

Instructions for using the bubbling unit for ethanol flow:

1. Switch on the HTP-2 and set it to external mode. Switch on the heaters as required.
2. Switch on the ethanol vaporization unit (external unit) and set it to external mode.
3. Switch on the heater and cooler on the external unit. Set up the oil bath temperature as per need based on the ethanol vapor pressure.
4. Open the exhaust and outlet as per need.
5. Set up the values of AR11 (70 kPa for 400 SCCM of Ar with exhaust open/ 100 kPa for 200 SCCM of AR with exhaust closed) based on the need. Check the flow and setup the value.
6. Similarly set AR12 to 10 kPa and adjust based on the flow. Irrespective of the values set here, the flow would equally be divided into the outlet and the exhaust (if open).
7. Change the bubbler setting from dry to wet.
8. Changing the oil bath temperature takes time and therefore stabilization requires large amount of time (typically about 30-40 min per change).
9. Automation is possible by setting up the **AR 1**, AR 11 (UR-B-01) and bubbling temperature on HTP-2. (In this case MV ethanol and **AR 2** (AR 12) must be set to 0).

Shut down:

1. Set the bubbler temperature to 5 °C (default value), the bubbler from wet to dry and wait for 10 min.
2. Stop the flow.
3. Stop heater, cooler and the line heating.