

An efficient alternative

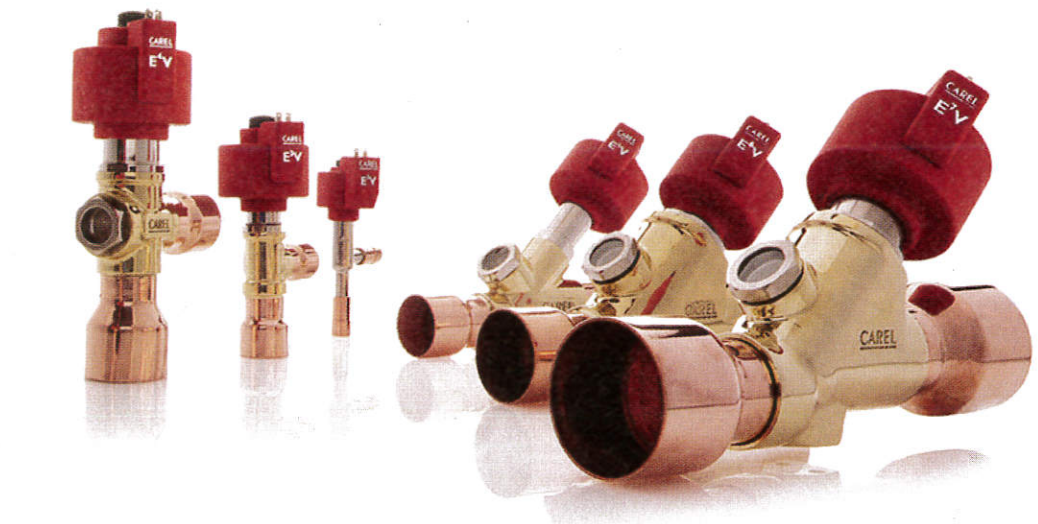
Use of electronic expansion valves within refrigeration and air conditioning systems provides a series of benefits over their mechanical counterparts, says **IDS Climalife**

Thermostatic expansion valves (sometimes referred to as metering devices) are widely used today in the world of refrigeration and air conditioning, acting to control the flow of refrigerant into an evaporator. This flow control is achieved via a temperature sensing phial that prompts the valve to open or close and regulate the flow of the high-pressure liquid refrigerant through to the evaporator in order for it to expand and evaporate into a cool gas before returning to the compressor. But these valves can be somewhat limited in terms of their performance and versatility.

Electronic expansion valves provide a more sophisticated level of decision-making and outperform their mechanical counterparts – borne out by the fact that they are now the standard offering from a number of manufacturers.

The most compelling argument towards using an EEV is its superior efficiency and the resulting energy savings gained through the reduction in work being carried out by the compressor. In the past, the EEVs' increased component cost and complexity put some people off, but the realisation that they also bring with them a range of other benefits has helped to change that view. These include: an intuitive user interface offering an engineer's diagnostic view; negating the need to connect up the gauges and temperature probes; and the provision of set-up wizards that ensure a suitable initial configuration with just a few parameter selections.

Many EEVs have the added ability to automatically adapt to a wide range of operating conditions, while intelligent operating pressure protection can ensure the compressor is actually far better protected and reliability of the



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system is improved. And now the all-important price point is improving too, thanks to their increased take-up and product development cycles.

Sound endorsement

The Carbon Trust has endorsed the energy benefit of EEVs in its guide *How to implement electronic expansion valves*. It says: "Even on machines that don't operate continuously, you could recoup your costs within three years. The more hours your plant operates, the shorter the payback time."

The guide also notes the valves' ability to "measure pressure and refrigerant more precisely, optimising energy use" and the fact that they "allow compressor discharge pressure to be reduced because they need less differential pressure than a conventional thermostatic valve. When the

discharge pressure is allowed to vary with the compressor temperature, the refrigeration cycle is more efficient."

Climalife works in partnership with Carel to supply electronic expansion valves in the UK. Steve Gatenby from Climalife says: "A typical Carel valve can be suitable for a wide range of refrigerants covering a wide capacity range, thanks to the fact that it can operate down to 10 per cent of its normal capacity without any performance loss. Plus, as the refrigerant selection is a configuration parameter, stock levels can be greatly reduced. Added to its lower maintenance requirements, the electronic expansion valve starts to look like a clear winner."

A range of add-on products are available too, which work with the EEV to enhance the efficiency of a system. Carel's MPXPRO, for instance, provides advanced management of standalone or multiplexed refrigeration units. Meanwhile, the ultraCella is a new range of controllers for cold rooms launched by Carel and available through Climalife. Development of the ultraCella focused on improved

usability for installers and end-users, and above all improved assembly, installation and configuration.

The Carel EXVs provide a straightforward process to change from a mechanical valve by changing the old mechanical valve for a new stepper motor valve and fitting an EVD Evolution valve driver, temperature and pressure sensors and associated wiring. The valve driver then only requires the setting of a few parameters (refrigerant, type of pressure transducer, application and superheat) and then with a signal from an external temperature controller to enable it, the installation is up and running.

Further parameters can be set to fine-tune the control if required, along with some parameters for the setting of safety limits such as MOP, LOP, Low or High Superheat. The use of an optional Ultracap unit ensures the valve closes in the event of a total power failure, allowing the expansion valve to double as a solenoid valve.

Companies such as Climalife are happy to advise on products and their use in conversions or new installations. **ESR**