

# RINGSPANN® CORPORATION

Power Transmission

Installation and Operating Instruction for  
Complete Freewheels FRS, FRSG, and FRZ

E 08.733e



## RINGSPANN CORPORATION

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<b>RINGSPANN</b>	<b>Installation &amp; Operating Instruction for Complete Freewheels FRS, FRSG and FRZ</b>			<b>E 08.733e</b>	
Date: 10/28/2014	Revision: 07 – E101415	By: PGW	Checked By: DNW	Number of Pages: 7	Page: 2

## 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 installation and operating instructions invalidate any product liability or warranty by RINGSPANN CORPORATION; the same applies if the product is taken apart or changed.
- The 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 CORPORATION agents.
- If a malfunction occurs, the product, or the machine into which it is installed, should be stopped immediately and either RINGSPANN CORPORATION or an accredited RINGSPANN CORPORATION agent should be informed.
- Switch off the power supply before commencing work on electrical components.
- Rotating machine components must be protected by the purchaser.
- Supplies abroad are subject to the safety laws prevailing in those countries.

## Warranty

RINGSPANN CORPORATION “seller” agrees to repair or replace (at its sole option), defective materials or workmanship for a period of one year from the date of delivery. Seller must be notified of such a defect within a reasonable time after discovery (not to exceed thirty (30) days), and the defective product must be delivered, prepaid to the seller’s factory with evidence that, it has been properly installed, maintained and operated in accordance with the seller’s instructions. Seller’s limited warranty excludes remedy for damage or defect caused by abuse; failure to resist corrosion or erosion from any corrosive agent or fluid, due to deposits of foreign material from any fluid; modifications not executed by Seller; improper installation or operation; defects or failures arising out of, in any way related to, or as a result either direct or indirect, of the Buyer’s failure to properly advise Seller of all normal and special operating conditions, known to or suspected by Buyer, when Seller is manufacturing the Equipment for a specific operation; or normal wear and tear under usage. This remedy is exclusive and is given in lieu of any warranty of merchantability, fitness, for a particular purpose or any other warranty, whether express or implied. Seller shall not be liable for consequential damages (including but not limited to, loss of use, lost profits, business interruption and the like), incidental damages, indirect damages, whether the claim for such damage is based upon warranty, contract, tort, strict liability or any other theory of recovery.

## Freewheel Rebuilding Service

RINGSPANN CORPORATION freewheels are precision devices manufactured under careful controls to meet manufacturing standards. When reconditioning is required, freewheels should be returned to RINGSPANN CORPORATION for service.




### CAUTION!

Disassembly and repair of RINGSPANN CORPORATION freewheels in the field is not recommended and will void any warranty.

## Introduction

FRS, FRZ and FRSG models are general purpose ball bearing freewheels suitable for overrunning, backstopping and light duty indexing applications.

- RINGSPANN CORPORATION FR Series freewheels mount on a through-shaft with the inner race driven by a key.
- The outer ring outside diameter is designed as a mounting surface or pilot for attaching the driven member.
- The outer ring outside diameter is machined on each end to provide proper alignment and concentric installation.

	<p><b>WARNING!</b> Failure to follow these instructions may result in product damage, equipment damage, and serious or fatal injury to personnel.</p>
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## Pre-installation Check

### 1. Shaft to Bore Fit:

**Note:** The inner ring bore generally has  $+.0000/+.0015$  tolerance.

Freewheel Bore	Shaft Fit Guide
0 to 2 inches dia.	Line fit to .002 inches loose
2 to 4 inches dia.	Line fit to .0025 inches loose
4 to 7 inches dia.	Line fit to .003 inches loose

**Note:** Machine builders may use non-standard shaft fits to mount RINGSPANN CORPORATION freewheels. In this event, direct any questions concerning shaft fit to the machine builder or RINGSPANN CORPORATION.

### 2. Key and Keyseat

#### 2.1.1 Material

- Use materials AISI 1018, 1141, 1045 or 4130 for key material.

#### 2.1.2 Overrunning & Backstopping

- **Fit:** Break edges of the key before installing, to prevent any bearing at these points. Install with a push fit. Be sure the key seats squarely. Do not use force fit.
- **Length:** The key must be equal to the length of the inner ring for proper engagement.


#### 2.1.3 Indexing


- **Fit:** Fit the key up to .001 inch interference on Width dimension to prevent loosening in indexing service. Do not exceed .001 inch tight.

### 3. Rotation

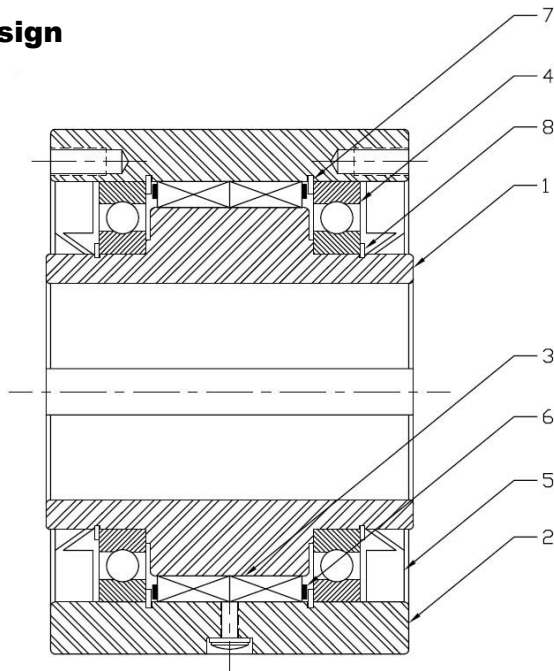
- The clutch is symmetrical. In determining the proper direction of free rotation, orientate the clutch to match the directional arrows marked free on either face of the inner race.

## Rotating Equipment

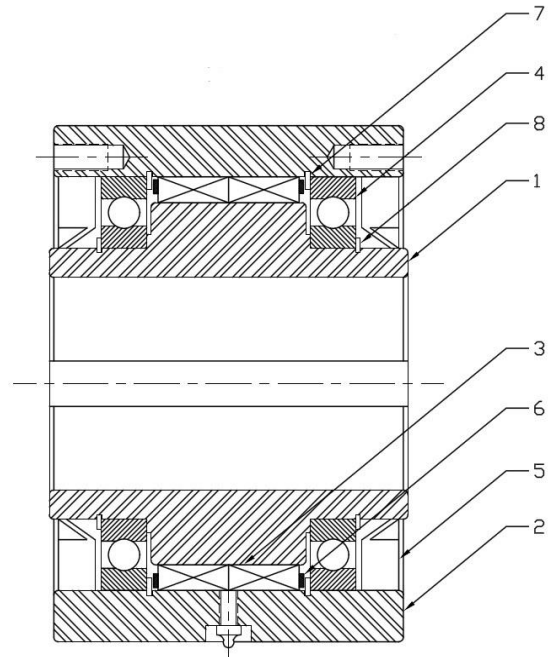
	<p><b>WARNING!</b> Rotating equipment is potentially dangerous and should be properly guarded. The user should comply with all applicable safety codes to guard rotating equipment.</p>
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	<p><b>WARNING!</b> Freewheels out of service or in storage for 2 or more years, require new seals before being put into operational service.</p>
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**4. Design**



**Complete Freewheel FRS, FRZ**



**Complete Freewheel FRSG**

Complete Freewheels FRS, FRZ, & FRSG are designed with the essential functional components. Inner Ring (1), Outer Ring (2), Sprags (3), Bearings (4), Seals (5), Spacers (6), Retaining Clips (7), and Lubricant.

**5. Complete FR Series Freewheel Types**

**5.1 Standard Type - FRS**

- This type is designed for universal use where oil lubrication is preferred.
- It is identified by the suffix "S" at the end of the product designation.
- Example: FRS-500-1.250" Bore – 1/4" x 1/8" Keyway

**5.2 Grease Type - FRSG**

- This type is designed for universal use where grease lubrication is preferred.
- It is identified by the suffix "SG" at the end of the product designation.
- Example: FRSG-500-1.250" Bore – 1/4" x 1/8" Keyway

**5.3 Type with Sprag Lift-Off Z - FRZ**

- This type is designed for extended service life using sprag lift-off at high speed rotating outer ring.
- It is identified by the suffix "Z" at the end of the product designation.
- Example: FRZ-500-1.250" Bore – 1/4" x 1/8" Keyway

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## Installation



### ATTENTION!

Before securing into place, check for proper rotation. As the clutch is symmetrical, in determining the proper direction of free rotation, orientate the clutch to match the directional arrows marked on either face of the inner race and then verify by spinning the freewheel by hand.

1. Mount the freewheel and key onto the shaft. Applying pressure only to the freewheel inner ring face.
 

**Note:** Oil lubricated freewheels may only be used on applications with mounting orientations within 5 degrees of horizontal. Grease lubricated freewheels may be used on applications with non-horizontal orientations.
2. Application of pressure to the outer ring could damage the bearings. For ease of mounting, it is permissible for oil lubricated freewheels to be immersed in hot, clean oil (not exceeding 200°F/93°C) for ten to fifteen minutes prior to mounting.
3. Secure the axial position of the freewheel inner ring onto the shaft. Approved methods of axial retention include the use of shaft collars, keeper plates, retention rings, or retention keys.
4. Mount attaching parts to the freewheel outer ring as required by the application.
  - When a torque arm is to be mounted to the freewheel, allow a 1/4 to 1/2 inch clearance around the torque arm. The torque arm must be in contact with the support bracket in the direction of loading in order to prevent shock loads.
  - Tapped mounting holes are provided in both ends of the outer ring. Centering of the gear, pulley, or sheave over the outer ring is recommended to avoid excessive over-hung loads.
  - Check with RINGSPANN CORPORATION if the freewheel must support large side loads during overrunning cycle of operation as damage may occur.
5. All RINGSPANN CORPORATION freewheels are lubricated before leaving the factory. However, check the following Lubricant table for the proper lubricant and fill level for each application type and ambient operating temperature range. Change the lubricant or add oil to proper level, if required.

## Lubrication

Proper lubrication and lubricant maintenance are the most important single maintenance factor for long, effective, trouble-free operation of freewheels. Read the following instructions and follow them, carefully, for maximum performance and utilization of RINGSPANN CORPORATION freewheels.



### WARNING!

Lubricants of the EP type (extreme pressure characteristics) should be approved by RINGSPANN CORPORATION. Those containing solid additives such as graphite or molybdenum disulphide should not be used.



### WARNING!

Do not mix oils. When switching from one brand or type to another, drain oil and flush freewheel with mineral spirits. Do not use any solvent containing Carbon Tetrachloride.



### WARNING!

The use of lubricants in freewheel assemblies, other than shown, can compromise proper function that may cause personal injury or property damage and will automatically void any warranty.



### WARNING!

RINGSPANN CORPORATION is not responsible for any lubrication changes made by others after the freewheel leaves the RINGSPANN CORPORATION factory.

## FRS & FRZ Oil Lubrication & Maintenance

**Note:** Always verify oil level in freewheel after installation and before start up.

Use oils selected from the following table according to the application and ambient temperature at the freewheel.

<b>Ambient Temperature Range</b>	<b>Recommended Oil Lubricant</b>
0°F to 150°F	MOBIL DEXRON-VI ATF or Equivalent DEXRON-VI
-20°F to 60°F	MOBIL DTE-15M or Equivalent
-50°F to 32°F	MOBIL Aero HF or Equivalent



### ATTENTION!

For applications where the ambient temperature exceeds +150°F (+65°C) consult RINGSPANN CORPORATION.

## Oil Lubrication – Filling Procedure

**Note:** FRS & FRZ freewheels are shipped with RINGSPANN CORPORATION approved lubricant.

Inspect the oil level once a month or every 160 hours of operation, whichever occurs first. Indexing applications that operate in excess of 150 strokes per minute and severe duty applications may require more frequent oil level inspection.

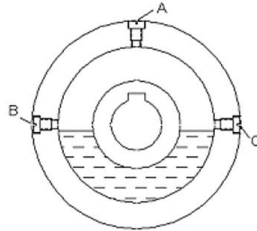


Figure A - (1/2 Full)

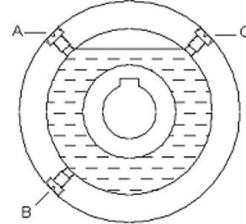


Figure B - (7/8 Full)

## Overrunning and Backstopping Applications – Figure A

- Rotate freewheel outer ring as shown in Figure A.
- Remove (A) & (B) or (A) & (C) plugs, add oil through (A) until oil flows from (B) or (C).
- Reinstall (A) & (B) or (A) & (C) plugs with sealing washers and tighten to prevent leakage.

## Indexing Applications – Figure B

- Rotate freewheel outer ring as shown in Figure B.
- Remove (A) & (C) plugs and add oil through (A) until oil flows from (C).
- Reinstall (A) & (C) plugs with sealing washers and tighten to prevent leakage.

**Note:** Contact RINGSPANN CORPORATION for indexing applications in excess of 150 strokes per minute.



### ATTENTION!

Applications where the ambient temperature falls below +20°F/-7°C or above +120°F/ + 55°C, consult RINGSPANN CORPORATION for special lubricant recommendations.



### WARNING!

Do not attempt to convert oil lubricated freewheels to grease lubrication or grease lubrication to oil lubrication. Any such conversion may result in malfunction and will void any warranty.

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## Maintenance Flushing Procedure



### WARNING!

Freewheels out of service or in storage for 2 or more years, require new seals before being put into operational service.

1. To assure continued operation efficiency.
  - a. Freewheels should be flushed every 6 months with mineral spirits.
2. If the freewheel has been out of service or in storage for 6 months or longer.
  - a. Flush with mineral spirits as instructed and lubricate with recommended oils only before putting the freewheel into operational service.
3. Environments that are dirty, abrasive, or in applications with severe operating conditions (24 hours per day).
  - a. RINGSPANN CORPORATION recommends that the oil be changed every month.

### Flushing Procedure

- Rotate freewheel outer ring to locate plug (B) in the 6 o'clock position.
- Remove plug (B) and drain oil from freewheel. Remove plug (C) for better drainage.
- Reinstall plug (B) and completely fill freewheel with mineral spirits. Reinstall plug (C).
- Rotate freewheel slowly for several minutes to break up and dissolve any oily residue.
- Remove plug (B) from 6 o'clock position and drain mineral spirits. Remove plug (C) for better drainage.
- Reinstall and tighten plug (B).
- Relubricate the freewheel according to Oil Lubrication Filling Procedure.
- Reinstall and tighten open plugs to prevent leakage.



### WARNING!

Do not use any solvent containing Carbon Tetrachloride as seal damage may occur.

## FRSG - Grease Lubrication & Maintenance

**Note:** FRSG freewheels are shipped from RINGSPANN CORPORATION packed with Mobilgrease XHP 221, unless otherwise specified.

### Use Greases from the Following Table Only

MOBIL	Mobilgrease XHP 221 or Equivalent
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**Note:** Use no other greases unless a specific recommendation has been verified by RINGSPANN CORPORATION.

1. To assure continued operation efficiency.
  - a. RINGSPANN CORPORATION recommends adding grease to the freewheel once per month under normal operating conditions.
2. Environments that are dirty, abrasive, or in applications with severe operation conditions (24 hours per day).
  - a. RINGSPANN CORPORATION recommends that grease be added every 2 weeks.

### Grease Lubrication & Flushing Procedure

1. Wipe all grease fittings clean
2. Pump new grease into all fittings until clean grease flows out around the seals on both sides of the freewheel.
3. Lubrication should be done with the freewheel at normal operating temperature.

**Note:** FRSG Freewheels are designed to purge excess grease during operation. Purge will stop as soon as internal temperatures and pressures stabilize.

# **RINGSPANN® CORPORATION**

**Power Transmission**

**Installation and Operating Instruction for  
Complete Freewheel Clutches  
FRX 400 thru 900  
FRXG 700 thru 900**

**E 08.734e**



## **RINGSPANN CORPORATION**

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## Important

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- The 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 CORPORATION agents.
- If a malfunction occurs, the product, or the machine into which it is installed, should be stopped immediately and either RINGSPANN CORPORATION or an accredited RINGSPANN CORPORATION agent should be informed.
- Switch off the power supply before commencing work on electrical components.
- Rotating machine components must be protected by the purchaser.
- Supplies abroad are subject to the safety laws prevailing in those countries.

## Warranty

RINGSPANN CORPORATION “seller” agrees to repair or replace (at its sole option), defective materials or workmanship for a period of one year from the date of delivery. Seller must be notified of such a defect within a reasonable time after discovery (not to exceed thirty (30) days), and the defective product must be delivered, prepaid to the seller’s factory with evidence that, it has been properly installed, maintained and operated in accordance with the seller’s instructions. Seller’s limited warranty excludes remedy for damage or defect caused by abuse; failure to resist corrosion or erosion from any corrosive agent or fluid, due to deposits of foreign material from any fluid; modifications not executed by Seller; improper installation or operation; defects or failures arising out of, in any way related to, or as a result either direct or indirect, of the Buyer’s failure to properly advise Seller of all normal and special operating conditions, known to or suspected by Buyer, when Seller is manufacturing the Equipment for a specific operation; or normal wear and tear under usage. This remedy is exclusive and is given in lieu of any warranty of merchantability, fitness, for a particular purpose or any other warranty, whether express or implied. Seller shall not be liable for consequential damages (including but not limited to, loss of use, lost profits, business interruption and the like), incidental damages, indirect damages, whether the claim for such damage is based upon warranty, contract, tort, strict liability or any other theory of recovery.

## Freewheel Rebuilding Service

RINGSPANN CORPORATION freewheels are precision devices manufactured under careful controls to meet manufacturing standards. When reconditioning is required, freewheels should be returned to RINGSPANN CORPORATION for service.



### CAUTION!

Disassembly and repair of RINGSPANN CORPORATION freewheels in the field is not recommended and will void any warranty.

<b>RINGSPANN</b>	<b>Installation &amp; Operating Instruction for Complete Freewheels Clutches FRX 400 thru 900 &amp; FRXG 700 thru 900</b>			<b>E 08.734e</b>	
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## Introduction

FRX and FRXG models are maintenance-free or low-maintenance (FRXG) ball bearing freewheels suitable for backstopping and overrunning applications with high overrunning speeds and low driving speeds.

RINGSPANN CORPORATION FR Series freewheels mount on a through-shaft with the inner race driven by a key. The outer ring outside diameter is designed as a mounting surface or pilot for attaching the driven member. The outer ring outside diameter is machined on each end to provide proper alignment and concentric installation.



### WARNING!

Failure to follow these instructions may result in product damage, equipment damage, and serious or fatal injury to personnel.

## Pre-installation Check

### Shaft to Bore fit:

**Note:** The inner race bore generally has  $+.0000/+.0015$  tolerance.

### Freewheel Bore

### Shaft Fit Guide

0 to 2 inches dia.	Line fit to .002 inches loose
2 to 4 inches dia.	Line fit to .0025 inches loose
4 to 7 inches dia.	Line fit to .003 inches loose

**Note:** Machine builders may use non-standard shaft fits to mount RINGSPANN CORPORATION freewheels. In this event, direct any questions concerning shaft fit to the machine builder or RINGSPANN CORPORATION.

## Key & Key-Seat

**Material:** Use materials AISI 1018, 1141, 1045 or 4130 for key materials.

**Fit:** Break edges of the key before installing, to prevent any bearing at these points. Install with a push fit. Be sure the key seats squarely. Do not use force fit.

**Length:** The key must be equal to the length of the inner race for proper engagement.

## Rotation

The clutch is symmetrical. In determining the proper direction of free rotation, orientate the clutch to match the directional arrows marked free on either face of the inner race.

## Rotating Equipment



### WARNING!

Rotating equipment is potentially dangerous and should be properly guarded. The user should comply with all applicable safety codes to guard rotating equipment.

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## Installation



### ATTENTION!

Before securing into place, check for proper rotation. As the clutch is symmetrical, in determining the proper direction of free rotation, orientate the clutch to match the directional arrows marked on either face of the inner race and then verify by spinning the freewheel by hand.

1. Mount the freewheel and key onto the shaft. Apply pressure only to face of freewheel inner race. Pressure applied to the outer race could result in bearing damage  
**Note:** FRX and FRXG freewheels may be mounted with any orientation from horizontal to vertical.
2. Secure the axial position of the freewheel inner race onto the shaft. Approved methods of axial retention include the use of shaft collars, keeper plates, retention rings, or retention keys.
3. Mount attaching parts to the freewheel outer race as required by the application.
4. If a torque arm is to be mounted to the freewheel, allow 1/4 to 1/2 inch clearance between stops and torque arm.
5. Tapped mounting holes are provided in each end of the outer race. Center the gear, pulley or sheave on the outer race. Avoid excessive over-hung loads.
6. Check with RINGSPANN CORPORATION if the freewheel must support large side loads during overrunning cycle of operation as damage may occur.
7. Check for proper rotation by spinning the freewheel by hand.

## Lubrication



### CAUTION!

Lubricants of the EP type (extreme pressure characteristics) should be approved by RINGSPANN CORPORATION. Those containing solid additives such as graphite or molybdenum disulphide should not be used.

FRX and FRXG freewheels are lubricated for life at the factory and do not require additional lubrication maintenance in the sprag assembly. Additional lubrication in the sprag assembly can lead to failure.

## Grease Seal Maintenance for FRXG



### CAUTION!

Grease seal maintenance should not be performed while equipment is in operation.

Grease seal maintenance should be performed at least every 3 months. Under severe conditions, such as heavy dust or twenty-four hours per day operation, grease seal maintenance should be performed every 2 weeks.

## Use the Greases from the Following Table Only

MOBIL	Mobilgrease XHP 221 or Equivalent
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**Note:** Use no other greases unless a specific recommendation has been verified by RINGSPANN CORPORATION.



### WARNING!

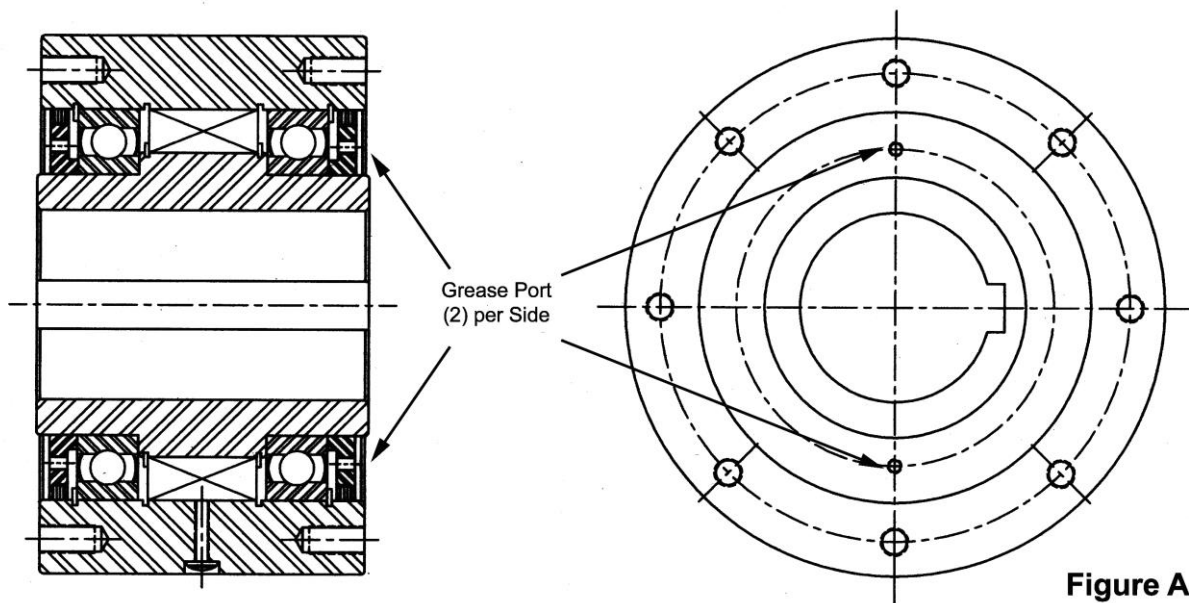
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### Grease Seal Maintenance Procedure

1. Remove all 4 setscrews from grease ports (Fig. A).
2. Using a hand grease gun, add clean grease into one port per side until all “dirty” grease is purged from opposite port.
3. Resume operation of freewheel without setscrews installed to allow excess grease to purge from grease cavity.
4. Reinstall all 4 grease port setscrews after one hour of operation or after excess grease purge stops, whichever comes first.

### Use Recommended Greases Only



#### **WARNING!**

RINGSPANN CORPORATION is not responsible for any lubrication changes made by others after the freewheel leaves the RINGSPANN CORPORATION factory.