



GRU400T

5-Axis high-speed machining center designed for the precision machining of dies, molds and complex hardware parts.



JINGDIAO 5-AXIS HIGH-SPEED MACHINING CENTER

GRU400T

With fully closed-loop control technology, the GRU400T is suitable for 5-axis machining of precision mold, precision parts and complex hardware parts.

Highlights

- 01 The machining effect of "0.1 μm feed, 1 μm cutting, nano surface finish" can be achieved stably.
- 02 The machines are capable of milling, grinding, drilling, boring, tapping, and other composite processing, and side milling.
- 03 The direct drive double axis rotary table has a strong load capacity with high machining accuracy.
- 04 Using the cooling technology of rotary table, bearing and screw nut and the fully enclosed shield improve the thermal stability of machine tool effectively.

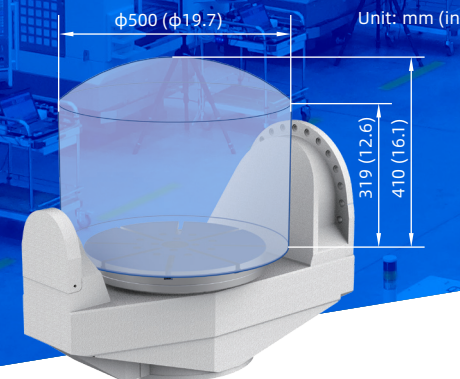


Learn More About GRU400T

01 02
03 04

Machine Structure

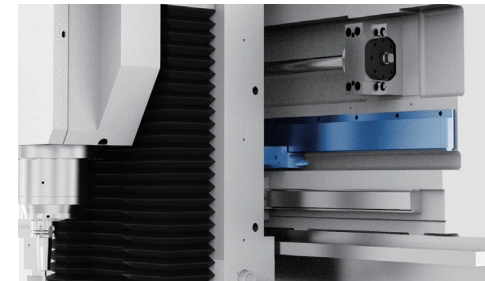
Max. Workpiece Dimension



Max. load (kg/lb): 150/330.7

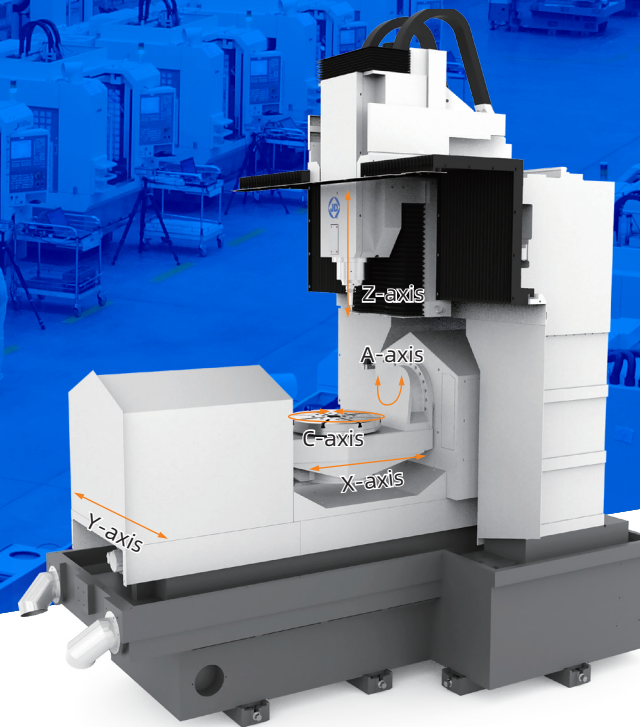
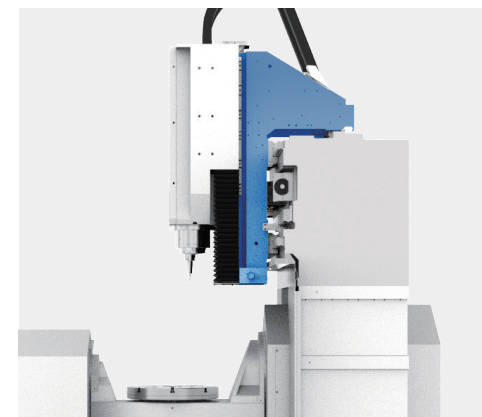
Higher Motion Accuracy

- + Full closed loop control, motion axes equipped with linear glass scales.



Better Machine Rigidity

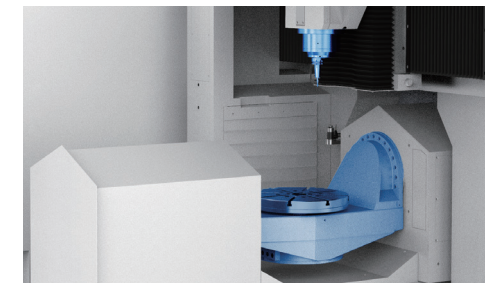
- + Inverted "L" structure.



Travel (X/Y/Z) mm/ (in)	450/680/400 (17.7/26.8/15.7)
A/C Rotation Angle (deg)	-120~90/360

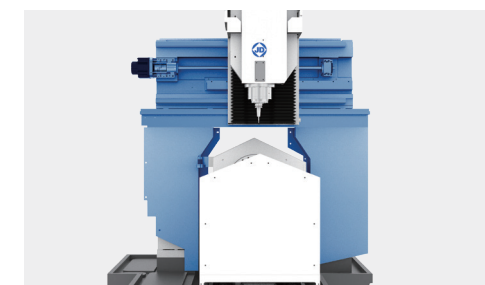
Good Thermal Stability

- + All round cooling design, using rotary table cooling, bearing cooling, screw cooling technology, and equipped with fully enclosed machine covers.



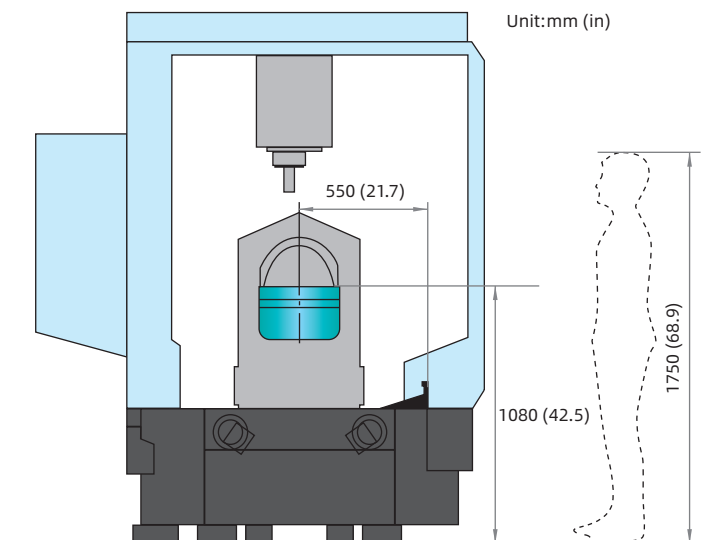
More Stable Geometric Accuracy

- + Classical fixed beam gantry structure.



Ergonomics

The operator loads the workpiece through the front door of the machine, and the chip conveyor is completed by the in-machine spiral chip conveyor rod. In order to facilitate the operation of the machine, the structural design of each operation part conforms to the ergonomics.



- + The worktable is close to the operator, which makes it easy to load and unload the workpiece.
- + Pneumatic components and lubricating components are all installed on the right side of the machine, which is convenient for inspection and maintenance.
- + The tool magazine door has a large opening degree, which is convenient for the loading and unloading of tools.



Machining Samples

Composite Machining Test Piece

Size (mm/in): 200×150×150 /7.9×5.9×5.9
Material: AL 6061

Highlights: + Realize milling, drilling, tapping, reaming, boring and other composite processing with one clamping.

Mold Insert of Auto Engine Cylander

Size (mm/in): 183×184×191 /7.2×7.2×7.5
Material: H13 (HRC52)

Highlights: + The virtual processing technology of JINGDIAO CAM software completes the optimization of the tools' clamping length and machining angle;
+ Cornering of the side wall with R0.75 mm ball end mill.

Throttle Die Casting

Size (mm/in): 135×115×75 /5.3×4.5×3.0
Material: ADC12 (HB90) 12% Silicon

Highlights: + The coaxiality of the hole is less than 0.01 mm, and the roughness of the reaming hole is less than 0.2 μm;
+ JINGDIAO on-machine measurement technology achieves continuous and stable mass production, and the yield of the part is increased from 70% to 98%.

Key Components

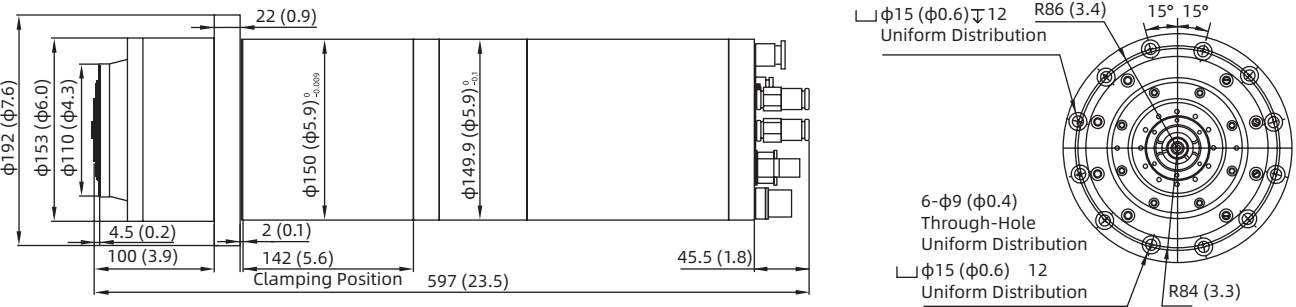
JINGDIAO High-Speed Precision Spindle

JINGDIAO's high speed spindles are the machine's main power source which produce precision machining results. Our in-house built spindles have low vibration, and high thermal stability resulting in a small coefficient of thermal expansion and stable cutting in conditions.

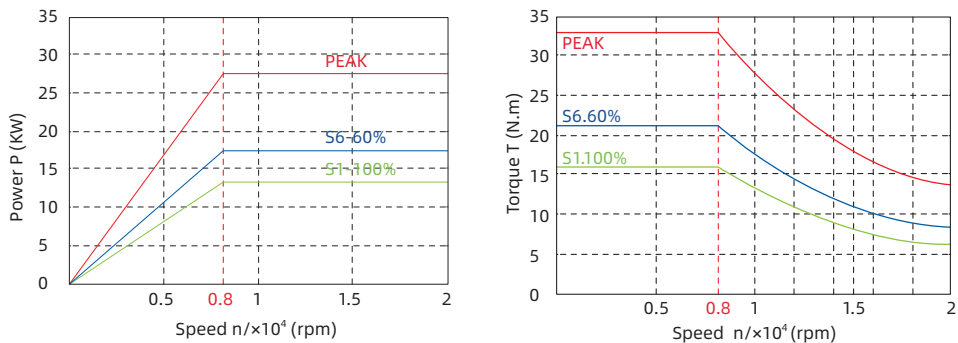


JD150S-20-HA50/A

Dimension Unit:mm (in)



Output Performance



Basic Specification

Clamping Diameter (mm/in): $\phi 150/\phi 5.9$ (0, -0.009) mm
Output Power (S6-60%): 18 KW
Output Torque (S6-60%): 21.5 Nm
Speed: 20,000 rpm
Tool Holder: HSK-A50
Weight (kg/lb): 46.5/102.5

Performance

- + Taper Bore Radial Runout $\leq 1.5 \mu\text{m}$ (5.9×10^{-5} in)
- + Rotor End Face Axial Runout $\leq 1 \mu\text{m}$ (3.9×10^{-5} in)
- + Vibration at Maximum Speed $\leq 0.6 \text{ mm/s}$ (1.44 ipm)

Optional

JD150SC-20-HA50 (Coolant Through Spindle)

Speed: 20,000 rpm
Tool Holder: HSK-A50

Basic Specification

Clamping Diameter (mm/in): $\phi 150/\phi 5.9$ (0, -0.009) mm
Output Power (S6-60%): 18 KW
Output Torque (S6-60%): 21.5 Nm
Speed: 20,000 rpm
Tool Holder: HSK-A50
Weight (kg/lb): 46.5/102.5

When machining with coolant through spindle, the cutting fluid or cutting oil is ejected to the tool tip through the hole of the internal cooling tool. This can improve the cooling and lubricating effects on the tool and workpiece. Coolant through spindle is helpful in deep hole drilling since the chips are quickly discharged through the spiral groove of the drill. This greatly improves the machining efficiency and tool durability.



JD130EF-32-HE32

Speed: 32,000 rpm
Tool Holder: HSK-E32

JD130SC-24-HA40

Speed: 24,000 rpm
Tool Holder: HSK-A40

JD130SCG-24-HA40

Speed: 24,000 rpm
Tool Holder: HSK-A40

JD130S-24-BT30

Speed: 24,000 rpm
Tool Holder: BT30

JD150SCG-20-HA50

Speed: 20,000 rpm
Tool Holder: HSK-A50

Cutting Test Results (Spindle Type JD150S-20-HA50/A 20,000rpm)

Item	Material	Teeth Number	Tool Size mm/in	Cutting Width (mm/in)	Spindle Speed rpm	Cutting Feed Rate mm/min (in/min)	Cutting Capacity cm ³ /mm
				Cutting Depth (mm/in)			
Face Mill	Aluminum	7	$\phi 80/\phi 3.15$	70/2.8 2/0.08	6,000	3,200 (126.0)	448
	Steel	4	$\phi 50/\phi 2.0$	45/1.8 0.8/0.03	1,000	1,000 (39.3)	36
	Aluminum	4	$\phi 16/\phi 0.6$	3.2/0.1 32/1.3	10,000	3,200 (126.0)	327.68
End Mill	Steel	4	$\phi 16/\phi 0.6$	1/0.04 32/1.3	3,600	2,400 (94.5)	76.8
	Aluminum	2	$\phi 24/\phi 0.9$	/	1,000	200 (7.9)	/
Drill	Steel	2	$\phi 24/\phi 0.9$	/	1,000	100 (3.9)	/
	Aluminum	2	M20×1.5	/	700	1,050 (41.3)	/
Tap	Steel	2	M14×1.5	/	400	600 (23.6)	/

Different machining conditions have different machining data, which is only for reference.

JD50 CNC System

The JD50 CNC system is developed independently by JINGDIAO. The control is highly efficient, reliable and very precise. Additionally, it has rich programming functions, convenient operation, flexible peripheral control, and can meet the processing Requirements of high machining accuracy and fine surface finishing.

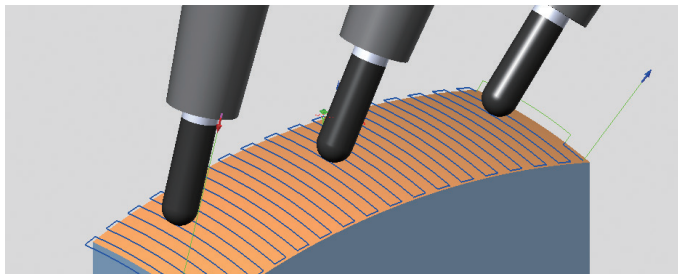


Basic Characteristics

- + The programming resolution and control resolution are 0.1 μm (3.9×10⁻⁶ in).
- + Supports linear, plane arc, space arc, spiral line, spline and involute interpolation methods.
- + Support pitch compensation and reverse clearance compensation.
- + Support RTCP multi-axis motion control.



0.1μm Feed, 1μm Cutting



Fixed Point Cutting

Not RTCP Program

G91G28Z0
G90
G0X0.7883Y2.4874A-90.C-77.1431
M590 L1
G43H1
Z35.0874
Z30.6074
N102G1Z30.1074F189.

Not intuitive

RTCP Program

G91G28Z0
G90
G68.2X29.3331Y6.6949Z-6.1-77.1431-90.K0.
G53.1
G0X0.7883Y-3.5126
M590 L1
G43H1
Z5.
Z0.52
N102G1Z0.02F189.

Intuitive

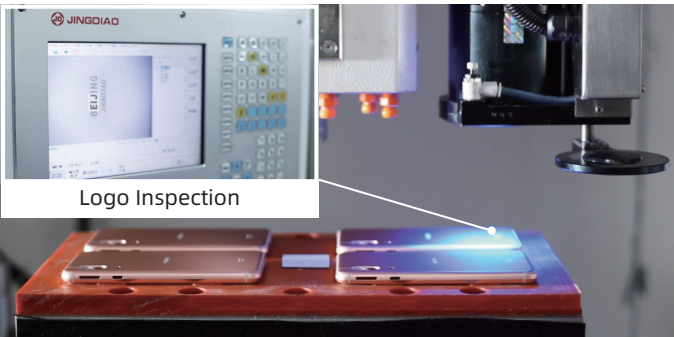
RTCP

System Advantages

- + Various programming methods and flexible technical process design.
- + Abundant types of interfaces and buses, with strong peripheral expansion capabilities.
- + Unique external extended function instructions (G100), which can realize instruction-level peripheral control, human-computer interaction, and complex data operations.

Advanced Features

- + Includes on-machine contact and non-contact measurement functions, which results in high-precision 2D and 3D measurements.
- + Built-In CAM technology and intelligent modification technology supports the on-machine tool-path deformation compensation machining.
- + Incorporates multiple communication protocols and remote monitoring.



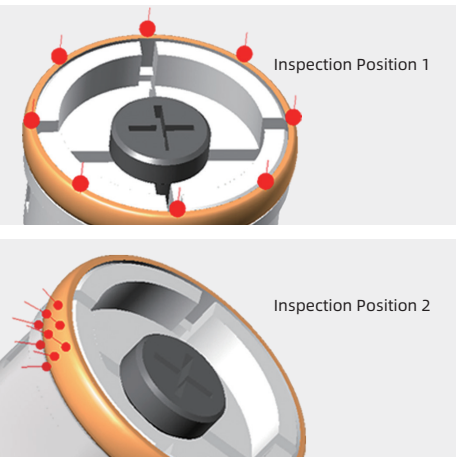
Non-Contact Measurement



Contact Measurement

Five-Axis Programming Features

- + Tool center point control function.
- + Inclined plane machining function.
- + Cylinder interpolation function.
- + Polar coordinate interpolation function.



Surface Deformation Compensation



Remote Monitoring of Machines

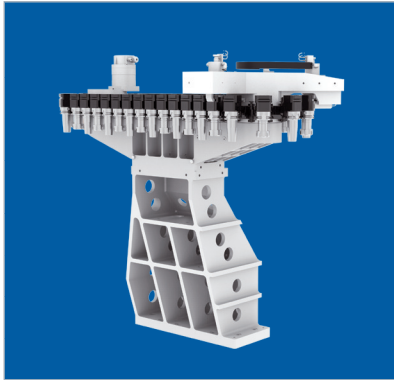
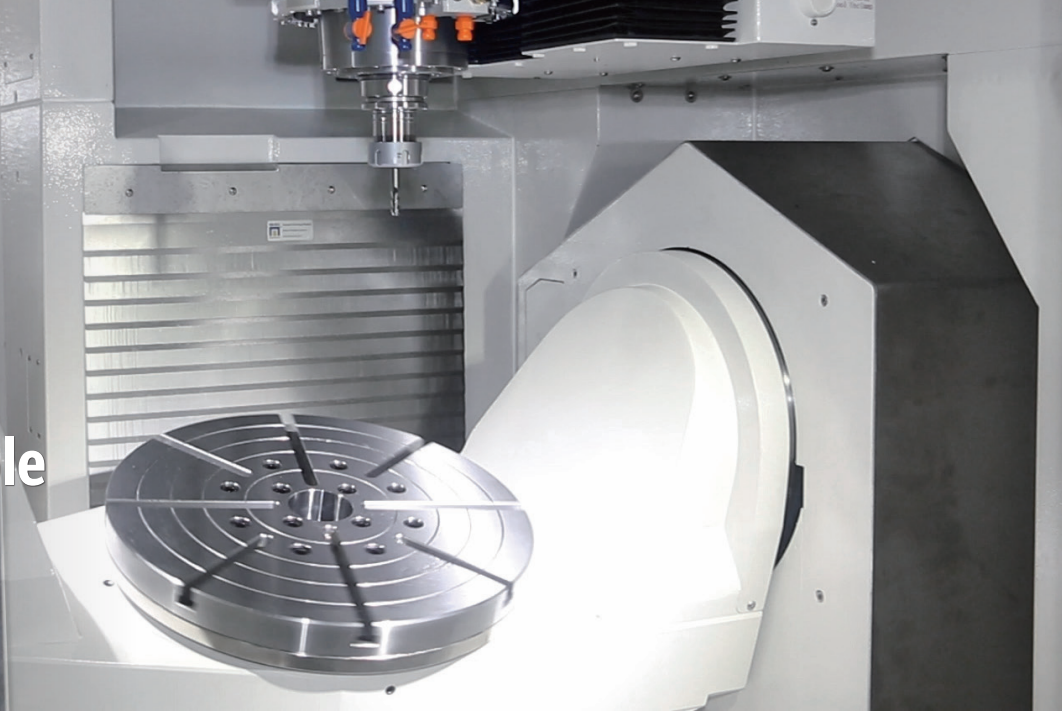


Tool Magazine

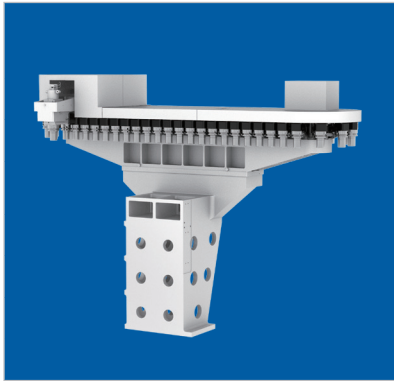
To meet your production needs, we have a variety of tool magazines to choose from.

Cradle Type Double Direct Drive Rotary Table

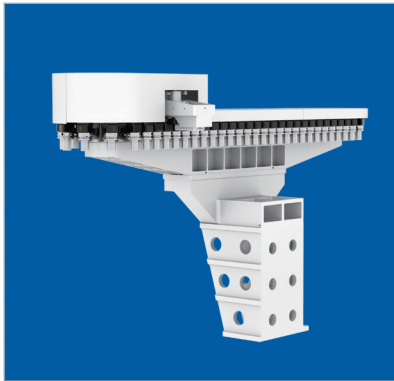
Assures high-precision multi-axis machining.



Type	Chain Type Tool Magazine with Manipulator	
Capacity	36	
Tool Holder	HSK-A50	BT30
Allowable Maximum Tool Length (mm/in) (From End of Spindle)	260/10.2	200/7.9
Maximum Diameter of Contiguous Tools (Full) (mm/in)	50/2.0	50/2.0
Maximum Diameter of Contiguous Tools (Vacant) (mm/in)	90/3.5	90/3.5
Max. Load of Each Position (kg/lb)	3.5/7.7	3/6.6
Max. Load of Tool Magazine (kg/lb)	85/187.4	85/187.4



Type	Chain Type Tool Magazine with Manipulator
Capacity	53
Tool Holder	HSK-A50
Allowable Maximum Tool Length (mm/in) (From End of Spindle)	260/10.2
Maximum Diameter of Contiguous Tools (Full) (mm/in)	50/2.0
Maximum Diameter of Contiguous Tools (Vacant) (mm/in)	90/4.7
Max. Load of Each Position (kg/lb)	3.5/7.7
Max. Load of Tool Magazine (kg/lb)	120/264.6



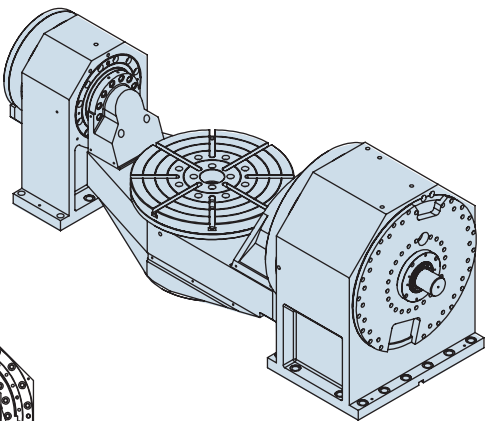
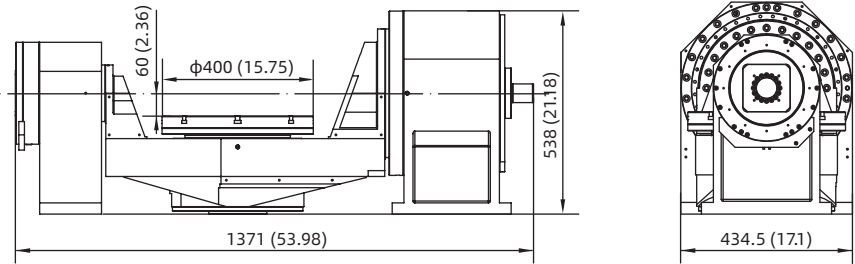
Type	Chain Type Tool Magazine with Manipulator
Capacity	63
Tool Holder	HSK-A50
Allowable Maximum Tool Length (mm/in) (From End of Spindle)	260/10.2
Maximum Diameter of Contiguous Tools (Full) (mm/in)	50/2.0
Maximum Diameter of Contiguous Tools (Vacant) (mm/in)	105/4.1
Max. Load of Each Position (kg/lb)	3.5/7.7
Max. Load of Tool Magazine (kg/lb)	130/286.6

Features

- + Direct drive motor, with emergency braking function.
- + Bridge deck tailstock structure, high precision and stable operation.
- + Circulating water cooling technology reduces the thermal deformation.
- + Five-Axis simultaneous processing, multi surface positioning processing.
- + The hollow design in the shaft makes the pipeline layout more convenient.

Dimension

Unit: mm (in)



Specification

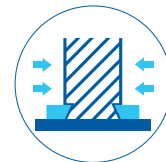
Item	Tilt Axis (A)	Rotation Axis (C)
Position Accuracy (")	8	8
Repeatability (")	5	5
Rapid Feed Rate (rpm)	60	100
Cutting Speed (rpm)	60	100
Cooling Mode	Circulating Water Cooling	Circulating Water Cooling
Positioning Locking Mode	Hydraulic Locking	Hydraulic Locking
Positioning Locking Air Pressure (MPa)	5	5
Safety Brake	√	--

Accessories

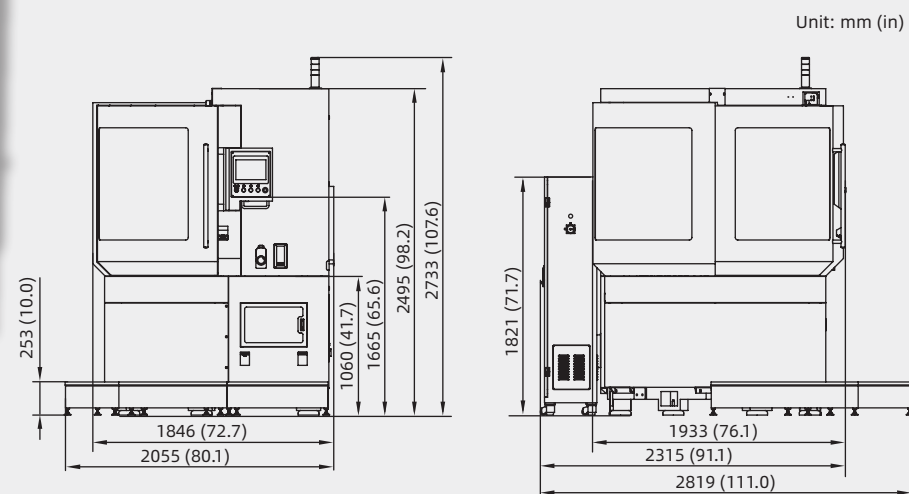
JDFMS150 Flexible Manufacturing System

JDFMS150 flexible manufacturing system is mainly composed of handling manipulator, storage module and control system. It is equipped with tridimensional fixed plate exchange system, which can realize the automatic handling of workpiece under the condition of no human intervention.

Configuration



01 Processing System 02 Feeding System 03 Clamping System 04 Software System



Specification

JDFMS150 Specifications		
Feeding System	JDFMS150-SR6A	<p>Workpiece Dimension (mm/in)</p> <p>330 (13.0) x 408 (15.7) x 260 (10.2)</p>
Load (kg/lb)	150 (330.7)	
Storage Capacity	6	
Workpiece Dimension (mm/in)	400×330×260 (15.7×13.0×10.2)	
Machine Dimension (mm/in)	2,055×2,819×2,733 (81.0×111.0×107.6)	
Weight (kg/lb)	6,000 (13227.7)	



Continuous Loading, Continuous Machining

When equipped with JDFMS150 material handling system, the GRU400T can achieve continuous and stable unattended production.

Customized Service

We can design and develop the structure according to your actual production needs.

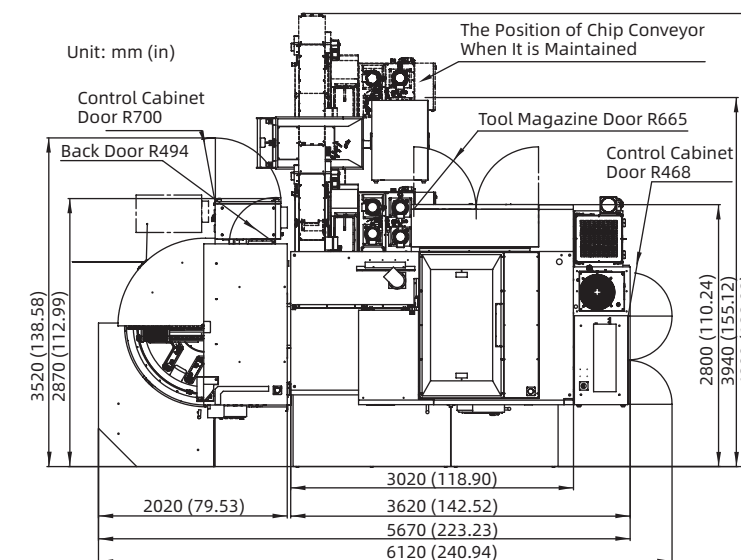
Maintenance Training

Project Delivery

Debug Verification

Project Design

Requirement Analysis



Production Mode

The exceptional features of JINDAIO operation management system makes it easier to collaborate with colleagues within in your manufacturing team. The personnel will perform Their respective duties, guarantee the continuous operation of the system, and improve the machines' actual utilization rate.

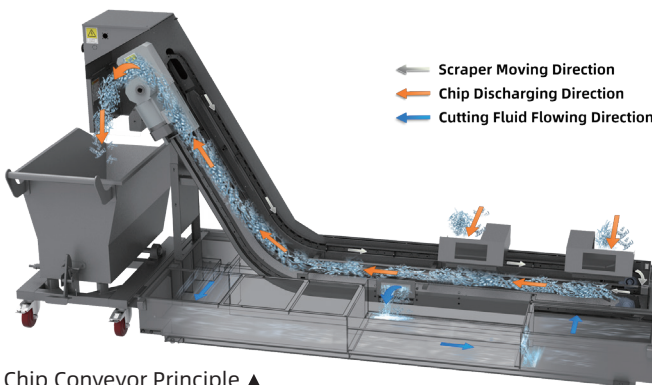
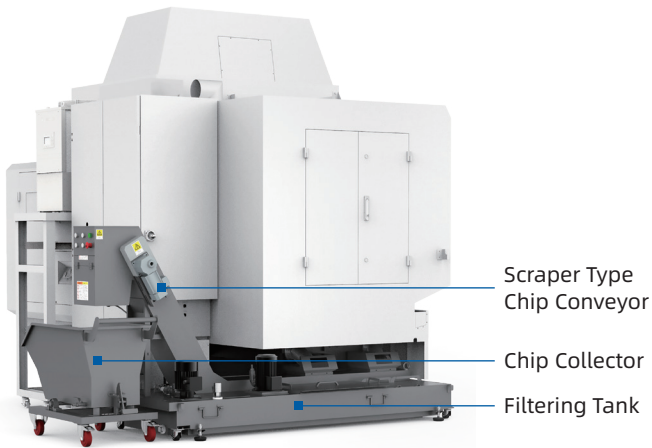
Factory Supervisor	Operator	Technologist	Dispatcher	Workshop Supervisor
Obtain Production Information in Time	Maintain	Synchronous Programming	Production Scheduling	Real Time Statistics of Machine State
	Preparation	Network Transmission	Flexible Adjustment	

Scraper Style Chip Conveyor System

The scraper style chip conveyor collects and filters out the collection of cutting chips from the machining fluid.

Features

- + Improves maintenance by moving the chips into disposal container.
- + Cutting fluid service life is extended by using a multistage filtration unit.
- + Equipped with a cleaning mechanism and drop recovery mechanism which is self cleaning resulting cutting fluid recovery.



Chip Conveyor Principle ▲

Appropriate Chip Types

Material	Chip Form	Chip Size	Applicability
Steel		Long	●
		Short	●
		Powder	●
Cast Iron		Short	●
		Powder	●
Aluminum/ Non-ferrous Metal		Long	●
		Cumulus	●
		Short	●

● :Ideal ● :Suitable ● :Not Suitable

Oil Mist Collector

The oil mist collector reduces the rise of internal temperature caused by the oil mist accumulation. It eliminates the diffusion of oil mist, reduces the internal electrical fault of the machine tool, improves the stability of equipment operation, reduces air pollution, and protects the workshop environment.

Specification

Item	Spec
Voltage (V)	AC380±10%
Power (W)	370
Current (A)	0.95
Frequency (Hz)	50±2%
Ambient Temperature (°C / °F)	5~40/41~104
Environmental Pressure	Atmos
Weight (kg/lb)	80/176.4
Max. Air Volume (m³/in³)	450/2.7×10 ⁷
Filtration Efficiency	> 99%

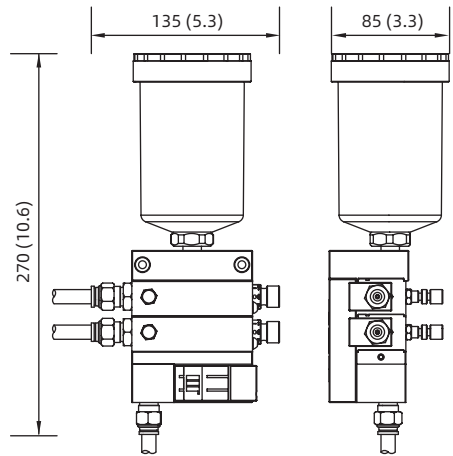


GL370 Oil Mist Collector ▲

Minimal Quantity Lubrication (MQL)

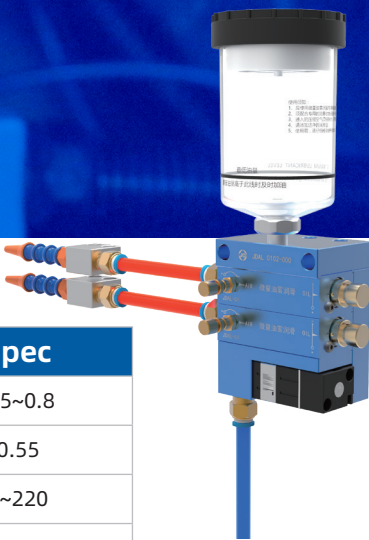
MQL cooling technology is used in precision grinding and micro milling. Equipped with MQL, the temperature fluctuation in the machine can be controlled within 0.5 °C (32.9 °F).

Dimension



Specification

Item	Spec
Pressure (MPa)	0.5~0.8
Working Pressure (MPa)	0.55
Air Volume (L/min)	0~220
Air Consumption per Nozzle (L/min)	100
Oil Consumption per Nozzle (ml/h)	0~30
Nozzle Quantity	2
Weight (kg/lb)	1.5/3.3
Mounting Pitch (mm/in)	70/2.8



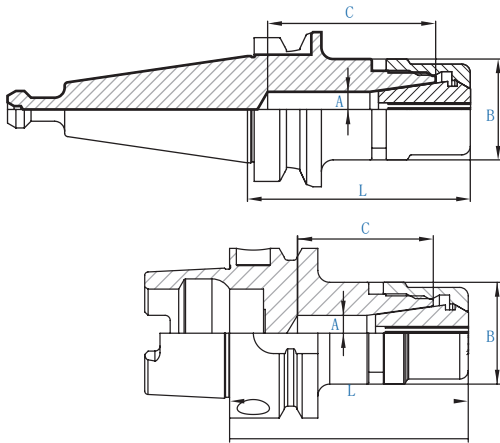
Tool Holders

Tool holders require good clamping performance such as high clamping accuracy, low vibration and the ability minimize oil mist during high-speed machining.

JINGDIAO tool holders have anticorrosive properties, minimize air resistance, and are designed good dynamic balance. Our tool holders are available in various styled including BT30, HSK.



Dimension Comparison Chart



Technical Parameter

Type	Name	Size mm (in.)				
		A	B	C	L	Thread
BT30	BT30-ER11-85S	7.5 (0.30)	19 (0.75)	35 (1.38)	82 (3.23)	M14×0.75
	BT30-ER16-60S	10.5 (0.41)	30 (1.18)	50 (1.97)	67 (2.64)	M22×1.5
	BT30-ER16-100S	10.5 (0.41)	30 (1.18)	50 (1.97)	107 (4.21)	M22×1.5
HSK-A	HSK-A40-ER16-060HS	10.5 (0.41)	30 (1.18)	28.5 (1.12)	65 (2.56)	M22×1.5
	HSK-A50-ER11-080S	7 (0.28)	19 (0.75)	30 (1.18)	80 (3.15)	M14×0.75
	HSK-A50-ER16-070S	10.5 (0.41)	30 (1.18)	40 (1.57)	71 (2.95)	M22×1.5
	HSK-A50-ER16-110S	10.5 (0.41)	30 (1.18)	40 (1.57)	111 (4.37)	M22×1.5
HSK-E	HSK-E32-ER16-060HS	10.5 (0.41)	30 (1.18)	27.5 (1.08)	65 (2.56)	M22×1.5

Distinctive Technologies

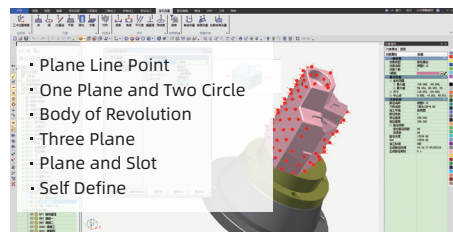
On-Machine Measurement and Intelligent Modification Technology

JINGDIAO's innovative on-machine measurement and intelligent modification technology (OMIM) is an ideal solution that integrates CAM programming technology, numerical control processing and precision inspection technology. Its intelligent application can effectively shorten the production cycle of the workpiece, streamline the processing flow, and improve quality and efficiency for production and machining.

The Function of JINGDIAO OMIM is Mainly Reflected in Three Aspects

+ Intelligent Workpiece Alignment

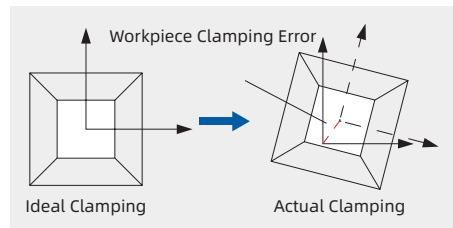
This feature automatically corrects the workpiece deviation through inspecting the offset of workpiece on machine and adjusting the program in control system. This reduces workpiece setup time, improves machining quality and increases production.



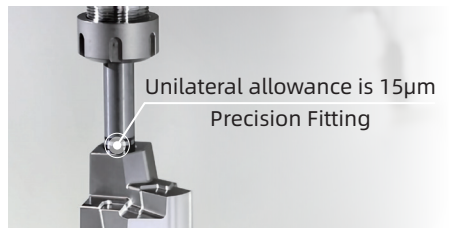
01-Support Multiple Workpiece Position Compensation Methods



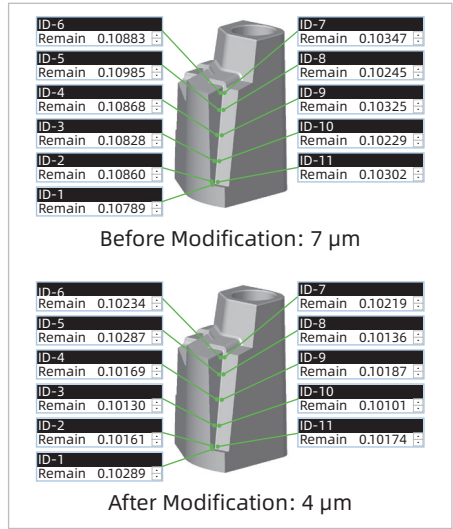
02-Obtain Actual Position on the Machine



03-Workpiece Position Compensation



04-Verification of Position Compensation Accuracy

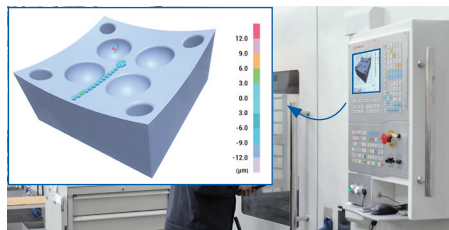


+ Machining Step Remaining Stock Inspection

With this feature, the remaining stock at each machining step can be measured in real time, and the inspection results will be displayed on the machine's control. The operator can analyze the results in order to ensure that an even amount of material is removed at every machining step. This results in reduced tool wear, constant chip load, improved machining accuracy and improved surface finishes.



Inspect the Remaining Stock on the Machine



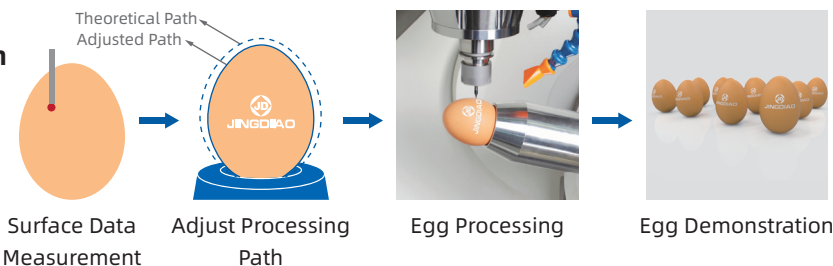
Real Time Display of CNC System



Achieve Stable Precision Machining

+ 5-Axis Path On-Machine Compensation

The CAM function embedded in the CNC system can compensate the inaccurate machining path, which caused by workpiece deformation, clamping deformation and clamping deviation, achieve five-axis adaptive machining.



A New Model of Numerical Control Processing

- + Machining and inspection are achieved on one machine, forming a new model of "integration of machining and inspection".
- + The digitalization of CNC machining experience enables a entry-level operator to complete precision machining.
- + The actual processing time proportion of CNC machines has increased from **25% -45% to 45% -70%**.



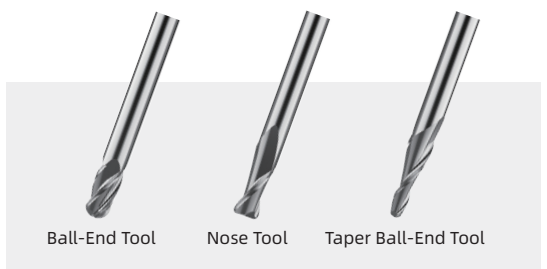
Before Using Integration of Machining and Inspection



After Using Integration of Machining and Inspection

Tool Inspection System

During the 5-axis machining process, JINGDIAO tool inspection system can inspect the errors of different positions of the tool contour of the bull nose tool, ball-end tool and other tools for precision machining and compensate intelligently. This can effectively reduce the unqualified workpiece accuracy caused by the tool inaccuracy.



* Tool Type

Realization



JINGDIAO Digital Twin (DT) Technology

With JINGDIAO's software, the actual production materials and process parameters are digitized to ensure the correct information is selected by the process personnel, material preparation personnel and the operator. This creates a seamless integration process development, material preparation and machine operation, and improves the accuracy and fluency of the machining Process.



Ensuring the Safety of 5-Axis Machining

Five-axis milling is a complex machining process. During the machining there is the risk of collisions between tools, tool holders and the workpiece. JINGDIAO uses its SurfMill software to establish the connection between production materials, CAM programming and actual processing in a virtual environment. The user can build the same digital scene in the software, simulate the machining process, analyze and adjust the process, and eliminate the machining risk in the software programming stage.

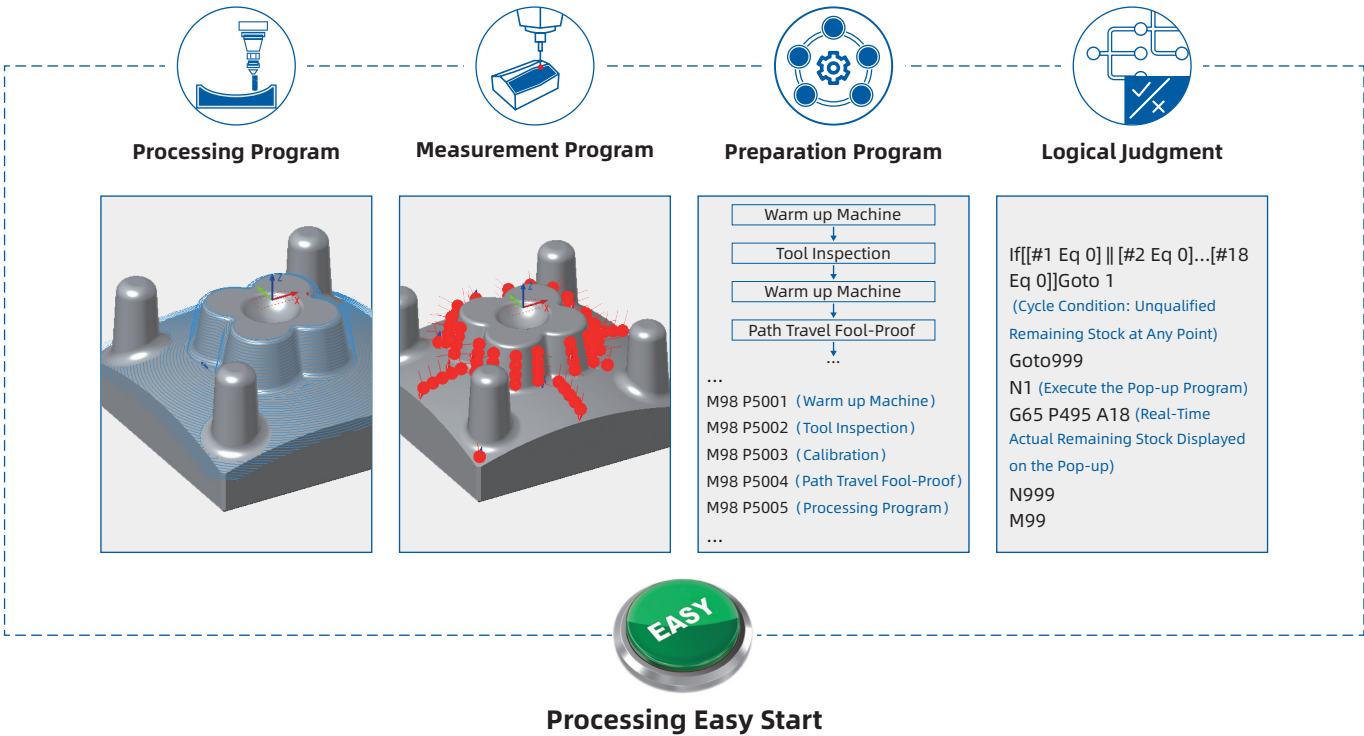


Application Scenarios of JINGDIAO Virtual Manufacturing Technology

Technical Points	Mirror the Actual Machining Environment to Ensure the Accuracy of Interference Risk Inspection	Informatization of Production Materials to Avoid Risks Caused by Wrong Selection of Materials	The Macro Program Fool-Proof to Avoid Risk Caused by Mis-Operation by Personnel
1 Risk Type	 Z-Axis and Workpiece	 Tool Holder and Workpiece	 Spindle and Workpiece
2 Cause Of Risk	 Ignore Z-Axis	 No Informatization of Production Material	 Tool Clamping Length Error
3 Solutions	 Complete Machine Model	 Informatization of Production Materials	 Tool Setup Foolproof

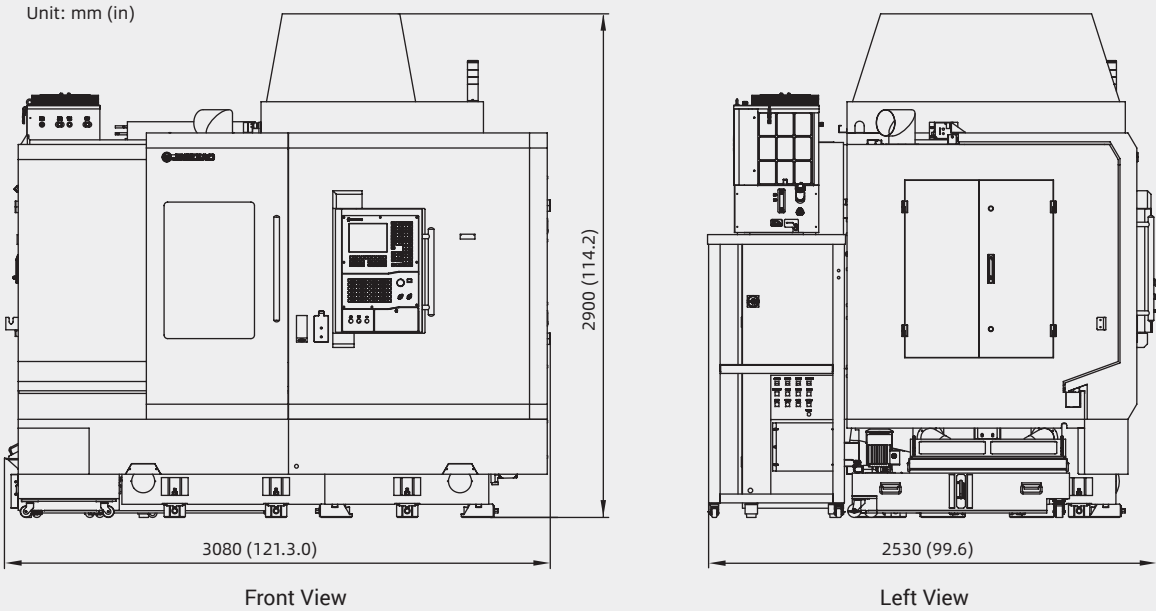
Easy Start

With this software, the program processing, measurement, preparation and logical judgment are combined into one program. The operator only needs to press the start button to begin the processing of the part which reduces machine setup time.

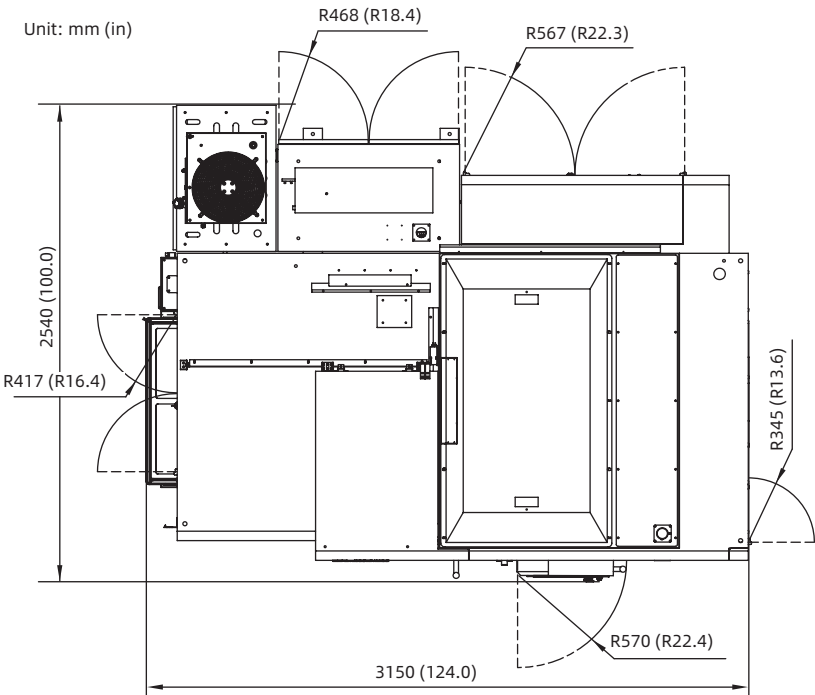


Technical Specification

Dimension



Layout



Items	Standard Value
Position Accuracy (X/Y/Z) mm/ (in)	0.002/0.002/0.002 (0.00008/0.00008/0.00008)
Position Accuracy (A/C) sec	8/8
Repeatability (X/Y/Z) mm/ (in)	0.0018/ 0.0018/ 0.0018 (0.00007/0.00007/0.00007)
Repeatability (A/C) sec	5/5
Travel (X/Y/Z) (mm/in)	450/680/400 (21.7/26.8/15.7)
A/C Rotation Angle deg	-120~90/360
Table Diameter (mm/in)	φ400/φ15.7
Max. Load (kg/lb)	150/330.8
Max. Spindle Speed (rpm)	32,000 (HSK-E32) 24,000 (BT30) 20,000 (HSK-A50)
Tool Magazine/Capacity	63 (Chain-Type Tool Magazine)
Rapid Speed (X/Y/Z) m/min (in/min)	15 (590.6)
Rapid Rotation Speed (A/C) rpm	60/100
Max. Cutting Feed Speed (X/Y/Z) m/min (in/min)	10 (393.7)
Max. Cutting Feed Speed (A/C) rpm	60/100
Drive System	AC Servo
Voltage	3-Phase, 480V/60Hz
Air Pressure (MPa)	≥0.55
Machine Weight (kg/lb)	10700/23593.5

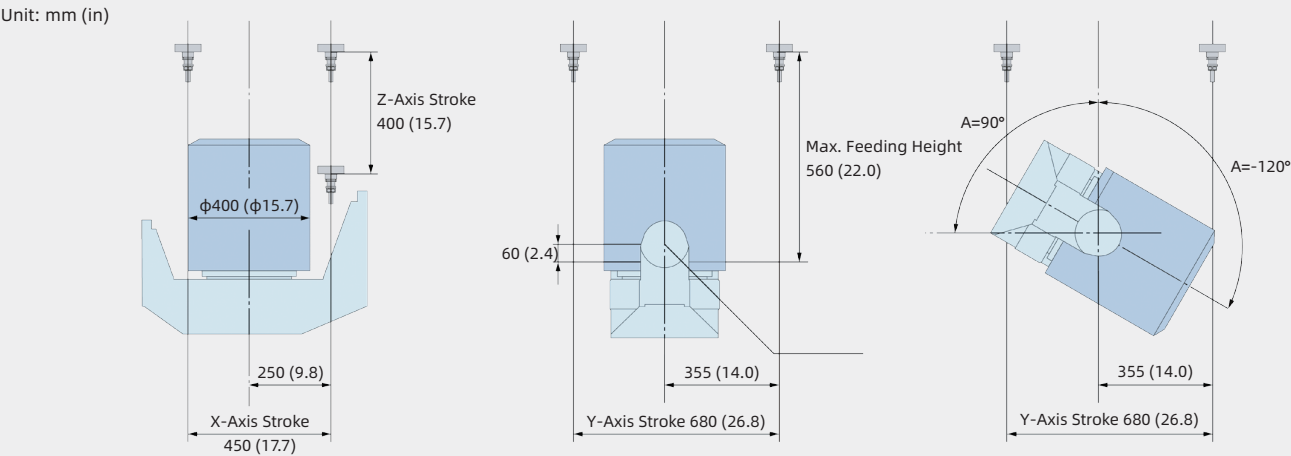
Standard Features and Options

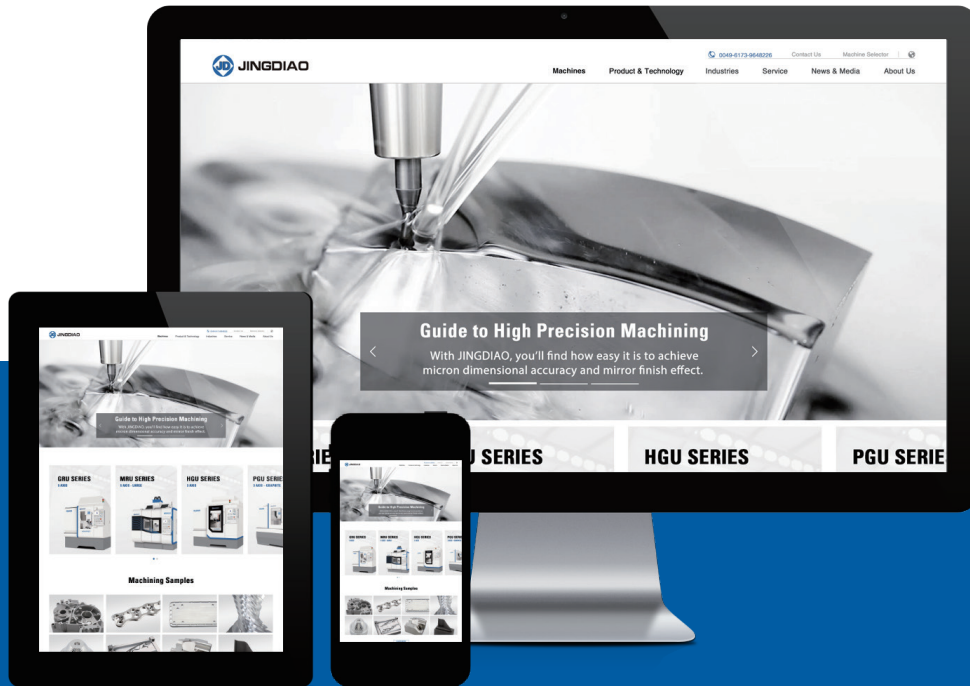
Items	Configuration
Control System	
JD50 CNC System	●
CAM Software	
JDSoft SurfMill 9.0	●
Spindle	
JD130EF-32-HE32	○
JD130S-24-BT30 (BT30)	○
JD130SC-24-HA40 (HSK-A40, Coolant through)	○
JD130SCG-24-HA40 (HSK-A40, Coolant through, Grinding)	○
JD150S-20-HA50/A (HSK-A50)	●
JD150SC-20-HA50 (HSK-A50, Coolant through)	○
JD150SCG-20-HA50 (HSK-A50, Coolant Through, Grinding)	○

Items	Configuration
Tool Magazine	
Chain Type Tool Magazine with Manipulator (63 Tools)	○ (HSK-A50)
Chain Type Tool Magazine with Manipulator (53 Tools)	○ (HSK-A50)
Chain Type Tool Magazine with Manipulator (36 Tools)	●
Cooling System	
Coolant Device (Half Ring Nozzle, 5 Nozzles)	○
Coolant Device (Ring Nozzle, 6 Nozzles)	●
Coolant Tank	●
Cutting Air Cooling System	●
Spindle Cooling	●
Rotary Table Cooling	●
Screw Cooling	●
Control Cabinet Cooling	●
Oil-Water Separating System	○
Oil-Mist Separation System	○
Micro Mist Lubrication	○
Chip Conveyor	
Scraper Type Chip Conveyor	○
Internal Spiral Chip Conveyor	●
Chip Conveyor Interface	○
Chip Collection	○
Measurement System	
Contact-Type Tool Set	●
Laser Tool Set	●
JINGDIAO On-Machine Measurement System	●
Standard Calibrating Ball	○
Others	
MPG (Manual Pulse Generator)	●
Bag Type Filtration System	○
Hollow Filtration System	○
Front Door Safety Lock	●
Low Oil Pressure Inspection Device	○
Low Air Pressure Inspection Device	●
Ground Protector of Power Leakage	●
Machine Foot	●
Alarm	●
Lubricating Oil Inspection	●
Auto Power off Function	○
Internal Lighting Switch	●
Dynamic Balance Holder	○

●: Standard ○: Optional

Stroke Diagram





You can find more information at
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The Pictures of the Equipment are for Your Reference Only. The Configurations and Parameters are Subject to Change Without Notice.
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