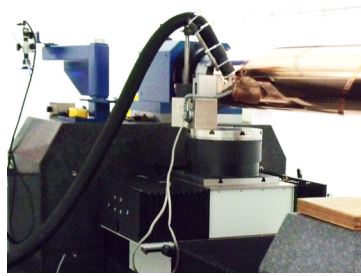


Large HydroRound® II on a Freeform® TL with Levicon Spindle



Small HydroRound® II on DRL2000HS

## HydroRound® II B-Axis

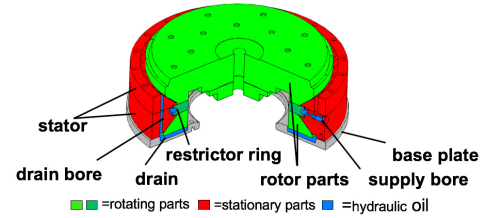
The HydroRound® II, a hydrostatic oil rotary bearing, is an accessory for our Nanoform® machines and Drum Roll Lathes (for variable angle machining on cylindrical surfaces).

The B-axis option can be installed on all Precitech machines in the factory or added to a machine already in the field. Precitech's exclusive Virtual Center Technology (VCT) enables multiple tools to be used in tool normal mode at the same time.

**HydroRound II Improvements:**  
Refined encoder error mapping techniques enabling

- 10X improvements in the industry standard position accuracy
- Enables use of the B-Axis as an ultra precision tool turret
- Form accuracy of XZB acceptance part now valid for tools located anywhere within 100 mm of the center

► **Improve part quality due to best-in-industry stiffness enabled by a unique self-compensating restrictor design**

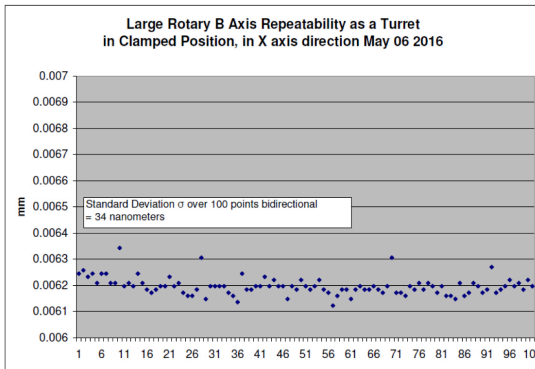
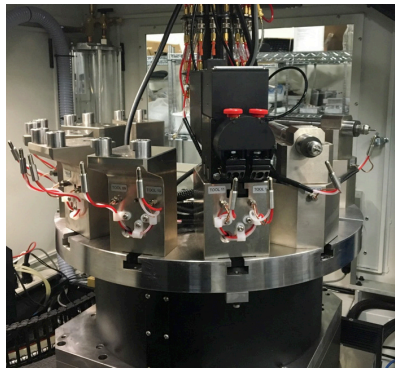


► **Increased productivity with quick tool setting enabled by Virtual Center Technology (VCT)**

► **Ultimate flexibility enabled by use as ultra precision tool turret**

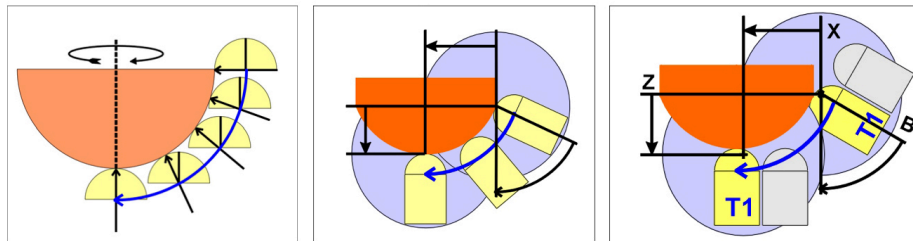
► **Higher damping characteristics vs. air bearing designs**

Large HydroRound® II on a Freeform® TL used as an ultra precision tool turret



Shown with 10 fixed tools, dual FTS1000, 2 marking spindles (or Levicon spindle), and 16 individual spray mists

Virtual center technology (VCT) exclusively available from Precitech



Traditionally tool normal machining required a time consuming process to set tools directly at the center of the B-Axis. With VCT, the tool can be simply set close to the center of the B-Axis, similar to setting tools on a 2 axis lathe. The UPx controller uses X and Z motion to keep the tool normal to the surface as if it were at the center of the B-Axis.

**Additional benefits of a B-Axis:**

- **Tooling is the single largest cost of ownership item for ultra precision machining. Precitech’s HydroRound II B-Axis pays for itself by reducing the cost of diamond tools.**
  - Tool normal machining allows the use of non-controlled waviness vs. controlled waviness tools
  - Tool normal machining allows the use of the full tool sweep, increasing tool utilization
- **Tool normal machining with Precitech’s HydroRound II B-Axis:**
  - Enables the manufacture of parts with high curvature that could not otherwise be made with a single diamond tool



Example steep angle fresnel requiring B-Axis

- Reduces the cutting cycle time of high efficiency diffractive optics utilizing split radius tools

	<b>381 mm (700 Ultra)</b>	<b>330 mm (Nanoform X, DRL)</b>
Table Top Size	381 mm (15 in.) dia.	330 mm (13 in.) dia.
Load Capacity	454 kg (1000 lbs.)	225 kg (500 lbs.)
Max. Speed	10 RPM	10 RPM
Motor Torque	6.8 N-m (6 ft-lbs.)	4.1 N-m (3 ft-lbs.)
Radial Error Motion	0.10 μm (4 μin.) @ 1” above table*	0.10 μm (4 μin.) @ 1” above table*
Coning Error	1.0 nm/mm (1.0 μin./in.)	1.0 nm/mm (1.0 μin./in.)
Radial Stiffness	525 N/μm (3,000,000 lbs./in.)	225 N/μm (1,280,000 lbs./in.)
Axial Stiffness	875 N/μm (5,000,000 lbs./in.)	600 N/μm (3,428,000 lbs./in.)
Moment Stiffness	17 N-m/μrad (150 lbs.-in./μrad)	3.4 N-m/μrad (30 lbs.-in./μrad)
Positioning Accuracy	<b>+/- 0.1 arc-sec</b>	<b>+/- 0.1 arc-sec</b>

*10x improvement in industry standard of +/- 1 arc-sec*

\*Can be reduced to <1 μin. at the working height of the tools by employing Precitech’s exclusive UltraMapping option