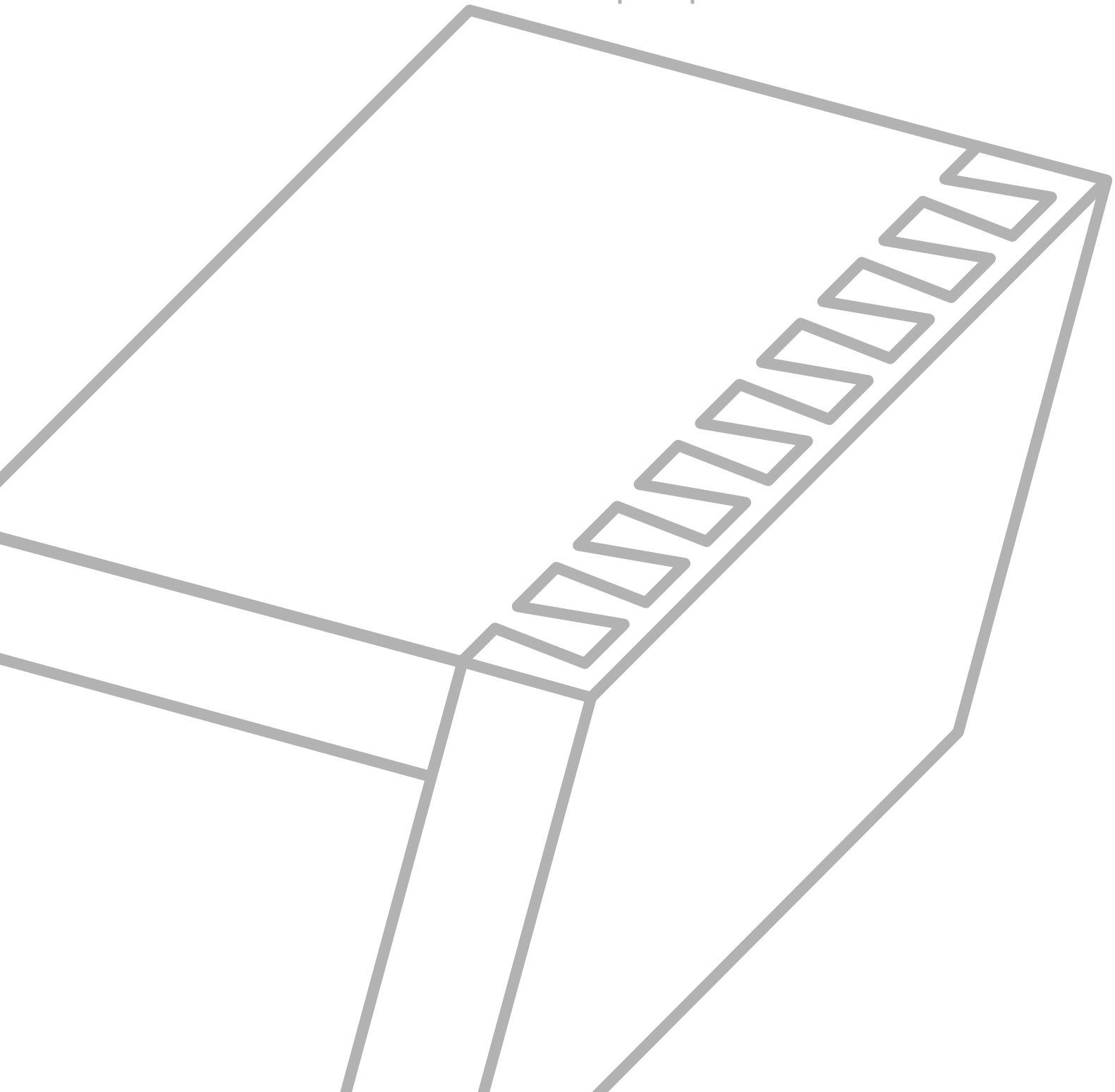


**Operation Manual**  
Multiple spindle dovetail machine



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1. Place machine on the concrete and firm floor. Maintain stability and balance at all times.
2. Only allow trained and experienced personnel to operate machine. Please contact us for personnel training if necessary.
3. Pay attention to safety symbols.
4. Disconnect from power source after machine stops.
5. Never leave when machine is running. Turn power off before leaving machine unattended.
6. Keep work area clean and empty. Only operators are allowed.
7. Make sure safety cover are in place before running machine.
8. Always wear safety glasses when operating machine.
9. Wear proper apparel. Do not wear loose clothing, gloves, neckties, rings, or jewelry that can catch in moving parts. Wear non-slip footwear and protective hair covering to contain long hair.
10. Replace damaged or dull cutters.
11. Remove tools before testing run machine. Make a habit of checking for adjusting tools or wrenches before turning machine on.
12. Do not turn on machine if the air supply is less than 7kg/cm.
13. Do not use machine in wet location, or expose machine to rain. Keep work area well lighted.
14. Check for damaged parts before using machine. Check for any other conditions that may impair machine operation.
15. Use recommended accessories. Refer to the information offered by manufacturers. Improper accessories increase risk of injury.
16. Make sure workpiece size is within the minimum and maximum dimensions that this machine is capable of processing.

# 2.

## SET UP

### 2-1. MOVE MACHINE

Use overhead travelling crane to move the machine. If use forklift truck pay attention the cooling system can not sustain, you have to pivot on machine. Maintain balance and stability and prevent collision.



### 2-2. POWER / GROUND WIRE

Machine power-in in the electrical box has mark R'S'T'E this four contact.



### 2-3. PHASE REVERSAL PROTECTOR

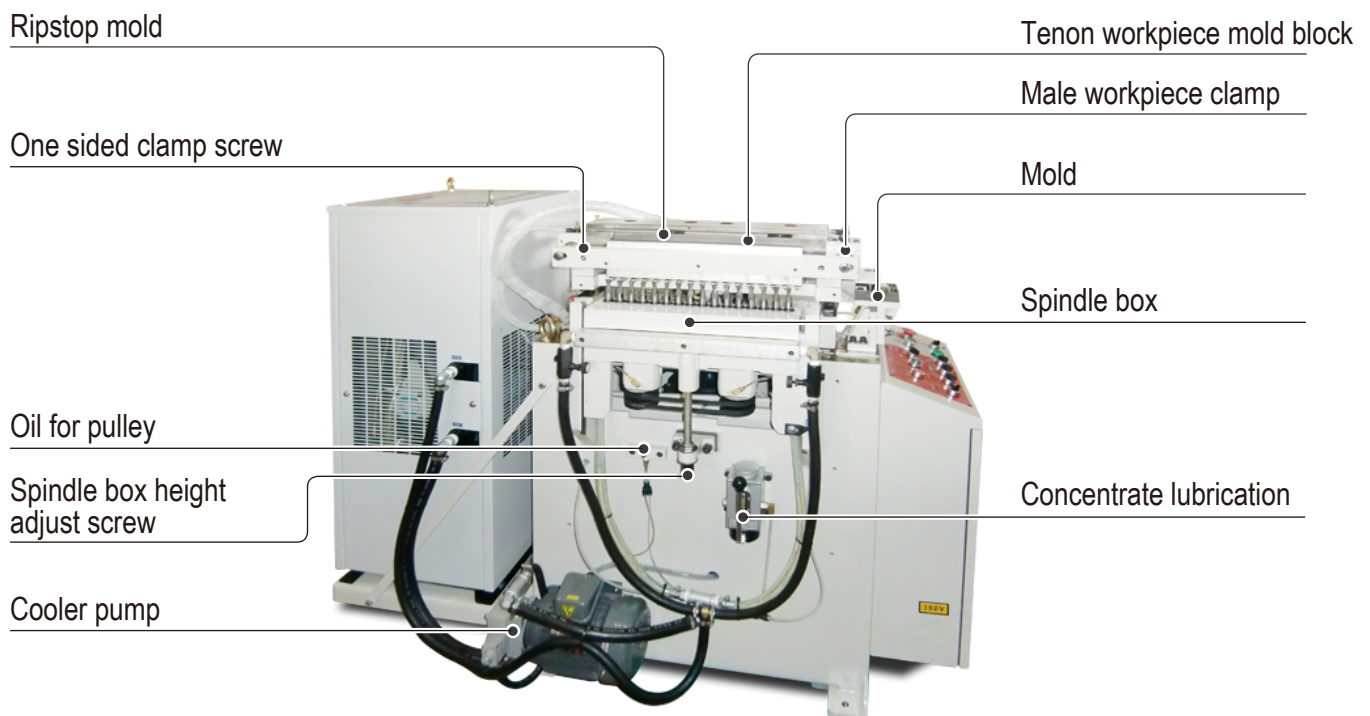
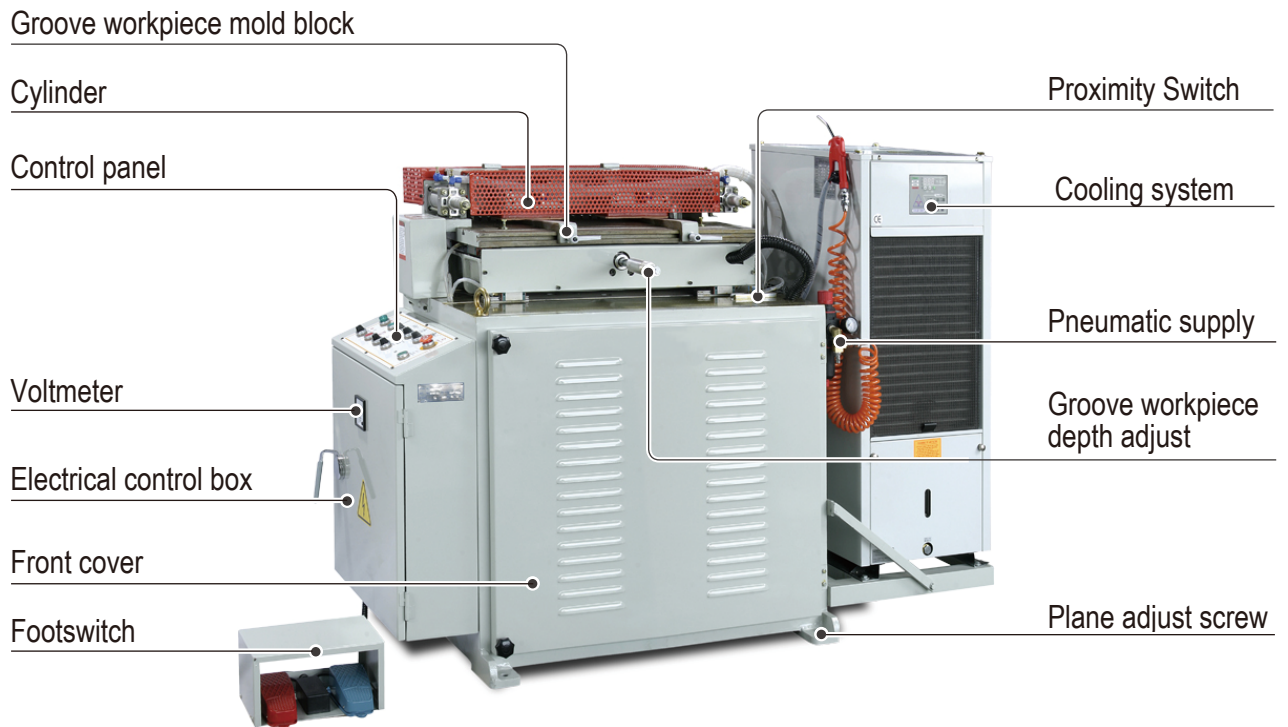
T1 is equipped has set phase reversal protector, if phase reversal can not able to turn on power, you can set the R'S'T any two-wire change then can turn on the power.

### 2-4. AIR PRESSURE PROTECTION SYSTEM

T1 use pneumatic supply for action, all step are through oil pneumatic action, so stable pneumatic supply of T1 is very important, set the pneumatic supply is maintained at 7 to 8kg/cm<sup>2</sup>.

And do not place T1 in the factory end of line, will make action not enough pneumatic, the T1 air pressure protection system will make power off.

## 3-1. MECHANICAL APPEARANCE



### 3-2. SAFETY SWITCH(POWER-OFF SWITCH)PLACE

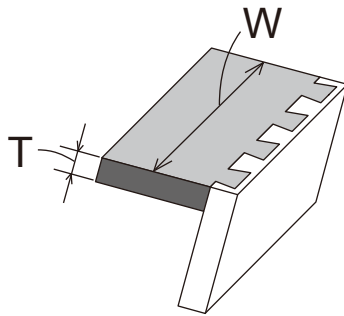
#### A.Front cover



#### B.Electrical control box



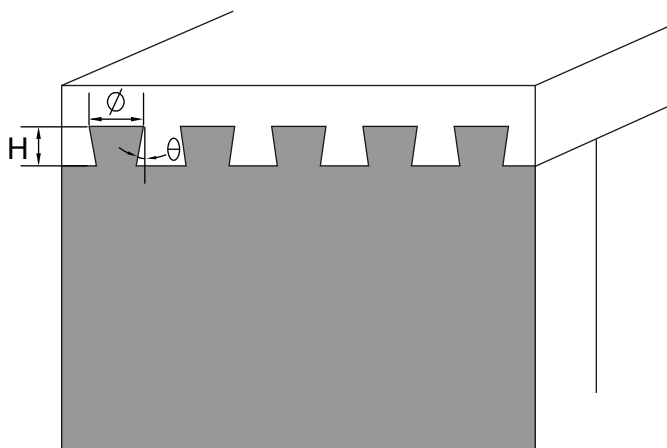
## 4-1. WORKPIECE SIZE



Workpiece size	
Max. width(W)	400mm(16 spindle) 600mm(24 spindle)
Max. thickness(T)	25mm
Min. thickness(T)	9mm

## 4-2. CUTTER DIAMETER ANGLE AND CORRESPONDING TENON HIGH

The following form show the cutter diameter and angle with tenon height; users are subject to special requirements, refer right list.



H	φ	θ
6mm	13.6mm	10°
7mm	13.8mm	10°
8mm	13.9mm	10°
8.5mm	14mm	10°
9mm	14.1mm	10°
10mm	14.3mm	10°
11mm	14.5mm	10°
12mm	14.6mm	10°
13mm	14.8mm	10°
14mm	15mm	10°
15mm	15.2mm	10°
16mm	15.3mm	10°

## 4-3. CUTTER SPECIFICATIONS

A: Same direction type-

Cutter direction: Right

Thread of a screw direction: Left

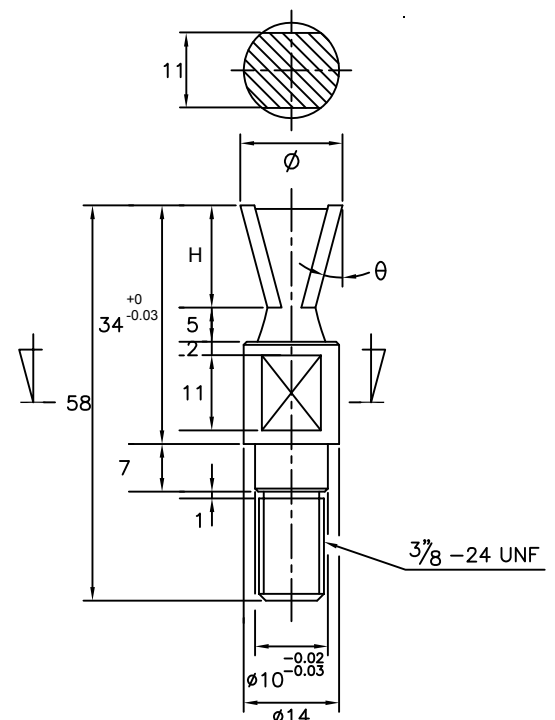
B: Standard type-

1. Cutter direction: Right

Thread of a screw direction: Left

2. Cutter direction: Left

Thread of a screw direction: Right



# 5.

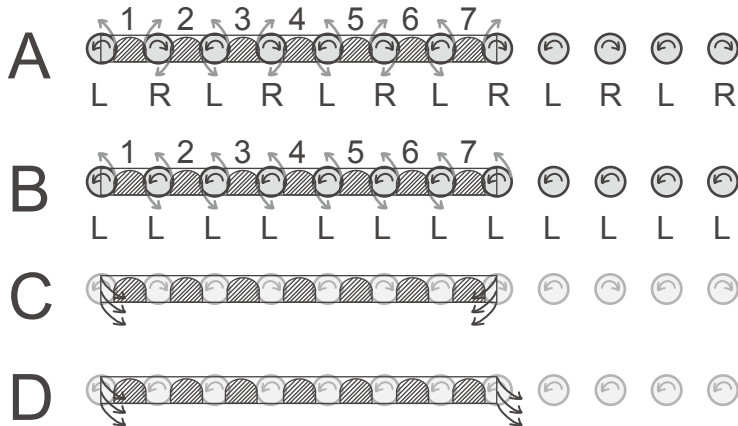
## 5-1. DIRECTION OF PROCESSING STRESS

The figure pic(A-D). Show the stress different between standard spindle box and same direction spindle box(optional).

Marked(L、 R) as spindle direction , The arrow extends out from the cutter is the process of stress & Tenon number

A,C : standard spindle box

B,D : same direction spindle box(optional)



## 5-2. BROKEN FROM TENON'S ARC.

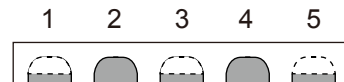


Fig.A, During the processing tenon position No. 1, 3, 5, 7, get two side cutting stress,it's more easy to broken from tenon's arc.

Fig.B, same direction spindle box, because the same of direction of knife, cutting stress can be dispersed in each tenon, Tenon arc is not easy to broken, better for loose material wood.

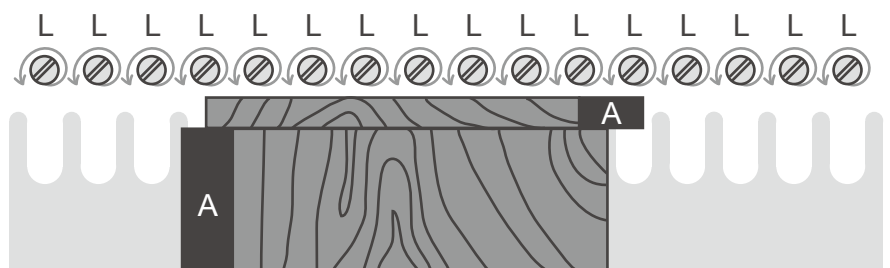
## 5-3. BROKEN FROM WORKPIECE SIDE



Fig.D, same direction spindle box, During the processing workpiece's Right side will get Cutting out stress(The arrow extends out from the cutter), it's more easy to broken, Can be excluded by using the mold block.

Fig.C, standard spindle box, During the processing ,can put workpiece between the cutter of direction of Inward, Both side of the workpiece will get inward cutting, Not easy to broken.

## 5-4. USING THE MOLD BLOCK



In the figure, Marked A is the mold block, it's solutions from Broken.

This block can be reused when we change the workpiece, But it must be close to the workpiece, Applicable Material: 1.wood 2. Bakelite 3. Acrylic 4. Aluminum.

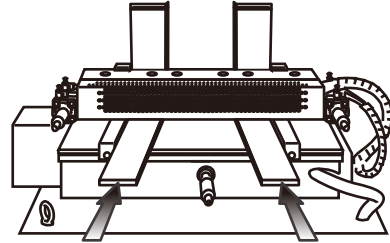


## 6-1. OPERATIONAL STEP

1. Turn on the power switch



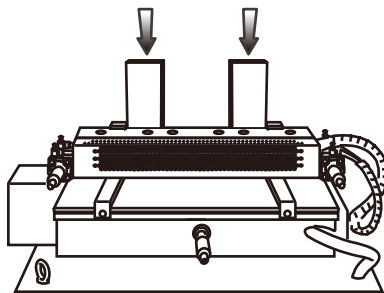
5. Place the groove workpiece



2. Switch to automatic mode

6. Press the start button again  
(groove workpiece clamp start then automatic working)

3. Place the tenon workpiece

4. Press the start button  
(tenon workpiece clamp start)

## 6-2. CONTROL PANEL/SWITCH/FOOTSWITCH

6-2-1. At automatic mode, only can use start button' footswitch (blue)' emergency button' footswitch (red) and the power switch, other button for the protection state can not be use.



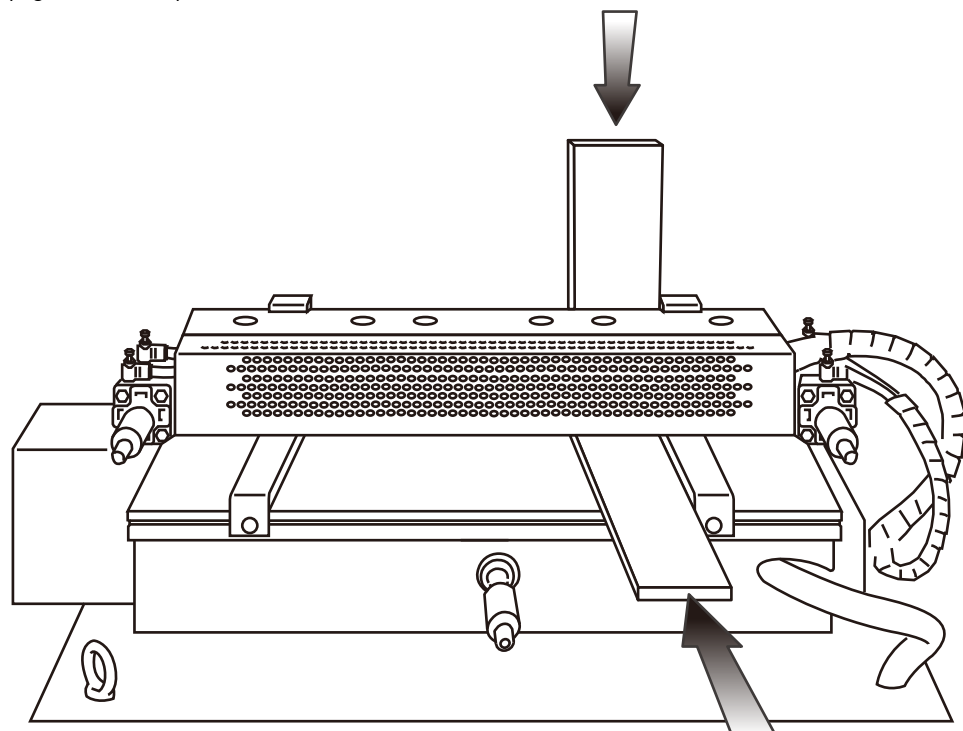
6-2-2. At the manual mode, in addition the start button, other buttons can be use.  
Mode Switch : Auto mode (working mode)

Manual mode (error excluded correction mode)



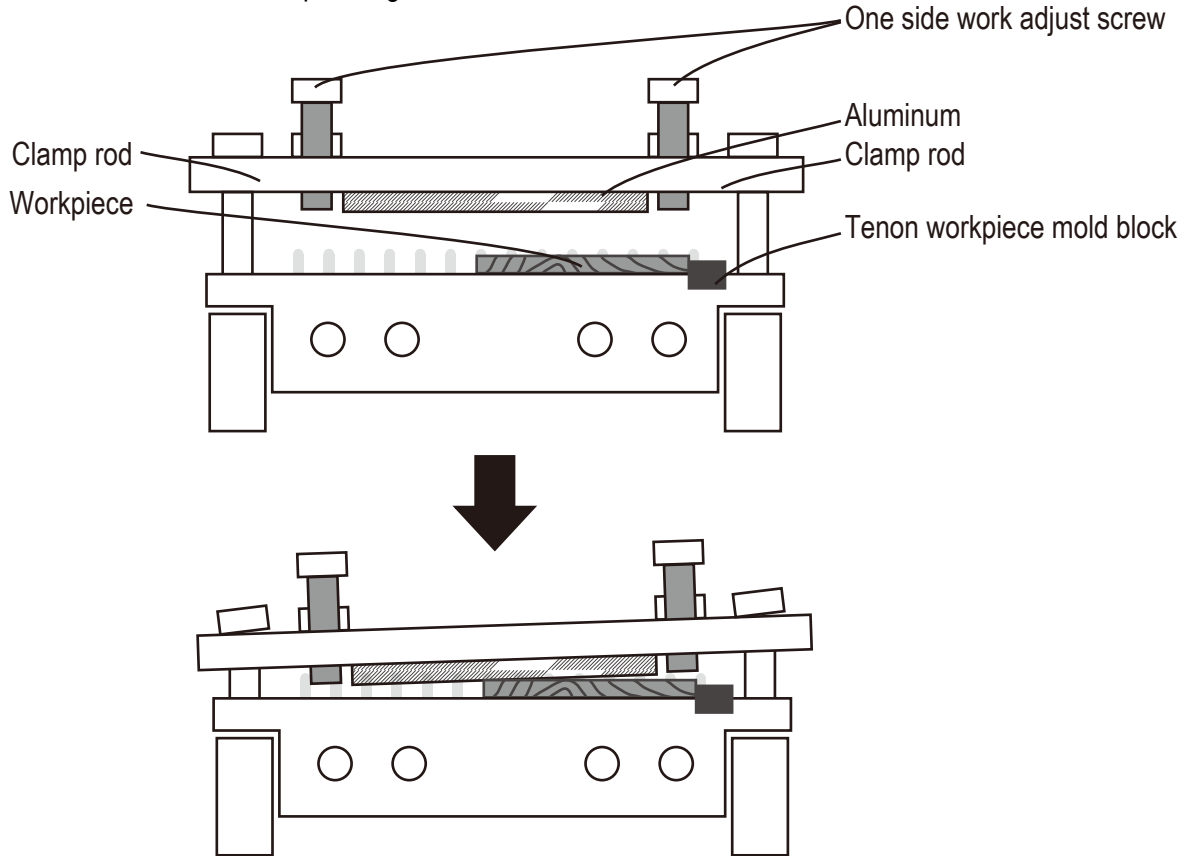
## 6-3. ONE SIDE / TWO SIDE CLAMP PRECAUTIONS

Usually use one time put two groups workpiece (two side clamp), the tenon clamp will be balance. If user one time just put one side the clamp will lost balance, easily let clamp wear. (figure below).

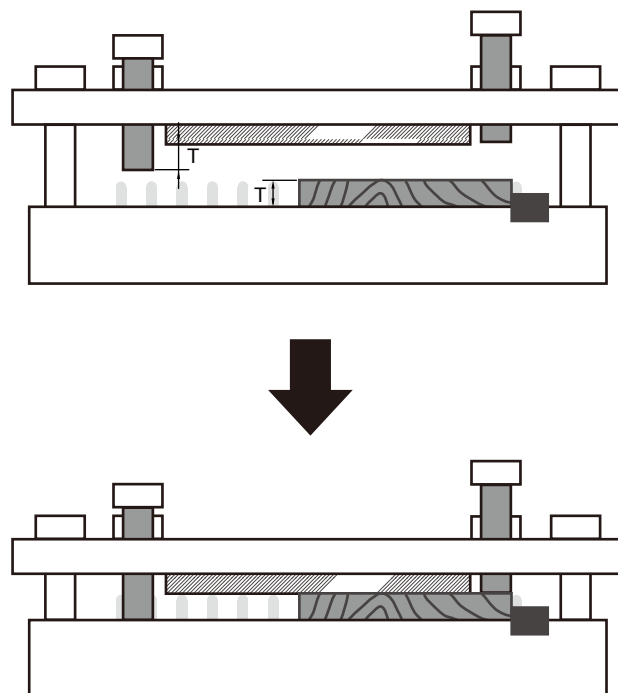


Therefore, if user use one side work, please adjust the below figure screw clamp to keep balance and reduce clamp wear .

1. One side work, clamp tilt figure

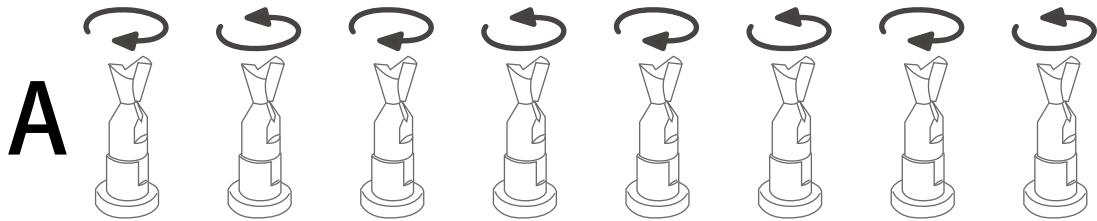


2. Adjust one side work adjust screw until wood thickness same as.

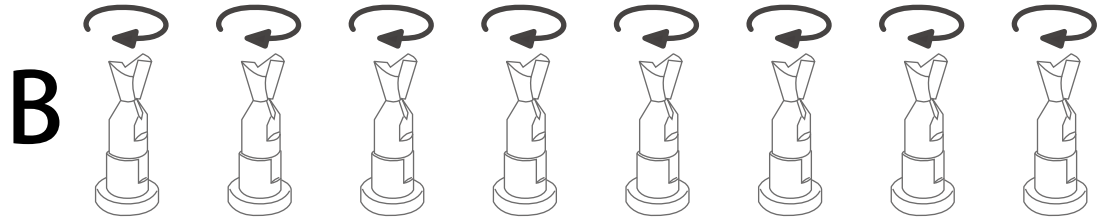


## 7-1. REPLACE CUTTER

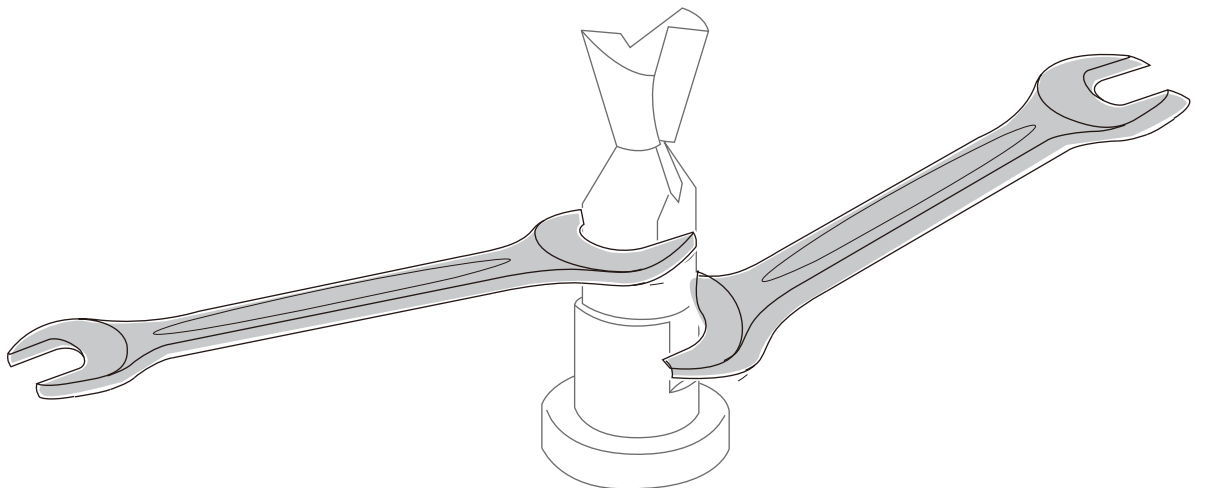
T1 have two type of spindle box, for standard type,cutter arrangement is fig.A



for same direction type,cutter arrangement is fig.B



As the figure below,use two No.12 wrench to release cutter, Reverse direction to locking cutter.



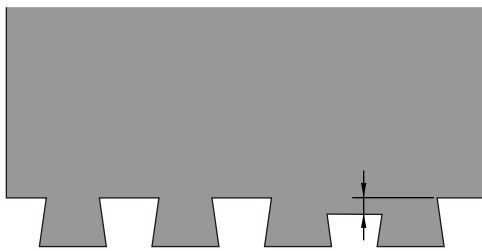
### 7-2. CORRECTION CUTTER HEIGHT

If the cutter height have tolerance , to cause the figure below(left),can use copper washer to elevate the cutter which one is lower.

As the figure below(right),put the copper washer in cutter body,then assemble on spindle box.

Attention:

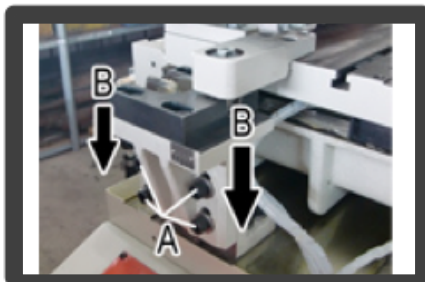
1. Base on the most height cutter to elevate the lower cutter.
2. If cutter have used copper washer, should pay attention to strength, it will lead copper washer broken when the strength too much.



### 7-3. CUTTER OFFSET COMPENSATION

When the cutter after grinding, cutter diameter will smaller and dovetail will become too tight, There are two ways to exclude.

1. Reduce the spindle box height ( Reference P14/9-1 )
2. Reduce the Track mold height,this way is equivalent to Cutter offset compensation (each Reduce 0.5mm ,the cutter dia. will be offset compensation 0.3mm), The advantage of not changing the tenon height.



The step for reduce track mold height.

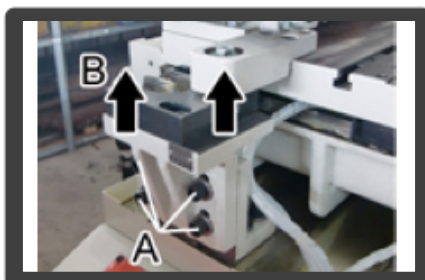
Be sure to disconnect the air before adjustment

- 1.fig.A (4) screws loose
- 2.reduce track mold to the direction of the arrow (fig.B)
- 3.fig.A (4) tighten the screws

Attention:

when cutter after grinding,if cutter dia. smaller than the original size 1mm,need to replace it with a new cutter.

After replace cutter,must raise the track mold to max. height,if cutter offset compensation using new cutter, there will be dangerous to hit the table.

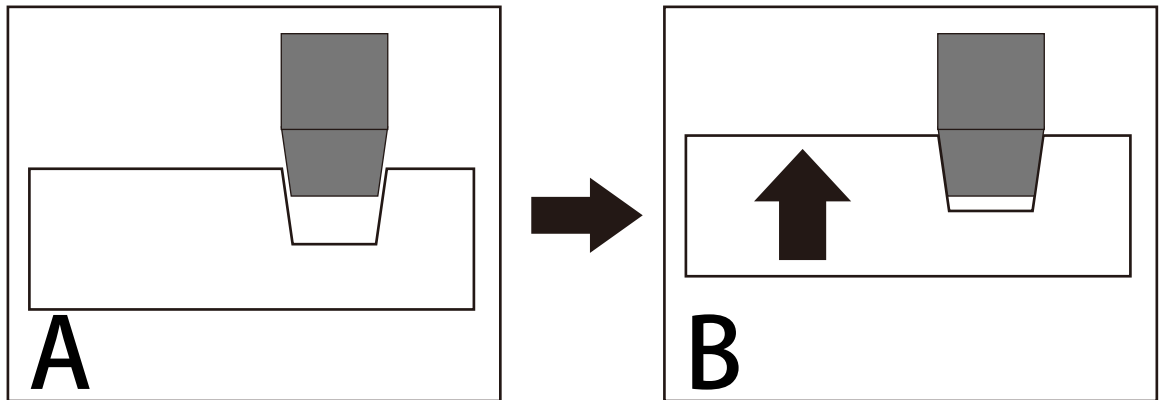


The step for raise the track mold.

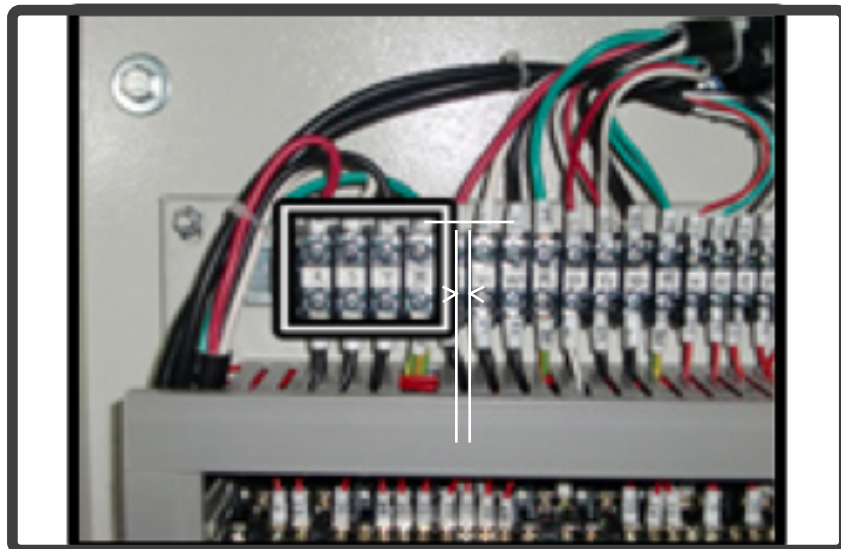
Be sure to disconnect the air before adjustment

- 1.fig.A (4) screws loose
- 2.raise track mold to the direction of the arrow (fig.B)
- 3.fig.A (4) tighten the screws

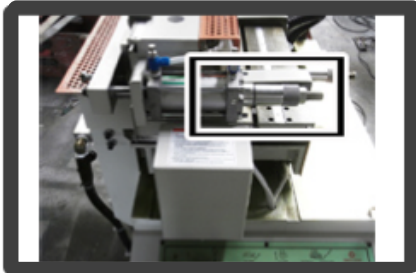
When the track mold raise to top, pay attention to strength, just nudge to the top , the axis of the track spindle friction will increase and reduce its service life when the raise strength too much.



When you reduce track mold height, attention to range between the cutter and table, each time reduce about 0.5mm, Do not reduced too much in one time, there will be dangerous to hit the table.

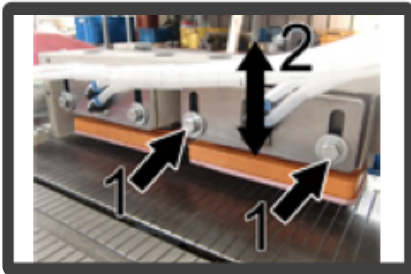
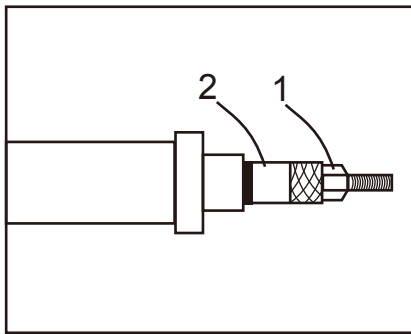


When the thickness of the wood is more than clamp range, can adjust by below step, Be sure to disconnect the air before adjustment.



#### A. Tenon workpiece clamp adjust

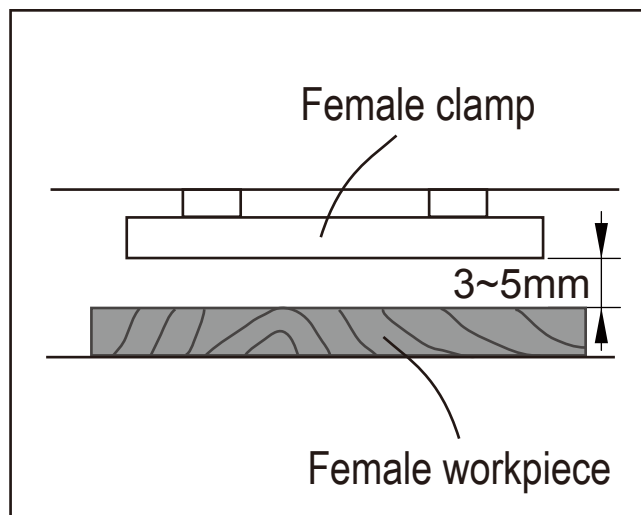
1. fig.1 screws loose
2. fig.2 move to right side can increase the clamp range; move to left side will be reduce.
3. fig.1 tighten the screws



#### B. Groove workpiece clamp adjust

1. fig.1 screws loose
2. fig.2 move up can increase the clamp range; move down will be reduce.
3. fig.1 tighten the screws

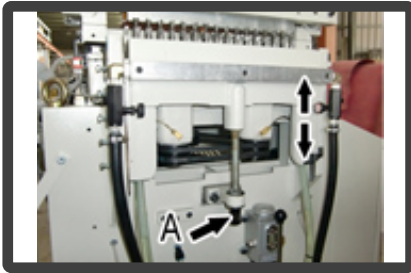
When the clamp range adjust, the best range is more than workpiece's thickness 3~5mm, can keep the hand will not hurt by clamp. (below the figure)





# 9.

## 9-1. TIGHTNESS ADJUSTMENT



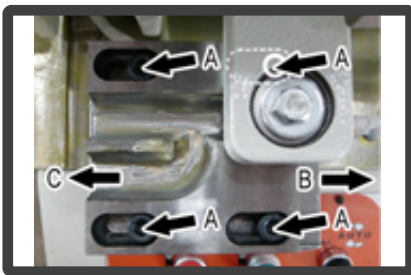
As left figure , adjust the spindle box height, can change the dovetail tightness.

Screws turn to the direction of the arrow A. will raise the spindle box height and tenon height(more tighten).

Screws turn to the contrary direction with the arrow A. will reduce the spindle box height and tenon height (more Loose).

If it is smaller cutter diameter after cutter grinding ,cause dovetail Become too tight,and If you do not want to change the tenon and groove height, Reference P11(7-3. Cutter offset compensation).

## 9-2. TENON SIZE ADJUST



As left figure to do Tenon size adjust.

Move track mold after fig.A screws loose,move to fig.C side

can increase the tenon size;move to B is reduce tenon size.

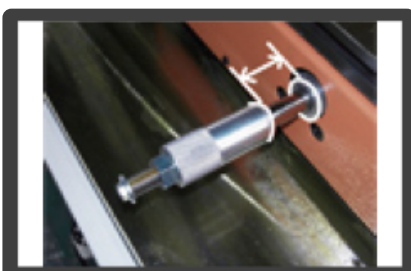
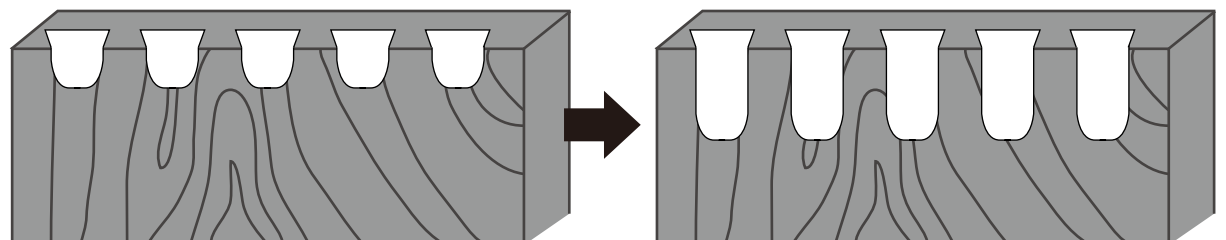
Dotted line have a screw,hide in track mold axis arm, after loose this one, need to change control mode to Manual mode,than move the table to left until the screw show out.

Attention:

If adjust tenon size more than 2mm, tenon's arc have problems as below the figure,or the table action not smooth(when track in arc not smooth), Reference 10-1.



## 9-3. GROOVE SIZE ADJUST



Adjust groove size as left the figure.

Attention:

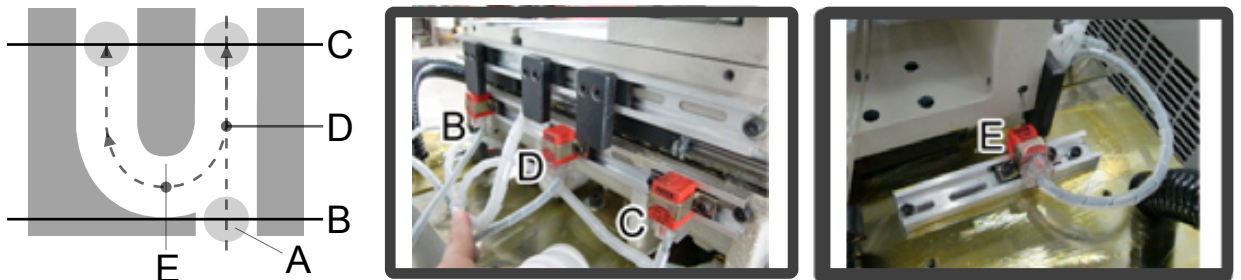
If adjust groove size more than 2mm,the table Move backward when it Move forward not yet reached the bottom,need to move the sensor C. Reference 10-1.



# 10.

## THE OPERATION PRINCIPLE OF THE TRACK MOLD AND SENSOR

### 10-1. THE SENSOR ACTION IN TRACK MOLD EXPLANATION

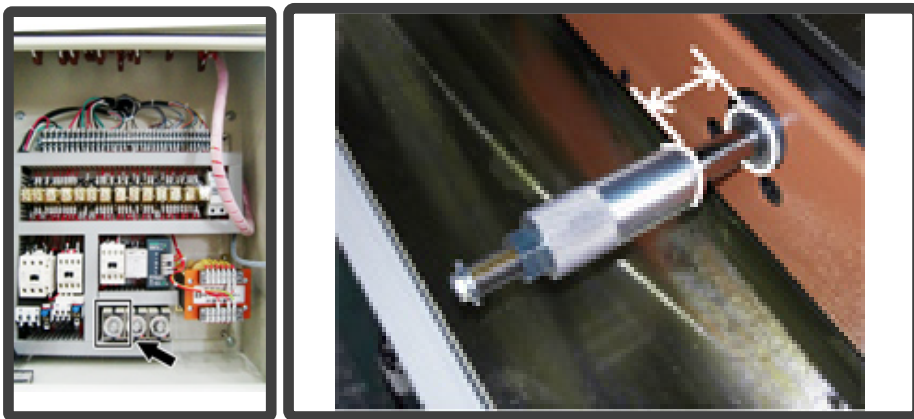


### 10-2. T1 ACTION PRINCIPLE

T1 Action principle as below the step:

- A. Start position
- C. Limit sensor of Move forward
- B. Limit sensor of Move backward
- E. the position of switch Hydraulic cylinder

1. Operation start, action position go forward from A to C (Driven by Y axis hydraulic cylinder), when sensor C hit the block (The block top of the sensor), Y axis hydraulic cylinder will stop, Through a Timer to delay (below the figure left), During this period, although the hydraulic cylinder is stop, the internal residual pressure will let keep go forward until hit groove limit (below the figure right).



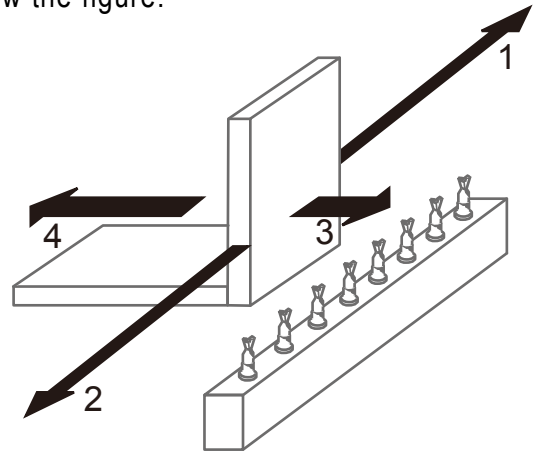
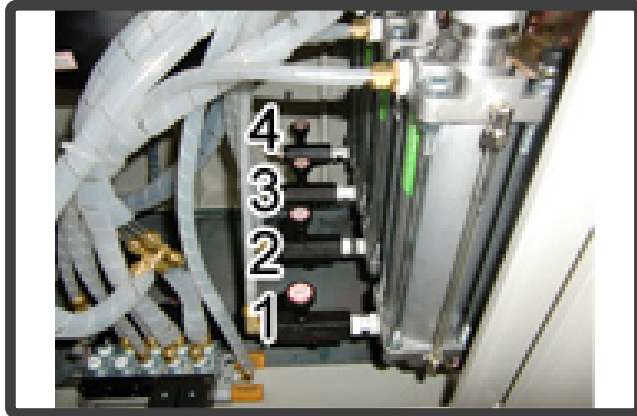
2. When Timer is on, the Y axis hydraulic cylinder will start to Move backward, until sensor D hit the block, Y axis hydraulic cylinder will stop, At the same time, the X axis hydraulic cylinder will start to left push, this is the arc action.
3. When sensor E hit the block (The midpoint of the arc), X axis hydraulic cylinder will stop, At the same time, the Y axis hydraulic cylinder will start to go forward, until sensor C hit the block again, Y axis hydraulic cylinder will stop, Through the same Timer to delay (below the figure left), the internal residual pressure will let keep go forward until hit groove limit (below the figure right).
4. When Timer is on, Y axis hydraulic cylinder and X axis hydraulic cylinder will start on same time, push the action return to Start position, the action will stop when sensor B hit the block.

# 11&12.

ADJUST THE SPEED  
& REPLACE THE BELT

## 11-1. TABLE SPEED AND VALVES OF HYDRAULIC CYLINDER

Setting table speed through adjust valves as below the figure.



## 11-2. ADJUST THE HYDRAULIC CYLINDER STOP TIMER DELAY



1. When we adjust some part like increase groove size or table speed up, it may lead to a problem:

The table move backward when it move forward not yet reached the bottom (groove limit).

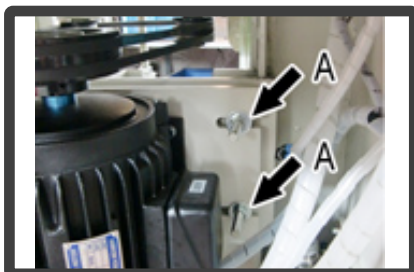
It can be improved through the Timer increase.

2. If we adjust some part like reduce groove size or table speed down, it may lead to a problem:

The table stop in groove limit time is too long.

It can be improved through the Timer reduce.

## 12-1. REPLACE THE BELT



Before replace the belt, loose the screws (fig. A), it can be easy to take out the belt when you push the motor forward. After replace the belt, pull back the motor and tighten the screws.

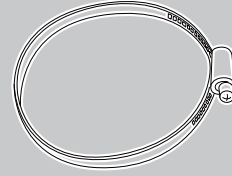
Attention:

Pay attention to strength, it will lead belt and spindle driver bearing wear faster when the strength too much.

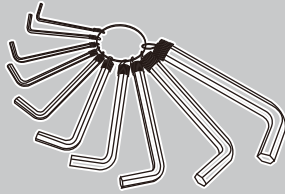
## 13. TOOLBOX CONTENTS



6PC Wrench Set



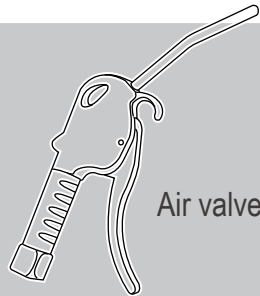
Ring for dust hood



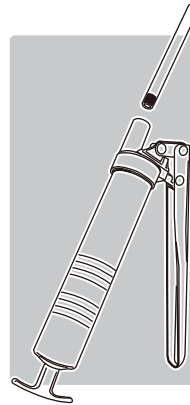
10PC Wrench Set



Oil bottle



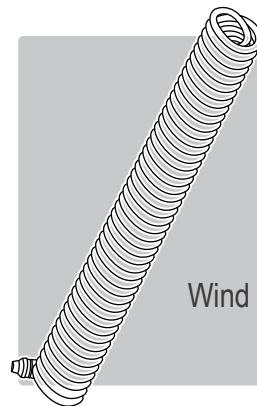
Air valve



Oiler



Cover knob



Wind pipe

Q1. CAN NOT TURN ON THE POWER.

A1:a.T1 is equipped has set phase reversal protector, if phase reversal can not able to turn on power, you can set the R'S'T any two-wire change then can turn on the power.

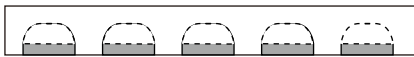
b.Check air, The air pressure demand exceeds 6kg/cm<sup>2</sup>

c.Check alarm on cooler panel

Q2. SHUTDOWN BETWEEN ACTION

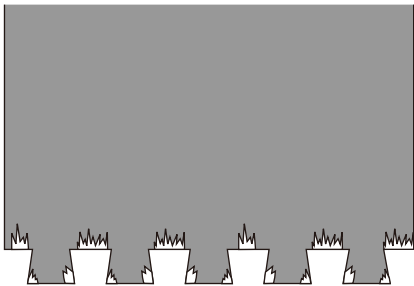
A2:For protection the spindle must work under cooler is normal conditions,if cooler have any alarm,T1 will shutdown immediately, in these cases,check alarm on cooler panel first ,and contact us.

Q3. TENON'S ARC BROKEN(AS BELOW THE FIGURE)

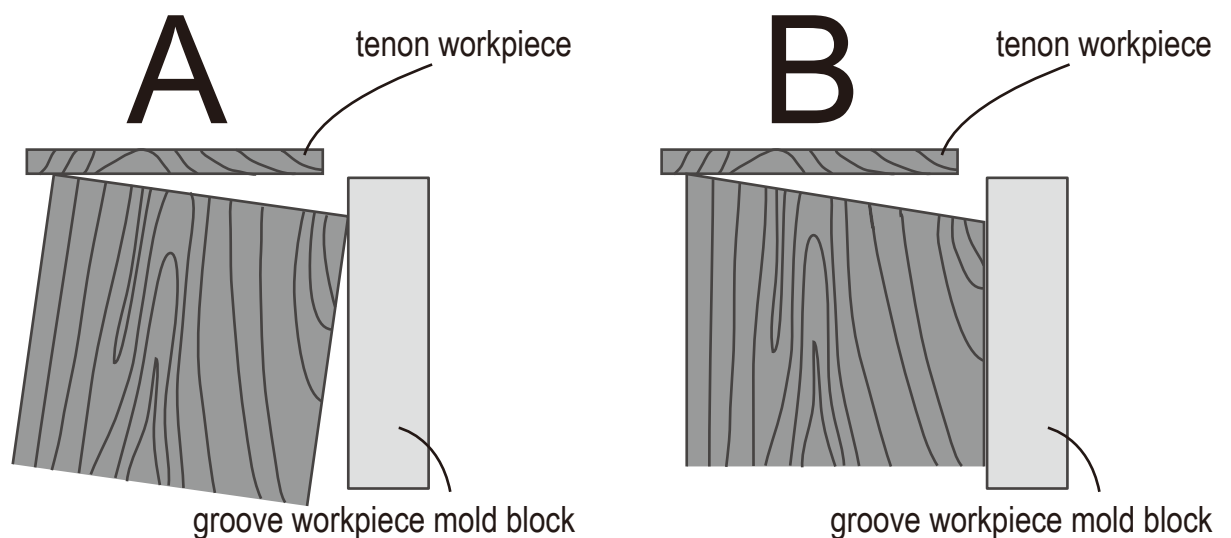


A3:Reference P16,slow down the valves 1 and valves 2.

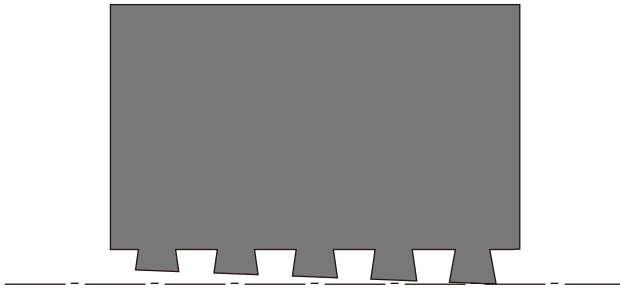
Q4. TENON'S FACE BROKEN(AS BELOW THE FIGURE)



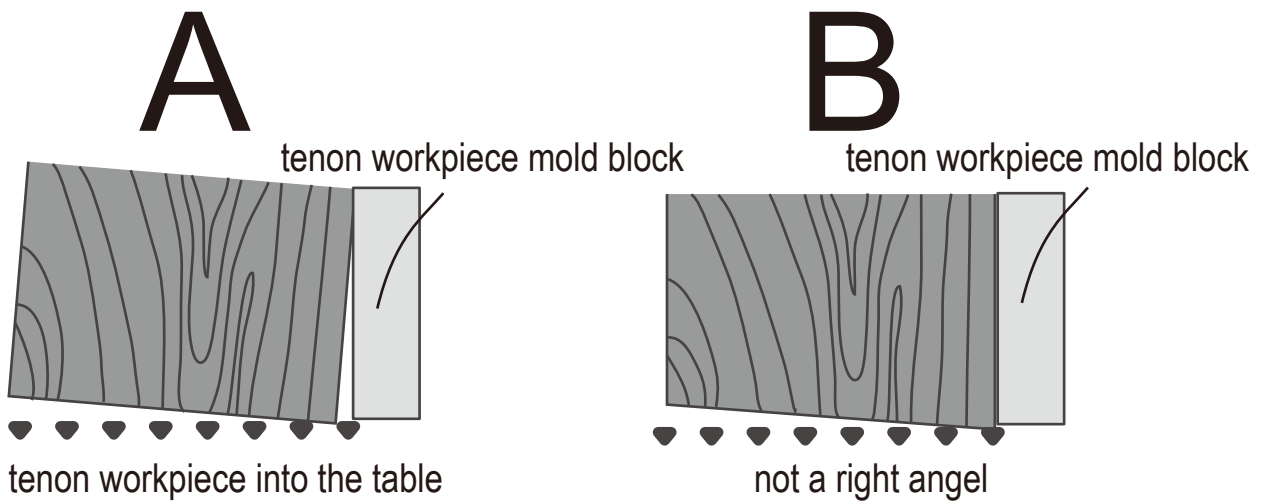
A4:Check it is close contact with tenon workpiece when the groove workpiece into the tenon workpiece(fig.A),or the groove workpiece does a right angle(fig.B).



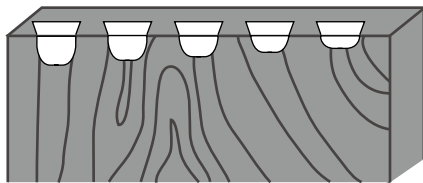
Q5. THE TENON DOES NOT A HORIZONTAL(AS BELOW THE FIGURE).



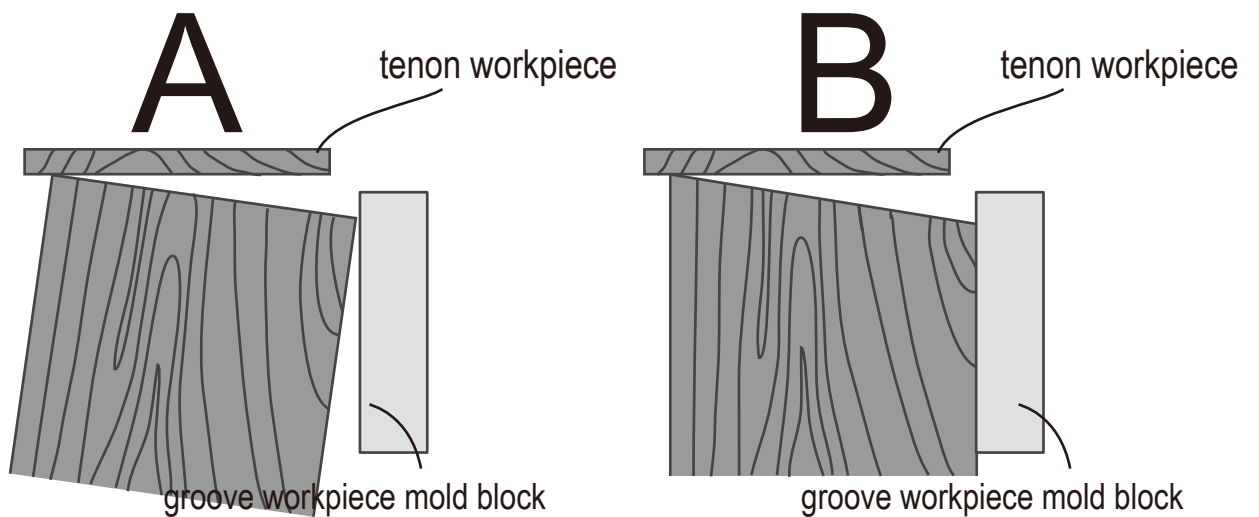
A5:Check it is close contact with table when the tenon workpiece into the table(fig.A),or the tenon workpiece does not a right angel(fig.B).



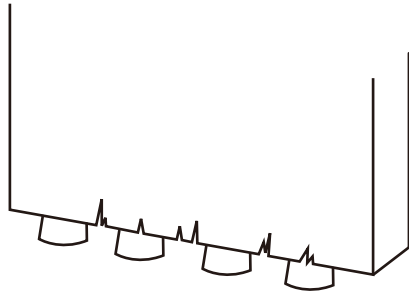
Q6. THE GROOVE DEPTH DOES NOT A HORIZONTAL(AS BELOW THE FIGURE).



A6:Check it is close contact with tenon workpiece when the groove workpiece into the tenon workpiece(fig.A),or the groove workpiece does not a right angel(fig.B).



Q7-1. THE TENON WORKPIECE INSIDE BROKEN (AS BELOW THE FIGURE)



Reason:

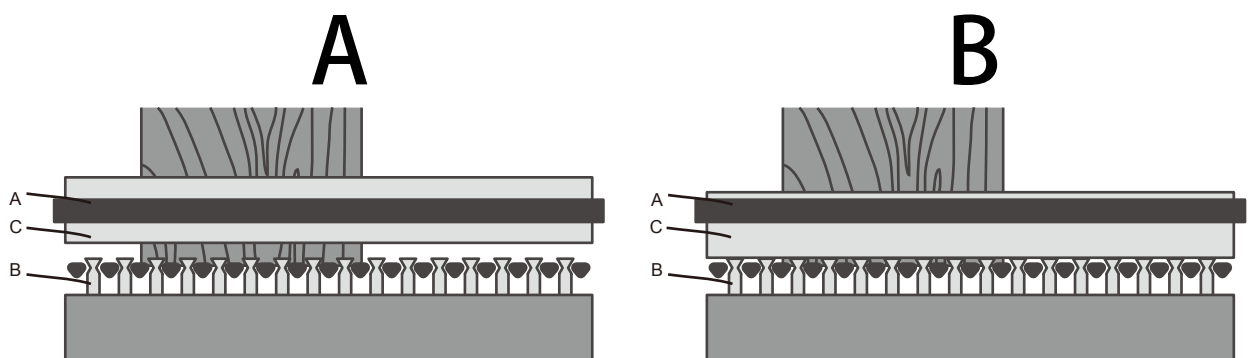
1. Does not place clamp mold block (as below the left figure.c).
2. Clamp mold block dose not close with cutter top (as below the left figure).
3. Table speed too fast.
4. Wood material is not suitable for processing.

as below the figure:

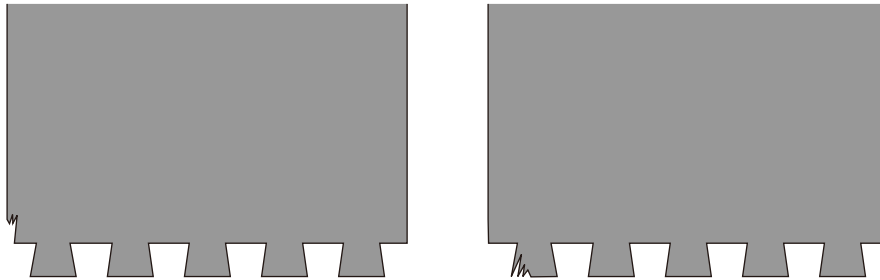
- A : Clamp pole  
 B: Cutter  
 C. Clamp mold block (Aluminum)

Semicircle between the cutter is table

- a. Check the clamp mold block height, correct adjust should be fig.B (block is close with cutter top).
- b. when you setting the block height, the cutter can cut block, it's safety for 0.5~1mm, but need to use a slower speed during the first time cutting.
- c. If clamp mold block has been used too many times, it is possible to lose the effect, Need to replace a new one.



## Q7-2. THE FIRST TENON OR THE LAST TENON'S FACE BROKEN

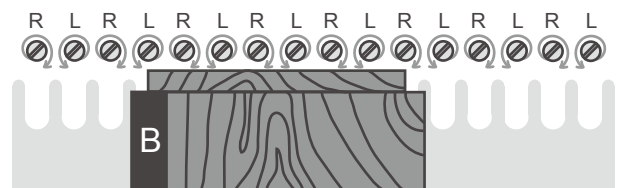
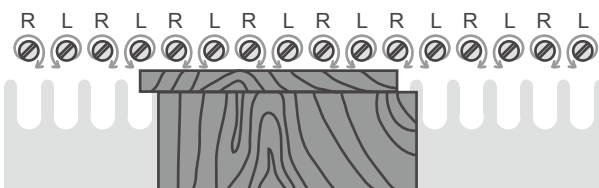
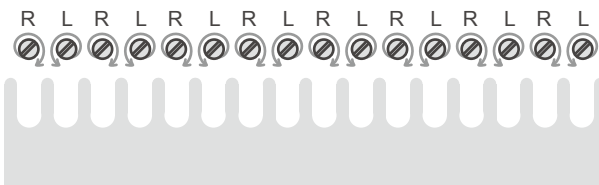


Reason:

1. Need place a mold block.
2. cutter direction is incorrect
3. cutting capacity too much
4. Table speed too fast
5. Wood material is not suitable for processing

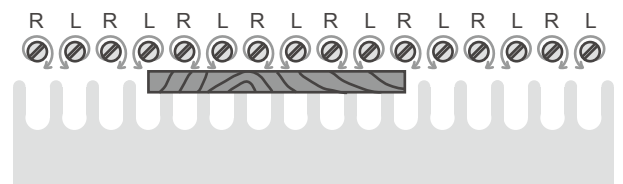
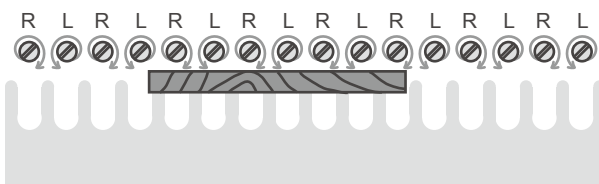
A7-2. As below the figure is a vertical view, the finger shape is table, circle shape is cutter, marked R&L is the direction of cutter.

1. The first tenon or the last tenon is not close with groove workpiece, as below the left figure, the left tenon's behind is vacant
2. Place a block as below the right figure, Applicable Material: 1. wood 2. Bakelite 3. Acrylic 4. Aluminum. The main purpose is close with left tenon, this can be reusable or fixed on the table.



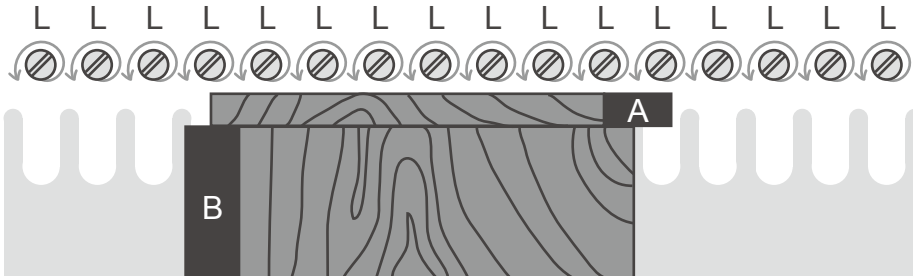
If the wood surface is easily torn material, the tenon workpiece's both sides is not suitable to cutting too much, as below the left figure, first tenon's capacity is too much, when the cutter pass through is easily to broken.

You can try to move the workpiece, replace as below the right figure, as much as possible to reduce cutting capacity, make both sides cutting capacity is average.



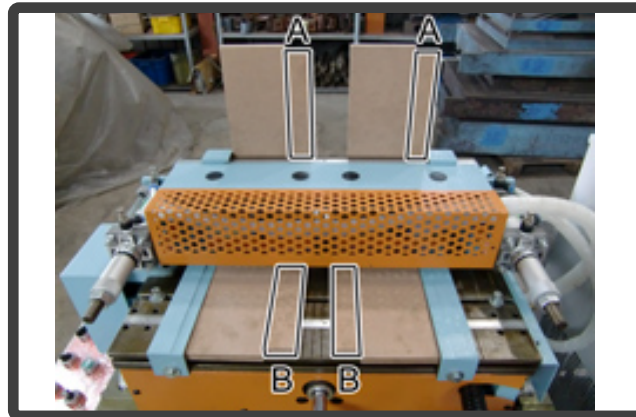
Q8. EXPLANATION FOR PLACE THE BOCK ON SAME DIRECTION TYPE OF SPINDLE BOX (AS BELOW THE FIGURE)

Marked A is the block for tenon's workpiece. Marked B is the block for groove's workpiece

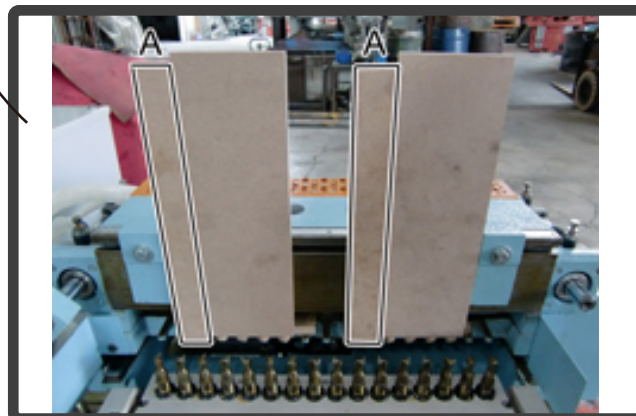
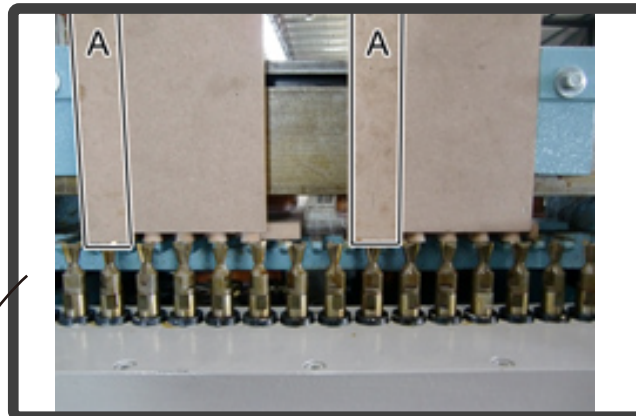


As below the figure, the block A and B can be reused when we change the workpiece. (Fig.2 it's back view ,remove some parts for good vision)

1



2

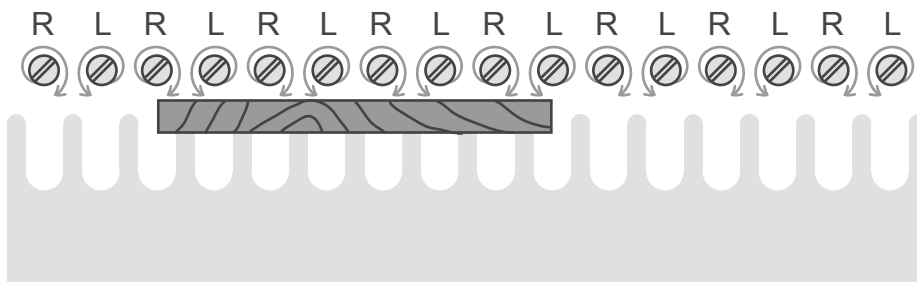




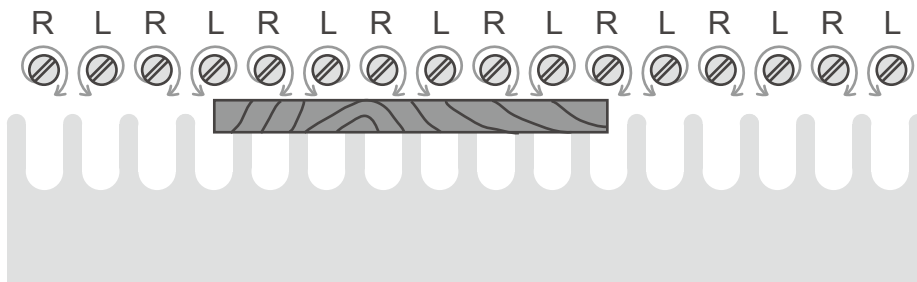
## Q9. CUTTER DIRECTION

A9. Cutter direction will affect the the finished product during processing, Especially for tenon's workpiece both sides, You can try to move the workpiece, replace as below the figure, make both sides Corresponds to the Inward direction of cutter.(for Standard type spindle box.)

For this case, both sides will tear during processing, because both sides corresponds to the outward direction of cutter.



For this case, both sides corresponds to the Inward direction of cutter,during processing will not get outwards stress, can get better finished products.



*\*If tenon arc is break, Can only be excluded by reduce processing speed.*

### 15-1. TEMPERATURE SET

T1 original setting temperature of celsius 30, that is best operating temperature for spindle box parts, if not special needs, do not change the setting of here.

If special needs before change contact with the agent or company.

### 15-2. COOLER OIL SPECIFICATIONS

The best cooling oil for T1, need to take into account the lubrication and cooling, the best viscosity coefficient is R32, when add cooler oil please chose this specifications best oil to keep the spindle box and bearing life.

### 15-3. OIL QUANTITY CONTROL

1. Please see following figure oil window, need check when POWER OFF keep seven full cooling oil, if not enough will affect the cooling indirectly affect the spindle box life; too much will overflow on spindle box axis.

Please check daily, be sure to keep oil on seven full.

2. The oilstock

Please see following oil valve, company has been adjusted finish, the cooling speed and viscosity are unrelated this adjustment, **USERS DO NOT ADJUST HERE.**



### 15-4. EXCEPTION MESSAGE LIST

Please see the cooler manual

### 15-5. REPLACE THE FUSE

Please see the cooler manual

### 15-6. ROUTINE MAINTENANCE

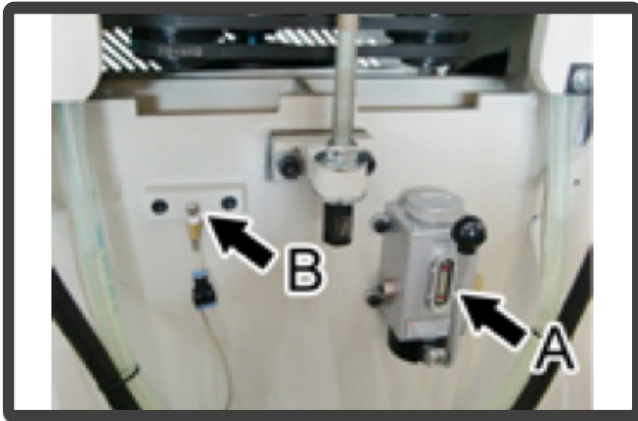
Please see the cooler manual

### 16-1. LUBRICATING OIL

1.T1 all of the precise linear guide way lubrication piping focused on here(fig.A) for user easy to use. At least three times/day at the lubrication.

\*Please use the linear guide way oil.

2.Fig.B here is Bearing of spindle pulley, At least three times/day ,use by Grease Gun.



### 16-2. THE COOLING LIQUID

The cooling liquid replaced at least once a month, Shutdown power of T1 then empty all the liquid and fill new cooling liquid.

\* Oil Specifications : R32 of friction

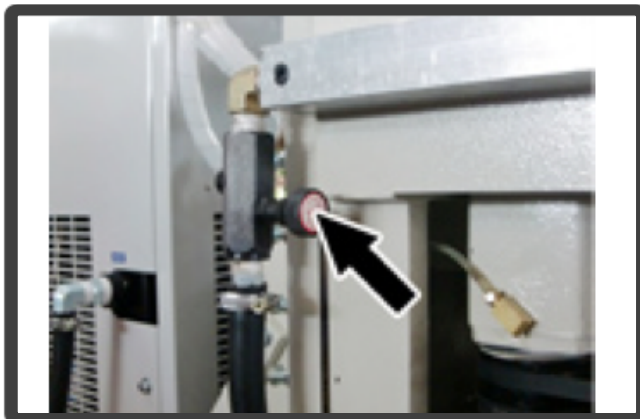
### 16-3. THE HYDRAULIC CYLINDER LIQUID

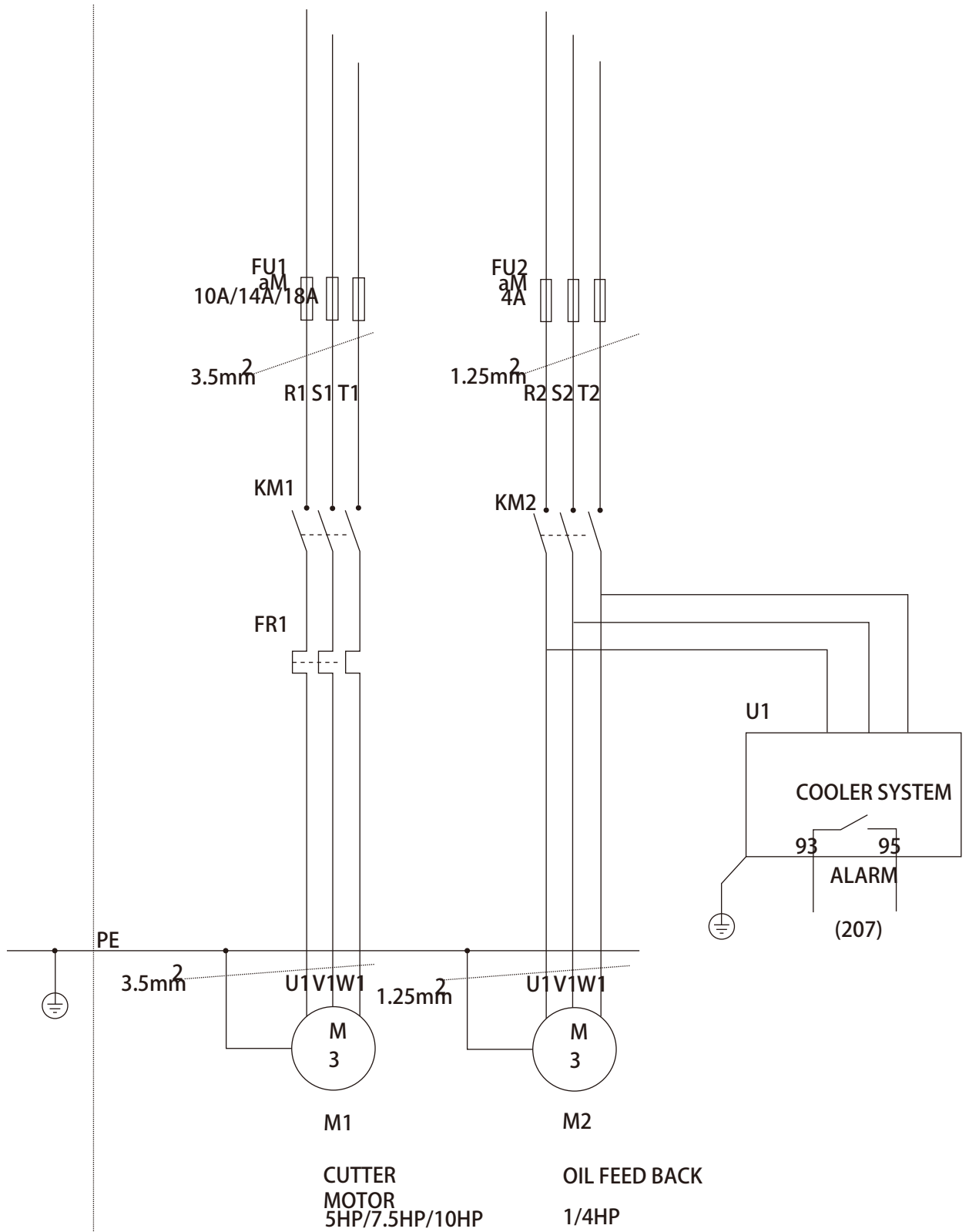
T1 is Pneumatic and hydraulic drive,need keep 70% full of liquid, user can check from here(as below the figure).

\* Please shut down for half an hour after check

If need to fill liquid, do not need more than 80% , liquid will overflow when fill more than 80%.

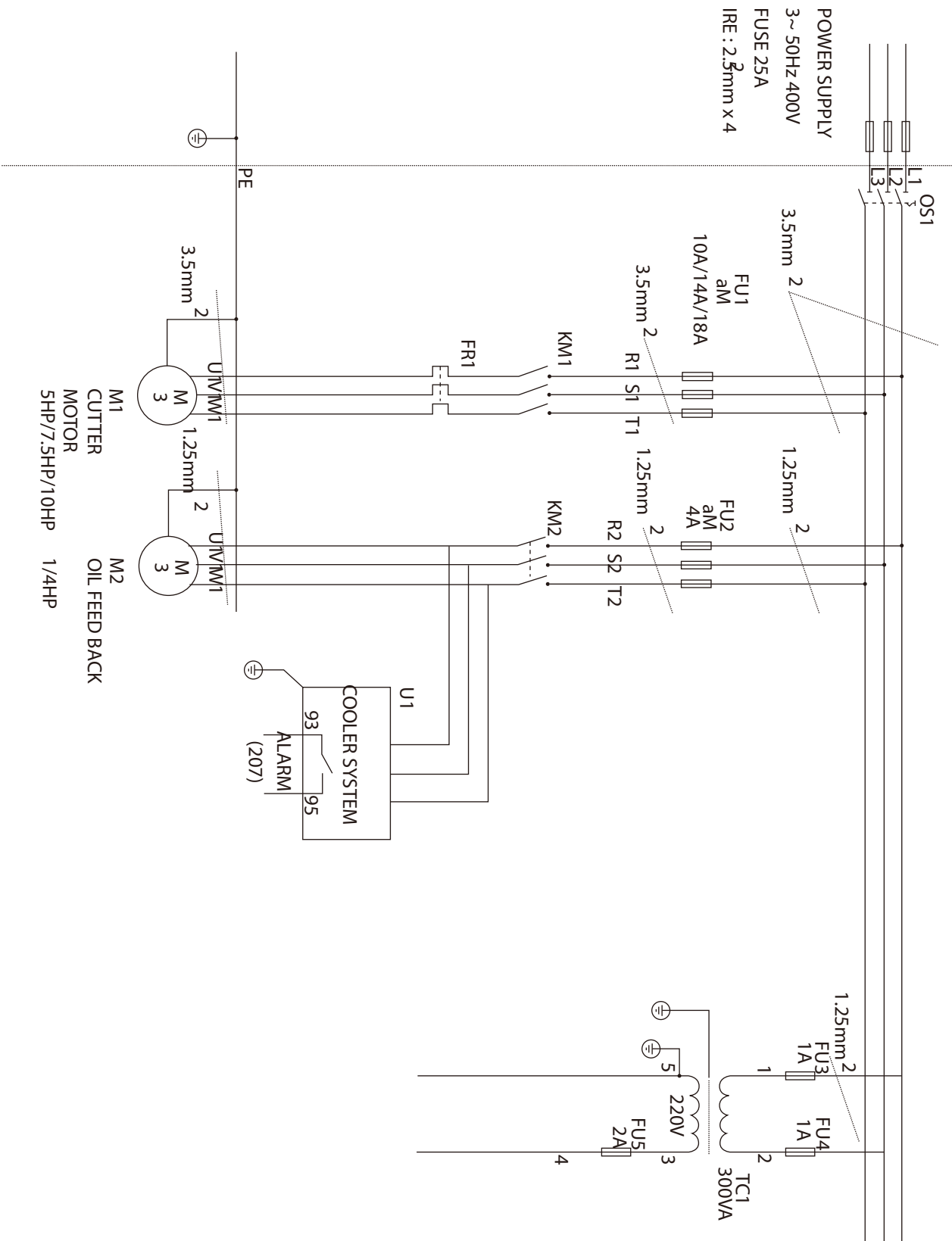
\* Oil Specifications : R32 of friction

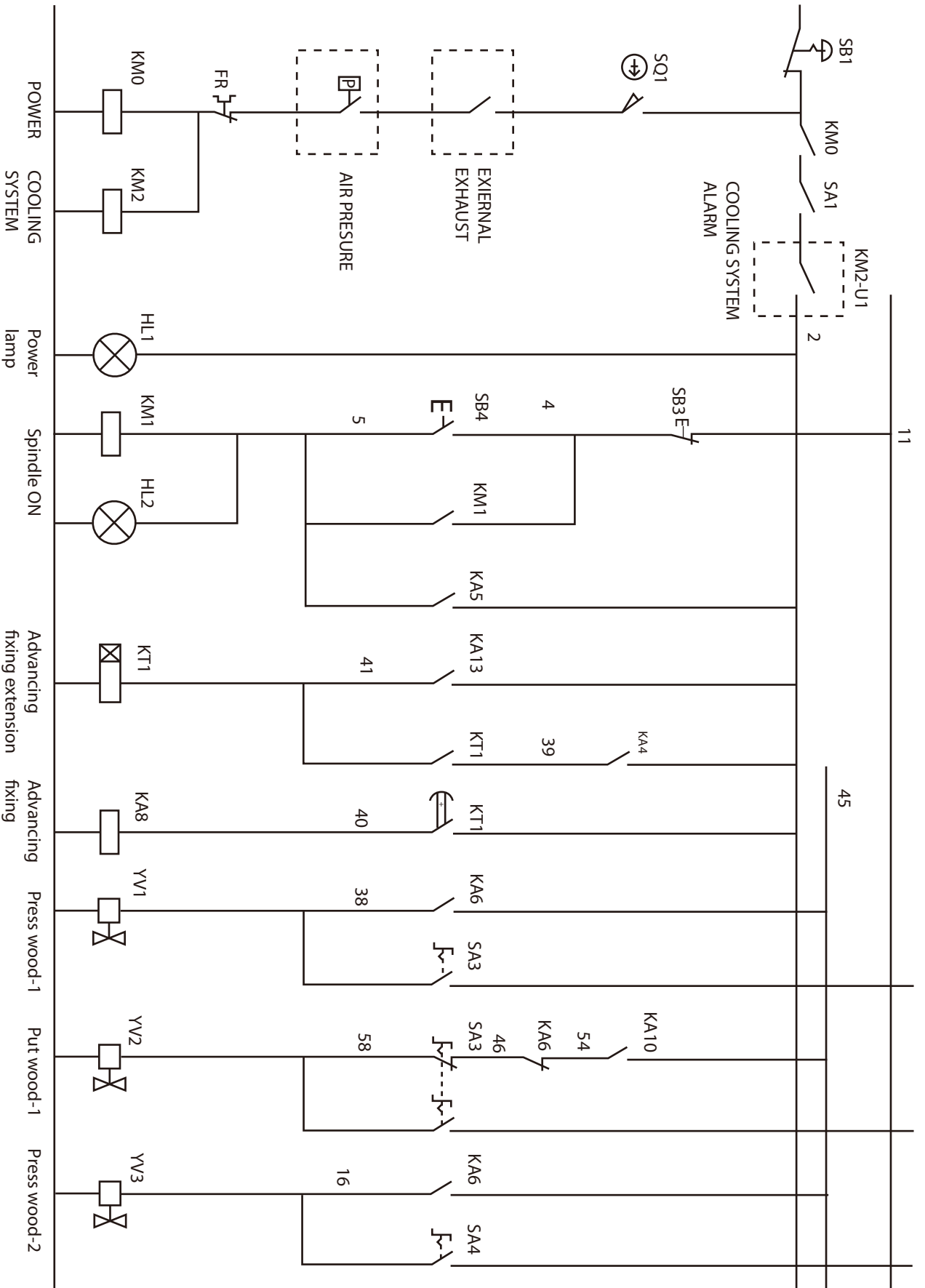




# 17.

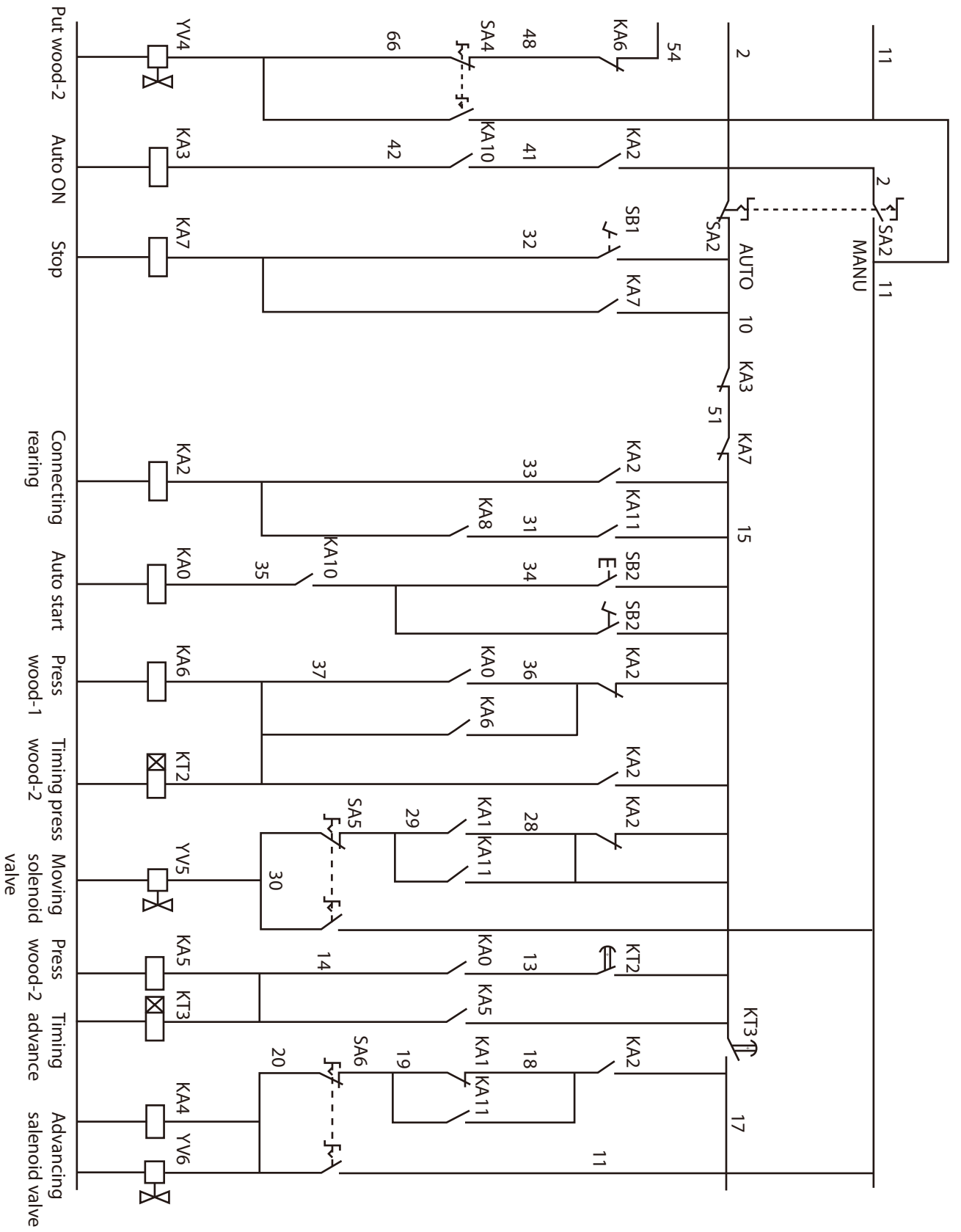
## ELECTRIC CIRCUIT



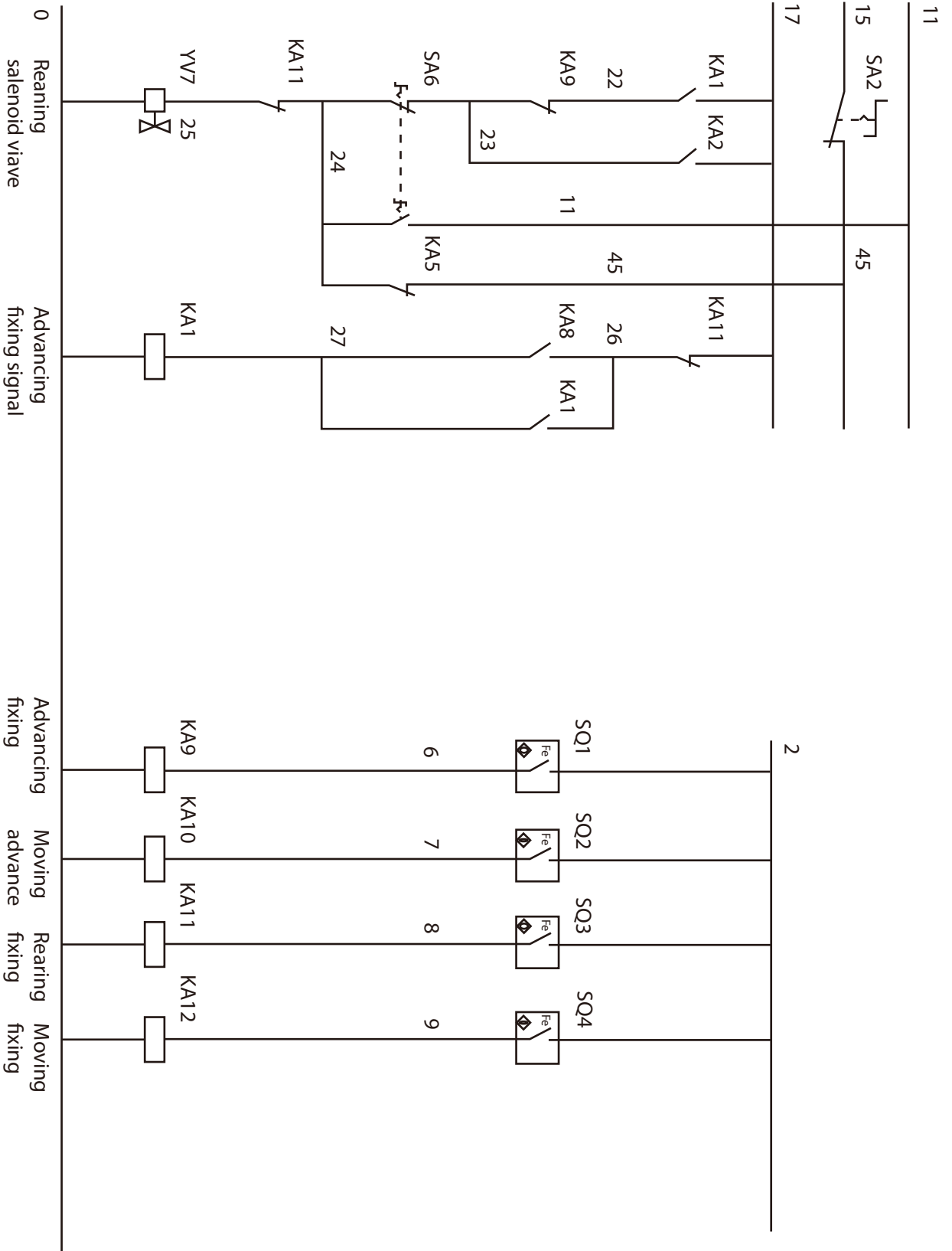


# 17.

## ELECTRIC CIRCUIT

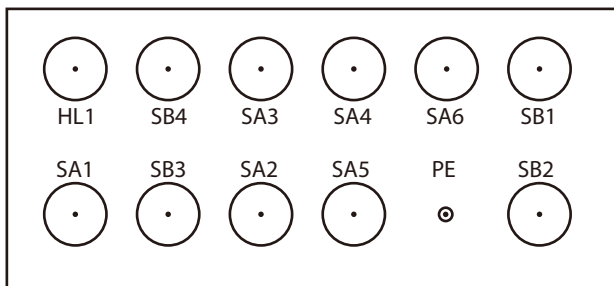
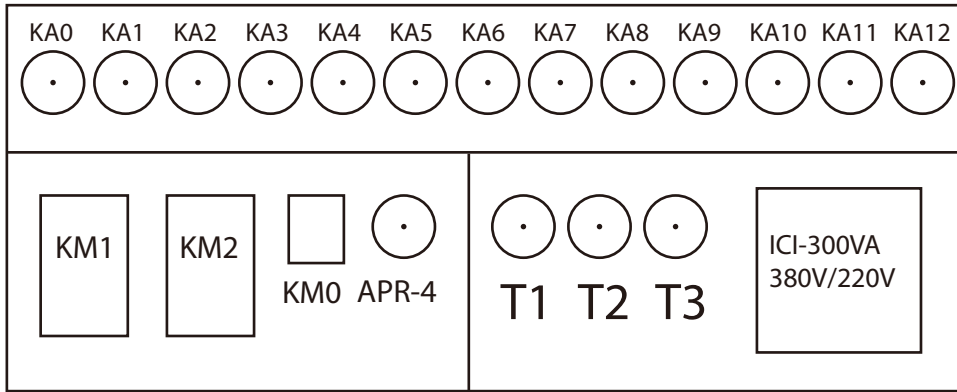


# 17.



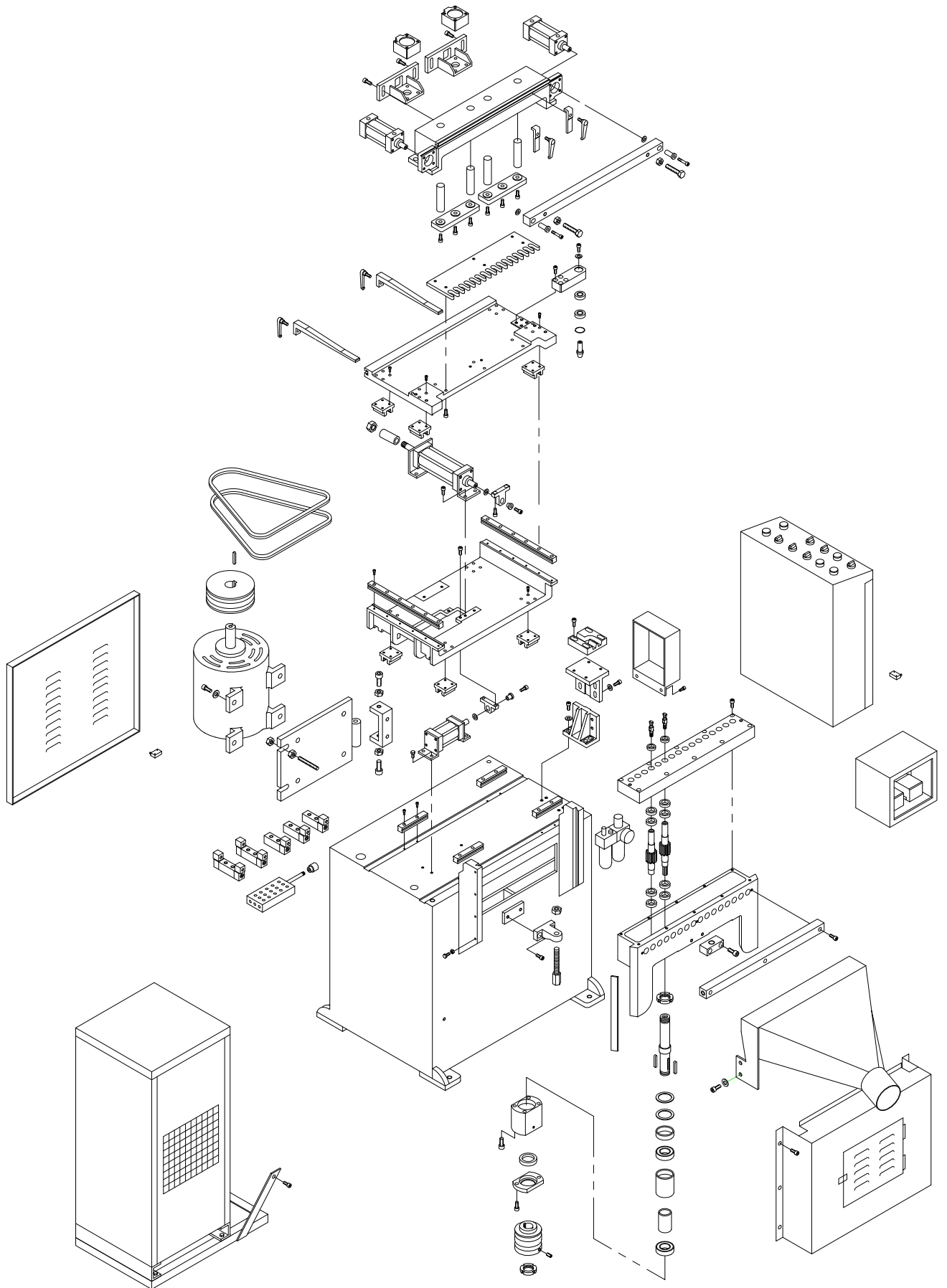


# 17.



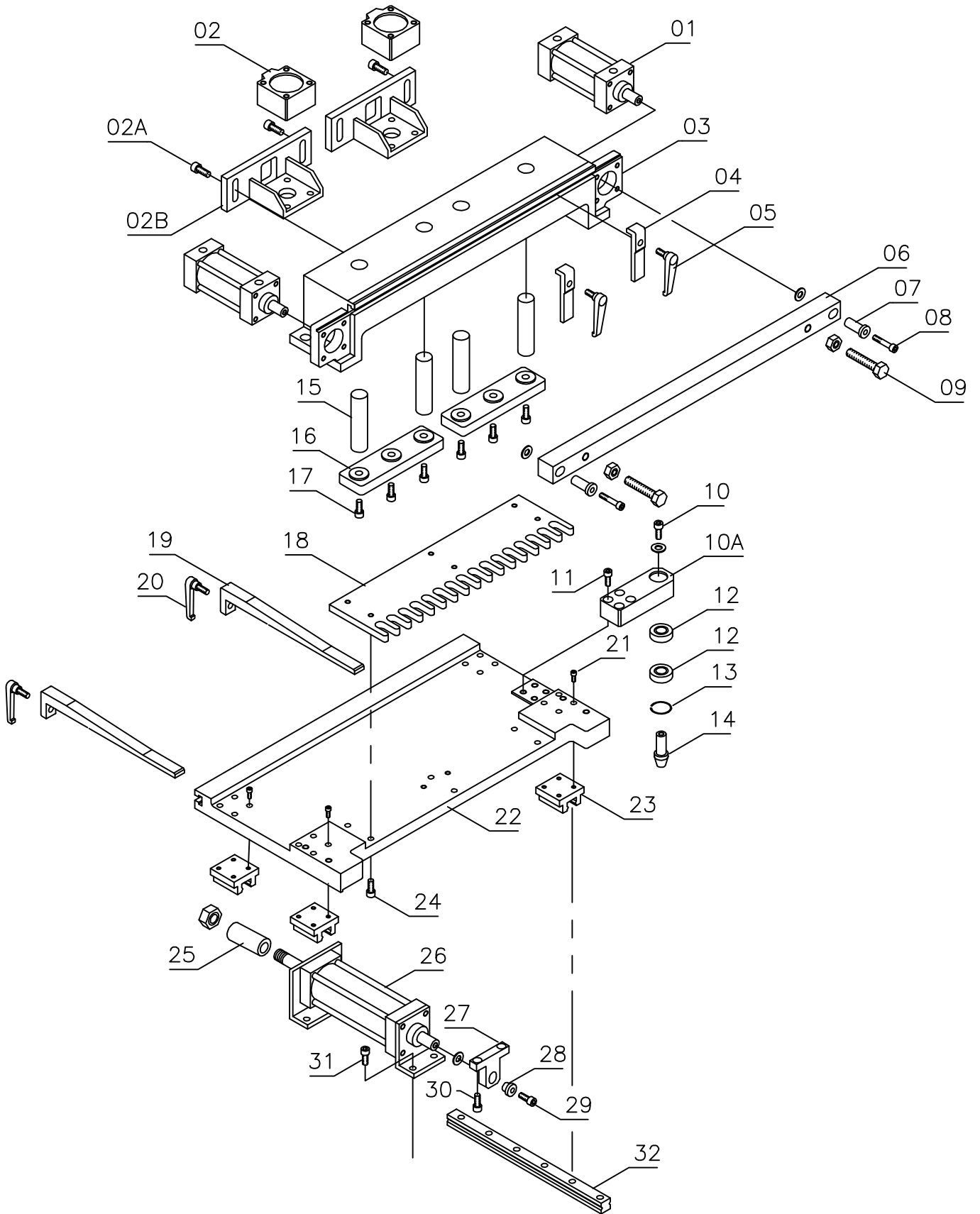
# 18.

## EXPLODED DIAGRAM



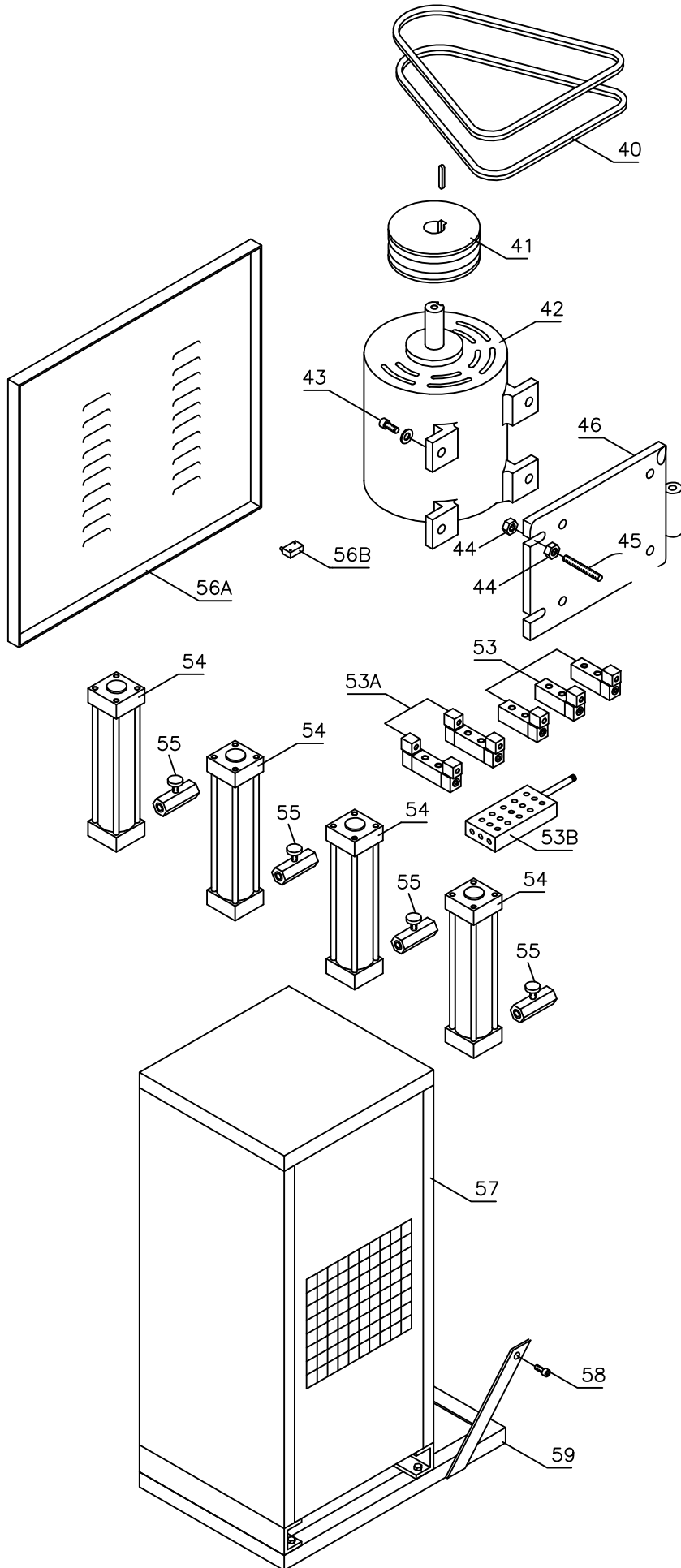
# 18.

| EXPLODED DIAGRAM



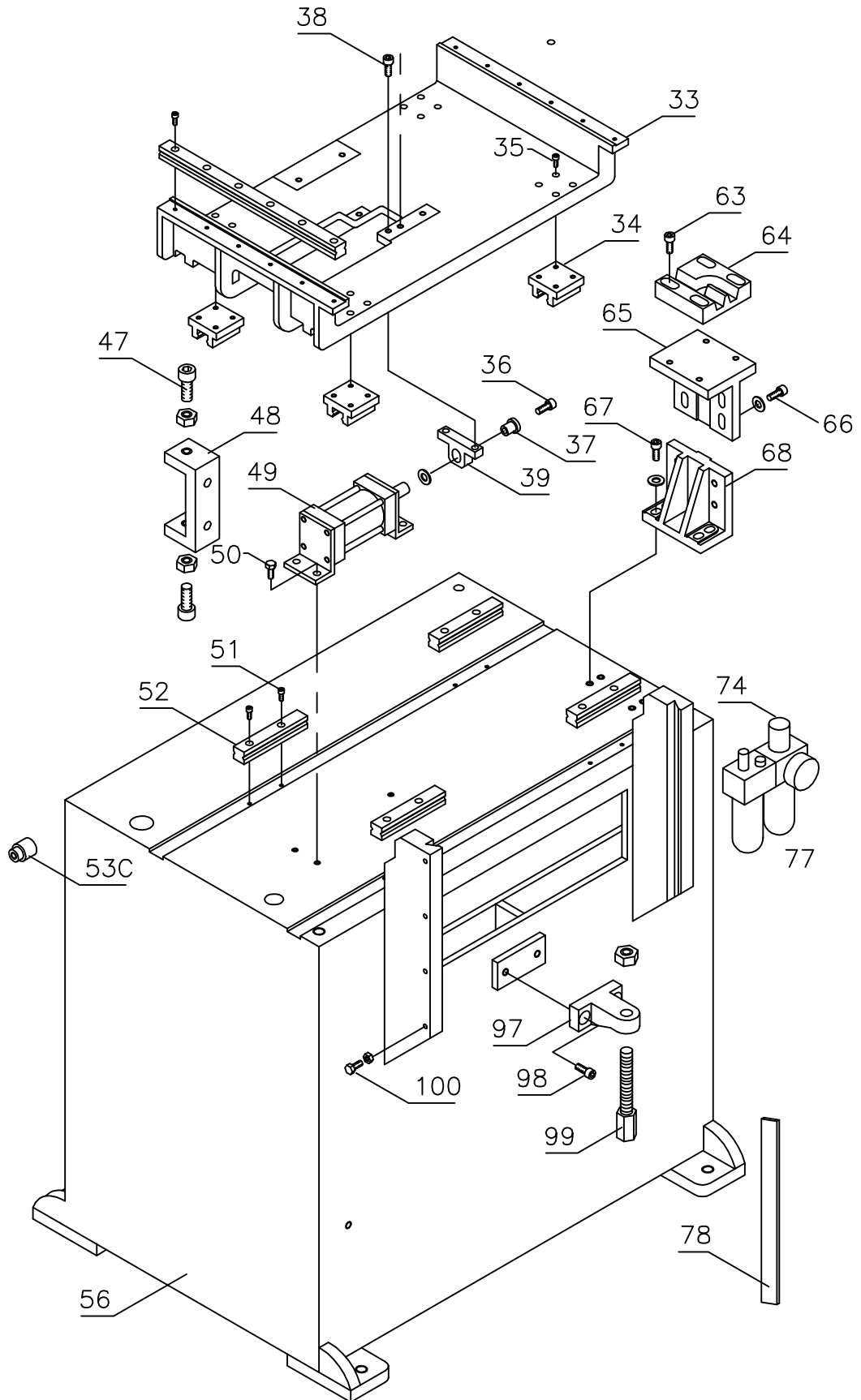
# 18.

EXPLODED DIAGRAM



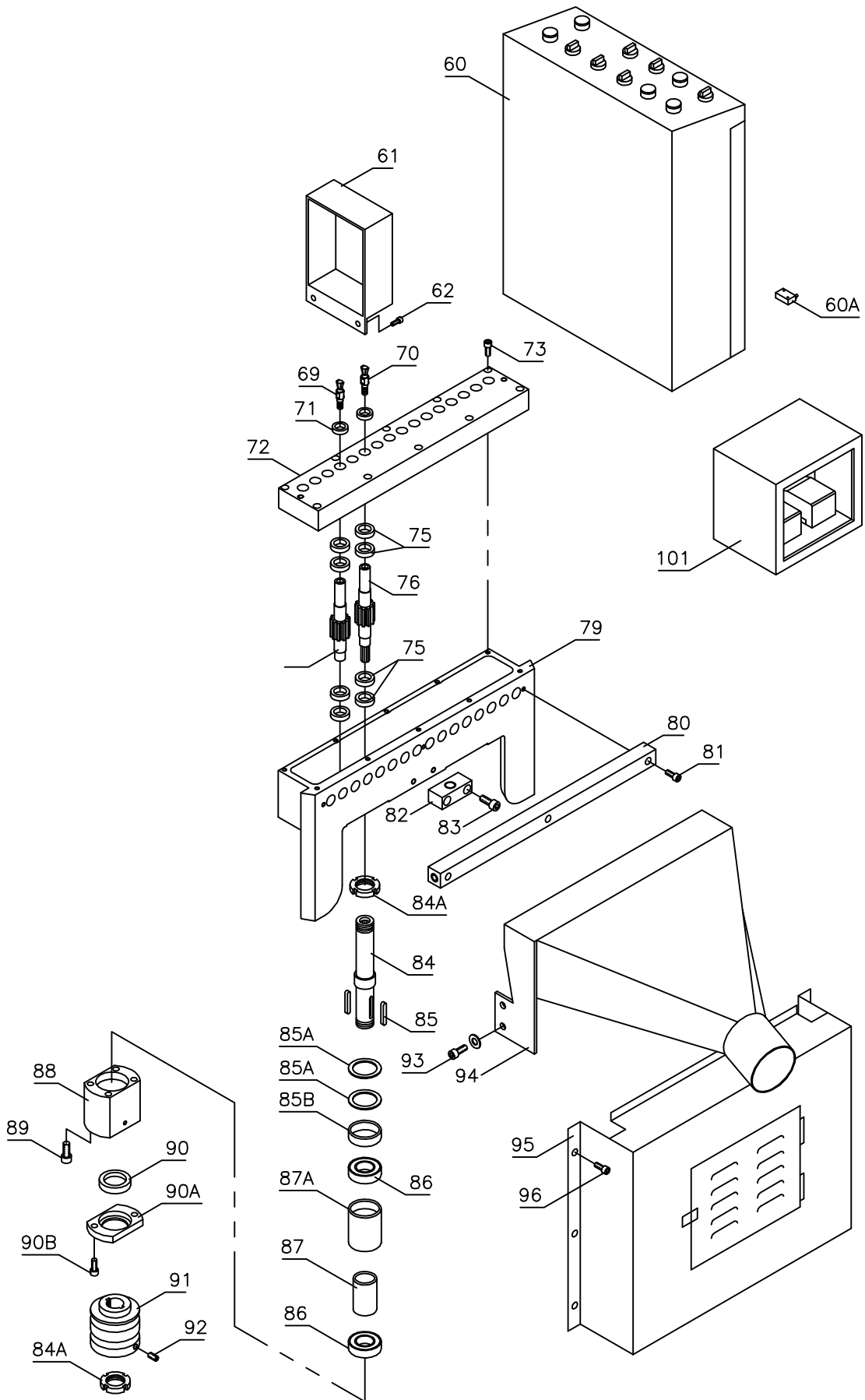
# 18.

| EXPLODED DIAGRAM



# 18.

## EXPLODED DIAGRAM



	CM-16AT	CM-24AT
Max. working width	412mm ( 16" )	615mm ( 24" )
Max. working thickness	25mm ( 1" )	25mm ( 1" )
Min. working thickness	9mm ( 3/8" )	9mm ( 3/8" )
Bit speed(rpm)	7500RPM	7500RPM
Bit quantity	16	24
Pneumatic supply	7.5kg/c m <sup>2</sup>	7.5kg/c m <sup>2</sup>
Main motor	7.5HP	10HP
Machine size	1490x890x1160mm	1700x890x1160mm
Packing size	1570x1010x1330mm	1780x1010x1330mm
Net weight	585kg	750kg
Gross weight	670kg	890kg

# Maintenance and Lubrication information

## MAINTENANCE INFORMATION

For your own safety, before maintenance your machine; please turns off the power switch, and unplug the power.

1. Please read carefully operating manual before operating the machine to understand the limits and potential damages of machine.
2. When operate the machine, make sure every safety cover has positioned.
3. For safety, machine with ground wirings is required.
4. It is not allowed putting tools/things on the machine when operating.
5. Make sure the power off when replaced the saw blade or maintained.
6. Always keeping machine and working surrounding area clean.
7. Please remember to turn off the machine before your leaving.
8. Do not maintain the electrical control box unless doing by an electrical specialist.
9. Do not stand on the dust cover when adjust the machine.
10. When move the machine, please raise up the horizontal screws.
11. Please follow the manual to maintain the machine regularly.
12. Keeping clean of the dust vent.
13. When execute different jobs, please adjust related parts.
14. Before turn ON the machine every day, please check all parts of the lubricator's oil, if there has manual lubricator device, please oiling manually before start running machine.
15. Check the lubrication oil regular in the air unite weekly, and drain the filtered water in the air unite before finished work every day.
16. Every thirty days, filling grease at each designated point.
17. Daily completed work, remove residual glue on the glue comb and conveyor.
18. Keep table and lubricated device clean, lubricating and dry.
19. Always keep circular saw web and tools sharp and dry.
20. Regularly inspect oil hydraulic pump tank and make sure circulating oil is enough every month (check oil meter).
21. Service life of tools is short, so please exchange or grinding them about every 30~45 hours in normal use.



**Note: Most of emphasis of maintenance is cleaning and oiling. If you surely do as required the quality of mechanical manufacturing shall be better and replacement rate of parts shall be decreased. Please make your own regular maintenance records manual, regular maintenance is accurately documented to avoid future disputes arising due to damaged parts.**

### Consumables:

**The machine has many expendables which need changing regularly. Such as: Belt; conveyor belt; tools; wind pressure pipe; hair brush and cloth rubber wheel. Please pay attention to these items in the maintenance state, and in accordance with the state as a regular replacement, ensuring machining quality.**



The maintenance of any machine is a vital ingredient to ensuring the longevity and performance of the machine. A maintenance schedule should be developed and followed by a qualified person, or someone who has been trained to perform such tasks. The maintenance schedule should include the following aspects;

- Clean machine at regular intervals and keep as free from dust as possible.
- Check cutter drive chain and replace when required - removing links is not good practice as sprockets will be subject to increased wear.
- Check motor drive belts regularly and tension if squealing noises are heard during startup.
- Keep electrical cabinet door closed and free from dust.
- Check and clean, if required, any dusts build up on sensors.

It is suggested that a regular maintenance check is carried out once a week. This is just a guide, and if excessive dust, water, or wear is present, the maintenance check should be carried out more regularly.

#### Preservation notes :

Check the oil gage before power on.

Operating this machine go by normal procedural.

Please be sure maintenance and shaving off the harden summing after finish.

The periods of general maintenance divided into daily, weekly, monthly and semiannually in order to diminish breakdown and elongate running life of machinery.

1. The oil in the hydraulic oil tank should be replaced for the first half year of operation. Then replace the hydraulic oil once a year.
2. In case any abnormal sound occurs on the hydraulic pump; first check if oil amount is sufficient or not. Then check if oil hoses loosened or not, and if filter jammed or not.
3. SPEED REDUCER: Replace oil after the first half year of operation. Afterwards, Replace oil once a year.
4. Please add grease in grease nipple quarterly.
5. Gas tank oil capacity on oil gage 90%

#### Selection and maintenance of hydraulic oil

1. Use abrasion resistance ISO VG32 ~ 68 hydraulic oil.

Recommended AW32 AW46 AW68

**R level circulating oil not applicable**

2. Hydraulic oil depending on the degree of deterioration it should be 1 to 3 years replacement, add new oil can not improve the oil quality, should be all new ones.
3. Oil filter should be cleaned once every 3 to 6 months or replaced.
4. The ideal oil temperature is 30°C ~ 50°C

# REGULAR MAINTENANCE TABLE

MAINTAIN SYSTEM	REGULATION ITEM	Daily	Weekly	Monthly	Quarterly	Half year	Yearly	Remarks
M/C BASE	Cleaning and lubricating the transmission lead screw.		★					Grease
	Lubricating the case of transmission lead screw.			★				Grease
	Cleaning and lubricating the precision linear guide ways.		★					Mobile oil
	Lubricating the gear reducer.						★	Gear oil
MOVABLE SIDE SYSTEM	Lubricating the case of precision linear guide ways.			★				Grease
FEEDING SYSTEM	Change the gear oil inside variable feed motor.					★		Gear oil
	Cleaning & lubricating the feeding transmission rod.	★						Mobile oil
	Lubricating the feeding transmission bearing.			★				Grease
	Lubricating the universal joint			★				Grease
	Lubricating the shafts of feed chain track.		★					Grease
GRAR BOX	Lubricating transmission shafts inside the gear box.			★				Grease
BOTTOM PRESSURE BEAM SYSTEM	Inspecting the tolerance of the spring of driver chain rollers.			★				
	Cleaning and lubricating the dogs on the feeding chain.		★					Mobile oil
	Angle balancing the dogs on the feeding chain.			★				
	Cleaning the feed driver rollers, and adjusting the tension of belts.			★				
COLUMN	Cleaning and lubricating the cases of slide lead screws on each column.		★					Mobile oil
AIR FILTER	Inspecting the air pressure and oil	★						Compress oil

P.S. NOTICE: / P.S .

1. The above mentioned maintenance methods are based on normal operation of the machines in 8 hours per day.
2. The gear reducer must be cleaned up and refilled with gear oil after initially 100 hours operation of machine. Then change the oil every 2500 hours. The lubricating oil Model: HD-320. (Common load, ambient temperature: 5°C ~ 40°C.)
3. Grease for bearings, Model: SKF-LGLT2 , others for grease NO. 3.
4. Mobil oil Model: CDC-R33, Compressor oil Model: R30.

# Maintenance Method

**Before use the machine, please check for the following conditions and repair or replace when necessary:**

- Loose mounting bolts.
- Worn switch.
- Worn or damaged cords and plugs.
- Damaged drive belt.
- Any other condition that could hamper the safe operation of this machine.
- Check the entire air system for leaks.

**Maintenance machine is important for best results, safe operation, and long service life.**

<b>Location</b>	<b>Inspection</b>	<b>Incidence</b>	<b>Activity</b>
sanding paper	Inspection	8 hours	if worn, please replace
Pad	Inspection	40 hours	if surface worn, please replace
Air unit	Cleaning	40 hours	release condensed water
Table lifting chain	Tension	300 hours	if needed, please tighten
All belts	tension	200 hours	if worn or loose, please replace or tighten
Conveyor belt	Tension	300 hours	if worn or loose, please replace or tighten
Table lifting bolt	Lubrication	40 hours, 1 year	Grease
Grease Nipples	Lubrication	1 month	Grease

## DAILY MAINTENANCE

1. Check the filter bowl on the filter / regulator / lubricator combination unit, and release the water inside the bowl.

The lubricator bowl should be kept at the proper quantity of lubrication oils.

2. Clean the pressure beam slide and lubricate it.
3. Clean the saw carriage.
4. Check the driving belt tension and adjust if necessary.
5. Remove the chips and dust inside the dust collection chute.
6. Clean the guide rods and lubricate them.

# Hydraulic machine maintenance and troubleshooting

## Hydraulic machine regularly check essentials

Check place	Check items	Check period	Inspection methods
Tank (Including working oil)	Oil leak	Weekly	Visually
	Oil capacity	Weekly	Visually
Pump	Oil cleanliness and traits	Three months	Dependency analysis
	Oil Temperature	Weekly	Oil temperature gauge or touch
	Excretion	Three months	Drive speed measurement, test station
	Pressure	Three months	pressure gauge
	Noise	Three months	Sense of hearing or noise meter
	Surface temperature	Three months	Thermometer or touch
	Seal, packing, oil leak or inhaled air	Three months	Visually or Check the fuel tank inside the bubble, noise
Pressure control valve	Setting value and action status	Three months	Manometer or operating status of the actuator
Flow control valve	Setting value and action status	Three months	Drive speed measurement
Directional control valve	Action status	Three months	Operation check of drive
	Inhaled oil leak	A year	Operation of the actuator in neutrally or measured in the test station
	Coil insulation resistance	A year	Determined by 500MV
Filter	Cleanliness	Month	Visually
	Cleanliness	Three months	Clean
Coolers	Cooling capacity	Three months	Oil temperature gauge or touch
	Leak water	Three months	Reference values of working oil analysis
Piping and Pipe Clamp (Including rubber tube)	Oil leak	Weekly	Visually
	Loosen, vibration	Weekly	Visually · Touch or vibration meter

## Proper oil temperature / critical oil schematic

100°C   80°C	Dangerous temperature	Absolutely not be used.
80°C   55°C	Critical temperature / caution temperature	Shorten the life of the oil of the actuator, use an oil cooler. Oil temperature over 60 degrees, each degree increase 8 in the service life of the sequence halved.
55°C   30°C	Safe temperature / ideal temperature	The most appropriate temperature, highest performance, longest life expectancy °
30°C	Room temperature	No danger when you start, but the efficiency of the low long-term operation °
20°C	Hypothermia	Start should pay attention, the high-viscosity oil · Often caused by idling status

### Hydraulic oil maintenance / management strategies

1. Use temperature below 70 °C, if possible, preferably below 60 °C. Especially in the case of a high pressure from the relief valve back into the working oil temperature is high or use a heater for some parts heating must pay great attention. That will accelerate the oxidation at high temperatures.
2. Required pollution control. Oil pollutants because of work sometimes becomes the catalyst accelerated oxidation.
3. Avoid water mixed with oil inside. Water will make oil deterioration, too much water will make the work of oil emulsion °
4. Different manufacturers of working oil cannot be mixed ° Same-manufacturers, but the name and a different grading of oil but also to avoid mix that will cause deterioration of the oil additives
5. Control of hydraulic machinery and piping have oil leak situation, temporarily discharge volume to a minimum.
6. Periodic inspections of oil. (※Oil has started to deteriorate, should be change a new oil · only add new oil does not prolong life ° )

## LUBRICATION

To machine the best performance and extend the life of this machine a periodically lubrication for this machine is very important. Use recommends lubricant only.

### (1) Automatic lubricator:

Recommended lubricant oil #32.

This automatic lubricator is mounted at right side front of the machine. It automatically supply oil to spindle quill on both side and auxiliary drum shaft.

### (2)

	Lubrication point	Recommended oil	Frequency
1	Front center shaft	Grease	Once per 30 days
2	real center shaft	Grease	Once per 30 days
3	Pulley inside left cover	Grease	Once per 30 days
4	Pulley drive shaft inside cover	Grease	Once per 30 days
5	Oscillation shaft	Grease	Once per 30 days
6	Real center oil inlet	Oil #32	Once per 4 hours

The machine needs periodical lubrication on the parts as shown in the below diagram, to ensure normal performance.

Neglected lubrication can cause serious problems for machine operation.

LUBRICATION POINTS DESCRIPTION	LUBRICATION METHOD
Pressure beam slide	Directly lubricate the rod surfaces.(ISO VG #68)
Connection rod pivot	Directly lubricate the rod surfaces.( ISO VG #68)
Guide rods	Directly lubricate the rod surfaces.(ISO VG #68)
Filter / regulator / lubricator Combination unit	Fill the lubricator bowl with oil.(ISO VG #10)
Bearings of scoring saw-blade	Greasing (GREASE NO.2)
Bearings of main saw-blade	Greasing (GREASE NO.2)
Bearings of guide wheel	Greasing (GREASE NO.2)
Bearings of pulley	Greasing (GREASE NO.2)