

NIMBLE | MACHINES®
Smarter. Swifter. Superior.

Gear Manufacturing Solutions

A Business Vertical of UCAM Pvt. Ltd

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About Us

UCAM is a pioneer in the manufacturing of 4th and 5th Axis CNC Rotary Tables, recognized as a leader in precision engineering since 1986. With over three decades of expertise, UCAM offers world class Rotary Indexing Solutions built with advanced technologies, ensuring superior precision, durability and versatility.

UCAM established Nimble Machines in 2015 as a dedicated division to provide cutting-edge gear manufacturing solutions. Today, Nimble Machines is India's leading manufacturer of advanced CNC gear hobbing machines, known for delivering exceptional productivity and precision.

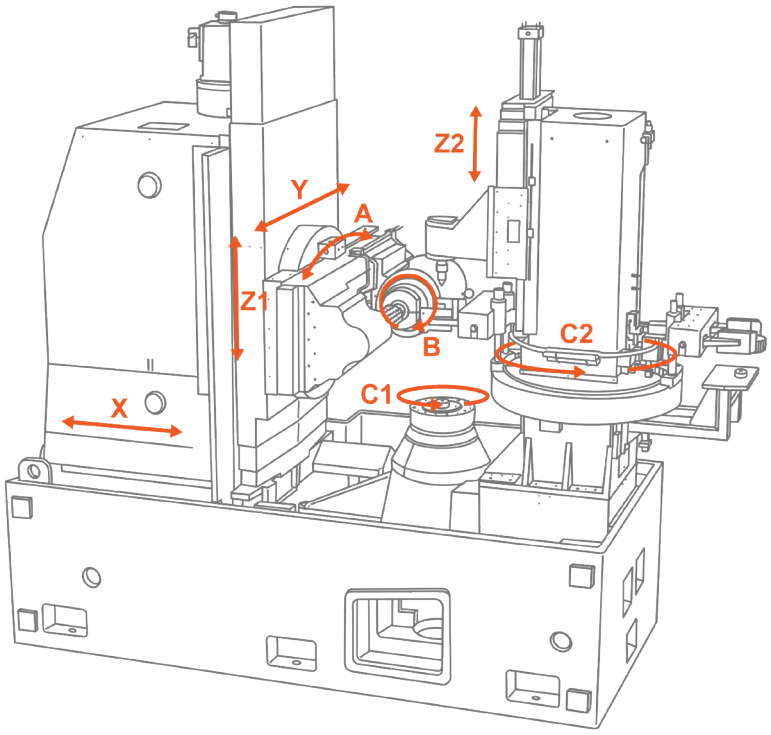


VAJRA Series

CNC Gear Hobbing Machines

Our VAJRA series 6-axis CNC Gear Hobbing Machines are engineered with direct drive technology and high speed spindle, enabling superior performance and exceptional accuracy in gear production. Equipped with the latest industry features, including advanced automation, Dry Hobbing and gear Skiving, these machines offer unmatched versatility and efficiency, meeting the demands of modern manufacturing across diverse industries.

Machine Concept



X	Radial Movement of Column Side
Y	Tangential Movement of Tool
Z1	Axial Movement of Hob Head
A	Swivel Movement of Tool
B	Rotary Movement of Tool
C1	Rotary Movement of Workpiece
C2	Rotary Movement of Ringloader
Z2*	Vertical Movement of Column Side

*Available in Servo / Hydraulic Tailstock Option

Rigid structure with UCRIDE® Technology

The heavy-weight design ensures exceptional rigidity for high-precision machining. UCRIDE® Technology enhances vibration dampening, ensuring consistent accuracy even in demanding conditions.

Dry / Wet Hobbing

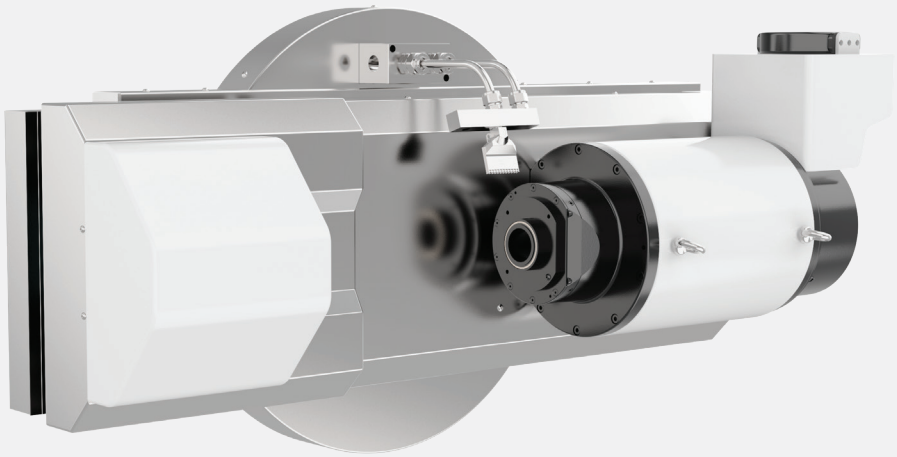
Whether using lubrication for cooling and chip removal or eliminating it for a cleaner and cost-effective dry hobbing operation, the VAJRA series provides the ultimate flexibility to seamlessly switch between dry and wet hobbing for varied manufacturing needs.

Finite Element Method (FEM) Design

Rigorous FEM simulation for structural rigidity, minimizing deformation under heavy loads and maintaining high precision.

Adaptable for Longer Components

Customizable machine design to handle longer shafts and larger components, providing flexibility for diverse gear production requirements.





Direct Drive Technology

The VAJRA series CNC Gear Hobbing Machines deliver unmatched precision and efficiency with advanced Direct Drive Technology, eliminating traditional gear for superior performance.

Benefits at a Glance

High Cutting Parameters

Faster machining, increased productivity

DIN Standard Accuracy

Achieves superior gear quality

Enhanced Synchronization

Smooth and precise operation with zero backlash

Reduced Wear & Maintenance

Longer machine life, lower costs

Model	Hob Speed (RPM)	Spindle Power (kW)	Work Table Speed (RPM)	Work Table Power (kW)
VAJRA 130	4000	12	400	5
VAJRA 250	1800	15	150	3.7
VAJRA 400*	1800 / 900	12 / 18	80	8

*Hob Spindle available with Direct Drive and Gear Drive option

Features

Hardware Features

Standard Features

- 6 Axis CNC Controlled
- Direct Drive Technology in Spindle & Work Table
- High Precision Electronic Gearbox (EGB)
- Servo Controlled Hob Shift with V-Shift
- High Clamping Torque on Swivel Axis
- Automatic Thermal Compensation for X-Axis
- Column Retraction during Power failure
- Hydraulic Tailstock

Optional Features

- Servo Tailstock
- Dry Hobbing Configuration
- Hard Hobbing / Skiving Feature
- Linear Scale feedback for Linear Axis
- 2 Station Ringloader for Component Loading and Unloading
- Component Magazine
- Extension of Column and Tailstock for Increased Axial Travel
- Remote Diagnostic for Machine Maintenance

Software Features

Standard Software

- Software for Spur, Helical and Spline Hobbing
- Lead Correction
- MOP and Span Correction Software
- Cluster Hobbing Cycles
- Spindle Load Monitoring Function
- V-Shift for Hob Shifting

Optional Software

- Software for Sprocket and Worm Wheel
- Program for Bad Sector Skip during Hob Shifting
- Deep and Plunge Hobbing
- Orientation Cycle
- Tangential Hobbing
- Diagonal Hobbing
- Lead Crowning

CNC Controller

The VAJRA series machines offer advanced control options with Siemens 828D and FANUC Oi-MF Plus controllers, providing world-class performance for diverse machining needs.

Key Features & Benefits

Manual Pulse Generator

Offers precise, hands-on control for incremental adjustments during setup or specific tasks.

Remote Diagnostics

Enables quick troubleshooting, minimizing downtime and enhancing machine uptime.

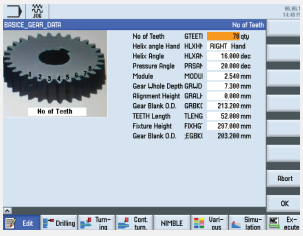
IoT Connectivity

Facilitates data exchange and monitoring for remote access, predictive maintenance, and improved operational efficiency.

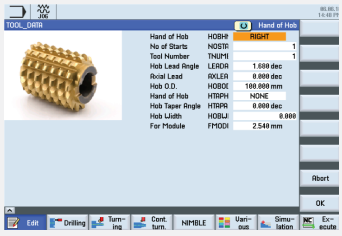


User Friendly Screens

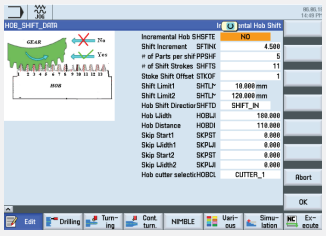
The intuitive HMI screens for Component Data, Hob Data, Hob Shift Data, and Cutting parameters make program creation simple, reduce setup time, and ensure error-free operation.



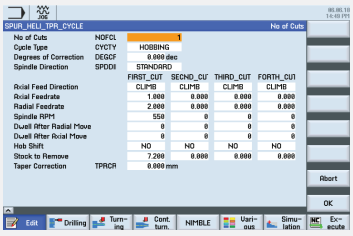
Component Data



Hob Data



Hob Shift Data



Cutting Parameters



Equipment

Standard Equipment

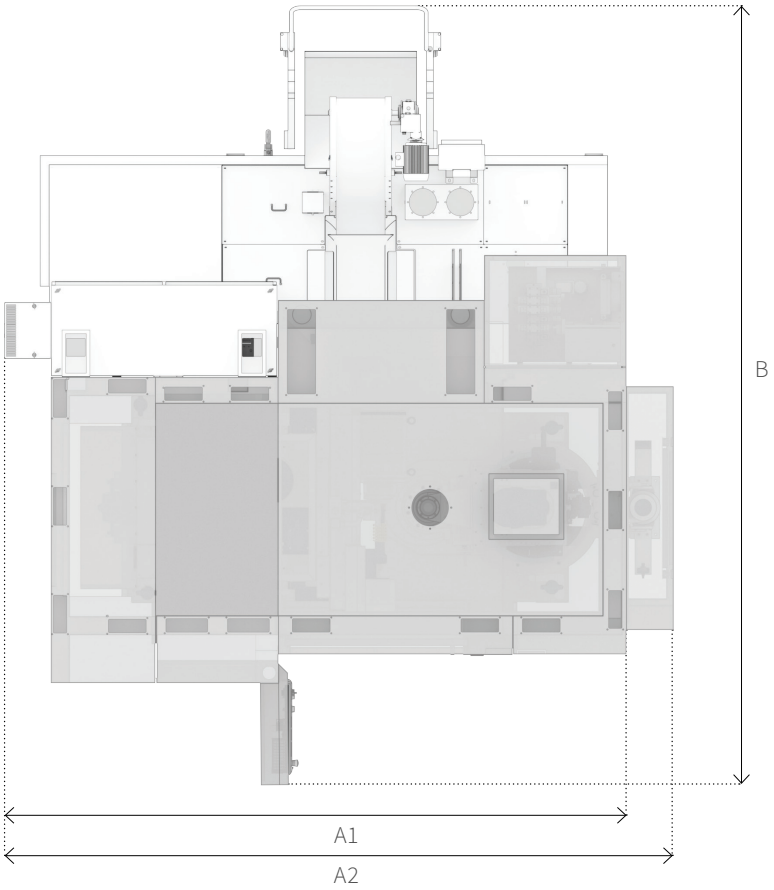
- Hydraulic Power Pack
- Chiller unit for spindle and work motor
- Panel cooler for Electrical cabinet
- Electrostatic Fume extractor
- Two hand operation
- Magnetic Chip conveyor
- Arbor
- Chip flushing arrangement
- 3 Light LED indication

Optional Equipment

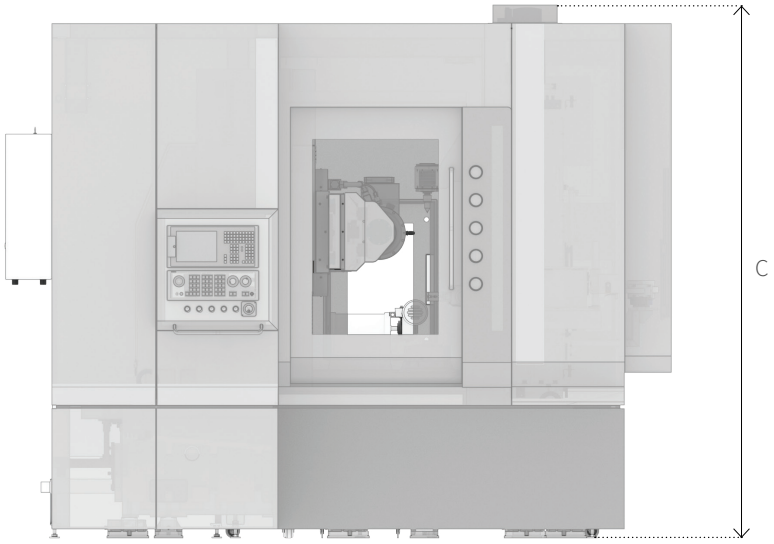
- Deburring attachment
- Hydro Locknut
- Cutting Oil chiller
- 3 Tier Tower lamp
- Cutting oil Filter
- Cutting oil flow switch
- Automatic Operator Door
- Coolant Oil Gun
- Additional Hob Arbor
- Quick change fixture adaptability
- Rotary Cylinder for work clamping

Machine Dimensions

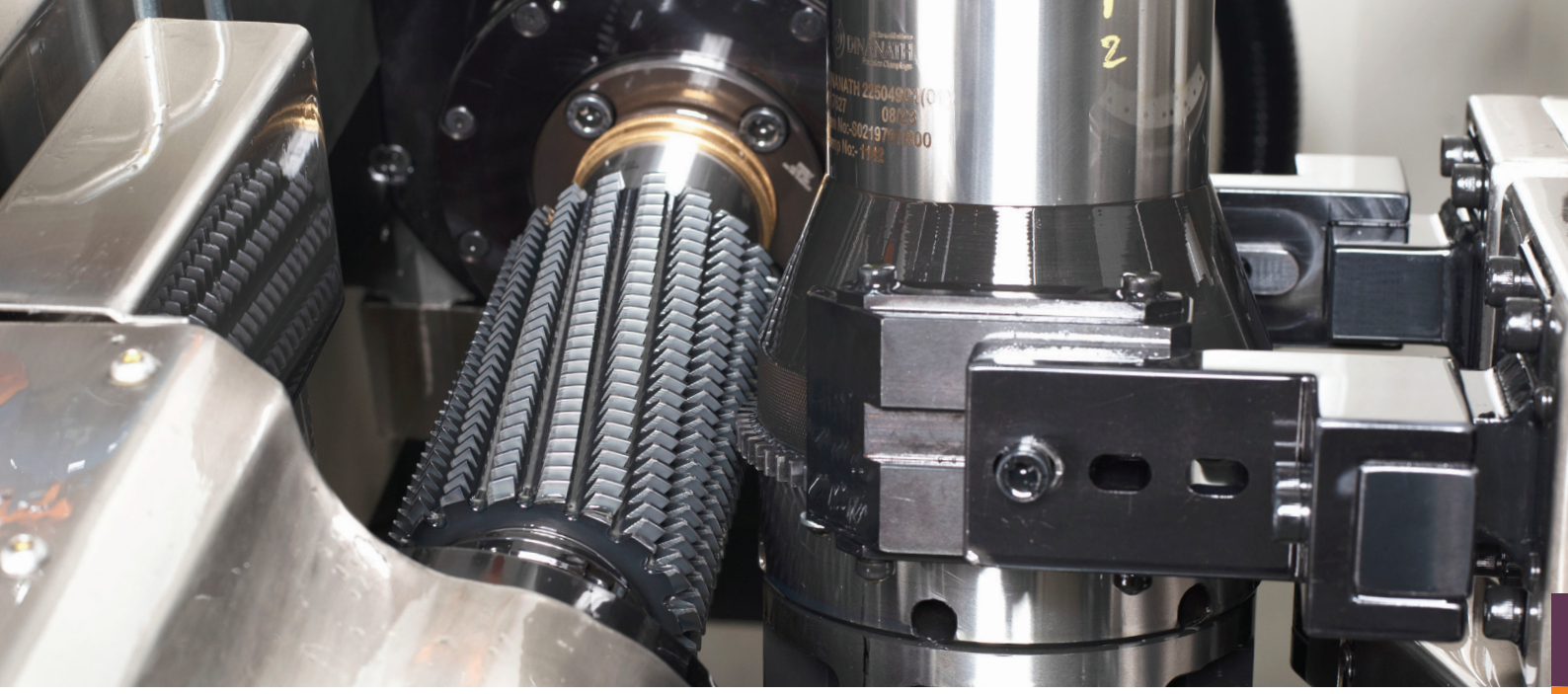
Plan View



Front View



Dimensions	Vajra 130	Vajra 250	Vajra 400
A1 (Without Automation Ring Loader)	2700	3325	4285
A2 (With Automation Ring Loader)	2880	3580	NA
B	3535	4200	4200
C	2465	2865	2965



Description	Units	VAJRA 130	VAJRA 250	VAJRA 400	VAJRA 600
Maximum Workpiece Diameter	mm	130	250	400	600
Max. module (in steel of 60-70kg/mm2 tensile strength)	mm	3	6	6 / 8	12
Centre distance between Hob and Work Table	mm	Min - 10 Max - 150	Min - 30 Max - 250	Min - 30 Max - 300	Min - 50 Max - 450
Vertical Movement of Counter Column from Table Top face	mm	Min - 345 Max - 645	Min - 310 Max - 710	Min - 310 Max - 710	Min - 350 Max - 1000
Hob Slide Travel (Axial)	mm	Min - 235 Max - 585	Min - 210 Max - 560	Min - 190 Max - 540	Min - 210 Max - 810
Maximum Hob Dia x Length	mm	Ø100 x 190L	Ø160 x 220L	Ø160 x 220L	Ø180 x 240L
Hob Shift	mm	170	210	210	220
Table speed, Rated	rpm	400	150	80	80
Hob speed, Rated	rpm	4000	1800	1800 / 900	400
Spindle Power	kW	15	12	12 / 18	20
Max. swivel of Hob head	deg	±45	±45	±45 /-30 to +45	-30 to +45
Total Connected Load	KVA	33	35	35 - 50	50
Total Weight (Approximate)	kg	10000	12000	13500	16000
Type of cutting	-	Dry / Wet	Dry / Wet	Wet	Wet

*Please note the machine specifications and dimensions may change without prior notice

Hydraulic Clamping

Built for robust performance, the Rotary Cylinder is integrated within the work table, ensuring secure and precise workpiece clamping. The clamping system supports high cutting parameters, maximizing productivity while maintaining stability and accuracy.

Benefits at a Glance

High Clamping Thrust

Supports high cutting parameters for maximum productivity without compromising stability or accuracy.

Clamp / De-clamp Feedback

Real-time clamping status displayed on the screen, ensuring optimal pressure.

Improved Component Accuracy

Consistent clamping pressure enhances machining precision and reliability.

Efficient Workholding

Quick Change Fixture compatibility reduces setup times and streamlines job transitions.



Automation

Features

Indexing Ring Loader

Streamlines component loading and unloading, supporting high-speed, precise operations.

Component Magazine

Available in Chain and Belt Type options, these magazines ensure continuous component feeding for uninterrupted production.



Benefits at a Glance

Reduced Cycle Times

Boosts productivity and throughput

Quick-Change Grippers

Ensure seamless transitions between components for efficient and flexible production.

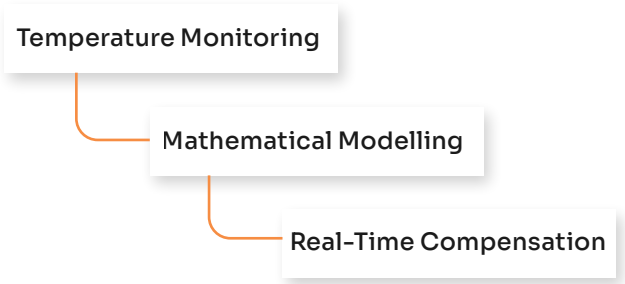
Advanced Features

High accuracy with Thermal Compensation

Thermal compensation monitors and adjusts for temperature variations during machining, ensuring consistent accuracy and minimizing the impact of thermal expansion on gear quality.

Benefits at a Glance

- Maintains dimensional accuracy, reducing rejections.
- Minimizes downtime by reducing manual correction needs.
- Supports high-quality gear production, even in demanding environments.

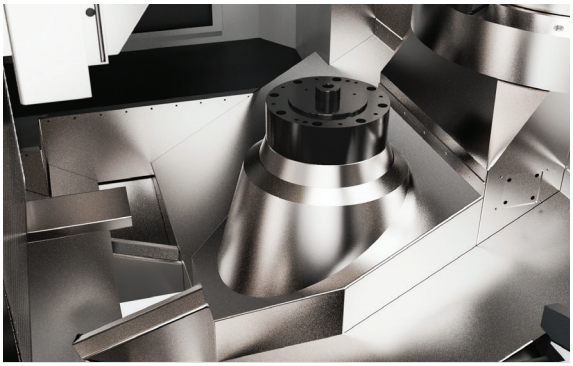


Dry Hobbing: Cost-Effective, Flexible and Sustainable

Dry hobbing delivers cost savings, improved productivity, and the flexibility to switch easily between dry and wet configurations.

Benefits at a Glance

- **Lower Cost per Piece:** Eliminates coolant oil, boosts cutting spped and productivity.
- **Sustainability:** No coolant disposal required, energy-efficient.
- **Safety & Health:** Reduces worker exposure to mists, ensuring safety.

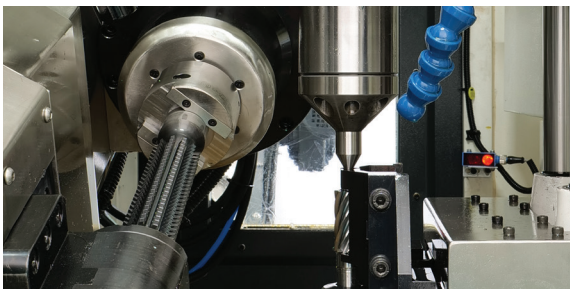


Hard Hobbing: A Specialized Finishing Process

Hard Hobbing is a finishing operation performed on hardened gear teeth after heat treatment. It serves as an alternative to other finishing processes, such as gear shaving.

Key Applications

- Primary process for automotive steering systems.
- Ideal for gears with interference geometries where grinding wheels cannot be used effectively.



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TARANG 325

CNC Spiral Bevel Gear Generator

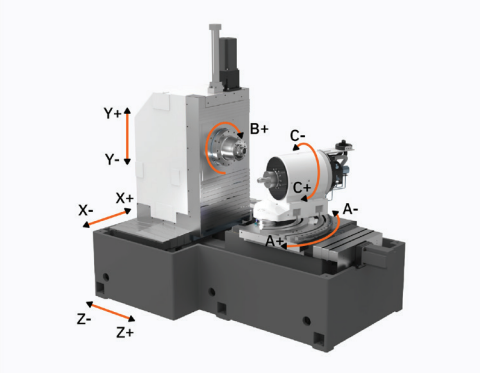
The Tarang Spiral Bevel Gear Generator is India's first indigenously manufactured 5-axis spiral bevel gear generator. Equipped with the advanced SIEMENS 828D numerical control system, it features a sliding cutter spindle that delivers high-speed backlash-free generating motion. This cutting-edge innovation demonstrates our commitment to setting benchmarks in gear manufacturing technology.

Advanced Technology

Advanced Technology for Precision Gear Cutting

The TARANG 325 integrates Direct Drive Technology in the spindle and work head for high-speed, precise cutting. With an HSK-C63 quick tool change mechanism, it reduces cycle time and boosts productivity. UCRIDE® technology, strategically applied composite epoxy filling, enhances vibration damping and machining stability.

The machine supports Hypoid Gear Hobbing, ideal for producing high-torque, low-noise gears used in automotive differentials, EVs, and industrial machinery, meeting diverse gear manufacturing needs with precision and efficiency.



X	Horizontal Slider	A	Machine Root Angle
Y	Vertical Slider	B	Cutter Spindle
Z	Sliding Base	C	Work Spindle

Features

Standard Features

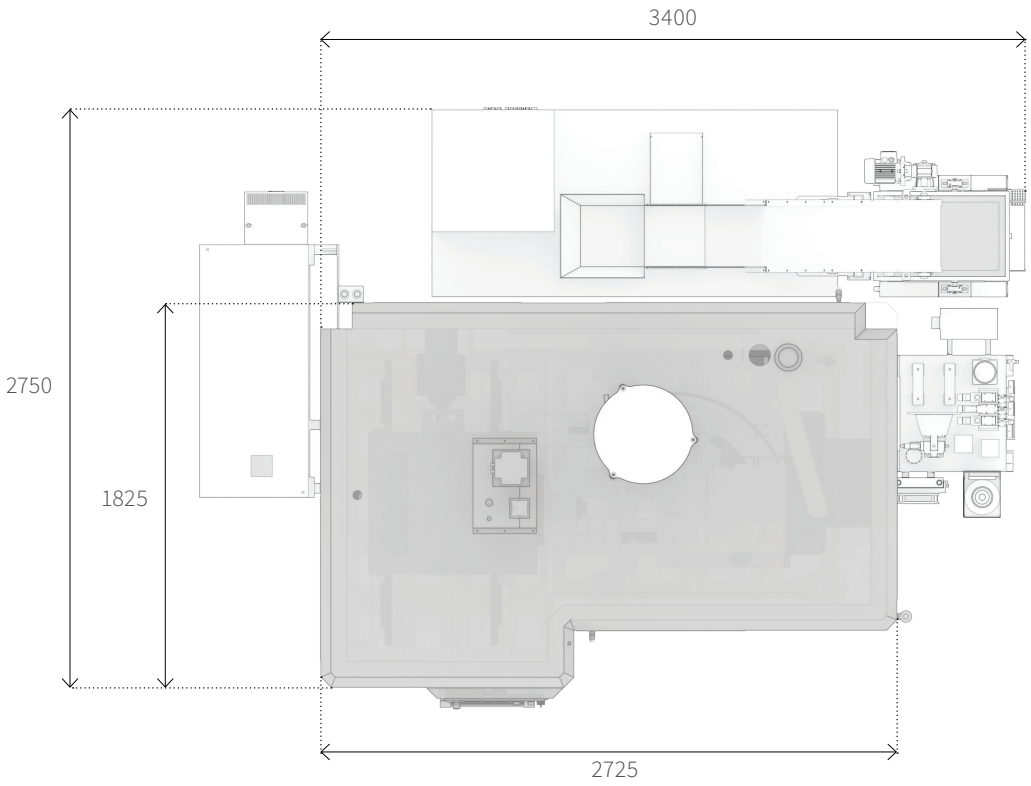
- 5 Axis CNC Controller
- Direct Drive Technology in Spindle and Work Head
- High Clamping Torque on the Work Table
- Axis retraction during power failure

Optional Features

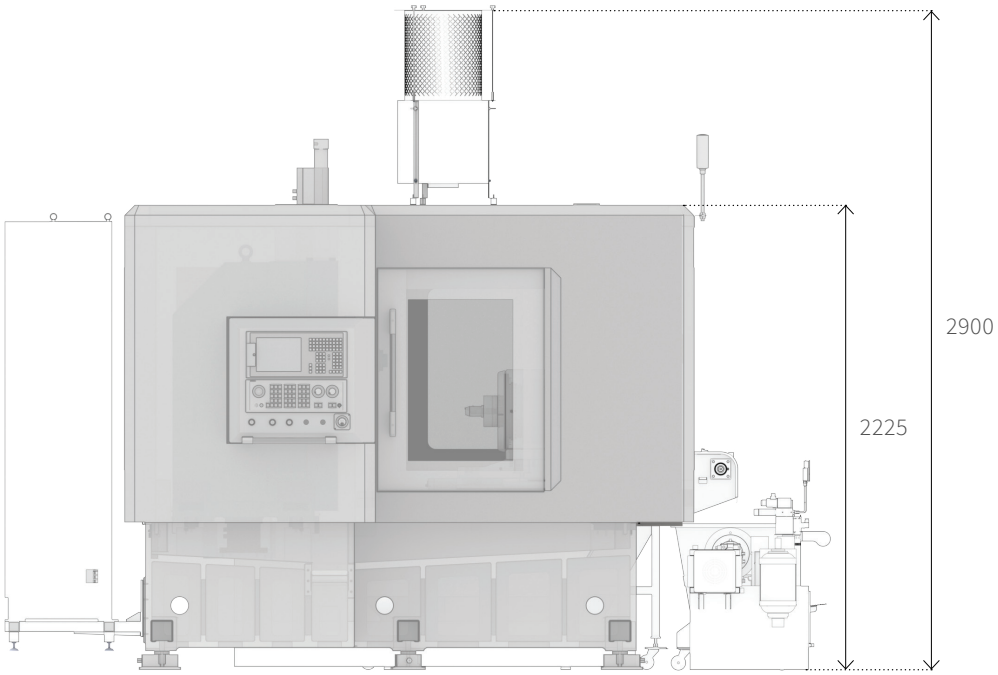
- Linear Scale feedback for Linear Axis
- Remote Diagnostics Feature for Machine Maintenance
- HSK Adapter for quick tool change
- Hypoid Spiral Bevel Gear Hobbing

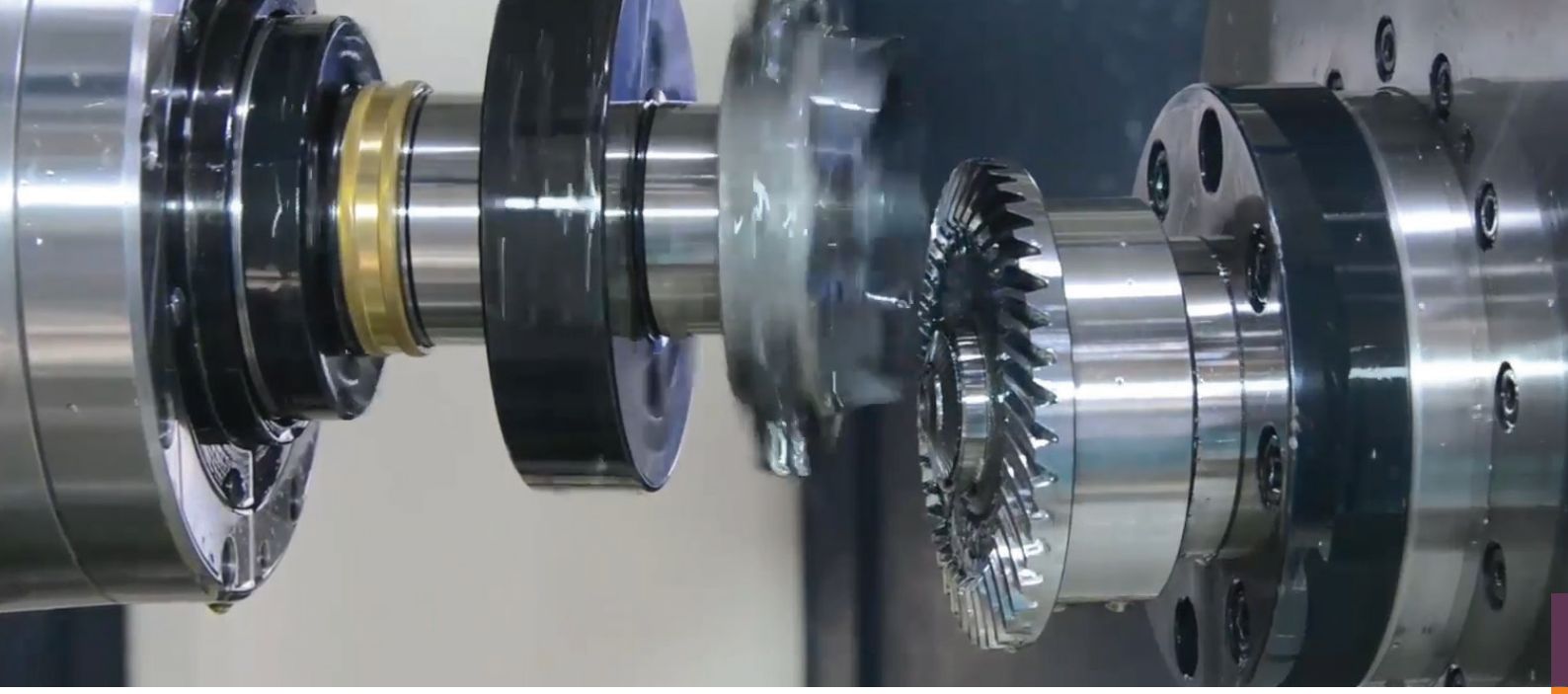
Machine Dimensions

Plan View



Front View





Description	Units	Value
Capacity		
Max. Work Piece Diameter	mm	325
No. of Teeth	nos	5 - 200
Max. Module	mm	7
Max. Cutter Diameter	inch	7 1/2"
Strokes		
X-Axis	mm	420
Y-Axis	mm	380
Z-Axis	mm	320
A-Axis	Degree	-5° ~ 90°
Cutting Spindle		
Max. Speed	rpm	500
Rated Torque	Nm	350
Type	-	Direct Drive
Spindle Taper	-	HSK-C63
Work Table Spindle		
Max. Speed	rpm	100
Rated Torque	Nm	350
Type	-	Direct Drive
Overview		
Controller	-	SIEMENS 828D
Power	KVA	20
Weight of the Machine (Approx)	kg	6500

*Please note the machine specifications and dimensions may change without prior notice

Applications

Spur Gear



Helical Gear



Sprockets



Worm Gear



Spline



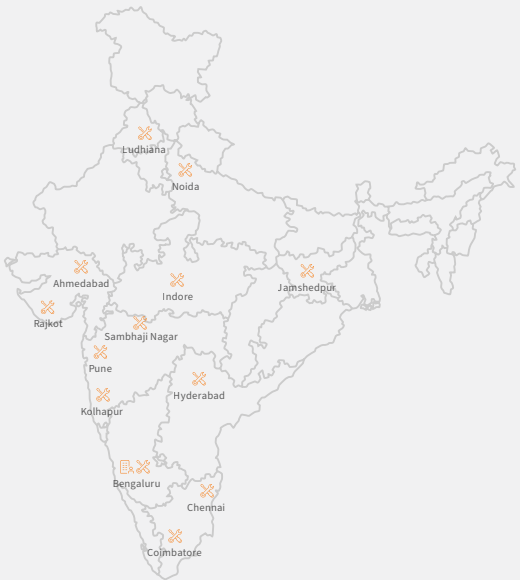
Spiral Bevel Gear



Service and Maintenance

Nimble Machine Service Team situated across prominent locations around India know the machines best and are able to provide quick, comprehensive and certified services.

Bengaluru	Ahmedabad
Chennai	Jamshedpur
Coimbatore	Noida
Hyderabad	Ludhiana
Kolhapur	
Pune	
Sambhaji Nagar	
Indore	
Rajkot	



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