Quality Manufacturing Processes

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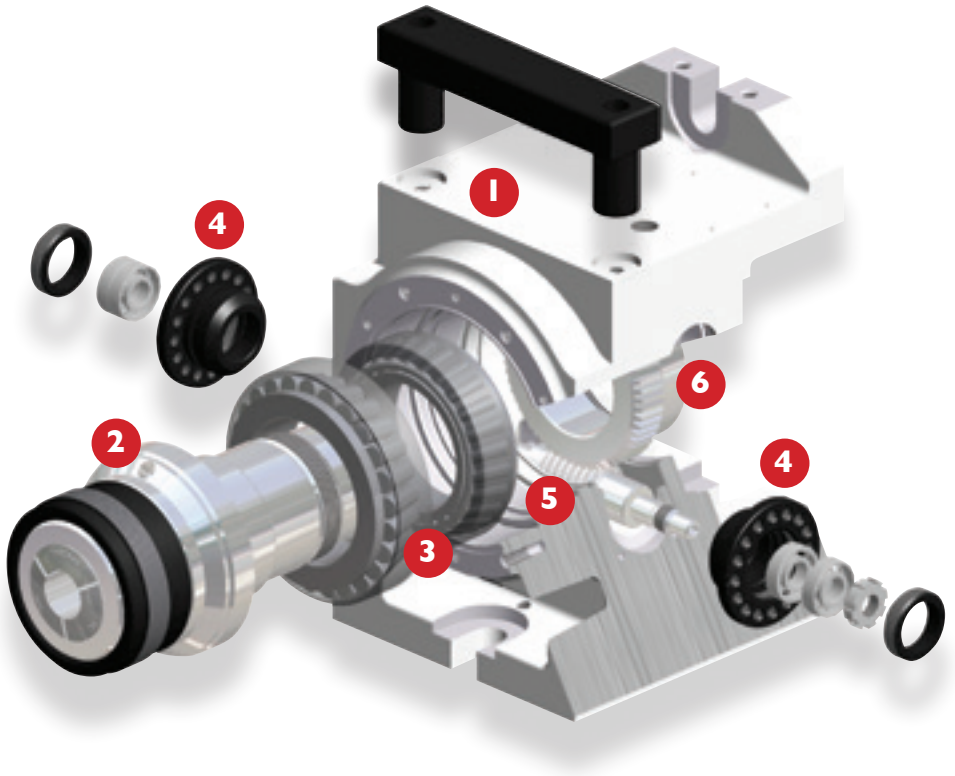
Hardinge's GD5C2 has higher accuracy, more spindle clearance and more thrust and radial load.
All rotary products are manufactured in Elmira, New York to strict specifications.

Curved front casting and removable handle for increased spindle clearance and better tool access.

±5 arc-sec Repeatability
±30 arc-sec Accuracy
.0002" Max. Runout (.005mm TIR)

Robust, dual-bearing spindle for heavier radial and axial loads.
50-lb (23kg) part weight and 1000-lb (4448N) tailstock thrust per spindle is not a problem – even on a quad unit with tailstocks!



Hardinge next-generation 5C² mechanically outmaneuvers the competition.

1. HOUSING
Machined and bored on a Dixi 280 precision CNC jig boring machine for close tolerance finish dimensions. Foundry castings (made in the USA) provide vibration damping.

2. SPINDLE
Spindle is finish ground on a high-precision Kellenberger® CNC universal grinding machine. All surfaces where bearings and gears are installed are ground in the same setup for maximum accuracy.

3. BEARINGS
High-load, tapered dual roller bearings are used to support heavy radial and axial loads and to provide a longer spindle life.

4. DOUBLE ECCENTRICS
Double eccentrics (not single) provide the finest gear mesh adjustment. Hardinge has lowered the backlash range and improved accuracy overall. Customers can perform future gear wear compensation for extended life and improved accuracy over time.

5. WORM DRIVE SHAFT
Hardened and ground steel worm drive shaft is standard. The process begins on a Hardinge SUPER-PRECISION® CNC lathe and the threads are finish ground on a Drake thread grinder. Grind quality of AGMA class 13 is verified on a Wenzel CNC gear inspection machine.

INSPECTION
Final inspection of every unit is performed using a Heidenhain encoder mounted directly on the spindle nose to assure final positioning accuracy and repeatability. Printout of accuracy is shipped with each unit.

6. ALUMINUM BRONZE WORM GEAR
A high quality worm gear system with 60:1 gear ratio allows for an efficient forward driving capability while at the same time preventing backdriving from occurring. The process begins on a Hardinge SUPER-PRECISION® CNC lathe, then hobbed on a Koepfer hobber.

SEALING
Hardinge has an extremely thorough seal system to keep coolant out.

MULTIPLE PART SETUPS
Choose from dual, triple and quad units for processing multiple parts to increase output. All spindles are synchronized for aligned part orientation within .0002" (.005mm).

THE EVOLUTION OF THE HARDINGE 5C² INDEXER SYSTEM

1901 Hardinge manufactures the 5C Collet

1940 Hardinge manufactures and introduces the 5C "threaded-nose" spindle

1940's Hardinge manufactures a 5C dividing head

1960's Hardinge manufactures 5C manual indexers using Hardinge's threaded-nose spindle & collet closer design

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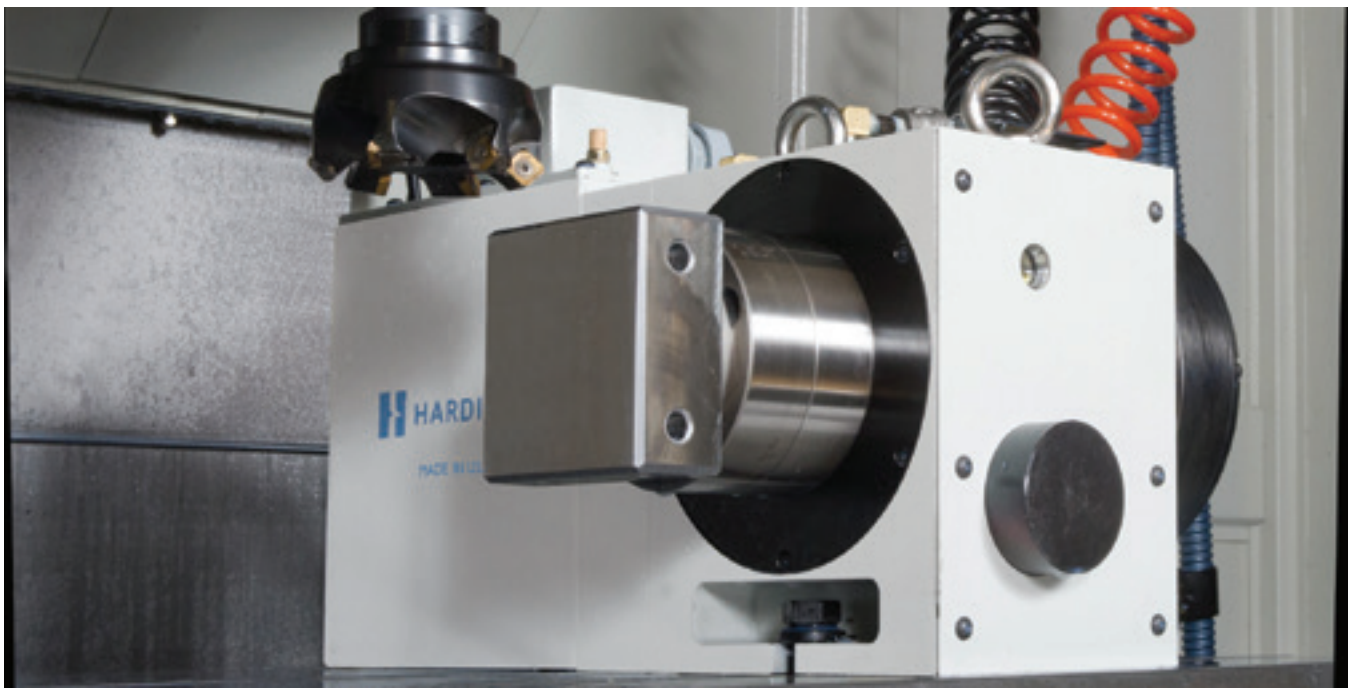
Hardinge Collet-Ready Spindles provide the most Flexible Rotary Products in the industry!

Hardinge rotary systems accept many styles of standard tooling without an adapter, which is unique in the industry.
You can purchase a complete system all tooled up and ready to run your parts.
Rely on the spindle tooling experts for the accuracy and repeatability to get the job done.

All-digital Indexer Control with USB capability

Hardinge indexer controls have USB capability for convenient upload or download of programs from a Windows-based Pocket PC.



2004
Hardinge manufactures 5C Rotary Systems based on 1960's mechanical design

2007
Hardinge manufactures and introduces the next-generation 5C² Rotary System

2014
Hardinge introduces the next generation of Indexer Control

MADE IN THE U.S.A.

Manufactured in the USA

Hardinge rotary products are manufactured in Elmira, New York to strict specifications and are approved for worldwide export.

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Fourth-Axis Integration

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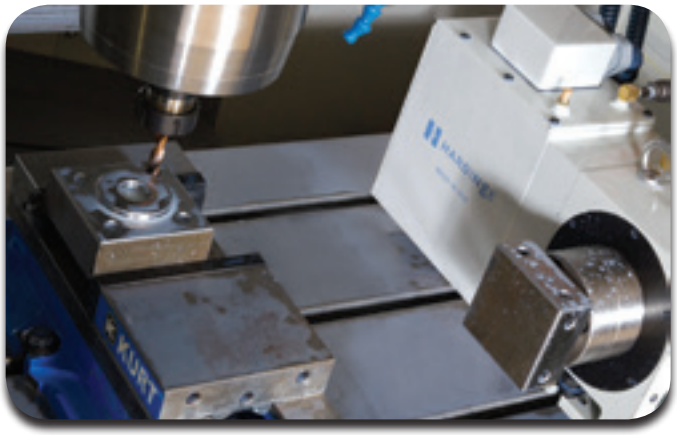

GD160LP Rotary mounted in a Bridgeport® vertical machining center machining six sides of the part.

GD160LP Rotary and GD210LP Rotary.

Spiral milling application on a Bridgeport knee mill using a 5C² indexer and manual tailstock.

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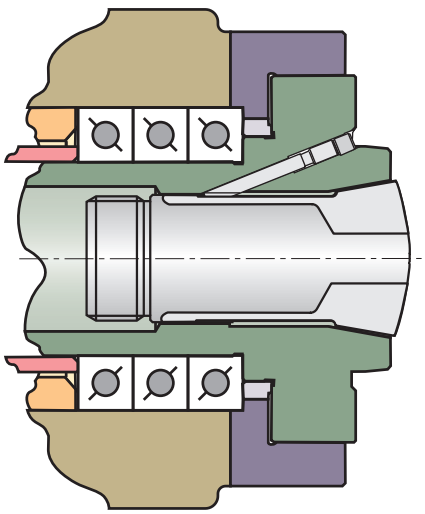
Advantages of the Hardinge Spindle

- Collet seats directly in the Hardinge spindle
- Minimum overhang from the spindle bearings assures that spindle accuracy is transferred directly to the workpiece
- Maximum rigidity and gripping power transferred to the part
- Minimum weight on spindle
- Optimum T.I.R.
- Gripping force directly over the workpiece
- Superior tolerances and finishes
- Quick changeover— collet draw tube is easily and accurately adjusted from the back of the spindle
- Ability to use a wide variety of workholding devices 3-jaw chucks, collets, quick-change collets, step chucks, expanding collets, Dead-Length® systems, fixture plates and others

GD160LP

16C

GD210LP

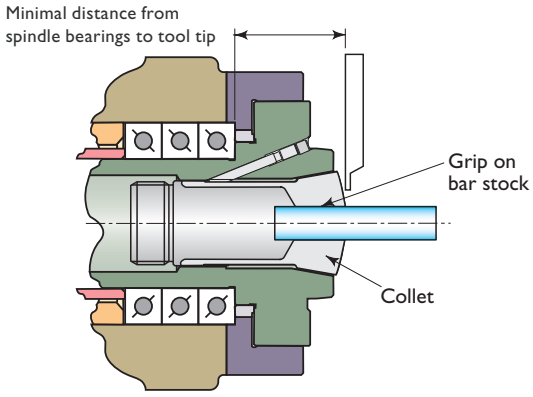


Hardinge Spindle shown with Collet

Image does not represent actual indexer design.

Disadvantages of other Rotary Spindle Designs

Hardinge Spindle Design – no collet adapter required



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Other Rotary Spindle Design – collet adapter required

Other spindle designs require the use of a collet adapter creating an extreme overhang from the spindle bearings.

Any error in the spindle is multiplied by the overhang distance.

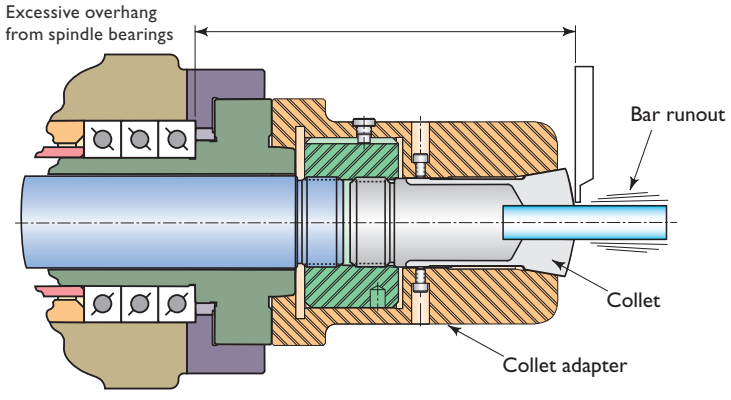

Image does not represent actual indexer design.

This spindle design:

- Is not rigid
- Is not easily adjusted
- Creates poor T.I.R.
- Reduces the work envelope
- Creates excessive overhang
- Does not allow quick changeover