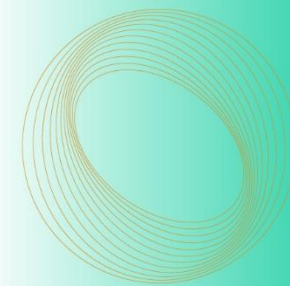




The Business Case Natural Refrigerants



BRUSSELS

29 Sept. 2026



ATMO.org



Economiser in mobile air Conditioning -Using CO₂ at high ambient temperatures-

Jan Pitz – KONVEKTA AG
Adrian Muresan - DORIN

1. INTRODUCTION OF DORIN COMPANY

Technology leader and pioneer in CO₂ (R744)
technology for commercial and industrial
refrigeration.



HQ in Florence – Italy houses our central corporate and advanced design R&D core.



150+ employees in **5** commercial direct offices and **3** manufacturing sites



To date: **15.000+** CO₂ semi hermetic compressors manufactured yearly by Dorin



+85M€ Group Revenue In Fiscal Year 2025

Substantial growth scaled consistently from 26 M€ in 2008

2. INTRODUCTION ABOUT KONVEKTA

Sales Volume CO₂-Systems

Konvekta Group

Engineering, manufacturing and sales of HVAC systems for buses, rail vehicles, agricultural & construction machinery as well as transport refrigeration

614

Employees

500

Service Stations

4

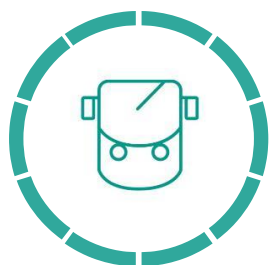
Plants



Bus



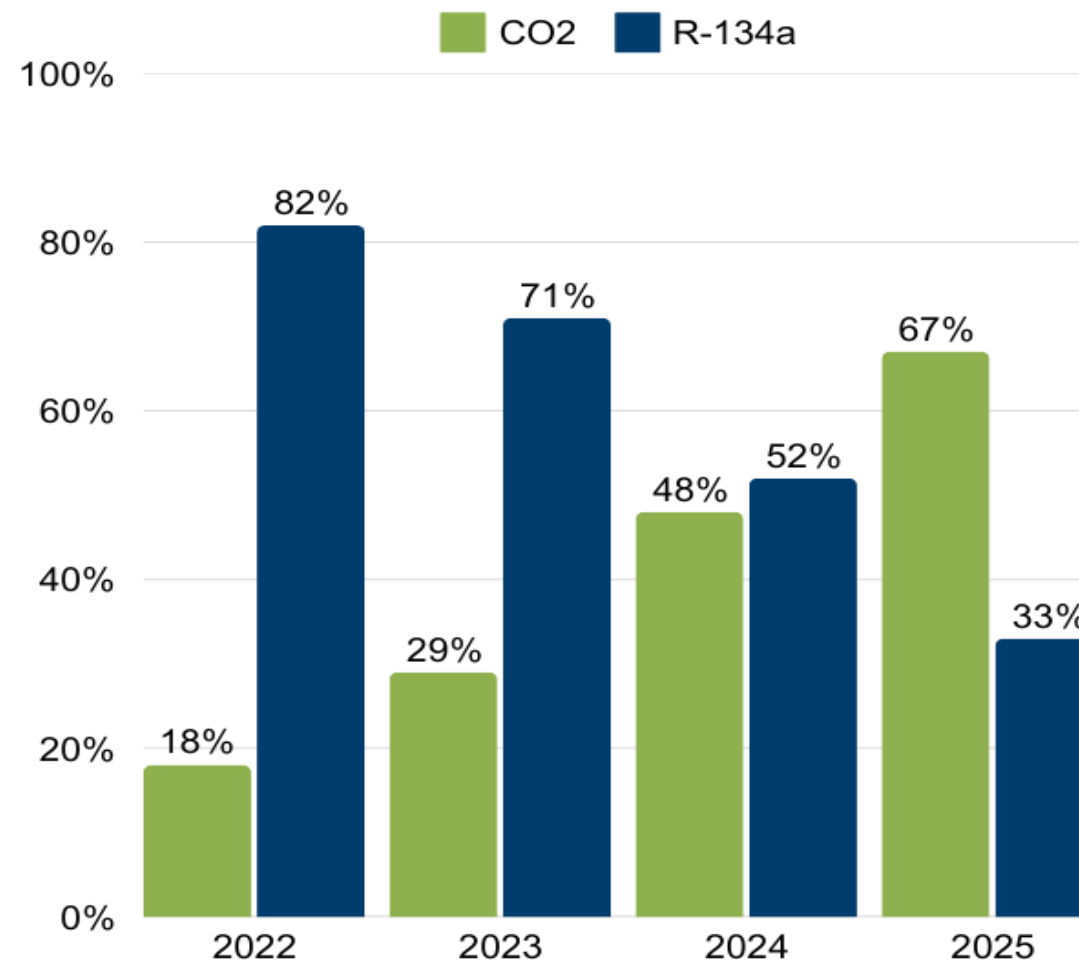
Rail

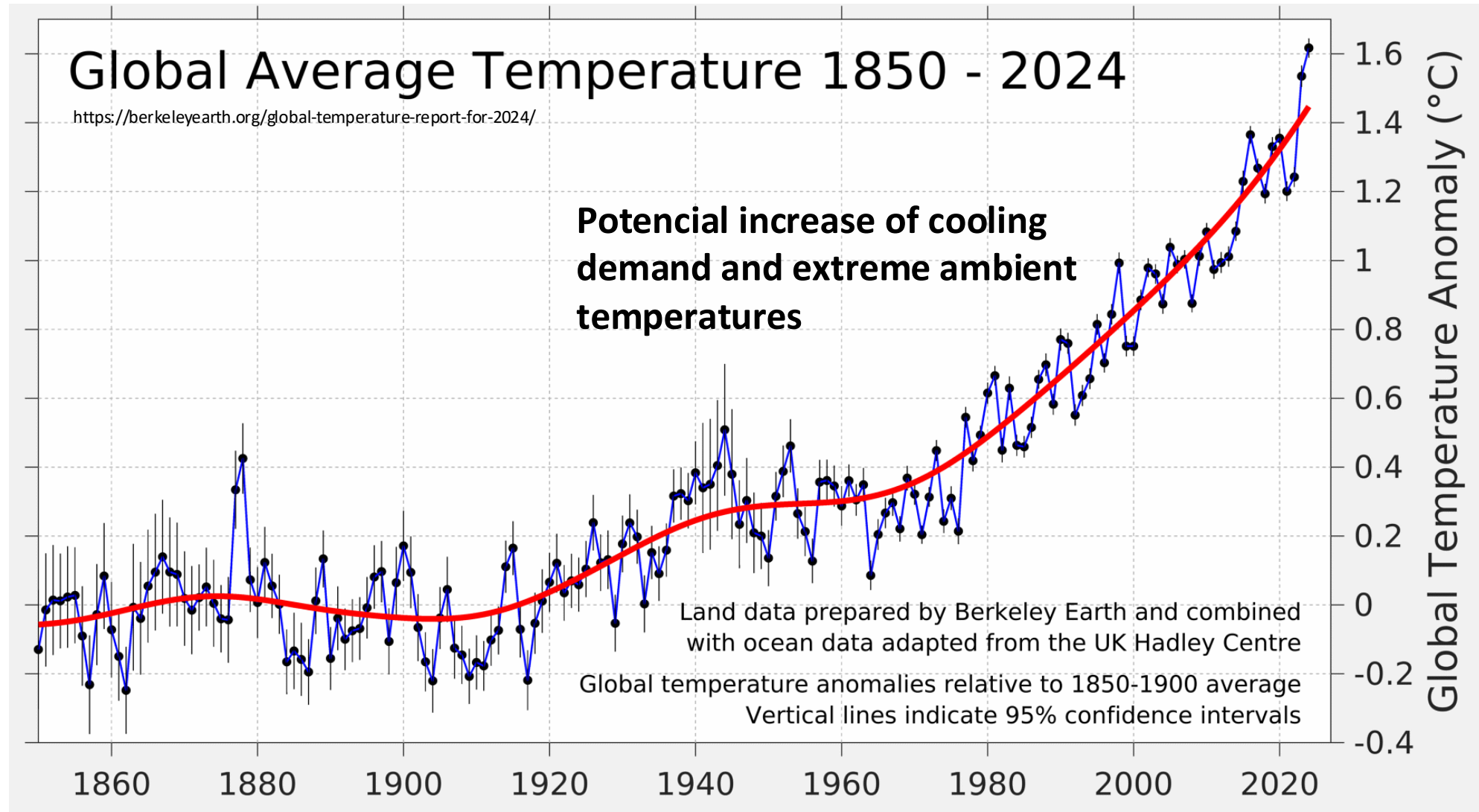


Cabin



Transport Refrigeration





4. DORIN CO₂ COMPRESSOR - Built for Peak Efficiency

Designed for transcritical CO₂ duty, our CD4 Range represents the benchmark in modern sustainable MAC industry



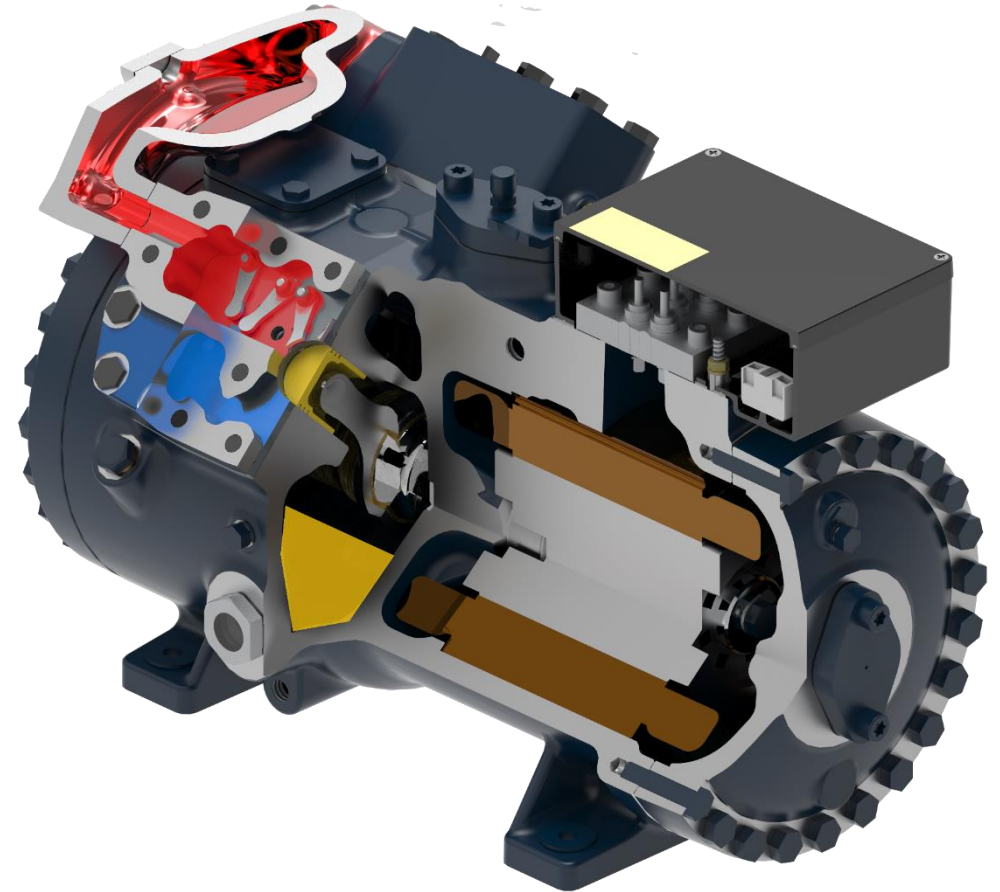
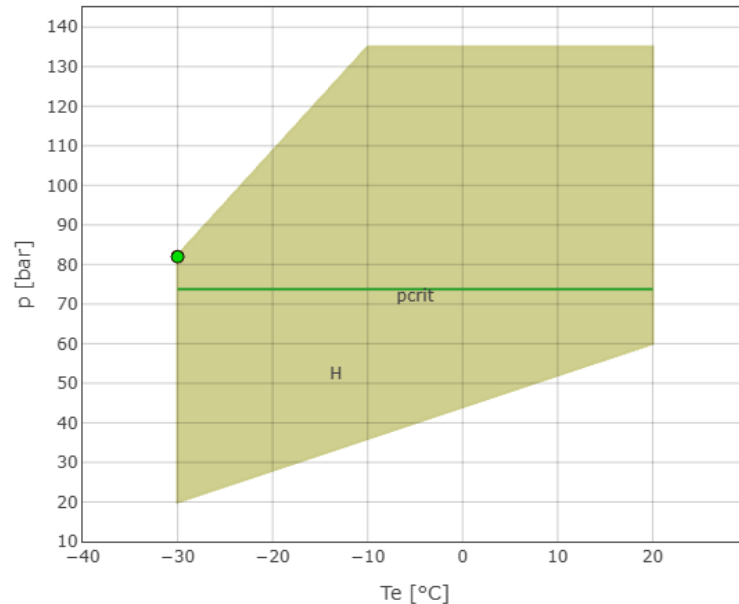
Thermal Stress Control: External discharge manifold isolates heat dissipation away from the oil sump - Unmatched heat dissipation



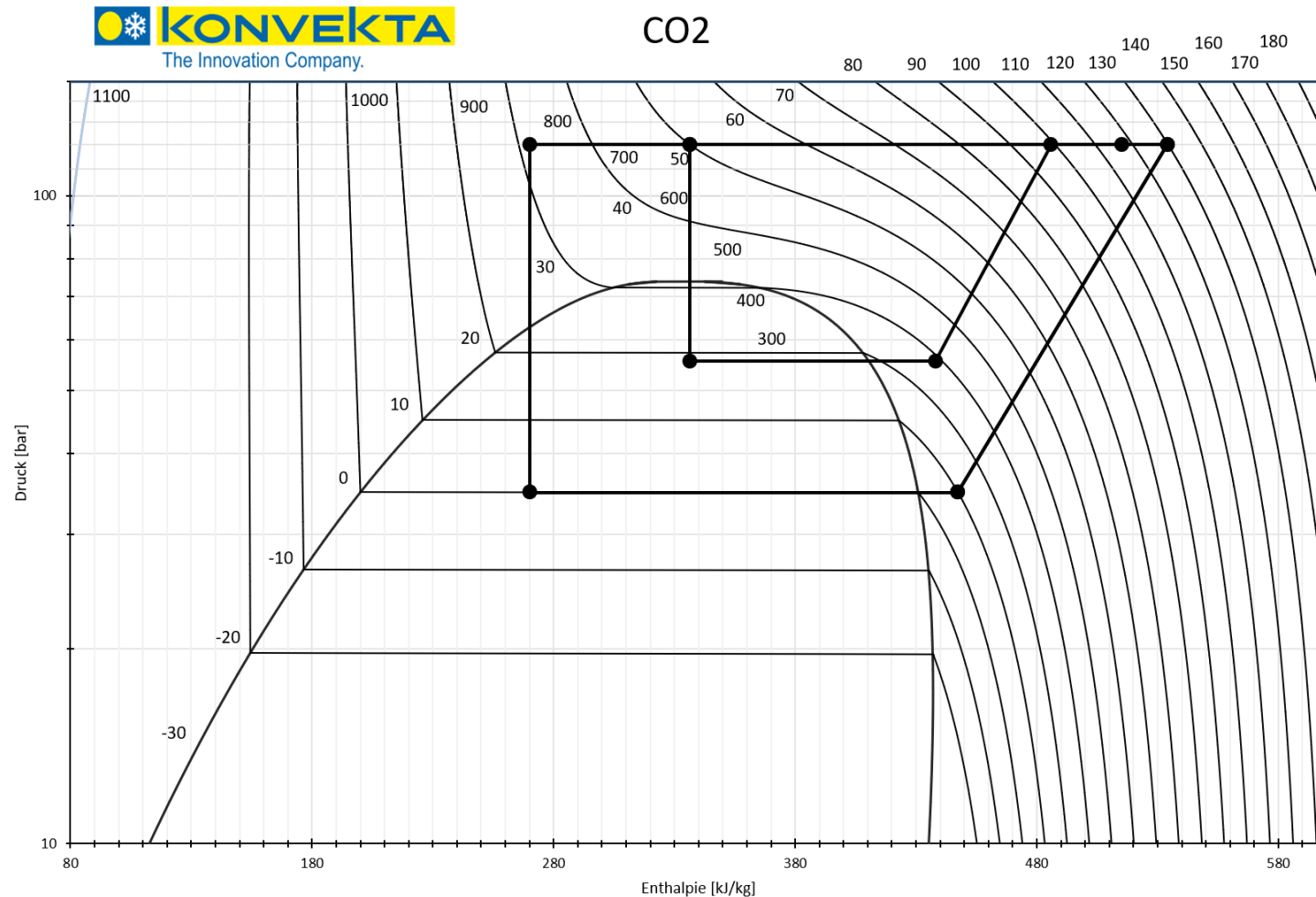
Premium Internals: Features robust cast iron pistons and specialized combustion-engine inspired wrist pin coatings.



Extreme Limits: Handles up to 160°C maximum discharge temperature and capability to work down to -30°C evaporating temperature

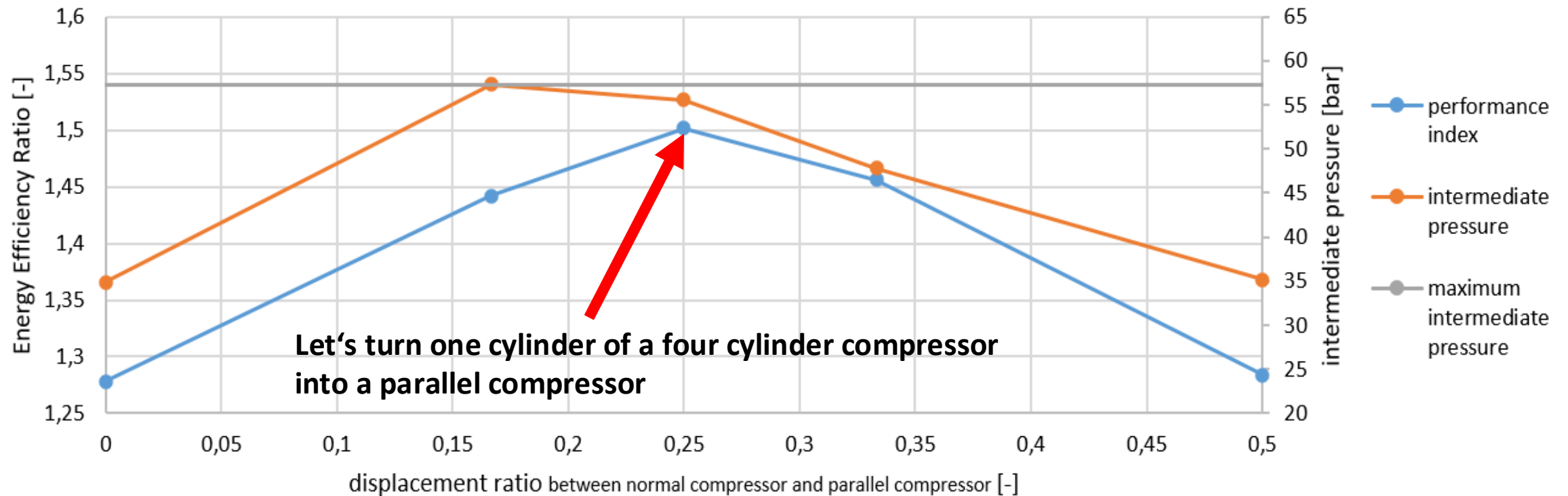


How to implement an economiser in mobile application



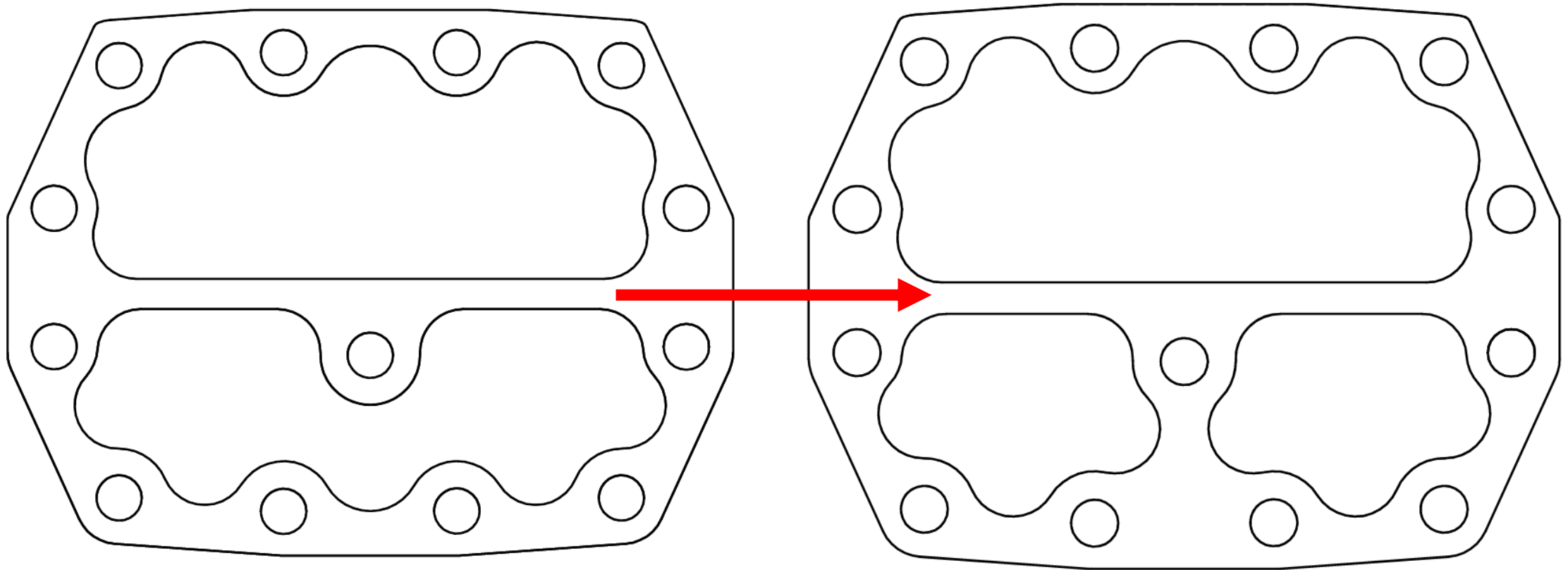
How much displacement is needed for an economiser piston?

Performance Index dependent on displacement ratio

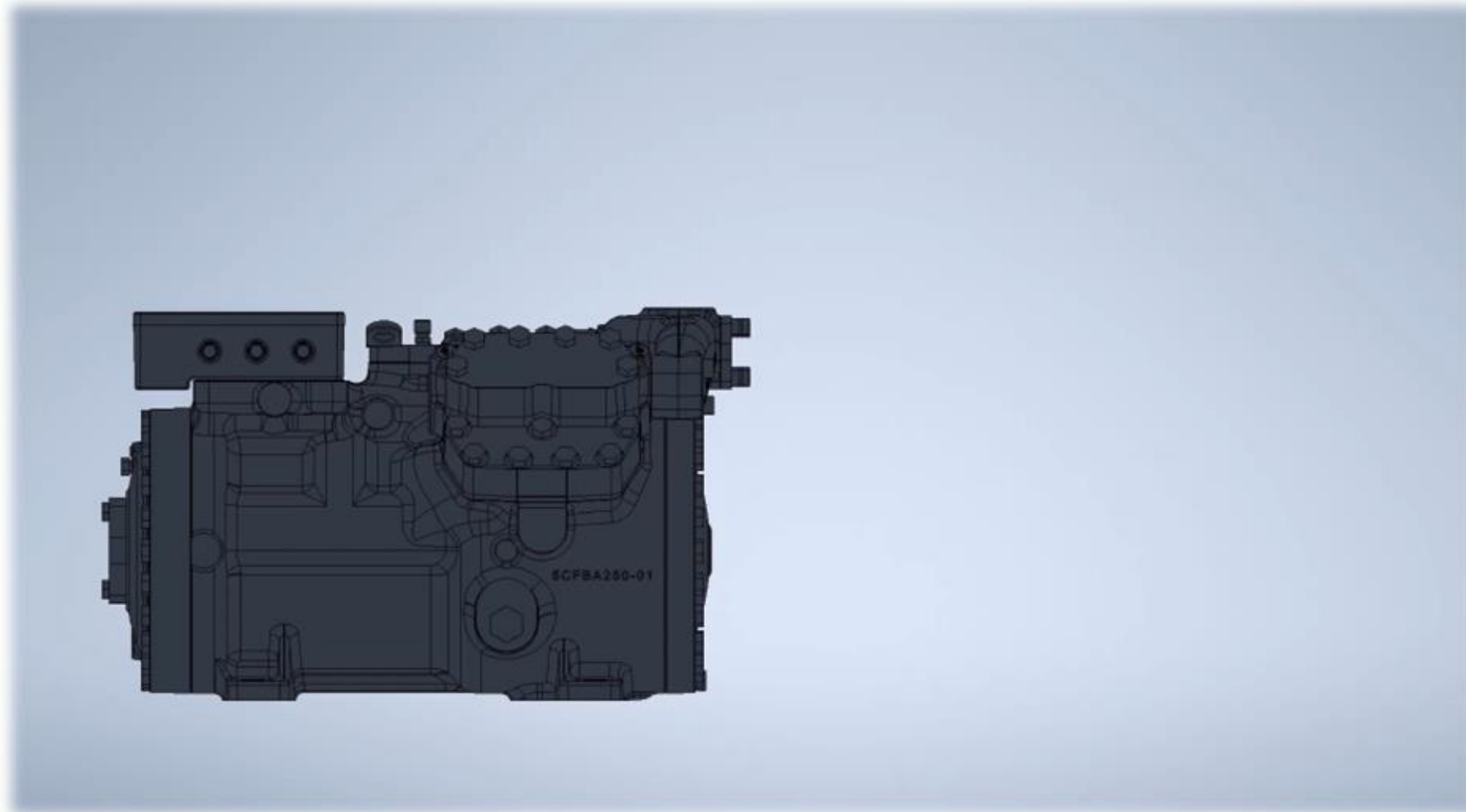


Calculation at 0°C evaporating temperature and 50°C gascooler outlet

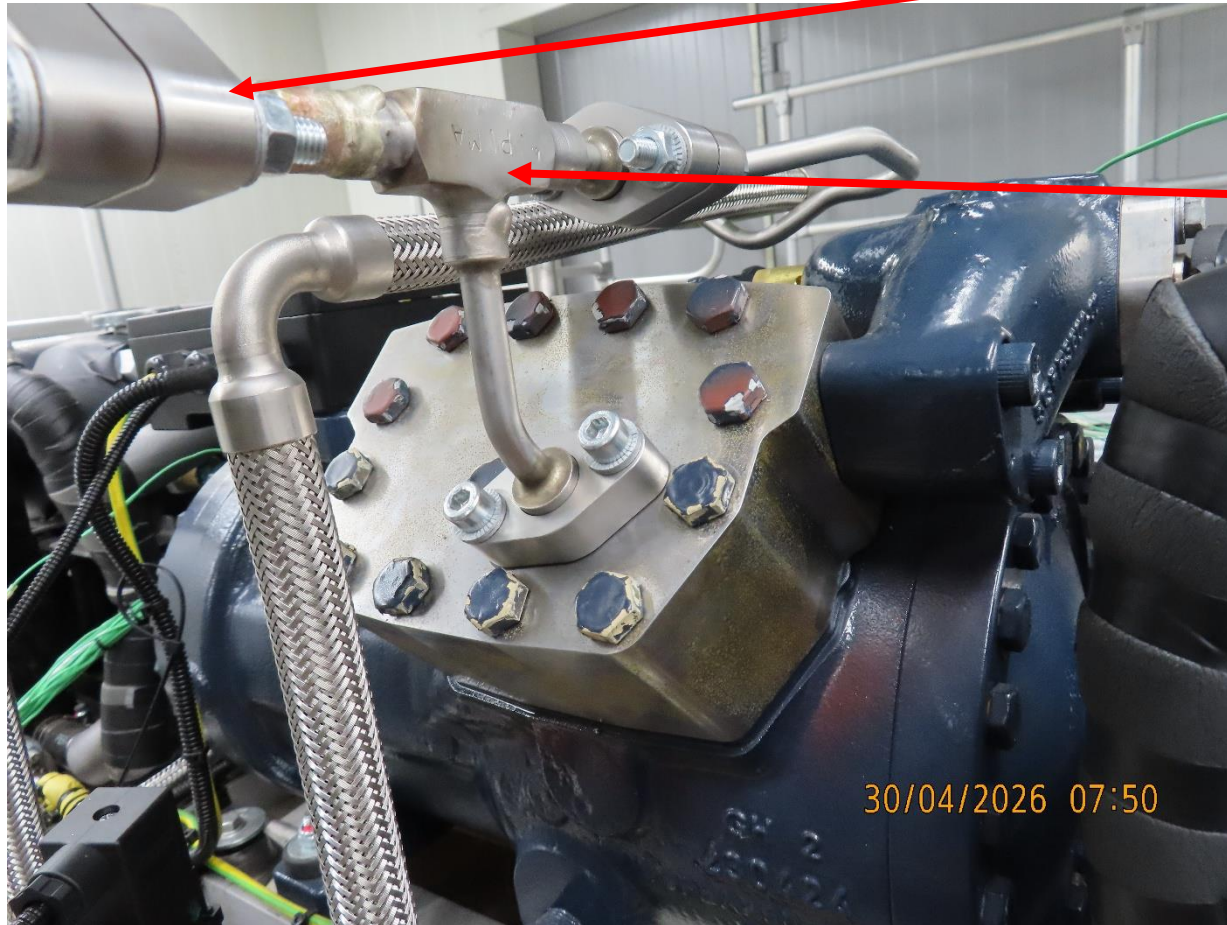
Step 1: seperate the suction chambers in the cylinder head



Step 2: install cylinder head with intermediate pressure intake



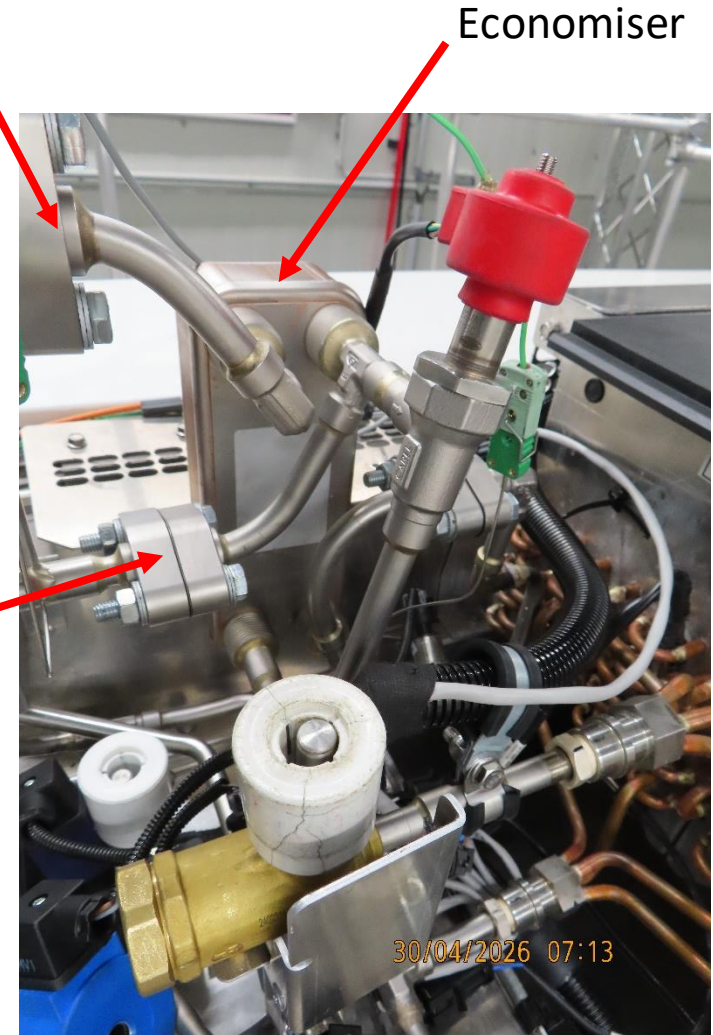
Step 3: install shuttle valve and economiser



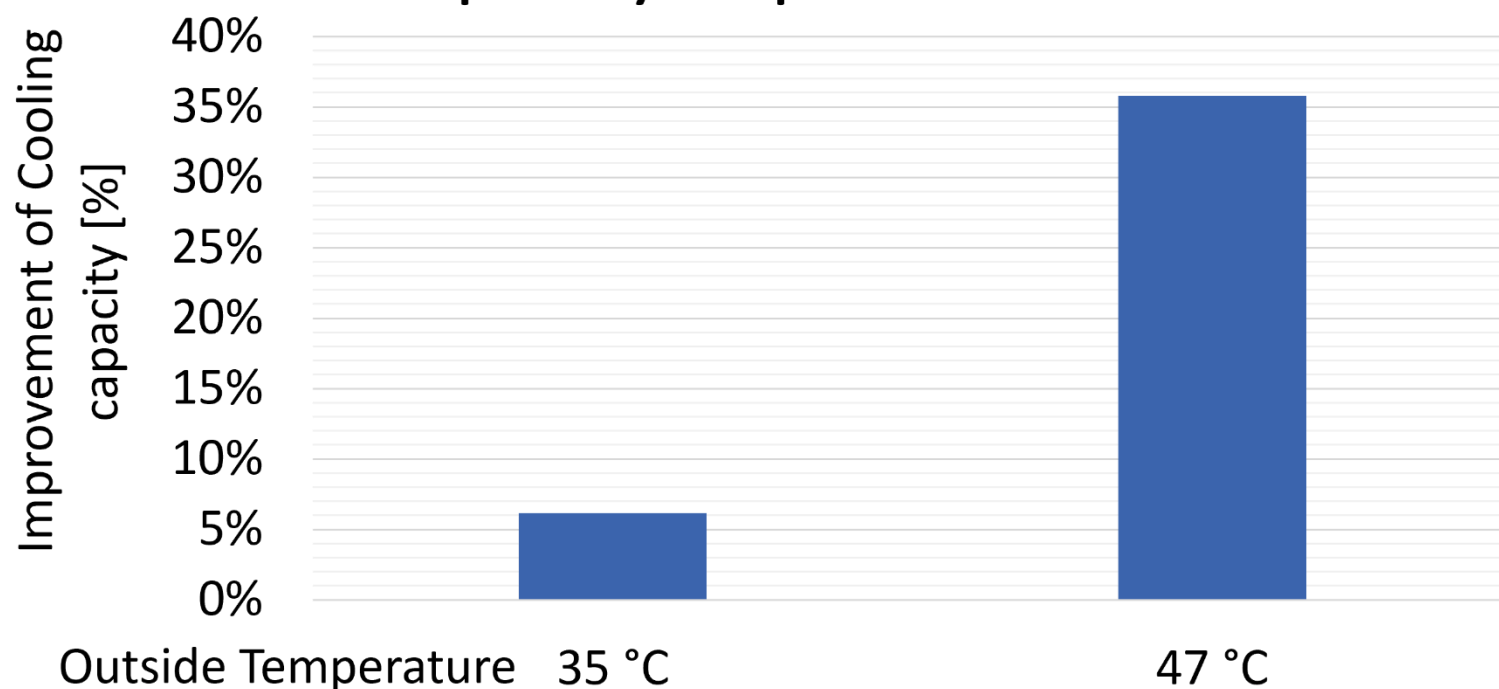
Suction line
intermediate
pressure

Shuttle valve

Gascooler
outlet



capacity improvement

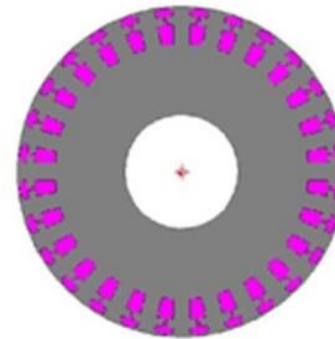


The capacity improvement at 47 °C outside temperature is due to better behavior of the system with Economiser

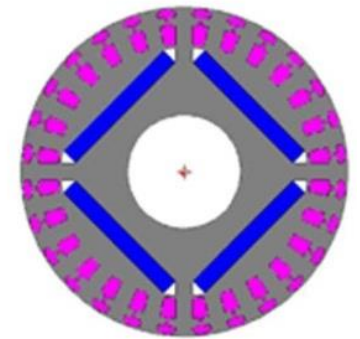
- At the reference measurement the compressor was in derating due to high pressure

Possible development steps

- implementing the shuttle valve directly in the cylinder head of a compressor
- using MAC compressor designs like the Dorin Boxer series
- combining the economiser with LSPM electric motor technologie
- introduce the economiser concept into a stock system



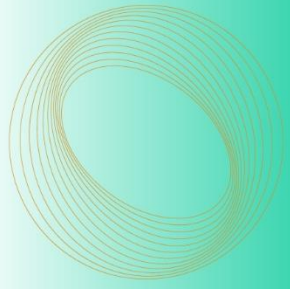
Induction rotor configuration



LSPM rotor configuration



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Thank you
for listening
Any questions?



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