

**Troubleshoot Glove Box Cryo-pump**  
**Eric Sundholm**  
**8-4-06**

**Background**

Pump and chamber were in good working order for many years. Pumping motion on the cold head suddenly, and without warning, stopped. The predictable pumping was replaced by a shaking and apparent short stroking like ticking.

**Data/observations**

Startup 8-2-06

- Static pressure on compressor 185 psi
  - This is below spec (250 psig @ 75°F)
  - A tag on the front of the compressor reads “Static Pressure 190-200 psi”
  - This change may have come from Austin Scientific Company
    - A hand written note about this company was inside of the manual
    - CTI-Cryogenics says that Austin many times will work on the compressors and change the static pressure
- Chamber leak rate 3um/min @ 30um start pressure (with TC1)
- Pump + Chamber leak rate 4um/min @ 40um start pressure (with TC1 and HV valve open)
- Cryo-pump was not started

Startup 8-4-06

Startup was attempted after roughing the system and observing same leak rates as above (only faster rough down). Holding the pump at room temperature and under vacuum overnight may have helped clean out the charcoal bed.

Breaker switch on compressor may be going bad. To get the compressor to stay running the user must very slowly rock the switch to “on”.

Once the compressor was running, the cold head was turned on.

- Running pressure on compressor 265 psi
- Shaking and ticking started in cold head
- Temperature gauge read 220 after ~10 min.
- Once everything was off (for several hours) temperature continued to fall to ~200, which leads me to believe the gauge is not calibrated.

Call to CTI-Cryogenics, customer service engineer (Sam) suggested to check the power being supplied to the cold head (expander module) from the compressor.

	Spec	Measured
Pin 1 & 2	150 Vac	144.4 Vac
Pin 2 & 3	150 Vac	144.4 Vac
Pin 1 & 3	0 Vac	9.2 Vac

Call back to CTI-Cryogenics, customer service engineer (Steve) suggested to check the winding resistance on the cold head (expander module).

	Spec	Measured
Pin 1 & 2	57 $\Omega$	48.6 $\Omega$
Pin 2 & 3	57 $\Omega$	~97 $\Omega$
Pin 1 & 3	114 $\Omega$	48.3 $\Omega$

Call back to CTI-Cryogenics, customer service engineer (Steve) again.

Given the above information concluded that the pump (cold head portion) has failed and wanted the entire pump sent in for repair. Steve thought the problem was with the pump and not the compressor (even with the static pressure being low).