

Installation and Operating Instruction for Complete Freewheels BA ... R and BA ... X

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Important

Please read these instructions carefully before installing and operating the product. Your particular attention is drawn to the notes on safety.

These installation and operating instructions are valid on condition that the product meets the selection criteria for its proper use. Selection and design of the product is not the subject of these installation and operating instructions.

Disregarding or misinterpreting these installation and operating instructions invalidates any product liability or warranty; the same applies if the product is taken apart or changed.

These installation and operating instructions should be kept in a safe place and should accompany the product if it is passed on to others – either on its own or as part of a machine – to make it accessible to the user.

Safety Notice

- Installation and operation of this product should only be carried out by skilled personnel.
- Repairs may only be carried out by the manufacturer or accredited agents.
- If a malfunction is indicated, the product or the machine into which it is installed, should be stopped immediately and either we or an accredited agent should be informed.
- Switch off the power supply before commencing work on electrical components.
- Rotating machine elements must be protected by the purchaser to prevent accidental contact.
- Supplies abroad are subject to the safety laws prevailing in those countries.

1. General introduction

Complete Freewheels BA ... R and BA ... X are machine elements with particular characteristics:

- In one direction of rotation there is no contact between the inner and outer ring; the freewheel is in freewheeling operation.
- In the other direction of rotation there is contact between the inner and outer ring; in this direction it is possible to transmit high torque.

Complete Freewheels BA ... R and BA ... X are used as:

- Backstops



Caution!

As Freewheels can be used as safety components, it is important to observe these installation and operating instructions carefully.

2. Applications of Freewheels

Application as Backstop

Freewheels are used as backstops if reverse rotation of the operating direction is to be prevented. In many machines and installations, for technical safety or functional reasons, it is necessary to ensure that you are working in just one specified direction of rotation. This is why there are legal stipulations requiring a mechanical safety device for the operation of, e.g. conveyor systems.

The normal operating mode of a backstop is freewheeling operation; the locking (torque transmission) is performed at zero speed. The immediate engagement of the clamping elements ensures the required high operating safety.

3. Design

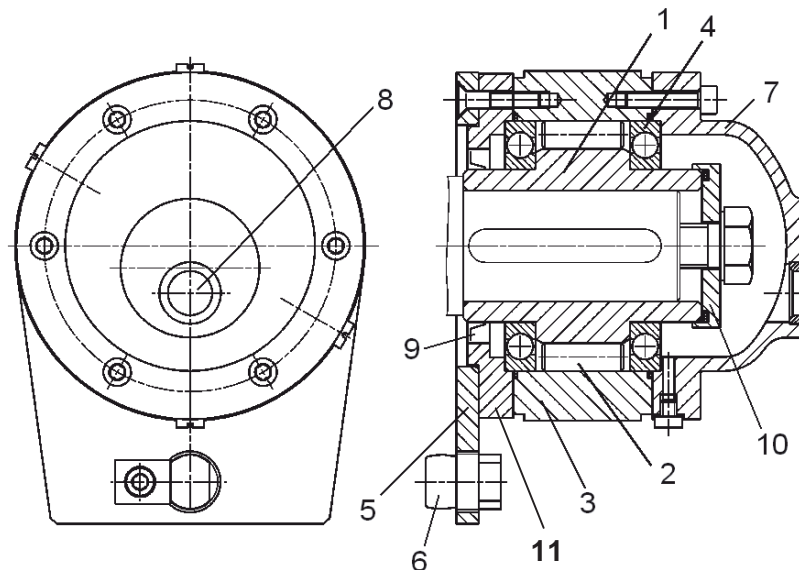


Fig. [1]

The Complete Freewheels BA ... R and BA ... DX / SX are designed as shown in Fig. [1]. The essential functional components are the inner ring (1), the clamping rollers or the sprags (2), the outer ring (3), the bearings (4), the lever arm (5) with the holding pin (6), the cover (11), the end cover (7) with oil level indicator (8), the seal (9) and the lubricant.

Optional is the retaining washer (10) with seals included.

4. Types

Complete Freewheels BA are available in 2 different types:

4.1 Standard type

This type is designed for universal use.

It is identified by the suffix "R" at the end of the product designation.

Example: BA 55 R

4.2 Type with sprag lift-off X

This type is designed for extended service life using sprag lift-off at high speed rotating inner ring.

It is identified by the suffix "X" at the end of the product designation.

Example: BA 55 .X



Please note!

Further information especially on design, function and selection, permissible torques or permissible speeds of these freewheels is provided in Catalog 84 "Freewheels". Please contact us if you need assistance.

5. General instructions



Caution!

The maximum permissible freewheel torque must not be exceeded due to torque peaks in specific applications.

The maximum freewheel torque should be calculated according to catalogue 84. Please contact us if you need assistance.

Freewheel damage resulting by excessive torque peaks impair component function and can result in excessive overheating of the freewheel!



Caution!

If the system is exposed to axial and/or radial loads, the roller bearings in the freewheel should be checked with reference to the rules for calculation provided by the bearing manufacturer. It is essential to ensure that bearings will not be damaged.

Bearing damage can result in overheating and the impairment of freewheel function!



Caution!

Torsion vibrations (amplitudes and frequencies which result in engagement and release of the freewheel in rapid succession) must be avoided.

Torsion vibrations can result in overheating and the impairment of freewheel function!



Caution!

Seals must be correctly installed during the entire service life of the freewheel. In case of occurring leakages are the seals to renew in time.

Seal damage can result in overheating and the impairment of freewheel function!

**Caution!**

Operation of freewheels with centrifugal sprag lift-off below the lift-off speed results in sprag wear. Occasional start and stop operations during operation below lift-off speed for periods of less than 20 second are permitted.

Excessive sprag wear can result in overheating and the impairment of freewheel function!

6. Condition at delivery**Caution!**

The freewheels are supplied without oil filling

The freewheels are delivered packed in anti-corrosion paper.

7. Technical requirements for safe operation

The bore in the inner ring normally has a tolerance of ISO H7. The tolerance of the shaft must be in this case ISO h6 or j6.

The key must have back play and may have only minimal width oversize, as otherwise the inner ring may be deformed.

8. Installation

The direction of machine or system rotation must be determined prior to freewheel installation. On the freewheel is a directional arrow indicating the freewheeling direction of the inner ring. Mark this direction with an arrow on the shaft to which the inner ring of the freewheel is to be mounted.

Ensure that the freewheeling direction of the freewheel matches the direction marked on the shaft.

**Caution!**

The drive must not be started in the direction opposite the freewheeling direction of the freewheel, as otherwise the freewheel may be destroyed!

The freewheeling direction can be reversed by exchanging the lever arm (5) with cover (11) and the end cover (7).

Before beginning of the installation the end cover (7) must to be dismantled.

Apply only uniformly distributed pressure (without heating) to the front face of the inner ring when mounting the freewheel to the shaft.

**Caution!**

The freewheel may not be driven onto the shaft by applying hammer blows, as the built-in roller bearings may be damaged in the process!

The freewheel is affixed along the axial plane of the shaft with a retaining washer. A sealing must be planned, so that the oil cannot escape by the parallel key groove of the inner ring.

In the end the end cover (7) install again. O-ring sealing do not forget!

9. Inspection prior to commissioning**Caution!**

Prior to start-up of the freewheel operation, the freewheel is to be filled with oil.

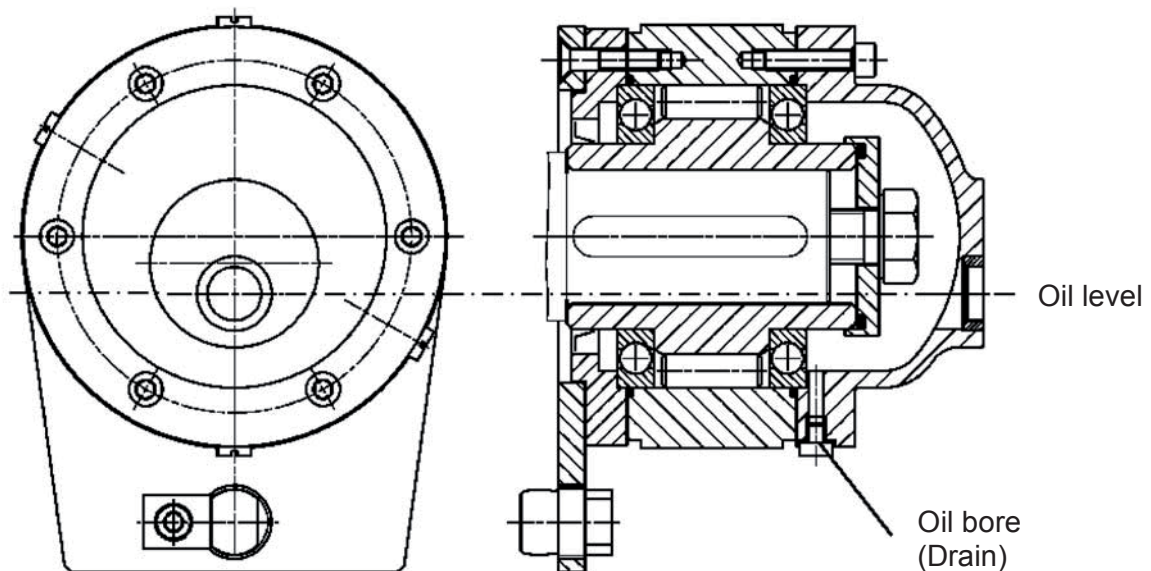


Fig. [2]

For this purpose an oil filler plug is present in the end cover.

- Unscrew the oil screw lying above and remove you the sealing.
- Pour oil into by this oil bore, until the oil level reached the center of the oil level indicator. See the oil selection table in Section 11 "Lubricants" for the appropriate grade of oil.
- Close the oil bore with the gaskets and screws.

Prior to initial operation, the safety screw on the holding pin must be loosened and the holding pin removed.

Turn the freewheel-outer ring against to the freewheel-inner ring by hand in the freewheeling direction (freewheeling operation). If the freewheel turns roughly, apply a light hammer blow to the outer ring while turning the freewheel by hand in the freewheeling direction.

Replace the holding pin and fix in place by tightening the safety screw.

The holding pin must have 0.5 to 2 mm play in the axial and radial directions.

**Caution!**

A certain degree of friction is caused by the seals. This is reduced after a short operating time.

**Caution!**

Do not release the lever arm for the backstop until the machine or system is load-free.
Release of the backstop under load conditions results in uncontrolled reverse movement of the machine or system.

10. Maintenance**Caution!**

The first oil change must be performed after 20 hours of operation!

During the first oil change, all particles accumulated during the "running in" procedure should be removed from the freewheel. That is why this oil change is required to ensure the service life of the freewheel.

Subsequent oil changes must be performed after every 2,000 operating hours, at a minimum

**Information!**

For a longer interval of oil change, we recommend using the synthetic lubricant MOBIL SHC 626.

If this lubricant is used, it must be changed after every 4,000 operating hours.

When the speed difference between the inner and outer ring will be less than 100 min^{-1} longer oil change intervals are allowed after consultation.

Oil change procedure:

- Remove the screws and gaskets from all oil bores.
- Collect and dispose of the old oil in accordance with applicable regulations.
- Clean the freewheel with cleaning oil and dispose of the cleaning oil in accordance with applicable regulations.
- Close the lower oil bore with a gasket and screw.
- Pour oil into the upper oil bore until the oil level reached the center of the oil level indicator. See the oil selection table in Section 11 "Lubricants" for the appropriate grade of oil.
- Close the oil bore with the gasket and screw.

**Caution!**

If seal problems occur (leakage) during operation, the machine or system must be shut down immediately. Determine the cause of the leak and replace the freewheel if necessary!

11. Lubricants

The freewheels are delivered not oil-filled. Please follow the instructions in Section 9 before commissioning. We recommend the following grades of oil for lubrication or oil changes:

Oil table			
Ambient temperature	For ambient temperatures from 0° to 50° C	For ambient temperatures from - 15° to + 15° C	For ambient temperatures from - 40° to 0° C
Kinematic viscosity at 40° C, ISO-VG	46/68 [mm²/s]	32 [mm²/s]	10 [mm²/s]
AGIP	OSO 46/68	OSO 32	OSO 10
ARAL	VITAM GF 46/68	VITAM GF 32	VITAM GF 10
BP	ENERGOL HLP 46/68	ENERGOL HLP 32	AERO HYDRAULIC 1
CASTROL	VARIO HDX	VARIO HDX	ALPHASYNTH 15
CHEVRON	EP HYDRAULIC OIL 46/68	EP HYDRAULIC OIL 32	HYJET IV
DEA	ASTRON HLP 46	ASTRON HLP 32	ASTRON HLP 10
ELF	ELFOLNA 46	ELFOLNA 32	ELF AVIATION HYDRAULIC OIL 20
ESSO	NUTO H 46/68	NUTO H 32	UNIVIS J 13
KLÜBER	LAMORA HLP 46/68	LAMORA HLP 32	Klüberoil 4 UH1-15
MOBIL	D.T.E. 25/26	D.T.E. 24	AERO HF A
SHELL	TELLUS OIL 46/68	TELLUS OIL 32	TELLUS OIL 10
Other manufacturers	Gearbox- or hydraulic oils without solid lubricants ISO-VG 46/68	Gearbox- or hydraulic oils without solid lubricants ISO-VG 32; Automatic transmission fluids [ATF]	Gearbox- or hydraulic oils without solid lubricants ISO-VG 10; Note setting point! Aviation hydraulic oils ISO-VG 10

Please contact us if temperatures exceed + 50 °C or fall below – 40 °C.



Caution!

Oils that contain friction-reducing additives like molybdenum disulfide or the like, may only be used with our authorisation.