Heat Pump Controls and Accessories

Crankcase Heater – As per recommendation by the compressor manufacturer, a crankcase heater is needed when the system refrigerant load exceeds the 120% of recommended maximum charge. If the installation has a refrigerant charge of only 78% of the recommended maximum, and so does not need a crankcase heater. The heat pump manufacturer and the HVAC contractor felt that a basement located compressor (where the temperature is always above 50 °F) does not need a crankcase heater. The systems have no crankcase heaters at present. Under consideration is the addition of crankcase heaters that can be switched on in specific conditions. For example, if the system has been off for an extended period and/or the basement has gotten cold during a prolonged power outage.

Forced Y2 (2nd stage switch) – Even when the outside temperatures are relatively cold (15 to 20 °F range), the Proper thermostat often chooses to run in Stage 1. This results in longer run times (not really a problem), but more significantly, the temperature of the heated air is reduced. Stage 1 operation gives a 19 °F temperature rise and Stage 2 Operation gives a 28 °F temperature rise (even with a higher CFM airflow). A non-scientific observation is that the room feels better when Stage 2 is run when the outside temperature is cold. The SWAG (scientific wild ass guess) is that Stage 2 operation raises the wall temperature more and the makes the rooms feel warmer. A planned consideration is addition a switch on the basement control panel that would allow Stage 2 Operation to be: OFF, Auto, or ON. This sounds nice, but it will cost a little electricity.

Y2 Delay – When the Proper thermostat chooses to run in Stage 2, the compressor is started with the Stage 2 solenoid energized. This does increase the starting surge. Adding a 60-second time delay from the activation of Y2 (Stage 2 call) until the compressor Stage 2 solenoid is engaged is planned.

Compressor Cutout on Loss of Water Circulation – Instead of relying on compressor protection using the HP Cutout if the ground loop water circulation fails, normally closed pressure switches were installed on the input side of the heat pump refrigerant-to-water heat exchanger. If the pressure is less than 10 psi, the FS (Flow Switch) fault contact to the heat pump controller is interrupted. If this contact is open for 30 seconds while the compressor is running, an AUX fault stops the compressor. This will automatically retry 3 times before the fault requires a power cycle to reset.

Ground Loop Plumbing Leaks – Consideration, a DiversiTech WetSwitch could be placed on the floor between the heat pumps and the ground loop flow center. If a water leak from any source coats the floor with water, the ground loop circulation pumps are disabled, which in turn will disable the heat pump compressors. Rather than risk emptying the ground loop of water through a major leak, it was decided to shut down all pumps for any detected leak.