



air-conditioning controllers  
parametric controllers



Carel integrated solution  
for chillers/heat pumps  
with screw compressors

# Solution for CH/HP units with screw compressors

The Carel integrated solution for chillers/heat pumps offers complete control of compressor operating limits, guaranteeing protection, reliability and maximum efficiency.

## Solution for chillers/heat pumps

- Compressor protection and reliability
- High-efficiency integrated solution
- Unit energy saving

The CAREL solution for units with screw compressors has been developed around the new pCO5+ range of programmable controllers.

The application can manage both air/water and water/water units with screw compressors, adopting either continuous or stepwise capacity control. The maximum configuration includes 1 screw compressor for each circuit, and up to 2 circuits.

The distinctive feature of this software is dynamic control of the compressor operating limits. In fact, the suction and discharge pressure are read at all times, thus determining the compressor operating point.

If this is near one of the limits set by the manufacturer, the software will implement corrective actions on the various unit devices (compressor capacity, electronic valve, condenser devices) so as to maintain or return compressor operation within the limits. This function thus ensures greater compressor protection and reliability, and at the same time, high unit efficiency. Finally, special attention has been focused on display usability. Access to the unit configuration and management parameters has been simplified, using a set of menus grouped by device. In addition, there are three password-protected access levels providing three different access modes to the parameters (read-only for support, settings for service, total access for the manufacturer). The main screen provides rapid access to the user functions that do not require a password (information on the status of unit components; unit On-Off and operating modes; set point).



### Compressor envelope control

The screw compressor is the most important and costly part of the unit, and for this reason it is important to guarantee its protection and reliability. The Carel solution allows simple management of all the main compressors available on the air-conditioning market, such as Bitzer, Frascold, Refcomp, Hambell and Fusheng.



### Unit efficiency

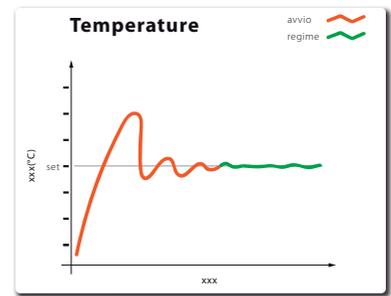
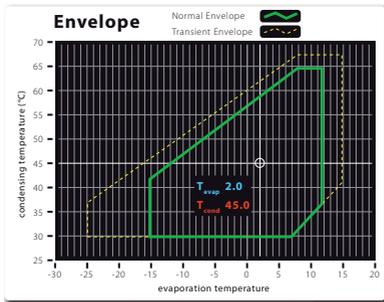
The EVD EVO driver and the electronic expansion valve are devices fitted as standard on the Carel solution for CH/HP units with screw compressors, and not only control suction superheat, but also guarantee energy efficiency through precise control in various outside temperature and load conditions.



### Unit protection

Ultracap is the new emergency power supply device for electronic valves, and is designed to ensure complete closing of the valves in the event of sudden mains power failures. The reliability of Ultracap, combined with the quality of the tight seal ensured by CAREL valves, eliminates the need for solenoid valves, meaning a considerable reduction in unit cost.

# The CAREL integrated solution for complete control of units with screw compressors



## Integrated unit control

pCO5+ is the true heart of the solution: it reads the inputs, manages the outputs and exchanges data with the other unit actuators (EVD EVO, fan controllers etc.), thus optimising unit control and efficiency. Indeed, by continuously reading the suction and discharge pressure, the controller determines the compressor operating point in real-time and, depending on just where this is in the envelope, adopts corrective actions so as to maintain or return compressor operation within the limits.

To ensure the compressor works inside the envelope, specific prevention actions are implemented on compressor capacity, condenser fan speed (for air/water units) and on the opening of the ExV. All managed directly by the controller.

## Temperature control

Efficient and stable operation by applying two different types of temperature control:

- PID control at start-up
- PID control in steady operation

Control at start-up needs to prevent excess power consumption. As when starting the load is unknown, capacity needs to be ramped up gradually, awaiting the response from the system. Control in steady operation, on the other hand, must be rapid so as to reflect any variations in load and maintain the water outlet set temperature as near as possible to the set point.

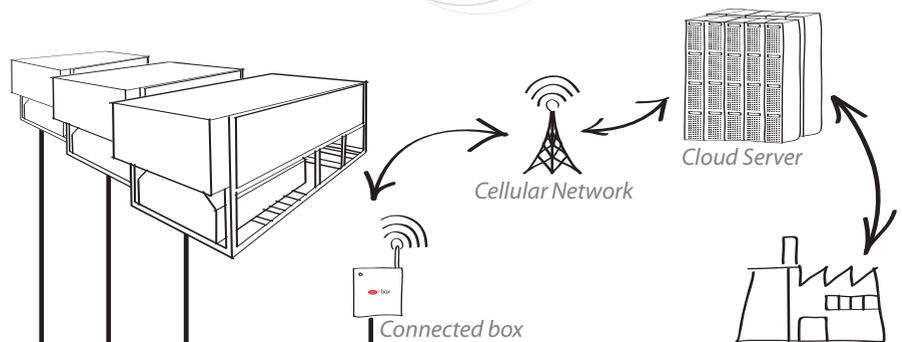
## Connectivity: tERA

tERA is new Carel cloud server platform for centralised site monitoring and management.

Connectivity to the system is simple and immediate, using wireless transmission: the system can collect all the data from the site via GPRS, using a channel that is independent of site infrastructure.

Users can, at any time and wherever they are, access all site information using any device available: desktop PC, tablet or smartphone.

Reports, graphs and alarms provide a rapid overview of unit status, allowing users to make the necessary changes to improve operation, either over the same remote connection, or planning specific service on site.



# Components in the solution

pCO5+, the result of Carel's more than 30 years' experience in the development of controllers for the HVAC/R market.



## pCO5+

pCO5+ represents Carel's latest proposal in the field of programmable controllers. pCO5+ offers specific new functions for improving efficiency in HVAC/R systems, such as the built-in EEV driver, greater flexibility through the use of universal I/Os, and greater connectivity using five serial lines, which allow management of smart actuators such as drivers for DC inverter compressors, brushless fans (EC fans), centrifugal compressors, variable flow-rate pumps, serial sensors, wireless sensors, and, not least, compatibility with the most commonly-used BMS systems available on the market

## EVD EVO e ExV

The care paid to the design and production of our valves has resulted in market-leading performance levels:

- high maximum operating pressure (Ps), 45barg on entire EXV range;
- extended operating temperature range, -40T65 °C for the refrigerant
- operation guaranteed in both directions, thus simplifying the refrigerant circuit layout in reverse-cycle heat pumps and reducing installation costs.

In addition, the combined effect of:

- Teflon gasket for a perfectly tight seal;
- calibrated spring and extra-closing steps to ensure tightness even with high pressure differentials;
- Ultracap, guaranteed closing even in the event of blackouts;

EXV sistema is the only solution on the market that can fully provide the function of solenoid valve

### Headquarters ITALY

CAREL INDUSTRIES HQs  
Via dell'Industria, 11  
35020 Brugine - Padova (Italy)  
Tel. (+39) 0499 716611  
Fax (+39) 0499 716600  
carel@carel.com

### Sales organization

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