

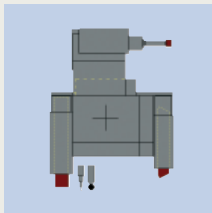
KEL-VIVA

Universal grinding machine for the most Demanding Applications



The innovative grinding system

2



2 different wheelheads

- UR-wheelhead
- R-wheelhead



KEL-SET

automatic grinding wheel measuring system (option)



C-axis

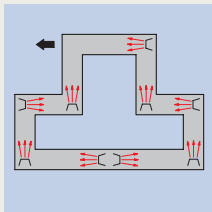
for unround components and threads (option)



Scale on upper table

for setting-up of table assemblies

- metric
- imperial



Flushing of base pan

- for good conveyance of grinding dust
- prevents dirt deposits

Precision with hydrostatics

These CNC universal cylindrical grinding machines have been developed to satisfy the highest demand for quality. Intensive application studies and the use of state-of-the-art technology in development and production have resulted to this universal grinding machine.

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 KEL-VARIA therefore has no particular requirements on the building's

foundations. The hydrostatic guides for the longitudinal slide movement (Z-axis) and for wheel slide infeed (X-axis) provide the basis for the machine's extreme accuracy. X- and Z-axis 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.

Advantages of hydrostatics

- Extremely fine correction possibilities
- Excellent dimensional accuracy in interpolating the X- and Z-axes, both for contour grinding and form dressing
- Even after years of use, no wear on the guideways
- Excellent damping and extremely smooth operation

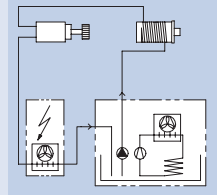




Cooling system

for a stable machine

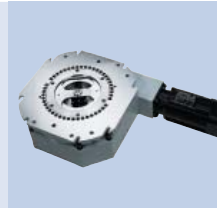
- electrical cabinet
- wheelhead
- spindle



3

Wheelhead with

- fixed intermediate section
- B-axis



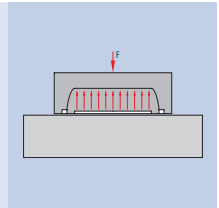
**Heidenhain control system
GRINDplusIT**

- Windows 2000
- 2-processors control system



Hydrostatics

- X- and Z-guideways
- no stick slip
- good damping



Prepared connecting plates

- for table flooding
- for diamond cooling
- for stabilizing of measuring unit



Cooling system

A comprehensive cooling system which includes the, wheelhead, internal grinding spindle and the heat exchanger of the electrical cabinet ensures an even thermal economy.

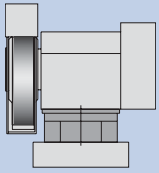
Equipment

- The infrastructure is modular in design, easy to service and easily accessible, with all important functions being monitored
- Connecting plates for dressing spindles/ measuring units
- Prepared for the use of oil as a coolant



Application-specific swivel device or intermediate section for the wheelhead

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Intermediate section fixed

- standard for machine type R



Water-cooled precision-balanced drive motors

- use of spindle bearings



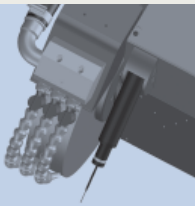
Hydrodynamic multi-surface spindle bearings

- high-accuracy spindle bearings, pre-stressed



Internal grinding attachment

- high-frequency internal grinding spindle



Active flagging device KEL-POS®

- determines component position in Z-axis
- mounted on wheelhead



Wheelhead

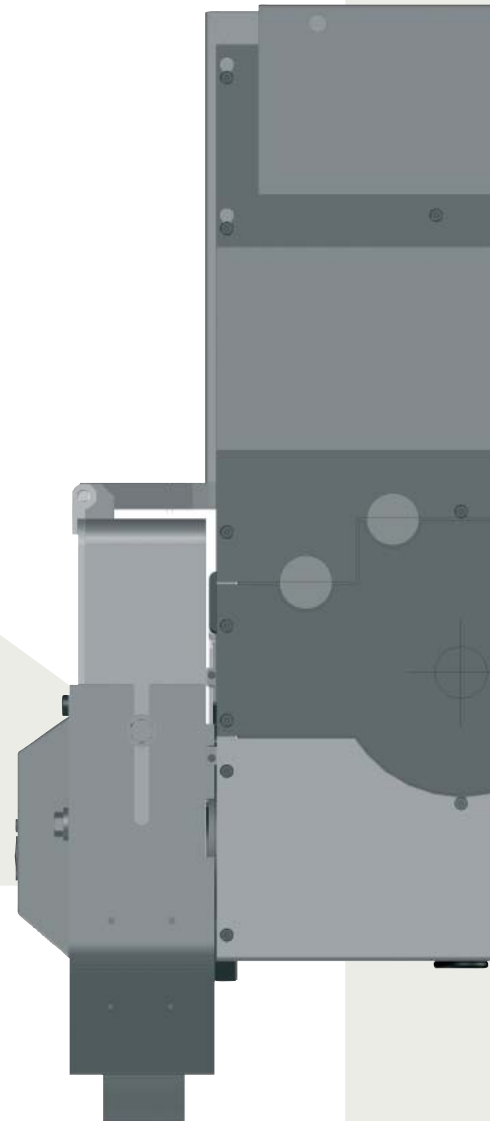
- Motor output 7.5 kW
- Water-cooled, precision-balanced drive motor
- Infinitely variable drive of OD and ID grinding spindles
- Grinding wheel dimensions 400 x 63 oder 500 x 80
- UR-wheelhead with high-frequency ID grinding spindle

HF ID grinding spindles

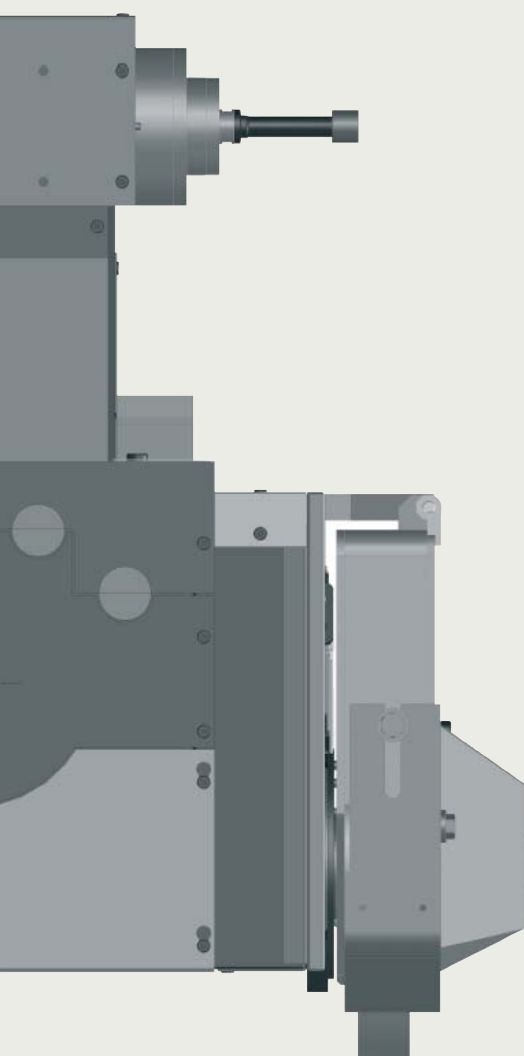
- MFV I230
- MFV I260

B-axis

The B-axis permits automatic positioning of the wheelhead at any angle. A precision worm gear and distortion-free clamping ensure the ultimate in positioning accuracy. The user is supported by comprehensive software. The measuring system provides a resolution of < 0.1 sec.



B-axis and automatic grinding wheel measuring system



B-axis

- automatic infinitely variable positioning of the wheelhead
- indirect measuring

B-axis

- precision bearings
- distortion-free clamping

Worm – worm wheel

- adjustable play

KEL-SET

- automatic grinding wheel measuring system

KEL-SET

- EU patent No. EP 0 542 674 B1
- US patent No. 5.335.454

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



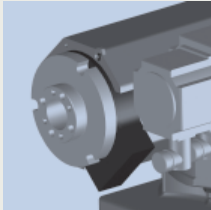
Workhead and C-axis

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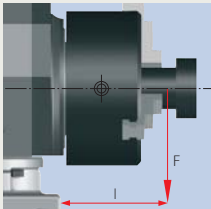
Workhead standard

- n 8-800 min-1



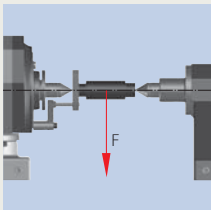
C-axis

- for standard workhead



Load with chucked work

- 100 Nm



Load between centres

- 100 kg



Spindle nose

- size 5 DIN 55026
- morse taper 5

Workhead

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

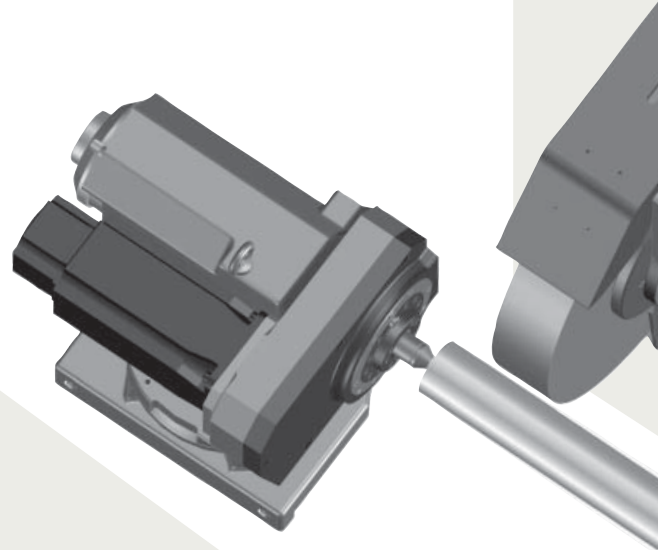
- Excellent roundness and dimensional accuracy thanks to pre-tensioned high-precision antifriction bearings
- Roundness of the workpiece $dR < 0.5 \mu\text{m}$ on chucked work
- Versatile in use

Options

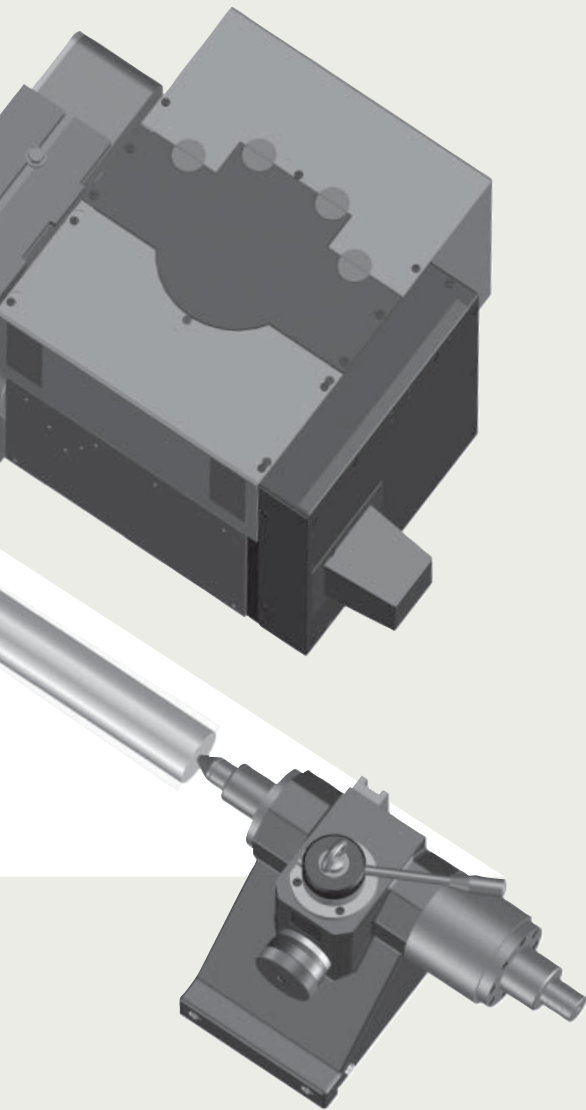
- Positioned spindle stop
- Swivel-angle display

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 0.001° 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 and longitudinal slide



Tailstock

- morse taper 4
- retraction of sleeve 48 mm



Micro-adjustment of tailstock

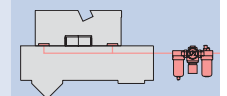
- adjustment range +/- 60 µm



Upper table swiveling



Upper table with air cushioning feature



Tailstock

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

- Sensitive sleeve pressure adjustment

Options

- Pneumatic sleeve retraction
- Micro-adjustment for fast and easy cylindricity corrections
- Air-cushioning for ease of tailstock repositioning

Longitudinal slide

The air-cushioning (option) and the backlash-free pivot pin permit an easy and accurate swiveling of the rigid upper table.

- Grinding length 600 1000 1500 mm
- Swiveling range 9° 9° 7°



Heidenhain control system GRINDplusIT

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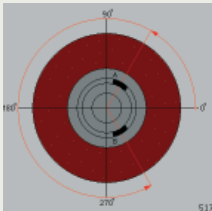
Monitor

- 15" TFT
- softkeys
- KELLENBERGER push-key strip



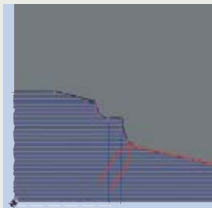
Keypad

- mobile hand panel with handwheel / emergency stop / confirmation key



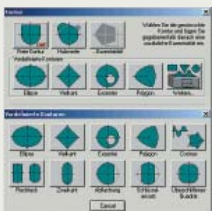
KEL-BALANCE

- semi-automatic balancing for 1 or 2 wheel / s
- operation and display integrated in the control system



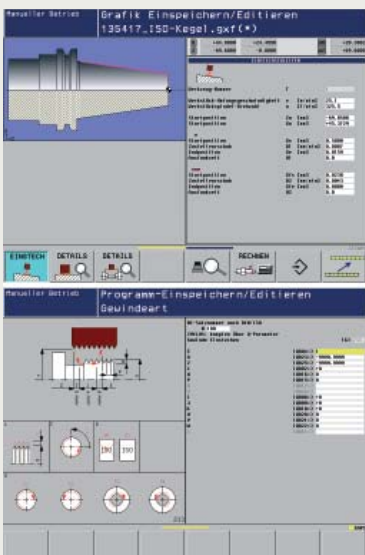
KEL-ASSIST

- SW package for the preparation of contour-grinding or profile-dressing programmes
- DXF import, threads, clearing cycles



KEL-POLY

- SW package for the preparation of unround grinding programmes
- correction of differences in the height of centres



GRINDplusIT HIGH LIGHT's

- Windows 2000
- KEL-PICTO
- Graphics editor
- DXF import
- Form editor
- Expanded grinding cycles
- Intermediate dressing at the push of a button
- Comprehensive tools management
- Several reference points for each grinding wheel
- Remaining-travel display
- Simple correction options



More powerful motors and a still faster control system ensure highly dynamic unround and thread-grinding operations. The highly capable new machine features absolute measuring in the B-axis, incremental, distance-coded scales in the X- and Z-axes, ultra-high resolution in the C-axis thus ensuring the ultimate in dimensional stability and profile accuracy of the workpieces produced.



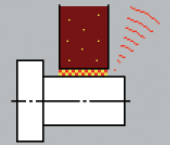
Additional panel

- for Movomatic in-process gauging systems
- for auxiliary units



KEL-TOUCH

- gap control with up to 3 sensors
- operation and display integrated in the control system



Swivel angle display

- for manual swiveling of the workhead



Hardware

- compact converter
- controller unit for 4 axes and 1 spindle



High frequency dressing device

- for rotating dressing tools



Electrical cabinet

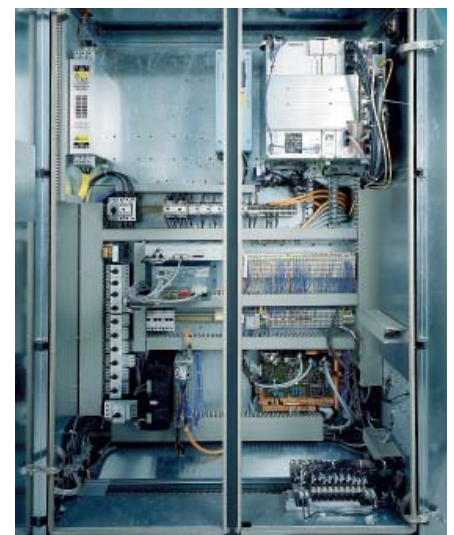
- Standard cabinet for EU and US
- HF drives integrated in the Heidenhain control system
- CE conformity
- Electrical cabinet with generous spare space
- Excellent overview and accessibility in the entire cabinet
- Heat exchanger integrated in the machine's coolant system

Power supply

- Coolant circulation system for wheelhead / HF ID grinding spindle and electrical cabinet

CE conformity

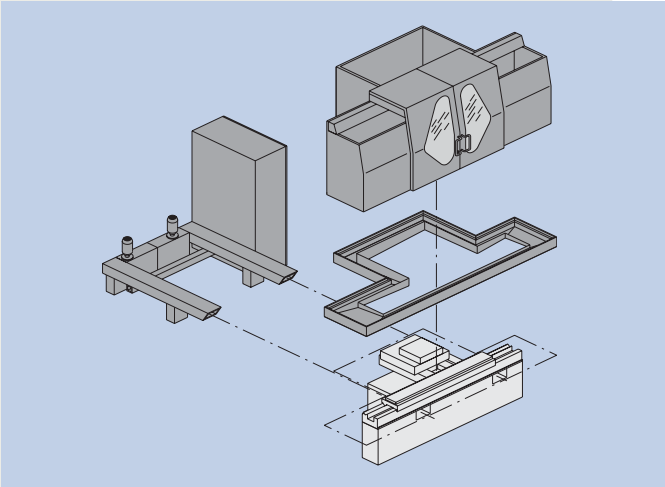
- Machine directive
- Low-voltage directive
- Electromagnetic-compatibility directive



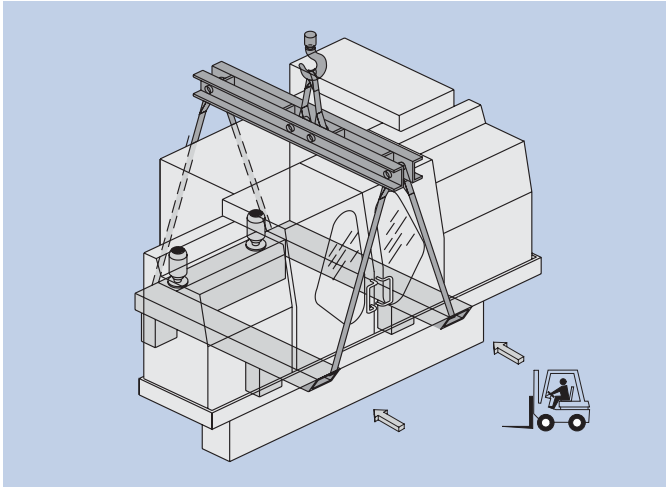
Technical data

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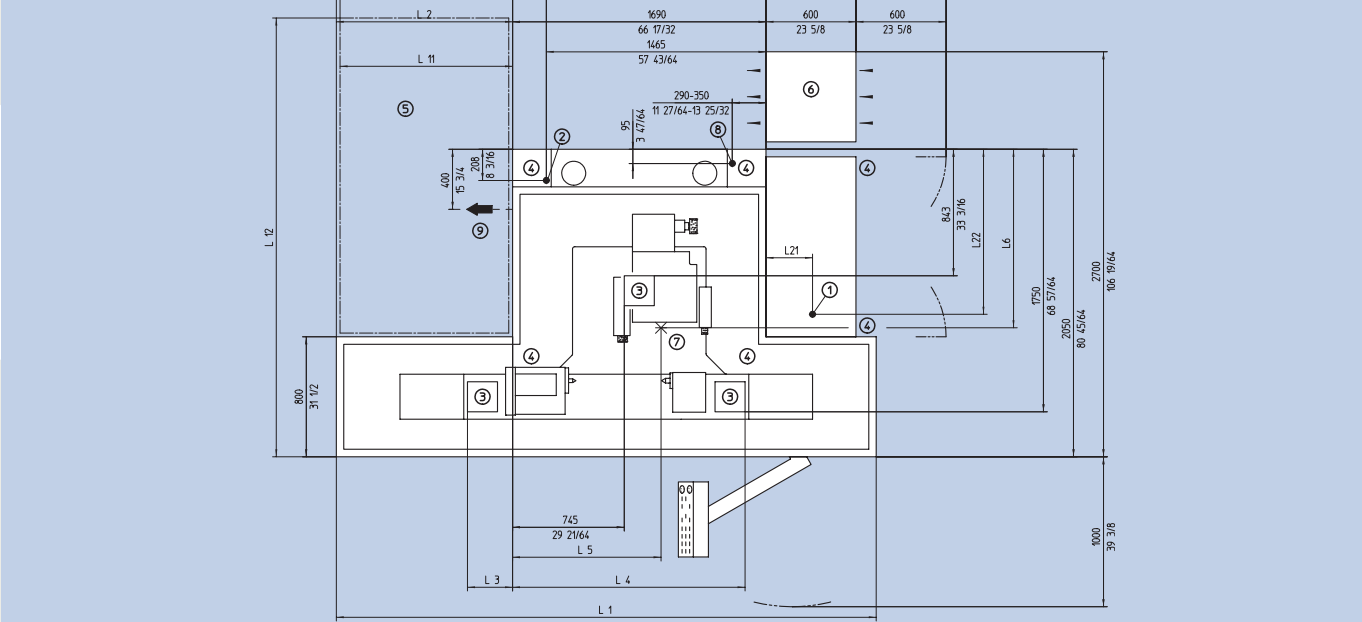
| Wheelhead type | | UR | R |
|---|--------|-------------------------------------|----------|
| Main specifications | | | |
| Distance between centres | mm | 800 / 1000 | |
| Grinding length | mm | 600 / 1000 | |
| Centre height | mm | 175 | |
| Weight of workpiece between centres | kg | 100 | |
| Load on chucked work | Nm | 100 | |
| Mains voltage required | | 3 x 400V / 50 Hz / 3 x 460V / 60 Hz | |
| Power consumption depending on equipment | A | 35 – 63 | |
| Space required / length x width | mm | 3010 x 2050 / 3600 x 2050 | |
| Longitudinal slide: Z-axis | | | |
| Travel | mm | 750 / 1150 | |
| Rapid traverse speed | m/min | 15 | |
| Resolution | µm | 0.1 | |
| Swiveling range of upper table | degree | 9 / 9 | |
| Wheelslide: X-axis | | | |
| Travel | mm | 320 | |
| Rapid traverse speed | m/min | 7.5 | |
| Resolution | µm | 0.1 | |
| Swivel devices | | | |
| B-axis | | standard | |
| Resolution | sec | 0.1 | |
| Swiveling range | degree | 240 | |
| Fixed intermediate section | | | standard |
| Wheelhead general | | | |
| Drive motor water-cooled | kW | 7.5 | |
| Peripheral grinding wheel speed | m/s | 35 / 45 | |
| Wheelhead UR | | | |
| Grinding wheel dimensions, lefthand side | mm | 400 / 500 | |
| Grinding wheel dimensions, righthand side | mm | 300 / 400 | |
| Wheelhead R | | | |
| Grinding wheel dimensions, lefthand side | mm | | 500 |
| Internal grinding attachment | | | |
| Bore for spindles up to | mm | 120 | |
| HF spindles MFV, optional | kW | 5.2 / 8 | |
| Workhead standard | | | |
| Rotational spindle speed | min-1 | 8 – 800 | |
| Driving torque spindle | Nm | 30 | |
| Spindle nose / internal taper | | DIN 55026 # 5 MK 5 / ASA 5 | |
| Swiveling range option | degree | – 10 + 100 | |
| Tailstock | | | |
| Internal taper | | MT 4 | |
| Retraction of sleeve | mm | 48 | |
| Micro-adjustment optional | µm | + / – 60 | |
| CNC control system | | | |
| Heidenhain | | GRINDplusIT | |
| Measuring systems | | | |
| Gap Control | | KEL-TOUCH | |
| Active longitudinal positioning | | Movomatic | |
| Passive longitudinal positioning | | Movomatic | |
| In-process gauging | | Movomatic | |
| Balancing | | KEL-BALANCE | |



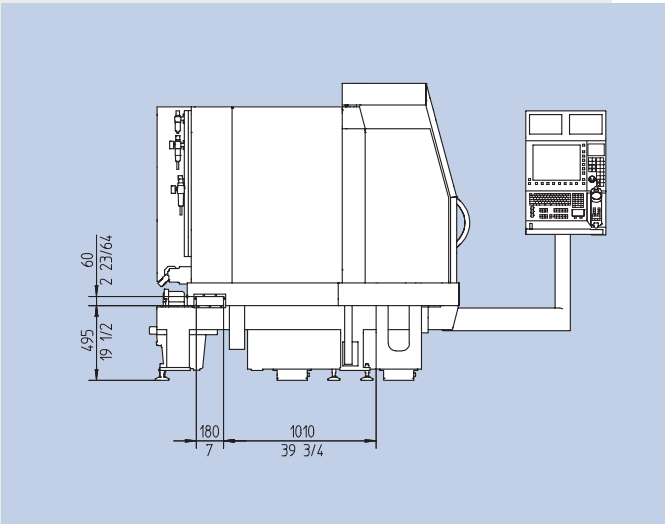
Separate infrastructure



Easy transport



Space-assignment plan



Coolant outlet

- 1 Power supply
- 2 Pneumatic supply
- 3 Vibration damping bases
- 4 Leveling elements
- 5 Coolant unit
- 6 Cooling unit
- 7 Coolant outlet

| Type | L 1 | L 2 | L 3 | L 4 |
|------|------|------|-----|------|
| 600 | 3010 | 775 | 300 | 1550 |
| 1000 | 3600 | 1175 | 300 | 1550 |

(Measures L11 and L12 are depending on type of filtration unit)

Competence and a world-wide partnership



First-class sales and service organization for all the major international markets with local well-trained staff. **KELLENBERGER** guarantees expert advice and support for evaluation, purchase, installation and services of our high-quality grinding systems.

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