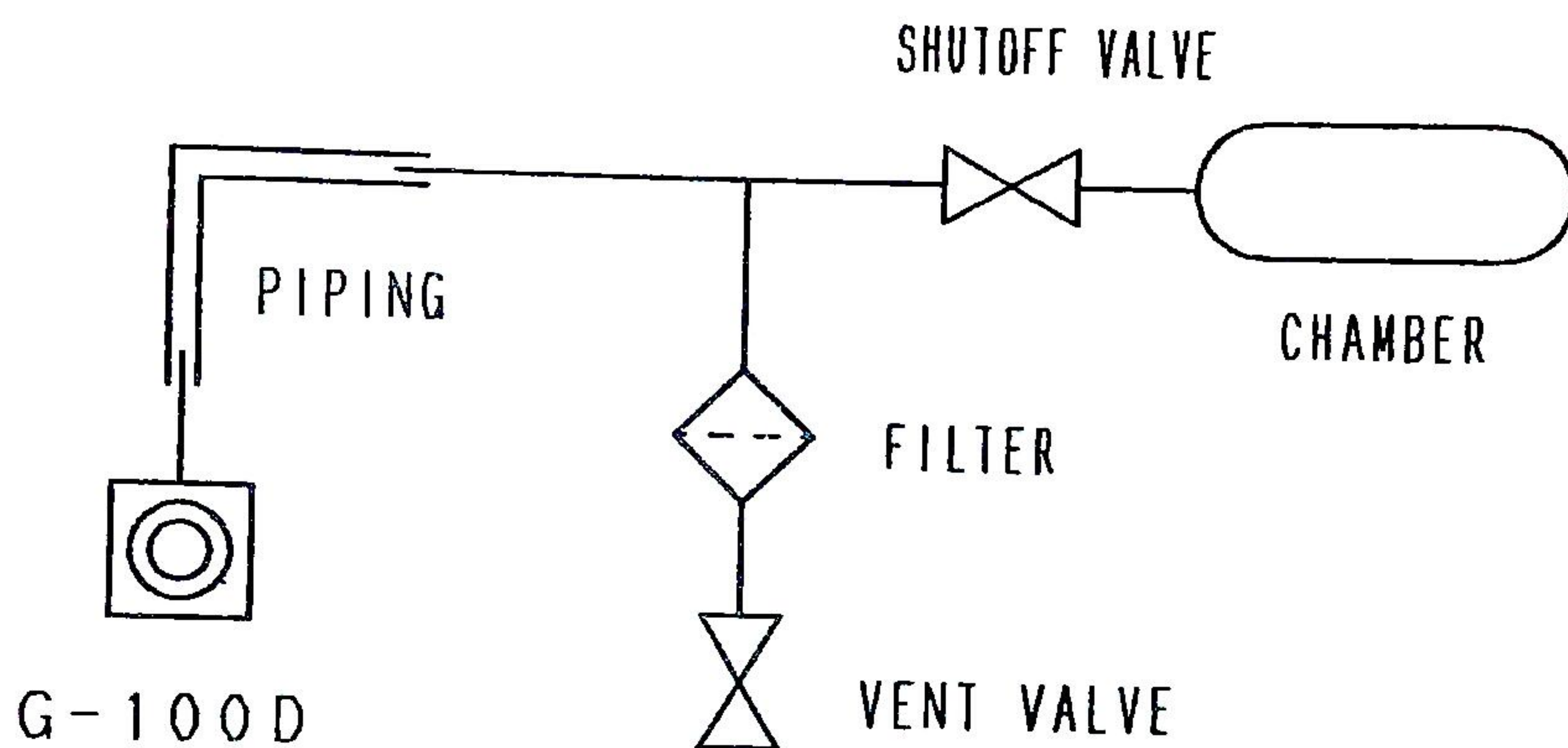


Fig. 3 Piping arrangement

(16) After checking the above, turn the pump switch ON to start operation.

## 5. SHUTDOWN

- (1) Turn the pump switch OFF.
- (2) This series of pumps not equipped with an anti-backflow mechanism. When shutting down the pump, be sure to vent the inlet port side to atmospheric pressure to prevent oil from flowing back.

## 6. CAUTIONS DURING OPERATION

Be sure to comply with the following cautions so that the pump is operated safely and without trouble.

### 6-1 Cautions during Operation

- (1) If the pump is operated continuously at a suction pressure higher than the ultimate pressure or with the gas ballast valve opened, oil will be discharged in the form of mist and the oil will be consumed sooner. Refill oil from time to time.
- (2) Remove the discharged oil mist safely or use the optional mist trap to remove oil mist.
- (3) This pump is not treated against corrosion. So do not use it to suck corrosive gas or liquid, organic solvent, condensable gas, water vapor, etc. If such material is sucked into the pump, emergency action can be taken by using the gas ballast valve if the sucked material is water vapor or condensable gas, but if liquid or gas is sucked and is left in the pump, rust will gather, resulting in oil leak or other trouble. In that event, immediately change the oil with fresh one.
- (4) Use the pump in an environment where dust or dirt is not admitted into the pump.
- (5) If the pump is incorporated in a system, keep the ambient temperature of the pump within the range of 7°C to 40°C using a cooling fan or the like.
- (6) This pump is not explosion-proof. Do not use it in the vicinity of inflammable solvent or the like, which can be very dangerous.
- (7) Do not use the pump except on the rated power specified on the motor. The motor will be overheated or cause noise.
- (8) Do not plug the discharge port nor reduce the discharge port diameter during operation

- (9) Do not restrict air flow to motor fan.

**-2 Startup in Cold Season**

- (1) When the pump is used in a cold season, the motor rotation will slow down and may stop as the suction pressure lowers because of high viscosity of oil. In such a case, run the pump for one to two minutes with the suction pipe vented to atmospheric pressure and wait until the temperature rises before starting operation.
- (2) When the pump is started at a low temperature, it will take time before the motor attains normal revolution. At this time, the motor current is 1.5 to 2 times higher than the rated current value, but this is not a trouble.

**i-3 Thermal Protector**

- (1) The single-phase motor for this pump includes a manually reset thermal protector. This automatically shuts off the motor power circuit to prevent the motor from burning when the motor has stopped rotation due to pump failure or is energized with an overcurrent due to overload. The type of the thermal protector varies with the pump model.

Operating temp.	100 ± 7°C
Resetable temp.	74 ± 12°C

- (2) If the thermal protector operates, turn the switch OFF and contact your local SINKU KIKO representative. At this time, never touch the motor, which is very hot.
- (3) After eliminating the cause of trouble and making sure that the motor temperature has lowered, press the manual reset button to restart operation. (Refer to "11. TROUBLESHOOTING".)

**7. INSPECTION AND MAINTENANCE**

**7-1 Changing the Vacuum Pump Oil**

- (1) Shut down the pump and wait until the pump temperature lowers.
- (2) Remove the piping, if connected, and make the pump bare. At this time, close the shutoff valve. (See Fig. 3.)
- (3) Operate the pump with the suction port vented to atmospheric

- pressure for five seconds to drain the oil in the pump.
- (4) Prepare an oil container (more than one liter) to receive the drained oil and place it in a receiving position.
  - (5) Remove the oil inlet plug and then the oil discharge plug (with O-ring) to drain pump oil.

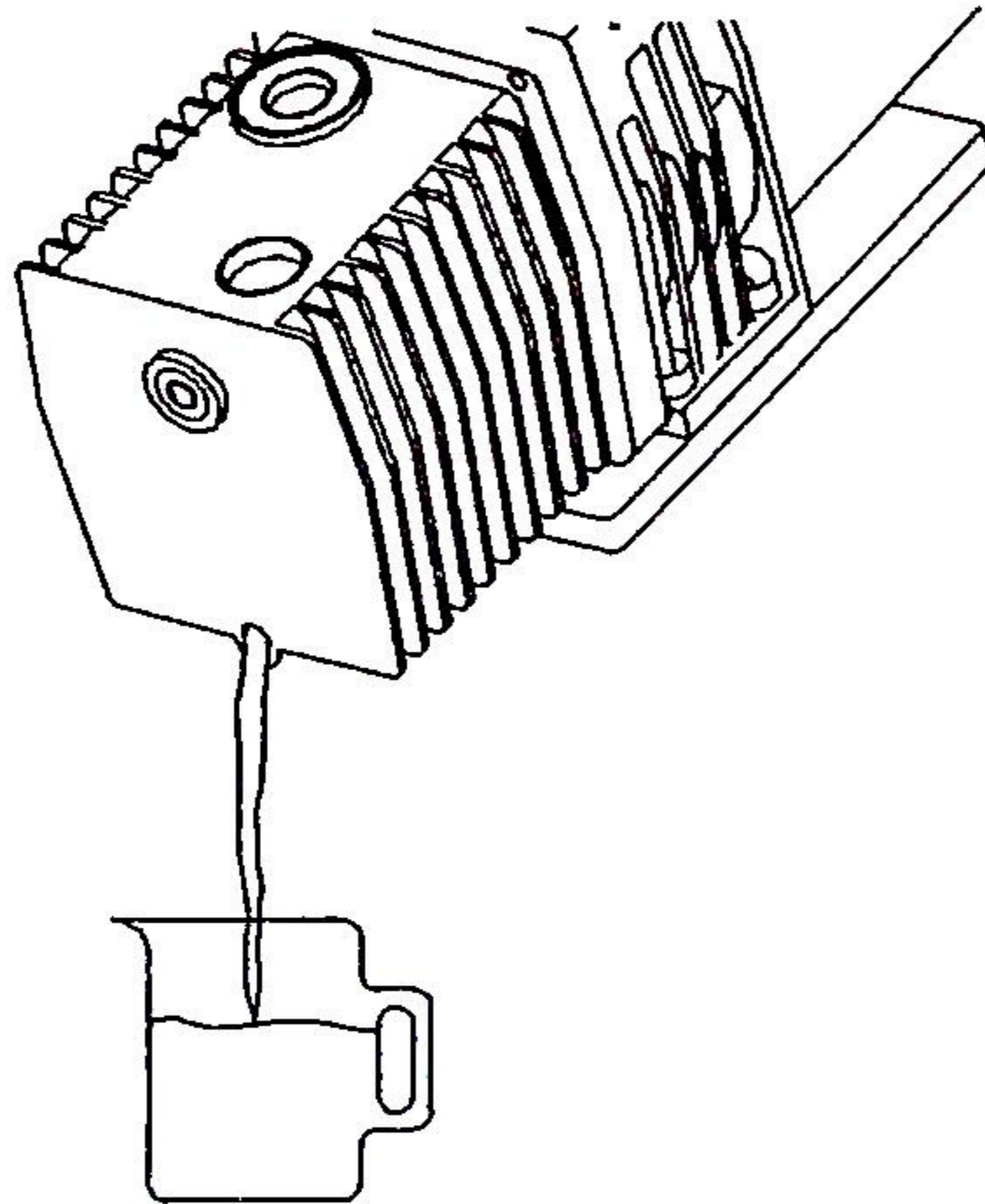


Fig. 4 Draining pump oil

- (6) Plug the drain plug (with O-ring) and pour the specified volume of vacuum pump oil through the oil filling port.

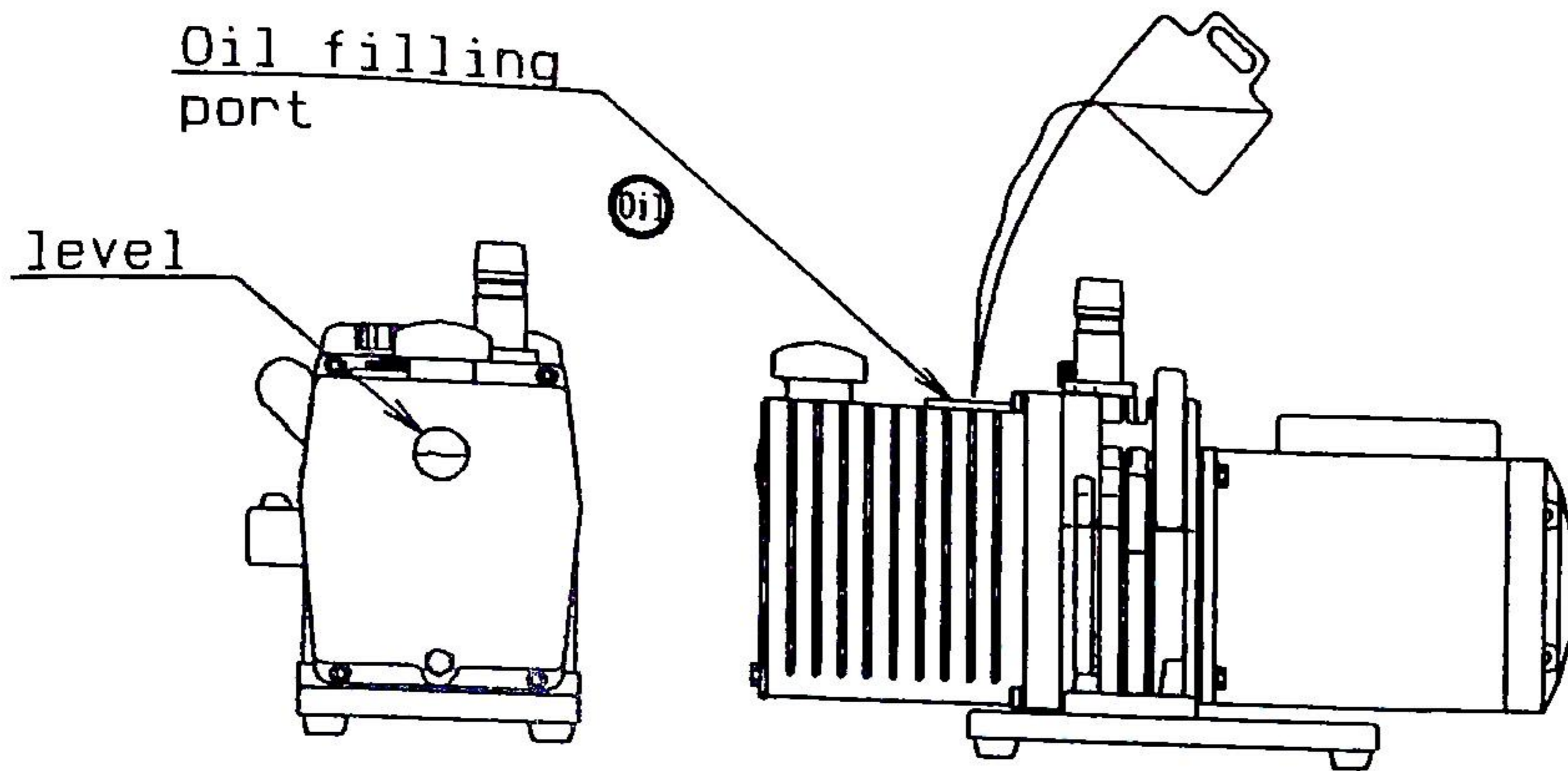


Fig. 5 Filling pump oil

- (7) Attach the oil inlet plug.
- (8) If oil is spilt inadvertently when filling the pump with oil, be sure to wipe it off. Otherwise, you may slip on the oil or take it for an oil leak at scheduled inspection.
- (9) Dispose of the drained or removed oil according to your local laws and regulations
- (10) Type of Oil used SMR-100 (mineral oil)

7-2 Scheduled Inspection

Frequency	Component	Check	Corrective action
Daily	Oil level gauge	Is oil level proper?.	Refill oil.
	Oil contamination	Check oil color through oil level gauge. Oil is abnormal if color is reddish brown or milky white.	Change oil.
	Sound and/or vibration	Unusual sound and/or vibration	Disconnect power and contact us.
Weekly	Overheating	Pump surface temperature (①,②,③) is room temperature +50°C or more	Disconnect power and contact us. Do not touch pump by naked hand.
	Oil leak	Check shaft seal, plugs and case fitting for oil leakage (See Fig. 7).	Disconnect power and contact us. Do not touch pump by naked hand.
Monthly	Oil filter	Filter clogged	Clean (Refer to 7-2.)
Six months after filling fresh oil or after 3000 hrs operation			Change oil (Refer to 7-1.)
2000hrs	Oil mist filter		Exchange filter element

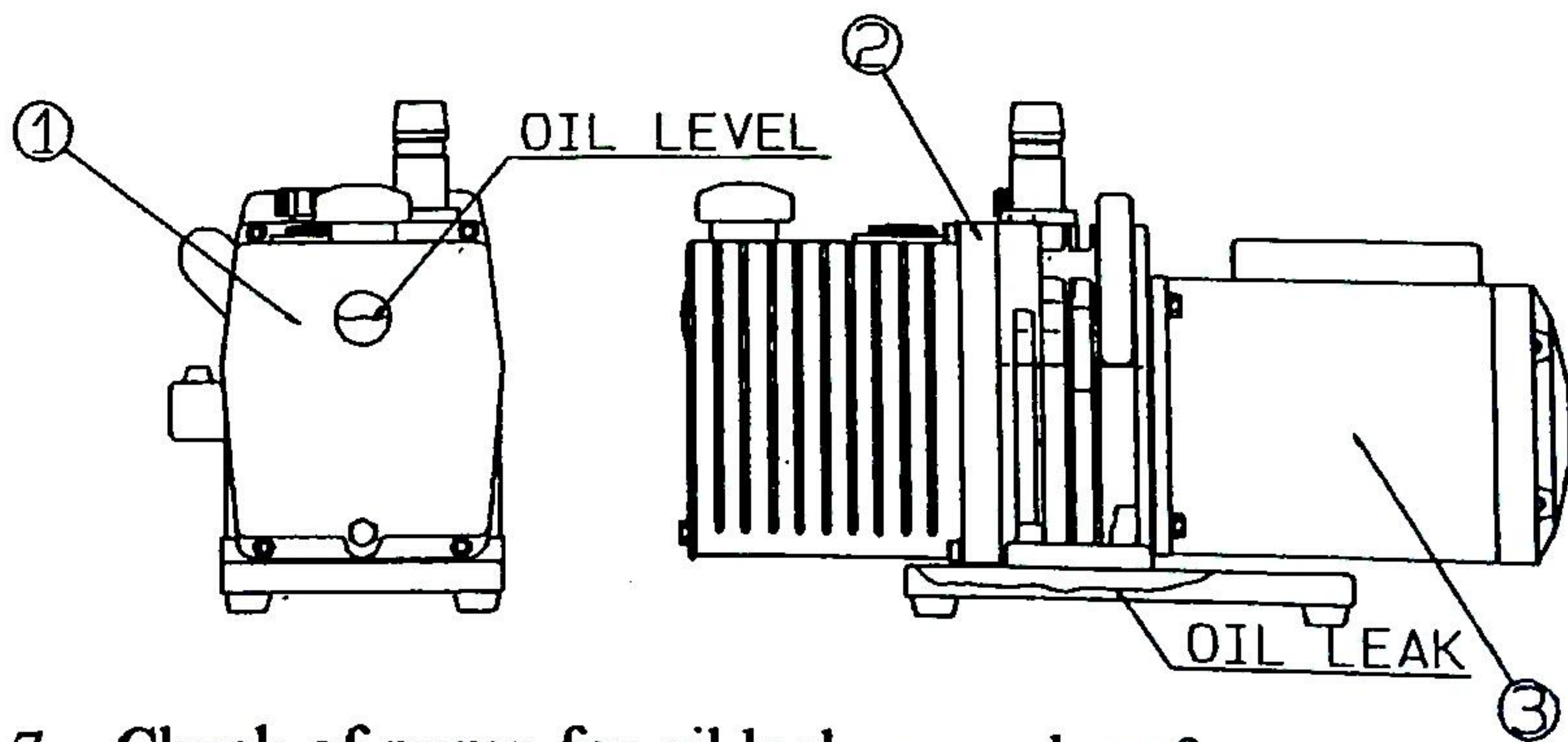


Fig. 7 Check of pump for oil leakage and surface temperature measuring point

## 7-3 List of Consumables

Description	GLD-100		GLD-135	
	Qty	Material	Qty	Material
Oil seal	4	NBR	4	NBR
O-ring	21	NBR	21	NBR
Discharge valve	2	FPM	2	FPM
Discharge valve spring	2	SUS316	2	SUS316
Check valve	2	FPM	2	FPM
Check valve spring	2	SUS316	2	SUS316
Vane	4	PF	4	PF
Vane spring	4	SUS316	5	SUS316
Coupling (spider)	1	NBR	1	NBR

- 1) Refer to "10. PARTS LIST" for the code No.
- 2) Refer to "9. EXPLODED VIEW" for the replacement of parts.

### 8. STORAGE

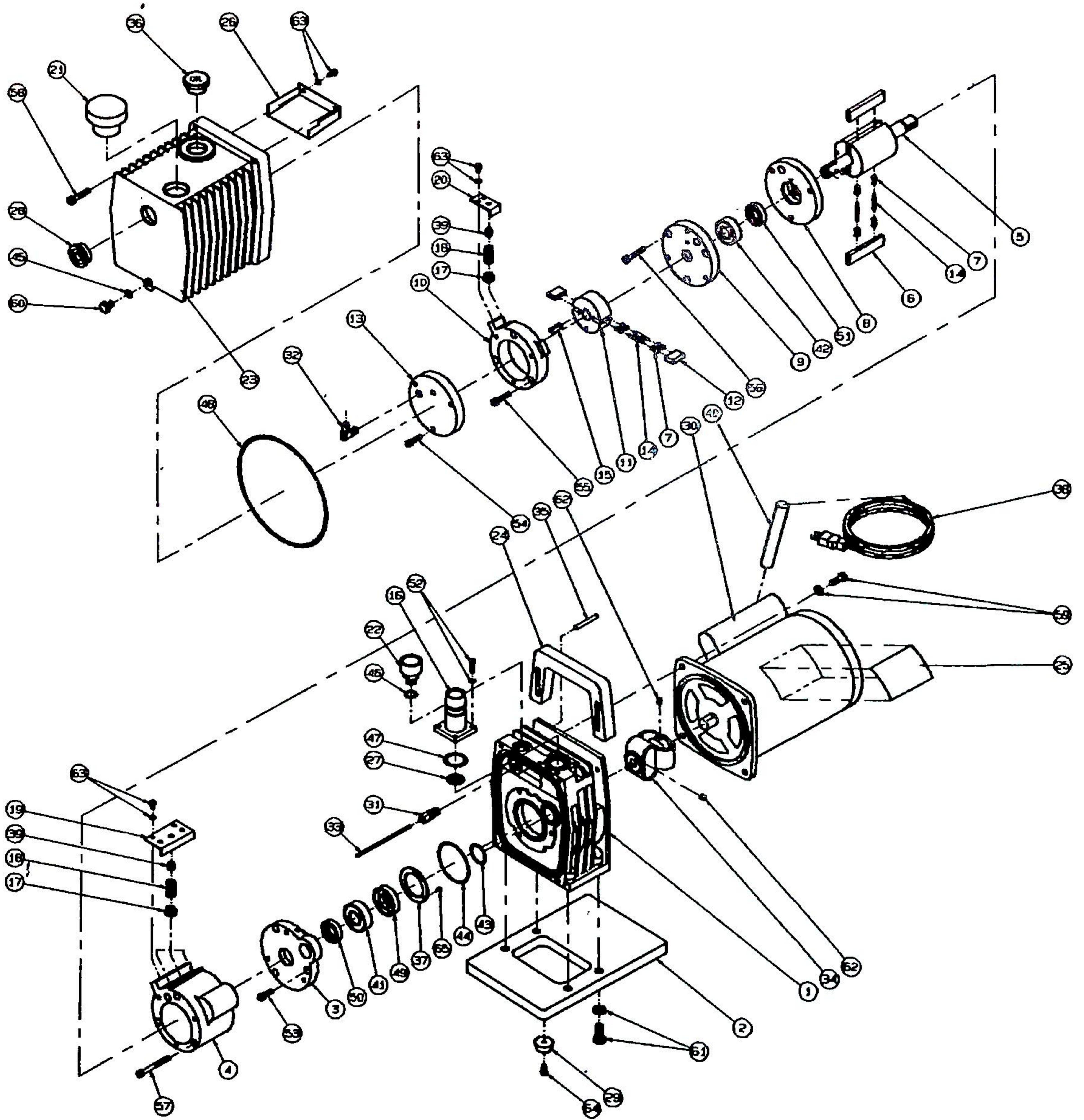
Turn the pump switch OFF, unplug the power cable, put the cap on the suction pipe and discharge pipe and store the pump in a clean, dry place.

If the pump is not used for a long time, fill the pump with fresh oil before storage. If the pump is stored with old oil in it, the pump interior may be corroded or the pump oil may be decomposed. This may cause trouble at startup.

Do not store the pump at an elevated place or in an unstable position.



# 9. EXPLODED VIEW Model G-100D



# 10 Parts List (G-100D)

No	CODE No	QTY	DESCRIPTION	REMARKS	No	CODE No	QTY	DESCRIPTION	REMARKS
1	00167	1	CASING		39	00271	4	SPRING HOLDER	
2	00510	1	BASE		40	01929	1	CORD ARMOR	
3	00677	1	No.1 INTERMEDIATE COVER		41	00535	1	BEARING	6203
4	00638	1	No.1 CYLINDER		42	00530	1	BEARING	6002
5	00652	1	No.1 ROTOR		43	00041	1	O-RING	S-24
6	00665	2	No.1 VANE		44	00047	1	O-RING	S-55
7	00528	8	VANE SPRING		45	00034	1	O-RING	P-8
8	00724	1	No.2 INTERMEDIATE COVER		46	00025	1	O-RING	P-12
9	00740	1	No.3 INTERMEDIATE COVER		47	00029	1	O-RING	P-24
10	00694	1	No.2 CYLINDER		48	00055	1	O-RING	V-160
11	00704	1	No.2 ROTOR		49	00080	1	OIL SEAL	TC-17-40-9
12	00714	2	No.2 VANE		50	08430	1	OIL SEAL	SCY-17-30-7
13	04279	1	SIDE COVER		51	00083	1	OIL SEAL	SC-15-30-7
14	00592	4	VANE SPRING HOLDER		52	01348	4	HEX. SOCKET HEAD BOLT	M4×16
15	00141	1	KEY		53	01318	3	HEX. SOCKET HEAD BOLT	M5×16
16	04776	1	SUCTION PIPE		54	01320	3	HEX. SOCKET HEAD BOLT	M5×20
17	00858	4	DISCHARGE VALVE		55	01321	3	HEX. SOCKET HEAD BOLT	M5×25
18	00869	4	DISCHARGE VALVE SPRING		56	01322	3	HEX. SOCKET HEAD BOLT	M5×30
19	00686	1	No.1 DISCHARGE VALVE GUARD		57	01324	3	HEX. SOCKET HEAD BOLT	M5×50
20	00736	1	No.2 DISCHARGE VALVE GUARD		58	01363	4	HEX. SOCKET HEAD BOLT	M6×30
21	00856	1	EXHAUST PIPE A'SSY		59	01277	4	HEX. HEAD BOLT	M6×18
22	00435	1	GAS BALLAST VALVE		60	01275	1	HEX. HEAD BOLT	M8×10
23	00629	1	FRONT COVER		61	01282	4	HEX. HEAD BOLT	M8×20
24	00311	1	HANDLE		62	01194	2	HEX. SOCKET SET SCREW	M6×6
25	00895	1	NAME PLATE		63	01230	6	CROSS-RECESSED PAN HD MACHINE SCREW	M4×8
26	00490	1	BAFFLE		64	01216	4	CROSS-RECESSED PAN HD MACHINE SCREW	M4×10
27	00814	1	SUCTION FILTER		65	01259	3	CROSS-RECESSED FLAT HD MACHINE SCREW	M2.5×5
28	00104	1	OIL LEVEL GAUGE						
29	00458	4	RUBBER LEG						
30		1	MOTOR(1 φ,100V)						
30		1	MOTOR(1 φ,200V)						
30		1	MOTOR(3 φ,200V)						
31	00798	1	TUBE CONNECTOR						
32	00799	1	TUBE CONNECTOR						
33	00278	1	TUBE						
34	00117	1	COUPLING	K5804					
35	00273	1	SPRING PIN						
36	00077	1	OIL CAP	KRM-A3					
37	00093	1	OIL SEAL GUARD						
38	04709	1	CORD						

# 11. OIL ROTARY VACUUM PUMP TROUBLE SHOOTING LIST

[CAUSE]	[SYMPTOM]		Motor will not turn			Motor turns but,			Takes longer evacuation time than normal	Less ultimate vacuum	Souns abnormal	Oil leaks	[COUNTER MEASURE]	
	No humming noise	Motor makes humming noise	Not smoothly	Pump will not turn	Turning inversely									
Power	●											Turn switch on		
		●	●					●		●		Make rated input voltage $\pm 10\%$		
Motor	●	●	●		●			●				Re-wire		
	●	●			●					●		Replace		
Ambient temperature	●											Reset after motor cools down		
		●	●					●	●			Make it above 7°C		
Evacuation system and tubing									●			Make it below 40°C		
								●	●			Make tubing correctly		
								●	●			Use trap		
									●	●		Use filter		
									●			Replace oil		
Pump proper									●	●		Make it within gauge		
												Overhaul		
												Overhaul		
										●		Overhaul or replace		
										●		Replace		
										●		Replace		
										●		Repair or replace		
												●	Re-tighten plug or replace o-ring	
													●	Replace
													●	Replace
												●	Overhaul	

## 12. OPTIONAL ACCESSORIES

### Oil Mist Separator

This is a special oil mist separator using a micro pump filter element. Attached to the discharge port of the oil rotary pump, it removes oil mist and provides a clean vacuum.

### Oil Mist Trap

The oil mist trap is designed to trap the oil mist discharged during operation of the oil rotary pump and automatically recovers it to the vacuum pump. Small vacuum pumps, which are often used at a higher pressure, may contaminate atmosphere with splashing oil. This oil mist trap resolves this problem.

### Inline Trap

This is the type of oil mist trap to be connected to the piping and traps oil mist of harmful gas without leak.

### Oil Filtration System (Model UFO-003, Model UFO-012)

If moisture content, acids, corrosive gas or particles are admitted into a vacuum pump, they not only shorten the life of oil, but also can lower vapor pressure or lead to pump failure. The UFO series oil filtration system removes these impurities that can deteriorate oil.

### Clamp Joint for Vacuum System

### Hose Port Suction Pipe

The hose port suction pipe is available from your local SINKU KIKO representative or SINKU KIKO.

### Vacuum Pump Oil (SMR-100)

Be sure to use the specified vacuum pump oil SMR-100 for the SINKU KIKO oil rotary vacuum pumps.

Change the pump oil as frequently as practicable.

### Vacuum Rubber Hose

The vacuum pump and a chamber or other can be easily and simply connected by means of the vacuum rubber hose. Unlike ordinary hoses, it is flexible and yet is not crushed with external pressure.

### Overcurrent Relay

The three-phase motor for the SINKU KIKO pumps are not equipped with overcurrent protecting function. Use this relay when the protective function is required. It has the same function as the thermal protector.

### 13. SERVICING

This manual contains only general information about pump operation. Therefore, if you come up with any question or trouble, contact your local SINKU KIKO representative or SINKU KIKO.

#### WARRANTY

This pump is warranted for a period of twelve (12) months from the date of delivery. Troubles imputable to defects in material or workmanship during normal operation within this warranty period will be corrected by SINKU KIKO free of charge.

However, the following troubles are not covered by this warranty.

- (1) Troubles imputable to misuse, abuse or operation not in conformity with the instructions given in this manual.
- (2) Troubles caused by inflammable gas or corrosive gas, use in a dusty place or a place where temperature and/or humidity is high, use under special conditions such as radiation or other.
- (3) Troubles caused by modification or repair by an unauthorized person
- (4) Troubles caused by acts of God or force majeure
- (5) Consumables
- (6) Troubles caused by use on power other than the rated power.
- (7) Troubles caused by unusual high internal pressure, such as when the pump exhaust pipe is blocked in use.
- (8) Troubles caused by operating conditions deemed not suited to this pump by ULVAC engineer.

This warranty is limited to repair or replacement of defective parts.

**ULVAC**  
**SINKU KIKO**

**INSPECTION CERTIFICATE**

Model : G-100DA  
G-100DB  
G-100DC  
G-100DD

Designation : Oil Rotary  
Vacuum Pump

Inspected by:



**SINKU KIKO CO.,LTD.**

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