APPLICATION NOTE

RESIDENTIAL AIR CONDITIONING SYSTEMS

The Problem

Residential air conditioner (AC) manufacturers sometime suffer premature warranty claims and are challenged by a constant market demand for lower energy consumption costs. Installation issues, poor maintenance practices and unreliable thermal or mechanical gauges often contribute to failures or inefficiencies within an AC system.

Most AC units today rely on very simple on/off feedback controls to regulate key functions such as fan motors and compressor loading. This simple feedback loop design can result in high power consumption during AC operation. Human and gauge error during installation can also play a large role in system performance.

Overcharging or undercharging the system can often be attributed to erroneous readings from inaccurate gauges that display potentially misleading information to service technicians. Too little refrigerant in an AC system may cause compressor overheating that could lead to lubrication breakdown, undo stress on system components and an increase in energy consumption. Overcharged systems can cause refrigerant to flood the evaporator and compressor, requiring the expansion valve to work overtime to regulate the flow into the evaporator. As a result, liquid slugging can damage the compressor and corrode critical parts over time. All these factors lead to increased energy consumption and an eventual increase in system failures or warranty claims.

The Solution

Designing AC systems with reliable pressure sensors from Sensata Technologies will provide more accurate control and allow precise monitoring of system performance. Residential systems can benefit from the addition of electronic pressure sensors placed in key locations. Pressure sensor intelligence can be used to indicate charge, provide constant pressure monitoring and enable better control of electronic expansion valves, variable speed fan motors and compressor loading.

Pressure sensors enable the use of intelligent charge indication units, which accurately display refrigerant pressures and allow the technician to compensate for environmental temperature effects upon charging. Sensors can also provide performance information that may indicate system problems that might otherwise be overlooked. Evaporator outlet pressure can be monitored by a pressure sensor networked into a central control unit and this direct feedback allows an electronic expansion valve to more accurately throttle the refrigerant flow entering the evaporator coils.

Sensor feedback, coupled with variable speed motors, allows fan speed to be regulated as needed rather than simply turning fan motors on or off. Similarly, compressor load control flexibility is enabled via electronic pressure sensors. The control system can regulate the compressor speed and reduce energy consumption by running the compressor at variable speeds rather than constantly cycling on and off from a dead stop.

Product specs available here: http://www.sensata.com/products/sensors/ipt-2cp5.htm

About Sensata Technologies

Sensata Technologies is a leading designer and manufacturer of sensors and controls for leaders in the global automotive, appliance, aircraft, industrial and HVAC markets. Our sensing and protection solutions improve safety, comfort and efficiency for millions of people every day.

For more information, please visit our web site at: www.sensata.com.