pRack 300 and 300T

Solutions for advanced
compressor rack management

A complete range

pRack is CAREL's complete offering for the control and management of compressor racks.

The ideal solution to meet multiple market requirements, thanks to:

- the high number of inputs and outputs;
- innovative control algorithms focused on saving energy;
- compatibility with the main market standards;
- several integration/supervision options.

pRack is positioned as an increasingly high-performance product in the compressor rack market, simplifying the management of intrinsically complex systems. The pRack platform comprises two families:

pRack pR300 HS

Greater integration through multiple communication lines. Embedded direct management of expansion valves combined with high-performance hardware, suitable for the management of synthetic refrigerants and subcritical CO_2 systems.

pRack pR300T HS

Designed for the management of transcritical CO_2 booster systems, this combines the direct control of high pressure valves via built-in drivers and management of oil recovery and heat recovery systems, in compact and functional hardware.

Easy to use

pRack has numerous features and procedures that make using the controller easier, such as the start-up wizard and several pre-configurations, guiding users step-by-step from commissioning to everyday use in the field.

Energy saving

pRack includes a group of energy saving features (heat recovery, floating suction and condensing pressure set points...), which can also be managed in sync with the supervisory system.

System optimisation

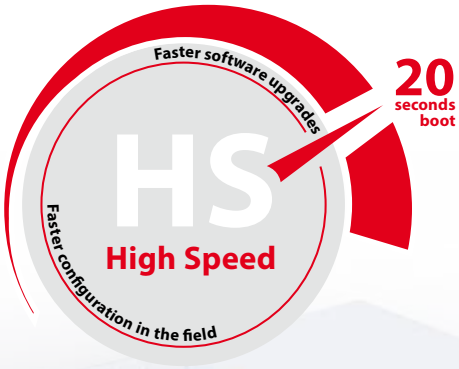
Management of modulating devices to guarantee the highest efficiency in controlling operating pressure and ensuring greater system stability.

HS platform

The pRack hardware update brings several improvements to the product. The hardware platform features the latest generation HS (high speed) microprocessor, ensuring five times faster execution speed than the previous model:

- startup time reduced to 20 s;
- faster software upgrades via USB;
- faster controller setup.

The pRack versions developed on pCO5+ HS hardware are pin-to-pin compatible with the previous versions.



Procedure that guides users step-by-step through the initial configuration by simply responding to a series of questions.

Once the configuration procedure has been completed, the parameter list can be saved in the controller's memory or to a PC.

Programming key to make a complete copy of the device's configuration and then easily duplicate it onto other devices running the same application.

Wizard

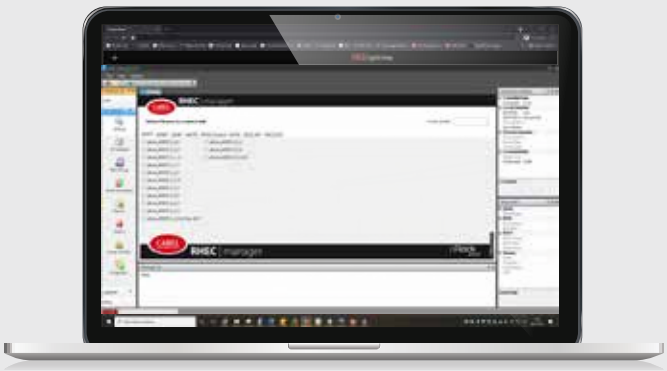
Backup configuration

USB or smart key

Guaranteed data saving

RHEC | manager

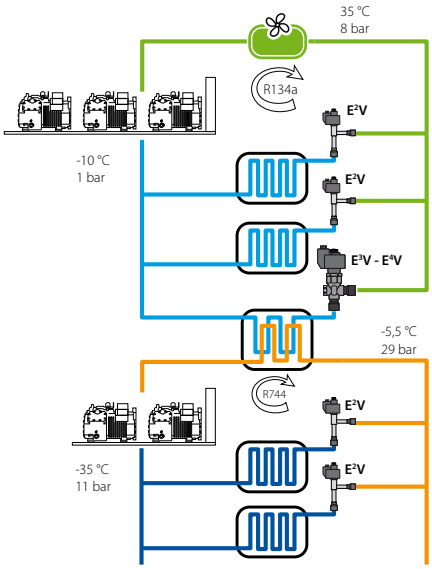
RHEC manager (Retail High Efficiency Controller) is a tool designed to help customers upgrade the software. It is also used to manage parameters and configurations and commission the controller, as well as monitoring via pLAN and RS485 connection. The software is designed for customers who want to generate reports and simulate configurations without having to connect directly to the system.



pR300 for applications with traditional refrigerants and subcritical CO_2

Especially suitable for cascade subcritical CO_2 systems, thanks to the integration of electronic expansion valves for the control of plate heat exchangers.

CASCADE



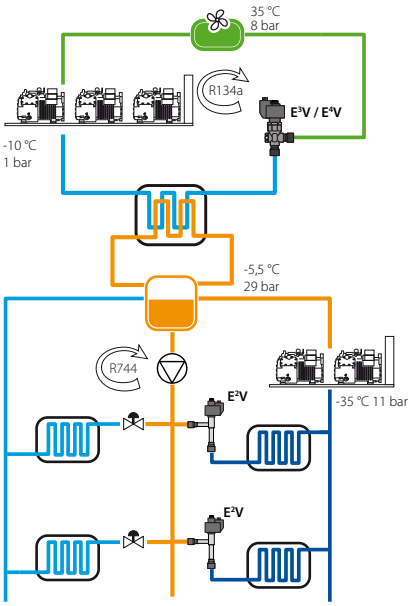
EEVS: Electronic Expansion Valve Synchronisation

Direct communication system between the low temperature compressors and the plate heat exchanger electronic expansion valve driver.

The low temperature compressor rack modulates the evaporator capacity based on the CO_2 **condensing pressure** for fine, precise control.

The medium temperature rack can be controlled based on an auxiliary temperature/pressure probe reading with proportional or dead band control.

PUMPED



Main features

One device only that meets the needs of both medium and large refrigeration systems. The pRack platform can adapt functionally to the type of system and the characteristics of the electrical panel.

Multitab

The flexible pRack architecture means several controllers can be connected together to make up a single control unit for managing up to two complete systems.

Double line

Management of an entire low/medium temperature system with one single controller. In addition to more traditional configurations, up to two suction lines and two split or shared condenser lines can be managed.

other features common

pR300T for transcritical CO_2 applications

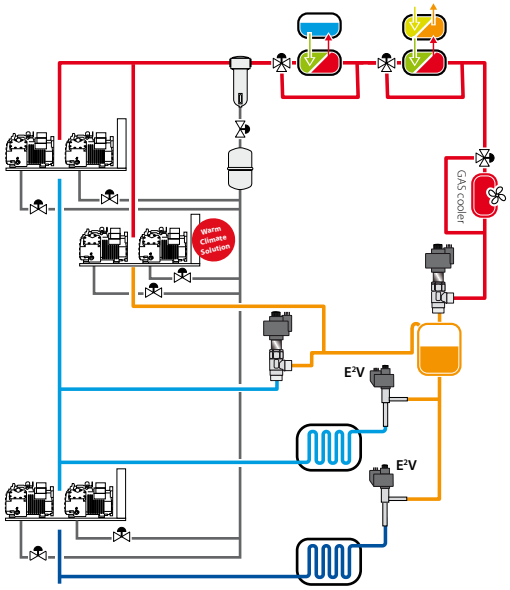
Advanced controller for the complete management of all the components of transcritical CO_2 booster systems.

High pressure valve

E^3VC and E^5VC are electronic expansion valves that are ideal for CO_2 booster systems, used as back pressure valves or flash gas valves. The different capacities available mean the gas cooler and receiver can be controlled in the high pressure stage of transcritical circuits.

Expansion for transcritical pRack CO_2

The new expansion board for pR300T provides 10 additional universal I/Os and 6 additional digital outputs.
Ideal for managing a high number of alarms for a single compressor and/or the probes required for dual heat recovery systems.



I/O configuration

All pRack inputs and outputs are fully configurable as NTC, PTC, PT100, PT500, PT1000, 0/1V, 0/5 V, 0/10 V, 0/20 mA or 4/20 mA probes, voltage-free digital inputs (standard and fast) and analogue outputs (0/10 V and PWM). Up to 10 universal channels, each configurable as an input or output.

Generic functions

Up to nine configurable functions per board to meet all market demands. The free analogue inputs and system variables on the device can be used to independently customise the control panel with specific logic, directly from the user interface.

Safety systems

- Backup pressure probes;
- Compressor discharge temperature monitoring;
- Low suction superheat protection;
- Heartbeat for activation of backup systems and internal log;
- Anti-liquid return output;
- Internal configuration backup.

to all available models

Efficiency and performance in the same package

Various features to increase efficiency and reduce the overall energy consumption of compressor racks.

Floating condensing pressure

pRack can adapt its operating conditions based on the outside conditions measured by a temperature probe.
The smooth line function maximises energy savings with the use of the MPXPRO and CAREL E²V expansion valves on the cabinets and in the cold rooms.

Heat recovery

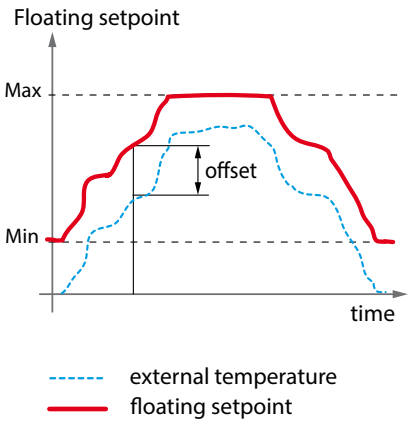
Function that exploits the heat normally expelled by the gas cooler for the production of hot water (domestic or industrial use), in heating systems (radiators, underfloor heating) and ventilation systems.
Possible options:

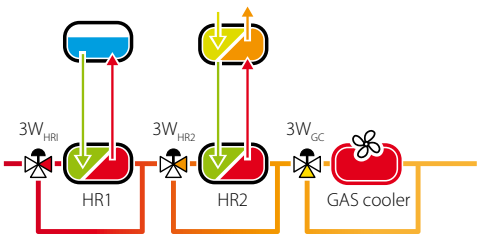
- two independent heat recovery stages;
- gas cooler bypass;
- pumping system activated via digital or analogue output.

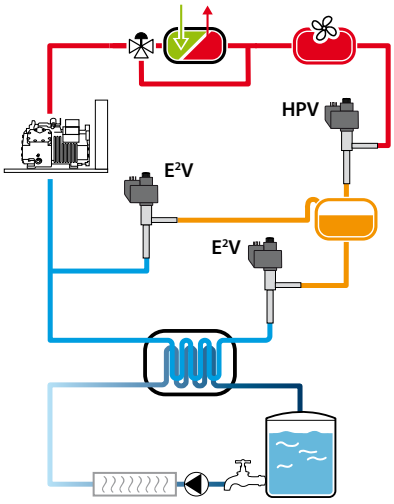
Water chiller

The growing market interest requires the implementation of new operating logic for chiller applications. The water chiller function on the pR300T is used to cool water (or another liquid) for:

- cooling equipment;
- air conditioning;
- industrial applications;
- food retail applications.



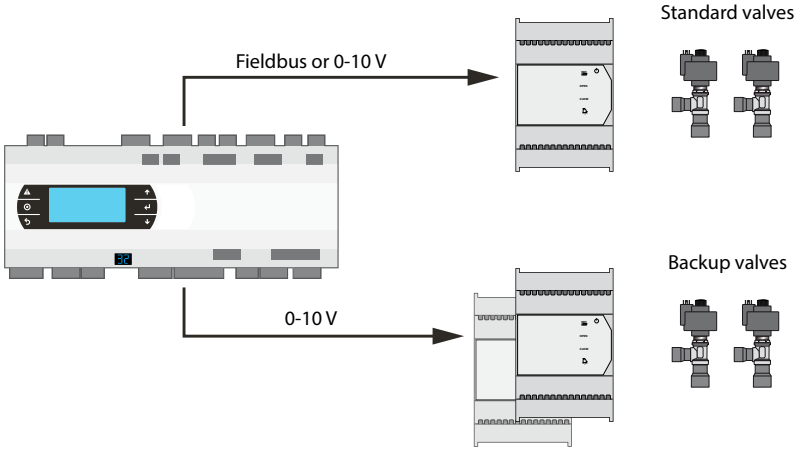




Backup valves

The backup valve function exploits a second HPV and a second FGV in the event of problems with the main driver or main valves.
This safety function can be used in two modes:

- replacement if the main valve is broken;
- supplementary when one of the main valves is unable to keep the pressure under control.



Tables and features

Technical specifications

Model	Analogue inputs	Digital inputs	0-10 V analogue outputs	Digital outputs	EEV
Small	5*	8 (24 V)	4	8	-
Medium	8*	12 (24 V) - 2 (230 V)	4	13	-
Medium & EVD	8* (+4)	12 (24 V) - 2 (230 V)	4	13	2
Large	10*	14 (24 V) - 4 (230 V)	6	18	-

* number of analogue inputs that can be used as free digital inputs.

List of part numbers

Model	Part number	Description
pRack pR300		
Small	PRK300S3F0	pRack pR300 small, built-in white pGDe, RS485 Fieldbus and BMS, USB
	PRK300S3FK	pRack pR300 small, external pGDe with connection cable, RS485 Fieldbus and BMS, USB
	PRK300S0E0	pRack pR300 small, without display, RS485 Fieldbus and BMS, USB, 2 SSR
	PRK300S3E0	pRack pR300 small, built-in pGDe, RS485 Fieldbus and BMS, USB, 2SSR
	PRK300S0F0	pRack pR300 small, without display, RS485 Fieldbus and BMS, USB
Medium	PRK300M3F0	pRack pR300 medium, built-in pGDe, RS485 Fieldbus and BMS, USB
	PRK300M3FK	pRack pR300 medium, external pGDe with connection cable, RS485 Fieldbus and BMS, USB
	PRK300M0E0	pRack pR300 medium, without display, RS485 Fieldbus and BMS, USB, 2 SSR
	PRK300M3E0	pRack pR300 medium, built-in pGDe, RS485 Fieldbus and BMS, USB, 2 SSR
	PRK300M0F0	pRack pR300 medium, without display, RS485 Fieldbus and BMS, USB
Medium & EVD	PRK300D3F0	pRack pR300 medium and built-in twin driver, built-in pGDe, RS485 Fieldbus and BMS, USB
Large	PRK300L3F0	pRack pR300 large, built-in pGDe, RS485 Fieldbus and BMS, USB
	PRK300L3FK	pRack pR300 large, external pGDe with connection cable, RS485 Fieldbus and BMS, USB
	PRK300L0E0	pRack pR300 large, without display, RS485 Fieldbus and BMS, USB, 6 SSR
	PRK300L3E0	pRack pR300 large, built-in pGDe, RS485 Fieldbus and BMS, USB, 6 SSR
	PRK300L0F0	pRack pR300 large, without display, RS485 Fieldbus and BMS, USB
pRack pR300T		
Small	PRK30TS3FK	pRack pR300T small, external pGDe with connection cable, RS485 Fieldbus and BMS, USB
Medium	PRK30TM3FK	pRack pR300T medium, external pGDe with connection cable, RS485 Fieldbus and BMS, USB
	PRK 30TM0F0	pRack pR300T medium, without display, RS485 Fieldbus and BMS, USB
Medium & EVD	PRK30TD3F0	pRack pR300T medium and built-in twin driver, built-in pGDe, RS485 Fieldbus and BMS, USB
	PRK30TD3FK	pRack pR300T medium and built-in twin driver, external pGDe with connection cable, RS485 Fieldbus and BMS, USB
	PRK30TD0F0	pRack pR300T medium and built-in twin driver, without display, RS485 Fieldbus and BMS, USB
	PRK30TD3E0	pRack pR300T medium and built-in twin driver, built-in pGDe, RS485 Fieldbus and BMS, USB, 2 SSR
Large	PRK30TL3F0	pRack pR300T large, built-in pGDe, RS485 Fieldbus and BMS, USB
	PRK30TL3FK	pRack pR300T large, external pGDe with connection cable, RS485 Fieldbus and BMS, USB
	PRK30TL0F0	pRack pR300T large, without display, RS485 Fieldbus and BMS, USB

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