Technitron
Integration Services
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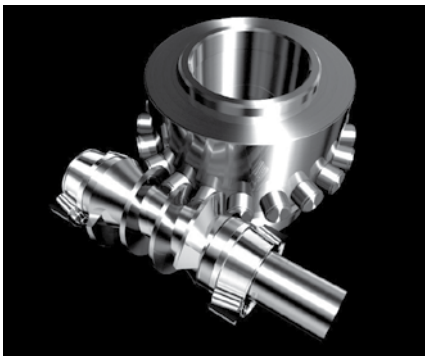
RollerDrive CNC™
The answer for a CNC rotary axis

Pure Motion By Zero-Backlash Technology

The RollerDrive CNC, a CNC rotary table, is designed to fulfill the demands of the latest machine tools for increased speed and precision. Inside, the RollerDrive CNC uses a RollerDrive, our zero-backlash reducer which transmits motion without distortions while staying robust against external forces unlike existing gears and torque motors. The high precision and rigidity achieved by the zero-backlash technology gives the RollerDrive CNC a rotational accuracy of less than ±10 arc sec. and repeatability of less than ±4 arc sec., and remains robust while doing heavy cutting work on hard metals.

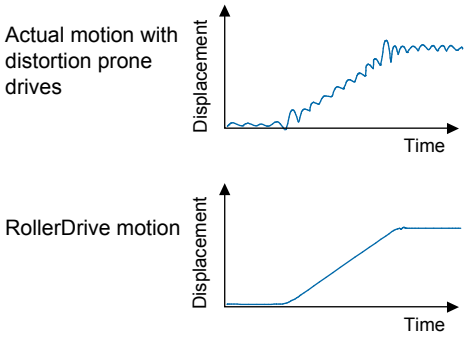


No Clamp Operation

The RollerDrive CNC does not require a clamp operation due to its mechanically rigid zero-backlash structure. This eliminates clamp and unclamp time and requires no energy like conventional hydraulic/air systems. Combined, the distortion-free performance and no-clamp design delivers ultra fast positioning that leads to higher productivity. For instance, a typical 90-degree rotation can be done within 0.4 seconds.

Perpetual Precision

The unique mechanism of the RollerDrive makes the RollerDrive CNC capable of withstanding years of operation without internal part wear or loss of precision. Regular calibration or readjustment work is unnecessary for the RollerDrive CNC.



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Mechanism

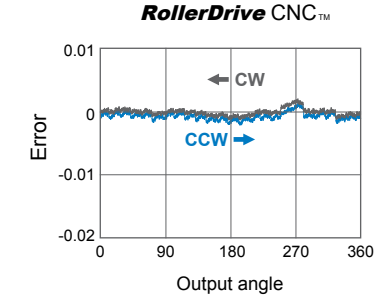
Performance By Zero-Backlash Technology

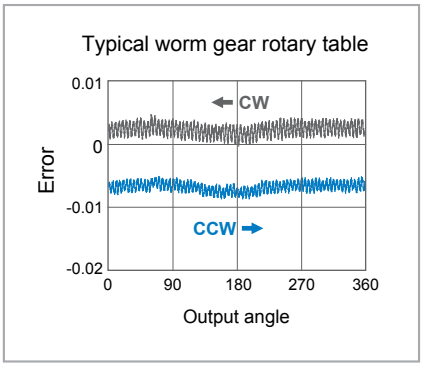
The main part of the RollerDrive mechanism consists of an input shaft and an output turret in which roller followers are embedded. An integral cross-roller bearing supports the output turret with minimal run out.

Preloaded roller followers contact the input rib surfaces with a wedge-shaped cross section, which can be adjusted by moving the input axis, to eliminate backlash completely. No backlash means superior precision and stiffness for both CW and CCW rotation, as shown on the diagram to the right.

Even with preload and zero-backlash, the needle-bearing type roller followers transmit power by rolling rather than sliding making it possible for the RollerDrive to achieve an outstanding efficiency of 90% or more and life-time wear-free durability.

All parts are made from only qualified alloy steels, and machined and ground with our ultra-precision machining system.





Approved Performance

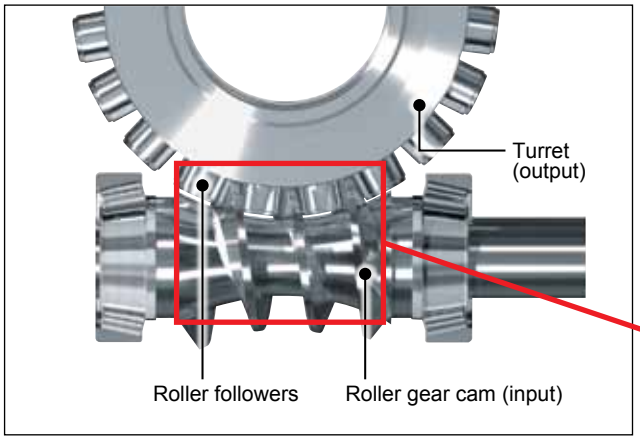
Be Distinctive

RollerDrive product series are widely used in various industries that require the highest in performance levels. Machine tool companies are not an exception and RollerDrive technology is already being applied to the world's leading machine tools.

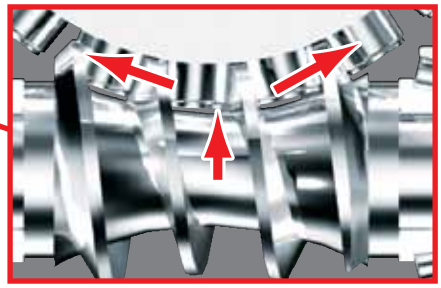
The "RollerDrive QUALITY" logo encompasses rotary axis speed, precision, and mechanical stiffness - essential performance qualities for standing up to heavy cutting work. This logo is available to RollerDrive users to make their applications distinctive in their market. Contact Sankyo Automation for details on the use of this logo.

RollerDrive QUALITY™
by Sankyo Automation

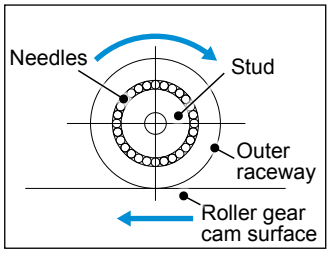
Exclusive Zero Backlash Structure



Preload Mechanism



Internal Construction of the Roller Follower



Rolling contact Preload

Features

- No backlash
- Power transferred by rolling contact eliminates wear
- High accuracy and good efficiency
- Preloadable for high rigidity

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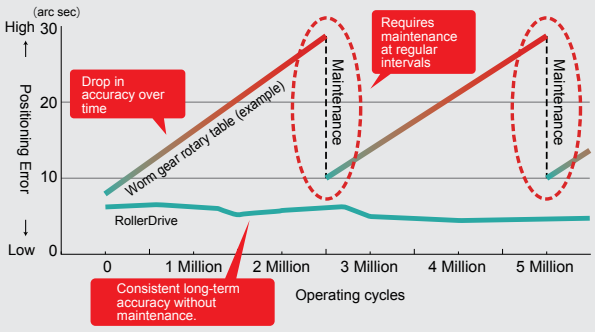
Low Maintenance and Excellent Price Performance

Consistent long-term accuracy without need for backlash adjustment.

Positioning Accuracy Aging Test

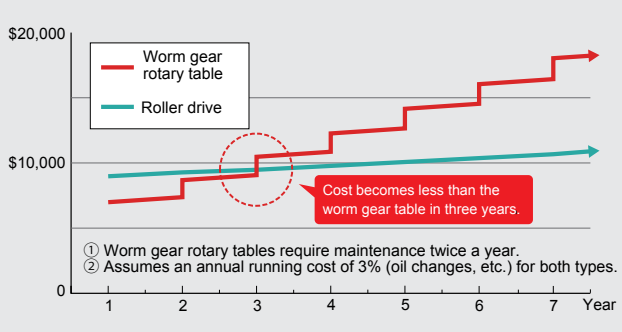


The RollerDrive graph is based on internal testing.

- Worm gear models
  Accuracy declines over time. Requires maintenance to achieve initial accuracy.
- The RollerDrive
  Accuracy is consistent with no maintenance even after 5 million operation cycles. (Requires regular oil changes)

Cost Comparison Versus Worm Gear Rotary Table
Offers Long-term Use Low Maintenance

Initial Cost versus Annual Maintenance Costs



① Worm gear rotary tables require maintenance twice a year.
② Assumes an annual running cost of 3% (oil changes, etc.) for both types.

Cost simulations are based on a table diameter of about 200 mm.

- Worm gear models
  Maintenance costs occur once or twice a year to adjust the backlash.
- RollerDrive
  Long-term use is possible without any mechanical maintenance.
  Beats the cost of a worm gear even after adding annual running costs to the initial investment cost. Price performance continues thereafter.

Based on internal calculations.

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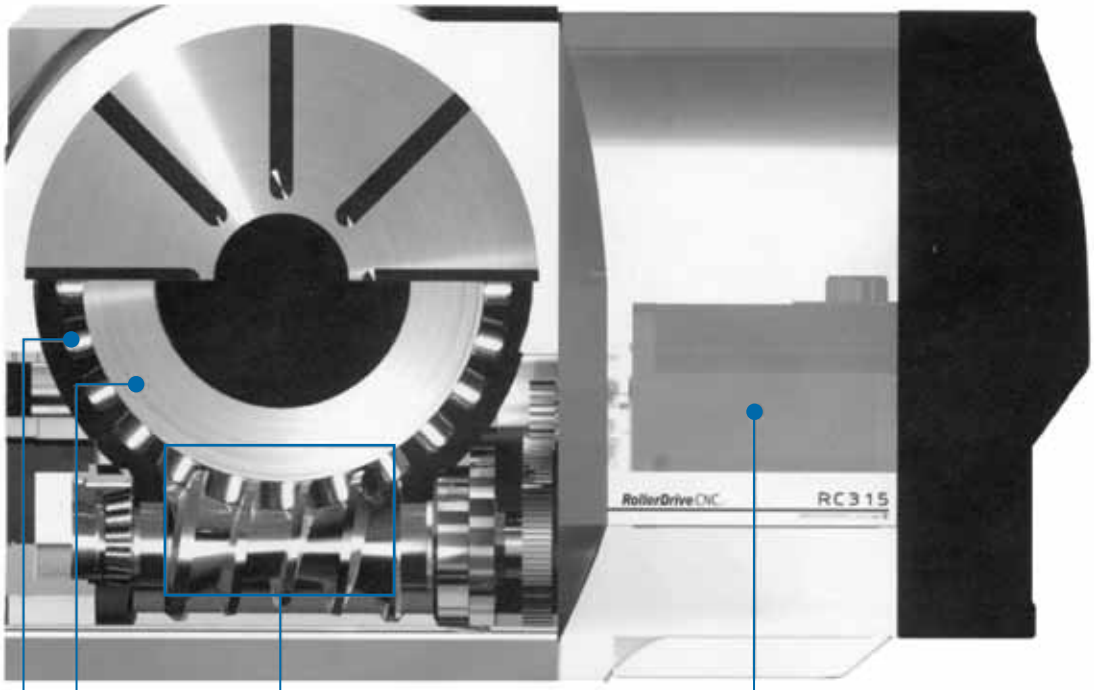
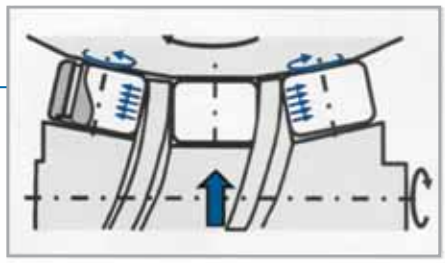


Servo Motor



Preload + Rolling contact achieves zero-backlash and long life

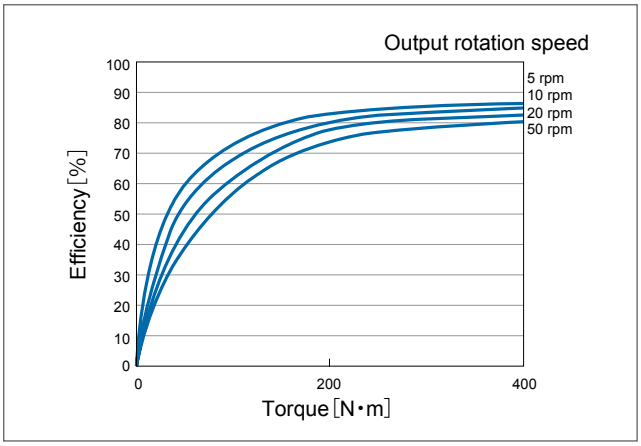
Outstanding rotating accuracy and rigidity with the integrated cross roller bearing

Shock resistant, high-performance cam followers

Efficiency

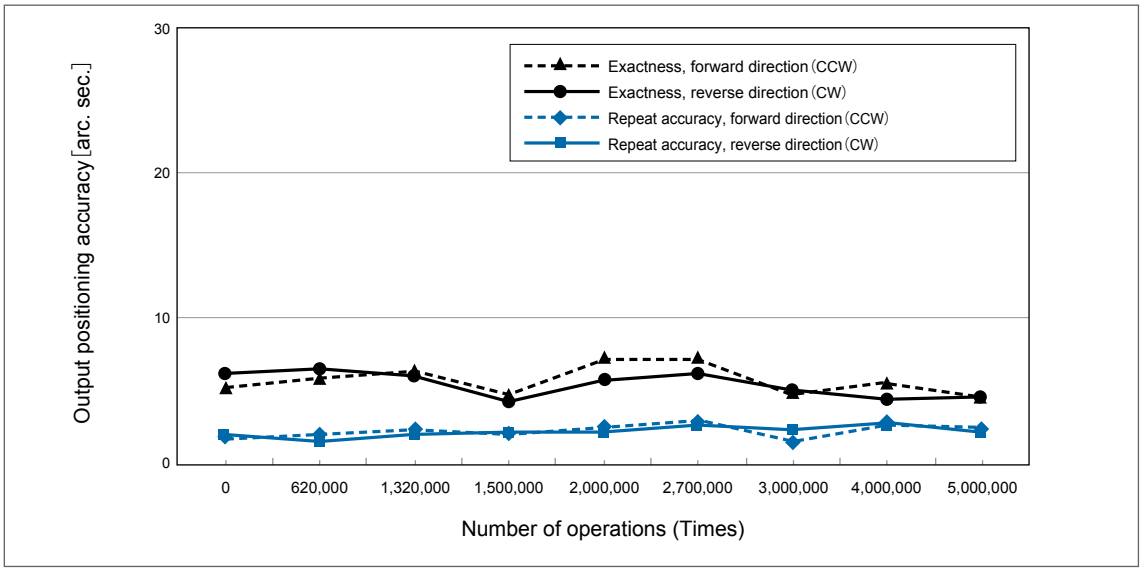
This indicates the percent of input power which is transmitted to the output. The ***RollerDrive***® motion mechanism has high efficiency because it employs rolling contact. Efficiency varies depending on conditions such as load torque, rotation speed and temperature.

RCC250



Durability

RollerDrive® Test of changes in RollerDrive positioning accuracy over time



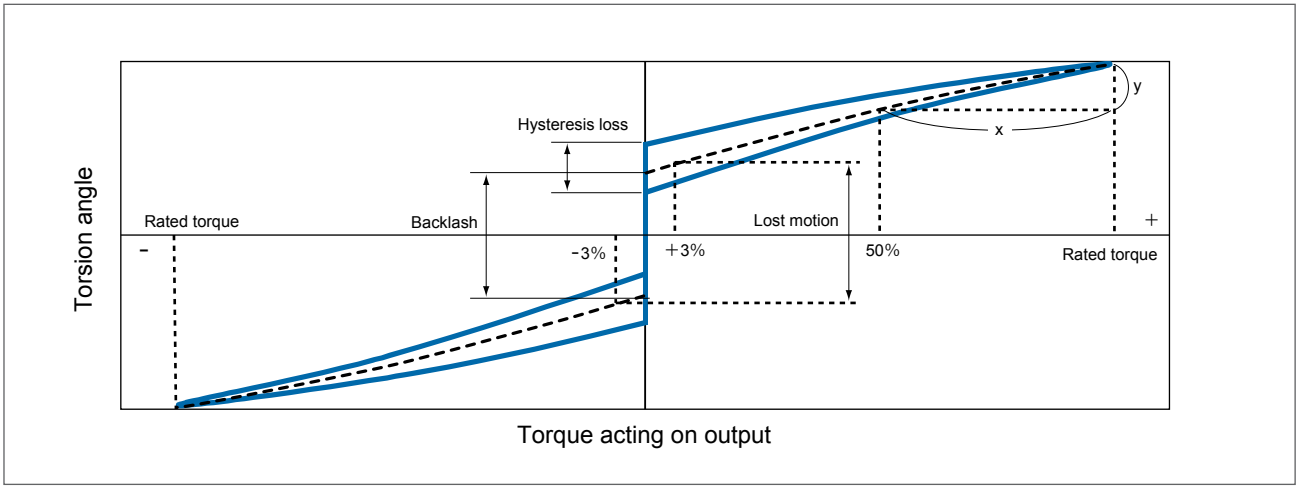
Test Conditions	
RollerDrive size	RCC250 class test machine
Output load weight	152 kg (φ500mm)
Output load moment of inertia	4.69 kg・m^2
Output rotation angle	0-345 degree (Reciprocating)
Output maximum rotation speed	100rpm
Acceleration time	0.100 sec
Constant speed time	0.475 sec.
Deceleration time	0.100 sec.

In the ***RollerDrive***®, all rotating elements operate in a state of rolling contact, and thus there is almost no wear, or degradation in accuracy over time.

There is almost no change in positioning accuracy after testing operation (5) million times, and this shows that the outstanding accuracy of the ***RollerDrive***® can be maintained over the long term.

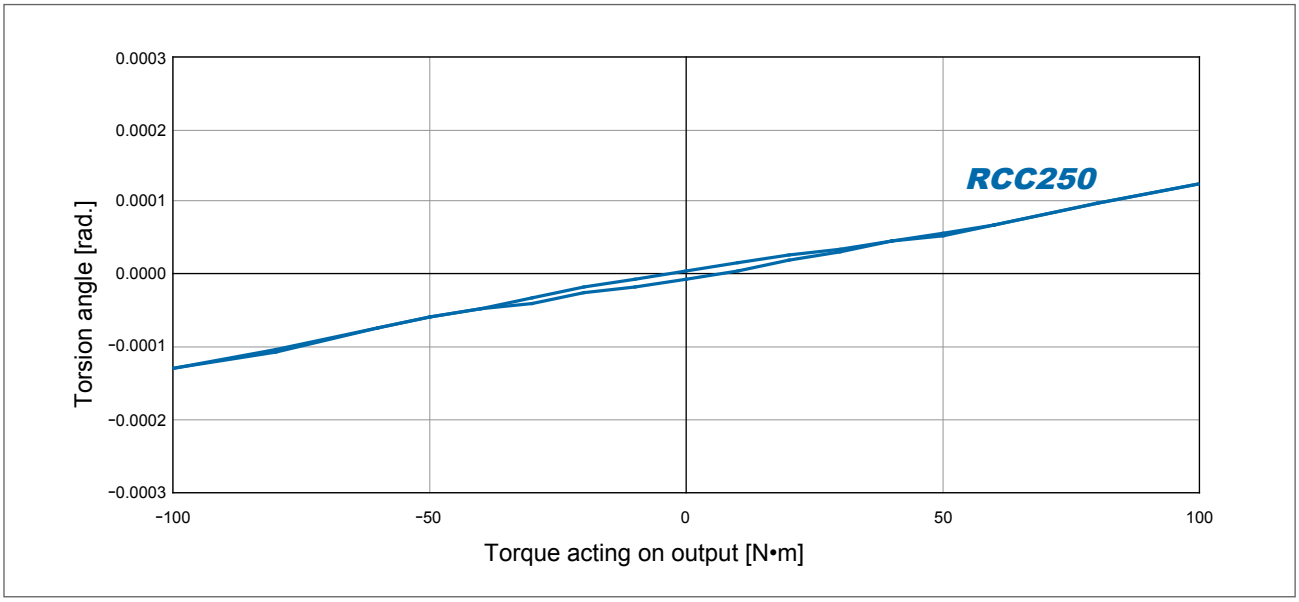
Backlash, Lost Motion & Hysteresis Loss

General Hysteresis Graph



Backlash	Rotation angle which can arise even with zero torque (looseness)
Lost motion	Torsion angle of the midpoint of the hysteresis curve width which arises when applying ±3% rated torque
Hysteresis loss	Torsion angle where there is no complete return, when torque is applied in both forward and reverse directions

RollerDrive® Hysteresis Graph



For a general reducer, the hysteresis graph can be obtained by applying torque to the output shaft, and plotting the generated torsion angle.

Backlash, lost motion and hysteresis loss can each be defined from the hysteresis graph, as indicated above.

Lost motion and hysteresis loss depend on the material characteristics, and occur in all types of structures. Backlash, on the other hand, occurs only when there are gaps or looseness in the structure. Backlash has a major effect on accuracy, servo gain and similar factors, and must be minimized.

With ***RollerDrive***®, backlash is completely eliminated using our unique preload structure, and lost motion and hysteresis loss are controlled to extremely small values due to the results of research on optimizing materials and structures.