

System Start-up

Rev. Jun. 1, 2023

1. Disconnect GN2 Purge at QC4
2. Connect QC4 to helium regulator, crack valve to slowly purge GN 2 out.
3. Disconnect helium, close V640, then close V606, then close new T'ed valve at V632.
4. Open control air valve on wall.
5. Turn on power at disconnect switches for the Console and both Compressors.
6. On Laptop Open "LookOut Direct". (opens if rebooted)
7. If RS Compressor Comm error, see instructions on back.
8. Maximize Vacuum page.
9. Vacuum VI-44 below 50 mT -if not, see instructions at end of page.
10. Open Main Panel
11. Check and Acknowledge alarms.
12. Open pure and Impure feed valves at the Gasboard for the Liquefier.
13. RDT installed - if not, see procedure.
14. Don't touch upper knurled nut on RDT.
15. Open Medium Pressure Tank Valve.
16. If Screw Compressors are < 175, add pure gas up to ~200psi.
17. If Screw Comps are ~200 psi, disconnect pure gas Quick connect.
18. 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.
19. Check that PT-1 (PI-34) is less than 50 PSI.
20. If not, Connect V312 to recovery and crack V312 to bleed down the pressure.
21. Remove left hand engine cover and Install Flywheel lock bar
22. Check grease in piston cylinders.
23. Open three water valves for screw compressor(s) (check chilled water supply).
24. Screw Compressor check sight glass for oil. (~1/3 full)
25. Open green horizontal tank.
26. Check for correct manual valving on the LP and HP sides of the screw compressor piping.
27. Use the compressor with fewer hours when using just one.
28. Push start Compressor #1 on computer or on screw compressor front panel.
29. Wait until it stops sucking, whistle noises subside. (~5-30 secs)
30. Push start Compressor #2 on computer or on screw compressor front panel.
31. Wait until in stops sucking, whistle noises subside. (~5-30 secs)
32. Check water at screw compressor, flow should be > 13GPM, Temp in ~60F.
33. Check Oil sight glasses SG21, 26, 28, + 29 and Alarm LS-2
34. HX PURGE.
 - a. Install Lockbar
 - b. Connect V312 to recovery
 - c. Open Manually by hand V312 to ½ turn open.
 - d. Open V323 for 2-3 seconds then close.
 - i. via Gas Mgmt (Manual – Open)
 - ii. until; PT-1 =~200psig Close V323
 - e. When PT-1 =~20 psig goto c. twice more
 - f. Close V312 when PI-34 is 20-50 psi.
 - g. Set to Auto V323.
 - h. Check purity at gasbag meter.
35. Purifier Purge
 - a. Close V308 via Cold Box-Man-Close
 - b. Close JT-Valve Loop mode via Sys Conf-Man
 - c. Main Panel, To Purification Mode, "Pure –R Purge".
 - d. Close (X) Purification Mode window.
 - e. Goto DAQ page
 - f. V609 and V632 should cycle three times each. 6 Loud farts
 - g. Wait for Purifier "Off" on Main Panel.
 - h. If not 6 distinct purges, see unblock instructions.
 - i. Set to Auto V308 and JT-307
 - j. Plug V312 yellow Jacket hose to recovery.
36. If PI-34/PT-1 is above 50 psi vent it manually cracking open V312 until below 50 psi.
37. Remove flywheel lock Bar and Reinstall engine cover .
38. Close Hand valve and V348 and turn off vacuum pump.
39. Make sure all controls are in Auto.
40. Open manual LN2 valve.
41. (Not necessary if it was on during last run.) Push LN2 Control on. Main Panel
42. On Sys Config , check under V160; V1606 = 230 for 2RS, 225 for 1RS
43. Push Engine Start. Main Panel-Liquefaction Mode.
44. DAQ Page
45. Look for:
 - a.) T-A at or below. (100K should be) Compressor(s) should load.

- b.) T-B below 80K. (should be)
- c) Pressure drop in Medium Storage Tank. (hurry)
- d) Pressure decay in pure storage banks. (too late)
46. If not using the internal purifier, skip to 49. and make sure that the AP purifier regulator PCV-621 is set to 90psig.
47. Wait for second stable liquefaction. (after V-370 stops ramping, Engine speed slows and settles)
48. Check V628 setting for running mode. (see V628 settings below)
49. Main Page-Purification mode-Push Purifier ON; Purifier will first go through a purge cycle ~5-7 1/2 minutes.
50. Monitor T-C and T-5 for cooling. (T-C goes to <22, T-5<120)
51. Monitor T-B, Once B or H < 8 = Liquefying.
52. Never touch the RDT upper knurled nut.

To Pump out Vacuum Can;

1. Vac. Pump Page
2. Click little square by pump icon
3. "Start" Vacuum Pump.
4. Give the pump 5 minutes to warm up.
5. When VI-43 is below VI-44 you can proceed.
6. Click little square by V348
7. Open V348
8. Slowly open hand valve.
9. Pump until VI-44<50mT or better. (Blue line approaches red line)
10. Close Hand valve and V348.
11. Turn off vacuum pump.

To Unload to reduce Liquefaction rate;

1. Push unload button. DO NOT PARTIAL LOAD.
2. Use V345 bypass regulator to reduce P-1 (Do not exceed 250 psig on P-1)

To unblock warm purifier;

1. Purifier page-heater E-72-manual on. Alert! No safety shut-off. Watch TE-7 and turn off at 300K max.
2. Turn back on at 295K repeat #1+ #2 as necessary.
3. Set to Man-Open V632
4. Conect ¼ yellowjacket to regulator. Set to 120 psig
5. Open V640
6. Crack V606-test flow at 3/8" Quick connect.
7. Connect V606 yellow jacket to recovery.
8. Wait for fart and PI-60 to drop
9. Close Regulator
10. Return E-72 and V632 to auto.
11. Disconnect both yellow jackets
12. Close V606 and V640.
13. Return to and repeat Purifier Purge.

Purifier Running V628 settings;
As tested with 99.8% helium

Configuration	V628	V1606	V1646	PIC-1*	PIC-2*
LN2, 2 comp	2 turns +0	230	55		
LN2 1 Comp	1 turn +11	225	45		
LN2, 1 Comp unloaded	+15	220	30	30-750	500-1000
No LN2, 2 comp	+15	225	25		
No LN2, 1 Comp	+0.7	225	25		

*Need to reset after every regen.

Adjust to get a 50% duty cycle on V624

Increase with increased impurities.

Decrease with purer impure gas.

RS Compressor Com Error; Unresponsive Compressor, No panel lights lit.

1. Close LookoutDirect if Open
2. Open DSL Launch5
3. Right click on the dead compressor.
4. Chose "Run"
5. Right click the dead compressor.
NUMBER1 = Compressor #1 nearest B125 door
NUMBER2 = Compressor #2 nearest loading dock door
6. DirectSoft Programing wil open.

7. Click "Mode" in the second row of icons.
8. In PLC Mode, tick "Run"
9. Click OK
10. .Exit DS Programing
11. Exit DSL Lauch5
12. Check Compresor from panel, Lights should be lit.
13. Return to LookoutDirect

Comp #1; 10.1.35.1 UDP

Comp #2; 10.1.35.2 UDP