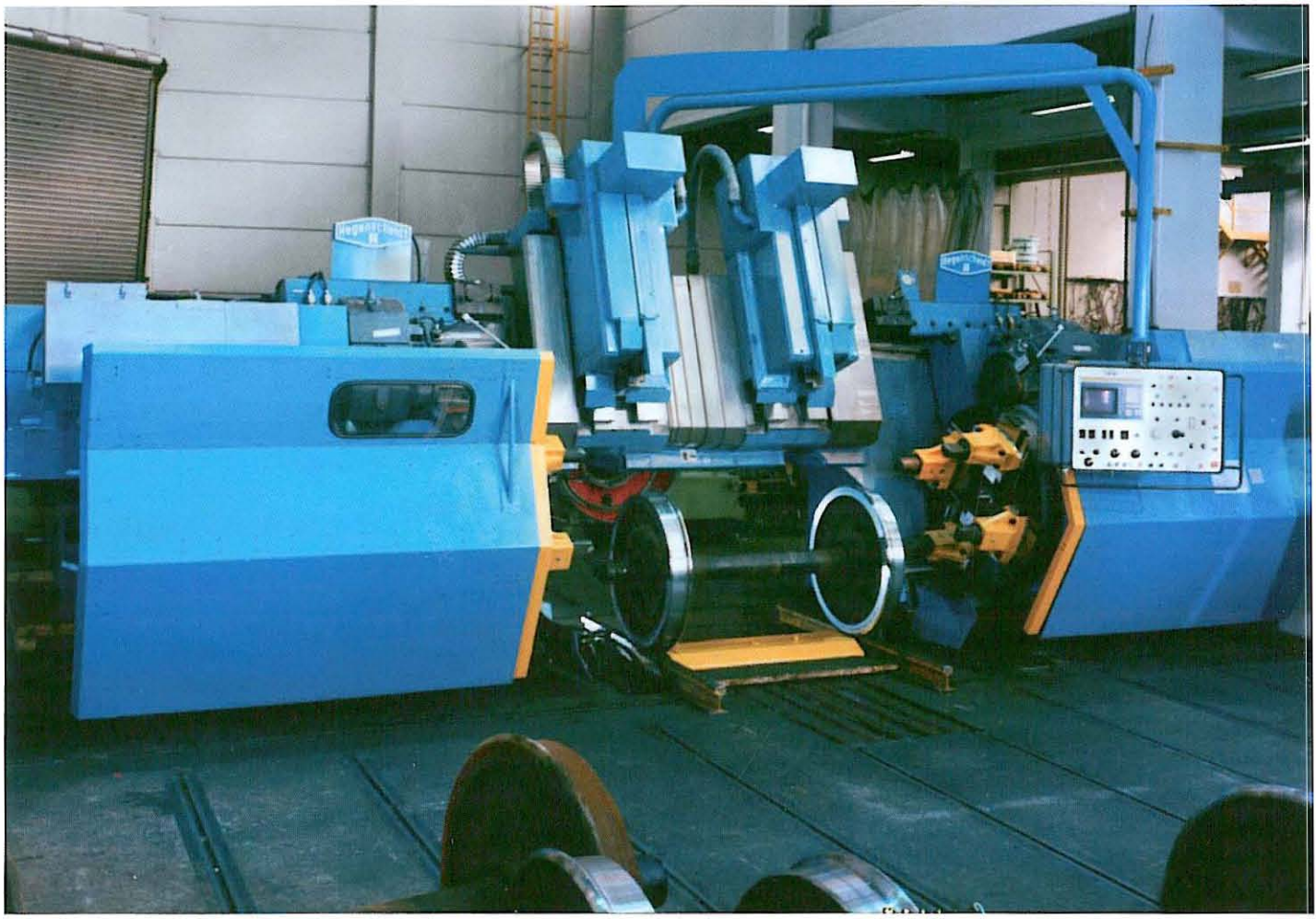
Portal Wheel Lathe

Type 165



Portal Wheel Lathe Model 165 with CNC controlled Tool Posts

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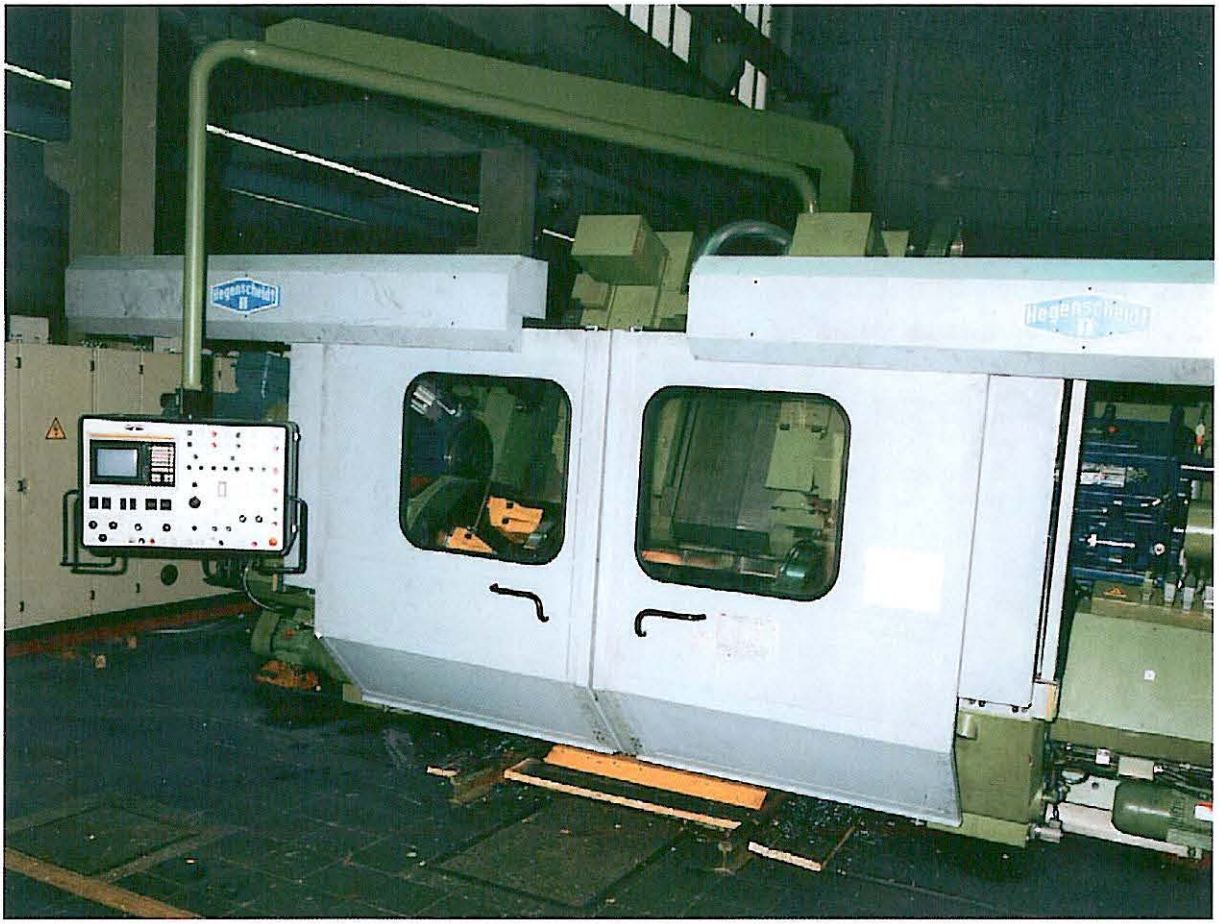
Hegenscheidt MFD

Concept of Portal Wheel Lathe



Portal Wheel Lathe Model 165 with CNC controlled Tool Posts

Working Range :

- Machining of new and worn wheelsets
- Wheel profile machining
- Machining of freight wheel set rims

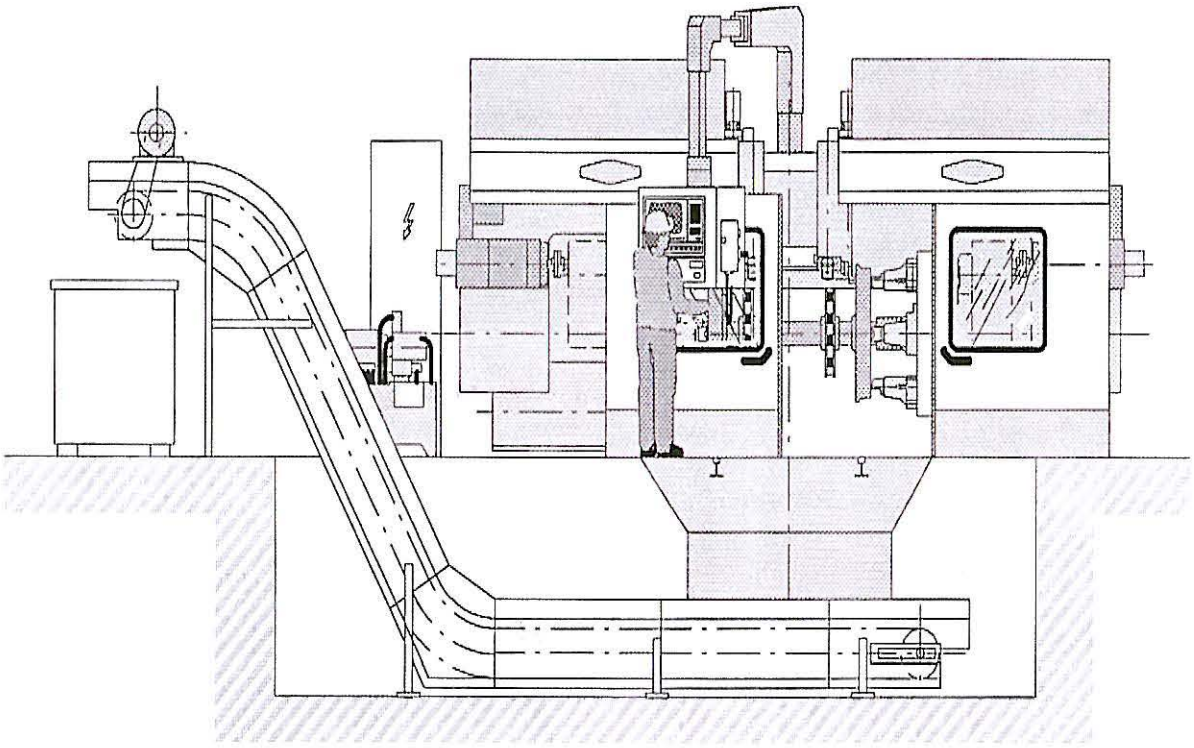
Wheel set types :

- Drive wheel sets with and without driving gear
- Wagon wheelsets

Equipment make-up :

- High performance machine capable of medium and heavy depth of cuts
- Portal type bed allowing roll-through of wheel sets
- Equipment installation at shop floor level
- Profile wear measurements with probes mounted to tool blocks with hydraulically controlled or CNC controlled tool blocks
- Fully automatic machine control system

The machine has been especially designed for the production in high performance wheel shops having a floor bound wheelset transportation system available. Because of this purpose the basis of the machine, the machine bed has been designed as a portal to bridge the wheelset supply track. The twin type tool post is fit in an overhead position to the machine base and therefore an unobstructed loading and offloading of the machine is guaranteed.



Advantages of this concept are: :

- Ease of chip removal.
- Tool blocks and headstocks are located away from the actual cutting area.
- Unobstructed view of the cutting tools during the machining operation.

Mounted to each side of the portal type bed are the headstocks, with integrated drivers, centers and a main drive system fitted to each headstock. Both headstocks are movable for ease of the load and unload functions.
The machine is of a compact, rigid design, i.e. during die machining process the portal type bed + headstocks, main spindles and centers, as well as the tool block slides and the portal type bed, are hydraulically clamped in order to support the cutting forces.

Movable safety doors with large observation windows protect the operator during the cutting operation in accordance to applicable safety standards.
Standardized process functions such as:

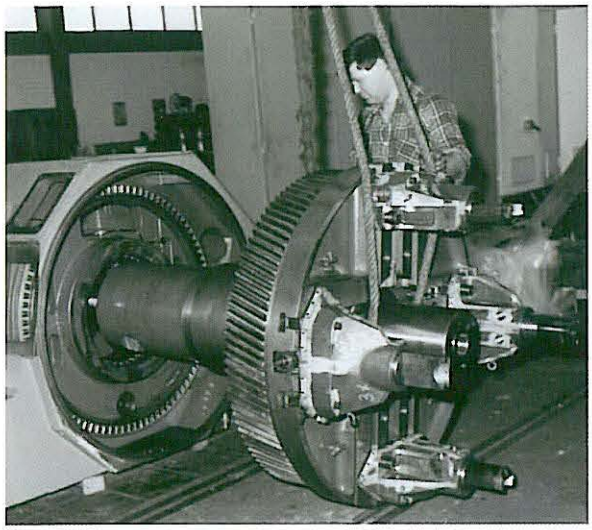
- Wheelset load/unloading
- Measuring
- Machining

are programmed for automatic sequence.

Machining of various wheelsets

Face plates :

Considering the load absorption generated by high clamping and cutting forces, as well as the frequency of the chucking and unchucking processes, die main spindles and the face plates are supported in large bearings, especially for the support of the axial clamping force. An axial bearing of 1100 mm in diameter mounted directly behind the face plate is provided.
This design assures the direct force transition into the supporting head stock housing. This design concept assures excellent repeatability of accuracies and provides maximum up-time of the equipment. This concept is of proven design on portal wheel lathes in operation for more than 25 years.



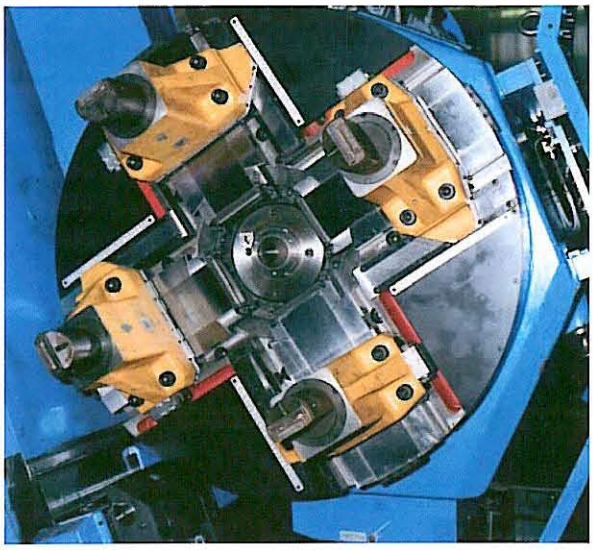
Main drive :

The machine is equipped with two synchronized electric drives. They provide the drive power through a reduction gearbox. The power is transmitted by helical gears directly to the face plates. Robust infinitely speed variable AC-motors are the standard drive.

Chucking System :

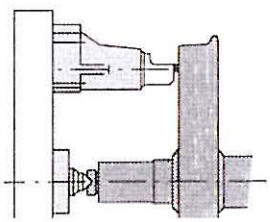
The chucking systems, as well as the overall machine concept, have been designed specially for machining of various wheelsets.
Our design takes into consideration:

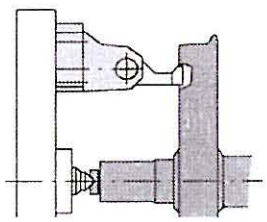
- The frequency of chucking cycles per shift.
- The capability of minimizing the indentations from chucking and the deformation of the wheelset.
- The guide ways of the chucks are equipped with hardened and ground - guideways.
- Protective covers are provided for the diameter adjustment spindles.
- Central adjustment of the drivers by manual adjustment or hydraulic motor (automatic) is available.

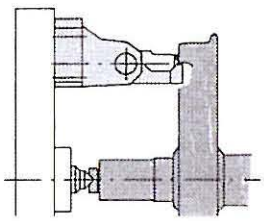


Considering the different type of wheelset designs, the following chucking systems are available.

- 4-jaw axial drivers with central adjustment for the chucking diameters
- 4 jaw-combination radial/axial drivers with central adjustment for the chucking diameters
- 3-jaw radial drivers /with or without central adjustment for me chucking diameters

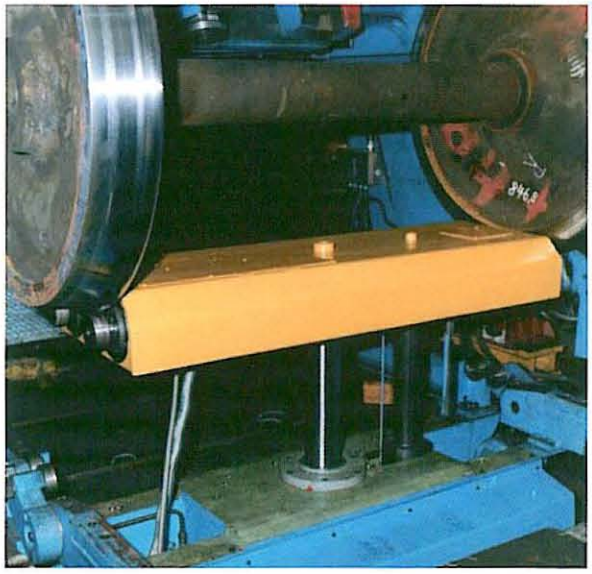






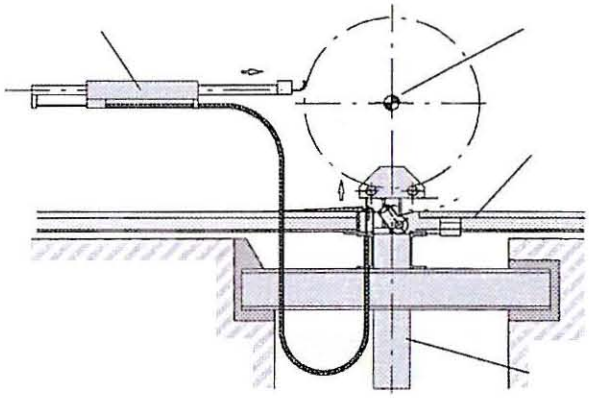
Wheelset arresting and run-off device

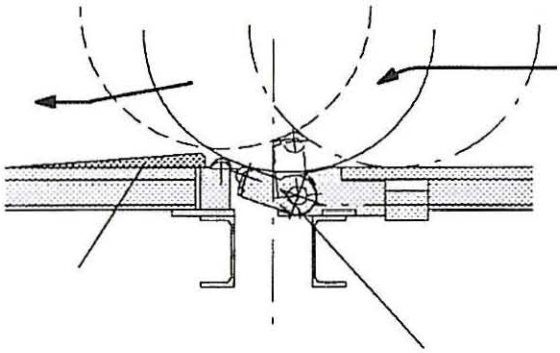
Wheelset arresting and run-off device for loading and unloading of wheelsets consisting of run-off wedge, wheelset arresting & run-off device and Wheelset elevator.
This design allows the automatic positioning of worn wheelsets of varying diameters ranges for axle centering purposes.



Centering device

The centering device is by electro-mechanical control and the wheelset elevator is of hydraulic design. The wheelset is automatically stopped when the correct vertical center position is reached. The centering accuracy is independent of the wheelset diameter and worn tread condition.





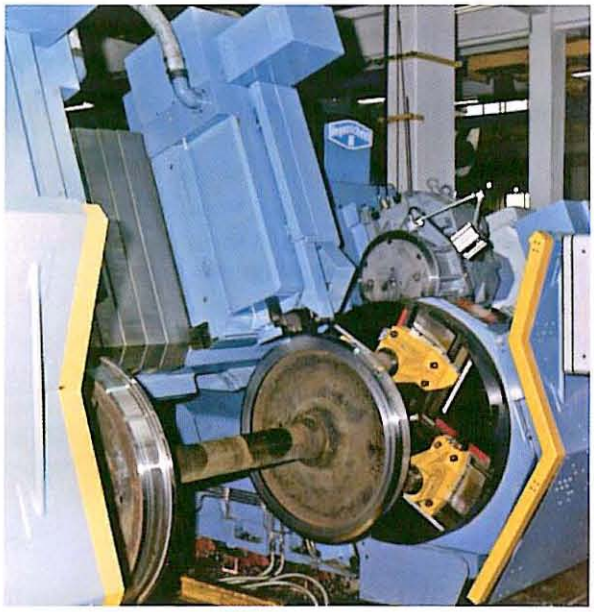
CNC controlled tool blocks

Characteristics and layout of the toolblocks are such as to allow the reprofiling of the wheel contour, facing of the wheel rims as well as the turning of the wheel tire.

For automatic referencing and wear measuring the toolblocks are equipped with positioning probes as well as wear probes.
The feed drives of the X and Z-axis slides are effected by precision ball lead screw assemblies, with heavy duty AC-frequency controlled servo motors.
The tool blocks and the machine is controlled by a CNC multiple path Control System.

The operation of the machine is accomplished by selecting the programs, with instructions and graphics, shown on the CRT screen.

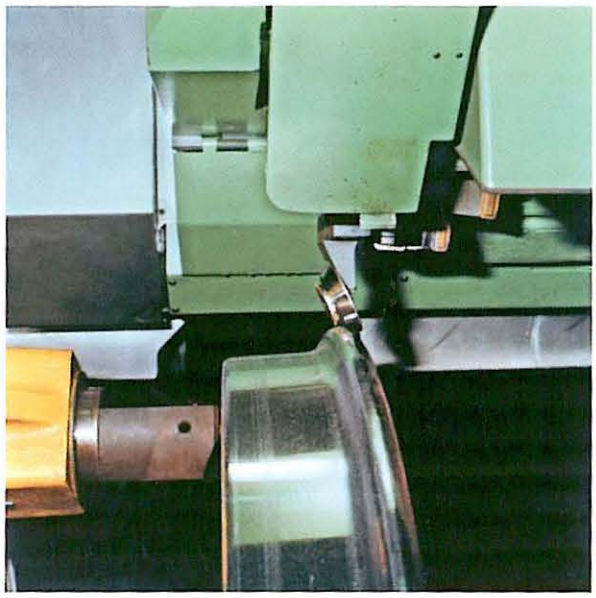
The operating steps and sequence of operations are pre-programmed to guide the operator.

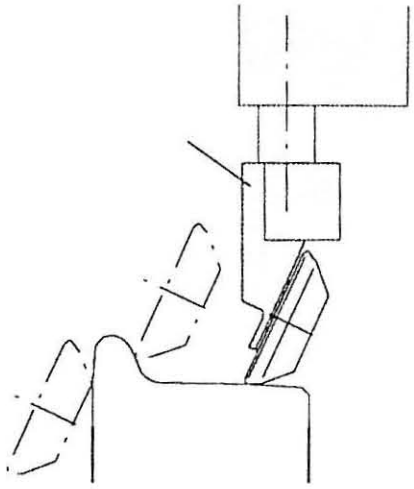


All relevant machining cycles are stored within the controller. External data input from an independent wheelset measuring system can be utilised.

Tooling Systems and Standard Set-Up

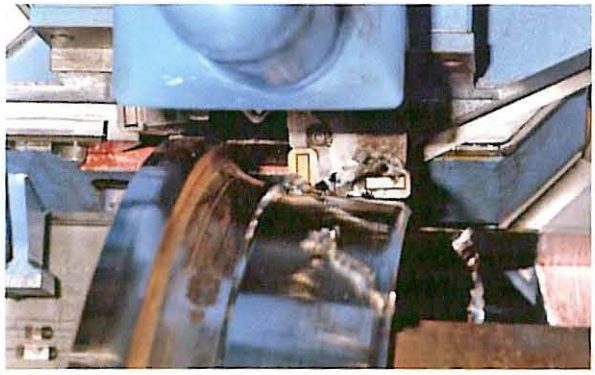
The probes provide profile wear measurements and positioning of the tool blocks and tool holder to assure minimum stock removal of the wheel material. The wear probes measure while the wheelset is rotating, establishing the worn wheel profile condition. Also, if required, the wheel width could be measured. Taking into consideration the maximum cutting depth limit of the machine and wheelset, the controller will automatically select the cutting program and the most suitable machining sequence based on actual wheel wear.
The measured wear data inputs automatically, determining the new wheel diameter of the worn wheelset as well as the position and cutting depth setting of the tool holders.





Tooling Systems :

Cartridge type tool holders with quick indexable carbide inserts are used for the reprofiling of the wheel contour.



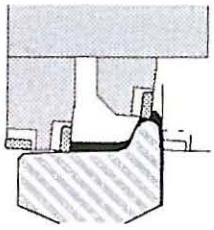
Standard Set-Up :

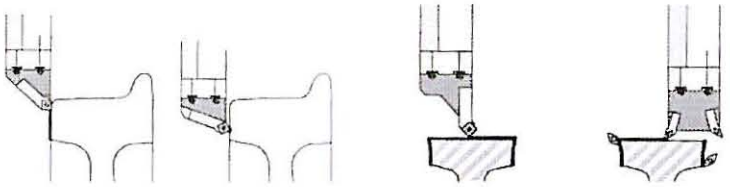
By using a topping and profile tool holder as shown, the inside rim faces, tread and flange contours are machined in a continuous path without changing the tool holder.

Please contact us should you require an additional machining process. We would like to review your requirement.

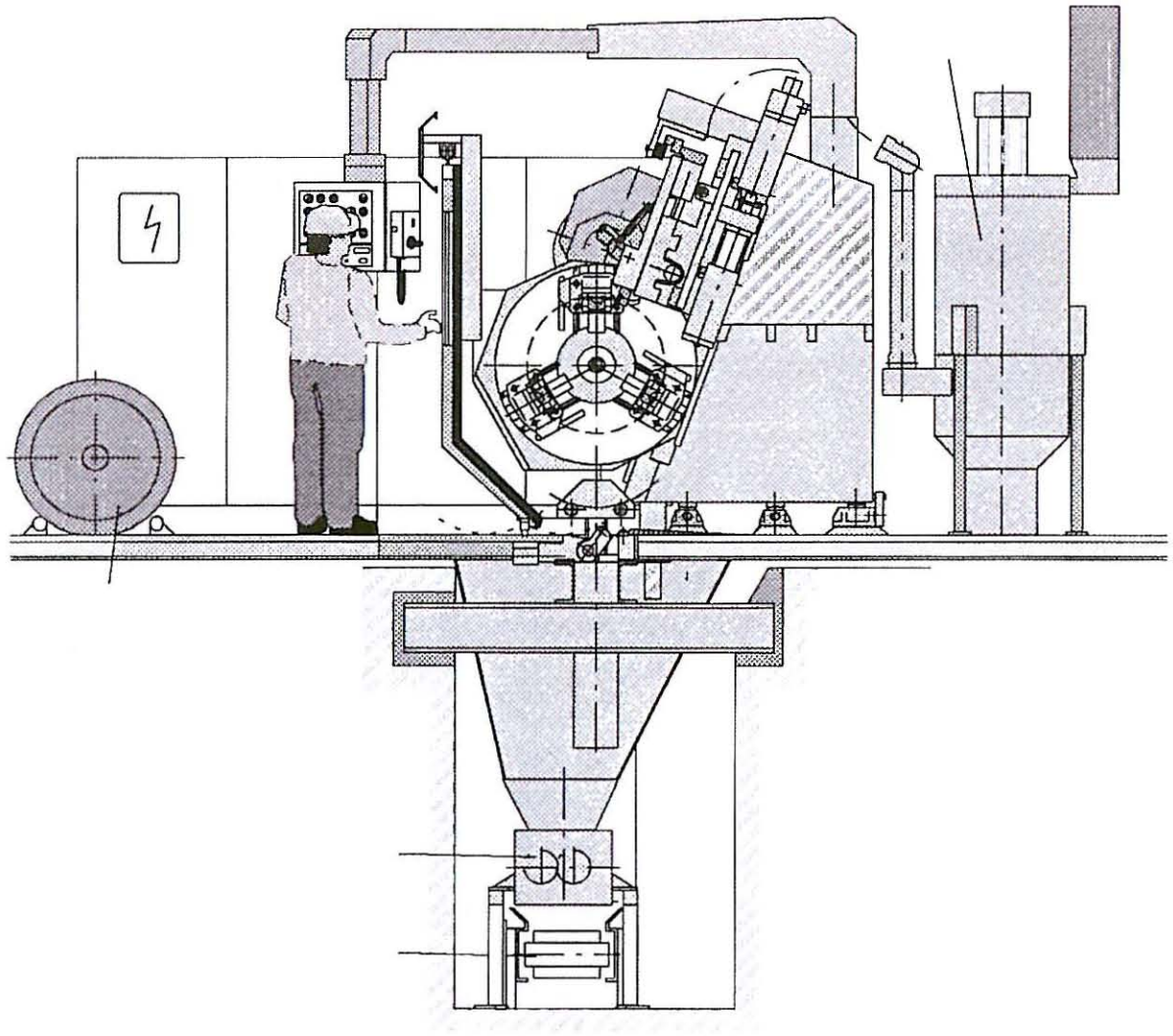
Additional applications by adding tool holders to the tool blocks :

- Machining of outer rim face, including turning of reference groove.
- Machining of the wheel tire (upon request)





Available Accessories



- **Wheelset Transporting Devices :**

To assure the ease of transporting the wheelsets to and from the machine we also recommend our transporting devices.

- **Chip Removal :**

Considering the machine production capability and heavy stock removal rates, heavy duty chip conveying systems from leading suppliers are available. Chip breakers (shredders) are also available to minimize the chip volume for ease and safe transporting and disposal.

- **Dust & Smoke Extractor :**

To maintain a clean environment and to prevent excess cutting dust to settle on the machine, a dust & smoke extractor with nozzles mounted near the cutting tools could be provided. The equipment would be of an industrial heavy duty type.

For additional accessories and requirements please contact us.

Technical data

Mechanical	
Track width	1000 – 1.676 mm
Wheel tread diameter - Normal application	600 – 1.100 mm
Wheel tread diameter - Special application	750 – 1.250 mm
Axle length	on request
Max. admissible axle weight	45 KN
Feed rate of tool post	0,01 -3,5 mm/U
Section of cut per tool post	32 mm² - max. 50mm²
Electric	
Operating voltage	400 / 50 V / Hz
Control voltage	230 / 50 V / Hz
Main drive capacity - Normal application	2 x 44 KW - max. 2 x 70 KW
Main drive capacity - Special application	upon project evaluation
Range of face plate revolution	1 - 70 min^{-1}
Machine control	Siemens CNC 840 D
Dimensions of machine (l x w x h) Track gauge 1.435 mm	8.200 x 3.000 x 3.000 mm
Machine weight	Ca. 540 kN
Machining accuracy	
Tread diameter difference of two wheels on one wheel set	≤ 0,15 mm
Deviation from nominal profile	≤ 0,2 mm
Run out at wheel profile (radial)	* 0,1 – 0,3mm
Run out at wheel profile (axial)	≤ 0,3 mm
Machine Performance	
Wheelset per 8h shift	35 – 60 Pcs.

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