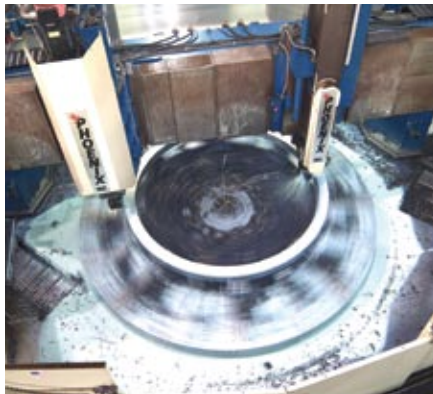
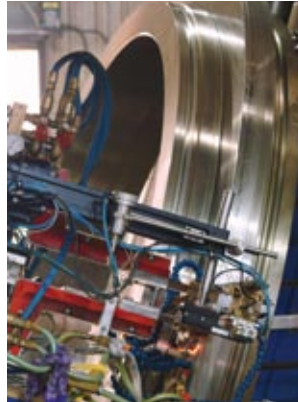


Large-Diameter Slewing Rings and Seamless Forged Rings



Capabilities and Product Digest

Rotek Incorporated



ThyssenKrupp

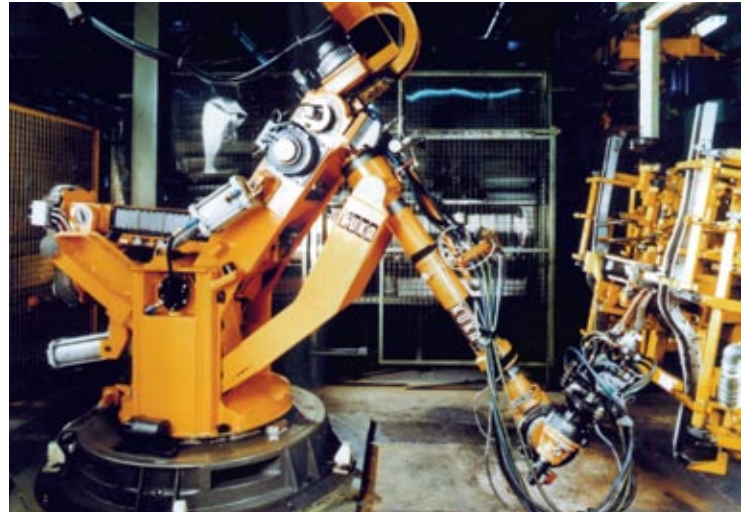
Rotek Incorporated Offers A Unique Combination of Experience and Technology in Large-Diameter Slewing Rings and Seamless Forged Rings

Rotek Incorporated pioneered both the development of large diameter slewing rings, and their introduction as a substitute for king post, hook roller and other older techniques for controlling loads in rotational applications. Since our founding in 1962, we've designed and manufactured thousands of large-diameter slewing rings for a wide range of applications, including power cranes and excavators, machine tools, robotics, medical equipment, large radar and radio telescope antennas, military equipment, offshore installations, tunnel boring mills, solar tracking and wind turbines.

Rotek engineers have also been responsible for most of the product design innovations for large-diameter slewing rings, including the introduction of offset raceways, wire insert raceways, high speed slewing rings, and "quiet" slewing rings for medical applications.

Today, Rotek offers a diverse line of large-diameter slewing rings: ball and roller types in single-row and multiple-row configurations; with integral internal or external gearing, or gearless models; diameters from 12 inches to 50 feet; in a wide range of load capacities, materials, and seal composites.

Rotek's diverse product line makes it possible to provide a large diameter slewing ring that is most appropriate for your application, on the most cost-effective basis possible. Many are available from stock or on short lead times. See page 6 for more information on our line of large-diameter slewing rings.



Rotek also offers the same expertise and quality in seamless forged rings.

Rotek began production of seamless rolled rings in 1981 to provide an integrated supply of rolled rings for our large-diameter slewing ring production. We soon expanded the mission of our state-of-the-art facility to produce high-quality rolled rings for other manufacturers, engineered for optimal performance in a specific application.

The successful implementation of this simple approach has attracted a large following of loyal customers, companies who understand the

benefits of Rotek's engineering and manufacturing capabilities:

- Metallurgy and engineering expertise
- A superior production process
- Complete heat treating and machining capabilities

Rotek manufactures engineered seamless rolled rings in a variety of materials, diameters and profiles. See page 7 for more information on our line of seamless rolled rings.

Three Row Roller Slewing Ring Configurations

Series 10,000 slewing rings are built with three independent rows of rollers. The three row roller slewing ring offers more capacity per unit size than any other Rotek design and is inherently the stiffest style of construction.

Raceway diameters: Standard models from 12" to 180" Special order slewing rings up to 360"

Gearing: Gearless, internal or external gearing

Capacities: Thrust: to 23,000,000 pounds

Moment: to 61,000,000 foot-pounds

Radial: to 2,500,000 pounds

Contact Rotek for load information on special order models.



Roller/Ball Combination Slewing Ring Configurations

Series 12,000 slewing rings incorporate a row of balls and a row of rollers into the same slewing ring. This combination of rolling elements is designed to handle small eccentricities at relatively high axial loads.

Raceway diameters: Standard models from 12" to 250" Special order slewing rings up to 360"

Gearing: Gearless, internal or external gearing

Capacities: Thrust: up to 17,500,000 pounds

Moment: up to 51,600,000 foot-pounds

Radial: up to 775,000 pounds



Precision Slewing Ring Configurations

Rotek offers precision slewing rings in single row ball, cross roller and three row roller configurations. Depending on raceway diameter and slewing ring configuration, critical size and fit specifications can be held to the following ranges:

- Runout tolerances to within .0003"
- Concentricities to within .0003"
- Surface flatness to within .0003"
- Parallelism to within .0003"
- Bolt hole positions to .010" diameter
- Gear precision equal to or exceeding AGMA 10 specifications

Raceway diameters: 12" to 180" Contact Rotek about larger sizes

Gearing: Gearless, internal or external gearing

Capacities: Contact Rotek Application Engineering for information



Wire-Race™ Slewing Ring Configurations

Series 15,000 Rotek Wire-Race™ slewing rings are available in single row ball, two row roller and three row roller configurations and feature a replaceable, hardened, inserted wire raceway that allows supporting rings to be constructed in a variety of materials. These slewing rings are ideal in applications where removal and replacement of the slewing ring would be difficult, where weight of the slewing ring is a critical consideration, and where the ambient environment is corrosive to steel slewing ring materials.

Raceway diameters: 12" to 600"

Gearing: Gearless, internal or external gearing

Capacities: Thrust: to 18,000,000 pounds

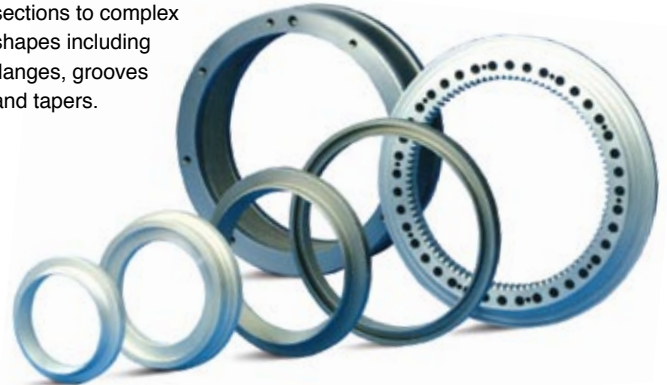
Moment: to 700,000,000 foot-pounds

Radial: to 2,000,000 pounds



Product Line Summary – Engineered Seamless Forged Rings

Rotek engineered seamless rolled rings are available in a wide selection of aluminum grades and carbon, stainless and alloy steels. All are certified; all are traceable. Seamless rolled rings are produced in diameters from 15" to 160", heights to 24" and weights to 9,000 pounds. Profile configurations range from simple rectangular cross sections to complex shapes including flanges, grooves and tapers.



Ring cross section

Mill Capability	U.S.	Metric
RING WEIGHT, Gr		
Minimum	145 lbs.	65 kg
Maximum	9,000 lbs.	4000 kg
OUTER DIAMETER, O.D.		
Minimum	15 in.	500 mm
Maximum	160 in.	4000 mm
RING HEIGHT h_r, $\frac{O.D. - I.D.}{2} > 2 h_r$		
Minimum	2 in.	60 mm
Maximum	24 in.	630 mm
WALL THICKNESS		
Minimum		
O.D. < 53 in.	1.6 in.	40 mm
O.D. > 53 in.	.03 X O.D.	
Maximum	2.5 X h_r	
but for functional efficiency, restricted to		
	24 in.	600 mm
MATERIALS		
A wide selection of aluminum grades and carbon, stainless, and alloy steels		
CONFIGURATIONS		
Profile configurations range from rectangular cross sections to complex contours including flanges, grooves and tapers.		
COMPUTERIZED HEAT TREATING		
Normalizing, quench hardening, annealing and tempering operations are performed in-house.		
COMPLETE SIZING AND MACHINING OPERATIONS		
Rotek's post-forming capabilities include specially designed expander units that perform hot or cold sizing operations to bring rings into final diameter tolerances, and complete machining capabilities that allow us to furnish rings at any stage from "as rolled" to "ready-to-install".		

Note: Rotek can supply seamless rolled rings in sizes other than those shown above. Contact us for more information.

Product Line Summary—Large Diameter Slewing Rings

Here is a summary of the large-diameter slewing rings available from Rotek Incorporated:

Single Row And Two Row Ball Configurations

Series 11,000 slewing rings are constructed with aluminum rings and plastic ball bearings to provide an economical slewing ring for light load applications. Raceway diameters: Standard models from 12" to 60" Gearing: Gearless, internal or external gearing Capacities: Thrust: up to 4,000 pounds; Moment: Contact Rotek Radial: Contact Rotek



Series 1000 slewing rings are constructed with chrome-alloy steel balls with no spacers and steel rings with unhardened raceways, for low-speed, bi-directional rotation of light loads. Raceway diameters: 12" to 42" Gearing: Furnished in gearless models only Capacities: Thrust; 1650 to 35,200 pounds Moment: Not recommended for moment loads Radial: Contact Rotek



Series 2100 slewing rings are four-point contact slewing rings with induction-hardened, offset raceways. Balls are chrome-alloy steel and separated by spacers to prevent ball-to-ball sliding friction, for medium to heavy-duty applications. Raceway diameters: 13" to 57" Gearing: Gearless, internal or external gearing Capacities: Thrust: 7,000 to 1,100,000 pounds Moment: 1,400 to 390,000 foot-pounds Radial: 400 to 150,000 pounds



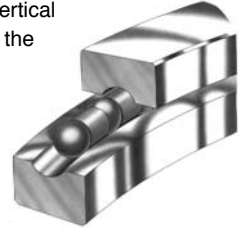
Series 3000 slewing rings feature offset induction-hardened raceway construction, the highest degree of raceway wrap, and durable ball separators. They offer an optimum combination of economy, reliability and durability. Raceway diameters: Standard models from 12" to 180" Special order slewing rings up to 360" Gearing: Gearless, internal or external gearing Capacities: Thrust: to 6,500,000 pounds Moment to 21,000,000 foot-pounds Radial: to 1,200,000 pounds Contact Rotek for load information on special order models.



Series 7100 slewing rings are single row ball vertical thrust slewing rings built for applications where the center of force remains within the slewing ring diameter under normal operating conditions. Lift-off protection is provided to hold the assembly together under occasional uplifting loads. Raceway diameters: Standard models from 12" to 180" Gearing: Gearless, internal or external gearing Capacities: Thrust: to 1,290,000 pounds Moment: Not applicable for moment loads Radial: Contact Rotek



Series 8000 slewing rings are single row ball vertical thrust slewing rings built for applications where the center of force remains within the slewing ring diameter under normal operating conditions. Rings, raceways, balls and separators only. Raceway diameters: Standard models from 12" to 180" Gearing: Available in gearless models only Capacities: Thrust: from 60,000 pounds and up Moment: Not applicable for moment loads Radial: Contact Rotek



Series 4000 slewing rings are two row ball slewing rings built with greater internal clearance than the Series 3000 model. Advantages include lower frictional torque and the ability to function in mounting structures with less accuracy and rigidity than required for other styles of slewing rings. Raceway diameters: Standard models from 12" to 180" Gearing: Gearless, internal or external gearing Capacities: Thrust: to 8,700,000 pounds Moment: to 24,000,000 foot-pounds Radial: to 860,000 pounds



High Speed Slewing Ring Configurations

Series 6000 slewing rings are single row, high-speed radial ball slewing rings, capable of raceway velocities of up to 3,000 feet per minute, with proper lubrication. Raceway diameters: Standard models from 12" to 180" Gearing: Gearless, internal or external gearing Capacities: Thrust: to 1,000,000 pounds Moment: to 2,500,000 foot-pounds Radial: to 244,000 pounds



Cross Roller Slewing Ring Configurations

Series 5000 slewing rings are built with V-groove raceways providing two roller paths in each ring, with rollers at right angles to one another. This design provides a higher theoretical dynamic capacity per unit size, greater stiffness, and a lower spring rate, than a single row ball slewing ring design. Raceway diameters: Standard models from 12" to 180" Gearing: Gearless, internal or external gearing Capacities: Thrust: to 4,600,000 pounds Moment: to 16,000,000 foot-pounds Radial: to 2,200,000 pounds



Overview: Our Extensive Design Experience Provides Effective Application Solutions

Rotek offers a unique combination of experience and technology in designing large-diameter slewing rings and rolled rings. We've designed and manufactured thousands of slewing rings and rolled rings for a wide array of application requirements. Our extensive experience combined with the use of sophisticated CAD/CAM and analytical technologies enables us to accurately predict final product capabilities and performance.



Our unique design capability is available on a no-charge basis to assist you and your prospects during the slewing ring specification process. Our team of application and design engineers can perform a preliminary design evaluation based on your particular application requirements. This comprehensive analysis includes a study of slewing ring design parameters, static and dynamic load capacities, bolted joint design and gear design parameters, just to name a few.

You can rely on Rotek to create the product design that delivers the most effective solution for your application. For more information, contact the Rotek Application Engineering Department at **1-800-221-8043**.

Overview: Integrated Facilities Provide Complete Manufacturing and Quality Control



Our integrated manufacturing capabilities – including two state-of-the-art ring rolling mills, heat treating facilities, complete machining facilities, and CNC/CAD/CAM technologies – allow us to offer our customers a high-quality product with shorter lead times and reliable delivery schedules.

With fully integrated manufacturing facilities, including two North American slewing ring plants and two seamless ring rolling mills, Rotek is able to machine and assemble our products with complete control over quality and scheduling.

Large-diameter slewing ring production begins at our 180,000 square foot rolling mill. Our rolling mills utilizes advanced production technologies, making them some of the most sophisticated facilities in the world.

Our production center includes state-of-the-art presses and rolling mills, complete heat treating capabilities and value-added machining operations, as well as modern quality assurance and testing.

Slewing ring production then continues at our manufacturing facilities, located in Florence, Kentucky and Aurora, Ohio. Each facility utilizes advanced CNC control technologies, as well as current CAD/CAM technologies. Rotek can ship your large-diameter slewing ring ready-to-install, or we can install the slewing ring into customer-supplied components to reduce your labor requirements for completed products.

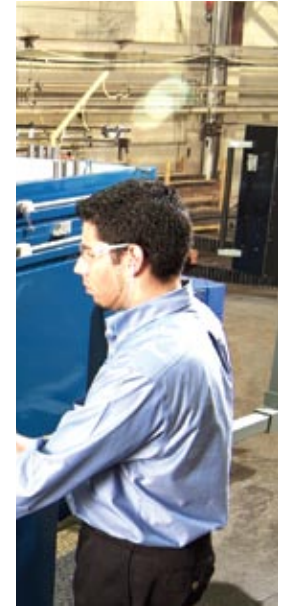
We've complemented our production expertise with a variety of customer-oriented business philosophies and techniques. Our Total Quality Management program and continuous improvement policy have earned certification to ISO 9001 and ISO 9002 standards.

Rotek Also Offers Worldwide Support

As an affiliate of Rothe-Erde, service is available virtually anywhere. With service facilities located in Germany, Brazil, Italy, China, India, Japan, Spain and Great Britain, our trouble-shooting network is ready to solve any slewing ring problem you or your customer might have — wherever it may occur.

Overview: Rotek Expertise Is Also Available After The Sale

Our customer-oriented services are extensive. Rotek offers experienced application engineering assistance and complete, worldwide after-the sale services, including installation supervision, preventative maintenance programs, and in-use slewing ring analysis. Rotek also offers refurbishment and replacement programs for slewing rings that require removal from service. Here is more detail on these services:



Installation/Change-Out Consultation and Supervision

Proper slewing ring installation is vital. That is why we offer consultation services and on-site supervision for the installation or change-out of any new or replacement slewing ring. We can also advise you on the proper mounting structure to assure maximum bearing performance.

Preventative Maintenance Programs

Rotek offers contracted preventative maintenance programs that provide regular inspection of your in-service slewing ring and the performance of scheduled maintenance procedures that can keep your slewing ring in peak condition and extend its service life.

In-Use Slewing Ring Analysis

To further extend the service life of your slewing rings, we can perform an on-site analysis of their performance in their current application. This in-use evaluation includes non-destructive testing and component wear analysis, as well as further maintenance recommendations.

Service Life Analysis

After your slewing rings have been removed from service, we can analyze wear patterns and make recommendations for replacement slewing rings that can provide a longer service life and better value.



Rotek Incorporated offers a diverse line of large-diameter slewing rings: ball and roller types in single-row and multiple-row configurations; with integral internal or external gearing, or gearless models; diameters from 12 inches to 50 feet; in a wide range of load capacities, materials, and seal composites.

Rotek also manufactures engineered seamless rolled rings in a variety of materials; in diameters from 15 inches to 160 inches; axial lengths up to 24 inches; weights up to 9,000 pounds; and in profiles from simple rectangular cross sections to complex contours.

Contact us at the address shown below for catalog materials or engineering information on any of our engineered products.

Specifications and other information appearing in this catalog are subject to change without notice.



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