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COMMANDER SK CREATES SIGNIFICANT ENERGY SAVINGS FOR GROCERY BUSINESS

Energy savings of 35% on a refrigeration plant are being achieved at a grocery business in Calgary in Canada thanks to the installation of variable speed drives from Control Techniques.

A new cooling system comprised of two new compressors and condenser coolers was being installed at the grocery company. The owner decided to explore ways of cutting his electricity bill while maintaining the correct – and critical – temperatures required in his refrigeration system.

The customer's refrigeration company, Chinook Refrigeration, called in Control Techniques to propose a solution for cutting high operating costs. The proposal specified one variable speed Commander SK AC drive per cooler to control all the fans simultaneously. The drives were integrated into a custom-designed panel built at the local Control Techniques Calgary Drive Center.

The Commander SK drives were set up with a minimum running speed of 12 Hz, following a 0-10V reference signal provided by the refrigeration controller, an Emerson Climate Technologies "E2." The controller provides the correction

control reference signal for the drives, varying the speed of the fans to provide the level of cooling required.

In the refrigeration system, the pressure of the refrigerant is regulated by controlling the cooling of the condensers. As the pressure rises, more cooling is required to lower the refrigerant pressure.

KEY BENEFITS

- 35% ENERGY SAVINGS
- IMPROVED TEMPERATURE CONTROL
- REDUCED STRESS ON SYSTEM
- CUSTOM DESIGNED SYSTEM
- EASY INSTALLATION & USE

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CONTROL TECHNIQUES

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For most of the year, the condenser runs at a fraction of its full capacity. In the old system, condenser cooling control was achieved using contactors to switch the fixed-speed fans off and on in pairs. This resulted in the fans constantly cycling and failing to provide the fine temperature control that is required. Because the pressure set-point was constantly being overshot, excessive expansion and contraction of the refrigerant resulted in mechanical fatigue of the lines. In time, this could lead to failure of the piping or connectors.

Four motors running at half speed use much less energy than two motors at full power. In addition, smooth changes to fan speed use less energy than repeated start-ups. In this VFD-controlled system, not only is there a significant saving in energy (the customer reports a 35% reduction in electricity usage), but pressure and temperature are regulated very accurately resulting in less stress on the entire system.

The Commander SK family of drives offers market-leading performance and features from ease of fitting, set up and use to dynamic response, connectivity and energy-saving efficiency. The drives provide connectivity to all major fieldbus networks as well as Ethernet/internet communications for global drive access.

The Control Techniques Calgary Drive Center built two panels for this customer, incorporating a 24V DC supply for the pressure transducer and a bypass system due to the critical nature of the application, as well as the Commander SK drives. Each drive was set up to provide PID control to a set-point with a pressure feedback variable. Alternatively it can follow an analog signal produced by the compressor control system. The condenser units – one with six cooling fans, the other with eight – are roof mounted.