New Kaeser Compressors with Rolling Bearings

FAG

Examples of Application Engineering

WL 22 502 EA

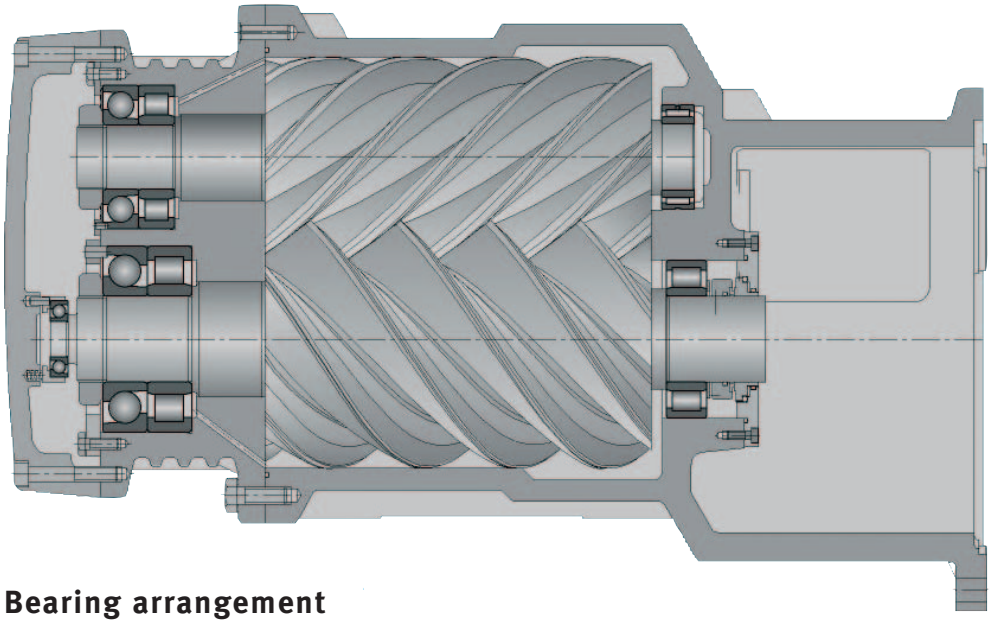
New CSD direct drive screw compressors built by KAESER KOMPRESSOREN GmbH, Coburg, Germany

Compressors are used to increase the energy content of the conveying medium, i.e. to move the conveying medium from a point with a lower energy content to another point with a higher energy content.
This part of the field of machines is unimaginable without screw compressors. They belong to the group of rotary piston compressors. Their popularity is due especially to their low noise and the absolute reliability with which they provide a constant supply of, for example, compressed air.
The compression is generated by two rotors (male and female) by pressing the air in the rotor grooves against the axial housing wall during the rotary motion.
The compressed air thus generated is supplied to the system in a nearly pulse-free stream.

Operators' primary requirements on systems providing compressed air are a high degree of efficiency and reliability. With these requirements in mind, the compressor manufacturer Kaeser in Coburg, Germany, has developed and marketed a new series of compressors called **"CSD"**.

These compressors are intended primarily for applications in craft and trade workshops with pressures of 7,5 to 13 bar and capacities of 5,5 to 10,15 m^3.
These bearings directly connect the motor to the rotor (1 to 1 drive), i.e. without a belt drive or some similar system, which offers significant advantages, not only with regard to transmission losses.

Bearing arrangement for CSD- screw compressors



Bearing arrangement

As already mentioned at the beginning, the conveying medium is pressed against the axial housing wall by the rotors. In order to work as efficiently as possible, this requires narrow gaps, and consequently as close an axial and radial rotor guidance by the bearings as possible. In a nutshell: the narrower the gap, the better the pressure coefficient. This requirement is an important bearing selection criterion.

The radial and axial forces are accommodated separately; this holds both for the male rotor and for the female rotor.

The radial forces are generally transmitted by means of cylindrical roller bearings or needle roller bearings.

In this case
- for the male rotor:
cylindrical roller bearings **NU2212-E-JP3-C3** (drive end),
NU312-E-JP3 (compressor end)

- for the female rotor:
needle roller bearing **NKIS45-C3** (drive end)
cylindrical roller bearing **NU309-E-JP3** (compressor end)

For both rotors the axial load, which acts constantly in one direction, can be accommodated at the compressor end by angular contact ball bearings of designs **7312-B-MP** and **7309-B-MP** that are mounted in the housing in such a way that they are radially relieved.

The male rotor features a small angular contact ball bearing **7305-B-MP** installed as a counterguiding element to the **7312-B-MP** in order to compensate for any axial counteracting forces, e.g. during start-up and coasting or acting via the opposite coupling.

For the female rotor – without coupling – this is not required; to provide axial counter guidance, the rotor face and the matching axial housing side are designed similar to sliding bearings (lubricating grooves etc.).

Lubrication

The bearings are lubricated by an oil circulation system that also removes heat. For this purpose, axial oil holes from the compression chamber to the bearing locations are provided that supply the necessary oil-air mixture from the compression chamber.

Schaeffler KG
Heavy Industries
Air Handling
Postfach 1260
97419 Schweinfurt (Germany)
Phone +49 9721 91-0
Fax +49 9721 91-3435
E-Mail pumps_compressors@schaeffler.com
Internet www.fag.com

00/01/07 Printed in Germany by Druckhaus WEPPERT GmbH