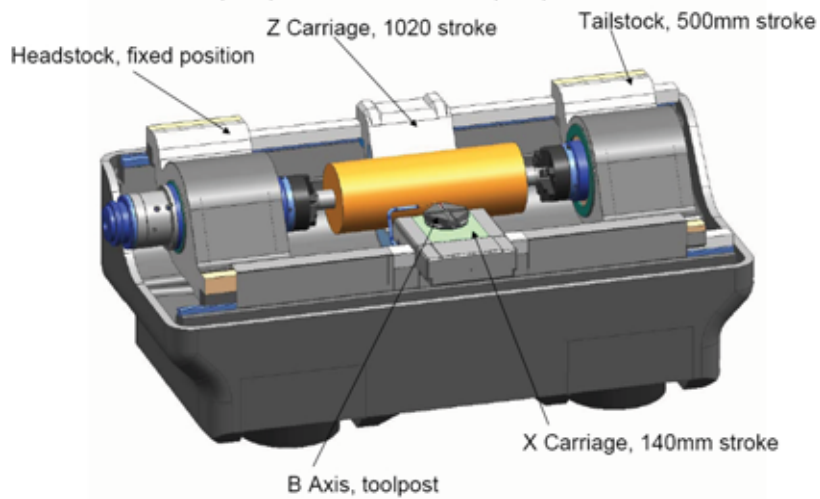




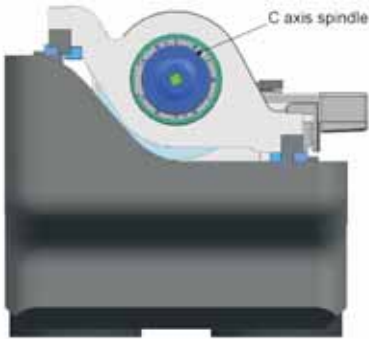
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Cranfield Precision UK

Machine view without enclosure or services slide with
406mm (16") diameter 1015 (40") face width roll



ECOR 1640
ROLL TURNING MACHINE
Diamond Turning
Optical Quality Components



Cranfield Precision has designed a Roll Turning Machine for production level machining of optical quality components.

Using Advanced 3D CAD techniques and FEA the ECOR 1640 Roll Turning Machine has been designed to have very good thermal stability, high stiffness and good damping.

The main axis of the machine uses a stepped hydrostatic design with rail positioning that provides 0 roll errors drastically reducing the majority of errors experienced on conventional lathes.

Specification

Workpiece

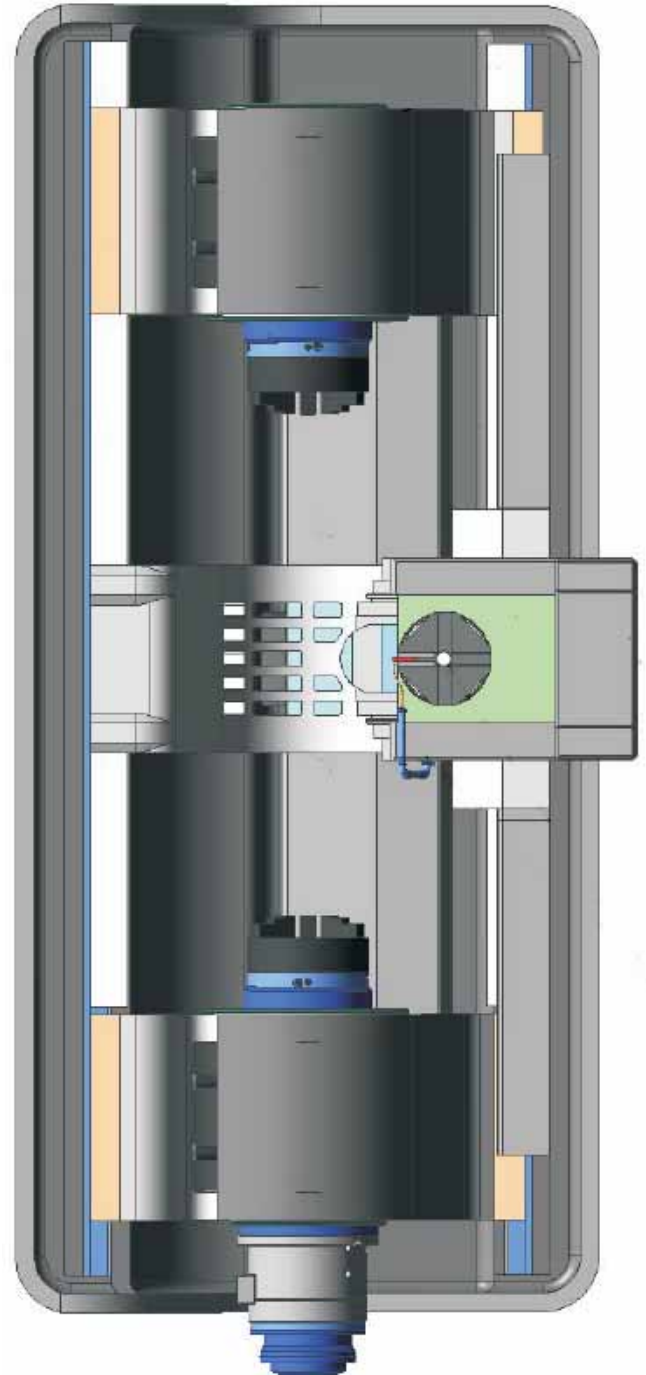
- ▶ Diameter 410 mm (16")
- ▶ Length 1016 mm (40")
- ▶ Weight 400 Kg (880lb)

X Axis (Infeed Axis)

- ▶ Stroke 140 mm
- ▶ Compensated accuracy <0.5 μm
- ▶ Feedback resolution <1.0 nm
- ▶ Bearings Hydrostatic oil
- ▶ Drive Linear motor
- ▶ Thrust 600 N Continuous, 2410 N Peak
- ▶ Velocity 100 mm/sec
- ▶ Acceleration 3.5 m/sec²

Z Axis

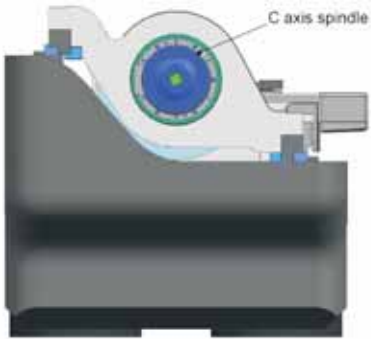
- ▶ Stroke 1020 mm
- ▶ Compensated accuracy <2.0 μm
- ▶ Feedback resolution <1.0 nm
- ▶ Bearings Hydrostatic oil
- ▶ Drive Linear motor
- ▶ Thrust 450 N Continuous, 2006 N Peak
- ▶ Velocity 100 mm/sec
- ▶ Acceleration 0.5 m/sec²



Plan View



CERT. NO. 920237



Specification

C Axis Work spindle

- ▶ Load capacity 300 Kg
- ▶ Speed 1200 rev/min under C axis control.
- ▶ Feedback resolution <0.05 arcsec
- ▶ Asynchronous error motion
<0.1 μm radial at spindle nose
- ▶ Synchronous error motion
<0.13 μm radial at spindle nose
- ▶ Drive Brushless DC

A Axis Tailstock Spindle

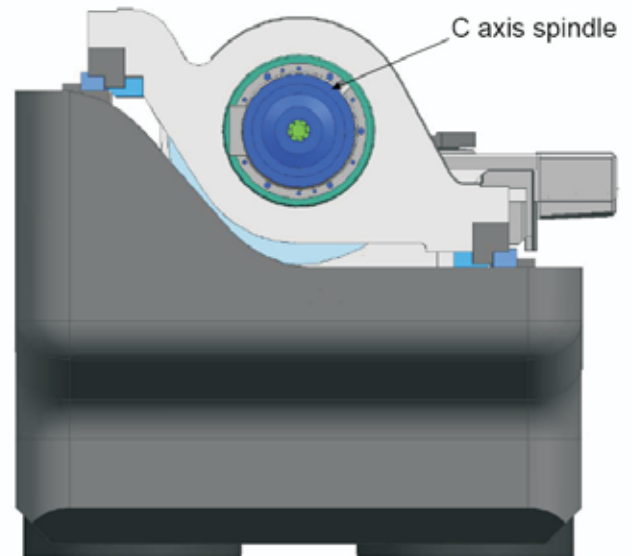
- ▶ Load capacity 300 Kg
- ▶ Speed 1200 rev/min.
- ▶ Asynchronous error motion
<0.1 μm radial at spindle nose
- ▶ Synchronous error motion
<0.13 μm radial at spindle nose

W Axis Tailstock Spindle

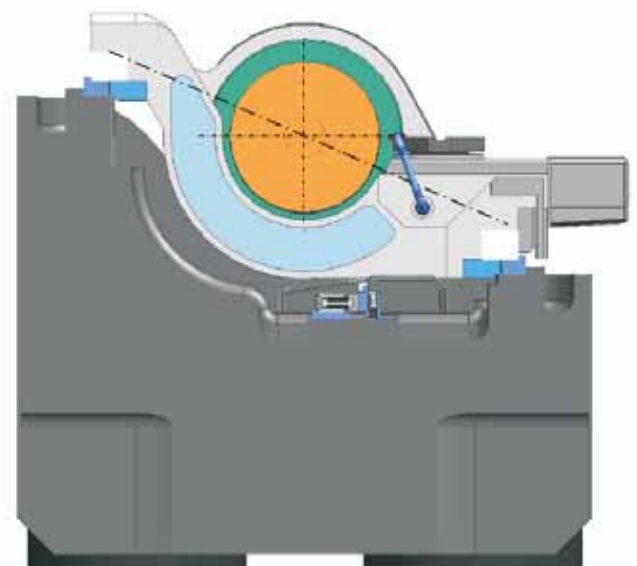
- ▶ Stroke 500 mm
- ▶ Accuracy <0.5 μm full stroke
- ▶ Positioning Powered automatic

B Axis Tool Spindle

- ▶ Stroke Unlimited
- ▶ Bearing type Hydrostatic oil
- ▶ Radial stiffness 440 N/im
- ▶ Axial stiffness 1225 N/im
- ▶ Load capacity 100 Kg
- ▶ Feed back resolution 0.05 arc seconds
- ▶ Asynchronous error motion
<0.1 μm radial at roll centreline
- ▶ Synchronous error motion
<0.13 μm radial at roll centreline
- ▶ Drive Brushless servomotor
- ▶ Torque 25 Nm Constant, 40 Nm Max



End View



Rail arrangement gives 0 roll error





Specification

Machine base and isolation

- ▶ Structure Monolithic granite casting with integral oil containment
- ▶ Isolation feet Passive air isolation <2.5Hz

Control system

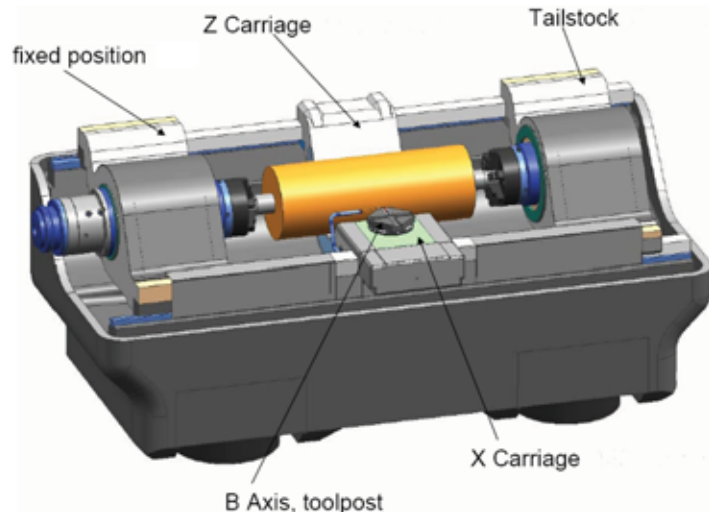
- ▶ Type Cranfield Precision CNC6400 with Windows XP-Pro user environment, Venture-Com RTX RTOS, RS274D and G&M code programming
- ▶ 17" Touch screen

Environmental control

- ▶ Hydrostatic oil Temperature control to 0.1° C
- ▶ Options Microclimate with air temperature control to 0.1°C
- ▶ Microclimate with oil shower temperature control to 0.02°C

Services supply

- ▶ Type Low stress catenary
- ▶ Option Independent isolated and driven services axis.



Machine axis layout

