

July 2016

Charts from data logged on my 2009 Jetta TDI wagon with a bit over 170,000 miles.

Updated with a few notes and results of changing the Refrigerant Control Valve (RCV).

Recently the air conditioning started to take its time to provide cold air after the car is parked for a while.

Suspicion is it is the Compressor Refrigerant Control Valve. (RCV)

Data collected with VCDS, using advanced measuring values from the HVAC controller

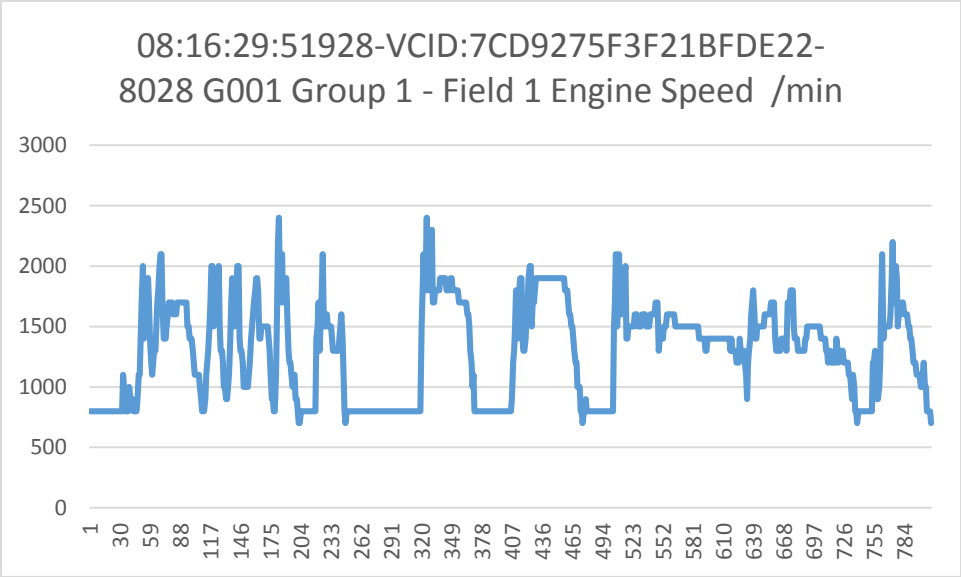
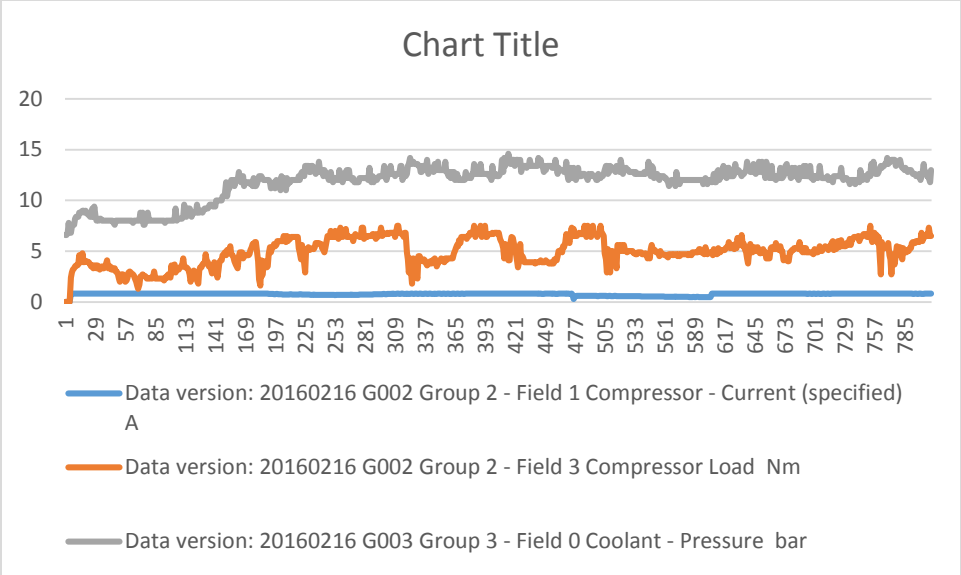
First charts are from 7 July. Ambient conditions are hot and humid. (around 90f)

At the beginning, controls are set for full cold, ac on, fan at 2. Air to dash vents.

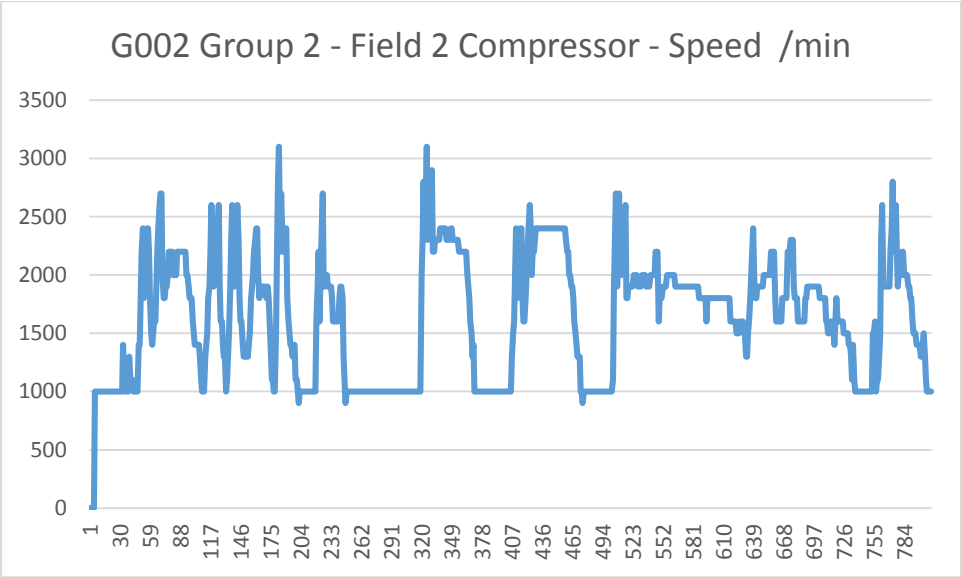
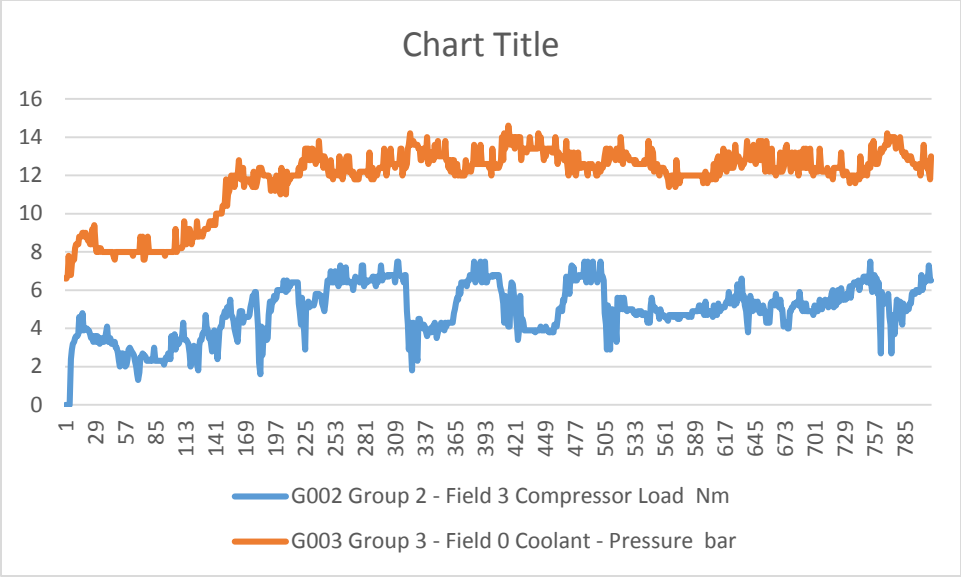
Compressor current is at 0.82 amps, which is as high as it seems to get. (calling for full volume in the variable displacement compressor)

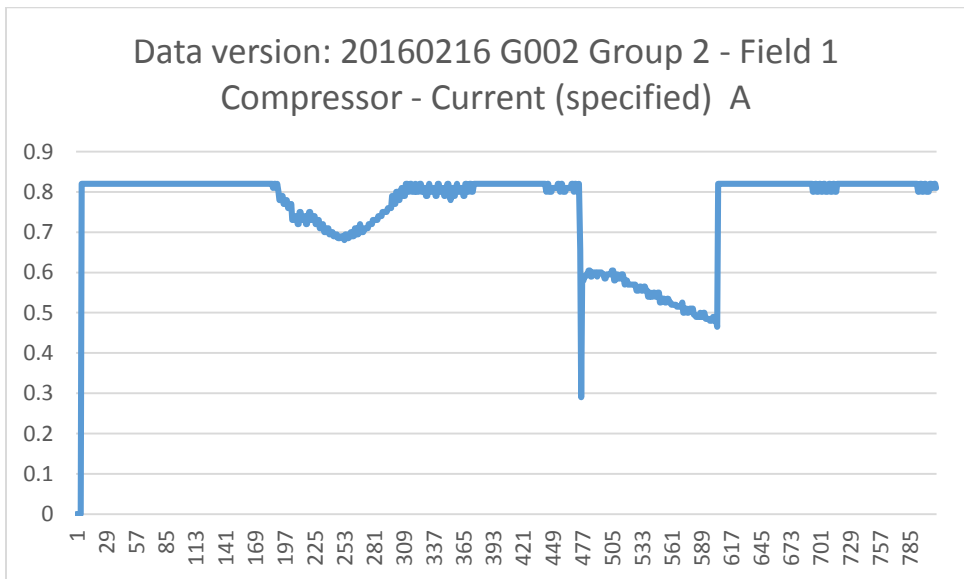
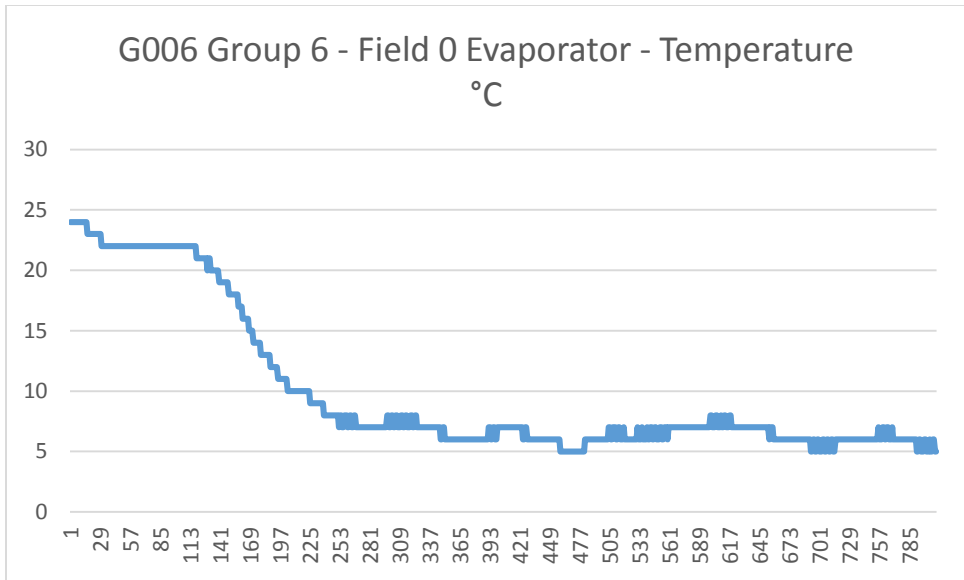
Around the 480 mark on the horizontal axis, (samples), I increased the temperature control. The control current to the compressor valve decreased, which says to me the control system is working.

Horizontal scales are in samples, which are a bit more frequent than once per second.



Wanted to show the rpm with the current, pressure, and compressor load. My first impression for the compressor load is it scales with the pressure, but is reduced at higher rpm.





These charts show the delay between request for cooling and the delay. In this case, around two minutes. Gets into the regulation phase (less current than max) when the evaporator is cooled down.

Temp request was for max cooling, and then I turned up the temp around 477 mark, then back to max cold before 617 on the horizontal

I previously ordered a valve from polarbear inc. My car has the Sanden PXE16 compressor.



Plenty of info online from folks who have done DIY on this.

The valve is in the AC compressor, and electric pulse modulation is used to apply current which creates a magnetic field which moves an internal valve against a spring. This allows external computer control of the displacement of the compressor. For these compressors, there is no clutch, the compressor always is moving. This control allows reduced load at startup, and constant load appropriate to the needs of the HVAC system.

I used some right angle snap ring pliers, after first having a local shop recover the R134a from my system. (they charged me a half hour labor. I let them keep the 1.1 pounds they pulled from the car.)

After a drive home, I put my gauge set on the car, and noted around ten psi after I had hooked up low and high side hoses. I vented down to a couple psi before removing the snap ring. A little wiggling of

the control valve with a pair of pliers and the valve came off with not much fuss. Was harder to figure out how to get the electric connector off.

My valve had a bit of corrosion on the outside. I used a couple Q tips to wipe the inside of the bore where the valve sits. My goal was to wipe only the part outside the O ring, to remove some of the rust and dust there, to make it less likely that the O rings on the new valve would pick up contaminants on the way into the compressor.

I put a few drops of PAG AC lube on the o rings. (the place I ordered the valve from also carries proper Sanden compressor oil), and installed.

The valve did not want to fully seat, until I remembered my next step was to pull a vacuum on the system. With the pump turned on, it was much easier to fully install the RCV and put the snap ring back into place.

Pulled vacuum for 40 minutes or so, then closed the gauge set valves and waited for a half hour looking for any gross leaks.

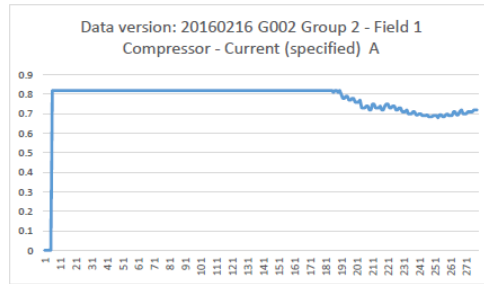
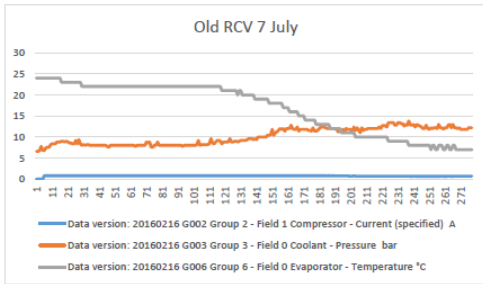
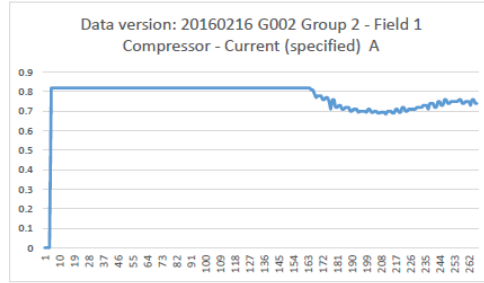
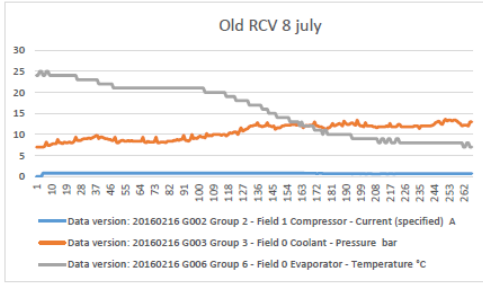
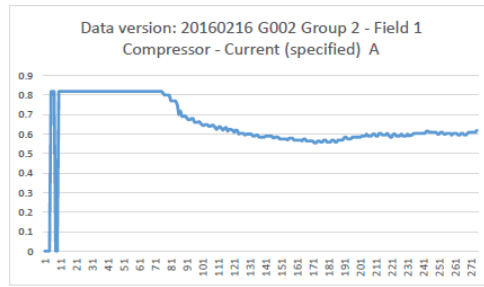
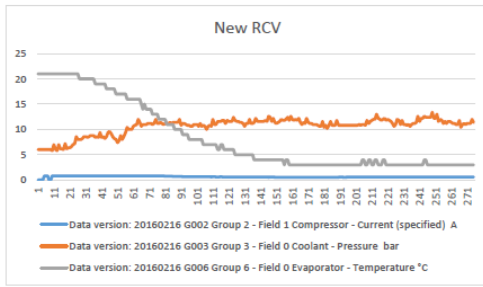
Then installed R134a from some small cans. Used a cheap digital scale, rosewill digital kitchen scale, to weigh the R134a. a little bookkeeping is required, basic addition and subtraction. Target is 525g, I think I hit 537 or so.

I talked with the tech at the shop that recovered for me, and he said the machine does pull some lubricant with the refrigerant during recovery. They usually add a half ounce on the fill. Not an exact science. For a single recharge, I think I am ok.

Half an ounce is around 15 cc.

The lube spec from alldata is 110 +- 10 cc. My take on this is that a single removal would be ok, but if there is need for a second recovery of the R134a, it would be a good idea to pay attention to the oil level when filling back up.

This valve really did the trick, and the system is working much better.

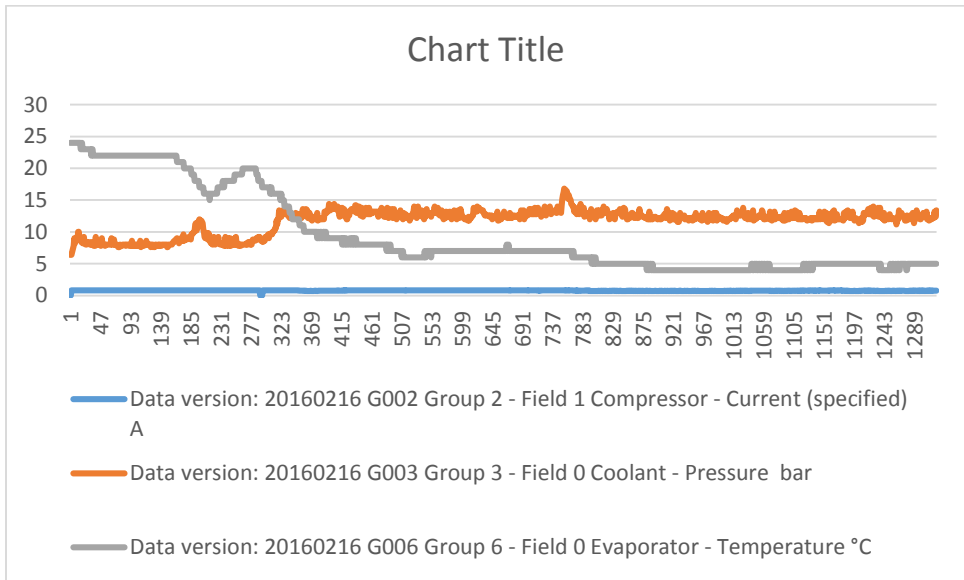
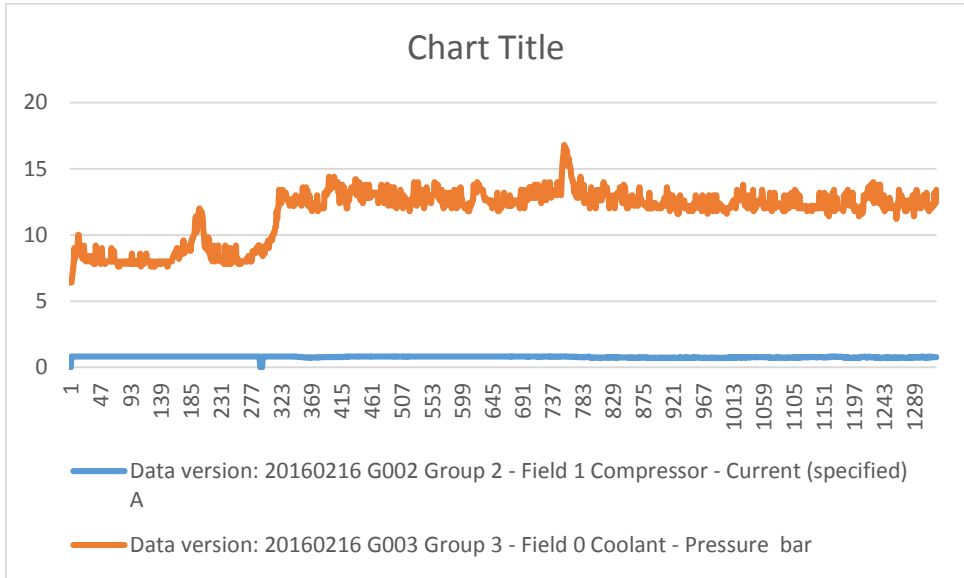


I put a few charts together, scaled for the same timeframe, all on my normal drive from my house first thing in the morning.

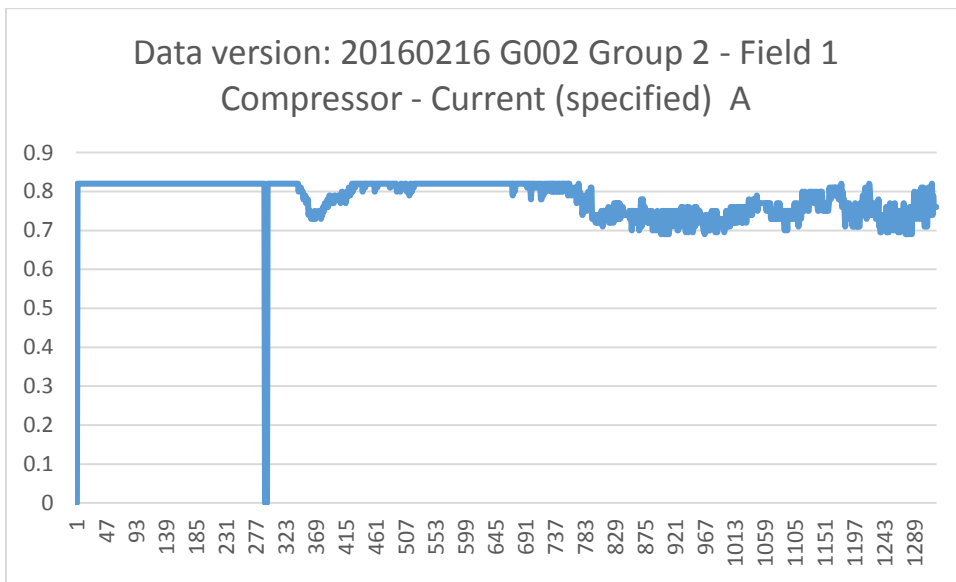
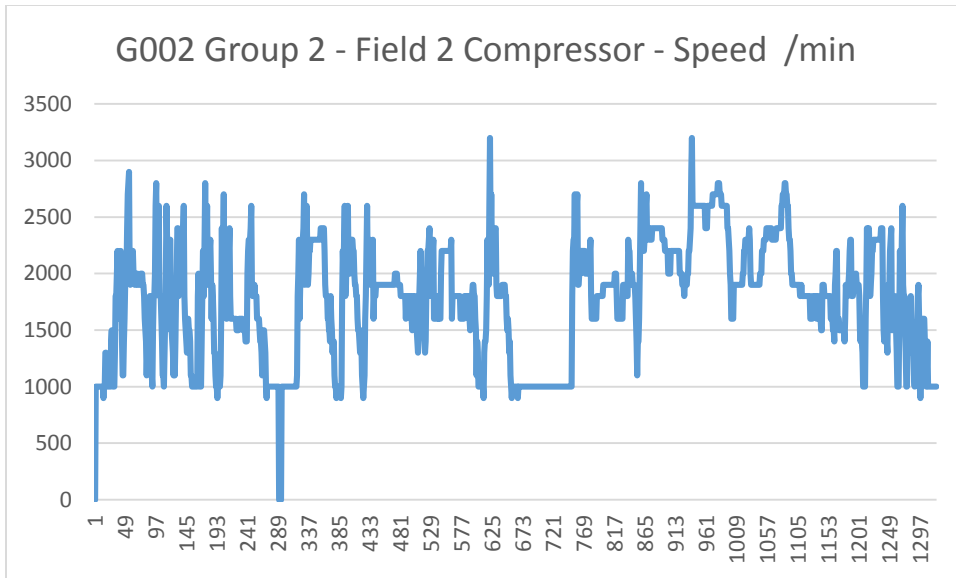
With the new valve, not only does the system get colder twice as fast, it gets colder as well.

Next set of charts are from the day before.

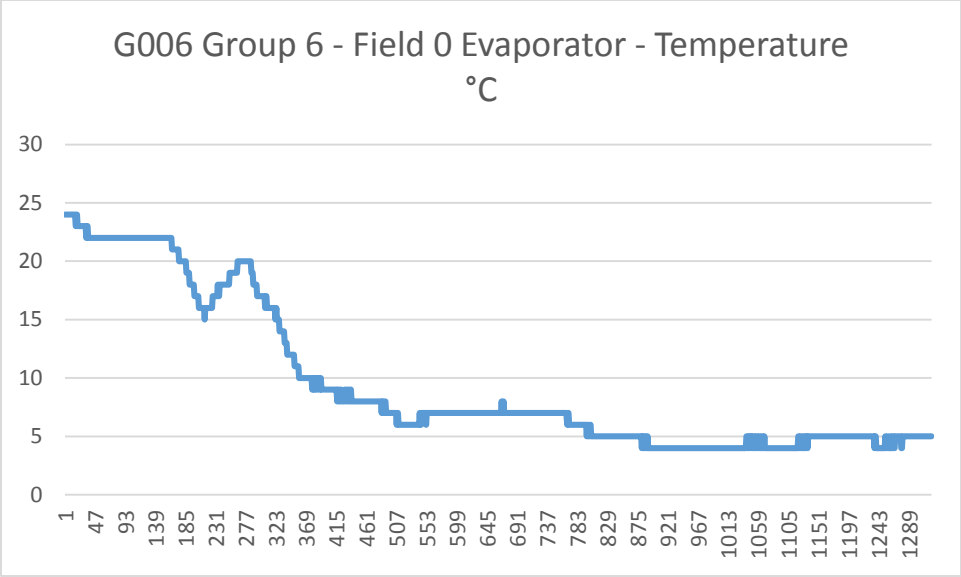
In this case, the log covers more time. I gave up and turned off the ac control off for a few seconds and then back on around 300 on the horizontal scale







With this scale, it is easier to see the details of compressor current. The drop to 0 is from my manipulation of the controls



Looks like it started to get cold, then quit, until after I cycled the control.