



RPG Rotary Drive System




Ring Gears and Segments



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.

Technical Support: 800-843-7445
(651) 484-5900

www.nexengroup.com

	<div data-bbox="548 527 609 579"></div> <div data-bbox="630 533 850 579">DANGER</div> <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 ONLY. 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.

Conformity Declaration: In accordance with Appendix II B of CE Machinery Directive (2006/42/EC):

A Declaration of Incorporation of Partly Completed Machinery evaluation for the applicable EU directives was carried out for this product in accordance with the Machinery Directive. The declaration of incorporation is set out in writing in a separate document and can be requested if required.

This machinery is incomplete and must not be put into service until the machinery into which it is to be incorporated has been declared in conformity with the applicable provisions of the Directive.

Nexen Group, Inc.
560 Oak Grove Parkway
Vadnais Heights, Minnesota 55127

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.



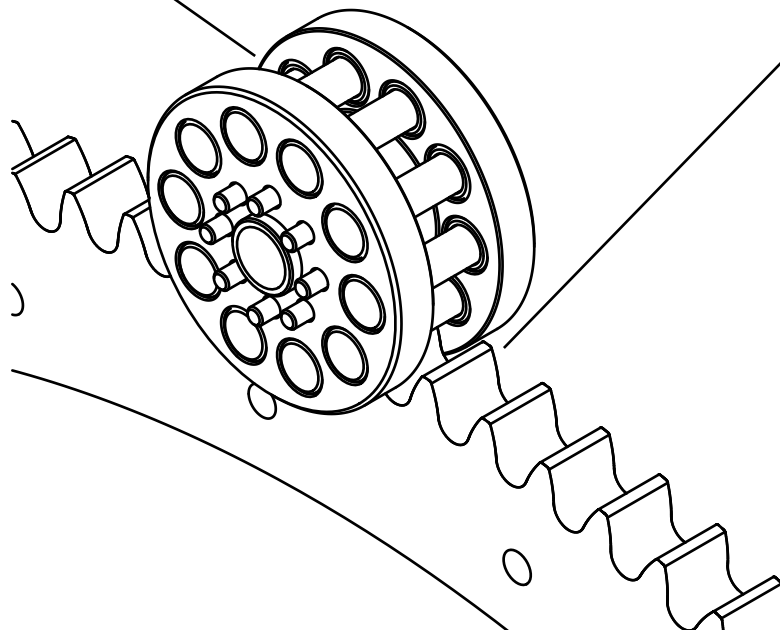
WARNING

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.



SYSTEM DESIGN OVERVIEW

The machine design guidelines, installation procedures, specifications, and tolerances, listed in this document are designed to obtain Nexen's published RPS performance ratings with reasonable effort. In some cases some of these requirements can be deviated from with a reduction in the RPS system performance. Contact Nexen to determine if the desired deviation is possible and its effect on system performance.

GENERAL SYSTEM REQUIREMENTS

- Unlike traditional gear systems, the Roller Pinion Gear (RPG) rotary drive system has zero mechanical clearance and requires a system preload for proper operation. This preload must remain relatively constant around the entire gear to obtain optimal system performance and life. To achieve this it is crucial that the bearing support system be as concentric as possible to the ring gear pitch circle diameter and not converge or diverge at any point. If the system converges, the pinion preload will become excessive and increase noise, reduce pinion roller bearing life, and potentially bind the system. If the system diverges pinion preload could be lost causing backlash, a loss of positional accuracy, an increase in noise, and a reduction in system life. See **Figures 1** and **2** for more details.
- Make sure that the machine design is rigid enough to avoid deflection that could affect the RPG system preload.
- The allowed ring gear concentricity variance tolerances shown in **Figure 2** are greater than the system preload. This is not an error. The RPG system has been designed to operate correctly under these conditions.
- The inner diameter and one side of the ring gear must be fully supported. This is best accomplished with a step in the mounting surface.
- For very large ring gears, a single piece mounting surface will become impractical requiring a segmented one. When installing the segmented ring gears, their joints should not be near the mounting surface joints but span them as much as possible.
- The RPG system generates a reaction force that tries to separate the pinion from the gear teeth. Make sure this is accounted for in the machine design. See product data for pressure angle specifications.
- The RPG system requires a mechanism to achieve proper pinion preload. It is recommended that the pinion be moved into the gear not vice versa. The recommended method is to mount the servo drive system on a sliding bracket that has an adjustment to push it into the gear. Another possible preloading method utilizes a bracket with an eccentric mounting slot pattern. Nexen offers a preloading mechanism that is easy to integrate into the application as shown in the literature supplied with Nexen pinions. Spring loaded preloading mechanisms should not be used since the spring force required to counteract the separation forces are much higher than the allowed preloading force resulting in a reduction in pinion needle bearing life and increased system noise. Reference literature supplied with Nexen pinion for detailed installation instructions.
- The RPG system requires periodic lubrication and should use the grease offered on Nexen's website as an accessory to the RPG products or equivalent lubrication as described in the Lubrication section on **Page 13**. For more information or applications with special lubrication needs consult Nexen.
- Do not use the RPG system in environments with temperature outside of -5 to 40° C (23 to 104° F), or with wide temperature swings since this can affect the preload and meshing of the system. If you have an application with any of these characteristics consult Nexen.
- The RPG systems are surface treated with black oxide, thin dense chrome 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 RPG system comes with other coatings, consult the product specifications for performance. Review surface treatment product specifications for corrosion resistance performance, and determine whether the RPG system is suitable for your application based on your familiarity with the corrosion resistant surface treatment or thorough testing. Nexen makes no claims for RPG corrosion resistance in any application.
- Nexen can provide additional tapped, untapped or countersunk holes in the ring gear as needed.

SYSTEM DESIGN OVERVIEW

RING GEAR AND ARC SEGMENT REQUIREMENTS

- RPG solid ring gears are available in diameters up to approximately 750 mm [29.5 in.], beyond this the ring gears will consist of segments that will be joined together to form a complete ring. Arcs of various radiuses and lengths can also be provided. Throughout this document “ring gear” will be used primarily but will also apply to arc segments unless otherwise noted.
- **CAUTION** Handle the ring gear or arc segments with care they are very high precision products. Do not drop, allow anything to fall on, or place them on non-flat surfaces.
- The ring gear ID, OD and the side without product labeling are reference surfaces. The side with labeling should be faced away from the machine bed mounting surface.
- Secure the ring gear using all of the available bolt holes. Refer to **Table 1**. This will ensure the highest degree of ring gear stability.
- Install the RPG system at the temperature at which it will be used.
- The ring gear teeth are hardened on the tooth faces only.
- If the gear is segmented, a special alignment tool is required to properly join the segments together and is available from Nexen. The alignment tool ensures proper pinion meshing and system accuracy when the pinion crosses gear joints. For full segmented rings an alignment tool for every joint is recommended. For partial arcs an alignment tool at every joint is also recommended for ease of installation. When the adjacent gear segments are properly positioned, there will be a roughly 0.6 mm [.02 in] gap between their ends. See **Figure 5** for details.
- If the ring gear rotates in the vertical plane, take precautions to prevent debris and contaminants from collecting on the ring gear since it could interfere with pinion meshing. In such environments, it is recommended that the ring gear be shielded and / or locate the pinion around the lower half of the ring gear to allow debris to fall out of the tooth pockets before reaching the pinion.

PINION REQUIREMENTS

Reference literature supplied with Nexen pinion for detailed installation instructions.

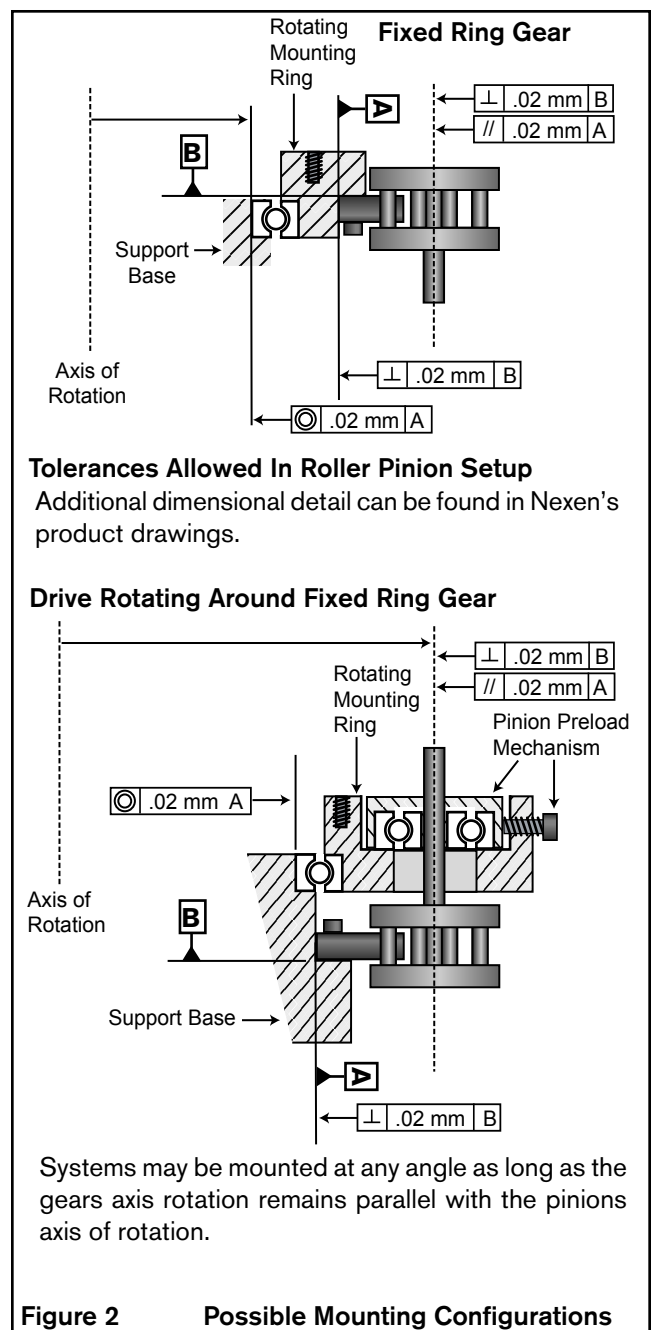
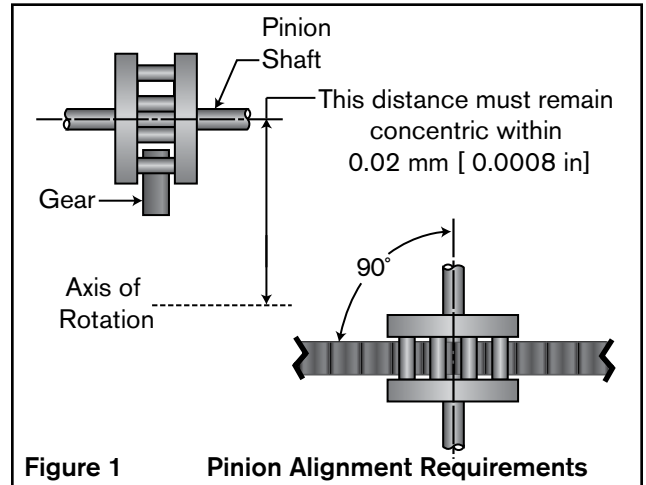
- Multiple pinions can drive a gear without an additional service factor but the load sharing by each pinion must be equal. This is best accomplished with discrete drives linked electronically; mechanically linking pinions is not recommended. Contact Nexen for more information.
- The RPG system can be operated such that the pinion revolves around the ring gear as long as the pinion preload remains within specifications as it revolves.

PROPER SYSTEM ALIGNMENT

The RPG system is available as solid round gears, segmented gears, or arc segments with internal or external teeth. The instructions that follow will use the reference “ring gears” but applies universally to all cases.

Unlike traditional gear systems, the RPG system operates with no mechanical clearance and requires a preload. For optimal performance the preload must remain as constant as possible as the ring gear travels past the pinion, or conversely, the pinion orbits around the stationary ring gear. To achieve this the ring gear and pinion concentricity, axial variance, pinion axis concentricity and parallelism to the axis of rotation must be well maintained. To verify these conditions have been met it is recommended that the supporting structure and bearing systems are in place and the RPG system is installed last. This will allow a dial indicator to be positioned where the pinion will be located and the system rotated to verify variance before and during the ring gear installation. The following guidelines will ensure this is achieved.

- The ring gear must be mounted on a step in the mounting surface that supports the inner diameter of the ring gear and the side of the ring gear opposite the product labeling and is rigid enough to prevent deflection that would affect pinion preload. The ring gear mounting surface concentric with the axis of rotation must have variance less than (0.02 mm [0.0008 in]). The mounting surface perpendicular to the axis of rotation must have variance less than (± 0.02 mm [± 0.0008 in]). This applies whether the ring gear is bearing supported and rotates or is fixed in place and the pinion orbits the ring gear. See **Figures 1 and 2**.
- The Pinion axis of rotation must be concentric (± 0.02 mm [± 0.0008 in]) to the axis of rotation of the ring gear. The angle between the Pinion Shaft axis and the plane the ring gear is in must be maintained as close to 90° as possible (Refer to **Figure 1**). Deviation from 90° can lead to improper mesh and decreased life of system.
- The Pinion Shaft must be supported adequately to ensure full contact of roller pins along the face of ring gear teeth.
- Once the RPG system is properly installed and preloaded verify the meshing tooth pattern is correct as outlined in the System Alignment Verification section in the literature supplied with Nexen pinions.



INSTALLATION

The RPG system is available as solid round gears, segmented gears, or arc segments with internal or external teeth. The instructions that follow will use the reference "ring gears" but applies universally to all cases.

If the ring gear will be oriented in the vertical plane precautions should be taken to minimize the possibility that debris could be deposited in the tooth pockets and interfere with the pinion meshing. This can be accomplished with shielding and/or if the ring gear rotates placing the stationary pinion along the lower 120° of the ring gear to provide an opportunity for debris to fall out of the tooth pockets before arriving at the pinion.

RING GEAR MOUNTING SURFACE VERIFICATION

1. **Ensure that the mounting surface and ring are completely clean**, free of burrs, or anything that could interfere with full contact between the mounting surfaces.
2. **Verify that the ring gear mounting surface meets the requirements** as shown in **Figures 1 & 2** using a dial indicator. Mark the high point in the surfaces as they are rotated. If out of specification, attempt to correct it by adjusting the bearings or other ring gear support structures. If the variance cannot be brought into specifications but is close, it may be corrected by shimming between the ring gear and mounting surface, if the mounting surface variance is only slightly out of specifications.
3. **Tighten the mounting screws to 50% of the specified torque**, as specified in **Table 1**, in a star pattern that allows for an even distribution of axial clamping force. Then repeat the tightening pattern with 100% of the recommended torque in **Table 1**.
4. **Pin the gear to the mounting surface.** If desired and provisions are present, drill through the dowel pin holes into the mounting surface and pin into place.

SOLID (ONE-PIECE) RING GEAR INSTALLATION

1. **Carefully place the solid ring gear onto its mounting surface**, align the bolt holes, apply serviceable thread-locker to, insert and hand tighten the mounting bolts.
2. **Measure the ring gear tooth peak variance** with a dial indicator at multiple points around the ring gear to ensure that is concentric to the axis of rotation with total variance less than 0.03 mm [0.0012 in] as shown in **Figure 3**.

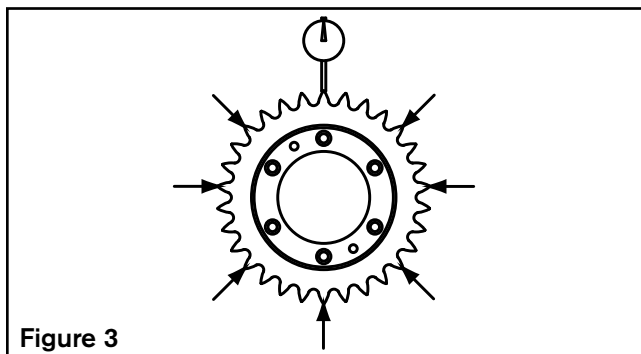


Figure 3

Mark the variance on the ring gear with a grease pencil or other easily removed marker at the high and low points that should be opposite each other. Rotate the ring gear so the dial indicator is resting on the tooth peak with the low reading and zero it. Place a soft buffer material on the high point tooth peak for protection and gently tap it towards the center of rotation half the difference of the high and low variance readings. Remove any variance markings on the ring gear and repeat the tooth peak variance measurements again. Repeat this procedure until the tooth peak variance is within specifications all the way around the ring gear. If the tooth peak variance cannot be brought into specifications remove the ring gear mounting bolts and rotate the ring gear relative to the mounting surface and repeat the procedure starting with **Step 1**.

Table 1

Gear/Gear Segment Mounting Screw Torque	
Bolt Size	Tightening Torque
M5	10 Nm [89 in-lb]
M6	16 Nm [140 in-lb]
M8	38 Nm [336 in-lb]
M10	68 Nm [602 in-lb]
M12	120 Nm [1062 in-lb]
M16	330 Nm [2921 in-lb]

Assumes class 12.9 steel socket head cap screws are used.

End user's responsibility to verify mating material has enough strength to adequately support torque values.

Consult Nexen for applications not covered by **Table 1** Information.

INSTALLATION

SEGMENTED RING GEAR INSTALLATION

Instructions outlined below apply to making both arcs and full rings with gear segments, installation differences are noted.

[Link to installation video](#)



This method requires an alignment tool between each gear segment. Installation using only one alignment tool is not recommended. Note: Repeated use of alignment tools for installation may result in wear and/or deformation of the contact surfaces. Visually inspect and replace as necessary.

1. **Clean the mounting surface and verify mounting surface tolerances** per instructions on **Pages 7 & 8**, and **Figures 1 & 2**.
2. **Place the segments into position** on the mounting surface. Loosely install three mounting screws in each gear segment, one on each end and one in the middle. Segments should be moveable by hand. See **Figure 4**.
3. **Install alignment tools** at each segment joint so the mounting screws align with the tapped holes in the segment and the lobes are in contact with the tooth flanks. See **Figure 5**.
 - Thread the alignment tool mounting screws with plastic washers into each gear segment. Torque each screw to the recommended value (See **Table 2**) while applying light pressure to maintain engagement with the tooth flanks. See **Figure 5**.
 - Next, torque the two set screws on each alignment tool to the recommended value. See **Table 2 & Figure 5**.
 - Verify the entire arc (or ring) is fully seated on the bottom mounting surface, while still being moveable by hand.
4. **Initially position the segments** in relation to the reference surface. Ideally the final location of the segment would be as close as possible to the nominal outside diameter of the tooth tips.

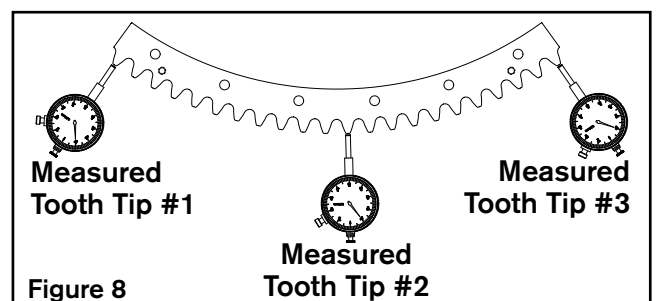
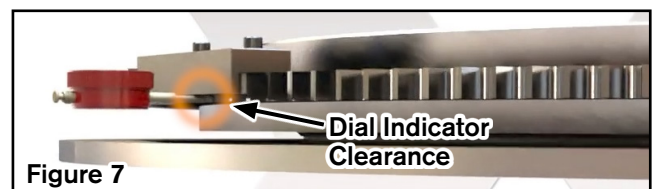
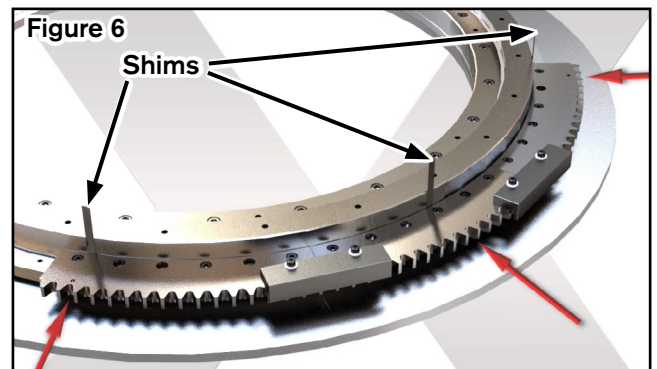
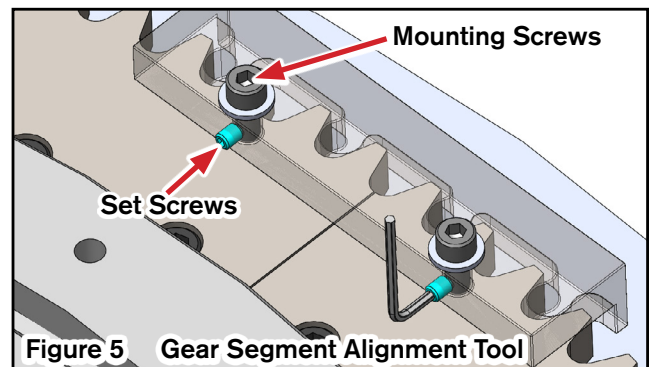
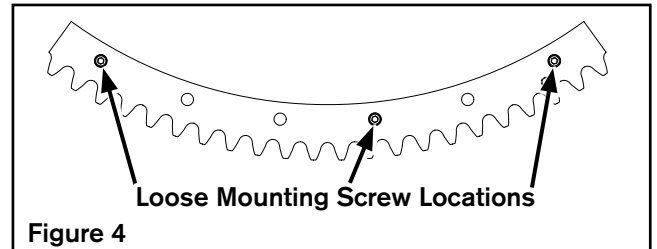
Partial Arc of Gear Segments Only:

- Place shims between the entire combined arc and the reference surface to account for adjustment in upcoming steps. The thickness of the shim should nominally locate the segment tooth tip OD in relation to the central axis. Generally, the shim thickness will be between .03 to .13 mm [.001 to .005 inch], depending on the reference surface and segment stack-up tolerances. See **Figure 6**.
- To initially locate, seat the segments against the shims by pressing in towards the center axis of rotation. Next, remove the shims. See **Figure 6**.

Full Ring of Gear Segments Only:

- Center the fully combined ring of gear segments to the pilot surface as best as possible by hand, by making the clearance between the segment's mounting diameter and the pilot surface consistent.

5. **Measure tooth tip runout** by positioning a dial indicator such that it will not interfere with the alignment tools. See **Figure 7**.
 - Rotate the system and take three indicator readings on each segment; one on each end and one in the middle. See **Figure 8** for an example of gear segment tooth runout reading locations.
 - Continue logging tooth tip runout for each segment until the entire partial arc or full ring is accounted for.



INSTALLATION

SEGMENTED RING GEAR INSTALLATION

Continued...

6. **Calculate the average value of the data** once the runout measurements are recorded.
7. **Verify the tolerance range.** The total measured runout should be equal to or less than .030 mm [.0012 inch]. See **Figure 9** for an example of runout readings averaged with the tolerance range shown.
8. **Adjust Segment Position.** Segments can be adjusted towards the center axis using a clamping device over the tooth tips. Use a soft buffer material to protect the teeth from damage while clamping. Adjust the segment away from the center axis by gently prying out on an empty counterbored hole.
 - While maintaining the dial indicator's position adjust the initial measurement's location radially to achieve the calculated average value. Manually tighten the nearest cap screw to lock the tooth's location to 50% torque specification in **Table 1**. Note that using an automatic tool to tighten the screw may vibrate the system out of the desired position, therefore it is recommended to use a manual tool.
 - Repeat this process for each measurement location on every segment along the entire arc or ring.
9. **Verify Segments' Position.** With each measurement position now adjusted, verify the total runout again by zeroing the dial indicator and taking measurements over the same tooth tip locations from **Step 5**. Repeat process as necessary to achieve desired runout. See **Figure 9** for an example of initial vs. adjusted runout readings.
10. **Install remaining screws.** With the segments now within the desired runout specification apply serviceable thread-locker to remaining screws, install into all empty hole locations and manually tighten to full torque specification. Again, manually tightening the screws is recommended since the use of an automatic tool may vibrate the segments out of the desired position.
11. **Individually re-install initial screws.** Next, individually remove each of the initial screws used to locate the segments (Step 2), apply serviceable thread-locker, and manually re-install to full torque specification (See **Table 1**); NOTE: Remove and re-install one at a time so the gear segments do not move out of the desired position.
12. **Remove alignment tools and verify runout.**

The Nexen RPS Gear Segments are now fully installed and ready for the pinion to be installed. Reference literature supplied with Nexen pinion for detailed installation instructions.

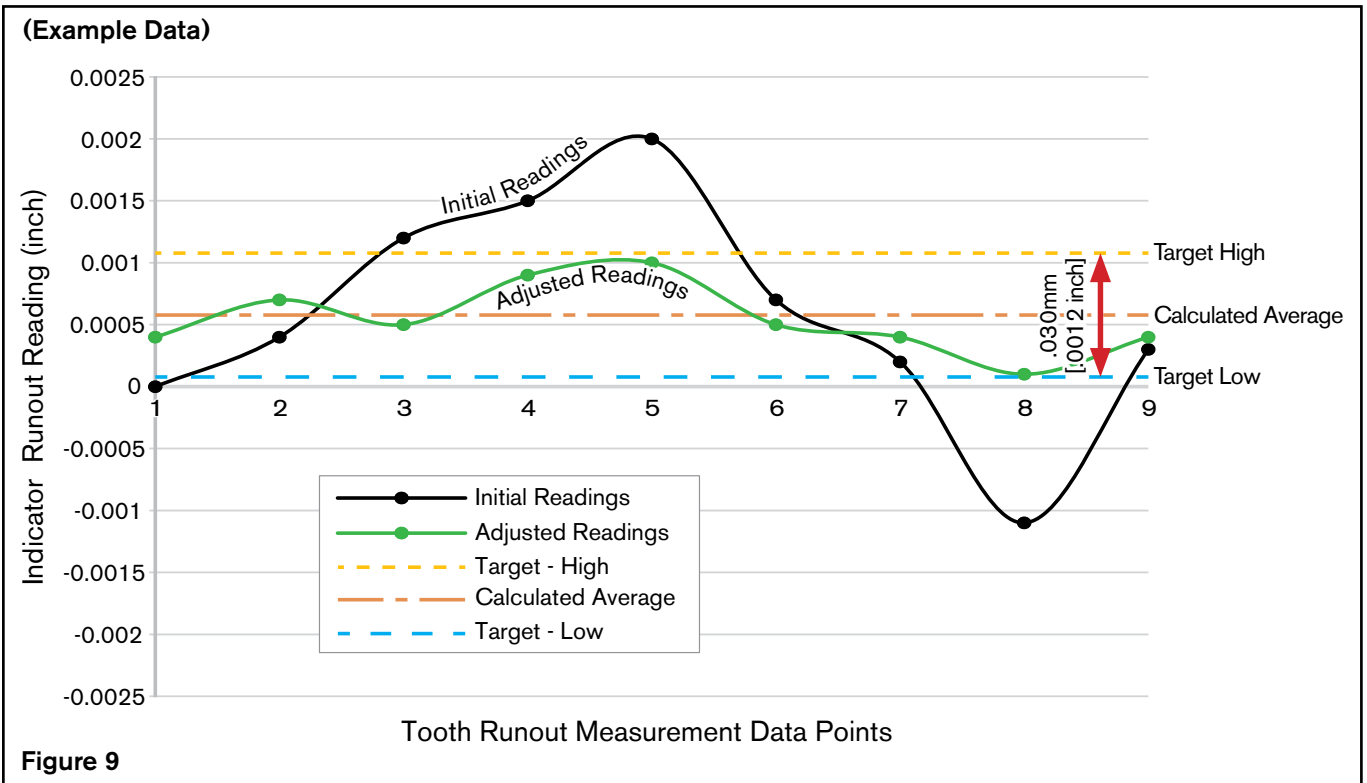
Table 2

Gear Segment Alignment Tool Mounting				
RPG Size	Mounting Screws		Set Screws	
	Screw Size	Tightening Torque	Screw Size	Tightening Torque
16	M6	3.5 Nm [31 in-lb]	M4	1.6 Nm [14 in-lb]
20	M8	4.0 Nm [35 in-lb]	M6	5.0 Nm [44 in-lb]
25				
32	M10	5.0 Nm [44 in-lb]	M8	6.0 Nm [53 in-lb]
40				


Refer to Nexen product drawings and CAD files for precise dimensions. Bolt lengths will vary based on machine design.

INSTALLATION

SEGMENTED RING GEAR INSTALLATION Continued...




OPERATION




⚠ DANGER

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




⚠ WARNING

Never exceed maximum operating speeds listed for your product. (See Table 7).



⚠ 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".



⚠ WARNING

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

Table 3

RPG Maximum Speeds*		
Product	Tangential Speed	Pinion RPM
RPG10	4 m/s [13.1 ft/s]	2400
RPG12	8 m/s [26.2 ft/s]	4000
RPG16	4 m/s [13.1 ft/s]	1500
RPG20	5 m/s [16.4 ft/s]	1500
RPG25	8 m/s [26.2 ft/s]	1920
RPG32	6 m/s [19.7 ft/s]	938
RPG40	5 m/s [16.4 ft/s]	625

*Standard RPG speed ratings, specials can vary. Review Nexen specifications for your specific product number.

LUBRICATION

Prior to interaction with lubrication it is recommended the user reads and understands all applicable Safety Data Sheets for manufacturer recommended handling, storage, and disposal information.

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

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. Prior to application of new lubricant it is recommended the user remove old grease and contaminants from the tooth and roller interface.

When lubricating the RPG 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, especially larger sizes, can seem difficult to turn due to seal drag. This improves as the pinion breaks in.

THK AFC grease is recommended for gear tooth lubrication although THK AFA can also be used. Both can be found on the RPS product pages of Nexen's website under accessories. 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 RPG system can be lubricated in two ways:

1. Apply grease to the pinion rollers and roll the pinion back and forth 5 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 5 times.

Wipe excess grease from the sides of the gear and pinion body to prevent grease being thrown off during operation and for general cleanliness.

SERVICE

If any part of the RPG rotary drive system product malfunctions, replace the unit or contact Nexen.

Mission Time: 10 years maximum from date of installation.

Nexen recommends only properly trained personnel in the installation and maintenance procedures allowed to install and perform maintenance on product.

People do not interact directly with this product during operation, but maintenance personnel may interact with this product. Adequate space must be allowed to ensure safety, Nexen recommends a minimum of 3 feet.

Disposal of product is responsibility of machine builder or end user.

TRANSPORT, HANDLING & STORAGE

During transport, ring gears and segments can be handled without the use of special equipment. Nexen products have a shelf life of 7 years beginning on the date of packaging serialization located on the original shipping container of the item.

The following criteria must be maintained to achieve full shelf life of the product:

1. Original packaging must remain unopened and intact.
2. Product must have been stored in a temperature and humidity controlled environment.
 - Temperature range of 65°F ±15°F (18.3°C ±8.3°C)
 - Relative humidity range of 35%-55%

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.

Limitation on Nexen's Liability

TO THE EXTENT PERMITTED BY LAW NEXEN SHALL HAVE NO LIABILITY TO BUYER OR ANY OTHER PERSON FOR INCIDENTAL DAMAGES, SPECIAL DAMAGES, CONSEQUENTIAL DAMAGES OR OTHER DAMAGES OF ANY KIND OR NATURE WHATSOEVER, WHETHER ARISING OUT OF BREACH OF WARRANTY OR OTHER BREACH OF CONTRACT, NEGLIGENCE OR OTHER TORT, OR OTHERWISE, EVEN IF NEXEN SHALL HAVE BEEN ADVISED OF THE POSSIBILITY OR LIKELIHOOD OF SUCH POTENTIAL LOSS OR DAMAGE. For all of the purposes hereof, the term "consequential damages" shall include lost profits, penalties, delay damages, liquidated damages or other damages and liabilities which Buyer shall be obligated to pay or which Buyer may incur based upon, related to or arising out of its contracts with its customers or other third parties. In no event shall Nexen be liable for any amount of damages in excess of amounts paid by Buyer for Products or services as to which a breach of contract has been determined to exist. The parties expressly agree that the price for the Products and the services was determined in consideration of the limitation on damages set forth herein and such limitation has been specifically bargained for and constitutes an agreed allocation of risk which shall survive the determination of any court of competent jurisdiction that any remedy herein fails of its essential purpose.

Inspection

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.

Limitation on Actions

No action, regardless of form, arising out of any transaction to which these terms and conditions are applicable may be brought by the Buyer more than one year after the cause of action has accrued.

nexen[®]

Nexen Group, Inc.
560 Oak Grove Parkway
Vadnais Heights, MN 55127

(800) 843-7445
Fax: (651) 286-1099
www.nexengroup.com

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