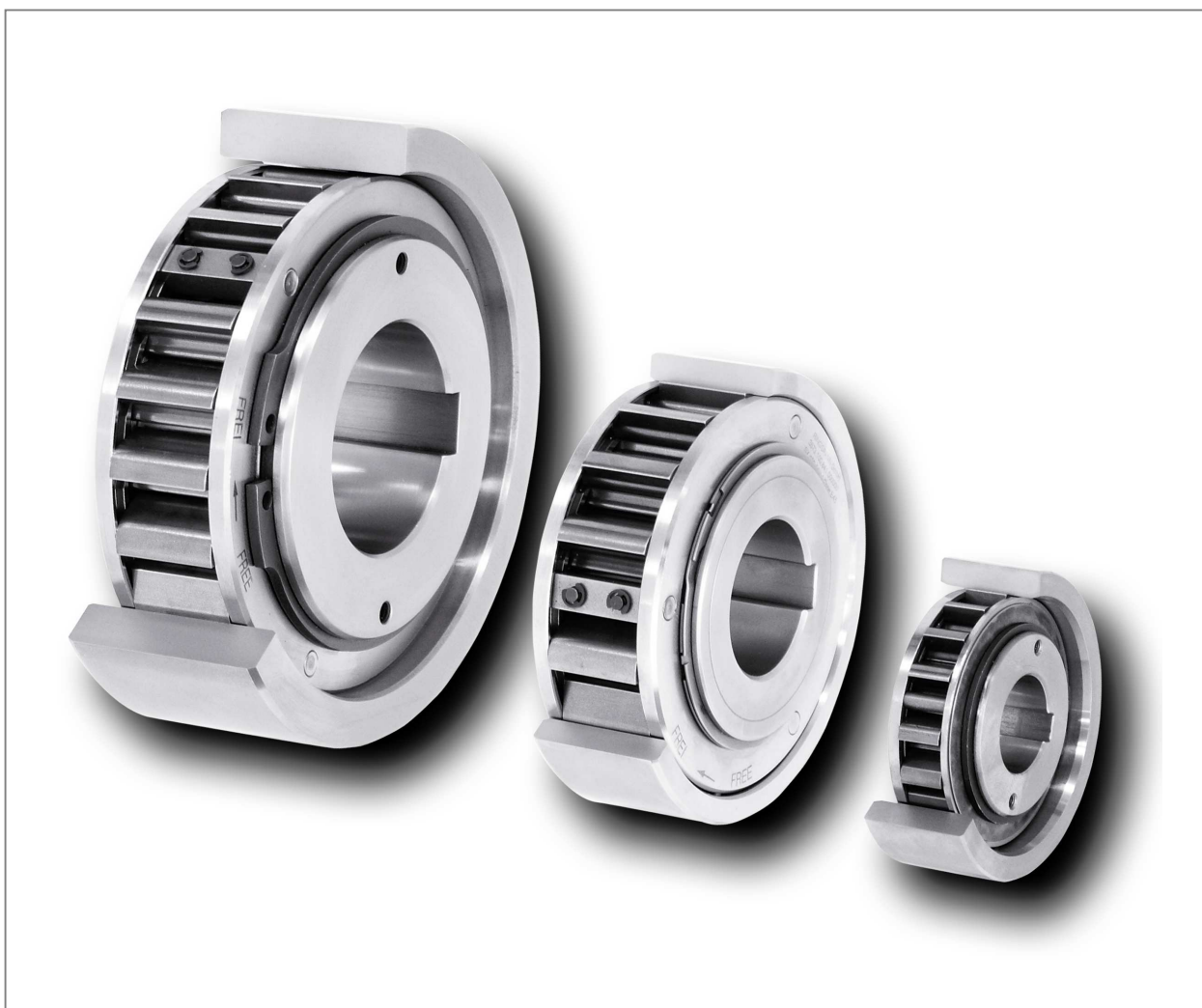


## Installation and Operating Instruction for Internal Freewheels FXN

E 08.728 e



Any questions? Please contact us.

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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.

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## 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.

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## 1. General introduction

Internal Freewheels FXN 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 FXN are used as:

- Backstops
- Overrunning Clutches



### 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.

### 3. Design

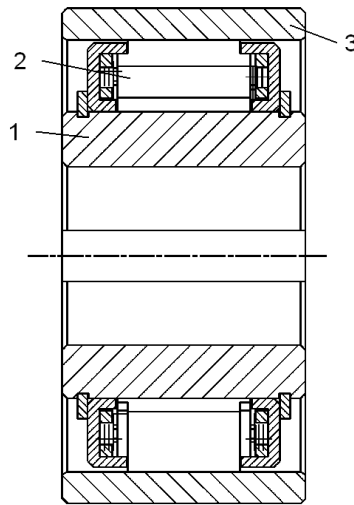


Fig. [1]

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

Internal Freewheels FXN are sprag freewheels without bearing support. Concentric alignment of inner and outer ring must be provided by the customer. The freewheels are particularly suitable for installation in enclosures with oil lubrication and sealing.

### 4. Types

Internal Freewheels FXN are available in type with sprag lift-off X:

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: FXN 101 .X



**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.

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## 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 FXN are without bearing support. Concentric alignment of inner and outer ring must be provided by the customer.

**The permissible run-out (T.I.R.) must be observed!**



### 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!**

Operation of freewheels with centrifugal sprag lift-off below the lift-off speed results in sprag wear.

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

**6. Condition at delivery**

The freewheels are delivered ready to install. 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.

In order to transmit the torques in the table of RINGSPANN Catalog 84 („Freewheels“), the outer ring must be pressed in a housing with the minimum outside diameter in this Catalog. The housing is made of steel or grey cast iron in the minimum quality GG-20.

As tolerance for the housing bore the data are obligatory in the RINGSPANN Catalog 84.

**Caution!**

The tolerance of the housing bore after RINGSPANN catalogue 84 must be absolutely kept.

**Risk of loss function!**

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## 8. Installation

Clean the mounting surface and the centering diameter for the outer ring on the housing or on the intermediate flange carefully and clean the shaft area for the inner ring.

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

Mark this direction with an arrow on the shaft on 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 outer ring is pressed in, with evenly pressure at the full front side area, into the housing.

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

The assembly of the freewheel inner ring with cage freewheel in the outer part is simplified by a slightly rotation of the inner ring in the freewheeling direction.

Secure the inner ring of the freewheel in axial direction on the shaft.

Make sure that the axial position of the outer ring with the cage freewheel will be after mounting in a position that in each case, between the lateral snap rings and the attachment part, a minimum distance of 2 mm is present.



### Caution!

The communicable or specified torque is only guaranteed if the permissible eccentricity between the shaft and outer ring track diameter are met.

Compliance with the allowable eccentricity must be guaranteed by the customer-defined support and centering the freewheeling parts

The most reliable check of existing run-out between shaft and outer ring can only be carried out when both, the outer ring and inner ring parts are mounted.

There are several methods for checking run-out, one of these is described here.

#### Control with dial gauge

- Fasten a dial gauge to the inner ring and locate the sensor of the dial gauge against the bore of the outer ring.
- Slowly turn the shaft 360° and determine the maximum run-out (T.I.R.) whilst ensuring (particularly in the case of taper or sleeve bearing applications) that the bearing play is included in the run-out.

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Compare this run-out value with the permissible value given in the documents of the machine.

Alternative the maximum radial run-out (T.I.R) can be determined by measuring the distance between the inner- (1) and outer ring (2). The measurement has to be done all 90 ° at the circumference with a internal measuring device e.g. " Intertest". The largest difference of the results of measurement lying in a line, is the run-out.



#### **Caution!**

If the maximum run-out is exceeded, the machine-related causes for the improper run-out error has to identify and rectify!

For application above the sprag lift-off speed no additional lubricant is necessary. If a lubricant is present e.g. in transmissions, it can be used.

A protection from contamination and humidity must be present.

Depending on the operational data an oil or a grease lubrication has to be planned. (see also Section 10 „Maintenance “).

## **9. Inspection prior to commissioning**

Before operating the freewheel you have to make sure, that the shaft can be easily and evenly turned in freewheeling direction.

## **10. Maintenance**

For starting and stopping operations with running times up to max. 20 s below the sprag lift-off speed, a moistening of the tracks has to be done before start-up with an oil according to our recommendation under Section 11 of this guidance or a soft grease of the NLGI class 000 to 2 with a max. basic oil viscosity of 42 mm<sup>2</sup>/s with 40°C on the basis of lithium soap and mineral oil (e.g. flow grease LBZ by Co. Mobil).

For applications with frequent starting and stopping operations the service life of the backstop without additional lubrication is limited by the frequent on and off procedures below the sprag lift-off speed. An oil or grease lubrication has to be planned for these applications in order to minimize the abrasion below the sprag lift-off speed. The free area around the backstop has to be filled with lubricant as specified in the instructions of the machine. If such documents are missing, the free area around the backstop has to be filled about 30% with a lubricant according to the RINGSPANN recommendation (see Section 11 "Lubricants").

For reason of preventive security an exchange of the sprag cages has to ensure depending upon operating conditions (e.g. every 3 - 5 years). It is to ensure that the sprag tracks of the inner and outer ring are in unobjectionable, operating-safe condition.

With frequent or constant operation below the sprag lift-off speed (see Catalogue P 84 or specific order documentation) either an oil bath or an oil supply from about 200 cm<sup>3</sup>/min between cage and outer track is necessary. The service life is limited nevertheless with these operation conditions. The sprag cage has to be exchanged according to the specified service life time. It is to ensure that the sprag tracks of the inner and outer ring are in unobjectionable, operating-safe condition.



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**Please note!**

If you need additional information, for example regarding need of life below the lift-off speed, please ask directly at the RINGSPANN GmbH.

## 11. Lubricants

We recommend the following grades of oil for lubrication or oil changes:

<b>Oil table</b>			
<b>Ambient temperature</b>	<b>For ambient temperatures from 0° to 50° C</b>	<b>For ambient temperatures from - 15° to + 15° C</b>	<b>For ambient temperatures from - 40° to 0° C</b>
<b>Kinematic viscosity at 40° C, ISO-VG</b>	<b>46/68 [mm<sup>2</sup>/s]</b>	<b>32 [mm<sup>2</sup>/s]</b>	<b>10 [mm<sup>2</sup>/s]</b>
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.