



OPERATION MANUAL

Vertical machining center

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Preface

Thank you for choosing the CNC machining center of Dongguan GOODA Machinery Co. We are pleased to introduce you to the safe use of the machine information to help you get familiar with our CNC machine tools as soon as possible to maintain safe, efficient and stable machine. At the same time, this will ensure that you and your colleagues can operate the machine safely and correctly, thereby increasing your productivity,

This will also ensure that you and your co-workers can operate the machine safely and correctly, thus improving work efficiency and work quality.

Before using the machine tool, please be sure to read all the operation and use manuals carefully and comply with the requirements therein and your company's safety regulations. Therefore, before using the machine, please read all the operation and use manuals carefully and comply with the requirements therein and your company's safety regulations in order to ensure the safety of the operator and the machine.

After you receive the machine, please check whether the machine accessories are complete or not, and notify us immediately if you find any missing or defective parts.

If you find any missing parts or defects, please notify us or the nearest service centre or agent immediately.

Please keep the manual near the machine for easy access and do not leave it unattended just because you are familiar with its contents.

Don't use it because you are familiar with its contents, and don't destroy it easily, but make good use of it to ensure your safe operation.

As we know that safety is for production and production must be safe, the information provided in this manual may only cover basic needs and cannot cover all operating methods and application scenarios, so please use your experience, common sense and good judgement to remind yourself and train your employees that safety must be the top priority in all operations. Therefore, please also use your experience, common sense and good judgement to remind yourself and train your staff that safety is the highest priority in all operations!

The design, manufacture and use of this CNC machine tool product information is the result of the wisdom of all our employees.

The design, manufacture and use of this CNC machine tool product is the brainchild of all of our employees. Our company is committed to providing safe and excellent CNC machine tools to assist your company to enhance the competitiveness of your products.

Product competitiveness, but due to certain factors that can not be completely mastered by our company (such as CNC system failure and other system and accessory failures), I am afraid that there are still inevitable machine tool failures, such as machine tool failure, in order to restore your normal operation as soon as possible and to help improve the technical standard of our company, we sincerely welcome you to record the failure of the then situation in detail, and immediately notify the company's sales department or the nearest office. the nearest
We sincerely welcome you to make a detailed record of the situation at the time of the failure and immediately notify our sales department or the nearest agent or service centre.

I. Safety Code

1-1、 General Safety Regulations

- (01) The machine shall be operated by trained personnel.
- (02) The use of the machine shall not violate the instructions of the user manual.
- (03) Appropriate lighting shall be provided in the area where the machines are used.
- (04) The fire prevention and disaster relief training in the factory shall be carried out in accordance with the law.
- (05) The floor of the factory shall be kept clean, the passageway shall be kept free, and no articles that may interfere with the safe operation shall be piled up near the machines.
- (06) Proper safety shoes should be worn to protect the feet in the factory.
- (07) Wear safety glasses to protect your eyes when working with chips and splashing liquids.
- (08) Do not wear gloves when working near moving or rotating parts of machines.
- (09) The cuffs of work clothes and trouser legs must be fastened.
- (10) Long hair must be tied back and stored in a work cap.
- (11) Necklaces and ties must be removed or stored inside the uniform.
- (12) Do not operate or service the machine when you are drunk or in poor physical condition, and prohibit the operator from operating or servicing the machine under such conditions. Operators are prohibited from operating or servicing the machine under such conditions to avoid accidents.
- (13) Do not climb the machine. If necessary, use a sturdy ladder.
- (14) Do not touch the rotating parts with your hands or body.
- (15) Do not touch moving parts with a spanner or similar object.
- (16) Do not open electrical boxes, junction boxes or other protective covers without permission.
- (17) Do not use screwdrivers, wrenches as pry bars or hammers.
- (18) Do not use compressed air to clean the machine, electrical control box, or NC unit.
- (19) Do not use flammable or explosive materials or gases in the vicinity of the machine installation.
- (20) Do not process materials that produce flammable or toxic fumes.
- (21) Do not install the machine in an area with high magnetic fields.

1-2、 Hanging Safety Regulations

(01) Anyone who performs hanging work should receive appropriate training.

(02) The following questions must be clarified before performing the hanging operation:

◎ The weight of the suspended object and the position of its centre of gravity.

Which kind of sling and ring should be used.

The sling will be perpendicular to the ground or at an angle that will affect its lifting capacity.

◎ Whether there is enough space for the lifting operation.

Whether the sling will hurt the shape of the machine or whether special fixtures are needed.

(03) Don't be reluctant to get the most suitable lifting tool to use in order to save time and money.

(04) Hanging tools must be visually inspected before use, there are any defects are not allowed to use.

(05) hanging height the lower the better, enough to use

(06) Before lifting, make sure that the sling is evenly stressed and does not slip, and check the balance of the sling at the moment of release. Make sure there is no error before lifting to the required height.

(07) If there are sharp edges and corners where the sling passes through, appropriate protection should be made.

(08) should be removed before lifting off the pipe and wire with interference.

(09) hanging must be smooth up and down, not suddenly start, suddenly stop or deliberately inch.

(10) hanging things, there should be no other placement of parts, tools, knives and other items.

(11) Do not stand under the hanging or put any part of the body under the hanging.

1-3、 Machine use safety code

Any metal cutting machine will have high horsepower, sharp cutting tools, fast moving or rotating parts, high voltage and automatic operation. These are necessary to meet your cutting needs, but they are also potentially dangerous! Splashing, hot chips, sharp edges, burrs, etc., which are always present during the cutting process and which would otherwise make it impossible to complete your task, are also potentially hazardous, and this machine is no exception; in order for this machine to be used safely, all operators, service personnel, and others who may be exposed to these potential hazards should be vigilant in observing the safety instructions. In order for the machine to be used safely, all operators, service personnel, and others who may be

exposed to these potential hazards should be alert and follow safety instructions. Anyone involved in the use of this machine must be properly trained and possess the necessary knowledge and skills.

If assistance is required, please consult our company or a distributor or after-sales service centre. Observing the following safety instructions will minimize the chances of injury!

- (01) Before starting the machine, make sure that non-operators have left the machine.
- (02) Read the instruction manual thoroughly and follow the instructions for safe use, and consult us immediately if you have any questions.
If there is any uncertainty, please consult us immediately.
- (03) Do not remove any protective devices (e.g., guards, interlocking devices, emergency stop buttons, ground wires, etc.).
- (03) Do not remove any protective devices (such as guards, interlocking devices, emergency stop buttons, earth wires, etc.).
- (04) Do not remove any warning devices (e.g. alarms, indicators, warning labels, etc.) and notify us immediately if they are not functioning properly or if the labels are detached.
- (05) Please follow the instructions in the user manual for safety inspection and maintenance.
- (06) Please check how to stop the machine before starting it.
- (07) Before starting the machine, you should know what will happen when you press the button.
- (08) Do not touch the tool or workpiece until the spindle and feed axes have come to a complete stop.
- (09) Never open the safety door and all windows before the spindle stops.
- (10) Do not clean chips or load or unload workpieces and tools before the spindle and feed axes come to a complete stop.
- (11) Do not use tools that are blunt and damaged.
- (12) Do not remove chips from tool tips by hand, but remove them with a brush.
- (13) Make sure to fix the cutter if it is loose.
- (14) Adjust the position of the cutting water nozzle when the machine is stopped.
- (15) Do not use cutting fluid with low flash point. (If this function is available)
- (16) A test run must be made to confirm that the programme is correct before using the programme for automatic machining.
- (17) Do not operate the machine with the safety cover removed.
- (18) Before machining a workpiece, make sure that the workpiece is completely fastened.
- (19) If it is dangerous for one person to load or unload heavy workpieces, it must be done by two or more people.

- (20) For workpieces weighing more than 20kg, use lifting equipment to assist in loading and unloading the workpieces.
- (21) Be sure to determine the position of the tool in relation to the workpiece and the depth of cut before cutting the workpiece.
- (22) Do not try to stop the machine by hand, but wait until it comes to a complete stop before proceeding to the next operation.
- Wait until it has automatically come to a complete stop before proceeding to the next operation.
- (23) Do not operate the key switches with gloves on, as this may lead to incorrect operation and cause other malfunctions.
- (24) Do not lean your body against the operating panel of the machine to prevent it from being touched unintentionally.
- (25) Adequate lighting must be provided in the workplace for safety.
- (26) Tools or obstacles around the workplace should be neatly organised to ensure work safety.
- (27) It is prohibited for two or more persons to operate the control panel and other pushbutton switches.
- (28) Do not attempt to repair the machine unless you have been trained and authorised to do so.
- (29) Please also observe the safety rules described in other sections.

1-4 Electrical Safety Code

(01) The power supply voltage of this machine is three-phase AC380V, which is fed directly into the main power switch.

Please connect the zero and earth wires, and the power supply capacity should be according to the data on the nameplate of the power box of the machine.

Note: Contact with this AC380V voltage is fatal.

(02) There should be enough space at the rear of the machine to open the door of the electrical box for maintenance or adjustment, and there is a PE contact in the electrical box, please make sure to connect it to the external protective conductor (ground) to establish complete protection. Please make sure to connect it to the external protective conductor (ground) to establish a complete protective grounding.

(03) All electrical and electronic repairs or adjustments must be performed by trained and competent electrical personnel.

(04) The power switch must be disconnected before opening the door of the electrical box.

(05) Make sure that the power supply is switched off before removing or replacing electrical components.

(06) It is necessary to prevent the risk of accidental switching on of the power supply by others during the maintenance process, preferably after switching off the power supply.

After disconnecting the power supply:

a) Lock the switch in the "OFF" position.

b) Or remove the fuse.

c) Or hang a "NO POWER ON" sign on the switch or ask another person to supervise.

(07) Do not remove protective interlocking devices or bypass them.

(08) All warning signs must be noted before operation and the wiring diagram must be read in detail.

(09) Maintenance tools should be insulated.

(10) Do not use fuses larger than the specified size, and do not bypass or short them with metal wires

(11) Replacement of any wire shall be determined to be in accordance with its original wire diameter and colour.

(12) Upon completion of the work, doors and windows shall be restored to their original state, and their protection and waterproofing shall not be damaged.

waterproof level.

(13) Before switching on the power, we must make sure that there is no other person engaged in other operations on or inside the machine.

(14) In areas where the public power transmission system does not have a grounding wire, be sure to bury a separate grounding copper rod (so that the resistance value is below 4 ohms), and connect it to the PE terminal inside the electrical box.

(15) It is prohibited to place any objects (e.g., food) inside the electrical box or on the operating box.

(16) The terminals of the control box, inverter, motor, relay box, etc. may have high voltage.

Do not touch them.

(17) Do not touch the switches or electrical components with wet hands.

II. Preparation before installation

2-1 Space Requirement

- (01) The width of the aisle for access and movement of the machine during installation.
- (02) The height required for crane hanging.
- (03) The space for personnel and workpieces to move in the front of the machine during operation.
- (04) The space required to open the rear electrical box door during maintenance.
- (05) It is better to have more than 1M safe passage around the machine.

2-2、 Foundation Requirements

Any machine needs a solid and stable foundation, and this machine is no exception. A good foundation, coupled with proper levelling, is one of the necessary conditions for the machine to give full play to its precision machining capabilities. In addition, it is also important to choose a location where the machine can be installed with less vibration, good ventilation, and protection from direct sunlight. It is also important to choose a location where the machine can be installed with little vibration, good ventilation, and protection from direct sunlight.

After the location of the machine has been determined, please pay attention to the following matters when doing the foundation work:

- (01) The machine foundation should have a soil resistance of 5 tonnes/m² or more.
- (02) The thickness of gravel laid on the machine foundation should be over 300mm.
- (03) The thickness of cement on the gravel should be more than 300mm.
- (04) The cement foundation should not be made of bricks and concrete, the effect of this kind of foundation is very poor.

2-3、 Environmental Requirements

In principle, the machine should be installed in an environment that meets the following conditions, which may be limited by region or season.

These conditions may be limited by region or season, if the difference is too large, other control facilities should be considered:

(01) Air temperature: $+5^{\circ}\text{C}\sim+40^{\circ}\text{C}$.

(02) Relative humidity not more than 80% (there should be no water vapour condensation).

(03) Atmosphere: No excessive dust, acidic gas, corrosive gas or salt.

(04) It should be a well-ventilated place without direct sunlight and away from heat sources.

(05) The place should be far away from the vibration source (e.g. far away from punching and shearing machines).

2-4、 Power Requirement

(01) Power supply voltage: $380\pm 10\%$ VAC

(02) Power frequency: $50\pm 1\%$ Hz

(03) Specification required for leakage circuit breaker on the power supply side (to be installed by the user in accordance with the regulations) Sensitivity:

30mA, also need to consider the power supply capacity.

(04) Grounding: The electrical box on the rear side of the machine is equipped with a contact point for connecting external protective conductors, labelled PE, so please connect it to the PE conductor of the electrical system. If there is no PE conductor in the electrical system, please bury a separate standard ground and connect this earth wire to the PE end point in the electrical box.

The grounding resistance should be less than 10 ohms.

(05) The standard model of this machine requires compressed air, the required pressure is about $7\text{Kg}/\text{cm}^2$, and the flow rate is 100 L/min.

The flow rate is 100 L/min.

(06) There should not be any electrical fuses or electrical discharge machines near the location where the machine is placed, as this may affect the normal operation of the NC.

Otherwise, it will affect the normal operation of NC.

III.Handling, Storage and Installation

3-1. Handling and Storage

The machine is heavy, the unpacked box or the unpacked machine can be loaded and unloaded by crane or self-truck, no matter what method is used, please pay attention to the load capacity of the lifting device and the required space, especially the height, the height of the plant and the crane is low, which may lead to improper angle between the slings.

When the height of the plant and crane is low, it may cause the angle between the slings to be inappropriate, and the following points must be carefully considered:

- (01) The load capacity of the slings will be drastically reduced;
- (02) The sling may slip from the hook;
- (03) The lateral force of the sling may damage the case or machine parts.

3-2 Installation

(01) When the machine is lifted to a predetermined position, please lower it slowly to prevent it from impacting with the ground.

(02) Only after the machine's position is confirmed on the ground can the sling be loosened and unlocked to complete the installation work.

(03) After the machine has been placed, check the force on the feet, and make the force on each foot even and consistent.

At the same time, adjust the machine level.

IV. Outline of the machine

4-1 Introduction of the machine

This machine is a general-purpose vertical machining centre machine tool, using this machine, generally only need to clamp the workpiece on the table, using the spindle tool for corresponding processing; due to the vertical structure, the spindle and the table for the perpendicular relationship, so only the vertical direction of machining, if you want to do the side of the workpiece, you have to change the workpiece side machining, you have to change the workpiece side machining.

If you want to work on the side of the workpiece, you have to change the clamping direction of the workpiece.

The automatic mode includes automatic, DNC and MDI; the manual mode includes manual, manual quick, handwheel and inch movement; the auxiliary mode includes editing and zero return. The manual mode includes manual, manual quick, handwheel and inching, and the auxiliary mode includes editing and zero return, which are designed for different purposes. These modes are designed for different purposes, please do not change the operation mode or machining mode during the automatic cutting process. Before using the machine

Before using the machine, be sure to read the machine's operating instructions thoroughly and understand them before proceeding with subsequent operations.

[Note]

When processing magnesium alloy materials, please take appropriate fire prevention measures to prevent the ignition of magnesium metal chip dust.

When using cutting oil or cutting fluid, avoid contacting low ignition point metal

4-2, Mechanical Motion Axes

(01) X-axis: Table movement;

(02) Y-axis: Saddle movement;

(03) Z-axis: Spindle box moves along the column;

(04) SP axis: cutting spindle

(05) +X direction: Table moves left:

(06) -X direction: Table moves right;

(07) +Y direction: Saddle forward; (08) -Y direction: Saddle forward.

(08) -Y direction: saddle backward; (09) +Z direction: saddle forward

(09) +Z direction: Spindle box moves up;

(10) -Z direction: Spindle box moves down;

(11) +SP direction: Spindle rotates clockwise;

(12) -SP Direction: The spindle rotates counterclockwise;

(Note): Left, right, front, back, up and down orientation to the operator standing facing the operating station and consider the orientation of the machine tool.

Mathematical definition of the axes, please refer to the book 6-4 machine tool mechanical movement and the definition of the axes section.

V. Preparation before the test run

5-1, cleaning and lubrication

(01) Before the machine is shipped, the X, Y, Z axes have been fixed and locked, please remove the fixing bracket after the machine is installed.

Please remove the fixing frame after the machine is installed.

(02) Remove the lifting rings and install the three-axis shield with the attached tools to prevent dust, cutting and other debris.

dust, cutting and other debris from entering the machine.

(03) Adjust the cantilever of the control panel into normal use and lock the screws.

(04) When this machine is shipped from the factory, it has anti-rust and moisture-proof treatment, please remove all the wrapping paper.

Please remove all the wrappers and use a rag to remove the anti-rust oil from each part.

Note: Do not use compressed air to clean the machine, because foreign dust, debris will be compressed air blown into the joints of oil and gas or other parts of the gap to accelerate the aging and breakage.

(05) After cleaning the machine, please add lubricating oil, if the ambient temperature is above 25°C, please choose 46# rail lubricating oil, if the ambient temperature is below 25°C, please choose 32# rail lubricating oil, and the spindle cooling oil should be ISO VG5, and the gearbox oil should be according to the gearbox manufacturer's specifications.

Gearbox oil should be according to the specified grade of the gearbox manufacturer's instructions.

WARNING: Before performing the cleaning operations in this section, make sure the main power switch is locked in the "OFF" position.

(O)" position, during the implementation of the machine shall not be turned on.

(06) Please manually press the lubrication pump to inject oil for several times, and the pressure is balanced to ensure the lubrication system is functioning properly.

The lubrication system operates normally.

5-2、 Levelling Adjustment

Levelling is very important and determines the machine's operating accuracy and normal life of the machine, and the level of the machine's installation also affects the machining accuracy.

Therefore, please follow the procedure below to

Therefore, please follow the procedure below to adjust the machine level to meet the factory requirements.

(01) Determine the foundation adjusting bolts so that the force is uniform;

(02) Place the table in the middle of the X-axis travel;

(03) Place the saddle in the middle of the Y-axis travel;

(04) Place the level in the centre of the working table (X and Y axes should be tested), and then Adjust the ground screws.

(05) The table should read out the value of at least three points, i.e. the positive limit point of X-axis, the middle point and the negative limit point of X-axis, and the difference of the three points is less than the maximum value required by the certificate of conformity, and the foundation bolts should be adjusted and locked, and then the leveling accuracy should be confirmed again, and then the leveling of the machine tool should be qualified.

Then other items can be adjusted, if necessary, the machine can be re-inspected after three days.

5-3. Safety Check

To ensure your safety and the normal use of the machine, please follow the checklist below to carry out a safety check.

safety check according to the following checklist:

(1) Check before power supply:

A. Confirm that the power supply is three-phase 380VAC 50/60HZ.

B. Make sure the external protective conductor (grounding wire) is installed.

C. Make sure the power supply side is equipped with a leakage circuit breaker that meets the specifications (30mA inductance).

D. Make sure the fixing bracket and lifting ring have been removed.

- E. Make sure the foundation screws are locked.
- F. Make sure the cutting fluid is ready and at the proper level (if any).
- G. Verify oil and water lines are not disconnected or broken.
- H. Verify that all chip guards are installed.
- I. Verify that foundation adjustment screws are tightened.
- J. Make sure the lubricant pipe is filled with lubricant.
- K. Make sure the travel setting is valid and normal.
- L. Make sure there are no foreign objects around the machine.
- M. Make sure the pressure of the air pressure circuit reaches the specified pressure: about 6Kgf/cm².

(2) Inspection after power on (Note: Please understand the functions of the buttons and the start-up procedure before performing the related work).

- A. Make sure the cutting fluid pump is rotating in the right direction and the pressure is normal, otherwise stop the machine immediately for inspection.
- B. Make sure the emergency stop button is functioning properly.
- D. Make sure the manual unit buttons function properly.
- E. Slowly move each axis of the machine manually to make sure the travel limit is normal. When the NC alarm is activated, please restore it and reverse it.
- F. Perform the function of zero return of all axes normally.
- G. Turn the spindle speed adjustment button to the lowest position and confirm the spindle unit start/stop button functions normally.
- H. Make sure other buttons function properly.
- I. Make sure there is no oil or water leakage.
- J. Confirm that the programme control function is normal.
- K. Confirm that the key of tool changer is normal.
- L. Confirm that the handwheel is effective in controlling each axis.
- M. Make sure that the handwheel is effective in selecting the feed gears.
- N. Make sure the table is clean and free of dirt.
- O. Make sure that the spindle loosening clamping knife is smooth and the signal is correctly in place.
- P. Make sure the working lamp can be illuminated normally.
- Q. Make sure the chip conveyor is rotating in the correct direction (if this option is purchased).

Make sure the centre flush high pressure test is correct (if this option is purchased).

VI. Introduction to the appearance of machine tools

6-1, machine appearance and description



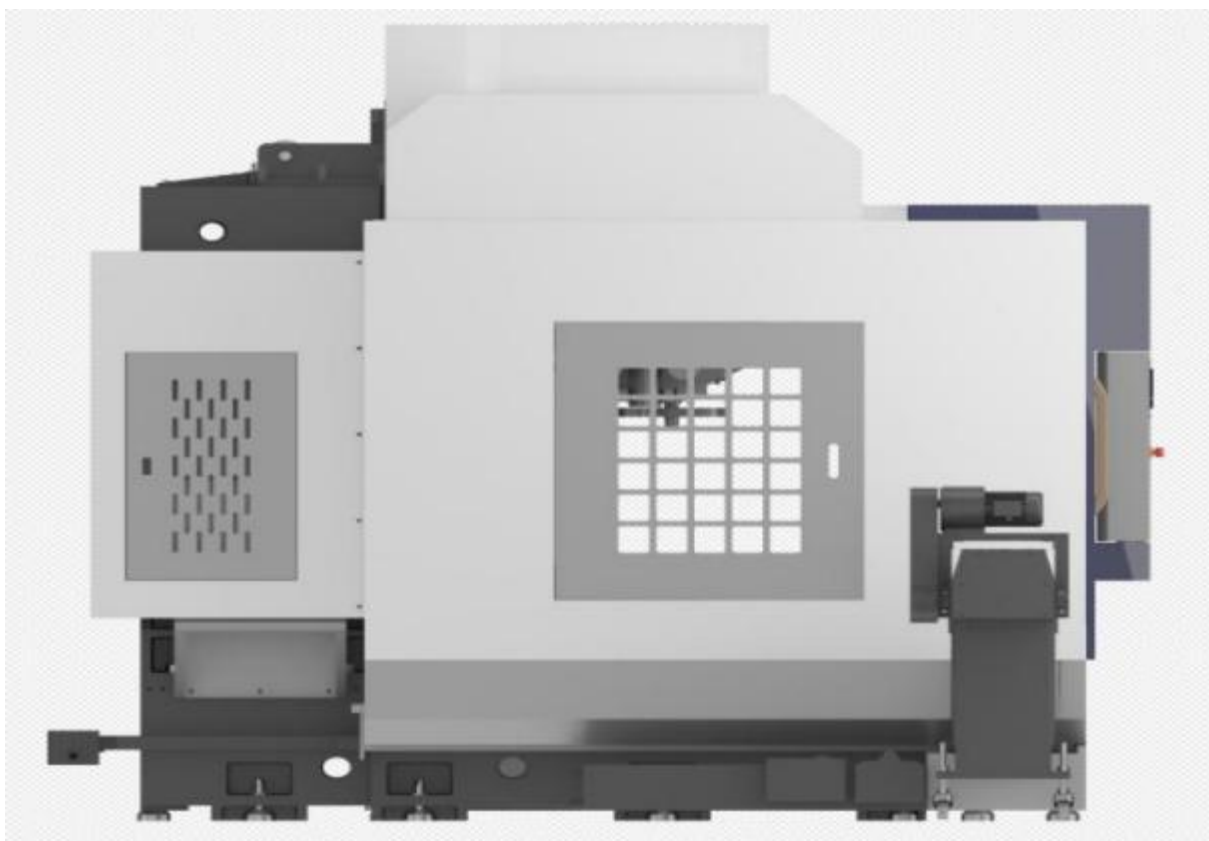
Axis View



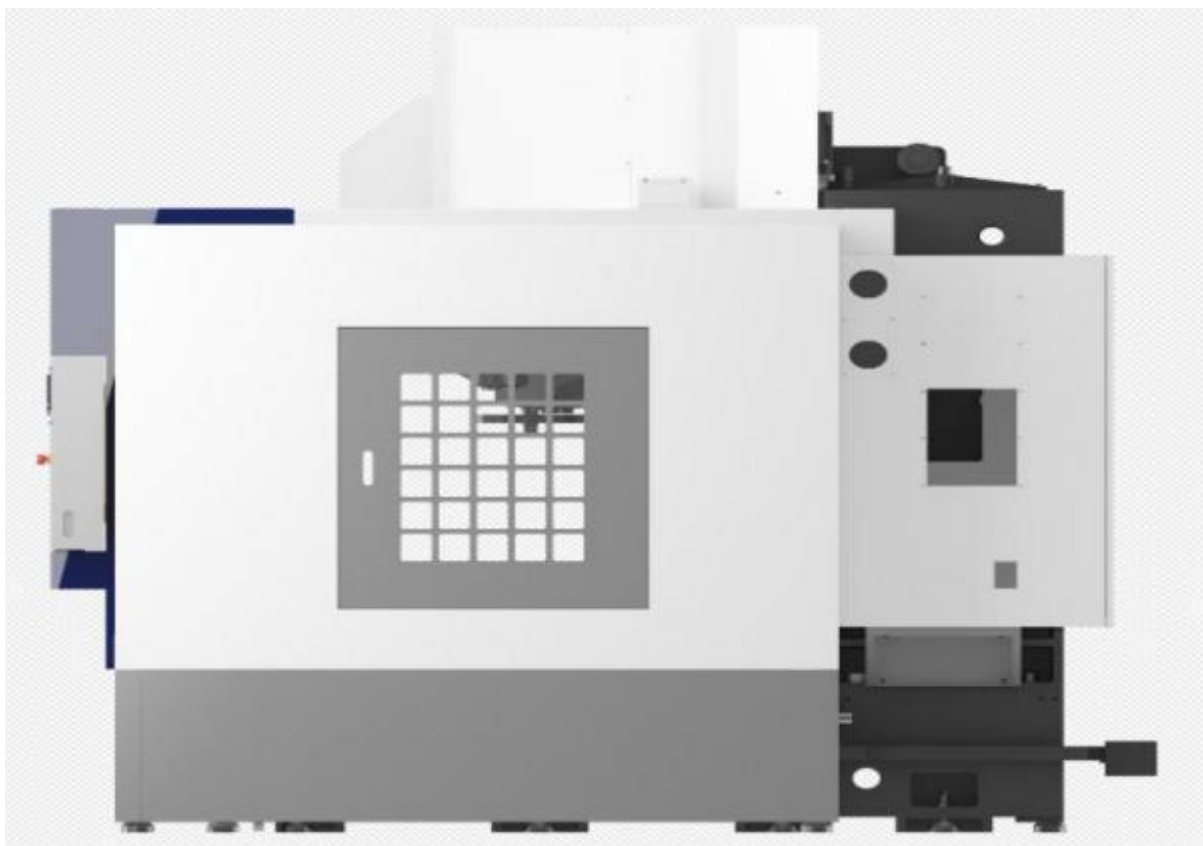
Front View



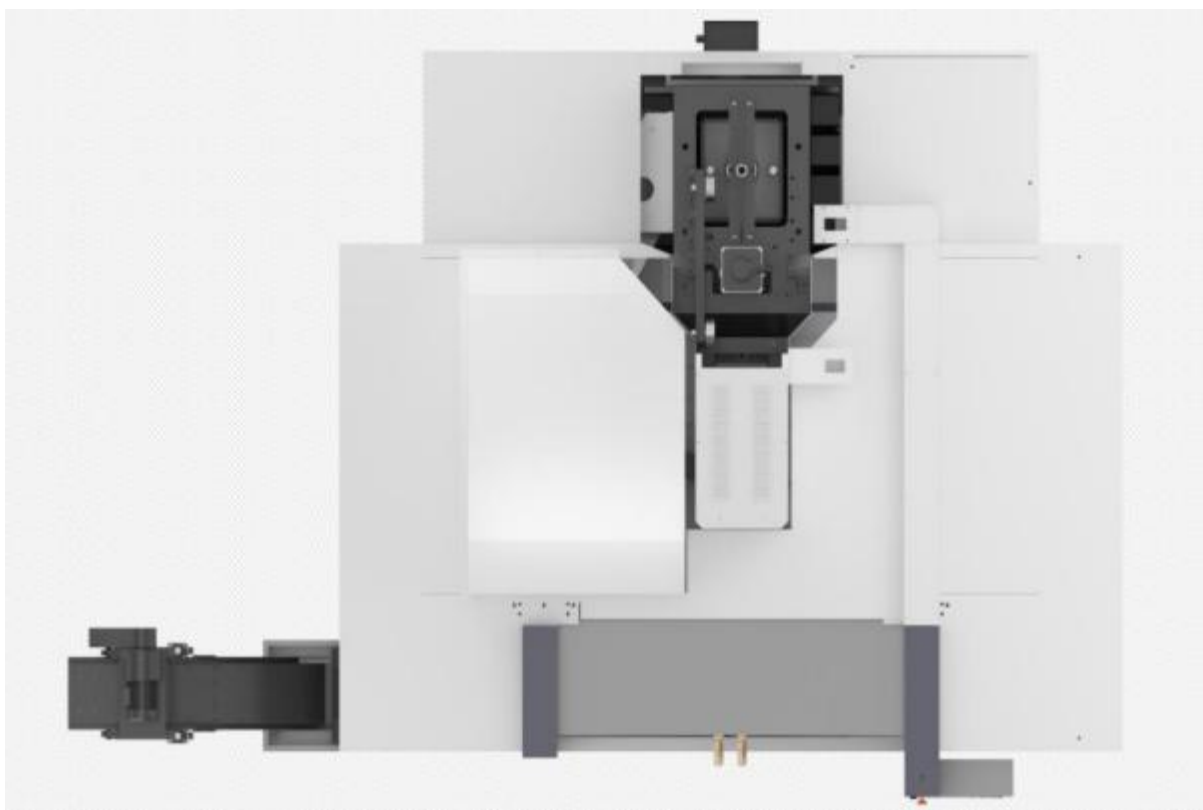
Left View



Right View



Top View



. LJ-1270NC has good rigidity and reliability, can remove metal efficiently, will provide an economical and efficient machining tools, reduce labour costs for the processing industry. The LJ-1270NC is a new product that provides an economical and efficient tool for the machining industry and reduces labour costs;

. The structure is single column, horizontal bed, absorbing advanced manufacturing technology at home and abroad, after many times of improvement and upgrading of the product, the product technology means mature, stable product quality, technical indicators and hardware and software configuration are in the advanced level. advanced level;

. Definition of each axis of the machine tool: the table moves left and right on the saddle as X-axis, the saddle moves back and forth on the bed as Y-axis, and the spindle box moves back and forth on the bed as Y-axis. The table moves left and right on the saddle as X-axis, the saddle moves back and forth on the bed as Y-axis, the spindle box moves up and down along the column as Z-axis;

. Can be any three-axis linkage machining, with boring, milling, drilling (drilling, expanding, reaming), tapping (rigid tapping), threading (rigid tapping), and other functions. Boring, milling, drilling (drilling, expanding, reaming), tapping (rigid tapping), countersinking and other processing functions, can achieve a clamping to complete multi-process machining;

. All the foundation parts are made of high quality grey cast iron, resin sand casting, three-dimensional synchronous design, FEM finite element analysis and other first-class research and development means, to carry out reasonable reinforcement, to ensure that the foundation parts have good torsion and bending resistance. . The reasonable reinforcement arrangement ensures the foundation parts have good anti-twisting and anti-bending ability, and have super precision and stability;

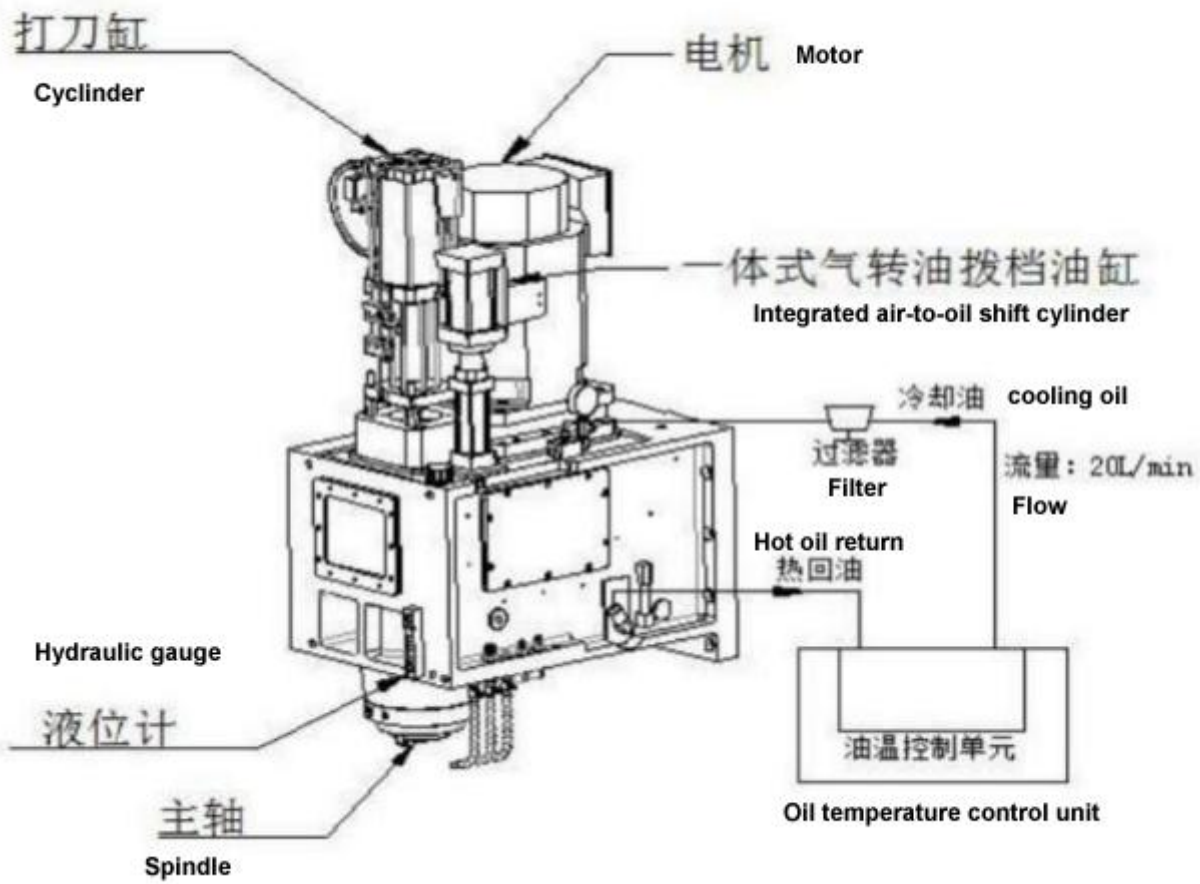
. The machine tool is made of high-quality HT-300 casting with secondary annealing treatment to ensure long-term vibration resistance and no deformation, excellent precision stability and long service life, which ensures sufficient rigidity and stability when the machine tool is running, and the whole machine uses ANSYS to carry out the static structural stress analysis and vibration frequency analysis, to understand the rigidity and frequency of the machine tool and avoid the

vibration zone of the machine tool. Frequency, to avoid the vibration area of the machine tool, in order to improve the service life of the tool;

. X/Y-axis guideway vice each adopts two high rigidity linear rolling guideway vice, small coefficient of static and dynamic friction, stable dragging, fast mechanical response, good high-speed response, low-speed non-crawling, high-speed positioning accuracy, high load capacity, two lines and one hard to ensure that the machine is rigid and stable, and two lines and one hard to ensure that the machine is rigid and stable. Two lines and one hard to ensure good rounding accuracy and cutting strength;

. The spindle adopts the split type 160 WEMAS vertical machining centre gear head, which enhances the spindle cutting rigidity and output torque, and is equipped with a high flow cooling system to effectively control the spindle temperature rise and ensure the spindle running efficiently and stably for a long period of time; the spindle is driven by the AC servo motor (rated power of 15KW), which has a high torque output in low-speed and low-grade operation, which is suitable for heavy cutting; and it can perfectly play the high-speed cutting performance in high-speed and high-grade operation. The spindle is equipped with a tool clamping mechanism, the disc spring pulls the clamping claw tightly through the tie rod, thus pulling the tool on the boring shaft tightly, when loosening the tool, the pneumatic pressure pushes the piston installed in the cylinder in the tail cylinder to make it move, and pushes the tie rod to drive the collet forward to make the collet open and loosen the tool, and the spindle adopts imported taper roller bearings, and the sleeve is made of high quality steel, which is suitable for heavy cutting. The spindle adopts imported tapered roller bearings and the diameter of the sleeve is increased to 220.

The spindle motor and the spindle, through the gear box to the spindle, its structure is shown in the figure below:



According to the user's needs optional tool magazine, the system can be selected, the company's tool magazine general formula crown 50 disc tool magazine, the total capacity of the tool has 16, 24, 36 three kinds of options, generally 24, high-quality tool magazine, produce High-quality tool magazine to produce high efficiency;

. The machine tool guideway and screw vice are supplied with oil by the special automatic lubrication hydraulic station, lubricated by the quantitative distributor, lubrication gap time, oil supply and action are controlled by the numerical control system, and can carry out the relevant detection and alarm. The lubrication gap time, oil supply quantity and action are all controlled by the CNC system, and can carry out relevant detection and alarm;

. Each screw support and other rolling bearings are lubricated by the grease coated in the rolling bearings. The rolling bearings and other rolling bearings are lubricated by grease applied to the rolling bearings;

. The two sides of the working table are equipped with spiral chip conveyer, and the iron chips are conveyed to the chain chip conveyor through the spiral chip conveyor and then to the chip

conveyor through the chain chip conveyor. The iron chips are transported to the chain chip conveyor through the spiral chip conveyor and then sent to the chip conveyor box through the chain chip conveyor to realise automatic chip removal throughout the whole process;

. There are two kinds of cooling: air-cooled and liquid-cooled, which can meet the cooling needs of tools and workpieces, and can also be customised to be mist-cooled;

. The guideway protection (X, Y, Z-axis) adopts stainless steel telescopic shield, which is neat, beautiful and easy to clean.

. LJ-1270NC (Wemas milling head) machining centre parameter configuration table

Item	Item name	Specification
Worktable	Worktable area (L X W)	700×1300
	Worktable Load	1000kg
	Worktable T-slot width	5— 18*122mm
Travel	X-axis travel	1200mm
	Y-axis travel	700mm
	Z-axis travel	570mm
	Distance from spindle face to table center	120~690mm
	Spindle case model	BT50-160
	Gear head type	#50
	Spindle speed	6000rpm
	Front bearing specification	Φ100mm
	Knife handle specification	BT50

Spindle Head	Spindle Lubrication	Grease 油脂
	Gearbox gear lubrication	ISO32 齿轮油
	Static pull force	2000/4500kgw
	Servo Motor Output	15/18kw
	Spindle ring spray	Optional
	Spindle center outlet	Optional
	Cooling method	Oil cooling
Travel	X-axis travel	1200mm
	Y-axis travel	700mm
	Z-axis travel	570mm
Spindle Head	Spindle case model	BT50-160
	Gear head type	#50
	Spindle speed	6000rpm
	Front bearing specification	Φ100mm
	Knife handle specification	BT50
	Spindle Lubrication	Grease 油脂
	Gearbox gear lubrication	ISO32 齿轮油
	Static pull force	2000/4500kgw
	Servo Motor Output	15/18kw

	Spindle ring spray	Optional
	Spindle center outlet	Optional
	Cooling method	Oil cooling
Tool magazine	Tool magazine capacity	24T
	Tool change time	2.9 S
	Maximum tool weight	15kg
	Max. tool diameter (full tool)	110mm
	Max. tool diameter (adjacent to empty tool)	200mm
	Maximum tool length	350mm
Rapid speed	Rapid speed (X,Y,Z)	30/30/30 m/min
	Feed speed(X,Y,Z)	16/16/16 m/min
Accuracy	Positioning accuracy GB/T 1742.2-2000	X:0.025/1000mm
		Y:0.02/1000mm
		Z:0.02/1000mm
	repeatability GB/T 1742.2-2000	X:0.015/1000mm
		Y:0.01/1000mm
		Z:0.01/1000mm
Power/Air Pressure	Total power of machine	30kw
	Air pressure	0.55-0.6Mpa 300 L/min

Other	Machine weight	about 10 ton
	Overall dimensions of machine(L X W X H)	3750*3100*2500

CNC system function table

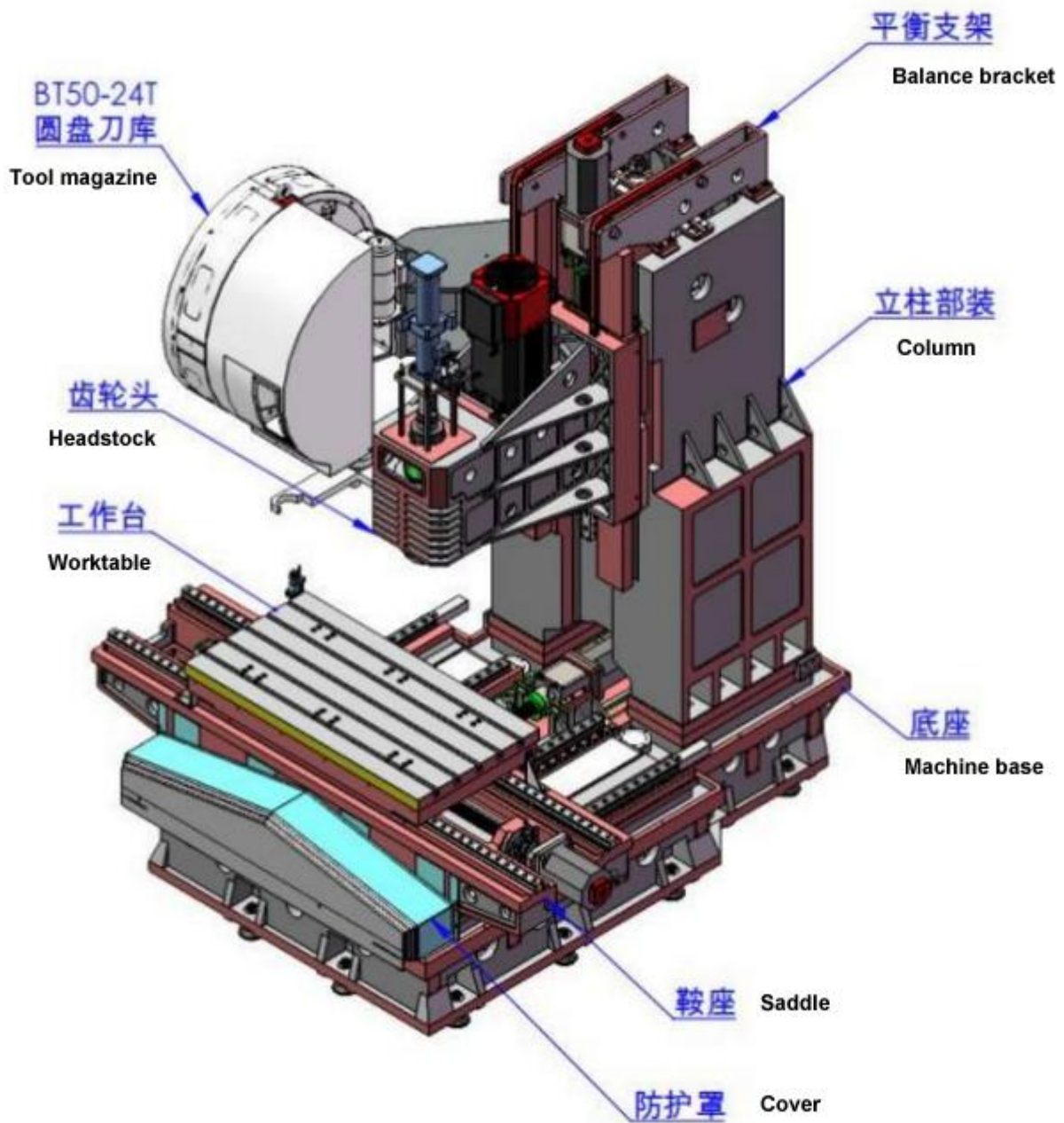
CNC system function (Fanuc)	
Control axes	X、 Y、 Z、
Simultaneous control of axes: - Minimum setting unit: - Minimum setting unit: - Minimum setting unit	Three Axis
Minimum setting unit:: - Minimum setting unit: - Minimum setting unit: - Minimum setting unit	0.001 mm
Maximum command values:: 1	9999.99 mm
Programmable controller	Built-in
Display	10.4" inch LCD display
Position detection	Built-in encoder for servo motor
Data input and output interfaces	RS232, CF card or USB interface
Interpolation function	Linear/Circular
Programming simplification function	Fixed cycle, dialogue programming, coordinate translation, coordinate system rotation, scaling and mirroring, etc.
Feed functions	Cutting feed multiplier 0~150
Spindle functions	Multiplier trimming 50~120
Tool compensation functions	Tool radius compensation, tool length compensation
Background editing functions	Programming

6-2、 Operating Panel

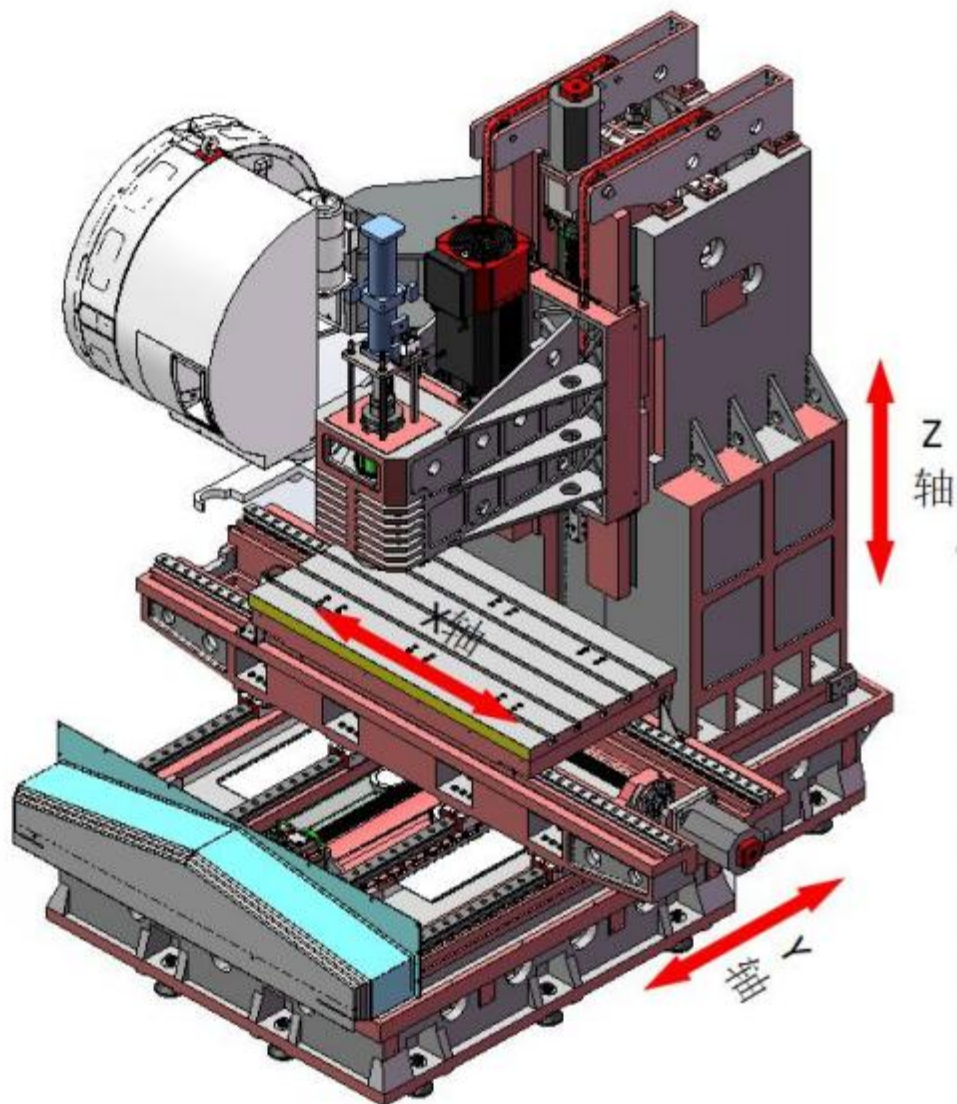
It is in-laid station operation, equipped with electronic handwheel can be easily held in the hands of operation.



6-3, Schematic diagram of each part of the machine tool



6-4, machine tool mechanical motion and the definition of the coordinate axes



This diagram shows the direction of the feed axes of this model, and the arrow points to the direction of the feed axis. The definition of the XYZ basic axes is in accordance with the definition of the direction of the Cartesian coordinate system in mathematics, and the corresponding axes of the feed axes that are parallel to the basic axes are called the UVW axes, and the corresponding axes of the axes that are rotating around the basic axes are called the ABC rotary axes, and the definition is designed to make the NC machine tools uniformly applicable to computer programming. CAM applications to The purpose of this definition is to make the CNC machine uniformly applicable to computer programming CAM applications, so that complex surfaces and 3D machining programmes can be calculated and generated and put into production practice;

The direction of rotation of the spindle is defined as clockwise rotation for positive rotation and anti-clockwise rotation for negative rotation, and for non-directly connected spindles, the direction is defined as the direction of rotation from the end of the spindle. For non-directly connected spindles, the orientation is defined as looking from the end of the spindle to the tool loading end, and for direct-connected structures, from the end of the motor to the end of the output shaft

VII.CNC Screen and Station Description

7-1. Brief description of Fanuc 0i-MF Plus system screen

The normal screen of Fanuc 0i-MF Plus system after power-on or the screen after pressing the POS button of the editing keyboard during system operation is as follows, the keyboard on the right side of the display is called the editing keyboard, and there are six keys with letters in the middle two rows in the order of POS, PROG, OFS/SET, SYSTEM, MESSAGE, and CSTM/GR. All the screens of the system are expanded to multi-layer sub-screens based on these six keys. All the screens in the system are expanded to multiple layers of sub-screens according to these six keys, this section mainly introduces these six main screens and some commonly used sub-screens. In order to better understand the tree structure of the system, we can think of the system as the root directory, under which there are six main directories, and under each main directory there are parallel sub-directories, and so on, so that you need to be familiar with the main directories in which commonly used screens are located, and it will be impossible to locate them if you choose the wrong main directories. If you choose the wrong main directory, it will be impossible to find the desired subdirectory, similar to the tree directory of a computer system.

a: POS 画面



POS screen is the screen displaying the current position of the machine tool, the above picture is in the JOG (manual) mode, the top column shows the title of the actual position on the left, and the selected programme number and the number of rows of the programme execution on the right; the middle part displays the current position of the machine tool in the relative coordinate system, the absolute coordinate system and the specific position of the machine coordinate system ("All") respectively. The left side of the middle and lower part of the display shows the functional status of the machine tool, the F code is the display of the feed speed of the axes and the number of machined parts, etc., the long white bar is the input display line, and the machining mode and the current time are displayed at the bottom of the display, and there are 12 software keys, which have corresponding physical softkeys. When the leftmost or rightmost software key displays a triangle to the left or right, it means that some menus in the same level menu are not displayed, and you can press the corresponding physical softkey, i.e., expansion key, to display other menus. Overall, the interface is divided into five large areas, which completely describe the current position and status of the machine.

b: PROG 画面



PROG is the short letter of English program, and its screen is mainly for editing and selecting user-added programs. The above figure shows that under the automatic processing mode, press PROG to display all the processing programs stored in the system under the catalogue menu, and the program catalogue, system capacity and the current program catalogue are displayed from top to bottom, with the name of the program displayed on the left and the size and production time of the program shown correspondingly on the right. When you need to select a programme, you can move the yellow cursor to the position of the required programme number by pressing the Move Up/Down soft key, and the software cursor will move one line every time you press it, for example, when you need to select O0001 programme, you can press the Move Down key several times until the cursor stops at O0001 programme, as shown in the following figure. For example, if you need to select O0001 programme, you can press the key to move the cursor down several times until the cursor stops at O0001 programme, as shown below:



Press INPUT again, the screen will be changed to display the content of O0001 programme, and the screen is shown as below, in the editing mode, the programme can be checked or modified, and the editing key of the control panel needs to be rotated to the editable side. The editing key of the control panel needs to be turned to the editable side, pay attention to the use of SHIFT soft key when editing.



c: OFS/SET 画面

实际位置 00001 N00000

绝对坐标		F		MM/MIN	
X	560.691	加工件数	03 J06 F	794	
Y	661.347	运行时间	34H23M 5S		
Z	145.878	循环时间	0H 0M 0S		
W	-82.961	设定(手持盒)			
B	359.955	写参数	= 0 (0:不可以 1:可以)		
模式		TU 检查	= 0 (0:关断1:接通)		
G00 G80 G15 F	M	穿孔代码	= 1 (0:EIA 1:ISO)		
G17 G98 G40.1 H	M	输入单位	= 0 (0:毫米 1:英寸)		
G90 G50 G25 D	M	I/O 通道	= 17 (0-35: 通道号)		
G22 G67 G160 T	HD. T	顺序号	= 0 (0:关断1:接通)		
G94 G97 G13.1 S	NX. T	纸带格式	= 0 (0:无变换 1:F15)		
G21 G54 G50.1		顺序号停止	= 0 (程 序 号)		
G40 G64 G54.2		顺序号停止	= 0 (顺 序 号)		
G49 G69 G80.5					

S 0 00100 LH 0 A>>

05100%L 0%

HND ***** 09:30:44

绝对 相对 全部 手动 监控 刀偏 设定 工件坐标系 操作

The main contents of OFS/SET screen are to set the machine workpiece coordinate system, tool offset and parameters; when the former screen is the parameter setting interface, after pressing the softkey of "tool offset", the display screen is as below. The former screen is the parameter setting interface, and the display screen is as follows after pressing the soft key of "tool offset".

刀偏 00001 N00000

号	〈长度〉		〈半径〉		相对坐标	
	形状	磨损	形状	磨损	X	Y
001	0.000	0.000	4.000	-0.030	0.000	0.000
002	104.450	0.000	0.000	-0.500	0.000	0.000
003	0.000	0.000	0.000	0.000	0.000	0.000
004	23.920	0.000	0.000	0.000	0.000	0.000
005	121.980	0.000	0.000	0.000	0.000	0.000
006	0.000	0.000	0.000	0.000	0.000	0.000
007	0.000	0.000	0.000	0.000	0.000	0.000
008	0.000	0.000	0.000	0.000	0.000	0.000
009	0.000	0.000	0.000	0.000	0.000	0.000
010	0.000	0.000	0.000	0.000	0.000	0.000
011	0.000	0.000	0.000	0.000	0.000	0.000
012	0.000	0.000	0.000	0.000	0.000	0.000
013	0.000	0.000	0.000	0.000	0.000	0.000
014	0.000	0.000	0.000	0.000	0.000	0.000
015	0.000	0.000	0.000	0.000	0.000	0.000
016	0.000	0.000	0.000	0.000	0.000	0.000

绝对坐标		X	560.691
		Y	661.347
		Z	145.878
		W	-82.961
		B	359.955

机械坐标		X	-824.525
		Y	-871.361
		Z	-944.607
		W	-182.961
		B	359.999

A>>

05100%L 0%

HND ***** 09:30:27

刀偏 设定 工件坐标系 操作

This interface is to input the compensation and wear value of tool length and radius corresponding to the tool number, you can input the value when you need it, and set it to 0 when you don't need it; when you need to adjust or set the coordinate system of the workpiece, you can press the "Coordinate System" softkey. When you need to adjust or set the coordinate system of workpiece, press "Workpiece Coordinate System" soft key, the screen will be changed as below:



The value of EXT in this screen is valid for all workpiece coordinate systems, which is the algebraic sum of the corresponding coordinate systems; In addition to the six workpiece coordinate systems from G54 to G59, there are also G54.1P001 to G54.1P048, which is a total of 54 workpiece coordinate systems, and all of them have the same format for use in the program, so that such a large number of workpiece coordinate systems are mainly used in the scenario that there are multiple workpieces clamped on the same machine tool table. Different workpieces can be positioned and programmed in different workpiece coordinate systems in order to reduce the calculation workload.

d: SYSYEM Menu

SYSTEM Menu is mainly for system parameter setting, specification diagnosis, PMC programme editing, etc. The interface is as follows after pressing the function key SYSTEM. After pressing the function key SYSTEM, the interface is shown as below:



The current interface is in the subdirectory "Parameters" of the SYSTEM trunk catalogue, and there are "Diagnostics", "Servo Guide", "System" and "Operation" and "Extension" in the same level menu. The same level menu also has "Diagnostic", "Servo Guide", "System", "Operation" and expansion keys. Diagnosis" is the display of machine input signal and output signal status information, which is an important basis for judgement of machine tool fault diagnosis, and its screen is as follows:



e: MESSAGE Menu

The MESSAGE Menu mainly displays the alarm information; the "Alarm" menu displays the current alarm and also shows the contents of related alarm information, such as alarm number, alarm time, etc. Its alarm screen is as follows:



When you need to check the alarm information, you can press the soft key under the "Information" menu of the software key, and the screen is as follows:



When you need to check the previous alarms, you can press the softkey under the "History" menu of the software key, which displays the alarm history. The alarm history is displayed as follows:



f: CSTM/GR Menu

The CSTM/GR Menu mainly displays the running trajectory of the tool and machining programme, press the CSTM/GR software key.

After pressing the CSTM/GR software key, the screen is shown below:



When the value of plotting coordinates in the above figure is 0, the screen displays the trajectory of XY plane; when it is 1, the screen displays the trajectory of YZ plane; when it is 2, the screen displays the trajectory of ZY plane; when it is 3, the screen displays the trajectory of XZ plane; when it is 4, the screen displays the trajectory of XYZ's 3-axis 3D axes (vertical); when it is 5, the screen displays the trajectory of ZXY's 3-axis 3D axes (horizontal). Scale refers to the scale of the graphic display, it can be greater than 1 for zoom in and less than 1 for zoom out, it is enough to choose the right scale, if the scale is not chosen properly, the display may be incomplete; Graphic Centre refers to the graphic display centre according to the value of this coordinate; Graphic Scope (Max)/(Min) refers to the scope of the graphic display area, beyond which, the graphic display will not be shown. The above parameters After setting the above parameters, you can press the softkey under the "Graphics" menu of the software key, and the screen will be as follows:



This view does not display 3D graphics because there is no machining programme running at present. If the display parameters are set reasonably, select the machining programme to be run in automatic machining mode, press CSTM/GR and start the cycle start button on the operation panel of the machine tool, then the CNC system of the machine tool will start to run the programme, and this screen will display the movement of the tool or the programme along with the running of the machining programme, when the programme is finished, the complete tool path or machining track will be displayed in the drawing area.

The screen will display the tool or programme trajectory with the continuous running of the machining programme, and when the programme has finished running, the complete tool path or machining trajectory will be displayed in the drawing area.

This graphic or trajectory can verify whether the graphic contour is the same as the designed programme trajectory, so as to verify whether the programme is written correctly, and can be used as a reference; In addition, under the "Operation" menu, there is also the "Start" End "Clear In addition, under the "Operation" menu, there are four menus of the same level, "Start " End " Clear " Scaling ", which allow you to select the beginning and end of the graphic display, as well as to clear the trajectory.

You can select the start and end of the graphic display, clear the track, and adjust the size of the display scale.

7-2、 Detailed explanation of the operation station (the operation station consists of two parts - display screen and control panel

a: Display screen----all information status of the machine tool is displayed on the screen




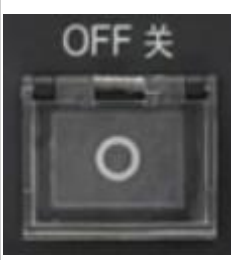
Processing information, data change and display are all carried out on this screen. The display screen is on the left and the editing keyboard is on the right.





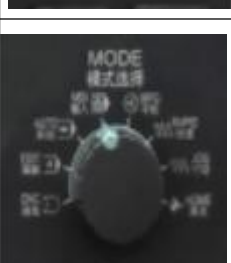
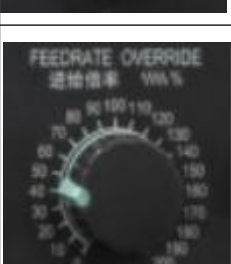
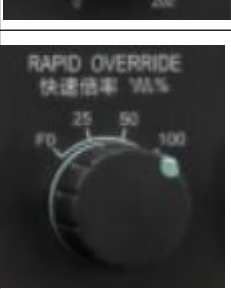
b: Control panel----All operations of the machine tool are controlled on this panel.




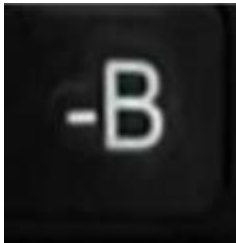

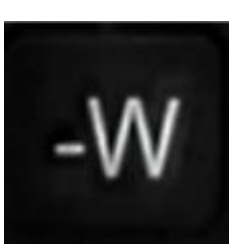



Each key has a green indicator light, and the corresponding key indicator light indicates that the machine tool control is in the corresponding state.




7-3. Detailed explanation of the control panel


Image	Definition	Instructions
	Power on	When the power supply of the machine tool is supplied, the power off button indicator light on the panel lights up. At this time, press the white power on button. The machine tool is powered on, the white indicator light will light up, and the CNC system starts.
	Power off	When the machine tool is finished using, press the power off button and the machine tool will be powered off. At this time, the indicator light on the power off button will light up and the CNC system will be shut down.


	<p>Emergency stop</p>	<p>When there are safety concerns about personnel safety or machine tool operation, press this button to stop all movements of the machine tool. At this time, the controller enters the not-ready emergency stop alarm device state, the servo spindle enable signal is cut off, and all auxiliary motors stop running.</p>
	<p>cycle start</p>	<p>In DNC or automatic or MDI mode, the program can be executed, and the machine tool automatically runs according to the program</p>
	<p>Feed hold</p>	<p>When the machine tool is in automatic processing, pressing this button will cause the control system to enter a pause state, that is, all movement and feed of the machine tool will stop and remain in the state before pressing the button.</p>
	<p>Program protection</p>	<p>When the key is turned to the edit-on position, the user can edit the machining program in the CNC system. When the key is turned to the edit-off position, the machining program cannot be edited.</p>
	<p>Mode selection</p>	<p>This machine tool has 8 processing methods for users to choose. Users can choose the appropriate method to perform corresponding operations according to actual operating needs.</p>
	<p>Feed rate</p>	<p>Adjust the percentage of the movement speed of the machine tool coordinate feed axis by changing the position of the knob switch</p>
	<p>Fast magnification</p>	<p>Adjust the percentage of rapid movement speed of the machine tool coordinate feed axis by changing the position of the knob switch</p>

	Spindle Override	Adjust the percentage of machine tool spindle speed by changing the position of the knob switch
	+X	In manual mode, press this button to move the X-axis in the positive direction.
	-X	In manual mode, press this button to move the X-axis in the negative direction.
	+Y	In manual mode, press this button to move the Y axis in the positive direction.
	-Y	In manual mode, press this button to move the Y axis in the negative direction.
	+Z	In manual mode, press this button to move the Z axis in the positive direction.
	-Z	In manual mode, press this button to move the Z axis in the negative direction.




	+B	In manual mode, press this button to move the B axis in the positive direction.
	-B	In manual mode, press this button to move the B axis in the negative direction.
	+W	In manual mode, press this button to move the W axis in the positive direction.
	-W	In manual mode, press this button to move the W axis in the negative direction.
	safety door	Reserved, no definition
	Overtravel release	Reserved, no definition
	Spindle forward rotation	In manual mode, press this button to rotate the spindle clockwise.

	Spindle stop	In manual mode, press this button to stop the spindle.
	Spindle reverse	In manual mode, press this button to rotate the spindle counterclockwise.
	cutting fluid	In manual mode, press this button to start the cutting fluid, then press it again Close, it can also be started with M08 in MDI or AUTO mode, and closed with M09.
	Floor flushing	Reserved, currently undefined
	working lamp	Press this button, the machine tool lighting work light will light up, press it again to turn it off
	Machine locked	Press this button, all coordinate axes will stop moving and remain stationary.
	Select skip reading	Press this button, the block with slash in the machining program will be skipped and not executed.

	Z axis lock	After pressing this button, the Z coordinate axis feed stops and remains stationary.
	Select stop	After pressing this button, when executing the machining program, it will pause when encountering the MO1 block. If you want to execute the subsequent program, press the cycle start key again.
	dry run	Press this button to quickly simulate the processing program.
	Handwheel simulation	When this button is pressed, the speed of the feed axis is controlled by the hand wheel.
	single block	Press this button, each time the processing program is executed, you need to press the cycle start button.
	MST locked	Press this button and the M, S, and T codes in the processing program will not be executed, and the other instructions will be executed as usual.
	Automatic power-off	Reserved, currently undefined

	reset	Reserved, currently undefined
	Function keys	Reserved, currently undefined
	Processing air blow	In manual mode, press this button to turn on the air blowing function to air-cool the tools and materials; in MDI or automatic mode, use MO7 to turn on, and M09 to turn off this function.
	Blow air into the knife setter	Reserved, currently undefined; (When a tool setter is installed, it means that the tool setter opens the guard or cleans the contacts or the measuring surface before setting the tool.)
	F1	Reserved, currently undefined
	Chip removal forward	Press this button and the chip conveyor will rotate clockwise
	Chip removal reverse	Press this button and the chip conveyor will rotate counterclockwise

	F2	Reserved, currently undefined
	Spindle orientation	Press this button and the spindle will stay at a fixed angle after rotating.
	lubricating	Press the button to start the lubrication pump
	AUX1	Reserved, currently undefined
	Tool magazine forward rotation	Press this key and the tool magazine will rotate forward.
	Tool magazine reversal	Press this key and the tool magazine will reverse
	AUX2	Reserved, currently undefined

 <p>MAG. TOOL 刀库刀号 05</p>	<p>Tool magazine tool number</p>	<p>Display tool magazine preselected tool number</p>
 <p>SPD. TOOL 主轴刀号 40</p>	<p>Spindle tool number</p>	<p>Display the tool number on the current spindle</p>
 <p>STATUS 状态 8.8</p>	<p>state</p>	<p>Reserved, currently undefined</p>

VIII. Operation mode and code description

8-1、 AUTO(Automatic)/DNC(Connection)

On the control panel, turn the mode selector switch to the position of AUTO(Auto)/DNC(Link), this mode is used to execute the machining programme in the memory of the CNC system, log in the programme into the memory in advance, select the programme and then press the Cycle Start button (CYCLE START), the system will automatically run the programme that has been selected; the DNC(Link) mode is to automatically run the programme outside the system when the machining programme is relatively large and cannot be put in the CNC system, it can be run via the communication interface. DNC (connected) mode is to automatically run the programme outside the system, when the machining programme is too large to fit in the CNC system, it can be read into the machining programme on the peripheral device through the communication interface or remote buffer to synchronise the machining, i.e., the machine tool receives the programme while machining at the same time, and this form of machining is called DNC machining. The usual communication ports are RS232 (some systems or models no longer have this interface for users) and SD card or USB interface.

8-2 EDIT

Turn the mode selector switch on the control panel to EDIT mode, in which you can edit the machining programmes stored in the system memory, such as adding, replacing, searching, deleting, copying, transmitting, merging, renaming and other operations.

8-3、 MDI (Input)

Turn the mode selector switch on the control panel to MDI (input) mode, i.e. manual data input mode, in this mode, you can input the programme instruction line in the MDI programme management interface, which can be used to edit the input instruction, and after the manual input of the programme is completed, press the CYCLE START key, and the machine tool will execute the programme instruction line that has already been inputted, which is mainly used for the execution of simple auxiliary instructions, which is very useful. This mode is mainly used for the execution of simple auxiliary commands, which is very convenient, such as spindle rotation, debugging tool change and so on.

8-4, MPG (handwheel)

Turn the mode selector switch on the control panel to MPG (handwheel) mode, in this mode, select the desired feed axis and travelling speed by using the axis selector switch and gear switch on the handwheel, and then control the travelling speed of the feed axis by using the speed of the handwheel pulse generator.

In this mode, the desired feed axis and travelling speed are selected through the axis selection switch and gear switch on the handwheel, and the travelling speed of the feed axis is controlled by the speed of the handwheel pulse generator.

8-5、 RAPID(Rapid)

Turn the mode selector switch to RAPID mode on the control panel, and press the axis feed key in the manual continuous rapid feed mode, the corresponding axis will move rapidly in the corresponding direction, and the moving rate is still controlled by the size of the rapid feed rate. The travelling rate is still controlled by the size of the rapid rate.

8-6、 JOG(Inch movement)

Turn the mode selector switch on the control panel to JOG mode, this mode is a tiny inch feed. This mode is a tiny inching feeding, every time you press the direction key of the feeding axis, the corresponding axis will move one notch in the corresponding direction.

8-7、 HOME(Home)

On the control panel, turn the mode selector switch to HOME mode to manually return to the home position; there are two modes to return to the home position, one-key automatic sequential return and manual return of each axis individually; the current machine tool is the second mode, adopting manual return of each axis individually, and the position return adopts absolute position encoder, unless the system alarms that the home position is lost.

The position return adopts absolute position encoder, so unless the system alarms that the home position is lost, there is no need to return to the home position every time the machine is switched on.

8-8 User Programming Instruction Codes

CNC system programming instructions are divided into G code instructions and M/S/T auxiliary code instructions, about G code instruction format and function, please refer to the "FANUC Programming Operation Instruction Manual M Series" instructions. This book introduces general G code instructions for our products. This book introduces the general G code and M code for our products and defines the unified M code. G Code Instruction Table

S Code Instruction

S code instruction for spindle auxiliary function.

[S] indicates the spindle (or tool) speed. It can control the spindle speed in forward or reverse.

The maximum number of [S] instruction is 5 digits, which is determined by the machine specification, and the required spindle speed can be input directly.

Command Format: S Mouth Mouth Mouth Unit: RPM

The M code instructions related to spindle auto-programming are as follows:

M03: Forward spindle rotation;

M04: Reverse spindle rotation;

M05: spindle stop;

M19: spindle orientation;

M29: Rigid tapping;

Example 1: Spindle forward rotation [450 RPM] is required.

Programming instruction line format: M03 S450 or S450 M03;

Example 2: Reverse spindle rotation [750 RPM].

Program instruction line format: M04 S750 or S750 M04;

Example 3] To stop spindle rotation

Program instruction line format: M05;

Example 4: The basic three axes return to zero and the spindle is orientated.

Program instruction line format: G91 G28 X0 Y0 Z0;

For the application and programming of the "M29: Rigid Tapping Mode" instruction, please refer to the "FANUC Programming Instruction Manual M Series" manual.

8-9, general processing examples of operating procedures

a: Machine power-up operation, in advance access to meet the requirements of the power supply, gas source and cutting fluid and other auxiliary facilities.



The power indicator light at the red circle is on, indicating that the machine has been closed and energised, and is in power standby mode; if the power indicator light is not on, it means that the power required by the machine has not been connected to the inlet power terminal of the cabinet box, and at this time, it is necessary for a professional and licensed electrician to introduce the qualified power supply into the inlet power terminal or the inlet end of the cabinet main switch, and the introduction of power supply needs to pay attention to the specification of the cable, which is selected based on the installed capacity calculated from the nameplate of the cabinet box to obtain the cable specification. When introducing the power supply, it is necessary to pay attention to the selection of cable specifications, which is calculated according to the installed capacity on the nameplate of the cabinet box to obtain the cable specifications

b: Press the rectangular white power on button on the operation panel (circled in red in the figure), the display screen will be as follows:



Wait for the system to turn on, the system start-up process will display the FANUC0i-FM Plus memory test and test results in turn, and in the lower right corner of the prompt message CNC load data 1 end, and then display the version number of the control system software, and then display the progress of the system software loading, the system software test results, the system initialisation process, PLC loading and test results, the user data loading test progress, and then after about a few seconds, the screen enters the normal machining screen, from power start to the normal screen display, the screen from power start to the normal screen display. After a few seconds, the screen enters the normal processing screen, and the total duration is about 40 seconds from power on to normal screen display.

After that, the screen enters the normal processing screen after a few seconds, and the total time from power on to normal screen display is about 40 seconds, and the display screen is as follows:



c: When there is a red emergency stop alarm prompted on the display, the red emergency stop switch on the operation panel will be turned to the right and then it will pop up automatically, and the emergency stop alarm signal on the screen will be cancelled after releasing the emergency stop switch for about 1 second. After releasing the emergency stop switch for about 1 second, the emergency stop alarm signal on the screen will be cancelled:



d: After pressing the POS softkey on the right side of the display, the screen will enter the normal display interface as follows:



e: After entering the normal screen, place the workpiece to be machined in a suitable position on the table and clamp it securely.

f: Turn the mode selector switch to RAPID mode on the operation panel, and load the required machining tool through the loose tool clamping button on the spindle. (If the tool is in the tool magazine, it can be picked up automatically by MDI method.

(If the tool is in the tool magazine, it can be picked up automatically by MDI)

g: Initially move the workpiece to the desired approximate position by pressing the direction button of the axis, then press the spindle forward or reverse button (depending on the tool to select the spindle forward or reverse direction) on the operation panel to rotate the spindle. (After switching on the machine, the spindle must be rotated once in the MDI or automatic mode to assign the initial speed to the spindle, otherwise the spindle will not rotate.

(The spindle must be rotated once in MDI or Auto mode after switching on the machine to assign the initial speed, otherwise the spindle will not rotate and no alarm will be generated.)

h: Turn the mode selector switch to MPG (handwheel) mode on the operation panel, and move the coordinate axis to the required position through the axis selector switch and gear switch on

the handwheel, and then prepare to establish the workpiece coordinate system. Press OFS/SET on the right side of the display, the screen will be displayed as follows;



i: Now let's take the example of establishing the coordinate system of G54 workpiece, and adjust the cursor to the X-axis position of G54 by using the up, down, left, right and right direction soft keys on the right side of the display. keys on the right side of the display to adjust the cursor to the X-axis position of G54, the screen will be as follows:



j: Enter the characters X and 0 (circled in red) by using the soft keys on the right side of the display as shown below:



At this point, the workpiece coordinate system of G54 has been established. Note: The value in G54 must be the same as the value of the current

Note: The value in G54 must be the same as the current mechanical coordinate value (the two red circles in the above figure), otherwise it will not be correct.

If you know the specific value of the coordinate system, you can adjust the cursor to the corresponding axis, and input the value of one axis by one axis through the numeric keypad on the right side of the display, and press INPUT when the value of one axis is input.

When the value of an axis is finished, press INPUT and the value will be written or changed automatically.

If it is necessary to shift the position of all workpiece coordinate systems at the same time, move the yellow cursor to the corresponding coordinate box in the EXT of 000 of G54 and input the required value through the edit keypad.

Then press INPUT to write the value. If you need to increase or decrease the value of an axis of the established coordinate system, you can use the right editing keyboard to Input the value and then press the "+Input" softkey, the screen is shown below:



When the value to be changed appears in yellow above the mode display at the bottom right of the screen and is asked, select "Execute" as follows; if you want to abort, select "Cancel".
When asked, select "Execute" and the screen will be as follows; if you want to abort, select "Cancel".



o: After moving the table away from the tool manually, turn the mode switch to AUTO on the control panel, then press PROG on the right side of the display and select "Catalogue", the screen will be displayed as below:



p: If you want to select the O0001 programme at this time, move the yellow frame cursor to the position of O0001 by using the up and down direction softkeys on the right side of the display, the screen will be as follows:



q: Press the "(Operation)" soft key of the software key of the display, the screen will be as follows:



r: Press the soft key corresponding to "Main Programme", a special symbol appears at the left end head of the programme number (at the red circle of the programme name in the following figure), which indicates that the O0001 programme has been selected, i.e., the selection of the required machining programme is completed, and the screen is as follows:



s:When you want to check the contents of the programme, press the leftmost expansion key to return to the previous menu and select "Programme Check". Program Check", the screen will be as follows:



t: When you want to edit the O0001 programme, rotate the mode switch to edit mode and select "Programme" in the software key.

The screen will be as follows after selecting "PROGRAM" in the software key:



In this screen, you can modify and edit the O0001 programme statement by using the direction keys and numeric keys of the editing keyboard on the right side; after editing, press the "programme check" and then press the "CYCLE START" button on the control panel. Press the "CYCLE START" button on the control panel after editing, the machine will automatically complete the machining work according to the programme. After the machining is completely finished, press the white "RESET" soft key on the editing keyboard to let the system return to the

default state, rotate the mode selector switch on the control panel to the RAPID mode or MPG (handwheel) mode, lift the tool first and then move the workpiece to the suitable position, and move the workpiece from the working position to the right position, and then move the workpiece from the working position to the right position. Lift the tool first, then move the workpiece to a suitable position and remove the workpiece from the table, thus a general machining process is finished; when switching off the machine, first move each feed axis to the middle of the stroke and then press the emergency stop switch. When switching off the machine, first move the feed axes to the middle of the stroke, then press the emergency stop switch, then press the power off button, and finally switch off the power supply main switch on the cabinet box.

u: Next, we will introduce the common MDI general machining process as below;

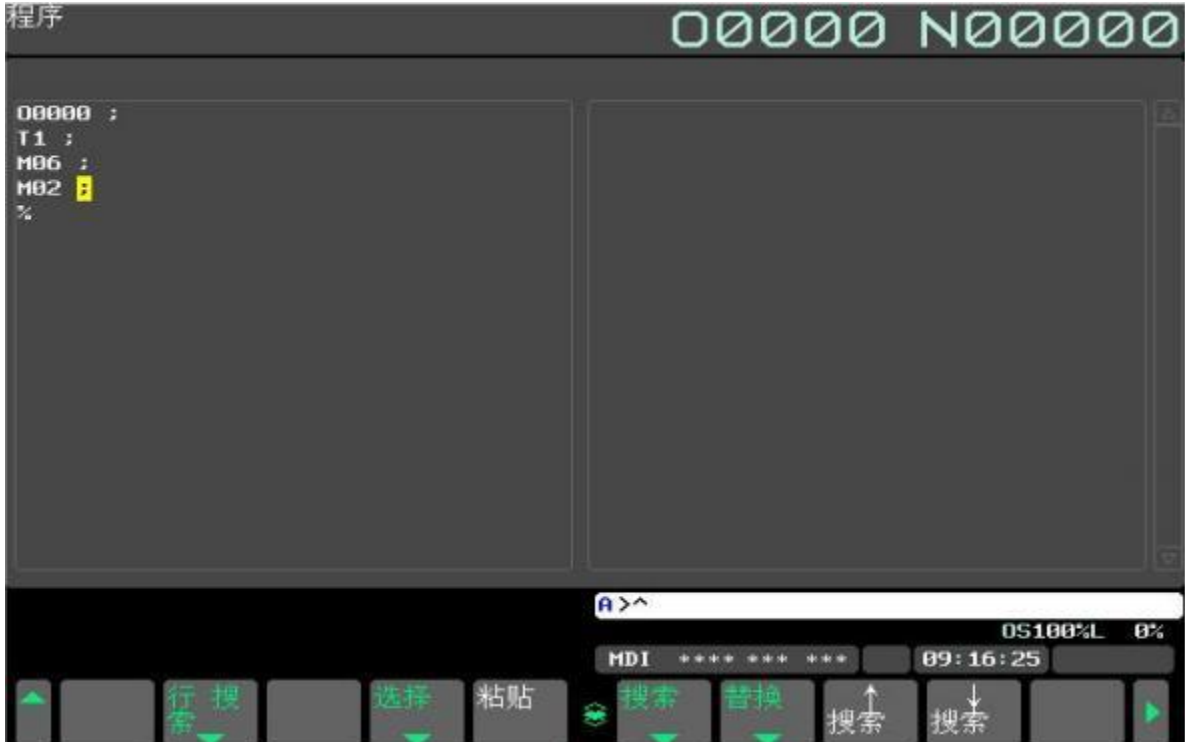
v: Turn the mode selector switch on the operation panel to MDI (input) mode and press the PROG soft key. soft key, the processing screen is as follows:



w: Using the edit keypad on the right side of the display, enter the desired character or programme statement as shown below:



x: After a character or programme statement is input, the statement is separated by the "EOB" softkey, and the separator character is ";". After finishing the input, press the INPUT softkey of the editing keyboard, the screen will be as follows:



y: After completing the character input, check and verify the characters line by line from the first line, after checking and verifying that there is no error, press the "CYCLE START" of the control panel, and the machine tool will automatically complete the processing work according to the programme, and after the processing is completely finished, press the white "RESET" key of the

editing keyboard, so that the system will return to the default state. After machining is completely finished, press the white "RESET" key of the editing keyboard to let the system return to the default state;

z: On the operation panel, rotate the mode selector switch to RAPID (fast) mode or MPG (handwheel) mode, move the workpiece to a suitable position, you can remove the workpiece from the table, so a general machining process is over, shut down the machine when the first feed axis to the middle of the stroke, and then press the Emergency Stop switch, and then press the power off button, and finally shut down the power supply on the cabinet box on the main air switch.

The above describes the common automatic processing and MDI manual input programming processing, these are only the most basic skills, if you want to master more and more detailed information on the operation, please refer to the accompanying FANUC manual "FANUC Programming Manual M Series".

Note: In the production process, there will be some need to adjust the situation, such as midway replacement of tool particles need to increase or decrease the value of the Z-axis coordinate system, etc., some functions of the detailed operating procedures need to be gradually mastered in the process of use, some functions in the previous operating panel has been introduced, all functions due to the application of the different scenarios can not be in the limited space in the description of the example, so the user needs to be in the process of the actual use of gradual familiarisation and mastery, especially to the FANUC Programming Manual M series. Therefore, it is necessary for the user to get familiar with and master the functions in the actual use process, especially the meaning of the user programming code should be completely mastered step by step, so that the user can operate this kind of general-purpose machine tool proficiently.

IX. The introduction of the tool magazine (user options)

LJ-1270NC machine in response to user requests, optional disc type tool magazine, if the user does not specify the manufacturer of the tool magazine, choose the standard BT50 disc type tool magazine, for all the manipulator type disc tool magazine tool change action or change the order of the knife are basically the same, the action flow is as follows:

- (01) knife disc selection (for positive or negative rotation of the nearest selected knife)
- (02) knife disc selection tool positioning
- (03) knife set back knife (knife set vertical)
- (04) robot arm buckle knife
- (05) Robot arm buckle knife in place
- (06) The spindle loosens the knife
- (07) After the spindle jaws loosen the tool, pull out the knife > The robot arm rotates 180. > Insert the knife
- (08) Spindle clamping jaws clamp the tool
- (09) After the spindle jaws clamp the tool, the robot arm returns to the home position
- (10) The tool holder returns to the horizontal position
- (11) Tool change action is completed

Our company chooses BT50 tool magazine, the total capacity of the tool is 24, because the tool magazine can save manpower to exchange the tool automatically, improve the processing efficiency, not easy to make mistakes, but the tool magazine failure requires professional maintenance, so the following will be introduced in detail to its mechanical structure, notes, electrical requirements, signal adjustment, fault determination and elimination methods. After skilled mastery and understanding, you can quickly determine the problem and quickly solve the problem, so as to improve productivity, cost savings, output maximisation.

This interface displays the current PLC alarm information of the machine, you need to eliminate the alarms in order, the alarms sent by PLC can be judged by checking the ladder diagram or checking the status in the I/O input/output screen, eliminate the alarms in order, and the system will return to normal machining state, there are some PLC alarms that must be eliminated by professional technicians. Some PLC alarms must be cancelled by professional technicians.



This screen displays the "Information History", which shows all the NC and PLC alarms that have occurred on the machine before, and arranges the information related to the alarms in the order of the time they occurred, such as the alarm number, the time of occurrence, the type of alarms, and the category of alarms, which is only a record. After the latest record is created, the earliest one will be replaced, and the total number of records remains unchanged. The number of records is limited, and after the latest record is created, the earliest one will be replaced, and the total number remains unchanged.

10-2 Alarm Description Table

The following alarms have been written for users of Fanuc systems by Gooda, and contain alarm contents and processing instructions

Alarm number	Alarm content	Phenomenon and treatment
1000	Emergency stop or overtravel solution	Performance: Enter alarm screen, red alarm light is on. Solution: Release the emergency stop switch or overtravel switch or check the emergency stop or overtravel line. overtravelling line.
1001	Axis not returned to zero	Performance: Enter the alarm screen and the red alarm light is on. Solution: Establish a reference point.
1003	Low lubricant level	Performance: Enter alarm screen, red alarm light is on. Solution: Lubrication tank oil is too low, please add oil.
1004	Low air pressure	Performance: Enter alarm screen, red alarm light is on. Solution: Air pressure is low, adjust the intake pressure.
1005	Spindle cooling alarm	Performance: Enter alarm screen, red alarm light is on. Solution: Check the spindle cooling oil tank.
1006	Low pressure at hydraulic station	Performance: Enter the alarm screen, the red alarm light is on. Solution: Check the hydraulic pipeline or adjust the hydraulic station pressure regulator.
1007	Spindle shift error	Performance: Enter the alarm screen, the red alarm light is on. Solution: shift incorrectly, check the shift of the high and low gear in place signal or check the shift mechanism movement device. Check the high and low gear position signals of the gearshift or check the motion device of the gearshift mechanism.
1008	axial overtravel	Performance: Enter the alarm screen and the red alarm light is on. Solution: The feed axis exceeds the hard limit, please reverse the exit to release it.
1009	System Battery Alarm	Performance: Enter into alarm screen, red alarm light is on. Solution: Please replace the battery.

1010	Bucket knife magazine not in home position	Performance: Enter alarm screen, red alarm lamp is on. Solution: Please check the home signal of tool magazine and the position of sensing block.
1011	Knife arm motor overload alarm	Performance: Enter the alarm screen, the red alarm light is on. Solution: Check the knife arm motor circuit, motor or knife arm movement mechanism.
1012	Cooling motor overload alarm	Performance: Enter the alarm screen, the red alarm light is on. Solution: Check the cooling motor wiring or motor insulation condition.
1013	Chip discharge motor overload alarm	Performance: Enter the alarm screen, the red alarm light is on. Solution: Check the chip removal motor line or motor insulation condition.
1014	Tool magazine motor overload alarm	
1016	T code error	Performance: Enter the alarm screen and the red alarm light is on. Solution: Check the correctness of T-code editing.
1017	Spindle not orientated	Performance: Enter the alarm screen and the red alarm light is on. Treatment: Please execute spindle orientation before executing this function.
1018	Tool arm not at home position	Phenomenon: When entering the alarm screen, the red alarm light turns on. Solution: Check the status of the knife arm origin switch or the position of the switch sensing block.
1019	K16.0 not set to 0	Phenomenon: When entering the alarm screen, the red alarm light turns on. Solution: Please set the K16.0 bit to 0.
1020	Tool holder out of position	Phenomenon: When entering the alarm screen, the red alarm light turns on. Solution: Check the status of the tool holder detection switch or the position of the sensing block.
1021	Tool number not found	Phenomenon: When entering the alarm screen, the red alarm light turns on. Solution: Check the edited tool pocket number or tool change statement format.
1022	No signal for sheath down	Phenomenon: When entering the alarm screen, the red alarm light turns on. Solution: Check the status of the detection switch under the tool holder and the position of the sensing block.

1023	Arm snap error	Phenomenon: When entering the alarm screen, the red alarm light turns on. Solution: Check the correctness of the knife buckling conditions.
1025	No release signal from spindle	Phenomenon: When entering the alarm screen, the red alarm light turns on. Solution: Check the knife unclamping signal status or the knife unclamping pressure and solenoid valve status
1027	No signal to rewind the sheath.	Phenomenon: When entering the alarm screen, the red alarm light turns on. Solution: Check the status of the detection switch on the tool holder and the position of the sensing block.
1028	Arm manual mode is on.	Phenomenon: When entering the alarm screen, the red alarm light turns on. Solution: Prompt tool magazine debugging to enter manual mode.
1029	Arm home position error	Phenomenon: When entering the alarm screen, the red alarm light turns on. Solution: Check the status of the knife tightening signal or the knife tightening pressure and the condition of the solenoid valve.
1030	Arm home position error	Phenomenon: When entering the alarm screen, the red alarm light turns on. Solution: Check the status of the knife arm origin switch or the position of the switch sensing block.
1031	Incorrect spindle tool clamping and release signal	Phenomenon: When entering the alarm screen, the red alarm light turns on. Solution: Check the spindle tool clamping and tool unclamping signal conditions and the position of the sensing block
1032	Tool change number equals spindle tool number	Phenomenon: When entering the alarm screen, the red alarm light turns on. Solution: It prompts that the tool number to be changed is the same as the tool number currently on the spindle.
1033	Motor overload	Phenomenon: When entering the alarm screen, the red alarm light turns on. Solution: Check the motor circuit or motor insulation condition.
1034	Balance mismatch	Phenomenon: When entering the alarm screen, the red alarm light turns on. Solution: Check the balance pressure difference condition.

1035	Spindle centre water overload alarm	Phenomenon: When entering the alarm screen, the red alarm light turns on. Solution: Check the central water outlet motor circuit or motor insulation condition.
1036	No spindle tool clamping	Phenomenon: When entering the alarm screen, the red alarm light turns on. Solution: Check the tool clamping signal status.
1037	Large knife mode prohibits rotation Knife alarm	Phenomenon: When entering the alarm screen, the red alarm light turns on. Solution: It prompts that the current mode is large knife and does not allow the knife disk to rotate.
1038	No double counting signal	Phenomenon: When entering the alarm screen, the red alarm light turns on. Solution: Check the double counting signal condition and the position of the sensing block.
1039	Large knife function on	Phenomenon: When entering the alarm screen, the red alarm light turns on. Solution: Prompt that the broadsword function is turned on.
2000	Safety door not closed	Phenomenon: When entering the alarm screen, the red alarm light turns on. Solution: Check the safety door closing signal status or sensing position.
2001	Four axes not clamped	Phenomenon: When entering the alarm screen, the red alarm light turns on. Solution: Check the clamping signal status of the fourth axis.
2002	Low air pressure	Phenomenon: When entering the alarm screen, the red alarm light turns on. Solution: Check whether the machine tool air inlet pressure reaches the standard or detect the switch status
2004	Lubrication oil pressure low	Phenomenon: When entering the alarm screen, the red alarm light turns on. Solution: Check the oil pressure of the lubricating oil pump and the oil circuit for leaks.
2005	Tool magazine initialisation complete	Phenomenon: When entering the alarm screen, the red alarm light turns on. Solution: Prompt that tool magazine initialization has been completed.
2006	The spindle is a large tool, the cutter disc is not rotating.	Phenomenon: When entering the alarm screen, the red alarm light turns on. Solution: It prompts that a large knife has been installed on the spindle and the cutterhead cannot rotate.

2007	Tool magazine initialisation not complete, please re-initialise.	Phenomenon: When entering the alarm screen, the red alarm light turns on. Solution: Please re-initialize the tool magazine.
2008	K Parameter setting error	Phenomenon: When entering the alarm screen, the red alarm light turns on. Solution: Check the correctness of the K parameter setting.
1040	Cutter count switch missing. One signal.	Phenomenon: When entering the alarm screen, the red alarm light turns on. Solution: A counting error occurs in tool magazine counting. Check the position of the counting switch and sensor block.
2009	Spindle oil level low	Phenomenon: When entering the alarm screen, the red alarm light turns on. Solution: Check the spindle cooling oil level detection signal status and actual oil level.
2011	Nitrogen pressure low	Phenomenon: When entering the alarm screen, the red alarm light turns on. Solution: Check the nitrogen pressure detection signal status and actual pressure conditions.
2010	Tool change not completed	Phenomenon: When entering the alarm screen, the red alarm light turns on. Solution: It prompts that the tool changing step has not been completely executed.
1042	Tool setter overrun	Phenomenon: When entering the alarm screen, the red alarm light turns on. Solution: Check the stroke setting of the tool setting macro program.
1047	Spindle not rotating during cutting	Phenomenon: When entering the alarm screen, the red alarm light turns on. Solution: Check the spindle command and statement format in the machining program.
1048	Backflush motor overload alarm	Phenomenon: When entering the alarm screen, the red alarm light turns on. Treatment: Check the post-flush motor circuit or motor insulation condition.
1051	No signal for high or low gear	Phenomenon: When entering the alarm screen, the red alarm light turns on. Solution: Check the high-speed or low-speed detection signal status or sensing position.
1057	High or low gear shift timeout	Phenomenon: When entering the alarm screen, the red alarm light turns on. Solution: The gear shift is not completed within the specified time, check the high and low gear signals.
2075	Rigid tapping interrupted	Phenomenon: When entering the alarm screen, the red alarm light turns on. Solution: Rigid tapping is interrupted midway.

2076	F2 Tapping return release	Phenomenon: When entering the alarm screen, the red alarm light turns on. Solution: Press the F2 key to tap and return to the release operation.
2080	The handwheel interpolation function is on.	Phenomenon: When entering the alarm screen, the red alarm light turns on. Solution: Prompt that the handwheel interpolation function has been enabled.
2082	Locked open over-axis please return to zero	Phenomenon: When entering the alarm screen, the red alarm light turns on. Solution: The feed axis lock is turned on, please perform the zero return operation of each axis.
2083	The tool life has been changed.	Phenomenon: When entering the alarm screen, the red alarm light turns on. Solution: It prompts that the tool life has expired and the tool needs to be replaced.
2085	Low centre discharge pressure alarm	Phenomenon: When entering the alarm screen, the red alarm light turns on. Solution: Check the central water outlet pressure detection switch and the actual pressure condition.
1050	Safety door not closed	Phenomenon: When entering the alarm screen, the red alarm light turns on. Solution: Check the signal status of the safety door detection switch and the position of the induction block
1081	Neighbouring tools cannot be set as large tools at the same time	Phenomenon: When entering the alarm screen, the red alarm light turns on. Solution: Adjacent tools cannot be large knives at the same time, otherwise they will interfere.
1082	Pre-selected tool is not turned on, the tool cup is down, can not change the tool directly, please perform the action of the tool cup up first.	Phenomenon: When entering the alarm screen, the red alarm light turns on. Solution: It prompts that the pre-selected knife function is not enabled. The knife cup is down and the knife cannot be changed directly. Please perform the knife cup up action first.
1083	The pre-selected knife function is on, the knife cup is up, the knife cannot be changed directly, please execute the action of the knife cup first.	Phenomenon: When entering the alarm screen, the red alarm light turns on. Solution: It prompts that the pre-selected knife function is not enabled. The knife cup is on the knife cup and the knife cannot be changed directly. Please perform the knife cup down action first.
1084	Water supply motor overload alarm	Phenomenon: When entering the alarm screen, the red alarm light turns on. Solution: Check the water supply motor circuit or motor insulation condition.

1085	Filter bag machine clogging alarm	Phenomenon: When entering the alarm screen, the red alarm light turns on. Solution: Check the filter bag clogging signal status and the actual condition of the filter bag.
1087	Gearbox liquid level low alarm	Phenomenon: When entering the alarm screen, the red alarm light turns on. Solution: Check the gearbox liquid level detection signal status and actual liquid level.
1110	Overload in spindle cutting	Phenomenon: When entering the alarm screen, the red alarm light turns on. Solution: Check the tool, cutting amount and processing parameter settings.
1112	Error in the signals of tool set up and tool set down.	Phenomenon: When entering the alarm screen, the red alarm light turns on. Solution: Check the tool holder up/down detection signal status and sensing position.
1113	Spindle fan overload	Phenomenon: When entering the alarm screen, the red alarm light turns on. Solution: Check the spindle fan motor circuit or motor insulation condition.

The above alarms are PLC alarms. For NC alarms, refer to the FANUC system NC alarm manual.

Conclusion

The GOODA CNC Horizontal Machines have been fully analysed during the development phase for all possible problems, and safety devices have been designed to prevent these problems, and have been fully tested and optimised during the prototype validation phase before being finalised. In order to avoid accidents caused by unfamiliarity with the machine, it is important that the user reads the supplied operating instructions thoroughly before operating the machine and that he/she understands them before starting to operate the machine in accordance with these instructions.

There may be omissions in the manual, so if you have any doubts about the operation of the machine or if a new problem arises and there is no corresponding countermeasure in the manual, please refer to the similar contents of the manual, or contact us directly, and we are ready to provide you with assistance. The contents of this manual as far as possible to do with the hardware and software revised to match, but because the machine tool system with customer demand, CNC software upgrades, the development of electronic control technology and continuous optimisation and upgrading, with the iteration of the product system, the old version of the operating instructions may not be updated in time, there are some differences in the function of the system and the actual system, when such problems occur, please contact with our sales and service centre or agent in a timely manner. Thank you for your patronage!

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