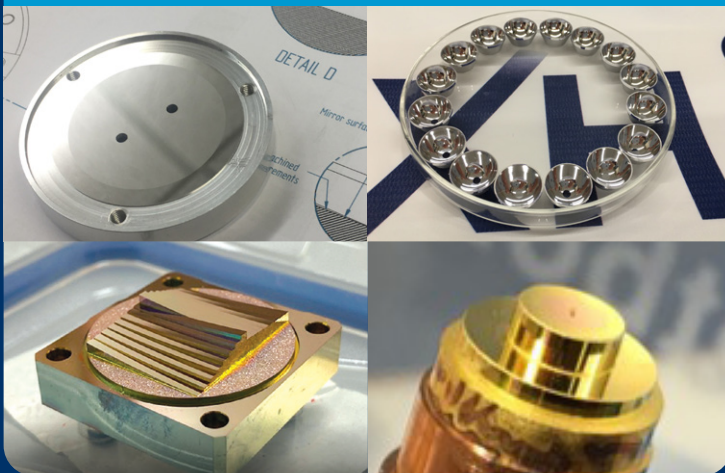


Ultra-precision 5 Axis Turn-Mill CNC Machining Centre

- 5 Axis CAM machining capability
- Nanometre machining performance
- Automatic diamond tool setting
- Automatic milling tool setting
- Micro-milling tool changer
- Integrated thermal and vibration management systems
- Low energy and compact design



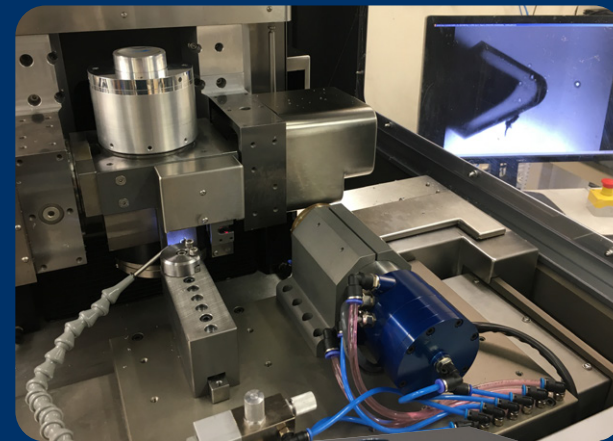
Loxham Precision $\mu 5$ TURN-Mill is a 5 AXIS CNC ultra-precision machining centre. It offers nanometre quality diamond turning and micro milling capabilities. Using a state-of-the-art open architecture CNC control system with automated tool setting it provides incredible machining performance with full CAM processing. $\mu 5$ also offers remote monitoring and process diagnosis.

Fluid film bearings are employed across all CNC motions providing high stiffness with ultra smooth motion. Direct linear and rotary drives are employed with nanometre resolution.

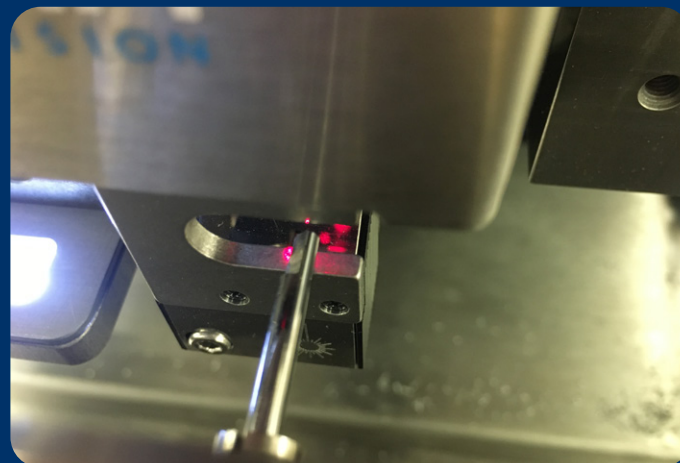
$\mu 5$ is a highly integrated machining centre with integral water-cooled electronics, thermal management and vibration isolation. The compact design enables the machine to fit through a standard single doorway, and at only 700kg it is very easy to deploy. Floor space requirement is less than 1 m² making it easy to accommodate and uses limited space within temperature controlled workshops.

The design of $\mu 5$ is ecologically tuned for minimal impact on resources throughout its lifecycle. $\mu 5$ is constructed from recyclable performance alloys having excellent thermal properties when actively cooled to avoid thermal distortion. Application of motorsports derived coatings gains robustness for bearing surfaces and stressed members. Low moving mass levels are achieved by employing low density materials, and through the use of low friction fluid film bearings. In combination, the low mass and friction properties provide high dynamic motion performance with low power requirement.

Overall design and integration of sub-systems result in the $\mu 5$ having low power consumption enabling operation from single phase electricity supply.



Automatic optical diamond turning tool setting



Automatic laser line micro-milling tool setting

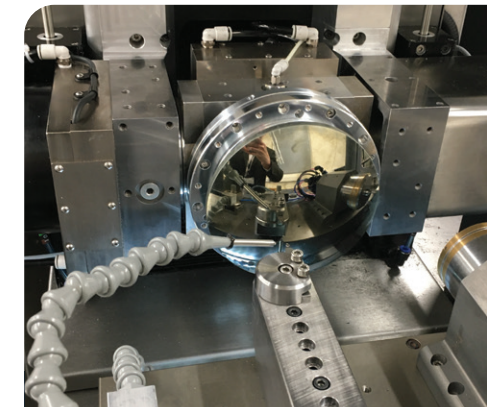


Easy ownership through compact and a low mass design

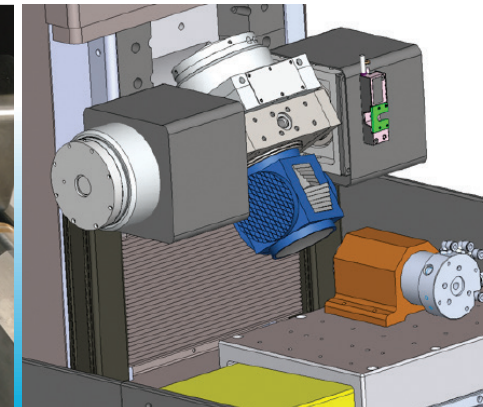
$\mu 5$ Turn-Mill has been developed to provide a broad range of ultra-precision machining operations as needed across a range of manufacturing sectors.

Applications include:

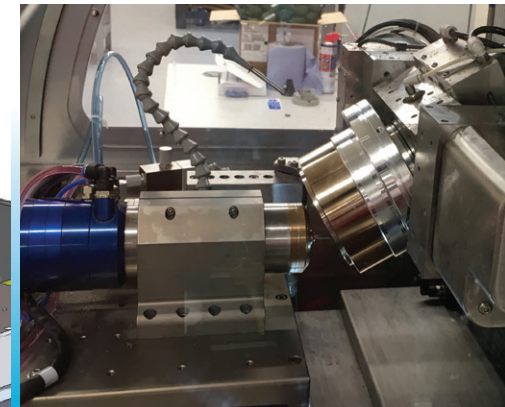
- Diamond turning of electro-optics
- Diamond Turn-Milling of integrated space components
- Multistage turning and micro-milling of motorsports components
- Micromachining of specialist watch components
- Ultra-fine machining of super conducting quantum devices
- Micro- milling of fine-featured medical devices



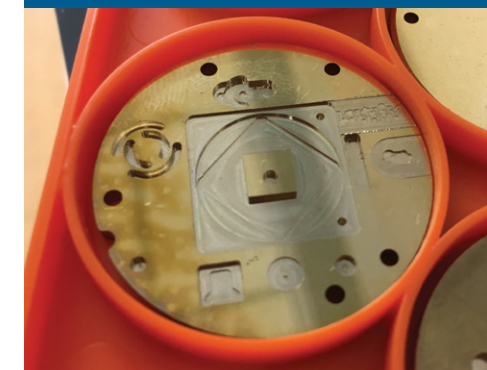
Electro-optics



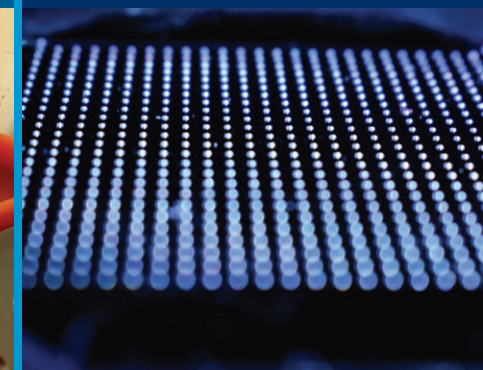
Space



Motorsports



Watchmaking



Quantum technologies



Medical devices

Specifications

µ5 TURN-MILL

Motions

X, Y, Z	200 mm, 150mm, 150mm
A, C	180°, 360° (position control 2000 RPM, speed control 5000 RPM)
S1	25,000 - 300,000 rpm
Machining Modes	Diamond turning 2 and 3 axes Micro milling and drilling 3, 4 and 5 axes Raster milling and diamond planning 3, 4 and 5 axes
Workpiece Capacity	Cylinders: Ø150mm by 25mm, Ø100mm by 100mm
Size	Cubics: 100mm by 100mm by 20mm, 70mm by 70mm by 70mm
Weight (max)	5kg

Machine Performance

Diamond Turning	Roughness: < 5 nanometre Ra (50mm sphere) Form accuracy: < 50 nm RMS (50mm sphere)
Micro Milling	Roughness: < 10 nanometre RMS Size control: < 2 micrometre

Automatic Tool Setting

Diamond Turning	< 0.001mm
Micromilling	< 0.002mm
Machine Structure and Motions	Fully recyclable aluminium alloy with integrated thermal management and vibration isolation. Fluid film bearing motions employing direct drives and feedback encoders.
Computer System	Intel i7 processor running Windows 10 IoT Enterprise 64 Bit with 16GB RAM, 2off 10/100/1000Mbit LAN connections, 256GB SSD Hard drive, 4 off USB3.0 ports, capacity multi touch screen.
CNC Control and CAM	Real time operating system, using Hyperwire fibre optic communication bus, 20kHz servo motor trajectory rates, signal logging, cutter compensation, RS-274, G code programming for CAM operation.

Installation details

Sizes	810mm (width), 1150mm (depth), 1750mm (height)
Weight	Approx. 700kg
Electrical Supply	200/240V, 13A
Air Supply	7 - 8 bar, clean < 5Qm, -15°C dew point, ISO 8573-1 Class 3



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