Scroll Troubleshooting Solution Chart - Copeland A/C specific

Deep Vacuum Conditions.

Deep vacuum can cause arcing damage to the Fusite pins. Models built after September 1991 have an internal vacuum protection and stop pumping when the pressure exceeds approximate. 10:1. Scroll compressors should never be used to evacuate a system, allowed to run in a vacuum or the have the suction service valve closed to check how low the compressor will pull suction pressure.

Hipot test reading showing high levels of leakage.

Scroll compressors are configured with the motor on bottom and the pumping components at the top. If the motor is immersed in liquid refrigerant they can show higher level of leakage current. The system should be run for a brief period of time before the hipot test is conducted.

Green slime in the oil.

Green slime is formed when there is a low side leak. This creates high temperatures which combined with water and air pulled in the system, degrades the white mineral oil by oxidation and hydrolysis. These degradation products attack the copper components and create the green oil/slime. Green slime is more prevalent in systems using a compressor that has a bronze or other largely copper containing bearing. Install a low pressure control and fix the low side leak to prevent green slime oil. Use proper refrigeration clean up procedures to remove the green slime.

Loud, very loud, relief sound coming from the compressor.

Some model scrolls have an internal pressure relief (IPR) valve. This valve opens at a discharge to suction differential of 375 to 450 psi (R-22) or 550 to 625 psi (R-410A). Check for restrictions in the discharge line, overcharge of refrigerant or a faulty component.

No start after charging.

Rapid charging only on the suction side of a scroll system may cause the scrolls to seal axially. Charge on the low and high side simultaneously to avoid this situation.

Overload tripping.

Check the condenser or evaporator fan for proper operation. Also check for loss of refrigerant charge or re-circulation of the condenser air. Being that the scroll is a refrigerant cooled compressor, checking the superheat at the compressor would be beneficial. The recommended superheat at the compressor is 20 degrees.

Overload tripping, pressures equalized, low amp draw - 3 Phase.

Normally caused by the compressor rotation running in the reverse direction. There is also an elevated sound associated with reverse rotation. Reverse any two of the 3 phase power leads and reapply power. Reverse rotation for over one hour may have a negative impact on the bearings.

Pressurized while unbrazing.

If the refrigerant charge is removed from a scroll by bleeding the high side only, it is possible for the scrolls to seal preventing pressure equalization through the compressor. This may leave the low side shell and suction line tubing pressurized. If a brazing torch is applied to the low side in this condition, then the pressurized refrigerant and oil mixture could ignite when it escapes. It is important to check the high and low side for pressure before unbrazing.

Runs noisily then trips on overload - Single phase.

Brief power interruptions may result in powered reverse rotation in compressors built before May 1995. This occurs as a result of the high pressure discharge gas expanding backwards through the scrolls at the power interruption, causing the scroll to orbit in the reverse direction. When the power is reapplied while reverse rotation is occurring, the compressor may continue to run noisily in the reverse rotation for several minutes until the overload trips. When the protector resets, the compressor will start and run normally. Installing an electronic control which can sense brief power interruptions with a five minute time delay will help avoid this condition.

Short cycling - Off cycle with pump down.

Refrigerant is leaking back thru the compressor. Install a discharge line check valve to avoid short cycling.

Shutoff noise.

Scroll compressors may run backwards for a brief period at shutoff as the internal pressures equalize. This momentary reversal of direction of the scrolls has no effect on the compressor durability and is entirely normal. Single phase compressors built since May 1995 have a device which prevents the reverse rotation and eliminates the noise. Three phase models have a device which reduces but does not eliminate the noise.

Shutoff sound.

The reversing valve should be wired so that the valve does not reverse when the system is shut off by the operating thermostat in the heating or cooling mode. If the valve is allowed to do this, suction and discharge pressures are reversed to the compressor. This results in a condition of system pressures equalizing through the compressor which can cause the compressor to slowly rotate until the pressure equalizes. This condition does not affect the compressor durability.

Suction line noise and vibration.

The scroll compressor produces two very close frequencies. These may result in a low level "beat" frequency which can be detected as noise coming along the suction line into a house. Elimination of the "beat" can be achieved by lessening either of the frequencies (see the third paragraph).

A second situation that may exist is that under some conditions the normal starting motion of the compressor can transmit an "impact" noise along the suction line. Three phase compressors may be more pronounced due to their higher starting torque.

Common remedies for these noises are to add a shock loop in the suction line, insure that an angled service valve is fastened to the unit, or add a suction line muffler.

These sounds are not usually associated with heat pump systems because of the reversing valve and tubing bends that are components of the system.

Suction pressure does not drop / discharge pressure does not rise.

On single phase models, either the reversing valve or the compressor is faulty.

On three phase models first, reverse any two of the power leads and reapply power. If the pressures still do not move to normal values then either the reversing valve or the compressor is faulty.

Start up clearing noises or lock up and trip on the protector several times before starting.

Usually occurs when the system charge exceeds the recommended limit and the compressor fills with refrigerant. A crankcase heater will help in this situation.

Start up gurgling sound.

This condition is just the normal startup of the motor, or it could exist when there is a low voltage condition. Installing a factory approved start capacitor and potential relay will help this situation.