

DCS chopper pumping station

Revision of December 17, 2012

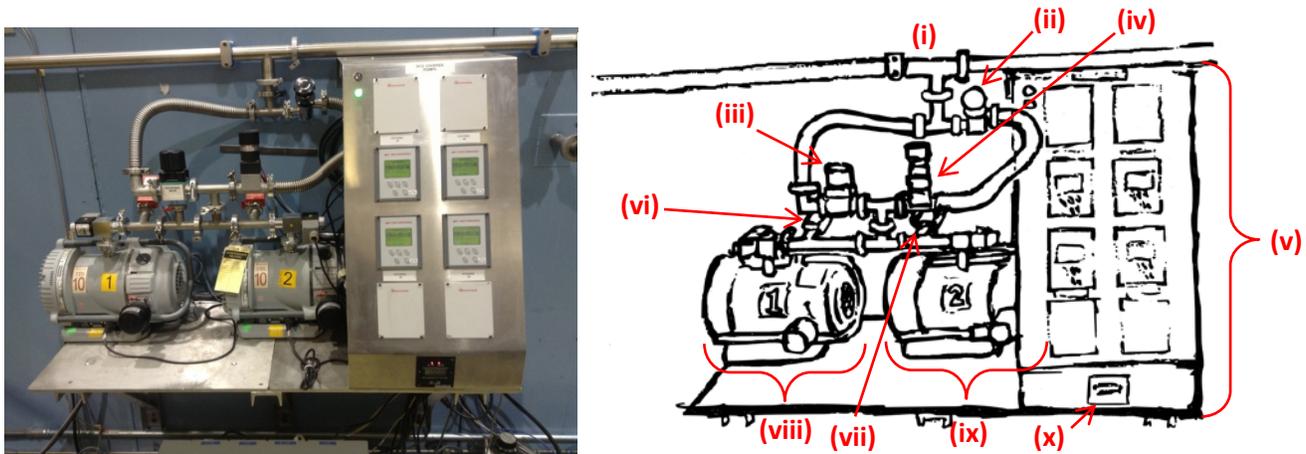


Figure 1. DCS chopper housing pumping station. The pumping station for the chopper housings consists of (i) plumbing to connect to the housing turbo molecular pumps, (ii) a manual lift-off valve for the primary pumping line, (iii) a manual lift-off valve for the rough pumping line, (iv) an automatic valve that closes in the event of a system failure, (v) a panel of Edwards TICs (turbo instrument controllers), (vi) a Pirani gauge for rough pump 1, (vii) a Pirani gauge for rough pump 2, (viii) rough pump 1, (ix) rough pump 2, and (x) a thermocouple vacuum gauge.

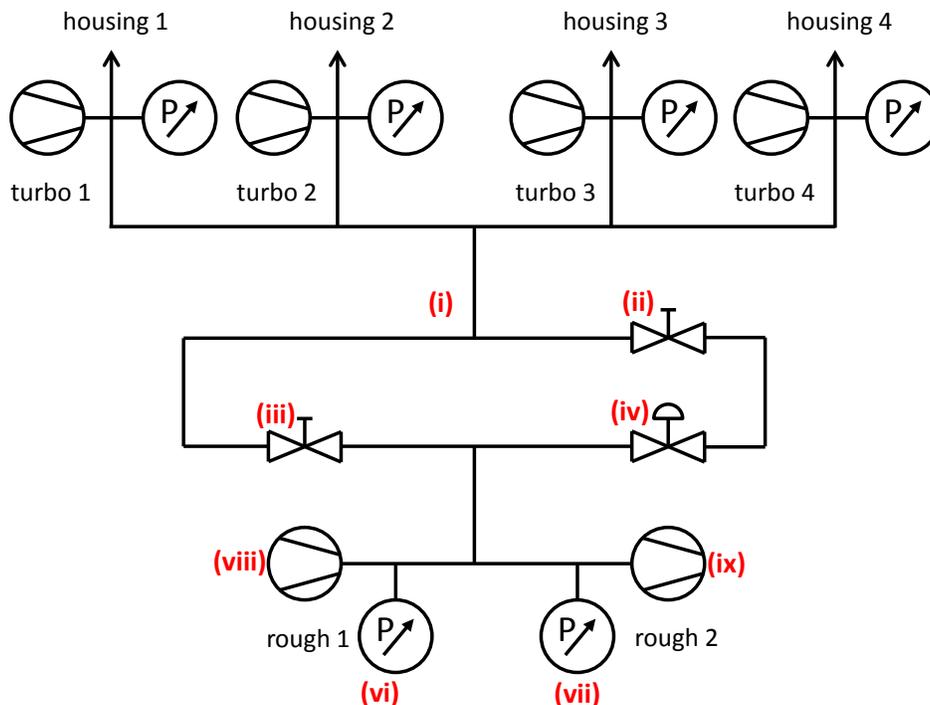


Figure 2. Flow diagram of DCS chopper housing pumping system. Roman numeral labels are defined in Fig. 1.



Figure 3. Detail of TIC panels. A close-up of the TICs shows standard conditions during chopper operation. Housings 1, 2, and 3 should have APGX approximately 8×10^{-5} Torr, while housing 4 has an updated vacuum gauge that shows a more accurate pressure near 3×10^{-4} Torr; these gauges are mounted on ports of the housings opposite to the pumping ports. Housings 1 and 2 should show APGL near 2×10^{-1} Torr, from the rough pump Pirani gauges. Housings 3 and 4 are not connected to a roughing gauge, but controlled off housing 1.

In the event that the system is completely vented:

- 1) The primary manual valve (fig. 1-ii) and the roughing valve (fig. 1-iii) should be opened
- 2) Ensure that all TIC displays show the main menu (fig. 2-b) and the appropriate gauges read
- 3) Initiate a pumping cycle by pressing the physical “cycle on/off” button on the TIC for housing 1
- 4) At this time either roughing pump 1 (fig. 1-viii) or roughing pump 2 (fig. 1-ix) will turn on; and the configuration is set to use TIC 1 as the main control, and therefore roughing pump 1 will turn on
- 5) When the appropriate Pirani gauge reads a pressure less than 7×10^{-1} Torr, the turbo molecular pumping cycle will begin
- 6) Before starting the choppers, the roughing valve must be closed to return the system to a protected mode (via the automatic valve in fig. 1-iv)
- 7) When the APGX reading on every housing is less than 1×10^{-3} Torr, the choppers may be started
- 8) It may take as long as a day to reach housing pressures less than 1×10^{-4} Torr on housings 1,2, and 3 while 4 does not reach that low

Additional notes: The two manual valves are only different because that was the available equipment. Conductance in this configuration is mostly limited by the valves (a roughing gate valve instead of a lift-off valve would decrease initial pumping time). The rough pump 2 is actuated by a relay box, so the switch of the pump should remain on even while the pump is “off.” Each rough pump has an hour-meter on the back. If the pressure of the system goes above ??? Torr, the automatic valve will close and the system will isolate. The housing 4 gauge was replaced due to failure induced by an oil-lubricated roughing pump plating the gauge innards. There is a chopper between the pumping port and the vacuum gauge.