

Danfoss BOCK FK40 GEA Vehicle Compressor User Guide

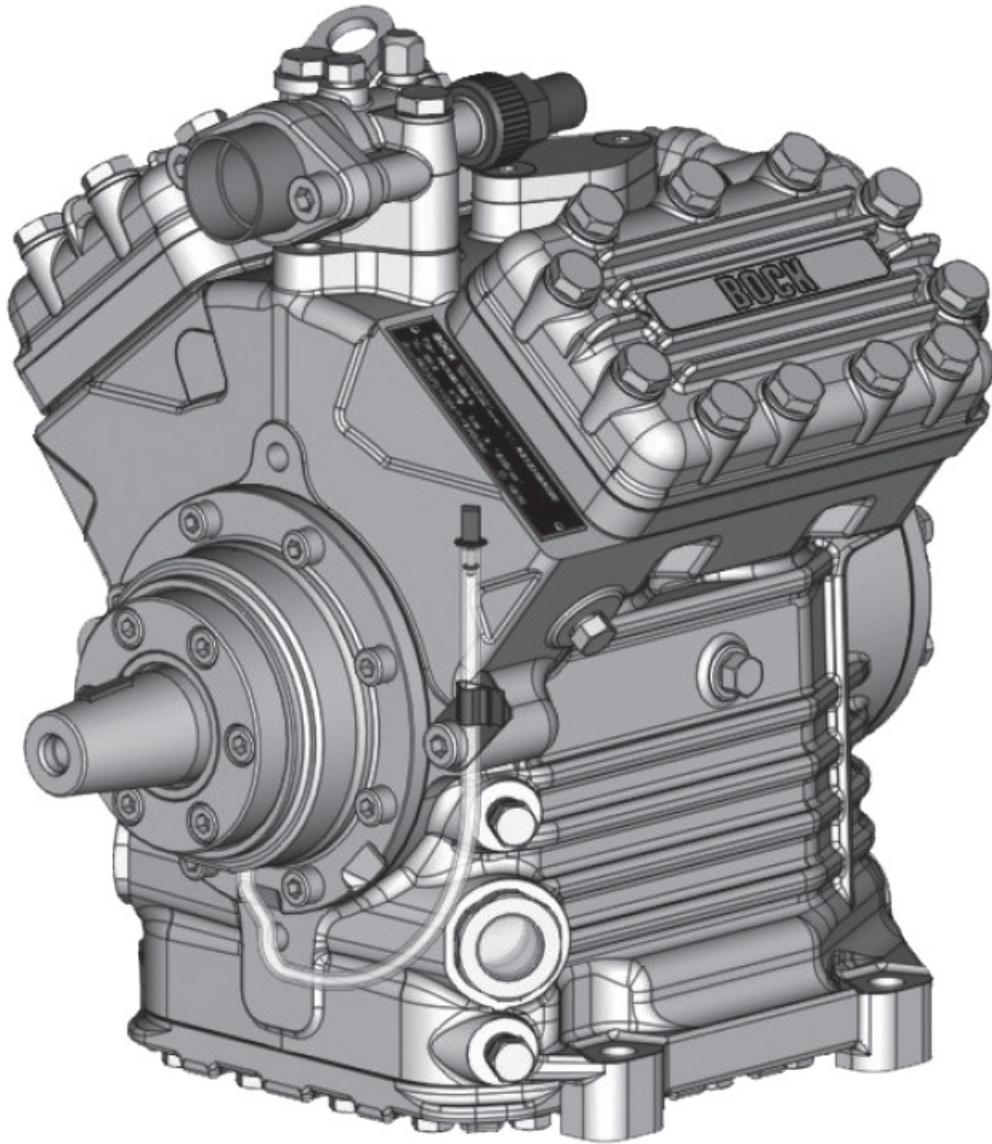
[Home](#) » [Danfoss](#) » Danfoss BOCK FK40 GEA Vehicle Compressor User Guide 

Contents

- [1 Danfoss BOCK FK40 GEA Vehicle Compressor](#)
- [2 Product Description](#)
- [3 Areas of application](#)
- [4 Compressor assembly](#)
- [5 Commissioning](#)
- [6 Maintenance](#)
- [7 Accessories](#)
- [8 Technical data](#)
- [9 Dimensions and connections](#)
- [10 Declaration of incorporation](#)
- [11 Documents / Resources](#)



Danfoss BOCK FK40 GEA Vehicle Compressor



About these instructions

- Read these instructions before assembly and before using the compressor. This will avoid misunderstandings and prevent damage. Improper assembly and use of the compressor can lead to serious or fatal injury.
- Observe the safety instructions contained in these instructions.
- These instructions must be passed onto the end customer along with the unit in which the compressor is installed.
- The safety advice, which is contained in these instructions for assembly, and which is relevant for regular operation and maintenance, must be forwarded by the manufacturer in his own documents to the operator of the entire system. It must also be ensured, that personnel working in daily operation with the compressor have access to important information such as safety and warning advice about the compressor. Such persons must read the safety advice and have understood it. Bock assumes no liability for any damage arising from non-compliance.

Identification of safety instructions:

- **DANGER** Indicates a dangerous situation which, if not avoided, will cause immediate fatal or serious injury.
- **WARNING** Indicates a dangerous situation which, if not avoided, may cause fatal or serious injury.

- **CAUTION** Indicates a dangerous situation which, if not avoided, may cause fairly severe or minor injury.
- **ATTENTION** Indicates a situation which, if not avoided, may cause property damage.
- **INFO** Important information or tips on simplifying work.

Qualifications required of personnel

WARNING

Inadequately qualified personnel poses the risk of accidents, the consequence being serious or fatal injury. Work on compressors is therefore reserved for personnel which is qualified to work on pressurized refrigerant systems: For example, a refrigeration technician, refrigeration mechatronic engineer. As well as professions with comparable training, which enables personnel to assemble, install, maintain and repair refrigeration and air-conditioning systems. Personnel must be capable of assessing the work to be carried out and recognising any potential dangers.

Danger to life and limb in the event of faults during operation

WARNING If a compressor continues to be operated during extreme running noise and/or a sharp reduction in refrigerating capacity, there is the danger of further events occurring, such as the fracture of the housing wall. If people are standing in the immediate surroundings, there is the risk of severe injury or even death from flying parts.

- In the event of extreme running noise, switch the compressor off immediately.
- If there is a sharp reduction in refrigerating capacity, switch the compressor off immediately.
- Secure the compressor against being switched on again.
- In such cases do not continue to operate the compressor under any circumstances.

Safety instructions

- Risk of accidents.
- Refrigerating compressors are pressurised machines and as such call for heightened caution and care in handling.
- The maximum permissible overpressure must not be exceeded, even for testing purposes.
- Risk of burns!
- Depending on the operating conditions, surface temperatures of over 60°C on the discharge side or below 0°C on the suction side can be reached.
- Avoid contact with refrigerant necessarily.
- Contact with refrigerant can cause severe burns and skin damage.

Intended use

- These assembly instructions describe the standard version of the FK40 manufactured by Bock. The compressor is intended for use in refrigeration systems in compliance with the operating limits.
- Only the refrigerant specified in these instructions may be used.
- Any other use of the compressor is prohibited!
- The Bock refrigerating compressor named in the title is intended for installation in a machine (within the EU according to the EU Directives 2006/42/EC Machinery Directive, 2014/68/EU Pressure Equipment Directive).
- Commissioning is permissible only if the compressor has been installed in accordance with these assembly

instructions and the entire system into which it is integrated has been inspected and approved in accordance with legal regulations

Product Description

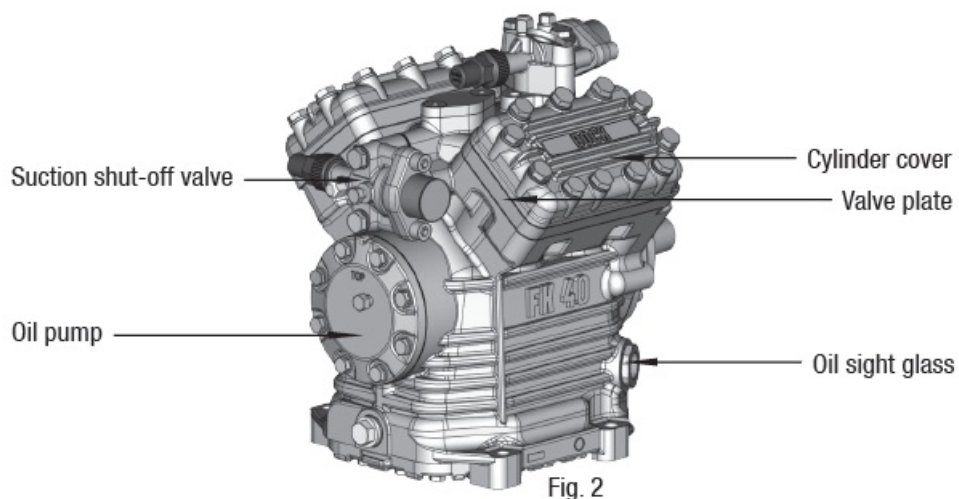
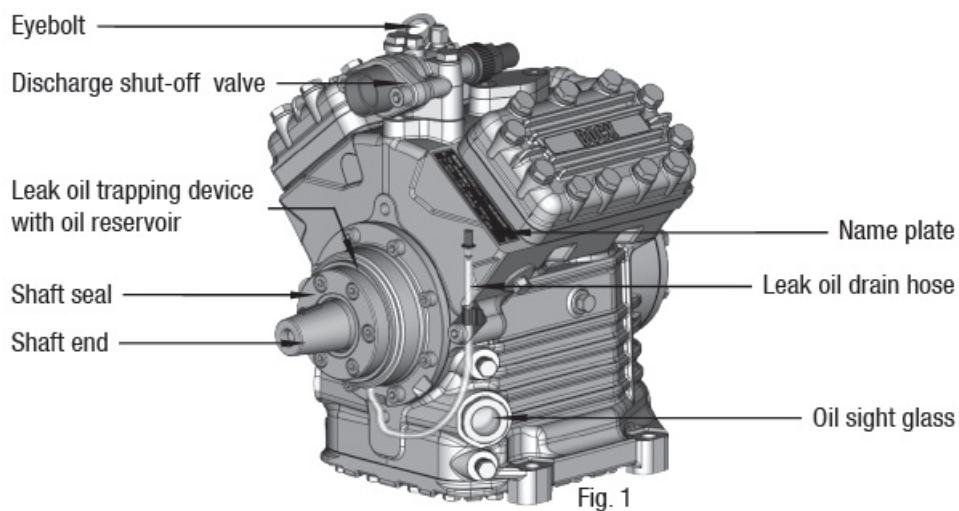
Brief description

Three different designs are available for various ranges of application

- for air-conditioning the K Design
- for air-conditioning or normal cooling the N Design
- for deep freezing the TK Design

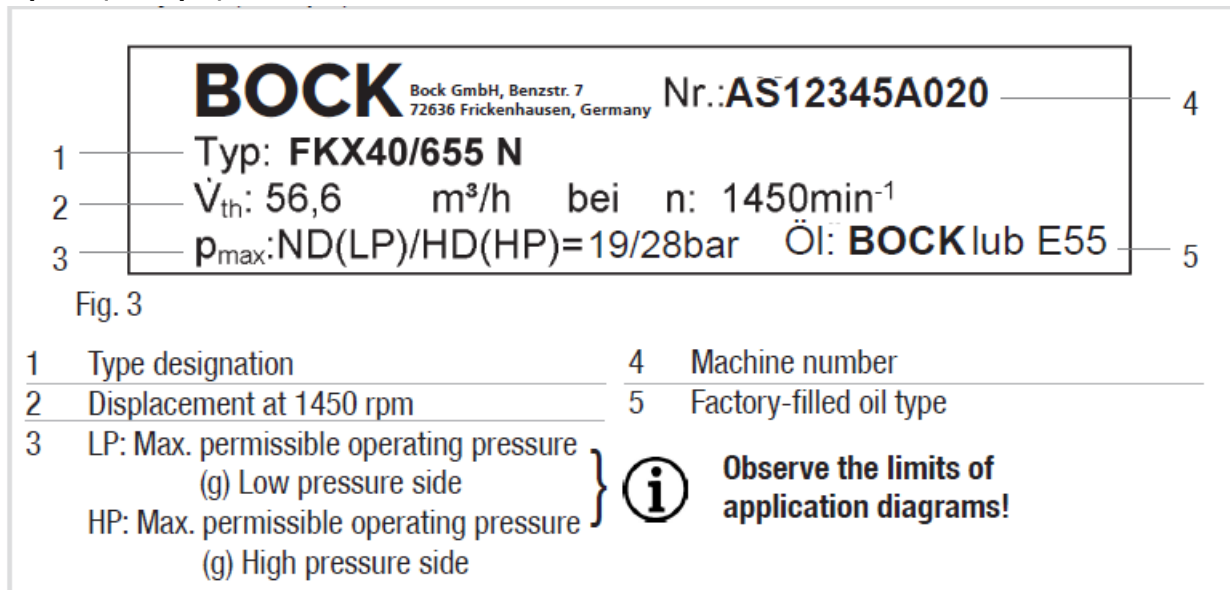
The differences lie mainly in the valve plate tooling which is adapted to each application range where operational safety and efficiency are concerned

- Compact four cylinder compressor in V design.
- Four capacity ranges (5 at K Design).
- Lightweight aluminum design.
- Lubricating oil pump with oil pressure relief valve independent of rotational direction.
- Variable arrangement of the shut-off valves

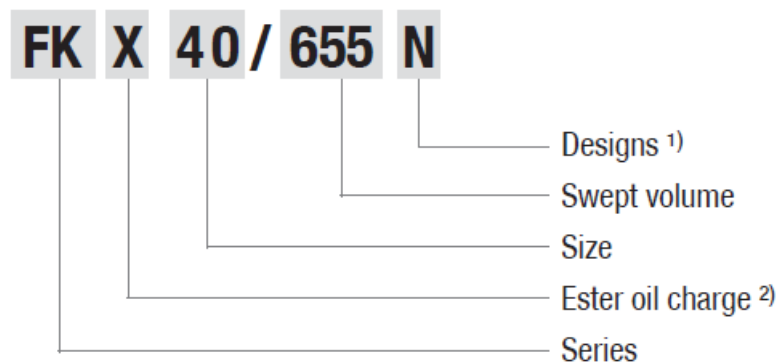


Dimension and connection values can be found in Chapter 9

Name plate (example)



Type key (example)



¹⁾ K - specially for air-conditioning

N - specially for air-conditioning or normal cooling

TK - specially for deep freezing

²⁾ X - Ester oil charge (HFC refrigerant, e.g. R134a, R407C)

Areas of application

Refrigerants

- HFKW / HFC: R134a, R404A/R507, R407C, R513A
- HFCKW / HCFC: R22

Oil charge

The compressors are factory-filled with the following oil type:

- for R134a, R404A/R507, R407C, R513A BOCK lub E55
- for R22 BOCK lub A46

Compressors with ester oil charge (BOCK lub E55) are marked with an X in the type designation (e.g. FKX40/655 N).

INFO For recharging, we recommend the above oil types. See chapter 6.6.

Limits of application

Compressor operation is possible within the operating limits.

These can be found in Bock compressor selection tool (VAP) under vap.bock.de. Observe the information given there.

- Max. permissible discharge end temperature: 140°C
- Permissible ambient temperature: (-20°C) – (+100°C)
- Max. permissible switching frequency: 12 x /h
- A minimum running time of 2 min. at equilibrium (continuous operation) must be achieved.

Avoid continuous operation near the threshold. Should the compressor happen to be used near the thresholds, we recommend the use of a thermal protection thermostat (Accessories, Chap. 7).

For operation with capacity regulator:

- Continuous operation, when the capacity regulator is activated, is not permissible and can cause damage to the compressor. See chapter 7.1.
- The suction gas superheat temperature may need to be reduced or set individually when operating near to the threshold.
- When the capacity regulator is activated, the gas velocity in the system can not under certain circumstances ensure that sufficient oil is transported back to the compressor.
- When operating in the vacuum range, there is a danger of air entering on the suction side. This can cause chemical reactions, a pressure rise in the condenser and an elevated compressed-gas temperature. Prevent the ingress of air at all costs!

LP = Low pressure

HP = High pressure

Compressor assembly

INFO

- New compressors are factory-filled with inert gas. Leave this service charge in the compressor for as long as possible and prevent the ingress of air.
- Check the compressor for transport damage before starting any
- work. New compressors are factory-filled with inert gas. Leave this service charge in the compressor for as long as possible and prevent the ingress of air.
- Check the compressor for transport damage before starting any work.

Setting up

WARNING Move compressors only with hoists that have adequate load-bearing capacity

- Transport and suspension unit on the eyebolt (Fig. 4) or direct on the discharge line valve (Fig. 5).

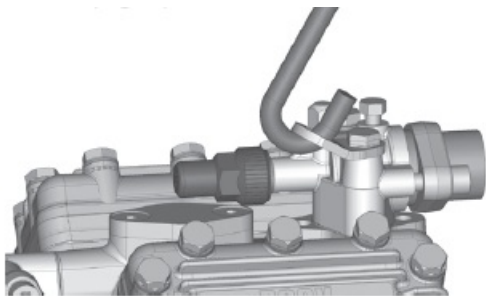


Fig. 4

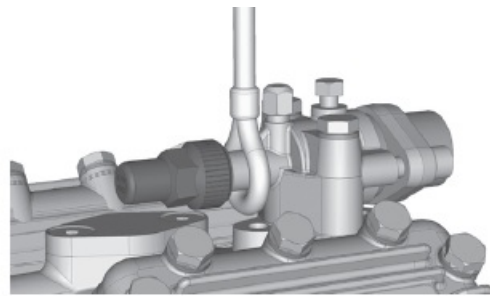


Fig. 5

- Storage at $(-40^{\circ}\text{C}) - (+100^{\circ}\text{C})$, maximum permissible relative humidity 10% – 95%, no condensation.
- Fittings (e.g. pipe holders, additional units etc.) on the compressor are permissible only following consultation with Bock.
- Setup on an even surface or frame with sufficient load-bearing capacity. Use all 4 fastening points.
- Correct setup of the compressor and mounting of the belt drive are decisive for running comfort, operating safety and the service life of the compressor

Maximum permissible inclination

ATTENTION Poor lubrication can damage the compressor. Respect the stated values.

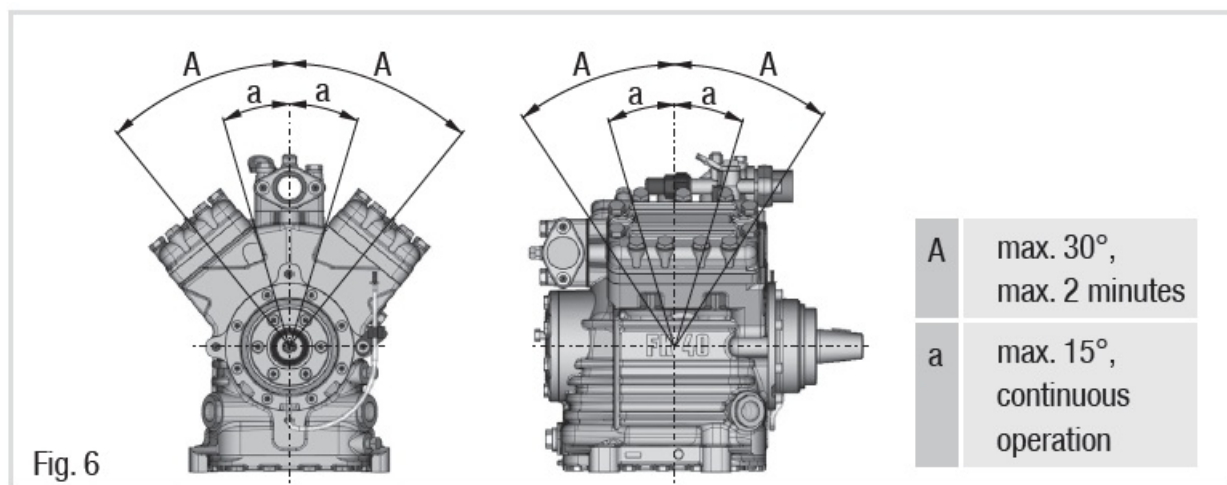


Fig. 6

V-belt drive

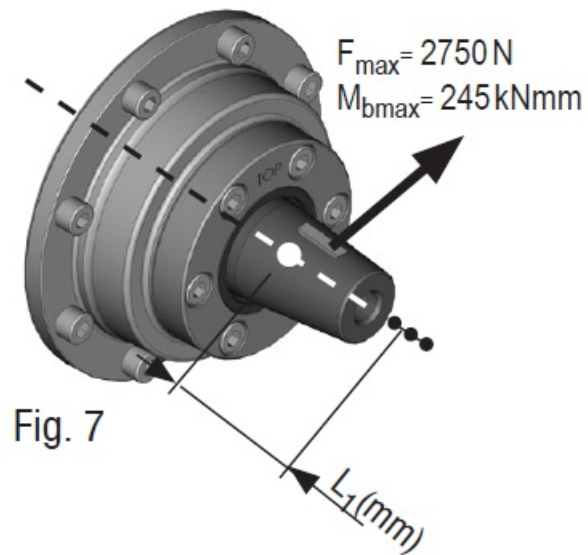
ATTENTION Inappropriately designed belt drives, especially belt knocking (offsets, inclinations) or excessive tensioning forces can cause compressor damage! Make sure that the drive belt is designed correctly, e.g. by using tensioners and selecting the belt profile and the belt length

During operation with capacity regulator (Accessories, Chap. 7), the changing load can cause increased running noises and belt drive vibrations

Main bearing load

To prevent the belt drive overloading the compressor main bearing, ensure that:

The force applied at the force engagement force by the belt tension (see Fig. 7) must not exceed $F_{\text{max}} = 2750 \text{ N}$.

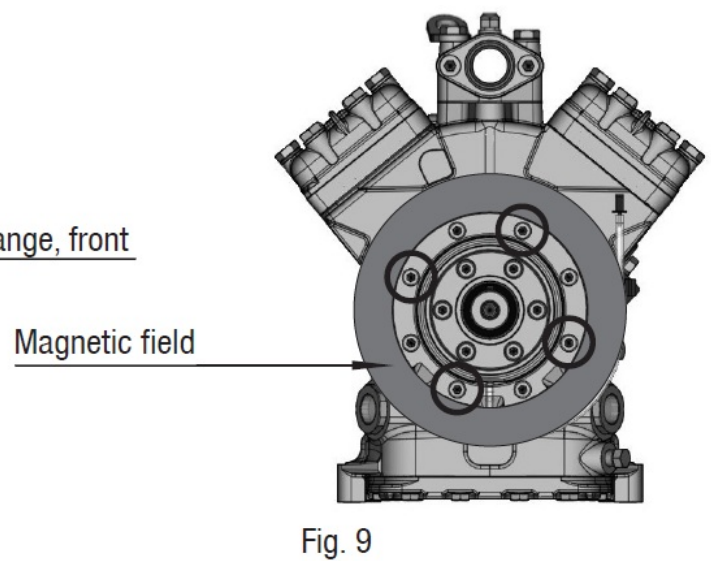
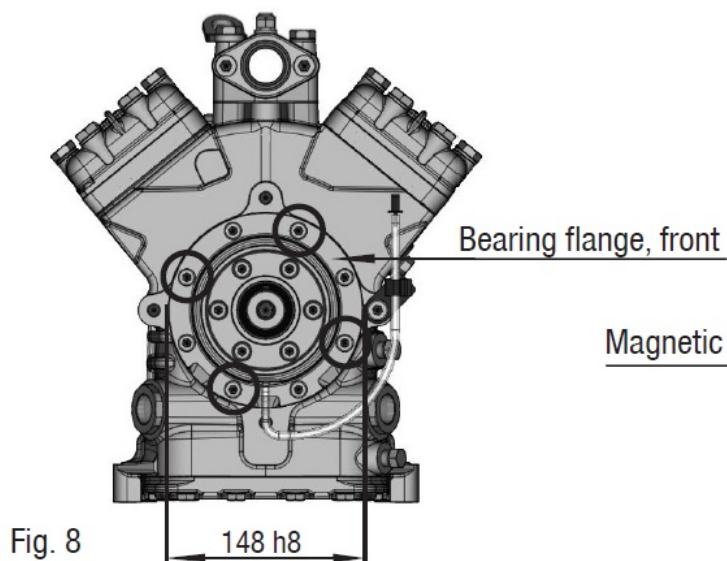


If the force engagement point shifts forwards (see Fig.11, small point), the force F_{\max} reduces as per the following formula:

$$F_{\max} = \frac{245 \text{ kNmm}}{(90 \text{ mm} + L_1 [\text{mm}])}$$

Electromagnetic clutch assembly

- The following description applies for an electromagnetic clutch secured to a shaft.
- To absorb the magnetic field of the electromagnetic clutch, the front bearing flange has a snug fit $\varnothing 148 \text{ h8}$ (see Fig. 8).
- To connect the magnetic field, loosen the 4 cheese head screws M8 on the bearing flange (see Fig. 8).
- Slide the magnetic field to a snug fit and re-attach using the four cheese head screws M8 (Fig. 9). Screw torque = 37 Nm.
- Further assembly of the electromagnetic clutch according to the clutch manufacturer.



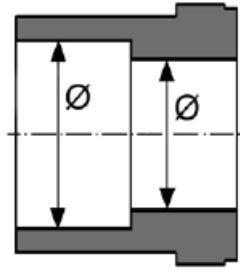


Fig. 10: Stepped internal diameters

- The pipe connections, if installed, have stepped internal diameters so that pipes with standard millimetre and inch dimensions can be used.
- The connection diameters of the shut-off valves are designed for maximum compressor output. The required pipe cross-section must be matched to the capacity. The same applies for non-return valves

ATTENTION Overheating can damage the valve. Therefore, remove the pipe supports from the valve before soldering. Solder only using inert gas to inhibit oxidation products (scale).

Pipes

- Pipes and system components must be clean and dry inside and free of scale, swarf and layers of rust and phosphate. Only use air-tight parts.
- Lay pipes correctly. Suitable vibration compensators must be provided to prevent pipes being cracked and broken by severe vibrations.
- Ensure a proper oil return.
- Keep pressure losses to an absolute minimum.

Operating the shut-off valves

- Before opening or closing the shut-off valve, release the valve spindle seal by approx. ¼ of a turn counter-clockwise.
- After activating the shut-off valve, re-tighten the adjustable valve spindle seal clockwise

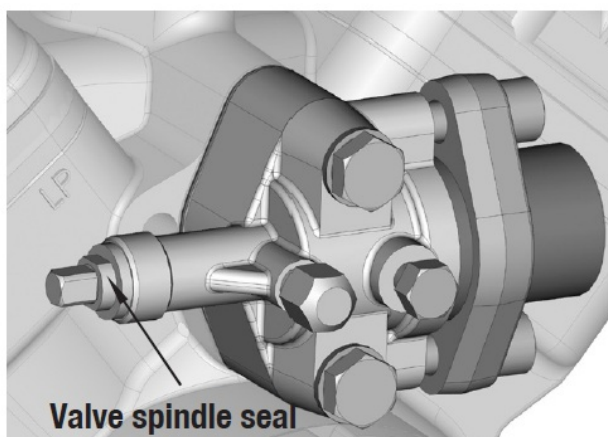


Fig. 11

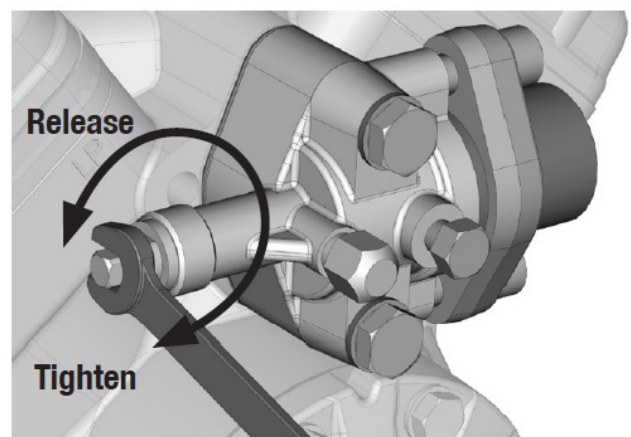


Fig. 12

Operating mode of the lockable service connections

After activating the spindle, generally fit the spindle protection cap again and tighten with 14-16 Nm. This serves as a second sealing feature during operation

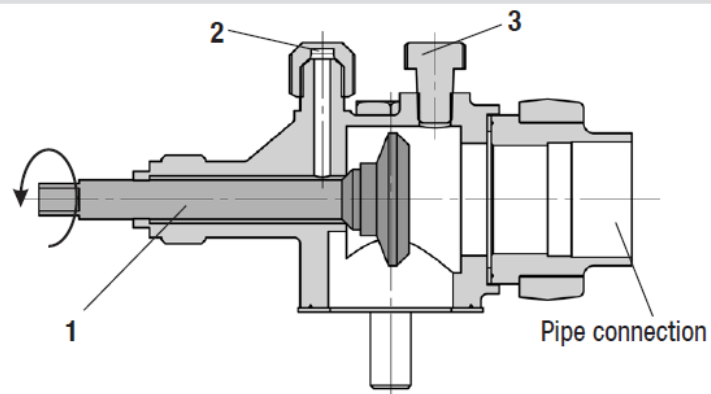


Fig. 13

Opening the shut-off valve:

- a) Spindle 1: turn to the left (counter-clockwise) as far as it will go.
—> Shut-off valve fully opened / service connection 2 closed.

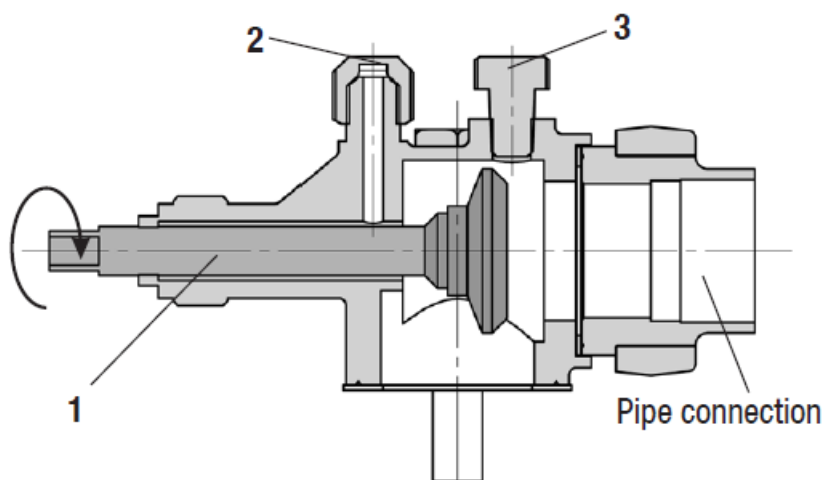


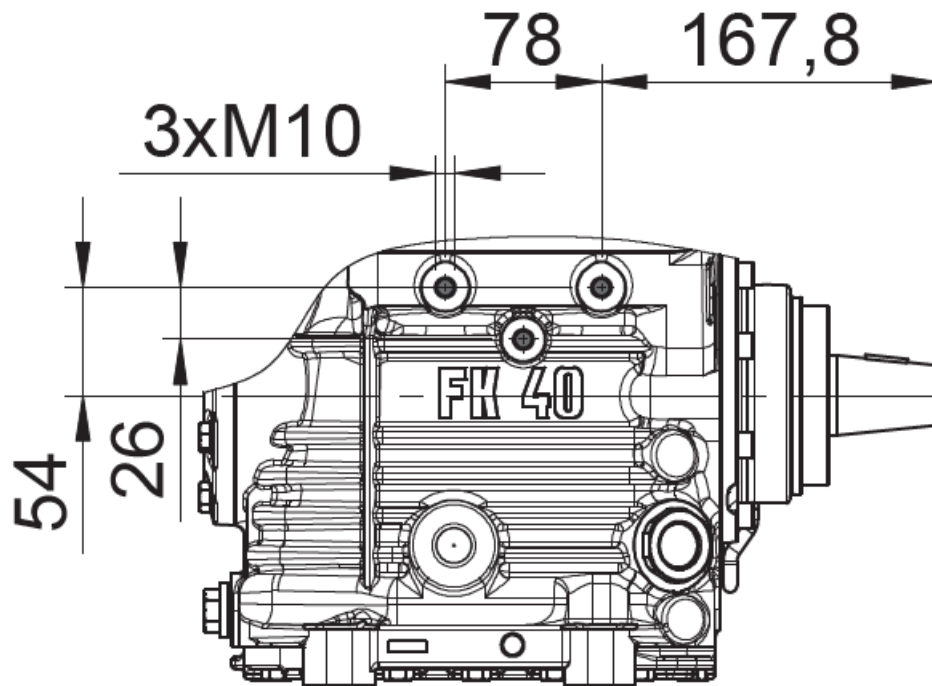
Fig. 14

Suction pipe filter

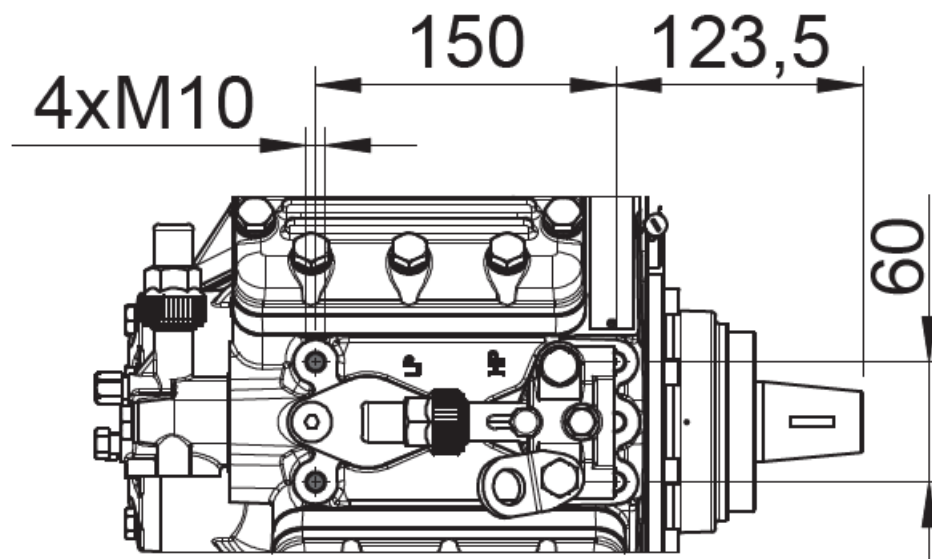
For systems with long pipes and higher degree of contamination, a filter on the suction-side is recommended. The filter has to be renewed depending on the degree of contamination (reduced pressure loss).

Characteristics for K1 special housing

Z



Mounting thread only on this side of the compressor available.



The M10 threads in the housing can be used for screwing on attachments and bracing the compressor

- • Maximum load on the screw connection = 6 g-force
- • Maximum tightening torque of the screws = 60 Nm with minimum screw-in depth = 20 mm and friction coefficient = μ 0,15.
- • Maximum screw-in depth 25 mm.
- • Usable screws up to strength class 10.9.

In case of screw-in depths less than 15 mm or lower friction coefficients than $\mu = 0.15$, the tightening torques and maximum load must be reduced.

INFO

If the M10 threads are used as additional bracing, installation is overdetermined. It must be ensured that the compressor housing is not distorted during installation. The specifications of the motor / chassis manufacturer are mandatory

Preparations for start-up

To protect the compressor against inadmissible operating conditions, high-pressure and low-pressure pressostats are mandatory on the installation side.

The compressor has undergone trials in the factory and all functions have been tested. There are therefore no special running-in instructions.

Check the compressor for transport damage

Pressure strength test

The compressor has been tested in the factory for pressure integrity. If however the entire system is to be subjected to a pressure integrity test, this should be carried out in accordance with EN 378-2 or a corresponding safety standard without the inclusion of the compressor

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Leak test

Risk of bursting!

- The compressor must only be pressurised using dried nitrogen (N₂).
- Never pressurise with oxygen or other gases!
- The maximum permissible overpressure of the compressor must not be exceeded at any time during the testing process (see name plate data)! Do not mix any refrigerant with the nitrogen as this could cause the ignition limit to shift into the critical range.

Carry out the leak test on the refrigerating plant in accordance with EN 378-2 or a corresponding safety standard, while always observing the maximum permissible overpressure for the compressor

Evacuation

First evacuate the system and then include the compressor in the evacuation process.

- Relieve the compressor pressure.
- Open the suction and discharge line valves.
- Evacuate the suction and discharge pressure sides using the vacuum pump.
- At the end of the evacuation process, the vacuum should be < 1.5 mbar when the pump is switched off.
- Repeat the process as often as is required.

Commissioning

Refrigerant charge

CAUTION Wear personal protective clothing such as goggles and protective gloves!

- Make sure that the suction and discharge line valves are open.
- With the compressor switched off, add the liquid refrigerant directly to the condenser or receiver, breaking the vacuum.
- If the refrigerant needs topping up after starting the compressor, it can be topped up in vapour form on the suction side, or, taking suitable precautions, also in liquid form at the inlet to the evaporator

ATTENTION

- Avoid overfilling the system with refrigerant!
- To avoid shifts in concentration, zeotropic refrigerant blends must always be added to the refrigerating plant in liquid form.
- Do not pour liquid refrigerant through the suction line valve on the compressor.
- It is not permissible to mix additives with the oil and refrigerant.

Oil level check

- After starting, check the compressor's oil level.
- Drive motor in operating condition "High idle".
- Compressor run time min. 10 minutes.
- The system should have reached Operating point and steady state
- Check oil level. As the installation location of the compressor can differ in practice (inclinations), it is recommended that the oil level is checked in both sight glasses. The oil level must be visible in at least one sight glass.

ATTENTION After a compressor is replaced, the oil level must be checked again. If the level is too high, oil must be drained off (risk of oil impact, reduced performance of the air-conditioning system).

Shaft seal

ATTENTION Failure to observe the following instructions can cause loss of refrigerant and damage to the shaft seal!

INFO

- The shaft seal seals and lubricates with oil. An oil leakage of 0.05 ml per operating hour is therefore normal. This applies particularly during the run-in phase (200 – 300 h).
- To trap and collect leaked oil, the FK40 is fitted with an integrated leak oil trapping device with oil reservoir (P.6, Fig. 1).

The compressor shaft is sealed to outside using a shaft seal. The sealing element rotates with the shaft.

- The following is especially important to ensuring fault-free operation:
- The complete refrigerant circuit must be correctly executed and clean inside.

- Heavy shocks and vibrations to the shaft as well as continuous cyclic operation are to be avoided.
- The sealing surfaces can stick together during prolonged downtimes (e.g. winter). Therefore, run the system every 4 weeks for 10 minutes.

Avoiding liquid shocks

ATTENTION Slugging can damage the compressor and cause refrigerant to leak.

To avoid liquid shocks, the following points should be observed:

- The complete refrigeration plant must be correctly designed and executed.
- The capacities of all components must be compatible (particularly evaporator and expansion valve).
- Suction gas superheating at the evaporator output should be at least 7 – 10 K (check setting of the expansion valve).
- The system must reach a state of equilibrium.
- Particularly in critical systems (e.g. several evaporator points), suitable measures, e.g. use of liquid traps, solenoid valve in the liquid line, etc. are recommended.

Maintenance

Preparation

- Before starting any work on the compressor:
- Switch off the compressor and secure it to prevent a restart.
- Relieve compressor of system pressure.
- Prevent air from infiltrating the system!
- After maintenance has been performed:
- Connect safety switch.
- Evacuate compressor.
- Release switch lock.

Work to be carried out

Oil change: In principle, an oil change is not a mandatory requirement, if the equipment is correctly manufactured and properly operated. Based on decades of experience, we recommend however that the following oil change/service work is carried out:

- Initial oil change during the first maintenance of the vehicle (at the latest after one year)
- Then after every 5,000 operating hours, at the latest however after 3 years. Also clean the oil filter.
- An oil change is also necessary, if the oil is very cloudy and dark, or after repairs have been carried out on the compressor

Emptying the shaft seal oil reservoir: As required depending on use, but at the latest after 1 year or approx. 1,400 operating hours

Where requirements are higher during use (frequent operation at the limits of application, or in hotlands with over +40 °C ambient temperature, or in the case of deep freezing), the following requirements must be observed:

- Initial oil change during the first maintenance of the vehicle (at the latest after one year)
- Then an oil change after every 2,000 operating hours, at the latest however after two years. Also clean the oil filter

Preventive maintenance

The above requirements for higher use applications also apply in the case of preventive maintenance. The shaft seal must also be changed after 3 years.

Regular inspections (at least annually): Checks to be carried out on oil level in the oil sight glass, oil fill level of the shaft seal in the oil drain hose, absence of leaks in the compressor, running noise, vibrations, pressures, temperatures, and functioning of auxiliary devices such as the capacity control.

Shaft seal, emptying the oil reservoir

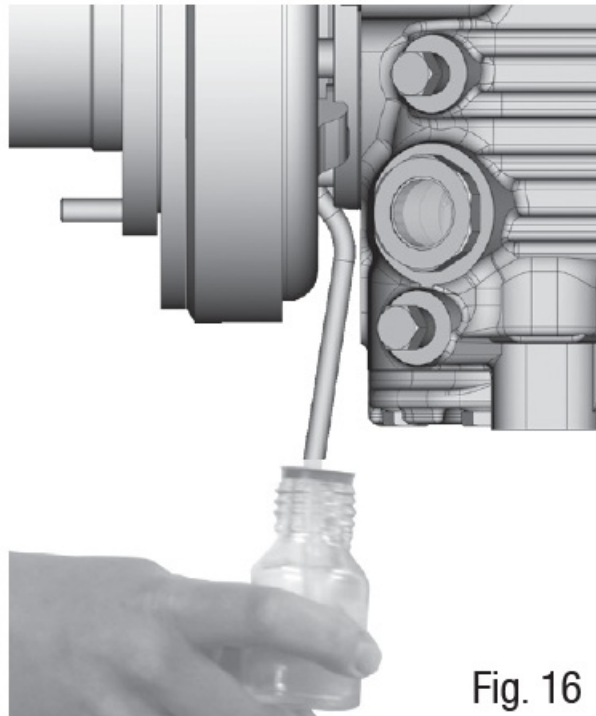


Fig. 16

- Since changing the shaft seal involves encroaching into the refrigerant circuit, this is only recommended, if the seal is losing refrigerant, or if oil is escaping in excess of the permissible amount (see information on page 15, chapter 5.7, "Shaft seal"). Changing the shaft seal is described in the relevant spare part kit.
- Emptying the oil reservoir: The oil reservoir can be emptied very simple without having to dismantle the coupling and/or belt drive. It is recommended that this is done at the same time as the air-conditioning maintenance and motor service.
- To proceed, detach the oil hose from the bracket, remove the sealing plug and drain the oil into a collecting vessel. After emptying, reseal the oil hose and clamp it into the bracket.
- Dispose of the used oil in accordance with national regulations.

The shaft seal is a wearing part, and its service life depends on the prevailing conditions.

Damaging effects on the shaft seal:

- Too little suction gas superheat, particularly during wet operation

- Too high or too low belt tension
- Thermal overload (operation outside the limits of application)
- Frequent cycling
- Long periods of stoppage
- Material deposits / dirt from the system

Due to these effects, the shaft seal can develop leaks, and it must then be replaced.

Recommended spare parts/accessories

- Maintenance set for oil change
 - BOCK lub E55 2 x 1 l
 - Oil drain screw with seal
- Maintenance set for shaft seal
 - shaft seal kit
 - BOCK lub E55 2 x 1 l
 - Oil drain screw with seal

Available spare parts and accessories can be found on our compressor selection tool under vap.bock.de as well as in our online spare parts catalogue at bockshop.bock.de.

Only use original Bock spare parts!

Integrated decompression valve

The valve is maintenance free.

However, constant leakage can occur after blowing off due to abnormal operating conditions. This leads to reduced performance and increases the compressed gas temperature. In this case check the valve and replace as necessary

Lubricants / Oils

The oil type filled as standard in the factory is marked on the name plate, and this should always be used, even in the case of maintenance units. Alternative oil types can vary significantly in quality due to additives or inferior raw materials by the manufacturer. Validation within the compressors entire operating limits can not be guaranteed, if such alternative oil types are used. It is for this reason, that we only recommend the use of oil from Bock! Bock assumes no liability for any damage arising from alternative oil types.

Refrigerant	Bock standard oil grade
HFC (e.g. R134a, R407, R 404A)	BOCK lub E55
HCFC (e.g. R22)	BOCK lub A46

Decommissioning

Close the shut-off valve on the compressor. Drain the refrigerant (it must not be discharged directly into the environment) and dispose of it according to the regulations. When the compressor is depressurised, undo the fastening screws of the shut-off valves. Remove the compressor using an appropriate hoist. Dispose of the oil inside in accordance with the valid national regulations.

Accessories

Capacity regulation

ATTENTION Capacity-regulated operation alters the gas speeds and pressure ratios of the refrigerating plant: Adjust the suction line routing and dimensioning accordingly, do not set the control intervals too close and do not let the system switch more than 12 times per hour (refrigerating plant must have reached a state of equilibrium). Continuous operation in the control stage is not recommended as the gas velocity in the plant system under certain circumstances does not guarantee sufficient oil return to the compressor with activated capacity regulator for a compressor speed below 1200 – 1500 rpm. We recommend switching to unregulated operation (100% capacity) for at least 5 minutes per capacity-regulated operating hour. An assured oil return can also be realised by a 100% capacity requirement after each compressor restart as otherwise the compressor can also be shut down in the regulated operating time by the thermostat.

Electrical actuation of the solenoid valve: Normally open, (corresponds to 100 % compressor capacity). Cylinder covers for capacity regulation are marked with the designation “CR” (Capacity Regulator).

FK40 / N + TK	... K
Designation	Ref. No.*	Ref. No.*
Special accessory 12 V	097B08703	097B08708
Special accessory 24 V	097B08704	097B08709

For a description, see technical information “Capacity regulation” (Item No. 09900) If the capacity regulator is factory-fitted, it is integrated into an extra, dedicated cylinder cover. For retrofits, it is supplied with the cylinder cover. The regulator closes one cylinder bank (capacity regulation approx. 50%).

Please note that the legacy BOCK ref. numbers are without 097B

Thermal protection thermostat (Item No. *097B07595)

A screw-in option is provided for the sensor element on the hot gas side of the compressor housing (see Chap. 9). Connect the thermal protection thermostat in series with the control line.

Technical Data:

- Switching voltage max. : 24 V DC
- Switching current max. : 2.5 A at 24 V DC
- Switch-off temperature : 145 °C ± 5 K
- Switch-on temperature : approx. 115 °C

Please note that the legacy BOCK ref. numbers are without 097B

Technical data

Type	No. of cylinders	Displacement cm ³	Swept volume (1450 rpm) m ³ /h	Weight kg	Connections N + TK *		Oil charge Ltr.	Inertia moment of the driving unit [kgm ²]	Lubrication	Oil pump
					Discharge line DV mm / inch	Suction line SV mm / inch				
FK40/390	4	385	33.5	34.0	22 / 7/8	28 / 1 1/8	2.0	0.0043	Forced lubrication	Rotation- independent
FK40/470		466	40.5	33.0	28 / 1 1/8	35 / 1 3/8				
FK40/560		554	48.3	33.0	28 / 1 1/8	35 / 1 3/8				
FK40/655		650	56.6	31.0	35 / 1 3/8	35 / 1 3/8				
FK40/755		755	65,6	31.0	35 / 1 3/8	35 / 1 3/8				

The technical data for the different designs K, N and TK are identical.
The compressor type data therefore do not mention these additions.
K design: closed with cardboard disc

Dimensions and connections

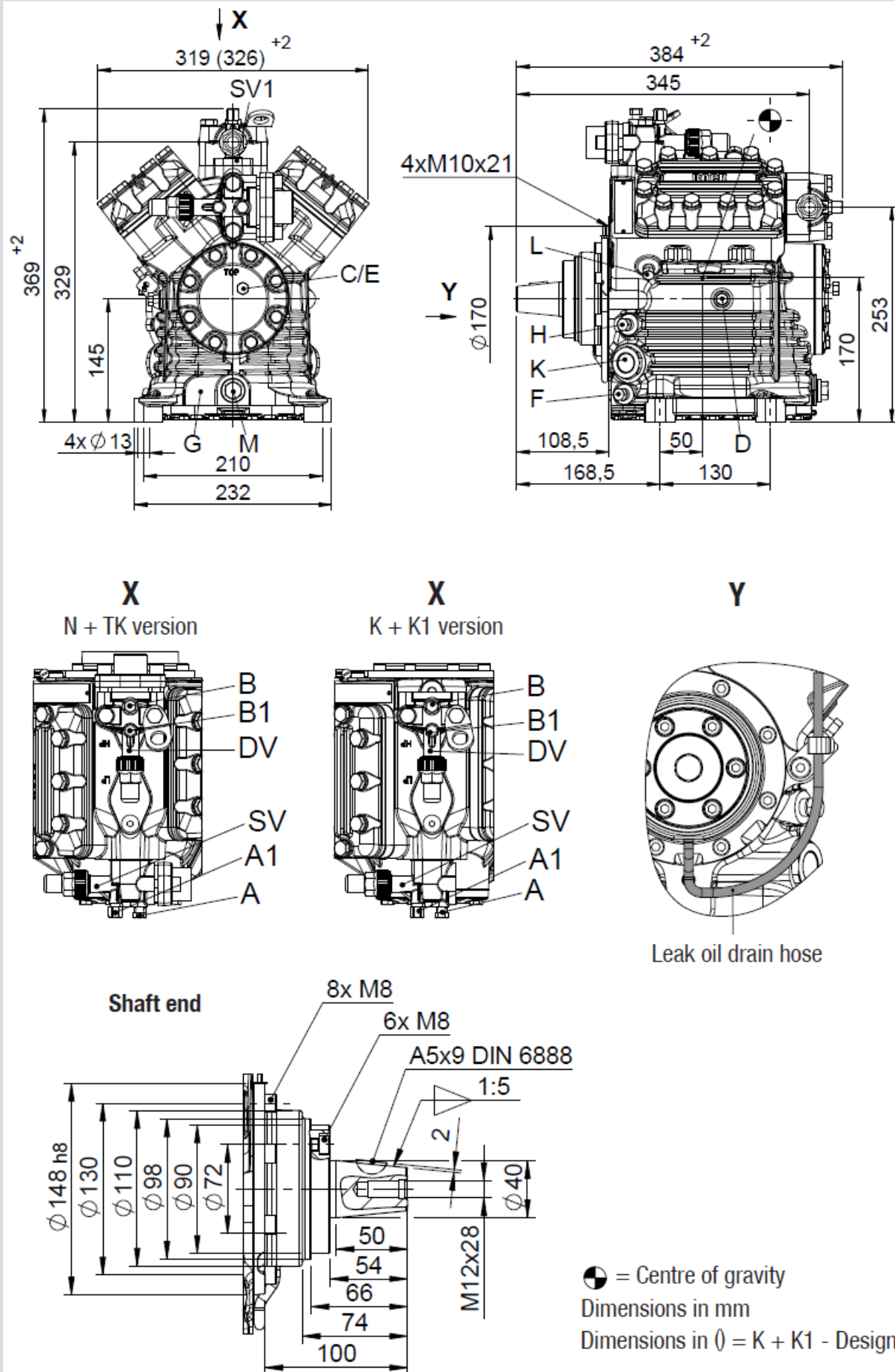


Fig. 17

SV DV	Suction line see technical data, Chapter 8 Discharge line	
A	Connection suction side, not lockable	1/8" NPTF
A1	Connection suction side, lockable	7/16" UNF
B	Connection discharge side, not lockable	1/8" NPTF
B1	Connection discharge side, lockable	7/16" UNF
C	Connection oil pressure safety switch OIL	1/8" NPTF
D	Connection oil pressure safety switch LP	1/8" NPTF
E	Connection oil pressure gauge	1/8" NPTF
F	Oil drain	1/4" NPTF
G	Opt. connection for oil sump heater	1)
H	Oil charge plug	1/4" NPTF
K	Sight glass	2 x 1 1/8"- 18 UNEF
L	Connection thermal protection thermostat	1/8" NPTF
M	Oil filter	M22 x 1.5
SV1	Opt. connection for suction line valve	--

No connection available as standard. Available on request (Connection M22 x 1,5)

Declaration of incorporation

Declaration of incorporation for incomplete machinery in accordance with EC Machinery Directive 2006/42/EC, Annex II 1. B

Manufacturer: Bock GmbH Benzstraße 7 72636 Frickenhausen, Germany

We, as manufacturer, declare in sole responsibility that the incomplete machinery

Name:	Semi-hermetic compressor	
Types:	HG(X)12P/60-4 S (HC) HG(X)88e/3235-4(S) (HC) UL-HGX12P/60 S 0,7 UL-HGX66e/2070 S 60 HGX12P/60 S 0,7 LG HGX88e/3235 (ML/S) 95 LG HG(X)22(P)(e)/125-4 A HG(X)34(P)(e)/380-4 (S) A HGX34(P)(e)/255-2 (A) HGX34(P)(e)/380-2 (A)(K) HA(X)12P/60-4 HA(X)6/1410-4 HAX22e/125 LT 2 LG HAX44e/665 LT 14 LG HGX12e/20-4 (ML/S) CO ₂ (LT) HGX44e/565-4 S CO ₂ UL-HGX12e/20 (S/ML) 0,7 CO ₂ (LT)... UL-HGX44e/565 S 31 CO ₂ HGX12/20-4 (ML/S/SH) CO ₂ T HGX46/440-4 (ML/S/SH) CO ₂ T UL-HGX12/20 ML(P) 2 CO ₂ T UL-HGX46/440 ML(P) 53 CO ₂ T HGZ(X)7/1620-4 HGZ(X)7/2110-4 HGZ(X)66e/1340 LT 22 HGZ(X)66e/2070 LT 35 HRX40-2 CO ₂ T H HRX60-2 CO ₂ T H	
Name:	Open type compressor	
Types:	F(X)2 F(X)88/3235 (NH3) FK(X)1 FK(X)3 FK(X)20/120 (K/N/TK) FK(X)50/980 (K/N/TK)	
Serial number:	BC00000A001 – BN99999Z999	

complies with the following provisions of the above-mentioned Directive:

According to Annex I, points 1.1.2, 1.1.3, 1.1.5, 1.3.2, 1.3.3, 1.3.7, 1.5.1, 1.5.2, 1.5.13 and 1.7.1 to 1.7.4 (excepted 1.7.4 f) are fulfilled

Applied harmonised standards, in particular:

- EN ISO 12100 :2010 Safety of machinery — General principles for design — Risk assessment and risk reduction
- EN 12693 :2008 Refrigerating systems and heat pumps — Safety and environmental requirements — Positive displacement refrigerant compressors

Remarks:

- We also declare that the special technical documentation for this incomplete machine has been created in accordance with Annex VII, Part B and we obligate to provide these upon reasoned request from the individual national authorities by data transfer.
- Commissioning is prohibited until it has been confirmed that the machinery into which the incomplete machine above is to be incorporated complies with the EC Machinery Directive and an EC Declaration of Conformity, Annex II. 1. A exists

Authorized person for compiling and handing over technical documentation:

Bock GmbH Alexander Layh Benzstraße 7 72636 Frickenhausen, Germany

Frickenhausen, 04th of January 2021

i. A. Alexander Layh, Global Head of R&D

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Documents / Resources

	<u>Danfoss BOCK FK40 GEA Vehicle Compressor</u> [pdf] User Guide FK40-390 N, FK40-470 N, FK40-560 N, FK40-655 N, FKX40-390 N, FKX40-470 N, FKX40-560 N, FKX40-655 N, FK40-390 K, FK40-470 K, FK40-560 K, FK40-655 K, FK40-755 K, FKX40-390 K, FKX40-470 K, FKX40-560 K, FKX40-655 K, FKX40-755 K, FK40-390 K1, FK40-470 K1, FK40-560 K1, FK40-655 K1, FK40-755 K1, FKX40-390 K1, FKX40-470 K1, FKX40-560 K1, FKX40-655 K1, BOCK FK40, BOCK FK40 GEA Vehicle Compressor, GEA Vehicle Compressor, Vehicle Compressor, Compressor
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