SEALION MACHINE

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VMCH SERIES

TECHNICAL SPECIFICATION

- VMCH1370
- VMCH1580
- VMCH1890

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INTRODUCTION

VMCH SERIES

- Vertical machining centers are mainly used for processing plates, discs, shells, molds and other high-precision, multi-process, complex shape parts.

- It can continuously complete milling, drilling, expanding, reaming, boring, tapping, and 2D-3D surface and beveled surface precision machining in one clamping, and the machining is programmed to shorten the production cycle, so that the user can get good economic benefits.

- VMC series vertical machining center is one of the products developed by our company with independent intellectual property rights.

- The machine tool adopts electromechanical integration structure and applies three-dimensional design software (UG) and finite element analysis software (Ansys) to carry out optimized design, which makes the machine tool structure design more reasonable, and the machine tool rigidity, precision retention, and reliability tend to be perfect.

- Through the introduction of advanced design concepts, scientific design means, to solve the traditional design can not avoid the shortcomings.

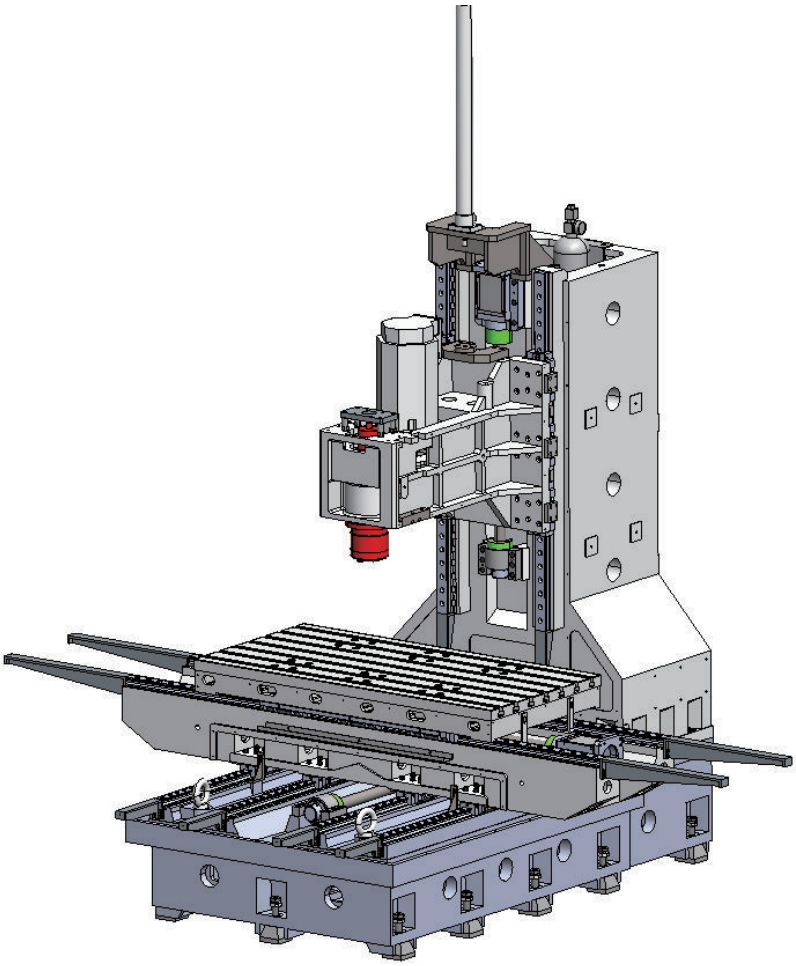
KEY TECHNOLOGY

1. General layout and external dimensions

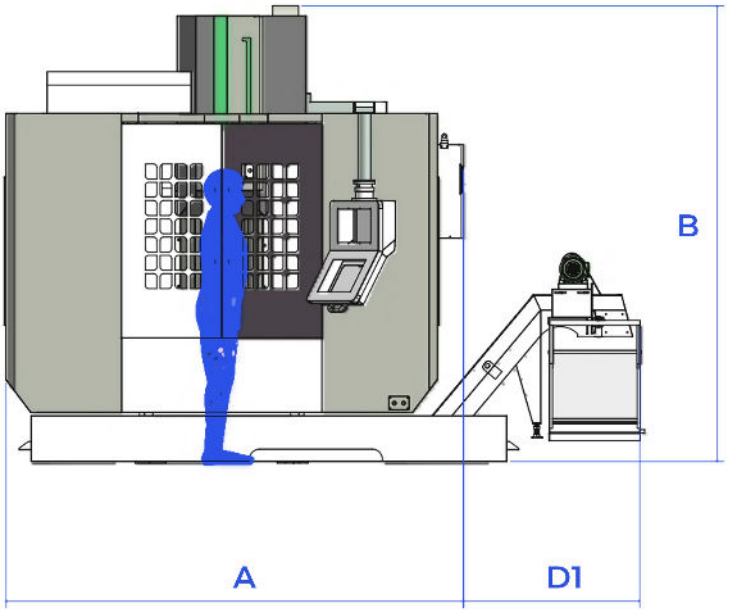
- VMC series vertical machining center adopts vertical frame layout, the column is fixed on the bed, the spindle box moves up and down along the column (Z-direction), the slide moves longitudinally along the bed (Y-direction), and the table moves transversely along the slide (X-direction).

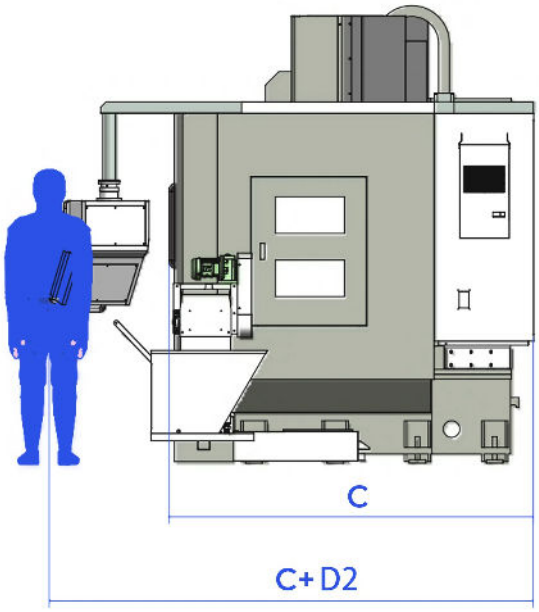
- The bed, table, slide, column, spindle box and other large parts are made of high-strength cast iron, molding resin sand process, two times aging treatment to eliminate stress.

- These large parts are optimized by UG and Ansys to improve the rigidity and stability of the large parts and the whole machine, effectively suppressing the deformation and vibration of the machine tool caused by the cutting force.



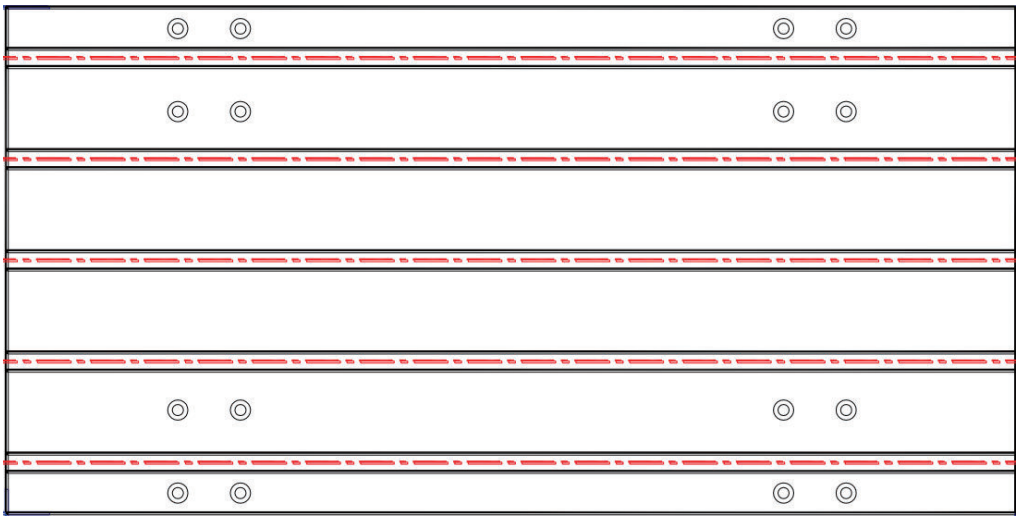
MACHINE LAYOUT

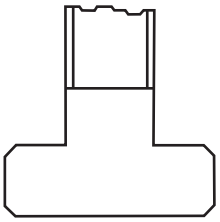




Model	A	B	C	D1	D2
VMCH1370	3685	3000	2690	1300	700
VMCH1580	4050	3000	2850	1300	700
VMCH1890	4900	3000	3260	1300	700

TABLE SIZE





Model	T-slot width	T-slot space	T-slot numbers
VMCH1370	18mm	110mm	5
VMCH1580	22mm	110mm	7
VMCH1890	22mm	125mm	7

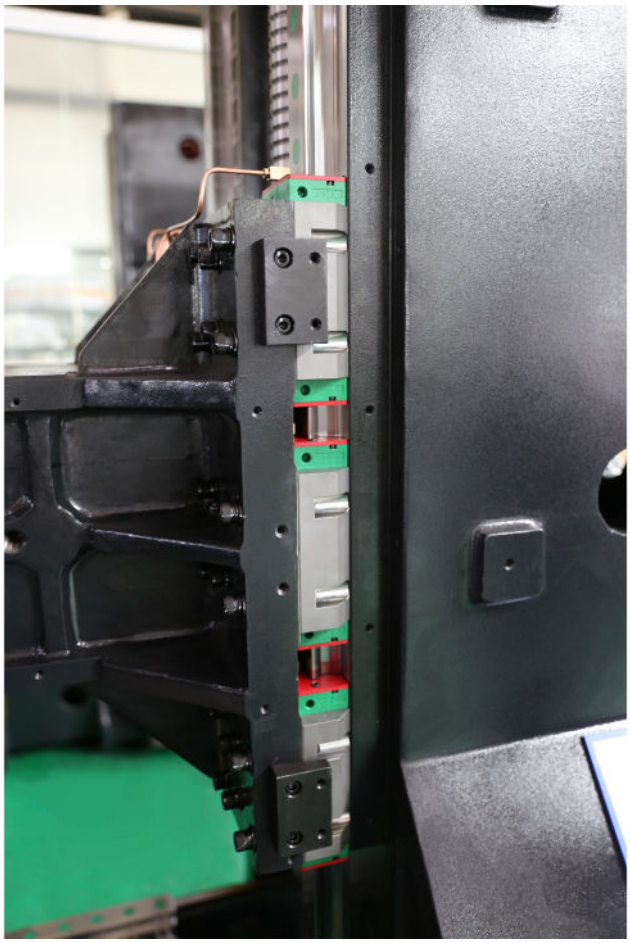
TRANSMISSION SYSTEM

- X/Y/Z axis guideway vice adopts imported rolling linear guideway.

- Small dynamic static friction high sensitivity, low vibration at high speed, no crawling at low speed, high positioning accuracy, and excellent servo drive performance, which improves the precision and accuracy stability of the machine tool.

- The three-axis servo motor is directly connected to the high-precision ball screw through the elastic coupling to reduce the intermediate links and realize the gapless transmission, flexible feeding, accurate positioning and high transmission precision.

- The Z-axis servo motor is equipped with an automatic holding brake function, which can automatically hold the motor shaft tightly in case of power failure so that it cannot rotate, thus playing a role of safety protection.



MAIN SPINDLE

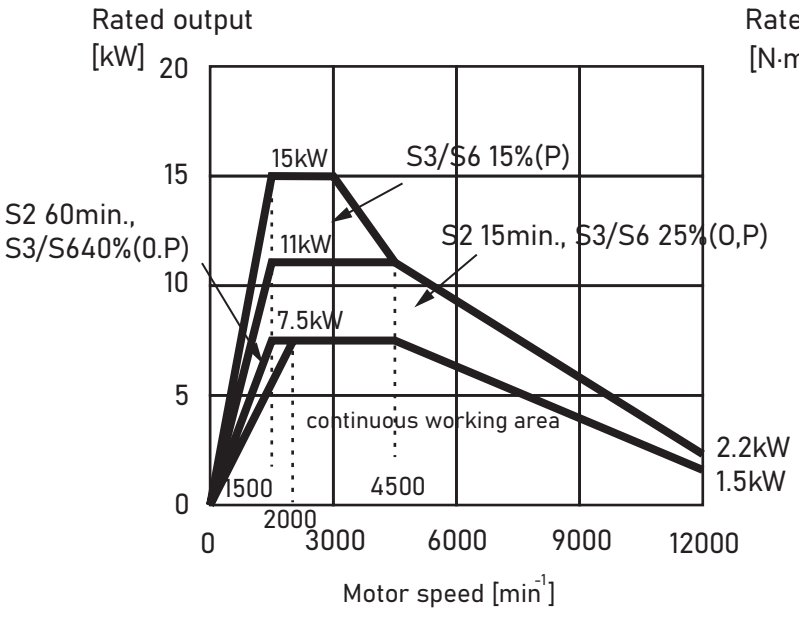
- The spindle set is made by professional manufacturer with high precision and high rigidity.
- The bearings adopt P4 grade spindle bearings, and the whole set of spindles passes the dynamic balance correction and running-in test after being assembled under constant temperature, which improves the service life and high reliability of the whole set of spindles.

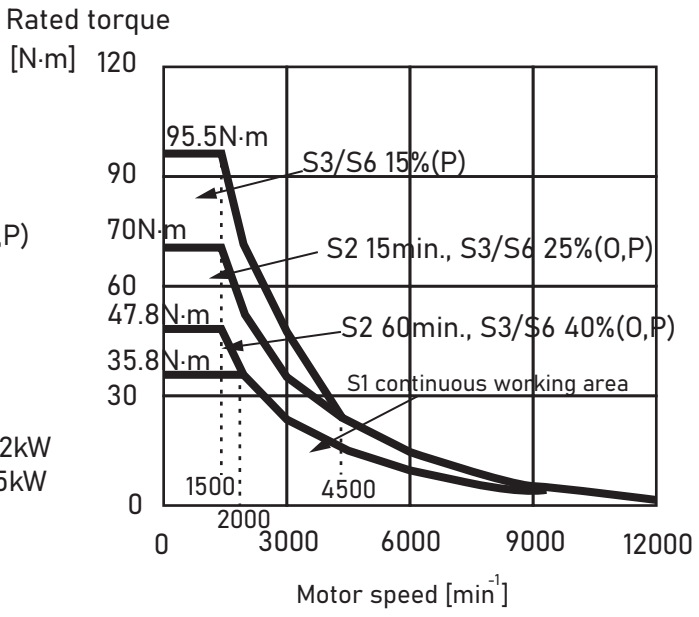
- The spindle can be used within the speed range of the spindle.
- The spindle can realize stepless speed regulation within its speed range.
- The spindle is controlled by the built-in encoder of the motor.
- The spindle can realize spindle orientation and rigid tapping function.

SPINDLE MOTOR OPTIONS

Option1: βil 8/12000-B

Rated power (kW)	7.5	7.5
Short time rated power (kW)	11	11/15
Max acceleration power (kW)	2000	2000
Rated power max speed (r/min)	12.1	16.5
Continuous rated torque (Nm)	35.8	35.8
Rotational inertia (kgm^2)	0.0179	0.0179
Corresponding amplifier	αiSP 11-B βiSVSP*-11-B	αiSP 15-B βiSVSP*-15-B
Characteristic nameplates	A06B-1230-K446#S00	A06B-1230-K446#S0P
Motor order number	A06B-2446-Bxyz	

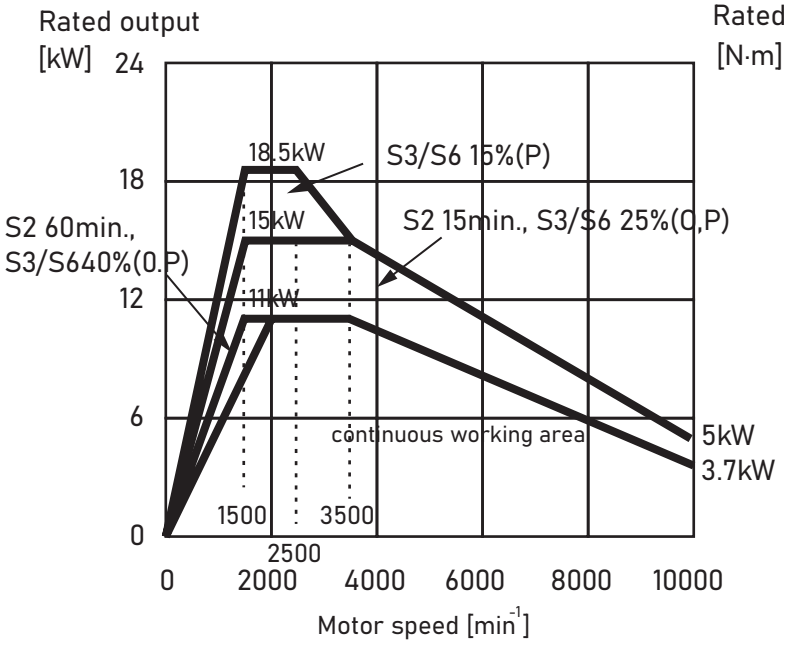


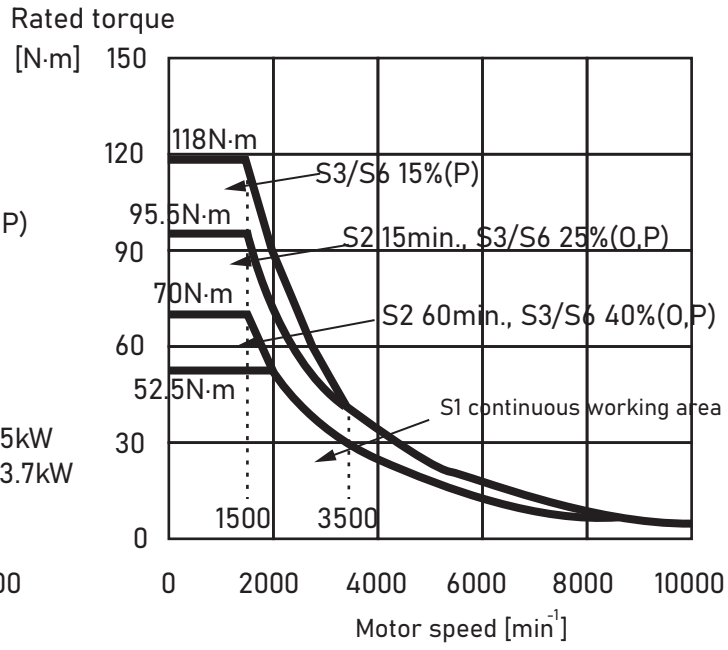


SPINDLE MOTOR OPTIONS

Option2: βil 12/10000-B

Rated power (kW)	11	11
Short time rated power (kW)	15	15/18.5
Max acceleration power (kW)	2000	2000
Rated power max speed (r/min)	16.5	20.4
Continuous rated torque (Nm)	52.5	52.5
Rotational inertia (kgm^2)	0.0275	0.0275
Corresponding amplifier	αiSP 15-B βiSVSP*-15-B	αiSP 15-B βiSVSP*-18-B
Characteristic nameplates	A06B-1230-K447#S00	A06B-1230-K446#S0P
Motor order number	A06B-2447-Bxyz	

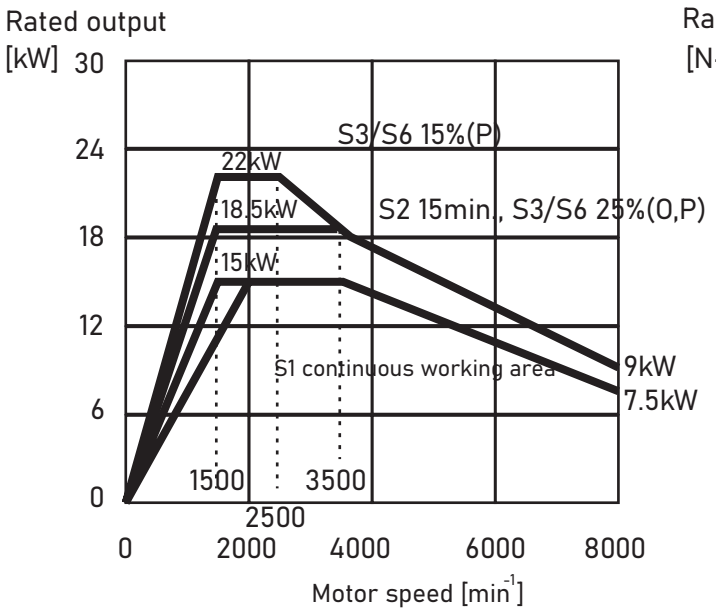


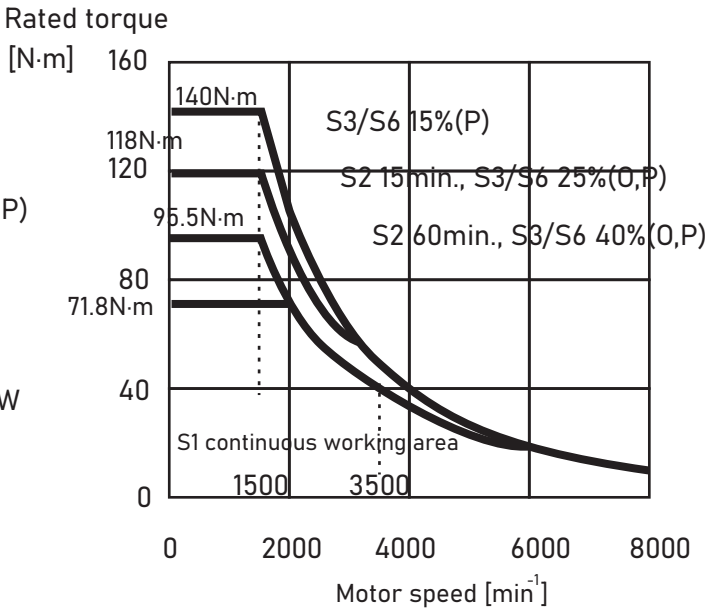


SPINDLE MOTOR OPTIONS

Option3: βil 15/8000-B

Rated power (kW)	15	15
Short time rated power (kW)	18.5	18.5/22
Max acceleration power (kW)	2000	2000
Rated power max speed (r/min)	20.4	24.2
Continuous rated torque (Nm)	71.6	71.6
Rotational inertia (kgm^2)	0.07	0.07
Corresponding amplifier	αiSP 22-B βiSVSP*-18-B	αiSP 22-B
Characteristic nameplates	A06B-1230-K498#S00	A06B-1230-K498#S0P
Motor order number	A06B-2498-Bxyz	

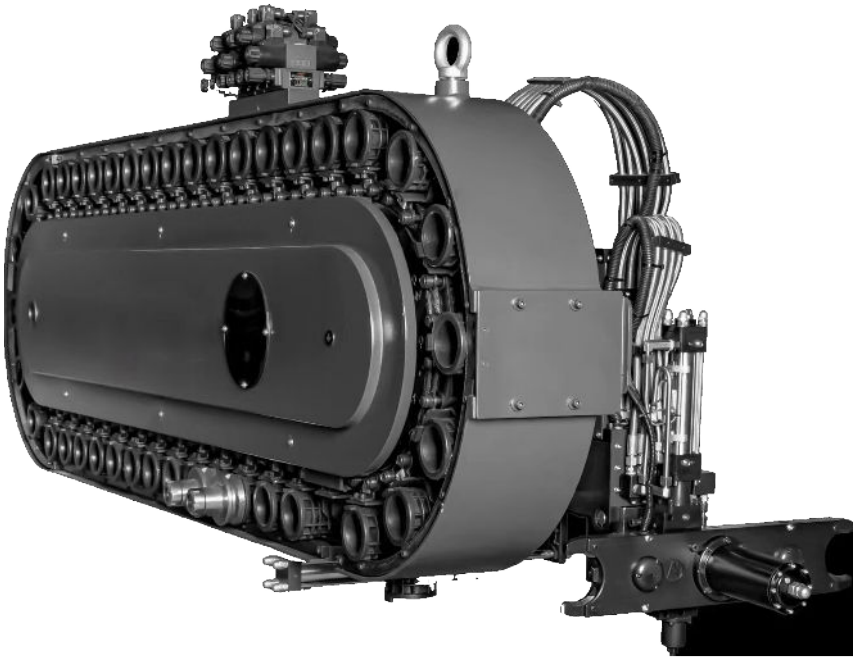




ATC SYSTEM

Disc Type Tool Changer				
Tools type		BT30	BT40	BT50
Tool capacity		24/32	24/32	24/32
Max diameter	Full size	Φ60/Φ60	Φ80/Φ75	Φ110
	Neighborhood empty	Φ120/Φ120	Φ160/Φ150	Φ220
Max tool length		200mm	250mm	350mm
Maximum tool weight		6KG	8KG	15KG
Changeover time		1.3s	1.3s	2.6s
Platen indexing time		0.65s/position	0.65s/position	1.25s/position
Tool changing method		ATC		
Sensor switch brand		PNP.NO Schneider Omron		
Cylinder solenoid valve		SMC		
Installation method		Vertical/horizontal/ATC separate type		
Voltage		220V/380,50Hz/60Hz(servo/general)		
Air Pressure		0.5-0.7Mpa		

ATC SYSTEM



Chain Type Tool Changer

Tools type		BT40
Tool capacity		32/40/60/120
Max diameter	Full size	Φ80
	Neighborhood empty	Φ140
Max tool length		250mm
Maximum tool weight		8KG
Changeover time		1.3s
Platen indexing time		1s/position
Tool changing method		ATC
Sensor switch brand		PNP.NO Schneider Omron/SMC
Cylinder solenoid valve		SMC
Installation method		Vertical/horizontal/ATC separate type
Voltage		220V/380,50Hz/60Hz(servo/general)
Air Pressure		0.5-0.7Mpa

COOLING SYSTEM OF MACHINE

6.

- Equipped with high-flow cooling pump and large-capacity water tank to fully ensure the circulation cooling, cooling pump power: 0.55Kw, pressure: 3bar.

- The spindle box end face is equipped with cooling nozzles, which can be water-cooled or air-cooled, and can be switched at will, and the cooling process can be controlled by M-code or control panel.

- The cooling process can be controlled by M code or control panel.
- The machine is equipped with a cleaning air gun to clean the machine.

Option: 2mpa/5mpa/7mpa Coolant Through Spindle

PNEUMATIC SYSTEM

7.

- The pneumatic system can filter the impurities and moisture in the gas source to prevent the impure gas from damaging and corroding the machine parts.

- The solenoid valve group is controlled by PLC program to ensure that the spindle loosening, spindle center blowing, spindle clamping, spindle air-cooling and other actions can be completed quickly and accurately.

LUBRICATION SYSTEM

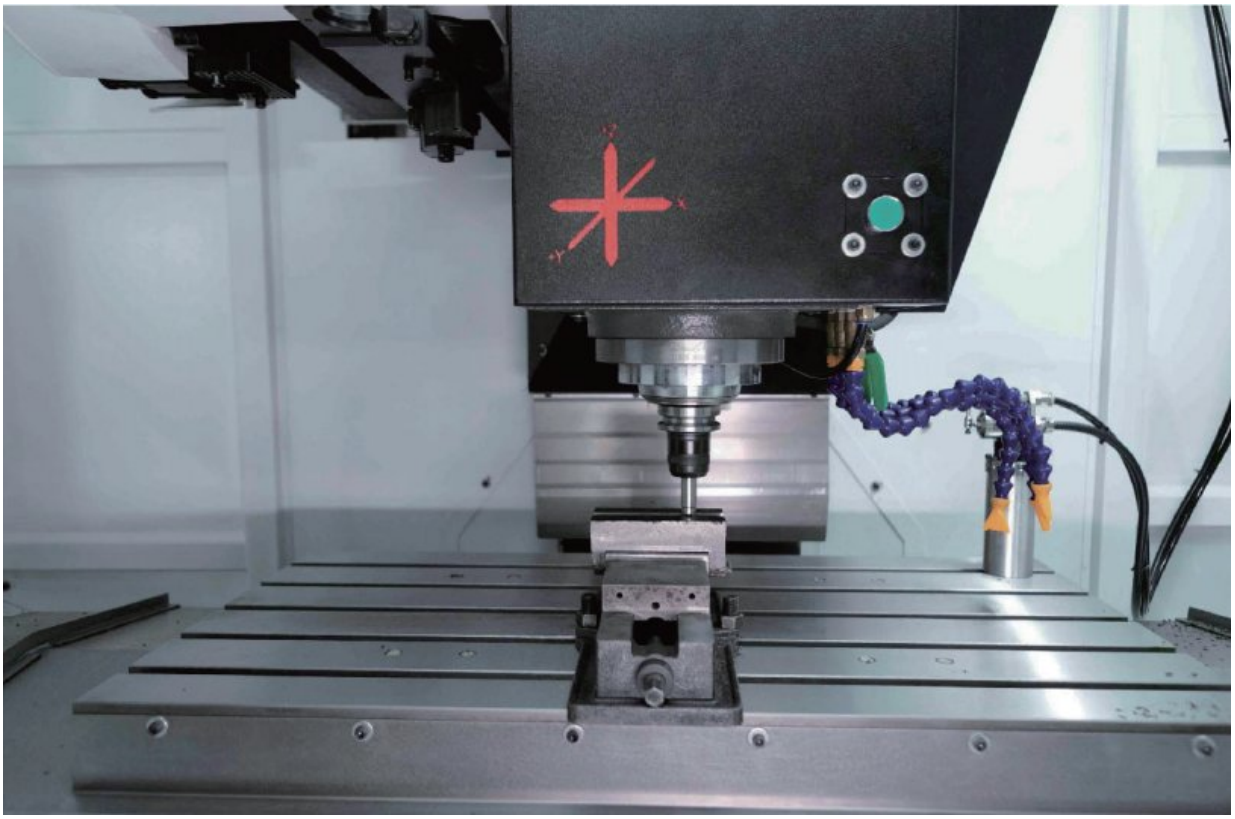
8.

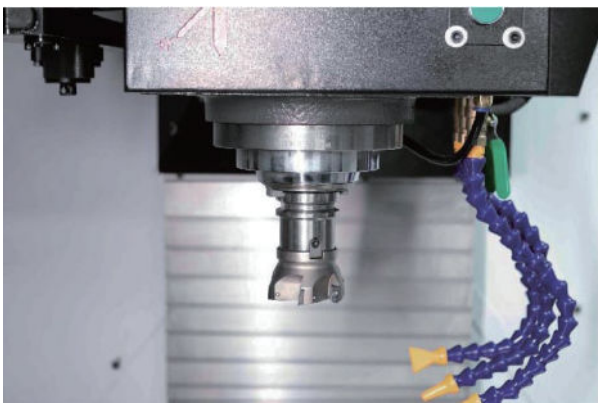
- The guide rail and ball screw vice adopts centralized automatic oil lubrication, and each node is equipped with quantitative oil dispenser, which injects oil into each lubrication part at regular intervals to ensure uniform lubrication of each sliding surface, which effectively reduces friction resistance, improves motion precision, and ensures the service life of the ball screw vice and the guide rail.

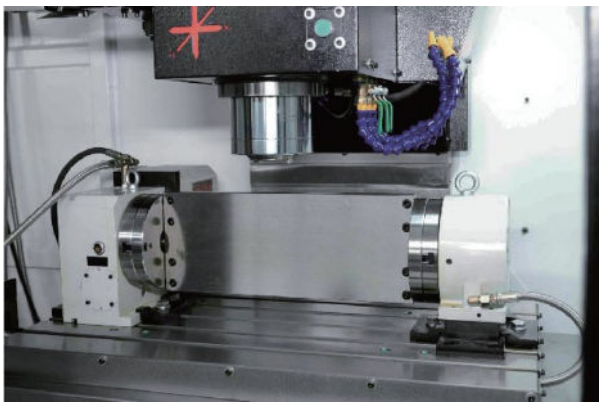
MACHINE TOOL PROTECTION

9.

- The machine is equipped with safety standard guards to prevent coolant from splashing and to ensure safe operation and pleasant appearance.
- Each guideway of the machine has a protective cover to prevent chips and coolant from entering the machine, and to protect the guideway and ball screw from abrasion and corrosion.







CHIP REMOVAL SYSTEM

10.

- The Y-axis split protection structure makes the iron chips generated in the process of machining fall directly onto the bed, and the large slanting structure inside the bed makes the iron chips slide down smoothly onto the chain plate of the chain chip conveyor at the bottom of the machine, and the chain plate is driven by the chip conveyor motor, which conveys the chips to the chip conveyor cart.
- The chain chip conveyor has large conveying capacity, low noise, and is equipped with overload protection device, which is safe and reliable, and can be suitable for the use of broken chips and rolled chips of various materials.

SPECIFICATION

ITEM	VMCH1370
Table	
Table size (mm)	700×1400
Max Load on Table (kg)	1200
Processing range	
X travel (mm)	1300
Y travel (mm)	700
Z travel (mm)	700
Table to Spindle Nose Distance (mm)	120-820
Spindle Center to Guideway Distance (mm)	810
Spindle	
Spindle type	Direct/Belt
Spindle speed (rpm)	6000/8000
Main Motor Power (kW)	15/18.5
X/Y/Z	
X/Y/Z Rapid Speed (r/min)	20/20/20
X/Y/Z Motor Power (kW)	≥3/3/3(brake)
X/Y/Z Torque (N-m)	27/27/27(brake)
X/Y/Z Feeding Speed (mm/min)	1-10000
Weight	
Machine Self Weight (kg)	9800

SPECIFICATION

ITEM	VMCH1580
Table	
Table size (mm)	800×1600
Max Load on Table (kg)	1500
Processing range	
X travel (mm)	1500
Y travel (mm)	800
Z travel (mm)	700
Table to Spindle Nose Distance (mm)	160～860
Spindle Center to Guideway Distance (mm)	855
Spindle	
Spindle type	Direct/Belt
Spindle speed (rpm)	6000/8000
Main Motor Power (kW)	15/18.5
X/Y/Z	
X/Y/Z Rapid Speed (r/min)	20/20/20
X/Y/Z Motor Power (kW)	≥3/3/3(brake)
X/Y/Z Torque (N-m)	27/27/27(brake)
X/Y/Z Feeding Speed (mm/min)	1-10000
Weight	
Machine Self Weight (kg)	12000

SPECIFICATION

ITEM	VMCH1890
Table	
Table size (mm)	900×2000
Max Load on Table (kg)	2000
Processing range	
X travel (mm)	1800
Y travel (mm)	900
Z travel (mm)	800
Table to Spindle Nose Distance (mm)	150-950
Spindle Center to Guideway Distance (mm)	965
Spindle	
Spindle type	Direct/Belt
Spindle speed (rpm)	6000/8000
Main Motor Power (kW)	15/18.5
X/Y/Z	
X/Y/Z Rapid Speed (r/min)	20/20/20
X/Y/Z Motor Power (kW)	≥3/3/3(brake)
X/Y/Z Torque (N-m)	27/27/27(brake)
X/Y/Z Feeding Speed (mm/min)	1-10000
Weight	
Machine Self Weight (kg)	14000

SPECIFICATION

ITEM	DATA
X/Y/Z Rapid speed	
VMCH1370	±0.008
VMCH1580	±0.008
VMCH1890	±0.008
X/Y/Z Repeatability	
VMCH1370	±0.003
VMCH1580	±0.003
VMCH1890	±0.003

STANDARD CONFIGURATION

ITEM	TYPE
Standard configuration	
CNC system	Fanuc 0i-MMF Plus
Main motor	Fanuc B MotorFanuc β MotorPMI/HIWIN
X/Y/Z Servo motor	NSK
X/Y/Z Ballscrew	PMI/HIWIN
Ballscrew bearing	NSK
X/Y/Z Guideway	UNITTA
Spindle group	OKADA/Detron
Synchronous Toothed Belt	LED
AT'C System	Standard
Work light	Standard
Spindle Taper Cleaning	Standard
Machine Fluid Washing System	Standard
Foundation pad &adjusting bolt	Standard
Centralized auto-feed lubrication system	Standard
Full protection of machine tool	Standard
3 colors Light	SMC/FESTO
A/C for electric cabinet Pneumatic SystemElectric Components	Schneider
Chain Type Chip Conveyor	Standard

OPTIONAL CONFIGURATION

ITEM

Optional Configuration
Syntec system 22MA
Mitsubishi M80B
Mitsubishi M80A
Fanuc Manual-Guide-i
Belt Type CTS 2Mpa
Belt Type CTS 5Mpa
Belt Type CTS 7Mpa
BT40 10000/12000RPM Direct Drive
Direct Drive CTS 2Mpa
Direct Drive CTs 5Mpa
Direct Drive CTS 7Mpa
BT40 15000RPM a Motor
BT40 15000RPM a Motor CTs 3Mpa
Motorized Spindle 18000RPM
Motorized Spindle 18000RPM CTS 3Mpa

Workpiece measurement

Angle head

Preset

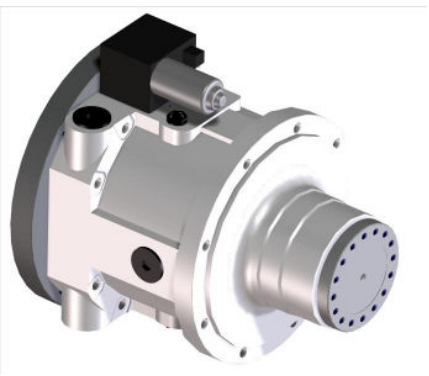
OPTIONAL CONFIGURATION

ITEM

Optional Configuration
32 Tools ATC
40 Tools ATC
60 Tools ATC
Auto Door
Heidenhain Linear Scale XYZ
Mist Control
TS27R Renishaw Tool Presetter
Local Tool Presetter
OMP60 Renishaw Workpiece Measurement
Renishaw A-2066-0001 Edge Finding
TJR 170mm 4 Axis Table
TJR 200mm 4 Axis Table
TJR 250mm 4 Axis Table
TJR 320mm 4 Axis Table
ZF Gearbox

5 axis rotary table

4 axis



ZF Gearbox

EASY DAMAGE PARTS

ITEM	MODEL
Easy damage parts	
Ballscrew	HIWIN/PMI 40MM
Bearing	Yoko3062/FAG
Synchronous belt	GATES-904-8YU
Tool cylinder sensor switch	SEALION
CTS connector	Obbursi
Fuse for FANUC controller	Fanuc
Fuse for electric cabinet	1A-2A
Water gun	Special Made
Water hose	Special Made
Air gun	Special Made
Air hose	Special Made
Work light	LED
Oil for spindle cooling	15L
Filter for CTS	SEALION
Guideway Oil	46# hydraulic oil
Dust net for A/C	Special Made
Filter for hydraulic station	SEALION

ELECTIRC SYSTEM FUNCTION

- FANUC 0i-MF PLUS TYPE (3) CNC system is a highly reliable and cost-effective CNC system, which has a fully digital structure and powerful processing power, and can simultaneously control up to 4 axes and 2 spindles.

- Together with the latest digital servo and integrated PMC, FANUC 0i-MF PLUS TYPE (3) CNC system constitutes a fully digital control system with excellent dynamic quality and control accuracy.

CNC Control system : FANUC 0i-MF PLUS TYPE (3)

FUNCTION	INSTRUCTION
Hardware Configuration	
Number of control axes	X, Y, Z three coordinate axes and a main axis
Number of linked axes	X, Y, Z three-axis linkage
Monitor	10.4″ color LCD monitor (with memory card interface), multi-language display
Operation panel	Full-function CNC keyboard
PMC	Built-in PMC SB7, 24000 steps
CNC User Memory Capacity	User memory capacity 1Mb, for storing user program and data

ELECTIRC SYSTEM FUNCTION

FUNCTION	INSTRUCTION
CNC Function	
Minimum input increment	0.001mm，0.001deg，0.0001inch
Compensation function	Backlash Compensation, Stored Pitch Error Compensation, Tool Length Compensation and Tool Radius Compensation, Smooth Backlash Compensation, Smart backlash compensation
Feed function	Rapid feed, feed per minute, inverse time feed, feed multiplier, auto acceleration/deceleration, AI advance control, bell-type acceleration/deceleration after cutting feed, intelligent overlap, linear acceleration/deceleration before cutting feed interpolation, bell-type acceleration/deceleration before pre-reading interpolation, bell-type acceleration/deceleration for rigid tapping
Spindle function	Spindle serial output, spindle speed function, spindle multiplier adjustment, spindle orientation, FSSB high-speed rigid tapping
Coordinate system setting	Proportional scaling, coordinate system rotation, programmable mirroring
Rigid tapping	

FUNCTION

CNC Programming

Programming Language
Metric/Inch Programming
Absolute/Incremental Programming and in the Same Program Segment
Mixed absolute and incremental programming in the same program segment
Polar instruction programming
External Memory

Layer Nested Subroutine Call

Drilling Fixed Machining Cycle
User Macro Program B
Selection of program segments to skip
Automatic cornering multiplication/deceleration
Chamfering/rounding transitions
Plane selection
Workpiece coordinate system (G52-G59)

ELECTIRC SYSTEM FUNCTION

FUNCTION	INSTRUCTION
Interpolation Type	
Positioning	Unidirectional position, accurate stop
Arbitrary two-coordinate circular interpolation	
Feed pause	
Spiral interpolation	Arc interpolation + up to two-axis linear interpolation
Thread cutting / Synchronized cutting	
Normal direction control	
Four-coordinate linkage	

Operating Method
AUTO Run/DNC Run/MDA Run
JOG Feed
Manual return to reference point
Handwheel interrupt and resume
Incremental feed
Empty run
Single program segment mode
Handwheel feed

ELECTIRC SYSTEM FUNCTION

FUNCTION	INSTRUCTION
Editing Functions	
Program segment search	
Program number search	
Background Editing	
Program Protection	
Safety Protection Functions	
Storage travel limit monitoring	
Hardware limit monitoring	
Emergency stop	
Monitoring	Static monitoring, speed monitoring, position monitoring, contour monitoring Safety The functions also always monitor the measuring circuits, overheating, voltage, memory, etc.

FUNCTION

Display Functions

Current position display

Actual cutting speed display

Program display

Clock display

Running time and part count display

Alarm message display

Self-diagnostic function display

NC and PLC signal status display

Data Transmission

Data transfer via reader/piercer interface

Data input/output transfer via PCMCIA card

OPERATING ENVIRONMENT

Environment :

- The machine should be placed indoors in a dry environment.
- The machine foundation should be made according to the machine foundation requirements.

Power supply voltage :

- Rated power supply voltage AC380V, voltage fluctuation range -10~+10%

Power frequency :

- 50Hz±1Hz.
- Beyond this range users need to purchase their own voltage stabilized power supply.

Ambient air temperature :

- 5°C~40°C
- 24h average temperature should not exceed 35°C.

Humidity :

- Maximum temperature 40°C.
- Relative humidity not more than 35%
- Humidity changes do not cause condensation.

OPERATING ENVIRONMENT

Air dust concentration :

- No more than 10mg/m3
- No acid salt and corrosive gases.

Air pressure :

- 0.5-0.7Mpa

Air flow :

- 350L/min

Attention :

- Machine tool should be installed far away from vibration source and heat source.
- The power in the plant where the machine tool is installed should be below 0.5G (G is the acceleration of gravity).

Idle noise level :

- ≤83dB (A)

INSTALLATION

1 Confirmation of plant foundation condition

- The machine weighs approx 9.5 t. Refer to the foundation plan or the floor plan for the area of the machine.
- High-strength non-shrink grout is recommended for the secondary pouring of foundation bolts.
- If there is no second pouring, a concrete layer of about 400mm thick is required.

2 Incoming power cable preparation

- Three-phase four-wire system
- Cable RVV 4*16 mm^2
- If the power supply does not meet the requirements, it is recommended to attach a stabilized power supply.

3 Compressed air access preparation (if needed)

- Air pressure 0.5-0.7MPa
- Outer diameter of gas pipe ϕ10mm
- Air source should be clean and dry, dew point temperature +7°C.
- When the compressed air contains a large amount of water, a dryer or other auxiliary device must be used to treat the air supply.

4 Oil for equipment

- See "Recommended Oil Consumables Table" for details.

5 Transportation confirmation

- Confirm the mode of transportation according to the plant and the surrounding road conditions.
- Meet the net transportation dimensions of the largest parts of the machine tool.
- The entrance and exit of the plant meets the minimum dimensions of the machine package.
- Confirm the lifting method according to the actual height of the building.

6 Preparation of installation spreader

- Wire rope (load capacity 12.5t or more), etc. through the lifting hole or special hoisting

RECOMMENDED OIL AND GREASE

Name	Capacity	Model	Recommended manufacturer	Maintenance advice
Thin oil lubrication pump				
Guideway oil	3L	ISO VG68	User decide	About half a month of oiling period
Knife cylinder				
Hydraulic oil	0.12L	ISOVG150~220	Turbine Lubricant	Add appropriate lubricant every 3 months
ATC Tools				
Gear oil	4.2L	ISOVG150~220	Turbine Lubricant	Add appropriate lubricant every 3 months
Radiator				
Cutting fluid	190L	Extreme Pressure Water Soluble Cooling Lubricants	Diluted concentration not less than 10%	Change the cutting fluid every 6 months

MACHINE ACCEPTANCE

Acceptance standards for geometric accuracy :

- GB/T18400.2-2010

Acceptance standards for positioning accuracy and repeat positioning accuracy :

- GB/T18400.2-2010

Acceptance carried out in two stages :

- pre-acceptance and final acceptance

Pre-acceptance :

- Party B will notify Party A after passing the inspection, and Party A will send relevant personnel to Party B's work site to carry out pre-acceptance of the machine tool, and inspect the relevant items in the machine tool accuracy inspection list. After passing the inspection, both parties sign the acceptance meeting minutes.

Final acceptance :

- Conducted in Party A, Party B sends personnel to carry out installation and commissioning. Acceptance inspection is based on the random packing list check accessories, check the integrity of the appearance of the whole machine, and according to the technical agreement (if any) to check the mechanical dimensions of the parameters of the standard test content of the Party B inspection. After the final acceptance of both sides in the "customer service report form" on the "security adjustment is completed, acceptance" words, sign and seal;

- If there are other requirements for testing items, both parties shall sign and confirm the technical agreement when Party A proposes in advance.