

Electronic Refrigeration Application Example

Cold Storage – Ripening Rooms

Application Issue

In cold storage rooms, too low evaporation temperatures lead to unnecessary dehydration of the refrigerated food, resulting in weight and quality losses.

High air humidity levels are particularly important in the case of slightly water-precipitating food such as fruit, vegetables, meat or cut flowers and are a key factor in maintaining quality and ensuring long storage times.

The aim is to keep the differential of room temperature and evaporation temperature as small as possible, thus ensuring a high air humidity level. This means that if evaporation takes place at too low a humidity level, expensive humidification equipment must be used to raise the humidity again.



Solution

Using an Electronic Expansion Valve (EEV) and Superheat control, it is possible to reach low superheat and a higher charging level of the evaporator and, therefore, higher evaporation temperatures. There will be more capacity by making better use of the evaporator.

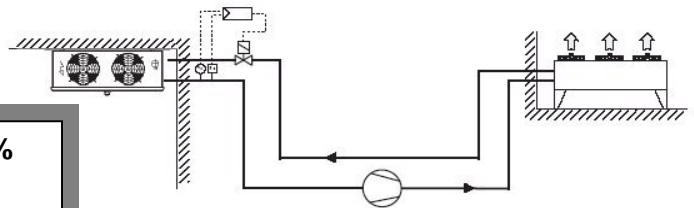
Control concept

The evaporation temperature calculated via the evaporation pressure is continually compared with the suction gas temperature. The superheat controller with its PID mode controls the EEV and ensures constantly low and adjustable suction gas superheat. Superheat is controlled more accurately.

In addition, the EEV offers an array of other advantages:

- Enhanced control performance owing to PID control
- Optimum use of the evaporator and, therefore, better COPs
- Precise adaptation to the demand due to superheat adaptation
- High level of reliability
- MOP function
- Rapid and accurate handling of large pressure variations

Cold storage room with differential of room and evaporation temperature as low as possible



Electronic Superheat Controls Save a Minimum of 12 % Compressor Energy

Example

- 20 Ton Compressor running for 7000 hours consumes approx \$8,300 of energy (\$.08/kw)
- Electronic Superheat Control system estimated installed cost is \$900.00 (trade cost)
- Installation variable (\$600.00 est.)
- 12% minimum savings = \$990
- Payback = 1.5 years
- Return on Investment (ROI) = 66%

Savings can be much greater

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