A Treatise on the Manipulation, Maintenance, Application, and General Usage of the Mbraun LabMaster 130 and LabMaster SP Laboratory Gloveboxes

HOW TO USE THE GLOVEBOXES

By: The Glovebox-teenees

Glovebox Basics

Model:
- -Mbraun LabMaster SP

Name(s):
- -Right Glovebox
- -Argon Glovebox
- -424-GB-Ar
- -“Ol’ Righty”

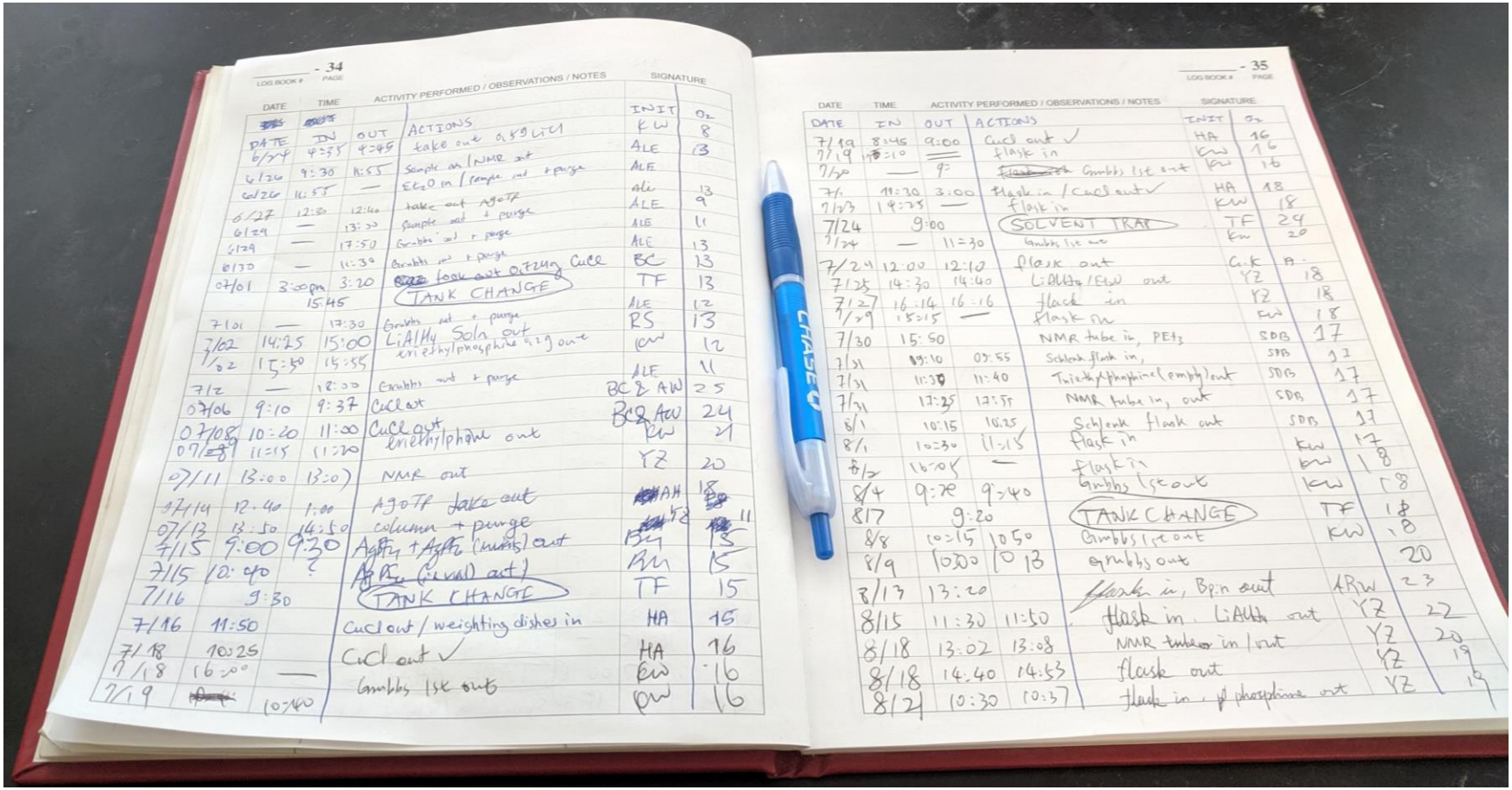
Atmosphere:
- Argon

Notes:
- -Has access to SPS
- -Generally has the better atmosphere (*generally*)

First Thing's First

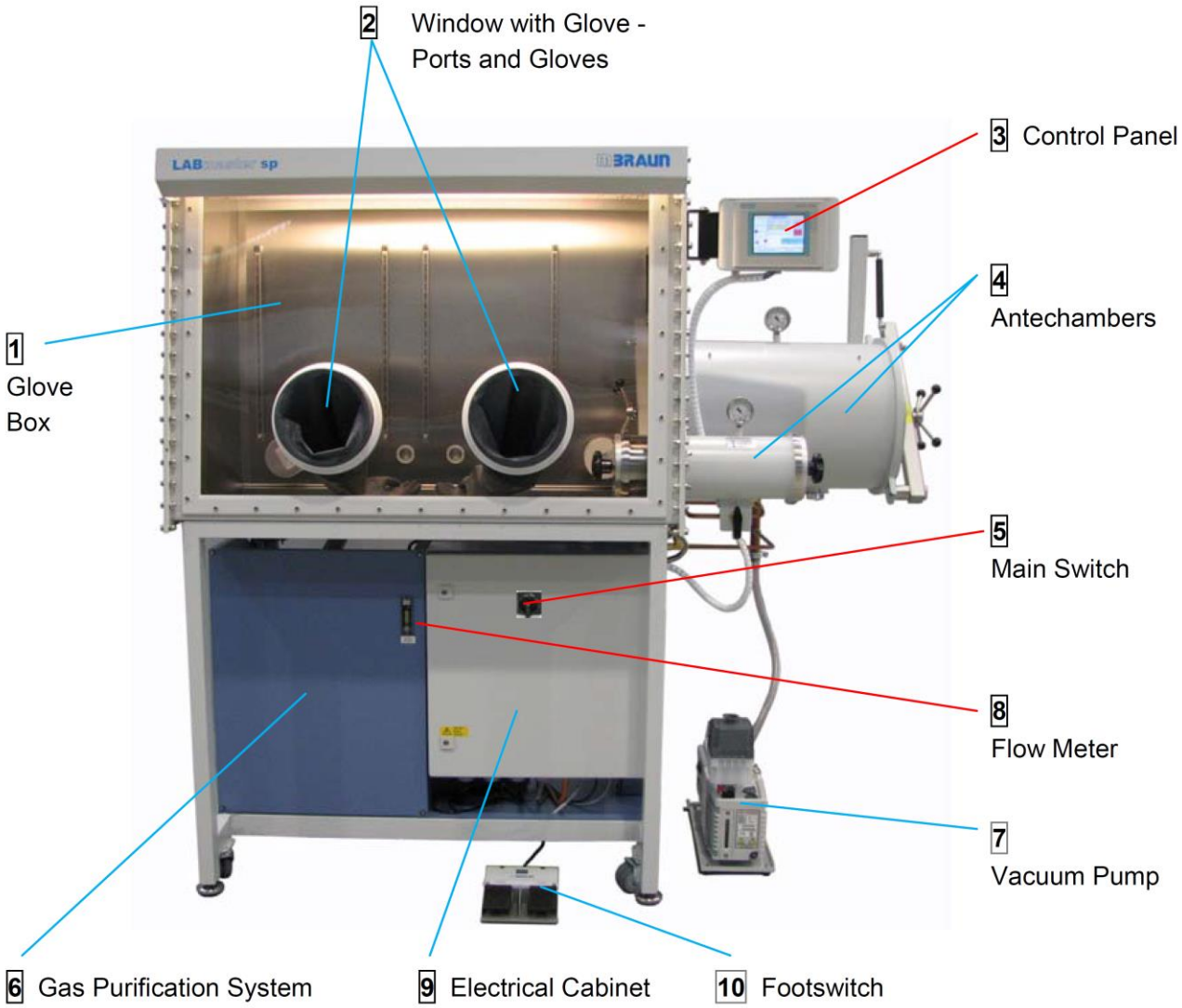
Before you begin, fill out the log book!

It helps the GB team figure out what happened when things go wrong. It's important!

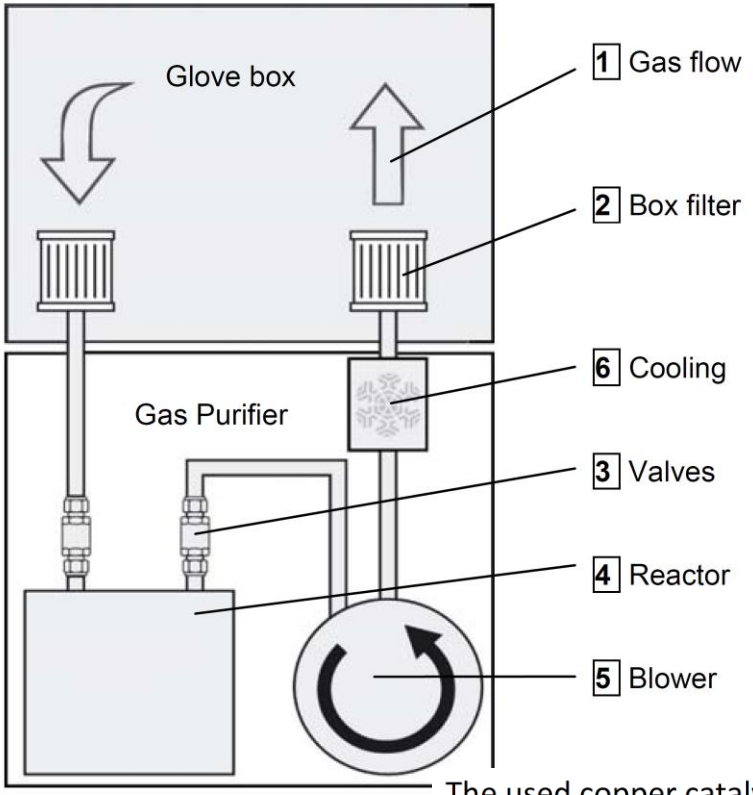


A Nice New Box

Glove Box with Gas purification platform Labmaster SP/DP:



How Circulation Works



Implications

Chemicals that react with copper will poison the catalyst; some examples:

- Phosphines
- Amines
- Sulfur-containing chemicals
- Chlorinated solvents

Technical Details:

The used copper catalyst is a finely dispersed activated/reduced copper oxide deposit on porous aluminium support. It consists of approximately 30% copper on the carrier material. During circulation the inert gas flows through the reactor column where copper reacts with the oxygen to copper oxide according to equation (1). During regeneration, the copper oxide is reduced to copper by means of hydrogen according to equation (2).

Circulation: $2\ Cu + O_2 \rightarrow 2CuO$ + heat (exothermic reaction) (1)

Regeneration: $2\ Cu\ O \rightarrow H2O + Cu$ + heat (exothermic reaction) (2)

Argon Tanks Fuel Our Chemistry

How to use a gas regulator:

Tells you how fast gas is allowed to flow.

Adjusts flow rate.

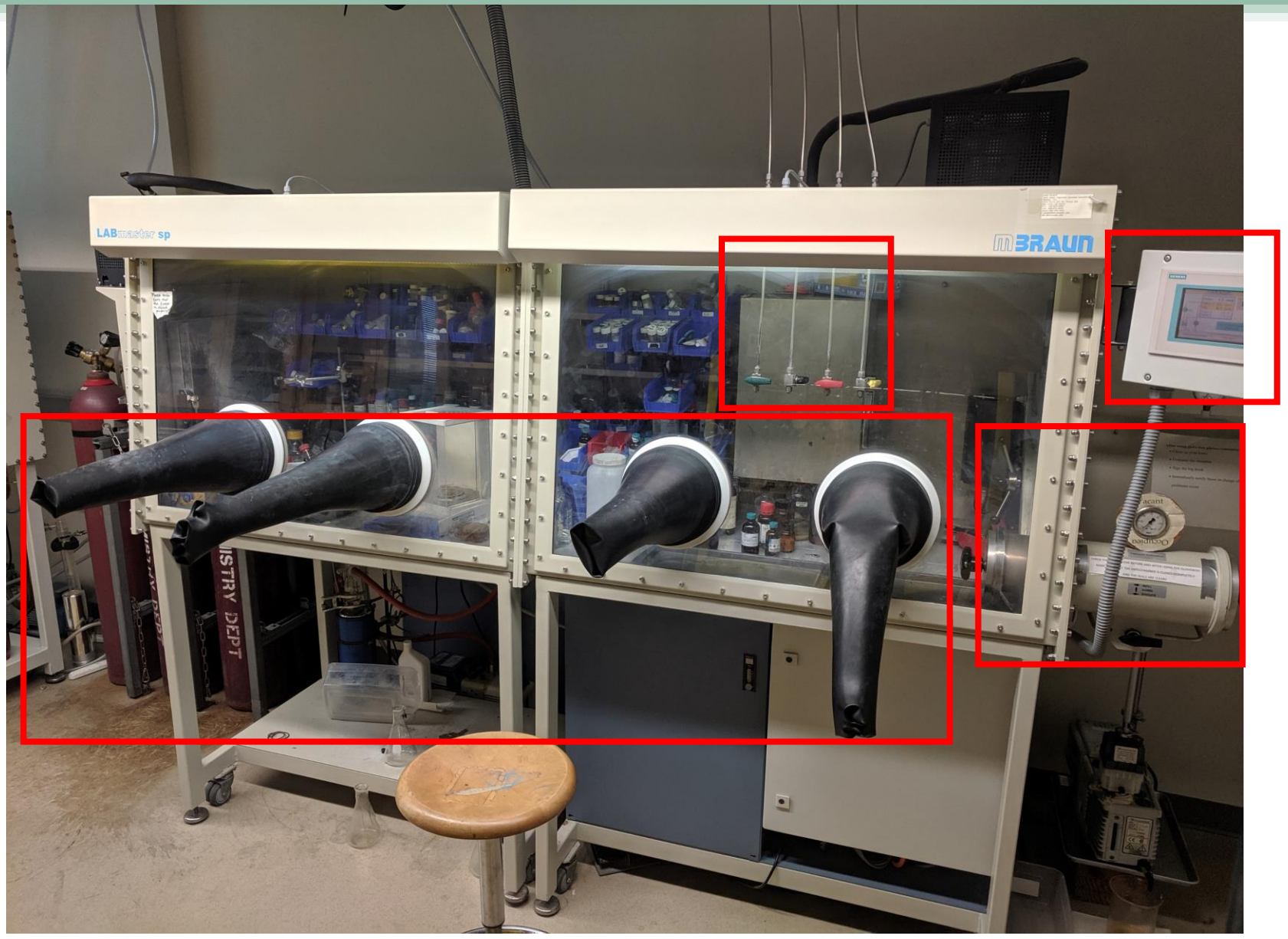
Tells you how much gas you have left.

General Tank Safety

Keep the metal caps on to avoid this:

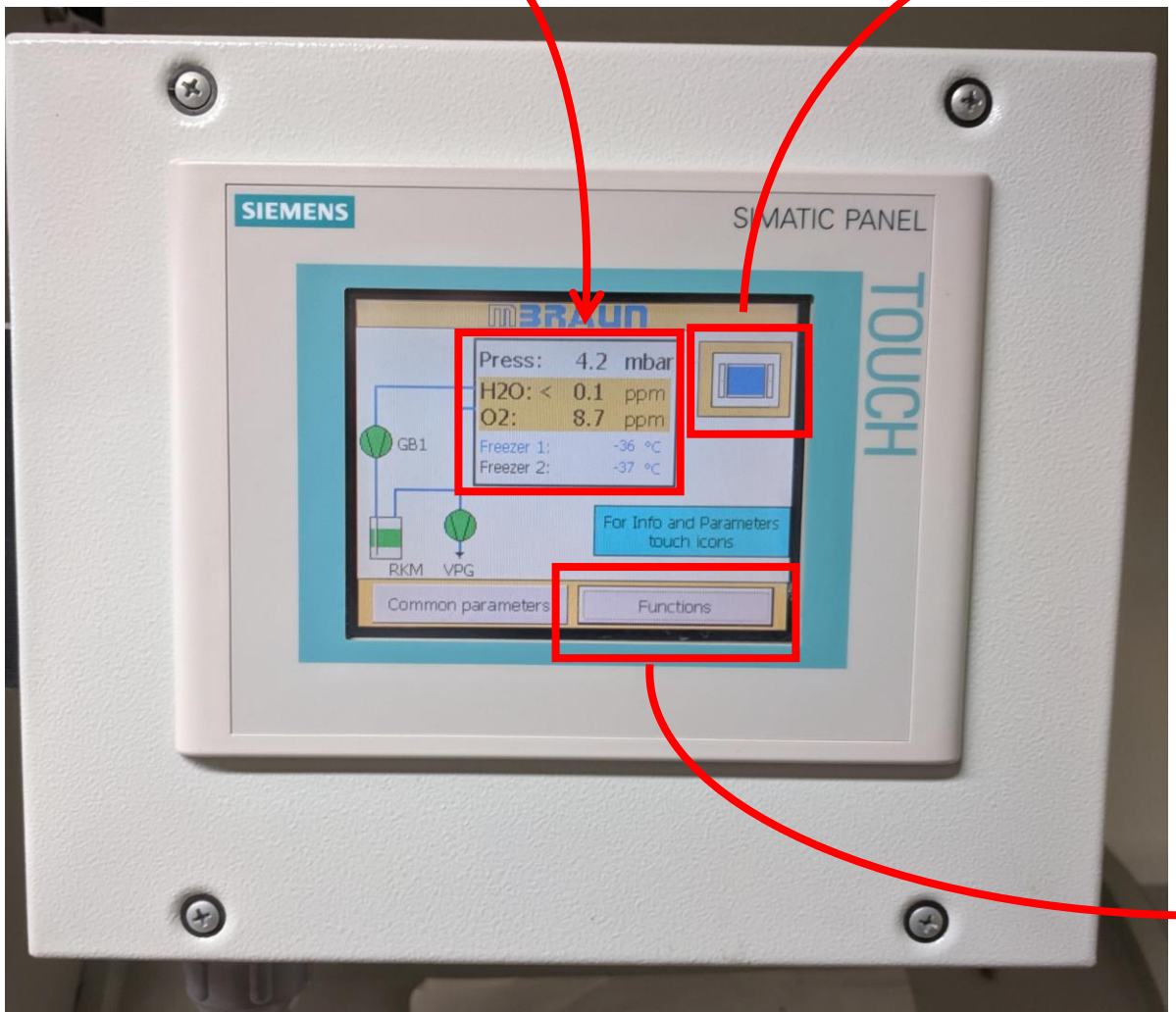
Use yellow cart to move tanks. Don't do this!

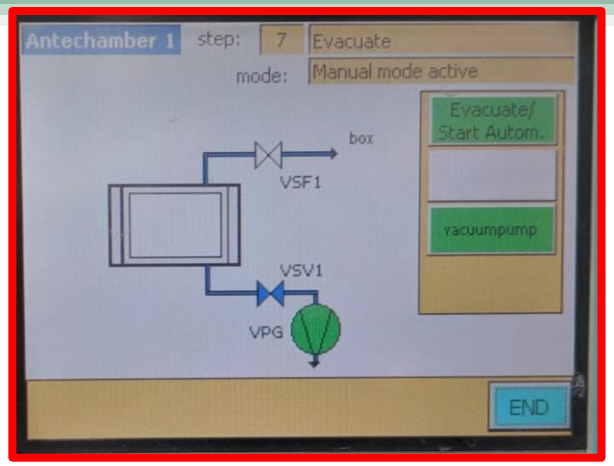
Ol’ Righty Basics



Ol' Righty Control Panel

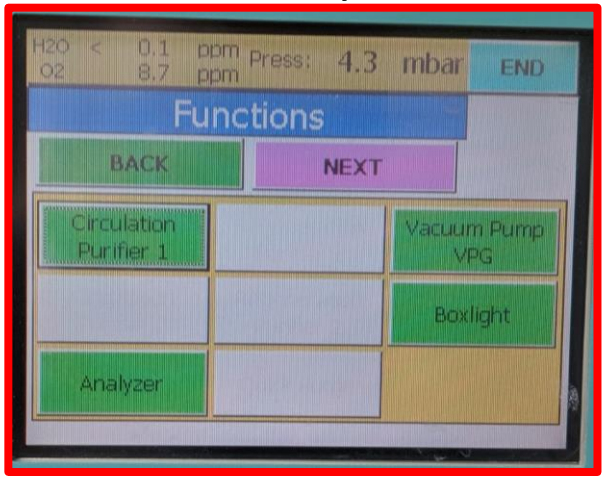
Important atmosphere information!





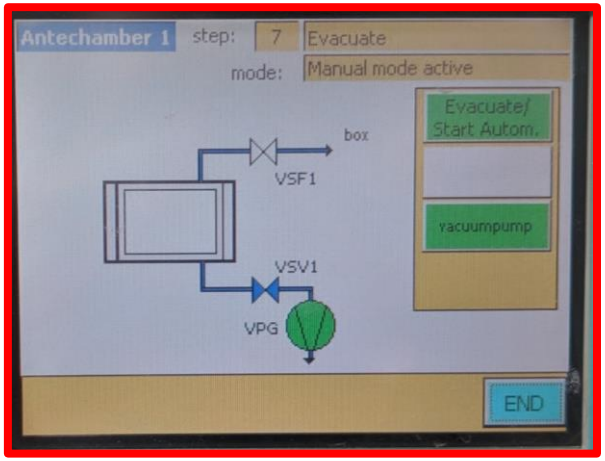
Big Antechamber control!

Circulation/Analyzer Control!



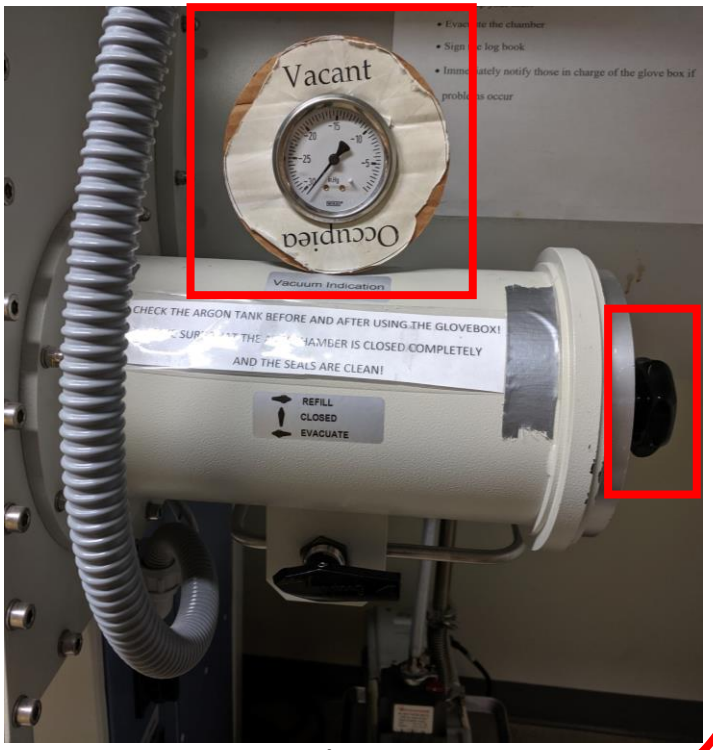
Ol' Righty Chambers

Big chamber controlled by panel

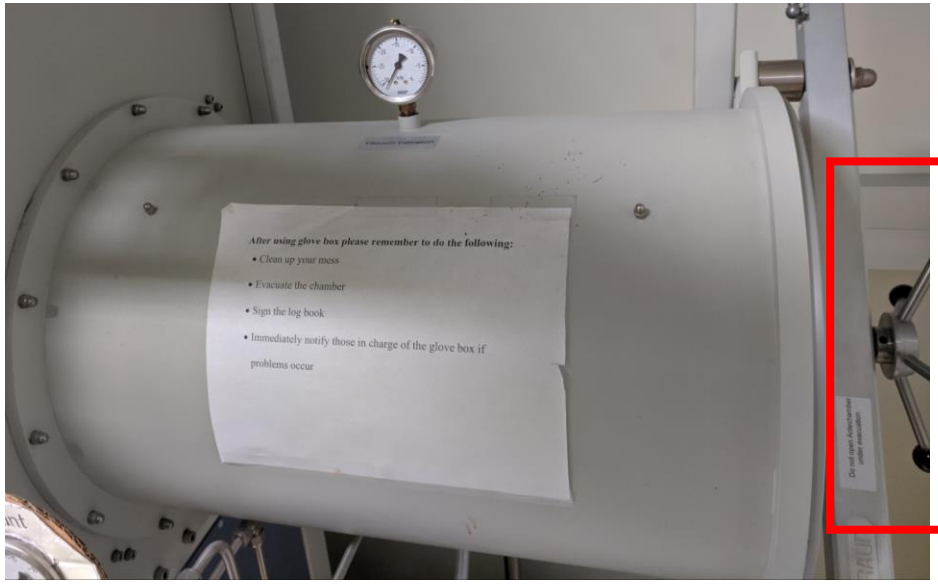


Green means it's doing the thing!

Pay attention! A friend might be using it!



Turn crank to open/close chambers

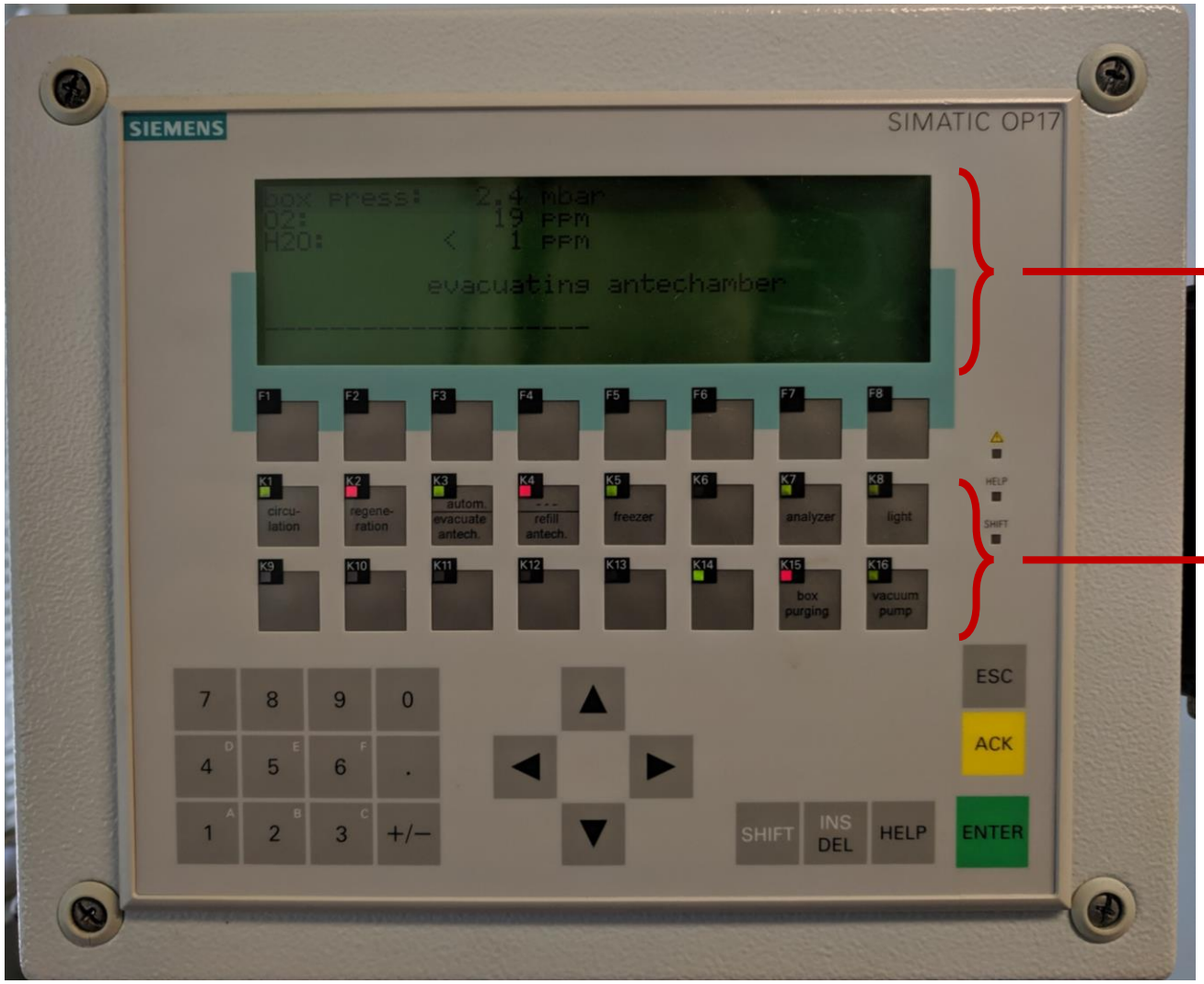


IMPORTANT:

1) Make sure chambers are **filled** before trying to open them!
2) Don't overtighten the cranks!

- Start a new entry in the logbook.
- Fill the antechamber with inert gas and turn the antechamber sign to "occupied".
- Set the valve to the closed (up) position and open the outer door.
- Place your equipment inside the antechamber and close the outer door.
- Evacuate the antechamber.
- After at least 5 minutes refill the antechamber with inert gas, repeat evacuation/refill cycle at least twice (**three times 5 minutes**), then open the inner door.
- Bring your equipment into the glovebox and close the inner door.
- When you are done working in the glovebox, open the inner door and place your equipment and trash in the antechamber.
- Close the inner door and set the valve to the closed position.
- Open the outer door, remove your equipment, and close the outer door.
- **Set the valve to evacuate and sign out in the logbook, turn the antechamber sign to "vacant".**

Ol' Lefty Control Panel

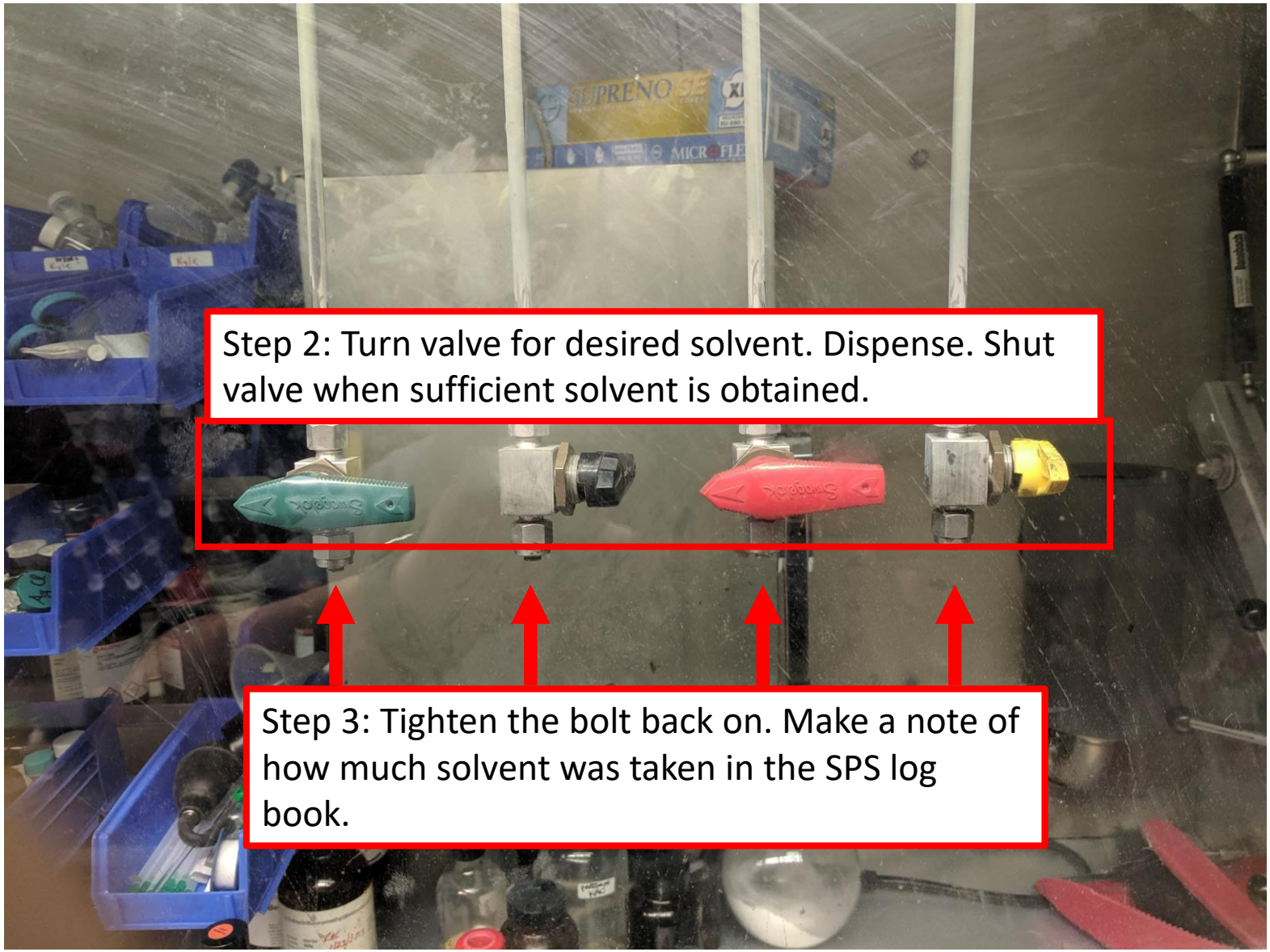


Main Display:
Gives information about atmosphere, shows the options available.

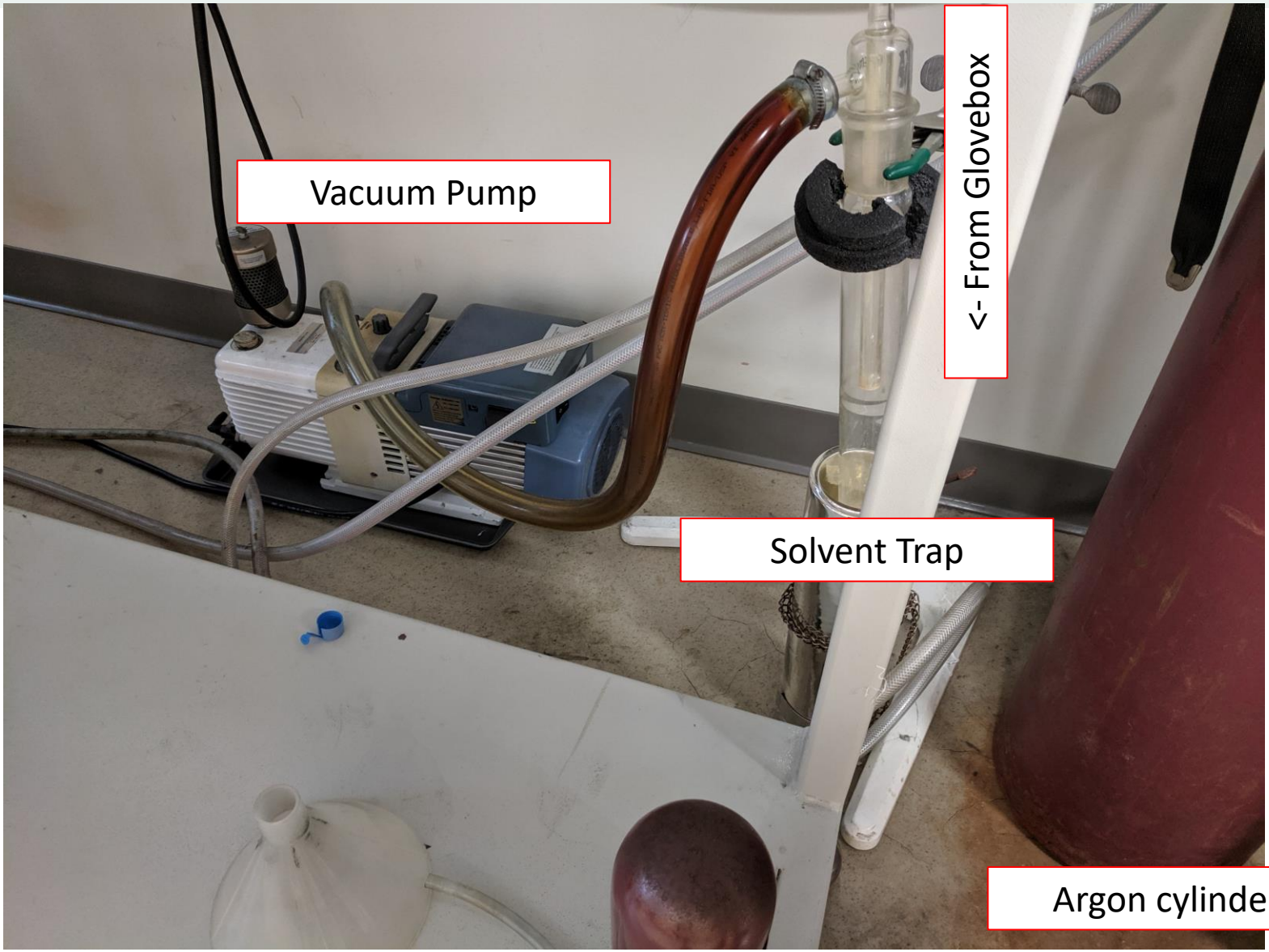
K1-K16 Buttons:
How you interact with the box.

K1 – Circulation (on/off).
K2 – Regeneration (GB team only).
K3 – Big chamber vacuum (on/off).
K4 – Repressurize Big Chamber (on/off)
K15 – Box purging (on/off, available when K1 is OFF)

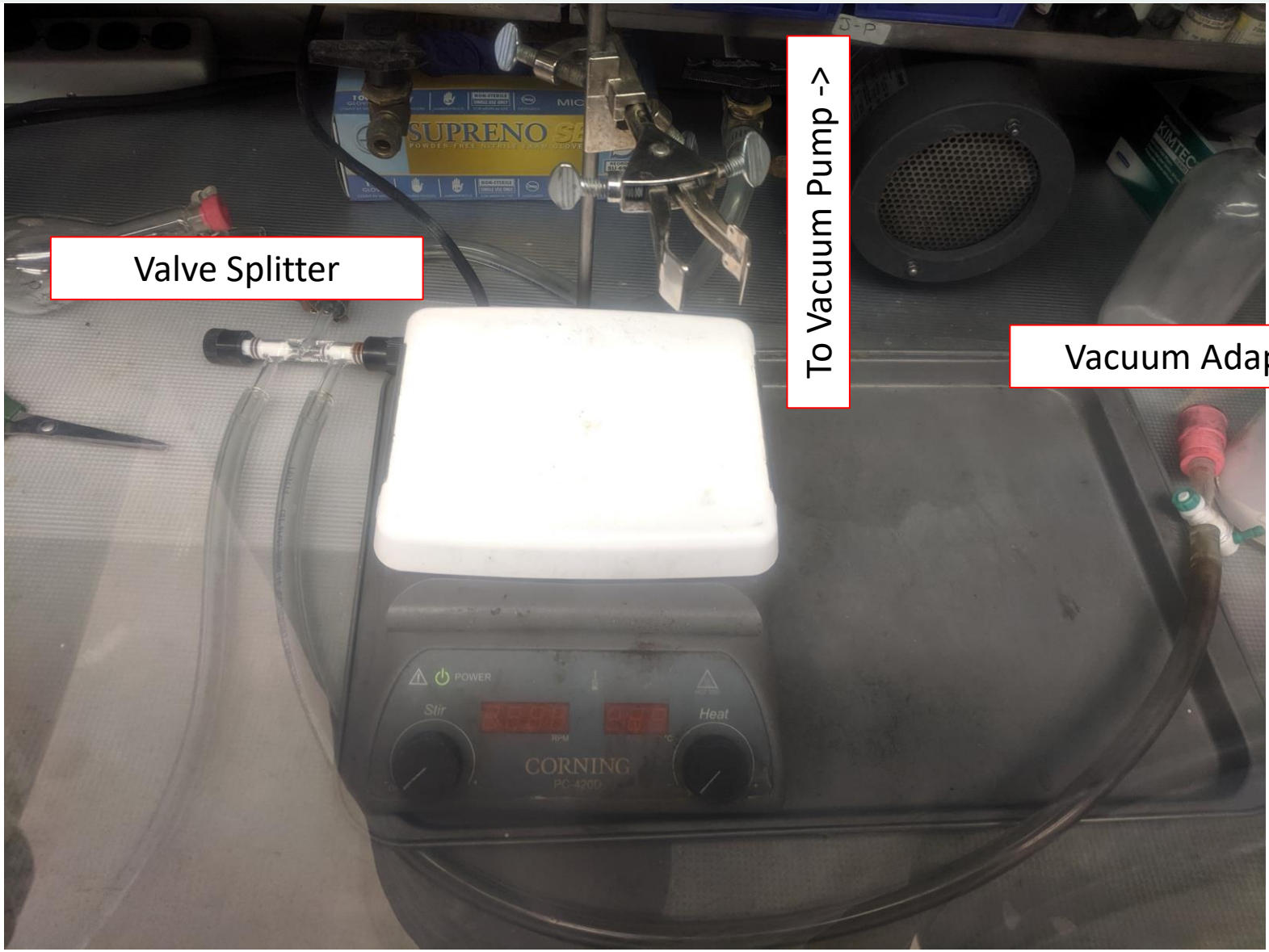
Ol'Righty SPS Access



Ol’ Lefty High Vacuum Pump



Internal Vacuum Interface



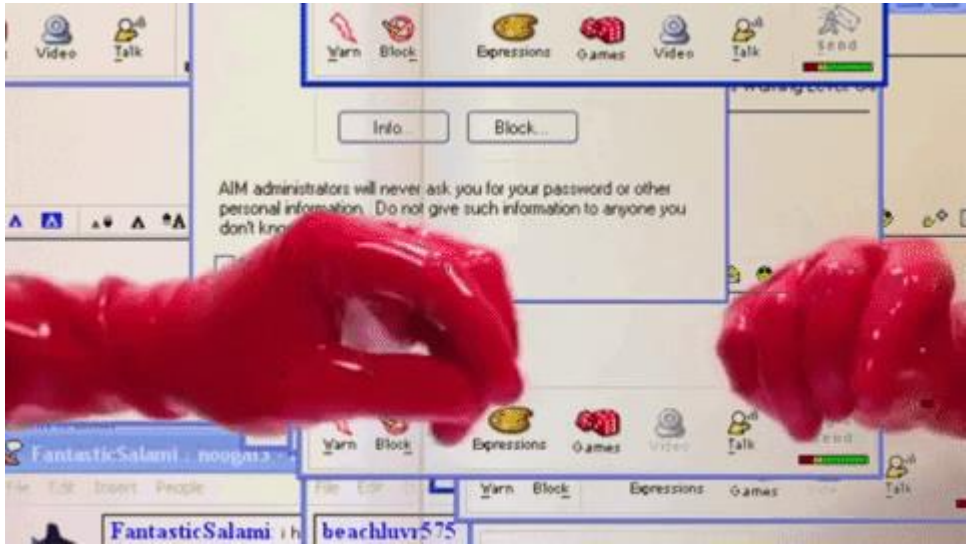
Glovebox Etiquette – 1

Glovebox Etiquette – 2 (Please clean)

Glovebox etiquette

- Always check the argon level of the cylinder before using the box.
- Use nitrile/cotton gloves when working in the glove box to avoid damaging the glovebox gloves. Arm protectors are available to protect your clothes from contamination (certain chemicals will penetrate the gloves).
- All solvents/chemicals should be dried and thoroughly degassed (freeze-pump-thaw). Commercial chemicals are often packed under argon BUT CHECK.
- Be extremely careful with solids, especially silica!
- Glassware should be dried in an oven and introduced while hot.
- Don't store large amounts of volatile solvents (dichloromethane!) in the box. No protic solvents or water (!). Such compounds need to be in tightly closed bottles and wrapped with electrical tape or in a secondary container (pickle jar or similar).
- Turn off the circulation when working with "bad" compounds or volatile solvents. Purge thoroughly afterwards.
- Don't leave bottles open longer than necessary. Vapors can enter and contaminate chemicals/solvents (NMR solvents!).
- SAFETY: Waste may be pyrophoric and catch fire when removing from the box (used Kim wipes!). Take out waste inside a secondary container and open inside a fume hood.
- NOTIFY US OF ANY PROBLEMS!

Do Your Part to Make the Glovebox a Great Place!



Thanks for listening!