

DK-908 DESKTOP EDM HOLE DRILLING MACHINE

USER ' S MANUAL

CHINA LUOYANG

Luoyang Xincheng Precision Machinery Co.,Ltd

USAGE NOTICE

Please read manual thoroughly. Please operate the machine after fully understanding operation methods.

In order to keep the machine tool in the best condition for a long time, please strictly observe the following items.

SAFTY CONCERNS

- (1) Please confirm that the ground wire is connected.
- (2) Do not touch the electrodes and work-pieces by hand during processing.
- (3) Please use the machine under the condition that the lower part of the machine and the door of the operation box are both closed.

INSTALLATION AND USE CONCERNS

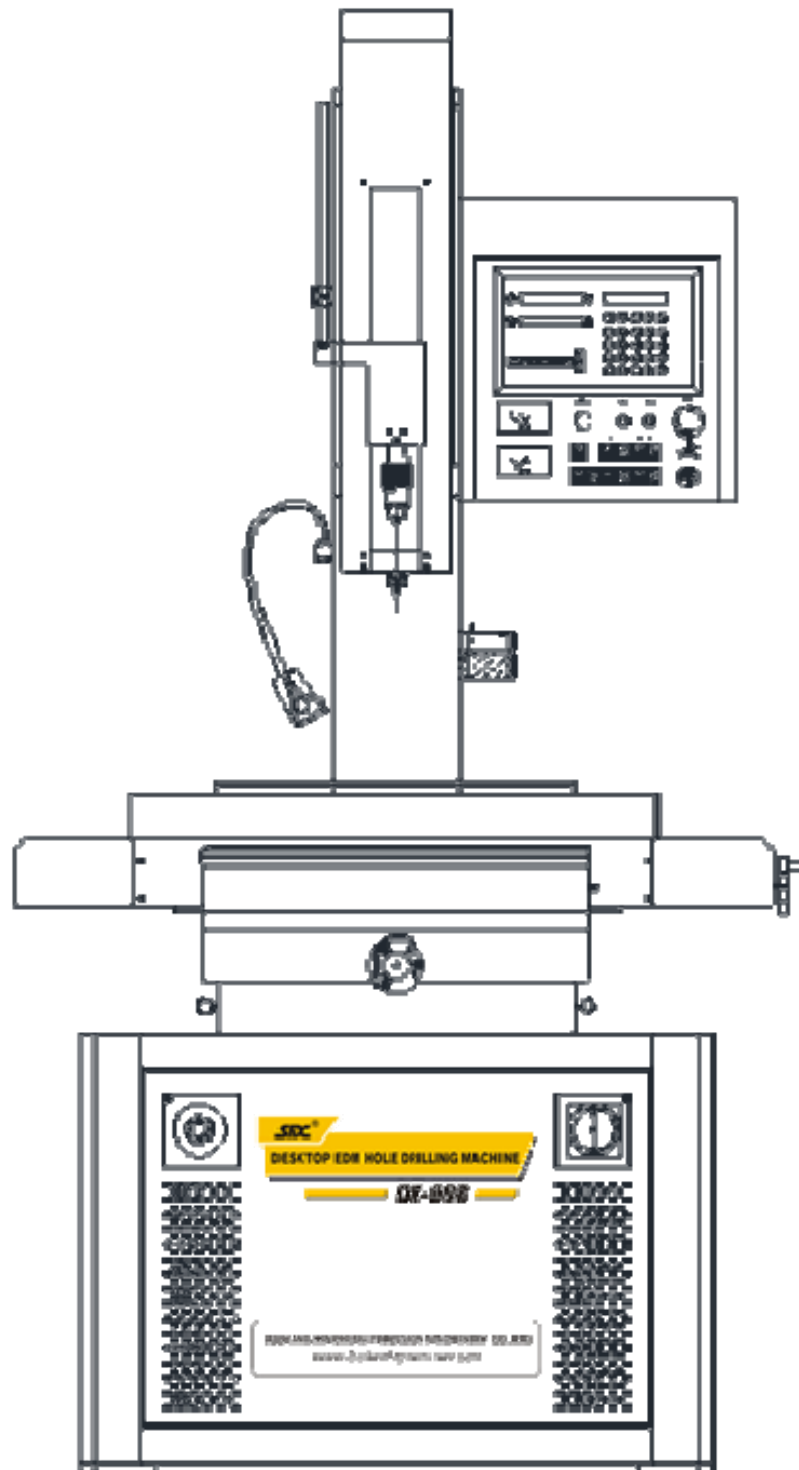
- (1) Please install the machine correctly in horizontally position.
- (2) Please do not place the machine in the following places:
 - A place where the temperature changes drastically due to direct sunlight.
 - A place around the machine where vibrations can occur, such as punching.
 - Places with lots of trash and dust.
- (3) Please do not place items on the cabinet and the operation box.
- (4) Do not place anything other than the work piece on the workbench.
- (5) Please do a cleaning work after the end of processing to prepare for future processing.
- (6) Various maintenance must be implemented.
- (7) At the end of the process, the electrode copper tube must be separated from the work piece and then turned off. (If the power is turned on again when the electrode copper tube is in contact with the work piece, it will cause malfunction.)

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1. SUMMARY

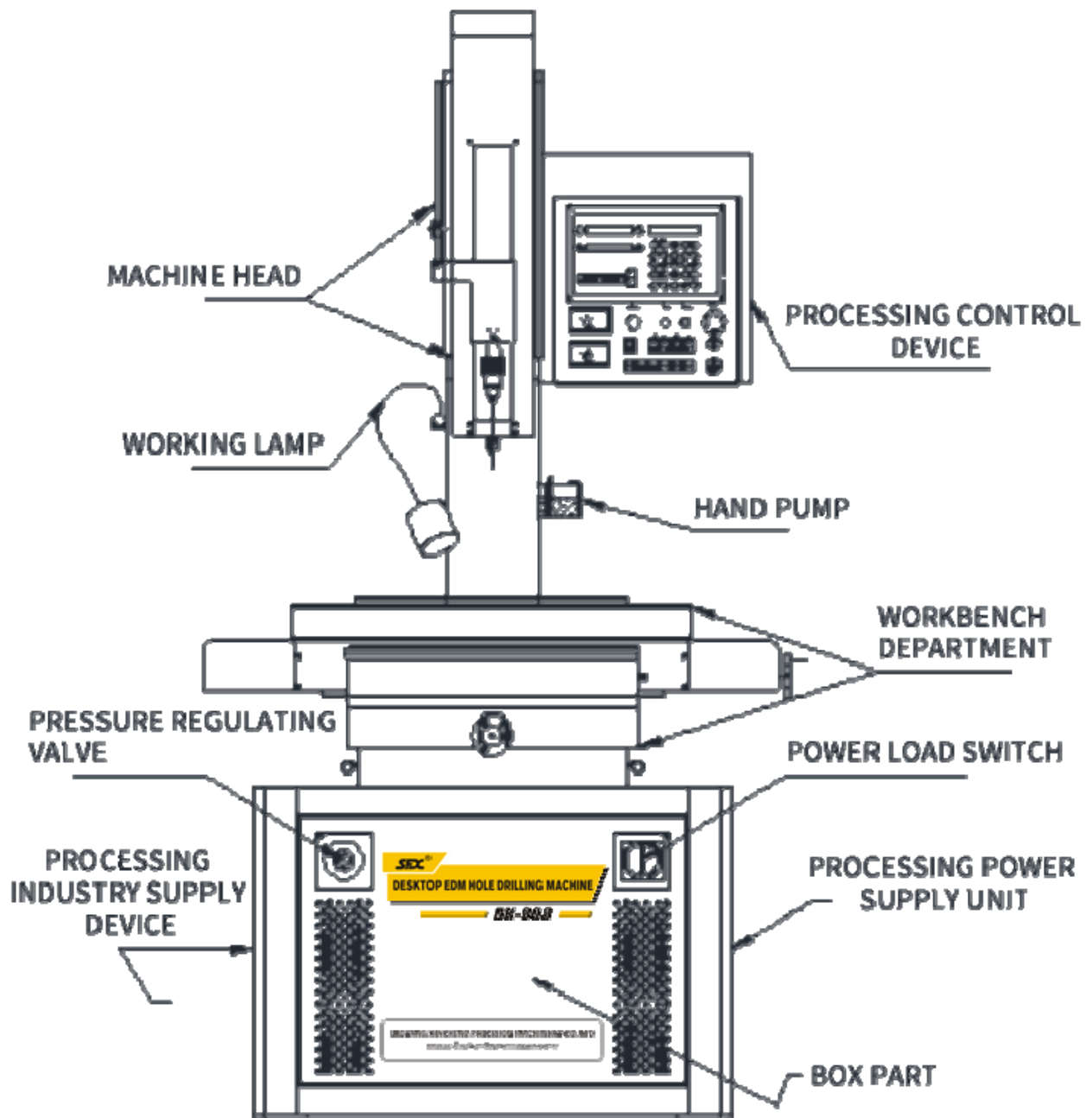
DK-908 type EDM Hole Drilling machine uses $\Phi 0.3 \sim 3.0\text{mm}$ copper tube electrode. Its working principle is to use the thin metal copper tube (called electrode wire) moving up and down vertically to erode metal by spark discharge.



The Manual Summarizes Entire Process & Maintenance of DK-908 EDM From Setup to Operation

2. MACHINE COMPOSITION

The machine is mainly composed of machine head, box part, workbench, working fluid supply unit, processing power supply unit, and processing control device.

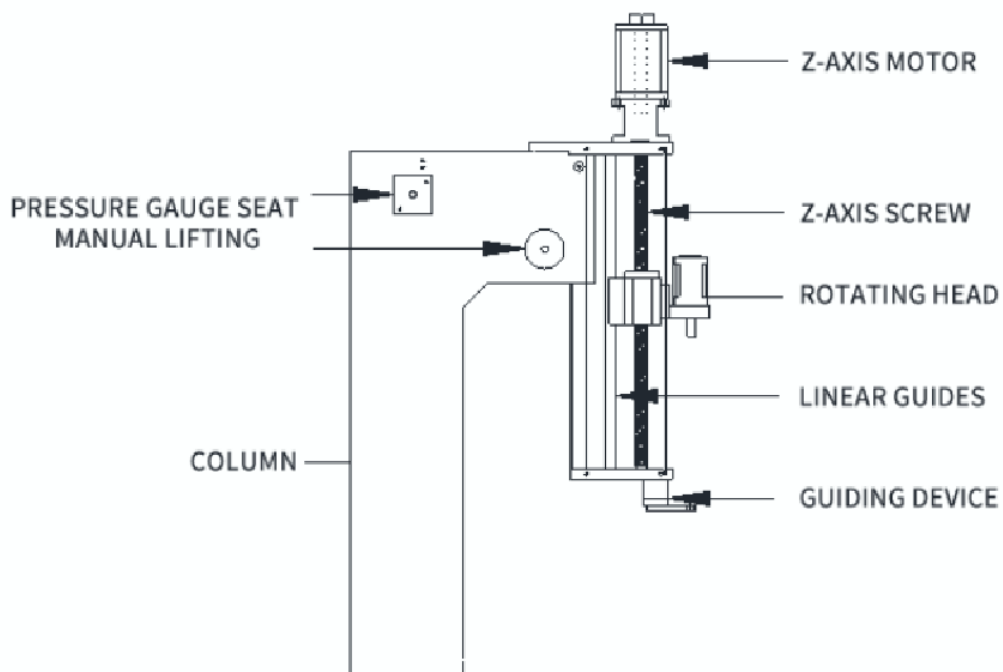


MACHINE EXTERNAL IDENTIFICATION DIAGRAM

1. Machine Head

The head parts are mounted on the column and consists of spindle system, counter shaft (W-axis) system, rotating head etc.

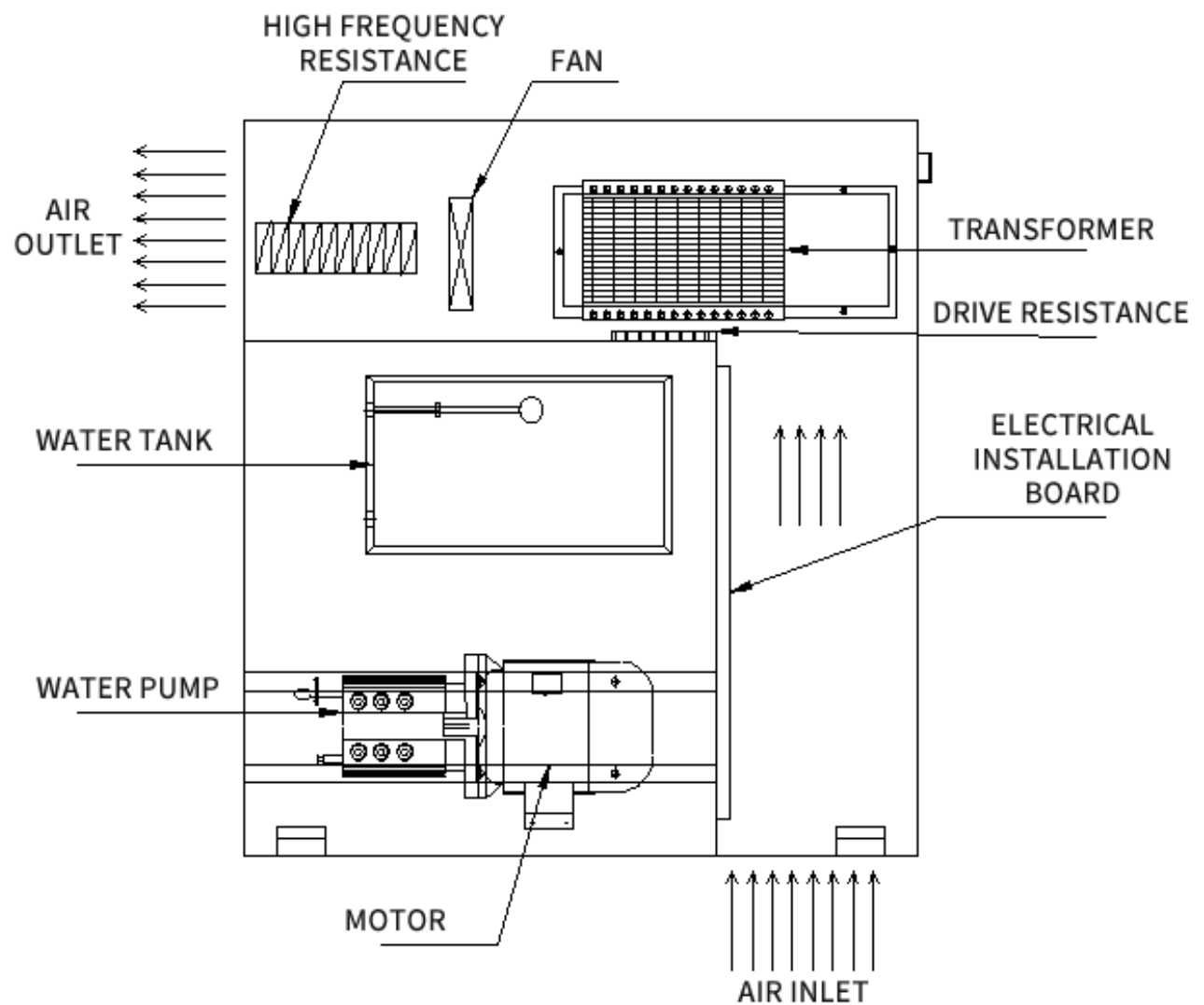
The spindle system is the main unit for completing servo feed in machining.



MACHINE HEAD INTERNAL ASSEMBLY DIAGRAM

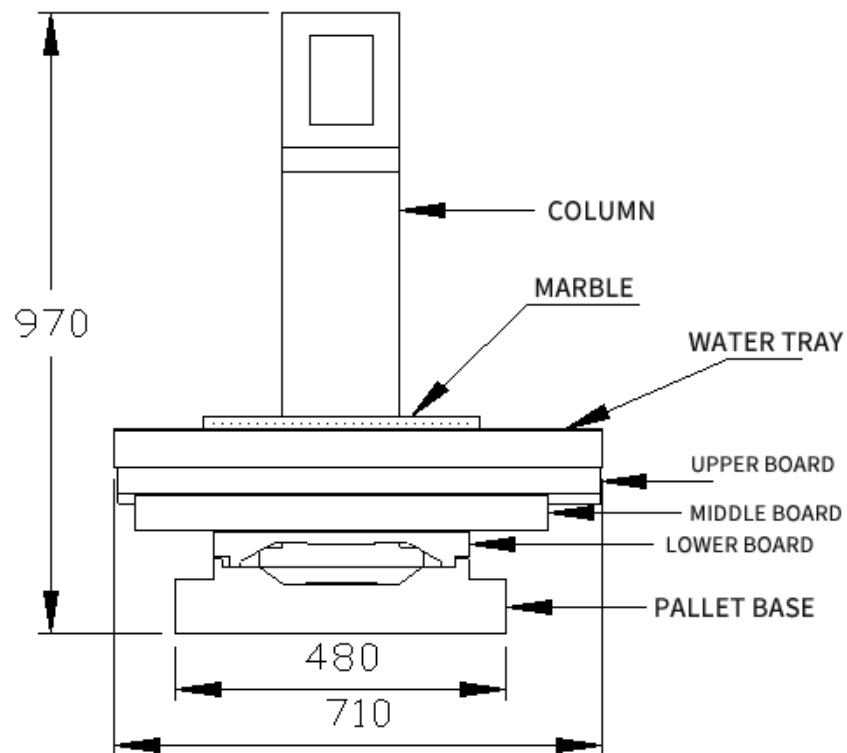
2. Box

The box body is composed of working fluid supply device and processing power supply unit, and is divided into two different spaces in the box body. The structure is not only convenient for maintenance and installation but also has better ventilation and cooling effect.

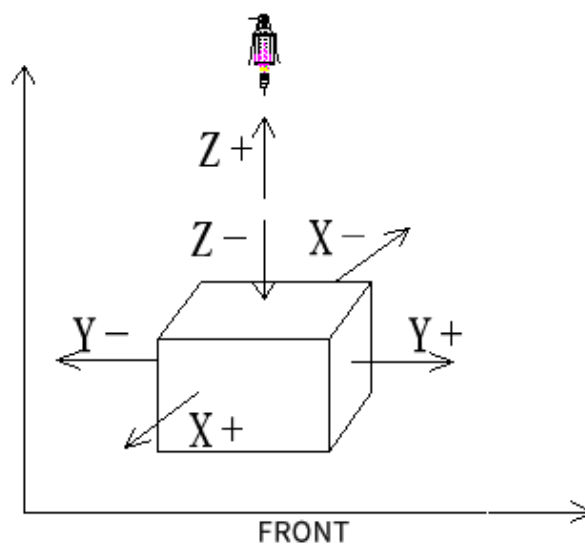


BOX INTERNAL ASSEMBLY DIAGRAM

3. Workbench



WORKBENCH DIAGRAM



MACHINE TOOL TRANSMISSION PATTERN

3.MACHINE PARAMETER

3.1 Item No.: DK-908

3.2 Machine Specification:

Machine Dimensions (Length * Width * Height)	(mm)	1000*1000*1900
Weight	(KG)	645
Workbench Dimension	(mm)	440*320
Minimum Reading Unit	(mm)	0.005
Workbench Left & Right Moving Distance (Y Axis)	(mm)	400
Workbench Back & Forth Moving Distance (X Axis)	(mm)	300
Maximum Loading Weight	(KG)	300
Head Stroke	(mm)	280
Spindle (Z-Axis) Servo Stroke	(mm)	380
Maximum Distance Between Guide And Workbench	(mm)	320

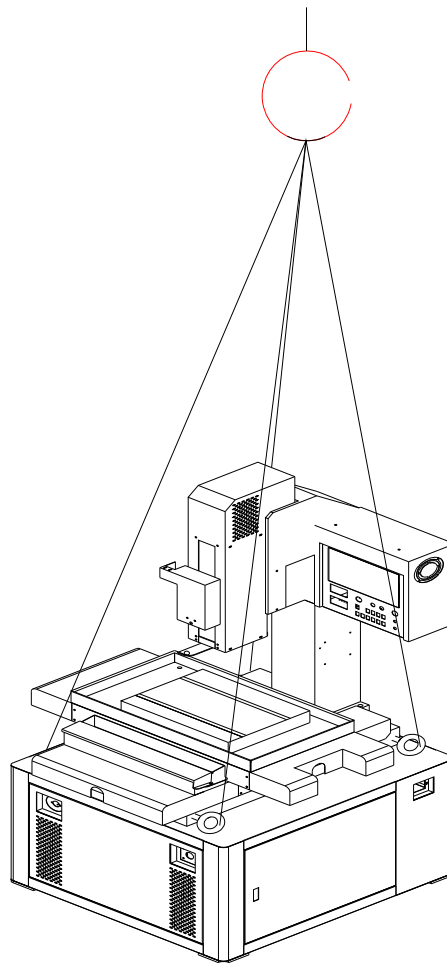
3.3 Main Technical Parameters

Electrode Diameter Range (Mm)	(mm)	$\Phi 0.3 \sim \Phi 3.0$
Spindle (Z-Axis) Maximum Feeding Speed	(mm/min)	750
Rotary Head (C Axis) Speed	r/pm	0~500 Adjustable
Maximum Input Power	(KVA)	3.3
Input Voltage	V/HZ	3 Phase*AC240V 50HZ
Maximum Machining Current	A	30
Machine Head (W Axis) Secondary Lifting Form		Manual
Digital Display		TWO AXIS
Working Fluid Supply Device		Electric Piston Pump
Maximum Working Fluid Pressure	Mpa	7

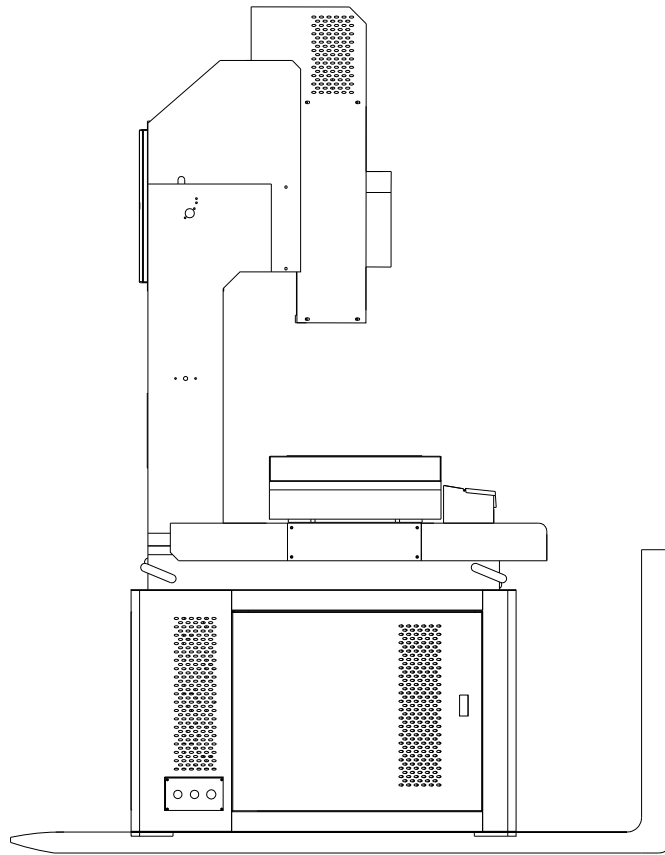
4. INSTALLATION

4.1 Transport

- (1) When lifting the machine, use eyebolts on the side of the machine pallet base. If the machine tool and the sling are in contact, please use a pad or lining cloth to cushion.
- (2) When transporting, please lower the machine head to the lower part near the lower limit position, and then use the skid to support the bottom cover of the machine head. Be careful not to touch the stainless steel guide plate.
- (3) Special care must be taken when transporting the machine, especially the spindle head, guides, workbench, sheet metal, etc. to maintain a certain safe distance from the external parts of the machine, and do not use these parts that are related to the machine as the fulcrum.
- (4) Rope Loop Transport Diagram.



(5) Forklift Loading And Unloading Diagram.



(6) After arriving place, remove fixed wooden strips and stow-wood feet to install adjustable machine feet.

Fix built-in bolts of stow-wood feet, connect it with the feet of box. After stow-wood is removed, adjust the nut of the adjustable machine feet at same height. Then fix the adjustable machine feet to the feet of the box. After horizontal adjustment is completed, tighten the adjusting nut.

4.2 Placement Environment And Adjustment

(1) Placement Ground

Place the machine on a level surface that can withstand the weight of the machine.

(2) Vibration Countermeasure

Please place the machine on a stable ground that is not vibrating.

If the adjacent machine tool will propagate vibration, use rubber for shock proofing.

(3) Environment

The placement environment will affect processing accuracy. So choose a place where the temperature changes little, the garbage is less, and it is not exposed to direct sunlight.

(4) Level Adjustment

When performing the horizontal adjustment work, place the level at the center of workbench and adjust it with the adjustment nut of the lower machine's four feet. Please adjust the level of machine's workbench within 0.04MM/M. After adjustment is completed, tighten the nut on the machine's feet screw and confirm that the machine's feet is in full contact with the ground.

(5) Room Temperature Management

Try to process at a place with temperature change and time zone changes a little, so that a better process can be obtained for the step distance work.

(6)Voltage

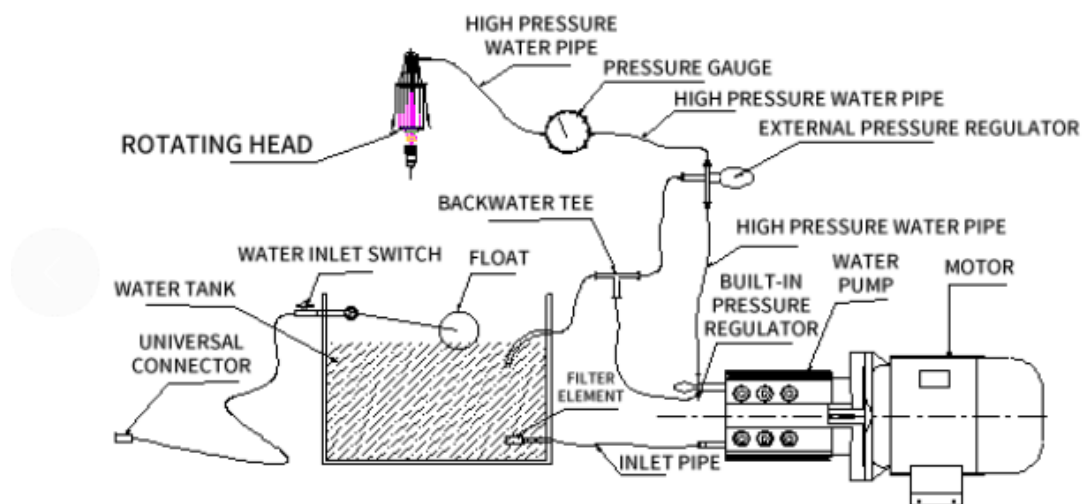
The power supply voltage is AC240V 50HZ.

(7)Ground wire

The ground wire must be connected securely.

4.3 Water Circulation Device

(1)



Electric Pump Water Circulation System

Electric Pump Water Circulation System

(2) Water Pump

The pump is light-small three-cylinder ceramic plunger pump with high-pressure & high-speed . The water temperature should be 0 to 40 °C at room temperature.

Main Technical Parameters

Plunger Diameter x Stroke	$\Phi 18 \times 4.5\text{mm}$
Rated Speed	1390r/min

Theoretical Flow	4.88L/min
Rated Pressure	7Mpa
Matching Motor	750W
Crankshaft Lubricant	N68-N150 Machinery Oil Gb3142-82
Plunger Material	Ceramics
Overall Dimension	200 × 190 × 115mm
Base Size	80 × 80-M6 Screw
Weight	4.8Kg
Connector	PC10-G3/8"
Outlet Joint Thread	M12 × 1.25
Suction Pipe Inner Diameter	Φ 10
Outlet Pipe Inner Diameter	Φ 6

Working principle: The power through the crankshaft linkage mechanism converts the rotary motion of the crankshaft into the reciprocating motion of the plunger. When the plunger retreats, due to the vacuum suction, the inlet valve opens and the outlet valve closes, and the water is drawn into the cylinder plunger. When the water pressure in the pump rises, the inlet valve is closed, the outlet valve is opened, and the high pressure water is discharged from the outlet valve through the high pressure pipe.

The pump pressure depends on the damping of the pump outlet. If the damping amount is larger, the pressure is higher, and vice versa.

★Since the plunger pump has weak water absorption performance, it is recommended that the lowest level of the water tank be kept above the suction hole of the plunger pump.

★The pump adopts an internal return water structure. When the copper pipe is blocked or the pressure gauge has pressure and no water, the running time of the pump cannot exceed 2 minutes.

★It is normal for the sports seal to have dripping or oil leakage during the operation of the pump, but the dripping amount does not exceed 1 ml/min.

★After the new pump has been in operation for 20 hours, the oil should be replaced and the oil should be changed every 100 hours.

Oil Change Method:

Open the fuel cap, place the oil container, open the oil drain bolt, and release the old oil. After the old oil is drained, screw out the oil drain bolt and inject the new lubricating oil with the specified label from the fuel

filler cap. The oil level should be half of the oil mark and screw the fuel filler cap.

★After the pump is working for about 500 hours, comprehensive inspection should be carried out to check whether the pump body screws loose, whether there is oil leakage or water leakage, and whether to replace some defective parts.

★Please do not disassemble the cylinder head or open the crankcase by yourself. If you have any problems, please contact our company in time. Please replace the accessories with original parts.

(3) Motor

Please refer to the motor nameplate for motor parameters.

The motor and the water pump are assembled in a direct connection manner, wherein the rotation direction of the motor satisfies the performance of the water pump which is not limited to the forward and reverse rotation.

★The motor must be grounded safely and reliably.

(4) Pressure Gauge

The output pressure value of the working fluid is displayed.

(5) Pressure Regulating Valve

When adjusting the pressure of the copper pipe to output the working fluid, when the pump is turned on, observe the pressure gauge to display the value, turn right to increase, turn left to decrease. The pressure is adjusted to 5~7Mpa, the pressure regulating valve is divided into two parts: built-in and external. The built-in pressure regulating valve is fixed on the pump body. The main function is to prevent the pipe and rotating motor from being impacted when the discharge pressure is too high. . It has been debugged at the factory. When it needs to be re-adjusted, please turn the external pressure regulating valve to the right and the built-in pressure regulating valve to the left to the bottom. Turn on the water pump and adjust the built-in pressure regulating valve while observing the pressure gauge to make the pressure gauge. Targeted to 8Mpa. The external pressure regulating valve handle is located at the upper left corner of the front door of the machine cabinet, which makes it easier to adjust the pressure and observe the pressure value.

(6) Filter element

The filter element is installed at the front end of the inlet pipe at the bottom of the water storage tank to prevent the foreign matter from being sucked into the water pump and the pipeline. Please clean it at least once a month. When cleaning, use a little force to rotate the inner wall of the filter to remove the filter. Generally, use diesel to clean the filter and then dry it with air gun. The filter must be immersed below the water surface during processing.

(7) Filter

After the filter is used for a period of time, the filter may be blocked due to a lot of impurities attached to the surface of the filter element. At the same time, the filter element may be damaged and blocked after the filter element is used for a long time. Please change it once every three months. When replacing, use a special wrench to unscrew the filter element to the right. Be careful not to fall out of the seal. When installing the new filter element, keep the filter element vertical and tighten with a special wrench.

4.4 Test Power Supply

(1) Connect The Power Supply

- a. The main power supply air switch of the main unit in the owner's distribution box is opened, and the multimeter between the three phases of the open-air output side and the zero-free voltage is measured using the multimeter 750V. And reliably hang the "no closing" information logo. (If the owner has other equipment connected to this switch, you need to obtain the owner's consent, and you must not open it without authorization)
- b. The main power air switch and the load switch of the machine are opened, and the voltage of the 750V voltage is measured by the multimeter to measure the absence of voltage between the input side and the output side of the switch, and the emergency stop switch of the control system is disconnected.
- c. Determine whether the power supply line diameter of the owner's power distribution cabinet machine meets the maximum power requirements of the machine system.

★Power supply wire diameter requirement $\geq 2.5\text{MM}^2$ (multi-core copper wire)

- d. Connect and tighten the power cord.

★The ground wire must be connected reliably (the ground wire is usually yellow-green cable)

(2) Line Routine Inspection

a. Visual Inspection

- a.1 Check the transformer and the pump motor moves in position due to long-distance transportation.

a.2 Check if the bundled wires are disconnected, loosen, and the circuit board and the fixed sheet metal are not dropped.

- a.3 Check the sheet metal for damage and affect the line.

b. Instrument Check

b.1 Main Circuit Check

Check whether the U, V, W three-phase resistors of the pump motor and the secondary stroke motor are

basically the same using the ohmmeter of multimeter.

Check if the two-phase resistance of the spindle motor and rotary motor A1, A2 and B1 and B2 are basically the same using the ohmmeter of multimeter.

Check the presence of grounding in each phase of the motor using the ohmmeter of multimeter.

Check the main circuit for a short circuit using the ohmmeter of multimeter.

b.2 Control Loop Check

Is there a short circuit between the AC circuit and the DC circuit of the ohmmeter of multimeter?

Is there a serial connection between the AC circuit and the DC circuit with the ohmmeter of multimeter?

Is there a grounding short circuit condition with the ohmic file of multimeter?

c. Fasten the fixed terminals in all power main circuits in the machine's electrical cabinet with suitable tools.

(Although the inspection is tightened at the time of shipment, sometimes the terminal may be loosened during transportation.)

(3) Power On

a. Use the multimeter voltage file to detect the voltage on the input side of the main power switch of the owner's power distribution cabinet.

b. Close the main power switch of the owner's power distribution cabinet (if the owner's switch supplies power to other equipment at the same time, notify the owner before the power transmission and obtain the power supply permission). Use the multimeter voltage file to detect the main open air output side voltage of the owner cabinet. Meet the requirements (note whether there is a phase loss phenomenon) and remove the "no closing" sign.

c. Close the machine power supply air switch and load switch, and measure the output side voltage to meet the system requirements. (note if there is a lack of phase)

d. Release the emergency stop switch and the system is powered.

After the system is powered on, the digital display shows the initial coordinates and the operation panel indicator lights.

★If the machine is abnormally sounded or smells off immediately, turn off the machine and find the cause.

(3) Power Phase Sequence Check

After the machine is powered on, first test whether the rotation direction of the secondary stroke (W-axis) motor is correct, click the UP button, and move the W axis upwards if it moves downward. Please change any two lines between the three-phase power supply, jog the DW button, and move the W axis down.

★Why can't I press the UP button from the beginning?

Because the W-axis has support pads in the lower part of the W-axis during transportation, if the direction is incorrect, the motor will not move downward and block the motor. At this time, the motor stall current is large if it is long. Blocking can cause adverse effects on the motor windings and even burn out the motor.

★Why check the power phase sequence?

Because the machine's secondary stroke (W-axis) motor uses a three-phase 380V permanent magnet low-speed synchronous motor, the motor drives the screw to hit the limit switch in the up and down operation and stops, and then can only run in the opposite direction. Once the power phase sequence is incorrect, the limit switch will be invalid. If the lead screw continues to operate after the limit switch fails, the mechanical unit will be stuck. Therefore, it must be ensured that the phase sequence of the three-phase power supply is correct before debugging or processing.

If the W axis is stuck at the upper limit, first adjust the phase sequence of the three-phase power supply, then lift the lift button and lift it from the position of the lower cover of the spindle with cork. (Note that the lower cover has a vertically oriented stainless steel device that cannot be touched)

If the W axis is stuck at the lower limit, it is generally only necessary to adjust the phase sequence of the three-phase power supply to drop smoothly.

When the W-axis is stuck, the UP or DW button cannot be activated all the time.

After the phase sequence adjustment of the three-phase power supply, please debug the limit switch again to work normally.

(4) Disassemble locking device

- a. After powering on, the W axis runs up and the W-axis support pad is removed.
- b. Remove the rotating head sheet metal anti-deformation pad.
- c. X Shaft locking plate

Use the Allen key in the toolbox to remove the X-axis left-hand pallet sheet metal fixing screw. You can see that the base and the X-axis carriage have the locking plate fixed connection. After the locking platen screw is unscrewed, the locking plate can be removed and then dragged. The sheet metal is reinstalled and fixed.

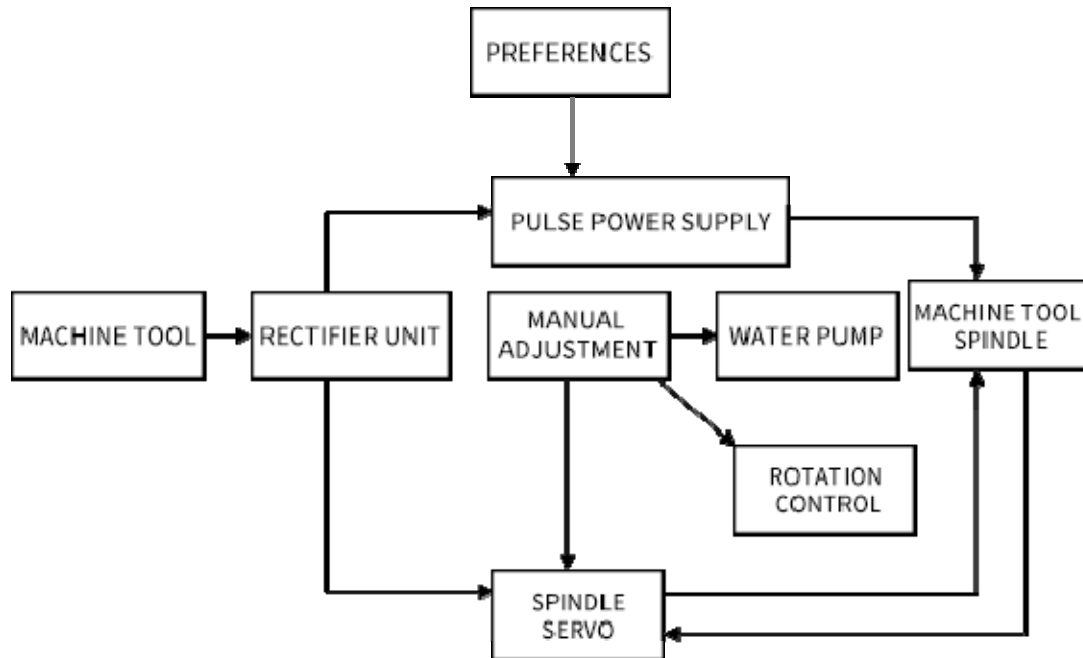
- d. Y-axis locking platen

Shake the X-axis carriage in the opposite direction of the column, and also remove the sheet metal screws behind the Y-axis. After removing the locking platen, reinstall the pallet sheet metal.

5. PARTS NAME AND FUNCTIONS

5.1 Electrical Control System

The electrical system of machine is mainly composed of pulse power supply, spindle servo system, rotary head device, rectifier unit and so on.



(1) Pulse power supply

The appropriate parameters are selected manually by the pulse parameters "selection switch" and "power amplifier tube" selection switch on the operation panel. According to the received settings, the large-scale integrated circuit automatically generates corresponding pulses and pulses as processing pulses, and simultaneously turns on the corresponding power tube channels, so that the pulse parameters and processing current are within the operator's setting range. If all the conditions are satisfied, the system pulse and the power tube turn-on signal are outputted between one pulse/pulse, and the circuit is pushed to the front stage after the level conversion circuit, and the electric energy is added to both ends of the spark gap by the amplifying circuit, thereby completing Discharge process.

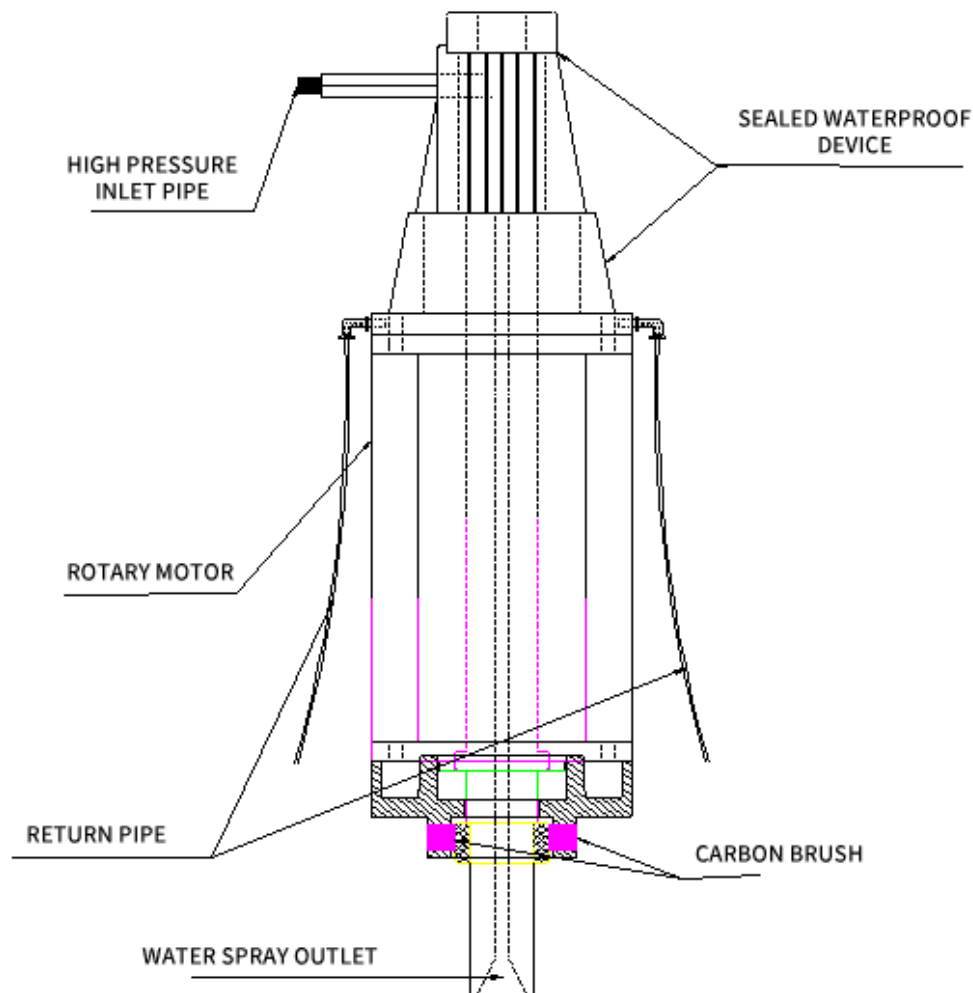
(2) Spindle servo system

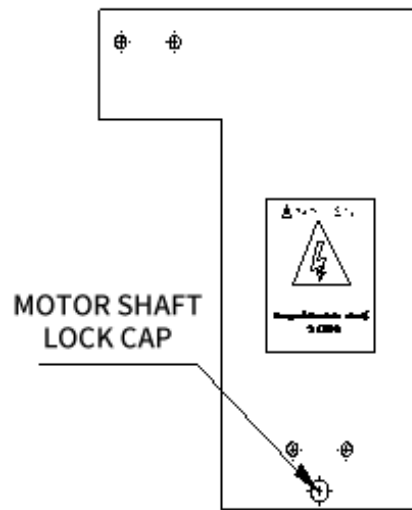
The spindle servo system is mainly composed of a control power driving unit, a feedback signal processing unit and a stepping motor. The control power driving unit adjusts the pulse signal control according to the difference between the given value of the system and the actual running value detected by the feedback signal unit; the power driving is used as the main loop of the system, and the pulse signal is converted into the corresponding angular displacement to the stepping On the motor, adjust feed speed of stepper motor.

5.2 Rotating Head

The rotating head is mounted on the spindle slider, which realizes the sealing introduction of the high-pressure working fluid during clamping, rotation, conduction and rotation of the copper tube electrode. This product is an integrated design. The rotation of the copper tube is directly driven by the motor. The synchronous gear reduction drive is omitted in the middle. The rotary motor is driven by the subdivided professional driver. The voltage adjustment range is wide, the torque is larger, the failure rate is low, and the rotation speed can be Adjustment is more advantageous for processing. The high-pressure working fluid is injected into the central hole of the rotor of the motor, and the design, structure and water leakage prevention performance of the sealed water inlet device are more reasonable and reliable.

★ This product is a patented product of the State Intellectual Property Office. It is forbidden to be counterfeit.

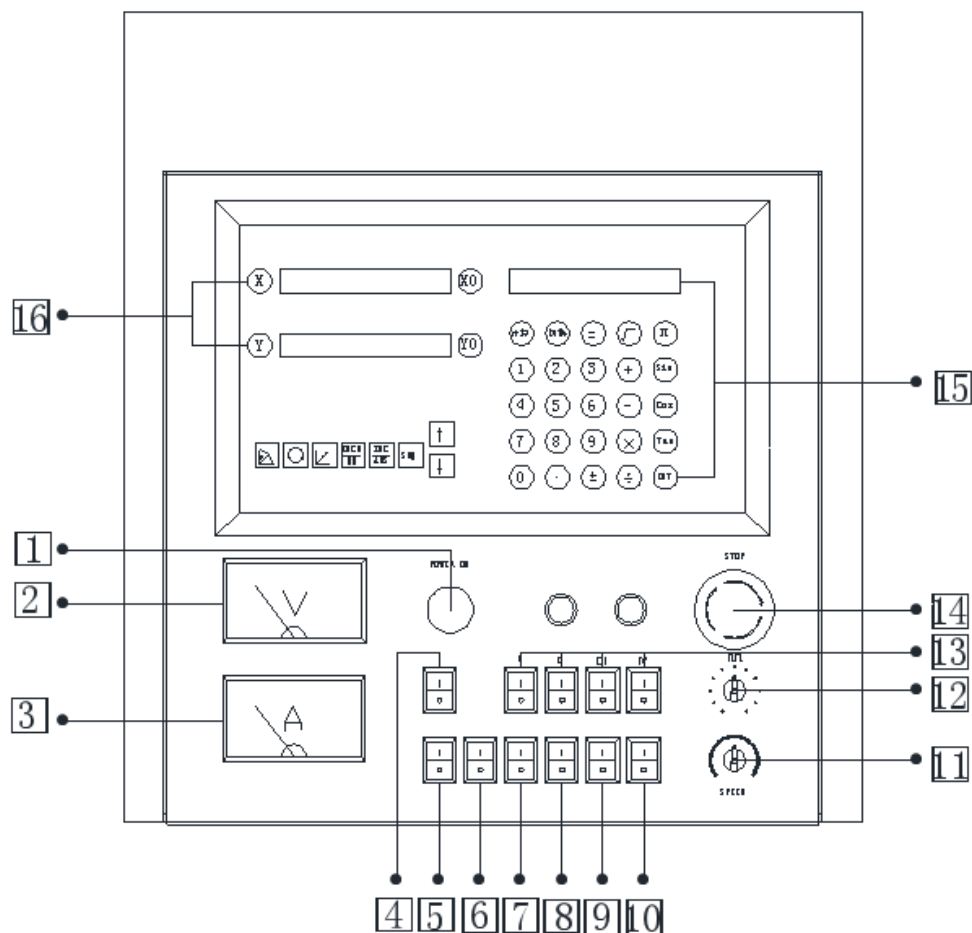




Rotating the head cover

★ Rotate the motor shaft to lock the screw device, press the screw cap, and the motor shaft locks and tightens the copper tube electric chuck.

5.3 Control Panel



Panel Layout

1 Indicator Light

Indicates if the power is on.

2 Voltmeter

The machining gap voltage is displayed.

3 Ammeter

The machining current is displayed.

4 Voltage Switch

Press the switch up to the high voltage state and the no-load voltmeter shows about 90V.

Press the switch down to the low pressure state and the no-load voltmeter shows approximately 60V.

5 Tool Switch

When the tool setting switch is pressed, the buzzer sounds a slight squeak, then press the machining switch and the spindle starts running. Adjust the potentiometer knob, the spindle is stable up and down, flexible operation. When the potentiometer is adjusted to the left, the spindle rotates upwards. When the potentiometer is adjusted to the right, the spindle runs downward. When the copper tube hits the work-piece, the buzzer makes a loud noise. The spindle rotates up and down, and a slight spark is generated at the lower end of the copper tube and the work-piece.

Use edge positioning and centering with this function in conjunction with the digital display.

★The tool switch cannot be opened during normal machining.

6 Rotary Head Switch

When the rotary switch is pressed, the rotary motor starts to run.

★ The direction of rotation of the motor is clockwise (viewed above, factory has been commissioned).

★ When the seal ring cannot be taken out, the water pump switch on the panel can be opened and the high pressure of the working fluid can be used to flush it out.

7 Water Pump Switch

Turn on the water pump, the copper tube electrode is out of water, and check the copper pipe water supply before processing begins.

8 High Frequency Switch

Turn on the high frequency switch and turn the pulse power on. The voltmeter shows the pulse processing

voltage, the copper tube and the workpiece are charged, and it is forbidden to touch it by hand.

★ Only open the high frequency switch of the water pump switch to open.

★ After processing, turn off the high frequency switch, then turn off the water pump and rotate the head.

9 Processing Switch

After setting the machining parameters, turn on the rotary head switch, water pump switch and high frequency switch, turn this switch on for processing. When the id is pressed, the spindle is raised and the potentiometer can be adjusted to change the rising speed.

10 Manual Switch

Pressing up, the spindle is raised, pressed, the spindle is lowered, and the machining is also effective.

11 Potentiometer

(1) The machining gap voltage and machining current can be adjusted during machining. Clockwise rotation reduces the gap voltage to increase the machining current, and counterclockwise rotation increases the gap voltage. The machining current is correspondingly smaller. Generally, the potentiometer is adjusted according to the processing parameters, and the machining current is stable. The improper selection of parameters will result in the stability of the adjustment potentiometer. The processing voltage is generally stable at 20 to 25V.

(2) When manual, adjust the spindle recovery speed. Rotate clockwise to slow down and counterclockwise to increase speed.

12 Parameter Adjustment Knob

The parameter adjustment knob has a total of 11 files from left to right. Select different gear positions according to different copper pipes, materials, processing voltage, etc. Generally, the larger the diameter of the copper tube electrode, the higher the corresponding gear position is selected.

13 Amplifier Switch

The power amplifier switch has a total of four points and eight channels as follows:

Amplifier identification	I	II	III	IV
Number of power amplifier tubes	1	2	2	3

The more the power amplifier tube is opened, the larger the machining current is, and the loss is also increased.

The power amplifier tubes are all turned off and no output current.

14 Emergency Stop Switch

When the machine is turned on, release the knob to energize the whole machine. When there is an

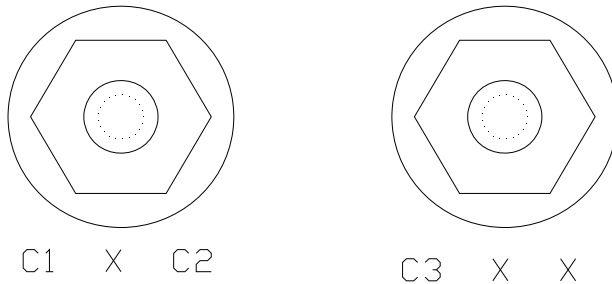
unexpected situation, press the knob to cut off the power.

15 Light Ruler Function Area

16 XY Axis Coordinate Display Area

Gap Capacitance

The side of the operation box is as follows:



C1, C2, C3 represent different capacitance values. × indicates neutral.

The button switch cannot be placed in the neutral position during processing.

6. PROCESSING ORDER

6.1 Process Before Starts

1 Placement of the work-piece



Place the work-piece on the table balance bar.

2 Electrode installation



The copper tube electrode is mounted in the chuck, then mounted on the machined rotary head shaft.

3 Confirmation of working fluid



Turn on the pump to check if the working fluid can be ejected normally from the front end of the electrode.

4 Adjustment of machining position



Move the X and Y axes to the machining position with the hand wheel.

Adjust the position of the W axis so that the lower end of the guide maintains a distance of 3 to 5 mm from the work-piece machining surface.

5 Processing condition setting



Set the machining parameters and turn the potentiometer to the far left.



6 Processing begins

Turn on the rotary head, pump, high frequency one by one, and then start machining.

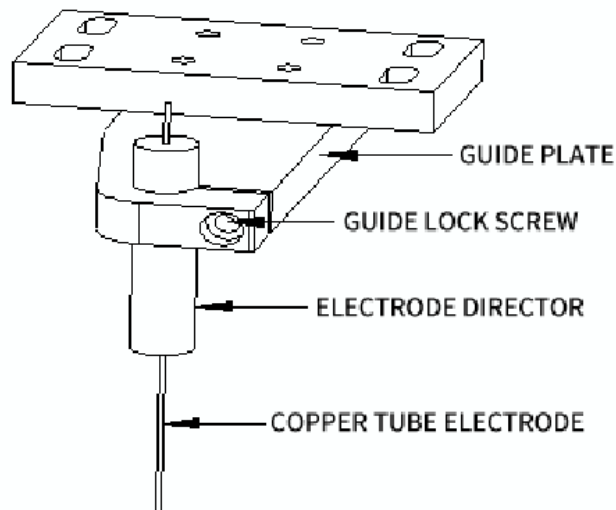
6.2 Setting Electrode Guide

Use an electrode guide that is suitable for the diameter of the copper tube electrode. Install the electrode guide firmly in the hole in the guide plate.

6.3 Copper Tube Electrode Installation

(1) Electrode inspection

- a. Select a copper tube electrode that cannot be too curved.

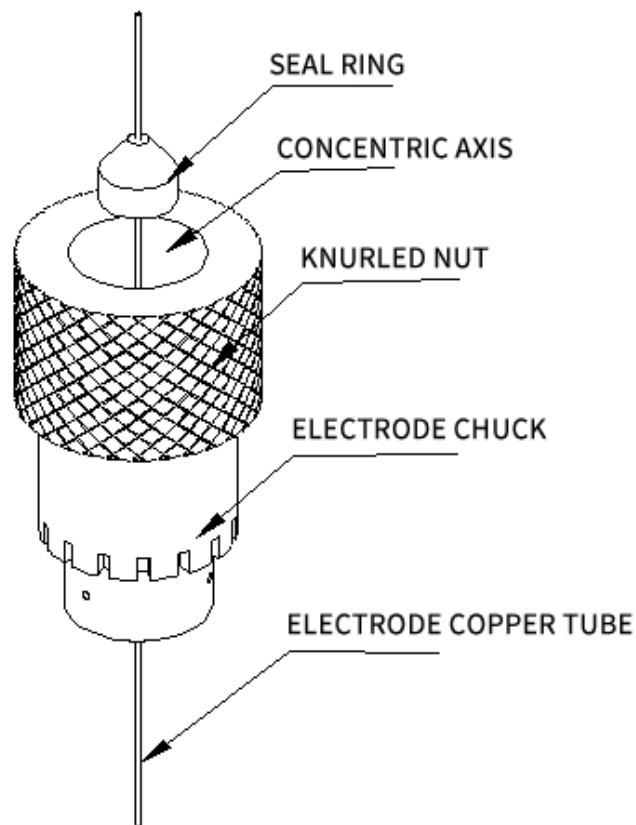


- b. Check if the hole of the copper tube electrode is clogged. (especially for copper tubes below $\Phi 0.5\text{MM}$)

The simple method of inspection is to put one end of the copper tube in the mouth, the other end in the water, and blow it with the mouth. If there are blisters in the water and the number of blisters is appropriate, there is no problem.

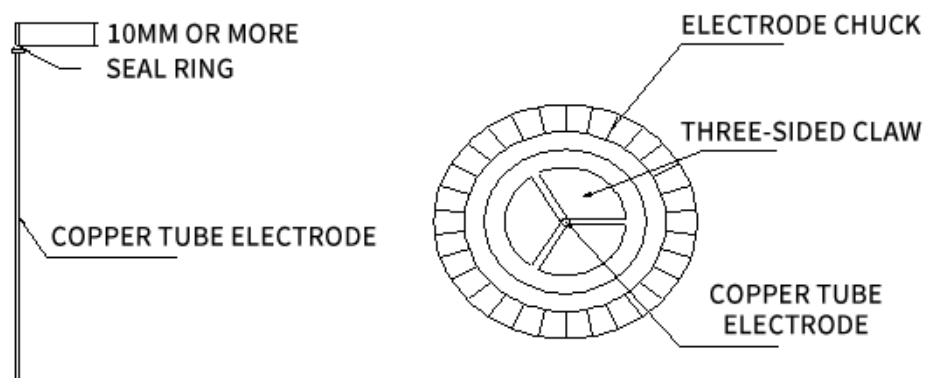
If the hole of the copper tube is blocked, turn the copper tube and cut the front end of the copper tube by a few millimeters while rotating the copper tube. When cutting the copper tube, cut the copper tube while cutting it on the plane, taking care not to bend or damage the copper tube. It is also possible to install the copper tube on the machine to open the water pump, and then cut off the end of the copper tube by a few millimeters with special scissors for the copper tube.

(2) Electrode mounting method



Install the sealing ring on the copper tube electrode as shown above, and then pass the electrode holder from top to bottom through the center hole of the chuck.

- ★ At this time, use a sealing ring suitable for the diameter of the copper tube electrode.
- ★ Be careful not to bend the copper tube electrode during operation.
- ★ The tapered head of the copper tube seal fits upwards with the inner tapered surface of the motor shaft.



The upper end of the copper tube should exceed 10 mm of the sealing ring.

Since the head of electrode holder is a three-sided claw, check if the copper tube electrode is installed at the center.

★ When using copper tubes below $\Phi 0.5\text{mm}$, in order to prevent damage to the copper tube electrodes, avoid using the electrode chuck wrench to operate with force. Otherwise, the copper tube may be bent or not spit water to affect the processing.

(3) Electrode chuck installation

- a. Open the machining switch and adjust the potentiometer to raise the spindle to the upper limit position at the fastest speed.
- b. Hold the electrode chuck knurled nut in the left hand and align it with the lower end of the rotating motor shaft (outer taper hole external thread), turn the rotary motor switch on the right hand, and the knurled nut will automatically lock upwards (when the knurled nut and the motor shaft rotate at the same time) Start). For copper tube electrodes above $\Phi 1.0\text{MM}$, press the locking screw cap above the electrode holder to lock again.
- c. Tighten the three jaws of the chuck with a special wrench for the electrode holder.
- d. Keep the copper tube electrode rotating, press the manual lift switch to make the main shaft run downward and observe the lower end of the copper tube safely passing through the center hole of the guide. When the copper tube electrode is transmitted from the bottom surface of the guide, it can be stopped. Be careful not to bend the copper tube electrode during operation.

6.4 Work-Piece Installation

- (1) Place the work-piece on the stainless steel balance bar on the work surface and temporarily fix it with a clamp.
- (2) The magnetic table of the dial gauge is attracted to the lower end cover of the spindle to position the work-piece. After positioning, secure the work-piece with the clamp.

6.5 Method Of Determining Processing Position

- (1) Open the tool setting switch, the rotary head switch and the processing switch so that the copper tube electrode exceeds the lower end surface of the electrode guide by 20 to 30 mm.
- (2) Slowly move the XY-axis carriage toward the end face of the workpiece so that the side of the copper tube electrode is in contact with the end surface of the workpiece. (At this time, if oil, water, garbage, etc. are attached to the machined end face, it will affect the accuracy of the machining position sought, so it must be wiped clean)
- (3) Once the side of the electrode comes into contact with the end face of the workpiece, the contact buzzer will

ring. At this point, stop moving the XY axis carriage.

★ If the copper tube hits the end surface of the workpiece very heavy, the copper tube will bend. Therefore, when moving the XY axis to move the board, you must carefully move it slowly with your eyes.

(4) After the position of the end face is determined, the copper tube electrode is raised without colliding with the workpiece. Then, while looking at the number of digital display, move the XY axis to the workpiece processing position.

★At this time, the radius value of the copper tube electrode should be considered to supplement the amount of movement.

6.6 Processing Condition Setting

The processing parameters are set according to the electrode diameter, the material of the electrode workpiece, the roughness of the machined surface, the processing efficiency, and the like.

Processing Parameter Selection Table
(for different processing environments, for reference only)

Electrode diameter (mm)	Speed	Gear position	Power tube	Processing gap voltage (v)	Processing current (A)	Gap capacitance	High and low pressure
Φ0.3	Low	3	2	40	2	C1	Low Pressure
	Medium	4	2	30	3	C1	Low Pressure
	High	4	3	25	4	C1	Low Pressure
Φ0.5	Low	3	3	25	5	C1	High Pressure
	Medium	4	2	20	5	C1	High Pressure
	High	3~4	5	15	8	C1	Low Pressure
Φ0.7	Low	4	3	15	7	C1	High Pressure
	Medium	3	4	15	8	C1	High Pressure
	High	5	3	15	8	C1	High Pressure
Φ1.0	Medium	5	4	15	12	C1	High Pressure
	High	6	5	15	14	C1	High Pressure
Φ1.5	High	7	5	10	15	C1C3	High Pressure
Φ2.0	High	8	6	10	20	C1C3	High Pressure
Φ2.5	High	9	7	10	25	C2C3	High Pressure
Φ3.0	High	9	8	10	30	C2C3	High Pressure

6.7 Machining

- (1) After setting the machining parameters, screw the potentiometer knob to the far left.
- (2) Turn on the rotary head switch, water pump switch, high frequency switch in turn, wait until the lower end of the copper tube electrode sprays water and the water pressure reaches the working value and press the processing switch.
- (3) While viewing the machining discharge state, slowly adjust the potentiometer to increase the machining speed and adjust until the discharge machining is stable.
- (4) When penetrating, if a spark is discharged from the lower part of the workpiece, the working fluid is ejected and the processing is completed.

If you put a rubber band or a pad under the workpiece, you can make a beautiful penetration hole.

If you want to make a more beautiful hole, please put a metal plate on the workpiece.

- (5) After the machining is finished, raise the spindle, pull it out from the guide hole, and clean the machine according to the operating instructions.

★When moving the workpiece at the end of machining, it is necessary to move the workpiece while optimistic about whether the copper tube electrode has been completely pulled out of the workpiece.

7. ABNORMAL PROCESSING CONCERNS

7.1 Electrode Director

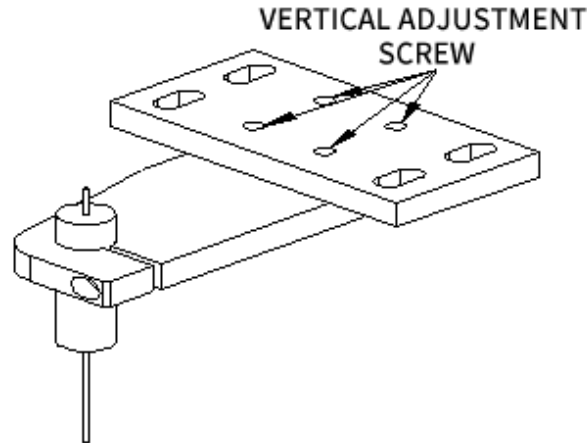
(1) Electrode Guide Inspection

- a. Check the gem nozzle of the electrode guide for cracks, notches, etc. In particular, if there is any burnt marks on the bottom of the electrode guide, if there is fine sandpaper, it can be removed by grinding.
- b. The copper tube electrode was used to pass through the electrode guide to confirm that the hole was not enlarged, the machining debris, and the like did not block the guide.

(2) Electrode Guide Fixing

The electrode guide is locked and fixed by stainless steel screws. The force of the screw is not too large. If the force is too long for a long time, the accuracy of the guide may be inaccurate, and the vertical hole of the hole is not good.

(3) Perpendicularity Adjustment Method of Electrode Guide



- a. Let the copper tube electrode protrude from the lower end surface of the guide by about 40 to 50 mm (preferably, the copper tube electrode with a diameter $\geq \Phi 1.5$ mm), or fix it at the electrode guide position with a ejector rod with an outer diameter of $\Phi 12$ mm.
- b. Use a square, a right-angled block, or a right-angled workpiece to the side of the protruding copper tube electrode or the side of the ram. Use a vertical adjustment screw to loosen the X-direction and the Y-direction while tightening the other side to adjust. The distance between the square and the side of the copper tube electrode or the ram is uniform.
- c. Finally, tighten all four vertical adjustment screws.

7.2 Unstable Processing

- (1) Please confirm the processing conditions.
- (2) Check that the working fluid is ejected from the front end of the copper pipe.
- (3) Please confirm that the copper tube is not bent or eccentric.
- (4) Check if the fixture of the workpiece is fixed.
- (5) Please confirm that the installation of the copper tube electrode, especially the electrode holder, is not abnormal.
- (6) Please confirm that the copper tube electrode is not abnormally consumed.
- (7) Check the installation position verticality of the electrode.

7.3 Copper Tube Electrode Bending

- (1) Please confirm the processing conditions.
- (2) Make sure that there is no insulation between the copper tube electrode and the workpiece.
- (3) Check if the workpiece and electrode output wires are connected.

- (4) Make sure that there is not too much space between the electrode copper tube and the workpiece.
- (5) Please confirm that the copper tube electrode is not blocked.

7.4 Abnormal Discharge

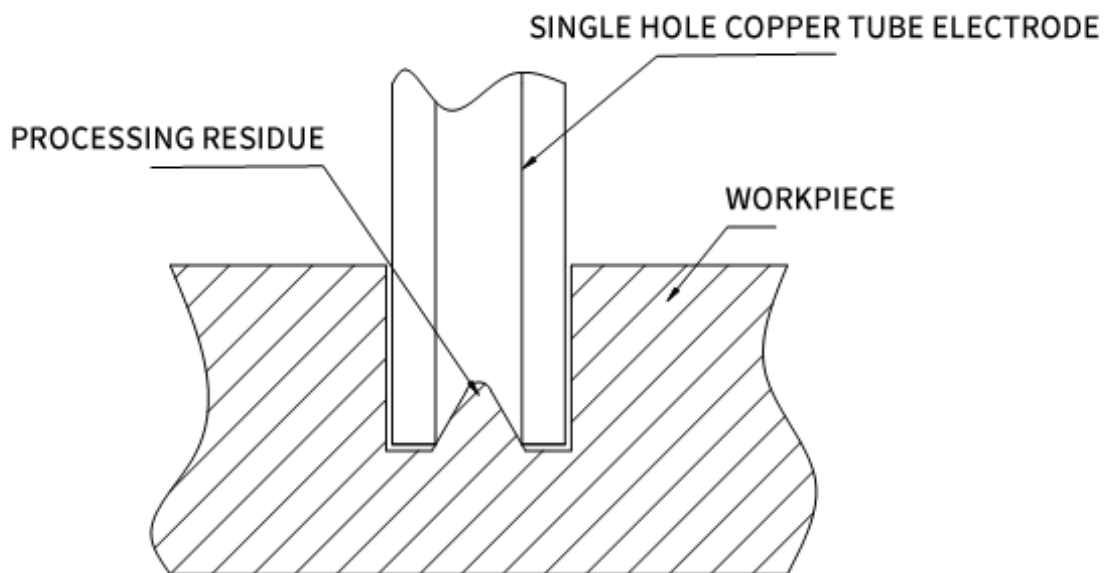
- (1) Please confirm the processing conditions.
- (2) There is no working fluid ejected from the copper tube electrode.

7.5 Raise The Knife Sharply

- (1) Please confirm the processing conditions.
- (2) Please confirm that the copper tube electrode is not bent.
- (3) Please confirm that the copper tube electrode is not abnormally consumed.

★When the copper tube electrode is processed again, if the black spot on the front end of the copper tube is found to be too long (generally <10mm) or deformed, use the special scissors for the copper tube to cut the blackened or deformed part at the front end. If the copper tube is sprayed with water, it will easily cause the copper tube to not discharge water, or open the polarity switch to process copper tube to consume a part of it.

- (4) When using a single-hole type copper tube electrode with a diameter of $\Phi 1.0\text{mm}$ or more, it is recommended that you use a hollow type copper tube electrode because of machining residue and unstable processing speed.



7.6 Low Processing Speed

- (1) Please confirm the processing conditions.
- (2) The working fluid is not sprayed smoothly enough.
- (3) The copper tube electrode extends out of the electric chuck too long.

(4) The copper tube and the electric chuck are not identical.

(5) The electrode guide is not perpendicular.

7.7 W Axis Can Not Move Up And Down

(1) Please confirm whether the three-phase power is out of phase.

(2) Please confirm whether the three-phase electrical phase sequence is correct.

(3) Check if the manual up and down buttons are in poor contact or the contacts are off.

(4) Please confirm that the limit switch is damaged and the machine is stuck.

(5) Please confirm whether the intermediate relay works normally or the conduction is not good.

8. MAINTENANCE AND INSPECTION

8.1 The lubrication parts of the machine tool are as follows:

Lubrication Position	Lubricating Oil	Quantity	Description
Workbench Carriage Guide Plane	Rail Oil	Moderate amount	Hand pump automatic injection (1 time / 100 hours)
Drag Plate Screw And Nut	Rail Oil	Moderate amount	Hand pump automatic injection (1 time / 100 hours)
z-Axis Linear Guide, Lead Screw and Nut	Rail Oil	Moderate amount	Hand pump automatic injection (1 time / 100 hours)
Machine Head Secondary Screw Rod and Nut	Rail Oil	Moderate amount	Hand pump automatic injection (1 time / 100 hours)

8.2 Loose Machine Check

Please check the power distribution Joint, electrical device, water circulation device, and circuit board connector regularly for every 3 to 6 months.

Power Distribution Connector

Whether the connection of the three-phase power cable to the grid and the machine is fixed.

Electrical Installation

Check whether the contactor wiring is loose, whether the contact has ablation marks, high-frequency capacitors, shunts, work-pieces, electrode wires, etc. The components of the high-current component are loose or not, and the switch is often used for processing on the panel. Whether the plug-in is loose, please check carefully and eliminate it in time.

Water Circulation Device

Since the machining fluid has been operating under high pressure conditions, the requirements for the entire water circulation system are relatively high. Please check the looseness of the joint during the inspection from

the influent to the effluent, especially if the high pressure pipe in the column is loose, deformed or damaged.

Circuit Board Connector

Check the circuit board connector. If it is loose, please reinforce it on the original basis. It is not recommended to plug in the connector twice.

★The main control power must be turned off before performing inspections.

8.3 Machine Ventilation Inspection

Please check regularly whether the cooling fan installed at the resistance box is running normally and whether the filter cotton installed at the front door air inlet needs to be cleaned or replaced every 1 to 3 months.

8.4 Working Fluid

(1) Production of Working Fluid

Please use tap water or distilled water and special machining fluid for small hole machine to be arranged in a ratio of 20:1. As the processing fluid is consumed during processing, evaporation will decrease. Please replenish it at any time.

Users who use tap water directly as a processing fluid confirm that tap water is not directly collected from underground.

(2) The container used as the working fluid is cleaned once a week to keep the container clean and free of other foreign matter.

(3) Check if the filter inside the inlet pipe filter needs to be cleaned or replaced once a week.

(4) Treatment of waste liquid

Although the working fluid itself is harmless to the human body, the discharged liquid contains machining chips and must not directly flow into the sewer or outdoor land. It is necessary to precipitate the discharged processing chips and hand them to the waste liquid treatment plant for treatment.

8.5 Cleaning of Various Components

The work table, water tray and operation panel are easily soiled, please clean it daily.

Please don't forget to clean the following places:

(2) Because there is water left always on the electrode holder that is prone to rust, please clean it after use, remove moisture, and refuel. It is best to remove it when not in use.

(3) Cleaning of the carriage base

Due to the overflow of the filler screw and the plane of the guide rail and the splash of the working fluid, the base is likely to have stains. When cleaning, please shake the Y-axis tray away from the column, remove the

waterproof plate on the base, and clean it carefully.

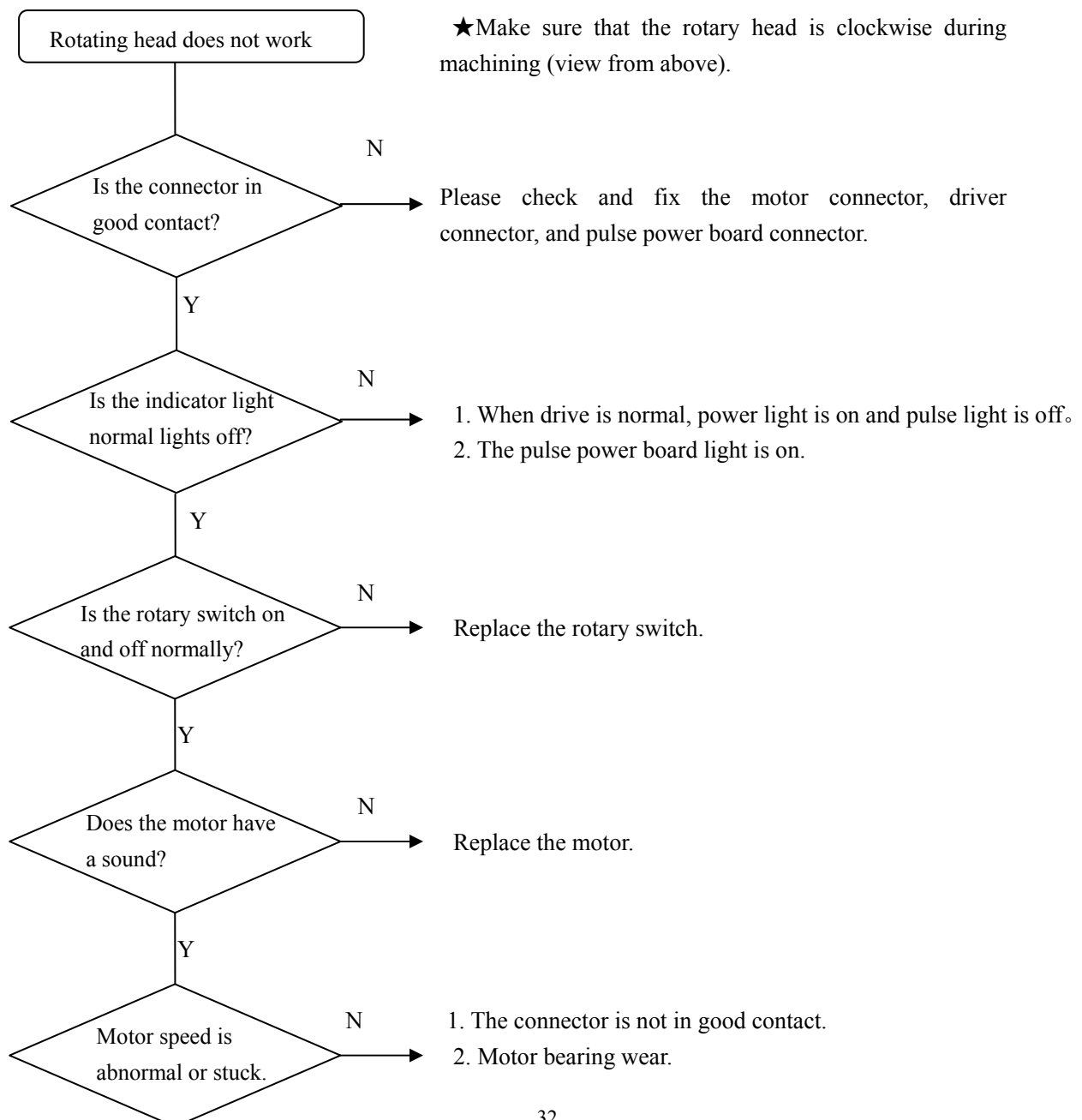
(3) Cleaning of the head storage tube

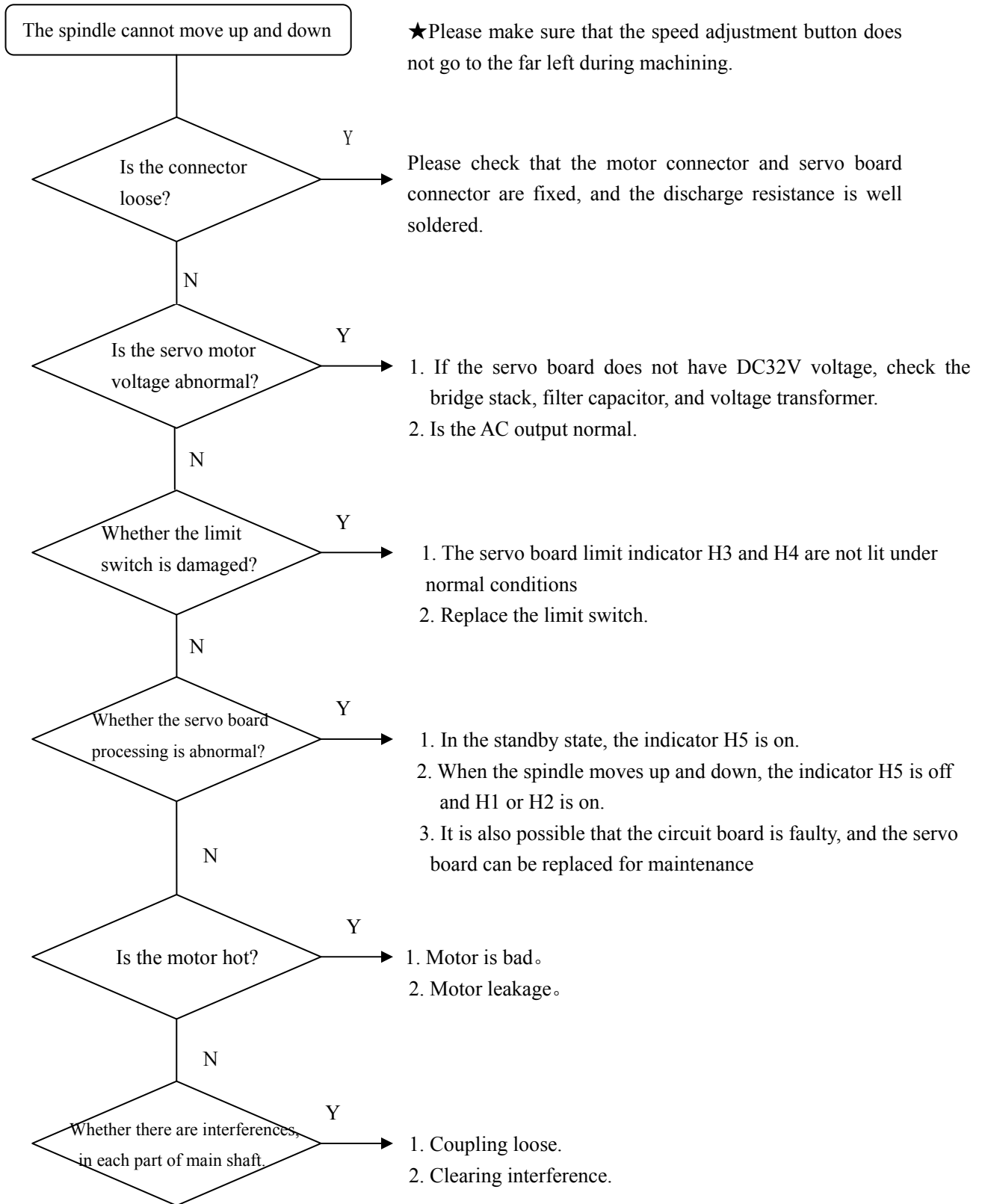
In order to maintain the full lubrication of the second stroke of the machine head, the oil storage pipe is installed in the lower part of the screw. Please check and clean once a month and refill the right amount of oil.

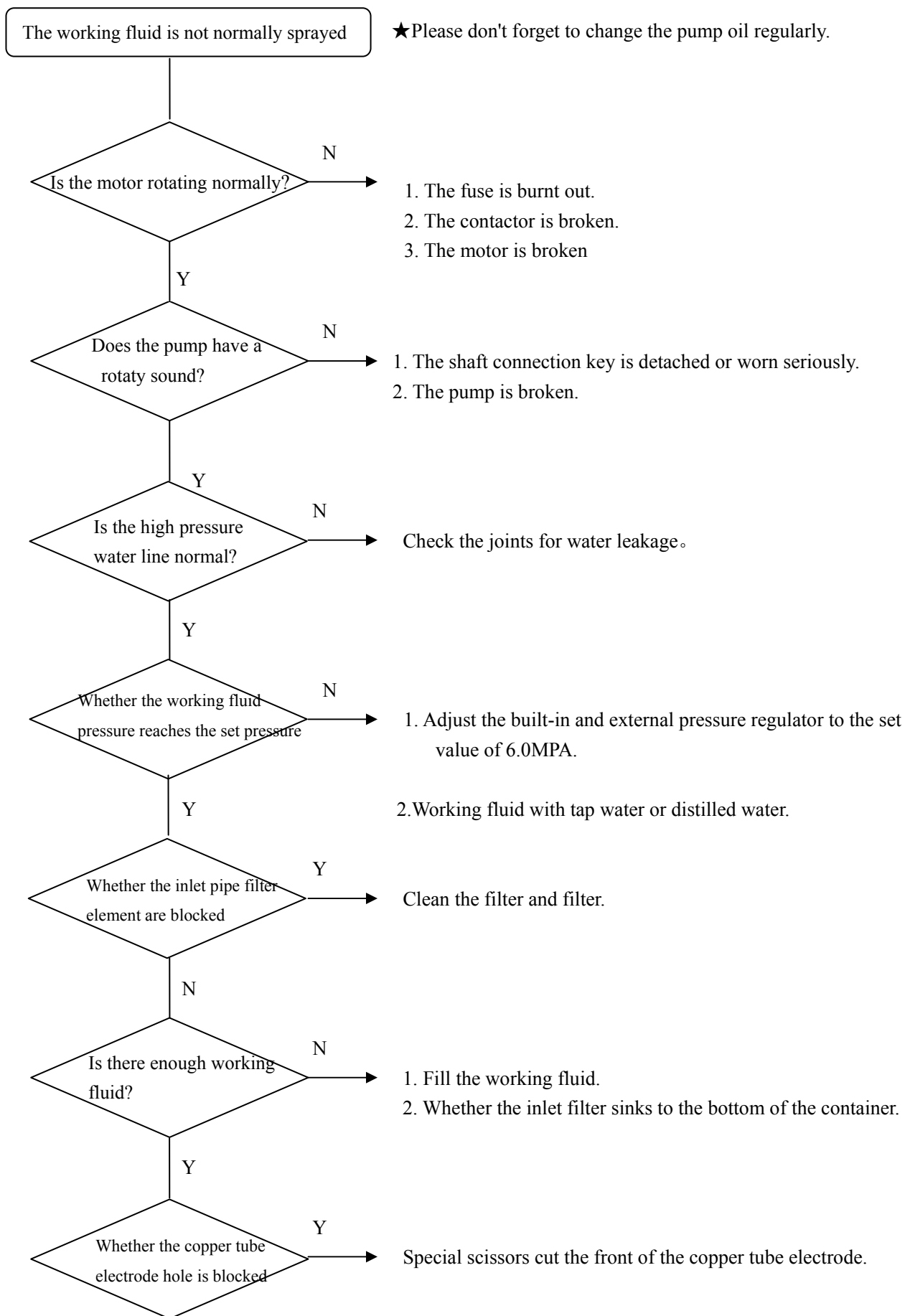
(4) Cleaning of the rotating head and the guide plate

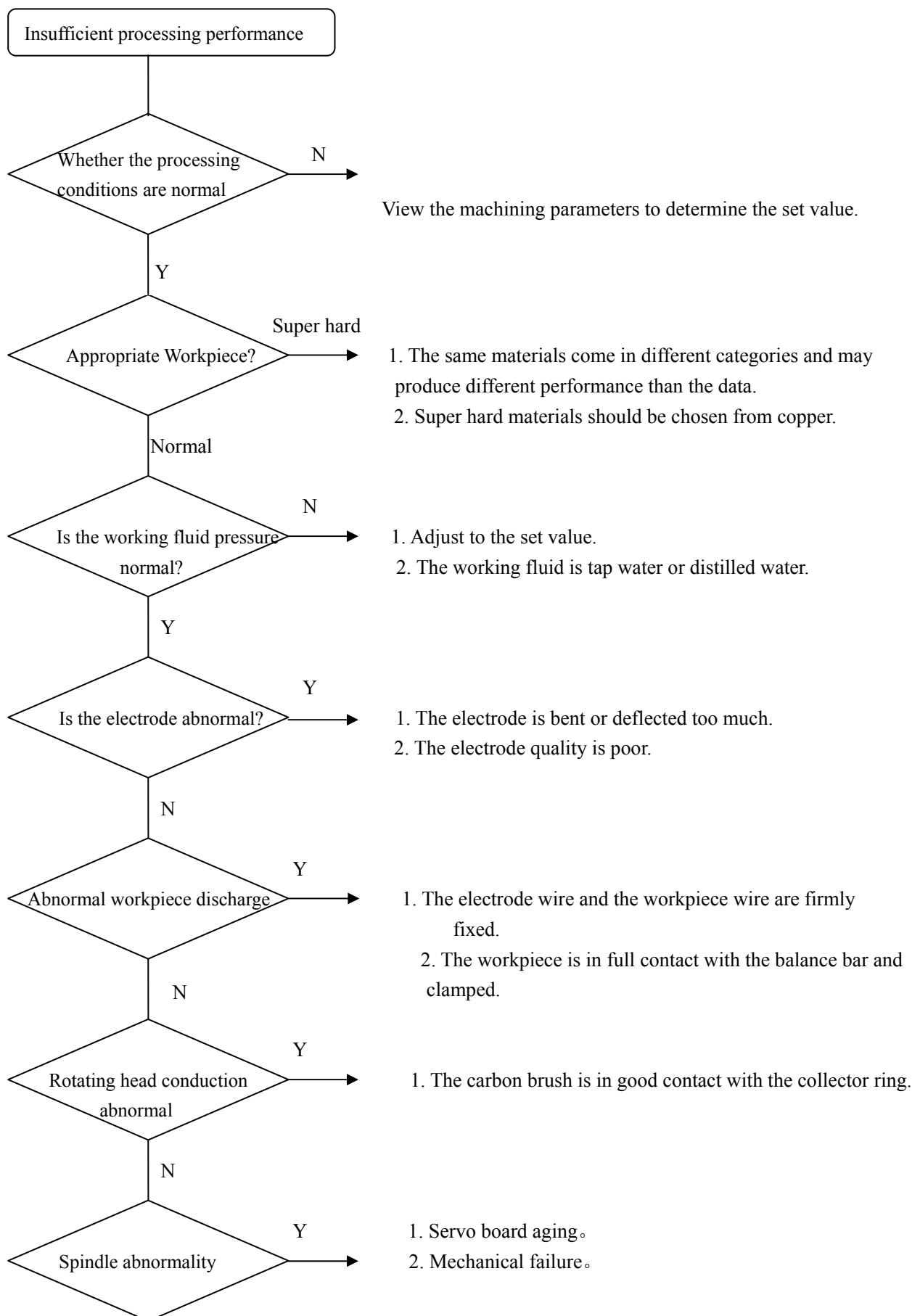
Since the two parts of the fixing parts and other mechanical connections of the machine tool are in an insulated state, if this part is stained with working fluid or conductive objects, not only will the processing speed be affected by the poor conductivity, but also the risk of sparking, etc. Be sure to keep it clean.

9. TROUBLESHOOTING PROCESS

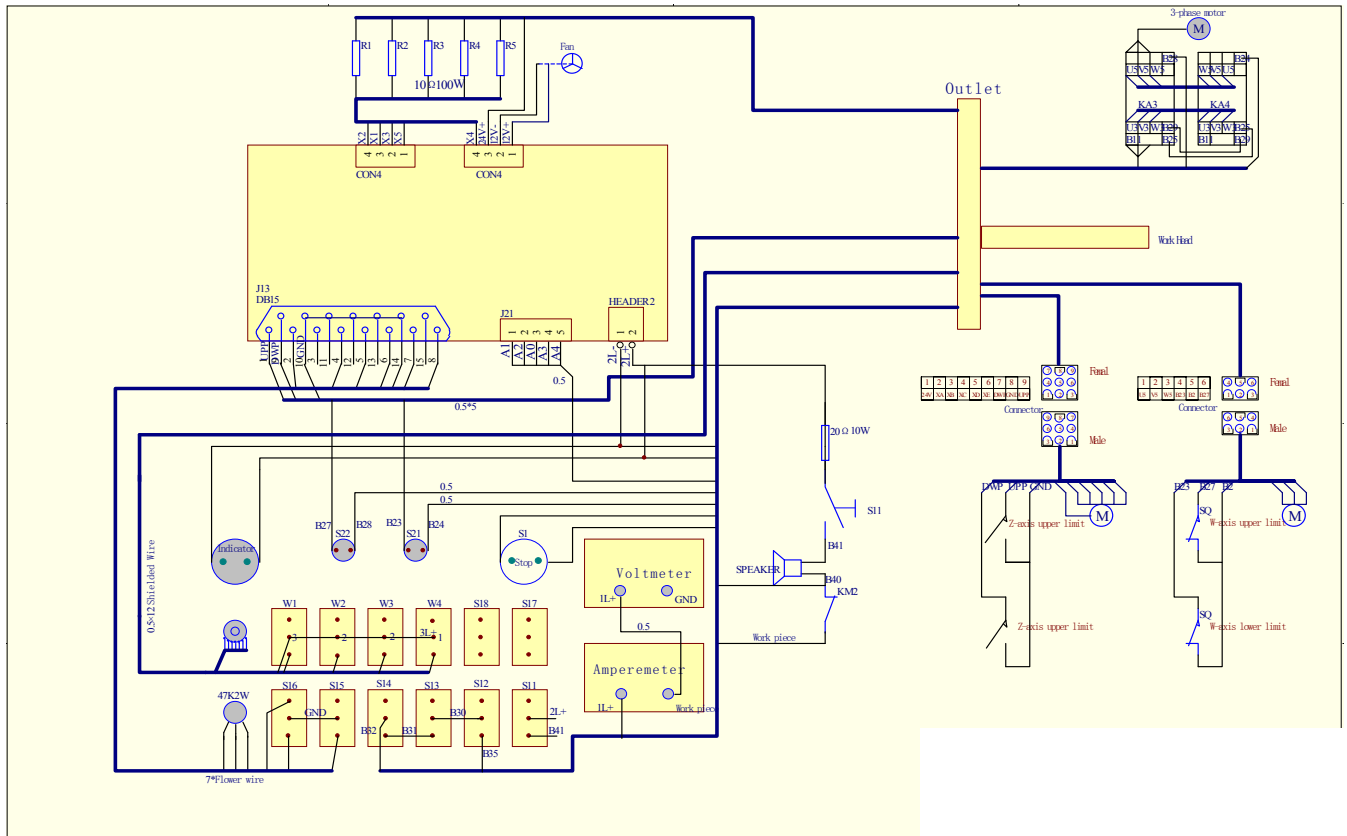




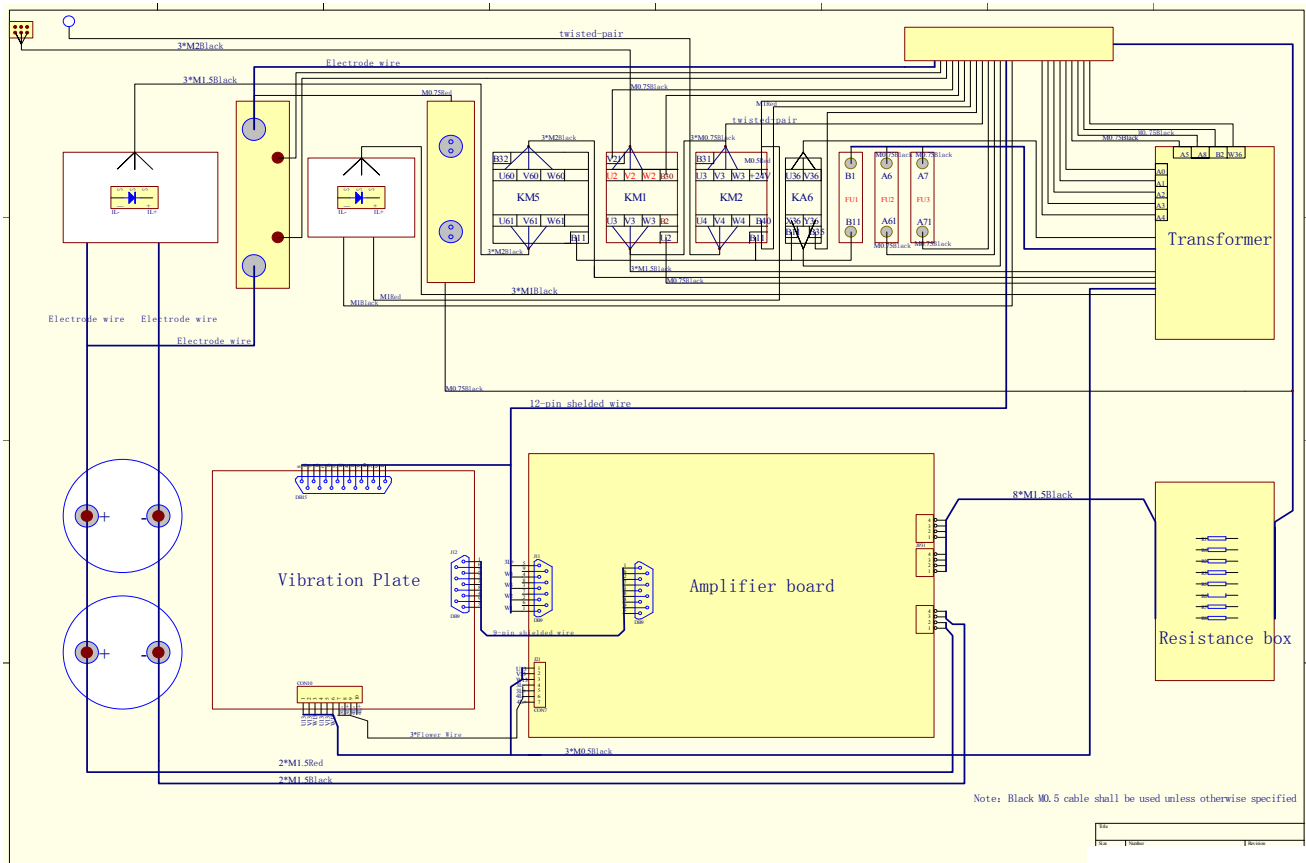




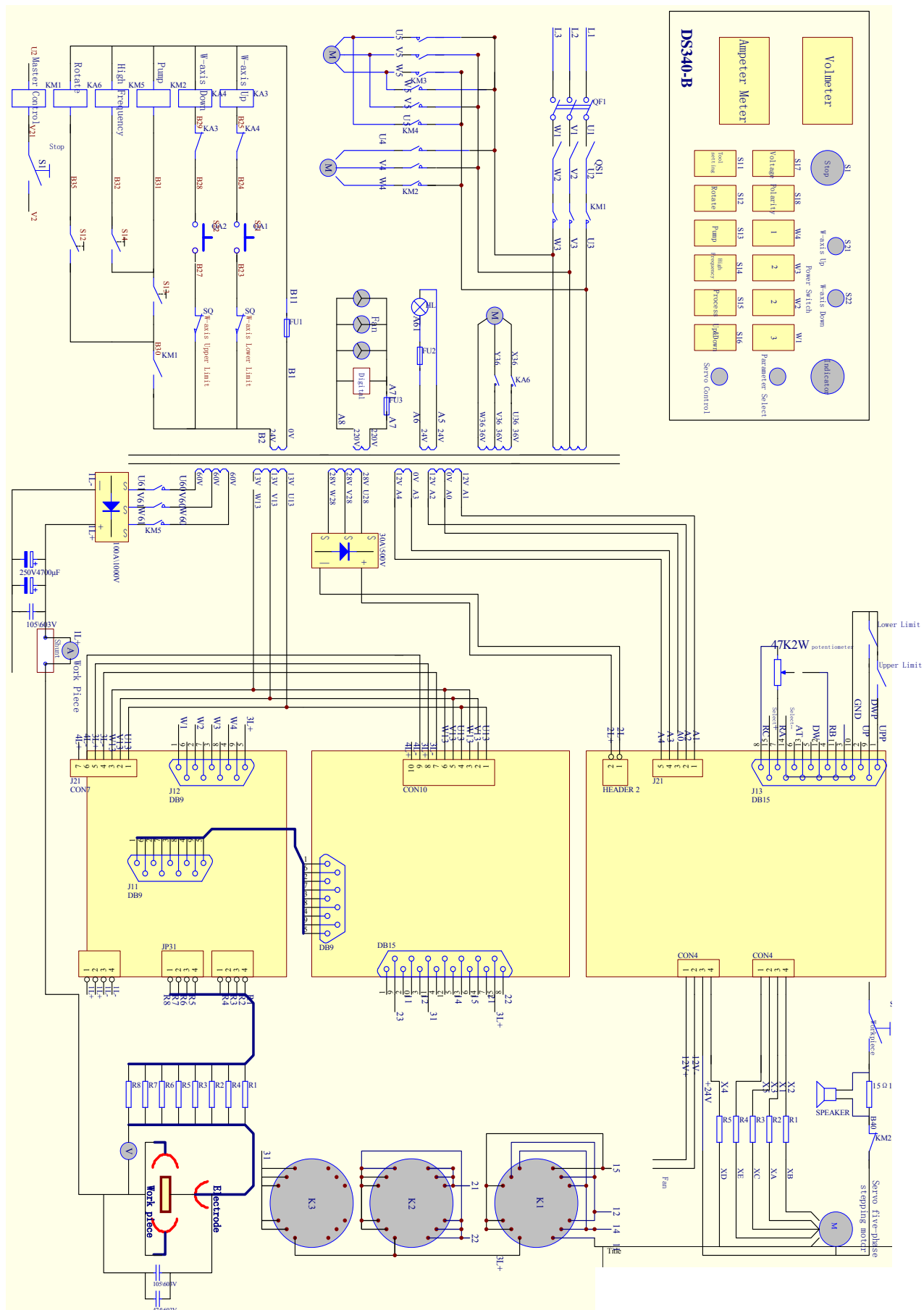
10. ELECTRICAL WIRING DIAGRAM



Panel Wiring Diagram



Electrical Assembly Drawing



Electrical Schematic

11. CERTIFICATE OF COMPLIANCE

CERTIFICATE OF COMPLIANCE

MACHINE MODEL: DK-908

WORK TRAVEL: 400 X 300 mm

SERIAL NUMBER: _____

The Machine is Qualified and Approved for Delivery.

PRODUCTION DEPARTMENT (Sign): _____

QUALITY INSPECTION DEPARTMENT (Sign): _____

DATE OF MANUFACTURE: _____

LUOYANG XINCHENG PRECISION MACHINERY CO.,LTD

ADD: NO.256 TANGGONG ROAD, LUOYANG, HENAN,CHINA 471000

TEL:0379-63512276 FAX:0379-69960770

12. SPARE PARTS PACKING LIST

Packing List

Item No.	Item Name	Model No.	Number	Remark
1	Allen Wrench	M3 M4 M5 M6 M8	1 each	
2	Double-Head Screwdriver		1pc	
3	Special Scissors For Electrodes		1pc	
4	Guider	Φ0.5	1pc	
5	Guider	Φ1.0	1pc	
6	Brass Tube	Φ0.5	100pcs	
7	Brass Tube	Φ1.0	100pcs	
8	Electrode Seal Ring	0-1.0mm	20pcs	
9	Precision Drill Chuck		1 set	
10	Machine Foot	M16	4pcs	
11	Water bucket		1pc	
12	Balance Bar Stand		1 pair	
13	Water Retaining Plate		1 pair	
14	User's Manual		1pc	

Note: The above accessories are factory standard configuration of the machine tool, and will be notified if there are any changes.