

Direct-Drive, Super-Precision<sup>®</sup>  
Rotary Systems



*See how  
we've grown:*

**NEW** Direct-Drive, High-Torque  
Super-Precision<sup>®</sup> Rotary System

**NEW** Direct-Drive, High-Speed,  
Super-Precision<sup>®</sup> Rotary System

**NEW** Plate Trunnions

**NEW** Cube Trunnion

**NEW** Dual-Bearing Spindle  
5C Indexing Systems

**NEW** I6C/3J Rotary Systems

5C Rotary Systems

Singles, Duals, Triples, Quads

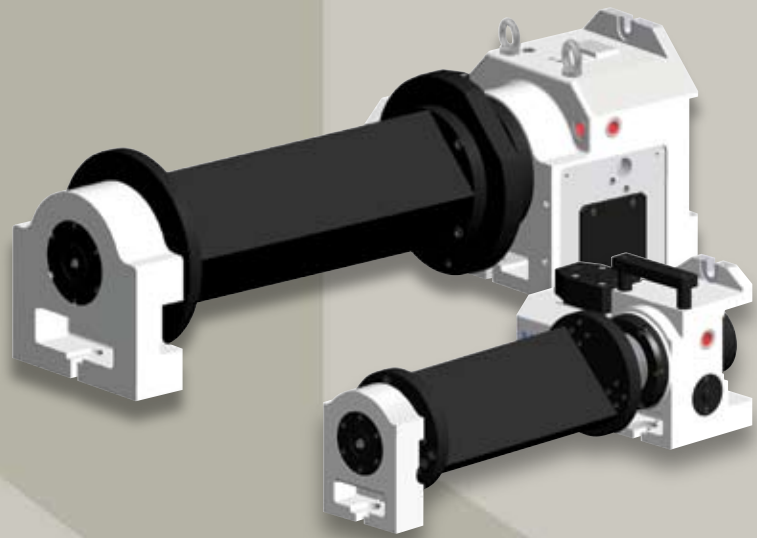
All-digital Servo Control

Tailstocks

Collet Closer Options

Spindle Tooling

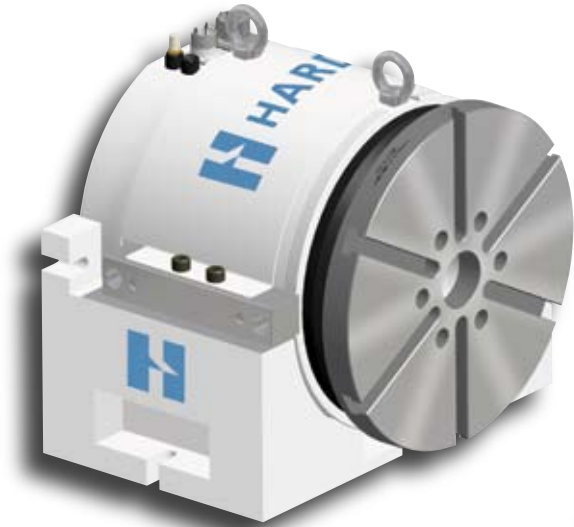
Trunnion Products



High-Precision, Gear-driven  
Rotary Systems



# Direct-Drive, Super-Precision® Quick-Change Rotary Systems™



**New  
DIRECT-DRIVE  
models**



## *Direct-Drive Advantages...*

Direct-drive, rare-earth permanent magnet torque motor

- No mechanical gearing, fewer parts to wear
- Zero backlash, high servo stiffness
- Rapid bidirectional response
- Wraparound motor for smaller footprint
- Super-Precision® positioning accuracy and repeatability

### **A2-5, 16C High-Torque Rotary System**

The **A2-5, 16C High-Torque, Super-Precision® Quick-Change Rotary System™** is ideal for difficult, high-precision machining or jig grinding applications requiring 4- or 5-axis interpolated machining or for parts that require extremely accurate angular positioning. Because it has no gears or mechanical elements, it is a workhorse for applications which require limited rotational movement but which repeat for long periods of time.

The zero backlash permits rapid bi-directional movement, without loss of time used to compensate for position over-travel, which means more time in the cut. Thermal isolation mounting arms with a cast iron base provide uniform heat dissipation to hold the centerline of the spindle constant.

A pneumatic collet closer is equipped with a dual cylinder resulting in 4560-pound (2068kg) of adjustable draw bar pull.

The accuracy of this system will enable very impressive process capabilities which yield impressive bottom line performance. A spindle clamp/brake is available, but not required for most jobs due to high servo stiffness.

### **A2-4 5C High-Speed Rotary System**

The **A2-4 5C High-Speed, Super-Precision® Quick-Change Rotary System™** is designed to position extremely fast with a high degree of accuracy and without backlash. An astonishing 3,600 degrees-per-second indexing speed, combined with the advantages of a direct-drive system, make this indexer ideal for drill & tap, laser processing, and intricate or high-speed milling applications. The design provides a solution to the problem found with high-speed milling machines having to wait for the rotary axis to position.

The High Speed system is offered as both an integrated 4th axis or as a standalone indexer driven by Hardinge's all-digital, user-friendly servo control. A fail-safe, thru-hole collet closer is standard.

The high-tech, yet simplified design with Super-Precision® positioning and repeatability will dramatically increase productivity and accuracy.

## Specifications

Rugged cross roller bearing for high-moment loads with super rigidity

Wraparound liquid-cooling increases continuous torque output by 38% (HT) and 100% (HS) when used for rigorous duty cycles and heavy cutting

Integrated axis capability for operation at maximum machine capability — full use of high-speed machining and machine's "Look-ahead" programming

Model	HIGH-SPEED	HIGH-TORQUE
Spindle Nose	A2-4, 5C	A2-5, 16C
Backlash (arc/sec)	ZERO	ZERO
Speed (degrees/sec)	3600	1500
RPM Maximum	600	250
Load Support	Cross roller bearing	Cross roller bearing
Torque Holding <sup>1</sup> (ft-lb/Nm)	108/146.0	345/467.7
Centerline (inch/mm)	4/101.6	7/177.8
Accuracy <sup>2</sup> (arc/sec)	±2.19	±2.19
Repeatability (arc/sec)	.01	.01
Gear Diameter	NO GEAR	NO GEAR
Resolution <sup>2</sup> (arc/sec)	±.077	±.077
Rare-Earth Perm. Magnet Torque Motor		
Maximum Torque (ft-lb/Nm)	28-56/38-76	195/264.4
Continuous Air-Cooled <sup>3</sup> (ft-lb/Nm)	3.8-7.6/5.2-10.4	63/85.4
Continuous Water-Cooled <sup>3</sup> (ft-lb/Nm)	7.5-15.0/10.2-20.4	87/117.9
Duty Cycle at continuous rated torque	100%	100%
Max. Air Pressure (psi/bar)	80/5.5	120/8.3
Weight (pounds/kg)	50/22.7	345/156.5

Notes: 1 – combination of stall torque plus clamping torque available  
 2 – accuracy and resolution of spindle-mounted direct feedback encoder  
 3 – continuous torque available 24/7, 365 days



Hardinge's new Direct-Drive Super-Precision<sup>®</sup>, Quick-Change Rotary Systems<sup>™</sup> include a drawbar actuator to accept a variety of workholding systems.

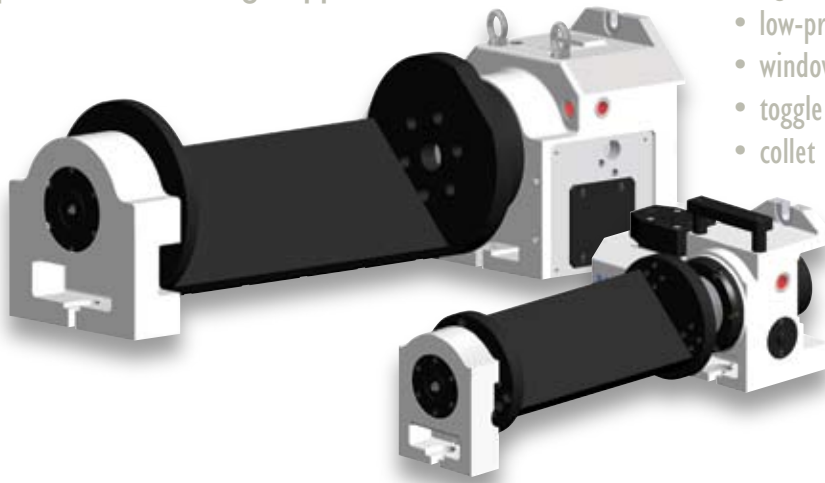
- Reduce Setup
- Precision Capability
- Share Spindle Tooling

## The Most Flexible Quick-Change Workholding Concept on the Market...

Hardinge's A2-4 (5C) and A2-5 (16C) spindle nose designs allow quick change between collets, expanding collets, step chucks, power chucks and face plates. Common spindle tooling can be shared between the Hardinge Quick-Change Rotary system(s) and a lathe. The gripping is in the spindle, closest to the spindle bearings, unlike surface-mounted adapters used on traditional rotary tables. Multiple workholding options provide alternate gripping solutions for increased precision and capability.

# Hardinge Trunnion Products

with super robust bearing support



Imagine the possibilities...

- low-profile clamping
- window box fixturing for 4-sided machining
- toggle and saddle clamping
- collet blocks

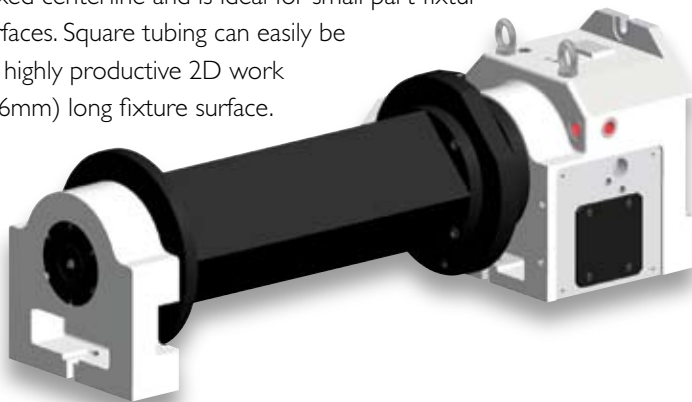
## Rotary Tooling Systems – Plate and Cube styles

Hardinge Rotary Tooling Systems allow for multiple part fixturing to increase output. A second plate or cube can be loaded and ready to mount when the first unit is finished to maximize cutting time. All parts can be machined efficiently with the same tool before going to the next tool.

Trunnions can be ordered with standard Hardinge Indexing Systems and can be field installed by the customer to an existing Hardinge indexer. Plates and cubes are made of blackened steel for ease of drilling and slotting according to the application requirements, either by Hardinge or by the customer. Custom-manufactured plates are available. A bearing pillow block assures rigid, accurate positioning and will accommodate heavy loads.

### Cube Trunnion

The 4" x 4" (101.6 x 101.6mm) A2-5 Indexer Cube Trunnion remains at a fixed centerline and is ideal for small part fixturing on four surfaces. Square tubing can easily be configured for highly productive 2D work on a 19" (482.6mm) long fixture surface.



## Plate Trunnions

5C and A2-5 Indexer Plate Trunnions have a 3-position adjustable centerline to accommodate various part heights. The 5C Plate Trunnion mounts using a collet-style face plate with a 1" x 5" x 12" (25.4 x 127.0 x 304.8mm), 2-sided fixture plate.

The A2-5 Plate Trunnion will bolt on to the spindle nose and has a 1" x 8" x 19" (25.4 x 203.2 x 482.6mm), 2-sided fixture plate. 5C Pneumatic collet blocks will mount to the plate to accept collets, expanding collets or step chucks.

Hardinge Rotary Tooling Systems are compatible with Hardinge's standard indexers with any collet closer configuration. A full 360-degree revolution can be made depending on clearance of the part setup.

Overall Length with

Hardinge Standard Indexer:

<b>5C Plate</b>	23.897" (606.9mm)
<b>A2-5 Plate</b>	35.490" (901.45mm)
<b>A2-5 Cube</b>	35.490" (901.45mm)

Centerline of standard Hardinge Indexers: (Plate Trunnions have 3-position adjustability)

<b>5C</b>	4" (101.6mm)
<b>A2-5 16C/3J</b>	6" (152.4mm)

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