

# AMCO

## Geared Head Drilling Machine

**Model No.: D150M**  
**Serial No.: T1408034**

*Operation Manual*



**WESTWAY Machinery Ltd.**  
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**MODEL ZX5040**

**Vertical Drilling Milling Machine**

**Operation      Manual**

**Max.Drilling Dia.: 40mm**

**Max.End-Milling Dia.:80mm**

**Serial No.: T1408034**

# RELEASE NOTE

This Machine (Serial No. *T1408034*)  
should be connected with electric  
supply of *575* V *30* Hz, 3-phase, 4-core  
wires (L1,L2,L3,N).

Fuse current *10* A

# WARNING

## General Machinery Safety Instructions

You are required to read this entire Manual before using this machine.

- 1. Read the entire Manual before starting machinery.** Machinery may cause serious injury if not correctly used.
- 2. Always use correct hearing protection when operating machinery.** Machinery noise may cause permanent hearing damage.
- 3. Machinery must never be used when tired, or under the influence of drugs or alcohol.** When running machinery you must be alert at all times.
- 4. Wear correct Clothing.** At all times remove all loose clothing, necklaces, rings, jewelry, etc. Long hair must be contained in a hair net. Non-slip protective footwear must be worn.
- 5. Always wear correct respirators around fumes or dust when operating machinery.** Machinery fumes & dust can cause serious respiratory illness. Dust extractors must be used where applicable.
- 6. Always wear correct safety glasses.** When machining you must use the correct eye protection to prevent injuring your eyes.
- 7. Keep work clean and make sure you have good lighting.** Cluttered and dark shadows may cause accidents.
- 8. Personnel must be properly trained or well supervised when operating machinery.** Make sure you have clear and safe understanding of the machine you are operating.
- 9. Keep children and visitors away.** Make sure children and visitors are at a safe distance for you work area.
- 10. Keep your workshop childproof.** Use padlocks, Turn off master power switches and remove start switch keys.
- 11. Never leave machine unattended.** Turn power off and wait till machine has come to a complete stop before leaving the machine unattended.
- 12. Make a safe working environment.** Do not use machine in a damp, wet area, or where flammable or noxious fumes may exist.
- 13. Disconnect main power before service machine.** Make sure power switch is in the off position before re-connecting.
- 14. Use correct amperage extension cords.** Undersized extension cords overheat and lose power. Replace extension cords if they become damaged.
- 15. Keep machine well maintained.** Keep blades sharp and clean for best and safest performance. Follow instructions when lubricating and changing accessories.
- 16. Keep machine well guarded.** Make sure guards on machine are in place and are all working correctly.
- 17. Do not overreach.** Keep proper footing and balance at all times.
- 18. Secure workpiece.** Use clamps or a vice to hold the workpiece where practical. Keeping the workpiece secure will free up your hand to operate the machine and will protect hand from injury.
- 19. Check machine over before operating.** Check machine for damaged parts, loose bolts, Keys and wrenches left on machine and any other conditions that may effect the machines operation. Repair and replace damaged parts.
- 20. Use recommended accessories.** Refer to instruction manual or ask correct service officer when using accessories. The use of improper accessories may cause the risk of injury.
- 21. Do not force machinery.** Work at the speed and capacity at which the machine or accessory was designed.
- 22. Use correct lifting practice.** Always use the correct lifting methods when using machinery. Incorrect lifting methods can cause serious injury.
- 23. Lock mobile bases.** Make sure any mobile bases are locked before using machine.
- 24. Allergic reactions.** Certain metal shavings and cutting fluids may cause an allergic reaction in people and animals, especially when cutting as the fumes can be inhaled. Make sure you know what type of metal and cutting fluid you will be exposed to and how to avoid contamination.
- 25. Call for help.** If at any time you experience difficulties, stop the machine and call you nearest branch service department for help.



## Drilling Machine Safety Instructions

You are required to read this entire Manual before using this machine.

1. **Maintenance.** Make sure the Drill is turned off and disconnect from the main power supply and make sure all moving parts have come to a complete stop before any inspection, adjustment or maintenance is carried out.
2. **Drill Condition.** Drill must be maintained for a proper working condition. Never operate a Drill that has damaged or worn parts. Scheduled routine maintenance should be performed on a scheduled basis.
3. **Leaving a Drill Unattended.** Always turn the Drill off and make sure all moving parts have come to a complete stop before leaving the Drill. Do not leave Drill running unattended for any reason.
4. **Avoiding Entanglement.** Remove loose clothing, belts, or jewelry items. Never wear gloves while machine is in operation. Tie up long hair and use the correct hair nets to avoid any entanglement with the Drill spindle or moving parts.
5. **Chuck key & wrench safety.** Always remove chuck keys, wrenches and any service tools immediately after use. Chuck keys left in the chuck can cause serious injury.
6. **Understand the machines controls.** Make sure you understand the use and operation of all controls.
7. **Drill bit selection.** Always use the correct Drill bit for the job you are Drilling. Make sure you use the correct shank drill bit for your drilling machine.
8. **Secure the Drill Bit.** Properly tighten and securely lock the drill bit in the chuck.
9. **Cutting Tool inspection.** Inspect Drill for sharpness, chips, or cracks before use. Replace any cutting tools immediately if dull, chipped or cracked. Handle new cutting tools with care. Cutting edges are very sharp and can cause lacerations.
10. **Reversing the spindle.** Make sure the spindle has come to a complete stop before changing the direction of the spindle.
11. **Stopping the spindle.** Do not slow or stop the spindle by using your hand.
12. **Speed selection.** Select the appropriate speed for the type of work, material, and tool bit. Allow the Drill to reach full speed before beginning a cut.
13. **Changing Belts for speed selection.** Always allow the machine to come to a complete stop and turn power off before changing belts. Not turning power off when changing belts can cause serious injury.
14. **Clearing chips.** Always use a brush to clear chips. Never clear chips when the drill is running.
15. **Power outage.** In the event of a power failure during use of the drill, turn off all switches to avoid possible sudden start up once power is restored.
16. **Clean work area.** Keep the area around the drill clean from oil, tools, chips.
17. **Surface/workpiece area.** Before turning the drill on, make sure the table is clear of any objects (tools, scraps, off-cuts etc.) Do not drill material that does not have a flat surface, unless a suitable support is used.
18. **Table Lock.** Make sure the table is tightened before starting the drill.
19. **Drilling Sheet metal.** All sheet metal should be clamped to the table before drilling.
20. **Mounting workpieces.** Use clamps or vices to secure workpiece before drilling. Position work so you avoid drilling into table.
21. **Guarding.** Do not operate the drill when chuck guard is removed.
22. **Eye and hand protection.** A face shield with safety glasses is recommended. Always keep hands and fingers away from the drill bit. Never hold a workpiece in your hand while drilling. Do not wear gloves while operating the drill.
23. **Drill operation.** Never start the drill with the drill bit pressed against the workpiece. Feed the drill evenly into the workpiece. Back the drill out of deep holes. Turn the machine off and clear chips and scrap pieces with a brush. Turn power off, remove drill bit, and clean the table before leaving the machine.
24. **Call for help.** If at any time you experience difficulties, stop the machine and call your nearest branch service department for help.

# PLANT SAFETY PROGRAM

## NEW MACHINERY HAZARD IDENTIFICATION, ASSESSMENT & CONTROL

### Drilling Machine

Item No.	Hazard Identification	Hazard Assessment	Risk Control Strategies (Recommended for Purchase/Buyer/User)
A	ENTANGLEMENT	HIGH	Eliminate, avoid loose clothing / Long hair etc.
B	CRUSHING	LOW	Secure & support work material on drill table.
C	CUTTING, STABBING, PUNCTURING	MEDIUM	Isolate power to machine prior to any checks or maintenance being carried out. Do not adjust or clean until the machine has fully stopped.
D	SHEARING	MEDIUM	Isolate power to machine when changing speeds or maintenance is being carried out. Make sure all guards are secured shut when machine is on.
E	STRIKING	MEDIUM	Ensure workpieces are tightly secured on machine. Wear safety glasses. Ensure correct spindle direction when drilling..
F	ELECTRICAL	MEDIUM	All electrical enclosures should only be opened with a tool that is not to be kept with the machine. Never clean or dust machine when power is on. Machine should be installed & checked by a Licensed Electrician.
G	HIGH TEMPERATURE	LOW	Wear appropriate protective clothing to prevent hot swarf.
H	OTHER HAZARDS, NOISE	LOW	Wear hearing protection as required.
Plant safety Program to be read in conjunction with manufactures instructions			

Authorised and signed by:

Safety Officer:

Manager:

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## Index

1、 Attention.....	1
2、 Machine Appearance, Application And Working Environment .....	2
3、 Main Specifications .....	4
4、 Transport And Installation.....	5
5、 Transmission .....	8
6、 Operation Instruction.....	9
7、 Lubrication System .....	12
8、 List And Distribution of Rolling Bearings .....	14
9、 Electrical System .....	16
10、 List of Accessories .....	22
11、 Structure of Main components .....	23

**1.Attention****1.1 Inspection And Acceptance**

Please check carefully when open the packge and make sure no parts missing.

**1.2 Safety**

Please read the operation manual carefully before the installation and adjustment of the machine. When finish the installation, check all the details and trial run the machine idlly before put it into operation.

Should any quality problems arise, please contact the dealer.

**1.3 Caution**

Keep in mind the safety measures for electric and operating protection.

1.3.1 Make sure the power supply of the machine is well switched on according to the operation manual, and grounded correctly and reliably.

1.3.2 Cut off the power supply when making adjustment and repair.

1.3.3 When the spindle motor is running, please don't change the spindle speed, changing speed should be done when the mahine is stopped.

1.3.4 Make sure the work piece and tool be installed well before running the machine.



## 2. Machine Appearance, application and working Environment

### 2.1 Machine Appearance

The machine appearance, refers to Fig.1. The machine is constructed with Gear Box, Spindle Box, Column, cross worktable, bracket, base plate and electrical box etc. The Gear Box is assembled on the Spindle Box. The Spindle Box is fixed on the Column, and its position is on the top of the machine. Worktable is fixed on the bracket is set in the middle of the column, and the column is installed on the base plate. The out line of machine is beeline and frame, look like legerity, perfect and agility.

### 2.2 Application

The machine is designed with multi-function of drilling, milling, broaching,reaming,and tapping etc, and of the advantage of big drilling capacity and accommodate to proess big size parts. It is suitable for using in both production and maintenance shops.

The worktable could be moved up and down and rotated 360° along the column. The operation of the machines is very light, agile and reliable.

### 2.3 Feature

The worktable of the machine is manual both in vertical and horizontal diretion. Worktable could be moved up and down and rotate 360° along the column automatically(manual). The feed of the spindle sleeve is auto and manual. The main transmission is gear-driven, and of big running distance and long life. The spindle could work when it tilted  $\pm 45^\circ$ . The front bearing of the spindle is cylindrical rolling bearing; It strenghthens the rigidity of the spindle system. The head of the spindle takes special structure, it is convinient for loading and unloading tool and improve the working efficiency.

### 2.4 Work Environment

2.4.1 The elevation of the workshop has to be 2000m or less.

2.4.2 The environmental tempreture should be -20℃ to 40℃.

2.4.3 With a medium tempreture of  $20 \pm 5^\circ\text{C}$ , the relative humidity should not exceed 85%.

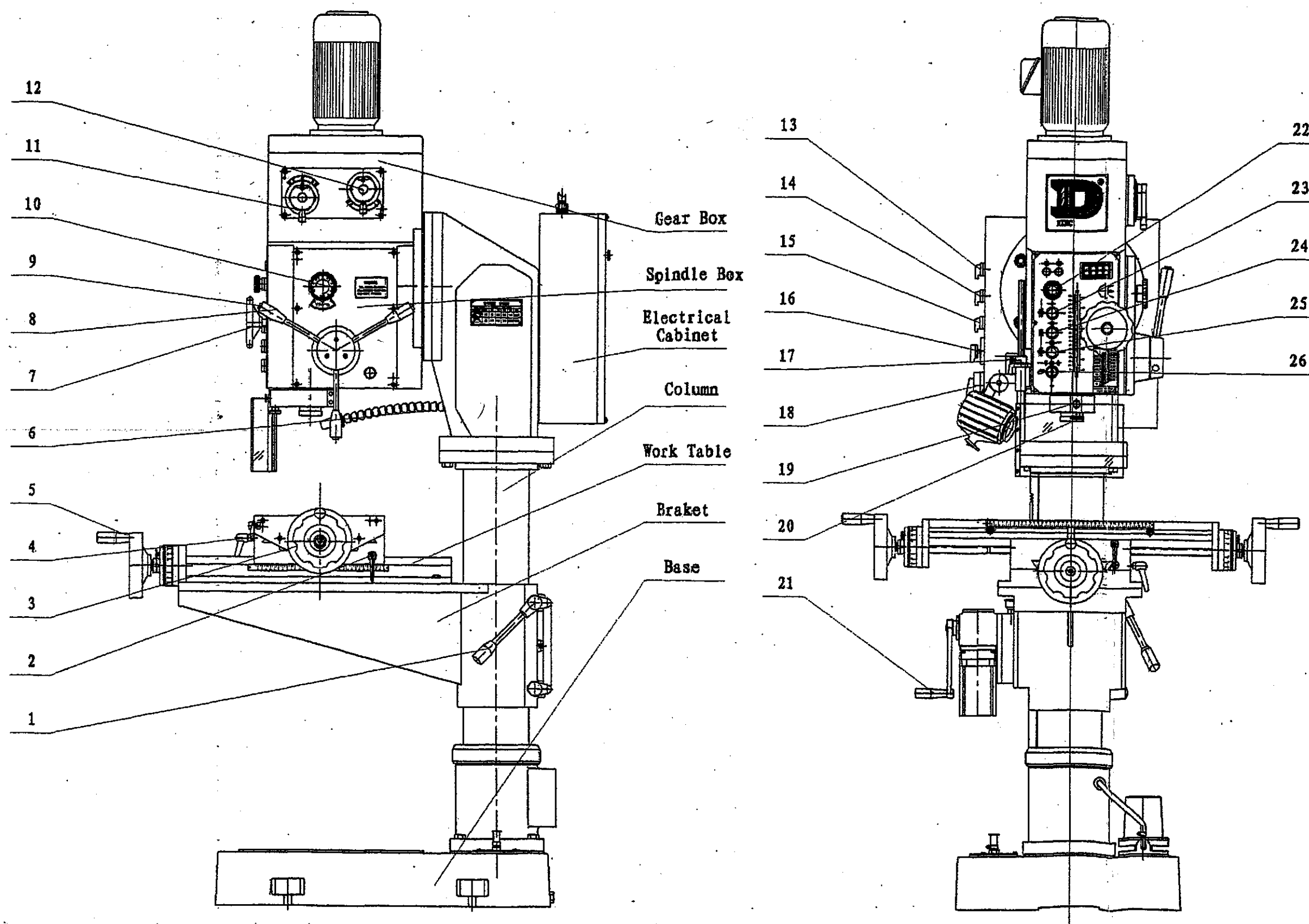
2.4.4 No conductive dust allowed.

2.4.5 No explosive factor allowed.

2.4.6 No corrosive gas or steam which may corrode metal or damage the insulation

2.4.7 Keep away from the source of impact or vibration

Fig.1 Outside Drawing



### 3. Main specifications (1)

### Table

NO.	Descriptions		Specification	Unit
1	Max. Dia. of drilling		40	mm
2	Max. End-milling dia.		80	mm
	Max. Tapping dia.		M27	mm
3	Max. Distance from spindle to generating line of column		380	mm
4	Max. Distance from spindle nose to surface of worktable		600	mm
5	Max. Distance from spindle nose to surface of base		1200	mm
6	Max. travel of spindle		180	mm
7	Max travel of worktable and bracket		560	mm
8	Horizontal swing degree of work table and bracket		$\pm 45^\circ$	Degree
	Vertical travel of worktable		400	mm
	Horizontal travel of worktable		280	
9	Taper of spindle bore		4	Morse
10	Number of spindle speeds		12	Steps
11	Range of spindle speeds	46、68、95、140、185、280		r/min
		370、550、750、1150、1450、2200		
12	Spindle feed steps		4	Steps
13	Spindle feed range	0.12、0.22、0.32、0.40		mm/r
14	Dia. of column		$\Phi 160$	mm
15	Effective working area of worktable(L×W)		700×320	mm
16	Effective working area of base(L×W)		450×440	mm
17	Dimension of T slot of worktable and base		3-14, 2-18	mm
18	3-phase 2-speed AC Motor (YD100L2-6/4)	Power	1.5/2.2	kW
		Voltage	380 (220、400、420)	V
		Speed	960/1440	r/min
19	3-phase electrical pump (Type AYB-6B)	Power	0.085	kW
		Voltage	380 (220、400、420)	V
		Flow rate	6	L/min
20	Machine dimension(L×W×H)		1250A×1130×2180	mm
21	Machine weight (Gross/net)		910/850	kg

#### 4. Transportaion and Installation

##### 4.1 Transportaion of the machine

- 4.1.1 Handle with care when transporting the machine. Pay close attention to the shopping marks. Don't lay down the machine on the wrong side. Avoid impact.
  - 4.1.2 The machine is fully assembled and packed before shipping to the customer. Please check carefully when open the package and make sure no patrs are missing.
  - 4.1.3 When lifting the machine by crane, the center of gravity should be close watched. For the correct way, see Fig. 3. TO between the rope and machine surface.
- #### 4.2 Foundation and Installation.

##### 4.2 Foundation and Installation

- 4.2.1 Take the work table as Radius, go 360° around the column would be the max. area of the foundation. The diameter of the foundation is 2500mm. See Fig. 2. Customers can decide the foundation area according to their own needs.
- 4.2.2 The depth of the foundation is selected so that it rests on a dense soil. The depth provided in Fig. 4 is for reference.
- 4.2.3 Buay the foundation bolts in the concrete mortar at the acurate position after solidification of the concrete lay the machine on the foundation and fullytighten the foundation bolts and carefully leveled by spirit level in its longitudinal and transversal direction.

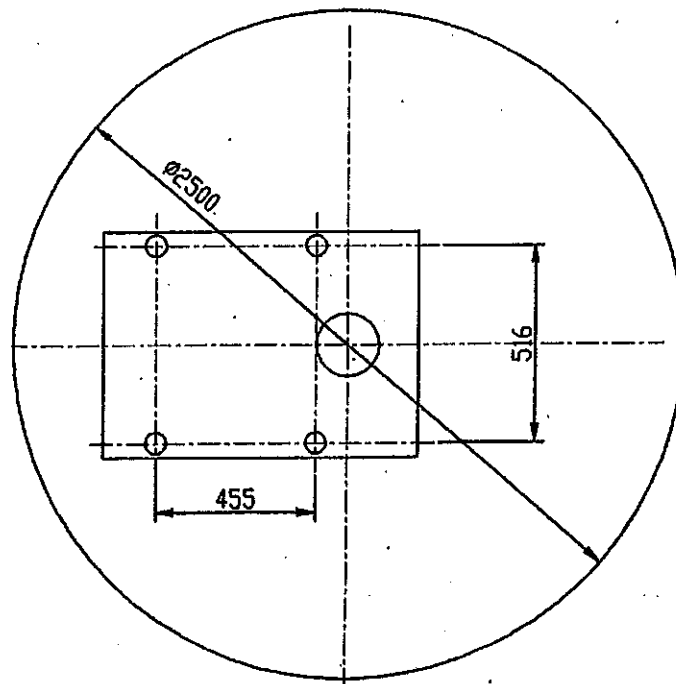


Fig. 2 Dimension of the foundation

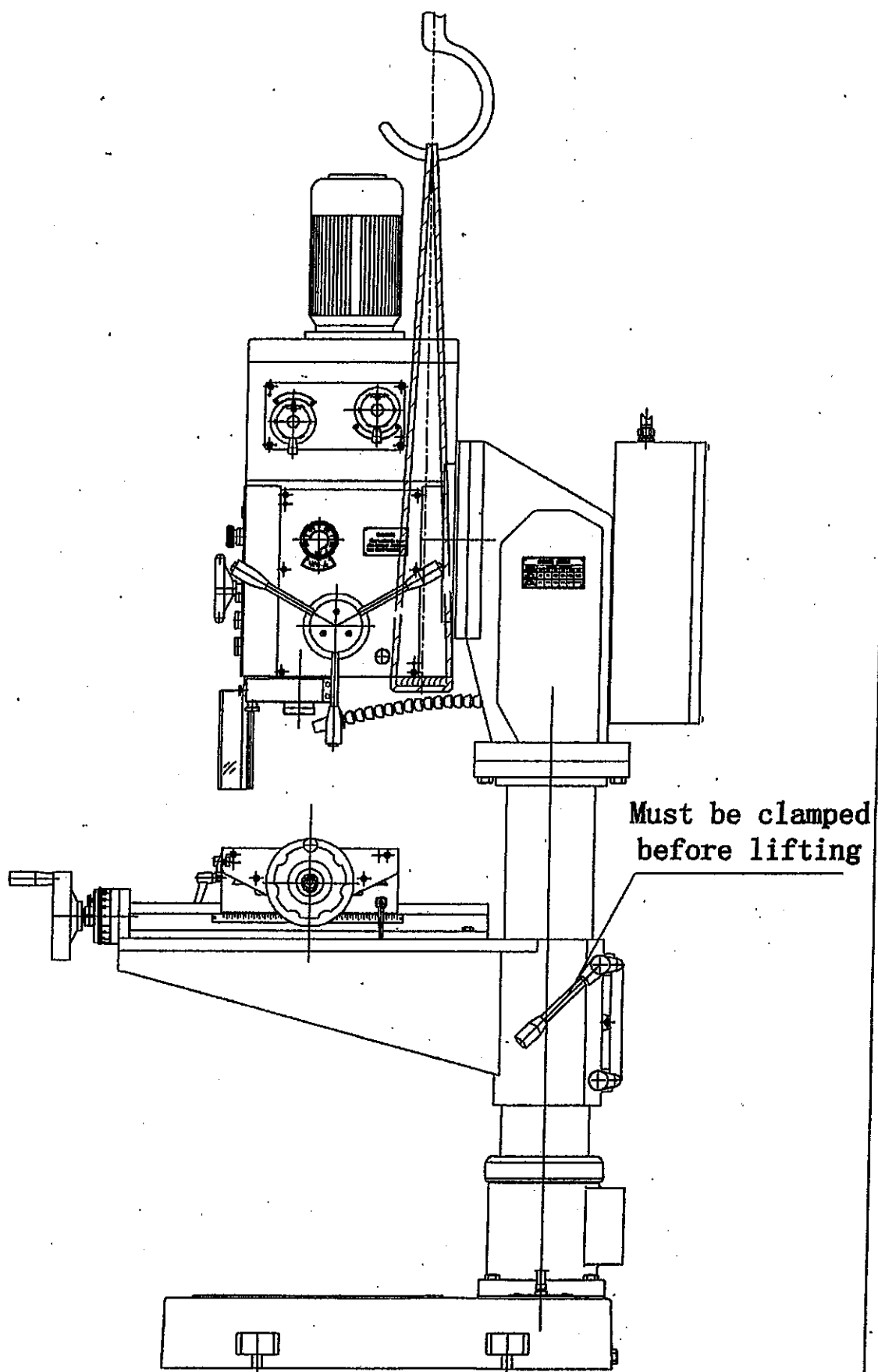
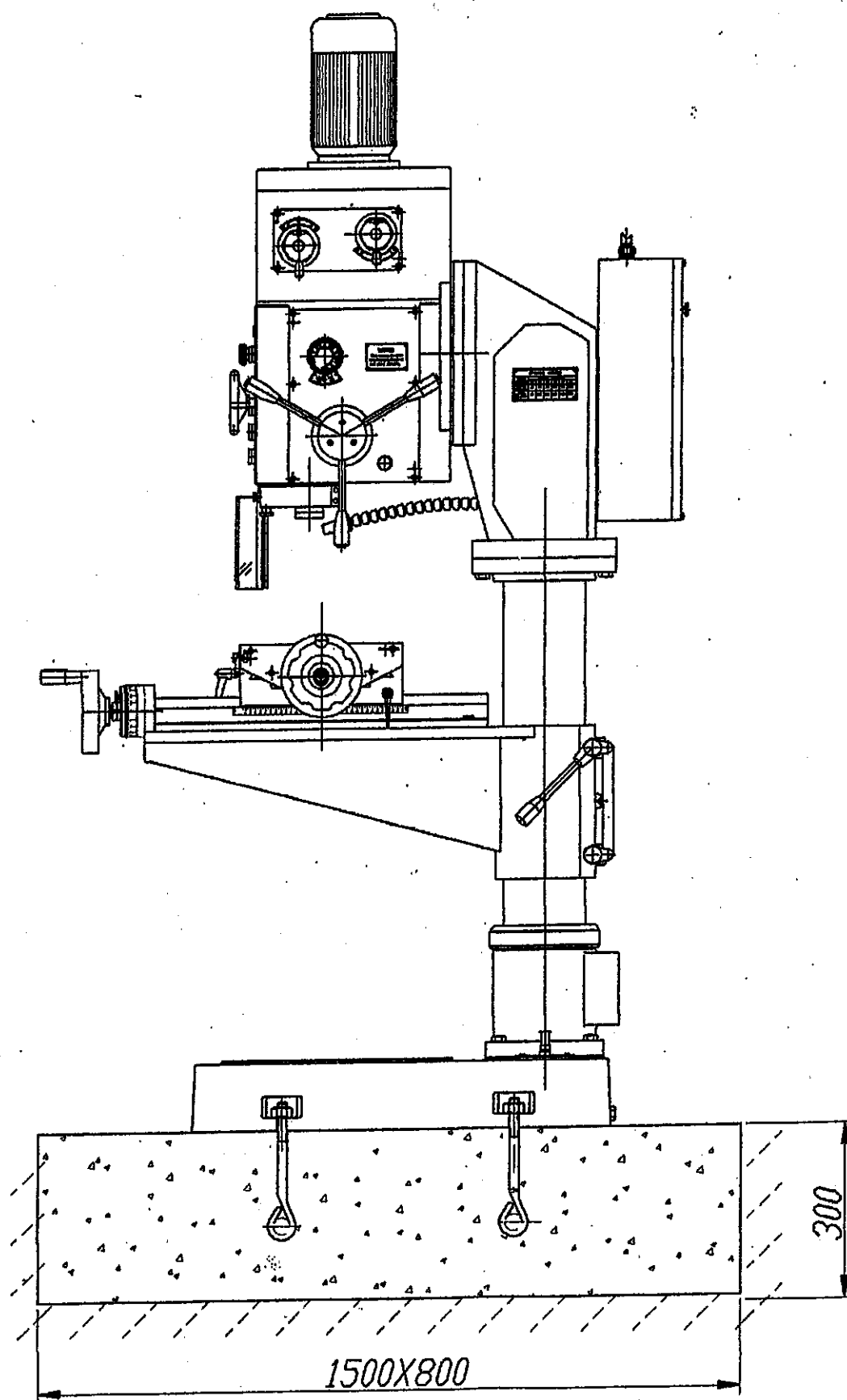
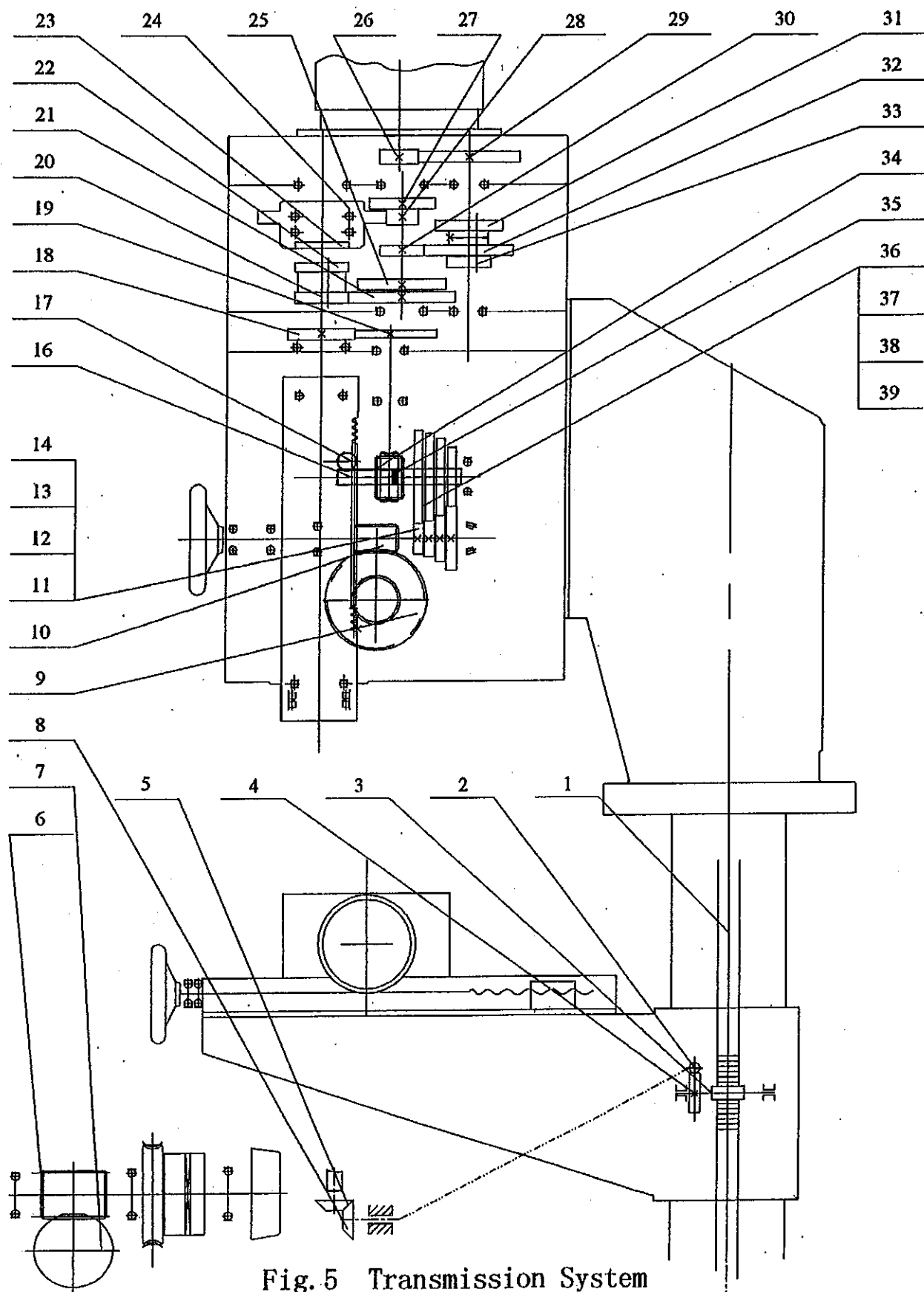


Fig. 3 Transport of the machine

Fig. 4 Foundation And Installation





**6. Operation Instruction****6.1 Starting the Machine**

6.1.1 Before starting the machine, read carefully the operation manual and be fully acquainted with all the details.

6.1.2 The operator should be familiar with all the rules and points of attention of running and maintaining the machine.

6.1.3 Strickly follow the instruction of lubrication. To fill the oiling places with lubricant at regular intervals.

6.1.4 When push in the tool unloading spacing shaft, there should be a clearance between the end of the tapershank of the Twist drill and the ram of the tool unloading device. Unqualified Taper shank and sleeve adapter can not be used.

6.1.5 Remove all the anti-rust coating or grease from the machine. Fill the machine with lubricant. Run the machine from low to high speed and check if it is normal.

**6.2 Description of control parts.**

6.2.1 Description of control parts. See Fig.1

6.2.2 Code of the control patrs. See Table 3

Table(3)

1	Bracket clamping and loosing handle	14	Coolant pump button
2	Clamping and loosing handle for transverse movment of worktable	15	Tapping select button
3	Handwheel for longitudinal movement of worktable	16	Two-Speed motor conversion switch
4	Clamping and loosing handle for longitudinal movment of worktable	17	Clamping handle for spindle sleeve
5	Handwheel for transverse movement of worktable	18	Power supply switch
6	Water supply cock	19	Feed depth leadscrew lock handle
7	Fine feed handwheel	20	Feed depth adjusting handle
8	Hand feed handle	21	Bracket table lifting handle.
9	Connect or shut off button for power feed & tapping	22	Emergency stop button
10	Feed regulating lever	23	Main motor start button
11	Spindle speed change handle A	24	Main motor stop button
12	Spindle speed change Handle B	25	Main motor spot-move button
13	Lamp switch for worktable	26	Electrical lifting button for worktable



### 6.3 Spindle speed change control

The 12 steps of spindle speed are accomplished by Gear driving system and 2-speed motor . See Fig.5 To change speed, first stop the motor. Turn the speed change handles(11)and(12)to the desired position. Then turn the switch (16) to Position (1) or(2). The speed of forward is selected.

Turn the switch to position "R", the same speed of Reverse running is selected.

### 6.4 Spindle feed operation(Fig.1)

#### 6.4.1 Automatic feed

First, stop the motor. Turn the feed change lever (10) to the desired feed rate on the Feed chart. Push down the button (9) on the end of hand feed lever(8) to engage the electromagnetic clutch. The auto feed of the selected amount is realized. If need to stop in the process, push button (9) again to disengage the electromagnetic clutch.

#### 6.4.2 Manual Feed

Turn the handle (8) counter-clockwise, the manual feed of spindle drilling can be realized.

#### 6.4.3 Fine feed

First, stop the motor. Turn the feed regulating lever (10) to the "0" position according to the indicating mark of the speed change handle on the Feed chart. When feed, push the fine feed handwheel (7) to make the joint gear engage, then turn the fine feed handwheel (7) counter-clockwise, the fine feed is realized.

#### 6.4.4 Tapping

The auto feed button should not be pushed down when tapping, because the spindle feeds according to the pitch, For safety, please turn the tapping select button (15) to the tapping position and keep it interlocked with auto feed.

### 6.5 Spindle Reset

The balance and reset of the spindle are accomplished by the coil spring.

The force of spindle balance can be adjusted by loosening the screw and turning the angle of spring box.

### 6.6 Tool loading and unloading (See Fig.1)

#### 6.6.1 Tool Loading

Turn the hand feed handle (8) to make the spindle sleeve protrude a little, then, push the tool taper shank into the spindle bore and fit it tightly, the tool could work reliably and safely. If use the special tool shank, should use the appropriate hooked spanner to tighten the nut and the spindle nose.

### 6.6.2 Tool Unloading

Turn the hand feed handle (8) to make the spindle sleeve protrude a little, then turn the spindle to the bore, use the wedge to beat the tool. If use the special tool shank, should use the appropriate tool to offload the tool shank.

### 6.7 Control of feed depth

The cutting depth is realized by moving the scale nut on the scale rod. In batch production, the cutting depth is controlled by loosening screw (19) and turn hand wheel (20) and moving the scale nut to the desired depth.

### 6.8 Coolant System

Coolant system: Turn coolant pump button (14) to "on" position, then turn the water supply cock (6), the coolant supply is controlled.

### 6.9 Work table Bracket

6.9.1 Loosening lever (1), as per requirements, the worktable and bracket can be elevated by motor driven or manual to its desired height. It also can swing around the column at certain angle. The manual feed could be done both in length and breadth, the feed capacity are readout by the scale or gauge. When feed, must loose the handle (2) and (4).

#### 6.9.2 Adjustment of longitudinal and transverse guide way of worktable

If the gap of the guide way is big, it will lead the working precision to be not up to the requirement, it should be adjusted. When adjust, loose the adjusting screw, then push the screw inside and spin to the suitable position, finally adjust the screw.

#### 6.9.2 Adjustment of the gap of leadscrew

If the gap between the longitudinal and transverse leadscrew and nut is big, it will influence the machining precision of the part and the roughness of the surface. There is a gap adjusting screw between the longitudinal and transverse leadscrew. When adjusting, set the adjusting screw to the suitable position.

## 7 Lubrication System

### 7.1 The machine adopts two ways of lubrication

- a. Grease lubricating
- b. Hand oiling

7.2 The gears in the gear box are lubricated by No.3 lithium grease. For new machines, after 6 months of running, the lubricant shall be cleaned and changed. Then change lubricating grease once per year. The gears in the feed system are lubricated by adding oil to the oil hole by hand.

The worm gear is lubricated by oil in the oil tank. The lubricant in the oil tank is No. 40 machine oil. The oil should be changed every 6 months. On the right side of the machine, there are a filling oil hole and an oil gauge. The oil outlet hole is at the bottom of the spindle box. The level of the oil is indicated by the oil gauge.

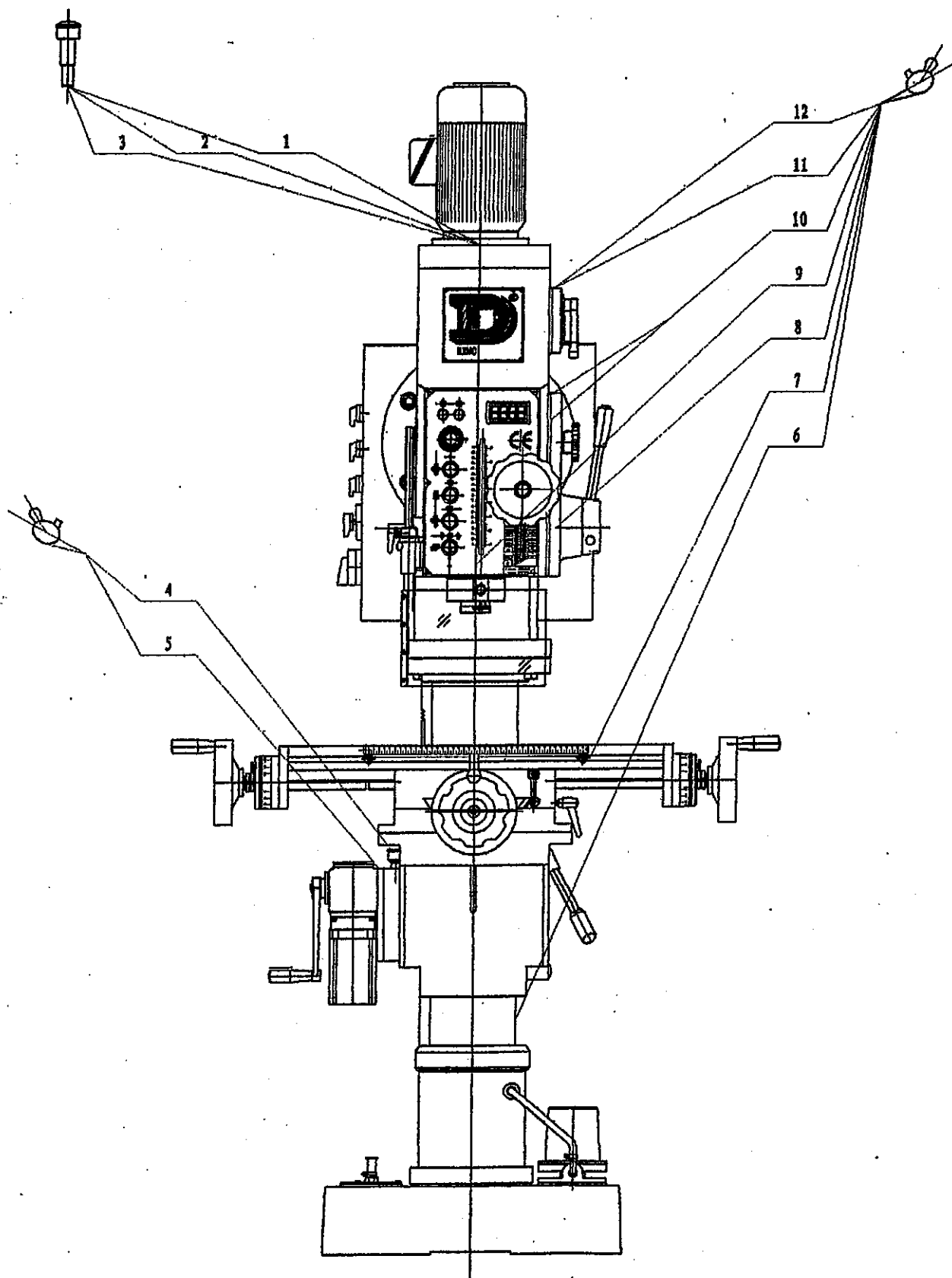
### 7.3 The machine needs hand lubrication.

- a. Hand lubricating places (see Fig.6)
- b. Method of hand lubricating(see Table 4)

**Table (4)**

NO. Of Place Need lubrication	Name of the Place	Method	Name of Lubricant	Cycle
1	Main Driving Shaft I Bearing	Oil gun	No. 3 Lithium grease	Every 3 months
2	Main Driving Shaft II Bearing	Oil gun	No. 3 Lithium grease	Every 3 months
3	Main Driving Shaft III Bearing	Oil gun	No.3 lithium grease	Every 3 months
4	Bracket lifting system	Oil gun	No.40machine oil	Every shift
5	Bracket lifting worm Bearing	Oil gun	No.40machine oil	Every shift
6	Guideway Surface of column	Oil gun pouring	No.40machine oil	Every shift
7	Guideway Surface of cross table and leadscrew	Oil gun pouring	No.40machine oil	Every shift
8	Feed Worm wheel	Oil gun	No.40machine oil	Every 6 months
9	Spindle sleeve surface	Oil gun pouring	No.40machine oil	Every shift
10	Feed system	Oil gun	No.40machine oil	Every shift
11	Speed declutch Shift shaft	Oil gun	No.40machine oil	Every shift
12	Speed declutch Shift shaft	Oil gun	No.40machine oil	Every shift

Fig. 6 Lubrication



## 8. List and distribution of rolling bearings

## 8.1 Distribution of rolling Bearings

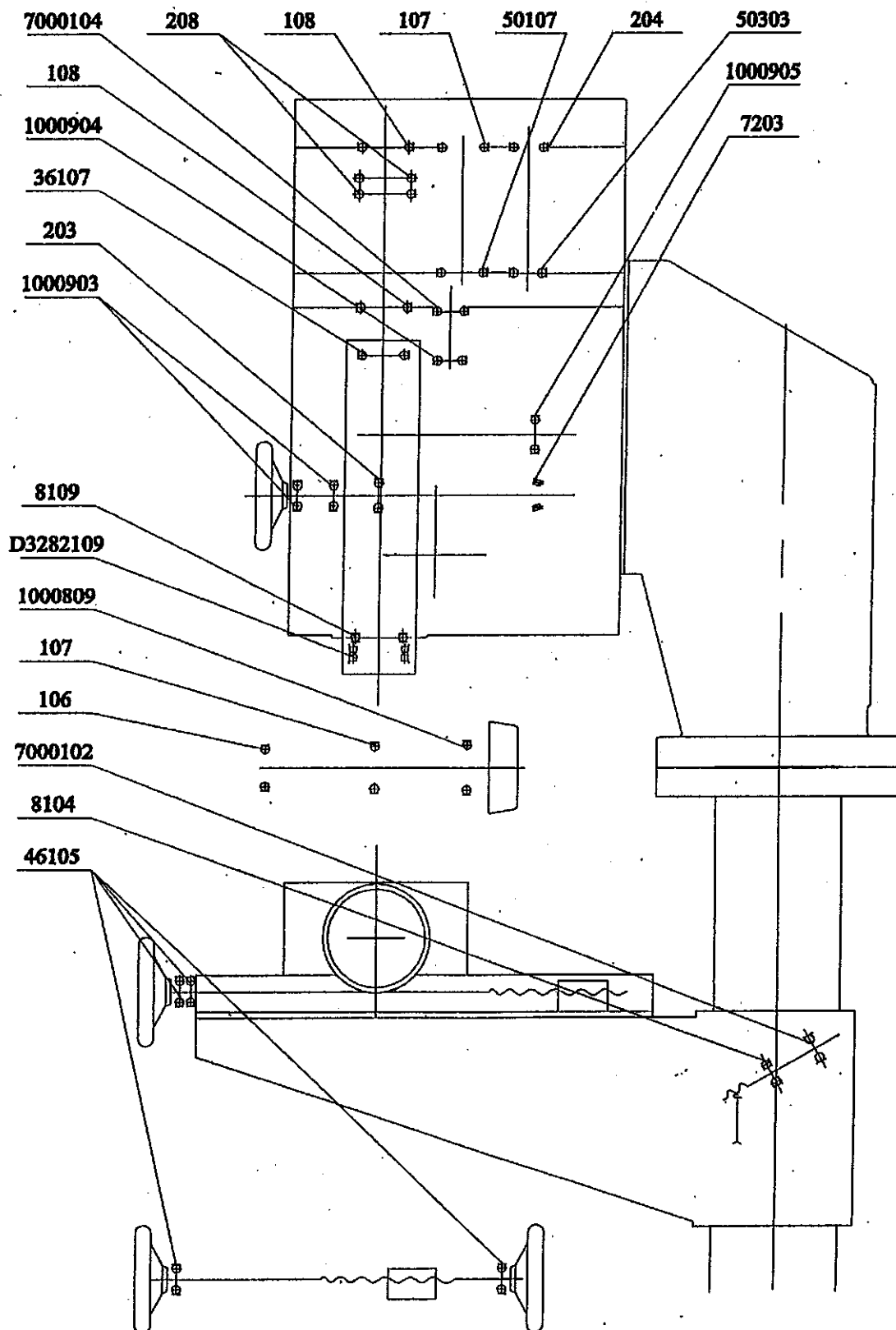


Fig. 7 Distribution of rolling bearings

## 8.2 List of rolling bearings

No.	Model	Description	Specification	Quantity	Accuracy
1	GB276;106	Deep-groove bearing	30×55×13	1	
2	GB276;107	Deep-groove bearing	35×62×14	2	
3	GB276;108	Deep-groove bearing	40×68×15	2	
4	GB276;203	Deep-groove bearing	17×40×12	1	
5	GB276;204	Deep-groove bearing	20×47×14	1	
6	GB276;208	Deep-groove bearing	40×80×18	2	
7	GB276;1000809	Deep-groove bearing	45×58×7	1	
8	GB276;1000903	Deep-groove bearing	17×30×7	2	P5
9	GB276;1000904	Deep-groove bearing	20×37×9	1	
10	GB276;1000905	Deep-groove bearing	25×42×9	1	
11	GB276;7000102	Deep-groove bearing	15×32×8	1	
12	GB276;7000104	Deep-groove bearing	20×42×8	1	
13	GB277;50107	Deep-groove bearing with snapping groove	35×62×14	1	
14	GB277;50303	Deep-groove bearing with snapping groove	17×47×12	1	
15	GB285;D3282109	Double cylindrical roller bearing	45×75×23	1	P5
16	GB292;36107	Corner touch ball bearing	35×62×14	1	
17	GB292;46105	Corner touch ball bearing	25×47×12	4	
18	GB297;7203	Tapered roller bearing	17×40×12	1	
19	GB301;8104	Thrust ball bearing with flat seat	20×35×10	1	
20	GB301;8109	Thrust ball bearing with flat seat	45×65×14	1	

## 9 Electrical System

### 9.1 General

The power supply of the machine is of 380V/50HZ. 3-phase, 60HZ and other voltages are possible(accord in order). Power supply for control circuit and lighting system is of 24V, which is provided by control transformer. On the control circuit, there are fuses for short circuit protection and an emergency stop button for emergency stop. The transmission is driven by a 2-speed,3-phase AC asynchronous motor, its speed change is realized by turning the switch.

The voltage of lifting motor is 380 v. The electrical cabinet is amounted on the back of the spindle box. The emergency stop button and other switches are on the front left site of the spindle box.(see fig.1) To ensure the safety of the operater, the electrical system has a safe ground connection.

### 9.2 Electrical Circuit

#### 9.2.1 Main Power Switch(QS1)

The main Power Switch(QS1) is for the control of the power supply. It has a lock for protection.

#### 9.2.2 protection of main motor

The main motor is protected by 11SM1B 3-phase auto switch (QF1), which can protect the motor from overload or short of phase.

#### 9.2.3 protection of Coolant pump

Protection of the coolant pump is provided by 3VE1 automatic Switch(QF2).

#### 9.2.4 Tapping Operation

Tapping operation is controled by contactors KM1,KM2, and select button SB6. The travel limit of tapping is controlled by SQ2,SQ3.When tapping, turn the select button SB6 on Position "1",("0" for driving), turn the 6LBB-20 combination switch to "1", start the spindle forward (KM1 suction engaged). Operate spindle by hand downward until touch the work piece to be tapped. When the tapping depth is reached, limit switch SQ2 is on , spindle rotates reversely (KM2, suction engaged), tap withdraws from the work piece.

When the spindle return to the highest point, limit switch SQ2 is on. Then Spindle turn forward and one cycle of the operation is finished. For next tapping operation, repeat the steps above. For drilling, turn the button SB6 on the position "0".

**Warning!** The motor turns forward and reverse frequently during tapping, so each operation should not exceed 8 times per minute. Please stop the motor and cool it down when it is hot, otherwise the motor could be burnt down.

### 9.2.5 Power feeding operating

Spindle is moved down over 5--6mm and push the any one button of the three operating levers, the electromagnetic clutch is engaged and power feed is starting and the indicate lamp HL2 is lighted.

The process is stopped by limit switch when the desired depth is arrived.

If need to stop the power feed, push the button of the levers again to disengage the electromagnetic clutch.

### 9.2.6 Emergency stop

During the process of machining, the emergency stop button SB3 can be pushed down for emergency stop. When it is pushed down, control circuit lost power, the machine stops. To restart the machine, relieve the mechanical lock of the button.

### 9.2.7 Zero voltage Protection

Zero Voltage Protection is provided by Contactor KM1. When the power is re-connected, push the button SB4 to suction engage the contactor KM1, the machinc is restarted.

### 9.2.8 Bracket & Worktable Lifting

The work table and it's bracket are protected by (SQ4),(SQ5),when the bracket is clamped, the electric lifting mechanism of worktable can not be started.

Raising lever (22)and turning the button (SB8) to get the requied working height.

### 9.2.9 The function of protecting screen

The machine can not be started, when the protecting screen is not in the correct working position.

## 9.3 Installation of Main Motor

9.3.1 Engage the gears of the main motor with those of the gear box, tighten the 4-M14×35 hex bolts.

9.3.2 Connect the main power supply line and ground wire as shown on the electrical diagram 8.

## 9.4 Maintainence of Electrical Device

Disconnect the main power supply before checking the electrical device. Keep the device clean by removing dust, dirt and grease regularly. Korosine or gasoline are prohibited using as cleaner. The working voltage of the motor can not exceed  $\pm 10\%$  of the rated voltage. To ensure the machine running normally, regular maintainence of the motor is a must.



## 9.4 List of Electrical parts

Table 6

Symbol	Item	Model & Specification	Qty	Remarks
QS1	Main Switch	PI-25/EA/SVB	1	
QS2	Conversion Switch	TO-6-67974GB/E	1	
QF1	Circuit Breaker	MS116 2.5 ~ 4A	1	
QF2	Circuit Breaker	MS116 0.16 ~ 0.25A	1	
SB1; SB2; SB6	Select Switch	C2SS2-10B-10	3	
SB3	Emergency stop Button	YW1B-V4B02R	1	
SB4; SB9	Start Button	CP1-10G-10	2	
SB5	Stop Button	CP1-10R-01	1	
SB7	Handle Button		3	Made by oursetf
SB8	Select Button	C3SS2-10B-20	1	
SQ1; SQ5; SQ6	Micro-switch	SS-5GL-F	3	
SQ2; SQ3	Proximity Switch	TL-Q5MC1	2	
SQ4	Travel Switch	LX19-001	1	
KM1 ~ KM5	Contactor	A12D-30-01	5	
HL1; HL2	Signal Lamp	CL502G AC24V	2	
BL1	Working Lamp	25W AC24V	1	Screw
T1	Control Transfomer	JBK5TH-160VA 575/24; 27; 27; 9	1	
U1	Circuit Board	HXPCB5-C	1	
	Sensor	TYPE: HC-0524NA	1	
	Digital Readout Watch	RSD-1	1	
M1	Two-speed Main Motor	YD100L2-6/4 575V 60HZ	1	
M2	Coolant Pump	AYB-6B 575V 60HZ	1	
M3	Lifting Motor	575V 60HZ	1	Special Order
YC1	Electromagnetic Clutch	DYLO-16S	1	
	Electrical Brush	M16X1	1	Special Order
R1	Resistor	62Ω 2W	1	
D1	Diode	1N5404	1	
DW1	Bridge Pile	QL10A 200V	1	
FU1 ~ FU3		10A	3	
FU4 ~ FU6 FU7 ~ FU9		3A	6	
FU11; FU12		1A	2	
FU10		5A	1	
		31110	4	
		31112	1	
		31113	2	

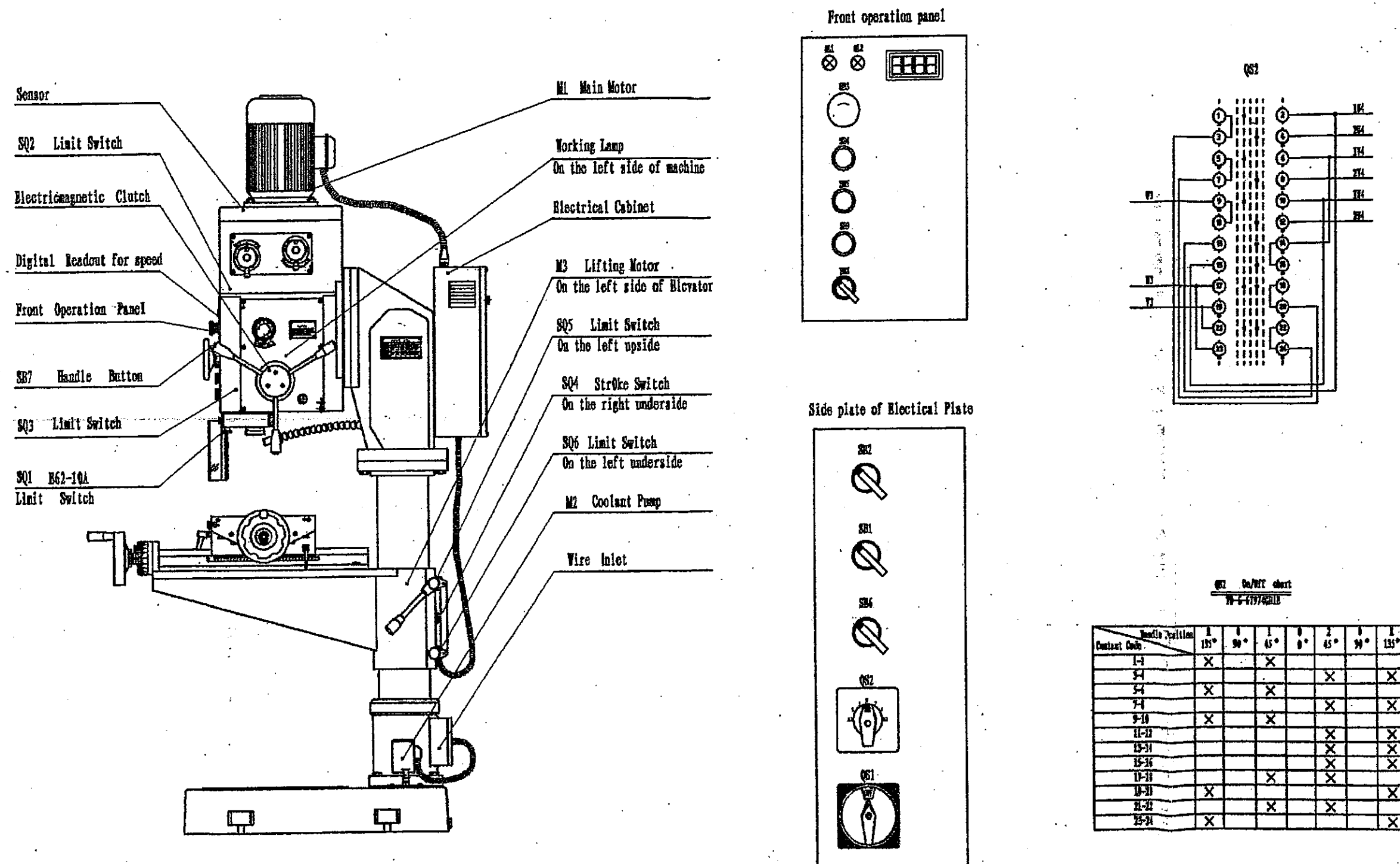


Fig.8 Machine Electrical Diagram

Power inlet

Main Power Switch

Two speed Main Motor

Coolant Pump

Lifting Motor for  
worktable

Transformer

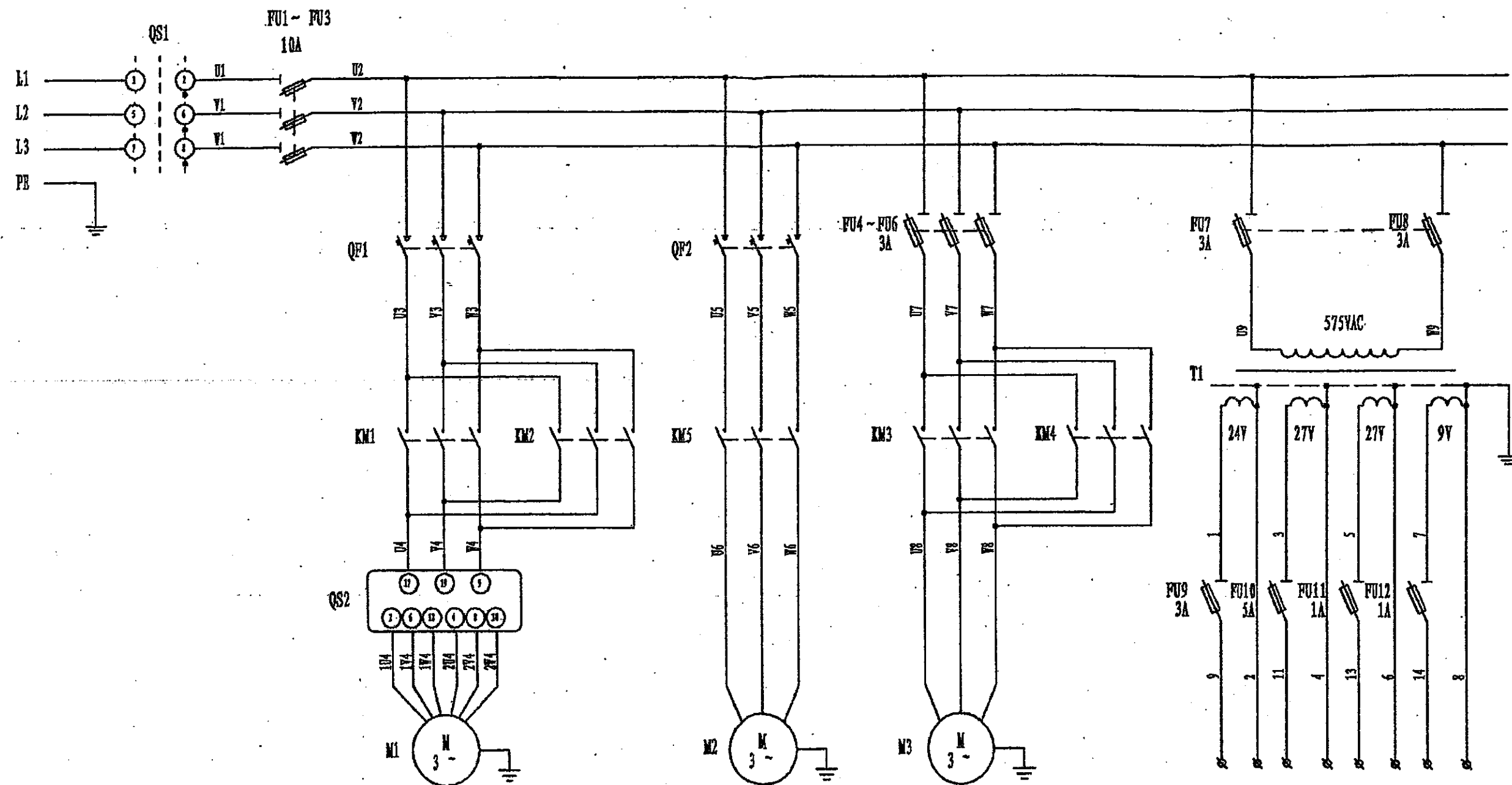


Fig. 9-1 Machine Electrical Diagram

## Electrical Control Wiring

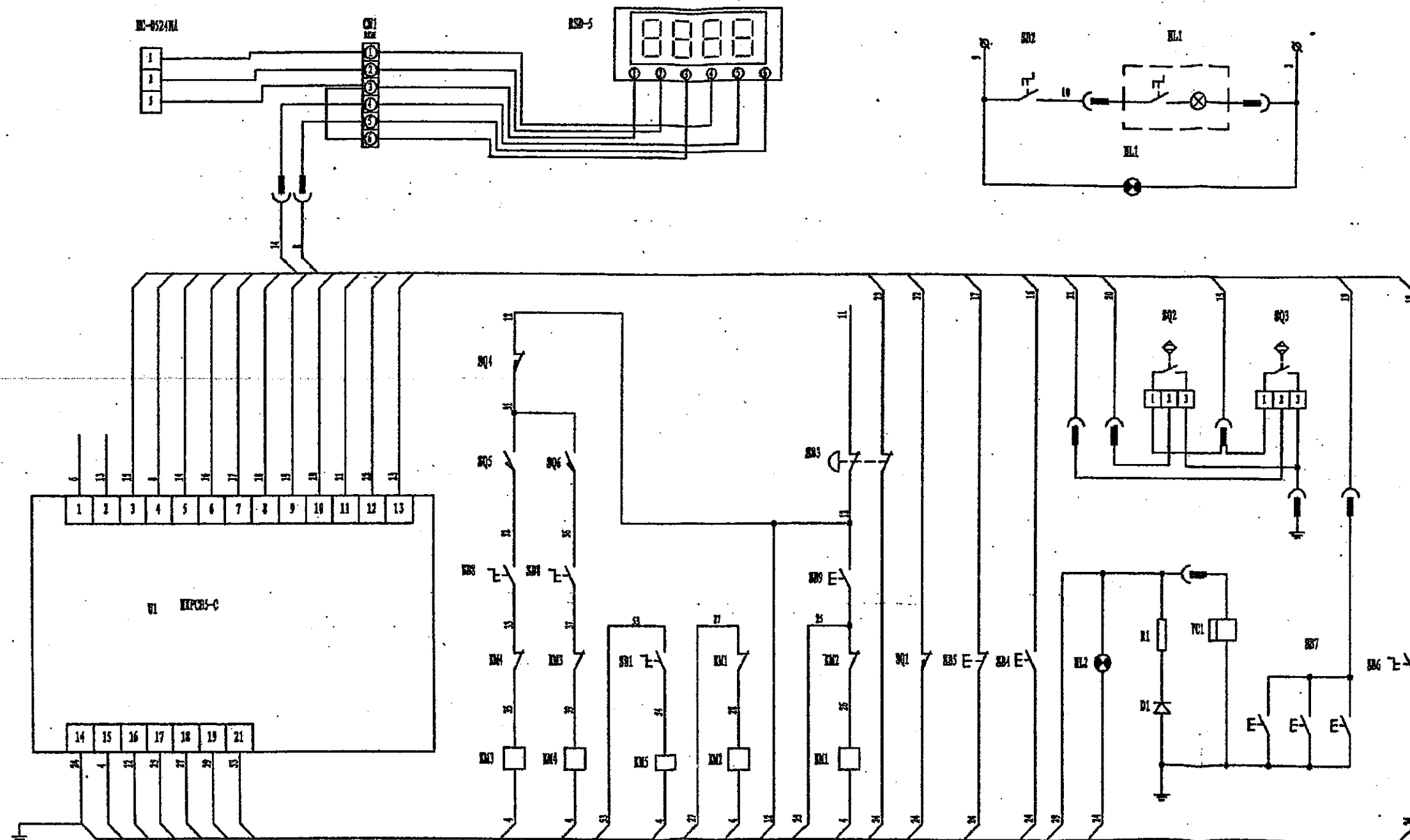


Fig. 9-2 Machine Electrical Diagram

**10. List of Accessories**

NO.	Description	Part No. or Draw. No.	Specification	QTY
1	Spanner drill chuck	GB6087	1~13	1 Pce.
2	Connecting bar of drill chuck	Z5035-50-206		1 Pce.
3	Short sleeve for taper shank tool	JB3477	4~3	1 Pce.
		JB3477	4~2	1 Pce.
		JB3477	3~1	1 Pce.
4	Wedge for taper shank tool	JB3482	Wedge 1	1 Pce.
	Wedge for taper shank tool	JB3482	Wedge 3	1 Pce.
	Wrench with single hend	GB894.1	45	3 Pcs
5	Hex nut	GB6170	M16	4 Pcs
6	Foundation bolt	GB799	M16×300	4 Pcs
7	Washer	GB97.2	16	4 Pcs
8	Double head wrench	GB4388	22×24	1 Pce
9	Hex bolt	GB5728	M14×35	4 Pcs
10	Washer	GB97.2	14	4 Pcs
11	Spring washer	GB93	14	4 Pcs
12	Fuse		φ 5×30;3A/1A	Each 2
13	Fuse		φ 5×30;5A	2 Pcs
14	Short sleeve for taper shank Without flat tail		4-3	1 Pce.
			4-2	1 Pce.
15	End milling cutter		φ 80	1 Pce.
16	Connecting bar for spring chuck			1 Pce.
17	Spring chuck of end milling cutter		4、5、6、8、10、 12、14、16	1set
18	Connecting bar for end milling cutter			1 Pce.
19	Hooked spanner		78~85	1 Pce.
20	Hooked spanner		68~72	1 Pce.
21	Square wrench		4×4	1 Pce.
22	Round nut	HX02-50-201B		2 Pcs
23	Elastic block ring for shaft	ZX5040-50-202		1 Pce.

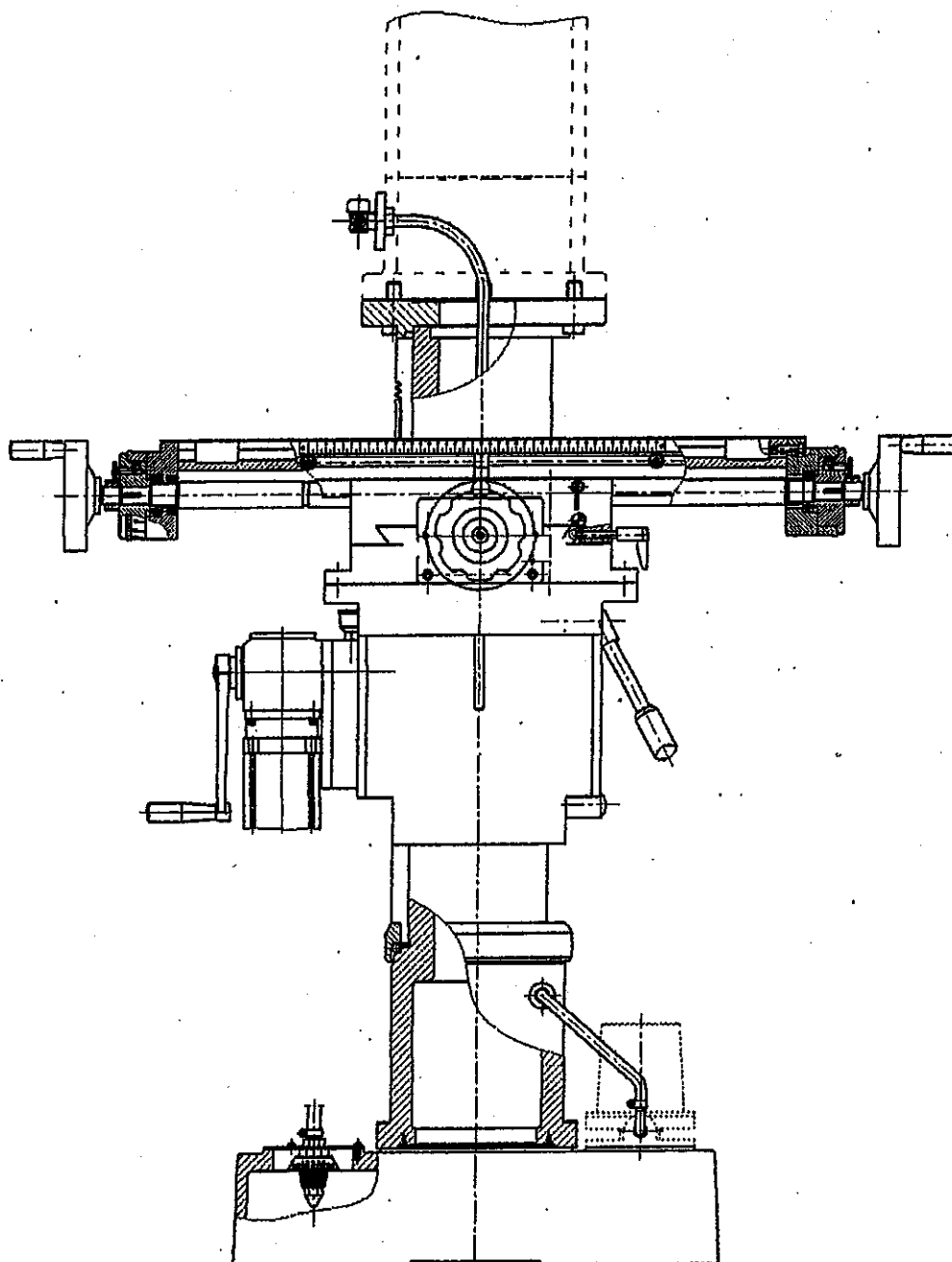
**11. Structure of main components**

11.1 Structure of column and bracket worktable (Fig 10)

11.2 Structure of spindle box and gear box (Fig 11)

11.3 Expand View of Feed Gear Box (Fig.12)

Fig. 10 Structure of Column and  
Bracket table



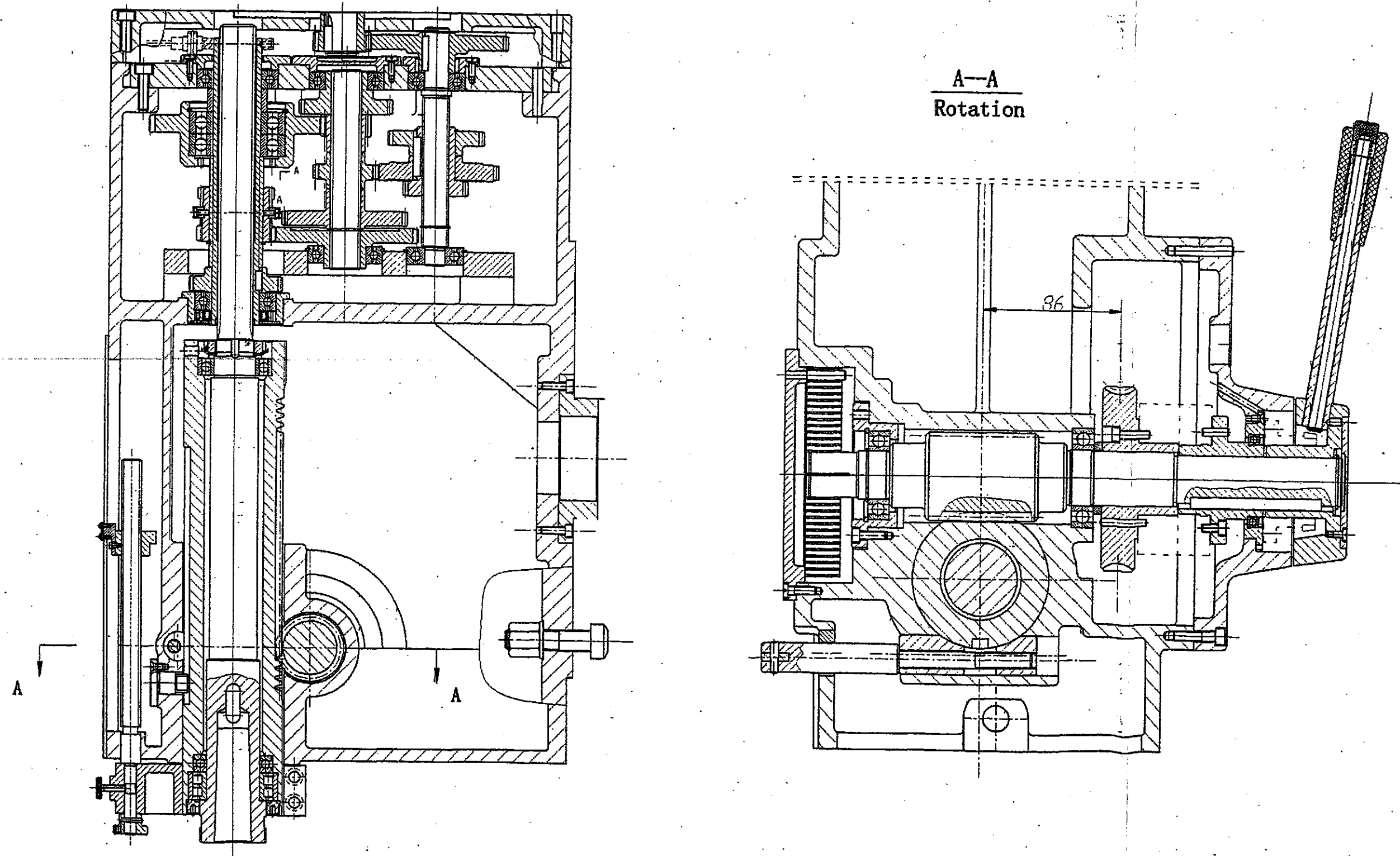


Fig.11 Structure of spindle Box and Gear Box

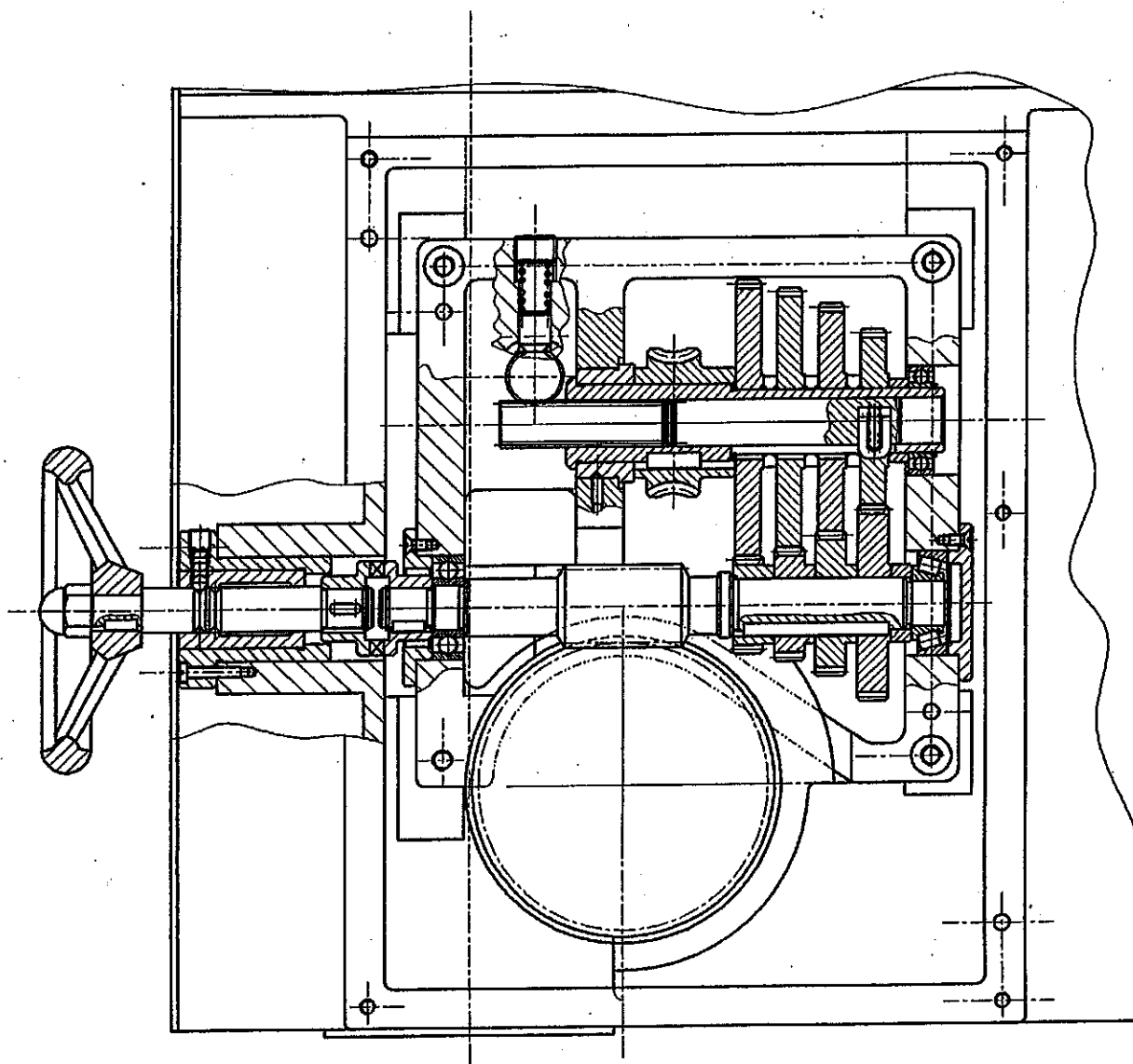


Fig. 12 Feed Gear Box



**Model ZX5040**  
**Vertical Drilling Milling Machine**

**Certificate of Inspection**

Max. Drilling Dia: 40mm

Max. End-Milling Dia: 80mm

Serial No: T1408-034

**Inspection confirmeds that the quality of  
the machine is up to the standard  
Q/SMOS1-2000. It is permitted to deliver.**

Factory Director: *zhang bin* Date:

Inspeccctor: *lizigang* Date:

MODEL ZX5040

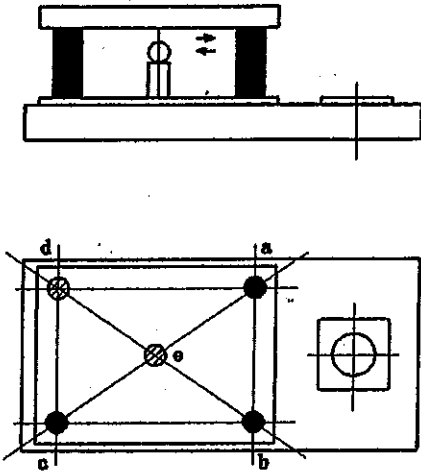
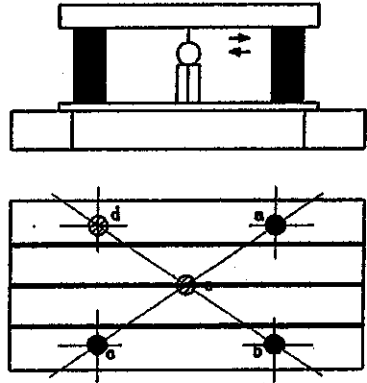
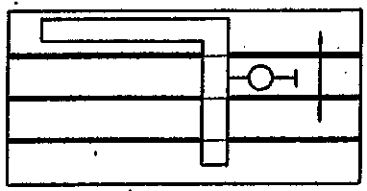
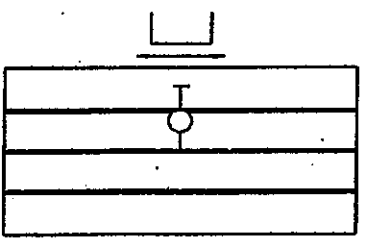
## Certificate of Inspection

TOTAL 3

PAGE 1

## Precision In spection Record

## Geometrical Precision Test:

NO	Item	Brief Drawing	Precision	
			Allowance (mm)	Actual Test
G1	Parallelism of the base surface		0.06 at any tested length of 300 (flat or concave)	$\frac{0.05}{300}$ (121)
G2	Parallelism of the work table surface		0.04 at any tested length of 300 (flat or concave)	$\frac{0.035}{300}$ (121)
G3	Perpendicularity of the movement of longitudinal relative to the movement of transverse.		0.05/300	$\frac{0.05}{300}$
G4	Parallelism of benchmark T slot to the movement of worktable.		0.05	0.04

MODEL ZX5040		Certificate of Inspection		TOTAL 3	
				PAGE 2	
Precision In spection Record					
Geometrical Precision Test:					
NO	Item	Brief Drawing	Precision		
			Allowance (mm)	Actual Test	
G5	Parallelism of worktable surface to the movement of worktable: a) Transverse b) longitudinal		a) 0.02/100  b) 0.06 Part: 0.03/300	a) $\frac{0.015}{100}$  b) 0.05	
G6	Spindle bore axis runout a) close to spindle surface b) at a distance of L to spindle surface		L=300 a) 0.02 b) 0.04	a) 0.01  b) 0.03	
G7	Parpendicularary of the spindle axis to work table surface		a) 0.1/300* (α ≤ 90°) b) 0.06/300*	a) $\frac{0.08}{300}$ (α ≤ 90°)  b) $\frac{0.05}{300}$	

MODEL ZX5040

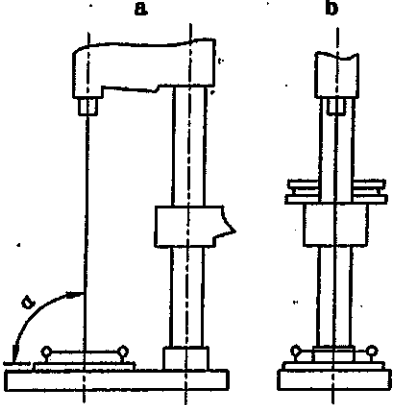
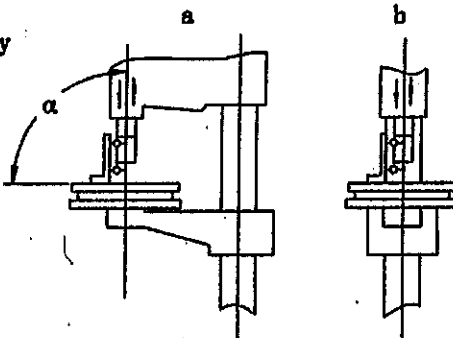
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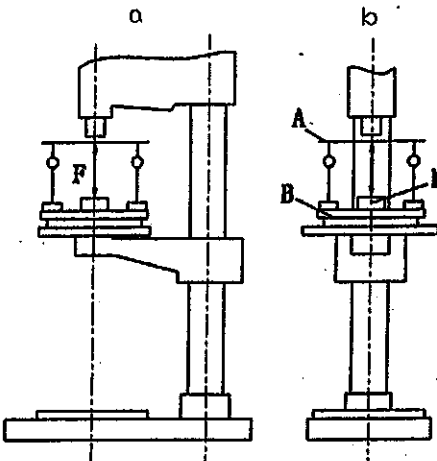
PAGE 3

## Precision In spection Record

## Geometrical Precision Test:

NO	Item	Brief Drawing	Precision	
			Allowance (mm)	Actual Test
G8	Perpendicularity of the spindle axis to Base plate surface		a) 0.10/300* ( $\alpha \leq 90^\circ$ ) b) 0.10/300*	a) $\frac{0.08}{300}$ ( $\alpha \leq 90^\circ$ ) b) $\frac{0.08}{300}$
G9	Perpendicularity of the vertical movement of spindle sleeve to work table surface		a. 0.1/300 ( $\alpha \leq 90^\circ$ ) ) b. 0.1/300	a) $\frac{0.09}{300}$ ( $\alpha \leq 90^\circ$ ) b) $\frac{0.08}{300}$

## Work Acuracy:

P1	The change of perpendicularity of spindle axis to work table surface udder the axial force.		$F=9000N$ a and b 2/1000	$\frac{1.38}{1000}$
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Distance between two contacts of indicator probe

**Model ZX5040**  
**Vertical Drilling Milling Machine**

**Packing List**

**Max. Drilling Dia. 40mm**

**Max. End-Milling Dia. 80mm**

**Serial No:** 71408034

MODEL ZX5040		Packing List		PAGE 1 OF 1
Case No.: 1/1 Dimension (L×W×H) :127cm×107cm×217cm Gross Weight: 910kg Net Weight: 850kg				
No.	Item	Spec. & Marks	Qty	Remarks
1	Main machine		1 set	
2	Main motor	YD100L2-6/4	1 set	
3	Spanner drill chuck	1~13; GB6087	1 Pce	
4	Connecting bar of drill chuck	Z5035—50—206	1 Pce	
5	Short sleeve for taper shank tool	4—3; JB3477	1 Pce	
		4—2; JB3477	1 Pce	
		3—1; JB3477	1 Pce	
6	Wedge for taper shank tool	Wedge1; JB3482	1 Pce	
		Wedge3; JB3482	1 Pce	
7	Hex nut	M16; GB6170	4 Pcs	
8	Foundation bolt	M16×300; GB799	4 Pcs	
9	Washer	14; GB97.2	4 Pcs	On the machine
10	Washer	16; GB97.2	4 Pcs	
11	Spring washer	14; GB93	4 Pcs	On the machine
12	Double head wrench	22×24; GB4388	1 Pce	
13	Hex bolt	M14×35; GB5782	4 Pcs	On the machine
14	End milling cutter	φ 80	1 Pce	
15	Fuse	φ 5x30; 3A/1A	Each 2 pcs	
16	Fuse	φ 5x30; 5A	2 pcs	
17	Sleeve for taper without flat tait	4-3	1 Pce	
		4-2	1 Pce	
18	Connecting bar for spring chuck		1 Pce	
19	Spring chuck of end milling cutter	4、5、6、8、10、12、14、16	1set	
20	Connecting bar for end milling cutter		1 Pce	
21	Hooked spanner	75~85	1 Pce	
22	Hooked spanner	68~72	1 Pce	
23	Square wrench	4X4	1 Pce	
24	Round nut	HX02-50-201B	2 pcs	
25	Elastic block ring for shaft	ZX5040-50-202	1 Pce	
26	Wrench with single hend	GB894.1;45	3 Pcs	
27	Operation manual		1 copy	
	Certificate of Inspection		1 copy	
	Packing List		1 copy	
Packing Inspector: <i>Zi Zi Jiang</i>				
Date:				

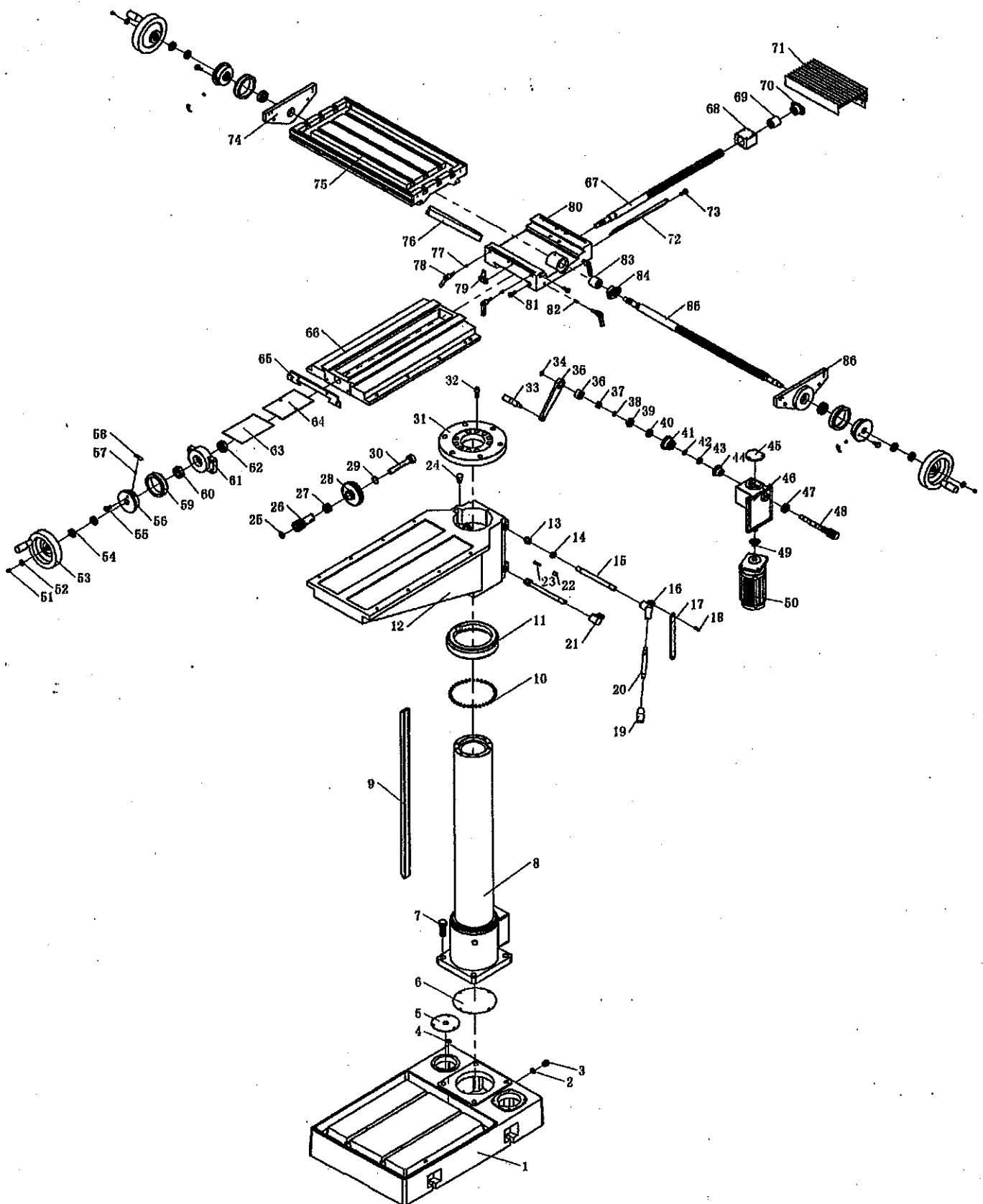


Fig1. Three-view drawing of work table and bracket parts



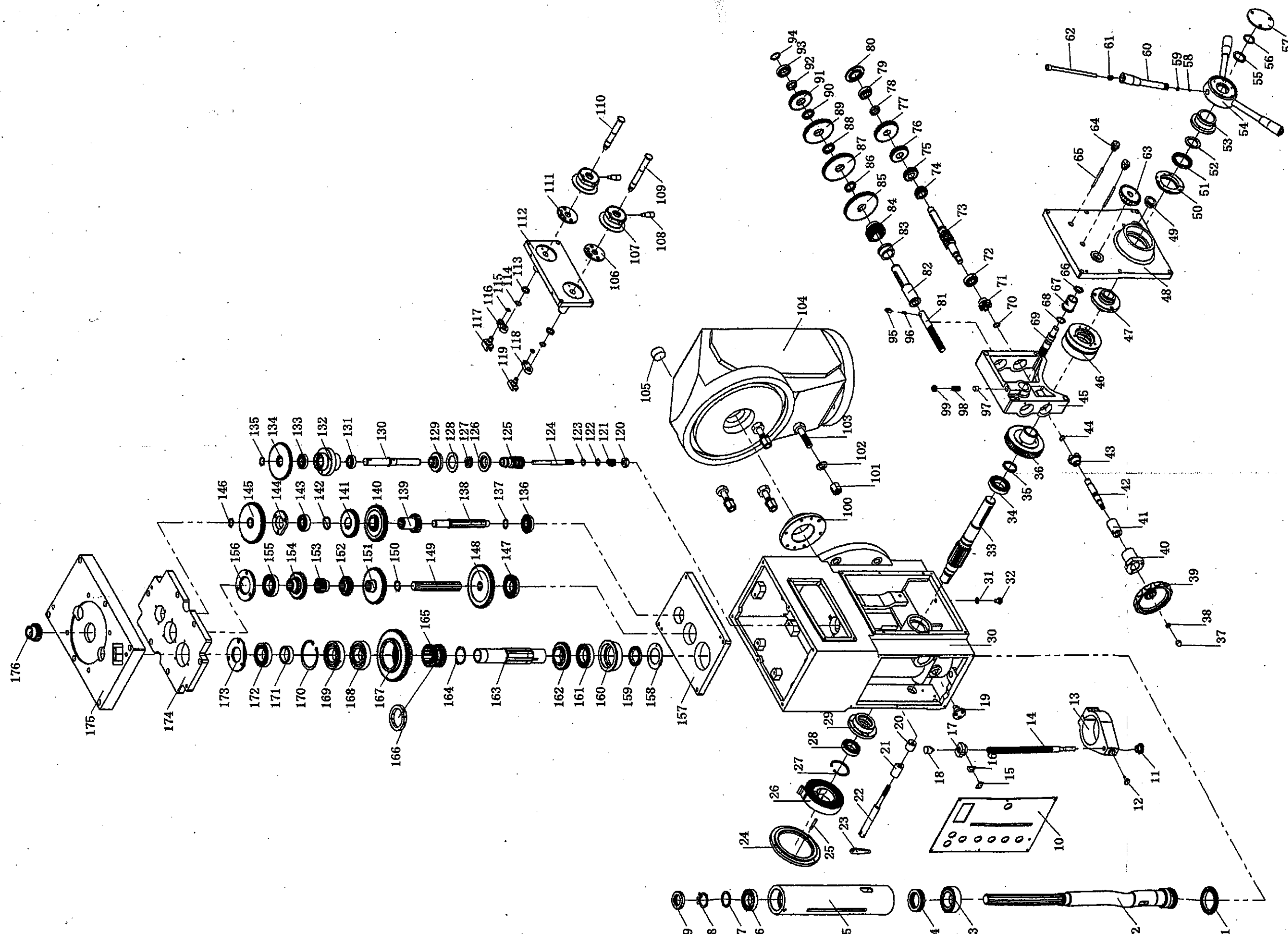


Fig2. Three-view drawing of spindle box and geared system

# 江苏通微电机科技有限公司

## 电机出厂检验报告

TW/QR0810

产品名称 变极多速三相异步电动机

规格型号

$\frac{1}{2}$  100L- $\frac{6}{4}$  575V 60Hz 2x5040W

检测依据 GB14711-2006 JB/T7127-2010 本次批量

1 台

序号	检 验 项 目	标 准 值	实 测 值	单 项 判 定
1	外 观	表面涂漆均匀、有光泽、无缺陷	✓	<input checked="" type="checkbox"/> 合格 <input type="checkbox"/> 不合格
2	噪 声 (dB) A	78	≤78	<input checked="" type="checkbox"/> 合格 <input type="checkbox"/> 不合格
3	绝缘电阻 (MΩ)	>20	500	<input type="checkbox"/> 合格 <input type="checkbox"/> 不合格
4	介电强度 (V/S)	2100	2100	<input checked="" type="checkbox"/> 通过 <input type="checkbox"/> 不通过
5	空载电流 (A)		1.8/1.9	<input checked="" type="checkbox"/> 合格 <input type="checkbox"/> 不合格
6	空载损耗 (W)		186/224	<input checked="" type="checkbox"/> 合格 <input type="checkbox"/> 不合格
7	堵转电流 (A)		2.9/4.7	<input checked="" type="checkbox"/> 合格 <input type="checkbox"/> 不合格
8	堵转损耗 (W)		461/785	<input checked="" type="checkbox"/> 合格 <input type="checkbox"/> 不合格
9	匝间绝缘 (kV)	2.5	2.5	<input checked="" type="checkbox"/> 通过 <input type="checkbox"/> 不通过
10	接地标志检查	有	✓	<input checked="" type="checkbox"/> 合格 <input type="checkbox"/> 不合格

### 综合判定:

该批电机依据标准检测, 以上各项均符合规定要求。则产品质量:

☒合格

☐不合格

产品编号:

1405003

检 验 员:

孙圣芳

审 核 人:

张明远

出厂日期: 2014年5月28日

## 质量保证书

型号升降电机 功率 0.18 KW 575V 频率 60 Hz 转速  
1650 r/min 数量 10 台

检测要求:

绝缘耐压大于 2200V

振动小于 1.8/mm

表面无划痕, 缺陷

质量符合 JB/T10391-2002

上海缘达特种电机有限公司

2014.8.15