

Chillventa Specialist Forums 2024 **Chillventa Fachforen 2024**

**CONNECTING
EXPERTS.**



TURBOALGOR

THE ULTIMATE SOLUTION FOR EFFICIENCY IMPROVEMENT OF
TRANSCRITICAL R744 REFRIGERATION SYSTEMS



- COMPANY PROFILE
- STATE OF ART
- TURBOALGOR TECHNOLOGY
- FREE PISTON EXPANDER
- FLUID CONTROL UNIT
- PERFORMANCES
- TEST BEANCHES
- TURBOALGOR SOFTWARE
- RANGE OF PRODUCT

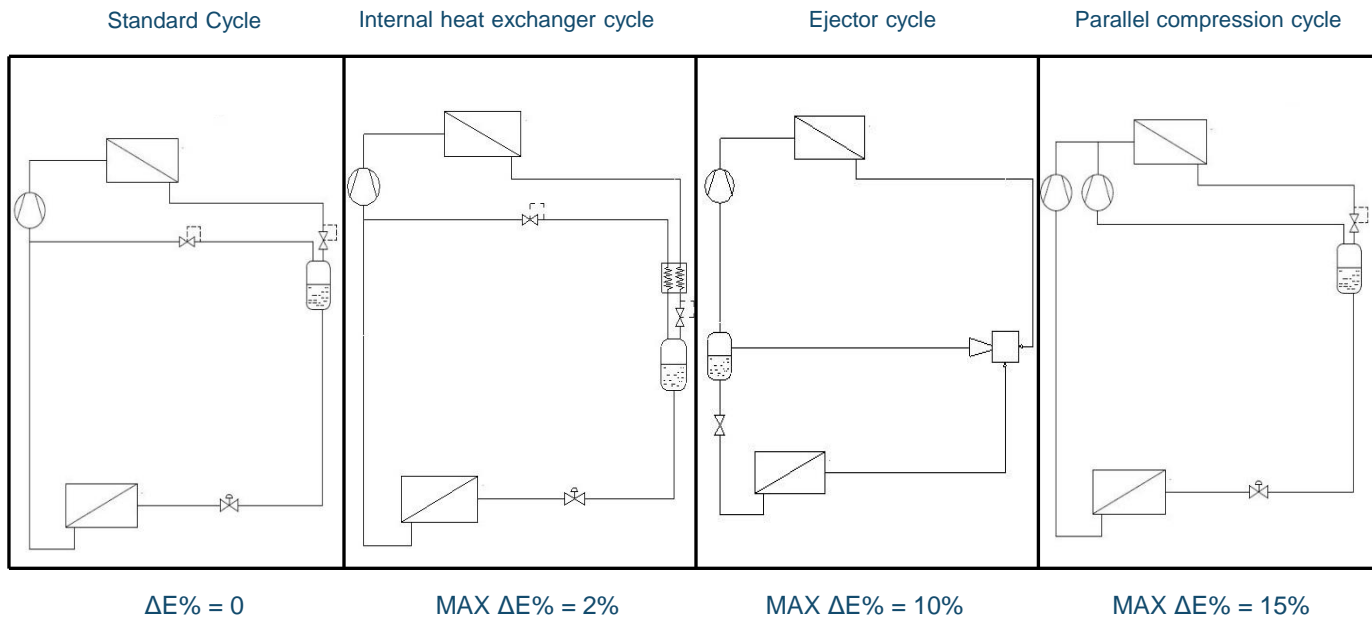
Turboalgor is an innovative SME owned by the [Angelantoni Group](#), synonymous with knowledge and expertise in the construction and optimisation of refrigeration systems.



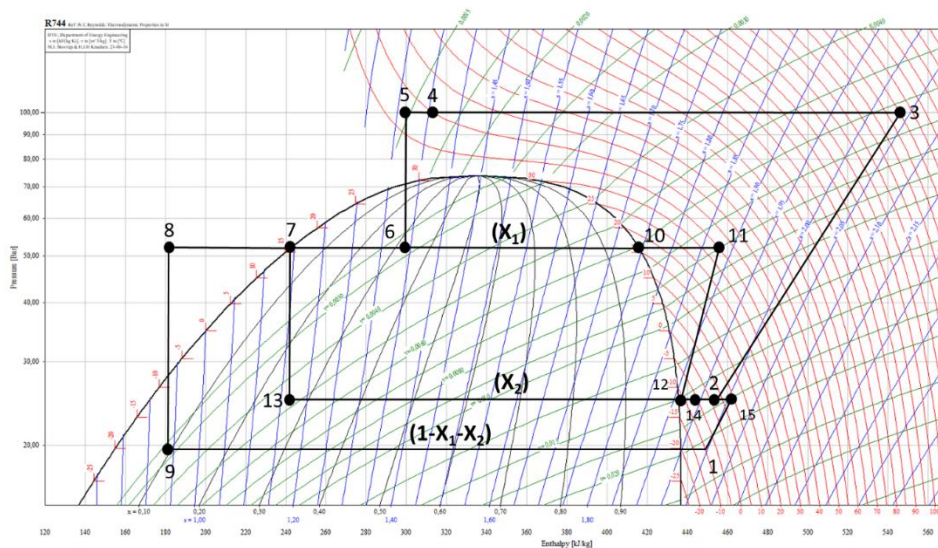
Turboalgor, with the Turboalgor CO₂ project, wins the European LIFE tender and FREEEX brand is created for the development and distribution of the technological solution designed to make R744 transcritical refrigeration systems more efficient.



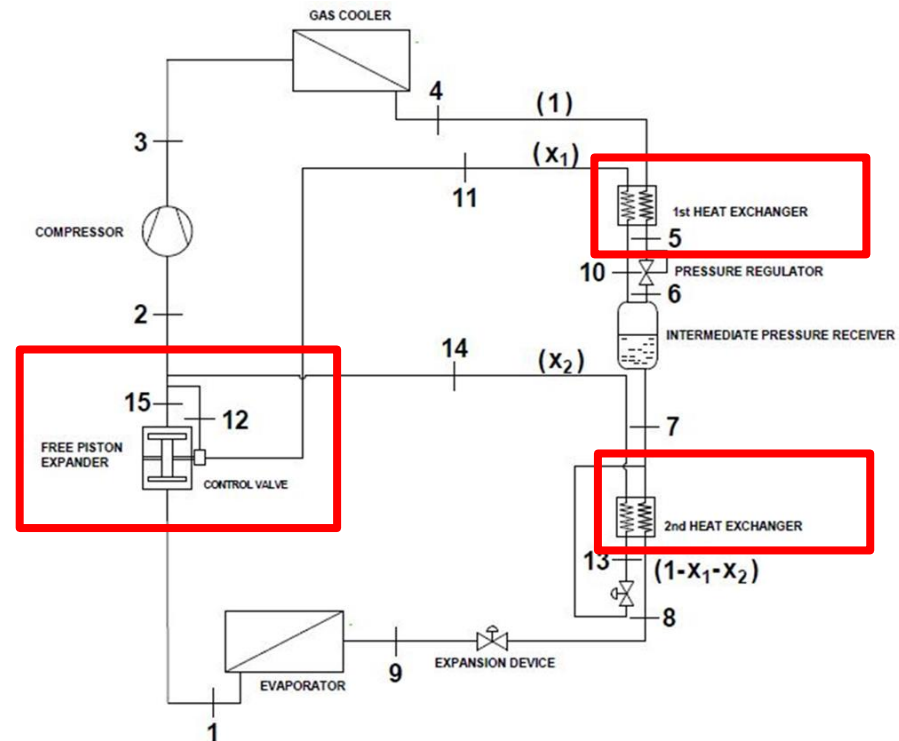
Co-funded by
the European Union

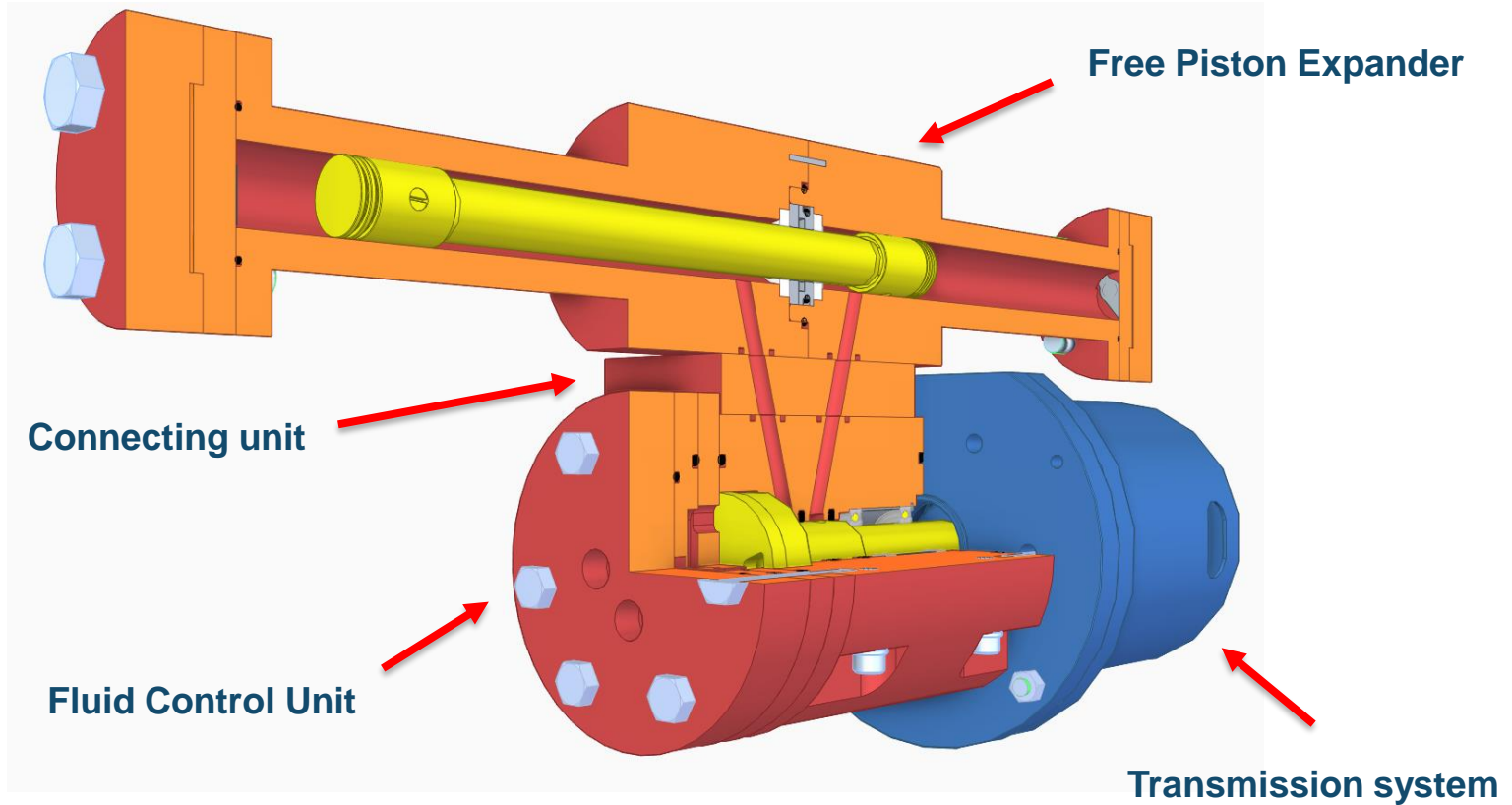


STATE OF ART



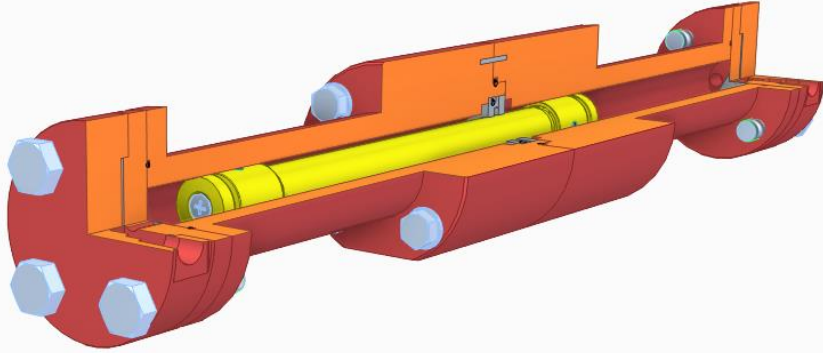
CHILLVENTA





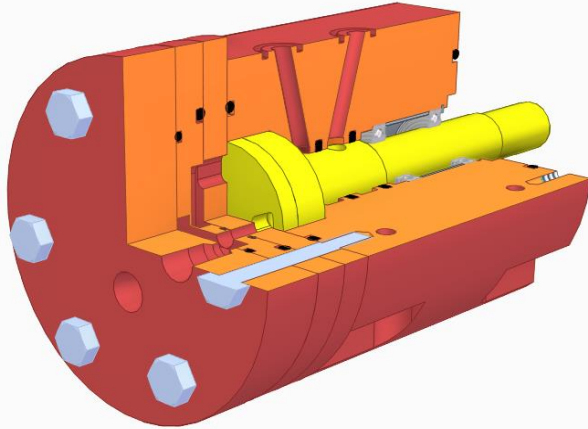
FREE PISTON EXPANDER

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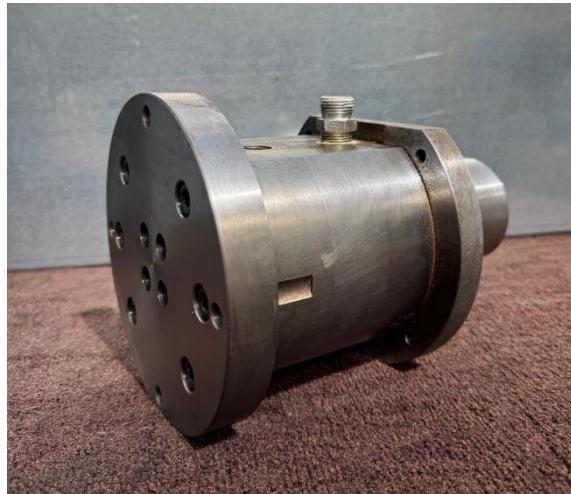


- Easy construction
- High thermodynamic efficiency
- High oscillation frequency ($>10\text{Hz}$)
- Compactness
- Wide cooling power range





- Simple mechanical design
- High reliability

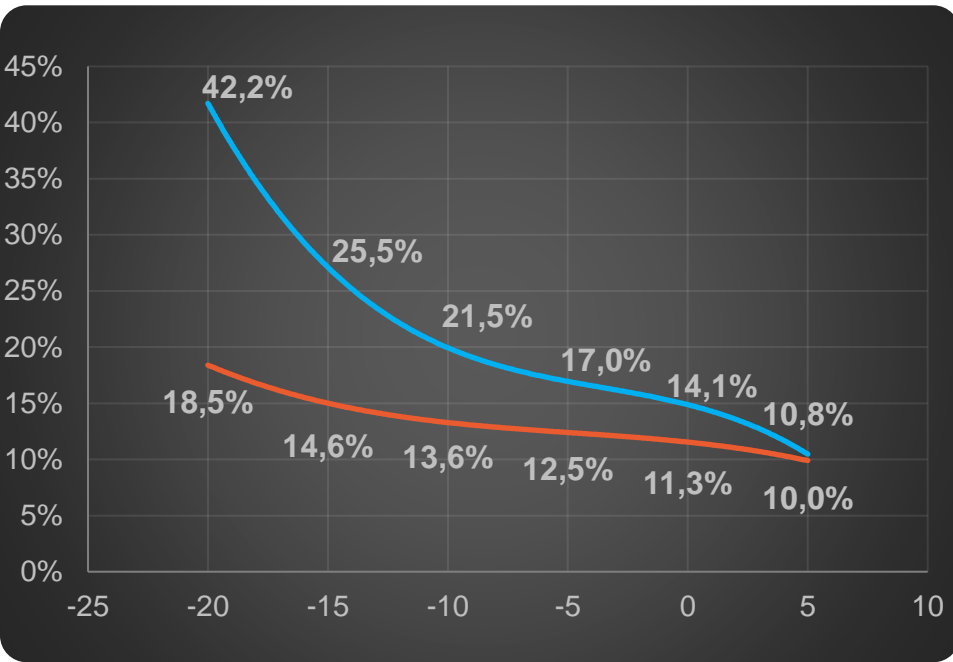


PERFORMANCES

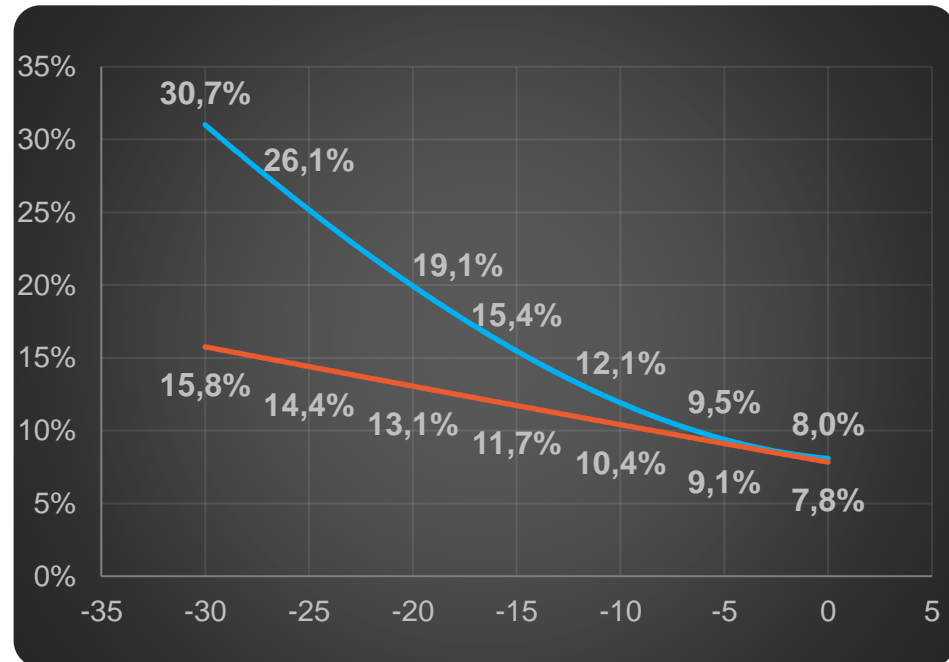
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— COOLING POWER
— ENERGY SAVING

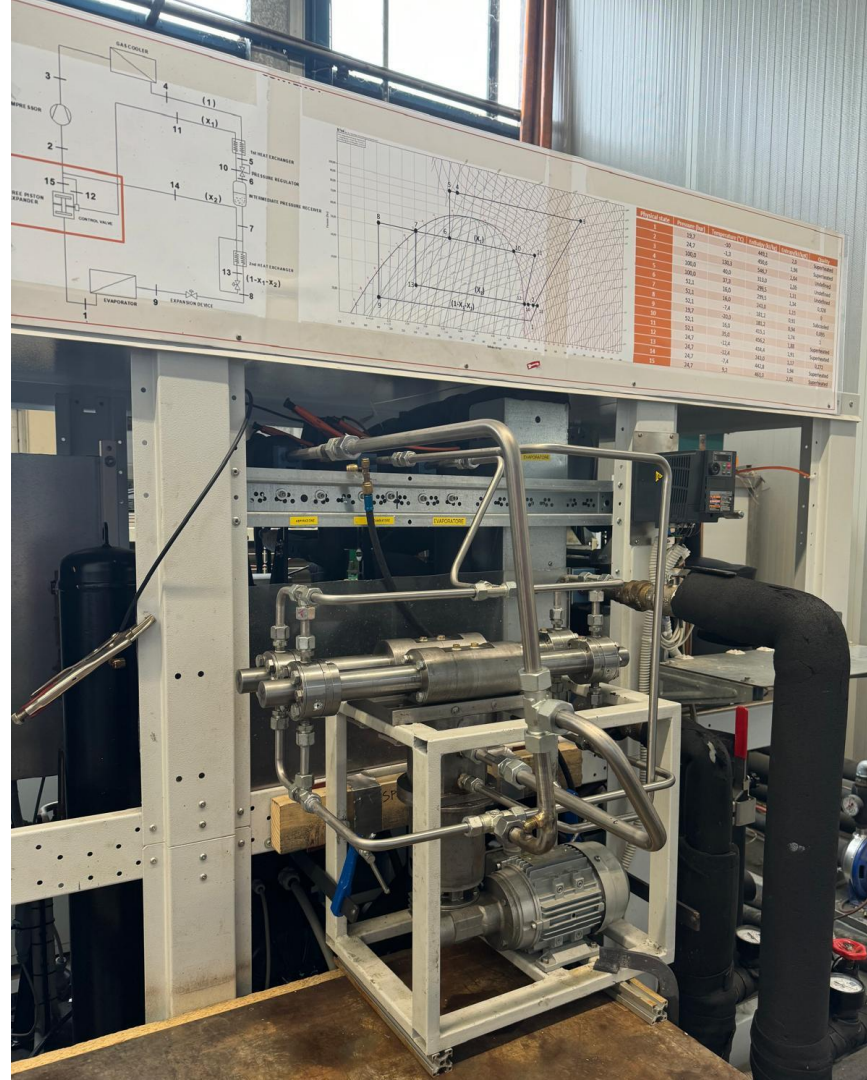
WARM CLIMATE-Gas cooler outlet Temperature 40°C



WARM CLIMATE-Gas cooler outlet Temperature 40°C



EVAPORATING TEMPERATURE



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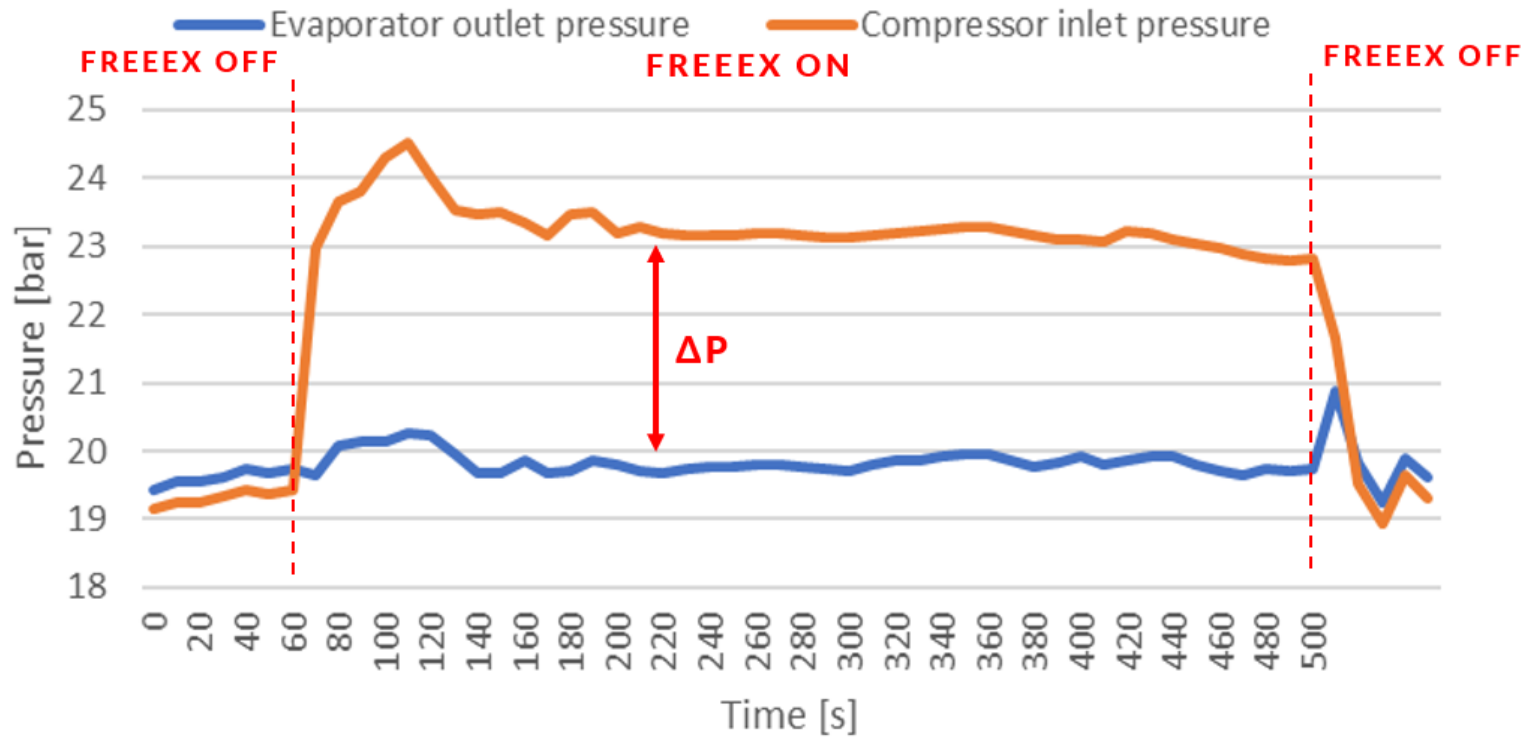
- R744 transcritical plant
- Mechanical power 15kW
- Evaporating temperature -20°C / 0°C

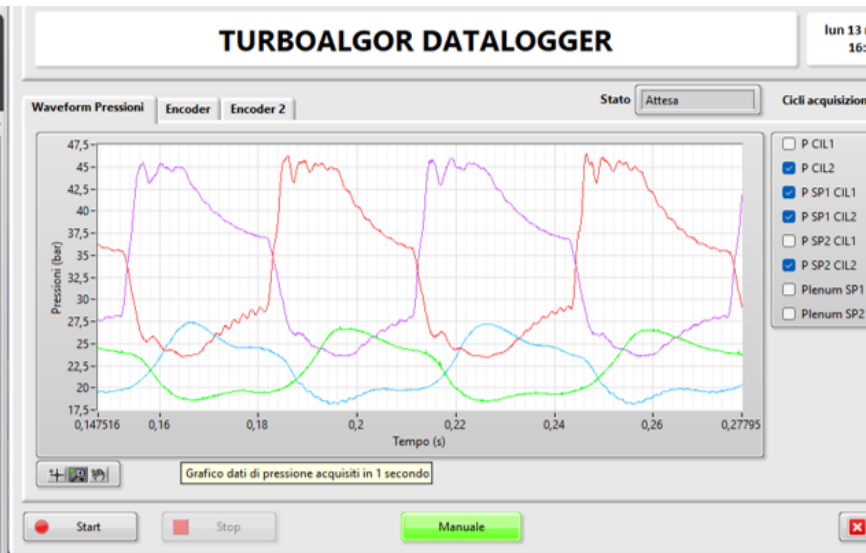
TEST BENCHES

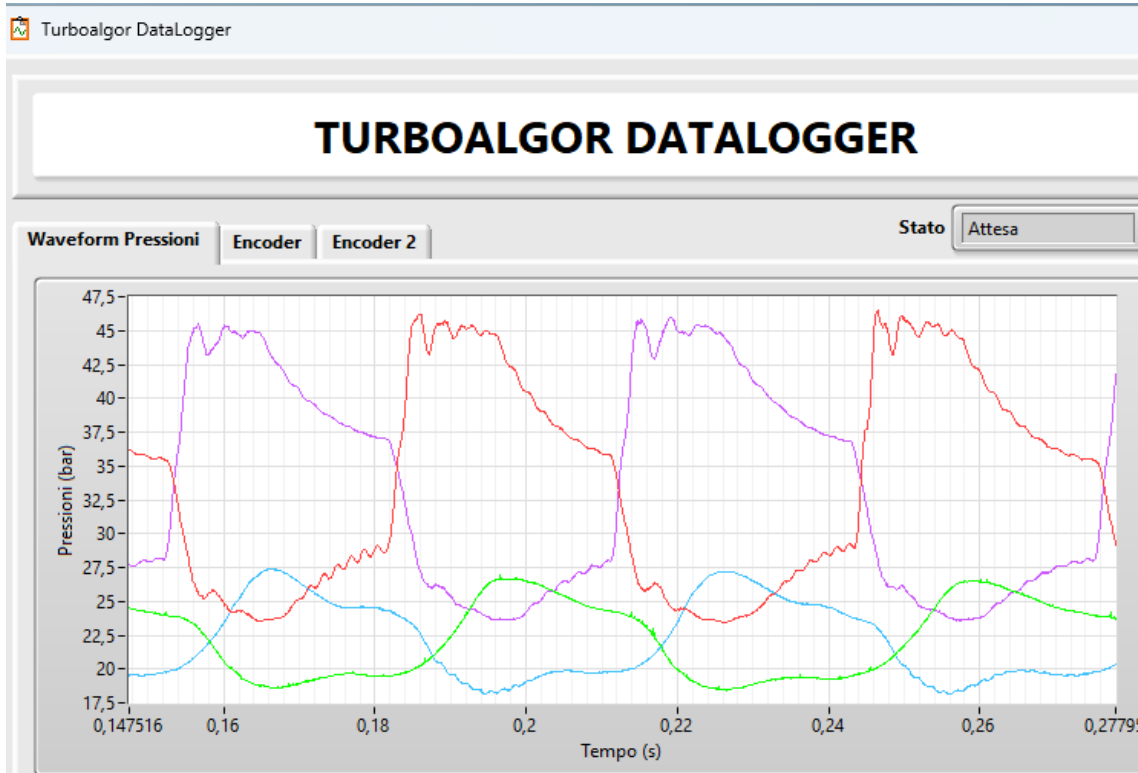
- R744 transcritical plant
- Mechanical power till 37,5kW



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EXPANDER 1
COMPRESSOR 1

EXPANDER 2
COMPRESSOR 2

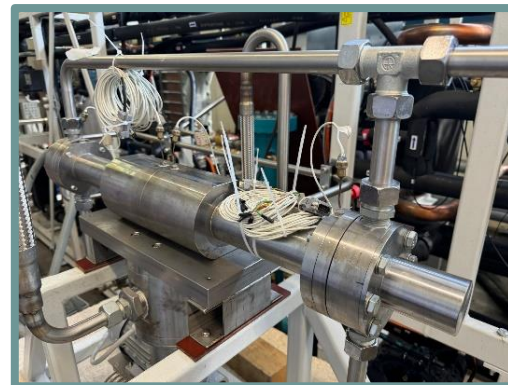
RANGE OF PRODUCT

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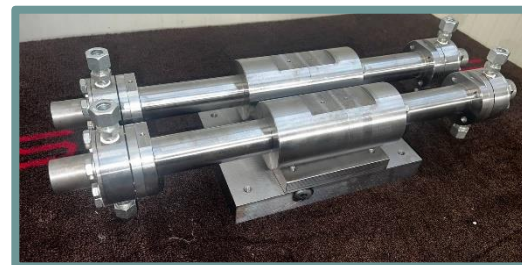
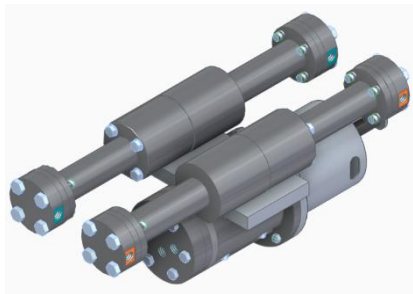
Three models are planned: a 7.5kW, a 22kW and 37kW (kW=absorbed power).
We are able to cover the bulk of the market for transcritical R744 plants, till 100kW of electrical power.



SIZE INCREASE



1 FCU + 2 PARALLEL FPE



Turboalgor has developed an innovative technology to improve the efficiency of transcritical refrigeration systems. The heart of Turboalgor's innovation is a patented **Free Piston Expander (FPE)** and its **Control Valve (FCU)**, a device designed to pre-compress the gas leaving the evaporator before it can reach the main compressor.

Thanks to this system the gas coming from evaporator is pre-compressed and subsequently sent to main compressor, reducing its specific consumption. Having 30 °C gas cooler outlet temperatures, **FPE can achieve energy savings up to 15%**, while at 40 °C the **savings reach 18%**

Turboalgor is developing a range of FPE models to meet the most of applications in transcritical refrigeration market.

In conclusion, Turboalgor Free Piston Expander development represents a significant step forward in the search for more sustainable refrigeration solutions.

COME IN A TAKE A LOOK AT OUR NEW TECHNOLOGY!

TURBOALGOR STAND 6-113

THANKS FOR THE ATTENTION

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