



APR Control — Benefits to the Design Engineer

APR Control – Providing Direct Expansion Modulation and Superior System Efficiencies

When selecting a DX system based on maximum load demands or design day conditions, the unit will inevitably be oversized during most of the year as design day conditions are usually only present around 10% of the year. This emphasizes the need for some sort of capacity control to accommodate the low load conditions.

The addition of an APR Control to a new or existing unit increases system performance during non-design days, which is the majority of the year. The APR Control modulates system capacity to match the lower load demand, resulting in stabilized temperature and humidity in the space.

Including the APR Control on plans & specifications allows engineering firms flexibility in system selection!

The APR Control — System Benefits

- Modulates system capacity to match varying loads.
- Maintains the evaporator in a continuous dehumidifying mode.
- Prevents excessive compressor cycling.
- Eliminates coil icing or freezing.
- Provides consistent temperature and humidity control by extending operating cycles.

The APR Control — User Benefits

- Modulating capacity results in consistent space temperature & improved dehumidification.
- Eliminating excessive cycling results in longer equipment life.
- Preventing coil icing results in reduced likelihood of equipment failure.
- Consistent temperature and stabilized humidity means greater comfort.

The APR Control — Operational and Functional Description

The APR Control modulates refrigeration capacity to match any variation of cooling load conditions. The APR Control modulates the capacity in response to the DX systems' suction pressure. The suction pressure is a direct result of the heat content in the entering air moving through the evaporator coil.

In low load conditions, the system will begin to over-cool the space and the temperature of the entering air will drop as a result. As the temperature drops, there is now less heat content in the air entering the evaporator. This lower temperature/less heat content air will cause the DX systems' suction pressure to drop. In order to avoid the thermostat from satisfying, the APR Control will modulate the system capacity to prevent the compressor from cycling off.

In R-410A applications, the APR Control comes factory set to maintain the suction pressure at 118psi (or 40°F SST). Please note that the APR Control is field adjustable to accommodate a wide array of applications and system challenges. Once the system suction pressure drops to 118psi, the APR will divert the excess capacity from the discharge line back into the suction line. The APR Control will continue to modulate to maintain the suction pressure setpoint. It is key to understand that the APR Control will only activate during low load conditions and will be completely inactive during design day conditions. The APR takes away capacity, it never adds it!

The APR Control varies the amount of refrigerant flow to the evaporator and condenser coil. Unlike hot gas bypass, which injects high temperature refrigerant gas into the evaporator coil, the APR Control only allows a sub-cooled liquid to enter the evaporator coil, ensuring the coil stays in a dehumidification state. **The APR Control is NOT hot gas bypass!**