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厦门扬森数控设备有限公司

Technical Documents
YSMV-3018 Double Column Machining

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廈門揚森數控設備有限公司
XIAMEN YANGSEN NC EQUIPMENT CO., LTD

1. General introduction of YSMV-3018 gantry CNC machining center

1 Overview

1.1 Narrative

This technical task book is used for the ordering, design,

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 adopts the international standard color, and the user provides a standard sample for painting.

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-3018 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 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.

(1) The workbench moves longitudinally

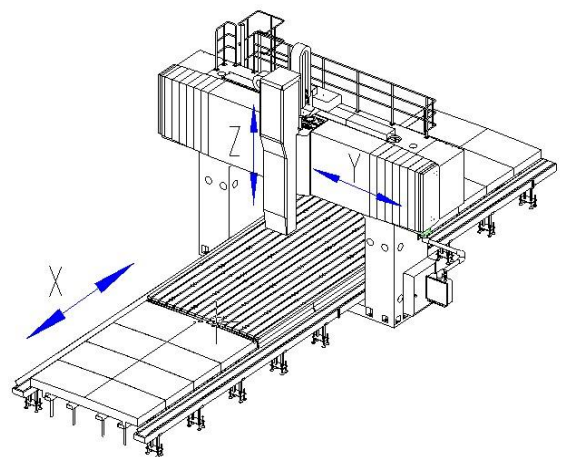
(X axis)

(2) The saddle moves along the beam

(Y axis)

(3) Axial movement of the ram

(Z axis)



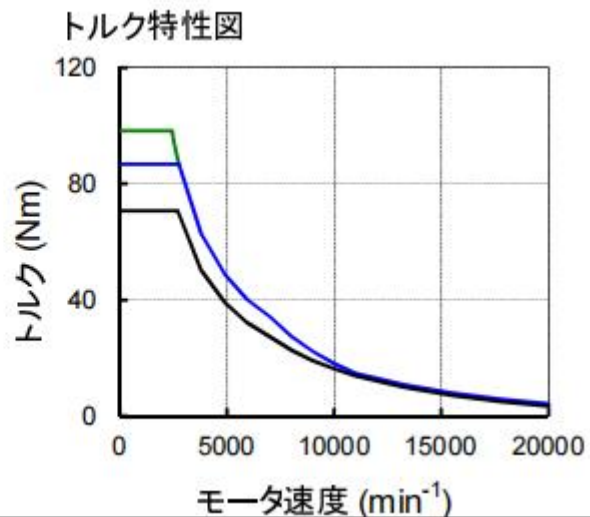
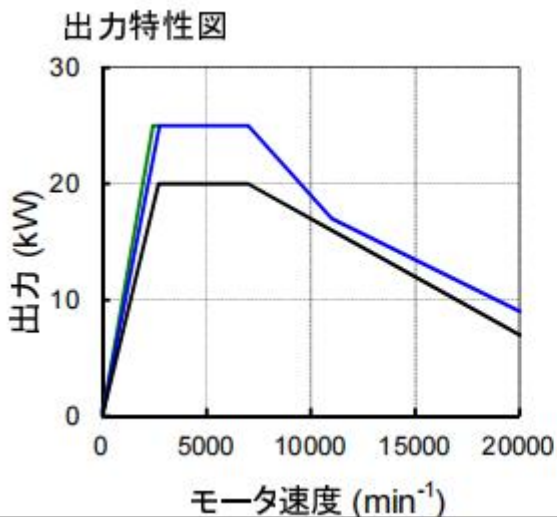


1. Machine tool spindle

The optional HSKA63-18000rpm high-frequency electric spindle has the advantages of high power and wide constant power range. The spindle tool is spring clamped and hydraulically released. The spindle is equipped with a coaxial ring encoder, which can synchronously feedback the instantaneous speed and rotation angle of the spindle. It has good high-speed continuous processing performance, strong overload capability, and rigid tapping function.

The main shaft bearing is lubricated with grease and has good high-speed performance. The spindle tool is clamped by spring and released hydraulically.

The labyrinth seal at the front end of the spindle is equipped with air pressure protection, and the taper hole of the spindle is blown and cleaned with pressurized air. Make sure the milling head is protected from dust and chips.



2. Feed transmission of each axis

X, Y, and Z-direction transmission all use AC servo motors as power sources, and ball screws as transmission components. The ball screw is fixedly supported at both ends. It is supported by an imported special precision bearing group and pre-stretched in both directions to ensure the feed stiffness and life of the screw. The Y-axis screw is equipped with an advanced auxiliary support structure, which can effectively avoid accuracy errors caused by the sagging center of gravity of the large-stroke screw. 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 so that it cannot rotate.

3. Guide rail form

The X-axis guide rail pair uses two heavy-duty linear guide rails with small friction coefficient and high sensitivity; small vibration at high speed and no crawling at low speed. The drive shaft has high positioning accuracy and excellent servo drive performance; at the same time, it has large load-bearing capacity and good cutting vibration resistance, 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 rail pair uses two heavy-duty linear guide rails; the guide rails are arranged in a stepped manner, with a large span and sufficient bending stiffness and torsional stiffness.

The Z-axis guide rail pair uses four heavy-duty linear guide rails and 8 slide blocks to ensure smooth cutting during processing.

4. Basic parts of machine tools

The bed, columns, beams, spindle box, etc. are all cast using high-strength cast iron materials and resin sand technology. To meet the heavy load cutting of machine tools, the cross beam adopts a large cross-section and has sufficient bending stiffness and torsional stiffness. These large parts are designed optimally with the aid of computer three-dimensional software, and the stiffeners are reasonably arranged to improve the stiffness of the large parts.

5. Machine tool lubrication

The lubrication of machine tools is divided into two forms: grease lubrication and automatic thin oil lubrication.

Grease lubrication parts: three coordinate bearings

Automatic thin oil lubrication parts: ball screw pair, linear guide rail, cast iron-coated friction guide rail pair

Automatic thin oil lubrication is a timed and quantitative fully automatic method. The action is automatically controlled by the CNC system and can detect and alarm.

6. Cutting cooling and chip removal system

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

7. Machine tool protection device

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

8. Electrical system

This machine tool uses the Japanese FANUC OI-MF-PULS CNC system. The spindle drive unit, feed drive unit, AC spindle motor, and AC feed servo motor are all imported originals with advanced performance, stability, and reliability.

9. Paint packaging

The color of the machine tool shall be based on the manufacturer's standard color standard. If the user has

special requirements, specify the color requirements when signing the agreement. In addition to the machine tool packaging box, the electrical cabinet and machine tool accessories are packed in sturdy wooden boxes, and the machine tool host is transported in bare metal to ensure the machine tool installation cycle.

10. Machine tool foundation

The foundation must be a solid, rigid, smooth concrete foundation and meet the requirements of the manufacturer's foundation drawings. The standard installation location of the equipment is ground installation. The host machine and all related accessories are placed on the ground. If the factory building has height restrictions, You can choose foundation sinking and indicate it in the agreement, otherwise it will not sink by default.

11. The machine tool parts are from famous manufacturers and brands, with top-level configuration.



3. YSMV-3018 Main technical parameters of gantry CNC machining center

Subject	Specification	Unit	YSMV-3018
Travel	X/Y/Z axis	mm	3000*1700*800
	Spindle nose to the worktable surface	mm	90-890
	Gantry width	mm	1700
	Gantry Passable Height	mm	900
Worktable	worktable (L*W)	mm	2700*1400
	Worktable max load	t	6
	T-SLOT	mm	7-22*200
Spindle	Spindle, taper hole (model/installation size)	mm	HSKA63
	Spindle speed	rpm	18000
	Spindle delivery type		Electric Spindle
Feed	Feed rate (X/Y/Z)	m/min	12-12-12
	The max cutting feed rate	mm/min	8000
ATC(optional)	Tool change method		Side Mount
	Tool Holder specifications	type	HSKA63
	Tool capacity	tools	24
	Maximum tool diameter (adjacent tool)	mm	Φ80
	Maximum tool diameter (without adjacent tool)	mm	Φ120
	Maximum tool length	mm	300
	Maximum tool weight	kg	8
	Fastest tool change time	sec	4
Motor	Spindle motor	kw	20-25
	x/y/z axis motor	kw	AIF40/3000/AIF22/3000/AIF22B/3000
	Cutting water pump motor	m/h-m	4-60
Accuracy GB/T 19362.2—2017	Positioning	mm	0.025/0.02/0.016
	Repeatability	mm	0.016/0.014/0.008
Power requirement	Power requirements	kva	45
	Air source requirements	Kg/cm	6~8
Others	L*W*H	mm	6600*3980*3650
	Weight	T	24

4. List of main purchased parts of gantry CNC machining center

No.	Product name	Qty	Manufacturer	Specification
1	Controller	1 pcs	Japan Fanuc	FANUC-OI-MF
2	Electric spindle	1 pcs	Japan Fanuc	20-25KW
3	X, Y, Z servo motor	1set	Japan Fanuc	AIF40/3000/AIF22/3000/AIF22B/3000
4	Spindle bearing (Front)	1set	Japan SKF	7014
5	Spindle bearing (Back)	1set	Japan SKF	7012
6	X, Y, Z axis screw bearings	1set	Japan NSK	
7	X, Y, Z axis ball screw	1set	Japan THK	6312/5010/5010
8	X linear guide way	2 pcs	Japan THK	55
9	Y linear guide way	2 pcs	Japan THK	55
10	Z linear guide way	4 pcs	Japan THK	45
11	Spindle unit	1set	YANGSEN	HSKA63-φ190
12	Tool magazine (optional)	1 set	Okada	24T Disc Type
13	Cutting fluid pump	1set	YANGSEN	LDPB4V-60-1350W
14	Automatic lubrication system	1 set	SKF	4L
15	Main pneumatic components	1set	Japan SMC	
16	Main electrical components	1set	Schneider	
17	Three-axis motor transmission mode and transmission ratio	1set	Japan NBK/Nidec	
18	Heat exchanger	1 set	Ouyi	
19	Chip removal device	1 set		Twin-screw chip removal + chain plate chip removal
20	Oil Cooler	1 set	Rico	

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

5. YSMV-3018 Main accessories list

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. YSMV-3018 Main function table of electrical system

CNC System: Fanuc OI-MF

No.	Function	illustrate
1.	Number of control axes	5 axis
2.	Simultaneously control the number of axes	4 axis
3.	axis name	X, Y, Z, U, V, W, A, B, C any
4.	Minimum input unit	0.001mm
5.	Fine acceleration and deceleration control	
6.	High Response Vector Control	(Servo HRV3 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	Rapid traverse and cutting feed 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	illustrate
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	O4 bit
41.	10 times input unit	N5 bit
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	illustrate
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 bytes
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	10.4" color LCD/MDI

6. Operating environment and testing requirements of YSMV-3018 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/m³, 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.

