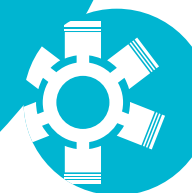
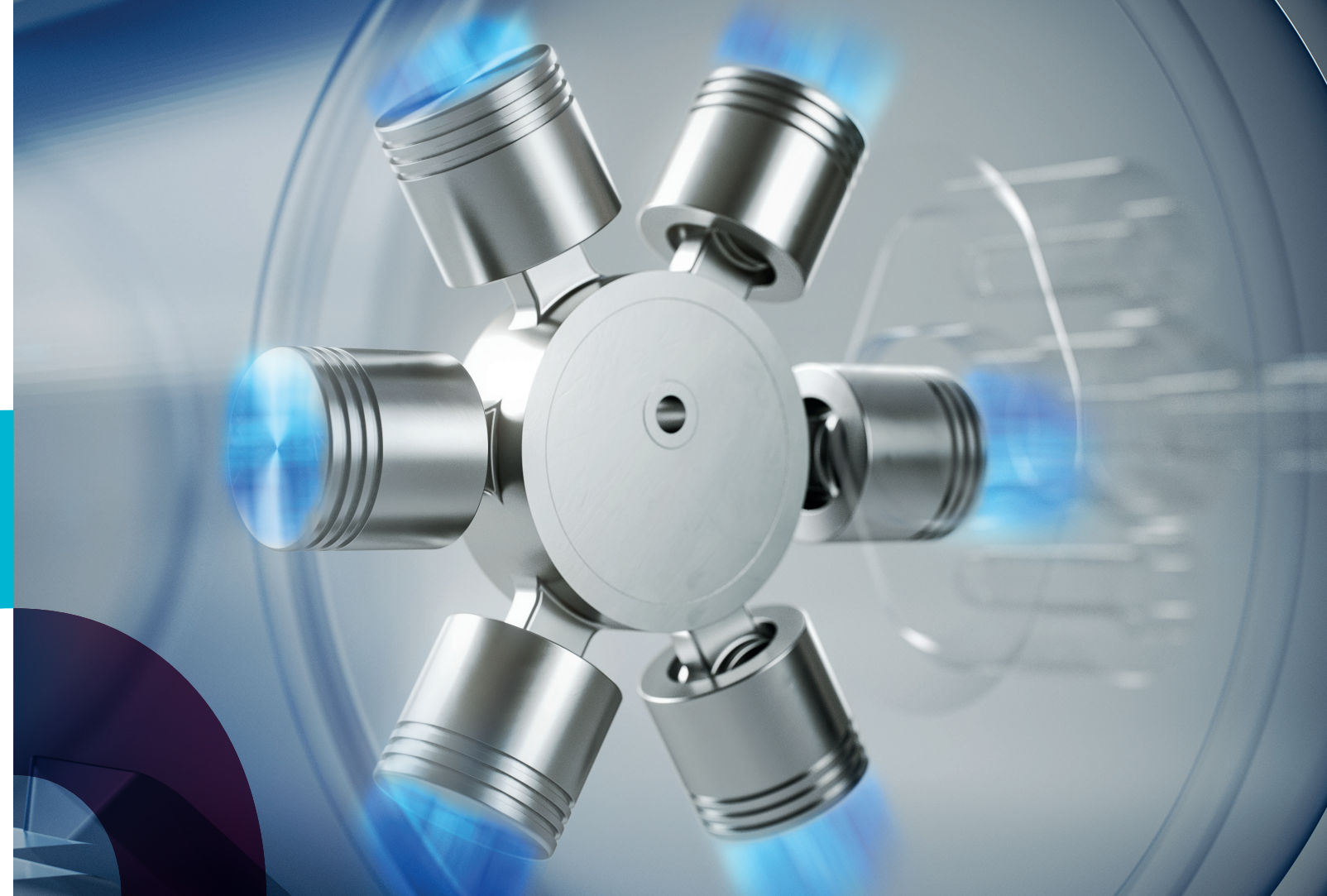


BOCK is one of the world's technology and innovation leaders in the development of environmentally friendly, economical solutions in the field of refrigeration and air-conditioning technology, including heat pumps and heat recovery – with one of the world's largest portfolios of compressors for natural refrigerants such as CO₂ (R744), hydrocarbons and other low-GWP refrigerants.

BOCK

Bock GmbH

Benzstraße 7
72636 Frickenhausen
Germany
Tel +49 7022 9454-0
Fax +49 7022 9454-137
bock.de



StarCO₂compressor®

Superior compressor technology by BOCK

Mobile CO₂ compressors –
milestones in electric bus
and railway air conditioning

BOCK

colour the world
of tomorrow

StarCO₂mpressor and heat pump - optimal combination for electric bus and railway



The idea is as simple as it is innovative: With cylinders arranged in a star shape around the crankshaft, a compact system design perfectly adapted to the natural refrigerant CO₂ (R744) is realized - This is ideal for combination with a heat pump, which thus achieves significantly higher efficiency. The result for the user: a mobile CO₂ vehicle compressor with an overall height of only 219 mm and a weight of 81 kg especially for roof installation in electric buses and railways, which raises air conditioning and heating to a new level of efficiency for the market. Due to the very wide frequency range of the HR series, all requirements of complex thermal management systems can be covered. A groundbreaking solution from the specialist in piston compressors.

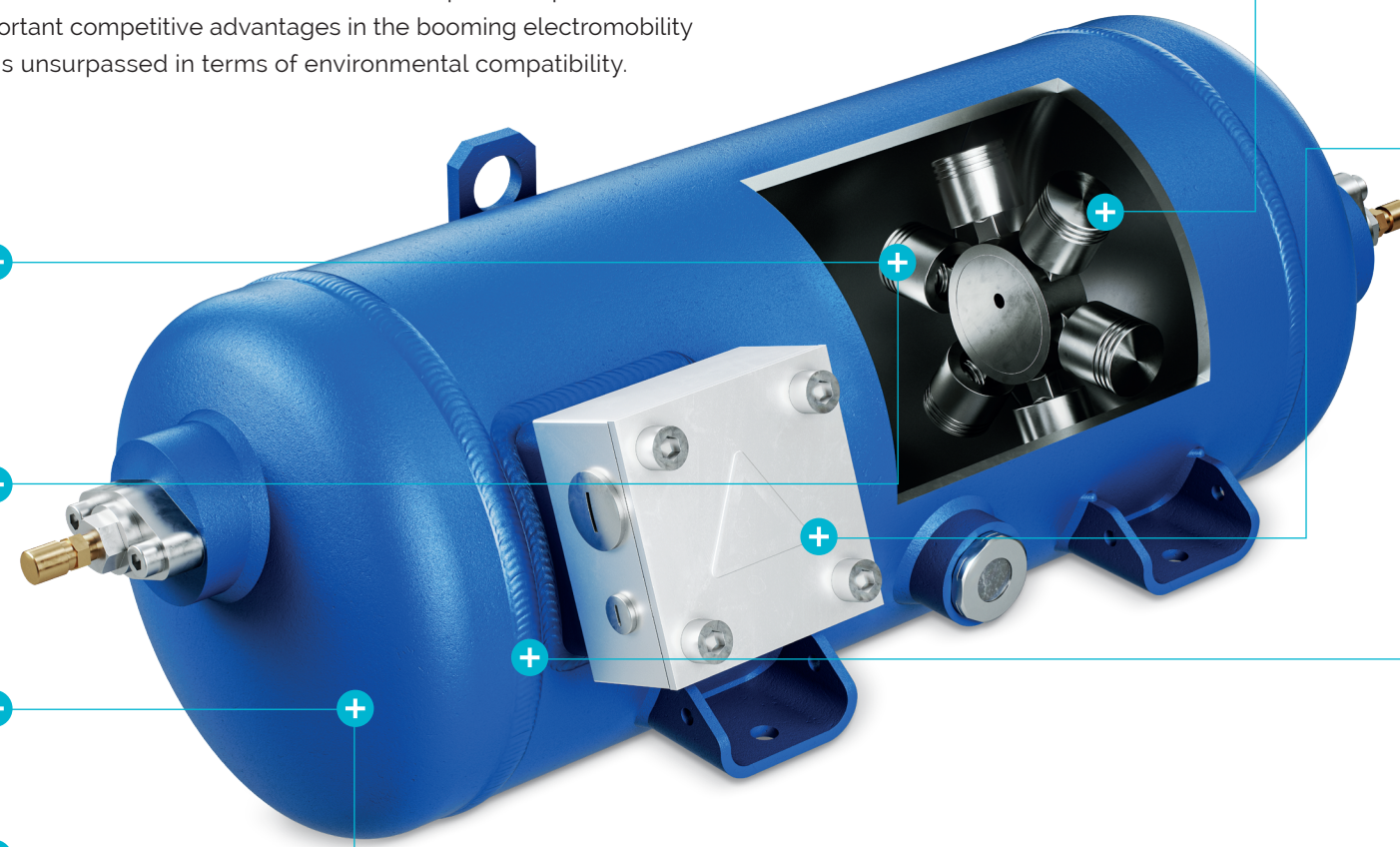
With its welded, robust steel housing, high-performance oil management and a valve design specially developed for mobile requirements, the StarCO₂mpressor sets new standards. This forward-looking technology has already proven its practicality with renowned manufacturers. A worthwhile investment for manufacturers and transport companies that secures important competitive advantages in the booming electromobility market and is unsurpassed in terms of environmental compatibility.

New drive gear design: cylinders arrayed in a star shape around the crankshaft, designed for transcritical use with R744 refrigerant

Very smooth operation due to robust drive gear with multiple bearings: high comfort for bus and train users

Lowest height: only 219 mm, perfect for space-saving roof installation

Lowest weight: only 81 kg, at least 25 % lighter than standard compressors of this performance class



Wide speed range: for optimum coverage of the wide range of heat pump performance requirements
HR40: 12.5 Hz - 75 Hz; HR60: 12.5 Hz - 65 Hz

Special oil management with high-performance oil pump: ensures constant oil supply up to 22° inclination during continuous operation, 30° short-term

Welded, robust steel housing: lowest leakage potential and high reliability, especially developed for mobile applications in transcritical CO₂

Technology that sets standards

- + Radial piston compressor four-cylinder **HR40** and six-cylinder **HR60**
- + Max. permissible overpressure: **150 bar/100 bar** (HD/ND)
- + Weight: **81 kg**, Height: **approx. 219 mm**, overall length: **600 mm**
- + Frequency range HR40: 12.5 - 75 Hz, HR60: 12.5 - 65 Hz
- + Maximum permissible inclination: **22°** continuous operation, 30° short-term
- + **Pipe connection** with flange connection, optional soldering sleeve
- + Displacement with 50 Hz / 2,900 1/min: HR40: **7,3 m³/h**; HR60: **10,9 m³/h**
- + Cooling¹/heating² capacity: HR40: **4 - 35 kW / 5 - 27 kW**; HR60: **5 - 45 kW / 5 - 35 kW**

1) based on evaporation temperature +10 °C, superheat 10K, high pressure 100 bar, gas cooler outlet +40 °C
2) related to evaporating temperature -20 °C, superheat 10K, high pressure 80 bar, gas cooler outlet +25 °C



The future in the field of electric bus and rail air conditioning belongs to space-saving, energy-efficient solutions which can deliver cooling and heating: the use of the natural refrigerant R744 provides the economic as well as the ecological benefit for the user, environmental and climate protection.

Ulrich Frey, Product Manager
Mobile Applications, Bock GmbH

Series BOCK HG12 and HG24 CO₂ T – compact, reliable, powerful

Transcritical CO₂ compressors in semi hermetic design



Natural Refrigerant



CO₂



Efficiency

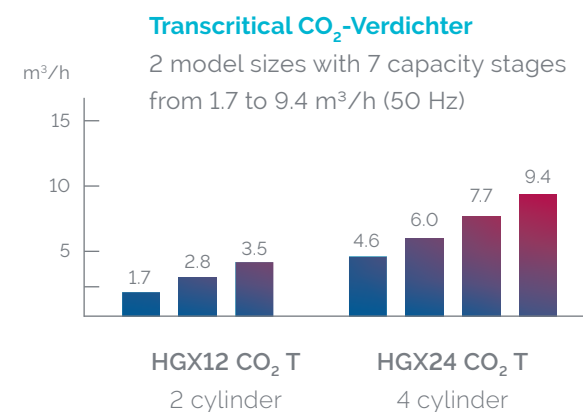


Reliability

The smallest among the strongest from BOCK: The series for the natural refrigerant R744 convinces with highest compressor and system efficiency, safety and reliability – equipped with all the necessary features for use with CO₂. Even at low capacities, BOCK relies on the proven oil pump for reliable oil supply in the compressor even under demanding conditions. The basis for this is a CO₂-optimized driving gear design combined with proven BOCK compressor technology.

Advantages and benefits that set standards

The advantages for you: significantly reduced energy and operating costs with a long service life and low maintenance effort. And maximum flexibility for stationary or mobile use in all application and performance ranges. At the same time, the low-noise and low-vibration operation as well as the compact and lightweight design of the HGX12 CO₂ and HGX24 CO₂ ranges set new standards in terms of user comfort, space requirements and connection, e.g. in bus and railway applications as well as transport cooling.



Large capacity range +
5 – 43 kW/3 – 35 kW
(Cooling-¹/heating capacity)

Displacement at 50 Hz +
1.7 – 9.4 m³/h
(7 capacity stages)

Optional: robust metal terminal box +
with access protection

CO₂-specific pressure design +
max. (LP/HP)
100/150 bar

Frequency range +
30 – 70 Hz

Oil pump for reliable lubrication system +

Compact dimensions and standard connections +

Low weight +
95 kg (HGX12 CO₂ T)
112-116 kg (HGX24 CO₂ T)
(Including shut-off valves)

Maximum permissible inclination +
15° continuous operation,
30° short-term

picture: HGX24 CO₂ T

Lowest oil carry over rate +

The most important at a glance



Lowest energy and operating costs

Highest efficiency and reliability thanks to more than 25 years of BOCK expertise in CO₂ compressor technology



Wide range of applications

From cooling to air conditioning to heat pump application - with reliable and flexible partial and full load



Outstanding running comfort

Low noise and vibration, compact and lightweight design and minimal oil carry over rate

¹ +10 °C/40 °C (100 bar)/10 K/30 – 70 Hz | ² -20 °C/+25 °C (80 bar)/10 K/30 – 70 Hz

BOCK service and support

Up-to-date information, training and tools about BOCK CO₂ compressors, compressors for hydrocarbons and solutions for other refrigerants. Use our expertise for your daily practice – online and free of charge

°Clever+Cool
Experts^{live}

BOCKshop

BOCK CO₂Tool

BOCK VAP

To ensure that you can make the best possible use of the advantages of BOCK compressors, we support you online and personal with four service and support modules. There you will find valuable information: from plant planning and design to implementation and operation to retrofitting or upgrading existing systems.

BOCK training courses

Together with Danfoss, BOCK offers special (online) user training courses. For this purpose, a complete transcritical supermarket refrigeration system with the latest CO₂ technology is in operation at the BOCK training center – with heat recovery + air conditioning + parallel compression + ejector – in order to make the seminars more practical.

BOCKshop

The online catalog in the **BOCKshop** is the best choice to find spare parts for your BOCK compressor easily and quickly around the clock. Including all Ex-drawings as well as further information such as parts lists – also for printing.

>> bockshop.bock.de

BOCKCO₂Tool

The strengths of the **BOCKCO₂Tool** based on Excel: Support for the selection of CO₂ compressors, e.g. by displaying the system schematic as RI flow diagram and refrigeration circuit in log-p-h-diagram, as well as selecting compressors in rack systems and for special CO₂ systems such as booster systems.

>> **Usage on request:** vap@bock.de

BOCKVAP

The BOCK compressor selection program (VAP) is the perfect tool, to find suitable compressors or condensing units for your stationary or mobile application: Simply enter cooling capacity and operating conditions and the suitable components will be displayed immediately. In addition, the tool provides you with further information, e.g. application limits, performance data, dimensions and connections, scope of delivery, accessories, 3 D compressor models and much more.

Another advantage: **BOCKVAP** is available to you free of charge as an online and offline version for PC installation.

>> vap.bock.de



From experts for experts – our new online formats can be used from any computer, regardless of location: Office, workshop or even at home.

