Tecumseh IntelliCOOL™

Technology Platform for Next Generation Refrigeration Systems

Cooling for a Better Tomorrow™
Tecumseh IntelliCOOL™ is a technology platform for intelligent cooling solutions used in commercial refrigeration systems. Tecumseh IntelliCOOL platform, which encompasses Tecumseh’s latest product innovations and initiatives in variable capacity cooling, intelligent control, energy management and connectivity, enables design engineers to turn their next generation ideas into reality. By utilizing Tecumseh IntelliCOOL components such as variable speed compressors, compressor inverters and system controllers, engineers can flexibly design optimal commercial refrigeration systems that are compact, quiet and deliver superior performance.

Innovative features such as electronic protection, on-board diagnostics, and remote communications provide technicians with the information needed to ensure refrigerated case(s) are operating at peak performance and with the highest level of reliability.

In line with Tecumseh’s refrigerant position, variable speed compressors used in Tecumseh IntelliCOOL support hydrocarbon and A2L refrigerants, delivering systems that are Eco-friendly, safe, and meet current and future energy requirements.

**Tecumseh IntelliCOOL Integration Options:**

- As Components
  - Variable-Speed Compressors
  - Tecumseh IntelliCI – Compressor Inverter
  - Tecumseh IntelliSC – System Case Controller

- As Condensing Unit
- As CRS (Complete Refrigeration System)

The four main benefits of Tecumseh IntelliCOOL are in the areas of **Energy Savings, System Performance, Connectivity and Serviceability, and Reliability**...
**Dynamic Variable Capacity Cooling**
Tecumseh IntelliCOOL optimizes energy savings by dynamically matching the capacity of the compressor to the refrigeration system’s cooling demand. The speed of the compressor is continually adjusted to ensure the refrigerated cabinet is maintaining the required temperature, while using the lowest amount of energy.

In some applications, built-in intelligence in the compressor controller enables the system to benefit from energy-optimization of the variable capacity cooling system without the need for an electronic system controller.

**Adaptive Defrost**
Defrosting the evaporator coil consumes energy and raises the temperature inside the refrigerated cabinet. Tecumseh IntelliCOOL constantly monitors refrigeration system temperatures and pressures and adapts the defrost function to save energy and then rapidly return the cabinet to optimal temperature. The main objective of adaptive defrost is to only initiate defrost when it’s needed and to stay in defrost long enough to ensure that the refrigeration system is operating within the necessary parameters.

**Smart Lighting Control**
Lights are necessary for consumers to see what’s inside the refrigerated cabinet. This is especially important as refrigeration display case manufacturers are incorporating glass doors into what has traditionally been open-type merchandisers, to save energy. Regardless of the type of lighting used, they also consume energy so, it makes sense to turn the lights off when they’re not needed. Tecumseh IntelliCOOL algorithms can be modified to fit the customer’s requirements for determining when to turn lights on and off.

**ECO Mode**
In applications where the cooling demand is periodically reduced, like at night or other low usage times, the system controls and cooling system operations can be automatically reconfigured to further optimize energy consumption.

**Precision Temperature**
Controlling temperature in refrigerated cases is essential to food safety, marketability and freshness. This is especially true for perishable foods such as fruits, vegetables, dairy products, meats, fish and poultry that must be kept within a certain temperature range to prevent spoilage.

One way that Tecumseh IntelliCOOL delivers temperature control is by varying the speed of the compressor. As the cabinet temperature varies from set-point, programming logic will determine how fast or slow to run the compressor to maintain temperature, while minimizing temperature over-shoot and rapid cycling.

Tecumseh IntelliCOOL is also able to monitor and control the evaporator and condenser fan motors, in conjunction with the compressor speed, to precisely control cabinet temperature.

**Input Power Management**
The quality of power supplied to the cabinet is critical to the long-term performance and reliability of electrical components: compressor, controls, and fans. Tecumseh IntelliCOOL includes intelligence to monitor the power source, protecting these components from high and low voltage conditions and over-current conditions.

Additionally, Tecumseh IntelliCOOL includes a wide voltage input range, allowing refrigeration systems to be used in regions with poor power quality. The same refrigeration system can be used in various regions across the globe, allowing for model reduction and standardization.

Variable speed operation also results in the compressors running at lower speeds for longer periods of time which contributes to lower overall noise and vibration. Additionally, Tecumseh IntelliCOOL can be configured to avoid motor speeds that produce resonant frequencies in the cabinet which cause excessive noise and vibration.

**Rapid Temperature Pull-Down**
Convenient stores, restaurants and other retail establishments rely heavily on cold beverages, the production of ice and the ability to maintain food at proper temperatures.

Peak periods throughout the day, typically around breakfast, lunch and dinner, place additional demands on refrigerated equipment. By operating the compressor at higher speeds, Tecumseh IntelliCOOL can greatly reduce the time needed to pull-down cabinet temperatures after restocking or during initial stocking.

**Quiet Operation and Low Vibration**
Noise and vibration produced by compressors, fans and other rotating devices can be annoying especially when refrigeration equipment is close to where people are socializing, dining, shopping or relaxing in smaller stores or cafes.

Tecumseh IntelliCOOL reduces overall refrigeration system noise and vibration by slowly ramping motor (compressor and evaporator and condenser fan motors) speeds up and down based on cooling demand, and eliminating noise fluctuations and extremes typical of on/off operation. Variable speed operation also results in the compressors running at lower speeds for longer periods of time which contributes to lower overall noise and vibration.

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Embedded Communications Interface
Using simple protocols, Tecumseh IntelliCOOL transmits information related to operating conditions, faults, and alarm states from the compressor, variable speed controller and various sensors connected to the electronic system controller.

LOCAL Diagnostics and Alarming
Tecumseh IntelliCOOL includes an array of diagnostics and FAULT information related to both the refrigeration system and cabinet performance. This information is available locally for use by owners and technicians to understand the cause of undesirable performance. FAULT information can also be used to configure alarms and provide direct information to service technicians.

REMOTE Diagnostics and Alarming
Tecumseh IntelliCOOL includes the capability to connect to future IoT and other remote monitoring and data collection networks. This ability to collect information about the performance and condition of the system, as well as diagnostic and FAULT information at remote sites.

This data can be analyzed and further used to monitor system performance, conduct preventative maintenance and dispatch service technicians.

Electronic Protection
Tecumseh IntelliCOOL protects refrigeration system components using high performance electronic circuits and intelligent software algorithms. This results in the elimination of bi-metal thermal protection devices.

Electronic protection is fast and precise, resulting in minimal exposure to abnormal environmental and electrical conditions that can adversely affect the long-term reliability of the refrigeration system and components.

Motor Soft-Start
Variable speed compressors used in Tecumseh IntelliCOOL have soft-start function which applies the required amount of current to the compressor motor during start-up, reducing start-up noise and motor stresses and ensuring reliable starting at both high load and low-voltage conditions.

Compressor Lubrication Management
Lubrication is essential to compressor performance and reliability. Tecumseh IntelliCOOL ensures that the compressor operates within a speed range where the appropriate amount of oil is delivered to the compressor’s bearing services and other key friction points.

Adequate return of oil in the refrigeration system is achieved using high speed operation after prolonged periods of low compressor speeds.

Self-Maintenance
Dust laden condenser coils impede heat transfer and cause the compressor to work harder and consume more energy. One of Tecumseh IntelliCOOL’s self-maintenance features is the ability to reverse the condenser fan to blow dust off the coil.

Don’t hold back. Use Tecumseh’s IntelliCOOL technology platform to bring your design to life.