



MAINTENANCE MANUAL

MDT-1 / MDT-2

CNC Turret Mill



Maintenance Manual

Preface

This user's manual explains the safety and maintenance of our product. It must be shipped along with the machine for easy access. The operator should read the manual first and follow the instructions to operate the machine.

Although the machine is well designed for safe use, any improper operations will still cause serious damage. A well-administrated and maintained machine will not only provide the proper functions of the machine, but also prevents occurring accidents. Operators should totally understand and follow all the operational safety rules of the manual to avoid unnecessary damages. This user manual will not cover all of the shop floor situations. As these operators should use their own knowledge to prevent all possible accidents that will occur in any kind of circumstances. Be aware of work safety at all times and if there are any accidents they should be analyzed for precautions.

Any comments and suggestions regarding the safety guidelines of the machines are welcome. The changing of the machine electrical circuits, structures and any parts without authorization are not the liability of the manufacturer.

Our research department consistently strives to improve our product therefore we reserve the right to redesign and modify the machine without advance notice. Upon receipt of the machine it is recommended that you assure that the serial number of the lathe coincides with the reference number of the manual. A one year limited warranty is provided with each machine from the date of installation that covers all damages that are caused by material defects. Upon receipt of your machine please check that the machine is complete with all the optional equipment ordered. If there are missing items or damage please consult with your sales agency immediately. For future sales or service need please contact your nearest representative for assistance.

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1. General Safety Practices and Precautions

1. This machine shall be fed with metals only. Work piece like wood, flammable and poisonous materials can not be operated.
2. This machine shall be operated and maintained by personnel, who received the special training and have thorough understanding of the machine characteristics, sizes and safety rules.
3. Employer shall ask their operators to attend the safety training.
4. Employer shall tell the operators what he knows about the dangerous operations.
5. Always refer to this manual before operates the machine. While operating or maintaining, always refer to the mark's contents.
6. Unless there is any adjustment or alignment to be made, all doors and shield must be properly closed.
7. Don't move, change or clean the work piece while the spindle is running or operation in process.
8. Be sure to bear in mind that the position of stop and emergency buttons to cope with the possible sudden dangers readily.
9. It is mandatory to wear goggles, safety shoes and mouth cover.
10. Do not wear gloves, loose clothing's, necktie and long-sleeves clothing during machine operations.
11. Wearing hard hats or tie up the hair if the hair is too long.
12. Always maintain the machine surrounding, work table in clean condition. Clear all the obstacles and fragments.
13. Operators shall wear gloves while Loading or unloading the work piece. Lifter shall be used while moving objects that are over 30kg.
14. Do not use machine tools during machine operations.
15. Shut off the power prior to the maintenance. Use only suitable tools.
16. Make sure that the work pieces are fixed before machining. Use a proper fixture when needed. A clearance should be left between the cutting tools and the work piece to avoid collision.
17. Operators can not leave after the spindle motor is started. Shut off the power if leaving is necessary.
18. Nothing can be placed on top the machine except work pieces and tools.
19. Do not use hand or other objects to stop the spindle or tools after shot off the power. It is necessary for them to stop gradually.
20. Do not use air compressor to clean the machine.
21. Do not change the design of the machine to fit for extra large work pieces or tools.

22. No other people can get closer to the machine except the operators. And operators can not lean against the machine.
23. Never try to maintain or check the electric apparatus unless that you are a qualified technician.
24. Do not bypass the interlock circuit.
25. Before examine the circuit, operators should follow the related warning marks.
26. Examine the circuit; Operators should make sure that it is a open circuit by using suitable apparatus.
27. Never try to change the circuit without the prior authorized by the manufacturer.
28. All electric apparatus should properly grounded.
29. Do not put on metallic watch, rings, necklace and spectacles during repairing or maintaining electric apparatus. Warning sign should be set up to avoid accidentally switch on the power.
30. Cutting tools shall be far away from the work pieces when the machine is started or stopped.
31. Stop practicing the machine and have an immediate repair of the machine when it is broken down.
32. Stop the machine when examining the work pieces.
33. Always keep the spindle clean and lubricated. Do not place any tools on the work table to maintain its surface precision and smoothness.
34. Use a brush to clean off the iron fragments.

2. Specifications

Machine Specifications

Unit:m/m

Specifications		MDT-1	MDT-2
Table size		1245mm×230mm (49″ ×9″)	1473mm×280mm (58″ ×11″)
Longitudinal travel		720mm(28.3″)	815mm(32″)
Cross travel		270mm(10.6″)	330mm(20″)
Vertical travel		355mm(13.9″)	378mm(15″)
Spindle nose to table top (D)		75~565mm (3″ ~22.2″)	90~540mm (3.5″ ~21.2″)
SPINDLE			
Spindle taper		NST#30 (or R8)	NST#40
Spindle Speed		0~3750rpm	0~3750rpm
Stroke of quill		110mm(4.3″)	
Quill feed rate	Mm	04 – 08 - 14	
	inch	0015 – 003 - 006	
Swiveling angle of head (R&L)		45°	
Spindle center to column front surface (E)		465mm(18.3″)	500mm(20″)
FEED RATES			
XYZ axes feed rates		1~3000mm (0.1~110ipm)	
Rapid traverse X,Y,Z axes		5000mm (200ipm)	
MOTOR			
Spindle drive motor		3HP inverter motor	5HP inverter motor
Drive on X,Y,Z		1HP (Depends on CNC system)	
Coolant pump		1/8HP	
L×W×H(mm)		1640×1840×2335 (64.5″ ×68.5″ ×92″)	
Weight		2000kgs	2060kgs

2. 1 Machine Specifications

1. Travel length is calculated by the point when table aligning with saddle left side to the point of right side.
2. Verifications is needed for customer special specifications.

2. 2 Maximum Allowable Loading Specifications:

2. 2. 1 Maximum Allowable Table Weight:

Model	Table load (kg)
MDT-1	200
MDT-2	300

2. 2. 2 Maximum Allowable Cutting Capacity:

Model	Face Milling ϕ	Drilling ϕ
MDT-1	76.2 (3")	16 (5/8")
MDT-2	76.2 (3")	16 (5/8")

(Cutting Material: S45C)

2. 3 Machine dimension and floorspace: (Diagram 2-1)

Unit: mm

No.	MDT-1	MDT-2
A	2174	2239
B	1607	1842
C	1756	2000
D	34~440	100~506
E	288	328
F	590	620
G	890	1000

A 500mm safety distance should be reserved to avoid dangerous caused by overcrowded

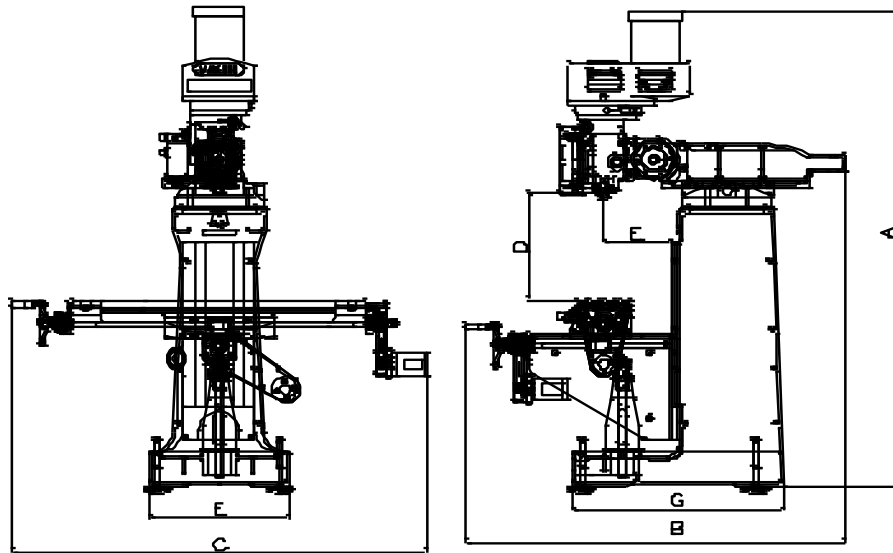


Fig. 2-1

3. Machine Parts Nomenclature And Moving Directions

3.1 Machine parts nomenclature (Refer to Fig. 3-1)

No	Name	No	Name	No	Name
1	Spindle motor	7	Z axis gear box	13	Tower
2	Milling head	8	Z axis motor	14	
3	Table	9	X axis gear box	15	
4	Saddle	10	Y axis gear box	16	
5	Machine body	11	Axial motor	17	
6	Spindle	12	Telescope arm	18	

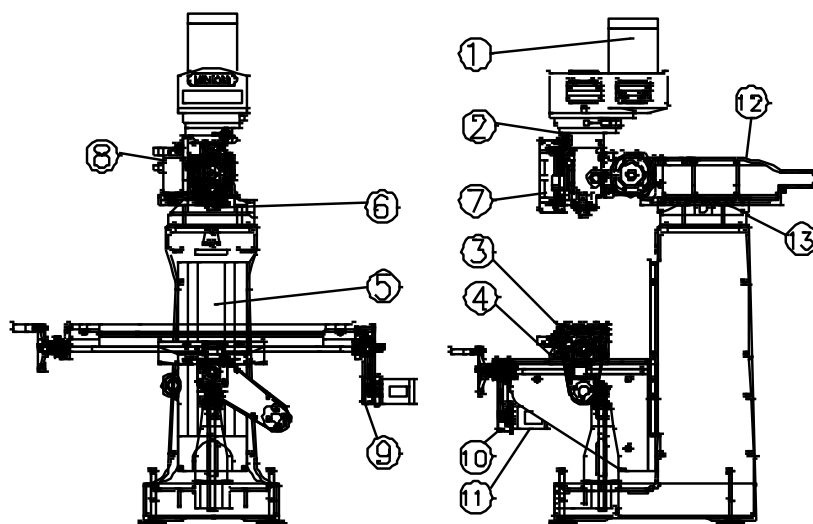
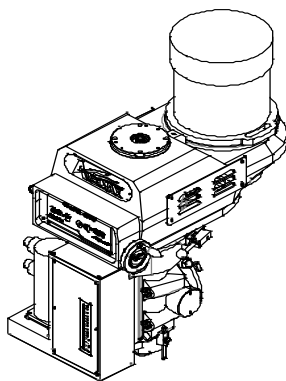


Fig. 3-1

Head Models (Fig. 3-2)

MDT-1, MDT-2



3.2 Moving Directions (Refer to Fig. 3-3)

X: Machine table moving from east to west (left and right)

Y: Machine table moving from north to south (back and forward)

Z: Knee up and down moving

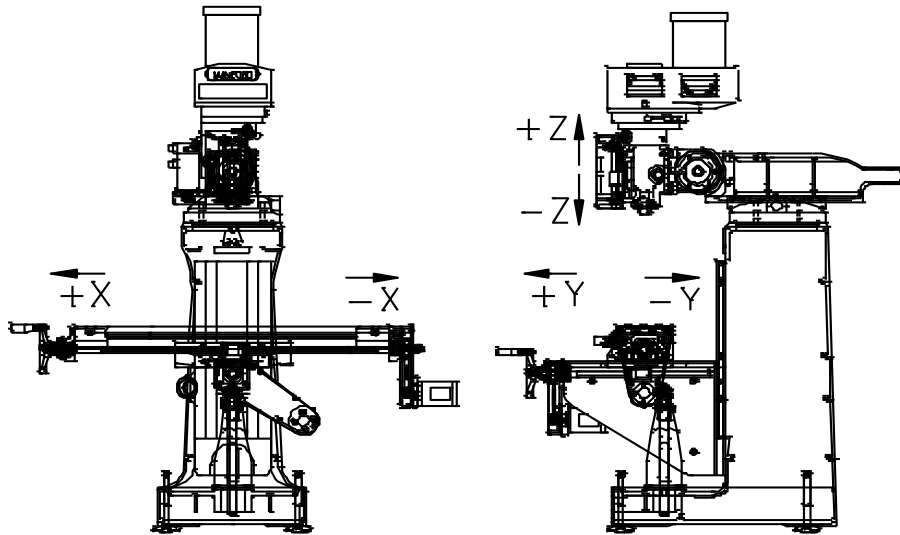


Fig. 3-3

4. Transport and Handling

4-1 Cautions for Unpacking

- (1) To transport the machine, it is necessary to support the machine with the crated case or pallet to avoid moisture. In case of damage by moistening, please contact our agents or forwarding agents.
- (2) After unpacking, check and see if all the accessories and tools are intact, otherwise, please contact our agents.
- (3) To hoist the unpacked case by reinforced cable, the motion shall be observed strictly the instruction appeared on the size of the wooden case.
- (4) Prior to unpacking, transport may be made by using forklift (Fig.4-1), and a reinforced cable (Fig.4-2).
- (5) After unpacking, do not move the sliding faces as long as the rustproof oil on them are not cleaned off and followed with the lubrication.

4.2 Hoist Handling

- (1) The safety weight of the hoist must be heavier than machine weight.
- (2) Insert steel bar through the machine and joint the reinforced cable with base hoisting hook to hang it up (Fig.4-3).
- (3) Use the lowest speed of the hoist to rise up the machine.
- (4) Always remains balance during the hoisting.
- (5) Use a soft rag or paper plate to protect the machine from being harmed by the cable.
- (6) Do not hoist the machine too high. The best height is to keep the machine base approximately 10cm from the ground.
- (7) During hoisting, make sure the screw is tied enough by the ram
- (8) Operators must keep safety distance from the machines during hoisting. No one should be allowed to enter this region at least 2m from that area.

4.3 Forklift Handling

Forklift is used if the hoist is absent (Fig. 4-4).

- (1) No need to remove the bottom wooden case when forklift is used. Place carefully and avoid collision so that precision is not affected.
- (2) Keep an eye to the center of gravity to maintain the machine in equilibrium.
- (3) The weight of the forklift must heavier than the machine's total weight.
- (4) A qualified driver is needed to drive the forklift.

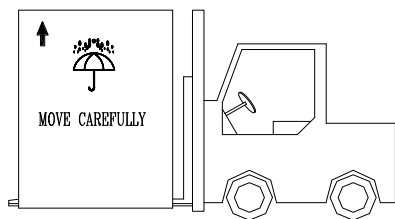


Fig. 4-1

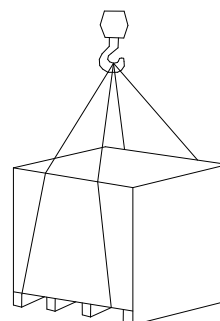


Fig. 4-2

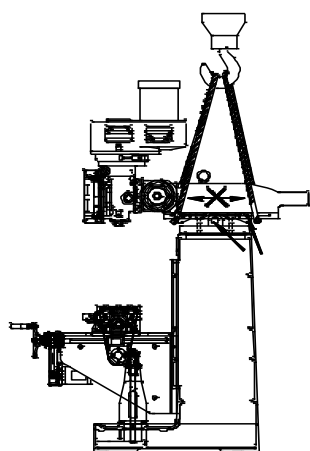


Fig. 4-3

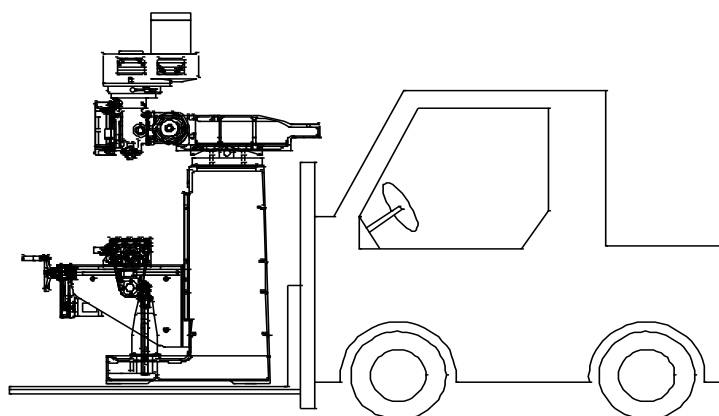


Fig. 4-4

5. Installation

5.1 Position selection

- (1) See section 2-3 for the machine installation dimensions.
- (2) Keep away from the vibration sources such as presses, cutting machines, shapers and so on.
- (3) Keep enough space between machine and wall for repairing, cleaning and electrical box doors opening.
- (4) Keep at least 50cm away from the wall and any objects for the extreme positions in X direction.

5.2 Foundation (Fig.5-1)

- (1) The foundation must be paved 20 cm concrete with 2500 lbs. strength. The wood foundation is prohibited. If the machine is installed on second floor, the special floor strength consideration is required.
- (2) When measuring machine level, clean up table surface, put level meter on the middle of table and check the level of table front, rear, left and side sections.
- (3) When applying level adjusting pad, clean up pad bottom, place them to ground, slowly align bolts to pads (refer to Fig. 5-1) and then adjust machine level.
- (4) Fill concrete to bolt bases. Please check machine level every month after implementation for 6 to 8 months.

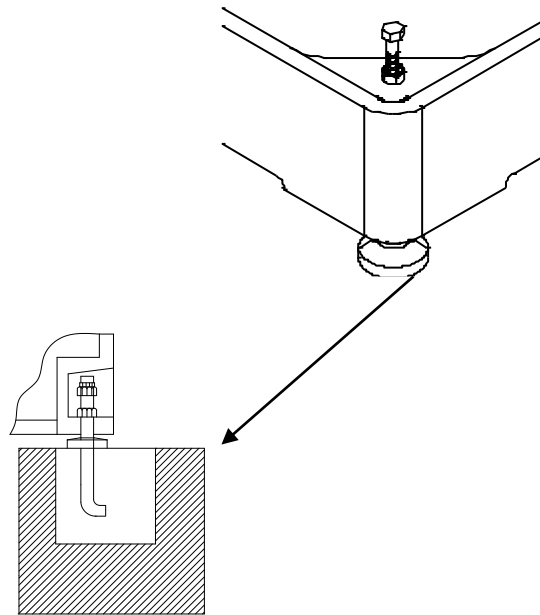


Fig. 5-1

5.3 Cleanging

Machine is sealed with the rust proof grease before shipment. Therefore, clean the sliding surface with kerosene and soft cloth, then lightly lubricate with oil before sliding movements.

5.4 Calibration

5.4.1 Horizontal Adjustment

- (1) Clean the worktable, then put two horizontal levels (as shown in Fig.5.3. Each graduation is 0.02mm / 1000mm) perpendicularly with each other. If there is only one level, the examination needs repeatedly in these two directions.
- (2) (Fig. 5.4) Before the adjustment, combine the horizontal bolt (A) and the nut (B), so that the nut is close to the head of bolt. Placing four horizontal block (C) to the horizontal bolt hole of the base, screw four bolts (A) into the blot hole until reach the center of the block (C) by using open-end spanner. Raise the machine to a height of approximately 5mm by turning the horizontal bolt clockwise. After that, starts the alignment.
- (3) New installation should calibrate the horizontal direction once a week and the calibration should be made every 6 months after the foundation solid.

5.4.2 Vertical Adjustment of Spindle and Worktable (Fig. 5-2)

- (1) Consult the manufacturer accuracy table for adjustment.
- (2) Loosen four tighten nuts (A) of the head slightly instead of completely to avoid the head fall and harm. Turn the worm bolt (B) to adjust the cross accuracy. After reach the accuracy requirement, tight the two opposite nuts (A) with gentle.

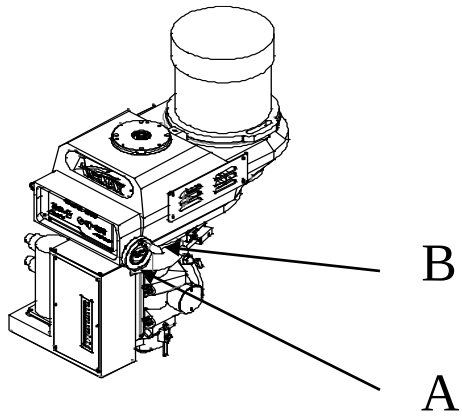


Fig. 5-2

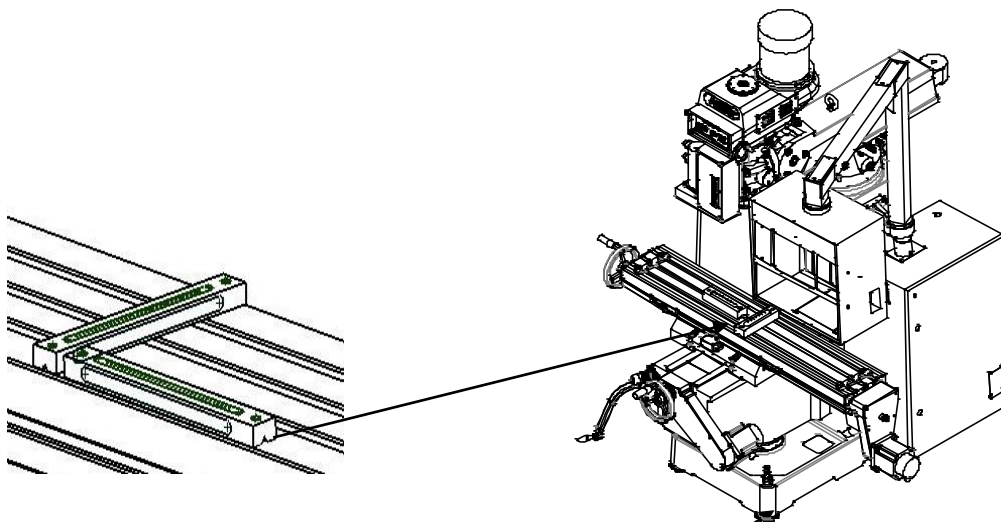


Fig. 5-3

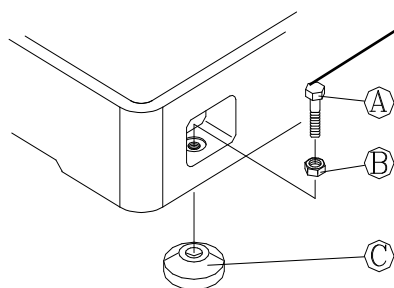


Fig. 5-4

5.5 Motor Test

5.5.1 Power Connection

- (1) Make sure the power voltage is the same voltage that was ordered.
- (2) The electric wire should be connected firmly on power switch.
- (3) Power should be connected to ground firmly.
- (4) Before wiring the motor, power should be shut down to avoid any electric shock

5.5.2 Motor Rotation Test

- (1) Turn power on, press the motor button to“ON”, and observe the rotating direction of the spindle. When looking front the machine, the spindle must rotate in clockwise directio, otherwise the power phase changes. Swap the two wires if this happens.
- (2) Follow the panel instruction to raise or downward the worktable as well as the cooling system.
- (3) Do not install the cutting tools when doing the motor rotation test.
- (4) Make sure everything is right, before start the operation.

6. Operations

6.1 Head

6.1.1 FWD/REV switch

The rotation of the motor is controlled by the reversing switch(Fig.6-1).When the high low speed lever(Fig. 3-1 18)is placed at the high gear position(forward),and the switch is on the "FOR", then the motor turns clockwise. When the switch is on "REV", the motor turns counterclockwise. When the switch is 'OFF", then the power source is cut off. When high low speed lever is placed at the "low" position (backward),the directions are reversed.

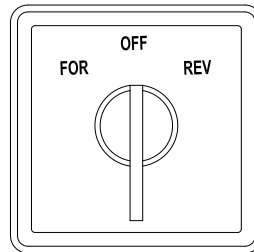


Fig. 6-1

6.1.2 Spindle brake

Power must be shut off before braking. When the spindle speed is lower than 200r.p.m.,operator can pull down or up the brake lever 1(Fig. 6-2) to stop the spindle.

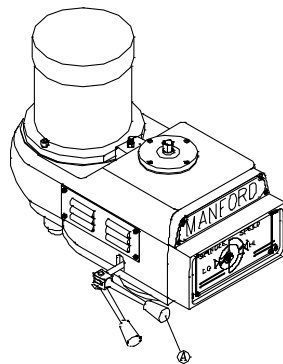


Fig. 6-2

6.1.3 chucking of tool shank and dismantling (Fig.6-3)

Firstly, the screw of the draw bar is right turn when the spindle is at the highest point. When the screw is turned clockwise, it is for locking of tooling shank, and vice versa. To take out the tooling shank, the draw bar must be turned from three to five rounds. Then, use a soft mallet to hit slightly on the draw bar to allow the tooling shank to separate from the spindle. Turn the draw bar until the tooling shank comes off totally.

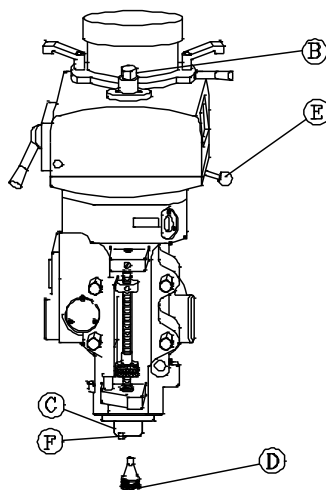


Fig. 6-3

6.1.4 Speed Change of Spindle (Fig. 6-4)

1. Hi-Low speed gear shift

- (1) The Hi-Low speed gear can be shifted by using speed handle (P). There is “HIGH”, ”NEUTRAL”, and “LOW” speeds, when the speed handle (P) is set at the position “FRONT”, ”MEDIUM” and ”BACK” respectively.
- (2) For shifting the speed from “HIGH” to “LOW”, turn the speed handle (P) counterclockwise to backend and turn the spindle (C) slightly with your left hand in order to engage the spindle gears and the back row gears.
- (3) For shifting the speed from “HIGH” to “LOW”, turn the speed handle (P) counterclockwise to backend and turn the spindle (C) slightly with your left hand in order to engage the spindle gears and the back row gears.
- (4) When shifting speed from “LOW” to “HIGH”, brake the front pulley by using the brake handle (R) (refer to 7.3), turn the speed handle (P) to the front clockwise and turn the spindle (C) slightly . It means that the clutch is engaged when you hear a “click” sound.
- (5) The spindle direction is reverse in “HIGH” and “LOW” speed. The direction must be clockwise during operation. If the spindle is counterclockwise in “LOW” speed, shift it with the switch of the spindle direction and make it turn clockwise.

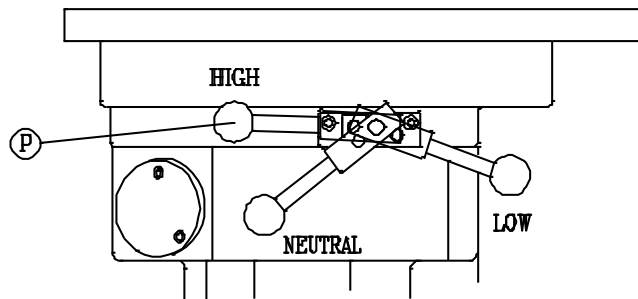


Fig. 6-4

2. Change Spindle Speed (Fig. 6-5)

- (1) Do not turn off the power when changing the speeds. Turn the spindle first before changing the speeds.
- (2) Turn the feed handwheel (T) in clockwise direction, the spindle speeds reduce gradually. The spindle speeds increase if in anticlockwise direction. Please adjust the speeds according to the indication plate.
- (3) Do not change speeds rapidly.

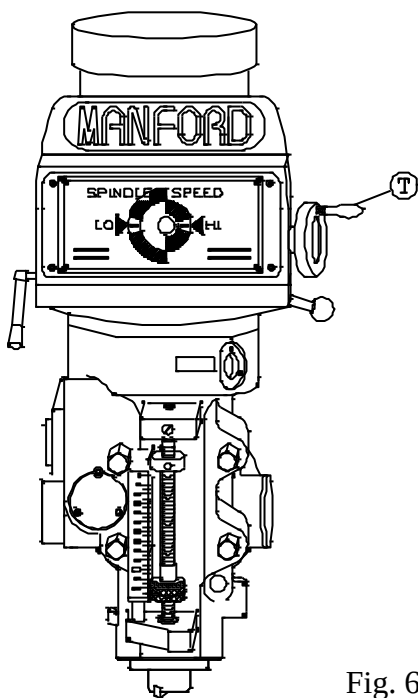


Fig. 6-5

6.2 Machine body operation

6.2.1 Setting of zeroing the dial (Fig. 6-6)

- (1) Loosen dial nut A. °
- (2) Turn the dial B to zero position.
- (3) Lock the dial nut A.

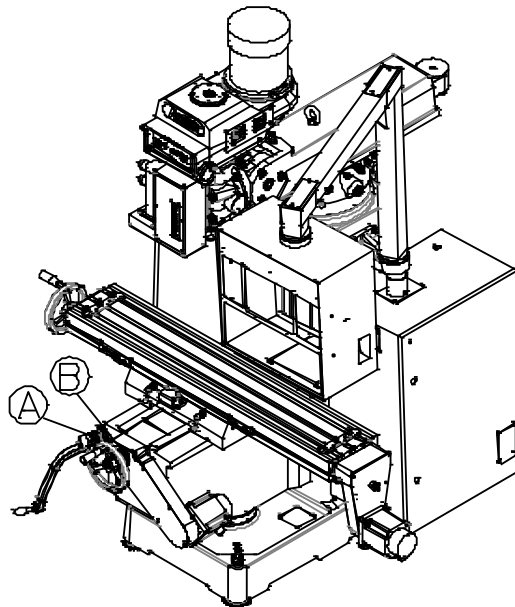


Fig. 6-6

6.2.2 Worktable Transverse and Vertical Movements (Fig.6-7)

(1) Longitudinal feed of the table

The handles at the both ends of the table controls the cross feed of the table. Turn the right-end handle (A) clockwise for left movement or counterclockwise for right direction. Turned the left-end wheel (B) , the direction is reverse against the right-end one.

(2) Cross feed of the table

The longitudinal feed of the table can be controlled by handle (C) which is located at the front of the table. The table moves backward when turned clockwise and moves forward when turned counterclockwise.

6.2.3 Longitudinal Travel Setting

- (1) To raise the working efficiency and quality, the longitudinal travel of the table (E). (E) could be set by the stop block (F). Loose the nut (G) while setting, move the stop block (F) to proper position. Then tighten the nut (G)

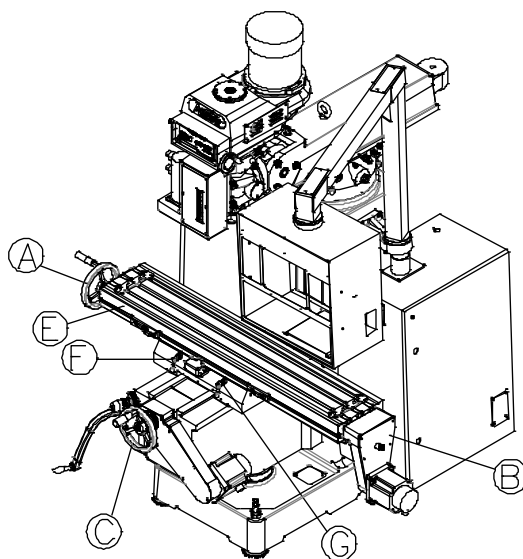


Fig. 6-7

6.2.4 Fix the Worktable, and Saddle. (Fig. 6-8)

- (1) Tighten the fixed handle (A) to fix the worktable.

- (2) Tighten the fixed handle (B) to fix the saddle.

(Note: To tighten turn the handle (A) (B) clockwise and loosened to turn it counterclockwise.)

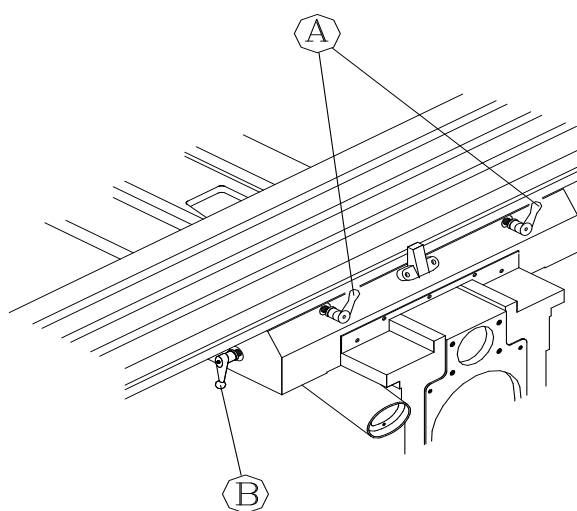


Fig 6-8

7. Trouble Shooting

The reasons and solutions for the problems in operation

Problems	Possible Reasons	solutions
Unsmooth spindle feeding	The quill fixed handle is not loosened.	Loosen the fixed handle.
No brake for spindle	The brake ring has worn.	Replace the brake ring.
The spindle breakdown	1.The poor contact of the switch 2.The belt is loose. 3.The motor is out of order. 4.The speed-shift handle is at "NEUTRAL".	1.Exam the switch. 2.Adjust or replace it. 3.Replace or fix it. 4.Shift the handle to "HIGH" or "LOW".
The spindle couldn't raise	The rebound spring breaks.	Replace the spring.
Wrong rotational direction	The switch is turned in wrong direction.	Turn the switch correctly.
Unsmooth feed of each travel	1.The gibs are too loose or tight. 2.The backlash of screw and nut is not fit. 3.There is no lubricating oil on the slide surface.	1.Adjust the gibs. 2.Adjust the backlash. 3.Exam the oil pipe and the oil pump.
Vibration in operation	1.The machine is not fixed. 2.The cutting parameters are not proper.	1.Fixed the machine. 2.Choose the proper speed and feed rate according to the material and size of the cutting tools.
Problems	Possible Reasons	Solutions

7.1 Dismount spindle motor

1. Start the motor and rotate the speed change handwheel (A) to change the spindle speed to the lowest.
2. Cut off power source and take off wire press board and reversing switch.
3. Take out the three concave hexagonal bolts(C) under the motor pulley cover (B).
4. Use two screw drivers to insert into the two holes between motor pulley cover (B) and belt housing (D). Then push down to loose the motor pulley cover (B). Take (B) and pulley (E) off. Place a screw driver in the speed change spring pieces to loose the motor pulley cover when the above mentioned method failed.
5. Lock two hexagonal bolts (M6x70)(F) into the motor vari-disc(G) to compress the speed change spring(H) in order to take out the retainer ring(K) and motor vari-disc(G).
6. Loose the two hexagonal bolts (L) to take off the motor (M).
7. To install back: pull back the speed change belt (N) to lift the motor-vari disc to the highest point. Install back by the reverse order of dismounting. Install motor-vari disc (G) and ring (K). Loose M6x70 screws (F) to release speed change spring (H), and then put back bearing (E) and bearing cover (B).

7.2 Motor Speed Belt Replacement (Variable speed head) (Fig. 7-1)

1. Follow the step 1-6 in 7-1.

Take out drawbar (P)

3. Dismantle the four hexagonal concave bolts(S) and use two them to slip into the screw holes of the upper bearing housing(R). Take off (R).
4. Remove from atop the two hexagonal concave bolts (U) of speed change cover (T) and take off the bolt sleeves (V).
5. Dismantle six hexagonal concave bolts (W) from the gear housing (D)and dismantle the gear housing(D).
6. When the speed change belt is replaced accordingly, restore the parts by reverse orders

7.3 Brake Ring Replacement (Variable speed head) (Fig. 7-2)

1. Take the pulley box apart according to the section 7-2.
2. Take off the bearing (A) by using extractors.
3. Remove the O-ring (B) with clip and take off the front pulley (C).
4. Remove the O-ring (D) with clip and take off the stationary driven vari disc (E).
5. Take off the four hexagon countersink head bolts of the bearing ring (F), and remove the brake ring (H).
6. Remove the spring (K) of brake ring to replace brake ring. Install back by reverse the procedure 1-5.

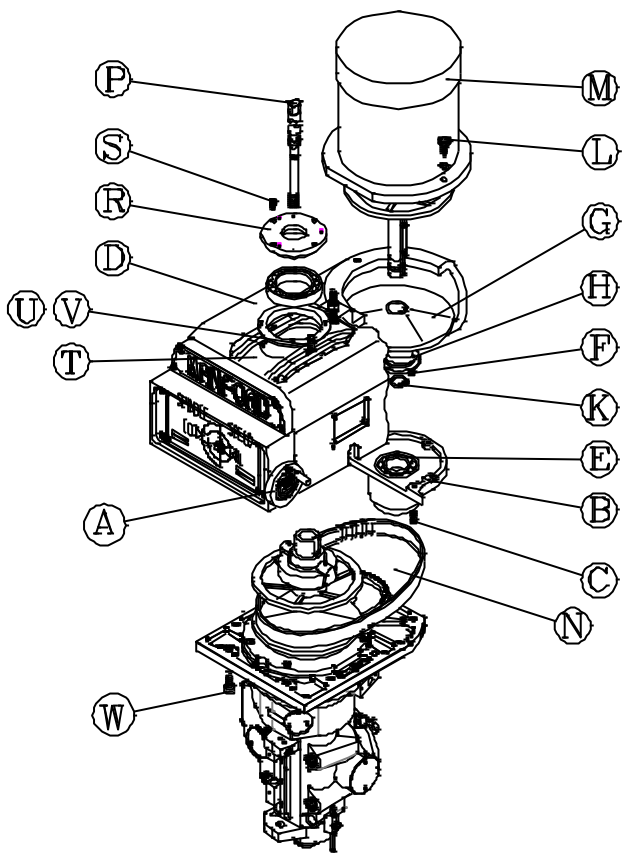


Fig. 7-1

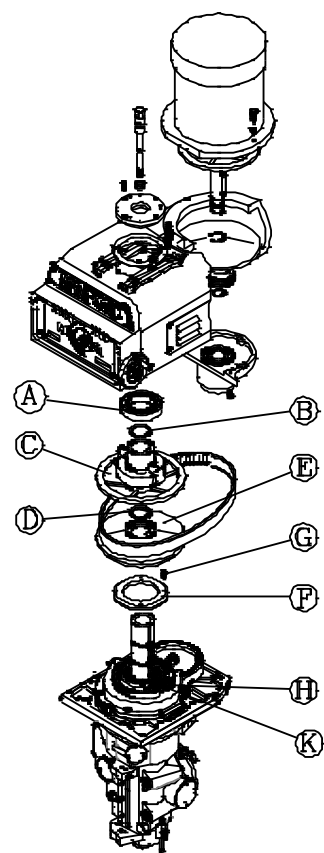


Fig. 7-2

7.4 Motor Timing Belt Replacement (Variable speed head) (Fig. 7-3)

1. Following the procedure in 7-1 and 7-2, dismount motor and pulley box.
2. Remove the five hexagon countersunk bolts on the brake base (D), move upward and take out the brake base. Now you may replace the timing belt (F).
3. Replace the motor timing belt and restore with the reverse order when complete the motor timing belt replacement.

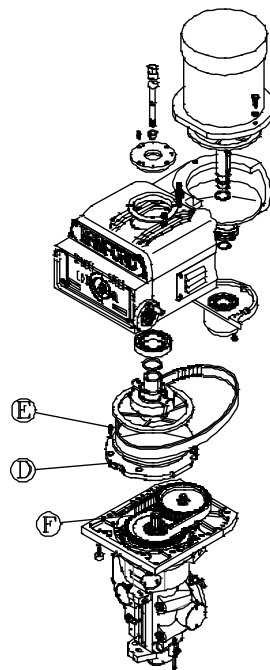


Fig. 7-3

7.5 Removing the Quill (Fig. 7-4)

1. Shut off the power.
 2. Shut off the power. (for variable speed head please see Fig. 7-1) °
 3. Take the cone shank handle (A) out.
 4. Take down three bolts and washer (B) at the gear box bottom.
 5. Take the pulley box set (F) out.
 6. Move the quill (C) to the highest point. Take out two bolts (G) at the top of the quill
 7. Support the quill (C) with left hand loosen the lock handle (E) and turn the quill handle (D) counterclockwise slowly to lower the quill (C) until it leaves the quill rack . Then turn the rack handle (D) clockwise slowly to origin.
 8. Support the quill (C) with both hands, move it down slowly until leave the head .
 9. Clean and lubricate the surface of the quill. Restore it according to reverse order.
 10. While restoring , support the quill (C) vertically and insert it into the head (U) .
 11. Insert the quill (C) into the head (U) until touch the gear of the quill handle , and then lower it about 10mm. Turn the quill handle (D) counterclockwise about 2.5 turns , and then push the quill (C) up to top. Finally , loosen the handle (D) clockwise slowly.
- PS: If the rebound force was too small , turn the handle (D) much than 2.5 turns . If it was too large , turn the handle less than 2.5 turns.

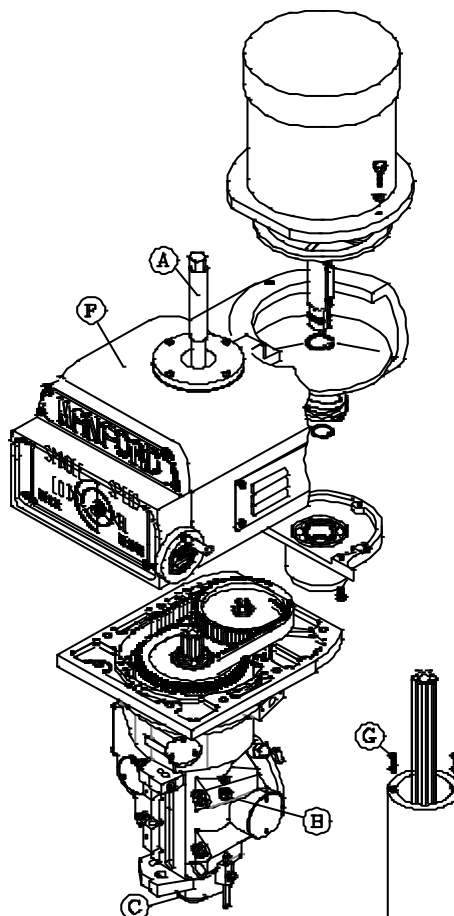


Fig. 7-4

7.6 Gib Adjustments (Fig. 7-5)

The motion friction will increase the gap of sliding contact after a long time operation. The gibs should be adjusted to maintain the precision.

7.6.1 Worktable Gib Adjustment

- (1) The gib of the worktable locates between the front of the worktable and the slide rail of the saddle.
- (2) Loosen two lock bolts (A) of worktable.
- (3) Loosen the gib-adjusted bolts (C) in the right-front of the saddle (B) slightly counterclockwise by using a screw driver and tighten the gib-adjusted bolt (D) in the left-front of the saddle (B) clockwise. Turn the wheel (E) to exam if there was resistance in the slide rail. Adjust and examine it repeatedly until the tension and relaxation is appropriate.
- (4) After adjusting then tighten the bolt (C) in the right-front of the saddle (B) clockwise.
- (5) If the slide of the worktable is still too loose even though the gib-adjusted bolt (D) in the left-front of the saddle had been tightened totally , it means that the gib has been worn very much . The gib has to be replaced this time.

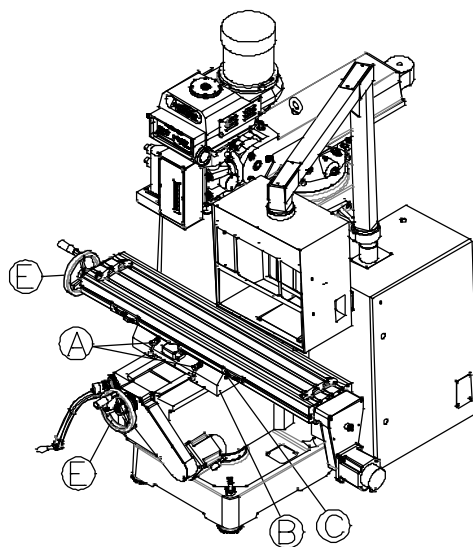


Fig. 7-5

7.6.2 The Saddle Gib Adjustment (Fig. 7-6)

- (1) The saddle gib locates between the left of the saddle (A) and the slide rail of the knee (C) .
- (2) Loosen two lock bolts (B) of the saddle (A) .
- (3) Clean the surface of the slide rail.
- (4) Move the saddle (A) to the front of the knee (C) .
- (5) Take the back and front scrapers (D) out of the saddle (A) .
- (6) Loosen the bolts (E) in left-back of the saddle (A) slightly counterclockwise by a screw driver , and tighten the bolt (F) in the left-front of the saddle (A) clockwise. Turn the wheel (G) to exam whether there is a slight resistance in the slide rail or not. Repeat the adjustment and exam until the tension and relaxation of the slide rail of the saddle (A) is appropriate.
- (7) After adjusting then tighten the bolt (E) in the left-back of the saddle (A) clockwise.
- (8) The way to adjust the lead gib in the both side bottom of the knee (C) is the same as the way before. Loosen the opposite bolts (H)(I) counterclockwise , and then tighten clockwise. Turn the wheel (G) to adjust and exam the tension and relaxation of the slide rail.
- (9) If the slide of the saddle (A) is still loosely even that the bolts (F)(H)(I) had been tightened totally, it means that the gib has worn. It should be replaced this time. After adjusting three gibs, reinstall the back and front scrapers (D) of the saddle (A) .

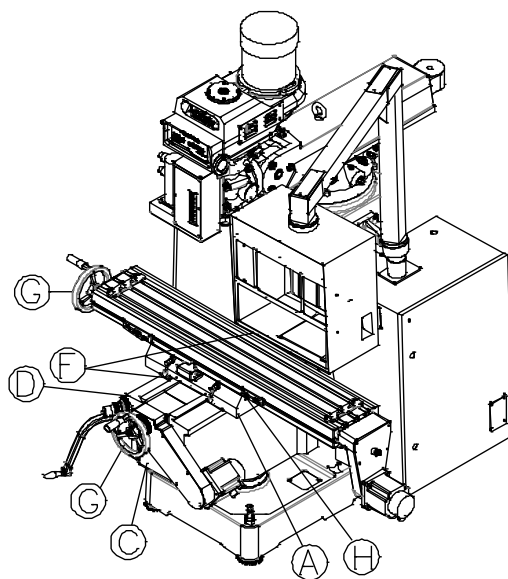


Fig. 7-6

8. Maintenance

Under long-term operations, if the machine has not been properly maintained and operated, its service life shall be greatly reduced. The work piece quality is therefore affected, and the efficiency, decreased. It is essential for an operator to know how to handle the machine and the concept of its maintenance and keep correctly

8.1 Daily Maintenance

- (1) Check and see if the oil level of hand crank pump is on the designated line.
- (2) Safety limit line is show on the Automatic lubrication pump oil mirror
- (3) Keep the machine idling for three to five minutes daily prior to operations.
- (4) At the close of the day, work table shall be cleaned and the unfinished work piece must be removed. A little bit of lubricant is recommended.
- (5) At the close of each day, all setting levers shall be loosened, and all sliding parts shall be moved to proper position. The cutter must be dismantled.
- (6) At the close of each day, the head stock must be restored to its normal position if it is tilted

8.2 Monthly Maintenance

- (1) Check and see if all clamping rails of various sliding surfaces are normal.

When the sliding of the rails is not smoothly.

- a. Use hand crank pump to pump oil.
- b. Check and remove the dusts in the sliding surfaces.

- (2) Check and see if the backlash between lead screw and its nut is normal.

When the clearance standard is below the quality requirements:

- a. Refer to 7-5 for proper alignments.

- (3) Check and see if the quill lock and that of each and every sliding surface is normal.

When worn-out occurs in the quill lock spread or loose engagement happens:

- a. Replace the bolt lever.

8.3 Quarterly Maintenance

- (1) Check and see if the brake functions and belt are normal.

When braking function is unusual:

- a. Refer to 7-3 for instructions. Replace the braking belts or other accessories (Refer to table) in a proper period.

When speed change and timing belts are unusual:

- b. Refer to 7-2 and 7-4 for instruction. Replace the belt.

(2) When the verticality of work table and head stock does not attain the requirement.

- a. Refer to 5-4-2 for alignments.
- b. During alignment, do not loosen totally the bolts and nuts of the head stock.

(3) Test the machine again by chart of test specs.

(4) Change the lubrication oil quarterly. Fill new oil into when the old one is totally cleaned.

Replace whatever parts worn-out.

(5) Replace the missing or broken materials.

8.4 Lubrication

8.4.1 Lubrication of Head (Fig. 8-1)

Item	Period	Lubricated parts	Oil	Amount
1	Twice one day	Quill	petroleum R68	Full
2	Twice a week	Gear-moving wrapper Spindle-feed machinery		Full
3	Once a week	Pin axis		5~6 drops
4	Once a month	Back-row gears	Grease	Engaing nature

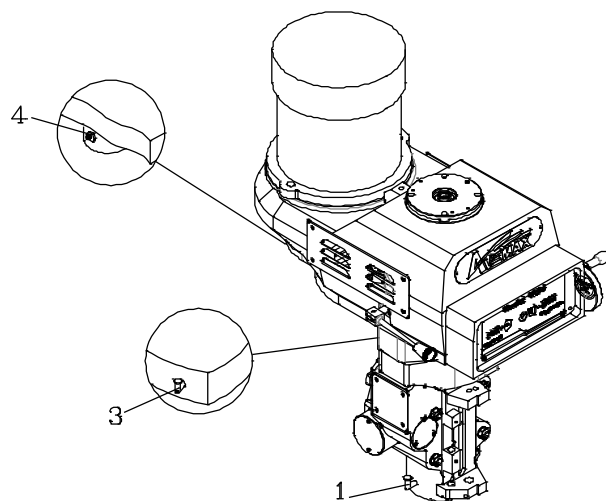


Fig. 8-1

8.4.2 The Lubrication of the Column (Fig. 8-2)

(1) Location: table, slidaway on the saddle, leadscrew and leadscrew nuts. Pull the lubrication pump on the left side of the base for lubrication.

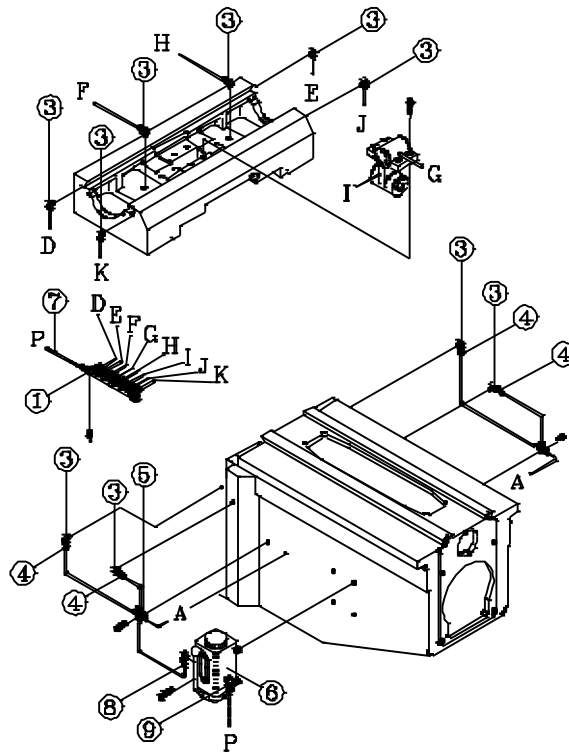


Fig.8-2

Period	Lubricated parts	Oil	Amount to add
4~6 times each day	The slide rail of the saddle working table	petroleum 68 VACTRA #2 ESSO FEBIS K53 SHELL TONNA 33	Pull the lubrication pump 5~6 times
	The slide rail of the saddle		
	The slide rail of the saddle knee stand		
	The cross lead screw		
	The longitudinal lead screw		
	The vertical lead screw		
Indicator of oil mirror		Cutting fluid (swire oil)	Indicator of oil mirror

9. Warning Sign Illustration

- 9.1 Do not put hands on table or get the workpieces while spindle isn't totally stopped. (Fig. 9-1) °
- 9.2 Cut off spindle power while changing tools. (Fig. 9-1) °
- 9.3 Don't shift Hi-Low speed handle before the spindle is fully stopped. (Fig. 9-2) °
- 9.4 Please add grease at the gear-moving wrapper of the spindle periodically in order to ensure that Hi-Low speed is shifted smoothly. (Fig. 9-3,9-4) °
- 9.5 Stamp a warning sign on the parts contain electricity. Cut off the power when dismounting (Fig. 9-5) °
- 9.6 The machine contain safety design,when open the electrical door,the power will automatically cut off (Fig. 9-5) °

Fig. 9-1

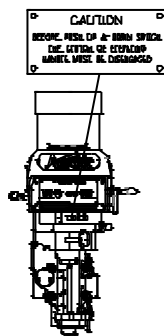


Fig. 9-2

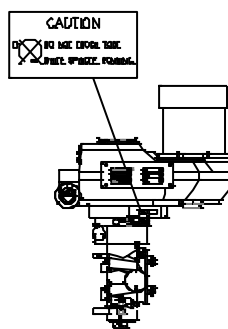


Fig. 9-3

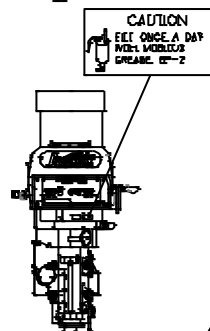


Fig. 9-4

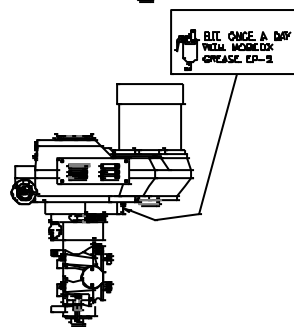
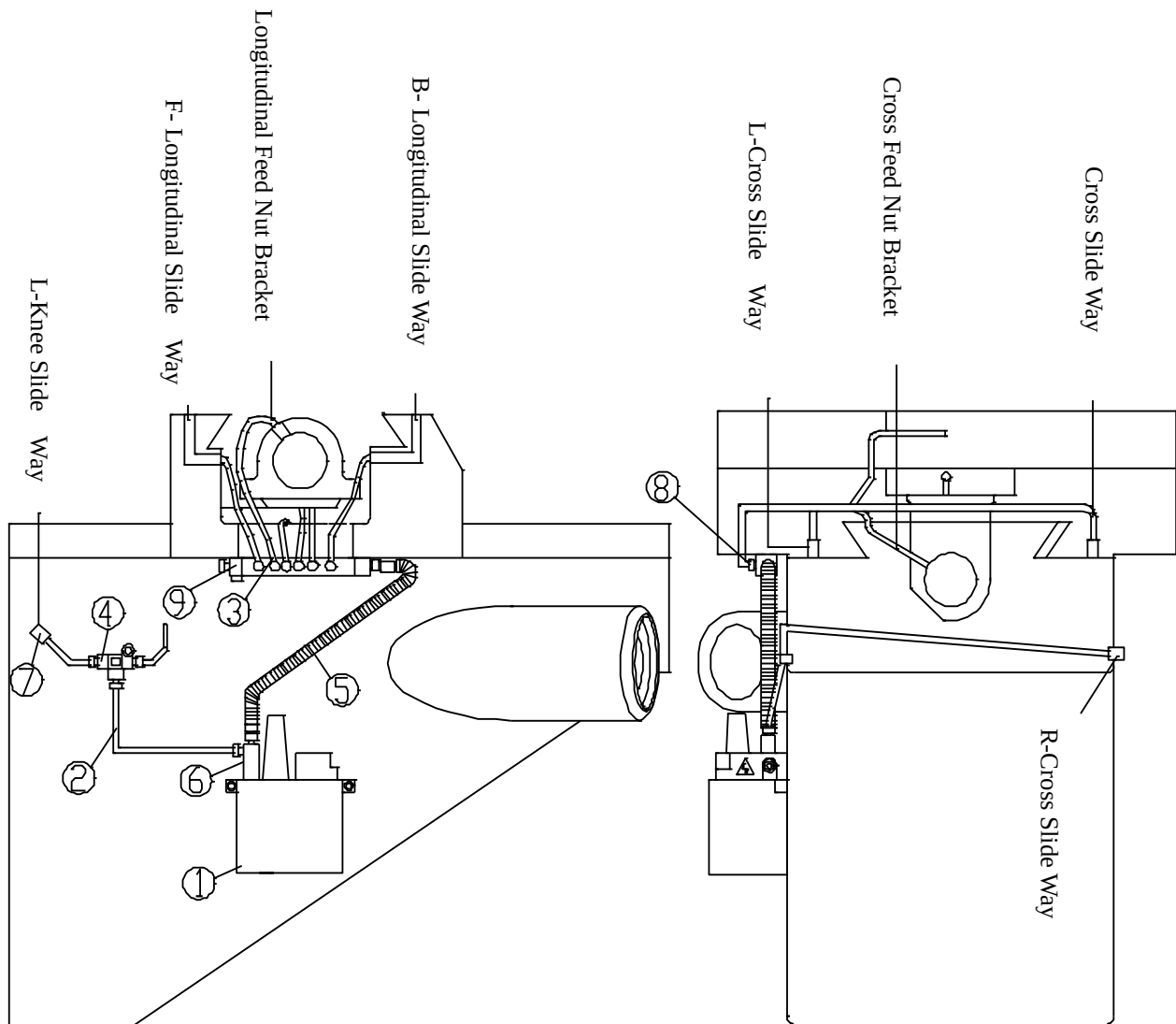


Fig. 9-5

10. Lubrication Diagram

10.1 Saddle Lubrication Diagram





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