



U 2000-400 D (Tandem Version)

Underfloor Wheel Lathe

Type U 2000-400



CNC-controlled machine with automatic measuring system

GP 078 EN HM-PC 09.04 - Subject to technical changes 27.08.08

THE TECHNOLOGY PROVIDER



THE NSH GROUP
NILES SIMMONS HEGENSCHIEDT



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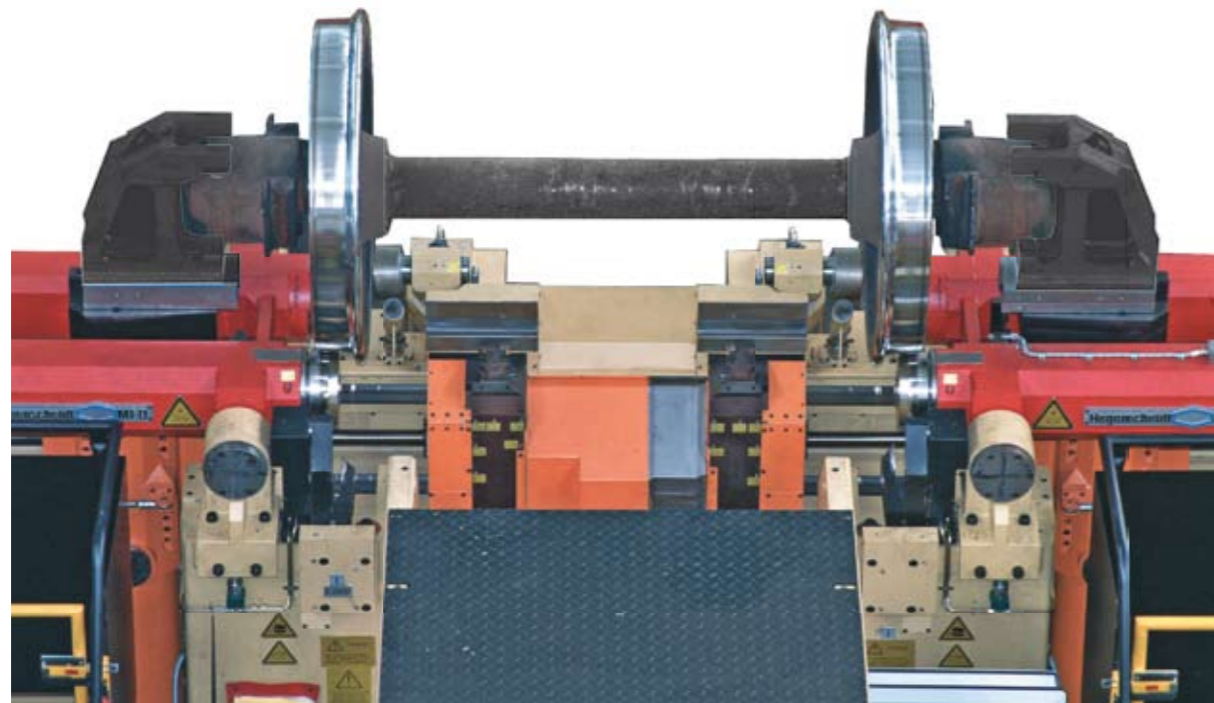
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Operative range and scope of application

The modern underfloor wheel lathe does not only fulfill all present demands of working conditions and accuracy. Due to the 2 column design together with the integrated crossbeam for carrying the tool posts the

layout is also intended to satisfy all future requirements and enhancements. It is a dynamically rigid and a particularly user and service friendly machine. This machine represents the highest standard in modern wheelset

machining technology. Due to its high utilisation ratio, its precision, long service life and low maintenance costs, the machine guarantees optimal economic efficiency.



Function

Wheelsets of railways as well as wheelsets of transport services (trams, underground stock, etc.)

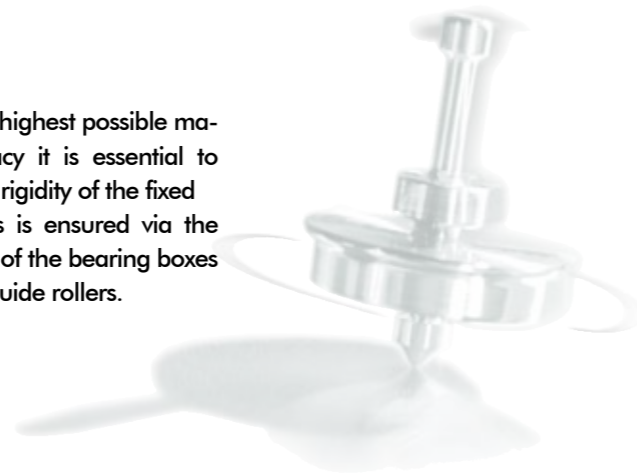
are reprofiled with the highest accuracy by means of CNC controlled Hegenscheidt-MFD

underfloor wheel lathes, no matter if they are assembled or disassembled.

Description

The wheelsets to be reprofiled are positioned either via the bridging rails (in situ condition) or via crane (demounted condition). To carry out reprofiling, the wheelsets are driven on the wheel treads by 2 friction drive rollers for each wheel.

To achieve the highest possible machining accuracy it is essential to provide a high rigidity of the fixed wheelsets. This is ensured via the radial centring of the bearing boxes and the axial guide rollers.



Machining accuracy ¹⁾

¹⁾ Form an geometrical tolerances acc. DIN / ISO 1101

Machining profile

Radial run out of tread	≤ 0,1 mm ^{3) 5)}
Lateral wobble	≤ 0,2 mm ^{4) 5)}
Deviation from nominal profile geometry	≤ 0,2 mm
Maximum diameter difference of two wheels on one axle	≤ 0,1 mm ²⁾
Maximum diameter difference of four wheels on one bogie	≤ 0,3 mm ²⁾
Surface finish profile	Ra ≤ 12 μm
Surface finish inner and outer wheel faces	Ra ≤ 25 μm

²⁾ requiring identical stock material on both wheels, sharp cutting tools, precise and stiff clamping of the axle bearing box. Depth of cut ≤ 4 mm (2 cuts)

³⁾ requires measuring cut, roughing cut or round wheels as well as perfect cutting tools, regular cutting conditions and correct radial centring of wheels

⁴⁾ requires lateral wobble < 0.5 mm

⁵⁾ when turning resilient wheelsets an increase of the given value up to 0.3 mm has to be considered

Machining brake discs

Lateral wobble	≤ 0,2 mm
Planeness	≤ 0,1 mm/100 mm
Surface finish	Ra ≤ 2,5 μm

Machine data

Drive rating	2 x 30 kW
Cutting force (if axle load is sufficient)	26 kN
Maximum cross section of cut (each tool post)	10 mm ² *
Speed range of main drives, infinitely variable	
- at constant torque	0 – 1.500 min ⁻¹
- at constant rating	1.500 – 6.500 min ⁻¹
Cutting speed range	
- at constant torque (drive rollers)	0 – 70 m/min
- at constant rating (drive rollers)	70 – 305 m/min
Cutting speed	
- at machining profiles	20 – 120 m/min
- at machining disc brakes constant	120 m/min
Tool post fast speed transversal x-axis	2 m/min
Tool post fast speed longitudinal z-axis	4,7 m/min
Feed range, infinitely variable	0 - 2,5 mm/rev
Axle distance between drive rollers	440 mm
Diameter of drive rollers	220 mm
Maximum noise level of the machine (without machining)	≤ 76 dB (A)
Measuring system of the machine	metric

* depending on axle load and additional load

Connection data

Executed according to VDE, EN and IEC regulations (other regulations upon request)

Operating voltage	400 V *
Mains frequency	50 Hz *
Mains type	TN
Connected power	≤ 100 kVA
Machine weight approx.	20.000 kgs
Space requirements (L x W) approx.	6 m x 7 m **
Foundation pit depth approx.	2,3 m

* alternative values possible

** at gauge 1,435 mm (for other gauges on request)

Main dimensions and operational data

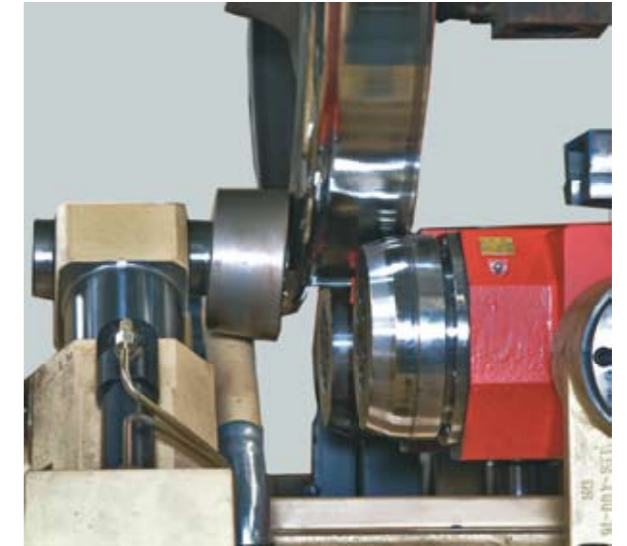
Wheelset data	
Track gauge	1.000 - 1.676 mm
Min. tread diameter	** 350 mm
Max. tread diameter	1.400 mm
Min. profile width	75 mm
Max. profile width	155 mm
Min. distance between axles, coupled	1.300 mm
Min. distance between axles, uncoupled	1.000 mm
Max. axle length of gauge 1.435mm	2.600 mm
Min. axle length of gauge 1.435mm	1.600 mm
Max. axle load, lathe	400 kN
Max. axle load, bridging rails	150 / 300 / 400 kN

**) without consideration of additional units, such as rail brakes or track cleaning devices.

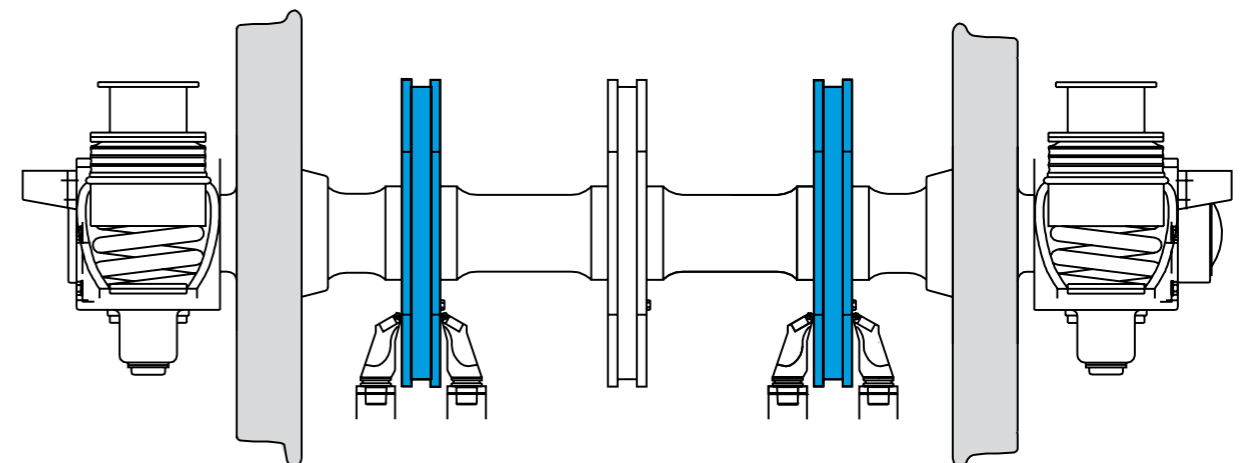
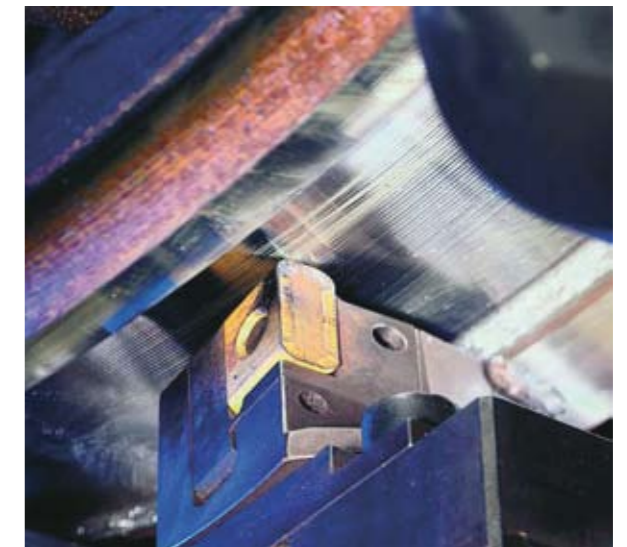


The Underfloor Wheel Lathe is suitable for:

- Reprofilng of wheelsets
- Partial reprofilng of wheelsets
- Machining of the inner and outer wheel face
- Reprofilng of individual wheels
- Machining of axle and / or wheel mounted brake discs (optional)



The machine is operated via a central control panel so that the operator has continuous access to all machine functions while being in the optimal working position. At the same time during machining, the operator is protected against swarf. The automated machining system is designed to provide the machine user with easily understandable machining menus. The prepared machine cycles gives a machine that is operator friendly and easy to use.



Machine Design

Standard components

The base machine is a standard unit which is CNC controlled and designed to lift, measure and machine a wheelset.

A tandem version, for simultaneous machining of bogies is also available.

The basic machine consists of the following as standard:

- 2 machine columns
- Cross beam
- 2 tool posts with integrated automatic measuring system
- 2 friction roller drives (roller carrier with drive unit)
- Electrical equipment
- Hydraulics
- Machine housing
- Integrated swarf conveyor
- CNC control Sinumerik 840 DE, make Siemens, operator guidance in proposed language
- Wheelset position indication

Customer or vehicle specific components:

- Outer bearing box centring with adapters
- Inner bearing box centring with adapters
- Rail system
- Swarf shredding devices
- Chip disposal (adaptation to the local conditions)
- Jacking for coupled wheel set equipment
- Necessary extensions according to machining task



Other options available to extend the machine range and to increase the degree of automation:

- Brake disc machining equipment
- Brake disc machining tools
- Additional centre adapters
- Antislip control unit
- Chip breakage control system
- Interruption on tool breakage (push button operated) with automatic repositioning at point of interruption
- Data storage
- Additional wheel profiles programmable
- Customised enhancements upon request

Advantages

The advantages of this machine are:

- Machine-integrated housing with optimised swarf evacuation ensures improved health and safety conditions for the operator.
- Integrated swarf guiding plates and large openings to the integrated swarf conveyor and / or chip crusher facilitate easy swarf evacuation.
- Simple approach to majority of disc brake types due to the new design of the toolposts.
- Permanent accuracy of the guiding elements for the toolposts.
- Oil lubrication of the toolposts is replaced by grease lubrication due to environmental aspects and simplified maintenance.
- All accuracy-relevant components (i.e. linear roller elements for guiding the toolposts) are designed for less maintenance and wear.
- The machine arrives on site completely pre-assembled and can be put into operation within a very short time.
- Compact machine design facilitates smaller pit dimensions.
- Simple foundation design eliminating cable ducts, since the main switchgear cabinet is an integrated part of the machine.
- Modular design enables further enhancements and add-ons (i.e. data transfer, additional holddown claws, etc.)

