

Hall 7A

Chillventa Specialist Forums 2022

Chillventa Fachforen 2022

**CONNECTING
EXPERTS.**



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CAREL

Heosbox CO₂ high efficiency solution, alternative to propane, for self contained units



DRIVEN BY
THE FUTURE

Sustainability in action

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11/10/2022

Heosbox CO₂: high efficiency solution, alternative to propane, for your self contained units



BETTER **CONTROL**
BETTER **ENVIRONMENT**

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Summary

Part 1

- *Solution background*
- *Waterloop advantages vs racks*
- *Heos sistema benefits*

Part 2

- *Heosbox CO₂ distinctive features*

Part 3

- *Heosbox CO₂ value proposition*
- *Conclusions*

Solution background

Market drivers

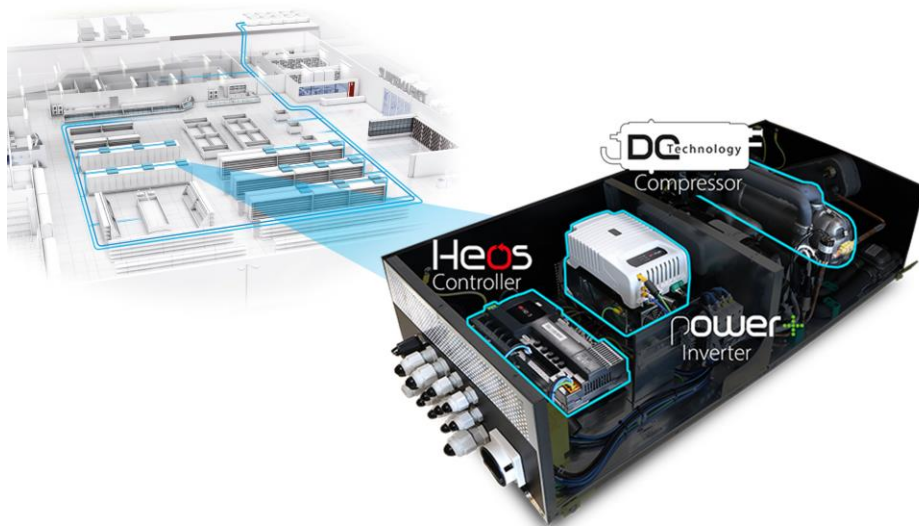


TEWI reduction

Direct Emission (Natural Refrigerants)
Indirect Emission (Energy Efficiency)

Sustainability

Cost saving (installation&maintenance)
Ease of integration (safeties,etc)



Heos box

CO₂ condensing unit for
waterloop systems
equipped with
Heos technology

Waterloop advantages vs racks



Charge reduction

Semi plug-ins utilities allow to drastically reduce the amount of refrigerant in the system.

80%
Refrigerant charge
reduction



Leakage risk reduction

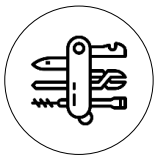
Self contained design reduce the amount of weldings thus reducing the leakage risk.

96%
Refrigerant leak
reduction



Increased efficiency

- ✓ Evaporating self adjusts according to each cabinet effective working conditions
- ✓ Cooling is the actual required by each cabinet and showcase temperature is directly controlled
- ✓ Pressure drops are limited by self contained design



Flexibility

Semi plug-ins utilities allow easy lay-out modification without the need for a "rack area" (wider sales area!)



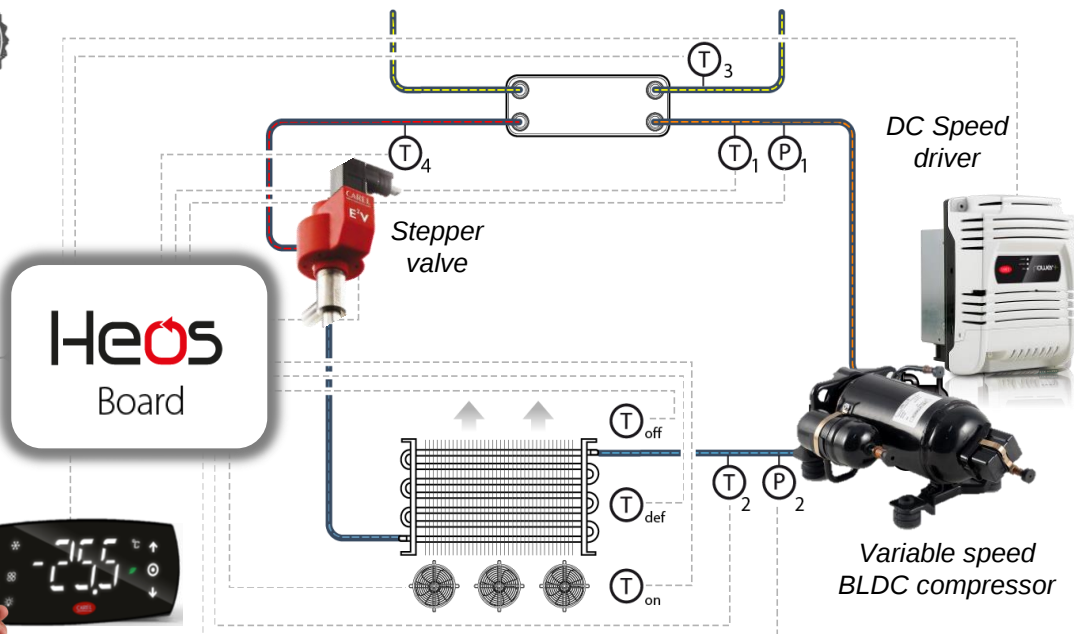
Heos sistema

All in one architecture, different refrigerant options

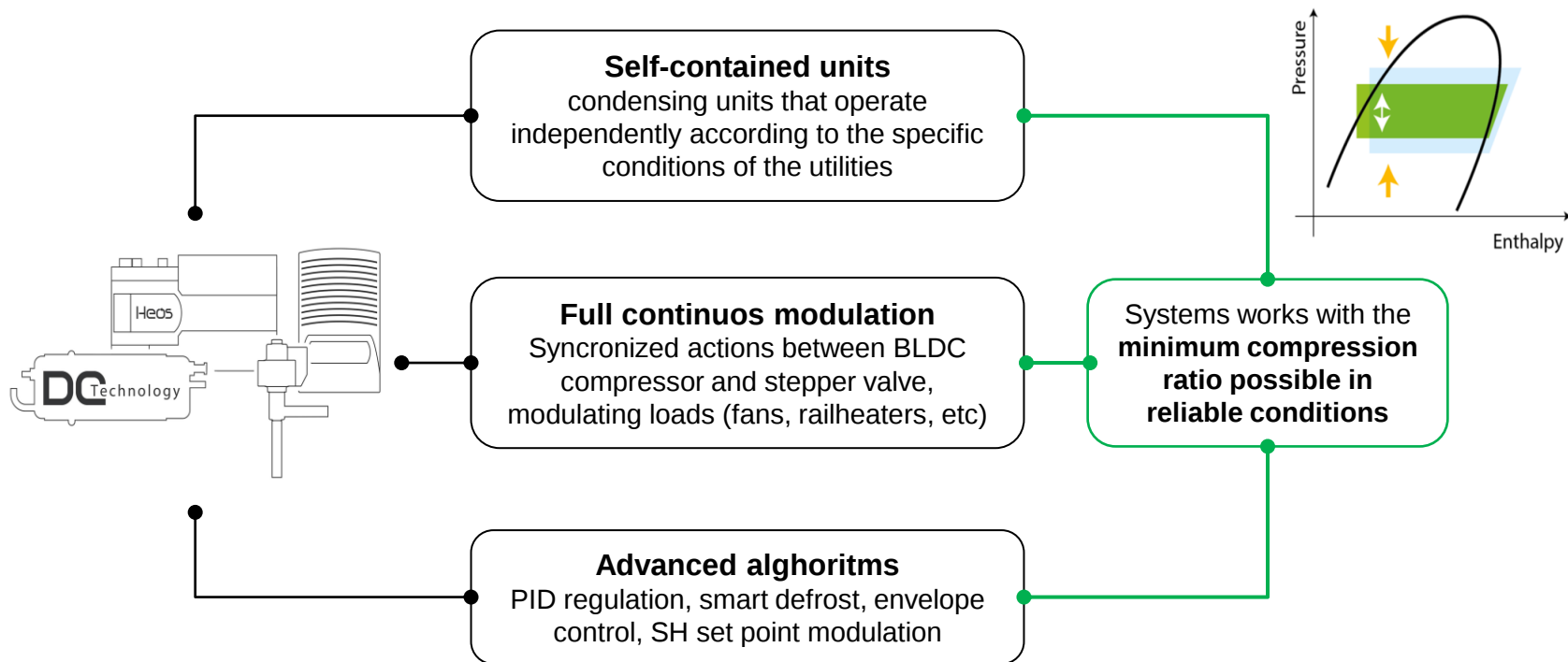
CO₂
Single valve design
Subcritical & transcritical



Single circuit >150g
Multicircuit (on/off & vcc) ≤ 150g
Propane & A2L



Heos technology advantages



DC technology & EEV

A case study

What

- Real comparison of **different compressor and valve technologies** in the same unit
- Same store, cabinets and operating conditions

How:

- **1 year of data collection**
- 24 hours cycles each configuration

Who:

- Data and results certified by a 3rd party laboratory



Compressor with DC inverter and electronic valve;



Compressor with DC inverter and thermostatic valve;



Compressor with PWM modulation and thermostatic valve;



ON/OFF compressor and thermostatic valve.

*Proven better
efficiency vs
different technologies*

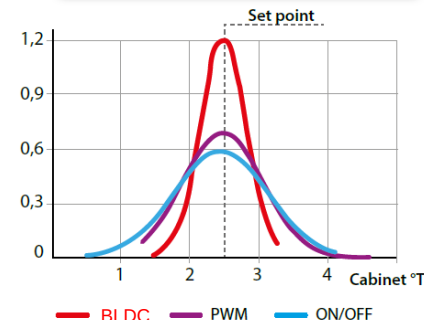


15% ÷ 30%

Exceptional
temperature and
humidity stability

±0,3°C

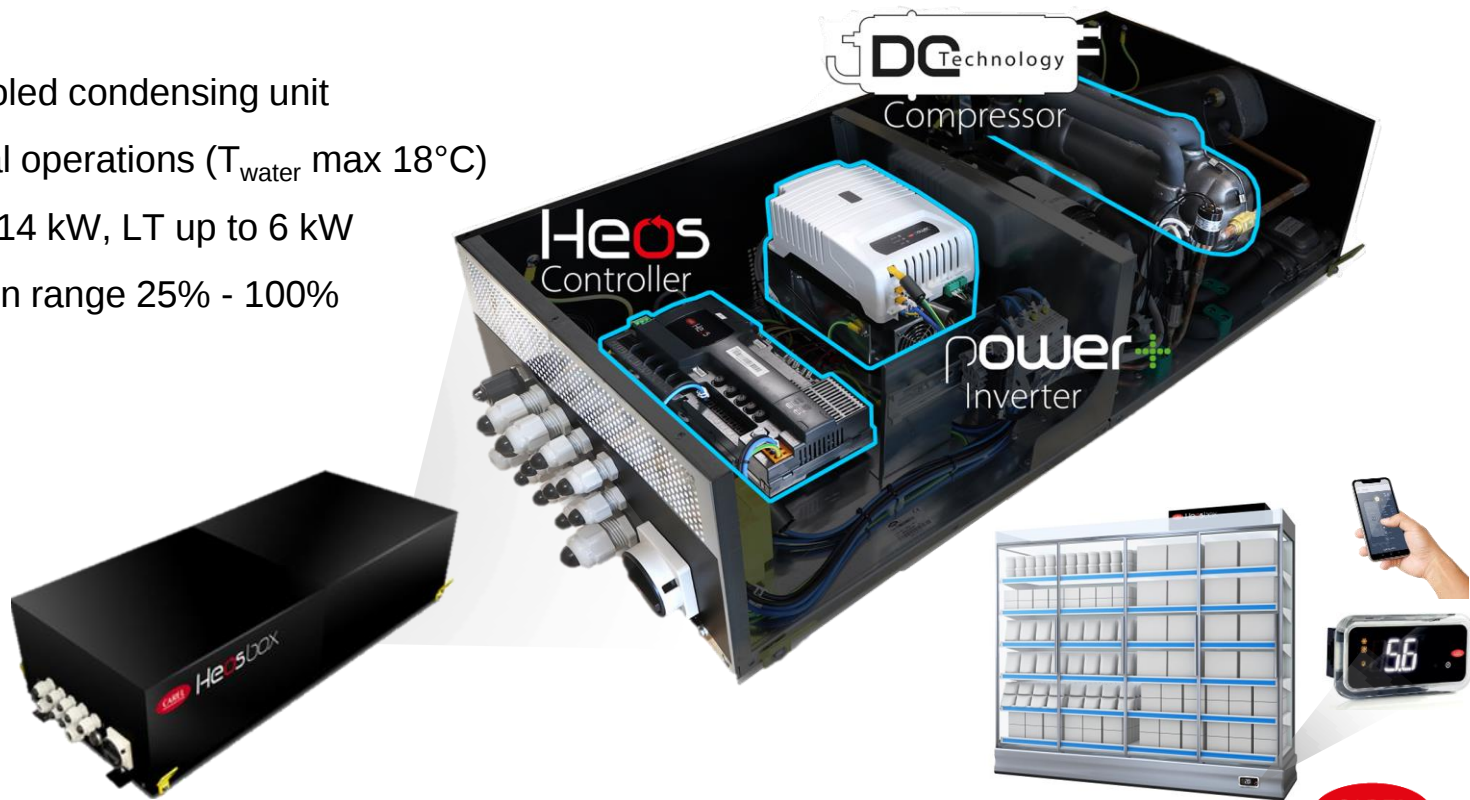
Cdu technology	Annual SPF	Power consumption over the year (kWh)
BLDC + EEV	2,92	14800
BLDC + TEV	2,60	16640
PWM + TEV	2,21	19520
ON/OFF + TEV	2,53	17120



Heosbox CO₂

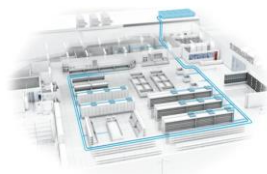
From components and know how...to the full condensing unit

- Water cooled condensing unit
- Subcritical operations (T_{water} max 18°C)
- MT up to 14 kW, LT up to 6 kW
- Modulation range 25% - 100%



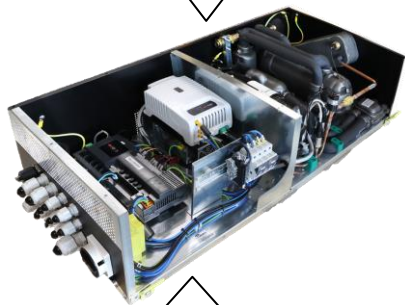
CO₂ subcritical advantages

Future proof alternative to propane



TEWI reduction

Direct Emission (Natural Refrigerants)
Indirect Emission (Energy Efficiency)



Cost saving (installation&maintenance)
Ease of integration (safeties,etc)

Sustainability



Efficiency

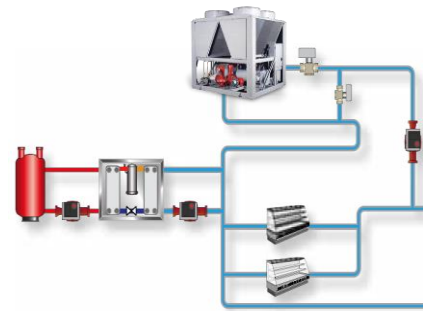
- CO₂ is exceptionally efficient in subcritical conditions

Cost saving

- Lower design pressure
- Single or multiple evaporator design with 1-valve config

Integration

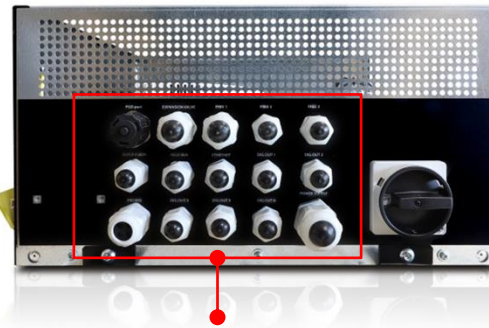
- No charge limits: CO₂ is A1 refrigerant
- Cold waterloop system enables synergies (HVAC&REF)



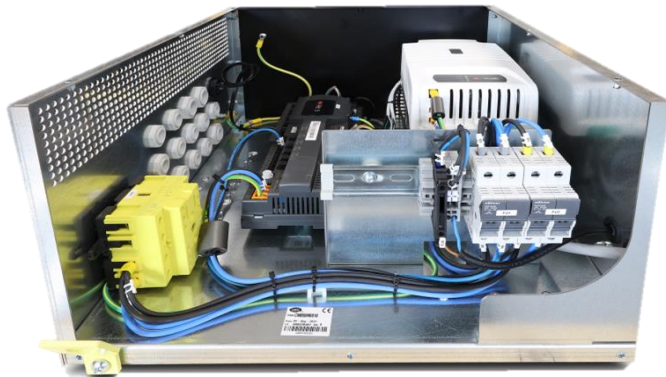
Refrigerating circuit details



Electrical panel & connections



I/O cable glands connections



Refrigerant connections

Water connections

Focus on the Heos controller

Distinctive features

Full circuit control
No additional devices needed



Showcase management
On/off or **P+I modulation**



M/S network
Synchronized actions



Remote connectivity
Wireless to supervisors

Wifi
Serial
converter



Remote connectivity
Wired to supervisors



Ethernet



RS-485

Local connectivity
Wired and wireless



Advanced logics

- *SH modulation*
- *P+I load management*
- *Smart defrosts*
- *Real time COP calculation*
- *Envelope control*
- *Oil recovery*



Full system knowledge...

...enables true predictive maintenance



Cabinet level



Preventive diagnostic

Store level



Advanced dashboard

Enterprise level



Multisite comparison
Machine learning



Descriptive analytics



Preventive analytics



Prescriptive analytics



Proactive analytics



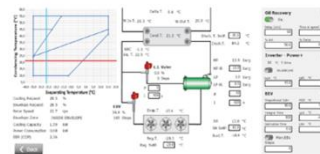
Problem notification

The system shows that some showcases require excessive defrosting



Understanding

Data analysis shows a non optimized parameter configuration



Implementation

Parameter configuration optimize via remote



Heosbox CO₂ value proposition

Cutting edge solution alternative to propane for self-contained units



Running cost saving

Decentralized benefits, full continuous modulation, synergies HVAC/R.



Ease of installation

Pre-configured semi plug-in units with advanced connectivity.



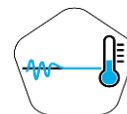
Maintenance cost saving

100% tested units. Full system control enables safety logics and predictive maintenance.



Food quality

Temperature and humidity stability means enhanced shelf life



Long story short

Conclusions

- Heosbox CO₂ is **condensing unit** for utilities connected to a **cold waterloop system**;
- Waterloop systems allow **subcritical operation** and enable **synergies with HVAC** systems;
- Subcritical operations means
 - **reduced complexity/costs**;
 - permanently **efficient working conditions**, boosted by **Heos technology**;
- Heosbox CO₂ directly looks to whom is looking for a **future proof solution alternative to propane**;
- Heosbox CO₂ is characterized by **advanced local and remote connectivity** and integrates **digital services** for active monitoring and data analysis.

[Visit us: https://www.carel.com/Heosbox CO₂](https://www.carel.com/Heosbox CO₂)

