

## System Start-up

Rev. Dec03

1. Open pure and Impure feed valves at the Gasboard for the Liquefier.
2. Turn on console power at disconnect switch.
3. Vacuum VI-45 below 100  $\mu$  -if not, see instructions at end of page.
4. RDT installed - if not, see procedure.
5. Retighten upper knurled nut on RDT.
6. Open yellow handle valve inside liquefier near V634.
7. Open Medium Pressure Tank Valve.
8. Record date, time, hours, of operation for liquefier and screw compressor, dewar level and pressure.
9. If screw compressor is < 150, add pure gas up to ~200psi.
10. The medium pressure storage tank should be above 100 psi, if not, the pure bank should be above 200 psi, if not, start the AP purifier or add pure gas from cylinders to the pure storage bank.
11. Rotate the new 3-way valve to point towards V312.
12. Unplug recovery line from the new 3-way valve and plug it into V312.
13. If PI-34 is above 50 psi, toggle V312 switch up, until PI-34 is below 50 psi, then toggle V312 down.
14. Remove left hand engine cover and Install Flywheel lock bar.
15. Slop grease around cylinder.
16. Open Red handle valve on back of liquefier - control pressure for JT valve.
17. Open three water valves for screw compressor (check chilled water supply).
18. Screw Compressor check sight glass for oil.
19. Open 3 yellow K-bottle.
20. If Screw Comp is ~200 psi, disconnect pure gas Quick connect.
21. Turn on screw compressor power at disconnect switch.
22. Push reset on front panel of screw comp. (Black Button)
23. Put on Ear Protection.
24. Open V375 and V341 - Right before start- if you hear gas flow 5 sec after valve is open something ` is wrong, close valves and stop here.
25. Push start on screw compressor front panel, or compressor #1 start on liquefier console.
26. Wait until whistle noises subside. (~5-30 secs)
27. Check water at screw compressor, flow should be > 9GPM, Temp in < 60F.
28. Shut off GN2 purge;
  - a. Close small needle valve at rear of console.
  - b. Rotate GN2 3-way valve to point left. (in lower right corner, behind right hand cover panel)
  - c. Close V640. (blue handle)
  - d. Open V608, one turn, gas should vent from the water drain.
  - e. Wait 2-5 seconds, close V608. (On PI-60, Open V608 until ~200psi, then close and wait until <60psi)
  - f. Open V640 to vent remaining gas.
  - g. Repeat c.), d.), e.) and f.) twice more.
  - h. Close V640.
29. All 5 extra valves and V341 need to be open here. Push HX PURGE start.
30. Wait for PURGE light to go out. (~ 5-10 minutes)
31. Close 3 of 5 extra valves not the old yellow handled one and the round black one below it.
32. If PI-34 is above 50 psi vent it by toggling switch for V312 up until below 50 psi.
33. Remove flywheel lock Bar and Reinstall engine cover .
34. Make sure the Engine Speed and JT Position controls are in Auto.
35. Toggle switches V312, V323, V309 down.
36. PS-35 set points; High 4 psi Low 3 psi.
37. Close V336 and turn off vacuum pump.

38. Open manual LN2 valve.

39. Push LN2 Control on. (If it doesn't work, there is a reset button underneath the valve inside the console to push.)
40. Push Engine Start.
41. Set JT position to manual 0.006.
42. Push "V" on PIC-1 until green numbers on SIC-1 = 110.
43. Push "A" on PIC-1 until green numbers on SIC-1 = 235.
44. Close V341.

NOTE-1: Monitor the dewar pressure. Maintain ~4 psi by carefully venting V339 into recovery.

NOTE-2: Record Data every 1/2 hour for the next 4 hours, or until 1 hour after purifier starts taking gas.

NOTE-3: When TIC307 is less than 39K you can switch the JT to "AUTO".

45. IF PI-33 drops to ~ 220 psi, push and hold Compressor #1 Load #1 for ~ 30 seconds, PI-33 should rise.
46. Look for:
  - a.) TIC at or below. (20K should be)
  - b.) Temperature E below 80K. (should be)
  - c) Pressure drop in Medium Storage Tank. (hurry)
  - d) Pressure decay in pure storage banks. (too late)
47. Once 38A or 38B is met. Load the screw compressor if it is not already loaded.
48. If using the internal Purifier, All 5 extra valves must be open.
49. If not using the internal purifier, skip to 53. and make sure that the AP purifier regulator PCV is set to 90psig.
50. Push Purifier ON; Purifier will first go through a purge cycle ~5-7 1/2 minutes.
51. Monitor temperatures C and D for cooling. (D goes to <22, C <120)
52. Monitor B+H, Once B or H < 8 = Liquefying.
53. Snug the RDT upper knurled nut.
54. Record data first thing every morning and last thing every night while liquefier is running.

### To Pump out Vacuum Can;

1. Push "ON" for Vacuum Pump.
2. Give the pump 5 minutes to warm up.
3. Slowly open valve V336.
4. When VI-45 is below 100 $\mu$  you can proceed but waiting until its below 50 $\mu$  is better.
5. Close V336.
6. Turn off vacuum pump.

### To Unload to reduce Liquefaction rate;

1. Push unload button for at least 2 but not more than 4 seconds.
2. Set JT to manual 0.003.

Phone#s; Greg Home 373-5913, Cell 213-0304, wife's 278-1406, John home 331-3885