

## Quick Start Manual for OIL DIFFUSION PUMP PFL-22,PFL-22TM,PFL-36,PFL-52

### «For safe use»

This quick start manual is prepared to help users to quickly understand the product's operating method and display content. Please read the instruction manual beforehand for detailed usage, caution on product use, and safety information to use the pump correctly.

You can download the instruction manual from Ulvac website.  
<https://showcase.ulvac.co.jp/ja>

## 1. Setting

Upon delivery of this product, check first that the delivered is exactly what you have ordered and there is no break or damage through transport or the like.

Oil one time portion	ULVOIL D-11	1set
Quick Start Manual		1copy

## 2. Ambient Condition for Storage, Install and Operation

As precise clearances are provided with this machine, be sure to fulfill the following for its storage, install and operation;

- ① Ambient temperature and humidity for storage :  
-10°C to 60°C, less than 95%RH
- ② Ambient temperature and humidity for operation :  
10°C to 40°C, less than 95%RH
- ③ Height (for both storage and operation) :  
Lower than 1,000 meters altitude
- ④ External vibration (for both storage and operation) :  
Vibration acceleration less than 114dB (0.5G)
- ⑤ Miscellaneous (for both storage and operation)
  - a. There shall be no corrosion behavior or explosive gas.
  - b. There shall be no freeze or dew formation.
  - c. There shall be no dust.
  - d. It shall be in house.
  - e. Another pump shall not be put on the Pump.  
The Pump shall not be laid down nor put touching its motor edge face or oil gauge edge face with the ground.
  - f. There shall be no direct sun beam.
  - g. Heat source shall be put away from the Pump.

Install the machine horizontal to a place where there are less dust and humidity. Make a layout taking into consideration of works such as setting, removal, check, cleaning and so on.

## 3. Preparation

- 1) Remove the tape around the lead-in connection port for cooling water, and protection materials for the inlet port of the baffle and the pumping ports (where the inlet and outlet ports are blocked with protection materials), and then check the pump and the jet for damage.
- 2) Wipe the flange dry with alcohol etc.
- 3) Oil is poured at the factory but check the presence of the oil before use. Heating without oil may cause a break in a cable of the heater or damage to the boiler.

## 4. Oil filling

Check whether the given oil, ULVOIL D-11, is at the specified level.

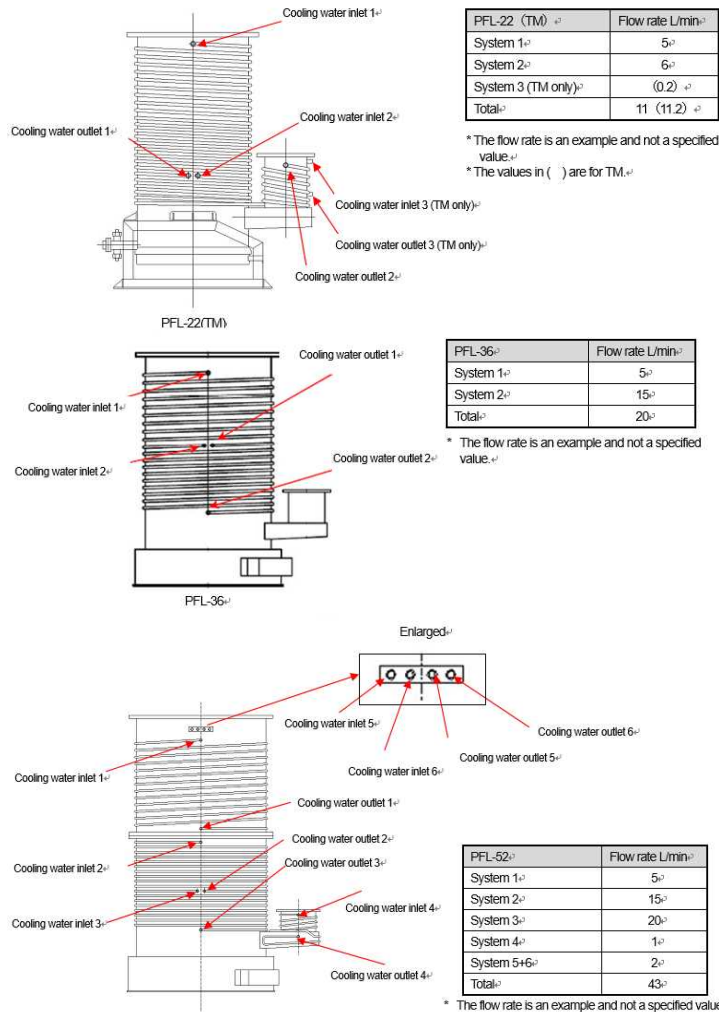


## 5. Water piping

Make connections so that the cooling water enters from the cooling water inlet at the upper part of the pump body and then comes out of the cooling water outlet at the upper part of the evacuation pipe.

For the amount of cooling water and the connections. Attach the joints for water piping (nylon tubes etc.) to install the piping.

Connect the cooling water in parallel per system. However, if a sufficient flow rate can be obtained within the specified water pressure, even series connection is allowed. Adjust the flow rate of each part as necessary so that the difference in temperature between the inlet and outlet ports of the cooling water is within 10 °C.

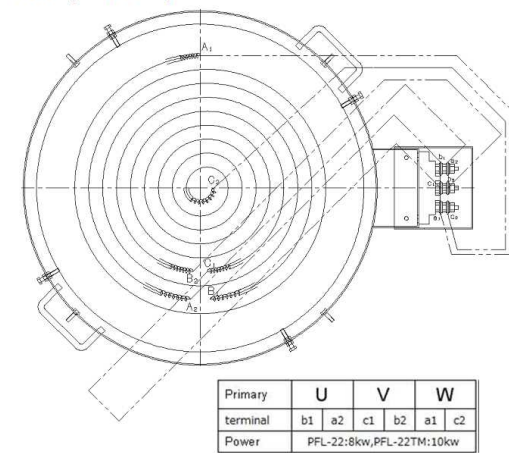


## 6. Inlet / Outlet port Piping

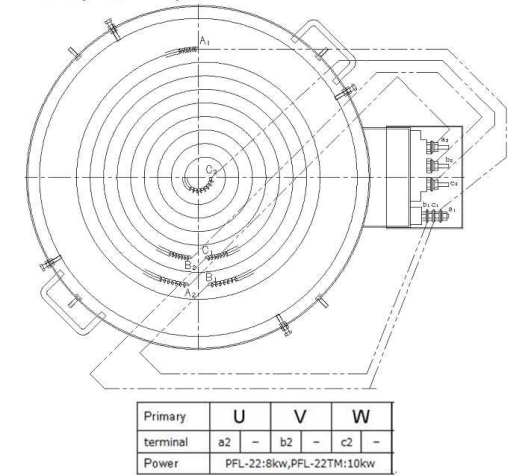
- (1) Thoroughly clean the inside of the vacuum chamber, piping, vacuum valves, etc. and then connect to the pump. If it is connected under a dirty condition, the ultimate pressure becomes higher or the time required for the pressure to decrease down to a given pressure becomes longer.  
Do not touch any part under vacuum by bare hands but wear clean nylon gloves.
- (2) Remove the gaskets set on the inlet and outlet port flanges, lightly wipe them with a cloth moistened with a solution, such as alcohol to remove dirt on the surface.
- (3) Do not apply even grease with a low vapor pressure to the gasket surfaces. Only wipe dirt off.
- (4) Also wipe the gasket grooves on the flange and the corresponding flange surfaces with a clean cloth.
- (5) Set gaskets in place.
- (6) Connect the inlet port with the piping using a JIS vacuum flange. For the diameter of the flange opening.

## 7. Electrical Connection

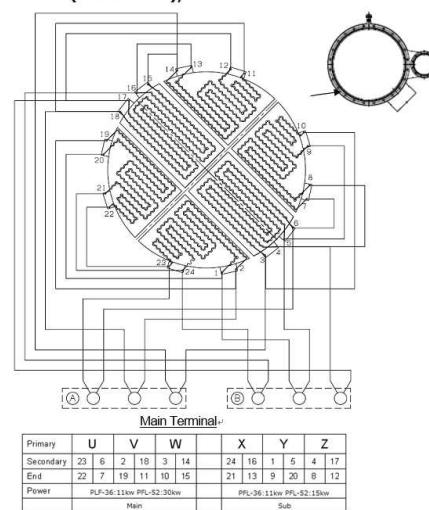
PFL-22(200V class)



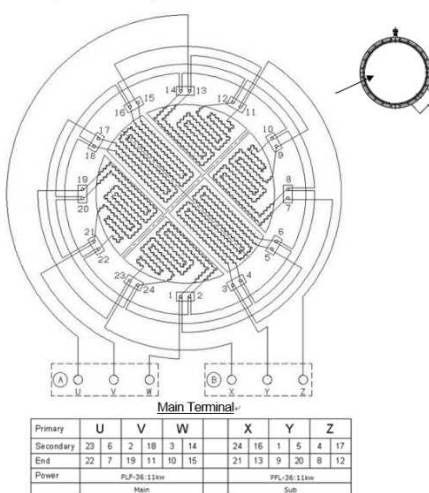
PFL-22(400V class)



PFL-36(200V class), PFL-52



PFL-36(400V class)

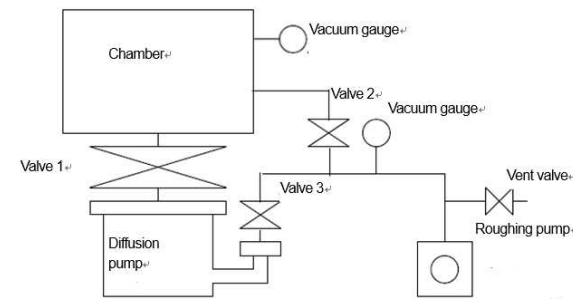


## 8. Operation

8-1. Pump operation

After installing the pump in the evacuation system, do the pumping with the roughing or auxiliary pump to 13 to 1.3 Pa (0.1 to 0.01 Torr) before operating the diffusion pump. (Fig. below shows a typical example of a diffusion pump evacuation system.)

- (1) Close the valves 1 and 2 and open the valve 3, and then do the pumping with a roughing pump until the pressure inside the diffusion pump reaches 1.3 to 13 Pa (0.01 to 0.1 Torr).
- (2) Do the pumping until the pressure inside the diffusion pump reaches 1.3 to 13 Pa (0.01 to 0.1 Torr), and then turn on the power to both the main heater and the sub heater. (PFL-22 (TM) has no sub heater.)
- (3) Oil evaporates as its temperature increases and then begins evacuation.
- (4) After the pump starts to run, close the valve 3, open the valve 2, and do the pumping of the chamber with a roughing pump to 1.3 to 13 Pa (0.01 to 0.1 Torr). After the pumping with the roughing pump, close the valve 2 and open the valves 1 and 3 for evacuation with the diffusion pump.  
Make sure with the roughing pump that the chamber pressure is reduced down to a sufficiently low level before opening the valve 1.
- (5) Check the water cooling temperature on the outlet side and, if it is 35 °C or more, increase the flow rate of the cooling water.
- (6) Approx. 60 minutes after the pump starts, shut off the power to the sub heater to operate the pump with the main heater only.  
If the sub heater is not shut off and kept running, the oil may evaporate more than necessary and be pumped to the roughing pump side, resulting in a decrease in oil level.



8-4. Operation Stop

- (1) Close valve 1. At this time, valve 2 is closed and valve 3 is opened.
- (2) Turn off heater switch of oil diffusion pump.
- (3) After turning off the heater, oil mist will continue for a while, so please do not stop the cooling water.  
For the pump stop time and cooling water stop time, please refer to the time in Table 2 as a guide.
- (4) Close the valve 3 and stop the oil rotary pump after 60 minutes have passed.
- (5) Please return the oil rotary pump to atmospheric pressure by leaking from the vent valve.
- (6) After turning off the heater switch, please stop the cooling water after the cooling water stop time in 60 minutes has passed.
- (7) If the operation stops and the ambient temperature becomes 5°C or lower, drain the water in the cooling water system.  
(Supply compressed air of 0.3MPaG (gauge) from the cooling water inlet port without stopping the cooling water outlet port.)  
If water is accumulated, it may be frozen and the cooling water pipe may be damaged.

ULVAC SHOWCASE



You can download the instruction manual from here.

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