Marketing news

Energy savings in cold rooms

CAREL EEV guarantees easy installation, high performance and fast payback for cold rooms

Where
Sausage factory, north Italy.

What
Cold room upgrade, from thermostatic valve (TEV) to electronic expansion valve (EEV).

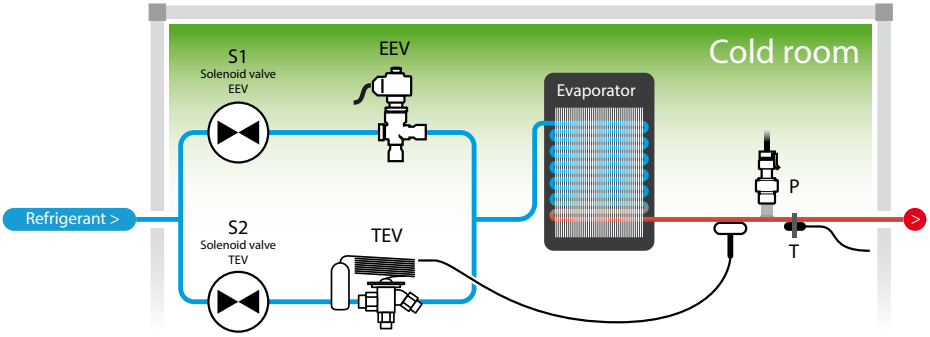
Why
Energy saving and higher cold room performances, with low installation cost impact.

Cold room setup

The application is a 90m3 cold room for meat storage:
- temperature inside the cold room -20°C;
- evaporator power 5,5kW, with 4 single-phase 200W fans and 5kW three-phase heaters for defrost;
- condensing unit with cooling capacity of about 5kW with an evaporation temperature of -25°C at an ambient temperature of 25°C;
- refrigerant gas used R404A;
- thermostatic valve for R404A.

Comparative test: TEV vs EEV

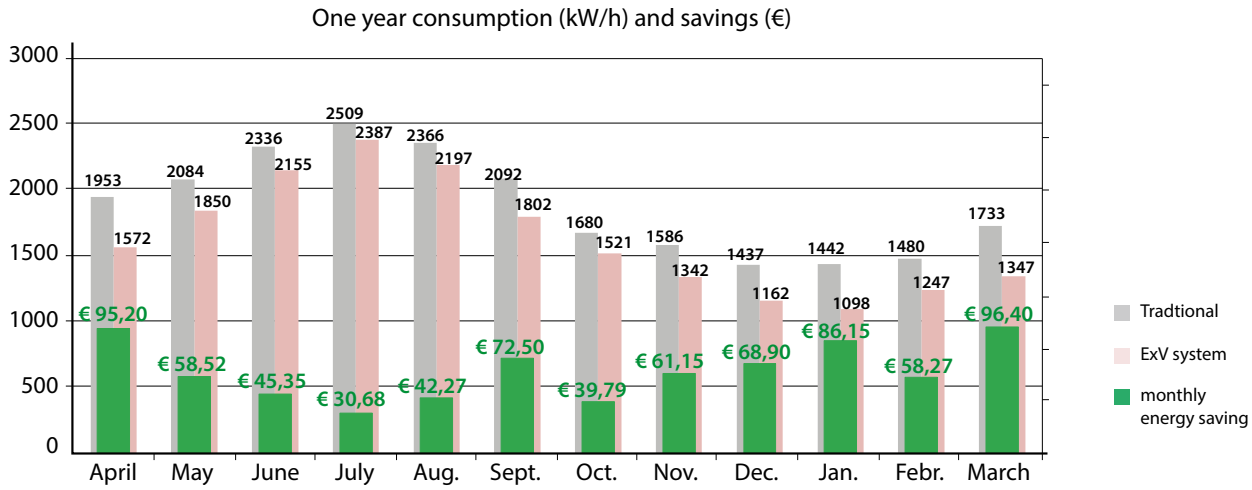
To set up a performance comparison between thermostatic valve (TEV) against electronic expansion valve (EEV) in the same conditions, it's needed to include both valves inside the same cooling circuit.
For EEV is needed also to add to the main cold room control, Ultracella, an electronic driver, called EVD module. This device can read the system conditions and manage directly the valve modulation to allow an optimal refrigerant flow through the evaporator.



The diagram shows the installation. An external logic allows to switch the refrigerant flow alternatively through the two valves each 3 days. Energy consumption (kWh) is measured in both cases considering all cold room loads.

The results

The field test lasted about a year and a half.
In this document are displayed the consumption data in a whole year.



It is evident how the energy consumption values fluctuate during the whole year, due to the external temperature modifications (and since temperature inside the cold room is kept at a fixed -20°C).

Cold room driven by thermostatic valve (in gray) show an energy consumption of an average 7% more than Carel electronic stepper valve (in red) in the summer months and 25% more in the winter. The average energy saving in a whole year reaches 13% for Carel electronic expansion valve compared to the old thermostatic valve solution.

	Electronic expansion valve (EEV)	Thermostatic valve (TEV)
Total energy consumption/ year	**19.678 kWh**	**22.699 kWh**
Total energy cost/year (@ 0,25€ /kWh)	**4.920 €**	**5.675 €**

Total energy saving/year

3.021 KWh

Total cost saving/year (0.25€ /KWh)

755 €

13%

Total saving

Considering the actual energy cost (estimated for this test in 0,25 €/kWh), Carel EEV solution can bring a saving of 755 € in a single year, that means an average of 60 € saving per month. The technology cost difference (to the end user) between Carel EEV system and a traditional TEV system can be recovered in one year only.

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