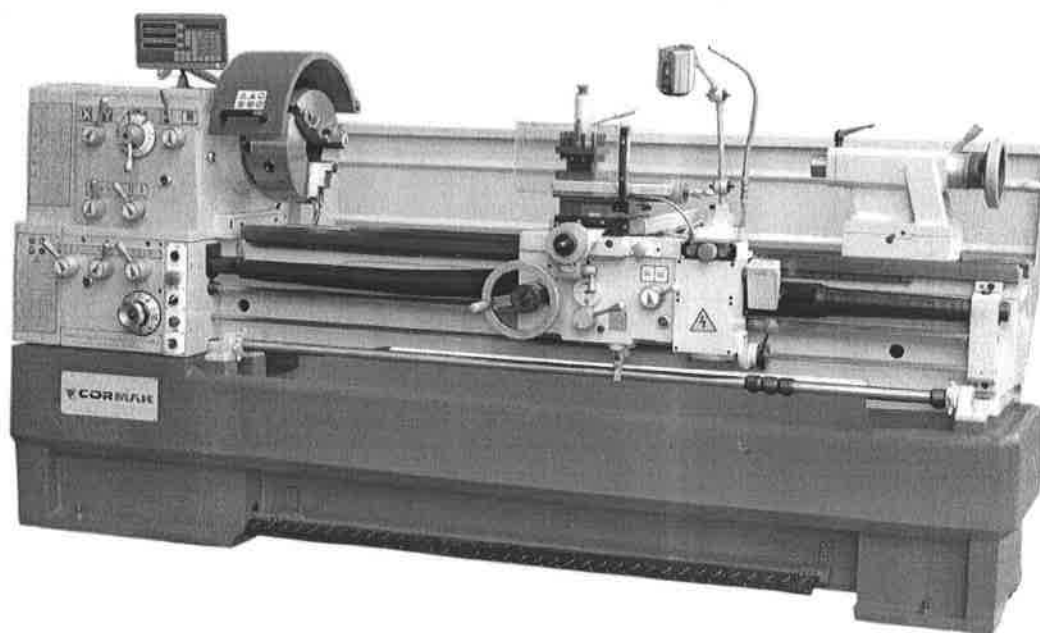


OPERATION MANUAL

ORIGINAL MANUAL

LATHE

MODEL: C6246B/1000, C6246B/1500



MAKTEK Jerzy Zalewski
ul. Brzeska 120, 08-110 Siedlce
tel. (25)644-18-07 fax.:(25)632-49-89
www.cormak.pl



Operation Manual Contents

Specification	4
1. Guideline for Safety Operation	
1-1 Safety Points for Attention	5
1-2 Danger of Operation	6
1-3 General Safe Rules for Operator of the Lathe	7
1-4 Protection of the Chuck	10
1-5 The Use of Emery Cloth in Metal Processing Can Cause Danger ...	10
1-6 Safety devices.....	12
2. Level of Noise	16
3. High Speed Precision Lathe	
3-1 Constructional Indication	17
4. Unpacking and Installation	
4-1 Points for Unpacking.....	19
4-2 Unloading of the Machine.....	19
4-3 Construction of the Ground.....	20
4-4 Cleaning.....	20
4-5 Level Adjustment.....	20
5. Electric Circuit Control	
5-1 Electric Wiring.....	23
5-2 Electric Device.....	23
5-3 Important Notes.....	23
6. Test Running	
6-1 Operation Symbols.....	26
6-2 Transmission and Stop of Main Spindle.....	27
6-3 Selecting Main Spindle Speed.....	27
6-4“Intermittent”Operation of Main Spindle.....	28
6-5 The Importance and Methods of Spindle Levelling Adjustment.....	28
6-6 Transmission and Stop of Gear Box.....	29
6-7 Operation of Gear Box.....	29

6-8 Manual Operation.....	29
6-9 Auto Feed Operation.....	30
6-10 Auto Feed Stop Operation.....	30
6-11 Four Position Auto Feed Stop Operation.....	30
6-12 Tailstock Operation.....	31
7. Cutting Threads	
7-1 Lead Screw Drive.....	32
7-2 Cutting Thread	32
7-3 Thread Dial Indicator.....	32
7-4 Thread and Feed Table.....	34
8. Lubrication	
8-1 Lubrication in Headstock.....	36
8-2 Lubricating in Gear Box and Apron.....	36
8-3 Useful Reference Lubricating Table for Other Mechanism.....	36
8-4 Lubrication Location.....	37
9. Maintenance & Servicing	
9-1 Headstock.....	38
9-2 Apron & Saddle.....	39
9-3 Gear Box.....	40
9-4 Adjustment of Tailstock Centering.....	40
9-5 Belt Tension Adjustment.....	40
9-6 Foot Brake Belt Adjustment.....	41
9-7 Brake and Micro Switch Adjustment.....	42
9-8 Adjustment to the Backlash of Lead screw.....	42
9-9 Maintenance for Cutting Liquid Coolant Pump.....	42
10. Chucks and Chuck Mounting.....	43
11. Preventive Maintenance.....	44
12. Trouble Shooting.....	47
13. Parts List Assembly	50-109

Specification

Models	CR6246B×1000 / CR6246B×1500 / CR6246B×2000		
Capacity			
Swing Over Bed	φ 460mm		
Swing Over Cross Slide	φ 270mm		
Swing in Gap Diameter×Width	690×165mm		
Height of Center	230mm		
Distance Between Centers	1000mm	/	1500mm / 2000mm
Width of Bed	300mm		
Cutting Tool Max. Section	25×25mm		
Total Travel of Cross Slide	285mm		
Total Travel of Top Slide	128mm		
Headstock			
Spindle Bore	φ 80mm		
Spindle Nose	D1-8		
Spindle Morse Taper in Nose, in Sleeve	M.T.No.7		
Spindle Speeds Number	12		
Spindle Speeds Range	25-1700r.p.m		
Thread & Feeds			
Lead screw Diameter & Thread	φ 35mm×4T.P.I. or Pitch 6mm		
Threads Imperial Pitches	2-112 T.P.I. (60nos)		
Threads Metric Pitches	0.1-14mm (41nos)		
Diametrical Pitches	4-112D.P. (50nos)		
Module Pitches	0.1-7M.P. (34nos)		
Longitudinal Feeds Imperial	0.0011"-0.0633"/Rev (42nos)		
Longitudinal Feeds Metric	0.031-1.7mm/Rev (42nos)		
Cross-Feeds Imperial	0.00033"-0.01837" (42nos)		
Cross Feeds Metric	0.014-0.784mm (42nos)		
Tailstock			
Total Travel of Tailstock Quill	130mm		
Tailstock Quill Diameter	φ 60mm		
Taper In Tailstock Quill	M.T.No.4		
Motor			
Spindle Drive Motor	5.5kW(7.5HP) 3PH		
Coolant Pump Motor	0.1kW(1/8HP)		
Weight & Measures			
Machine Space Required (L×W×H): cm	220×108×137 /	275×108×137 /	325×108×137
Packing Case Dimensions (L×W×H): cm	225×112×160 /	280×112×154 /	330×112×154
Net Weight	1655kg	/	1820kg / 1975kg
Gross Weight	1920kg	/	2125kg / 2305kg

1. Guideline for Safety Operation

The lathe is a high speed and powerful machine and can cause danger if operate it improperly.

Before operating the lathe please read the following guidelines of safety operation. Take care and observe to make the lathe be under normal operation environment so as to avoid danger.

The lathe is in accordance with GB15760-1995 <General Technical Condition of Safety Protection of Metal Cutting Machine> issued by the state.

The manual covers information and hints necessary for proper and safe operation of the lathe.

It is required the operator of the lathe should accept suitable technical training before operating the machine, own skills to operate it and hold the certificate of operation; or he should be trained under the close supervision of somebody who can skillfully operate the machine.

The lathe should be operated under the environmental temperature of $+5^{\circ}\text{C}$ - $+40^{\circ}\text{C}$; the elevation up to 1000 m; the relative humidity of 50% when ambient temperature is $+40^{\circ}\text{C}$ or higher relative humidity if ambient temperature is lower.

The manual also covers related information for those who owns necessary skills or appointed persons to make suitable maintenance upon the machine.

1-1 Safety Points for Attention

1. Keep the lathe and the working area clean and in good order.
2. All guard devices and cover plates should be on the place; the side cover should be closed.
3. Do not place any objects in the processing area of the lathe as they may bump with rotating or moving parts.
4. Do not contact or leap over moving or rotating parts of the lathe.
5. Before starting the lathe, you should understand how to stop it.
6. The lathe cannot be operated under overload.
7. Stop running of the lathe immediately in case any accident occurs.
8. When mounting the chuck or other attachment on the spindle, switch off power supply of the lathe to prevent rotation of the spindle.
9. Do not mount the jigger if it is not checked or confirmed to be compatible with the lathe.
10. Check the center you used if its load capacity can meet with requirement.
11. Switch off power supply before leaving the lathe.
12. The maximum weight of the workpiece on the lathe is 500 kg.
13. The chuck should be properly and firmly mounted on the spindle of the lathe.
14. Take care that the workpiece should be gripped firmly and the speed of the spindle cannot exceed the safe speed of the chuck.

15. As it is possible to contact with human body, especially when the material with small diameter is used, it is not allowed in any case that the rod material cannot extend out the end of the spindle of the headstock which has no special guard and relative support.
16. There is the label of speed limit for the chuck and that no speed change is allowed in operation at the lower right corner of the headstock, the electric warning board at the electric cabinet (box) and that no touch on the workpiece (or chuck) when it is rotating on the guard of the chuck to remind you to take care.

1-2 Danger of Operation

When operating the lathe you should fully understand the danger of following operations:

1) Cutting Fluid

The cutting fluid is hazardous to human body. To contact the cutting fluid continuously especially the original fluid, it can cause the skin allergic or ill if seriously, even the emulsion can also cause the same. Therefore following precautions should be taken:

- a. Avoid any unnecessary contact.
- b. Put on the protective clothes.
- c. Adopt guard shield or plate.
- d. Do not wear oily or dirt clothes.
- e. Clean all parts of the body where the cutting fluid is contacted after work.
- f. Do not mix different cutting fluids.
- g. Replace the cutting fluid regularly.
- h. Correctly treat the cutting fluid.

2) Safe Operation of the Chuck of the Lathe

All jiggers of work pieces should have clear labels of the maximum safe speed and the speed of the spindle can never exceed it. It should point out that the maximum safe speed on the label is supposed under ideal work condition and lower speed of the spindle should be selected in following cases:

- a. Adopt the chuck to jig the workpiece under noisy work condition.
- b. If the chuck is surely damaged, it is dangerous to operate under high speed, especially when the chuck of grey pig iron is used it shall break if it is something damaged.
- c. If no gripping force is known before jiggling.
- d. All factors such as strength of the workpiece to be jigged, balance of the jiggling faces and the workpiece etc. can largely affect the maximum safe speed.

When the workpiece is rotation, it may not be jigged firmly due to the role of centrifugal force and following factors may be involved:

- a. The speed is too high.
- b. The weight and type of the claws are off standard.
- c. The working radius of the claw is unsuitable.
- d. The claw has bad lubrication.
- e. It is unbalanced.
- f. The dynamic factor is not considered in the jiggling force.
- g. Too large cutting force.
- h. Is the workpiece jigged internally or externally?

These factors should be seriously considered as they can cause different influence in different purposes. The manufacturer cannot provide concrete data for general use as they are beyond the range controlled by the manufacturer of the machine.

1-3 General Safe Rules for Operator of the Lathe

1. When jiggling the workpiece, it cannot have oil or grease;
All parts should be jigged firmly;
Do not intend to jig the workpiece which is unsuitable or hardly to jig well;
Do not jig the workpiece exceeding the weight allowed by the lathe;
Master suitable hoisting method when the workpiece is hoisted.
2. Ensure to remove oil or grease on handy tools and operation grippers;
Ensure the structures of handy tools and operation grippers are suitable to touch safely by hand.
3. When operating the handy tool or the operation gripper, it should be gripped firmly;
Select suitable position to grasp on the handy tool or the operation gripper;
You cannot grasp the handy tool or the operation gripper on unsuitable position;
You cannot operate with excessive force.
4. Grasp the handy tool or the operation gripper on recommended positions.
5. Do not allow to leave other handy tool or operation gripper on the chuck.
6. Do not allow to use broken, damaged or defected tool.
7. Ensure the workpiece is jigged firmly on the chuck or other jiggers.
8. Take special care of irregular workpiece.
9. Take care of large flashes and burrs on the workpiece.
10. Always take care to select correct tool in work.
11. It is not allowed to leave other unfixed handy tool or operation gripper on the chuck.
12. Do not allow to use the tool without the handle.
13. Always adopt the chuck, the follow rest and the center to support the workpiece.
14. The workpiece should have correct position in the hexagon hole and the groove of

the screwdriver.

15. Take care that the locking screw should be tightened.
16. Do not make preparation work in a hurry.
17. Never use the substitute tool if no suitable tool is available or prepared in the workshop.
18. Do not allow to move away the guard plate or to open the protection door when the lathe is switched on.
19. Do not let your hands or body be within the working area of moving parts.
Take care to move parts of the lathe which could drop down.
Take care of relative position between the hand or the body and the lathe.
Take care of the tool to be grasped and other parts inserted in the chuck or the workpiece.
Do not let your hands or body be on the place where they could be hurt by the chuck or the workpiece.
20. Take care not to push the handle, to operate the clutch or to switch on power supply to cause accident.
21. Master every function and all kinds of operation methods.
22. Never put your hands on the chuck or the workpiece to stop rotation of the spindle.
23. For the lathe driven by the clutch, in case the clutch is disengaged, the spindle should be stopped running otherwise the clutch or the brake device should be adjusted.
24. When the lathe is not in use, ensure to switch off power supply of the lathe.
25. Stop the rotation of the chuck before replacing the new workpiece.
26. Always take care to check if driving of the chuck, the belt pulley and driving parts are loose.
27. When the handle of the chuck is in the chuck, never start the spindle.
28. Do not operate the laths if the attention is not concentrated in order to avoid accident.
29. When preparing to make other operation of the lathe such as the tailstock, take care to avoid danger such as bumping or dropping.
30. Take care of guard cover of the chuck and other covers which cannot be loosened.
31. Put on the safety cap to operate the lathe if the operator has long hair to avoid danger due to hair is wounded by rotating parts of the machine.
32. Take special care to make operation if you are closing to rotating part of the machine.
33. Always pay attention to filing and deburring:
Take special care when the file or the deburring tool is closing to the chuck;
The file or the deburring tool could bump the chuck.
34. For the lathe driven by the clutch, take care that the clutch should be at the position the lathe is stopped when making measurement.

35. Take care of rotating and stopping positions of the spindle when hand is on the handle of the clutch.
36. Ensure the spindle of the lathe should be at the stop position when measuring the workpiece jigged on the chuck.
37. When the measuring meter is used on the lathe, ensure the motor is at the stop status.
38. Wear protective gears met with safe standard before making operation on the lathe;
It is not allowed if taking off protective gears in a short period of time before making operation on the lathe;
Wear protective gears properly.
39. Take care of cuttings flying out from the lathe.
40. Select suitable guard plate on the operation position.
41. Never leap over or go around the chuck or the workpiece to make adjustment when they are in running status;
Never leap over or go around the chuck or the workpiece to take something;
Take care of the place the workpiece is put when making adjustment of the lathe or the workpiece;
Never leap over or go around the chuck or the workpiece to move the tool/lathe to other position;
Never leap over or go around the chuck or the workpiece to tighten parts on the lathe;
Never leap over or go around the chuck or the workpiece to remove iron chips.
42. Master suitable method to load, and never apply force from unsuitable position.
43. Never mount the workpiece too large or heavy toward the lathe.
44. Never mount the workpiece too large or heavy toward the operator.
45. Use necessary tools to treat the workpiece.
46. Never apply excessive force on the attachment or the operation lever.
47. Take care to jig the workpiece firmly.
48. Tighten all claws, nuts, screws and fasteners.
49. Always take care to use correct equipment.
50. Never make cutting beyond the ability of the lathe.
51. Do not apply excessive force to polish or to deburr.
52. Always take care to adopt suitable tool to deburr. Do not deburr in a hurry and take care of burrs on the chuck and the workpiece.
53. Switch off power supply to stop all movements of the lathe before replacing the exchange gears.
54. Take care if the chuck/parts could drop down when the lathe is in operation.
55. Must predict the distance of the possible collision before apron longitudinal feed and cross side cross feed approach limit position, Stop feeding in a timely, Prevent from collision, Accidents.

1-4 Protection of the Chuck

The lathe is equipped with the guard of the chuck (option), which is suitable for the standard chuck.

In case the chuck guard is equipped on the lathe, it should be in a closed status before the spindle is running.

1) When the machine is equipped with larger chuck, the chuck guard should be replaced with one which has corresponding diameter with that of the chuck.

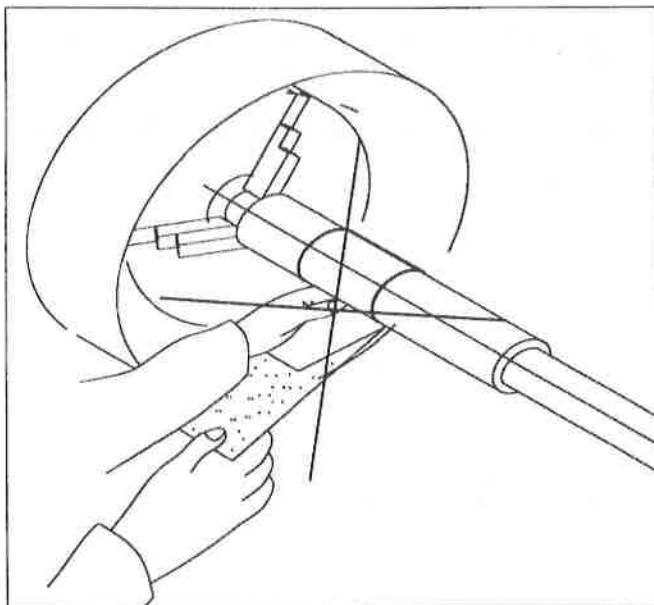
It is suggested that claws cannot extend out the outer diameter of the chuck in order to avoid bump with the chuck guard. For the sake of safe operation, always take care not to extend claws out of the outer diameter of the chuck.

2) When the face chuck is used, the chuck guard should be removed. If it is indeed required by customer, the special chuck guard can be provided but it should be confirmed that only the face chuck is used and any case should be responsible by customer himself.

1-5 The Use of Emery Cloth in Metal Processing Can Cause Danger

In all accidents occurred on the lathe, most are from the use of emery cloth to cause breakage of fingers, or even to amputate occasionally.

When workpieces with different shapes are rotating on the lathe, if using emery cloth to deburr, to polish or to process finished sizes, it can cause the accident when winding emery cloth on the workpiece to be ground by two hands. If winding the emery cloth on the finger or to make rough grinding, the finger could be seized firmly to cause serious injury.



Precautions

The operator should have certain recognition and knowledge on the necessity to treat part by emery cloth on the lathe.

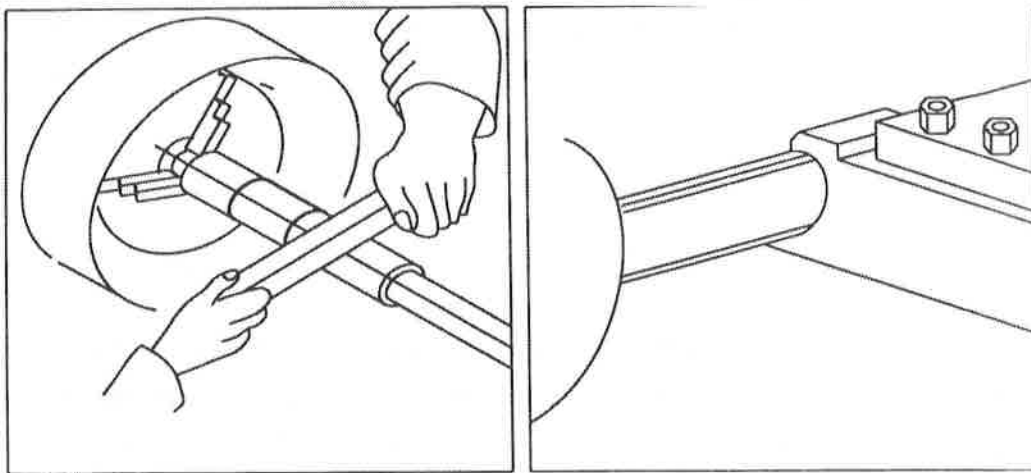
It is not needed to process by emery cloth in following cases:

If the requirement of the surface roughness is not so high;

Make processing by turning or on special polisher or grinding machine, the finished sizes and surface roughness can be achieved well.

If technological rule defines that the workpiece should be ground by emery cloth, then the emery cloth should be used in following cases:

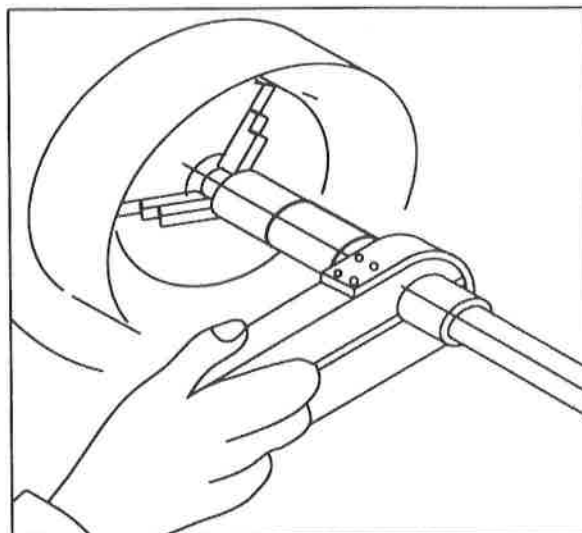
a. Nail the emery cloth on a quality wood board to grind;



b. The emery cloth is fixed on and jigged by the tool holder to grind.

c. The “Robust Grinder” consists of two pieces of jointed wood board and the emery cloth to make grinding and the workpiece to be polished can go through its hole.

d. The polish is made by the wire brush stuck with abrasive material.



Apply force at the both ends of the emery cloth to pull it upward. Never pull it loosely or wind it on your finger or on the workpiece.

When the end of the workpiece is polished, only a short piece of the emery cloth shall be used as it cannot be wound.

When polish by the emery cloth is made, never operate by wearing gloves.

1-6 Safety devices

Operate the lathe only with properly functioning safety devices.

Stop the lathe immediately if there is a failure in the safety device or if it is not functioning for some reason.

It is your responsibility!

If the safety device has been activated or has failed, the lathe must only be operated again when

- the cause of the failure has been removed,
- you have made sure that there is no existing danger for persons or objects.

WARNING!

If you bypass, remove or override a safety device in any other way, you are endangering yourself and other persons working on the lathe. The possible consequences are the following

- injuries due to components or parts of components flying off at high speed,
- contact with rotating parts,
- fatal electrocution,
- pulling-in of clothes.

The lathe includes the following safety devices:

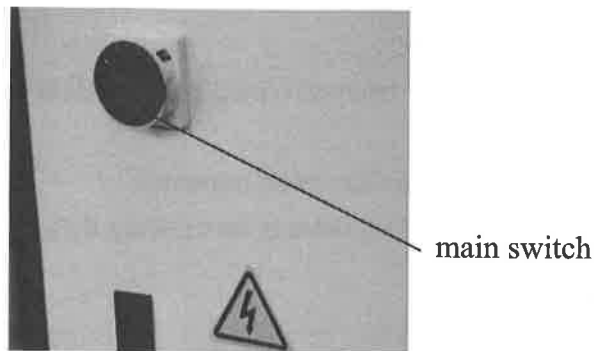
- a lockable main switch,
- an EMERGENCY-STOP button,
- a protective cover on the headstock with position switch,
- a lathe chuck protection with position switch,
- a recoil spring as protective cover on the guide spindle, the coil spring prevents the pulling-in of clothes into the guide spindle,
- chip protection,
- securing screw
- an overload clutch on the feed shaft,
- safety screws for the Camlock bolts on the workpiece holder.

a. Lockable main switch

In the position "0", the lockable main switch can be secured against accidental or non-authorized switching-on by means of a padlock.

When the main switch is switched off, the current supply is being interrupted.

Except for the areas marked by the ideogram in the margin. In these areas, there might be voltage, even if the main switch is being switched off.



WARNING!

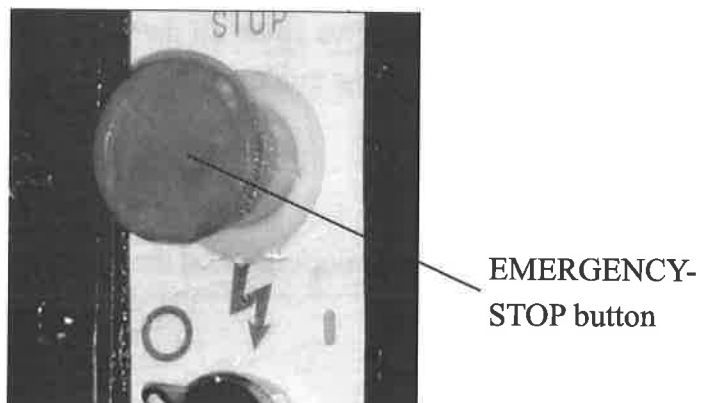
Dangerous voltage exists even if the main switch is switched off.

In the areas marked by the ideogram in the margin, there might be voltage, even if the main switch is switched off.

b. EMERGENCY-STOP button

The EMERGENCY-STOP button switches the lathe off.

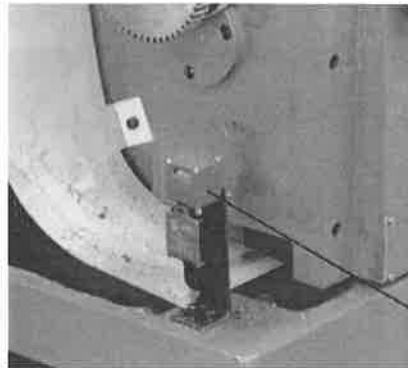
After actuating the switch, turn it to the right, in order to restart the lathe.



c. Protective cover on the headstock

The headstock of the lathe is provided with a protective cover and a position switch.

The lathe only starts when the protective cover is mounted.



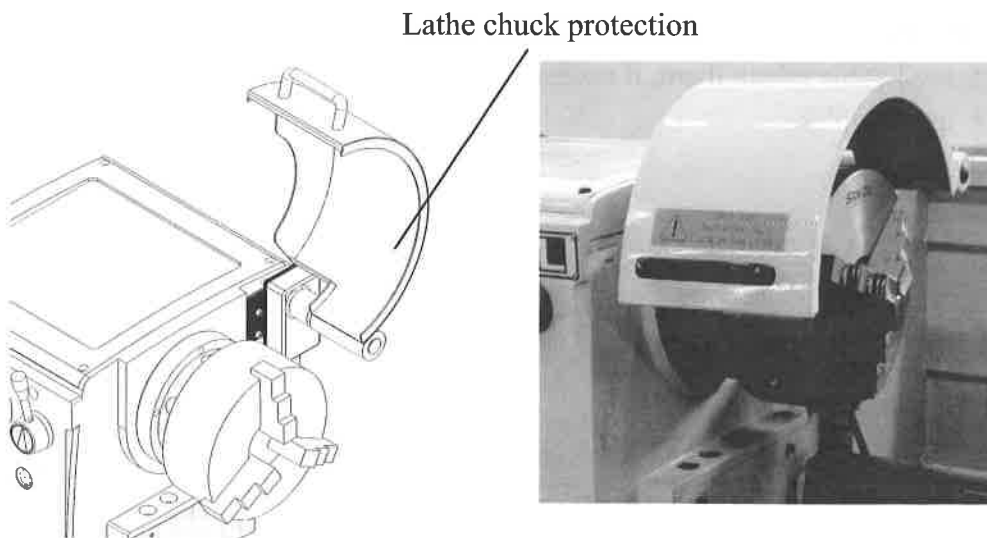
positions switch

WARNING!

Only remove the protective cover when the main switch of the lathe is turned off and secured by a padlock.

d. Lathe chuck protection with position switch

The lathe is provided with a lathe chuck protection. The lathe can only be switched on if the lathe chuck protection is closed.



e. securing screw

Tighten the securing screw at the end of the lathe bed in order to prevent the tailstock from unintentional drawing-out of the lathe bed.



positions switch

Safety check

Check the lathe at least once per shift. Inform the person responsible immediately of any damage, defect or change in the operating function.

Check all safety devices

- at the beginning of each shift (with the machine stopped),
- once a week (with the machine in operation),
- after every maintenance and repair work.

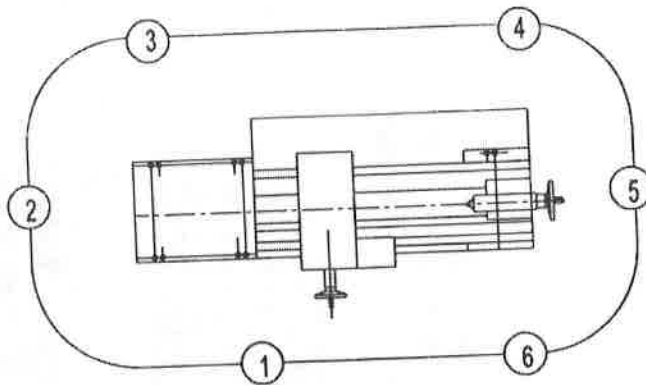
Check that the prohibition, warning and information labels as well as the markings on the lathe

- are legible (clean them, if necessary),
- are complete.

2. Level of Noise

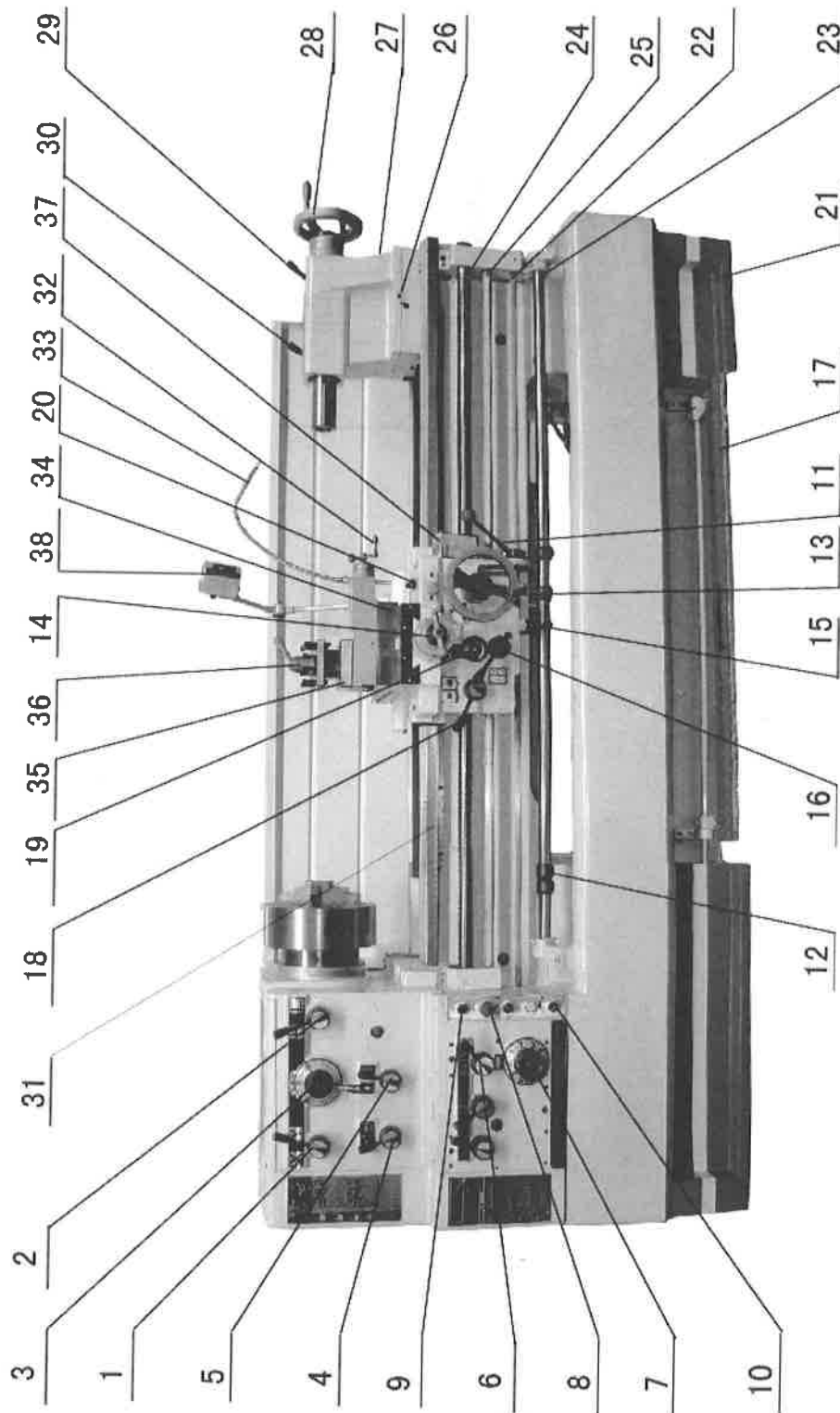
According to GB/T16769-1997 <Measurement Method of Sound-Pressure-Level of Metal Cutting Machine>, measure the noise at six positions being one meter far from the lathe. The maximum noise should be less than 85dB (A) .

Note: The measurement should be made at the spindle with standard chuck at the maximum speed.



3. High Speed Precision Lathe

3-1 Constructional Indication



No.	Description	No.	Description
1	Main Spindle Speed Change Lever	20	Saddle Fixture Screws
2	High/Low Speed Change Lever	21	Foundation Adjustment Bolts
3	Main Spindle Speed Change Lever	22	Start Lever
4	Forward/Reverse Lever	23	4-Position Auto Stop Lever
5	Thread Feed Select Lever	24	Lead screw
6	Thread Feed Change Lever	25	Auto Feed Rod
7	10 Steps Feed Change Disc	26	Tailstock Set Over Adjust Screws
8	Power Switch	27	Tailstock Body
9	Intermittent Switch	28	Tailstock Hand-wheel
10	Coolant Pump Switch	29	Tailstock Body Clamping Lever
11	Start Spindle Control Knob	30	Tailstock Spindle Locking Lever
12	Eccentric Center Ring	31	Rack
13	Longitudinal Apron Hand-wheel	32	Compound Rest Handle
14	Cross Slide Feed Knob	33	Coolant Control Valve
15	Auto Stop Centering	34	Compound Rest
16	Auto Feed Lever	35	Four Way Tool Post
17	Foot Brake Pedal	36	Tool Post Clamping Lever
18	Half Nut Engaged Lever	37	Thread Dial Indicator
19	Feed Select Lever (Longitudinal & Cross Feed)	38	Lamp

4. Unpacking and Installation

4-1 Points for Unpacking

For short distance transportation of this machine, fix it onto the truck by hemp rope: while for long distance, packed by a wooden case or dispatched by container. Please first to check if there is any damage on packing when arrive. After unpacking carefully inspect whether it exists any injury or insufficiency. If any contact us immediately for proper settlement or any of the damages of the machine will receive no any compensation from us.

4-2 Unloading of the Machine

When the machine is unloaded from the car or to be moved, please proceed with following steps (as illustrated 4-2)

1) Preparing two round sticks (long approx.830mm dia 40mm) insert into the preserved holes on lathe bed. Then lift up with applying wires on both end of the stick.

2) Lifting the machine by a crane.

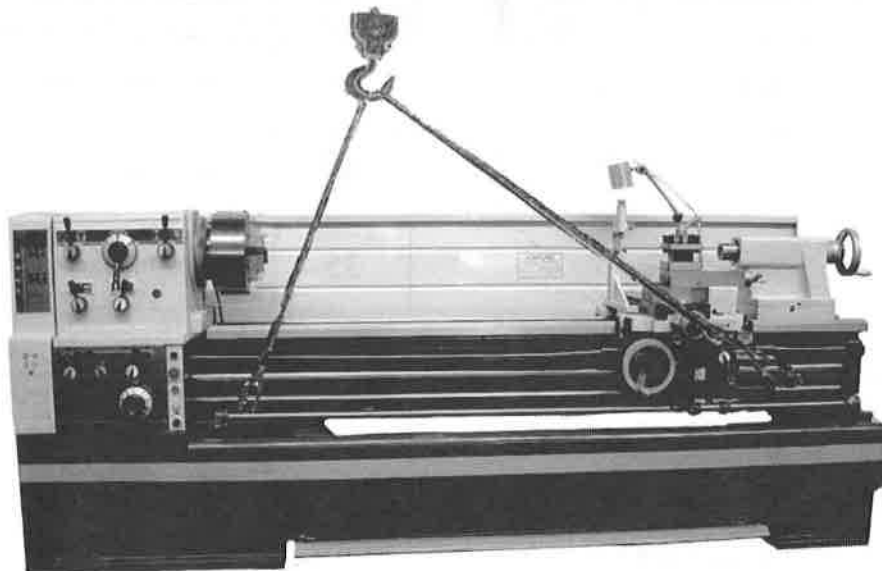
3) Before lifting adjust the position of Lathe Apron and Tailstock to maintain the balance of machine.

4) When the machine was shifted to its destination. always handle with care to put it down. Don't let go of it to hit the ground or it will affect the accuracy of the machine.

Note: Machine weight can be seen in Specification Table.

5) For the adjustment of electric control, keep the distance between machine and wall not less than 600mm.

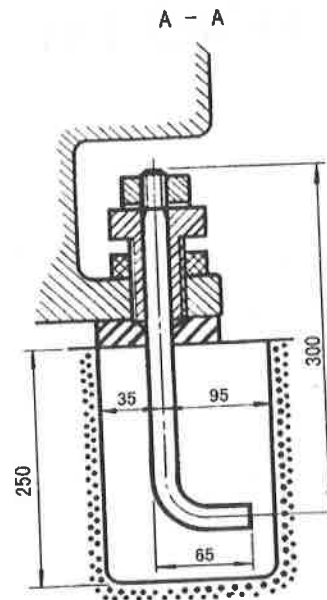
illustration 4-2



4-3 Construction of the Ground

Due to the recent tendency of utilizing Utilizing Ultra-Hard Alloy Steel tools, it surely increase the speed of heavy cutting comparing to the previous steel tools. But, in the mean time, it easily happens to the vibration of the machine. For assuring better cutting result, it requires a very strong and steady construction of ground. (Please refer to right illustration of construction of ground)

illustration 4-3



4-4 Cleaning

All our machine are with a anti-rust oil layer before delivery. After inspection, please remove to clean the slideways, lead screw, shafts and other polished parts by a soft cloth with cleanser (do not use gasoline or cellulose solvent to avoid fire or explosion). Then apply a thin layer of oil for lubricating purpose. Push those movable parts such as: Tool Holder, Tailstock back and forth.

4-5 Level Adjustments

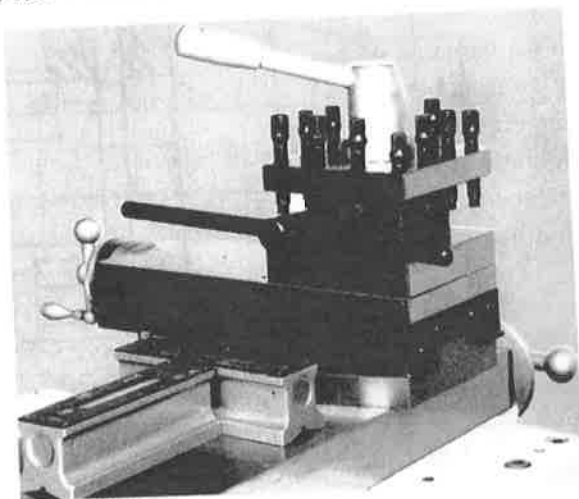
Wait until the fixture screws and cement completely concrete to start adjusting lathe bed horizontally. In doing this, place a leveling instrument (with accuracy 0.02 mm/1000mm) upon the grooves of lathe bed to confirm the level of right and left side. Same procedure for the front and rear leveling.

The allowance of level should be adjusted within 0.04 mm/1000mm.

illustration 4-5

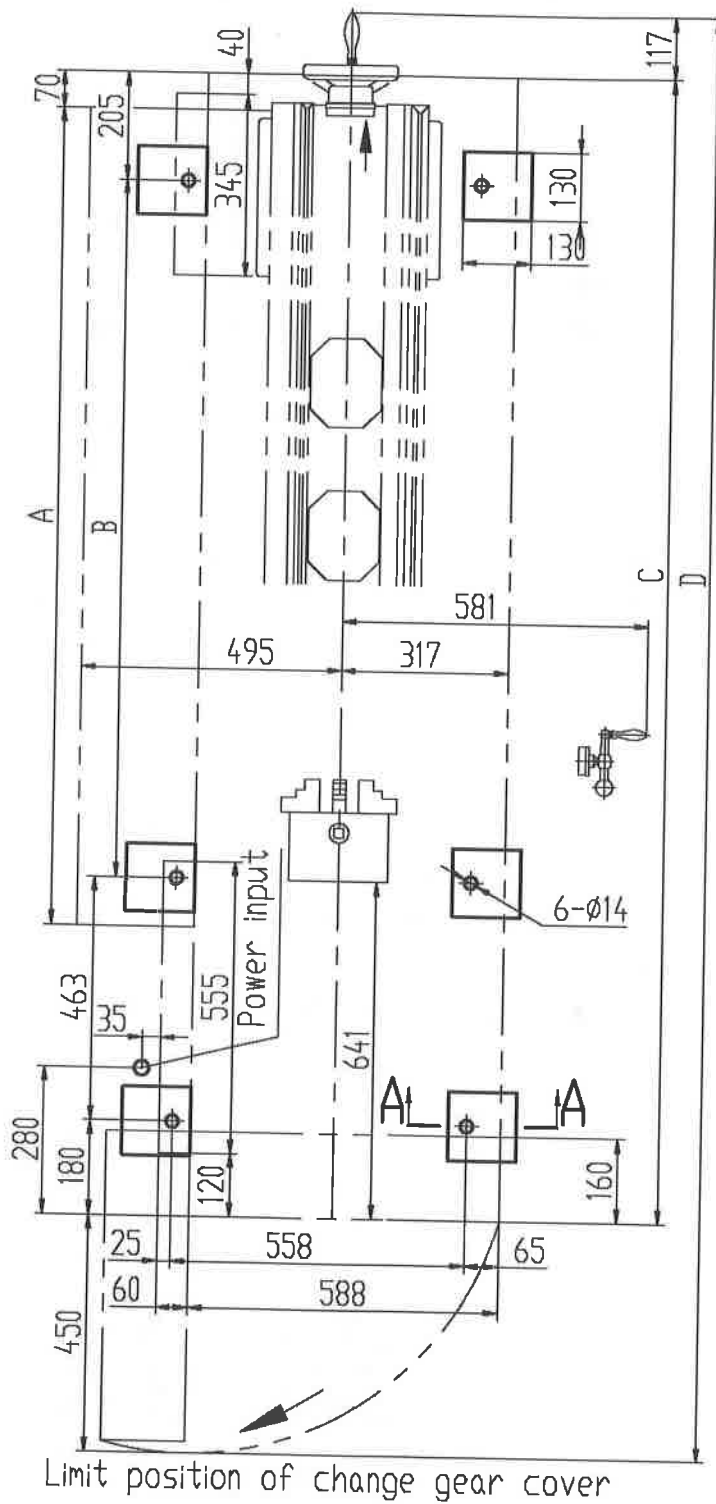
Screw up the nuts, check again, if whatever errors occur due to tightly screw-up thereafter, adjustment may require to be done again.

As per illustration indicated, place two leveling instruments on lathe bed to check the level by pushing them back and forth in its possible maximum moving range.



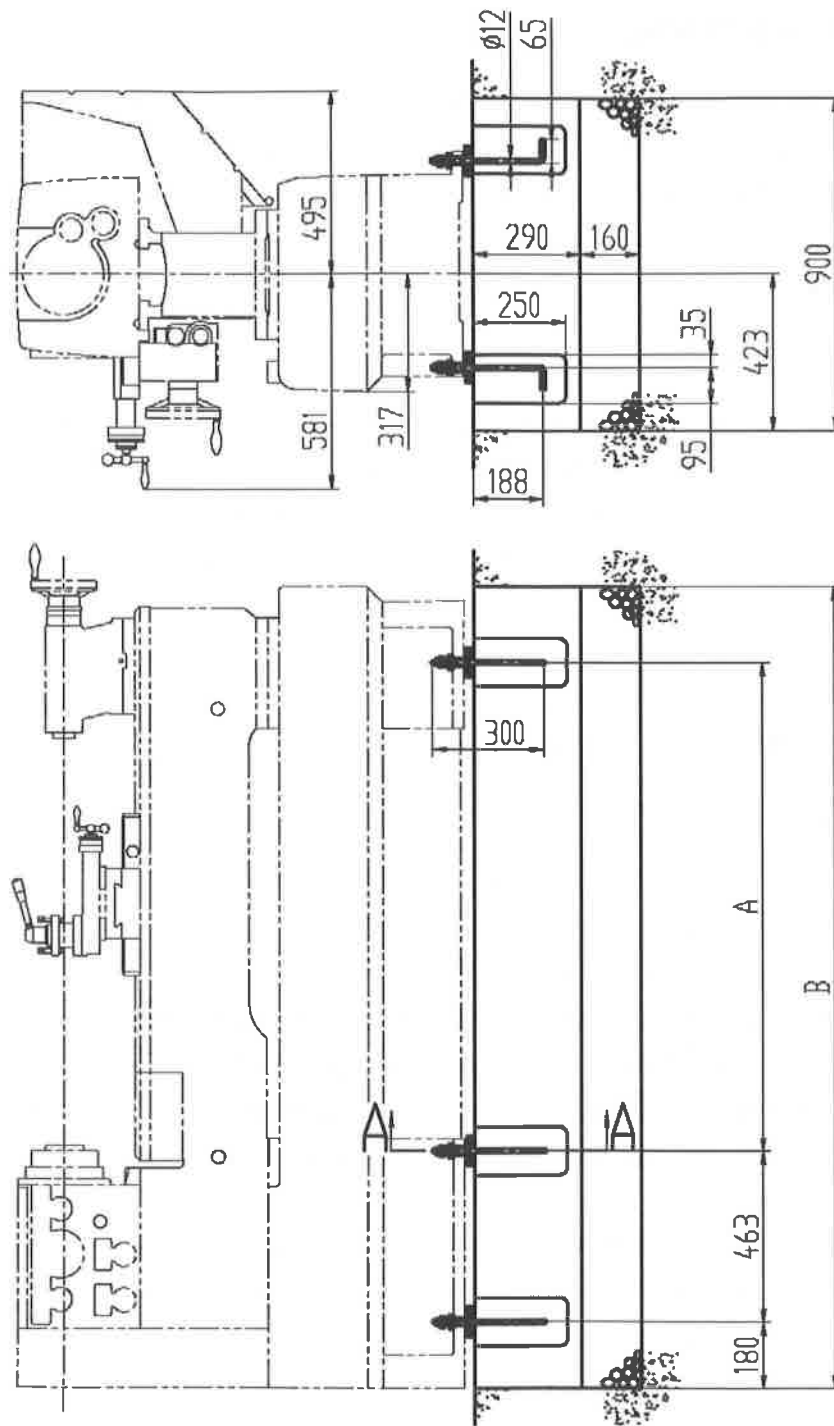
CR6246B LAY-OUT AND FIXING DIAGRAMS

Limit position of tailstock



	A	B	C	D
distance between centers 1000mm	1555	1317	2165	2732
distance between centers 1500mm	2105	1867	2715	3282
distance between centers 2000mm	2605	2367	3215	3782

illustration 4-3



5. Electric Circuit Control

5-1 Electric Wiring

You can find the electric control box by open the metal cover behind the lathe bed. Connect the terminals "R", "S" and "T" to power source. Note that the specification of the electric wires must be above 8 sq. mm of its cross section area. Power switch of the machine and power source should be with fuse and the machine ought to be grounded.

5-2 Electric Device

1) The electric pannel is equipped with cut-off device and solenoid contactor for avoiding from overloaded breakdown of motor.

2) Tumbler Rotation Switch connect with Micro Switch.

3) Foot brake is connected with micro switch, braking prior to the manually starting. Whenever you release the foot brake, you need to re-operate Spindle Control Lever again to resume the operation of main spindle.

4) On top of the control box, there exist a "INTREMITENT" button for intermittent operation of the spindle.

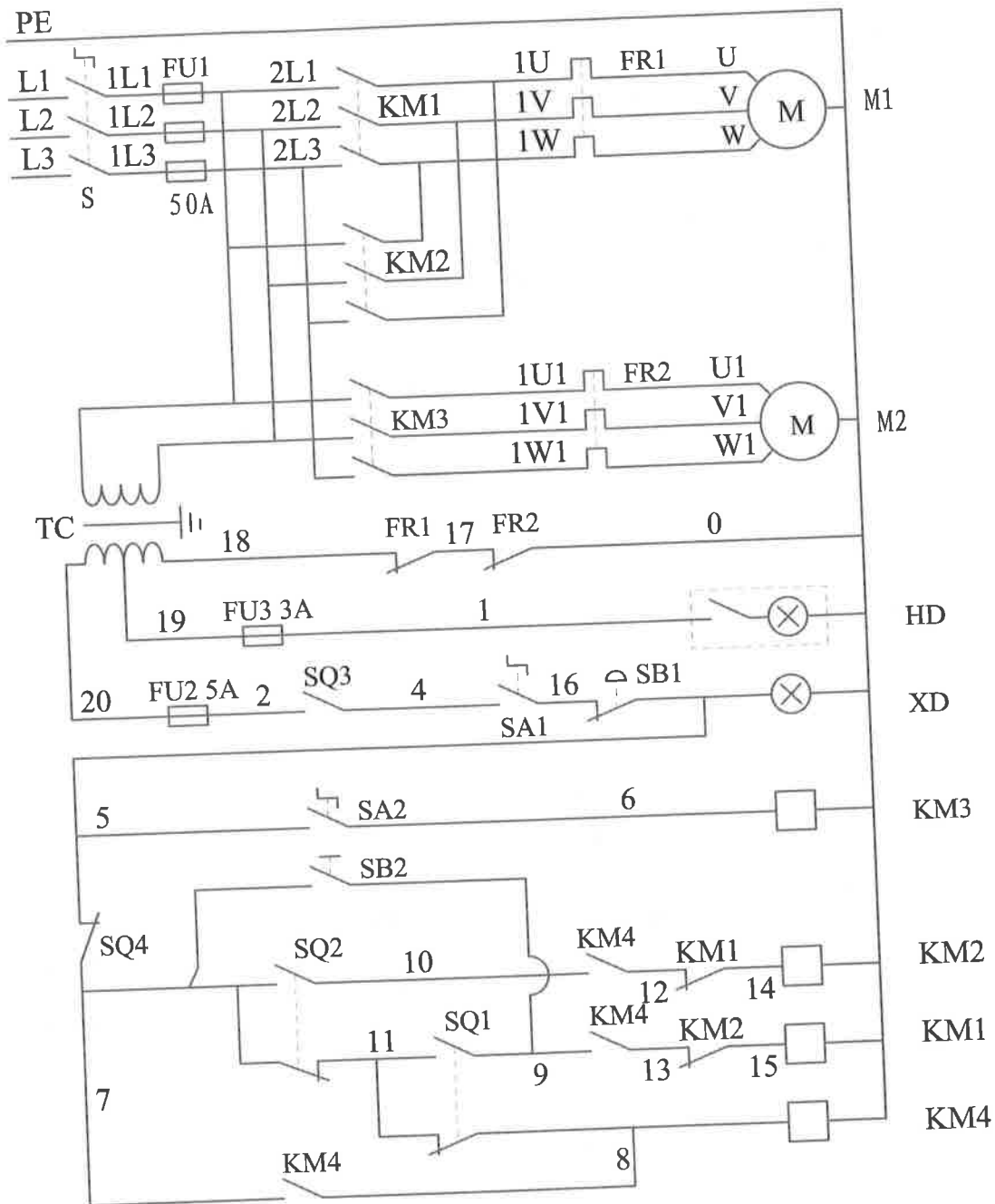
5-3 Important Notes

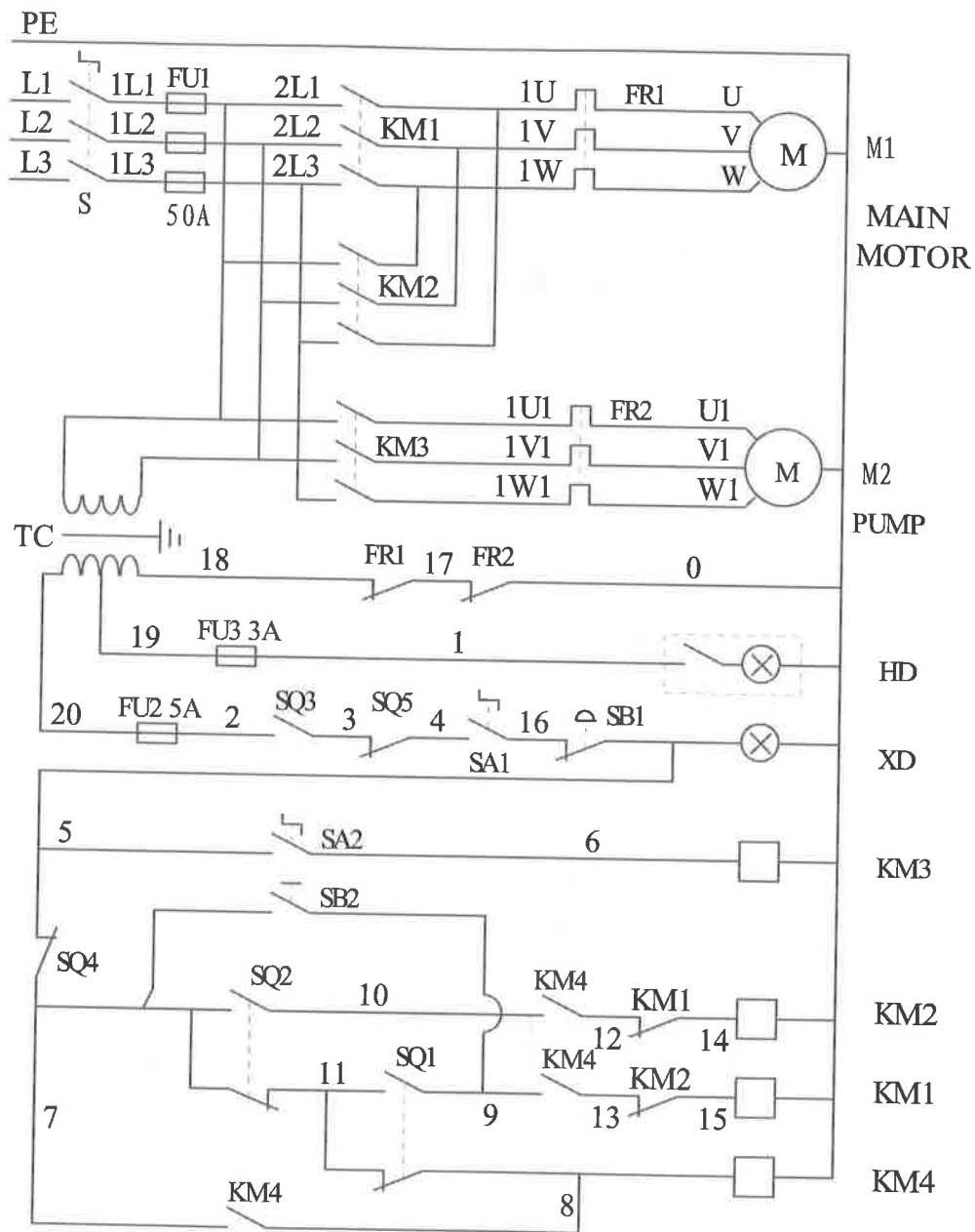
****Check the rotating direction of spindle after wiring:**

1. Turn on the power switch.
2. Slightly push "INTREMITENT" button.
3. Look at the rotating direction of Main Spindle from Tailstock.
4. If it is of anti-clockwise, you've got a right wiring.
5. If oppositely, exchange any of two wires among "R" "S" "T" terminals.

****If the power indicating lamp is on but you can not start the motor. Thus, it is overloaded.**

If it happens the current out of limit, the cut-off device will activate immediately. In this moment, please turn off the power then press slightly the recovery plate near cut-off device in the control box. It will work again. (electric circuit program as illustrated on next page)





6. Test Running

6-1 Operation Symbols

1		High speed revolution	11		Variable adjustment (pressure)(clock - wise-pressure in- creased; counterclock- wise pressure decreased)
2		Low speed revolution	12		Electrical control box
3		Forward revolution	13		Imperial threads
4		Neutral gear	14		Metric threads
5		Reverse revolution	15		Auto feeding rate per revolution
6		Light	16		Pump
7		Intermittent button	17		Power switch- ON
8		Cross feeding	18		Power switch- OFF
9		Longitudinal feeding	19		Oil inlet (hole)
10		Cone clutch	20		

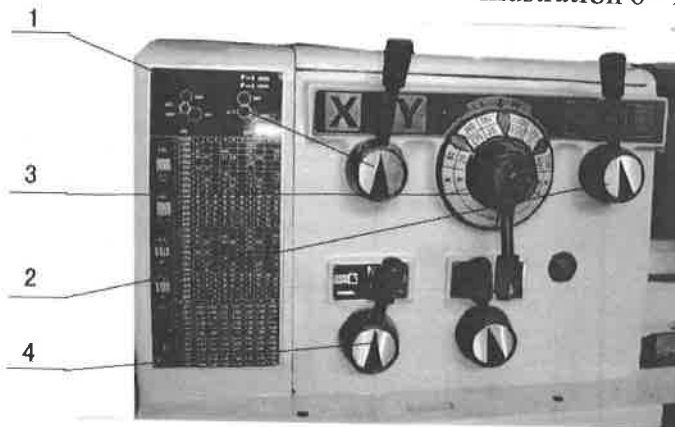
6-2 Transmissions and Stop of Main Spindle

You can start test run when you follow the previous steps as illustrated by the Manual. Position the High/Low Speed Lever (2) in "L", Main Spindle Speed Change Lever (3) in left position, Forward / Reverse Lever (4) in the middle of "N" position. Turn Start Lever (11) Right and push down to rotate obversely the spindle; pull up to rotate reversely. By using Spindle Control Lever to operate the machine in normal condition, use brake when it needs to stop in emergency.

Naturally, in this case, you need to push the Spindle Control Lever again in the middle position to re-start the Spindle.

Turn on Pump switch (10) to start pump. Adjust Valve (33) is used for adjusting the required quantity of cooling water.

illustration 6 - 2

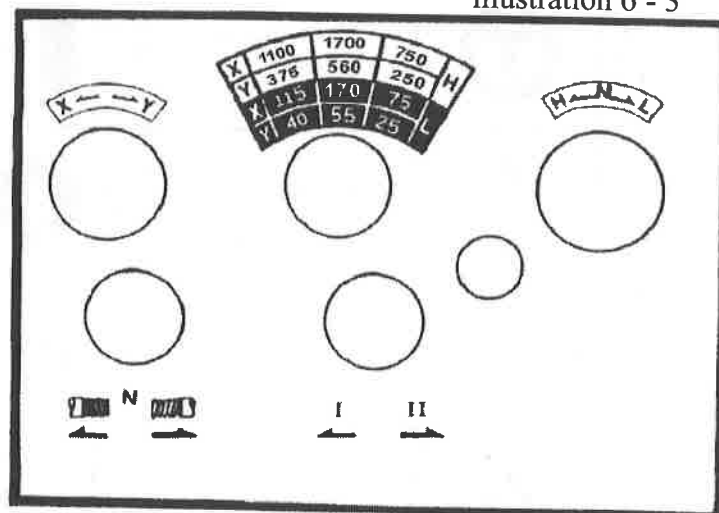


6-3 Selecting Main Spindle Speed

The speed of main spindle is consisted of 3 speed change lever, i.e. Speed Change Lever (1), High/Low Speed Lever (2) and Main spindle Speed Select Lever (3) to perform 12 speed change. When you shift High/Low Speed Lever (2) to the neutral position in between "H" and "L", you can rotate the Main Spindle only with you

illustration 6 - 3

hands. For the safely reason and not to injure the gear every speed change must operate in the time while motor stops. If the teeth of the gear can not be properly engaged, push "INTERMITENT" button (9) then shift Speed Change Lever (1)(2) or (3) to change the rotating speed.

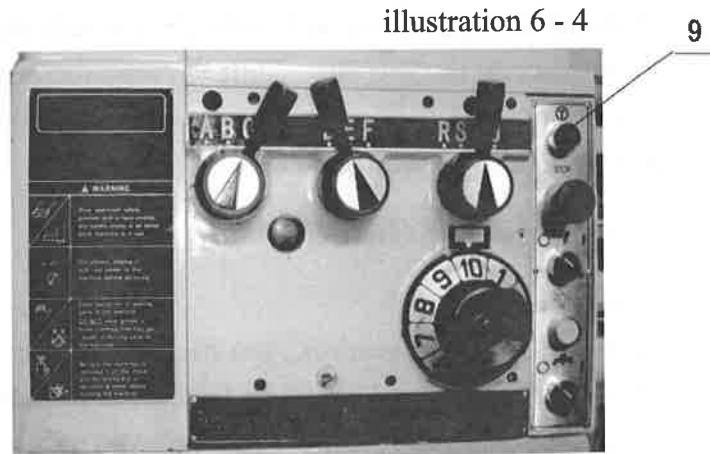


CAUTION: DO NOT CHANGE SPEED WHILE SPINDLE IS RUNNING.

BE SURE ALL GEARS ARE PROPERLY ENGAGED BEFORE STARTING.

6-4 “INTERMITTENT” Operation of Main Spindle

For the convenient way of changing Main Spindle Speed, confirming Feed Speed and Centering objects, the machine equipped with “INTERMITTANT” button (9) located in the right side of Gear Box. Push it down, Main Spindle will immediately rotate forward; and if to release the button, it stops. Note that the intermittent function cannot rotate reversely.

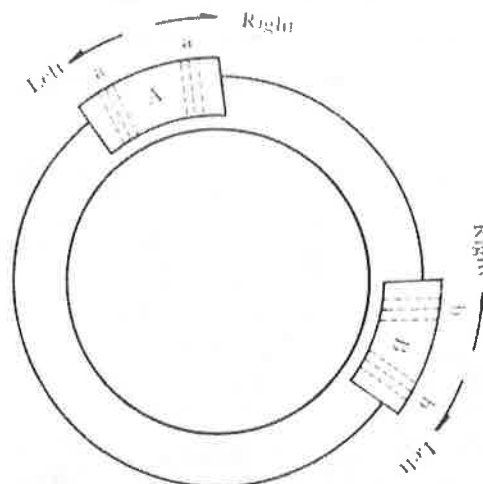


6-5 The Importance and Methods of Spindle Leveling Adjustment

1) Switch on to make the Spindle turn while the Spindle is set up at 1100 r.p.m. By putting the palm of the left hand on the Headstock cover to feel its chatter. An unlevelling Spindle will lead to lathe chatter. Move Leveling Block (either “A” or “B”) left or right to adjust until your left hand feels the minimum chatter.

2) Afterwards, change the Spindle speed to 1700 r.p.m. or 750 r.p.m. and check the Leveling with the same way as we did at 1100 r.p.m. by adjusting the Leveling Block “A” or “B”.

illustration 6 - 5



6-6 Transmissions and Stop of Gear Box

Open the end side cover of Headstock, you will find a gear train transmit the power from Headstock to Gear Box. Shift Forward/Reverse Lever (4) to right side, it runs forward, or to left side, reversely, or it stops if you shift it to the middle position. Never change speed while machine is running.

6-7 Operation of Gear Box

1. Cutting Threads

A special designed gearbox, you need not to use back gears to proceed threading. Please refer to gearbox cutting feed table and shift to appropriate Thread Feed Select Lever (5)(6)(7) respectively then you may obtain required specification.

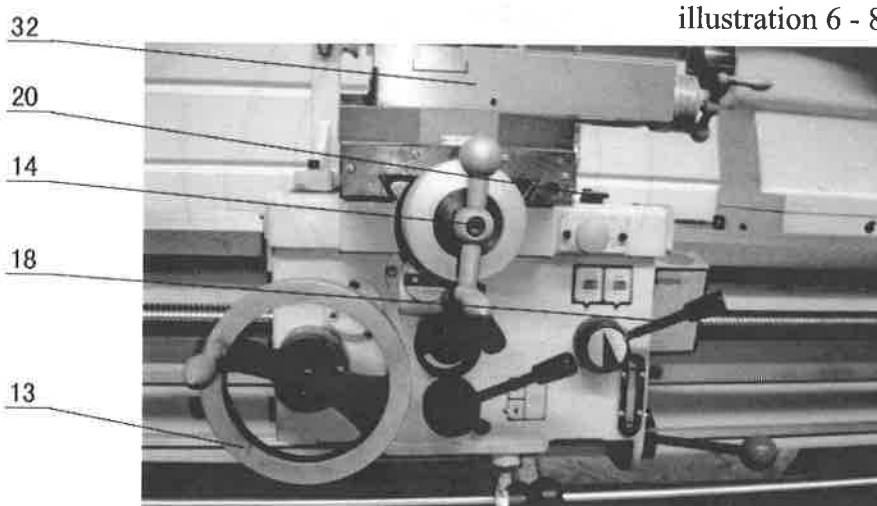
2. Auto Feed

The selection of Auto Feed should be coordinated with the cutting speed and feed speed. Please refer to cutting table and select proper feed speed and follow the instruction plate to shift thread Feed Select Lever (5)(6)(7).

6-8 Manual Operations

Firstly shift the Half Nut Engaged Lever (18) of Apron and Forward/Reverse Lever (4) to "N" position, then you can arbitrarily operate Longitudinal Apron Hand-wheel (13) Cross Slide Handle (14) and Compound Rest Hand-wheel (32). It feeds 17mm per revolution of Apron Hand-wheel. The dial on Cross Slide and Compound Rest is graduated 0.02mm per division and feeds 4mm per revolution.

Release Tool Post Clamping Lever (36) and you can revolve the Tool Post anticlockwise then fix it. In order to lock the Apron, only screw up the Saddle Set Screw (20). If there is any backlash in between Cross Slide and Compound Rest, just to screw up the set screws on the both ends of the sloping plate.



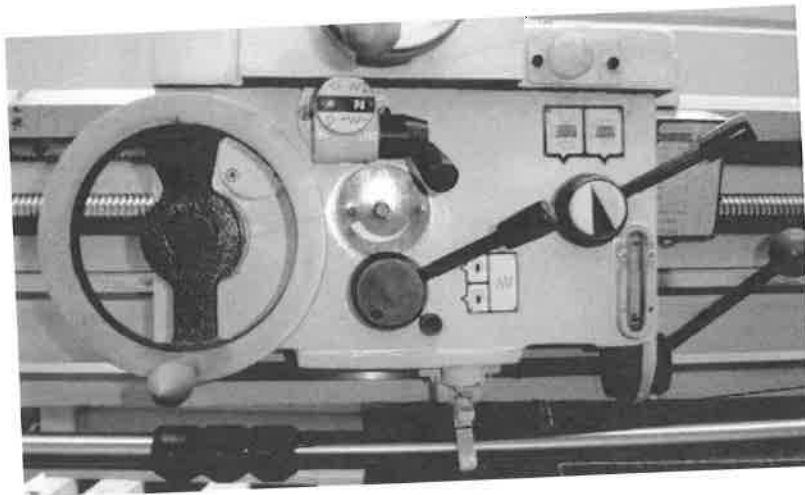
6-9 Auto Feed Operation

- 1) Shift Forward/Reverse Change Lever (4) on Headstock to decided the direction of feeding.
- 2) Select proper Feed Speed by shifting Gear Box Feed Change Lever.
- 3) Push down Half Nut Engaged Lever (18) to proceed threading.
- 4) Push down Longitudinal Feed Select Lever (19) when it needs to feed the tools crosswise.
- 5) Pull up Cross Feed Select Lever (19) when it needs to feed longitudinally.

6-10 Auto Feed Stop Operation

The machine is equipped with Auto Stop Feed in Apron. Screw up the screw on Eccentric Centering Ring (12) and settle in appropriate position. Note that the highest point of Eccentric Centering Ring have to be outward, and no mater it feed forward or backward, you can both set the Eccentric Centering Ring in required position. Test once before beginning to process in preventing to process in preventing unnecessary damage or danger.

illustration 6 - 10



12

6-11 Four Position Auto Feed Stop Operation

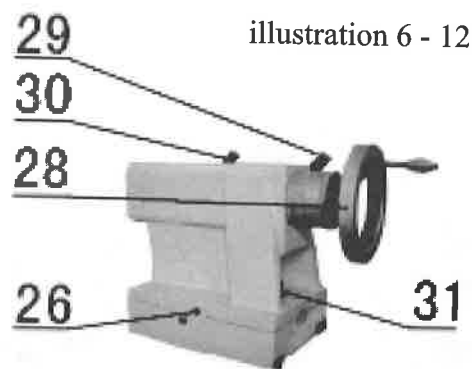
If it requires processing the object to a certain length or object with steps, you may use this utility to complete a multi-section cutting.

- 1) Place Eccentric Centering ring (12) to any require position, the highest point indicates outward. Then fix it. Now you can try to operate Auto Feed of Apron to make sure precisely position by adjusting Eccentric Centering Ring.
- 2) Secondly, turn Auto Centering Lever to second point. Fix second Eccentric Centering Ring as per above method.
- 3) Same way to fix the third, the fourth.
- 4) While Apron is auto feeding forward, only the one Eccentric Centering Ring which

with its highest point outward can touch the Auto Stop Centering (15) and stops Apron Feed, it will pass through all the rest of Eccentric Centering Rings and will not activate at all.

6-12 Tailstock Operation

- 1) Tailstock Hand-wheel Dial is divided 0.02mm per graduation. Tailstock Hand-wheel (28) revolves one cycle clockwise, the quill of Tailstock feeds 5mm. If revolves anti-clockwise, the quill runs backward; when it runs to the last the center will be automatically telecasted.
- 2) By pushing the Tailstock Locking Lever (30) forward, you can steady the quill of Tailstock. If you wish to steady the Tailstock or the lathe bed you only need to push Tailstock Clamping Lever forward.
- 3) Tailstock Centering
Let loose of the Adjustment Screw (26) of Tailstock, then adjust the other side, tighten screws on both sides after adjustment.



7. Cutting Threads

7-1 Lead Screw Dive

Forward Reverse shifting Lever (4) to right side. Lead screw(24) reversely to left side. Lead screw obverse to "N" position, thus, lead screw will not be rotated.

7-2 Cutting Thread

- 1) As soon as you decide to process which threads, Please position Thread Feed Select Lever (5) Thread Feed Change Lever (6) and 10 steps Feed Change Disc (7) in reference to the Thread Table.
- 2) Turn on the power、 drive Lead screw directly.
- 3) Push down Half Nut Engaged Lever (18) and start screw cutting.

7-3 Thread Dial Indicator

- 1) To use Inch Lead screw in processing Imperial Threads.

To precede screw cutting in Imperial Threads, firstly you have to loose Half Nut then to match Half Nut as per instruction of Thread Dial indicator with no necessary to change Lead screw. When you do this procedure of threading, lock the index disc on shaft (1) than take 16T worm gear so that you can process all Imperial threads; that is, you have to follow the indicating plate and not to loose Half Nut while cutting Metric threads.

INDICATOR TABLE		
		
4½ , 11½ 13½ , 23	16	2
5 , 7 9 , 11 3 , 19 26 , 27		4
OTHER EVEN NUMBER THREADS		8

2) To use Metric lead screw in processing Metric Threads

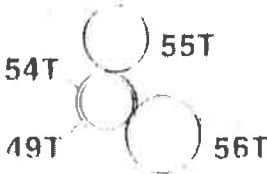
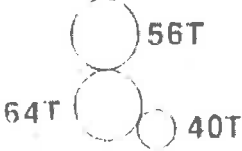
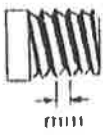
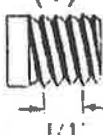
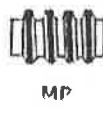
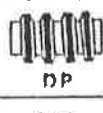
Use 11T worm gear to cut 2.75 and 5.5, but if you wish to repeatedly use Half Nut, it requires to steady it on an original fix scale. For instant, the original point shows scale 1 in index disc when next clutching you must be start it when it also indicates scale 1 for not to damage the threads. Same story, if it is on scale 5, you should also have it on scale 5 in next coming clutching.

Use 14T worm gear for cutting 0.5 and 0.75 and when you repeatedly use Half Nut you don't have to fit it on certain scale. It can be done without any damage on threads in any scales of index disc.

INDICATOR TABLE			
			
11T	2.75	5.5	1
13T	3.25	6.5	
14T	1.75	3.5	
	7		
	0.5	0.75	1~7
	1	1.5	
	2	3	
	4	6	
15T	1.25	2.5	,
	5		
	2.25	4.5	
18T	6.75		

7-4 Thread and Feed Table

CR6246B (Metric)

LEAD SCREW		P=6mm									
CROSS FEED ROD		P=4mm									
											
(V)		(VV)									
	LEVER	1	2	3	4	5	6	7	8	9	10
	ICFS	0.1						0.15			
	ICES	0.2			0.25			0.3			0.35
	ICDS	0.4	0.45		0.5	0.55		0.6	0.65		0.7
	ICFU							0.75			
	ICFS	0.8	0.9								
	ICDU	1			1.25			1.5			1.75
	ICFU	2	2.25		2.5	2.75		3	3.25		3.5
	ICFU	4	4.5		5	5.5		6	6.5		7
	ICDU	8	9		10	11		12	13		14
	IAER	64	72	76	80	88	92	96	104	108	112
	IAFR	32	36	38	40	44	46	48	52	54	56
	IBFR	16	18	19	20	22	23	24	26	27	28
	IAER	8	9	9 1/2	10	11	11 1/2	12	13	13 1/2	14
	IAFR	4	4 1/2	4 3/4	5	5 1/2	5 3/4	6	6 1/2	6 3/4	7
	IBFR	2	2 1/4	2 3/8	2 1/2	2 3/4	2 7/8	3	3 1/4	3 3/8	3 1/2
	ICES	0.1						0.15			
	ICDS	0.2			0.25			0.3			0.35
	ICFS	0.4	0.45		0.5	0.55		0.6	0.65		0.7
	ICDU							0.75			
	ICES	0.8	0.9								
	ICFU	1			1.25			1.5			1.75
	ICFU	2	2.25		2.5	2.75		3	3.25		3.5
	ICDU	4	4.5		5	5.5		6	6.5		7
	IAFR	64	72	76	80	88	92	96	104	108	112
	IBER	32	36	38	40	44	46	48	52	54	56
	IAER	16	18	19	20	22	23	24	26	27	28
	IAFR	8	9	9 1/2	10	11	11 1/2	12	13	13 1/2	14
	IBFR	4	4 1/2	4 3/4	5	5 1/2	5 3/4	6	6 1/2	6 3/4	7
	LEVER	1	2	4	5	7	8	10			
	ICFT	0.031	0.034	0.038	0.041	0.045	0.049	0.053			
	ICET	0.062	0.068	0.076	0.082	0.090	0.098	0.106			
	ICDT	0.124	0.136	0.152	0.164	0.180	0.196	0.212			
	ICFT	0.248	0.272	0.304	0.328	0.360	0.392	0.424			
	ICET	0.496	0.544	0.608	0.656	0.720	0.784	0.848			
	ICDT	0.992	1.088	1.216	1.312	1.440	1.566	1.700			
	ICFT	0.014	0.016	0.017	0.019	0.021	0.023	0.024			
	ICET	0.028	0.031	0.035	0.038	0.042	0.045	0.049			
	ICDT	0.056	0.062	0.070	0.077	0.084	0.091	0.098			
	ICFT	0.112	0.125	0.140	0.154	0.168	0.182	0.196			
	ICET	0.224	0.250	0.280	0.308	0.338	0.364	0.392			
	ICDT	0.448	0.500	0.560	0.616	0.672	0.728	0.784			

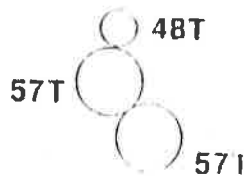
CR6246B (Inch)

LEAD SCREW

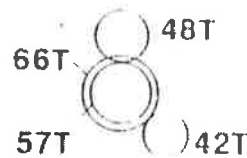
4 T.P.I.

CROSS FEED ROD

10 T.P.I.



(V)



(VV)

(V)  mm	LEVER	1	2	3	4	5	6	7	8	9	10
	I CFS	0.1						0.15			
	I CES	0.2			0.25			0.3			0.35
	I CDS	0.4	0.45		0.5	0.55		0.6	0.65		0.7
	I CEU							0.75			
	I CFS	0.8	0.9								
	I CDU	1			1.25			1.5			1.75
	I CFU	2	2.25		2.5	2.75		3	3.25		3.5
	I CEU	4	4.5		5	5.5		6	6.5		7
	I CDU	8	9		10	11		12	13		14
(V)  T/1"	I AER	64	72	76	80	88	92	96	104	108	112
	I AFR	32	36	38	40	44	46	48	52	54	56
	I BFR	16	18	19	20	22	23	24	26	27	28
	I AER	8	9	9 1/2	10	11	11 1/2	12	13	13 1/2	14
	I AFR	4	4 1/2	4 3/4	5	5 1/2	5 3/4	6	6 1/2	6 3/4	7
	I BFR	2	2 1/4	2 3/8	2 1/2	2 5/8	2 3/4	3	3 1/4	3 3/8	3 1/2
(VV)  MP	I CES	0.1						0.15			
	I CDS	0.2			0.25			0.3			0.35
	I CFS	0.4	0.45		0.5	0.55		0.6	0.65		0.7
	I CDU							0.75			
	I CES	0.8	0.9								
	I CFU	1			1.25			1.5			1.75
(VV)  DP	I AFR	64	72	76	80	88	92	96	104	108	112
	I BER	32	36	38	40	44	46	48	52	54	56
	I AER	16	18	19	20	22	23	24	26	27	28
	I AFR	8	9	9 1/2	10	11	11 1/2	12	13	13 1/2	14
	I BFR	4	4 1/2	4 3/4	5	5 1/2	5 3/4	6	6 1/2	6 3/4	7
	(V)  in/O	LEVER	1	2	4	5	7	8	10		
I CFT		0.0011	0.0013	0.0014	0.0016	0.0017	0.0018	0.0020			
I CET		0.0023	0.0025	0.0028	0.0031	0.0034	0.0037	0.0040			
I CDT		0.0045	0.0051	0.0056	0.0062	0.0068	0.0073	0.0079			
I CFT		0.0090	0.0102	0.0112	0.0124	0.0136	0.0146	0.0158			
I CET		0.0181	0.0203	0.0224	0.0248	0.0272	0.0293	0.0316			
I CDT		0.0362	0.0406	0.0440	0.0496	0.0544	0.0586	0.0633			
I CFT		0.00033	0.00037	0.00041	0.00045	0.00049	0.00053	0.00057			
I CET		0.00066	0.00074	0.00082	0.00090	0.00098	0.00107	0.00115			
I CDT		0.00131	0.00148	0.00164	0.00180	0.00197	0.00213	0.00230			
(V)  in/O	I CFT	0.00262	0.00295	0.00328	0.00360	0.00394	0.00426	0.00459			
	I CET	0.00525	0.00590	0.00656	0.00720	0.00787	0.00853	0.00918			
	I CFT	0.0105	0.01181	0.01312	0.01440	0.01574	0.01706	0.01837			

8. Lubrication

8-1 Lubrication in headstock

An oil-splash feed is utilized in the lubrication system of Headstock. On top of the Headstock there grooves surrounded providing lubricant flow into the spindle bearing along the groove, then finally flow down on the bottom of the box. When supplying the lubricant, remove the cap of oil sight glass. To drain the waste oils away, a drainer hole located in the right side downward of the Headstock.

Please take good care of checking whether the Headstock has been filled up with lubricant or not when you purchase the machine. If negative, use as show in the figure (8-4) lubricating oil. We request you to change the lubricant at first month and then do once every two months so to assure the gears are working in the best conditions.

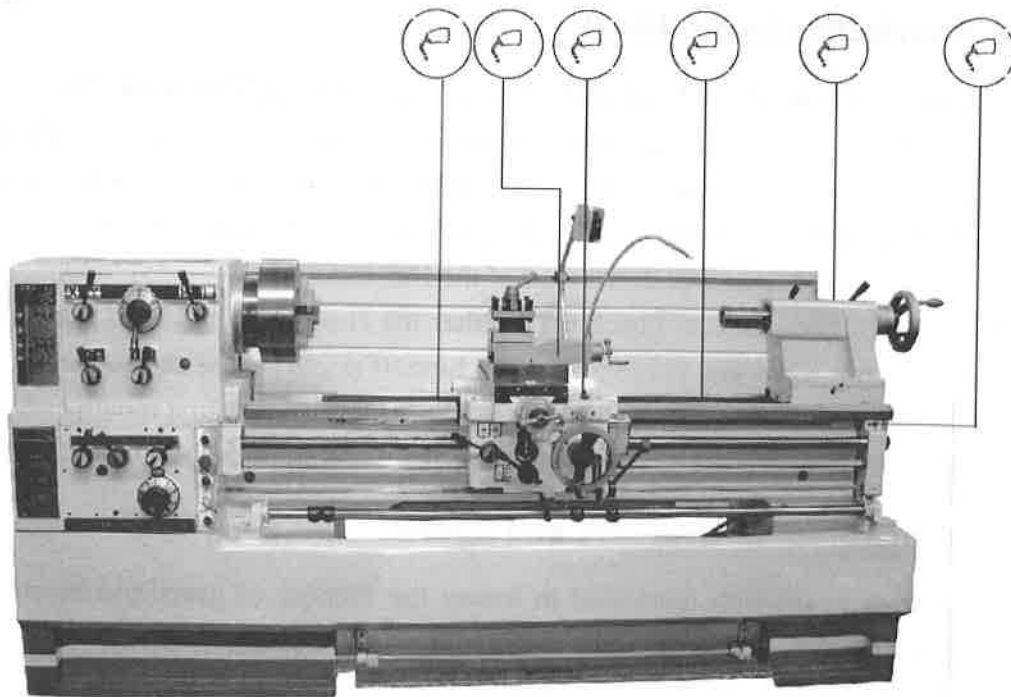
8-2 Lubricating in Gear Box and Apron

- 1) Gear Box is oil-bath lubricated to insure the lifetime of gears and bearing. It is recommended the lubricant to be changed every six months.
- 2) Apron is also oil-bathed. If the oil quantity in Apron is lower than center level of oil sight glass, then it is time to add up some oil to standard level.

8-3 Useful Reference Lubricating Table for other Mechanism

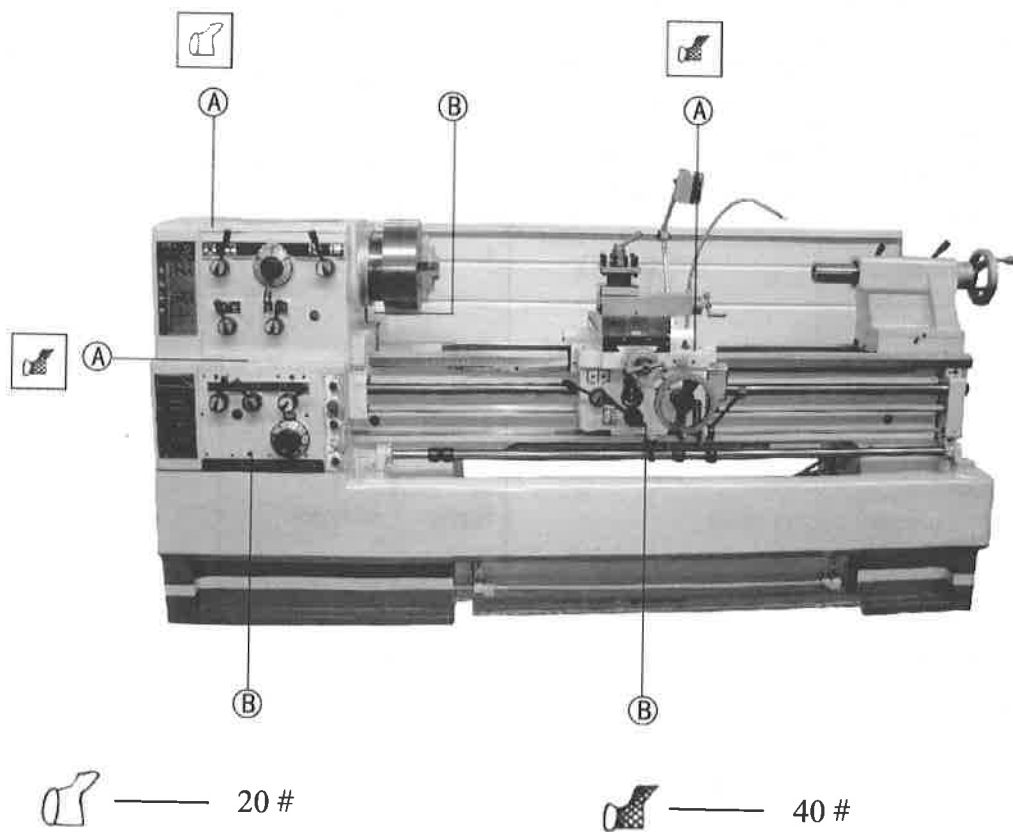
No.	Location	How	How many	For how long to	Oil exchange time
1	Headstock	Remove the screws of filler hole on left side up	L	Once a month	One month, then every two month
2	Gear Box	Open top cover remove the screws of filler hole	L	Once a month	Every half year
3	Apron	Remove the screws of filler hole	L	everyday	
4	Compound Rest	By oilcan	approp.	everyday	
5	Auto Feed lever	By oilcan	approp.	everyday	
6	Tailstock	By oilcan	approp.	everyday	
7	Lead screw	By oilcan	approp.	everyday	
8	Bracket of Three Rods	Remove the screw of filler hole	approp.	everyday	
9	Bedway	Press the manual oil pump	approp.	everyday	

8-3 Add oil once a day



8-4 Lubrication Location

(A) Filler hole (B) Drainer hole



9. Maintenance & Servicing

For a better acknowledgement to this lathe, either in operation or some simple way of trouble-shooting or servicing, to bring the machine to the utmost function, we are now stating some important points as below.

9-1 Headstock

1) Prevent from oil leakage from top cover of Headstock:

Before covering the top cover of Headstock, whenever it is removed, please wipe to clean the contact surface and apply some grease on it. Make sure it is tightly securing by setscrews.

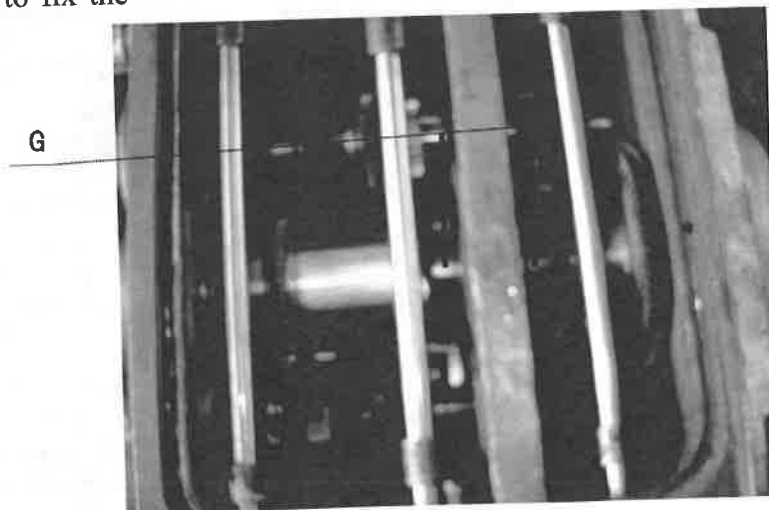
2) Prevent from blocking up the oil circuit:

The leakage of front headstock cover mostly caused by over-filling the oil or a block-up of oil circuit. In this moment, remove the Headstock cover first, then blow the air jet into two oil circuit hole, which is on up side and down side of front Spindle bearing, in the same time to rotate the Spindle and it will work again.

3) Adjustment on Spindle Bearing:

The front and the intermediate section of spindle roller bearing. For high accuracy and to meet the request of operation function, you may be asked to adjust the appropriate pressure on bearing. After a long period of operation, nut "G" probably will get loose and result the "wave trace" on cutting surface. You need to adjust it at this moment. Use a hexagon socket wrench to remove the setscrew and install back with the fixing nut again properly. Only an appropriate pressure is enough. Never have it too tight, as it will lead to the bearing to over-heated or damage the rolling surface of bearing and lessen its dynamics. Make sure to fix the setscrew completely after adjustment as illustrated.

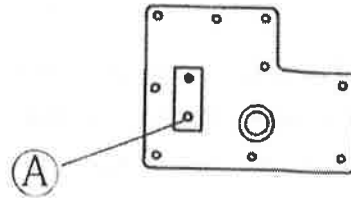
illustration 9-1-3



9-2 Apron & Saddle

1) Filler hole location of Apron:

On the right platform of Saddle. The filler hole has oil plug indicates "OIL".



2) Drainer Hole location of Apron:

On the bottom cover of Apron, as illustrated left, position "A" (also can be seen in front side of Apron downward)

3) Model No of Apron lubricant & change period

Model No is way oil. ISO UG 68, suggestion changing period is every half a year.

4) Adjustment for the loosely Half Nut Engaged Lever:

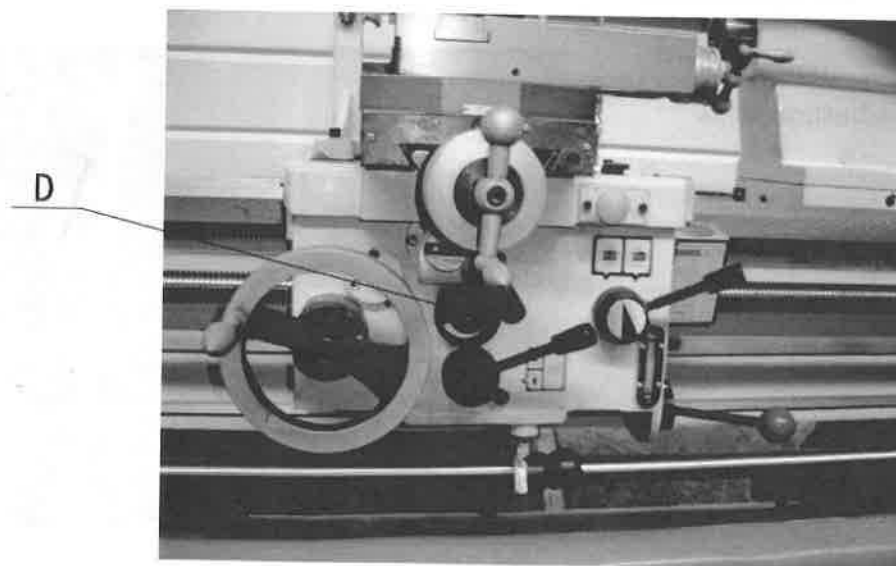
After long period of operation, the Half Nut Engaged Lever will get loose, please adjust as per following steps:

- Remover Thread Dial Indicator, there is four adjustment screws can be seen.
- Adjust those four screws to proper pressure as soon as to push the lever.
- Install Thread Dial Indicator back.

5) Feed load adjustment (cross feed & longitudinal feed):

There is a conical clutch "D" in the middle of Apron which is an overload protector device. The capacity of safety load is about 12 kg. Appropriate load can be adjusted by a hexagon socket screw in the middle of apron. Turn clockwise to increase load; anti-clockwise it decrease. A proper load capacity can be tested by pressing hand-wheel handle while auto feed operates to see if it wills automatically cut-off when load is over 12 kg.

illustration 9-2-5



9-3 Gear Box

1) Filler hole location of Gear Box:

Under the top cover of gearbox, remove the top cover there is an oil plug indicates, "OIL" where filler hole is in. as per illustration "A".

2) Drainer hole location of Gear Box:

On the left side of the ten-step speed change the disc downward. The drainer hole is in the screws with hexagon socket nut as illustrated "B" where an arrow point.

3) Oil brand and oil exchange time:

We suggest as show in the figure 8-4 and please change it every half-year.

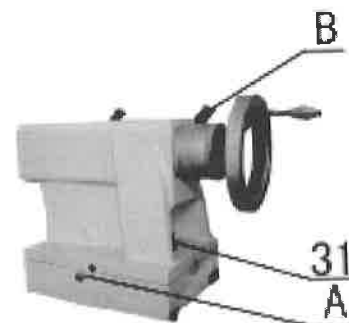
illustration 9-3



9-4 Adjustment of Tailstock Centering

1) To adjust the accuracy of Tailstock, get loose two hexagon socket screws which connect the Tailstock body and Bottom Plate, adjustment to be done depends on what you expect it to which direction; if you need it to be in cline front, you must let loose the adjustment screws then correct it to required accuracy minutely, then install the hexagon socket screws and the adjustment screws. Never have it too tight or the Clamping Lever will be come heavier, as per illustrated "A".

2) If you feel the Release Hand-wheel is still too heavy although the Tailstock quill has been fixed. This is because the Clamping Block cannot be released freely. You have to push forward the Clamping lever a bit and it will recover in good order again.

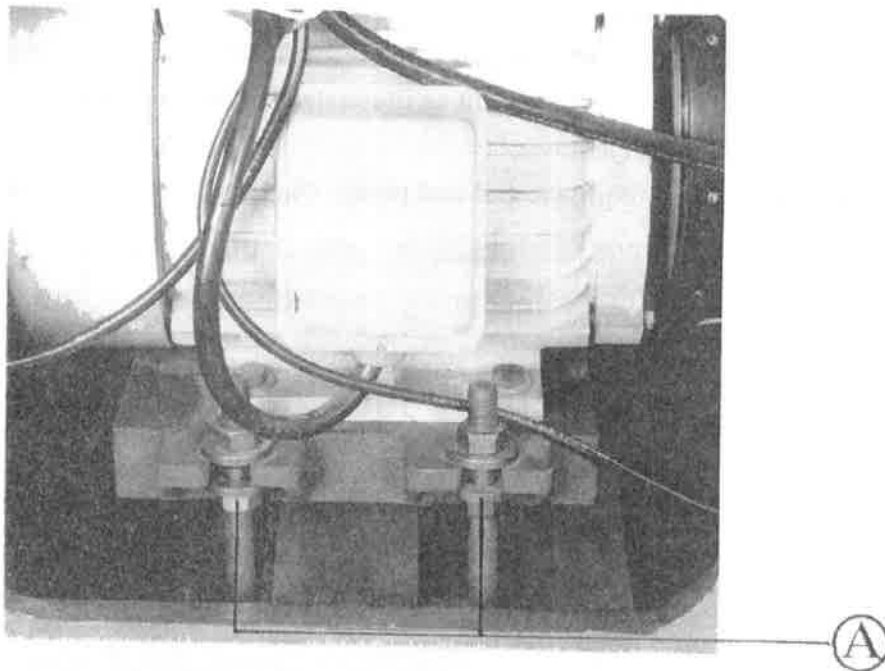


9-5 Belt Tension Adjustment

After long period of working, belts will get slacked, so you need to adjust it for some times. It is as:

- 1) Open the cover on rear left side of the lathe.
- 2) Release adjustment Nut "A", lower the motor to proper height and bring the belt to certain tension.
- 3) Install the Nut tightly.

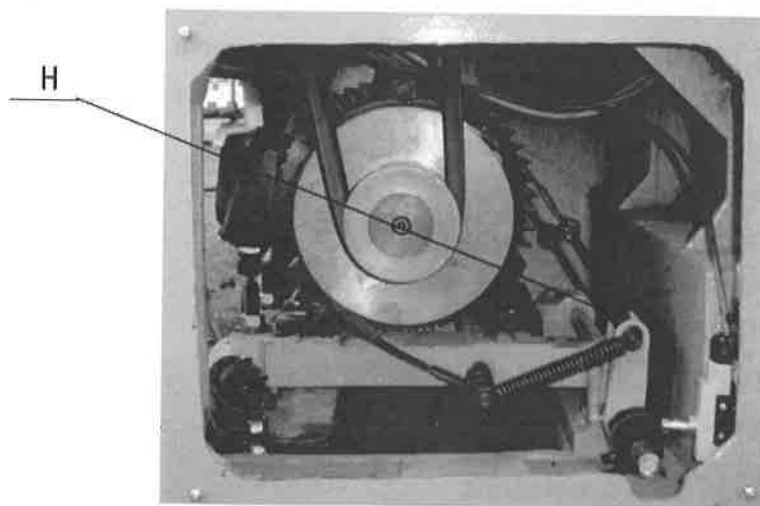
illustration 9-5



9-6 Foot Brake Belt Adjustment

A brake pad fading may caused the slack of brake belt. Adjust Nut "H" on brake belt. Open side rear cover, remove top nut, push bottom nut to appropriate position, then install two nuts to complete adjustment. Install the side rear cover.

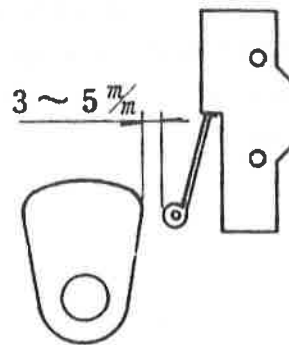
illustration 9-6



9-7 Brake and Micro Switch Adjustment

Foot brake is linked to Micro Switch. It needs to maintain a backlash of 3-5mm from Brake Cam to the touching head of the Micro Switch. Always disconnect the power to break the machine or it will cause the fading of brake pad. After stepping the foot brake, needs to reiterate the spindle control lever to make the spindle revolute again.

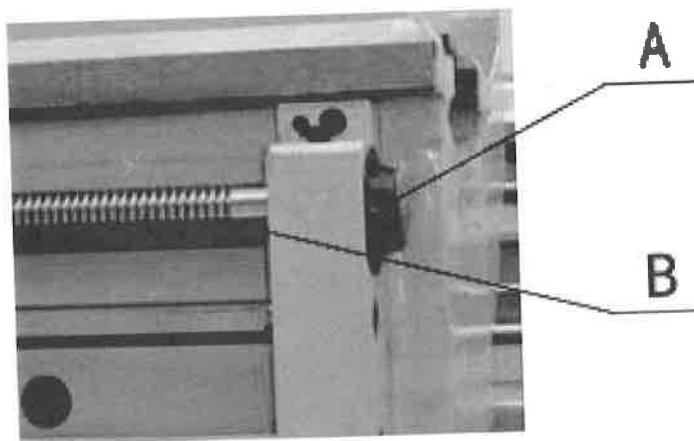
illustration 9-7



9-8 Adjustments to the Backlash of Lead screw

When it happens to some pile-up threads during processing, it is caused by the backlash on Lead screw. Adjust the packing nut appropriately on rear side of the Lead screw. Open the cover on rear side of Lead screw Bracket, turn nut "A" very tight with no backlash left behind. (To check the result by pushing down Half Nut Handle, turn Apron Hand-wheel to rotate, clasp the contact point between Gear Box and Lead screw. Make sure there is no backlash created). Install "A" nut and side cover.

illustration 9-8



9-9 Maintenance for Cutting Liquid Coolant Pump

If there is no cutting liquid flow out when you start the motor switch, you have to check whether motor has activated or not, secondly to check whether the cutting liquid in tank is over the level, if not, needs to add more liquid. While re-starting the pump if you still can not see any liquid were pumped out, it must be some block-up in pump or leakage, and it has to be taken apart for servicing or cleaning.

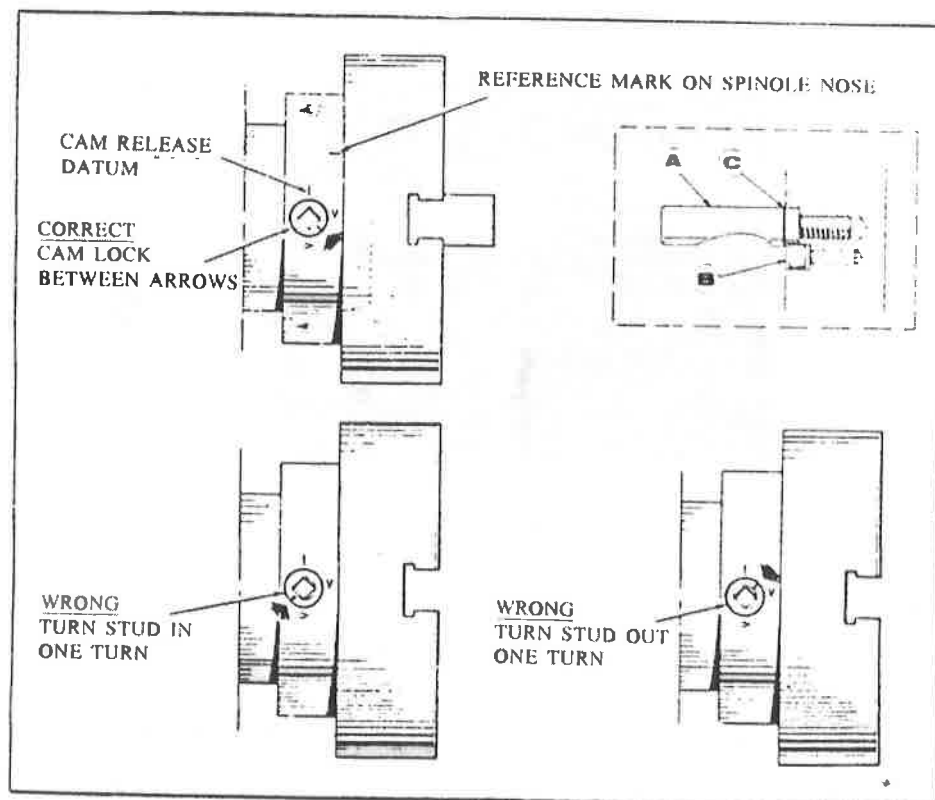
10. Chucks and Chucks Mounting

When fitting chucks or faceplates, first ensure that spindle and chuck tapers are scrupulously clean and that all cams lock in the correct positions; see Fig. It may be necessary when mounting a new chuck to re-set the cam lock studs (A). To do this, remove the cap-head locking screws (B) and set each stud so that the scribed ring (C) is flush with the rear face of the chuck-with the slot lining up with the locking screw hole.

Now mount the chuck or faceplate on the spindle nose and tighten the six cams in turn. When fully tightened, the cam lock line on each cam should be between the two V marks on the spindle nose.

If any of the cams do not tighten fully within these limit marks, remove the chuck or faceplate and re-adjust the stud as indicated in the illustration. Fit and tighten the locking screw (B) at each stud before remounting the chuck for work. A reference mark should be made on each correctly fitted chuck or faceplate to coincide with the reference mark scribed in the spindle nose.

This will assist subsequent remounting. Do Not Interchange Chucks Or Face Plates Between Lathes Without Checking For Correct Cam Locking.



11. Preventive Maintenance

1. Daily Inspection:

Inspection of lathe is carried out on basis of each shift. The inspection work accords to the following item 1-1.

1-1 Check before start the motor.

- 1) Clean-up of machine: Dust, chips and other articles should be removed from sliding surface of machine to make the rotating or sliding parts performing easy and smoothly. All other static parts are often also cleaned to avoid the corrosion.
- 2) Gearing and oiling: Regular oiling should be done every day (see lubrication plan sheet) to keep the machine properly lubricated.
- 3) Check all the running parts not too tight, or loose. Bearings of headstock, longitudinal and cross feed, tool holders etc would be examined and adjusted by hand to proper fitness.
- 4) Check the sensitivity & reliability of all manual control levers:
To try the speed change rate function of headstock feeds and apron in gear box and inspect their starting, stopping and forward & reverse action whether they are sensitive and reliable or not.
- 5) Fixture and fig of headstock, tailstock and tool holder Tight clamping between tailstock and bed surface, close running fit of spindle in tailstock, clamp bolts of tool holder, and figs on headstock.

1-2 Check after start the motor.

- 1) To check electrical control system:
Try to put “on” and “off” button and examine the sensitiveness of starting, stopping and pilot lamp strictly.
- 2) The sensitivity and reliability of mechanical control device:
Control levers for forward and reverse main spindle, automatic feeds and threads change should be sensitive and reliable. Automatic control devices for longitudinal and cross feed, gear change threads change, carriage, and spindle direction change should be accurate also.
- 3) Limitation of noise and vibration:
When starting max speed of headstock spindle on no loading basis, check the noise and vibration whether they are over specified limit or not.
- 4) Coolant system:
Check the quantity of coolant oil and start the oil pump for inspecting its function and leakage.
- 5) Lubricating system:
Examine all Lubricating system carefully and ensure all flowing line without

obstacles.

1-3 Caution during operation:

1) Temperature of bearings.

Touch the main bearing by hand and feel the temperature is normally or not.

2) Temperature of motor:

Feel the temperature of motor bearing at the case of full load.

3) Noise and vibration:

If you find the noise and vibration of the machine are abnormal or irregular. Stop the machine immediately for inspection and adjustment.

4) Quality of products:

If you discover the quality of products is out of limit, stop the machine at once for finding the causes of defects.

5) Safety affairs:

- a. Must stop operation when you leave the machine.
- b. When changing main spindle speed or feeding speed stop running first.
- c. All tools and products are strictly not allowing to be left on sliding surface of bed.

1-4 Check after operation:

1) Cleaning and collection of all tools:

All tools should be kept clean first then put back to original position (tool cabinet).

2) Proper position of tailstock, carriage & tool holder:

Tailstock, carriage & tool holder should be placed to proper position.

3) Clean-up of machine:

All of the oily matters, chips etc, on the machine should be removed completely and put a thin lubricating oil on the sliding surface of machine to prevent the corrosion.

2. Weekly Inspection:

1) Lubricating system:

Clean up the whole lubricating system and replenish with fresh lubricating oil.

2) Cooling system:

Clean up the whole cooling system and replenish with new cooling oil.

3) Transmission system:

Check the damage of rubber V-belt and readjust the tensile strength of V-belt.

3. Monthly Inspection:

1) Dismantle and clean all the dust, chips and foreign matter from moving parts.

2) Electrical system:

Carefully examine the connection of all electrical wires, terminals and switches,

which occasionally have been damaged by chips or other.

4. Semi-yearly Inspection:

1) Change oil in gearbox:

Remove the used oil from gearbox of headstock, feed and replenish with fresh oil.

2) Check the wear and tear of all gears and packing:

Inspect the damage of all gears in various box, spindle and bearings, and packing.

Repair or replace it if necessary.

3) Check the clearance fit of complicated feed mechanism:

Check the clearance fit between feeding screw lever and nut and main screw spindle and nut whether they are right or not.

4) The stability of machine body:

Tighten up the foundation bolts of machine body to the ground and make the body stable.

5. Yearly Inspection:

1) Positioning and leveling:

According to the inspection regulation, recheck the positioning and leveling after a year service.

2) Inspection for accuracy:

According to the regulation. Inspection work for accuracy should be rechecked. If the accuracy is over specified limit, the adjustment or alignment will be done accordingly.

3) Bearing inspection:

Reexamine the insulating materials and clearance fit & lubrication of all bearings.

4) Inspection for appearance:

- a. If paints are peeled off, repaint it with the same color.
- b. Check the exposed parts whether they have been damaged, corroded, or deformed, repair or replace them if necessary.

12. Trouble shooting portion of machine

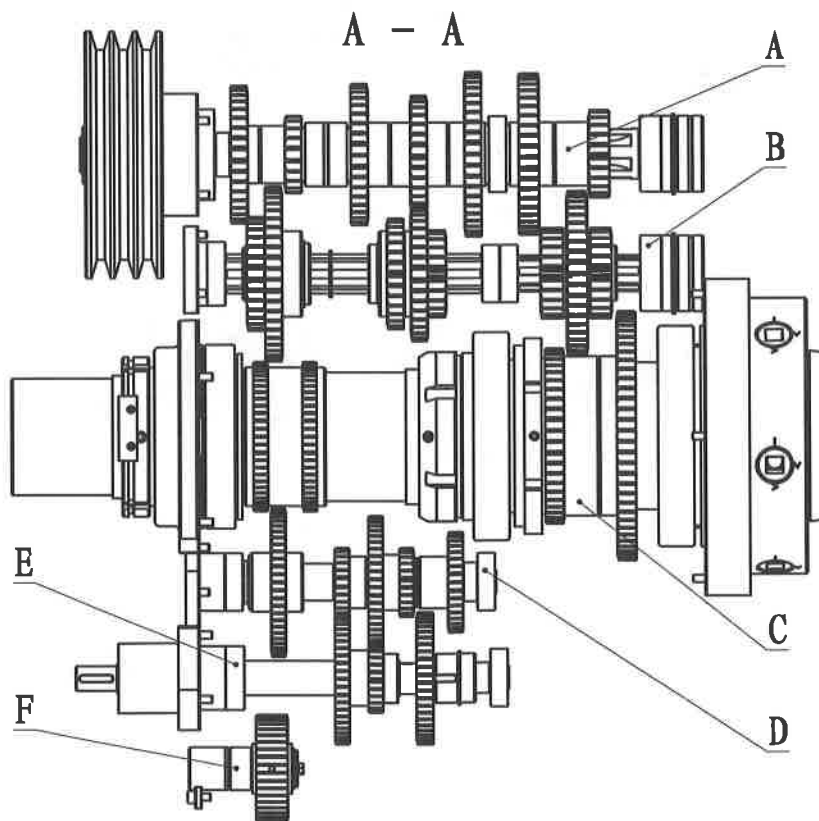
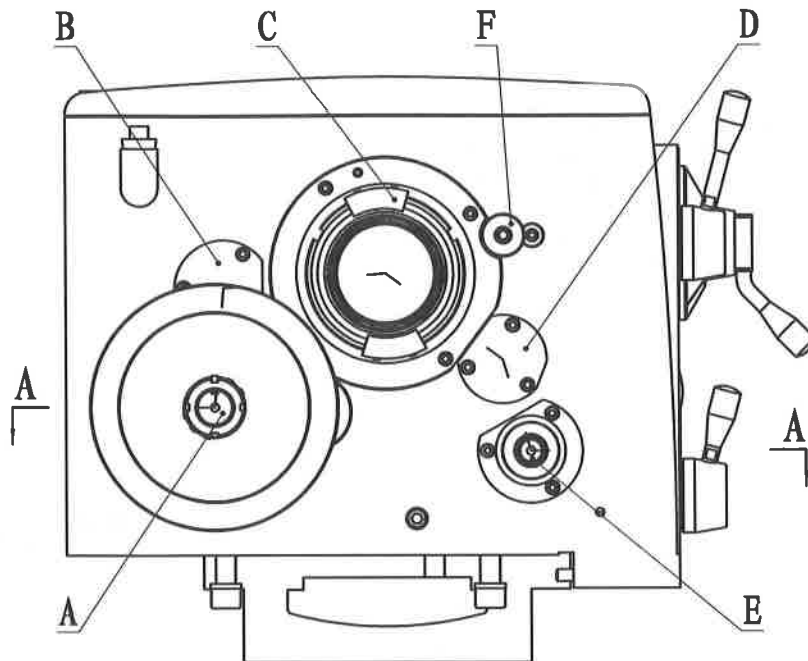
TROUBLE	PROBABLE CAUSES	REMEDY
Overheat of headstock bearing	1. Oil level in headstock is too low or too high. 2. Quality and viscosity of oil is wrong 3. Oil is too dirty. 4. Oil hole in bearing obstructed by dirt. 5. Bearing obstructed by dirt. 6. Badly worn bearing. 7. bearing in its case is not in proper position. 8. Bent or sprung main spindle. 9. Too much end thrust.	Check the oil level and replenish or discharge the oil to the proper level. Replace the oil with recommended one. Replace oil. Remove the dirt from the oil hole. Clean the bearing and renew oil. Replace bearing. Dismantle and reassemble it. Replace main spindle. Adjust thrust nut.
Oil leakage from gearbox.	10. Plug of drain not tightly. 11. Headstock cracking, 12. Leakage from overflow headstock cover. 13. Leakage from overflow spindle bearing house.	Remove recement threat; replace and tighten. Repaired by special welding. Tighten cover screw or replace gasket. Replace oil ring.
Excess noise of vibration of machine	14. Badly worn bearing. 15. Badly worn gear. 16. Bent or sprung shaft. 17. lose of foundation bolts.	Replace bearing. Replace gear. Replace shaft. Tight foundation bolts.

TROUBLE	PROBABLE CAUSES	REMEDY
Chatter	18.Clamp of work piece in from loose status. 19.Spindle bearing thrust too loose. 20.Headstock is not tight with bedway. 21.Excess clearance between carriage and bedway. 22. Excess clearance in cross or compound slide. 23.Cutting angle of cutting tool is not correct. 24.Edge of cutting tool has been worn-out. 25.Weak of tool shank and too long for extension. 26.Tool fixed to holder not tight enough. 27. Unbalances of workpiece or chuck when high speed revolution. 28.Front point of cutting tool not in correct position.	Tighten clamp. Adjust bearing thrust. Tighten headstock screw. Adjust carriage back clamp. Adjust taper gib. Regrind tools to correct cutting angles. Regrind cutting tool. Replace with rigid tools or reset the tools. Tighten tool again. Balance or reduce spindle speed revolution. Reset cutting tool.
Bending, when long workpiece cutting	29.Feed valve too large. 30.Workpiece too thin or too long.	Reduce feed valve size. Use following rest and adjust position of tool.
Accuracy of product fails	31.Accuracy fails in machining.	Check the accuracy of correlation between products and machine (ref. Accuracy chart.)
Uneasy to hold gear change lever.	32.Set spring broken or too weak.	Adjust adjusting screw or replace the spring.

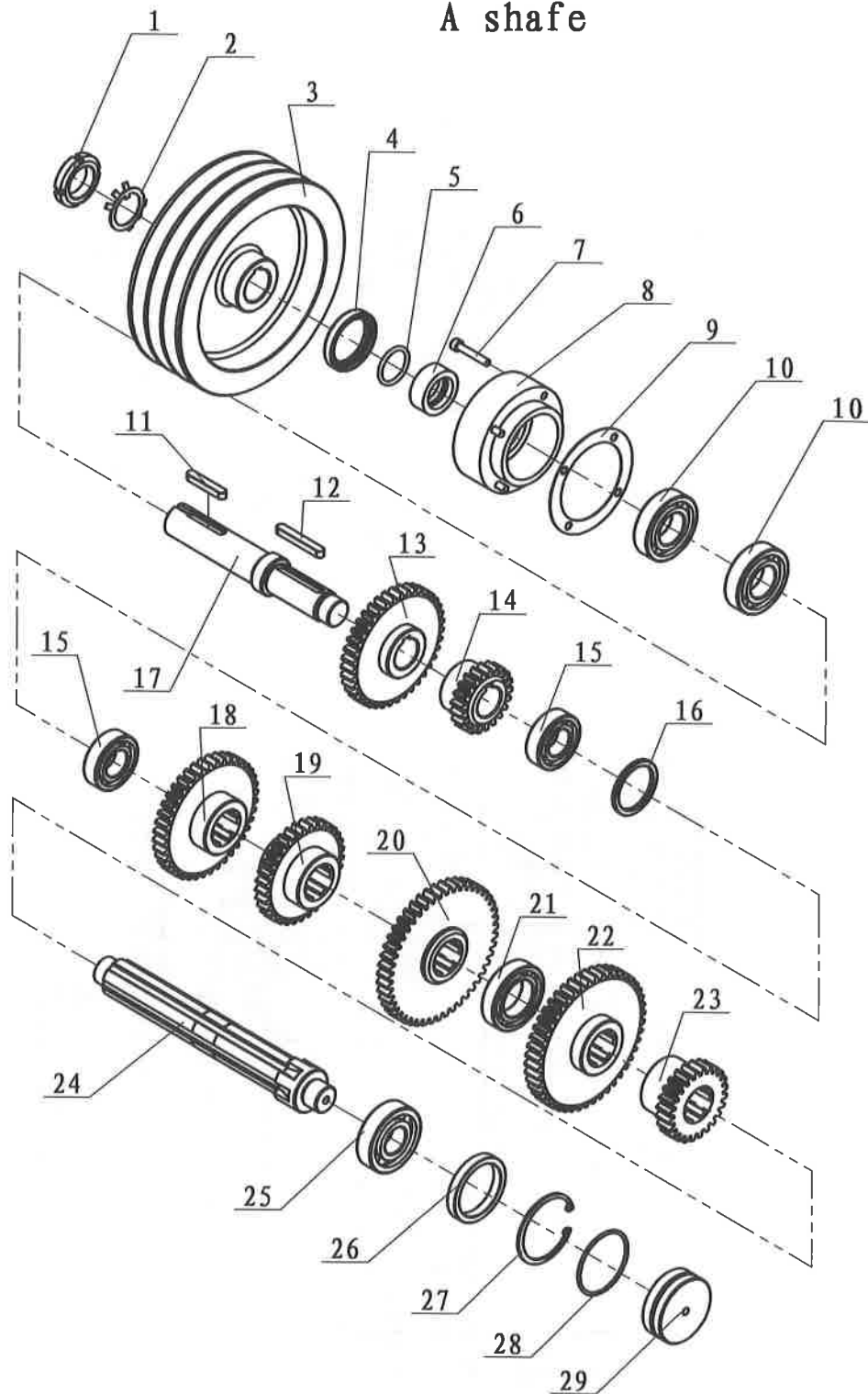
TROUBLE	PROBABLE CAUSES	REMEDY
Misalignment of chuck with main spindle	33.Incorrect position of cam.	Adjust cam and lock in proper position.
Uneasy to cut thread	34.Excessive clearance of lead screw in axial direction. 35. Excessive clearance between saddle and cross slide or cross slide and tool post slide. 36.Worm thread or nut in cross slide or tool post slide. 37.Excessive clearance of hand-wheel.	Adjust the thrust nut of the lead screw holder. Adjust slide gib to proper position. Adjust or replace it. Adjust the set bushing of hand-wheel.
Tailstock is uneasy to clamp with bed stably	38.Clamp handle lever too long or too short.	Adjust the adjusting nut of clamp block.

13. Parts List Assembly

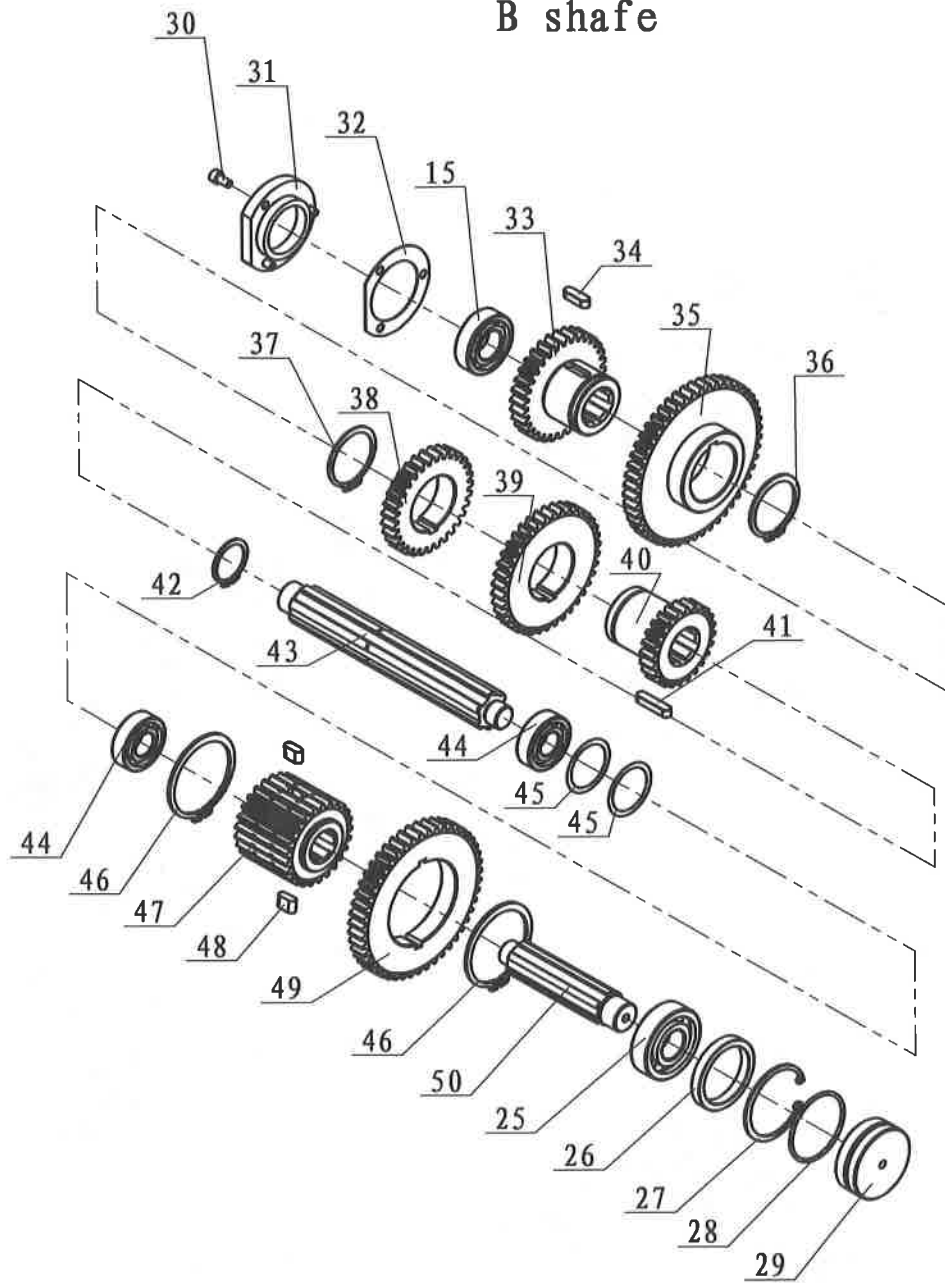
Headstock



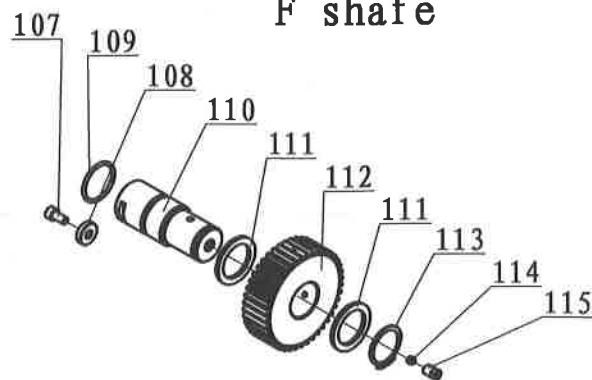
A shafte



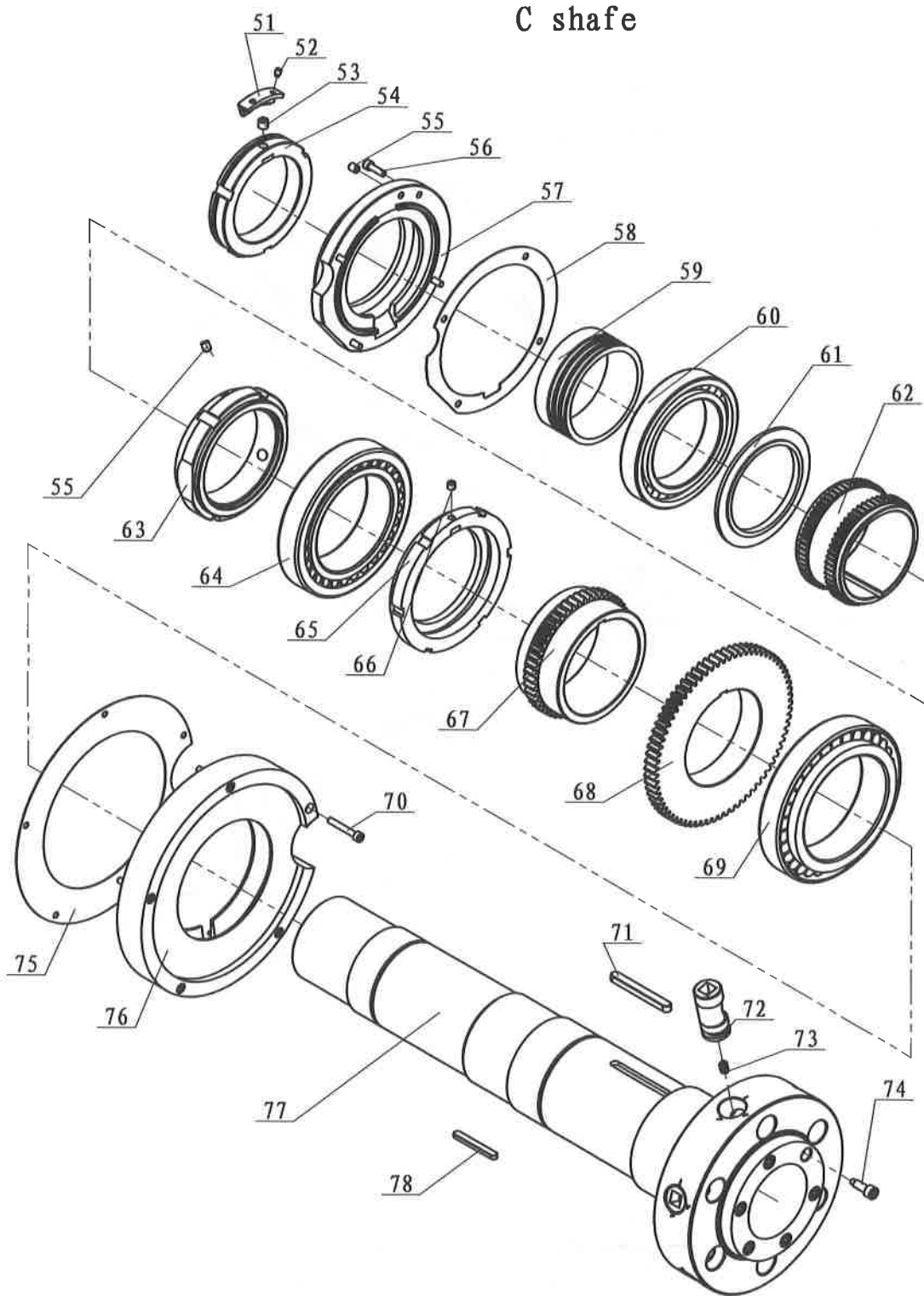
B shafe



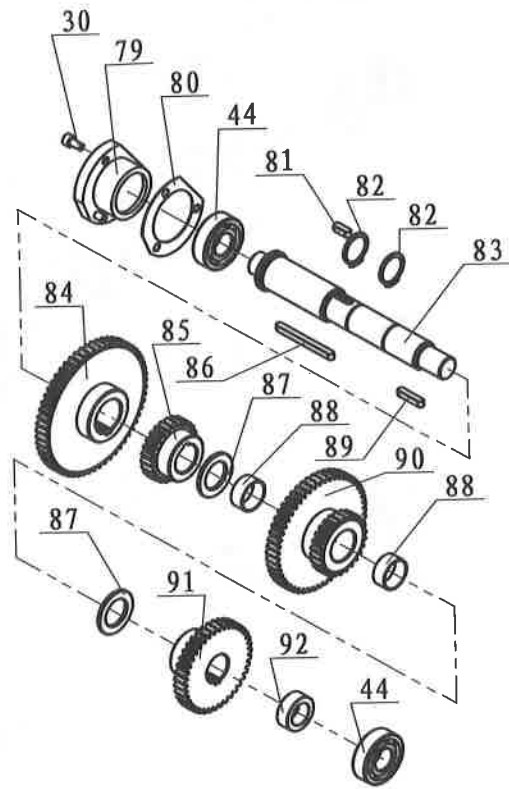
F shafe



C shafe



D shafe



E shafe

