RINGSPANN®
Power Transmission

Installation and Operating Instruction for Internal Freewheels FN and FSN

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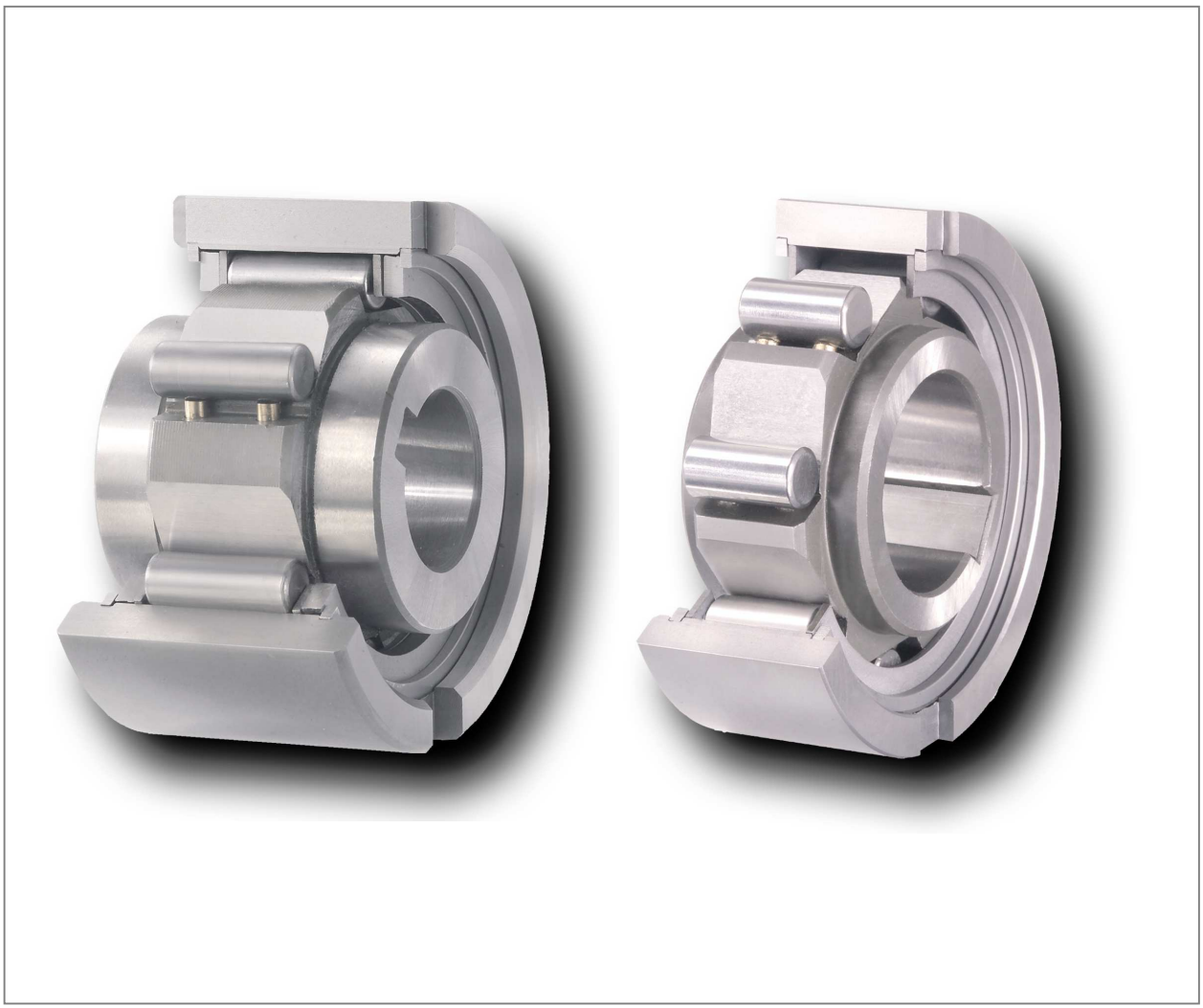

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Important

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 by RINGSPANN; 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 RINGSPANN agents.
- If a malfunction is indicated, the product or the machine into which it is installed, should be stopped immediately and either RINGSPANN or an accredited RINGSPANN 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

Internal Freewheels FN and. FSN 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.

Internal Freewheels FN and FSN are used as:

- Backstops
- Overrunning Clutches
- Indexing Freewheels

Caution!

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

2. Applications of Freewheels

2.1 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.

2.2 Application as Overrunning Clutch

The overrunning clutch engages machines or machine parts and automatically interrupts their contact as soon as the driven part of the overrunning clutch is turned faster than the driving part. In many cases, this can replace a more expensive externally actuated clutch.

With overrunning clutches the engagement take place in the driving operation (torque transmission), while in freewheeling operation the torque transmission between the inner and outer ring is interrupted. In driving operation the speeds of the inner and outer ring are equal, while in freewheeling operation they are different.

2.3 Application as Indexing Freewheel

The indexing freewheel transmits a back-and-forth motion into a stepped rotation (indexed feed). The RINGSPANN indexing freewheel works precisely and quietly and enables an infinitly adjustable setting of the feed.

3. Design

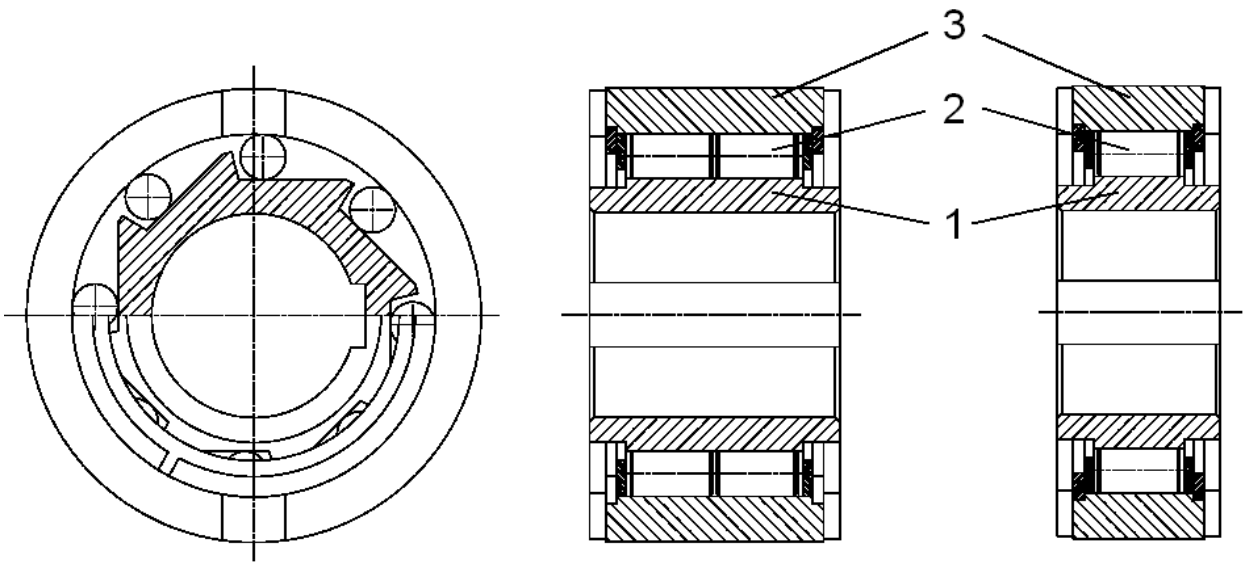

Fig. [1]

Internal Freewheels FN and. FSN are designed as shown in Fig. [1]. The essential functional components are the inner ring (1), the rollers (2), the outer ring (3) and the lubricant.

Internal Freewheels FN and FSN are roller freewheels without bearing support.

4. Types

Internal Freewheels FN and. FSN are available in type Standard.

Please note!

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

5. General instructions

Caution!

Reliable torque transmission between the freewheel is guaranteed only if the maximum permissible speed in driving operation of the freewheel is not exceeded.

Operation at speeds in excess of the speeds permitted for the different operating modes can result in damage and overheating of the freewheel!

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 RINGSPANN catalog 84. Please contact RINGSPANN if you need assistance.

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

Danger to life and limb!

When freewheels are used as backstops, it is essential to ensure that they can be released only when the machine or system is standing still and load-free.

Release of the freewheel under load conditions results in uncontrolled reverse movement of the system.

Caution!

Internal Freewheels FN and FSN are without bearing support. Concentric alignment of inner and outer ring must be provided by the customer.

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!

6. Condition at delivery

The freewheels are delivered ready for installation. They are 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.

The torque at the outer ring is transferred by a front side key joint.
Also here the key must have back play and may have only minimal width oversize, as otherwise the inner outer ring may be deformed.

The tolerance of the housing bore must be ISO H7 or G7.

8. Installation

Clean carefully the housing bore for the outer ring and the contact surface of the shaft for the inner ring.

The direction of machine or system rotation must be determined prior to freewheel installation.

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!

When a freewheel is used as a backstop, the drive must not be started in the direction opposite the freewheeling direction of the freewheel, as otherwise the freewheel may be destroyed!

The mounting of the freewheel on the shaft and/or into the housing bore must take place via a front side constant pressure on the inner and the outer ring.

Secure the axial position of the inner ring on the shaft.

Caution!

The transferable and/or specified torques are guaranteed only if the permissible concentricity eccentricity between shaft and sprag track of the outer ring is kept. Keeping of the permissible concentricity eccentricity must be ensured by the user with specified storage and centring of the freewheel parts.

Caution!

The inner and the outer ring not be axially spanning against each other.

Caution!

If the permissible concentricity eccentricity of the customer shaft to the housing bore in the customer part (see table 1) exceeds inadmissible deviation, are the machine causes inadmissible to be determined and to remove!

Table 1:

Freewheel Size	permissible concentricity eccentricity: customer shaft to the housing bore in the customer part [mm]
FN/FSN 8	0,02
FN/FSN 12	0,02
FN/FSN 15	0,02
FN/FSN 17	0,04
FN/FSN 20	0,04
FN/FSN 20	0,04
FN/FSN 25	0,04
FN/FSN 30	0,04
FN/FSN 40	0,06
FN/FSN 45	0,06
FN/FSN 50	0,06
FN/FSN 60	0,10
FN/FSN 70	0,10
FN/FSN 80	0,10

So that these values can be maintained, should be ordering directly next to the freewheel running ball bearing with normal clearance.

9. Inspection prior to commissioning

The lightly freewheeling operation of the freewheel must be examined before start-up.

An oil lubrication with the prescribed oil quality is to be planned in agreement with the oil selection table in Section 11 „Lubricants “for the suitable degree of the oil.

If a horizontal installation of the freewheel, we recommend an oil level up to the shaft center.

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.

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

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 ºC to 50 ºC C**	**For ambient temperatures from – 15 ºC to + 15 ºC**	**For ambient temperatures from – 40 ºC to 0 ºC**
Kinematic viscosity at 40 ºC, ISO-VG	**46/68 [mm^2/s]**	**32 [mm^2/s]**	**10 [mm^2/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 ^{o}C or fall below – 40 ^{o}C.

Caution!

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