

GRINDING



JONES & SHIPMAN ULTRAGRIND

Precision Cylindrical Grinding Range



www.jonesshipman.com
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JONES & SHIPMAN
A KELLENBERGER COMPANY



Benefits of using cast iron for bed and major elements in the cylindrical grinding process

High level of thermal stability

Jones & Shipman machines are manufactured with high grade cast iron for all major elements to ensure a homogenous, continuous and stable medium. This means that the bed, slideways, table, wheelhead and workhead castings combined have the same low coefficient of thermal expansion, which is similar to steel, used in spindles, ballscrews and bearings.

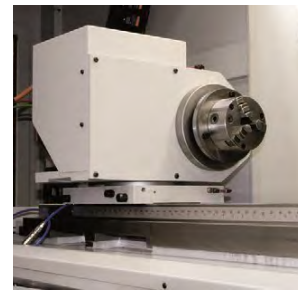
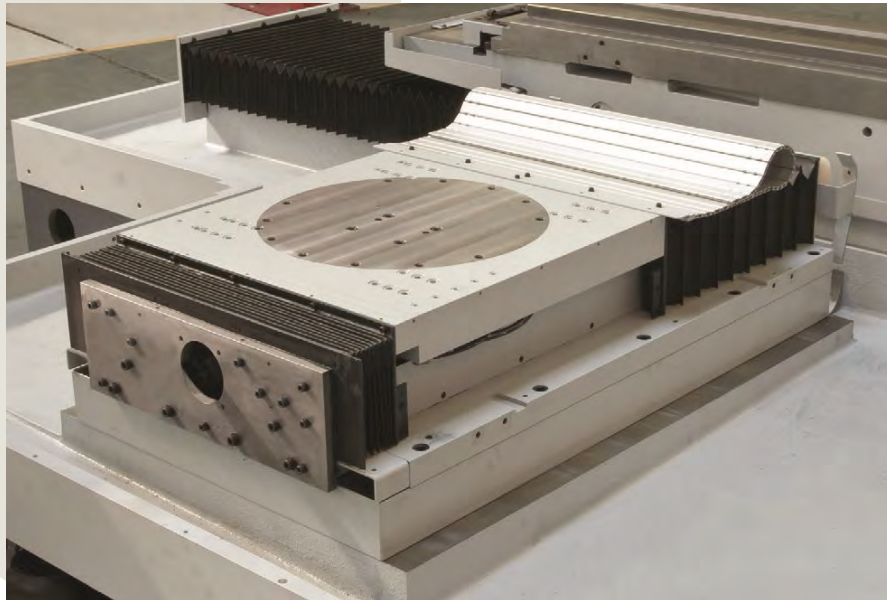
- The grinding process generally relies far more on thermal stability than vibration damping. Cast iron ensures lower level thermal expansion plus greater consistency than typical polymer granite composite structures
- Further stability is achieved by porting coolant over main machine elements and the large bed surface to assist maintaining a consistent temperature
- Any minimal short-term temperature variation that occurs is compensated by the stable composite of the cast iron. In our experience this provides a more stable environment than combining the coefficient of the principal metal elements, with the coefficient of granite or polymer granite

Fully supported table slideways

- Lubricated Turcite[®], precision hand scraped for smooth movement and the highest accuracy, ensures low friction, significantly reduced stick-slip differentials and minimal wear

Infeed linear guides

- Recirculating roller bearing linear guideways, designed to take loads from all directions and support extremely high capacities guarantee a high level of precision and low friction linear movement



Robust construction & innovative design

Bearings & ballscrews

- Ultra high precision bearings are used, as are DIN standard precision ground ballscrews

Workhead

- The rigid live & dead spindle workhead contains robust, high precision tapered roller bearings assuring maximum spindle stability with superior stiffness. The spindle has a 50 INT taper with a $\text{Ø}50$ mm through bore to accommodate workholding devices and through bore coolant options
- The table section & workhead base are designed to ensure the alignment face of the workhead is directly under the centre line of the workhead spindle and therefore the component being ground, thus minimising any thermal growth

Taper controlled tailstock

- A high accuracy, plain bearing lever operated, fine taper correction tailstock with adjustment applied manually in $1 \mu\text{m}$ increments or less with a total adjustment range of ± 0.1 mm

Air cushion lift to workhead and tailstock bases

- Both the workhead and tailstock bases are fitted with air lift pads to ensure easy, quick and accurate re-positioning. This reduces wear and ensures faster set-ups

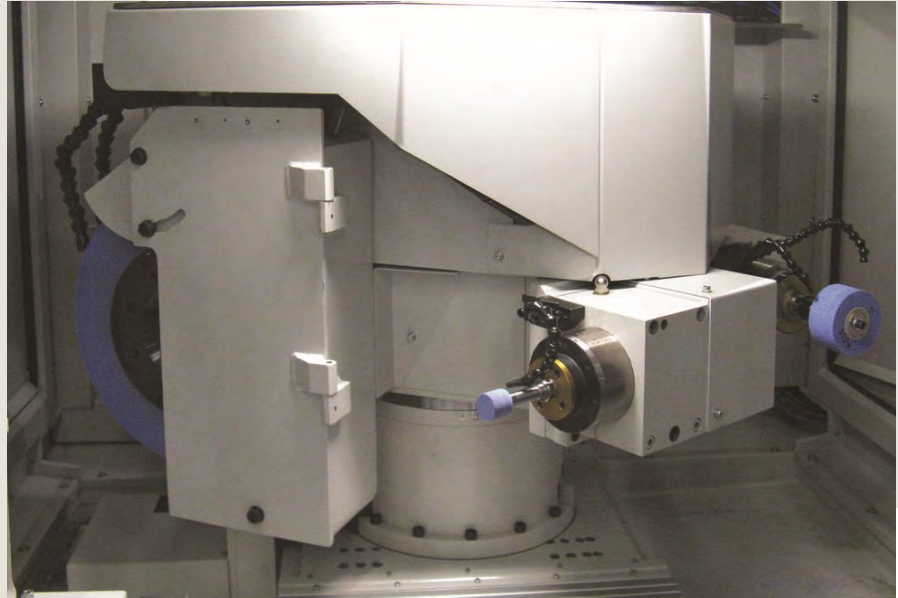
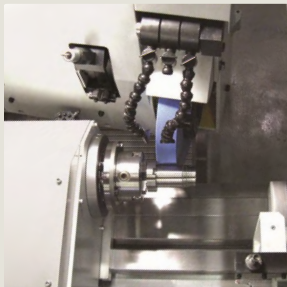
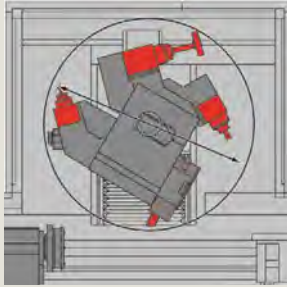
Tailstock lifting & storage arm

- The tailstock lifting arm simply and quickly lifts and stores the taper controlled tailstock away from the work area inside the machine when not in use



Intelligent layout of wheelhead

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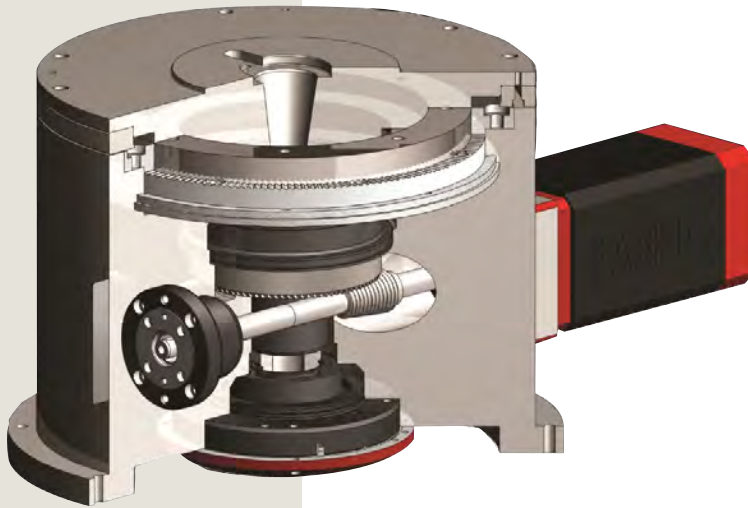
Modular wheelhead design

- A brand new wheelhead design ensures a wide choice of external and internal grinding spindle combinations, effectively creating a custom machine, but without the cost and build time associated with it
- Wheel sizes up to $\text{Ø}500 \times 100$ mm and wheel spindle power up to 11 kW. With up to 18 kW direct drive on internal spindles and HSK mounting for quick and easy precision
- Ultra rigid construction and spindles to optimise the latest wheel technologies, such as Ceramic, CBN and Diamond providing substantially increased metal removal rates and productivity

Intelligent layout of wheel spindles

- The large bed area allows spindles to be positioned further away from the wheelhead body/turret and still effectively rotate without the possibility of collision into the guards
- This extra distance enables a larger working area around each wheel, making wheel positioning much more flexible for all work piece types and sizes
- It also ensures practical application of the multiple wheel datum software feature which, for example, allows a single wheel to dress and grind @ 0° for a diameter, then rotate to 10.225° for a taper, then 45° for a chamfer, keeping a straight wheel at all times. This saves valuable time, extends the life of the wheel and diamonds, reducing consumable costs
- The intelligent layout also extends to the guarding, which has access doors all around to ensure fast and simple access for operators or for preventative maintenance engineers

'B' axis and additional equipment



B-axis

- The clever design of the 'B' axis as a sealed unit, removes possible exposure to ingress, ensuring a longer life and lower maintenance requirements

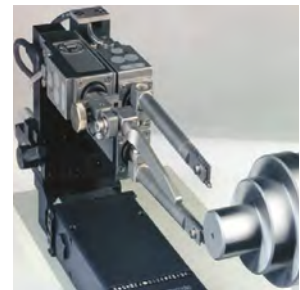
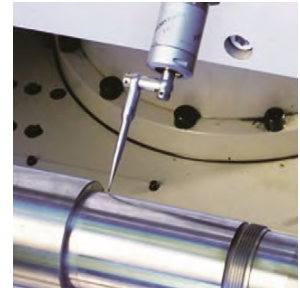
Features of the 'B-axis' wheelhead swivel

- Spiral drive gears - A right angled/offset drive consisting of a gear and pinion gives a greater number of continuously meshing teeth resulting in higher strength, smoothness of action and maximum accuracy
- 3-piece Hirth coupling with 1° positioning resolution and +/- 2.5" arc repeatability to give smooth engagement with hydraulic clamping
- Fanuc® digital AC servo motor positioning
- High precision Heidenhain® rotary encoder enables infinitely variable angular positional programming resolution of 0.0001° (optional)

Additional equipment

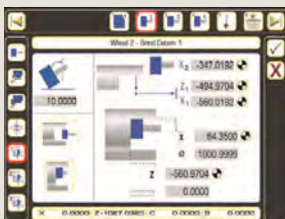
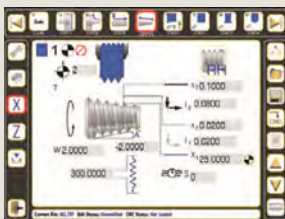
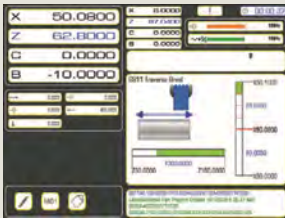
A wide range of additional options are available on request. The most popular items are listed below, other equipment is listed on our price list with special requests reviewed on a case by case basis.

- Coolant systems including filtration, chillers & high pressure pumps
- Mist extraction systems
- Standard & specialist workholding solutions
- In process diameter gauging
- Gap elimination or auto digitise touch detection
- Shoulder probing, head or table mounted
- Internal spindles - direct drive and HSk mounting
- Wheel balancing - auto or semi-auto
- Chucks, collets and steadies
- Automated doors, tailstock & workholding
- Automation solutions for component load & unload
- Turnkey solutions



Control System Design

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Faster set-up and operating efficiency

- UltraGrind software is designed to minimise set-up times, fundamental in reducing machined component costs whilst maximising manufacturing output
- Easy to follow set-up pages with graphical images allow the operator to digitise diamond and wheel positions by means of a simple user-friendly touchscreen interface
- This graphical programming removes the requirement for operators to input complex code, subsequently reducing set-up and operator training costs
- ISO programming is fully supported and codes can also be easily viewed and used at any time as each method of modification updates the other seamlessly within the program

Hardware

- The UltraGrind incorporates Fanuc® flagship 320i touch-screen CNC control with a Windows XP® embedded system with instant switch-off and a large capacity solid state memory in place of a hard drive for improved reliability
- IGB of integrated Flash memory provides a massive storage capacity and the memory necessary for part program storage
- For operator convenience and flexibility a remote pendant is provided
- The latest technologies are used, Ethernet connection to enable all programs to be managed via a PC or network giving the extra information needed for complete traceability, plus, USB, PC card and RS232 to assure full flexibility and enable quick cost-effective integration to be easily implemented

General Specifications

Maximum length between centres
 Centre height
 Grinding diameter
 Maximum weight between centres
 Maximum weight at workhead
 Table traverse distance (Z axis maximum)
 Table traverse speed (Z axis maximum)
 Table swivel clockwise/anticlockwise, inclusive
 Shipping Dimensions (approximate)
 Machine Dimensions - net weight (approximate)
 Machine Dimensions - gross weight (approximate)
 Z and X axis traverse control
 Z and X axis traverse feedback
 Z and X axis electronic handwheel increments
 Z and X axis minimum programmable increment

Model 1000

1000 mm
 180 mm / 200 mm / 250 mm
 360 mm / 400 mm / 500 mm
 200 kg
 100 kg
 1160 mm
 15 m/min
 11° / 16°
 16.11 m³
 7720 kg
 9200 kg

Model 2000

2000 mm
 180 mm / 200 mm / 250 mm
 360 mm / 400 mm / 500 mm
 500 kg
 Heavy duty option available
 2150 mm
 8 m/min
 3° / 5°
 35.47 m³
 11000 kg
 13400 kg

Fanuc® Digital AC Servo motor
 50 nanometre Heidenhain® 'Absolute' linear scale
 0,0001, 0,001, 0,01, 0,1 mm
 0,0001 mm

Wheelslide (X Axis) (all models)

Total infeed
 Maximum traverse speed
 Maximum programmable diametrical infeed rate per min.

340 mm
 15 m/min
 100 mm

Wheelhead Options

External wheels
 Left or right hand (maximum)
 Wheel bore
 Wheel speeds
 Wheel motor power (standard)

500 x 100 mm
 203,2 mm
 45 or 50 m/s
 7,5 kW (11 kW optional)

Internal wheels (Variable speed self driven spindles)

Motor power
 Wheel dia. (maximum)
 Wheel speed from

2.5 - 18 kW
 150 mm
 2000 - 160,000 r.p.m.

Live & dead swivel base workhead

Speed range, continuously variable
 Spindle taper
 Output torque (continuous rating)
 Motor power (continuous rating)
 Swivel angle

0 - 1000 r.p.m.
 50 int / 4MT adaptor
 54 Nm
 4 kW
 -15° - 90°

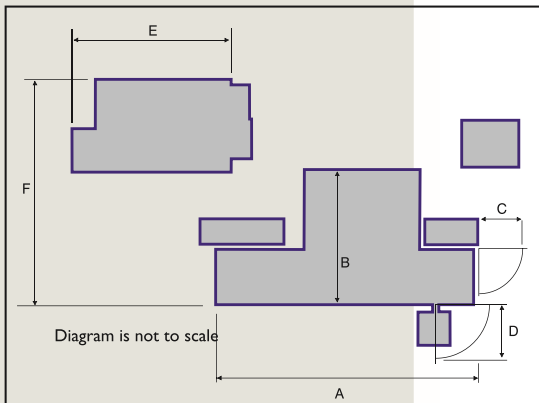
Taper control tailstock

Poppet taper
 Centre travel

4 MT
 50 mm

Control System

320i Fanuc® CNC with 264 mm colour touchscreen
 Networking as standard
 Remote diagnostics
 I/O Ports - USB, RS232, PC Card,
 Ethernet, RJ45 as standard
 Storage - 1GB integrated Flash memory



Base Plan Dimensions:

	Model 1000	Model 2000
A -	4140 mm	7500 mm
B -	2070 mm	2150 mm
C -	600 mm	600 mm
D -	800 mm	800 mm
E -	2380 mm	2380 mm
F -	3400 mm	3400 mm
Height:	1800 mm	2200 mm

It is essential that a minimum of 1m is allowed around the machine envelope.

All specifications and design are subject to alterations without notice.

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Jones & Shipman also offer a range of Surface Grinders, Creepfeed Grinders and other Cylindrical Grinders for Toolroom and Production applications.

World-wide sales and service



Through our Group Companies and an established network of distribution Jones & Shipman guarantee competent advice and support in evaluating, purchasing and using high-quality cylindrical, surface and creepfeed grinding systems.

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