






**Precision Ring Drive**



In accordance with Nexen's established policy of constant product improvement, the specifications contained in this manual are subject to change without notice. Technical data listed in this manual are based on the latest information available at the time of printing and are also subject to change without notice.

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	<p style="text-align: center;"> <b>DANGER</b></p> <p>Read this manual carefully before installation and operation. Follow Nexen's instructions and integrate this unit into your system with care. This unit should be installed, operated and maintained by qualified personnel <b>ONLY</b>. Improper installation can damage your system, cause injury or death. Comply with all applicable codes.</p>	
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This document is the original, non-translated, version.

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ISO 9001 Certified

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## GENERAL SAFETY PRECAUTIONS



### ⚠ WARNING

Use appropriate guarding for rotating components. Failure to guard could result in serious bodily injury.



### ⚠ DANGER

This product has moving parts that can crush or cut appendages. Provide adequate spacing or guarding from any operating product.



### ⚠ WARNING

Failure to properly support the load before disengaging the RPG system could cause serious harm to operators or equipment.



### ⚠ WARNING

Ensure proper guarding of the product is used. Nexen recommends the machine builder design guarding in compliance with OSHA 29 CFR 1910 "Occupational Safety and Health Hazards".



### ⚠ CAUTION

Use lifting aids and proper lifting techniques when installing, removing, or placing this product in service.



### ⚠ CAUTION

Watch for sharp features when interacting with this product. The parts have complex shapes and machined edges.



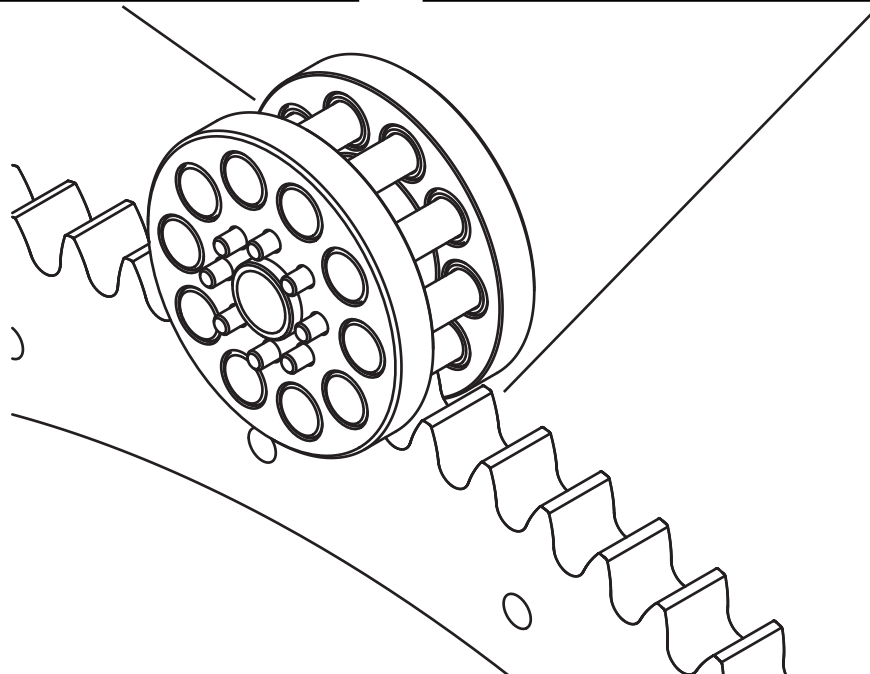
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## SYSTEM DESIGN OVERVIEW

### GENERAL SYSTEM REQUIREMENTS

- The dial plate must be included in all loading calculations.
- The dial plate must be designed such that it will rigidly mount to the ring drive using all provided fasteners, take caution to ensure the dial plate has adequate clearance over the ring drive components (i.e. the guard, pinion, etc).
- Make sure the machine design is rigid enough to avoid deflection that could affect the ring drive system.
- The Precision Ring Drive (PRD) requires periodic lubrication and should use the grease offered on Nexen's website as an accessory to the RPS/RPG products or equivalent lubrication described in the lubrication section.
- Large Temperature swings can affect performance of the PRD; ideal temperature range is -5 to 40 C.
- The PRD gear and pinion are surface treated with Raydent®, Armaloy®, or Nickel Plating (with the exception of the pinion rollers that consist of bearing grade steel), and will have moderate corrosion resistance. Pinion roller corrosion will lead to pinion needle bearing damage and then system failure. Always protect the pinion from adverse conditions. If the PRD system comes with other coatings, consult the product specifications for performance. Review surface treatment product specifications for corrosion resistance performance, and determine whether the PRD system is suitable for your application based on your familiarity with the corrosion resistant surface treatment or thorough testing. Nexen makes no claims for PRD corrosion resistance in any application.

## MOUNTING SURFACE DETAILS

The surface used to mount the PRD should be machined to a flatness of .050mm as shown to ensure proper alignment. See Figure 1.

All provided provisions for fasteners should be utilized.

Make sure there is proper clearance around the gearbox as seen in Figure 1.

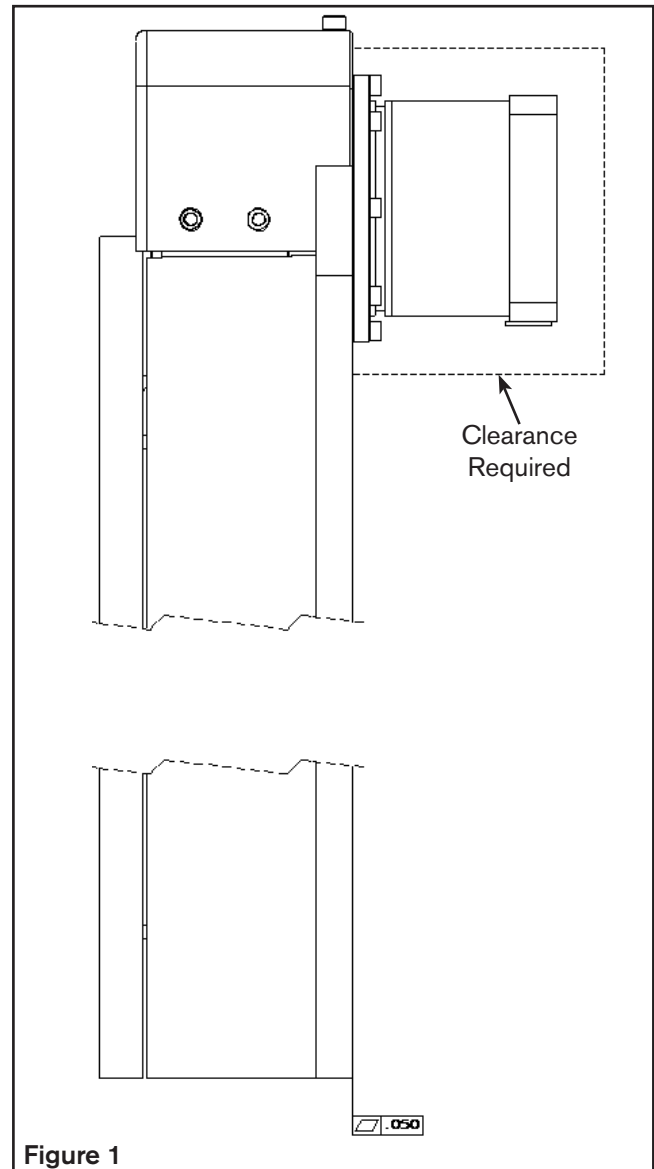


Figure 1

## INSTALLATION INSTRUCTIONS

### Ring Drive Mounting

Nexen recommends removing the guards before installation. The mounting holes are accessible thru the guard, but removing the guard will make the process easier.

1. First remove the pinion guard by removing the six M6 fasteners. See Figure 2.
2. To remove the gear guard, the multiple M6 fasteners are accessible around and between the gear teeth from the top. See Figure 2. Take extreme caution near the gear teeth as they may be damaged by contacting them with a tool.
3. Position the ring drive on the customer supplied mounting surface. The size 400 can be lifted using the threaded holes used to mount the dial plate. The size 750, 1100 and 1500 have a pattern of M12 threaded holes on the inner race of the bearing that can be used to lift the product.
4. Once the Ring drive is in location, install the M12 mounting bolts to secure to the mounting surface. Tighten the bolts in a star pattern to ensure even distribution of load. Nexen recommends using grade 12 bolts for any application, although it is the customer's responsibility to ensure the mounting is suitable for the system loads.

5. Reinstall the gear guard followed by the pinion guard.

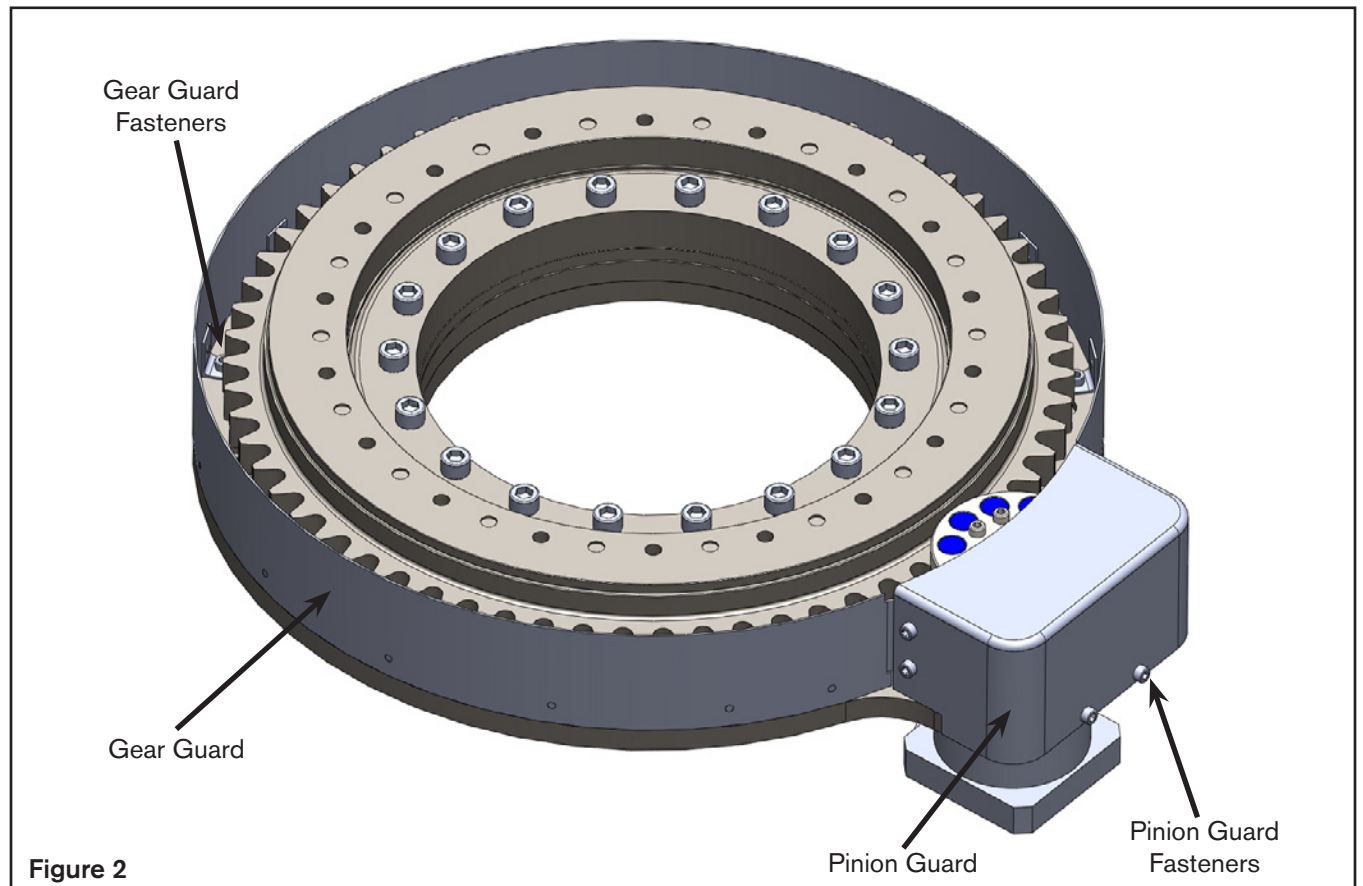
### Motor Mounting

The motor mounting depends on the motor/gearbox combination being used; please refer to the gearbox manufacturer's mounting instructions (included with this document).

### Dial Plate Mounting

The dial plate is designed to be piloted by a series of dowel pins installed in the plate and that straddle the male pilot on the ring drive. Drawings are available for each specific size, which will aid in understanding the method of piloting the dial plate.

The dial plates should be mounted using all available holes. Again, tighten in a star pattern to ensure even load distribution. It is the responsibility of the customer to ensure the bolt grade and qty is sufficient for the application.



## LUBRICATION

### Pinion

The pinion needle bearings are sealed and lubricated for life and cannot be serviced.

### Gear

Nexen recommends lubricating the gear teeth every 2 million pinion revolutions or 6 months, but it may need to be lubricated more frequently based on the application conditions, and observable tooth or roller wear.

When lubricating the PRD system inspect the pinion rollers and gear teeth for any abnormal wear patterns and ensure the pinion rollers are not seized or have excessive play. Wear on the edges of the gear teeth (not uniform across the tooth face) or rings on the rollers indicate an alignment problem which should be corrected to obtain maximum system performance and life. The rollers in new pinions can seem difficult to turn due to seal drag. This improves as the pinion breaks in.

THK AFA grease is recommended for gear tooth lubrication. Nexen offers this grease under product number 853901. Greases for special applications such as food grade, vacuum, or others are allowed if they use a synthetic base, a polyurea thickener, and meet the following Kinematic Viscosity Levels: CST@40C = 25; CST@100C = 5. Contact Nexen for recommendations on alternative greases.

The PRD gear teeth can be lubricated in two ways:

1. Apply grease to the pinion rollers and roll the pinion back and forth five times over one meter circumference of gear teeth, repeating the process until the entire gear is lubricated.
2. Using a swab apply a very small dab of grease on the middle of each tooth face and rotate the ring gear five times.
3. Wipe excess grease from the sides of the gear and pinion body to prevent grease being thrown off during operation and for general cleanliness.

### Output Bearing

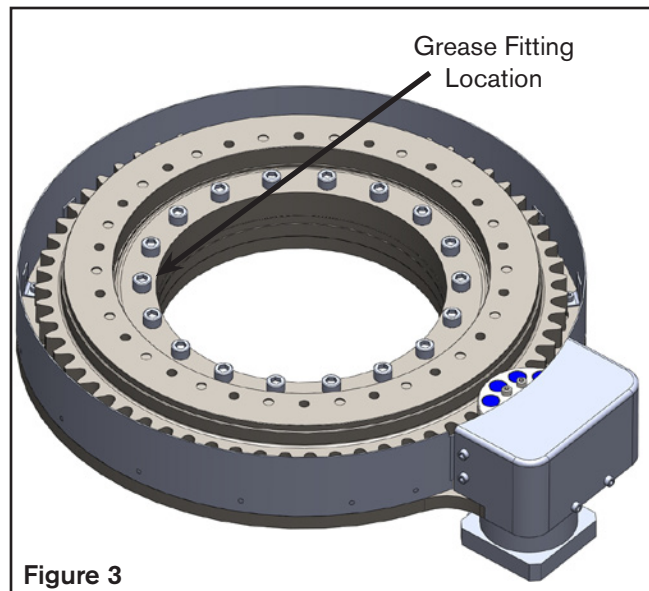
The output bearing is fitted with multiple grease fittings on the inner race. See Figure 3.

The bearing manufacturer recommends that the greasing be carried out during rotation at slow speed, on two revolutions minimum, through all the grease fitting locations.

The bearing should be greased every 150 hours in normal usage, every 50 hours when the application conditions are severe such as an extremely dusty or wet environment, or every 6 months, whichever comes first.

A light extrusion of the new grease must appear at the protection seal lip.

Nexen recommends Mobilux EP2, shell retina EP2, shell alva EPLF2 or equivalent. Contact Nexen for recommendations on alternative greases for extreme conditions.





## PRELOAD

The PRD is delivered with proper preload from the factory. If adjusting the preload is required, a tool can be purchased from Nexen to aid in this process. The Nexen preloader is configured as shown below in Figure 4.

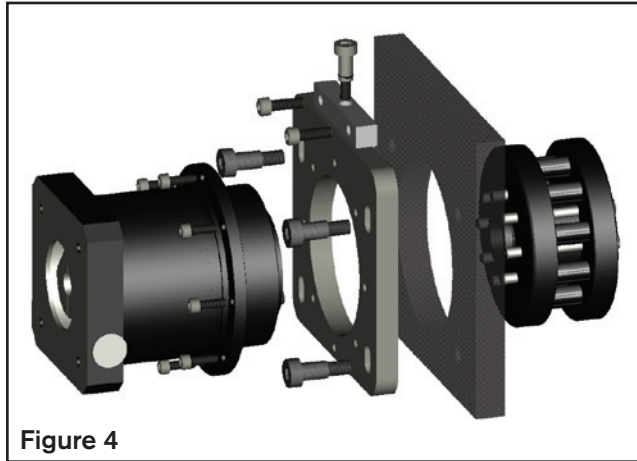


Figure 4

To ensure optimal meshing of the roller pins with the gear teeth, the shaft must be preloaded to 0.010 - 0.015 mm [0.0004 - 0.0006 in] beyond full roller/tooth root engagement.

**NOTE: Do not apply excessive preload. Preloading beyond 0.015 mm [0.0006 in] will decrease product life, increase noise, and cause vibration. When the PRD system is properly preloaded, there will be no tangential play between the gear teeth and the pinion rollers if the pinion is not allowed to turn and the rotating assembly forced back and forth in the direction of rotation.**

### Preloading Procedure

**Note: Be careful when engaging the pinion and servo assembly to the gear to avoid damaging the gear teeth or pinion rollers.**

1. With a dial indicator mounted on the movable carriage, measure off the tooth peaks. Move the carriage down the run taking frequent measurements to locate the high spot in the run. This is where the pinion preloading should be done to prevent excessive preload from occurring elsewhere in the run.

2. Apply serviceable thread locking compound to the pinion preloader slider bolts and install the servo and preload mechanism. Ensure the preload related bolts are just loose enough to allow the pinion to be pulled away from the gear teeth. For the Nexen Preloader System, this is approximately 0.2 - 0.3 Nm [2 - 3 in-lbs].
3. Verify that the pinion rotational axis is as parallel as possible to the gear's rotational axis, and the gear is centered between the pinion bearing flanges.
4. Rotate the preload adjustment screw clockwise to separate the pinion from the gear. This will ensure that clearance is initially present. Then seat the pinion into contact by turning the preload adjustment screw counterclockwise until a slight resistance is felt and then back the screw off 1/8 of a turn. This step is critical to prepare for preload settings.
5. Place a magnetic base dial indicator on the same part of the machine as the motor and reducer, and locate its probe on the OD of the pinion flange such that it measures in the direction of preload travel.
6. Apply the preload of 0.010 - 0.015 mm [0.0004 - 0.0006 in] with the preload application screw(s) and then tighten the M8 x 1.25 preload lockdown bolts to their recommended torque of 40 Nm (350 in-lbs). Typically the preload will change slightly when the preloader lockdown bolts are tightened. If tightening the preload bolts causes the amount of preload to fall outside of specifications, record how much it changed when tightening the preloader lock down bolts then loosen the preloading system and repeat the preloading procedure but adjust the initial preload (more or less) by the recorded preload deviation. This procedure will ensure that when the preloader lockdown bolts are tightened the amount of preload should fall within specifications.
7. With the pinion preloaded to specifications manually rotate the gear by hand (if possible) checking for smoothness and uniformity of resistance. If manually applied motion is not possible, use the servo motor to rotate the gear, with just enough torque output to move it while looking and listening for resistance to motion.

## WARRANTY

### Warranties

Nexen warrants that the Products will (a) be free from any defects in material or workmanship for a period of 12 months from the date of shipment, and (b) will meet and perform in accordance with the specifications in any engineering drawing specifically for the Product that is in Nexen's current product catalogue, or that is accessible at the Nexen website, or that is attached to this Quotation and that specifically refers to this Quotation by its number, subject in all cases to any limitations and exclusions set out in the drawing. NEXEN MAKES NO OTHER WARRANTY, EXPRESS OR IMPLIED, AND ALL IMPLIED WARRANTIES, INCLUDING WITHOUT LIMITATION, IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED. This warranty applies only if: (a) the Product has been installed, used and maintained in accordance with any applicable Nexen installation or maintenance manual for the Product; (b) the alleged defect is not attributable to normal wear and tear; (c) the Product has not been altered, misused or used for purposes other than those for which it was intended; and (d) Buyer has given written notice of the alleged defect to Nexen, and delivered the allegedly defective Product to Nexen, within one year of the date of shipment.

### Exclusive Remedy

The exclusive remedy for the Buyer for any breach of any warranties provided in connection with this agreement will be, at the election of Nexen: (a) repair or replacement with new, serviceably used, or reconditioned parts or products; or (b) issuance of credit in the amount of the purchase price paid to Nexen by the Buyer for the Products.

### Agent's Authority

Buyer agrees that no agent, employee or representative of Nexen has authority to bind Nexen to any affirmation, representation, or warranty concerning the Products other than those warranties expressly set forth herein.

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Buyer shall inspect all shipments of Products upon arrival and shall notify Nexen in writing, of any shortages or other failures to conform to these terms and conditions which are reasonably discoverable upon arrival without opening any carton or box in which the Products are contained. Such notice shall be sent within 14 days following arrival. All notifications shall be accompanied by packing slips, inspection reports and other documents necessary to support Buyer's claims. In addition to the foregoing obligations, in the event that Buyer receives Products that Buyer did not order, Buyer shall return the erroneously shipped Products to Nexen within thirty (30) days of the date of the invoice for such Products; Nexen will pay reasonable freight charges for the timely return of the erroneously shipped Products, and issue a credit to Buyer for the returned Products at the price Buyer paid for them, including any shipping expenses that Nexen charged Buyer. All shortages, overages and nonconformities not reported to Nexen as required by this section will be deemed waived.

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