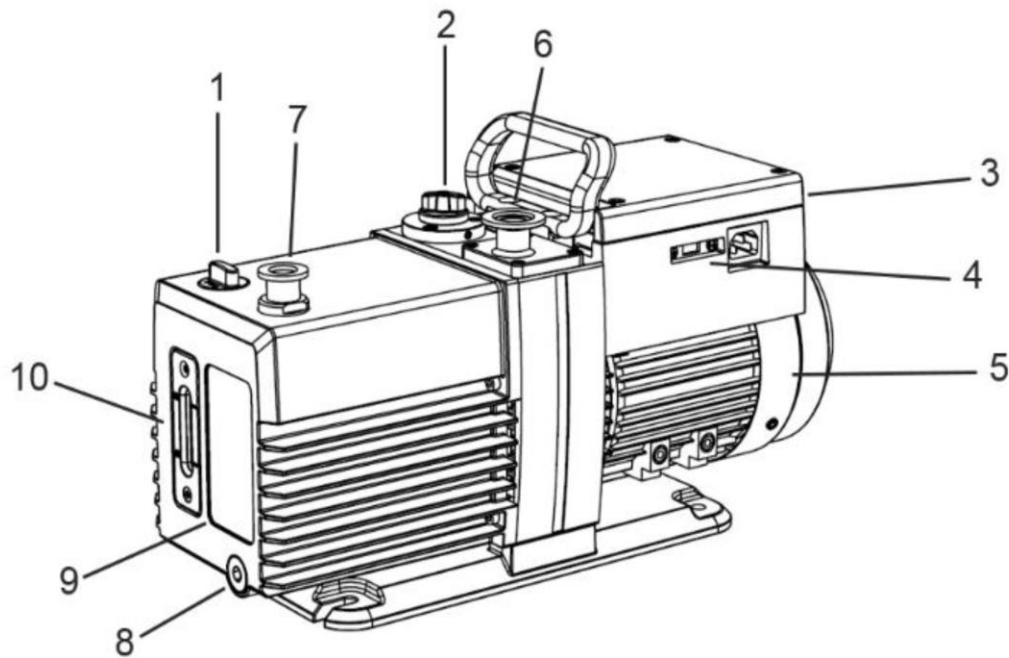


Vacuum pumps

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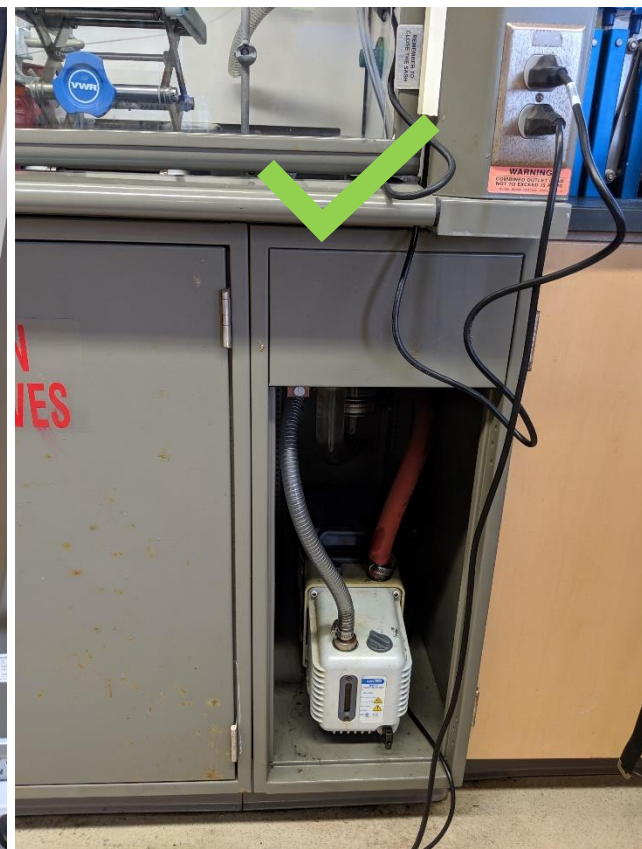
1 -	Screw-plug for oil filling
2 -	Rotary knob for setting the gas ballast valve; direction of rotation: to the left = open to the right = closed
3 -	On / Off switch
4 -	Voltage selector switch
5 -	Drive motor
6 -	Suction port
7 -	Exhaust port
8 -	Oil drain screw-plug
9 -	Type plate
10 -	Oil inspection glass

GAS BALLAST: removal of small amounts of solvents/moisture from the oil; use whenever the vacuum gets worse and after an oil change.

EXHAUST: Vent exhaust fumes into the hood or install the pump inside the hood! Even with a cold trap, there is a danger of hazardous or at least unpleasant fumes exiting the pump.

Avoid venting your oil pump exhausts into the lab

- Place your pump inside the hood (added benefit: shorter tubing to the Schlenk line) or in the designated cabinet under the hood (big hoods only).
- Alternatively, vent the exhaust into the hood with a hose/tubing.
- Install the pump in a well-ventilated area to avoid overheating issues.





Liquid oxygen hazards

- Boiling point of liquid nitrogen: $-196\text{ }^{\circ}\text{C}$; liquid oxygen: $-183\text{ }^{\circ}\text{C}$.
- Explosion/fire hazard; strong oxidizer
- Check your vacuum setup for leaks. Install a vacuum gauge.
- Don't use oil pump for vacuum filtrations in air or to aspirate a solution with air.
- If liquid oxygen is present let it evaporate slowly inside the hood; alert lab members

Vacuum pump etiquette

- Always use a liquid nitrogen filled cold trap and empty/clean it after use. Use a base tarp for acidic vapors. Pre-dried samples for elemental analysis may be dried without a trap overnight.
- Monitor liquid nitrogen level, especially overnight (*use blue isotherm dewars*).
- Turn off the pump after use (exception: extremely dirty oil; see next bullet).
- Change oil about every 6-12 months or when needed; color is a good indicator. Keep a record (e.g. write it on the pump)
- Use flushing oil for ~1 h with the ballast open when changing dirty oil
- Be extremely careful with solids like silica. Use a frit or cotton to block entry to the pump.
- Install a vacuum gauge to detect leaks.
- In case of problems: Notify the person in charge. **DON'T JUST TAKE A NEW PUMP!** Give a detailed problem description if possible.
- Rotavap pumps: Decrease the pressure only as much as necessary to evaporate a solvent, e.g. don't evaporate dichloromethane at 10 torr/mbar. Solvent will enter the pump and decrease vacuum quality for everyone (in addition to killing the pump over time).

