

MY series double servo CNC pipe cutting machine tool

Operating manual



Catalogue

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I. Main uses and characteristics of machine tool

High precision automatic pipe cutting machine tool

High precision automatic pipe cutting machine tool is suitable for the cutting of various pipes, especially for the mass production of bearing enterprises. This machine tool adopts PLC to control and the most advanced dual-axis double servo system for positioning and cutting, which can cut multiple pieces of materials fed at a time with high precision and efficiency. The machine tool can detect each cutting work-piece, which makes up for the machine tool's deficiencies in the past such as insufficient feeding for oil, rust and bending materials or rebound after feeding, thus putting an end to the emergence of waste products.

This machine tool has the functions of tool breaking, no material alarm, setting count stop and so on. The machine tool adopts cross roller quenching guide rail, which has the characteristics of good rigidity, small rolling friction and long life.

Servo system is used in both vertical and horizontal feeding, which has the characteristics of quick response and stable feeding.

II. Machine tool specifications

Model	CXZG-80
Cutting Diameter	1-3/16" to 2-3/4" 30mm to 70mm
Maximum Machining Length	4" 100mm
Working Table Feed Speed	0 - 39.4 ft/min 0 -12 m/min
Cutting-off Tool Feed Speed	0 - 78.7 ft/min 0 -24 m/min
Air Pressure	725 psi 5 mpa
Motor	5.5 Kw
Amp	22A
Power	3 phase 220V 60Hz
Packing Size (L x W x H)	85" x 44" x 66"
Net Weight	1764 lbs
Shipping Weight	2020 lbs

III. Machine tool installation and connection

1. Machine tool must be adjusted to a horizontal position before it is fixed.
2. The center of the rack must be concentric with the center of the spindle.
3. Machine tool and rack must be fixed firmly.
4. The power line adopts three-phase five-wire system and the machine tool shell must be effectively grounded. It is recommended that the power incoming line is above 2.5mm².
5. Power requirement: Rated voltage of spindle motor is three-phase 220v and a too low or too high voltage will cause the malfunction of the servo.
6. Please pay attention to the spindle motor and hydraulic motor positive and negative rotation after power on.

IV. Machine tool operating system

This operating system consists of two parts: operating panel setting and touch screen parameter setting.

Operating panel setting

The operation panel is composed of touch screen, emergency stop, spindle start, spindle stop, manual, semi-automatic, automatic selection buttons, cycle start button, feeding knob, release and tighten button, cutter jog in button, cutter jog out button, axial jog in button and axial jog out button.

Operating panel:

Operation mode selection

This system has three operating modes: manual mode, semi-automatic mode and full automatic mode.

1. Manual mode

Manual mode is to put the “manual, semi-automatic and full automatic knob” in the “manual” state. In this mode, the spindle can be started and stopped by the spindle start and stop button; Move the cutter through cutter jog in button and cutter jog out button; Move the backer through the axial jog in and jog out buttons; Feeding is controlled by the feeding knob; Tighten and loosen the chuck by tightening and loosening the rotary knob.

2. Semi-automatic mode

Semi-automatic mode is to put the “manual, semi-automatic, and full automatic button” in the “semi-automatic” state. At this time, press the cycle start button, and the system will cut once according to the data which has been set. When completing cutting, cutter retract will stop.

3. Full automatic mode

Full automatic mode is to put the “manual, semi-automatic, and full automatic button” in the “full automatic” state. At this time, press the “cycle start button”, the system will automatically feed, clamp and cut according to the data which has been set. Until there is no material or tool breaking, then the system will alarm and stop.

Emergency stop button

Under the working condition, all output will be stopped when pressing the “emergency stop button”. After pressing the emergency stop button, all the buttons are invalid. And the work can be continued only after turning on the emergency stop button.

Turning full automatic and semi-automatic state to manual state

When turning the full automatic state and semi-automatic state to manual state, all alarms will be reset and the action of going back to the original position will be conducted axially and radially.

Spindle start and stop

The spindle is directly driven by a three-phase motor and turns counterclockwise. If the speed needs to be changed, change the size of the motor pulley or buy a machine tool with a frequency converter, which can directly change speed by changing the frequency. In manual mode, the start and stop of spindle can be controlled by the “spindle start” and “spindle stop” buttons on the panel; In automatic and semi-automatic modes, the spindle can be started automatically by pressing the “cycle start” button (please pay attention to safety); when turning the automatic and semi-automatic states to manual state, automatic state will be ended and the spindle will automatically stop rotation.

Clamp

In manual mode, the loosening and clamping of chuck can be controlled through the “loosening and clamping knob”; In automatic and semi-automatic modes, the CNC system automatically controls the chuck’s loosening and clamping.

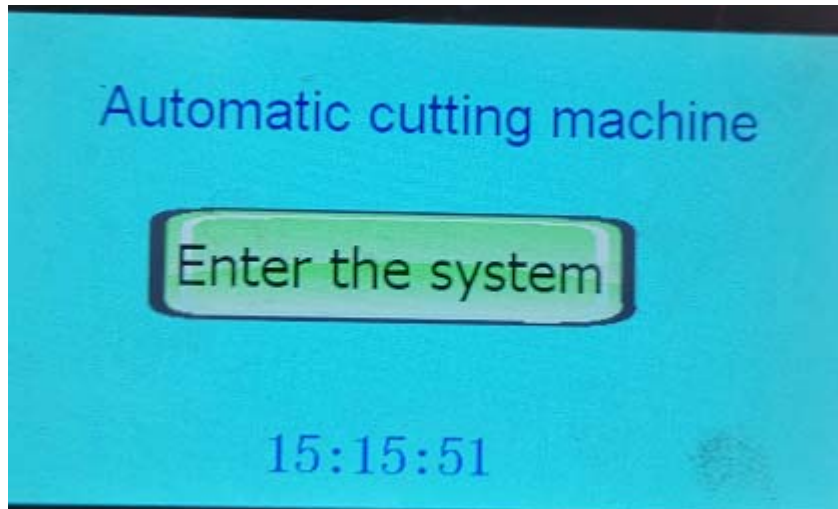
Feeding

Feeding adopts a two-way solenoid valve, which can adjust the length of feeding by adjusting the feeding back limit. In manual mode, the feeding can be realized through the “feed knob”.

Touch screen parameter setting

1. Welcome screen

When powered on and started, the touch screen will enter into the welcome screen, and then click to enter the main screen of the system.



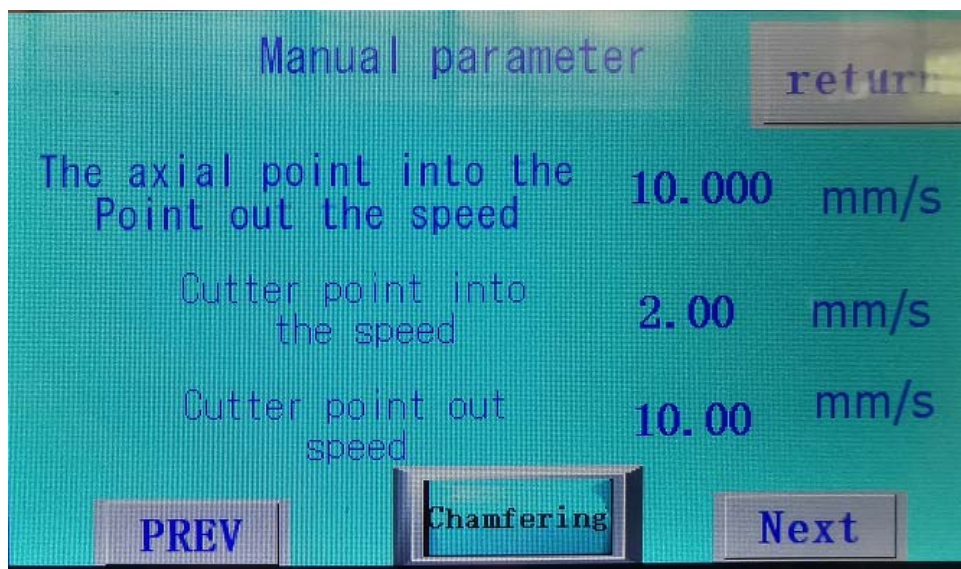
2. Main screen

3. Manual parameters screen

Click “manual parameters” in the main screen to enter the screen of manual parameters; Click “back to the home page” in the manual parameters screen, then exit the manual parameters screen and enter the main screen.

Axial jog in and jog out speed: It refers to, in manual mode, the axial speed when operating the buttons in operation panel, which should be set to 10MM/S;

Cutter advance and retract speed: It also refers to, in manual mode, the jog in and jog out speed of cutter when operating the buttons in the operating panel. The speed should be set as 1.5MM/S.



4. Automatic parameter screen

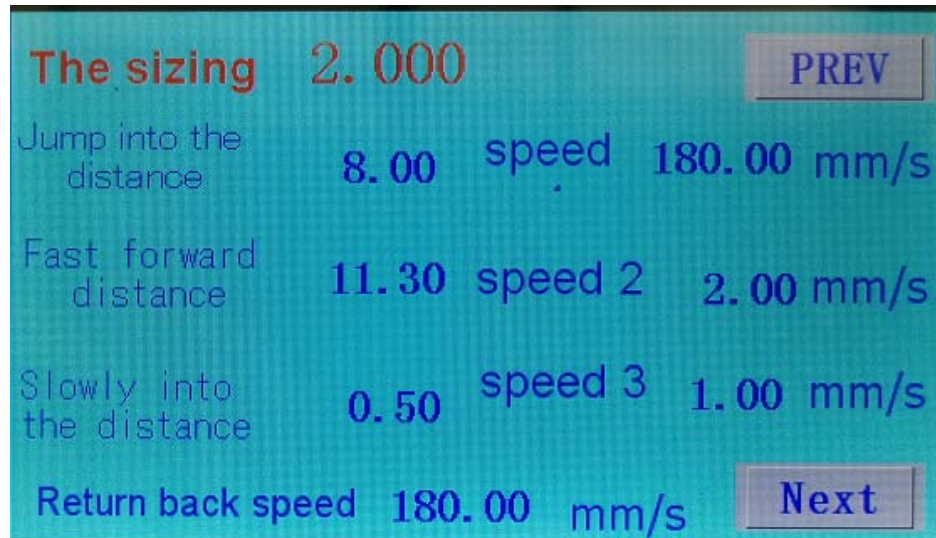
Automatic parameter screen includes the automatic parameter (cutter) screen and the

automatic parameter (axial) screen.

Automatic parameters (cutter) screen: it mainly sets parameters related to cutter.

Automatic parameters (axial) screen: it mainly sets parameters related to the direction of the spindle.

Click automatic parameters in the main screen to enter the automatic parameters (cutter) screen; Switching between the automatic parameters (cutter) screen and the automatic parameters (axial) screen can be realized through the next page button and the previous page button on the previous page.



Automatic parameters (cutter) screen

Jump into distance: It refers to the distance from the tip of the cutter to the surface of the steel pipe. The jump into distance shall not be set greater than the distance from the cutter tip to the steel pipe. Otherwise the cutter will be directly damaged during working;

Cutter fast advance distance: It refers to the normal distance of cutting steel pipe, that is, the thickness of steel pipe. Due to the bending and irregularity of the steel tube, the distance should be larger than the thickness of the steel tube so as to cut off.

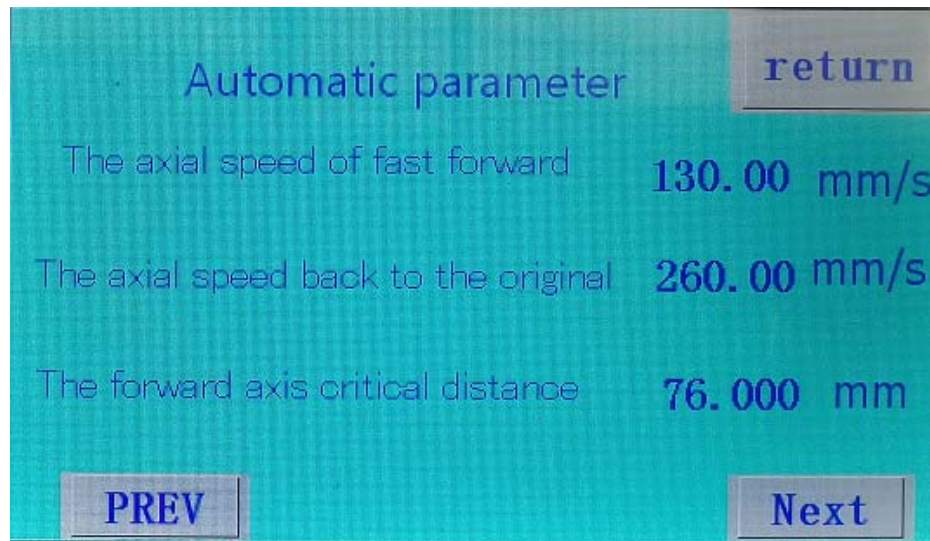
Work-feeding distance: It refers to the distance from the time when the steel pipe is going to be cut off to the time when it has been completely cut off. (This distance directly affects the knife tool durability)

Cutter fast jump speed, fast advance speed and slow advance speed: They correspond to the three different speeds of cutter jump forward distance, fast advance distance and slow advance distance. When making specific adjustment, the fast jump speed can be set larger in order not to affect cutting, fast advance speed should be set according to the thickness of scrap iron, which should be no more than 0.8MM, and the slow advance speed can be slowed with a suitable speed of 0.2MM/S. The end of the scrap iron is very soft, which is not easy to break the knife. Fast advance distance, speed and slow advance distance and speed can be adjusted properly to avoid product hanging knife and make the machine run more smoothly.

Cutter return speed: It refers to the quick return speed of the cutter after cutting products,

which can be set according to your own requirements.

Turn off setting: A certain amount of products to be cut can be set for the machine, which will stop automatically when it has finished cutting. This function is designed for the fixed amount of products in a box or a bag at the scene, and you can set zero if you do not use this function. The machine will automatically stop when the count is up to the certain amount, and the alarm screen will prompt this, turning on the alarm light. After stopping, the first thing you need to do is reset the parking counts on the monitoring screen, and then turn the “manual, semi-automatic and automatic knob” from the automatic state to the manual state, when the reset alarm information can only start up again.



Automatic parameters (axial) screen

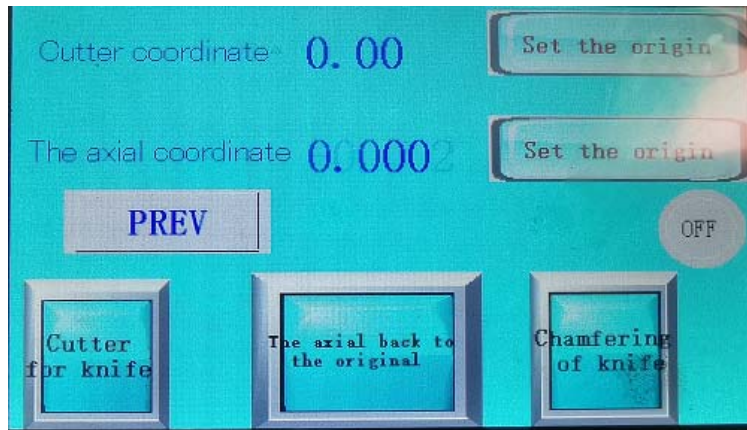
Axial fast advance speed: It refers to the axial advance speed before the backer touches the steel tube. The speed is set at about 150MM/S.

Axial front and rear limit distance: It refers to the distance from the rear limit of the large drag plate to the front limit, which can be obtained from the figure displayed at the axial origin on the origin setting screen. First, in manual mode, click the axial origin setting; after returning to the origin, click the axial point advance, and stop until the front limit is reached; If 80.00MM is displayed at this time, the axial advance limit is set to 81MM, that is, 1MM more than the output data. If it is set too small, the drag plate may stop in the middle when running automatically.

Dimension adjustment: That is the height setting of the product to be adjusted. After the setting is completed, tap “height confirmation” to take effect. When the two figures above and below are the same, the setting of backer height is successful. The height of the backer is generally set as 0.2~2mm. If it exceeds the range, the hard backer will be adjusted.

Spindle frequency: For the machine tool with frequency converter, the value of spindle frequency can be changed to change the spindle speed. Machine tools without frequency converters do not have this function.

5. Origin setting



Origin setting screen

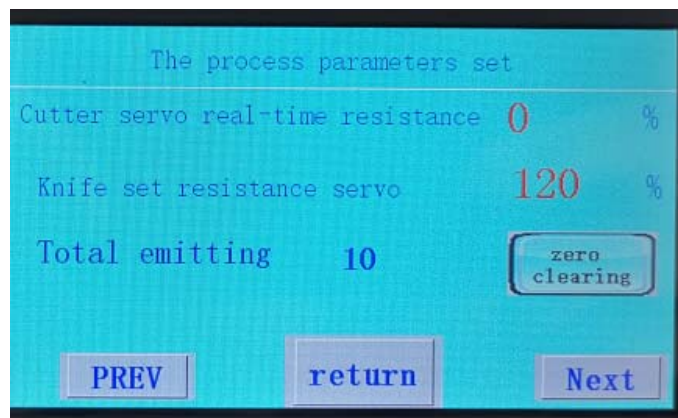
Cutter jump into distance: It refers to the distance from the cutter tip to the surface of the steel tube. The jump into distance shall not be set greater than the distance from the cutter tip to the steel tube. Otherwise the cutter will be directly damaged during working.

Cutter origin setting: click the button of “cutter origin setting”, and the current position is the origin of the cutter axis. The figure of the current position displayed to 0.00, and the indicator light is on.

Axial origin setting: Before setting the origin, make sure that the cutter will not touch anything in the axial movement. After pressing the axial origin setting button, the system will automatically take the axial rear limit switch as the origin to return to the zero point, and the indicator will light up. Since the axial rear limit switch is the origin, it is required to ensure that axial position does not exceed the rear limit before setting the axial origin. If the limit is exceeded, it is required to manually move the axial position through the operation panel to make it within the limit range.

Cutter setting: Manually jog in axially through the operation panel to make the steel tube in front of the tool rest; tap “cutter jump into”, and then install the cutter. It shall prevail that the tool tip just meets the work piece, and fix the screw so that the cutter won’t fall off; then tap “cutter jump”, tighten the screws with an Allen wrench.

6. Monitoring screen



At the same time, the counts of products are also shown here. Product counts include work piece counts and stop counts. The count of work piece is the cumulative count of the product, and the count can be cleared zero by pressing the count reset button for 10S. Stop count starts by setting a value on the automatic parameters (cutter) screen, and the machine tool will automatically stop when the stop count equals the set value. Tap “stop count reset”, the stop count becomes zero. The two product counts don't influence each other, and work independently.

Spindle running frequency: It refers to the actual operating frequency of the frequency converter when the spindle of the machine tool which has been equipped with a frequency converter is running. Machine tools without frequency converters have no such display.

7. Alarm screen

When the system detects abnormalities in the machine tool, the alarm page as the above figure will pop up.

Tool breaking alarm: The tube is not cut off, or the work piece hits the backer when it falls.

Emergency stop or servo alarm: when pressing emergency stop or servo alarm button, this information will be displayed. If the emergency stop button is pressed, release the emergency stop button to reset the alarm; if there is no emergency stop button, it is a servo alarm. Please open the cabinet door, record the information displayed on the servo drive, and contact the manufacturer.

No material alarm: after three times of automatic feeding, there is still no material to cut. It indicates that all the tubes may have been cut or they are too bent to be fed normally.

Not clamping alarm: the clamping signal is interrupted during normal cutting process. Please check the clamping limit switch.

Feeding is not in place alarm: if the feeding is not in place for a long time after the automatic feeding of the lathe, please check the feeding limit switch or check whether the feeding hydraulic cylinder is working normally.

V. Machine tool adjustment

1. Adjust the tightness of the front and rear bearings of the spindle through the rear shaft nut. It has been adjusted before leaving the factory. If it has been used for a long time, it needs to be cleaned, greased and adjusted.

2. The spring chuck relies on the clamping cylinder to be pushed to the ball joint, and the chuck is clamped through the pull tube. When the clamping solenoid valve loses power, the clamping cylinder will change to use the spring force to release the chuck. The original size of the chuck is adjusted by pulling tube nut and clamping movable block. Adjustment method: unscrew the pull tube nut and the six M6 screws above the clamping movable block (type 100 is three M6 screws), and the tube nut shall be adjusted to ensure smooth feeding and strong clamping, and then lock tight the screw which has been screwed off under the clamping state.

3. The feed towing consists of bottom, middle and top parts. Between various dragging plates, high precision cross roller guide rails with good abrasion resistance are used to support and high density servo motor is used to drive. Front limit switch x0 and rear limit switch x4 for limiting are available on the large pallet, while the small pallet has no limit for limiting. Please pay attention during operation.

4. Adjustment of the feeding pallet. In the manual state, put the switch SA3 to feeding , making the feed pallet reach the right feeding position until x22, the adjust feeding in place switch is on, so as to ensure the feeding position accurate every time. Feeding length: the limit nut on the feeding drag plate can be adjusted to make the feeding length appropriate.

5. Feed parameter adjustment of machine tool: After power on, tap the flicker on the touch screen to enter the working screen when the self-check of the machine tool has been completed. In the manual state, adjust the origin of the backer to align it with the front edge plane of the steel pipe. Tap the backer origin setting button on the touch screen to make the number of the backer origin change to 0.00MM, and make the red indicator light. Then tap the axial origin setting to change the number of the axial origin to 0.00MM.

VI. Machine tool electrical system

See the electrical schematic diagram (attached diagram) for the principle of the electrical system. The power supply is three-phase, and 2.5mm² is recommended for incoming line. The machine tool shell must be effectively grounded to ensure personal and property safety.

VII. Machine tool maintenance

In order to ensure the normal operation of the machine tool and reduce the wear of parts, all friction surfaces of the machine tool should be properly lubricated.

1. Spindle bearing should be lubricated with high-temperature grease once a month, cleaned once every six months, and replaced with new grease.
2. Cross roller guide rail of feed mechanism should be filled with high-speed grease, cleaned every three months and replaced with new grease.
3. Ball screw should be cleaned regularly to ensure accuracy and life.
4. The other bearings of the machine tool should be lubricated, cleaned once a year, and replaced with new grease.
5. The iron chips of guide rail and screw face should be cleaned frequently to ensure that the dust cover is intact.
6. The electrical equipment of the machine tool should be checked and cleaned to prevent dust and iron chips from entering and damaging the equipment. The machine tool must be well grounded.
7. The working chuck must be cleaned frequently to prevent the chuck and the pull tube from deadlocked if the chuck is not removed for a long time.

VIII. Common trouble shooting

- 1、 No circulation: the clamping cylinder induction switch x21 is not on, adjust to make it on; Backer stuck switch x24 is not bright, check whether the rocker arm bearing is stuck and whether there is oxidation at the signaling contact point.
- 2、 Manually feeding is not in place: If the feed chuck is too loose, replace it; if the feeding chuck is separated from the feeding pull tube, remove and tighten them; appropriately adjust the chuck if the clearance of adjustment of the chuck is too small, making it difficult for the material to be sent out.
- 3、 Automatic feeding is not in place: when manual feeding is normal, adjust the feeding in place induction switch next to the feeding pallet to make the induction switch bright when feeding to the front position.
- 4、 Abnormal tightness of chuck: check the sealing ring in the oil cylinder and replace the broken sealing ring.
- 5、 Tool-breaking easy to happen: remove and clean the chuck to keep the chuck and axle hole clean, and the lubricating oil should often be kept in the contact between the inclined surface. Check whether the lead screw and guide rail of the small drag plate are stuck, and replace them after cleaning.
- 6、 Chuck and pull tube are screwed dead: in this case, do not try hard to twist the pull tube. The correct way is to hold tight the two nuts behind the pull tube, gently knock nut clockwise and counterclockwise, so that the iron ash on the place where the pull tube and chuck are dead screwed slowly fall naturally, which is the most effective method.
- 7、 Check on the bumping of the feeding material against the backer: Check whether the distance of sensor x11 above the pallet is adjusted in the proper position.

IX. Machine tool wearing parts

The warranty period of the machine tool wearing parts is six months; Clamping claw is a normal accessory, no warranty for damage.

Wearing parts list

1. Main spindle front bearing		1
2. Main spindle rear bearing		1
3. Klemmlager		1
4. Feed tube bearing		1
5. Cross roller guide rail	GZV9*250	4
	GZV9*160	2

Cautions:

1. After power on, the touch screen displays the prompt that “please return to the origin”. Then, please go to the origin setting screen and make axial origin regression until such prompt disappears; Otherwise, tap the “Cycle Start”, and it cannot automatically cut.
2. After the origin regression, if the machine tool still cannot cut automatically when tapping the “Cycle Start”, please check whether the clamping induction switch is on. If the clamping induction switch is not on, the clamping is not in place, and it cannot cut automatically.
3. If the main spindle does not rotate, please check whether the relay is released, and then check whether the contactor is engaged or whether the frequency converter is working.
4. If the hydraulic pump is not working, please check whether the relay is engaged, and then check whether the contactor is engaged.
5. If the machine tool is not fixed well, the machine tool will shake badly, which is easy to cause the tool-breaking alarm.
6. The chuck cannot be loosened. Please knock down the chuck and oil the chuck.
7. If the first material is often cut short, please check whether the chuck is adjusted properly, or check whether the clamping induction switch is too close to the front, and the clamping is felt when not clamped.
8. The feeding solenoid valve is a two-way solenoid valve, which can adjust the feeding rear limit and the feeding length.
9. If the servo motor often stops working for no reason. Please check whether the voltage servo motor uses single-phase power supply with a voltage range of 200~235v.
10. If tool-breaking is easy to happen, check whether the chuck is clamped, whether the oil pressure is normal, and whether the front and rear bearings of the spindle box are fixed in place.
11. If the product often hits to the backer, causing malfunction of the machine tool or pause, increases the fast retreat speed suitably.

X. Delta driver common alarm

AL001 indicates that the current is too high, check whether the servo motor power plug is short circuit. Replace the UVW power line or the motor.

AL002 indicates the over voltage. Check whether the 220V voltage of incoming line exceeds 235V

AL003 indicates too low voltage. Check whether the 220V voltage of incoming line is lower than 200V.

AL006 Remove the coupling of the lead screw connected to the servo motor, there may be something wrong with the pallet if the motor idles. And if the motor idles and alarms, then the

motor needs to be replaced.

AL009 Remove the coupling of the lead screw connected to the servo motor, there may be something wrong with the pallet if the motor idles. And if the motor idles and alarms, then the motor needs to be replaced.

AL011 indicates that the encoder is abnormal. Check servo motor encoder plug to replace the code line of the link driver or replace the motor