RTS1000

UNDER-FLOOR WHEEL LATHE

MACHINE SPECIFICATIONS

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2nd Edition
7/30/2020

Technical Support Phone Number: 906-233-1500

COMPONENTS

PAINT SCHEME

Delta Wheel Truing Solutions RTS1000 Under Floor Wheel Lathe

The RTS1000 CNC Controlled Underfloor Wheel Lathe is specifically designed using the latest technology and manufactured components to re-profile railway wheelsets.

The modern design of the RTS1000 underfloor wheels lathe combines the latest industry knowledge and experience of machine-tool construction to provide a specifically designed and cost-effective solution for wheelset machining on locomotives, light rail, passenger & freight vehicles, without the need to remove the axle from the bogie.

Machine capabilities with standard equipment:

- Machining of Wheel profiles on wheelsets mounted on vehicles.
- Machining of Wheel profiles on wheelsets mounted on bogies.
- Machining of Wheel profiles on single wheelsets with axle boxes mounted.
- Machining of stand-alone wheelsets between centers.

The RTS1000 underfloor wheel lathe utilizes FANUC 35i-B state-of-the-art control software, with a specially designed user interface to simplify operation. The custom control software includes a “On-Board Measuring System” that maximizes the cost efficiency of wheelset machining.

The RTS1000 is installed in a pit where it is installed within the track and anchored through the base of the machine. The compact design of the RTS1000 underfloor wheel lathe minimizes the requirement for costly construction work.

The Fanuc Series 35i-B Model B control panel is located at the center of the RTS1000 for ease of set-up and operation. The RTS1000 is designed to be controlled by a single operator.

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MACHINE CHARACTERISTICS

Machine Function

- Simultaneous machining of worn wheel sets by re-profiling the wheels to required specifications and turning the profile to a nominal diameter by eliminating flat spots, high flanges, tread hollows etc.
- Turns the wheels of rail vehicles without the need to remove the wheel sets from the bogie and the bogie itself from the vehicle.

Wheelset Data

- Rail Size: Built to customer's specifications.
- Rail Gage: Narrow to broad.
- Wheel Profile: Multiple profiles available per customer specifications.
- Machine is suitable for re-profiling the following:
    - Monobloc and resilient wheels.
    - Wheelsets installed on the bogie connected to the vehicle without the need of removal of wheel set / bogie.
    - Wheelsets disassembled from the vehicle.
    - Free wheel sets.

Machine Performance

- Axle/truck held in place by using live centers or hold down arm assemblies either on the truck's axle centers or on the journal box.
- Lateral movement stabilizer arms prevent side-to-side axle movement.
- Rotation of the wheel set is achieved by utilizing (4) hydraulically driven friction drive rollers.
- The friction drive rollers are also used for auto-centering and lifting the wheel sets off the rail.
- Sliding rails are retracted once the parameters are satisfied and wheels are no longer contacting the rail via the lifting rollers.
- Once sliding rails are retracted you can now access the lathe controls and begin the re-profiling process.
- Machine is protected by sensing and avoiding servo motor overloads.

Production Rate

- Index and clamp vehicle onto the machine. (approximately 10 minutes)
- Pre & post measuring of the wheelset. (approximately 10 minutes)
- Under normal conditions an average wheel set can be turned in (approximately 25 minutes, depending upon wheel condition).
- Increased productivity by optimizing cutting conditions and process time.
- Example: Vehicle indexed onto the machine 10 minutes, (3) 8-minute profile passes at 1/8" depth of cut (total 3/8" off the radius of the wheel) plus 10 minutes for pre & post measuring of the wheelset. Total time of 45 minutes for re-profiling 1 wheelset.

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MACHINE SPECIFICATIONS

Cutting Capacities	S.A.E.	METRIC
Maximum Axle Load	140,000 lbs.	63502.9318 Kg
Minimum Wheel Diameter	20 in	508 mm
Maximum Wheel Diameter	54 in	1371.6 mm
Minimum Track Gage	56-1/2 in	1435.1 mm
Maximum Track Gage	66 in	1676.4 mm
Max Depth of Cut	.394 in	10 mm
Operating Speed	20 rpm	20 rpm

Travels

X Axis	11 in	279.4 mm
Y Axis	7-1/2 in	190.5 mm

Feedrates

X Axis	0 – 6.000 ipm	0 – 152.4 mm/min
Y Axis	0 – 6.000 ipm	0 – 152.4 mm/min

Rapid Motion

X Axis	30 ipm	762 mm/min
Y Axis	30 ipm	762 mm/min

Axis Motors

Max Torque X Axis	708 lbf	5933 Nm
Max Torque Y Axis	708 lbf	5933 Nm
Cutting Force	5929.6 lbs.	26.37617 kN

Drive Motors

Low Speed High Torque Motors	37.5 hp	27.96 kW
Cont. Speed	315 rpm	315 rpm
Speed	380 rpm	380 rpm
Cont. Torque	1660 ft-lbf 315 rpm	1660 Nm-lbf 315 rpm
Driver Roller Diameter	7.750 in	196.85 mm

Footprint

Main Base	76 x 156 in	1930.4 x 3962.4 mm
Weight: Approximately	70,000 lbs.	31,751.466 kg
Pit Dimensions	Contact Delta Wheel Truing Solutions	
Machine Size	Contact Delta Wheel Truing Solutions	

MACHINE SPECIFICATIONS (continued)

Main Power Requirements

Main Power 400amp 460vac, 3 Ph 50/60hz
Fused Power Disconnect, 300amp 460vac 3 Ph 50/60hz

Control Power Requirements

Control Power 24vdc

Hydraulic Power Unit Specifications	S.A.E.	METRIC
Horsepower	150 hp	110 kW
Reservoir	250 gallons	946 liters
Piston Pump with Compensator	200CC	181 lpm
Piston Pump with Standard Cut-off	28CC	32.176 lpm
Max Torque	437 ft-lbf 1780 rpm	592 Nm-lbf 1780 rpm

MACHINE ACCURACY

Machining of Profile

Diameter Deviation between Both Wheels on One Axle	.0039 in	.1 mm
Radial Run Out of Wheel	.0039 in	.1 mm
Axial Run Out of Wheel	.0039 in	.1 mm
Accuracy of Wheel Profile	.0078 in	.2 mm
Surface Finish	250 µm in	6.3 µm mm

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OPERATION SPECIFICATIONS

Machine Operations

- Hold Down Arms / Live Centers:
  - Arms make contact on top of the journal box or approved area per customer's specifications.
  - Live centers contact axle centers.
  - Live Centers/Hold Downs move in/out utilizing a hydraulic cylinder.
  - Slides move along an automatically oiled horizontal slide assembly.
  - Slides move in/out utilizing a hydraulic cylinder.

- Lateral Guide Rollers:
  - Rollers make contact on the back side of the wheel.
  - There is a total of 2 idle wheels which are auto centering.
  - Hydraulic cylinders are locked between the lateral rollers and wheel.

- Friction Drive Rollers:
  - 4 Harden & Ground hydraulically driven friction drive rollers.
  - Rollers contact the wheel and are used to lift, center and drive the wheelset.
  - The friction drive rollers are tapered to match the wheel profile.
  - Drive rollers are under constant pressure to assure traction and prevent slippage.
  - The area in which the rollers make contact on the wheel prevents any flats from developing, maintaining profile accuracy and surface finish.

- Lifting:
  - The lifting assembly is attached to the base of the friction drives.
  - Moves along an automatically oiled vertical slide assembly.
  - Moves up/down utilizing a hydraulic cylinder.

- Sliding Rail:
  - Designed to support the weight of the axle load, locomotive or light rail vehicles.
  - Once the wheels are lifted off the sliding rails and securely clamped, 2 hydraulic cylinders are utilized to retract the rails.
  - When not in use or during vehicle shunting process, sliding rails are fixed in the closed position.

- Lathes:
  - (2) Heavy duty lathes mounted on (1) crossbeam.
  - Hardened and ground dovetails & ways.
  - Lathes are independent of each other but work simultaneously to re-profile both wheels at the same time.
  - Each lathe utilizes 1 toolholder containing 2 inserts.
  - Automatic oil lubricated dovetails and ways.
  - Lathes consists of X axis slide (left/right) & Y axis slide (in/out) driven by a servo motor, reducer, and ball-screw with covers for protecting ball-screws from swarf and debris.

OPERATION SPECIFICATIONS (continued)

Control Operations

- CNC Lathe Control:
  - Fanuc Series 35i-B Model CNC with step by step color coded process controller.
  - 10-1/2” Touch Screen with operational keyboard.
  - Handheld iPendant control with protective cover.
  - Emergency Stop.
  - Ethernet / USB ports for Service & Support.

- Controls / Software:
  - Fanuc 35i-B plc controls and on-board measuring device are used for operating the system.
  - On-board measuring device Indicates the minimum material removal required to meet specifications of the diameters and profiles of the wheels of each single wheel set, four wheels of a single bogie as well as all the bogies/wheels of the entire vehicle.
  - Both the software and the measuring device work together in calculating all profile information and measurements of wheel. Including vehicle number, truck number, axle number, operator, location, date etc. All this information is stored and can be saved and exported. The controls come preloaded with the customers profile. Additional profiles can be added upon request and are easily selected by the press of a button.

- Automatic Tool Stop & Retract:
  - The cutting tool automatically retracts during the cutting process when servo overload is detected to prevent damage to the system or wheel.
  - The lathe controls have a tool retract button to retract the tool from the cutting process any time it is pressed. This sends the lathe to its machine home position. This feature is used for rotating or replacing the insert on the tool holder during the cutting process. Once insert is rotated or replaced, press start, and lathe resumes to the exact position where it was retracted resulting in reduced run time.

Hydraulic Operations

- Hydraulic:
  - HMI display with push button controls
  - Hold Down Arms or Centers: In / Out
  - Lateral Stops: Up / Down – In / Out
  - Lifting: Up / Down
  - Sliding Rails: In / Out
  - Friction Drives: Start / Stop

- Friction Drive RPM: Increase / Decrease

OPERATION SPECIFICATIONS (continued)

Systems Operations

- Hydraulic HPU:
  - Supplies fluid to all the hydraulic cylinders and motors on the system.
  - Tank heater for maintaining fluid temperature when not in use.
  - Heat exchanger maintains fluid temperature while in operation.
  - Fluid filtration & monitoring system.
  - 250-gallon reservoir tank with low level warning and shutdown.

- Lubrication:
  - All lubrication points are controlled by injectors to feed the exact amount of oil needed.
  - Injectors are controlled using automatic oilers with timers.
  - Centralized automatic lubrication system provides adequate lubrication to all moving components including both lathe ball-screws dovetails & slide system.
  - Components that are not lubricated through the centralized oiler system are manually lubricated through dedicated grease fittings.

- Machine status:
  - 2 Three colored (Red, Yellow and Green) traffic lights mounted on top of the columns giving a clear indication of the lathe status.

- Safety:
  - Safety inner-lock protected doors allows automatic operation of machine only when doors are in locked position. Doors are equipped with inspection windows allowing constant visual status of the machining process.

- Main Console:
  - Main Power 300amp 460vac, 3 Ph 50/60hz.

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COMPONENTS

- Main Structure
  - 2 Support Columns.
  - 1 Crossbeam.
  - Base Plate.
- Hold Downs
  - Hold Down / Centers.
  - Removable Adapter Assemblies.
  - Accommodates Proper Holding Positions for Multiple Bogies.
  - Limit Switches for Home Position.
  - Ability to Adjust to Customer Specifications.
- Lifting Device
  - Axle Stabilizers & Centering.
  - Slide Assembly.
  - 4 Hydraulic Drive Rollers.
  - Limit Switches for Home Positions.
  - Lateral Movement Control.
- Sliding Rails
  - Rail Housing.
  - Hardened Rail.
  - Limit Switches for Retracted and Extend Positions.
  - Grease Lubrication.
- Lathes
  - Hardened and Ground Dovetails & Ways.
  - Fanuc Motors.
  - Apex Gearboxes.
  - Rockford Ball Screws.
  - Limit Switches for Home Positions.
- Lateral Guides
  - 2 Hardened Rollers.
  - Self-Centering Roller Housing.
  - Hydraulically Positions Slides & Positioner.
  - Limit Switches for Retracted and Extend Positions.

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COMPONENTS (continued)

- Hydraulics
  - Hydraulic Power Unit.
  - Tank Fluid Heater.
  - Radiator & Cooling Fan.
  - 4 Hydraulic Drive Motors.
  - Directional Valves.

- Internal Standard Chip Conveyor
  - 14-7/8” Wide x 174” Length Conveyor.
  - 2-1/2" Pitch Piano Hinged Steel Belt Conveyor.
  - Formed 10 Gauge Steel.
  - 1/2 HP 1750 RPM TEFC 460 V 3 PH 60 Hz Drive Motor.

- External Chip Conveyor
  - Chip Conveyor Ordered to Fit Customers Pit Specifications.
  - 2-1/2" Pitch Piano Hinged Steel Belt Conveyor.
  - Formed 10 Gauge Steel.
  - 1/2 HP 1750 RPM TEFC 460V 3 PH 60 Hz Drive Motor.

- Chip Crusher
  - Hopper Opening: 23” x 41”
  - Machine Opening: 23” x 31”
  - Hopper Volume: 0.5 yds
  - 2 Replaceable Crushing/Shredding Assemblies.
  - Rotor Speed: 60-80 RPM
  - Overload Cut Out and Reverse for Crusher Discharge.
  - Power: 460V 3 PH 60 Hz

PAINT SCHEME

Stationary Components

PPGEPX904 LIC EPOXY GRAY PRIMER
PPGEPX901 UROTEC EPOXY PRIMER CATALYST
PPG AUE100 #905689 A Code Safety Blue

Moving Components

PPGEPX904 LIC EPOXY GRAY PRIMER
PPGEPX901 UROTEC EPOXY PRIMER CATALYST
PPG AUE100 #911740 A Code Safety Red

Electrical & Hydraulic Components

PPGEPX904 LIC EPOXY GRAY PRIMER
PPGEPX901 UROTEC EPOXY PRIMER CATALYST
PPG AUE100A/S1 #920710 A Code Competitive Gray

Miscellaneous Components

PPGEPX904 LIC EPOXY GRAY PRIMER
PPGEPX901 UROTEC EPOXY PRIMER CATALYST
PPG AUE100 #900 A Code Safety Black

Fanuc America Service and Support

"Service First" is not just a slogan. It is a commitment to you - our valued customer - that FANUC America will provide lifetime support on our products at 264 service locations supporting 108 countries throughout the world.

If you would like to reach us right away, the FANUC America Technical Support Call Center (1-888-FANUC-US or 1-888-326-8287) is available to all customers of FANUC America, and is supported 24-hours a day, 7-days a week unless noted otherwise. Please visit the support pages for each FANUC product line (CNC, Robot, ROBOMACHINE) for more information on FANUC America call center options.

Limited Express Warranty

Delta WTS guarantees to the Purchaser of the Equipment manufactured by Delta WTS to be free from defects in material and workmanship for a period of one (1) year from the date of purchase. The obligation of Delta WTS under this warranty shall be limited to the repair or replacement of the equipment parts thereof which may prove to be defective in material or workmanship, to the satisfaction of Delta WTS upon inspection, under normal use and service.

Quality Policy

Delta Wheel Truing Solutions commits to customer satisfaction by controlling our environment through quality processes, and continual improvement of **man, materials, machines, methods, and measurements,** resulting in excellent customer service.

NOTE: Improvements are a continuous process, machine specifications and technical details above may change due to updated form, fit and function.