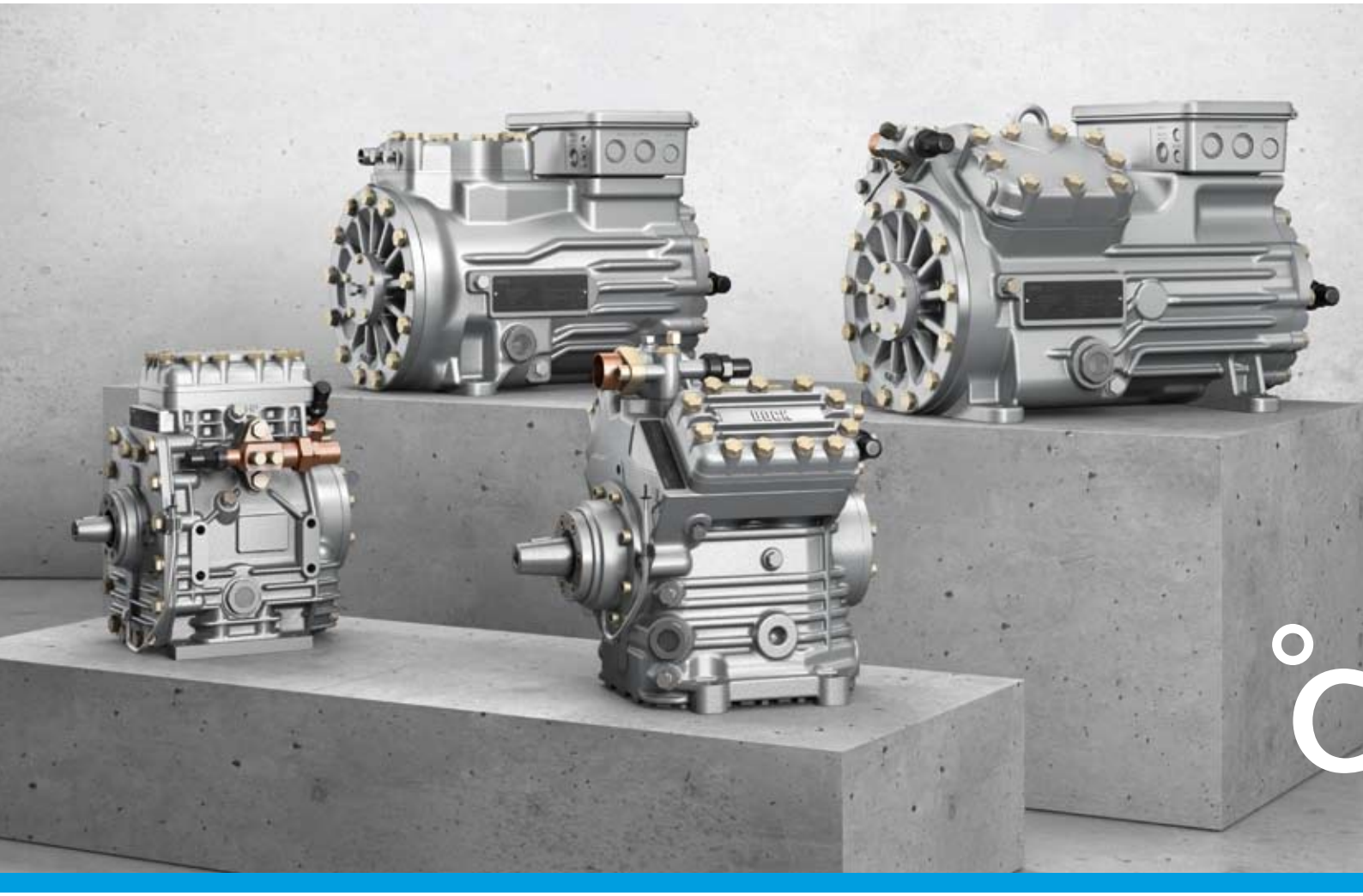
In Touch



Catalogue Mobile Applications

Bock vehicle compressors for bus-, railway air-conditioning and transport refrigeration

BOCK® COMPRESSORS

GEA Refrigeration Technologies / GEA Bock

CO_2 compressors transcritical

CO_2 as a refrigerant

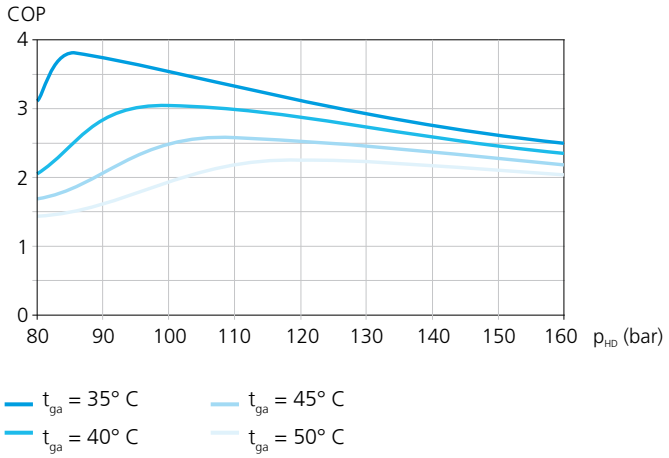
Within refrigeration technology, carbon dioxide (CO2) is known by the name R744 and has a long history. It is a colourless gas which liquefies under pressure and has a slightly acidic smell and taste. Carbon dioxide has no ozone depletion potential (ODP=0) and a negligible direct effect on global warming (GWP=1) when used as a refrigerant in closed systems. It is not combustible, is chemically inactive and heavier than air.

Carbon dioxide has a narcotic and asphyxiating effect on humans only at higher concentrations. As carbon dioxide is less energy efficient than other refrigerants, recently work has particularly concentrated on optimising plant technology for specific applications. Carbon dioxide is available naturally in large quantities.

Special features of CO_2 transcritical

Based on the high CO2 pressure and the low temperature of the critical point of 31°C (74 bar), transcritical operating conditions occur at higher temperatures at the heat exchanger. In this case, in comparison to subcritical applications, the refrigerant CO2 can no longer be condensed. In this case, the refrigerant gas is cooled in a gas cooler. The temperature and the pressure are dependent on each other, compared to the subcritical operation.
A special feature in these operating points is the necessary regulation of the high pressure at the so-called optimal high pressure. In doing this, the greatest possible enthalpy difference at the evaporator and the lowest possible power consumption of the compressor should be reached. In this way, the maximum coefficient of performance (COP) of the system is achieved. An additional valve with intelligent control after the high-pressure heat exchanger is needed for this in the system.

For additional technical data, see GEA Bock software.



t_{ga} = Gas cooler outlet temperature
Limit conditions: isentrope compression
Evaporation pressure = 40 bar with internal heat exchanger

Important Information

- Transcritical CO_2 applications are still in the development phase
- They require a completely new kind of system and control
- They are not a general solution for the substitution of F-gases
- We explicitly point out that all information in this product information corresponds to our present state of knowledge and can change anytime because of the ongoing development process of our products. We cannot assume any liability for the correctness of this information at any time
- Compressors can only be provided for selected projects
- Operation and warranty are subject to separate agreements

08/2011 – 09689-08.2011-Gb ◦ Subject to change without notice

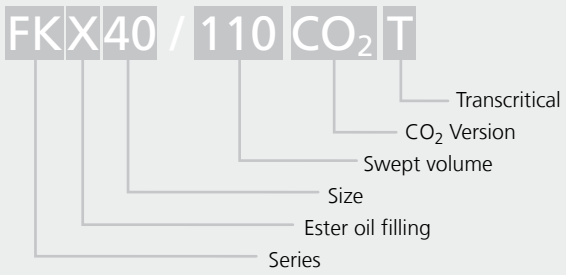
Bock FK40 CO_2 for bus air-conditioning

This compressor is a development project and only available on request! Our competent team is happy to advise you.
Since the beginning of the 90's GEA Bock and leading institutes and manufacturers are concerned with the development of compressors for the transcritical CO2 process.
In 1993 the first open-type CO2 compressor for bus air-conditioning was produced and introduced to the public in 1994 in an air-conditioning system of the company Konvekta at the IAA commercial vehicles trade fair.
Since this time those compressors are used for field tests and are the basis for many CO2 studies of international institutes.
Compact, high-pressure resistant, powerful and reliable. Based on the internationally known Bock FK40 vehicle compressor for the application in standard R134a bus air-conditioning systems, there is now available a FK40 for the refrigerant CO2 for special projects.
Basically the compressor has the same outstanding characteristics as its model.

Special Features

- 4-cylinder compressor
- Static and dynamic design up to a permissible operating pressure of 140 bar
- Interchangeable with our standard FK40 for R134a use (same fixing points at the baseplate)
- Belt drive by a housing mounted electromagnetic clutch
- Unrivaled when it comes to transcritical CO2 commercial vehicle applications
- Wide speed range through the established K-valve plate principle, based on the FK40

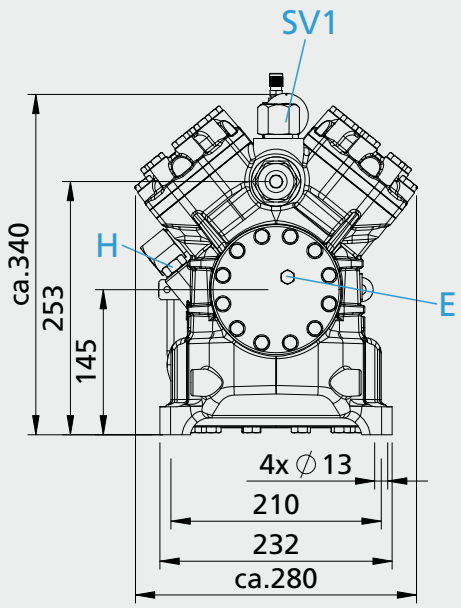
Type key



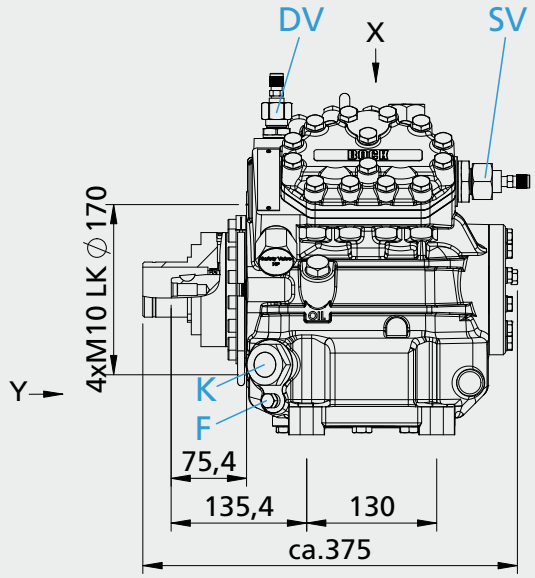
Type	Displacement 1450 rpm
FKX40/110 CO_2 T	9,64 m³/h

FK Type	Number of cylinders	Swept volume	Displacement (1450 rpm)	Weight	Connections		Oil charge
					Discharge line DV	Suction line SV	
		cm³	m³/h	kg	mm	mm	Ltr.
FK40/110 CO_2 T	4	110	9,64	66	15	22	1,6

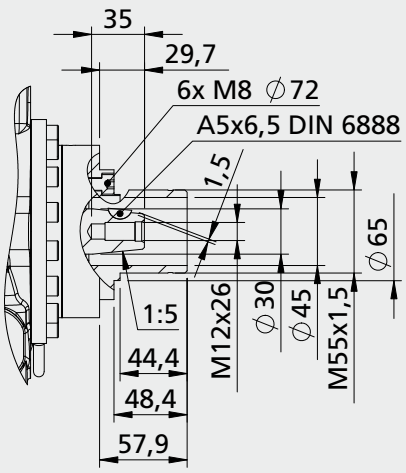
FK40 CO_2 T



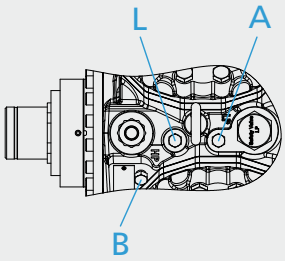
FKX40/110 CO_2 T



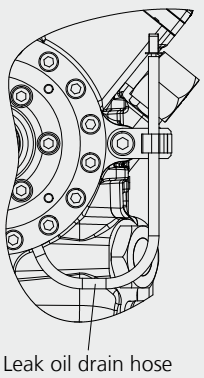
Shaft end



View X



View Y



Dimensions in mm
Connections see page 83

08/2011 – 09689-08.2011-Gb ◦ Subject to change without notice

Connections		FK40 CO_2 T
SV DV	Suction line Discharge line	See technical data! Page 82
A	Connection suction side, not lockable	$^1/_8$ " NPTF
B	Connection discharge side, not lockable	$^1/_8$ " NPTF
E	Oil pressure gauge connection	$^1/_8$ " NPTF
F	Oil drain	$^1/_4$ " NPTF
H	Oil charge plug	$^1/_4$ " NPTF
K	Sight glass	G1 "
L	Connection thermal protection thermostat	$^1/_8$ " NPTF

GEA Bock GmbH
Benzstraße 7
D-72636 Frickenhausen
Telefon: +49 (7022) 945 4-0
Telefax: +49 (7022) 945 4-137
bock@geagroup.com
www.bock.de

GEA Refrigeration Technologies
www.gearefrigeration.com