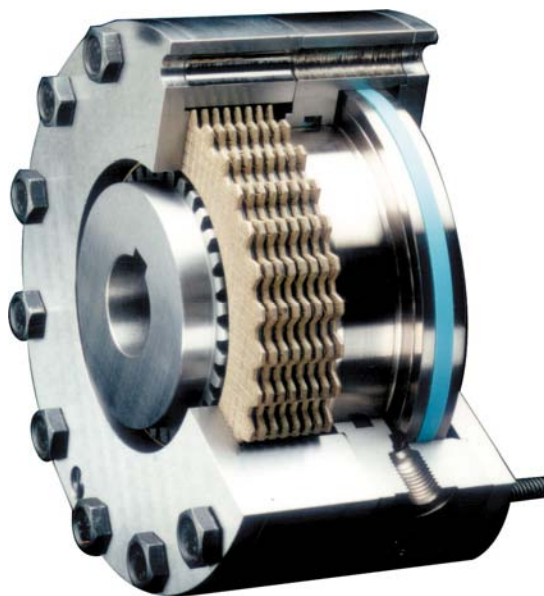


Operation manual

Pressure released and spring operated multiple disk brakes

according to
KWN 24001



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|------------------|--------------------------|------------|-------------------------------|
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Manufacturer's Declaration



Product:

Pressure released and spring operated multiple
disk brakes HEK according to KWN 24001

In accordance with the EU Machine Directive 98/37/EG, Appendix IIB

we

KWD
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Löbtauer Straße 45 - D – 01159 Dresden
P.O. Box 270144 – D – 01172 Dresden

hereby declare, that the

Pressure released and spring operated multiple
disk brakes HEK according to KWN 24001

described in this operation manual are intended for installation in a machine. Commissioning of the machine is prohibited until it is established whether the machine, in which these components are fitted complies with the EU directive (original issue 89/392/EWG, including all subsequent amendments).

All harmonized standards published by the EU Commission in the Official Gazette of the European Union – insofar as they apply to this product – have been taken into consideration.

Date/ Manufacturer's signature

08.02.2005 signed C. Spensberger

Safety and Information Symbols



Danger!

Danger of injury to personnel

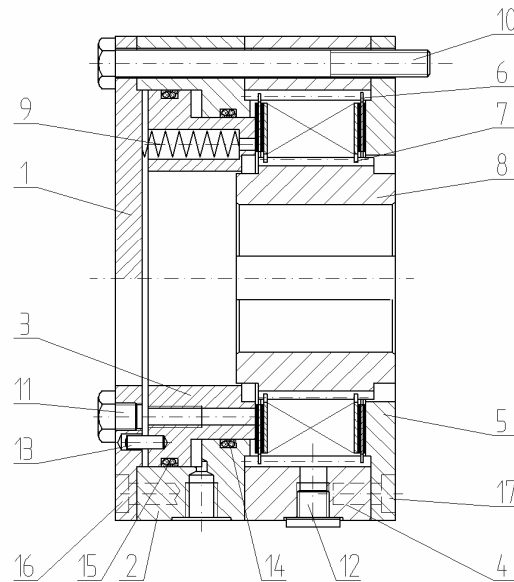


Attention!

Follow instructions

1. Design and function

- 1 cover plate
- 2 housing
- 3 piston
- 4 external body
- 5 mounting flange
- 6 outside discs
- 7 inside discs
- 8 internal body
- 9 pressure spring
- 10 fastening screw
- 11 plug screw
- 12 plug screw
- 13 dowel pin
- 14 rod seal
- 15 piston seal
- 16 assembly screw
- 17 assembly screw



The brakes are designed as holding brakes or service brakes for dry or wet operation. The brakes are intended for horizontal installation (tolerance $\pm 15^\circ$).

The brake torque is transmitted by friction discs and the torque transmission is non positive locking. The brake force is generated by spring pressure.

The braking torque is transmitted from the fastening screws through the external body to the internal body by means of a non-positive connection through a system of outside and inside discs with special friction lining (sintered bronze). The discs are soaked in oil in the factory.

The full braking torque is only reached in a pressureless state. The brake is released hydraulically (hydraulic connection on the housing).

By means of the on the piston effecting pressure the pressure springs will be pressed together and the disc released.

The brakes start to release at a pressure of 15 to 30 bar (218 to 435) and can be operated at up to 320 bar (4640 psi).

The piston space is protected against corrosion (Housing, piston). the housing and piston form the actuating unit. The piston and the housing are equipped with PTFE (polytetrafluoroethylene) seals (flexible pre-stressing with O-rings). If the hydraulic pressure fails, the brake can be released mechanically. this is accomplished by removing the plug screws from the cover plate and inserting proper size screws into the tapped holes of the piston and pulling the piston back.



When released, function-related idle-running torque occurs, which can amount to up to 2 % the rated torque.

The brakes are subject for function-related wear but the braking moment is guaranteed at the maximum permissible wear also. Re-adjustment is not necessary because of the automatic compensation by the piston. Completely worn discs may only be changed as a pack.



In the unusual case of leakage the complete actuating unit has to be replaced.

The exact technical characteristic values can be found in the corresponding drawings.



Advice's for special design:

- The brake can be adjusted due to the variation of the number of pressure springs which are placed in spring chamber of the piston.
- On requirement the brake can be produced only for dry operation (disc are not soaked in oil). The brake torque increases to 1,4 times of the catalogue value. Please take into account that in case of any contact with oil or another lubricant the brake torque will be decreased!
- In case of using of biological oils or HFD pressure fluids as well as at higher operation temperatures (> 100° C) seals made of FPM can be used.

The fastening screws are designed for the transmission of the maximum brake torque. In case of higher torque's, for example in between of two devices, additional supports are necessary (pins).

2. Installation and operation

2.1. Installation

Die Bremse wird als komplette Baugruppe geliefert.

- (1) The brake is pushed as a complete module onto the shafts, centred, aligned and screwed with the fastening screws to the connection parts accordingly. The installation between 2 connection parts is the same. All component parts must be axially fixed and fastened. A precise centring of the brake is to be guaranteed. If 2 shaft ends are accommodated inside the internal body, the bearings of the drive must be brought as close as possible to the brake. It is recommended to install the leakage oil connection in vertically downwards.



To make it easier to fit the spring-operated multiple-disc brake and enable the internal body to be turned, it is recommendable to connect to the hydraulics before installing the brake. This will make it possible to apply the necessary air pressure to the brake to release it so that the internal body can be turned freely. The same can be done by releasing mechanically.

- (2) Connect to the hydraulic connection
Connect the hydraulic connection and let out any air out of the system. A test for correct functioning must also be carried out by repeatedly actuating and releasing the brake. The oil pipes should be as short as possible and without sharp bends or restrictions of diameter. The backflow system is to be laid out in such a way that no backpressure greater than 3 – 4 bar results. Also in the case of dry running, the connection of an overflow oil pipe is recommendable for safety reasons: ISO VG 22 to 68 are recommended as hydraulic oils to release the brake. The maximum oil temperature may not exceed 100° C.
- (3) Lubrication/cooling
The discs are soaked in oil in the factory. Splash lubrication is not necessary. The characteristic values for dry operation apply.
If the coupling is to be put into an oil bath (splash lubrication), the right lubricant must be poured in. The friction diameter (1/10 of the disc outer diameter) is the maximum immersion depth for the discs. The characteristic values for wet operation apply. If the brake is fitted with oil cooling circulation the connection for the cooling oil has to be

assembled. The pressure of the cooling oil is limited to 1 bar. The characteristic values for wet running apply.

ISO VG 22 to 68 recommended as hydraulic oils to the lubricants.

Following Requirements are to be observed regarding the lubricants:

- high heat resistance and ageing stability
- low tendency to settle
- neutral behaviour with copper (max. degree of corrosion 2 per DIN 51759)
- low alloying ingredients

2.2. Operation

A minimum pressure (releasing pressure) must be applied to the brake until fully released. The if the releasing pressure is too low, the brake will be subject to increased heating (constant braking torque). The maximal braking torque can only realise without pressure.

3. Maintenance

The brake is for the most part maintenance-free. Maintenance is restricted to visual checks for external damage (e.G. points of impact) and to checking the braking torque. If the braking effect deteriorates, the brake must be disassembled and the worn components replaced.

1. Check for oil leakage after about 5.000 actuations (in dry operation).
When released, slight oil leakage at the sealing elements in inevitable. It is necessary to check regularly for oil leakage in order to be able to recognise in good time any damage there max be and function-related signs of wear on the seals. The carry out this check, loosen the oil-leakage screw and drain the oil.
2. Check for wear on disc when is a drop in braking torque
The brake discs are subject to function-related wear. Wear on the brake discs is increased if used as a service brake. The check for wear can only be done on the complete disc pack. For This purpose the multiple-disc pack must be taken out and the overall thickness measured. The minimum dimension of the thickness depends on the brake size and is available on request from the producer.



As a guideline, checks should be carried out at the following intervals:
used as a service brake: approx: 2.000 operating hours
used as a holding brake: approx: 5.000 operating hours
or when there is a noticeable drop in braking effect.

3. Checking the springs when there is a drop in braking torque
The springs used are designed to be long-lasting. Spring fatigue can only occur after 1 million braking operations. Disassemble the spring and check the length of the unstressed spring. The springs are worn and must be replaced if they are less than 90 % of the original length. The length depends on the brake size. Please ask the manufacturer for the lengths.

3.1. Disassembly



The work should only be done in an appropriately qualified workshop!

The brake must be disassembled in order to replace worn parts with spare parts. Separate the spring-operated brake from the hydraulic system and release it from the connection parts. Loosen the assembly screws.



The cover plate is spring loaded!
Continue disassembly according to which components need changing.

3.2. Assembly

Before assembly all components must be checked visually, cleaned, and damaged components replaced. Assembly is done in reverse order to disassembly.



If the sealing elements are worn, we recommend that the entire actuating unit be replaced. Note disc layering! Start with an outside disc and alternatively layer outside disc and inside disc. Always finish with an outside disc!

4. List of spare parts

The spare parts are described by the art.-no. and its item number and are available from the manufacturer.

5. Storage and transport

The brake must be stored in a sealed state in a closed room and protected against atmospheric influences and exposure to, e.g., dirt, dust, moisture, chemical media, excessive heat and mechanical damage. The relative air humidity should not exceed 70 %. The brake is provided with temporary corrosion protection for 6 months.

Due to the high hydraulic pressure the sealing surfaces in particular are produced with high precision and accuracy so that jerks, knocks and contact damage in transport. Cannot impair functioning.