



PGA600

3-axis high speed machining center designed for graphite electrode/mold machining



JINGDIAO 3-AXIS HIGH-SPEED MACHINING CENTER

PGA600



Learn More About PGA600



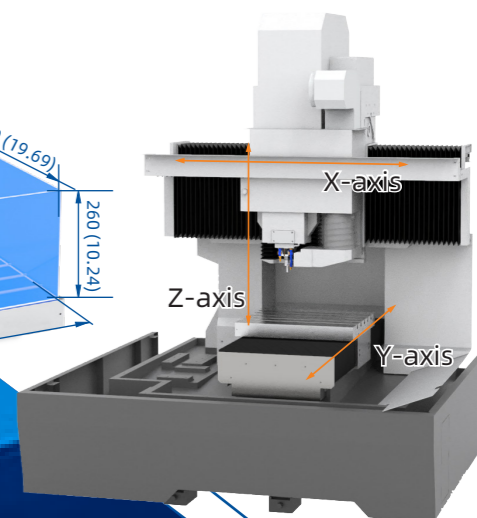
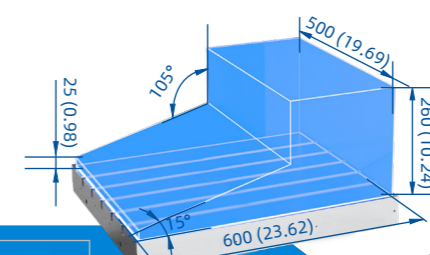
Designed for Graphite Machining

Max. Workpiece Dimension

Unit: mm (in)

Max. load (kg/lb): 300/661.39

Travel (X/Y/Z) mm/ (in)	600/500/200 (23.62/19.69/7.87)
Table Size (mm/ in)	620x520 (24.41x20.47)



Highlights

Adopt the full closed-loop control technology, with the ability of "0.1 μ feeding and 1 μ cutting", meeting the machining requirements of high precision products.

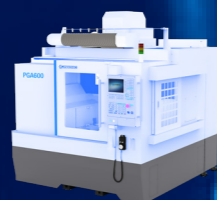
03 Dust Collector

The optional funnel dust collector is easy to operate and easy to remove the graphite dust.



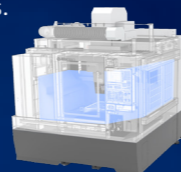
01 Fully Enclosed

Fully enclosed machine covers can effectively protect graphite dust from entering the working environment.



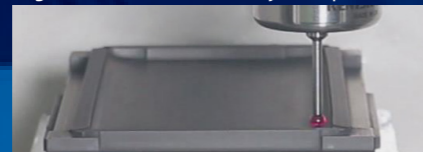
02 Machine Isolated

The machining area is completely isolated from the non-machining area. This design prevents dust from entering the axis drive systems.



04 Intelligent Modification

Workpiece position on-machine measuring and size deviation intelligent modifying, dimensional accuracy is improved.



05 Ball Screw Cooling

Our chilled ball screw nut provides thermal stability which results in machining accuracy.



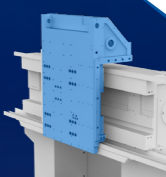
01 Bridge Style Design

Innovative gantry structure with beam and columns cast in one piece, providing high rigidity and vibration suppression ability.



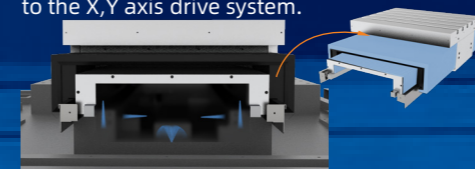
02 "L" Style Design

The X-axis adopts inverted "L" structure, which improves the rigidity and anti-vibration performance of the structure.



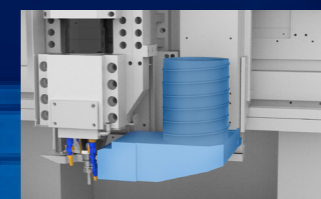
03 Flexible Covering - Positive Pressure

Ball screws, linear motion guideways, and bearings, are protected from graphite dust with a double layer flexible covering. A positive flow air pressure provides additional protection to the X,Y axis drive system.



04 Dust Collection

The in-machine dust collection system moves with the spindle which immediately removes the dust from the machining area.

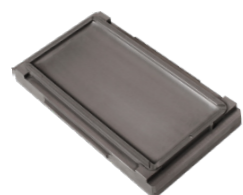


05 Automation

Located on the right side of the machine, the automatic door, can accommodate the automatic loading and unloading of workpieces.



Machining Samples



Graphite Hot Bending Die (Convex)

Size (mm/in): 180x120x18 / 7.09x4.72x0.71

Material: Graphite (Poco LT-1)

- Highlights:
- + Control the cutting allowance by using JD On-machine Measurement and Intelligent Modification Technology.
 - + The deviation of mold forming surface ≤ 0.007 mm (0.00028in).
 - + No drawing on the surface, roughness Sa $\leq 0.65\mu$ m.

Graphite Electrode

Size (mm/in): 70x25x50 / 2.76x0.98x1.96

Material: Graphite (German Sigri 8650)

- Highlights:
- + Although graphite is a brittle material, JINGDIAO can machine parts with sharp, crips corners and without tool marks.
 - + Thin wall feature, tool length to diameter ratio is 10:1.
 - + Good surface consistency.
 - + Dimension accuracy is ± 0.01 mm.



Gear Cover Die Casting

Size (mm/in): 80x30x75 / 3.15x1.18x2.95

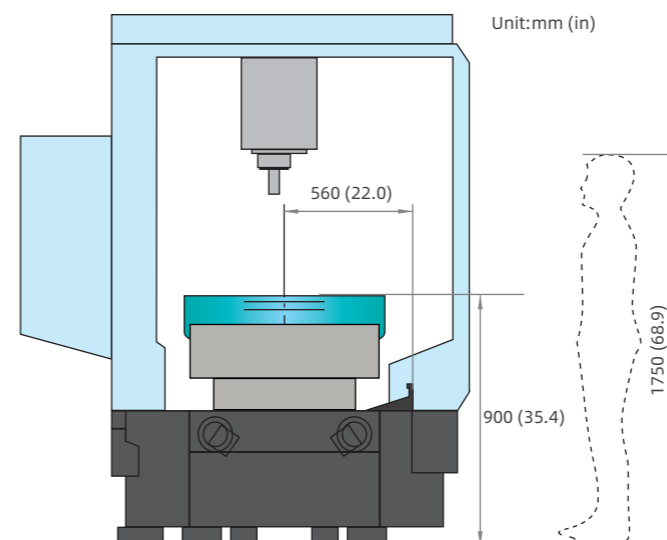
Material: Graphite (ToYo Tanso iso63)

- Highlights:
- + Graphite brittle material, sharp edges and corners, no edge breakage.
 - + Uniform side wall machining effect, no tool deflection.
 - + Thin-wall feature, length-diameter ratio is 1:60.



Ergonomics

Ergonomic factors is taken into account in the design of PGA600 machine, effectively improve the use comfort and convenience.



- + The worktable is close to the operator, easy to load and unload the workpiece.
- + The front protective door is designed with a large window, which is convenient for observing when processing.
- + All protective doors are equipped with safety switches, door open is forbidden while processing to avoid security accidents occurring.
- + Loose broach button is installed near the spindle to improve the operation convenience.
- + The electric cabinet can be connected with the machine body by screws, no need to plug and unplug the pipeline, easy to hand overall when moved.



Key Components

High Speed Precision Spindle



JD105S-28-HE32

28,000rpm & 32,000rpm

Two types High-speed Precision Spindle which clamping diameter is 105mm (5.90in) for PGA600 to choose, they are JD105S-28-HE32 (synchronous) and JD105-32-HSK32 (asynchronous).

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. which can provide guarantee conditions for stable cutting in graphite machining and other precision machining processes.

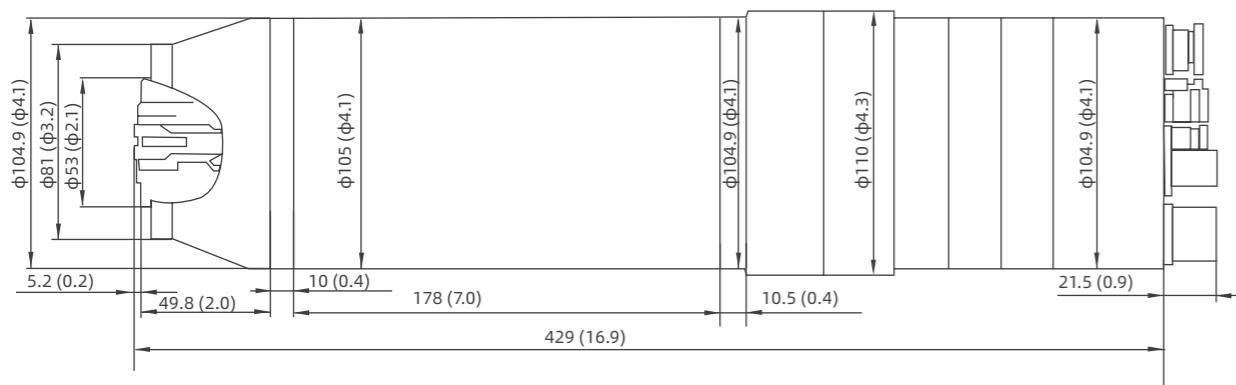
Basic Specification

Clamping Diameter (mm/in): $\Phi 105/\Phi 5.90$ (0, -0.00035)
 Output Power (S6-60%) (KW): 9.2
 Output Torque (S6-60%) (Nm): 4.0
 Speed (rpm): 28,000
 Tool Holder: HSK-E32
 Weight (kg/lb): 14.3/31.53

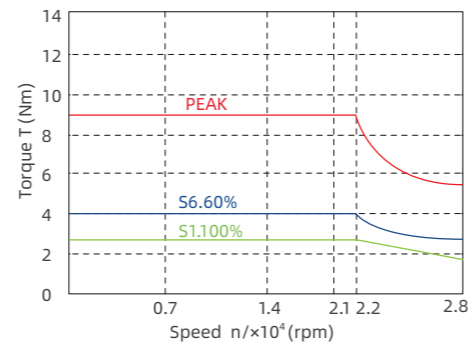
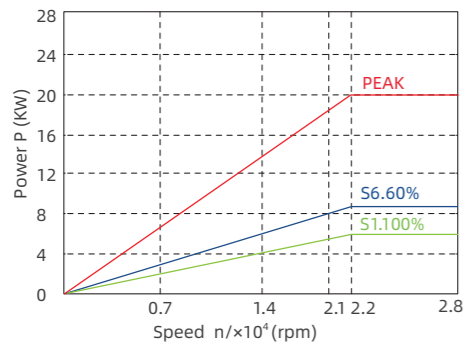
Performance

- + Taper Bore Radial Runout $\leq 3 \mu\text{m}$ (1.18×10^{-4} in)
- + Rotor End Face Axial Runout $\leq 1 \mu\text{m}$ (3.9×10^{-5} in)
- + Vibration at Maximum Speed $\leq 1.2 \text{ mm/s}$ (4.72×10^{-5} ipm)

Dimension Unit:mm (in)



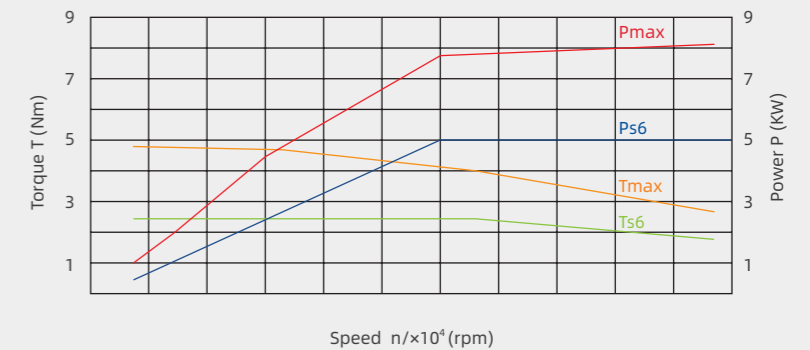
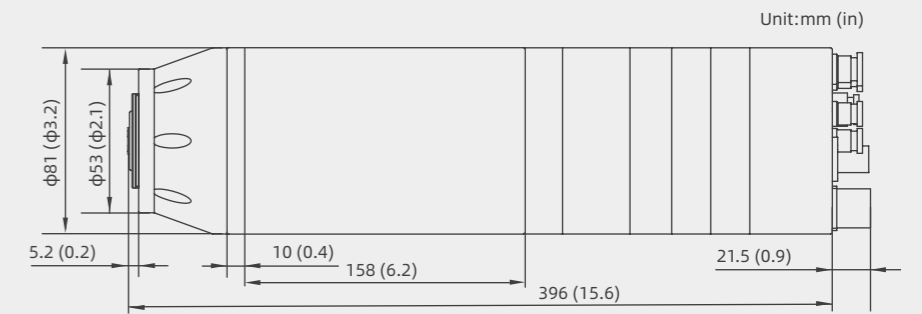
Output Performance



Optional



JD105-32-HSK32



Basic Specification

Clamping Diameter (mm/in): $\Phi 105/\Phi 5.90$ (0, -0.0007)
 Output Power (S6-60%) (KW): 5.0
 Output Torque (S6-60%) (Nm): 2.4
 Speed (rpm): 32,000
 Tool Holder: HSK-E32
 Weight (kg/lb): 14.5/31.97

Performance

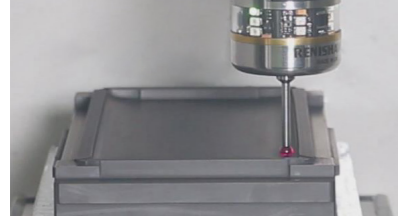
- + Taper Bore Radial Runout $\leq 1.5 \mu\text{m}$ (5.09×10^{-5} in)
- + Rotor End Face Axial Runout $\leq 1 \mu\text{m}$ (3.9×10^{-5} in)
- + Vibration at Maximum Speed $\leq 0.6 \text{ mm/s}$ (2.36×10^{-5} ipm)

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 PGA600 graphite machining and other variety processing requirements of high machining accuracy and fine surface finishing.

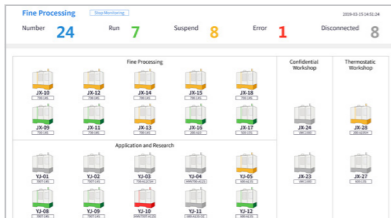
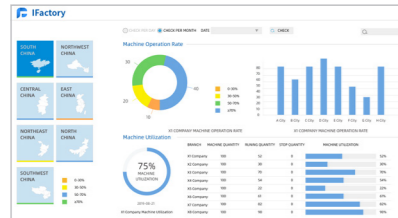


Featured Function



+ High-Speed High-Precision machining.

Advanced forward-looking function can produce smooth transition between line segments, which greatly improve machining speed. The flexible motion parameter matching function and rich compensation function can improve processing efficiency and machining accuracy.



+ Intelligent Monitoring.

With a wide range of expansion interfaces, it can integrate various types of testing equipment to monitor machine status in real time. Complete network communication interface are provided for remote monitoring of machine tools.

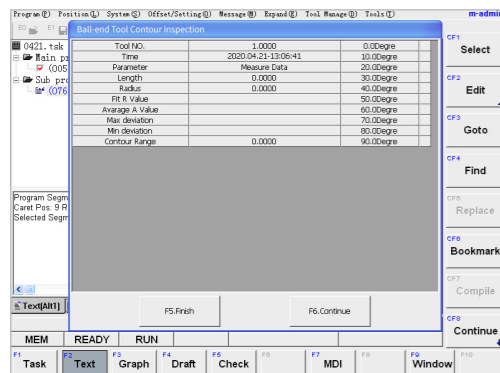


+ Safe and Convenient Operation.

MPG trial cutting, authority management and fool proofing function can greatly reduce the failure rate caused by operator error. Built-in auxiliary programming function and parameterized automatic programming function can improve programming efficiency.

System Advantages

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

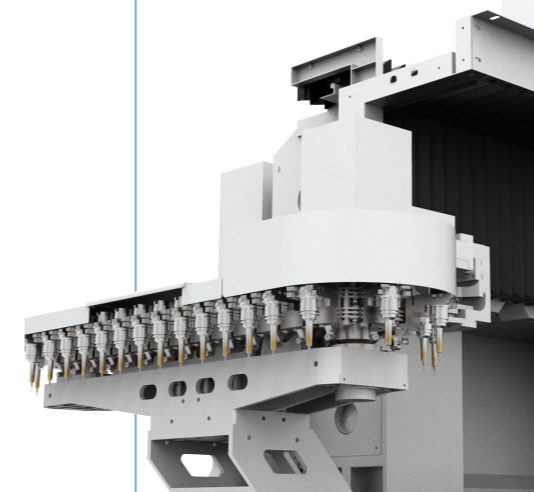
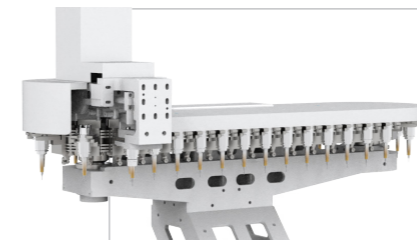


B10			
	A	B	C
1	Tool NO.	1	0.0Degree
2	Time	2020.04.21-12:56:43	10.0Degree
3	Parameter	Measure Data	20.0Degree
4	Length	0	30.0Degree
5	Radius	0	40.0Degree
6	Fit R Value		50.0Degree
7	Average A Value		60.0Degree
8	Max deviation		70.0Degree
9	Min deviation		80.0Degree
10	Contour Range	0	90.0Degree
11			



Tool Magazine

Maximum 36 tool magazine capacity, meeting the needs of various graphite products processing.



Type	Chain Type Tool Magazine with Manipulator
Capacity	36
Tool Holder	HSK-E32
Allowable Maximum Tool Length (mm/in) (From End of Spindle)	155/6.10
Maximum Diameter of Contiguous Tools (Full) (mm/in)	50/1.97
Maximum Diameter of Contiguous Tools (Vacant) (mm/in)	90/3.54
Max. Load of Each Position (kg/lb)	1.5/3.30
Max. Load of Tool Magazine (kg/lb)	54/119.05

Graphite Dust Collector

PGA600 is equipped with a powerful dust collector with the pulsed back shot ash system, it's suitable for graphite dry cutting, cast iron and ceramic dust - producing processing, can effectively reduce the cleaning difficulty, separate the dust produced by processing from the air.

Highlights

- 01

 Powerful Dust Collection
- 02

 Health Protection
- 03

 Reduce Production Cost
- 04

 Long Life and Convenient Maintenance
- 05

 Improve Workshop Environment



Features

- + **Powerful Suction:** It can automatically bounce off the dust from the filter while the dust collector is running continuously and quickly collect dust particles generated in the processing process.
- + **Stable Collection Efficiency:** To prevent dust accumulating in the work space of machine tool, an optional dust collection bag can be used together to ensure a stable and efficient collection effect.
- + **Easy Installation and Maintenance:** The filters can be installed or removed quickly, and the replacement and maintenance are convenient.

Specifications

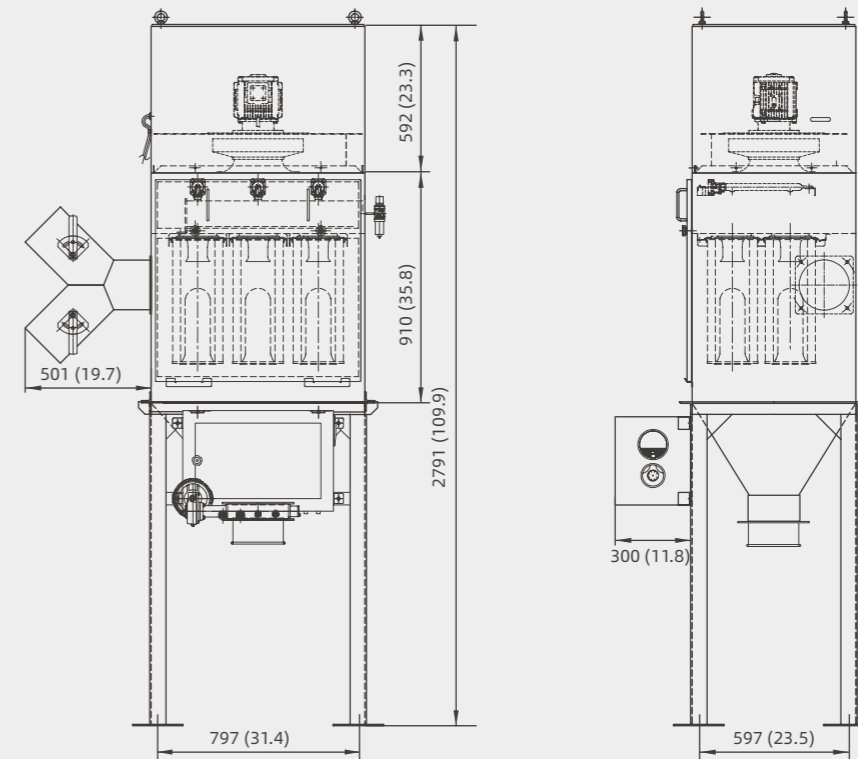
Item	Spec
Air Volume m ³ /h (gal/h)	1800m ³ /h (395944.47)
Static Pressure (Pa/Psi)	-1960/-0.28
Rated Power (KW)	2.2
Filtering Accuracy (µm/in)	3/0.0001183
Noise (dB)	70±2
Dimension (mm/in)	1430×1030×2791/56.30×40.55×109.88

Dust Collection Path



Negative pressure is generated under the drive of high speed motor, and the graphite dust is sucked into the graphite dust collector, which can reduce the harm of dust to the workshop environment and protect the health of the operators.

Dimension Unit: mm (in)



Spindle Chiller

- + It is used for cooling of spindle, electric control cabinet and ball screw.
- + The temperature range is from 5- 40°C (41- 104 °F),and the temperature precision is up to ±1°C (31.82-32.18 °F)to ensure the stability of cooling water flow.
- + With constant temperature, follow and automatic three control modes.
- + With six circulating waterways, the number of waterways can be selected according to the number of cooled objects.



ZLJB-18-380-C

Specification

Type	Specification
Input Voltage	AC three phase 380v±10% 50Hz
Apparent Power (KVA)	1.85
Rated Cooling Capacity (KW)	1.8 (Environment temperature is 25°C / 77 °F , compressor frequency is 50Hz)
Coolant Temperature Range (°C / °F)	5~40/41~104
Coolant Temperature Control Accuracy (°C / °F)	±0.1/31.82~32.18
Working Environment Temperature Range (°C / °F)	0~45/32~113
Compressor	25Hz~60Hz Frequency
Refrigerant	R410A
Refrigerant Charge (kg/lb)	0.56/1.32
Cooling Method	Vapor Compression Refrigeration
Max Working Pressure (MPa/Psi)	4.0/580.2
Condenser Axial Fan (W)	78
Water Tank Capacity (L/gal)	18/4.76
Coolant	Pure water & DOWTHERM
Cooling Circulation	Pump Forced Circulation
Water Pump Power (KW)	0.58
Water Flow (L/min) / (gal/min)	≥2.0/0.44 (Related to spindle runner and connection line)
Pump Max Lift (m/in)	40/1574.80
Noise (dB)	≤62
Net Weight (kg/lb)	84/185.18
Dimension (mm/in)	415×480×87 (16.34×18.90×34.45)

Tool Holder

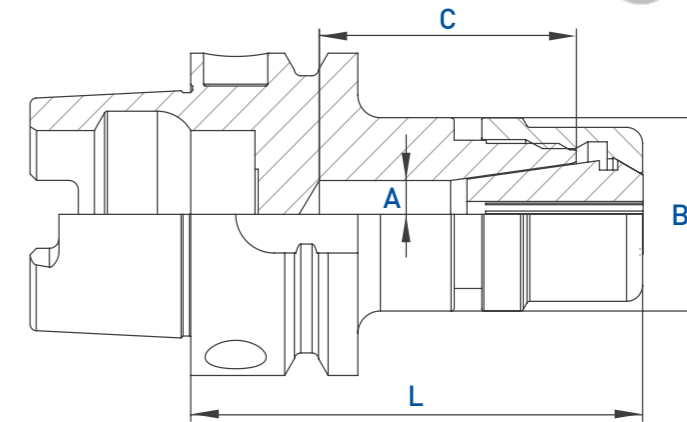
Tool holders require good clamping performance such as high clamping accuracy, low vibration and the ability minimize oil mist during high-speed machining.

JINGDIAO tool holders have anticorrosive properties, minimize air resistance , and are designed good dynamic balance.



Dimension Chart

HSK High-speed Tool Shank Dimension



Technical Parameter

Type	Name	Size mm (in)				
		A	B	C	L	Thread
HSK-E	HSK-E32-ER16-060HS	10.5 (0.41)	30 (1.18)	27.5 (1.08)	65 (2.56)	M14×0.75

On-machine Measurement and Intelligent Modification Technology



Beijing JINGDIAO's innovative On-Machine Measurement and Intelligent Modification Technology (OMIM) is a mature solution that integrates CAD/CAM programming technology, numerical control processing and precision inspection technology.



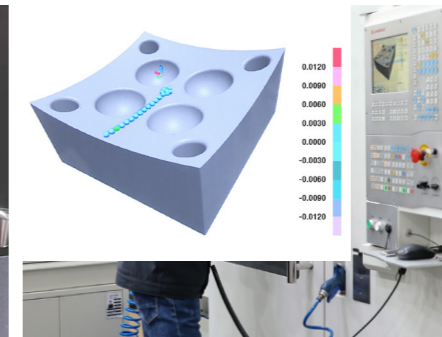
It can measure the position deviation of the fixture, compensate the workpiece position and measure the cutting allowance of the each steps, so as to realize the continuous and stable precision machining.

+Remaining Stock Inspection

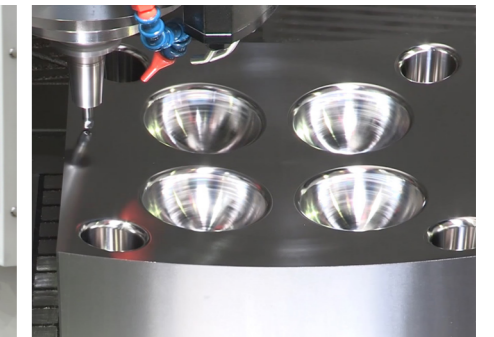
Inspect the machining step remaining stock on the machine, and feed back the inspection results in real time. Technologist can analyze these results to make sure every processing step be reasonable. so as to realize the breakthrough of "from inspecting defective products to not manufacturing defective products".



Inspect the Remaining Stock on the Machine



Real Time Display of CNC System



Achieve Stable Precision Machining

+Digitization of Machining and Continuous Production

When off-line detection of parts quality, manual intervention seriously affect the continuity and stability of production. The technology can realize in-process inspection and finished inspection of product quality, help digital processing of products,achieve the new production mode of "integration of manufacturing and inspection", and improve the production continuity of products.



Before Using Integration of Machining and Inspection

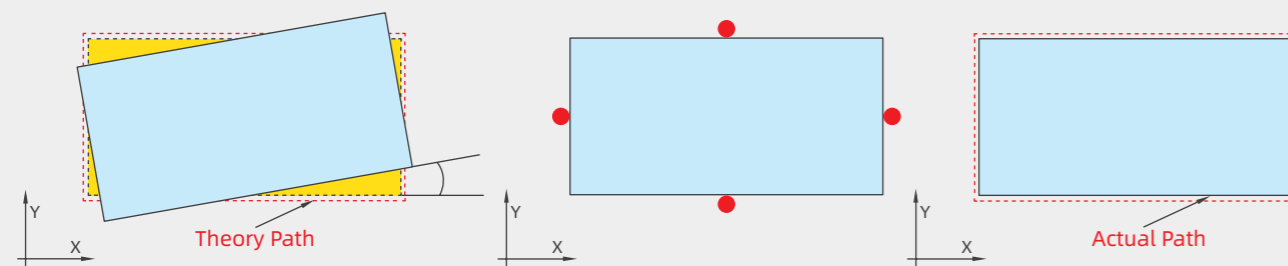


After Using Integration of Machining and Inspection

The Function of JINGDIAO OMIM is Mainly Reflected in 3 Aspects

+Compensation of Workpiece Position Deviation

There are always assembly deviations when the workpiece is clamped to the fixture in machining, "Compensation of workpiece position deviation" can realize intelligent compensation and modification of the workpiece position by calculating the deviation between the actual position and the theory position.



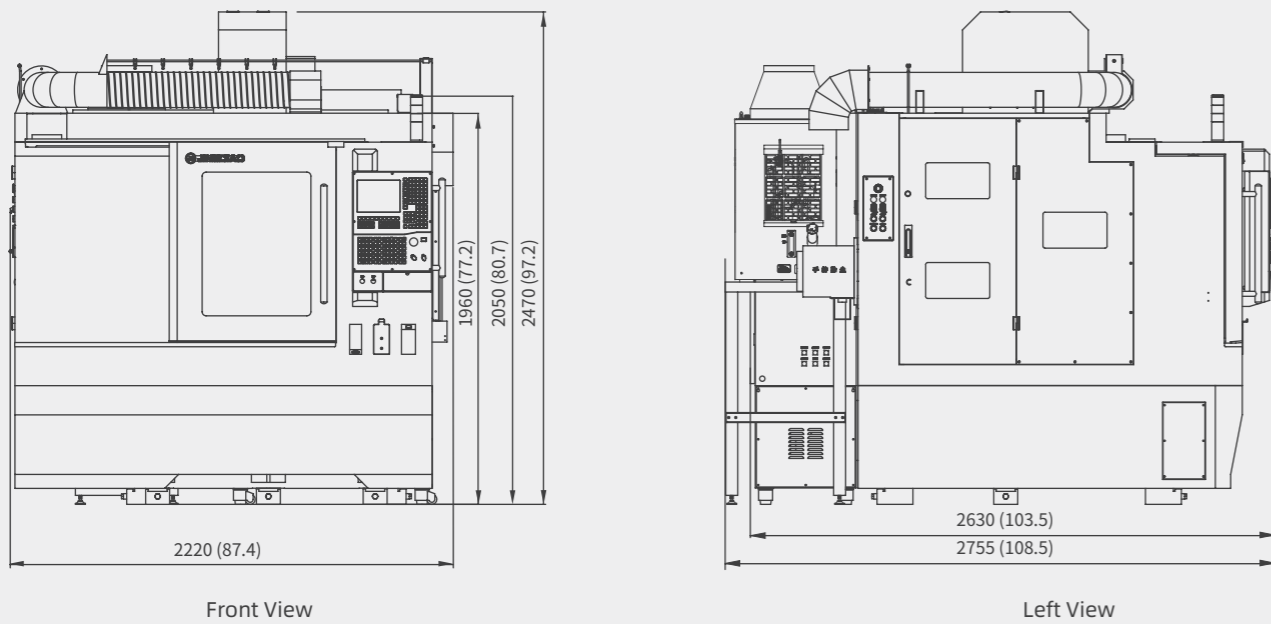
Clamping Error

Position Deviation Measurement

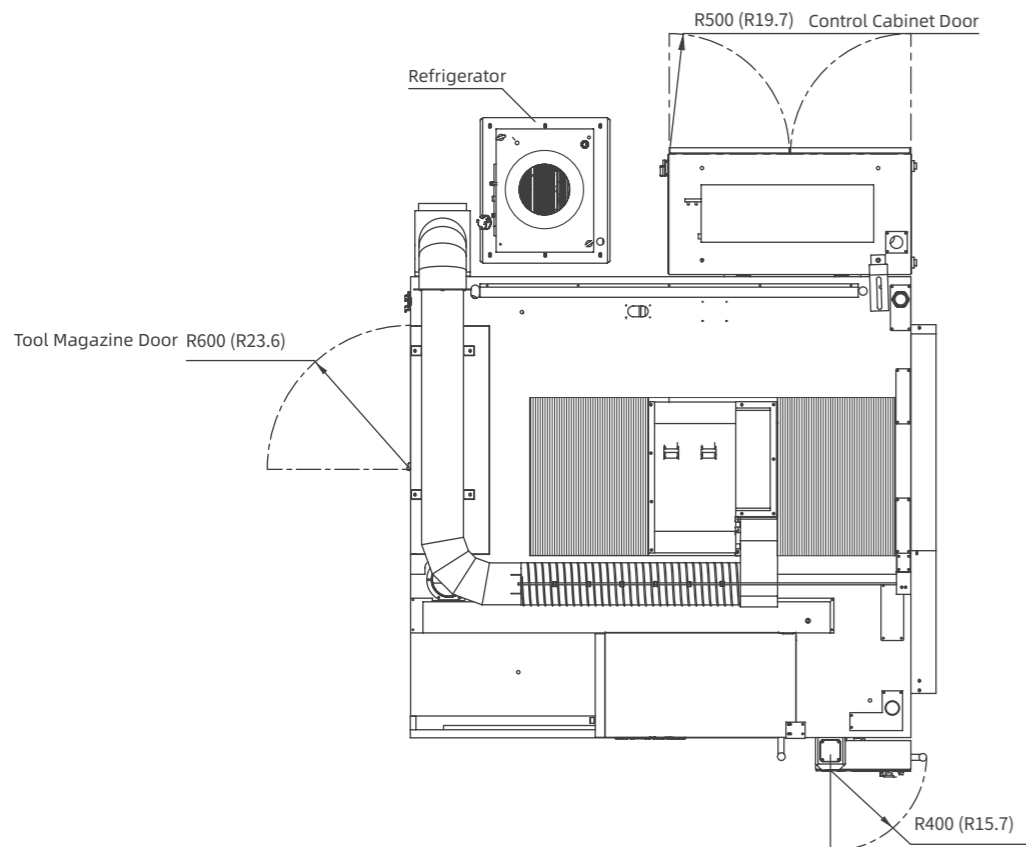
Intelligent Modification

Technical Specification

Dimension Unit: mm (in)



Layout Unit: mm (in)



Specification

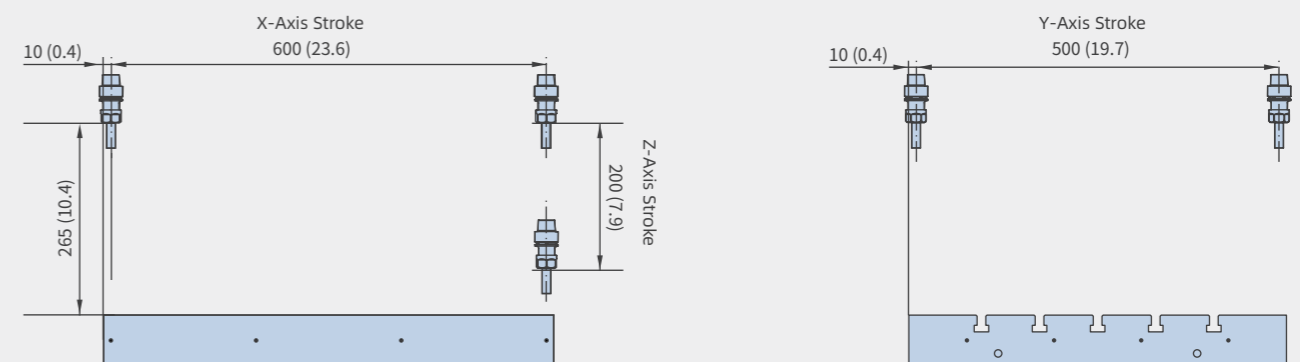
Items	Standard Value	
Position Accuracy (X/Y/Z) mm/ (in)	0.002/0.002/0.002 (0.000079/ 0.000079/0.000079)	
Repeatability (X/Y/Z) mm/ (in)	0.0018/0.0018/0.0018 (0.0000709/ 0.0000709/ 0.0000709)	
Travel (X/Y/Z) (mm/in)	600×500×200 (23.62/19.69/7.87)	600×500×260 (23.62/19.69/10.23)
Tool Feed Speed (m/min)/ (in/min)	18/18/15 (0.71/0.71/0.59)	
Cutting Speed (m/min)/ (in/min)	10/10/10 (0.39/0.39/0.39)	
Table Size mm/(in)	620×520 (24.41×20.47)	
Max. Spindle Speed rpm	JD105S-28-HE32	28,000 (HSK-E32)
	JD105-32-HSK32	32,000 (HSK-E32)
Tool Magazine/Capacity	Chain type manipulator tool magazine 36	
Max. Work Piece Height mm (in)	265 (10.43)	330 (12.99)
	Max. Load kg/ (lb)	
Max. Load kg/ (lb)	300 (661.39)	
Drive System	AC Servo	
Voltage	3-Phase, 480V/60Hz, or Customized	
Air Pressure (MPa/Psi)	≥0.52/75.4	
Machine Weight (kg/lb)	8500 (18739.29)	

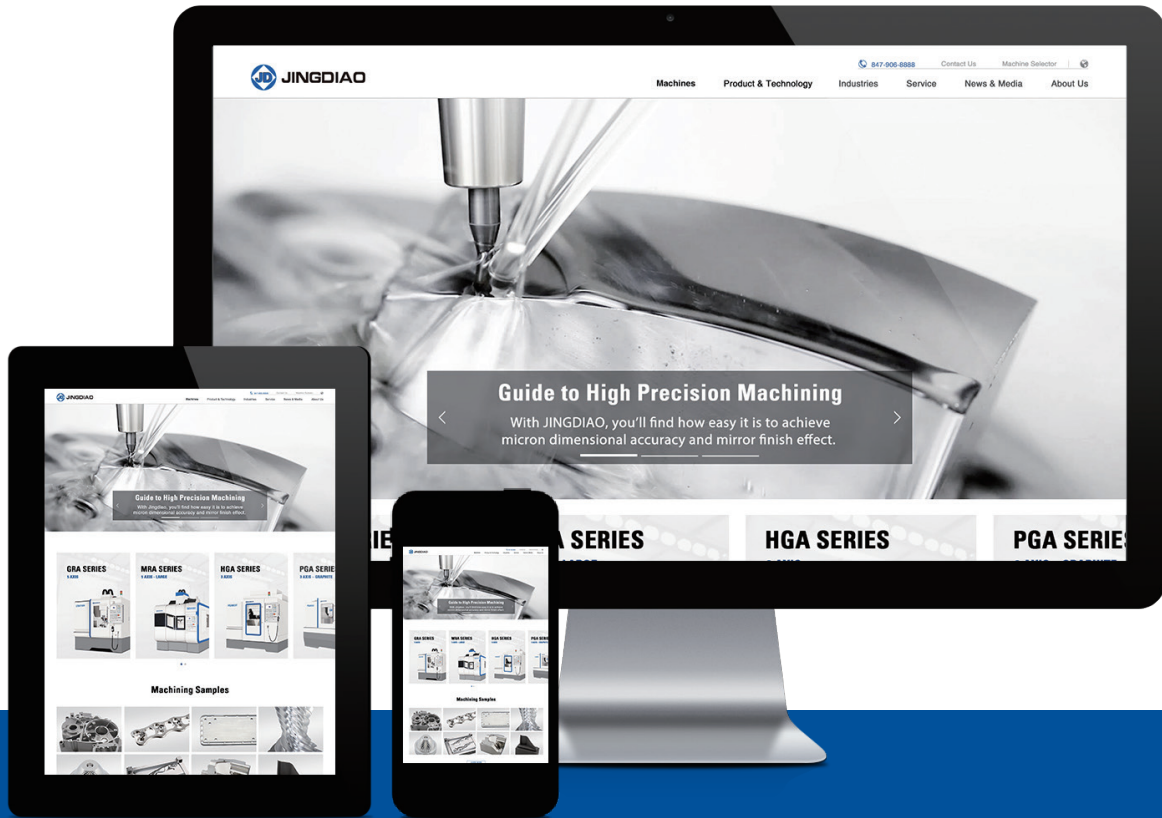
Standard Features and Options

Items	Configuration
Control System	
JD50 CNC System	●
CAM Soft	
JDSoft SurfMill 9.0	●
Spindle	
JD105S-28-HE32 (HSK-E32)	●
JD105-32-HSK32 (HSK-E32)	○
Tool Magazine	
Chain Type Tool Magazine with Manipulator (36 Tools)	● (HSK-E32)
Cooling System	
Spindle Cooling	●
Lead Screw Cooling	●
Electrical Cabinet Cooling	●
Chip Conveyor	
Air Cooling System	●
Built-in Vacuum Device	●
Dust Collector	○
Measurement System	
Contact-Type Tool Set	●
Laser Tool Set	●
JINGDIAO On-Machine Measurement System	●
Standard Calibrating Ring	●
Others	
MPG (Manual Pulse Generator)	●
Machine 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	●
Automatic Door	●

●: Standard ○: Optional

Stroke Diagram Unit: mm (in)





You can find more information at
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