INSTRUCTION MANUAL

MODEL: *HU410×800VAC TOPLINE*

CONTENTS

Specifications of the Lathe and its Main Data

Main Data of the Lathe	HU410×800VAV TOPLINE
Max. swing diameter over bed	ϕ400 mm
Max. swing diameter over carriage apron	ϕ245 mm
Height to spindle center	200 mm
Distance between centers	800
mm	
Width of bed	260 mm
Max. size of tool shank (W×H)	20×20 mm
Max. travel of cross slide	212 mm
Max. travel of top slide	112 mm
Main Data of Spindle	
Spindle bore	ϕ52 mm
Spindle head joining style	D5
Spindle reducing bush taper	MT6/ MT3
Spindle speed grade	2
Spindle speed range	50～2500
rpm	
Cutting Thread, Feed Range and Kind	
Large screw size	ϕ24 mm×6 mm
Metric thread range & kind	0.2～14 mm (26 kinds)
Module range & kind	0.1～7MP (23 kinds)
Metric spindle longitudinal feed per revolution	0.025～2 mm/rev (20 kinds)
Metric spindle cross feed per revolution	0.0125～1 mm/rev (20 kinds)
Tailstock Data of Lathe	
Travel of tailstock sleeve	110 mm
Diameter of tailstock sleeve	ϕ50
mm	
Inside taper of tailstock sleeve	MT3
Motor Size of Lathe	
Power of main motor	5.5 kW
Power of cooling pump	
1/8HP	
Weight and Size of Lathe	

Outline size (L × W × H) unit: cm	188x107x155
Packing size (L×W×H) unit: cm	193x112x184
Net weight of lather	1250 kg
Gross weight of lathe	1450 kg

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°C - +40°C; the elevation up to 1000 m; the relative humidity of 50% when ambient temperature is +40°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 of 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 200 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 that no speed change is allowed in operation at 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 griping force is known before jigging.

d. All factors such as strength of the workpiece to be jigged, balance of the jigging 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 ahs bad lubrication.

e. It is unbalanced.

f. The dynamic factor is not considered in the jigging 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 jigging 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 grippe 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 witch 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. When the lathe is not in use, ensure to switch off power supply of the lathe.
24. Stop the rotation of the chuck before replacing the new workpiece.
25. Always take care to check if driving of the chuck, the belt pulley and driving parts are loose.
26. When the handle of the chuck is in the chuck, never start the spindle.
27. Do not operate the laths if the attention is not concentrated in order to avoid accident.
28. When preparing to make other operation of the lathe such as the tailstock, take care to avoid danger such as bumping or dropping.
29. Take care of guard cover of the chuck and other covers which cannot be loosened.
30. 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.
31. Take special care to make operation if you are closing to rotating part of the machine.
32. 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.

33. Ensure the spindle of the lathe should be at the stop position when measuring the workpiece jigged on the chuck.
34. When the measuring meter is used on the lathe, ensure the motor is at the stop status.
35. 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.
36. Take cars of cuttings flying out from the lathe.
37. Select suitable guard plate on the operation position.
38. 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.
39. Master suitable method to load, and never apply force from unsuitable position.
40. Never mount the workpiece too large or heavy toward the lathe.
41. Never mount the workpiece too large or heavy toward the operator.
42. Use necessary tools to treat the workpiece.
43. Never apply excessive force on the attachment or the operation lever.
44. Take care to jig the workpiece firmly.
45. Tighten all claws, nuts, screws and fasteners.
46. Always take care to use correct equipment.
47. Never make cutting beyond the ability of the lathe.
48. Do not apply excessive force to polish or to deburr.
49. 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.
50. Switch off power supply to stop all movements of the lathe before replacing the exchange gears.
51. Take care if the chuck/parts could drop down when the lathe is in operation.
52. 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.

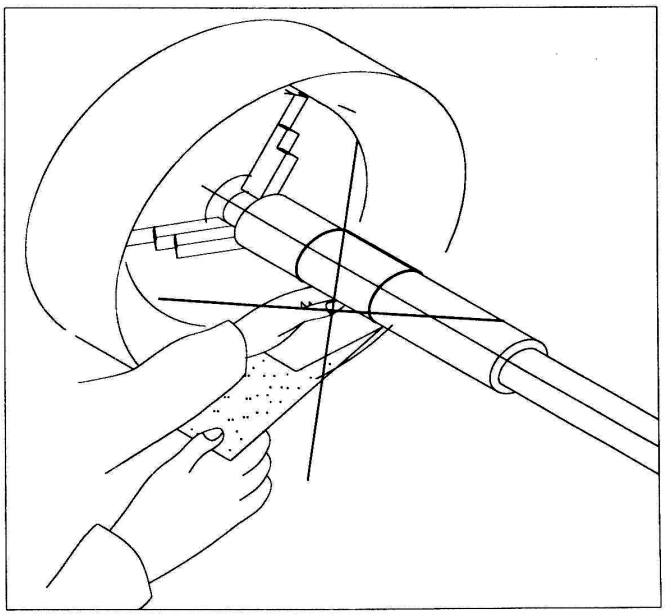
It is suggested that claws cannot extend out the outer diameter of the chuck in order to avoid bump with the chuck guard. For the sake of safe operation, always take care not to extend claws out of the outer diameter of the chuck.

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.

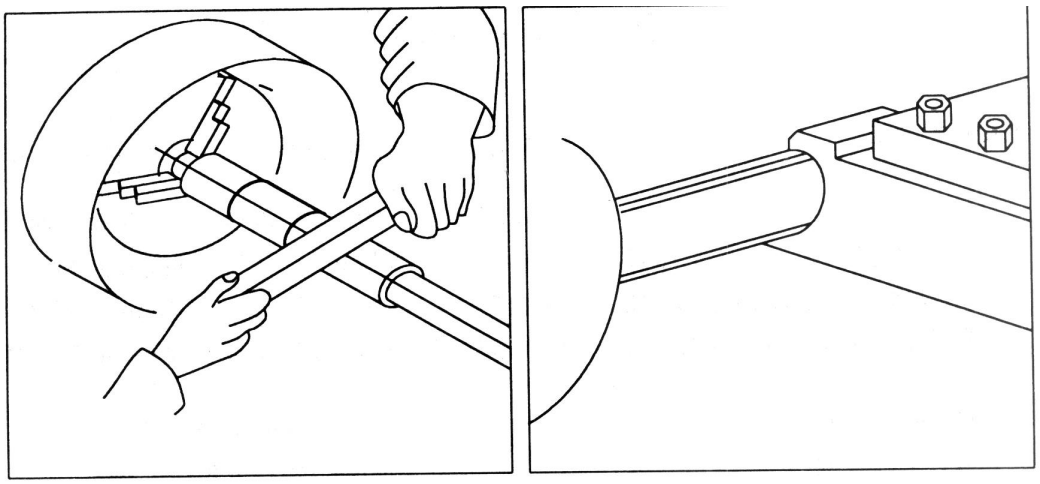
It is not needed to process by emery cloth in following cases:

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:

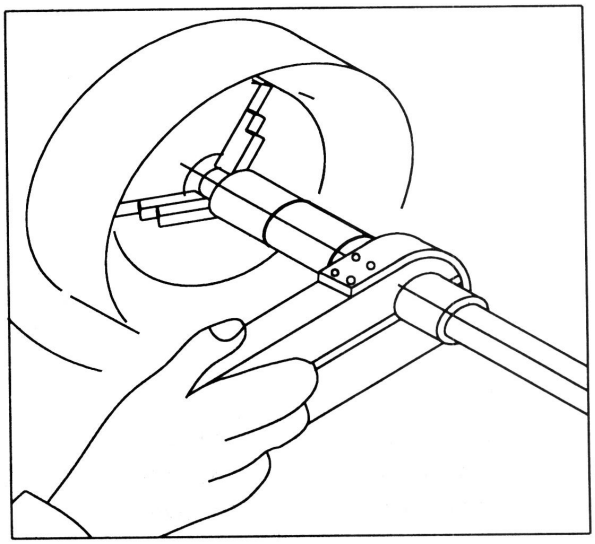
a. Nail the emery cloth on a quality wood board to grind;



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.

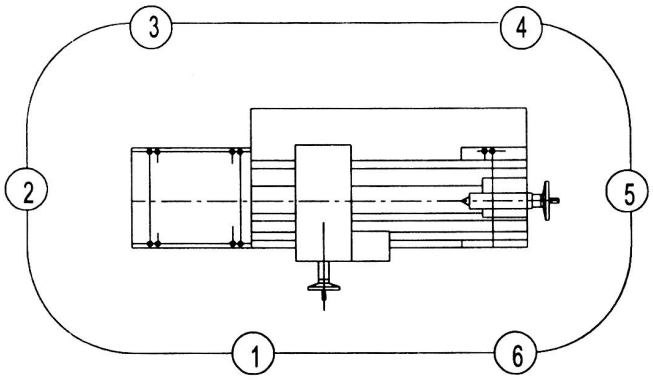
When the end of the workpiece is polished, only a short piece of the emery cloth shall be used as it cannot be wound.

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

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. Handling and Installation

3-1 The Weight of the Lathe and Hoisting

The weight of the lathe is shown on the manual.

Ensure that the hoister has enough hoisting capacity before hoisting.

Preparations and safety examination:

1. Remove all unfixed devices;

2. Fix the tail on the tail end of the bed;

3. Fix the saddle on the bed and tighten the fixation press plate on the tail of the saddle;

4. Ensure screw, pin and fixation bolts on the ring of the hoister are reliably tightened;

5. Only correct hoister can be used;

6. Check ropes if they are robust and reliable in case they are used.

Do not wind the hoisting tool around the bed as it can cause curvature and damage of the leading screw and the smooth bar.

3-2 Handling

When handling the packed lathe, tie ropes as per the hoisting mark and positions on the packing case to hoist, unload and place the machine levelly and stably without over tilting.

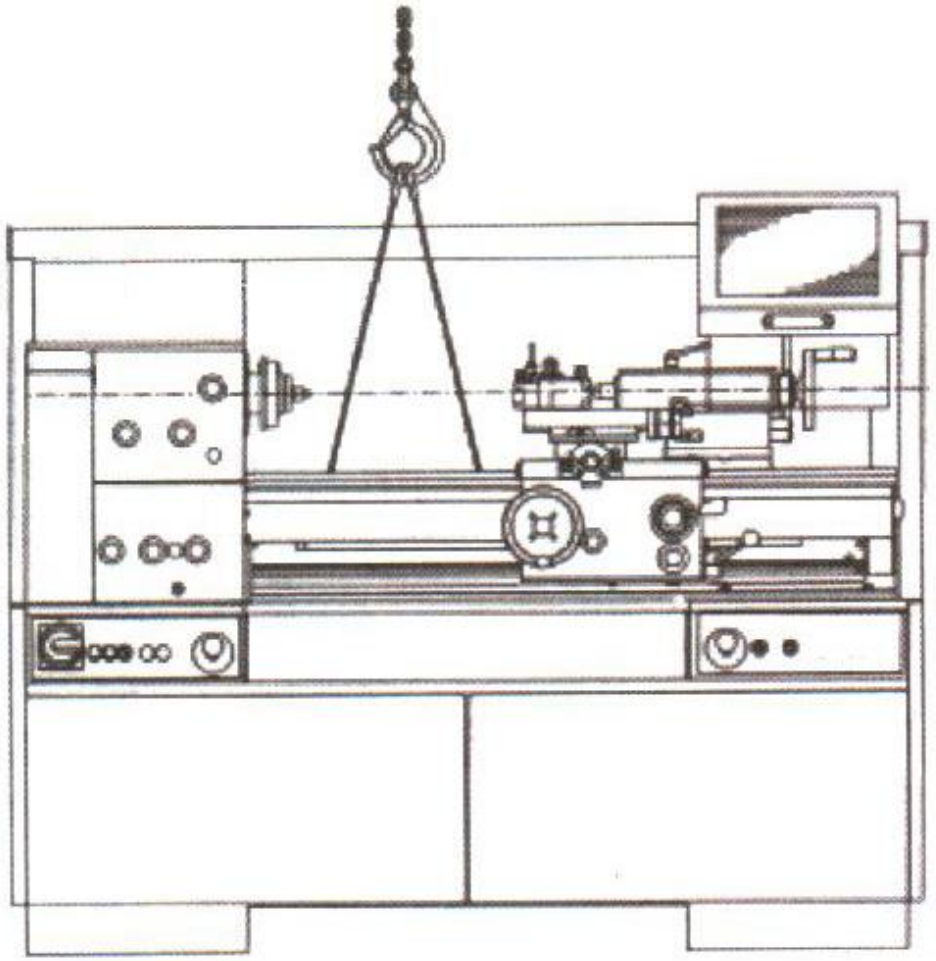
3-3 Unpacking

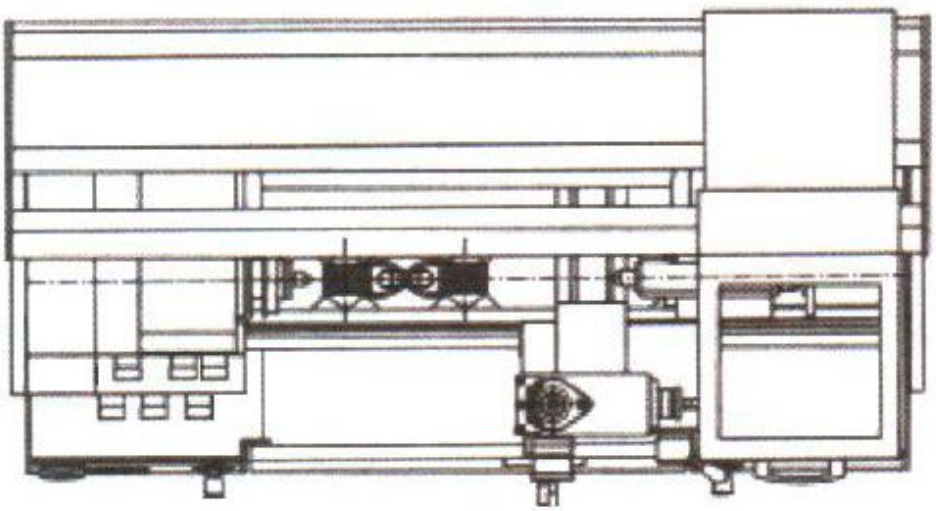
After unpacking, first of all check appearance of the lathe and check attachments, tools and documents as per the packing list.

3-4 Hoisting

Put the wooden pad nearing the guide rail for the hoisting tool to avoid bumping the guide rail.

Hoist the machine gently off the ground, and make further adjustment of position of the saddle if necessary so as to make hoisting more balanced.





3-5 Rules of Safe Hoisting

1. Do not let the hoister operate under the overload status.
2. Do not use damaged hoisting tools.
3. Position the hoisting tool correctly and do not place it on the sharp corner or let slide over the edge angle or along the edge of the machine.
4. Do not drop down the object.
5. Correctly position the hoisting tool for easy removal later.
6. Adopt smooth hook with inner radius no less than 50 mm.
7. Avoid to place over one hook on the same hoisting tool.
8. Avoid acid, alkaline and other dangerous articles.
9. The hoisting tool cannot be polluted by oil dirt.
10. Take care that friction could occur between the hoisting tool and the machine due to vibration in the course of transportation. Therefore the hoisting tool should have protect sleeve.

The hoisting tool is made of 100% polyester materials or steel wire with enough strength. It is suggested to put the protect sleeve on the hoisting tool to prevent its damage caused by sharp object.

Each set of the hoisting tool should have clear mark of safe working load with the safe coefficient of 6:1.

For the sake of safety, the hoisting tool should be coated with safe colors.

Make an overall check on the hoisting tool regularly.

3-6 Installation

The lathe should be placed on the horizontal ground with robust foundation with enough space around it for easy processing and service. The lathe should be fixed on the foundation by bolts so as to make its performance into full play. It can be put into operation immediately after the level adjustment is made.

3-7 Foundation

The steel pad should be placed under the screws for level adjustment no matter the adjustment iron is used or the lathe is fixed by screws.

3-8 Position the Lathe by Adjustment Iron Pad

Place 8 iron pads on the base of the lathe to level the lathe or position the lathe n the foundation and adjust 8 leveling screws to make the load distributed evenly. Readjust the lathe one week later by the precision leveler and it can then be put into

formal use.

3-9 Fix the Lathe by Anchor Screws

Adjust anchor bolts to make them be loaded evenly. Level the lathe by the precision leveler and tighten anchor bolts, then recheck the horizontal accuracy of the bed by the precision leveler.

3-10 Lubrication Examination

Before each shift, fill oil in the saddle, the cross slide and the bed tail by the oil gun.

See the lubrication part in the maintenance section of the manual.

3-11 Spindle Bearings of the Headstock

Though all bearings of the headstock have been adjusted and tested before leaving the factory, it is suggested to make further commissioning of the bearings of the headstock before long-term operation at high speed.

Suggested time of speed of commissioning:

Run for 1 hour at 15% of the highest speed;
Run for 30 min at 30% of the highest speed;
Run for 30 min at 80% of the highest speed.

3-12 Cleaning

Before operating the lathe, clean anti-rust oil on rails, leading screw, feed bar, taper hole of the spindle and sleeve of the bed tail by kerosene.

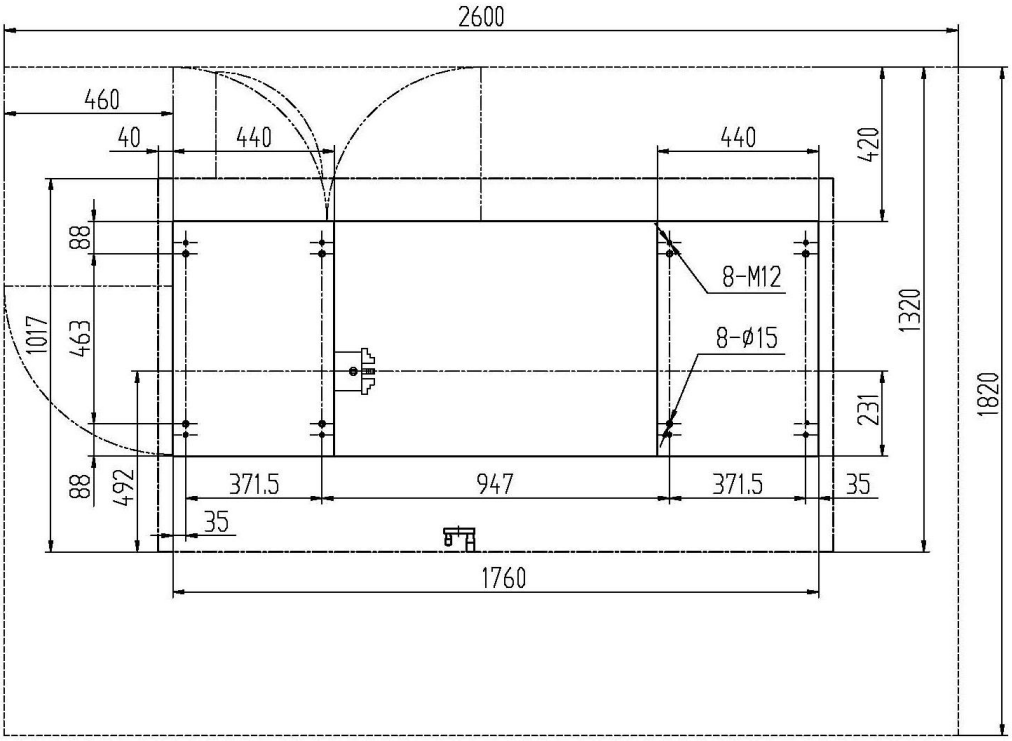
Do not use unauthorized solvent, cellulose solvent or gasoline as they are dangerous and can damage paintings.

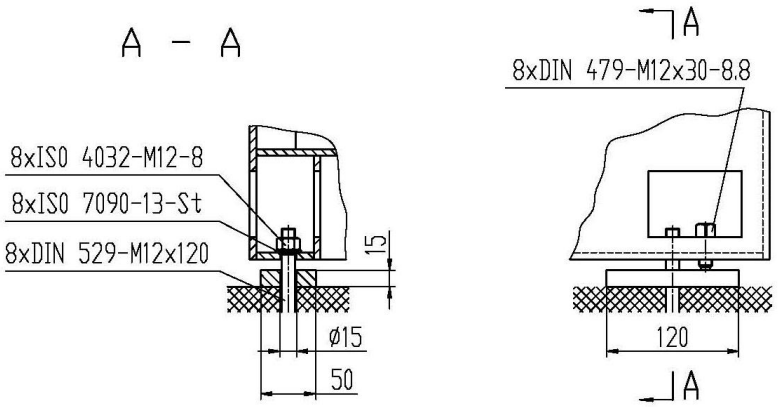
After cleaning, all smooth and processed surfaces should be oiled.

3-13 Leveling

Make leveling by the precision leveler (0.02mm/m) mounted on the cross slide. Make leveling of the lathe by adjusting relative anchor bolts from one end to the other and from the rear part to the front part. The longitudinal and lateral leveling should be done as per stipulations on the Item G1 in <Conformity Certificate> of the lathe so as to avoid torsion.

Foundation Drawing





Steel plate 50x15x120mm and fixed material user ready.

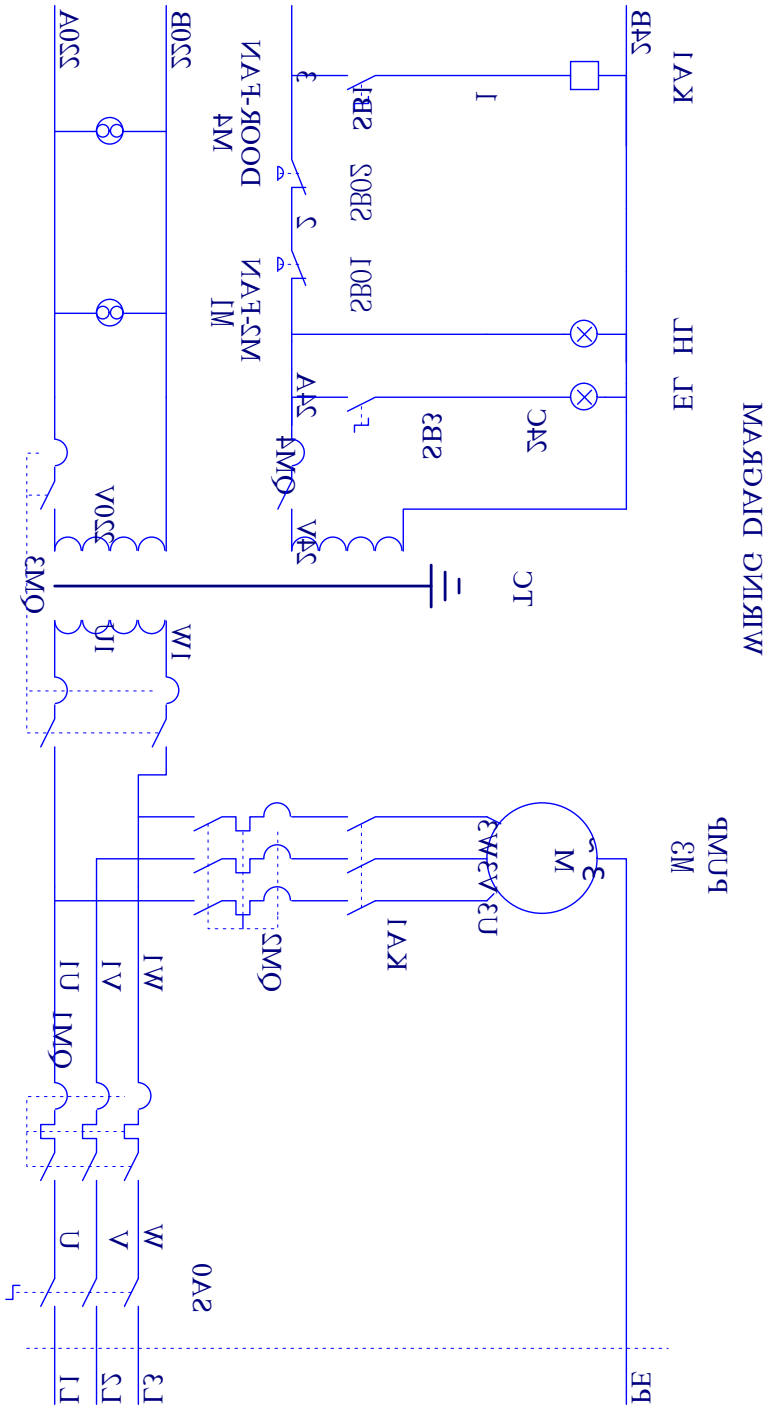
4. Power Supply and Connection

Input Voltage

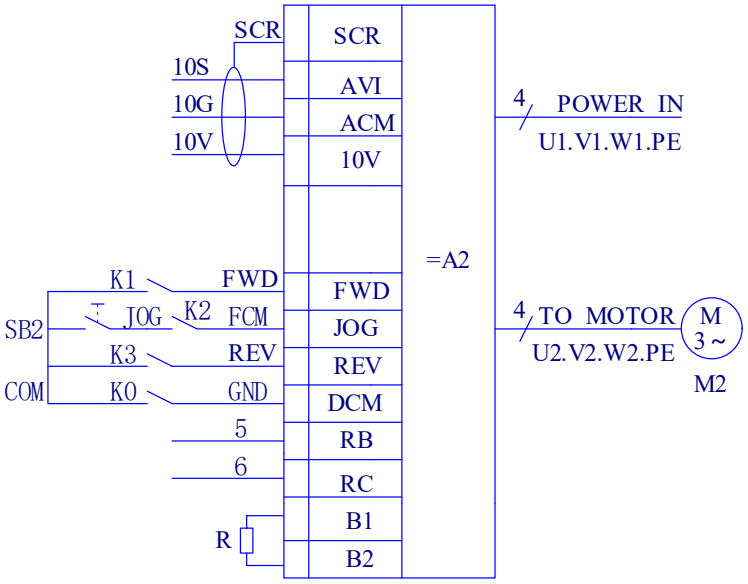
The power supply is three-phase 380 V ± 10%, 50 Hz, and the lathe with power supply of 220 V, 60 Hz is also available.

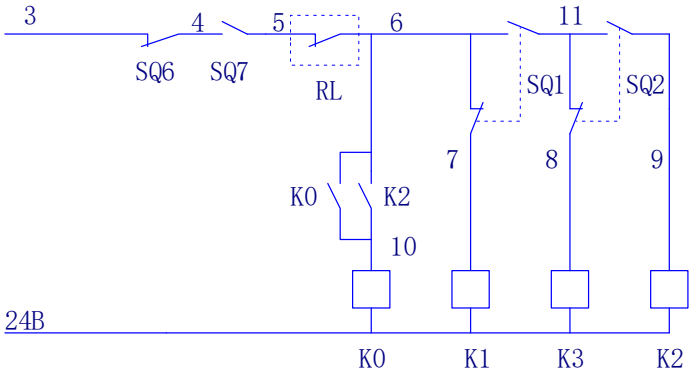
Power supply introduced to each lathe should run through an external distribution cabinet equipped with independent fuse, from which wires shall be led into the electrical cabinet of the machine and connected with terminals inside the cabinet. The grounding wire should be also connected.

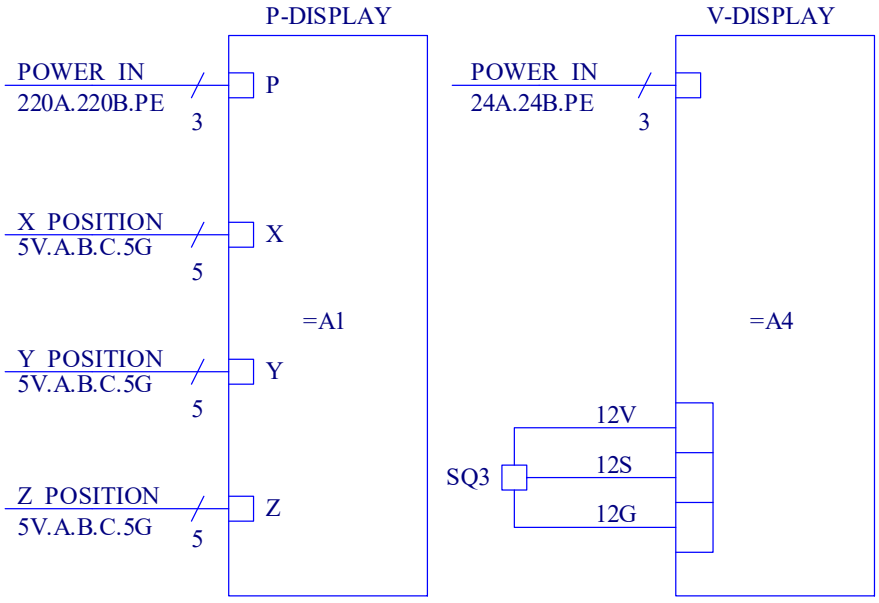
ELECTRIC CIRCUIT CONTROL(1/2)



ELECTRIC CIRCUIT CONTROL(2/2)







5. Chuck and its Installation

When mounting the chuck and the surface plate, first of all to ensure clean of the spindle and the taper part of the chuck.

Warning

When adopting the four-jaw chuck and the surface plate, be sure to take care of the limit of the speed of the spindle.

The chuck with defects such as crack etc. is not allowed to use on the lathe.

The steel plate three-jaw chuck is recommended.

6. Safe Operation of the Lathe

Safe Regulations of the Lathe

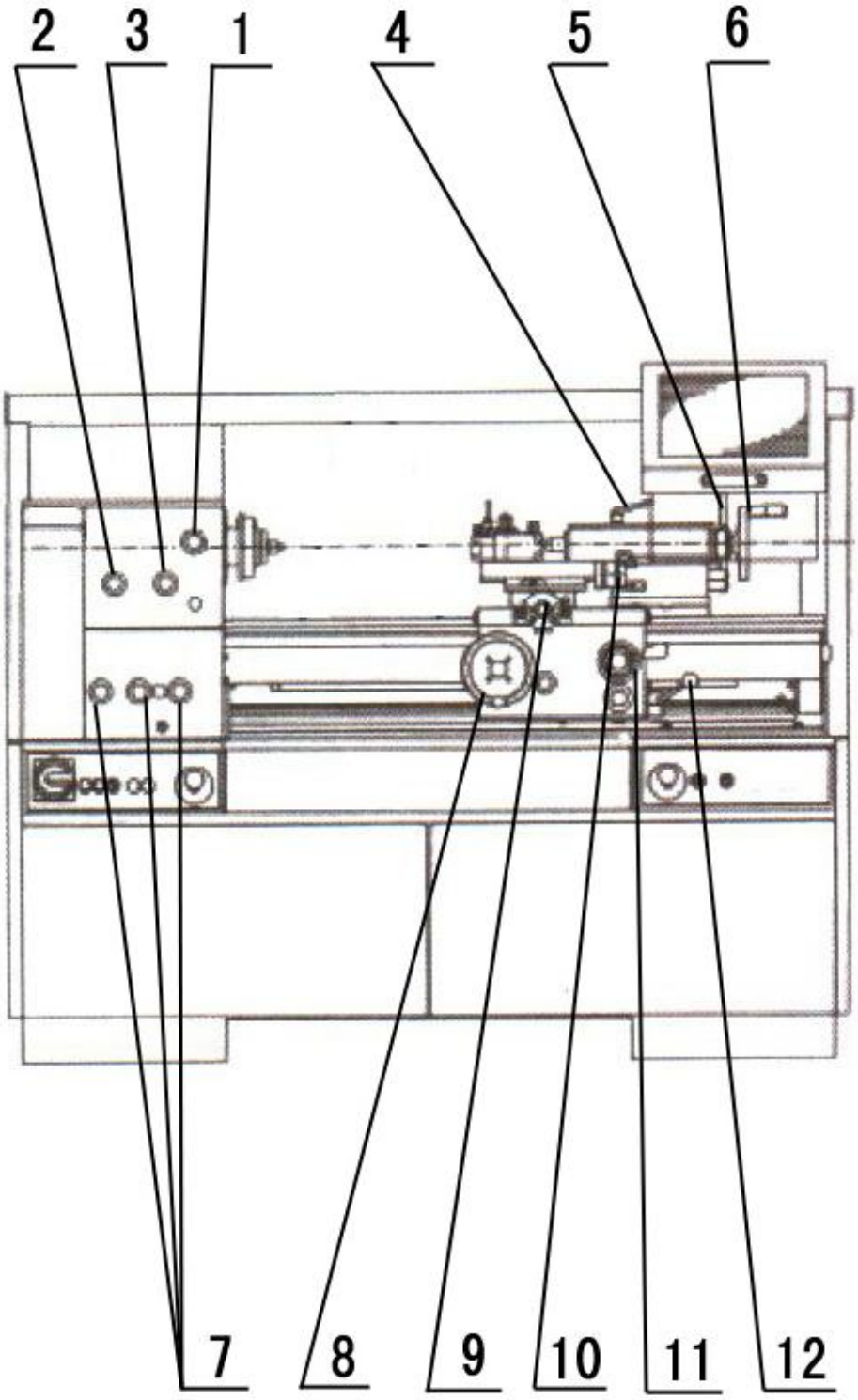
Before starting the lathe, read the operation instruction on the manual carefully.

For the sake of safety, please read the guidance of safe operation at the beginning of the manual.

Key points are as follows:

1. Ensure to master the way to stop the machine before starting it.
2. Stop operation of the lathe immediately in case any accident occurs.
3. Ensure cutting speed, feed and cutting depth to be suitable with the processed parts and the jigger.
4. When the spindle is rotating, do not contact the tool, the chuck and the workpiece.
5. Wear and use suitable protective articles and devices.

7. Operation System



1. Selection Handles of Spindle Speed
2. Pitch Extension Handle
3. Left/Right Screw Handles
4. Tail Sleeve Lock Handle
5. Tail Fast Lock Handle
6. Tail Hand Wheel
7. Feed Handle
8. Apron Longitudinal Hand-Wheel
9. Lateral Hand Wheel
10. Small Tool Holder Handle
11. Apron Handle
12. Start Spindle Control Knob

7-1 Electric Control

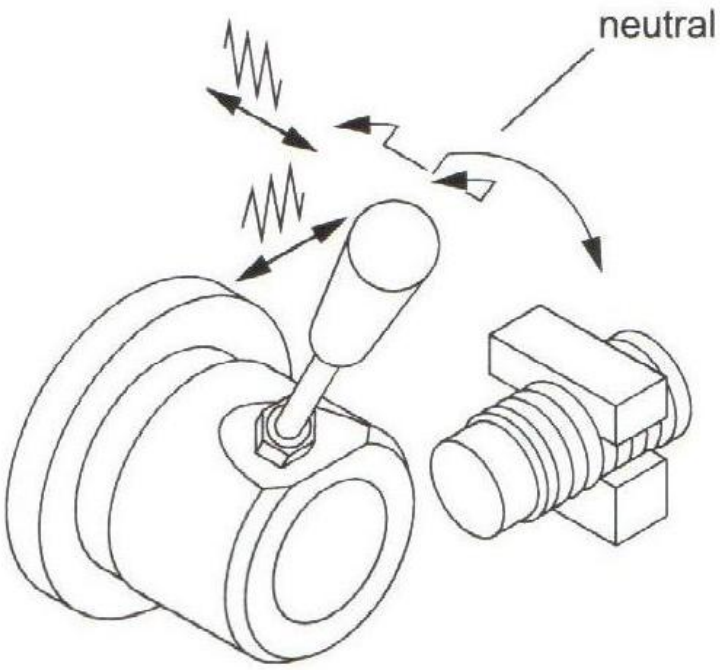
The main switch of power supply of the lathe is located at the rear of the lathe. When it is switched on, the lamp of power supply lights. There is the interlocked switch inside the side cover to switch off power supply when the door is opened.

7-2 Speed of the Spindle

Only when the handle (3) in the “A” position, the handle (1) can changed to the “X” position..

Warning: The spindle system is not allowed to change speed in motion.

7-3 Operation of the Carriage Apron

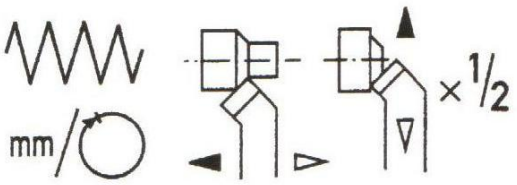


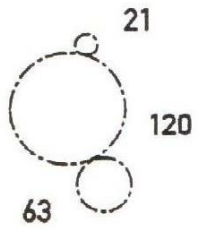
The apron handle is pushed to the front of the limit position, lift the black bakelite handle and counterclockwise rotate the handle to the limit position, realized cross feed cutting movement.

The apron handle is pulled out the last position, lift the black bakelite handle and counterclockwise rotate the handle to the limit position, realized longitudinal feed cutting movement.

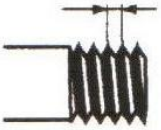
The apron handle in the middle position, lift the black bakelite handle and clockwise rotate the handle to the limit position, realized the thread cutting movement.

8. Thread and Feed Table

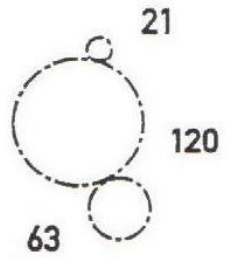




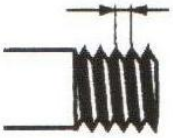
f mm/U	Schaltung	f mm/U	Schaltung
0,025	ACEK	0,25	ADEM
0,032	ACFK	0,32	ADFM
0,04	ACGK	0,4	ADGM
0,05	ACHK	0,5	ADHM
0,063	ACEL	0,63	BDFL
0,08	ACFL	0,8	BDGL
0,1	ACGL	1	BDEM
0,125	ADFL	1,25	BDFM
0,16	ADFL	1,6	BDGM
0,2	ADGL	2	BDHM



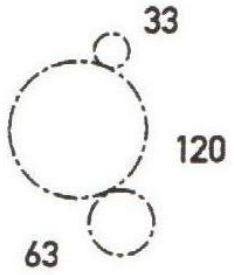
mm



0,2	ACEK
0,25	ACFK
0,3	ACGK
0,35	ACHK
0,4	ADEK
0,5	ADFK
0,6	ADGK
0,7	ADHK
0,75	ACGL
0,8	BCEK
1	ADEL
1,25	ADFL
1,5	ADGL
1,75	ADHL
2	ADEM
2,5	ADFM
3	ADGM
3,5	ADHM
4	BDEL
5	BDFL
6	BDGL
7	BDHL
8	BDEM
10	BDFM
12	BDGM
14	BDHM

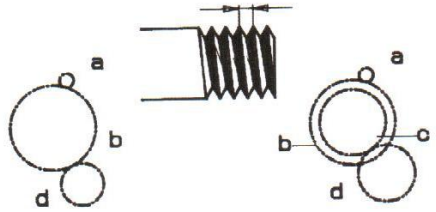


mm × π



0,1	ACEK
0,2	ADEK
0,25	ADFK
0,3	ADGK
0,35	ADHK
0,4	BCEK
0,5	ACEM
0,6	BCGK
0,7	BCHK
0,75	ADGL
0,8	BDEK
1	BCEL
1,25	BCFL
1,5	BCGL
1,75	BCHL
2	BDEL
2,5	BDFL
3	BDGL
3,5	BDHL
4	BDHM
5	BDFM
6	BDGM
7	BDHM

1/"	a	b	c	d	Schaltung
80	21	120	127	63	ACGK
72	28	120	127	63	ACFK
64	28	120	127	56	ACFK
56	30	120	127	63	ACGK
52	32	120	127	52	ACFK
48	21	120	127	63	ADFK
44	30	120	127	33	ACEK
40	21	120	127	63	ADGK
36	28	120	127	63	ADFK
32	21	120	127	63	ACGL
30	28	120	127	63	ADGK
27	32	120	127	54	ADFK
26	30	120	127	52	ADFK
24	21	120	127	63	ADEL
22	30	120	127	33	ADEK
20	21	120	127	63	BCGK
19	32	120	127	38	ACEL
18	32	120	127	54	ACGL
16	21	120	127	63	ADGL
14	30	120	127	63	BCGK
13	32	120	127	52	BCFK
12	21	120	127	63	BDFK
11½	32	120	127	46	ADEL
11	30	120	127	33	BCEK
10	21	120	127	63	BDGK
9	32	120	127	54	ACGM
8	21	120	127	63	ADGM
7	30	120	127	63	BDGK
6	21	120	127	63	BDEL
5	28	120	127	70	BDEL
4½	32	120	127	54	BCGL
4	21	120	127	63	BDGL
3½	32	120	127	56	BDEL
3	21	120	127	63	BDM
2¾	32	120	127	33	BCGL
2½	28	120	127	70	BDGM
2¼	32	120	127	54	BDGL
2	21	120	127	63	BDGM
1¾	32	120	127	70	BDFM
1½	28	120	127	63	BDGM
1¼	32	120	127	70	BDHM
1	32	120	127	56	BDHM



DP	a	b	c	d	Schaltung
200	22	120	127	70	ADEK
180	22	120	127	63	ADEK
160	22	120	127	56	ADEK
140	22	70	127	63	ACGK
120	22	120	127	63	ADGK
100	22	120	127	70	BCEK
80	22	120	127	70	ADEL
72	22	120	127	63	ADEL
64	22	120	127	56	ADEL
56	33	70	127	63	ACEL
52	33	63	127	52	ADEK
48	33	120	127	63	ADEL
44	32	120	127	56	ADEL
40	22	120	127	70	ADEM
36	22	120	127	63	ADEM
32	22	120	127	56	ADEM
28	33	70	127	63	ADEL
24	33	120	127	63	ADEM
20	22	120	127	70	BDEL
18	22	120	127	63	BDEL
16	22	120	127	56	BDEL
14	33	70	127	63	ADEM
12	33	120	127	63	BDEL
11	32	120	127	56	BDEL
10	22	120	127	70	BDEM
9	22	120	127	63	BDEM
8	22	120	127	56	BDEM
7	33	70	127	63	BDEL
6	33	120	127	63	BDEM
5	33	100	127	63	BDEM
4	22	120	127	28	BDEM
3½	33	70	127	63	BDEM
3	22	70	127	63	BDEM

mm	a	b	c	d	Schaltung
0,45	21	120	-	70	ADFK
4,5	21	120	-	70	BDFK
5,5	33	120	-	63	BCHL
9	21	120	-	70	BDFM
11	33	120	-	63	BDHL
16	28	120	-	63	BDGM
18	28	120	-	56	BDGM
20	30	120	-	63	BDHM
22	33	120	-	63	BDHM
24	32	120	-	56	BDHM

mm×π	a	b	c	d	Schaltung
0,12	22	120	127	70	ADEK
0,14	28	100	110	63	ACGK
0,16	32	100	110	63	ACGK
0,18	33	120	-	70	ADEK
0,22	33	100	110	63	ADEK
0,28	28	100	110	63	ADGL
0,45	33	120	-	70	ADEL
0,55	33	100	110	63	ADEL
0,65	52	100	110	63	ACGL
0,85	34	100	110	63	ADGL
0,9	33	120	-	70	ADEM
0,95	38	120	110	70	ADEM
1,125	33	120	-	56	ADEM
1,375	33	100	110	63	BCGL
1,6	32	120	110	70	BDEL
2,25	33-	120	-	56	BDEL
2,75	33	100	110	63	BDFL
3,15	33	120	-	70	BDHL
4,5	33	120	-	56	BDEM
5,5	33	100	110	63	BDFM
6,3	33	120	-	70	BDHM

9. Normal Troubles and Remedies

S/N	Normal Trouble	Causes	Remedies
1	Higher temperature rising of the spindle bearings. The max. temperature over 70°C or temperature rising over 40°C.	1. The brand of lubricating oil is not right.; 2. Lubrication oil is not suitable (much or less); 3. Clearance of the spindle bearing is too small.	1. Fill suitable lubricating oil in the spindle bearings; 2. Replace with lubricating oil of right brand; 3. Readjust clearance of the spindle bearings.
2	The spindle vibrates in course of turning.	Clearance of the front bearings of the spindle is too large.	Readjust the front bearings of the spindle and reduce clearance of bearings.