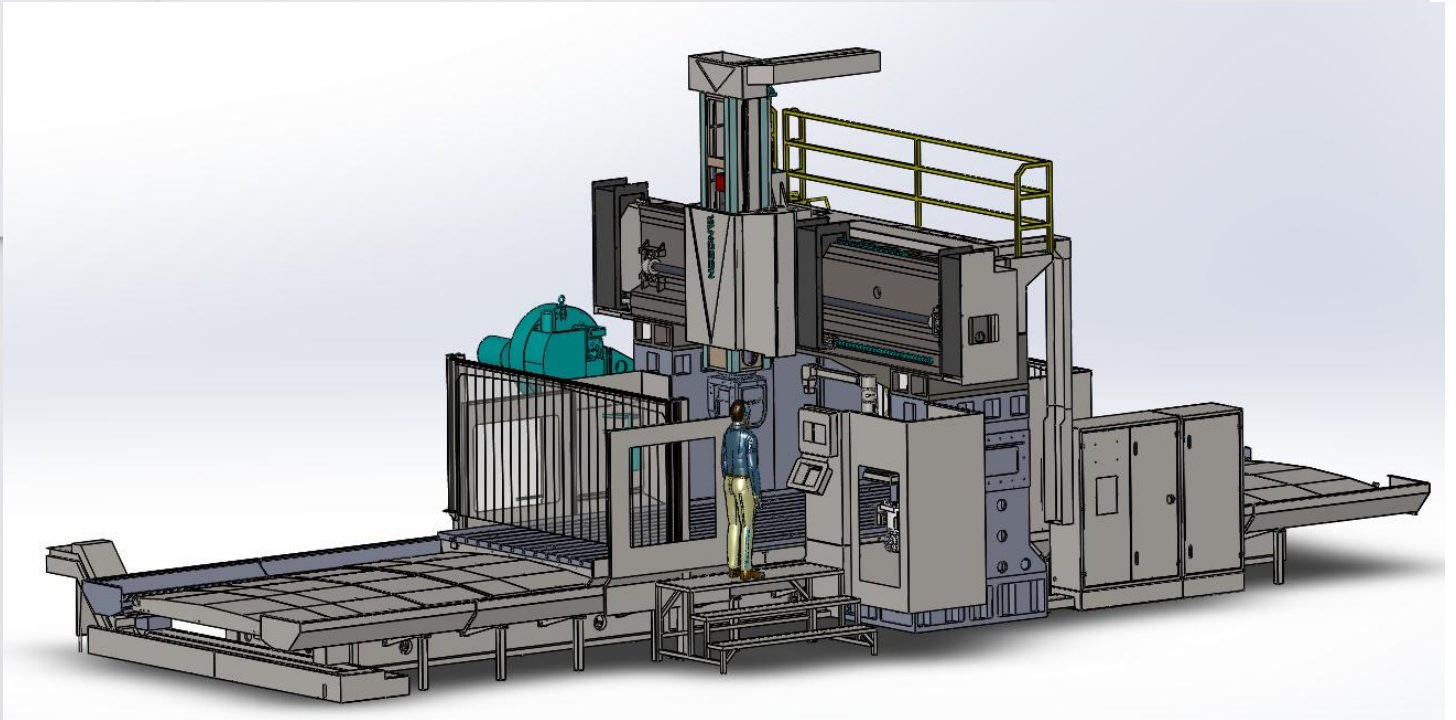


客户的需求就是我们所做的一切

All We Do Are Clients Demand



Pre-sales technical information

Axis Machining Center CNC Machining

YSMV-5041-5X



厦门扬森机械科技有限公司

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## **1、 YSMV-5041-5X General introduction of gantry CNC machining center**

### 1 Overview

#### 1.1 Narrative

This technical task book is used for the ordering, design, manufacture, installation, commissioning and acceptance of the CNC gantry type machining center and auxiliary equipment of the user.

#### 1.2 Installation position of gantry type CNC machining center

The gantry type CNC machining center described in this technical task book is installed in the workshop of the user.

### 2. Basic environment

2.1 Power supply voltage: AC 380V $\pm$ 10%, 50Hz $\pm$ 5%, 3-phase 5-wire system.

2.2 Use 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 type CNC machining center is painted with an international standard model.

### 4. The standards that the gantry type CNC machining center meets

The ambient temperature detected by GB/T shall comply with the provisions of GB1093-89

Accuracy implementation standard: GB/T19362.2-2017

Machine tool electrical conforms to GB 5226.1-2008 electrical standard

## **2.The main structure and technical characteristics of YSMV-5041-5X gantry CNC machining center**

The overall layout of the machine tool is a fixed-beam beam structure, and the worktable moves forward and backward; the left and right columns and the bed are distributed on both sides of the workbench. The gantry table moves forward and backward in the X axis, the square ram moves vertically in the Z direction on the slide plate, and the slide plate and the ram move horizontally in the Y direction on the beam. As shown below:

(1) The workbench moves longitudinally

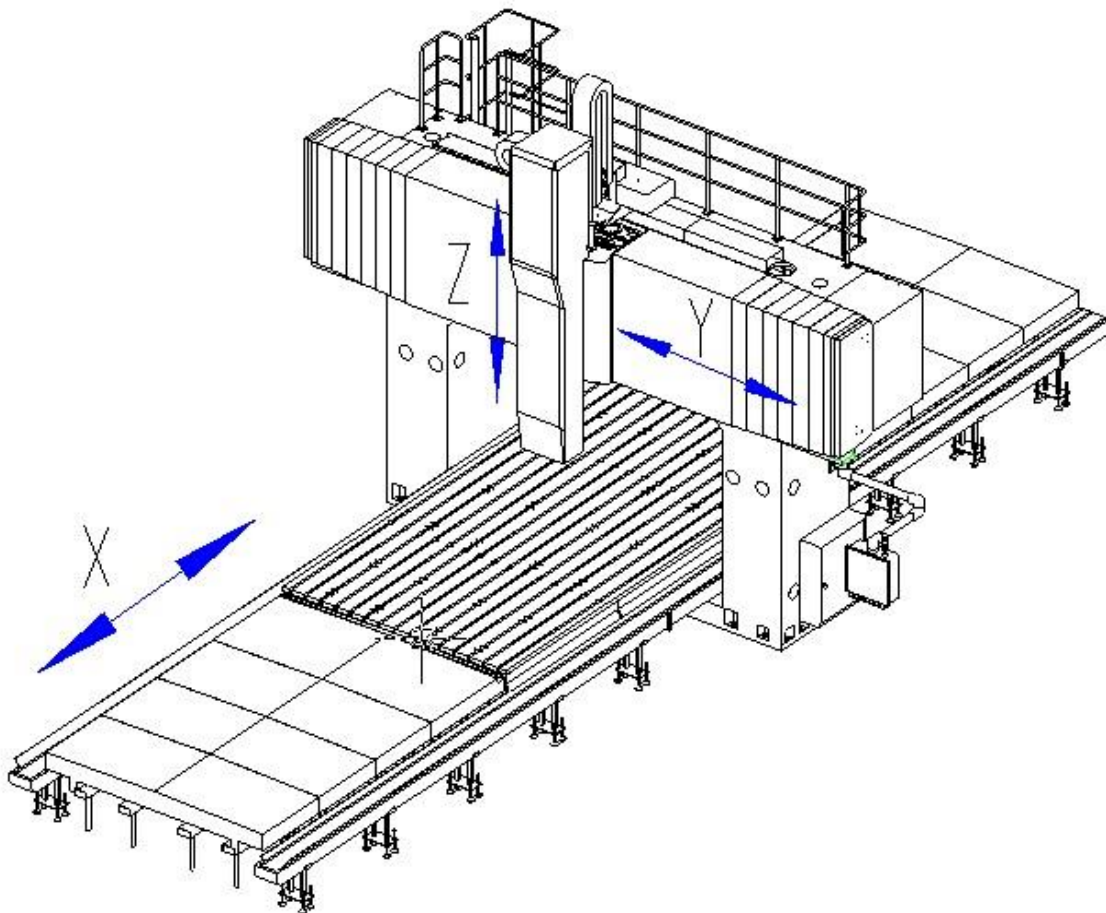
(X axis)

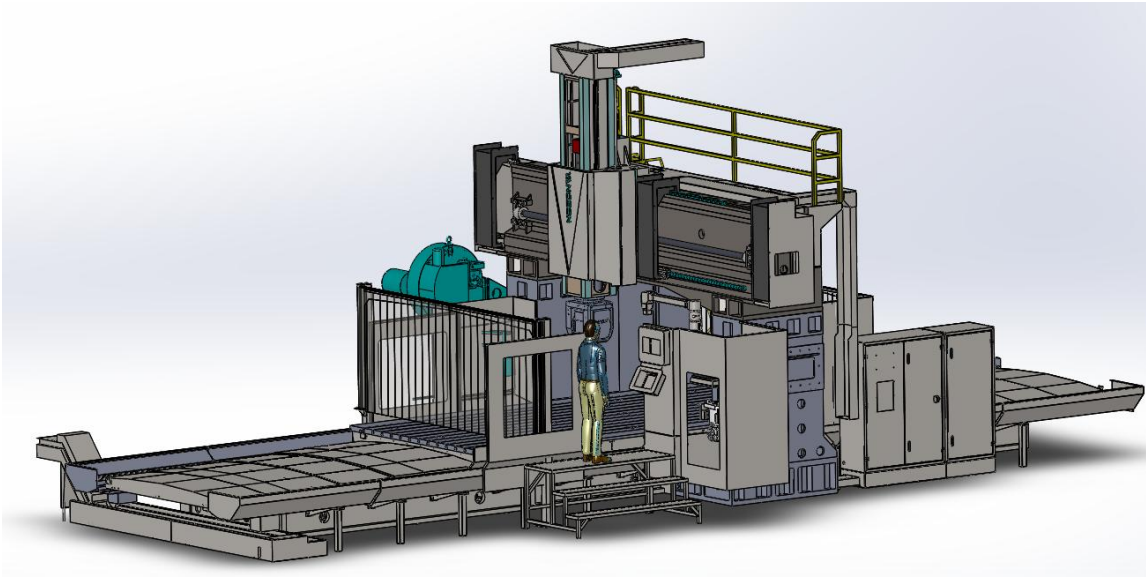
(2) The saddle moves along the beam

(Y axis)

(3) Axial movement of the ram

(Z axis)

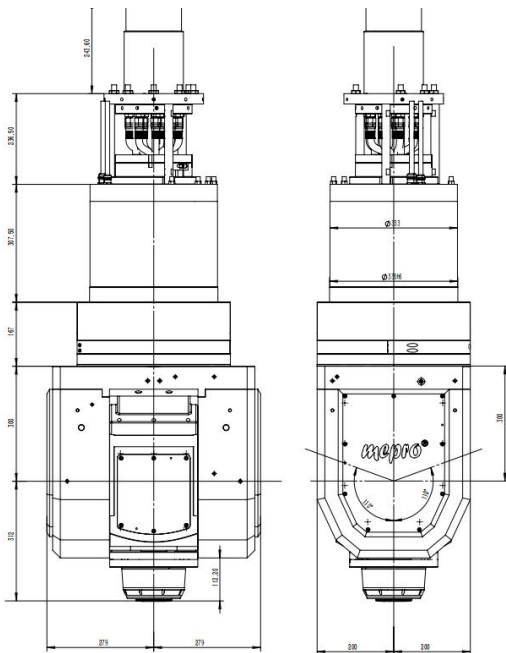




### 1. Machine tool spindle

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 precision and the machining accuracy of the machine tool. The machine tool has the functions of spindle orientation and rigid tapping. The headstock parts adopt double nitrogen liquid balance cylinder mechanism to ensure the stability of the headstock movement.

Five-axis linkage double pendulum milling head: A/C mechanical axis + electric spindle, fork-type integrated structure, with high rigidity characteristics, A/C axis is driven by a unique anti-backlash structure.





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轴抱紧扭矩	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轴抱紧扭矩	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, Y, and Z transmissions all use AC servo motors as power sources, and ball screws as transmission components. The ball screw is fixedly supported at both ends, supported by imported special precision bearings and pre-stretched in two directions to ensure the feed rigidity and life of the screw. The Y-axis screw is equipped with an advanced auxiliary support structure, which can effectively avoid the accuracy error caused by the sag of the center of gravity of the large-stroke screw. The Z-axis motor has an automatic brake function. In the event of a power failure, the automatic brake will hold the motor shaft tightly so that it cannot rotate.

## 3. Rail form

The X-axis guide rail pair adopts two heavy-duty linear guide rails, which have small friction coefficient and high sensitivity; small high-speed vibration and no crawling at low speed. The positioning accuracy of the drive shaft is high, and the servo drive performance is excellent; at the same time, the bearing capacity is large, and the cutting vibration resistance is good, which can improve the dynamic characteristics of the machine tool, improve the precision stability and service life of the machine tool;

The Y-axis beam guide pair adopts two heavy-duty linear guide rails; the guide rails are arranged in steps, with a large span, and sufficient bending rigidity and torsional rigidity.

The Z-axis guide rail pair adopts four heavy-duty linear guide rails to ensure smooth cutting during processing.

## 4. Basic parts of machine tools

The bed, columns, beams, and spindle boxes are all cast with high-strength cast iron materials and resin sand technology. In order to meet the heavy-duty cutting of the machine tool, the cross-beam adopts a large cross-section, which has sufficient bending rigidity and torsional rigidity. These large pieces are designed with computer-assisted three-dimensional software, and the arrangement of ribs is reasonable to improve the rigidity of the large pieces.

## 5. Machine tool lubrication

There are two types of lubrication for machine tools: grease lubrication and automatic thin oil lubrication.

Grease lubrication part: Three coordinate bearings

Automatic thin oil lubrication parts: ball screw pair, linear guide rail, cast iron-friction guide rail pair composed of plastic paste

Automatic thin oil lubrication is a timing and quantitative automatic method, the action is automatically controlled by the numerical control system, and can detect and alarm

## 6. Cutting cooling chip removal system

The cutting cooling of the machine tool adopts the external cooling method, and the cooling liquid is emulsified and non-corrosive liquid. The chip removal is sent to the trolley through the two-measuring chain plate chip removal machine on the bed.

## 7. Machine tool protection device

The bed guide rail (X-axis) of the machine tool adopts an anti-rust metal telescopic protective cover; the beam guide rail (Y-axis) adopts an organ-type protection; work in the environment.

## 8. Electrical system

This machine tool adopts German Siemens 840D/ONE CNC system. The spindle drive unit, feed drive unit, AC spindle motor, and AC feed servo motor are all imported, with advanced performance, stability and reliability.

## 9. Paint packaging

The color of the machine tool is subject to the manufacturer's standard color standard. If the user has special requirements, specify the color requirements when signing the agreement. Machine tool packing box In addition to the electrical cabinet and machine tool accessories, which are packed in strong wooden boxes, the main engine of the machine tool is transported bare metal to ensure the installation cycle of the machine tool.

## 10. Machine tool foundation

The foundation must be a solid, rigid and smooth concrete foundation, and meet the requirements of the manufacturer's



foundation drawings. The standard installation position of the equipment is ground installation, and the host and all related accessories are placed on the ground. If the factory building has height restrictions, Foundation sinking is optional and specified in the agreement, otherwise the default is not to sink.

11.The machine tool parts belong to the famous brand of famous factory, and the advanced configuration in the industry.

**機床零部件屬於名廠名牌**



### 3. Main technical parameters of YSMV-5041-5X gantry CNC machining center

Subject	Specification	unit	YSMV-5041-5X
Travel	X/Y/Z axis	mm	5000*4300*1500
	Spindle nose to the worktable surface	mm	250-1750
	Gantry width	mm	4100
	Gantry passable height	mm	1780
Worktable	worktable (L*W)	mm	4600*3000
	Worktable max load	t	30
	T SLOT	mm	28×200
Spindle	Spindle, taper hole (model/installation size)	mm	HSKA63
	Spindle speed	rpm	18000
	Spindle delivery type		AC swing five-axis head
Feed	Feed rate (X/Y/Z )	m/min	12-12-12
	The max cutting feed rate	mm/min	6000
ATC(optional)	Tool change method		Side Mount
	Tool Holder specifications	type	HSKA63
	Tool capacity	tools	24
	Maximum tool diameter (adjacent tool)	mm	80
	Maximum tool diameter (without adjacent tool)	mm	120
	Maximum tool length	mm	350
	Maximum tool weight	kg	8
	Fastest tool change time	sec	2.5
Motor	Spindle motor	kw	30
	x/y/z axis motor	kw	5.4/5.4/5.4
	Cutting water pump motor	m/h-m	4-60
Accuracy GB/T 19362.2—2017	Positioning	mm	0.02/0.015/0.01(with grating scale) )
	Repeatability	mm	0.01/0.008/0.005 (with grating scale) )
Power requirement	Power requirements	kva	40
	Air source requirements	Kg/cm	6~8
Others	L*W*H	mm	12800*8050*6420



	Weight	t	About 53
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**4. List of main purchased parts of gantry CNC machining center**

No.	Product name	Qty	Manufacture	Specification
1	Controller	1 pcs	Siemens	ONE
2	Electric spindle	1 pcs	Mepro	30KW
3	X、 Y、 Z servo motor	1set	Siemens	1FK2210-4AC01-0MB0/1FK2210-4AB01-0MB0/1FK2210-4AB11-0MB0
4	Spindle bearing (Front)	1set	Japan NSK	
5	Spindle bearing (Back)	1set	Japan NSK	
6	X, Y, Z axis screw bearings	1set	Japan NSK	
7	X, Y, Z axis ball screw	1set	Japan THK	8020/8020/6316
8	X linear guide way	3pcs	Japan THK	55
9	Y linear guide way	2 pcs	Japan THK	55
10	Z linear guide way	4pcs	Japan THK	55
11	Spindle unit	1set	Mepro	HSKA63
12	Cutting fluid pump	1set	YANGSEN	LDPB4V-60-1350W
13	Automatic lubrication system	2 set	SKF	4L
14	Main pneumatic components	1set	Japan SMC/SKF	
15	Main electrical components	1set	Schneider	
16	Three-axis motor transmission mode and transmission ratio	1set	Japan Nidec/NBK	
17	Electric cabinet air conditioner	1 set	Rico	
18	Chip removal device	1 set		Twin-screw chip removal + chain plate chip removal
19	oil cooler	1 set	Rico	
20	Tool magazine (optional)	1 set	Okada	Disc type BT50 -24T
21	Hydraulic station	1 set	TAIWAN	
22	Three-axis grating ruler (optional)	1 set	Heidenheim	

Note: The manufacture preserves the rights to exchange parts at equivalent values.



5、 Main accessories list of YSMV-5041-5X gantry CNC machining center

NO	Function	Specification	Quantity	Remark
1	Allen wrench	1.5---10	1 set	
2	screwdriver	word, cross	1 set	
3	raw tape		2 volumes	
4	glass glue	porcelain white	1 bottle	
5	Electronic handwheel		1pcs	
6	card reader		1pcs	
7	Memory card		1pcs	
8	cable	5 meters, 20 meters	2pcs	
9	snap ring		1pcs	
10	screw		1 package	
11	machine tool ground		1 stick	
12	Bellows connector		1pcs	
13	toolbox		1pcs	
14	foundation		1 set	
Accompanying documents				
1	Machining Center System Operation Manual	U disk	1 copy	
2	Certification		1 copy	
3	Packing List		1 copy	
4	Machine tool circuit diagram		1 copy	



**6. Main function table of electrical system of YSMV-5041-5X gantry CNC machining center**  
CNC system: German Siemens ONE

NO	Function	Explanation
1.	Number of control axes	5 axis
2.	Simultaneously control the number of axes	5 axis
3.	Axis name	X、 Y、 Z、 A/C
4.	Minimum input unit	0.001mm
5.	Fine acceleration and deceleration control	
6.	High Response Vector Control	
7.	Imperial/Metric Conversion	G20/G21
8.	interlock	
9.	Emergency stop	
10.	Overtravel alarm	
11.	Mirror image	G51.1,G50.1
12.	backlash compensation	
13.	Stored pitch error compensation	
14.	Automatic operation	
15.	DNC operation	
16.	MDI operation	
17.	Program restart	
18.	Single block	
19.	Manual continuous feed	
20.	Manual reference point return	
21.	Set reference point position without stopper	
22.	Reference point offset	
23.	Rapid positioning	G00
24.	linear interpolation	G01
25.	Multi-quadrant circular interpolation	G02, G03
26.	Helical interpolation	
27.	Thread cutting, synchronous feed	
28.	Pause	G04



NO	Function	Explanation
29.	Skip function	G31
30.	Reference point return	G28
31.	Rapid feed rate	
32.	Rapid travel magnification	F0, 25, 50, 100%
33.	Automatic acceleration/deceleration	
34.	Feed speed override	
35.	JOG feed speed	
36.	The code	EIA RS244/ISO840 Automatic Identification
37.	Logo skip	
38.	Control I/O	G15/G16
39.	Maximum Programmable Size	9 bits
40.	Absolute/Incremental Programming	O4bits
41.	10 times input unit	N5bits
42.	Plane selection	G17, G18, G19
43.	Polar coordinate command	
44.	Coordinate system setting	G92
45.	Workpiece coordinate system	G52—G59
46.	Manual absolute value	ON/OFF
47.	Subroutine call	10 nested
48.	User Macro	
49.	Fixed cycle	
50.	Scaling	G50/G51
51.	Coordinate system rotation	G68/G69
52.	Program format	
53.	Program stop / program end	M00/M01/M02/M30
54.	Accessibility	
55.	High-speed M/S/T/B interface	
56.	Spindle serial output	
57.	Spindle override	
58.	1st Spindle Orientation	
59.	Rigid tapping	
60.	M function	M2 digits



NO	Function	Explanation
61.	S function	S4/S5 digits
62.	T function	T2 digits
63.	Tool offset logarithm	400 pairs
64.	Tool offset memory C	
65.	Tool Length Compensation	G43、G44、G49
66.	Tool radius compensation C	
67.	Part program storage length	512K byte
68.	Program protection	
69.	Status Display	
70.	Program display	
71.	Parameter setting and display	
72.	Alarm display	
73.	Alarm history display	
74.	Operation history display	
75.	Help function	
76.	Display language	Simplified Chinese
77.	Display language dynamic switching	
78.	Graphic display	
79.	Data protection lock	
80.	Embedded Ethernet interface	
81.	Memory card interface	
82.	Status output signal	
83.	Setting and display unit	17寸color LCD/MDI



## **7. Operating environment and testing requirements of YSMV-5041-5X gantry CNC machining center**

### **1. Working environment of the machine tool**

The working environment of the machine tool is directly related to the performance and normal operation of the machine tool. If the temperature is too high, the control mechanism in the numerical control system will fail or malfunction; if the temperature is too low, the working conditions of the lubrication system and hydraulic system will deteriorate and the machine tool will Faulty or damaged machine parts. Therefore, we recommend that the machine be used under the following conditions:

The temperature in the factory building can generally work normally in the temperature range of 0°C to 38°C, within this range, the error of the day should not exceed 5°C. Note: If the temperature in the factory building exceeds this range, the machining accuracy of the machine tool will be reduced.

The detected ambient temperature should comply with the provisions of GB1093-89.

Relative humidity < 75%

The dust concentration in the air shall not exceed 10mg/m<sup>3</sup>, and shall not contain acid, salt and corrosive gas.

Atmospheric pressure 86 ~ 106kpa

The machine tool should be installed away from vibration and heat sources. The power in the workshop where the machine tool is installed should be below 0.5G (G is the acceleration of gravity).

### **2. Machine tool testing requirements**

During machine tool inspection, the inspection instruments and inspection tools should be placed in the inspection environment for enough time to keep them in an isothermal state, and the influence of factors such as airflow, sunlight or external heat flow should also be avoided during inspection, and the ambient temperature for the evaluation of machine tool position accuracy 20°C shall prevail, but generally the following conditions shall be met.

Ambient temperature 0°C ~ 38°C.

The machine tool should be kept in the testing environment for no less than 12 hours before testing.

Any temperature gradient in the space occupied by the machine tool shall not exceed 0.5°C/h.

## **Xiamen Yangsen NC Equipment Co., Ltd**

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