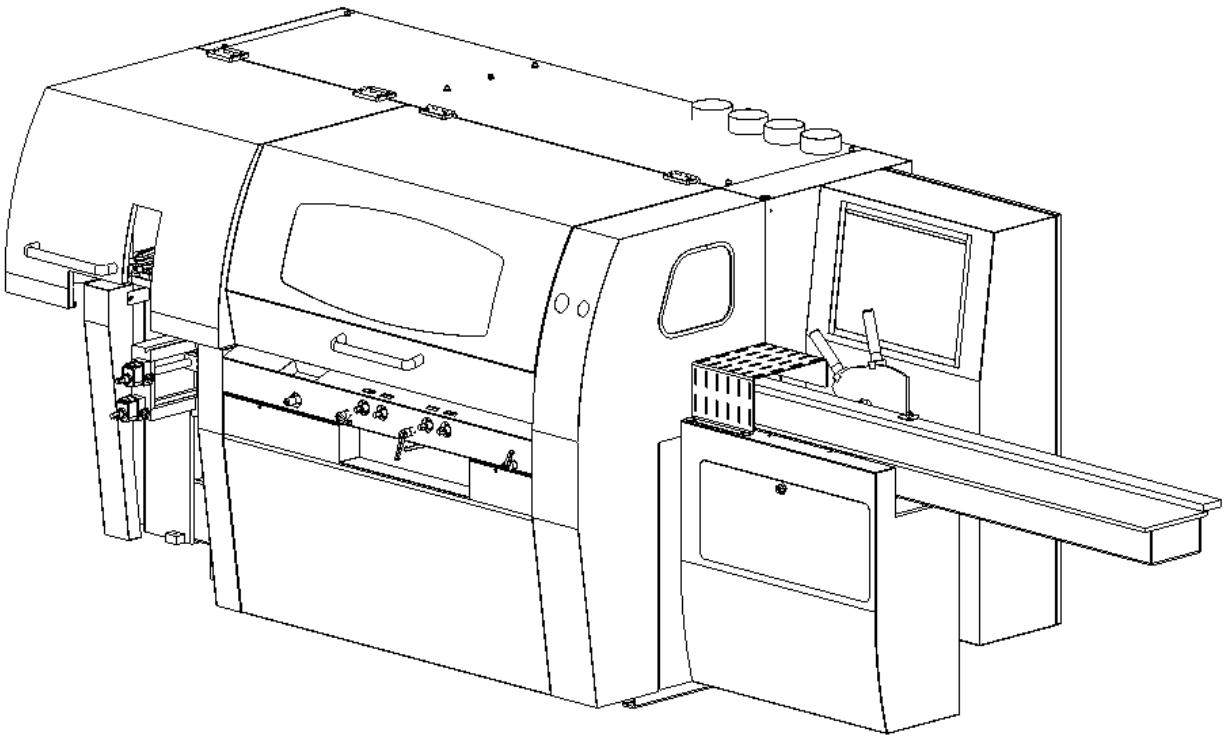
G 230/4 – G 230/5U

4 SIDE MOULDER

Code	Lingua
-	GB

INSTRUCTIONS 07/09 *SPARE PARTS*



CE

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CONTENT

Attachment：

Electric principle

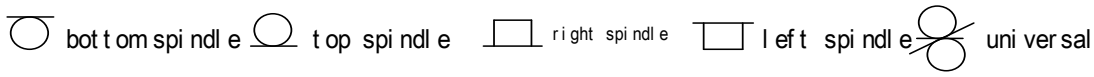
1. Machine Type Identify and Spindle Arrangement

1.1 Machine Type Identify（Example）

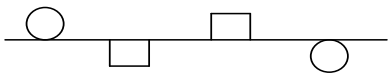
G 230/4 Model: Light-duty, economic type
Working width: 18~230mm
Quantity of spindle: four spindles

G 230/5U Model: Light-duty, economic type
Universal spindle
Working width: 18~230mm
Quantity of spindle: Five spindles (including universal)

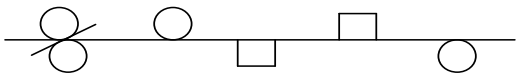
1.2 Spindle Arrangement（Example）



G 230/4



G 230/5U



2. **Safety**

2.1 **General rules of safety**

① Do not operate the machine before reading earnestly throught and fully understand the operation manual. The person who operates the machine must be very familiar with the adjusting contents, adjusting procedures and safety rules.

② To make proficient with specialized trainning before operating.

③ Please pay attention to the warning symbols on the machine and abide by the rules.

④ To avoid wrapping in working, workers should have their hair and sleeves bound. No loose coat, gloves and jewelry allowed while working.

⑤ **Unrelated person is not allowed to stay around the running machines.**

⑥ Do not stand in front of the infeed and outfeed directions to avoid unexpected injury from the rebound and spring of workpieces.

⑦ **Do not raise the feeding device while processing the logs, or else the workpieces might be loosened and do harm to human and machine.**

⑧ Do not take away any of the protected covers while processing, neither adjust the wind-tubes, feeding wheels and side pressure wheels.

⑨ Do not clean the chips while the machine is running, for fear that dangers might cause.

⑩ Do not try to stop the spindles by hands or other things, let the spindles stop automatically by pushing the stop button.

⑪ Spindle nuts must be tight enough to avoid loosen. Check manually if the spindles can rotate freely before machine starts.

⑫ **Daily check of the safety devices before machine starts is necessary, to eliminate hidden troubles.**

⑬ Please make sure that the power is off and the machine is completely stopped befor adjusting, matain the machine and installed cutter blocks.

⑭ The maintenance and maintain of machine tools shall be done termly by qualified personnels, and the work of power system can only be done by qualified electricians.

⑮ **Protected gloves are needed while installing or changing cutter blocks to prevent harming from sharp edge of knives.**

⑯ Safeguards for eyes and ears are needed while working. (Noises of machine tool is no higher than 85dB)

⑰ Ensure the neatness and roominess of working locality. Any of the impediments would be effected on operation，and hidden troubles lurking.

⑱ **Do not remove safety devices, limit switches of cover interlocks and other switches, and ensure the validities.**

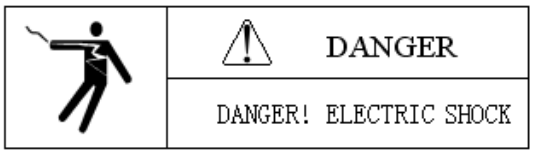
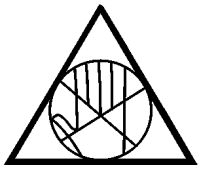
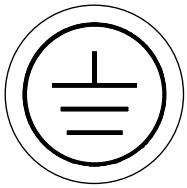
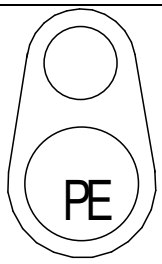
⑲ While observing and checking the equipments (herein the equipment shall be stopped and cannot be started up), the runner must ensure the selection switch is switched to “test”, and others cannot change the state position without permissions.

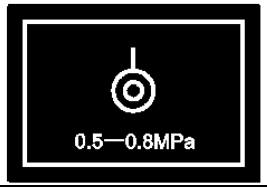
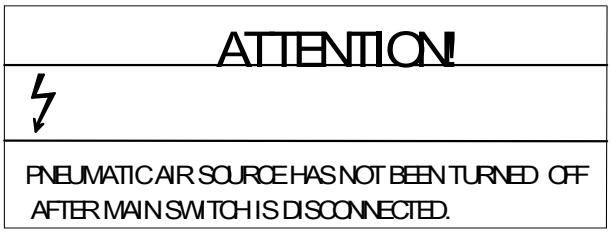
⑳ **Power must be off while romoving and checking the electricity.**

○,21 **Press any of the emergency stop buttons to stop the machine when there are emergencies.**

2.2 **Warning symbols**

TABLE 1

No.	Symbols	Instruction of Symbols
1		Be careful of the electricity.
2		Safety protector Runners must wear protective goggles.
3		Safety protector Runners must wear ear protector.
4		Keep safe Caution machanical injury.
5		Cutter blocks rotating, watch out!
6		Electricity here! Cut off the power while repairing the machine.
7		Watch out while closing cover doors
8		Earthing
9		Earthing

10		Pneumatic power entrance. (0.5~0.8MPa) (CE machine)
11		The outer cover can only be opened after the safety indicator turns on. (CE machine)
12		Open switchboard only when the main switch is in the “0” position. Pneumatic air source has not been turned off after main switch is disconnected. (CE machine)

2.3 **Correct use of machine tool**

The processing range of workpieces only limit to the data of technical parameters. Do not use if the data overruns.

Do not process the timber with nail or concrete.

The cutter tools must be made in accordance with ***manufactured saw blade and milling cutter***

Check the locking state of cutter blocks before operating the machine. Let the machine run with nothing for at least 5 minutes to inspect running state, to get rid of obstructions in time.

Lay the timber onto the infeed table and push hardly to the guiding fence one by one.

To avoid spring of workpieces, adjust the height of infeed wheels matching the height of workpieces, and ensure enough feeding power.

Do not change speed when the machine is stopped, in case of causing damage to the machine.

Press emergency stop to examine and repair when trouble comes out.

Let the machine run with nothing to clean up the chips after processing.

3. **Operational requirements of machine tool.**

3.1 **Environment required for machine tool**

①Ambient temperature:5~40□

②Relative humidity: 30~95%

③Height above sea level of machine use: max. 1000m.

④Transportation and storage temperature: –25~55□, 70□ acceptable within 24 hours.

⑤ Do not use the machine in explosive environment.

3.2 **Power supply, Pneumatic power, Dust collecting and Lubrication**

①Power supply:

Three-phase alternating current, Frequency 50±1%Hz, Voltage 380±10%V and Motor power (please see the parameter table).

②Pneumatic power

Dry, filtered and lubricated compressed air. Pressure used should be 0.5~0.8Mpa and the connector should be plastic hose of OD(Outter Diameter) 8mm.

③Dust collecting:

Wind speed must be 30 – 34 m/s, dust-intakes of ID (Inner Diameter)120mm, wind cost (m^3/h) please see the table below.

TABLE 2

		4 spindle machine	5 spindle machine
Wind	Min.	4900	6110
	Max.	5540	6930

④Lubrication

Using all of high temperature lubrication above 120ºC, Ca-based Grease ZG-3 ,ZG-0, engine oil N46.

4. **Main purpose of machine tool**

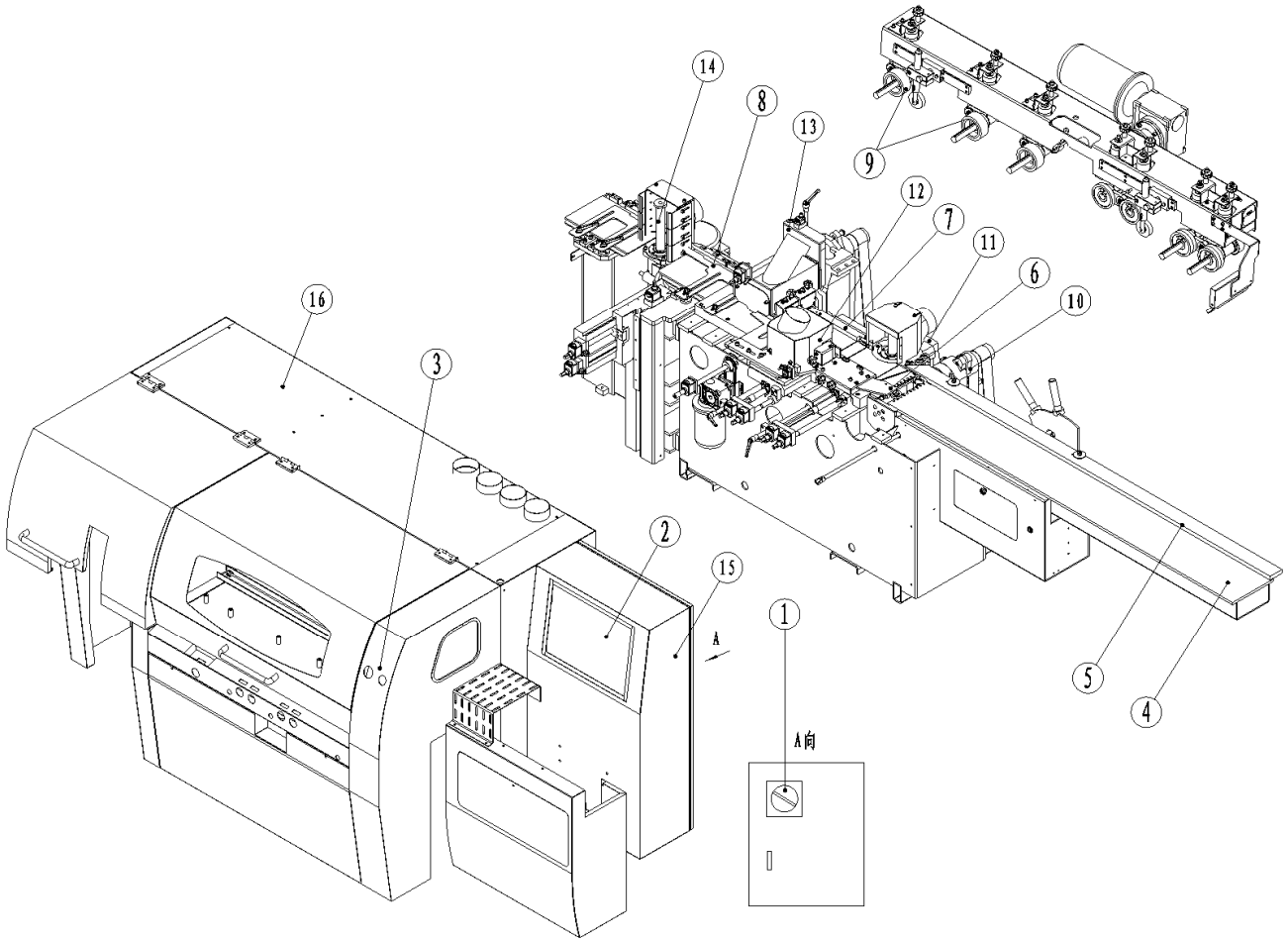
Mainly used for synchronized working on four sides of wood block, wood bar, floor batten, window and door frame, furniture component, etc. It can also be used for shape planing when fixing special-purposed cutters, such as armrest of stairs and so on.

5. **Brief introduction of machine tool and main technical parameters**

5.1 **Brief introduction of machine tool**

The machine tool is built-up by operation device, guiding of workpieces, spindles, safety device, elevation device and so on.

Take G 230/5U for example, its configuration please see.



Operation device:

10— Main switch (onto the door of electricity box)

11— Main control panel

12— Pneumatic control area

Workpiece guiding:

13— Infeed table

14— Infeed fence

15— Side pressure wheel components of left spindle

16— Guiding fence

17— Side pressure board

18— feeding pressure wheel

Spindle：

10—bottom spindle
11—right spindle
12—left spindle
13—top spindle

14—universal spindle

Safety device：

15—electricity box
16—cover

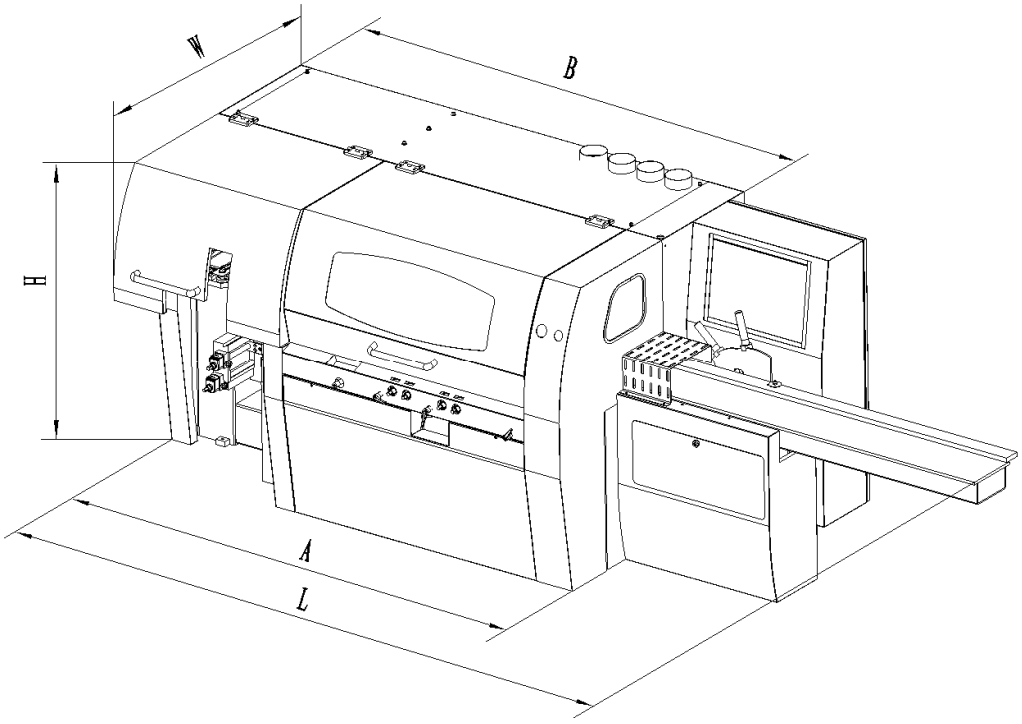
5.2 Main technical parameters

TABLE 3

No.	Item		Unit	Technical parameters	
1	Size of workpieces	width	mm	min=18	max=230
		thickness	mm	min=7	max=120
2	Feeding speed		m/min	6 ~ 12	
3	Feeding table	Adjustable range (up/down)	mm	10	
4	Adjustable range of infeed guiding fence		mm	10	
5	Adjustable range of outfeed board (adding pads)		mm	max=1	
6	Bottom spindle	speed	r/min	6000	
		Diameter of spindle	mm	Ø40	
		OD of cutter block installed	mm	Ø120	
		Max. length of cutter installed	mm	250(including pre-trimming cutters)	
		OD of pre-trimming cutter	mm	max=140	
		Thickness of pre-trimming cutter	mm	10	
		Axial adjustable range of spindles	mm	20	
		Motor power	kW(HP)	4(5.5) ~ 5.5(7.5)	
7	Vertical milling cutter spindle	speed	r/min	6000	
		Diameter of spindle	mm	Ø40	
		OD of cutter block installed	mm	min=Ø100	max=Ø180
		Max. length of cutter installed	mm	130	
		Axial adjustable range of spindles	mm	25	
		Motor power	kW(HP)	2×4(5.5) ~ 5.5(7.5)	
8	top spindles	speed	r/min	6000	
		Diameter of spindle	mm	Ø40	
		OD of cutter block installed	mm	Ø120	
		Max. length of cutter installed	mm	240	
		Axial adjustable range of spindles	mm	25	
		Motor power	kW(HP)	5.5(7.5) ~ 7.5(10)	
9	Universal spindle	speed	r/min	6000	
		Diameter of spindle	mm	Ø40	
		OD of cutter block installed	mm	Ø120	
		Max. length of cutter installed	mm	240	
		Motor power	kW(HP)	4(5.5) ~ 5.5(7.5)	
10	Feeding pressure wheel	Steel wheels OD/ID	mm	Ø120/Ø30	
		Rubber wheels OD/ID	mm	Ø120/Ø30	
11	Motor power of feeding		kW(HP)	4 spindles	5 spindles
				1.5 (1.8)	2.2 (3)
11	Motor power of feed beam elevation		kW(HP)	0.18 (0.25)	
12	Pressure of pneumatic power		MPa	0.5~0.8	
13	OD of chip conveying pipe		mm	Ø120	
14	Total motor power used kW(HP)	4 spindles		5 spindles	
		19.2(26.1) ~ 25.7(34.6)		23.9(32.8) ~ 31.9(43.3)	

NOTE: The cutter tools must be made in accordance with EN847-1 ***manufactured saw blade and milling cutter*** to configure cutters and set the speed for the chief shaft. When an overweight cutter block with oversized diameter operating at high speed is adopted, unallowable vibration will be caused, which is not in accordance with the safety requirements.

6. **Overall size of machine tool**



(Figure 2)

TABLE 4

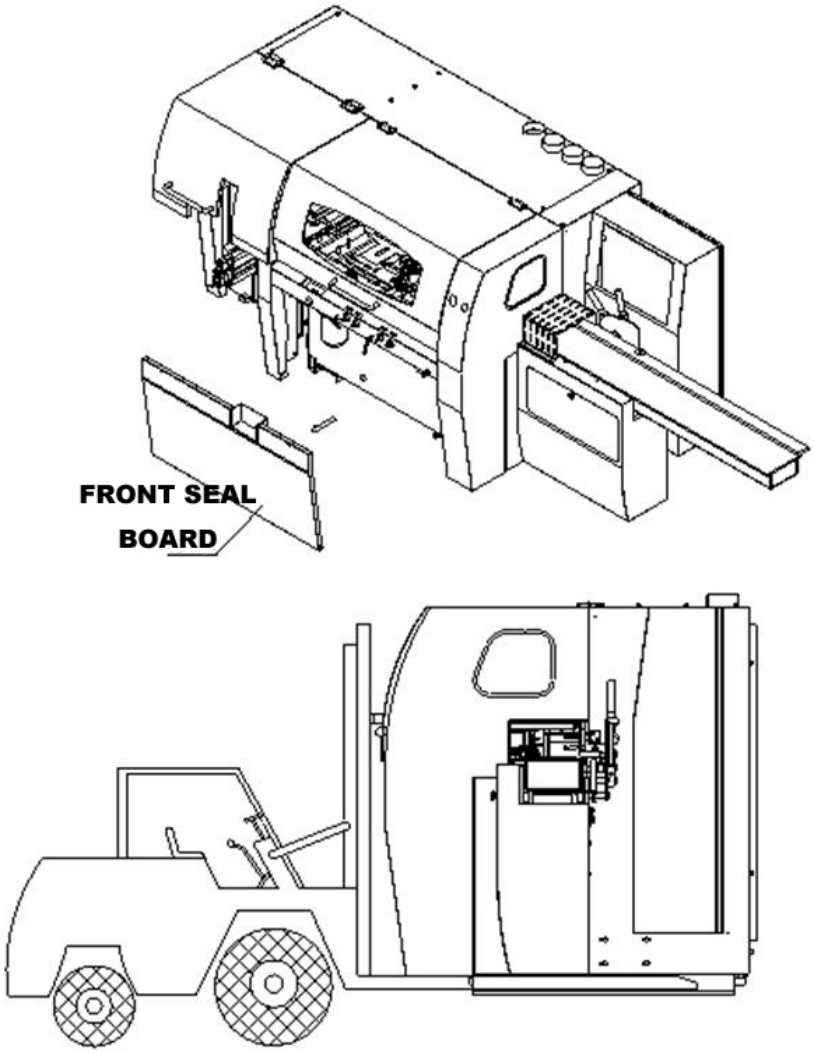
model / size	G 230/4	G 230/5U
L	3425	4260
W	1485	1489
H	1517	1517
A	1579	2414
B	1579	2414

7. **Portage and installation of machine tool**

7.1 **Portage of machine tool**

7.1.1 **Portage by forklift**

While transfering the machine by forklift, please remove the bottom cover first. Extend the arms of forklift under the empty place of machine tool and raise the machine tool carefully. Please see(Figure 3).



（Figure 3）

Attention:

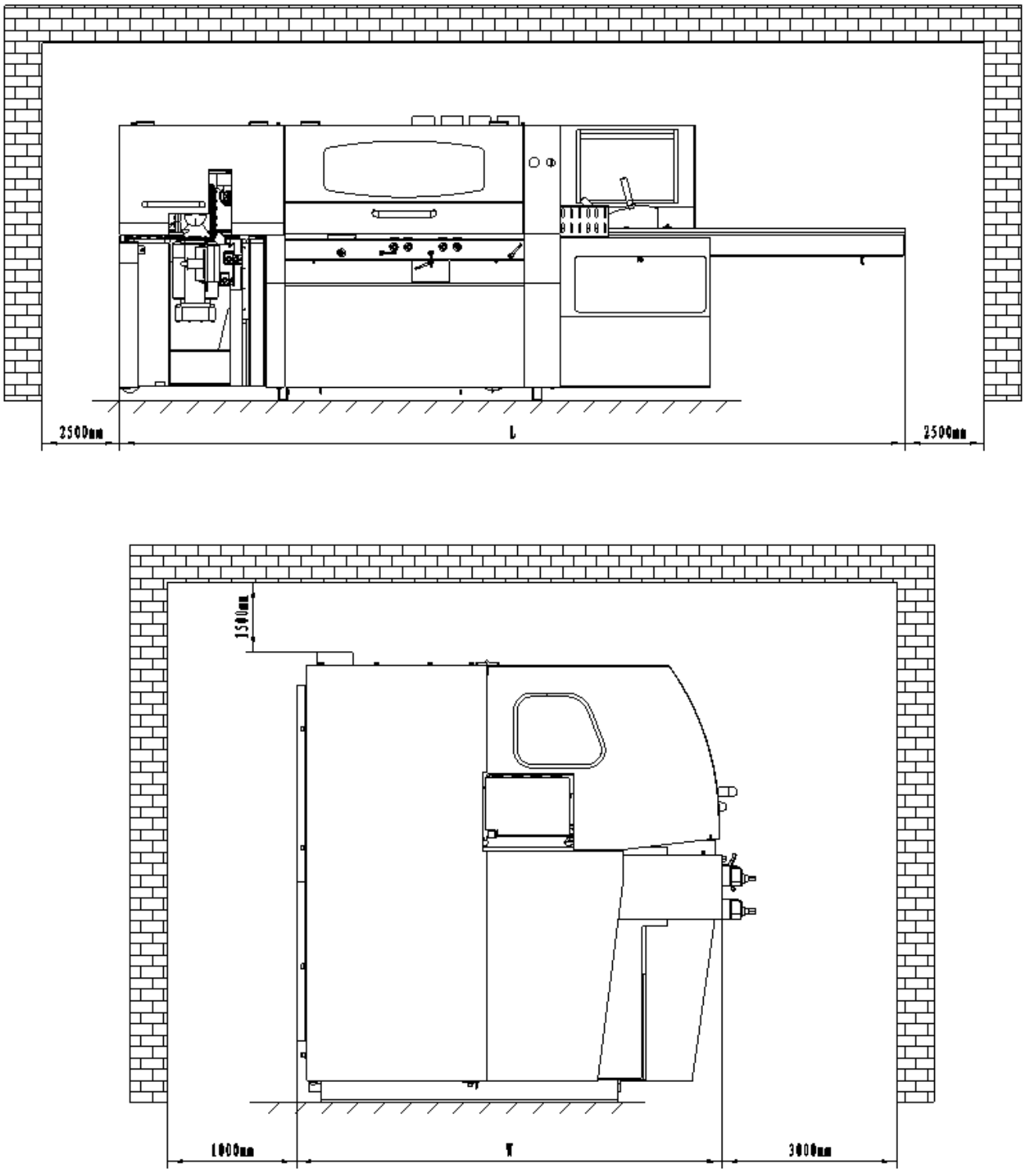
① Extend the arms of forklift slowly under the empty place (guiding groove for forklift) of machine tool.

② Keep balance of the machine tool while transfering.

③ Do not raise too hight, otherwise it would be easy to lose the balance of the machine.

④ Pay attention to the locking bars in front of the digital indicator covers. Do not crash.

7.2 **Disposal of machine tool**



(Figure 4)

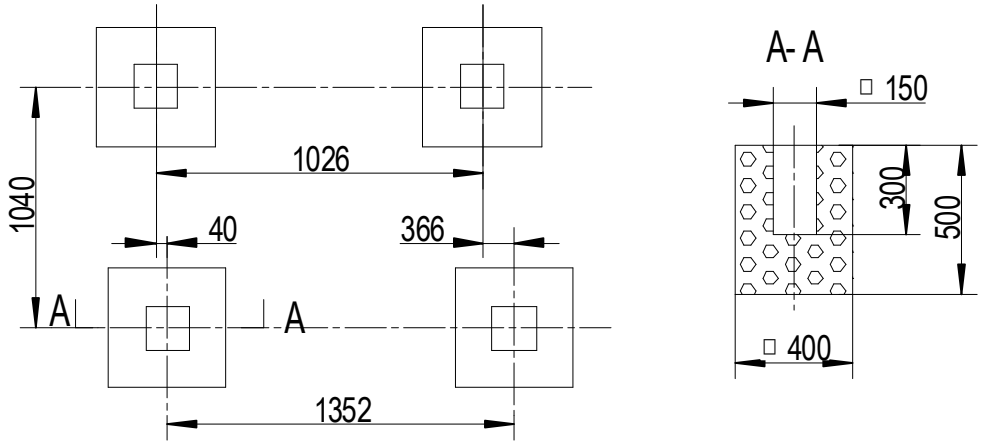
Note: The size of L, W, H please see Table 4.

7.3 **Installation of machine tool**

7.3.1 **Disposal figures of base-bolt**

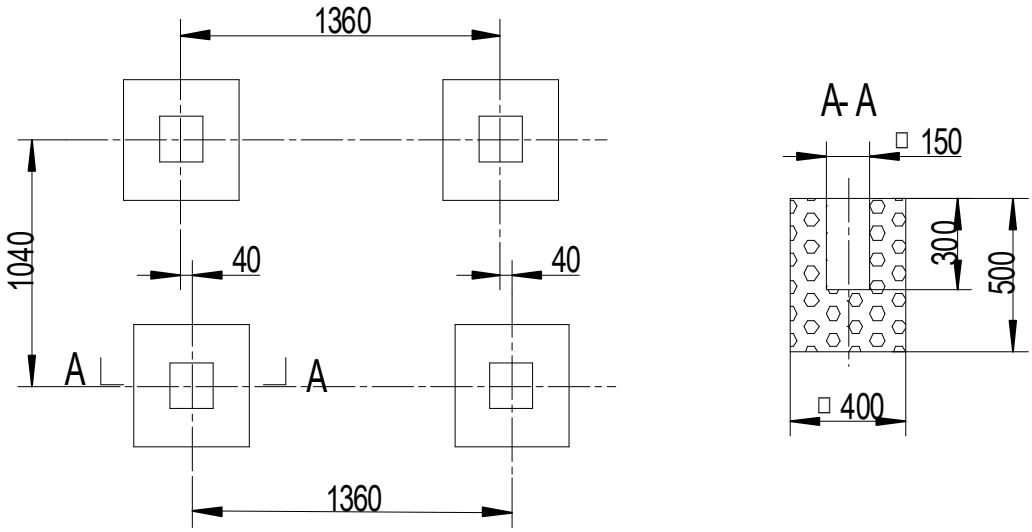
This machine does not need the base-bolts for installation and fixing generally. If it is demanded, installation dimension of base-bolts please see (Figure five, six).

G 230/4



(Figure 5)

G 230/5U



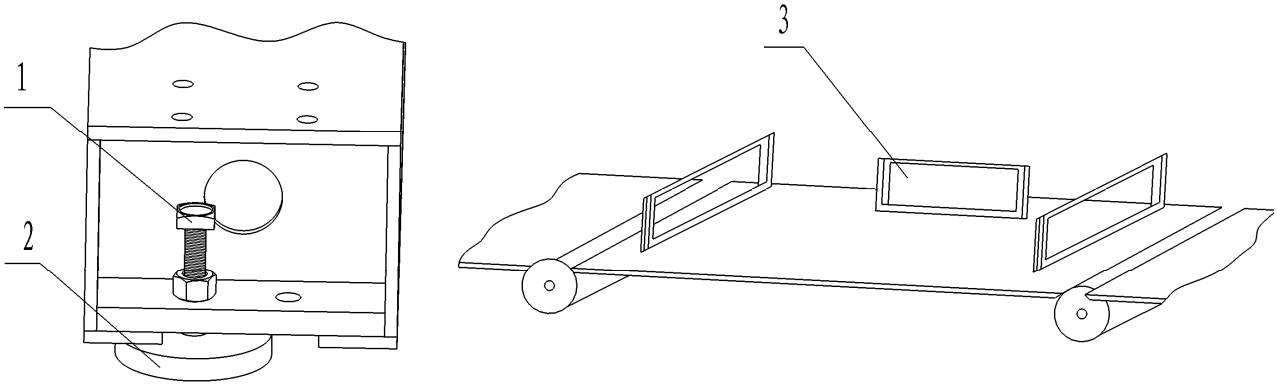
(Figure6)

7.3.2 **How to level the machine tool**

① Place pad 2 under the adjusting bolt 1 of the base.

② Place a level gauge 3 on the machine table, perfect to be the center of the machine.

③ Adjust the level of machine via the adjusting screw 1, the error is ±0.1mm/m. Please see (Figure 7)

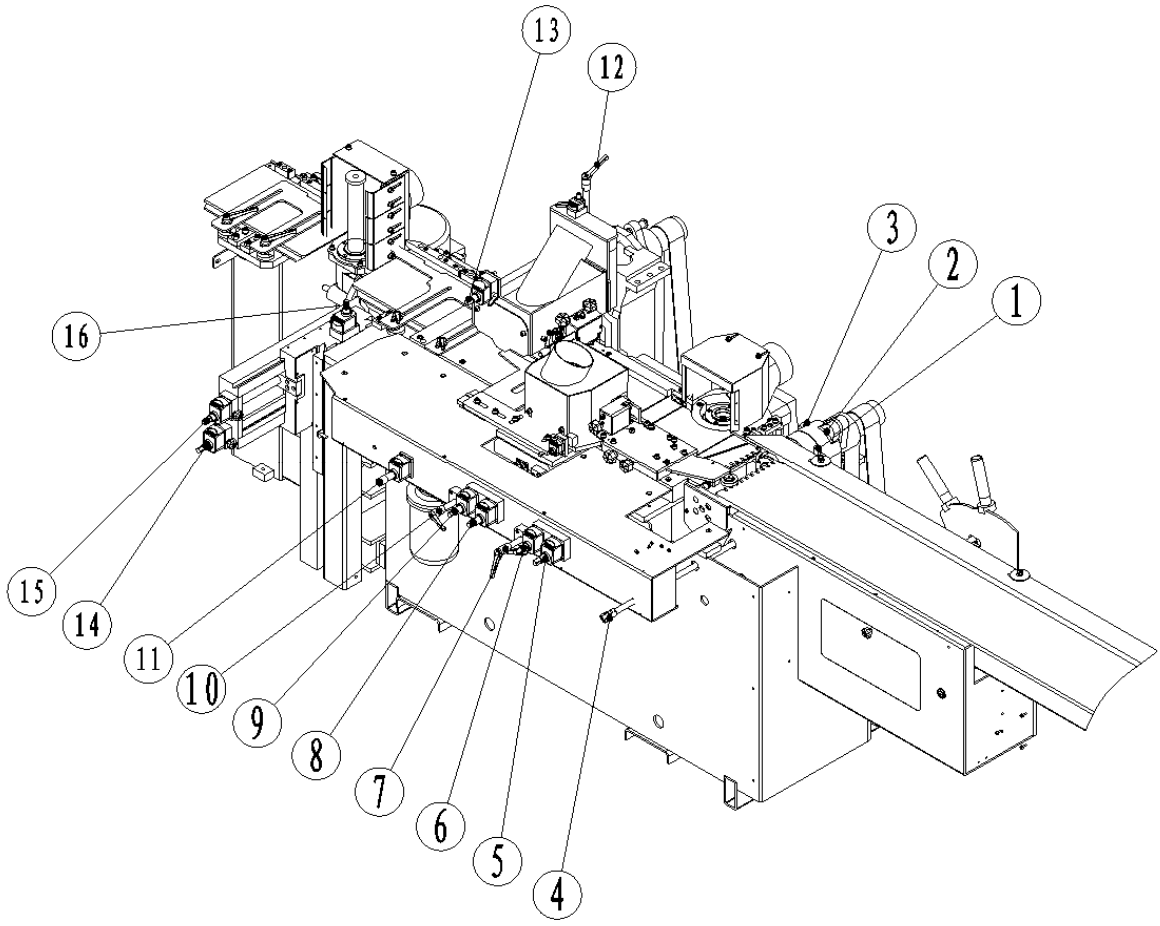


(Figure7)

8. **Machine tool adjustment**

8.1 **Location of adjusting bars and locking bars**

The location of adjusting bars and locking bars of machine tool please see (Figure 8) and (Table 5). (Take G 230/5U for example)



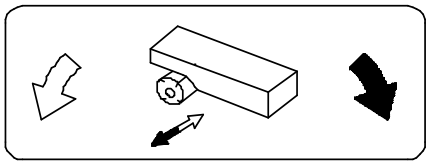
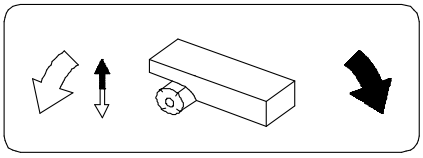
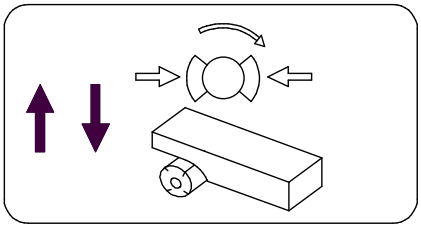
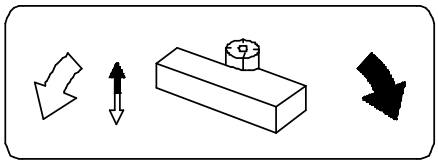
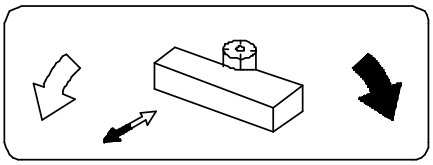
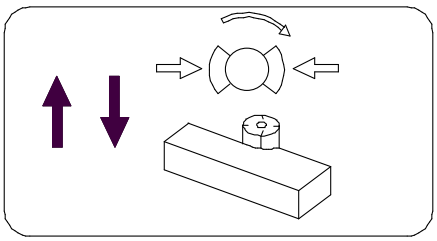
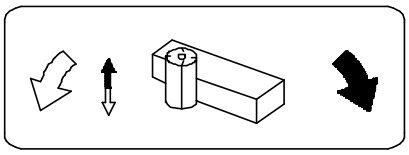
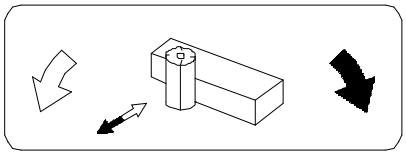
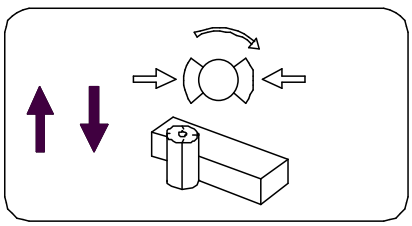
(Figure8)

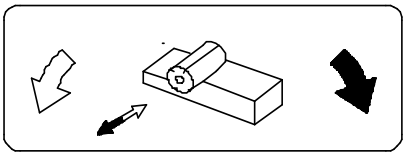
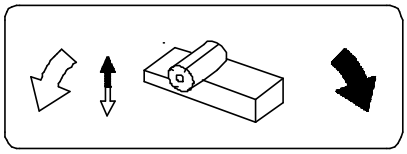
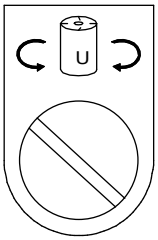
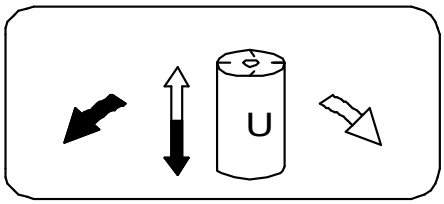
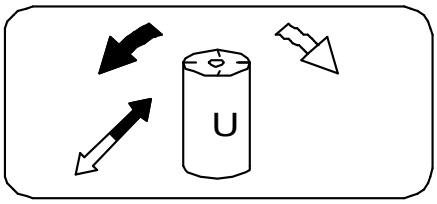
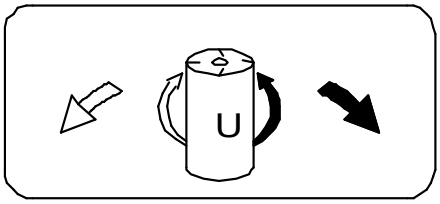
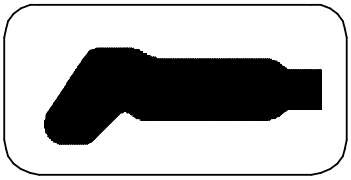
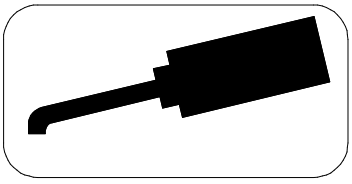
TABLE 5

No.	Bottom spindle	No.	Right spindle	No.	Left spindle
1	Radial locking bar	5	Radial adjusting bar	8	Radial adjusting bar
2	Radial adjusting bar	6	Axial adjusting bar	9	Axial adjusting bar
3	Axial adjusting bar	7	Axial locking bar	10	Axial locking bar
4	Axial locking bar				
No.	Top spindle	No.	Universal Spindle		
11	Radial adjusting bar	14	Rotary adjusting bar		
12	Axial locking bar	15	Horizontal locking bar		
13	Axial adjusting bar	16	Vertical adjusting bar		

8.1.1 Symbol instructions of spindles

TABLE 6

No.	Symbols	Instruction of symbols
1		Axial motion of bottom spindle Rotate the adjusting bar clockwise, and the spindle moves forwards. Rotate the adjusting bar anti-clockwise, and the spindle moves backwards.
2		Radial motion of bottom spindle Rotate the adjusting bar clockwise, and the spindle moves upwards. Rotate the adjusting bar anti-clockwise, and the spindle moves downwards.
3		Radial locking motion of bottom spindle After the radial locking motion, rotate the locking bar clockwise to lock the orientation.
4		Axial motion of right spindle Rotate the adjusting bar clockwise, and the spindle moves upwards. Rotate the adjusting bar anti-clockwise, and the spindle moves downwards.
5		Radial motion of right spindle Rotate the adjusting bar clockwise, and the spindle moves forwards. Rotate the adjusting bar anti-clockwise, and the spindle moves backwards.
6		Radial locking motion of right spindle After the radial locking motion, rotate the locking bar clockwise to lock the orientation.
7		Axial motion of left spindle Rotate the adjusting bar clockwise, and the spindle moves upwards. Rotate the adjusting bar anti-clockwise, and the spindle moves downwards.
8		Radial motion of left spindle Rotate the adjusting bar clockwise, and the spindle moves forwards. Rotate the adjusting bar anti-clockwise, and the spindle moves backwards.
9		Axial locking motion of left spindle After the radial locking motion, rotate the locking bar clockwise to lock the orientation.

10		Axial motion of top spindle Rotate the adjusting bar clockwise, and the spindle moves forwards. Rotate the adjusting bar anti-clockwise, and the spindle moves backwards.。
11		Radial motion of top spindle Rotate the adjusting bar clockwise, and the spindle moves upwards. Rotate the adjusting bar anti-clockwise, and the spindle moves downwards.
12		Positive and nagative rotate derections of universal spindle Turn to top left corner, universal spindle rotate anti-clockwise. Turn to top right corner, universal spindle rotate clockwise.
13		Axial motion of universal spindle Elevation of universal spindle (electromotion) height position display
14		Radial motion of universal spindle Rotate the adjusting bar clockwise, and the spindle moves forwards. Rotate the adjusting bar anti-clockwise, and the spindle moves backwards.
15		Rotate angle adjustment of universal spindle Rotate the adjusting bar clockwise, and the spindle leans forwards. Rotate the adjusting bar anti-clockwise, and the spindle leans backwards.
16		Orifice for filling gas
17		Filling gas

8.2 **Cutter block installation**

Cutter block installation: Please see（Figure9）

① Loosen and remove the locknut 5 by wrench 7, then take out the locking washer 3 and pressure cap 4.

② Clean and grease the OD of spindle 1, inner of cutter 2, then install cutter 2 and cutter ring 3 onto the spindle.

③ Install spindle pressure cap 4 and locknut 5, use the wrench 7 to lock the locknut 5 on the spindle.

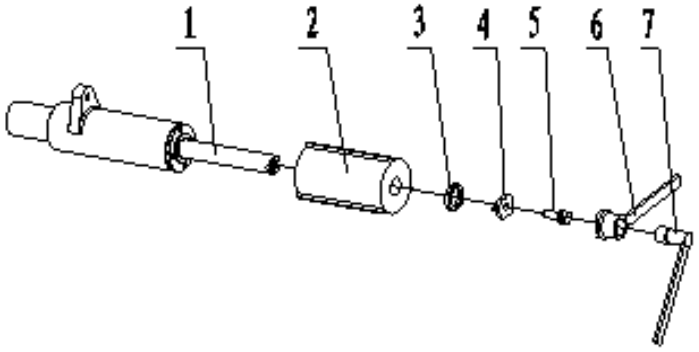
Attention：

a. The blades should be in a same cutting circle while installing the blades. **Especially ensure that the nips of blades must be firmly installed and check each locknut carefully. Or else it would be very dangerous if the blades fly out.**

b. Do not beat to lock or Loosen the locknut 5 while installing cutter blocks, for fear that damage of spindle and locknut would occur.

The usage of wrench for spindle nut：

Lock the spindle by small wrench 6 then rotate big wrench 7 to lock or loosen locknut 5. Please see（Figure9）



（Figure9）

8.3 **Spindle adjustment**

8.3.1 **Radial and axial adjustments of spindles**

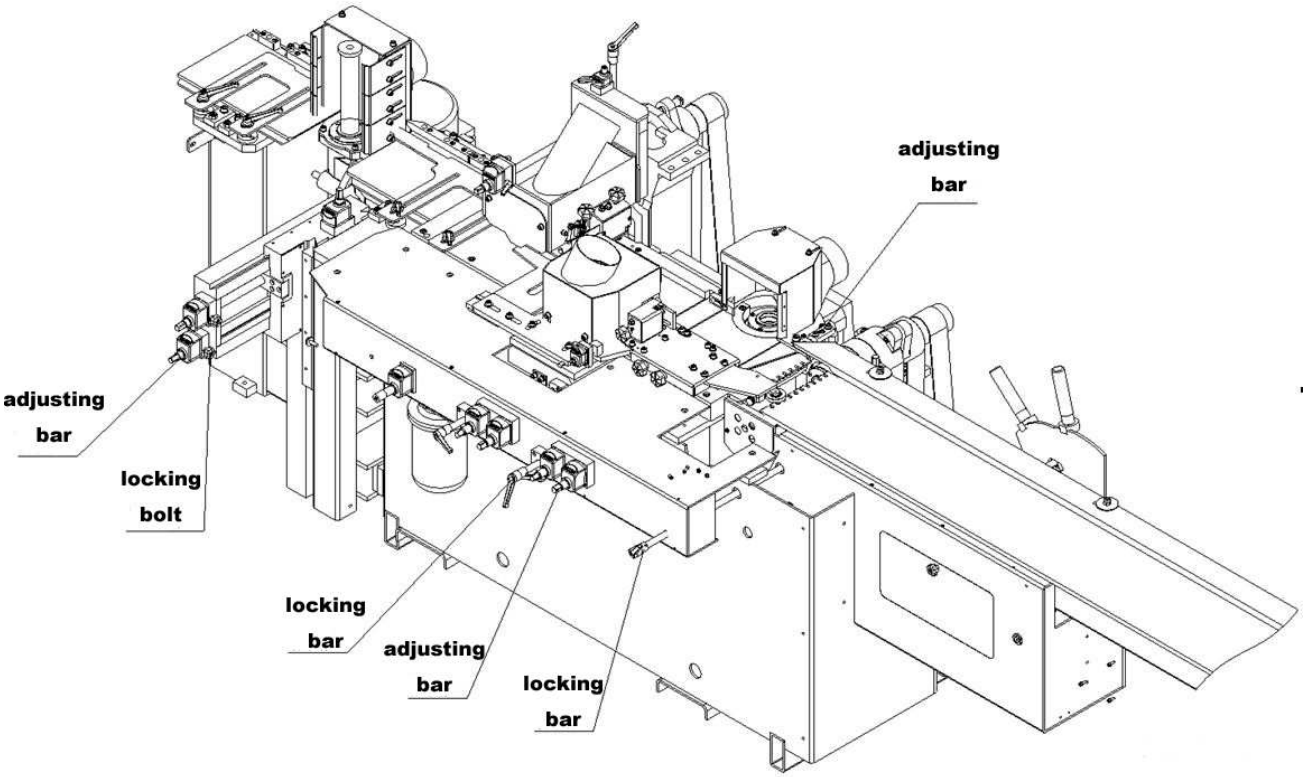
Spindle can be adjusted by radial and axial directions. The adjustable quantity can be displayed by digital indicator.

Steps of adjustment:

① Loosen the locking bar.

② Adjust the radial or axial spindle position by rotating the adjusting bar.

③ Lock the locking bar after the adjustment of spindle position is done. Please see（Figure10）



（Figure10）

8.4 **Adjustment of digital indicator**

Adjust the spindle by adjust ruler first then adjust the indicator according to the value measured of the processed workpieces.

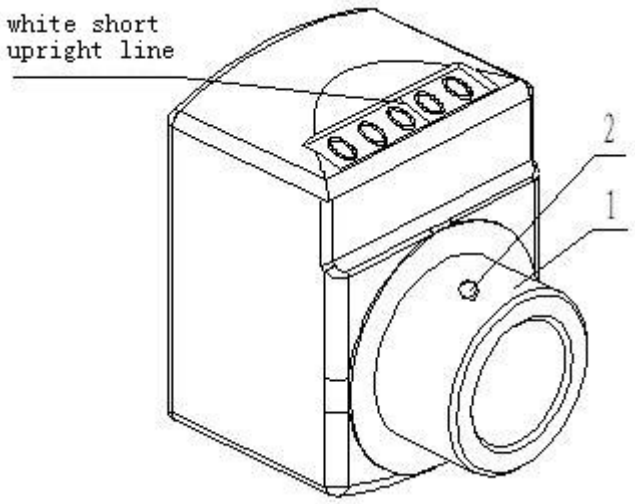
Steps of adjustment: see（Figure11）

① Loosen the locknut 2 on the adjust ring 1 of digital indicator.

② Rotate the adjust ring 1 to the value in need. (Attention: The last rotate direction of digital indicator must be the same as the rotate direction of spindle.)

③ Lock the locknut 2.

① The 1st number after the radix point line (white short upright line) changes “1” indicates the adjustable quantity is 0.1mm.

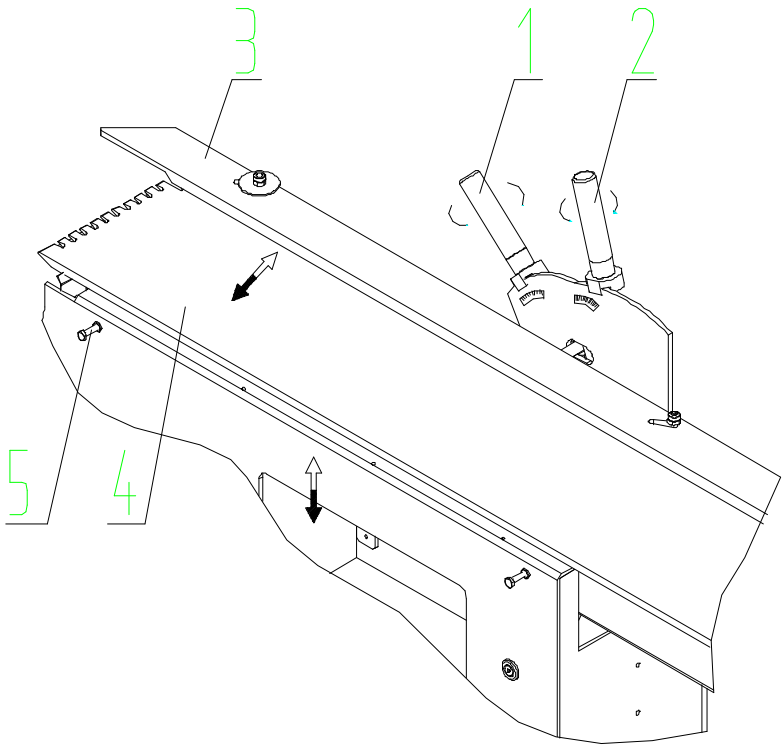


（Figure11）

8.5 **Infeed table and feeding fence adjustment**

8.5.1 **Adjustment of infeed table**

The up/down adjustment of infeed table (namely adjust the cutting quantity of 1st bottom spindle) please see（Figure12）, steps of adjustment: Loosen the two locknuts 5 of machine tool profile, unscrew adjusting bar 2, pull or push according to the graduated scale under adjusting bar to adjust the height of infeed table 4 in need. The adjustable range is 0-10mm, screw adjusting bar 2 after finished, then lock lokcnut 5.



（Figure12）

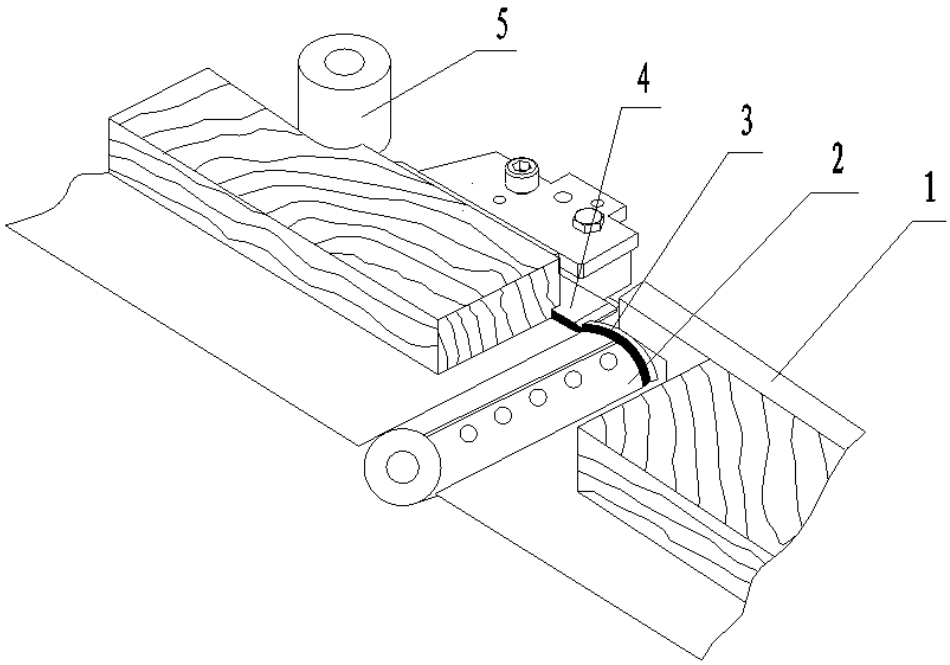
8.5.2 **Adjustment of feeding fence**

The forward/backward adjustment of feeding fence (namely adjust the cutting quantity of right vertical milling cutter) please see (Figure 16), steps of adjustment: Unscrew adjusting bar 1, pull or push according to the graduated scale under adjusting bar to adjust the position of feeding fence 3 in need (forward or backward). The adjustable range is 0-10mm, screw adjusting bar 1 after finished.

8.6 **Bottom spindle adjustment**

8.6.1 **Function and requirement of pre-trimming cutter**

The pre-trimming cutter 3 and plane cutter 2 installed onto the bottom spindle. See (Figure 13), the pre-trimming cutter 3 mills a right angle at the right bottom corner of timber. When the profile of this right angle touches the inner surface of guiding board 4, the timber would be guided by guiding board 4 and no longer guided by feeding fence 1. Then this right angle will be milled by right vertical milling cutter 5. Generally mill about 0.5mm which is set already before leaving the factory. Due to the pre-trimming cutter 3 and bottom spindle are radial adjusted together, the diameter of these two must be set right with one another. The OD of pre-trimming cutter 3 needs to be bigger than the diameter of plane cutter 2 about 20mm.



(Figure13)

8.6.2 **Radial and axial adjustments of bottom spindle**

①Radial adjustment of 1st bottom spindle

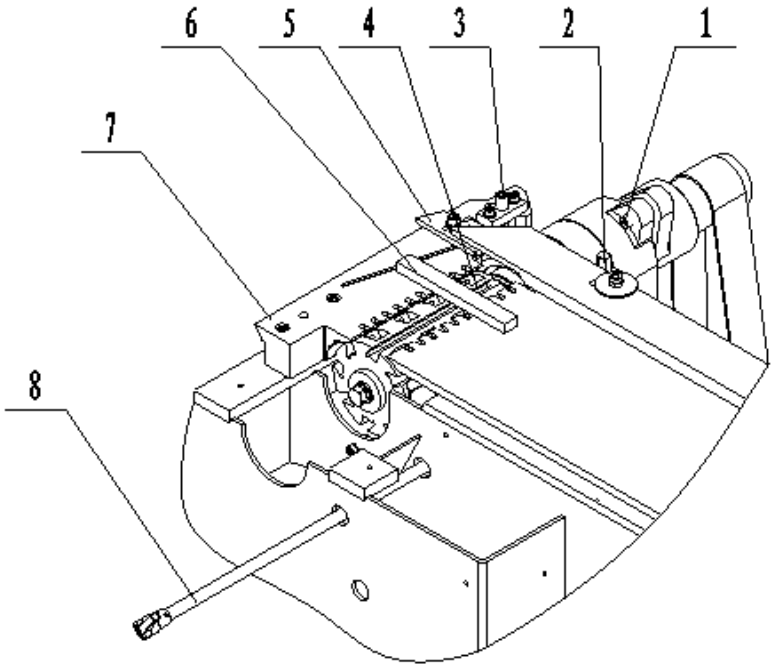
The radial adjustment of 1st bottom spindle, namely adjust the position of edge and working table. Please see（Figure14）

a. Put cutter adjusting ruler 6 on the working table 7.

b. Loosen radial locking bar 8.

c. Rotate radial adjusting bar 4, adjust the up/down position of spindle, check the edges of cutter block. The correct position adjusted is when the edge 4 touches the cutter adjusting ruler 6.

d. Lock the radial locking bar 8.



（Figure14）

②Axial adjustment of 1st bottom spindle

The axial adjustment of 1st bottom spindle, namely adjust the position of grinder and guiding board of bottom angle. Please see（Figure14）

a. Press cutter adjusting ruler 6 against to the oriented surface of bottom angle guiding board 5.

b. Loosen locking screw 2, rotate screw 1, axial adjust the position of pre-trimming cutter.

c. Adjust at lease one piece of blade of pre-trimming cutter (front blade) touches the cutter adjusting ruler 6.

d. Lock the locking screw 2.

8.7 **Right spindle adjustment**

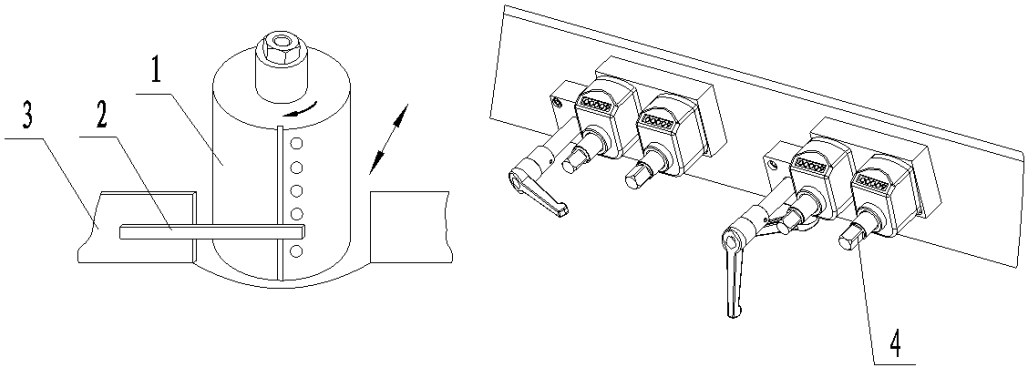
8.7.1 **Radial adjustment of right spindle** See（Figure15）:

① Install measured cutter block 1 (E.G. radius of 62.5mm)

② Press cutter adjusting ruler 2 firmly against to the guiding board 3.

③ Rotate radial adjusting bar 4, radial adjust the cutter, turn the cutter manually reverse cutting direction (namely the way as showed in the figure), let the edge touches the cutter adjusting ruler 2.

④ Set the value of digital indicator. For example, set the value into 62.5mm when the radius of cutter block is 62.5mm.



（Figure15）

8.7.2 **Axial adjustment of right spindle**

The Axial adjustment of right spindle please see（Figure16）:

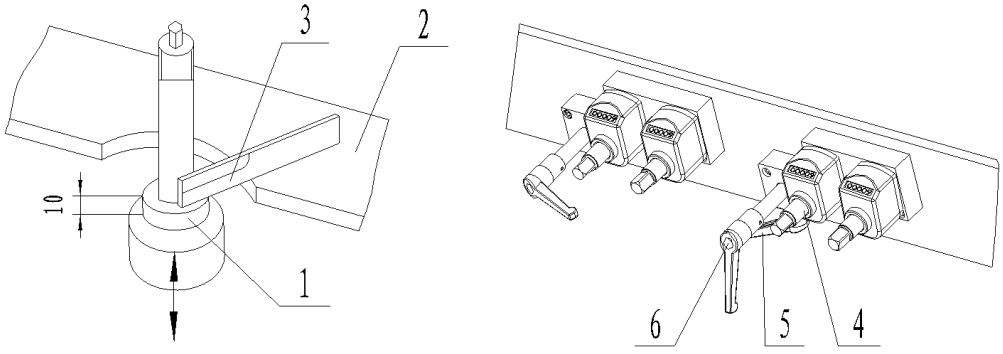
① Put a spindle ring 1 of 10mm thickness onto the spindle.

② Put cutter adjusting ruler 3 onto the board 2.

③ Loosen locking bar 5 then axial locking bar 6, rotate axial adjusting bar 4, axial adjusting the spindle until the top of spindle ring 1 touches the cutter adjusting ruler 3.

④ Screw axial locking bar 4, lock locking bar 5.

⑤ Set the value of digital indicator into 10mm.



（Figure16）

8.8 **Left spindle adjustment**

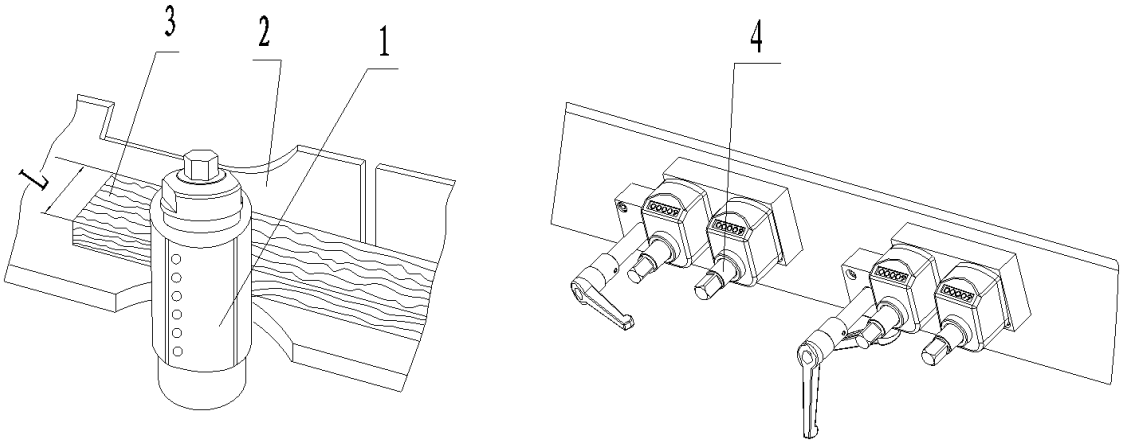
8.8.1 **Radial adjustment of left spindle** See（Figure17）:

① Choose a standard test piece 3, measured the width L of test piece.

② Put test piece 3 between guiding board 2 and cutter 1.

③ Rotate radial adjusting bar 4, radial adjust the spindle and let cutter blade clings to test piece 3.

④ Set the value of digital indicator into L



（Figure17）

8.8.2 **Axial adjustment of left spindle**

The axial adjustment of left spindle please see（Figure18）:

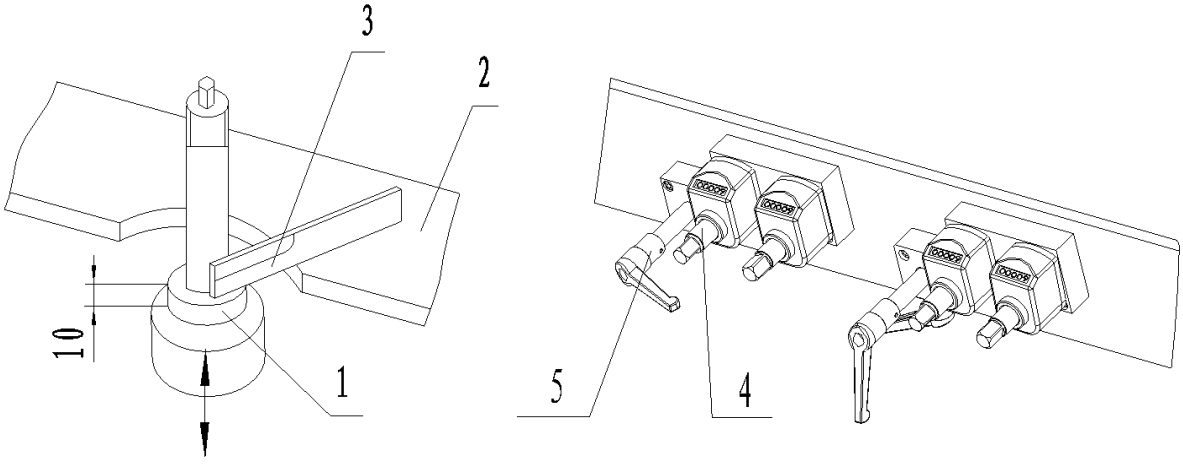
① Put a spindle ring 1 of 10mm thickness onto the spindle.

② Put cutter adjusting ruler 3 onto the board 2.

③ Loosen axial locking bar 5, rotate axial adjusting bar 4, axial adjusting the spindle until the top of spindle ring 1 touches the cutter adjusting ruler 3.

④ Screw axial locking bar 5.

⑤ Set the value of digital indicator into 10mm.



（Figure18）

8.9 **Top spindle adjustment**

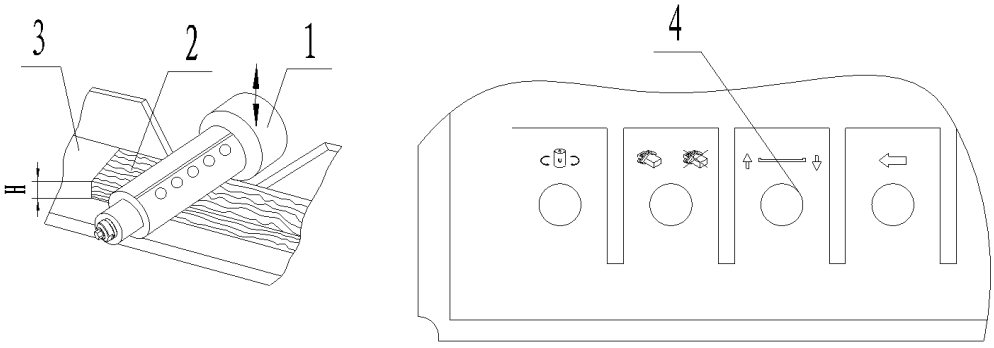
8.9.1 **Radial adjustment of top spindle** see（Figure19）:

① Choose a standard test piece 2, measured the height H of test piece.

② Put test piece 2 between guiding board 3 and cutter 1.

③ Adjust knob 4 on the control panel, radial adjust the spindle and let cutter blade clings to test piece 2.

④ Set the value of digital indicator into H. (Digital indicator please see No.2 in figure 27)



（Figure19）

8.9.2 **Axial adjustment of top spindle**

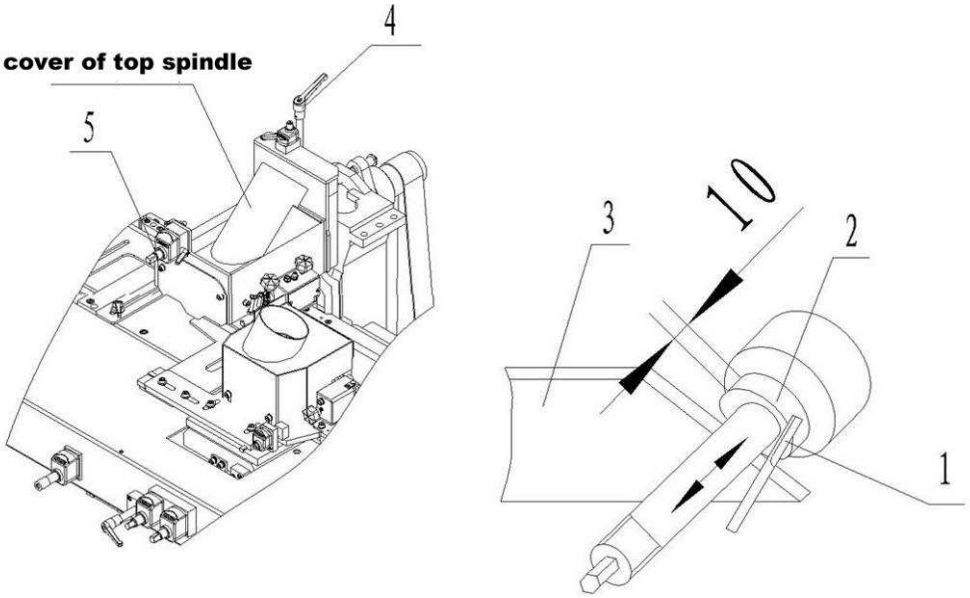
The axial adjustment of top spindle please see（Figure20）:

① Let a spindle ring 2 of 10mm thickness circle the spindle, and put cutter adjusting ruler 1 onto the guiding board 3.

② Loosen axial locking bar 4, rotate axial adjusting bar 5, axial adjusting the spindle until the top of spindle ring 2 touches the cutter adjusting ruler 1.

③ Screw axial locking bar 4.

④ Set the value of digital indicator into 10mm.



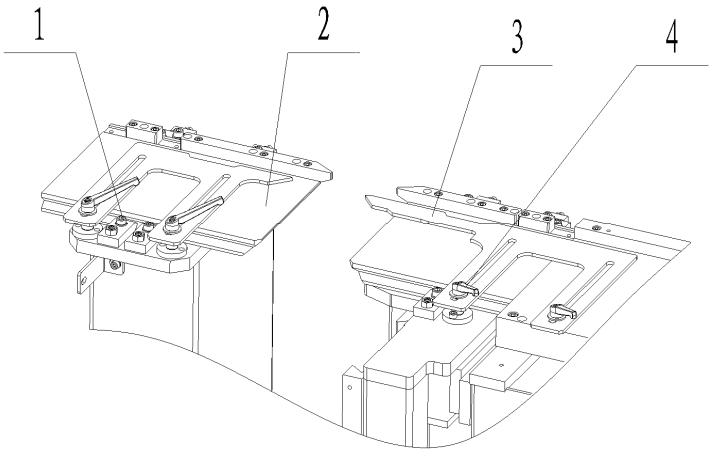
（Figure20）

8.10 **Universal spindle adjustment**

Universal spindle can be adjusted by rotary angles, forward and backward, elevation and selection of positive or negative. It can be used as a left vertical spindle, right vertical spindle, top horizontal spindle or bottom horizontal spindle by adjusting the different position of forward and backward of level sliding board, elevation of upright sliding board and rotating angle of 360 degrees of spindle. The universal spindle can process every last part of the workpieces. The preparative works needs before adjusting. please see（Figure21）

① Loosen bolt 1 and locking bar 4, move fence 2 and side pressure board 3 until the spindle passes throught smoothly.

② Uninstall cutter, adjust the protected cover.

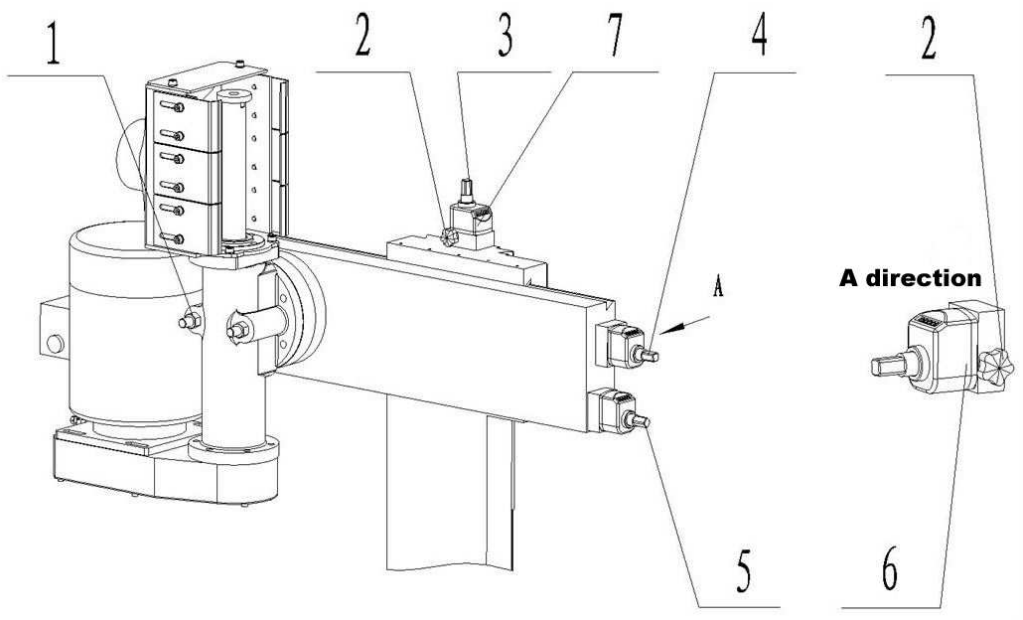


（Figure21）

8.10.1 **Rotate angle adjustment of universal spindle**

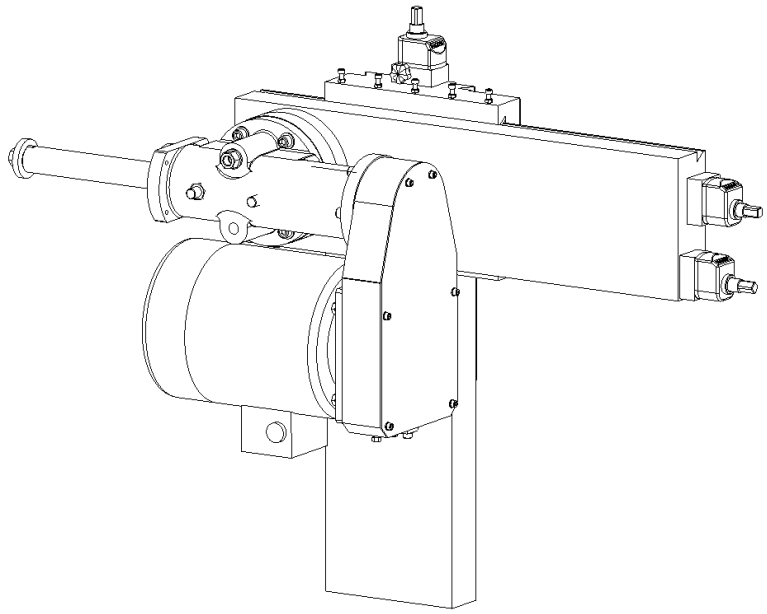
The rotary angle adjustment of universal spindle please see（Figure22）:

Loosen lockbolt 1 and bar 2, rotate adjusting bar 5 to the angle in need according to the symbol and required angles of adjusting bar 5. Then screw the lockbolt 1 and bar 2.



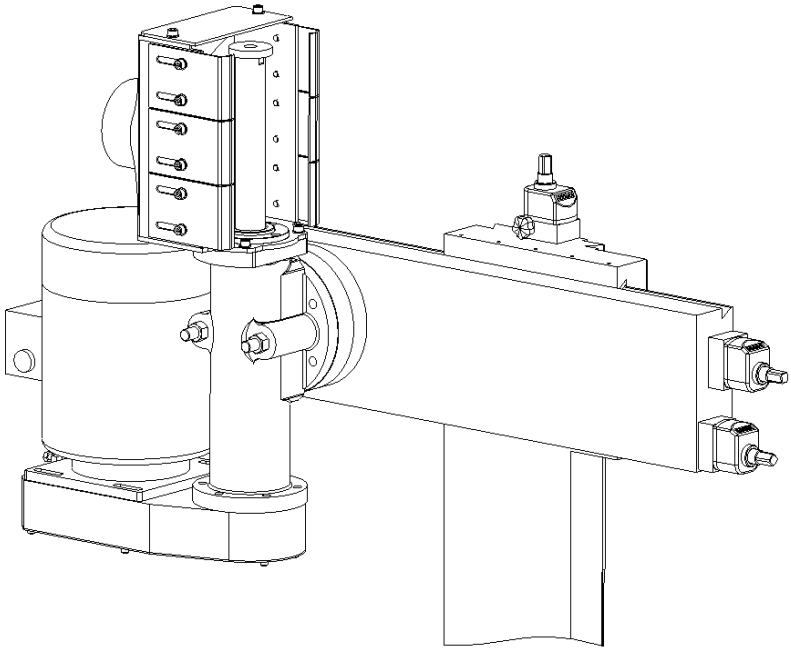
（Figure22）

When the universal spindle is settled as a top or bottom spindle, the motor shall be adjusted by the side of the operator, as shown in Figure（a）



（Figure a）

When the universal spindle is settled as a left or right spindle, the motor shall be adjusted downwards, as shown in Figure（b）



（Figure b）

8.10.2 **Forward and backward adjustment of universal spindle**

The forward and backward adjustment of universal spindle please see（Figure22）

① Loosen A direction locking bar 2.

② Rotate adjusting bar 4 according to symbols by adjusting handle, move forward and backward to the position in need.

③ Observe elevation value from readout 6.

④ Lock A direction locking bar 2.

8.10.3 **Elevation adjustment of universal spindle**

The elevation adjustment of universal spindle please see（Figure22）

① Loose bar 2.

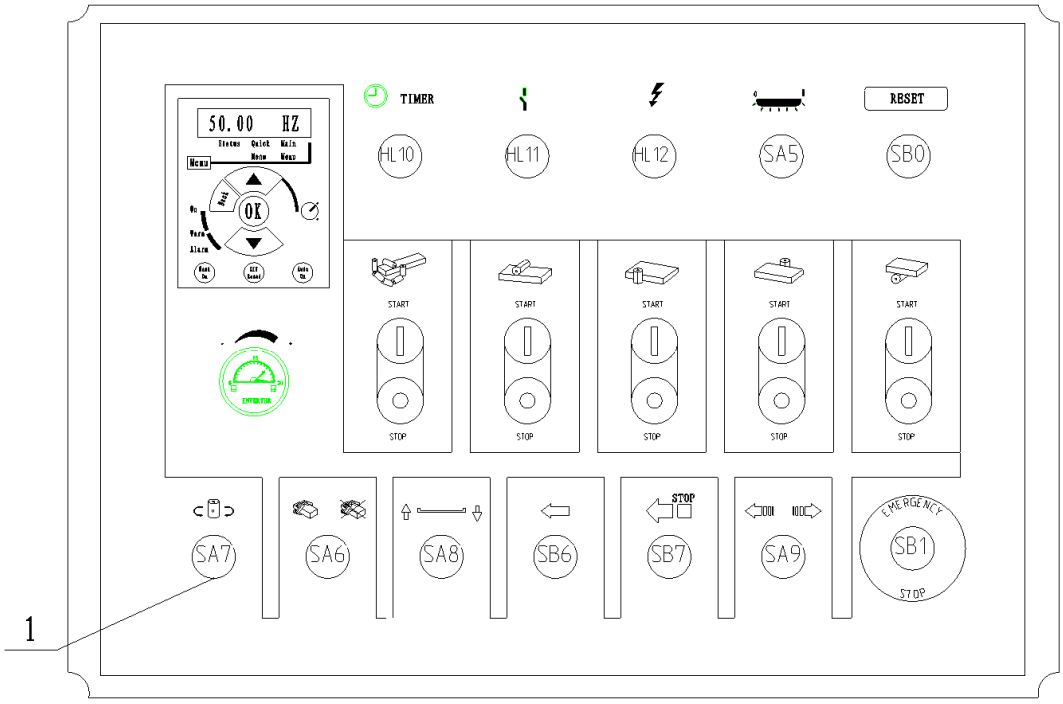
② Rotate adjusting bar 3 accoring to symbols, move up/down to the position in need.

③ Observe elevation value from readout 7.

④ Lock bar 2

8.10.4 **Positive and negative selection of universal spindle**

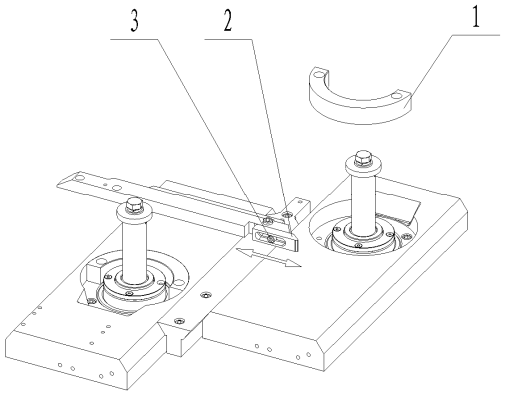
Rotate knob 1 (SA7) and choose the positive or negative direction of universal spindle, please see (Figure 23). (Select the clockwise or anti-clockwise of spindle when the universal spindle stays in different positions.)



（Figure23）

8.11 **Adjustment of insert and fence**

When left and right spindles are using cutters of small diameters, insert 1 is needed. With cutters of big diameters, the insert 1 should be removed. While using cutters of small diameters, the position of board 2 can be adjusted according to the rotate OD of cutters. Loosen locknut 3 and adjust, please see（Figure24）



（Figure24）

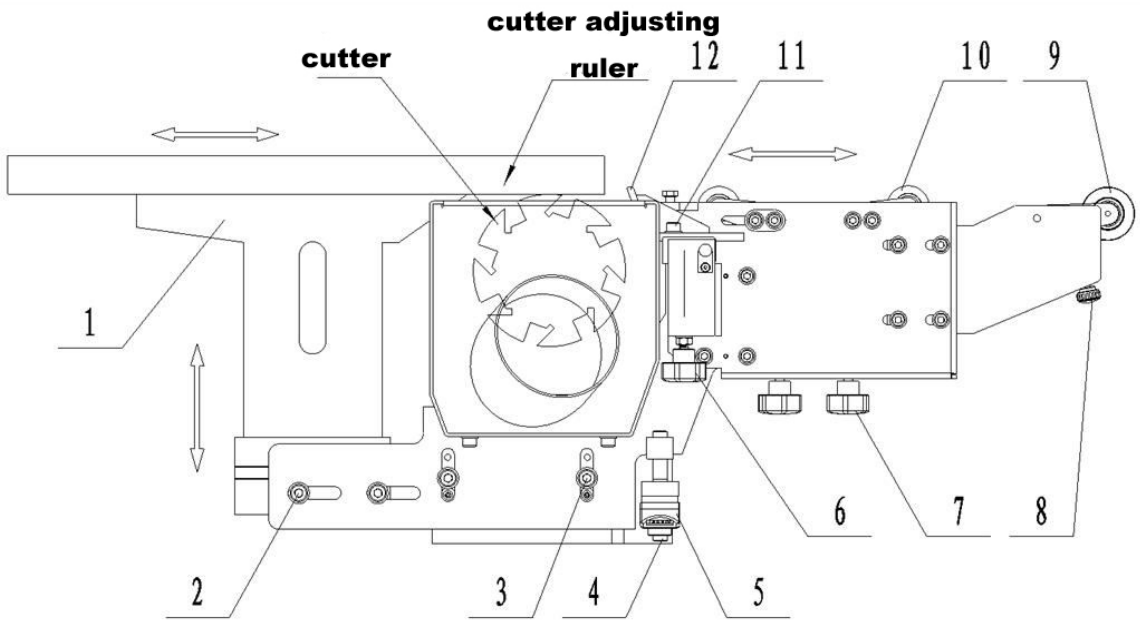
8.12 **Side pressure board of left spindle adjustment**

① Install one cutter with measured dimention (e.g. cutter with radius R=60), press cutter adjusting ruler firmly onto the rear pressure board 1, loosen bolt 3, adjusting screw 4 to make tangency of cutter's cutting blade and cutter adjusting ruler. Set the value of readout 5 into 60. Lock bolt 3.（Figure25）

② Press cutter adjusting ruler firmly onto the side pressure board 12, adjusting bart 7 and 8, Keep side pressure wheel 9 and 10 together with side pressure board 12 a beeline and parallels the guiding board.

③ While using different cutters, loosen bolt 2 and 11 then adjust the left and right position of rear pressure board 1 and side pressure board 12 separately. Adjust screw 4 to ensure 3~5mm compressed quantity side pressure board and cutter (namely adjust compaction).

④ Rotate bar 6, 7 and 8. to adjust impaction of side pressure board 12, adjusting wheel 9 and 10 separately.

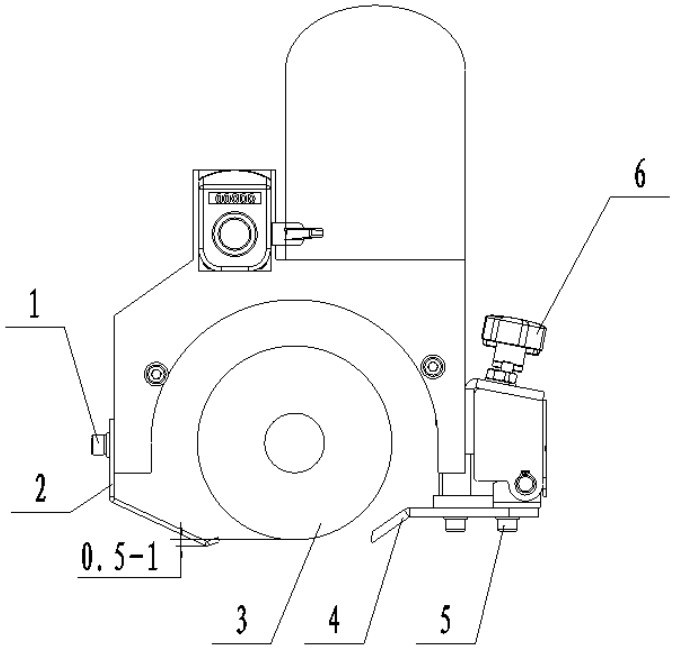


（Figure25）

8.13 **Adjustment of front and rear pressure device of top spindle**

The adjustment of front and rear pressure device of top spindle is according to the dia. of cutter used. Keep the rear pressure part 2 0.5~1mm (compressed quantity) lower than cutter edge 3. Chip-breaker 4 is of 3~5mm compressed quantity. The pressure shoe must be adjusted to the center of the width of workpiece.

Looson bolt 1 to adjust the up/down position of rear pressure part 2. Loosen bolt 5 to adjust the up/down position of front chip breaker 4. See（Figure26）. Rotate bar 6 to adjust the pressure of front chip breaker.



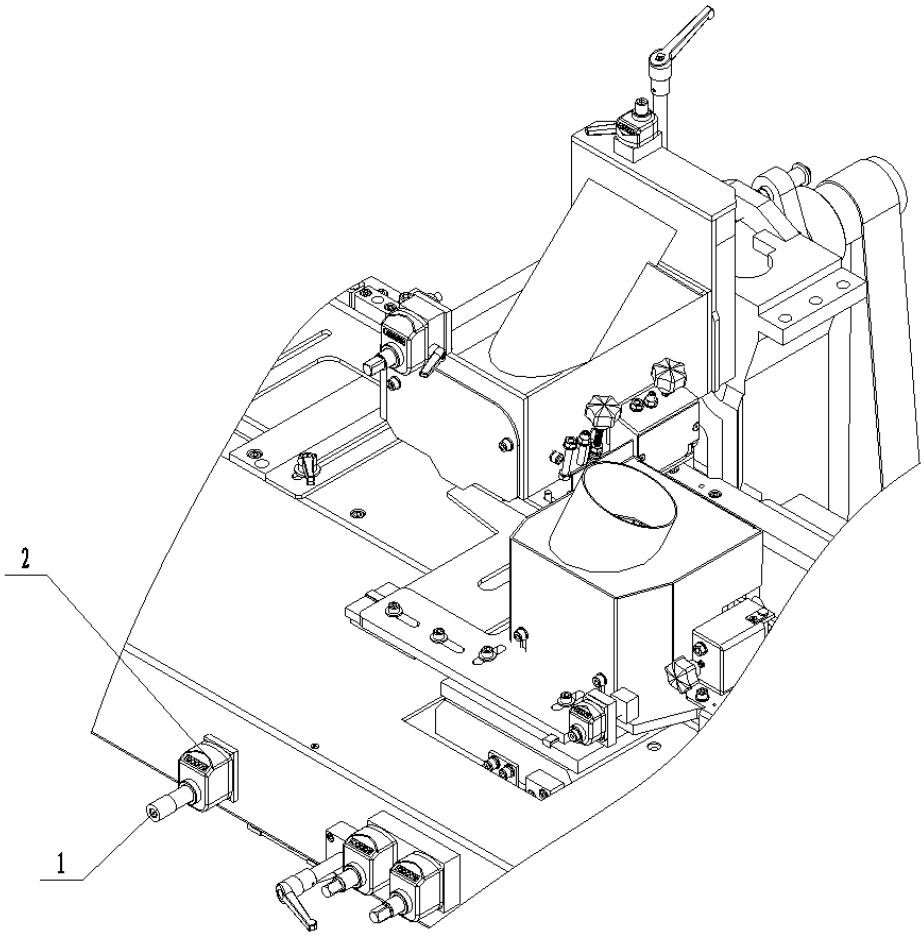
（Figure26）

8.14 **Adjustment of feeding device**

8.14.1 **Feed beam elevation**

①The elevation of feed beam please see（Figure27）

When the electric adjustment of the feed beam doesn't work, adjustment can be done manually. Adjusting steps: Remove ring 1 from adjusting bar, then adjust by rotating the adjusting screw. The readout 2 will show the position of the feed beam.



（Figure27）

② Electric elevation of feed beam

The electric elevation of feed beam please see（**14.2**）.

8.14.2 **Feeding wheels orientation**

Raise or fall the feed beam to set the orientation of feeding wheels.

For example: Raise or fall the feed beam to keep the staff guage indicating 30mm, then adjust the distance of 27mm from the bottom of feeding wheels to working table.

8.14.3 **Feeding wheels adjustment**

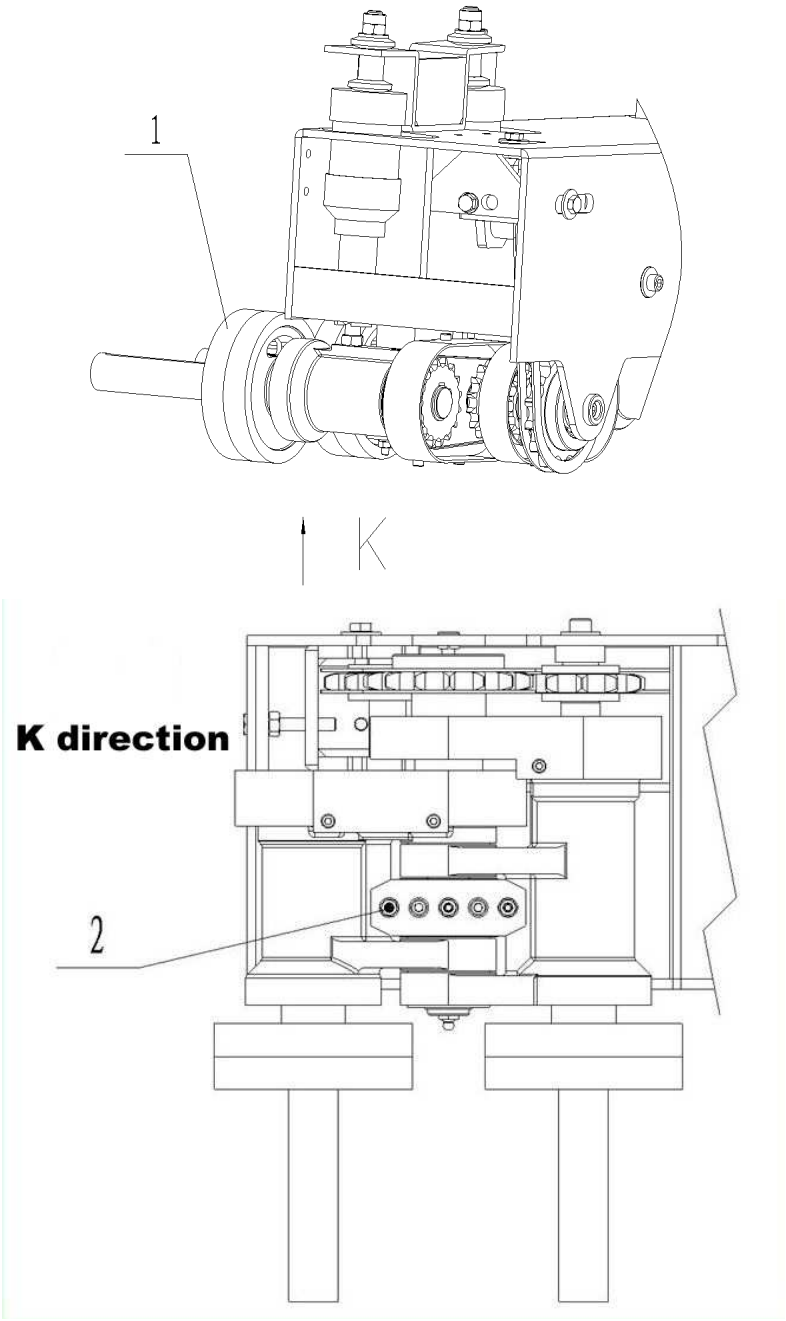
Feeding wheels can be adjusted up or down, the steps of adjustment: please see（Figure28）

① Loosen the locknut 2 so as to change the flexing length of lockbolt.

② When feeding wheels 1 achieves the requirement, the lockbolt surface will meet rocker.

③ Lock nut 2 after the adjustment is done.

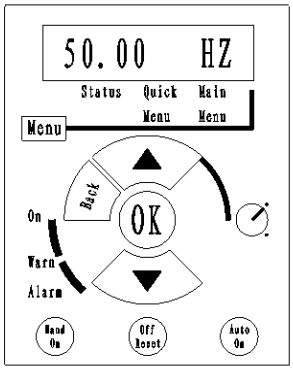
Attention: Before leaving factory, the feeding wheels before top spindle have been set in the plane of horizon. Please adjust the position of feeding wheels following the above steps accoring to the cutting quantity of top spindle in need before using the machine.



（Figure28）

8.15 **Feeding speed adjusting**

8.15.1 **Inverter to feed**



Parameters setting of inverter:

1．Press【MENU】until the cursor positioned by the Main Menu.

2．Use【▲】【▼】to blowse, and select parameter group.

3．Press【OK】to confirm the selection of the parameter group.

4．Use【▲】【▼】to blowse the selecting parameters.

5．Press【OK】to confirm the selection of parameter, enter the password.

6．Use【▲】【▼】to set or change the value of the parameter.

7．Press【OK】to confirm the selection value of parameter.

8．Use【▲】【▼】to select the next group of parameter.

9 .Exit the parameter setting, press twice of【Back】to go back to shortcut menu or press 【Manu】 for the stating manu.

10．Detailed operation please refer to the indication along with the machine

Incerter speed adjusting:

Adjust via the operation on the electrograph of inverter control panel. The speed will be of range 6-12 m/min. Clockwise rotate electrograph, the speed would be faster, contra the speed would be slower.

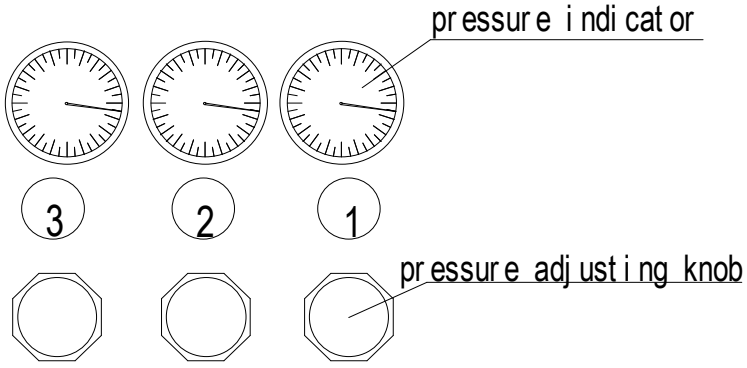
8.16 Pressure adjustment

The pressure of feeding wheels can be adjusted separately. While adjusting pressure, pull out the pressure adjustment knob and rotate left or right until the finger points to the value in need. Then press the knob back to primary position. Please see（Figure30）

1st section of feeding steel wheel ① pressure setting: 0.1～0.2MPa

2nd section of feeding steel wheel ② pressure setting: 0.2～0.3Mpa

3rd section of feeding rubber wheel ③ pressure setting: 0.3～0.4Mpa

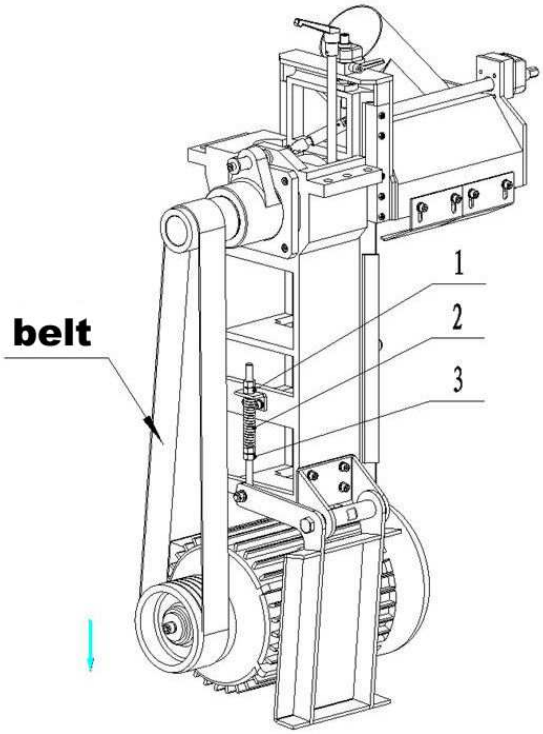


（Figure30）

8.17 **Loose and tight of spindle belt**

①Loose and tight of horizontal spindle belt

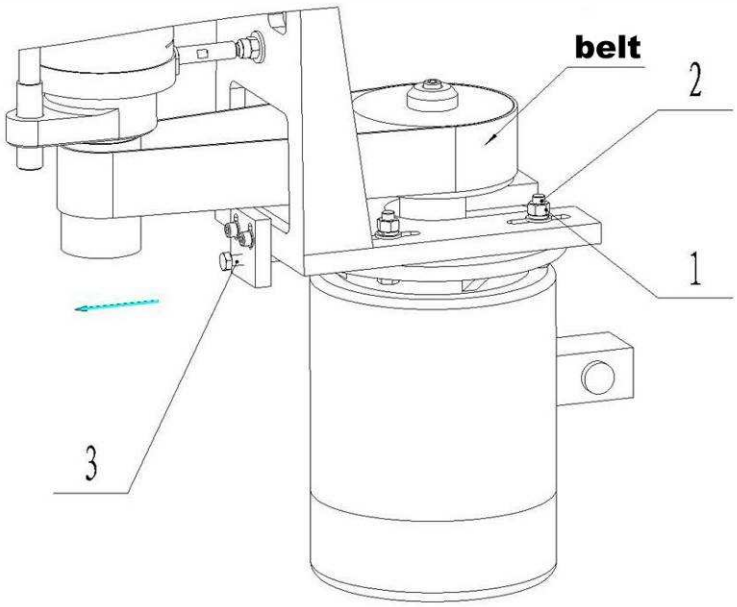
The loose and tight of horizontal spindle belt please see（Figure31）: Mainly depend on the motor weight to adjust the loose and tight of belt, adjust nut 1 and 3 at one time, by dint of tension of spring 2 to increase the loose or tight of the belt.。



（Figure31）

②Loose and tight of vertical spindle belt

The loose and tight of vertical spindle belt please see（Figure32）: Loosen lockbolt 1 and bolt 2 of motor, adjust bolt 3 to adjust the loose or tight of spindle belt, screw nut 1 and bolt 2 after finished.



（Figure32）

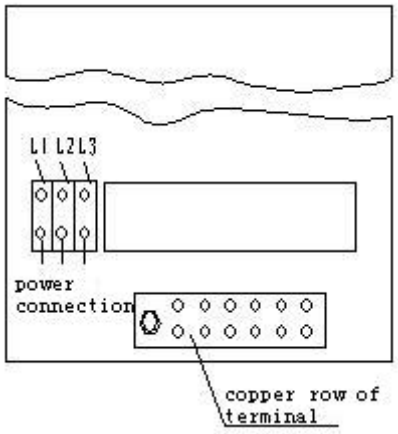
9. **Test run of machine tool**

9.1 **Electric test run of machine tool**

① Check the insulated resistance of electric equipment before the first electrify. This can only be done by qualified electrician.

② According to the power on the brand and the attached technical requirement of electric principle, select correspond cross-sectional area of three-phase four-conductor cable.

③ Power supply cable goes throught from Pg29 of the bottom of electric box. Let cables L1, L2, L3 meet the homonymous terminals on the left in the electric box. Protected earthing will meet the bottom-left terminals of the electric box. Please see（Figure33）



（Figure33）

④ Check if each controlled breaker in the electric box positioned normal “ON”. The cover must be closed while closing the electric box for inspection. Check whether the limit switches and emergency stops are in the normal position. Switch on pneumatic supply (pressure under normal situation), trun the main electric breaker on the electric box to “ON”, then the power indicator lights. Press restoration button SB0, when spindles and feeding contactors are under normal positon, main contactor KM0 will take action and the indicator HL10 lights, machine toll is ready to work. Press SB10-SB18 to start each spindle then to press SB6 to start feeding. To stop the feeding, press SB7, then to stop each spindle by pressing SB9-SB17. When the machine is running, the feeding will be stopped automatically by pressing stop of any spindle.

Attention: ① When the cover is opened, only jogging lift or fall the feed bead can be done, spindles and feeding can only be operated when the cover is closed.

② For the first start of each spindle and feeding motor, check whether the rotary direction of each motor is tally with the symbols sticked on the control panel. If not, change random 2 of the 3 pieces of power supply cable. **This operation can only be carried out by qualified electrician.**

③ Press emergency stop SB1 on the main control panel, wait 45 seconds till the safety indicator HL10 lights, then to open the cover and operate.

④ Machine and electric box must use specified earthing cable. To open the electric box and maintain can only be carried out by qualified electrician, the main power breaker much be off at the same time before operation.

9.2 **Pneumatic power**

Pressure is 0.5~0.8Mpa. Adjust the cylinder pressure to a specific value by adjusting the reductor.

9.3 **Dust-collection**

The wind speed should be 30-34m/s to collect all the dust. For less dusts, the wind speed can be reduced.

9.4 **Test run**

Start the machine after the steps of 9.1-9.3 are finished, feed a 30×150×800mm or similar wood-blank in, measure its dimension after processing and further check digits indicated on all the digital indictators.

10. **Lubrication and maintenance**

10.1 **Lubrication of machine tool**

TABLE 7

No.	Lubricated Part(s)	Lubricant	Lubricating times	Standard of Lubricating volume	Remark
1	Friction part when adjusting cutter (e.g. chain, screw rod, angular gear etc., sliding sleeve of chief shaft	Ca-based Grease ZG-3	Once a shift	Grease coated	
2	Bearing of feeding shaft	Ca-based Grease ZG-3	Once every 6 months	As defined	
3	Gear box of feed beam elevation	Engine oil N46	Once every 6 months	As defined	
4	Working bench	Engine oil N46	3-5 times/shift	Press 4-5 times	Manual oil pump

Attention: The gear oil that used by gear box for infeed must possess nicer bubble-resistent capability. For example, Gear oil of CKE/P is good.

The working table is lubricated by manual oil pump, please fill the oil according to working requirement.

10.2 **Maintenance and maintain of machine tool**

10.2.1 **Main point of maintenance**

The maintenance of machine tool must be checked termly to ensure the normal work of machine tool. The main point of maintenance please see（TABLE 7).

TABLE 8

No.	**Maintained point**	**Checked period (hour)**	**Work of inspection and maintenance**
1	Pneumatic system	Once a shift	Water drainage
2	Belt	Once a shift	Inspection
3	Emergency~stop buttons	80	Function inspection
4	All switches	80	Function inspection

10.2.2 **Adjustment of spindle belts**

Loose and tight of spindle belt please see（8.21）

The magnitude of loose and tight of transmission is controlled by the elongation of belt:

Length of belt≤ 1 m elongation 1.0%~1.4%

Length of belt≥1m elongation 0.6%~0.8%

10.2.3 **Maintenance to the thread bar lifting on feed beam**

①Remove the dust proof cover termly (every 3 months)

②Clean up the dust from the thread bar.

③Lubricate the thread bar with calcium grease ZG-3, and then fix the dust proof cover.

10.2.4 **Daily maintenance**

① The runner must pay full attention to the working state of equipment when the machine is running. Press emergency stop if there is any thundering situations. Turn off the main power and inspect the causes. Restart the machine to work after the trouble is eliminated.

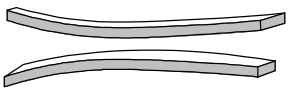
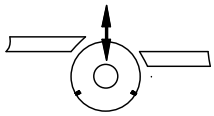
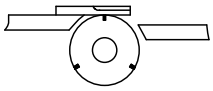
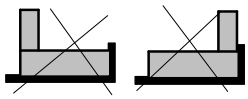
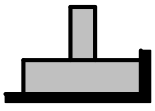
② Inspect whether the emergency stops can work aperiodicity.

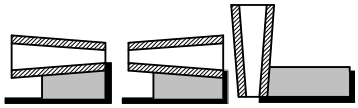
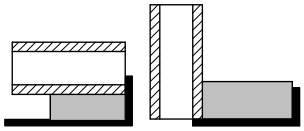
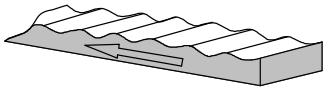
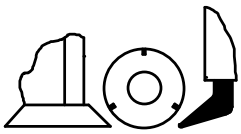
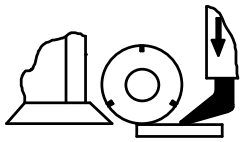
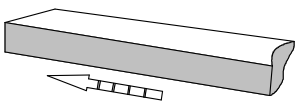
③ Inspect whether there is damage or creepage of electric components termly.

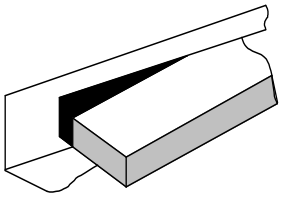
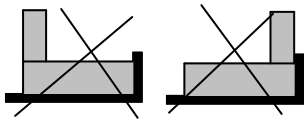
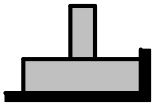
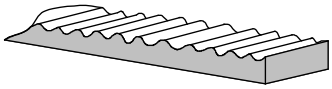
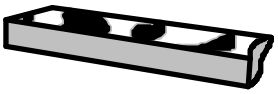
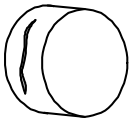
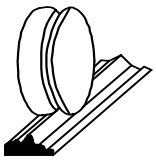
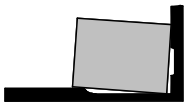
11. **General troubles and trouble-shooting methods**

11.1 **Troubles and trouble-shooting methods of workpiece**

TABLE 9

No.	Troubles	Possible causes	Trouble-shooting method
1	Nibbles appear on the workpiece	The blades are not level with the guiding fence or the table	Re-adjust
2	The workpiece bows while planing 	Cutter of planing does not adjusted precise enough relative to the table or cutter blunt. 	Re-adjust the working table relative to the table. 
3	The workpiece twists 	① The feeding pressure wheel deviates  ② One side of the level-planing cutter wears out seriously because of processing the raw wood block with same width frequently	① Re-adjust the pressure wheel to the center of workpiece  ② Re-sharpen the planing cutter

No.	Troubles	Possible causes	Trouble-shooting method
4	The workpieces are unparalleled to each other in width direction 	① The cutter edge is unparalleled to the machine table.  ②One side of the blade wears out	① Re-adjust the cutter.  ② Re-sharpen the cutter
5	 The workpieces are unparalleled to each other in length direction	The pressure of front and rear pressure shoe of top spindle is not enough.	Re-adjust the pressure of front and rear pressure shoe of top spindle
6	The workpieces are unparalleled to each other in length direction of both ends 	The fence of right spindle unparalleled which is caused by the lossed while processing.	
7	 Irregular wavelike tracks appear on the surface of workpiece and thus make the workpiece unstable and shaking	The force from the pressure parts on the workpiece is not  properly adjusted.	Re-adjust force from the pressure parts on the  workpiece properly.
8	Feeding unsmooth. 	a) The pressure on the raw wood block is excessively large when feeding b) Position of the feeding beam is too high.	a) Reduce the pressure of side pressure parts and the top pressure parts. b) Adjust the height of the feeding beam

No.	Troubles	Possible causes	Trouble-shooting method
9	 The workpiece deviates from the reference guide.	 a) Axial position of the feeding wheel is not correct b) The pressure of the side pressure part is not even	a) Adjust the feeding pressure wheel to the workpiece central b) Check all pressure parts 
10	 Tracks of the feeding wheel appear on the surface of the workpiece	a) less process redundancy of the raw wood block b) more cutting output by the first bottom horizontal cutter-shaft c) too big feeding pressure	1) select a raw wood block with more process redundancy 2) reduce the cutting output by the first bottom horizontal cutter-shaft reduce the feeding pressure
11	 Burnable and black marks appear on the workpiece	a) the cutter is damaged because of the too low feeding speed. b) The wood block stays in the machine for a certain period of time c) Cutter becomes blunt	a) Accelerate the feeding speed b) Don't let the trial workpiece stays under a cutter shaft for too long time c) Re-sharpen the cutter
12	 Scratches appear on the rubber wheel	Sharp surface of the raw wood block 	Properly reduce the pressure of the out-feed wheel
13	General adjustment is correct, but defects still appear on workpiece	Machine table and the  reference guide are severely worn out	Change the table and the reference guide (select wear-proof materials with hardened surface .)

11.2 **Troubles and trouble-shooting methods of cutter blocks**

TABLE 10

No.	Troubles	Possible causes	Trouble-shooting method
1	The cutter severely worn out	The cutter material not appropriately selected	Select cutter materials that match the timber type (high speed steel HSS, Stellite alloy steel (Stellite), Hard metal alloy steel (Hardmetal))
2	Cutter edge broken	a) Too high Temperature when re-sharpen. b) Too big back angle	a) Select suitable grinding wheel when re-sharpening the cutter, slow down the speed of sharpening and pay attention to the cooling of the cutter. b) Decease the back angle.
3	Cutter rotates unsteadily	a) No dynamic balancing on cutter. b) Not balanceable blades assembly. c) Different types of blade assembled together (different weight). d) Scrap remaining between the cutter pan and root of the cutter-shaft.	a) Do a dynamic balance test on the cutter. b) Make blades balanceable c) Assemble the blades of the same type. (of same weight) d) Clean the entire joint before assembling.
4	Cutter cannot be assembled onto the cutter-shaft	Distortion on the inner hole which is caused by the loose and tight differ of lockbolts on the cutter	Average the force of all locking nuts.

11.3 **Troubles and trouble-shooting methods of electric power**

TABLE 11

No.	Troubles	Possible causes	Trouble-shooting method
1	Machine can not be started	No power supplied or low voltage	Check the fuse, “Emergency stop” button and breaker
2	The motor for cutter-shaft can not be started or continuous feed can not be operated	a) “Emergency stop” button has been pressed down b) The cover is opened c) The min. breaker on the control transformer is overheated broken d) Air-switch of the motor is cut off e) Supply of air is not deficient f) Limit switch at feed entrance is pressed down or connect badly g) Locking limit switch on the safeguard connect badly	a) Restore the “Emergency stop” button b) Close the cover. c) Switch on the min. breaker d) Turn on the air-switch e) Recover the supply of air f) Reset or change limit switch g) Check locking limit switch

12. **List of generally replaced standard parts**

12.1 **Bearings**

TABLE 12

Name	Model	Assembled part
Deep slot ball bearing	6207-2Z	First bottom spindle unit
Deep slot ball bearing	6009-2Z	First bottom spindle unit
Thrust ball bearing	51104	Right spindle unit
Deep slot ball bearing	6207-2Z	Right spindle unit
Deep slot ball bearing	6009-2Z	Right spindle unit
Deep slot ball bearing	6001-2RS	Right spindle elevation adjusting bar
Thrust ball bearing	51104	Left spindle unit
Deep slot ball bearing	6200-2RS	Side pressure wheel unit of left spindle 1
Deep slot ball bearing	6000-2RS	Side pressure wheel unit of left spindle 2
Deep slot ball bearing	6001-2RS	Left spindle elevation adjusting bar
Deep slot ball bearing	6207-2Z	Top spindle unit
Deep slot ball bearing	6009-2Z	Top spindle unit
Deep slot ball bearing	6002-2Z	Top spindle elevation adjusting bar
Deep slot ball bearing	6009-2Z	Universal spindle assembly
Deep slot ball bearing	6207-2Z	Universal spindle assembly
Thrust ball bearing	51104	Vertical moving slide assembly of universal
Thrust ball bearing	51104	Horizontal moving slide assembly of universal
Deep slot ball bearing	6005-2RS	Horizontal moving slide assembly of universal
Deep slot ball bearing	6202-2Z	Horizontal moving slide assembly of universal
Deep slot ball bearing	6002-2RS	Feeding pressure wheel group（Ⅰ）
Deep slot ball bearing	6005-2RS	Feeding pressure wheel group（Ⅰ）
Deep slot ball bearing	6007-2RS	Feeding pressure wheel group（Ⅰ）
Deep slot ball bearing	6002-2RS	Feeding pressure wheel group（Ⅱ）
Deep slot ball bearing	6005-2RS	Feeding pressure wheel group（Ⅱ）
Deep slot ball bearing	6007-2RS	Feeding pressure wheel group（Ⅱ）
Deep slot ball bearing	6002-2RS	Feeding pressure wheel group（Ⅲ）
Deep slot ball bearing	6005-2RS	Feeding pressure wheel group（Ⅲ）
Deep slot ball bearing	6007-2RS	Feeding pressure wheel group（Ⅲ）
Deep slot ball bearing	6004-2RS	Vertical pressure wheel assembly
Deep slot ball bearing	6003-2RS	Adjusting outfit Ⅰ
Deep slot ball bearing	6003-2RS	Adjusting outfitⅡ
Deep slot ball bearing	6003-2RS	Chain wheel assemblyⅠ
Deep slot ball bearing	6003-2RS	Chain wheel assemblyⅡ
Deep slot ball bearing	6207-2RS	Feeding initiative chain wheel assembly
Thrust pad	AS 2542	Top spindle elevation adjusting unit

12.2 **Belt**

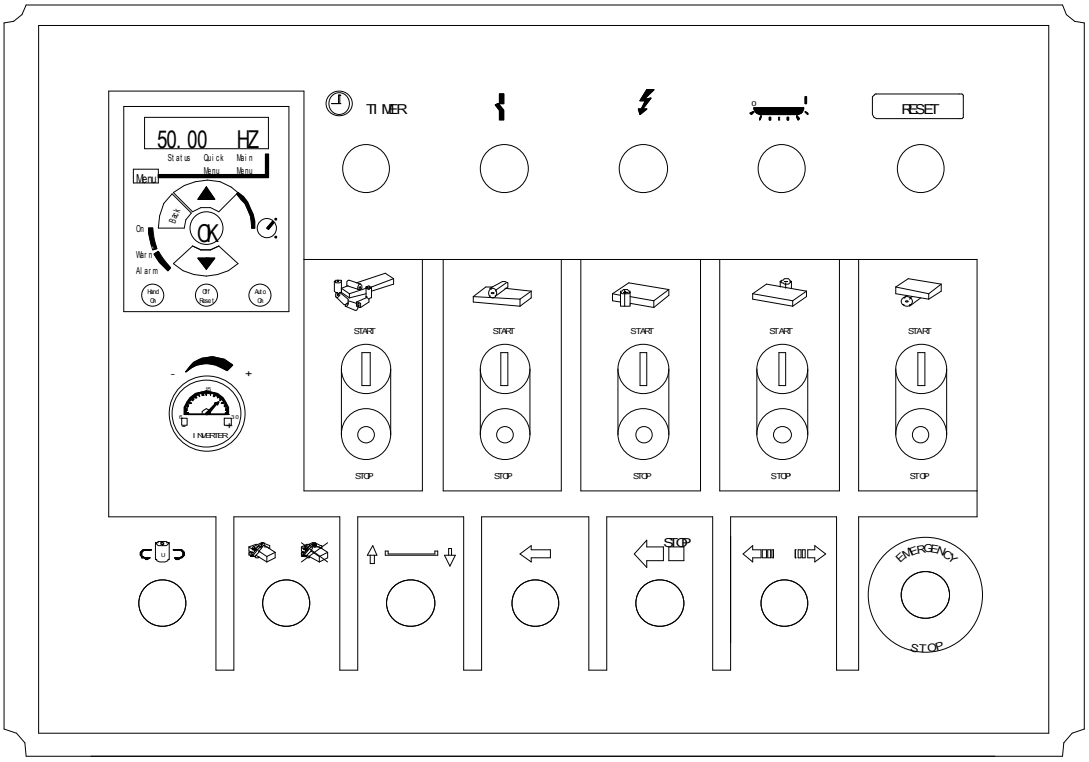
TABLE 13

Name	**Specification (inner girth×width×thickness) (mm)**	**Location**
Belt	63×3×1485	Bottom spindle
Belt	63×3×1030	Left spindle
Belt	63×3×1330	Right spindle
Belt	63×3×1745	Top spindle
Triangle belt	SPZ L=808	Universal spindle

13. **Function introductions of control panel**

13.1 **Function introductions of main control panel**

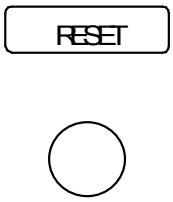
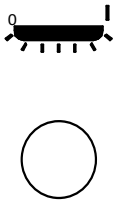
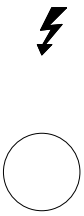
Main control panel

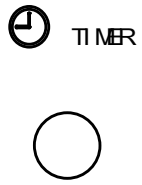
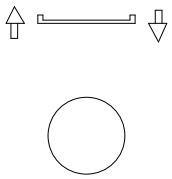
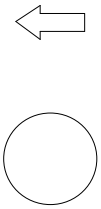
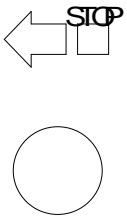
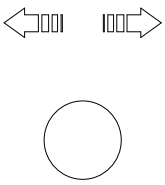


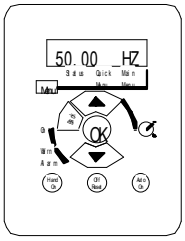
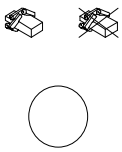
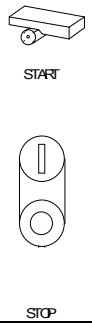
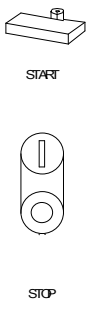
(Figure54)

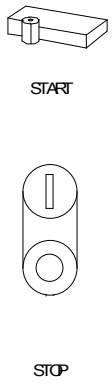
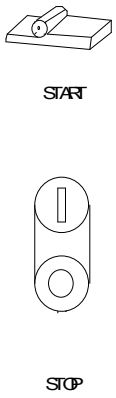
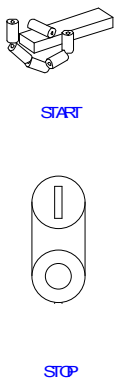
13.2 **Introductions of switch function on the main control panel**

TABLE 18

No.	Switch indicator	Switch name	Switch function
1		Emergency stop button	Press this button to stop working when any accident or abnormal state occurs.
2		Restoration selection	Once Press emergency button to restore, you should press this button, the machine will start up again when the light is on.
3		Working light selection switch	Turn to “1”, the woking light will be on. Turn to “0”, working light will be off.
4		Power indicator	Joint the master switch, while the light is on, it means that power is put through.
5		malfunction indicator	any of the motors is overloaded or circuit shorts, this indicator lights and the working would be stopped.

No.	Switch indicator	Switch name	Switch function
6		Safety indicator	46 seconds after pressing emergency button, the light will be on, it means that you can open the cover and do any operation at this time.
7		Feed beam elevation knob	Clockwise rotate the knob for lifting, anti-clockwise for falling
8		Feeding start-up button	Press this button and feeds continiously
9		Stop feeding button	Press this button and stop the feeding.
10		Jogging feeding/reverse knob	Turn anti-clockwise for feeding, turen clockwise for jogging reverse.

No.	Switch indicator	Switch name	Switch function
11		Inverter control panel	To set and display related parameters of inverter feeding motor and adjust the proper feeding speed.
12		Selection switch of universal rotate direction	Turn the switch to“↻”, and universal spindle rotates clockwise. Turn the switch to “↺”, and universal spindle rotates withershins.
13		Universal spindle and feeding interlock selection switch	Turn to “ ”, the universal spindle mustbe started then feed; Turn to “ ”, no need to turn on the universal spindle and feeds
14		First bottom spindle starts First bottom spindle stops	Press “start” or “stop” button to start or stop the right spindle.
15		Right spindle starts Right spindle stops	Press “start” or “stop” button to start or stop the right spindle.

No.	Switch indicator	Switch name	Switch function
16		Left spindle starts Left spindle stops	Press “start” or “stop” button to start or stop the left spindle.
17		1st top spindle starts 1st top spindle stops	Press “start” or “stop” button to start or stop the 1st top spindle.
18		Universal spindle starts Universal spindle stops	Press “start” or “stop” button to start or stop the universal spindle.。

14. Electrical control principle

14.1 Turn on the machine

Check if each controlled breaker in the electric box positioned normal “ON”. The cover must be closed while closing the electric box for inspection. Check whether the limit switches and emergency stops are in the normal position. Switch on pneumatic supply (pressure under normal situation), trun the main electric breaker on the electric box to “ON”, then the power indicator lights. Press restoration button SB0, when spindles and feeding contactors are under normal positon, main contactor KM0 will take action and the indicator HL10 lights, machine toll is ready to work. Press SB10-SB18 to start each spindle then to press SB6 to start feeding. To stop the feeding, press SB7, then to stop each spindle by pressing SB9-SB17. When the machine is running, the feeding will be stopped automatically by pressing stop of any spindle.

Attention① When the cover is opened, only jogging lift or fall the feed bead can be done, spindles and feeding can only be operated when the cover is closed.

② For the first start of each spindle and feeding motor, check whether the rotary direction of each motor is tally with the symbols sticked on the control panel. If not, change random 2 of the 3 pieces of power supply cable. **This operation can only be carried out by qualified electrician.**

③ Press emergency stop SB1 on the main control panel, wait 45 seconds till the safety indicator HL10 lights, then to open the cover and operate.

④ Machine and electric box must use specified earthing cable. To open the electric box and maintain can only be carried out by qualified electrician, the main power breaker much be off at the same time before operation.

14.2 Height adjustment of feed beam

With the feeding stop, via SA8 knob on the control panel to adjust the height of feed beam. Turn left for lifting, right for falling. Release the knob and SA8 goes back to zero, the height adjustment stops.

14.3 Start and stop of spindle

Make sure that the cover is closed, and the main contactor KM0 is under normal situation then to start each spindle by pressing corresponding buttons on the control panel. Each spindle is using star delta starter, it will delay about 6 seconds to start. The corresponding indicator lights for normal start and extinguished for stop.

Pay attention that, for starting each spindle, there must be time spacing to avoid current overload. Better wait for a complete start of one spindle then another.

For starting universal spindle, do select the rotating direction on the control panel by switch SA7 then to press the button for start.

14.4 **Start and stop of feeding**

The start and stop of feeding is interlocked with the start and stop of each spindle. The feeding only starts when all of the spindles are started. (Note: if the universal spindle is of no use, please turn the selection switch SA6 on the control panel to right so that the interlock of universal spindle is cut, then the feeding can be started.) While the machine is running normally, stop any of the spindles and the feeding will be stopped.

14.5 **Jogging feed and reverse**

Only when the feeding is stopped, turn the SA9 switch on the control panel left or right shortly for jogging feed and reverse. Let go of SA9 to stop jogging feed or reverse.

14.6 **Speed adjustment of inverter（please see content 8.15.1）**

14.7 **Normal stop and emergency stop**

Normal stop: Press “stop feeding” SB7 on the control panel to stop the feeding device, then stop each spindle and the machine stops.

Emergency stop: Press emergency stop button SB1 on the control panel, and the machine stops. If the machine needs to be restarted again, first restore the emergency stop butten, then press the restoration button SB0 on the control panel. When the restoration indicator lights, the operations for each spindle or feeding can be done accordingly.

14.8 **Control for opening the cover**

Under stop and running situation, the cover can only be opened by pressing the emergency stop button SB for about 45 seconds and wait until the safety indicator HL10 lights.

14.9 **Control of working lamp**

The working lamps are controlled by the selection switche SA5 on the main control panel. Turn to”1” and the lamps are on, turn to “0” and the lamps are off.