KELLNERBERGER
1000
Cylindrical Grinding Systems

800-843-8801
WWW.HARDINGE.COM
INNOVATIVE GRINDING SYSTEM

PRECISION WITH HYDROSTATICS
Hydrostatic guideways and a strict separation of the machine base from the assemblies, generating heat or vibration, provide superb precision and productivity. The excellent static and dynamic rigidity of the machine base permits a three-point set-up. The Kellenberger 1000 therefore has no particular requirements on the building’s foundations. The hydrostatic guides for the longitudinal slide movement (Z-axis) and for wheelslide infeed (X-axis) provide the basis for the machine’s extreme accuracy. X- and Z-axes movements are practically frictionless at all speeds. There is no stick slip; even the smallest increments of 0.1 µm can be traveled without a problem, so that the machine features measuring-machine accuracy.

LARGE WORK SPACE — UNIQUE TABLE CONCEPT
The machine table has been considerably extended so it allows unmatched, optimal positioning of the grinding wheel and a larger travel distance, but also many machining options and application-specific configurations.

FUNCTIONAL MACHINE CASING
The increased sheet metal thickness means even more process reliability, allowing larger internal grinding wheel diameter of up to 125mm. With their large viewing windows, the generously-sized doors allow optimum control over the work process and make it easier to access the work space. The genuine glass laminated safety panes require very little maintenance.

EASY COMMISSIONING
The integrated transportation concept (hook machine) shortens commissioning times considerably.

Hydrostatics
• X and Z guideways
• no stick-slip, no wear
• good damping
• ultra-fine correction options

Hydrostatic B-axis
• full-fledged NC axis
• pre-tensioned hydrostatic guideway
• Direct drive

C-axis
• for non-circular workpieces
• for threads
• high-precision spindle bearing
• Direct drive
• high flexibility

Platform concept for more than 30 different wheelheads
• Universal wheelheads
• Diagonal wheelheads
• Tandem wheelheads
• various mounting positions

Dressing systems
• independent interface at table
• pivotable unit for chucked work
• rigid diamonds
• Form and profile dressers
Control system
• Heidenhain GRINDplus 640
  • FANUC 31i

Software
• KEL-MMI
• KEL-SOFT

X/C interpolation
• non-circular workpieces
  • Thread grinding
  • Jig grinding
  • Groove grinding

X/Z interpolation
• Taper grinding
  • Profile grinding
  • dressing

X/Z/B interpolation
• Contour B+
  • Profile grinding with controlled grinding wheel

COMPACT AND MAINTENANCE-FRIENDLY
Elements such as the power supply, electrical cabinet, and a central connection point for lubricating coolant, water cooling system, and compressed air were all integrated into the casing. Service and maintenance doors for unimpeded access to machine components are integrated into the back.

OPTIMIZED ENERGY MANAGEMENT

MACHINE RE-COOLING SYSTEM
• comprehensive cooling system with needs-based design (wheelhead & grinding spindles, direct drive, hydrostatics, electric cabinet)
• increased flow rates at lower system pressure
• active cooling principle for optimal temperature stability
• minimized thermal drift, so smaller deviations on workpiece
• Hydrostatic oil cooled to ambient temperature
• automatic tracking of surroundings, water cooler: Sensor in bed measures reference temperature of regulator

OPTIONS
• increased coolant pressure up to 10 bar
• Interface for fire extinguisher system
• automatic door drive
• Replacement aid for grinding wheels and tailstock
**HYDROSTATIC B-AXIS**

Full-fledged NC-axis with pre-tensioned hydrostatic guideway and direct drive.

The pre-tensioned hydrostatic is the basis for higher accuracy and better surface quality. Steps of 0.0001° can be traveled with ease.

**KEL-SET**

Automatic grinding wheel measuring system. Movements to the measuring ball and to the grinding wheels occur automatically, with their position information being stored in the control system. When swiveling the wheelhead into any angle, the positions of the grinding wheel edges are automatically taken account of.

**ADVANTAGES FOR THE USER**

- Programming takes place with the actual dimensions according to the work drawings and independently of the swivel angle of the wheelhead
- No need for renewed calibration of the swiveled grinding wheel
- Simple and fast acquisition of the grinding wheel data when retooling the machine
- Integrated tool management for external, face- and internal grinding

---

Hydrostatic B-axis
- pre-tensioned hydrostatic guide
- wear-free direct drive
- One second 180° swiveling

KEL-SET
- Patented automatic grinding wheel measuring system

Direct drive system
- water-cooled high-torque motor guarantees high level of torque
- No referencing rotary encoder

Contour B+
- Machining possible in unclamped state
- Short cycle times
- New machining methods
- High flexibility

Clamping
- and B-axis position without any deformation
- Large dimensions guarantee high clamping moment
WORKHEAD

Robust and rigid design on a solid base. Strong motor. Infinitely variable spindle speed. Airlock seals prevent ingress of dirt or water as well as the formation of condensation.

WORKHEAD

• Roundness and dimensional accuracy due to pre-tensioned high-precision antifriction bearings
• Roundness of the workpiece $dR < 0.4 \, \mu m$ ($< 0.016 \, \mu inch$) on chucked work
• Versatile in use
• fine adjustment for cylinder correction for chuck work
• ISO 702-1 spindle nose

OPTIONS

• Roundness of the workpiece $dR < 0.2 \, \mu m$ ($< 0.008 \, \mu inch$) on chucked work
• positioned spindle stop

C-AXIS

The option of interpolating the X- and C-axes makes it possible to use the cylindrical grinding machine also for unround shapes such as polygons, free contours and eccentric forms. The rotary encoder with a resolution of $0.0001°$ is installed directly on the workhead spindle. The non-circular movement is superimposed on the grinding movements so that the grinding machine can use all the grinding cycles on unround grinding too, including the handwheel release for the X-axis.

TAILSTOCK

The tailstock features a large and heavy design. The nitride-coated sleeve runs in sturdy ball-bush bearings.

• rigidity allowing high rates of infeed even with heavy workpieces
• sensitive sleeve pressure adjustment
• Micro-corrector for quick and easy cylinder corrections
• pneumatic relief for tailstock movement

OPTIONS

• hydraulic or pneumatic sleeve retraction
• automated cylinder correction
• enlarged travel, 80 mm (3.14 inch)
• reinforced design
MODULAR WHEELHEAD VARIANTS

UNIVERSAL WHEELHEADS
• Motor output 10 kW (13.6hp)
• water-cooled precision-balanced drive motor
• infinitely variable drive of OD and ID grinding spindles
• hydrodynamic multi-surface spindle bearings
• Grinding wheel dimensions
  Ø 500 x 80 mm (20 x 3.15 inch)
• high-frequency ID grinding spindles

The universal wheelhead covers various user needs. In addition to external, face- and internal grinding, the use of two internal grinding spindles or the option of thread grinding or unround grinding are now increasingly in demand. Grinding in one setting allows shorter processing times and improves the quality of the workpieces considerably.

The new modular system makes it possible to supply the universal wheelhead to customer specifications, from a simple wheelhead with one tool to a configuration with up to four tools, see examples.

DIAGONAL WHEELHEADS
• Motor output 2x 10 kW (13.6hp)
• water-cooled precision-balanced drive motors
• infinitely variable drive of OD and ID grinding spindles
• hydrodynamic multi-surface spindle bearings
• Grinding wheel dimensions
  2x Ø 500 x 80 mm (20 x 3.15 inch)
• high-frequency ID grinding spindles
• min. 2 OD grinding wheels
• max. 2 OD grinding wheels and 2 HF ID grinding spindles

The diagonal wheelheads provide the option of rough and finish grinding in one setting. The additional use of HF ID grinding spindles also allows universal OD, face and ID grinding.

INTERNAL GRINDING ATTACHMENT
• high-frequency internal grinding spindle
MODULAR WHEELHEAD VARIANTS

**WORKHEAD, C-AXIS & TAILSTOCK**

**DIAGONAL/TANDEM-TYPE WHEELHEADS**

- Water-cooled precision-balanced drive motors
- Hydrodynamic multi-surface spindle bearings

**TANDEM-TYPE WHEELHEADS**

- Motor output 2x 10 kW (13.6hp)
- Water-cooled precision-balanced drive motors
- Infinitely variable drive of OD and ID grinding spindles
- Hydrodynamic multi-surface spindle bearings
- Grinding wheel dimensions 2x Ø 500 x 63 (20 x 2.5 inch)
- High-frequency ID grinding spindles
- Min. 2 OD grinding wheels
- Max. 4 OD grinding wheels or 2–3 OD grinding wheels and 1 HF ID grinding spindle

The tandem-type wheelheads are designed for the possibility of carrying out straight and angular infeed operations in the same setting. With an additional HF internal grinding spindle it is possible to also process internal grinding work. The ideal equipment for these wheelheads can be determined by the nature of the workpieces to be ground.

**HF ID GRINDING SPINDLES**

- MFM 1224-42
- MFM 1242-60
- Frequency converter up to 3000 Hz
Monitor
• 19” TFT Multitouch
• expanded process data display

Keypad
• Mobile hand panel with handwheel/ emergency stop/ confirmation key

KEL-PROG
• dialog based ISO programming
• Cycle selection via Softkeys

KEL-FORM
• Standard non-circular contour

KEL-GRAPH
• graphical programming
• Cylinders, cones, radii
• DXF import

KEL-TOOL
• Tool administration
• local dressing devices
• Standard wheel definition

OPTIONS

KEL-TOUCH
• GAP control with up to six sensors
• Operation/display integrated control system

KEL-BALANCE
• semi or automatic balancing of the grinding wheels
• Operation and display integrated in the control system

KEL-SOFT OORG
• 3D software for creating non-circular grinding programs
• Algorithms for error detection and correction. Contour and grinding analysis
• Animation of non-circular motion and profile programmes
In-process gauge system
- up to four gauge heads
- interrupted diameters
- non-interrupted diameters
- passive longitudinal positioning

KEL-SOFT Profil
- Contour-grinding or profile-dressing programmes
- CAD import, thread, clearing cycles

Remote diagnostics
- Reduced standstill and maintenance times
- Reduction in costs for service and maintenance
- easy operation
- highest IT security standard

KEL-GRAPH
- graphic programming
- Cylinders, cones, radii
- DXF import
- Visualization of the grinding process

KEL-TOOL
- Tool administration
- local and global dressing devices
- Standard wheel definition with multiple reference points

Monitor
- 19” TFT Multitouch
- expanded process data display

Keypad
- Mobile hand panel with handwheel/ emergency stop/ confirmation key
## SPECIFICATIONS

### Main specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Metric</th>
<th>Imperial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance between centres</td>
<td>1000 / 1600</td>
<td>40 / 63</td>
</tr>
<tr>
<td>Grinding length</td>
<td>1000 / 1500</td>
<td>40 / 59</td>
</tr>
<tr>
<td>Centre height</td>
<td>200 / 250 / 300</td>
<td>7.87 / 9.84 / 11.81</td>
</tr>
<tr>
<td>Weight of workpiece between centres</td>
<td>150 / 200 / 300</td>
<td>330 / 441 / 660</td>
</tr>
<tr>
<td>Load on clamped work</td>
<td>160 / 200 / 750</td>
<td>118 / 236 / 553</td>
</tr>
<tr>
<td>Main specifications</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Distance between centres</td>
<td>1000 / 1600</td>
<td>40 / 63</td>
</tr>
<tr>
<td>Grinding length</td>
<td>1000 / 1500</td>
<td>40 / 59</td>
</tr>
<tr>
<td>Centre height</td>
<td>200 / 250 / 300</td>
<td>7.87 / 9.84 / 11.81</td>
</tr>
<tr>
<td>Weight of workpiece between centres</td>
<td>150 / 200 / 300</td>
<td>330 / 441 / 660</td>
</tr>
<tr>
<td>Load on clamped work</td>
<td>160 / 200 / 750</td>
<td>118 / 236 / 553</td>
</tr>
</tbody>
</table>

### Main specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Metric</th>
<th>Imperial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance between centres</td>
<td>1000 / 1600</td>
<td>40 / 63</td>
</tr>
<tr>
<td>Grinding length</td>
<td>1000 / 1500</td>
<td>40 / 59</td>
</tr>
<tr>
<td>Centre height</td>
<td>200 / 250 / 300</td>
<td>7.87 / 9.84 / 11.81</td>
</tr>
<tr>
<td>Weight of workpiece between centres</td>
<td>150 / 200 / 300</td>
<td>330 / 441 / 660</td>
</tr>
<tr>
<td>Load on clamped work</td>
<td>160 / 200 / 750</td>
<td>118 / 236 / 553</td>
</tr>
<tr>
<td>Mains voltage required</td>
<td>3 x 400V / 50 Hz / 3 x 460V / 60 Hz</td>
<td>3 x 400V / 50 Hz / 3 x 460V / 60 Hz</td>
</tr>
<tr>
<td>Power consumption depending on equipment</td>
<td>A</td>
<td>35-80</td>
</tr>
<tr>
<td>Space required / length x width</td>
<td>3600 x 2050</td>
<td>141.73 x 80.70</td>
</tr>
</tbody>
</table>

### Longitudinal slide: Z-axis

<table>
<thead>
<tr>
<th>Specification</th>
<th>Metric</th>
<th>Imperial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Travel</td>
<td>1170 / 1670</td>
<td>46.06 / 65.74</td>
</tr>
<tr>
<td>Rapid traverse speed</td>
<td>20</td>
<td>787</td>
</tr>
<tr>
<td>Resolution</td>
<td>0.1</td>
<td>0.004</td>
</tr>
</tbody>
</table>

### Wheelslide: X-axis

<table>
<thead>
<tr>
<th>Specification</th>
<th>Metric</th>
<th>Imperial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Travel</td>
<td>365</td>
<td>14.37</td>
</tr>
<tr>
<td>Rapid traverse speed</td>
<td>10</td>
<td>393</td>
</tr>
<tr>
<td>Resolution</td>
<td>0.1</td>
<td>0.004</td>
</tr>
</tbody>
</table>

### B-axis

<table>
<thead>
<tr>
<th>Specification</th>
<th>Metric</th>
<th>Imperial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resolution</td>
<td>0.0001</td>
<td>0.0001</td>
</tr>
<tr>
<td>Swivel range</td>
<td>max. 240</td>
<td>max 240</td>
</tr>
</tbody>
</table>

### Wheelhead general

<table>
<thead>
<tr>
<th>Specification</th>
<th>Metric</th>
<th>Imperial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drive motor water-cooled</td>
<td>10</td>
<td>13.4</td>
</tr>
<tr>
<td>Peripheral grinding wheel speed</td>
<td>35 / 45 v-konstant</td>
<td>6890 / 8860</td>
</tr>
</tbody>
</table>

### Wheelhead Universal

<table>
<thead>
<tr>
<th>Specification</th>
<th>Metric</th>
<th>Imperial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grinding wheel dimensions, lefthand side</td>
<td>400 / 500</td>
<td>16 / 20</td>
</tr>
<tr>
<td>Grinding wheel dimensions, righthand side</td>
<td>400 / 500</td>
<td>16 / 20</td>
</tr>
</tbody>
</table>

### Wheelhead Tandem-type

<table>
<thead>
<tr>
<th>Specification</th>
<th>Metric</th>
<th>Imperial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grinding wheel dimensions, lefthand side</td>
<td>400 / 500</td>
<td>16 / 20</td>
</tr>
<tr>
<td>Grinding wheel dimensions, righthand side</td>
<td>400 / 500</td>
<td>16 / 20</td>
</tr>
</tbody>
</table>

### Wheelhead Diagonal

<table>
<thead>
<tr>
<th>Specification</th>
<th>Metric</th>
<th>Imperial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grinding wheel dimensions, lefthand side</td>
<td>400 / 500</td>
<td>16 / 20</td>
</tr>
<tr>
<td>Grinding wheel dimensions, righthand side</td>
<td>400 / 500</td>
<td>16 / 20</td>
</tr>
</tbody>
</table>

### Internal grinding attachment

<table>
<thead>
<tr>
<th>Specification</th>
<th>Metric</th>
<th>Imperial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bore for spindles up to</td>
<td>120</td>
<td>4.72</td>
</tr>
<tr>
<td>Spindle MPM MPM</td>
<td>10 / 15</td>
<td>3.4 / 20.1</td>
</tr>
<tr>
<td>Rotational speed 1224 / 42</td>
<td>42000</td>
<td>42000</td>
</tr>
<tr>
<td>Rotational speed 1242 / 60</td>
<td>60000</td>
<td>60000</td>
</tr>
</tbody>
</table>

### Workhead Standard / Direct drive 200 / Direct drive 300

<table>
<thead>
<tr>
<th>Specification</th>
<th>Metric</th>
<th>Imperial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rotational spindle speed 1-1000 / 1-1000 / 1-500</td>
<td>1-1000 / 1-1000 / 1-500</td>
<td></td>
</tr>
<tr>
<td>Internal taper</td>
<td>M15 / M15 / M16</td>
<td>M15 / M15 / M16</td>
</tr>
<tr>
<td>Short taper holder outside</td>
<td>ISO / 02 / Size 8 / Size 8 / Size 8</td>
<td>ISO / 02 / Size 8 / Size 8 / Size 8</td>
</tr>
<tr>
<td>Micro-adjustment</td>
<td>+/- 60</td>
<td>+/- 60</td>
</tr>
</tbody>
</table>

### Tailstock

<table>
<thead>
<tr>
<th>Specification</th>
<th>Metric</th>
<th>Imperial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal taper</td>
<td>MT4</td>
<td>MT4</td>
</tr>
<tr>
<td>Retraction of sleeve</td>
<td>50 optional 80</td>
<td>1.96 optional 3.15</td>
</tr>
<tr>
<td>Micro-adjustment</td>
<td>+/- 150</td>
<td>+/- 6</td>
</tr>
</tbody>
</table>

### CNC control system

<table>
<thead>
<tr>
<th>Specification</th>
<th>Metric</th>
<th>Imperial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heidenhain GRINDplus 640</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fanuc Fanuc 31i</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Measuring systems

<table>
<thead>
<tr>
<th>Specification</th>
<th>Metric</th>
<th>Imperial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gap Control</td>
<td>KEL-TOUCH</td>
<td></td>
</tr>
<tr>
<td>Balancing</td>
<td>KEL-BALANCE</td>
<td></td>
</tr>
</tbody>
</table>

All specifications and designs are subject to alterations without notice.
Hardinge is a leading international provider of advanced metal-cutting solutions. We provide a full spectrum of highly reliable CNC turning, milling, and grinding machines as well as technologically advanced workholding accessories.

The diverse products we offer enable us to support a variety of market applications in industries including aerospace, agricultural, automotive, construction, consumer products, defense, energy, medical, technology, transportation and more.

We've developed a strong global presence with manufacturing operations in North America, Europe, and Asia. Hardinge applies its engineering and applications expertise to provide your company with the right machine tool solution and support every time.