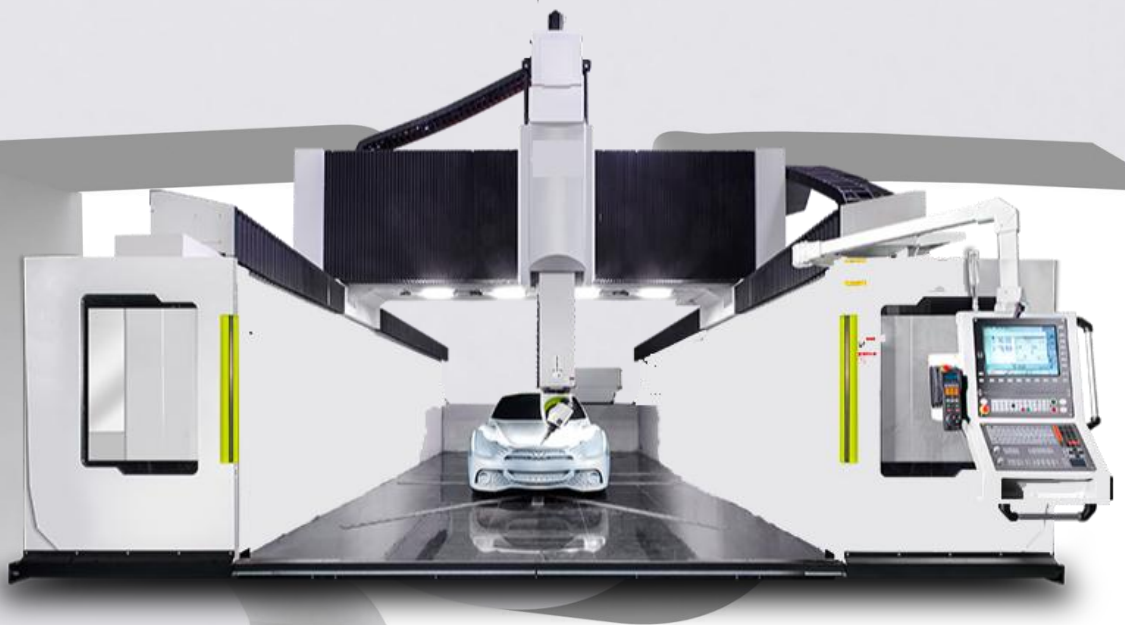**Customer needs are everything we do**

All We Do Are Clients Demand

Supplier: Xiamen Yangsen NC Equipment Co., Ltd.

Xiamen Yangsen NC Equipment Co., Ltd.	Pre-sales technical information **YSMT-6042-5X Gantry Machining Center**

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12.   1. General introduction of YSMT-6042-5X gantry CNC machining center

1 Overview

1.1 Narrative

This technical assignment is used for the ordering, design, manufacturing, installation, commissioning and acceptance of the user's CNC gantry machining center and its ancillary equipment.

1.2 Installation location of gantry CNC machining center

The gantry type CNC machining center described in this technical assignment is installed in the user's workshop.

2. Basic environment

2.1 Power supply voltage: AC 380V+-10%, 50Hz+-5%, 3-phase 5-wire.

2.2 Usage environment: The user is responsible for the power supply from the workshop to the equipment control cabinet.

3. Color of Gantry CNC Machining Center

The color of the gantry CNC machining center is painted using international standard samples.

4. Standards that Gantry CNC machining centers meet

The ambient temperature for GB/T testing should comply with the requirements of GB1093-89

Accuracy implementation standard: GB/T19362.2-2017

The electrical equipment of the machine tool complies with the electrical standard GB5226.1-2008

2. Main structure and technical features of YSMT-6042-5X gantry CNC machining center

The overall layout of the machine tool is a synchronous moving overhead crane type gantry structure, with a fixed workbench and the gantry crane moving forward and backward; the left and right columns and the bed are distributed on both sides of the workbench. The gantry crane moves forward and backward along the X-axis, and the "box in box" symmetrical crossbeam structure design
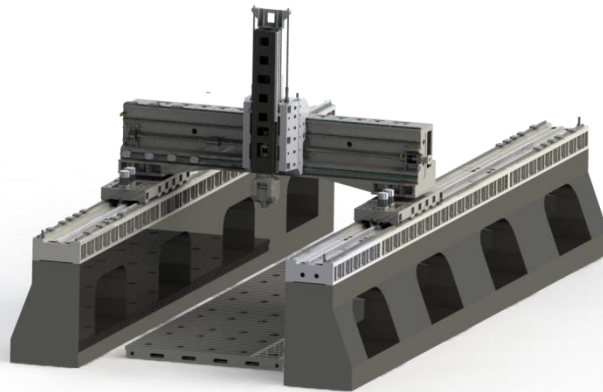
(Note: This picture is for reference only and is not a basis for the contract)

1. Machine tool spindle

The spindle adopts HSKA63 high-speed electric spindle. The spindle has a water-cooled internal cooling method to reduce the thermal deformation of the spindle, improve the stability of the spindle accuracy and the machining accuracy of the machine tool. The machine tool has the functions of spindle orientation and rigid tapping. The spindle box component adopts a double nitrogen liquid balance cylinder mechanism to ensure the stability of the spindle box movement.

Five-axis linkage double-swing milling head: A/C mechanical axis + electric spindle, fork-type integrated structure, with high rigidity, A/C axis adopts unique anti-backlash structure transmission.
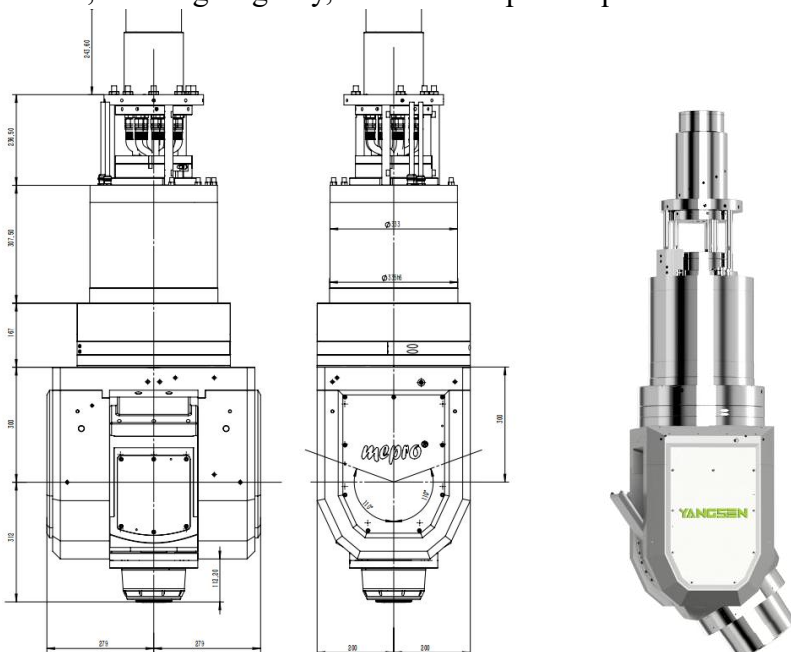
AC five-axis head technical parameters

项目	单位	参数
A轴最大扭矩	Nm	1060
A轴最大转速	rpm	60
A轴抱紧扭距	Nm	4000（60bar）
A轴转角范围	°	±110
A轴编码器类型		绝对式
A轴定位精度	"	8
A轴重复定位精度	"	4
C轴最大扭矩	Nm	1350
C轴最大转速	rpm	60
C轴抱紧扭距	Nm	4000（60bar）
C轴转角范围	°	±360
C轴编码器类型		绝对式
C轴定位精度	"	8
C轴重复定位精度	"	4
主轴S7扭矩	Nm	120
主轴S6扭矩		85
主轴S1扭矩		72
主轴最高转速		18000
主轴额定转速		4000
主轴额定功率	-	30
刀柄	-	HSK-A63

2. Feed transmission of each axis

The X-axis adopts double-sided single drive, that is, both the left and right slides are equipped with a set of dual-motor gear rack drive structure, which can effectively eliminate the transmission gap and improve the positioning accuracy and repeatability of the machine tool.

The Z-axis transmission uses an AC servo motor as the power source and a ball screw as the transmission component. The ball screw is fixedly supported at both ends, supported by imported special precision bearing groups and pre-stretched in both directions to ensure the screw feed stiffness and life. The Y-axis lead screw is equipped with an advanced auxiliary support structure, which can effectively avoid the precision error caused by the drooping center of gravity of the lead screw with a long stroke. The Z-axis motor has an automatic brake function. In the event of a power outage, the automatic brake will hold the

motor shaft tightly to prevent it from rotating.

3. Guide rail form

The X-axis guide pair adopts four heavy-load linear guides with low friction coefficient and high sensitivity; small vibration at high speed and no creep at low speed. The drive shaft has high positioning accuracy and excellent servo drive performance. It also has large load-bearing capacity and good cutting anti-vibration performance, which can improve the dynamic characteristics of the machine tool and increase the accuracy, stability and service life of the machine tool.

The Y-axis crossbeam guide pair uses two heavy-duty linear guides; the guides are arranged in a stepped manner with a large span and sufficient bending and torsional rigidity.

The Z-axis guide pair uses four heavy-duty linear guides to ensure smooth cutting during processing.

4. Basic parts of machine tools

The bed, columns, beams, spindle box, etc. are all made of high-strength cast iron materials and resin sand casting technology. In order to meet the heavy-load cutting requirements of machine tools, the crossbeam adopts a large cross-section with sufficient bending and torsional rigidity. These large parts are designed with the assistance of computer 3D software, and the ribs are arranged reasonably to improve the rigidity of the large parts.

5. Machine tool lubrication

There are two forms of machine tool lubrication: grease lubrication and automatic thin oil lubrication.
Grease lubrication parts: three coordinate bearings
Automatic thin oil lubrication parts: ball screw pair, linear guide, cast iron-plastic friction guide pair
Automatic thin oil lubrication is a timed and quantitative fully automatic mode. The action is automatically controlled by the CNC system and can perform detection and alarm.

6. Cutting cooling and chip removal system

The machine tool cutting cooling adopts external cooling method, and its coolant is emulsified non-corrosive liquid. The chips are sent to the trolley through chain plate chip conveyors on both sides of the bed.

7. Machine tool protection device

The machine tool's bed guide rail (X-axis) adopts rust-proof metal telescopic protective cover; the beam guide rail (Y-axis) adopts accordion-type protection; the entire machine tool adopts simple protection to prevent iron filings and coolant splashing, allowing the operator to work in a safe and comfortable environment.

8. Electrical system

This machine tool uses the German Siemens ONE CNC system. The spindle drive unit, feed drive unit, AC spindle motor and AC feed servo motor are all imported originals with advanced performance, stable and reliable.

9. Paint packaging

The machine tool color shall be based on the manufacturer's standard color standard. If the user has special requirements, the color requirements should be clearly stated when signing the agreement. Except for the electrical cabinet and machine tool accessories which are packed in sturdy wooden boxes, the main machine tool is transported bare to ensure the installation period of the machine tool.

10. Machine tool foundation

The foundation must be a solid, rigid, smooth concrete foundation that meets all the requirements of the manufacturer's foundation drawings. The standard installation location for the equipment is ground installation, with the host and all related accessories placed on the ground. If there is a height restriction on the plant, the foundation can be sunk and indicated in the agreement, otherwise it will not be sunk by default.

3. Main technical parameters of YSMT-6042-5X gantry CNC machining center

Items	Specification	unit	YSMT-6042-5X
Travel	X/Y/Z Axis	mm	6000*3000*1500
	Distance from spindle nose to worktable	mm	350-1850
	Gantry width	mm	4200
Workbench	Workbench size (L*W)	mm	6000*3000
	Maximum load-bearing capacity of workbench	t/㎡	10
	T-Slot	mm	36*200
Spindle	Spindle, taper hole (model/installation dimensions)	mm	HSKA63
	Spindle speed	rpm	18000
	Spindle drive mode		AC swing five-axis head
Feed	X/Y/Z axis rapid feed	m/min	15/15/15
	Maximum cutting feed	mm/min	6000
Motor	Spindle motor	kw	30
	Three-axis servo motor	kw	5.4*4/5.4/5.4
	Cutting water pump motor	KW	2.7
Accuracy (GB/T19362.2-2017)	positioning accuracy	mm	0.03/0.02/0.015
	Repeatability	mm	0.02/0.015/0.01
Power requirements	Power requirements	kv	60
	Air source requirements	Kg/cm	6~8
Machine size	Length*Width*Height	mm	13000*8130*5950
	weight	t	82

4. List of main purchased parts for YSMT-6042-5X gantry CNC machining center

Serial number	name	quantity	Manufacturer	Specifications
1	CNC system	1 set	Siemens, Germany	ONE
2	Electric spindle	1 set	Iberg	30KW
3	X, Y, Z servo motors	1 each	Siemens, Germany	1FK2210-4AB01-0MB0/1FK2210-4AB01-0MB0/1FK2210-4AB11-0MB0
4	Spindle front bearing	Group 1	FAG/NSK	
5	Spindle rear bearing	Group 1	FAG/NSK	
6	X-Drive	Group 1	Taiwan	Double rack and pinion
7	Y/Z axis transmission	Group 1	Taiwan	Lead Screw
8	X-axis linear guide	4	Japan THK	55 specification heavy load roller linear guide
9	Y-axis linear guide	3	Japan THK	55/45/55 heavy-duty roller guide rails
10	Z-axis linear guide	4	Japan THK	55
11	AC five-axis head	1 set	Iberg	T70.5-HSKA63
12	Cutting fluid pump	1 set	YANGSEN	4-10
13	Automatic lubrication system	2 sets	SKF	
14	Main pneumatic components	1 set	Japan SMC	
15	Main electrical components	1 set	France	Schneider
16	Electric cabinet air conditioner	1 set	Rico	
17	Three-axis transmission mode and gear ratio	1 set	Japan Nidec/NBK	
18	Chip removal device	1 set		Chain plate type
19	Oil Cooler	1 set	Rico	
20	Three-axis grating ruler (optional)	1 set	HEIDENHAIN	Absolute

If a supplier is unable to supply, we will replace it with a brand of equal quality.

5. List of main accessories for YSMT-6042-5X gantry CNC machining center

Serial number	name	Specification or mark	quantity	Remark
1	Hexagon wrench	1.5---10	1 set	
2	screwdriver	One word, cross	1 each	
3	Raw tape		2 volumes	
4	Glass glue	Porcelain White	1 bottle	
5	Electronic handwheel		1	
6	Card reader		1	
7	Memory card		1	
8	cable	5m, 20m	2 pieces	
9	Clamping ring		1	
10	screw		1 package	
11	Machine tool ground		1 piece	
12	Bellows fittings		1	
13	Toolbox		1	
14	Footing		1 set	
	random document			

1	Milling Operation Manual (ONE)	U Disk	1 serving	
2	Certification		1 serving	
3	Packing List		1 serving	
4	Machine tool circuit diagram		1 serving	

Customer selects configuration

NO.	Option name and specification	Quantity	Remark
1	Five-axis head HSKA63-18000	1	
2	Three-axis grating ruler HEIDENHAIN	1	
3	Machine head follow-up vacuum cleaner	1	
4.	Fully enclosed, automatic sunroof,	1	
5.	Spindle Oil Cooler	1	
6.	Tool Magazine 16T	1	
7.	TS27R Renishaw's non-contact tool breakage detection system	1	

8.	Workpiece on-line probe: Primo-ruby ball head diameter 4mm	1	
9.	NC4 F230 Renishaw's tool setter	1	
10.	Vacuum system with vacuum pump 250 m3/h and vacuum connector	1	
11.	18 months warranty, Installation, commissioning, training	1	

6. Main functions of the electrical system of the YSMT-6042-5X gantry CNC machining center

CNC system: SIUMERIKONE

Serial number	Function	illustrate	Remark
Hardware Configuration			
1	Number of controlled axes	5-axis	Standard
2	Number of axes controlled simultaneously	5-axis	Standard
3	Axis name	X、Y、Z、A/C	Standard
4	CNC system		Standard
5	Operation Area		Standard
6	Machine tool operation panel		Standard
7	Handheld operating unit		Standard
8	Ethernet interface		Standard
9	USB 口	2x USB 2.0	Standard
10	PLC Program	内装 SIMATIC S7-200	Standard
11	PLC Function	Up to 4096 flags, 128 timers, 64 counters	Standard
12	PLC peripheral modules	PP72/48DPN	Standard
13	CF card interface	1	Standard
14	Linear ruler interface	3-axis	Standard
System functions			
1	Minimum pulse equivalent	Linear axis 0.001mm, rotation axis 0.001°	Standard
2	Feed rate per minute/per revolution		Standard
3	Feed and rapid feed		Standard
4	Feed rate adjustment 0～120%		Standard
5	Spindle speed limit		Standard
6	Spindle constant speed cutting		Standard
7	Spindle monitoring		Standard
8	Spindle orientation and accurate stop		Standard
9	Spindle ratio 50～120%		Standard

Serial number	Function	illustrate	Remark
10	Spindle speed display		Standard
11	Acceleration with jerk limitation		Standard
12	Programmable acceleration		Standard
13	FRAME	Realize coordinate system transformation and inclined surface processing	Standard
15	Forward-looking function or forward-looking function	Realize frequent motion control in high-speed machining	Standard
16	Tool radius compensation		Standard
17	Tool length compensation		Standard
18	Lead screw pitch error compensation		Standard
19	Measurement system error compensation		Standard
20	Backlash compensation		Standard
21	Quadrant error compensation		Standard
22	Tool Management	The machine tool needs to be equipped with a tool magazine	

Interpolation function

1	Precise stop		Standard
2	Feed Pause		Standard
3	Thread cutting		Standard
4	Three-coordinate linear interpolation		Standard
5	Circular interpolation of any two coordinates		Standard
6	D+N helical interpolation (circular interpolation + up to two-axis linear interpolation)		Standard

programming

1	Tapping		Standard
2	Excessive chamfering/rounding		Standard
3	Metric, Imperial, or mixed size programming		Standard
4	Programming	Complies with DIN66025 standard and has high-level language programming features	Standard
5	Absolute or incremental programming		Standard
6	Variable and parameter operations		Standard
7	Dynamic Program Buffer (FIFO)		Standard
8	7 levels of subroutine nesting		Standard
9	Program jumps and branches		Standard
10	Macro Program		Standard
11	Translation and rotation of coordinate system		Standard
12	Programming and processing at the same time		Standard

Serial number	Function	illustrate	Remark
13	Program command returns to reference point		Standard
14	Contour programming and canned cycle programming		Standard
15	Mirroring and scaling		Standard
16	Plane Selection		Standard
17	Workpiece coordinate system		Standard
18	Drilling and milling process fixed cycle		Standard
19	Zero offset		Standard
20	Program segment search		Standard
21	Program Number Search		Standard
22	Backstage editing		Standard
23	Program protection		Standard
24	Select a program via the catalog		Standard
25	3MB user memory (RAM)	Can be used for part programs, tool compensation and data offsets	Standard
Safety protection function			
1	Programmable processing area limitation		Standard
2	Program testing function		Standard
3	emergency stop		Standard
4	Software limit monitoring		Standard
5	Hardware limit monitoring		Standard
6	Contour monitoring		Standard
8	Static monitoring		Standard
9	Location monitoring		Standard
10	Speed monitoring		Standard
11	Processing area restrictions		Standard
13	Safety functions Clock monitoring measuring circuits, overtemperature, voltage, memory, limit switches		Standard
Operation method			
1	AUTOMATIC 自动	Including program running, program interruption, dry run, single program segment, etc.	Standard
2	JOG (manual) adjustment	Including REF mode, incremental mode (x1, x10, x100, x1000, x10000 and arbitrary increments)	Standard
3	MDA Manual Data Entry		Standard
4	TEACHIN	Interactive program generation for machine tools	Standard
Operation and display			
1	NC and PLC diagnostic functions with text display, screen saver		Standard

Serial number	Function	illustrate	Remark
2	Self-diagnosis function display		Standard
3	Current location display		Standard
4	Graphical Display		Standard
5	Program Display		Standard
6	Program error display,		Standard
7	Operation error display		Standard
8	Actual cutting speed display		Standard
9	Chinese and English menu display		Standard
10	Alarm information display		Standard
11	Multiple M-code instruction sets		Standard
Data Communication			
1	USB □	NC data, PLC data and programs are backed up to a USB flash drive for data input and output	Standard
2	CF card interface	Data input and output transmission via CF card	Standard