

# BOCK CO<sub>2</sub> compressor program

Transcritical and subcritical  
CO<sub>2</sub> compressor ranges

# BOCK

colour the world  
of tomorrow

# CO<sub>2</sub> specialists for all capacity ranges

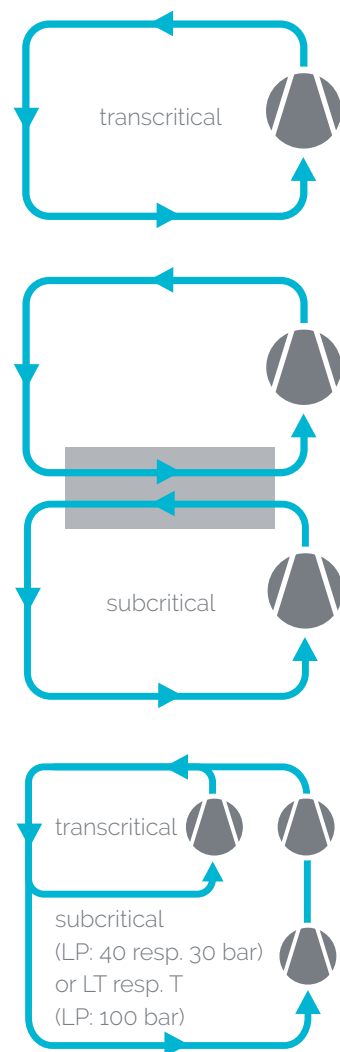
Your plus at BOCK: Every compressor capacity size equipped with all CO<sub>2</sub> relevant features

For many years, BOCK compressors have been key components for commercial and industrial applications in the field of air conditioning, refrigeration, heating and heat pumps – with the focus on the use of future-proof natural refrigerants such as CO<sub>2</sub> (R744). They provide planners, investors and operators with clever solutions in which functionality, cost-effectiveness and climate protection go hand in hand. Another plus: Minimized noise, vibrations and pulsations ensure a high degree of user comfort and a high level of plant safety and reliability.

## CO<sub>2</sub> driving gear design with proven BOCK technology

Perfect solutions for small and large performance requirements: The semi-hermetic BOCK CO<sub>2</sub> compressor program offers nine specialists for use in transcritical and subcritical CO<sub>2</sub> systems – stationary and mobile. Your advantage: An optimized driving gear design specifically for operation with the environmentally friendly refrigerant R744 combined with decades of proven BOCK compressor technology – equipped with all CO<sub>2</sub> relevant features. This ensures highest plant efficiency with minimized investment, energy and operating costs as well as maximum operational reliability and runtime.

We call it: The °Clever Art of Cooling and Heating





Requirement- and environment-oriented solutions with high efficiency and reliability, excellent running performance and minimized investment, energy and operating costs

» to CO<sub>2</sub> compressor video

### Wide range of applications

With their wide application limits and frequency ranges the gas cooled BOCK CO<sub>2</sub> compressors offer suitable solutions for single-stage, cascade or booster systems in stationary and mobile applications: from medium and low temperature cooling in supermarkets, hypermarkets or industrial applications up to air conditioning systems and heat pumps in buses and trains. In doing so support the fulfillment of leading energy efficiency and environmental standards such as the European F-Gas Regulation or the global Kigali Agreement and meet strict European standards and ASERCOM directives.

A highlight in the range are the HGX12 CO<sub>2</sub> T and HGX24 CO<sub>2</sub> T as well as LT series – ideal for solutions with smaller performance requirements.

### CO<sub>2</sub> transcritical and subcritical

All transcritical and subcritical CO<sub>2</sub> compressors support a wide frequency band with a broad capacity range, so that the cooling and heating capacity can be flexibly adapted to the respective requirements. For special subcritical requirements with high operating and standstill pressures, BOCK offers a specifically designed LT\* – Low Temperature variant with two motor versions.



BOCK CO<sub>2</sub> specialists for small and large performance requirements: HGX12 CO<sub>2</sub> T and HGX44e CO<sub>2</sub>

\* HGX12 CO<sub>2</sub> LT available from Q2/2022

# Series BOCK HG12 and HG24 CO<sub>2</sub> T + LT – compact, reliable, powerful

Transcritical and subcritical CO<sub>2</sub> compressors for smaller capacity requirements

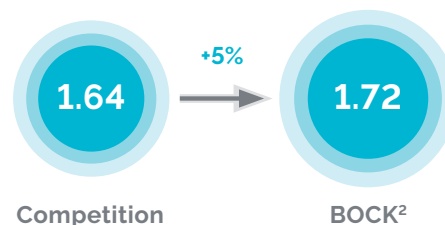


The smallest among the strongest from BOCK: The series for the natural refrigerant R744 convinces with highest compressor and system efficiency, safety and reliability – equipped with all the necessary features for use with CO<sub>2</sub>. Even at low capacities, BOCK relies on the proven oil pump for reliable oil supply in the compressor even under demanding conditions. The basis for this is a CO<sub>2</sub>-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 CO<sub>2</sub> and HGX24 CO<sub>2</sub> ranges set new standards in terms of user comfort, space requirements and connection, e.g. in supermarkets, heat pumps and air conditioning systems.

## BOCK efficiency in competitive comparison (MT Efficiency – EER<sup>1</sup>)

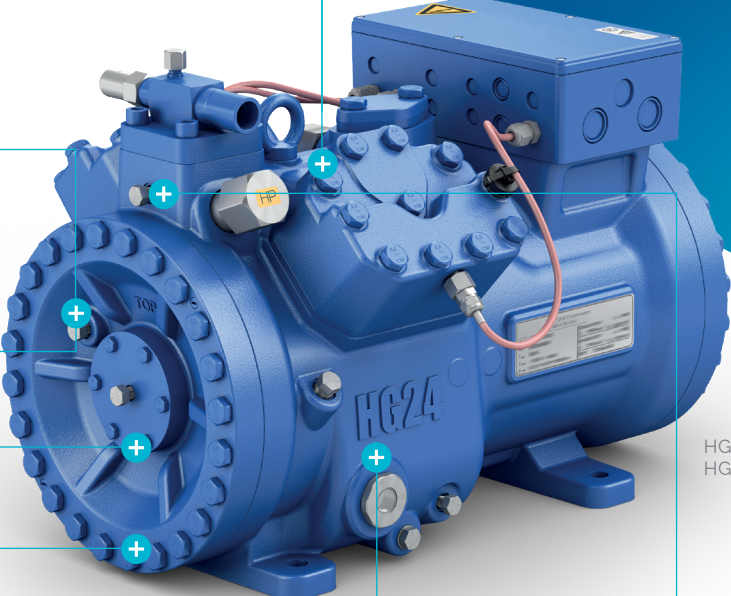


<sup>1</sup> EER = Energy Efficiency Ratio = Refrigeration capacity/power consumption

<sup>2</sup> HGX24/70-4 S CO<sub>2</sub> T

Evaporating temperature at 50 Hz: -10 °C.

Gas cooler outlet temperature: +35 °C/90 bar, suction gas superheat: 10 K



**Large capacity range** +  
 Stationary: 2 – 26 kW/4 – 48 kW  
 (Cooling<sup>1</sup>/heating<sup>2</sup> capacity)  
 Mobile: 5 – 43 kW/3 – 35 kW  
 (AC<sup>3</sup>/heating<sup>4</sup> capacity)

**Displacement m<sup>3</sup>/h at 50 Hz** +  
 CO<sub>2</sub> T: 1.7 – 9.4 m<sup>3</sup>/h  
 (7 capacity stages)  
 CO<sub>2</sub> LT: 1.7 – 12.7 m<sup>3</sup>/h  
 (9 capacity stages)

**CO<sub>2</sub>-specific pressure design** +  
 CO<sub>2</sub> T: max. (LP/HP)  
 100/150 bar  
 CO<sub>2</sub> LT: max. (LP/HP)  
 100/100 bar

**Frequency range** +  
 30 – 70 Hz

**Oil pump for reliable lubrication system** +

**Compact dimensions and standard connections** +

**Low weight** +  
 95 kg (HGX12 CO<sub>2</sub> T)  
 112-116 kg (HGX24 CO<sub>2</sub> T)  
 (Including shut-off valves)

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

**Lowest oil carry over rate** +

HGX12 CO<sub>2</sub> T + LT and  
 HGX24 CO<sub>2</sub> T + LT

## 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 CO<sub>2</sub> compressor technology



### Wide range of applications

From low temperature to high-temperature heat pumps – 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

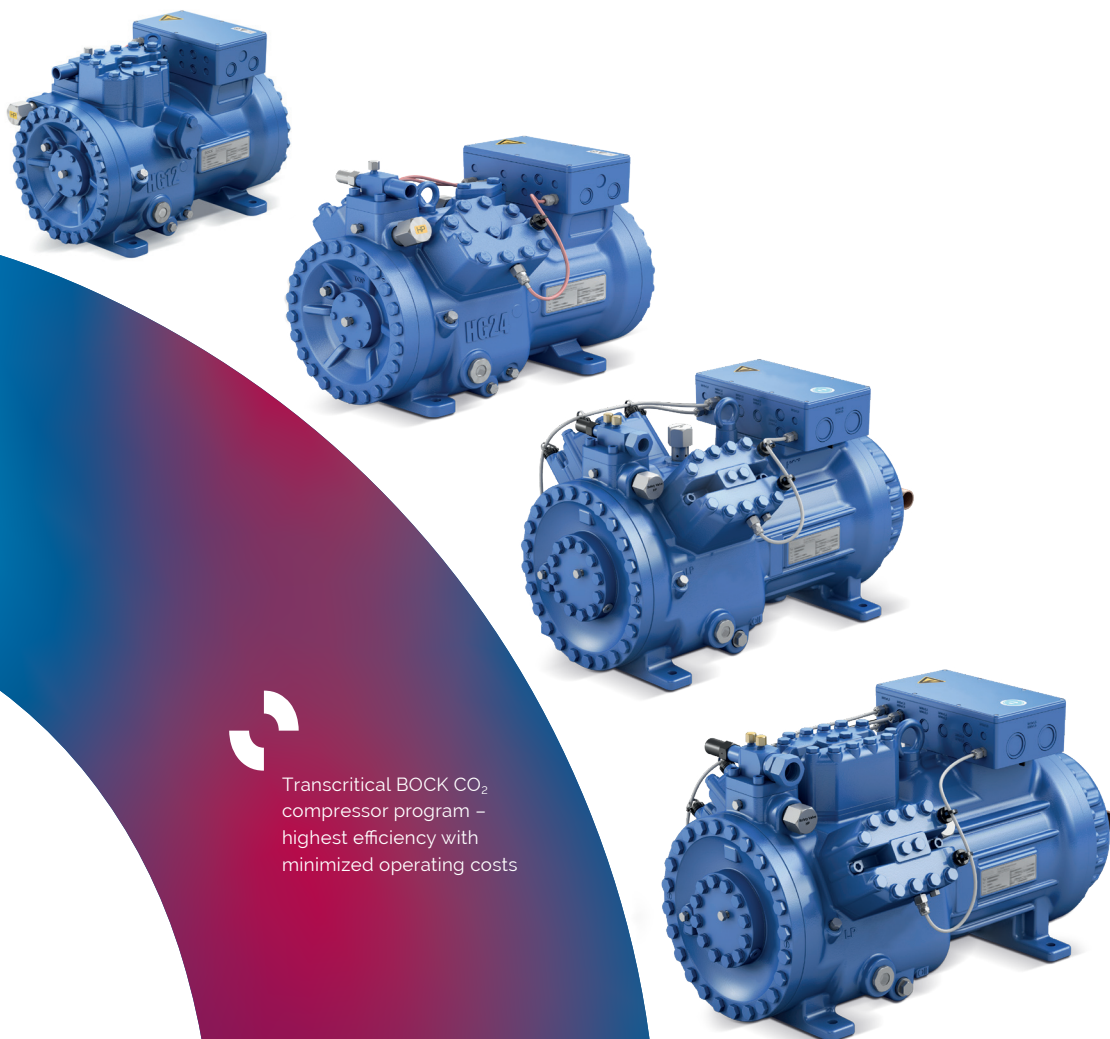
<sup>1</sup> -10 °C/35 °C (90 bar)/10 K/30 – 70 Hz | <sup>2</sup> -10 °C/25 °C (80 bar)/10 K/30 – 70 Hz  
<sup>3</sup> +10 °C/40 °C (100 bar)/10 K/30 – 70 Hz | <sup>4</sup> -20 °C/+25 °C (80 bar)/10 K/30 – 70 Hz

# Transcritical CO<sub>2</sub> compressors

Flexible use in transcritical and subcritical applications for supermarkets, commercial and industrial refrigeration systems and heat pumps

The BOCK CO<sub>2</sub> compressor program offers you with HGX12 CO<sub>2</sub> T, HGX24 CO<sub>2</sub> T, HGX34 CO<sub>2</sub> T and HGX46 CO<sub>2</sub> T four transcritical model sizes with 19 displacement stages, which set groundbreaking standards in the market. Their broad operating limits and wide frequency range enable tailor-made solutions for a wide range of applications.

With their optimized efficiency, the gas-cooled semi-hermetic compressors achieve the highest EER/COP values within their range of applications – officially confirmed by ASERCOM (Association of European Refrigeration Component Manufacturers) certification for several displacement stages. Further advantages of reciprocating compressors: highest reliability and durability.



Transcritical BOCK CO<sub>2</sub> compressor program – highest efficiency with minimized operating costs

## Cooling capacity

3 – 85 kW



Evaporating temperature at 50 Hz:  $-10\text{ }^{\circ}\text{C}$ ,  
Gas cooler outlet temperature:  $+35\text{ }^{\circ}\text{C}/90\text{ bar}$ , suction gas superheat: 10 K

## Heating capacity

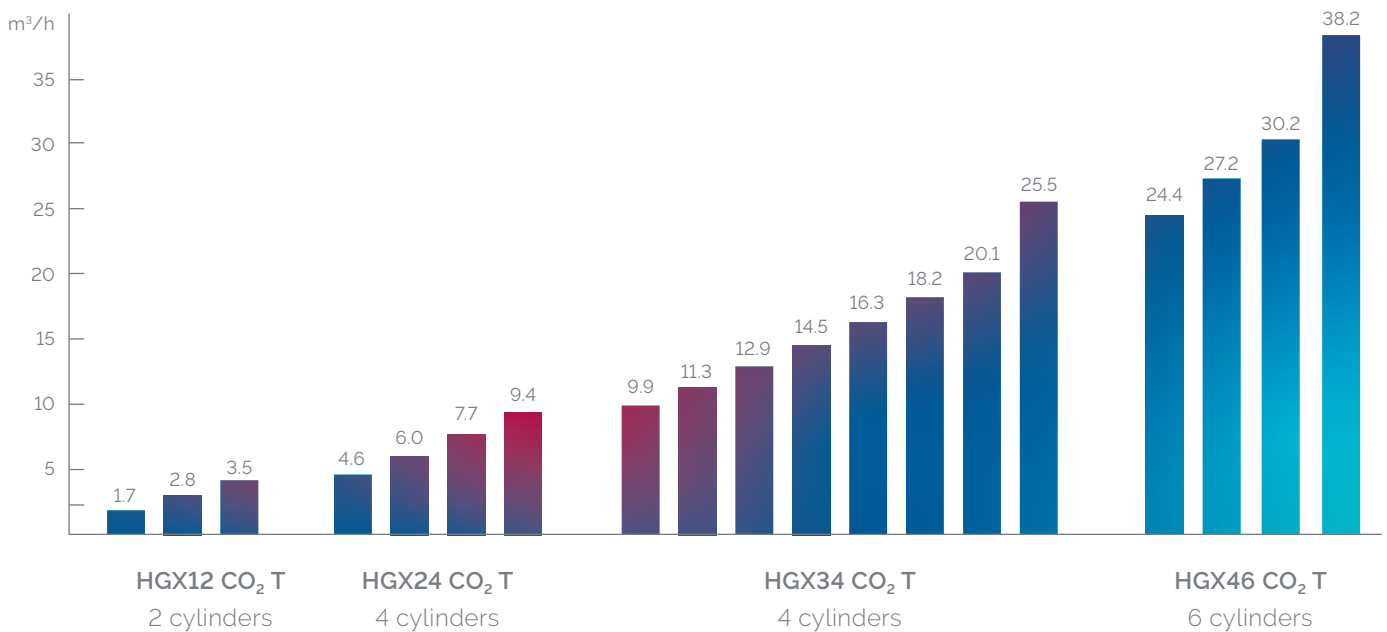
9 – 182 kW



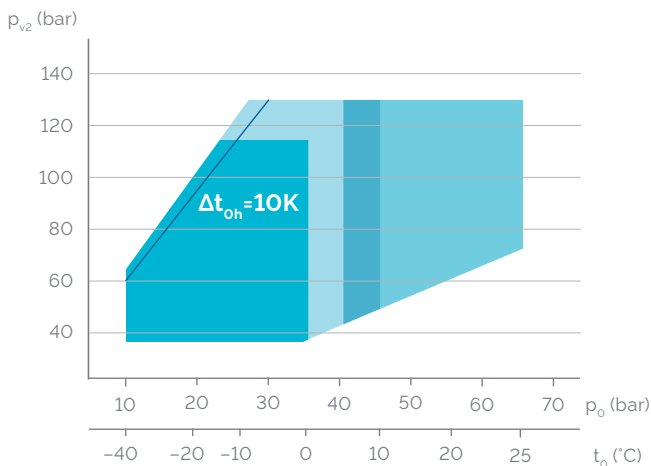
Evaporating temperature at 50 Hz:  $5\text{ }^{\circ}\text{C}$   
Gas cooler outlet temperature:  $+25\text{ }^{\circ}\text{C}/100\text{ bar}$ , suction gas superheat 10 K

## Transcritical CO<sub>2</sub> compressors

4 model sizes with 19 capacity stages from 1.7 to 38.2 m<sup>3</sup>/h (50 Hz)



## Operating limits



Max. permissible operating pressure (LP/HP) 100/150 bar

- compressor version ML
- compressor version S
- compressor version SH
- compressor ranges HGX12 CO<sub>2</sub> T and HGX24 CO<sub>2</sub> T

## BOCK efficiency in competitive comparison (MT Efficiency – EER<sup>1</sup>)



Competition

BOCK<sup>1</sup>

<sup>1</sup> HGX46/345-4 S CO<sub>2</sub> T

Evaporating temperature at 50 Hz:  $-10\text{ }^{\circ}\text{C}$ ,  
Gas cooler outlet temperature:  $+35\text{ }^{\circ}\text{C}/90\text{ bar}$ , suction gas superheat: 10 K



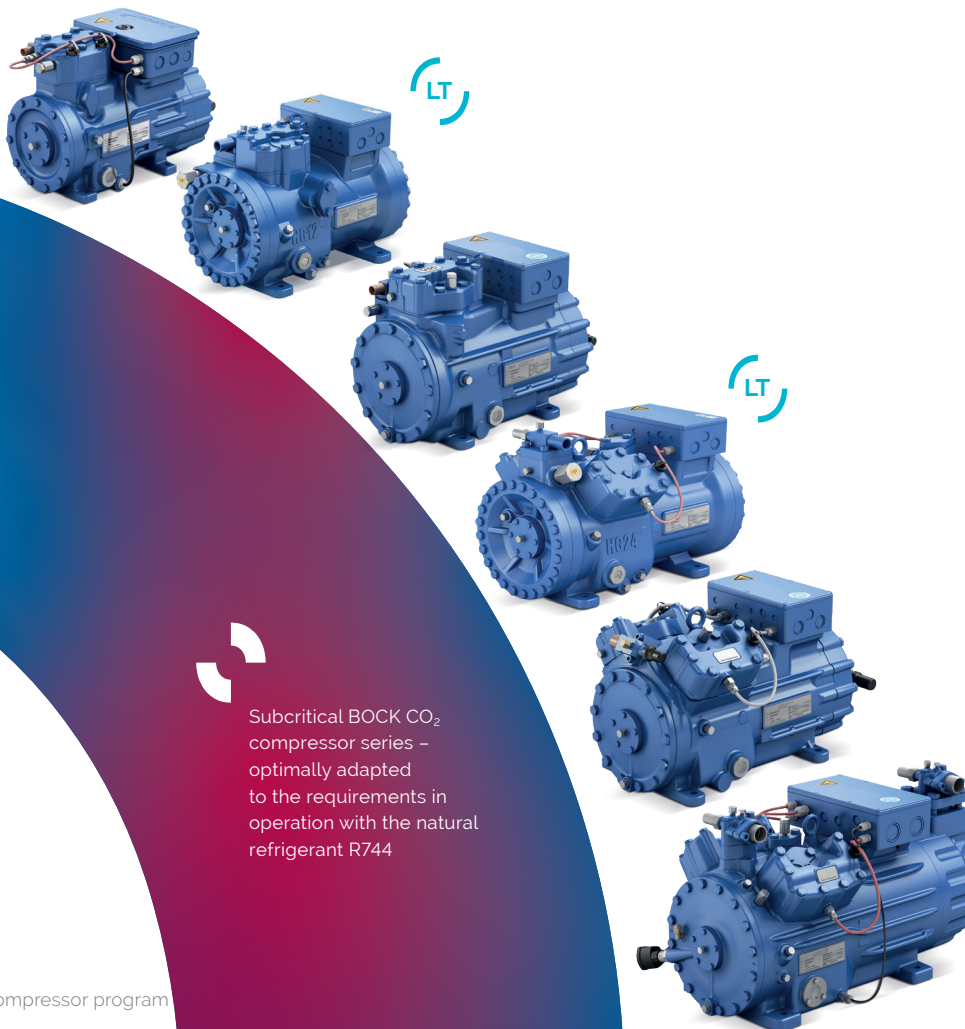
# Subcritical CO<sub>2</sub> compressors and LT compressors

Flexible use for cascade and booster CO<sub>2</sub> systems in supermarket, commercial and industrial refrigeration applications

For use in low temperature applications, the BOCK CO<sub>2</sub> compressor program offers four subcritical model sizes with 17 displacements: HGX12e CO<sub>2</sub>, HGX22e CO<sub>2</sub>, HGX34e CO<sub>2</sub> and HGX44e CO<sub>2</sub>. The subcritical series is based on the advantages of the proven BOCK compressor technology, which has been holistically optimized to meet the requirements of CO<sub>2</sub> operating conditions. Its wide range of applications enables tailor-made, cost-saving solutions for the most diverse applications – and all this with the highest reliability and durability.

## Specialist for Low Temperature (LT)

For special specifications in the low temperature range with evaporating temperatures between -50 °C to 0 °C and condensing temperatures up to 25 °C, BOCK offers a specifically designed LT variant with high efficiency. The compressors are designed for subcritical CO<sub>2</sub> systems with high standstill pressures (LP 100 bar) – available in two motor versions ML and S for a wide frequency band and wider operating limits.

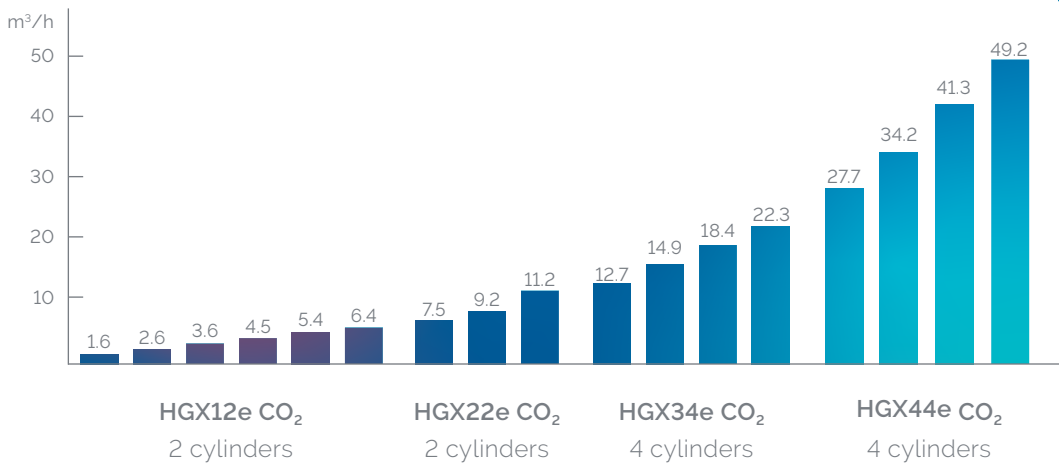


Subcritical BOCK CO<sub>2</sub> compressor series – optimally adapted to the requirements in operation with the natural refrigerant R744



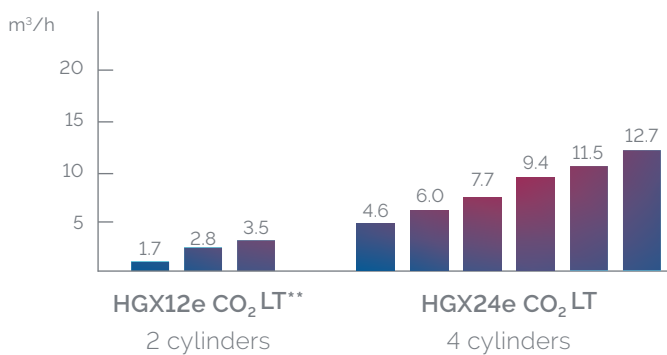
### Subcritical CO<sub>2</sub> compressors (LP 40 bzw. 30 bar)

4 model sizes with 17 capacity stages from 1.6 to 49.2 m<sup>3</sup>/h (50 Hz)

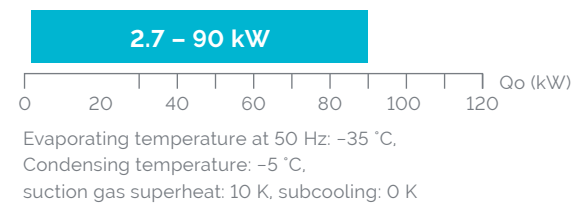


### Subcritical CO<sub>2</sub> compressors (LT range – LP 100 bar)

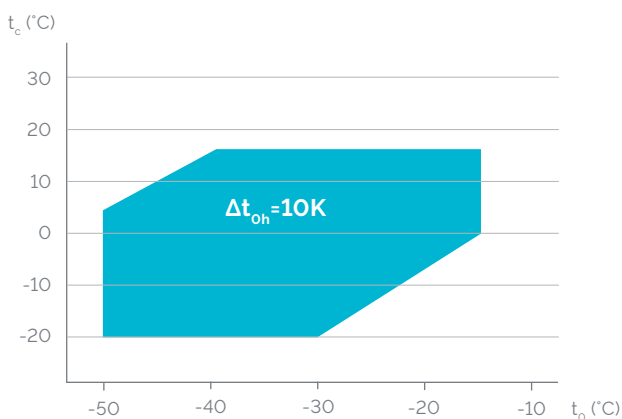
2 model size with 9 capacity stages from 1.7 to 12.7 m<sup>3</sup>/h\* (50 Hz)



### Cooling capacity

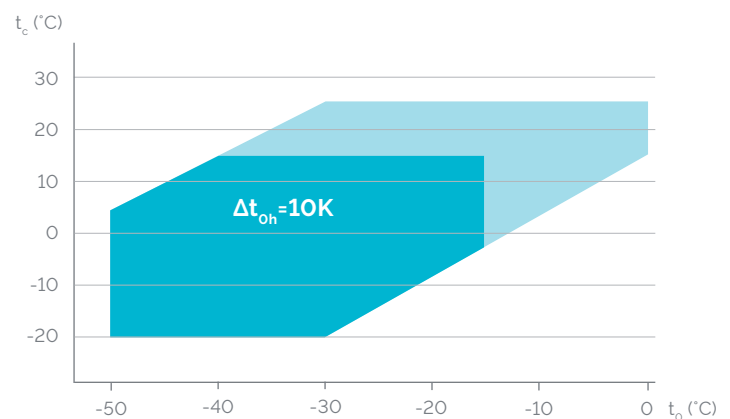


### Operating limits HG CO<sub>2</sub> (subcritical)



Max. permissible operating pressure (LP/HP):  
40/55 bar HGX12e CO<sub>2</sub>, HGX22e CO<sub>2</sub> & HGX34e CO<sub>2</sub>  
resp. 30/55 bar HGX44e CO<sub>2</sub>

### Operating limits HG CO<sub>2</sub> LT



Max. permissible operating pressure (LP/HP): 100/100 bar  
● compressor version ML ○ compressor version S

\* For higher capacities in low temperature applications with standstill pressures up to LP 100 bar, the HGX34 CO<sub>2</sub> T and HGX46 CO<sub>2</sub> T are available in the ML version with 12 displacement stages.

Details and further explanations can be found on the internet via the BOCKVAP compressor selection tool [vap.bock.de](http://vap.bock.de). \*\*HGX12 CO<sub>2</sub> LT available from Q2/2022

# BOCK service and support

Up-to-date information, training and tools about BOCK CO<sub>2</sub> compressors, compressors for hydrocarbons and solutions for other refrigerants. Use our expertise for your daily practice – online and free of charge



# °Clever + Cool Experts<sup>live</sup>

**BOCKshop** | 

**BOCK CO<sub>2</sub>Tool** | 

**BOCK VAP** | 



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

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 CO<sub>2</sub> 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](http://bockshop.bock.de)

## **BOCKCO<sub>2</sub>Tool**

The strengths of the **BOCKCO<sub>2</sub>Tool** based on Excel: Support for the selection of CO<sub>2</sub> 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 CO<sub>2</sub> systems such as booster systems.

>> **Usage on request: [vap@bock.de](mailto: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](http://vap.bock.de)

**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 CO<sub>2</sub> (R744), hydrocarbons and other low-GWP refrigerants.**

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