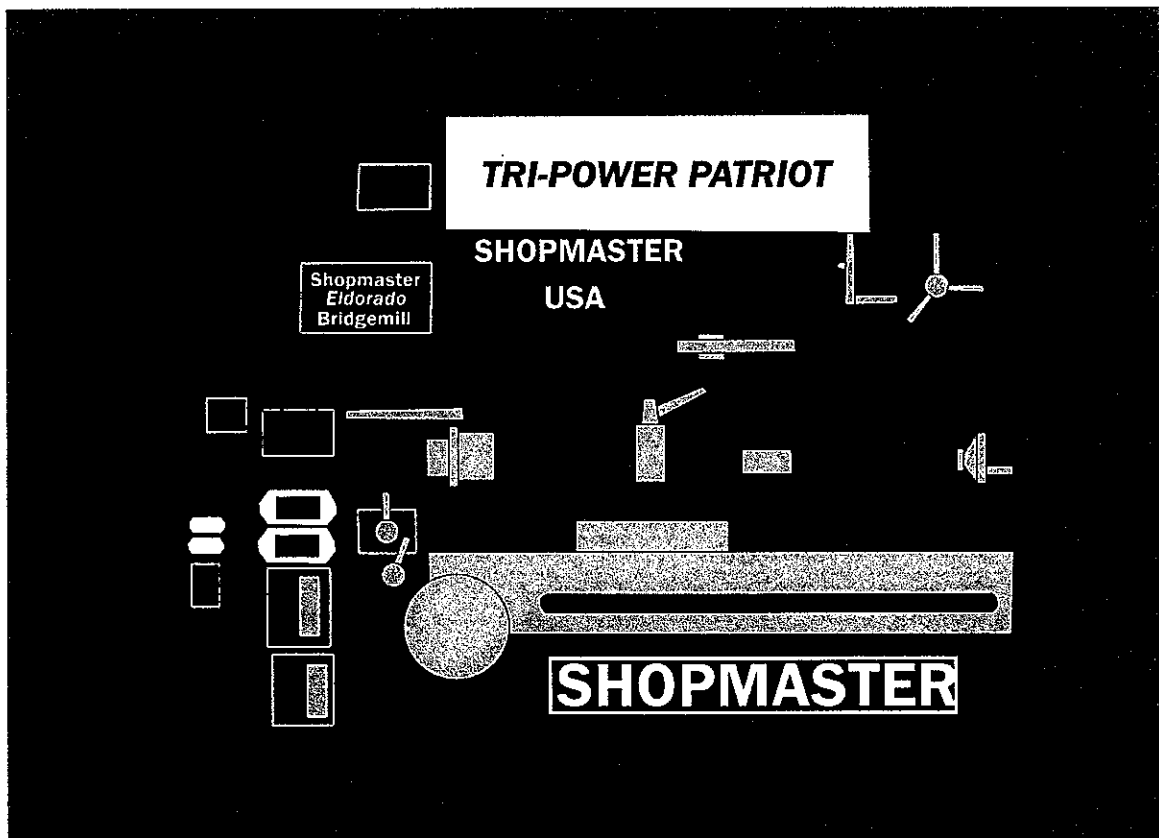


# SHOPMASTER™

# PATRIOT™



## OWNERS MANUAL

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# **NOTES ON CNC, DRO AND BALL SCREWS**

**Your DRO system has several settings for resolution. Some of the settings are incorporated for various applications such as surface grinders, EDM machines etc. For the PATRIOT machine we suggest you use the 0.0004" setting. This will allow you to set positions to 0.0004" ( 4 tenths ) which is about the finest reasonable expectation for the machine accuracy. You may notice that the final digit will jump back and forth under machine running, this is normal for our machine. However your 3<sup>rd</sup> digit which is 1 thousandth of an inch should remain stationary. Locking the non moving motions during cutting will reduce any display jumping.**

**The standard lead screws supplied with the PATRIOT are 10 threads per inch acme . On the X and Y axes, one turn of the handwheel will produce 0.010" ( ten thousandths ) of an inch travel. 10 turns will produce 1 inch of travel. On the Z axis, due to internal gearing ratios, 1 turn of the handle produces 0.0067" of travel which means the dial has an odd number of increments. If you have ball screws installed the ratio is doubled because the ball screws are 5 threads per inch. If you have DRO installed, these ratios become unimportant because the DRO reads table motion exactly.**

**Our CNC system is a micro stepping controller, so the motors require 2000 steps for 1 revolution. On all three axes, the belt ratio is 2-1, so it requires 4000 steps for 1 revolution of the lead screw. Therefore, with the standard acme screws it will require 40,000 steps for 1" of travel on X and Y. While Z will require 60,000. With ball screws, these values will be cut in half due to the ball screws being 5 threads per inch, so use 20,000 on X and Y and 30,000 on Z.**

**These are initial settings, and once you begin testing the motions you may add or subtract steps in the motor tuning section until you have the settings exact. Always do the steps per inch settings prior to doing the Backlash compensation setup.**

# **SAFETY RULES FOR THE PATRIOT**

**WARNING -- DO NOT ATTEMPT TO OPERATE UNTIL YOU HAVE READ THOROUGHLY AND UNDERSTAND COMPLETELY ALL INSTRUCTIONS AND RULES CONTAINED IN THIS MANUAL. FAILURE TO COMPLY CAN RESULT IN ACCIDENTS INVOLVING FIRE, ELECTRIC SHOCK, OR SERIOUS PERSONAL INJURY. MAINTAIN YOUR OWNERS MANUAL AND REVIEW FREQUENTLY FOR CONTINUING SAFE OPERATION AND INSTRUCTING POSSIBLE THIRD-PARTY USER.**

## **1. KNOW YOUR TRI POWER MACHINE**

**For your own safety, read the owner's manual carefully. Learn it's application and limitation as well as the specific potential hazards peculiar to this tool.**

## **2. NEVER ATTEMPT ANY OPERATION OR ADJUSTMENT IF THE PROCEDURE IS NOT UNDERSTOOD.**

## **3. KEEP GUARDS IN PLACE AND IN WORKING ORDER.**

## **4. REMOVE ADJUSTING KEYS AND WRENCHES.**

**Form habits of checking to see that keys and adjusting wrenches are removed from the TRI POWER before turning on the machine.**

## **5. DON'T USE IN DANGEROUS ENVIRONMENT.**

**Don't use the TRI POWER in damp or wet locations or expose it to rain. Keep work area well illuminated.**

## **6. DO NOT REMOVE DRIVE COVERS WHILE IN OPERATION.**

## **7. DON'T FORCE TOOLS.**

**It will do the job better and be safer at the rate for which it was designed .**

## **8. WEAR PROPER APPAREL.**

**No loose clothing, gloves, neckties, rings, bracelets, or jewelry to get caught in moving parts. Non-slip footwear is recommended. Wear protective hair covering to contain long hair.**

## **9. ALWAYS USE SAFETY GLASSES.**

**Every day eyeglasses only have impact-resistant lenses. They are NOT safety glasses.**

## **10. SECURE WORK.**

**Always secure your work to the table with clamps or vise-NEVER attempt to hold a part by hand.**

## **11. DON'T OVERREACH**

**Keep your balance and proper footing at all times.**

**12. MAINTAIN TOOLS IN TOP CONDITION.**

**Keep tools sharp and clean for best and safest performance. Follow instructions for lubricating and changing accessories.**

**13. DISCONNECT TOOL FROM POWER SOURCE.**

**Before servicing and when changing accessories such as bits or cutters .**

**14. AVOID ACCIDENTAL STARTING.**

**Make sure switch is in "OFF" position before plugging in cord.**

**15. USE RECOMMENDED ACCESSORIES.**

**Consult the owner's manual for recommended accessories. Use of Improper accessories may be hazardous.**

**16. CHECK DAMAGED PARTS.**

**Before further use of the TRI POWER, a guard or other part that is damaged should be carefully checked to ensure that it will operate properly and perform its intended function-check for alignment of moving parts, binding of moving parts, breakage of parts and any other conditions that may affect its operation. A guard or other part that is damaged should be properly repaired or replaced.**

**17. DIRECTION OF FEED.**

**Only feed work into a cutter against the direction or rotation of the cutter.**

**18. NEVER LEAVE YOUR TRI POWER RUNNING UNATTENDED.**

**TURN POWER OFF.**

**Don't leave the machine until it comes to a complete stop.**

**19. NEVER PERFORM AN ABNORMAL OR LITTLE USED OPERATION WITHOUT STUDY AND USE OF ADEQUATE BLOCKS, JIGS OR FIXTURES.**

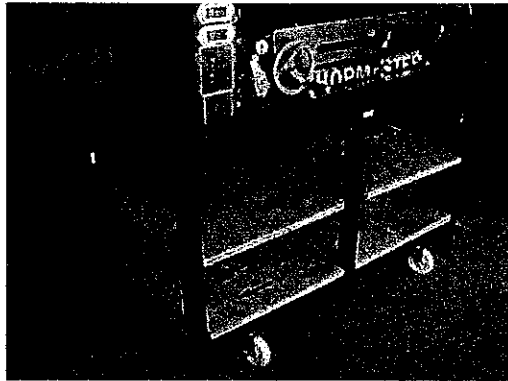
# PREPARATION OF YOUR BENCH

Your PATRIOT is equipped with a full steel frame welded bench incorporating a drip tray for coolant and steel enclosures. Casters are installed for ease of movement and each leg has an adjustable pad for leveling the machine. The frame has supports for 2 shelves and the crate has sufficient material to make the 2 shelves.

1. After removing the wood crate, set it aside.
2. The bench legs are mounted upside down on the bench top. Remove the 12 bolts holding the bench legs in place and lift the leg assembly straight up and off the bench top. ( requires 2 people)

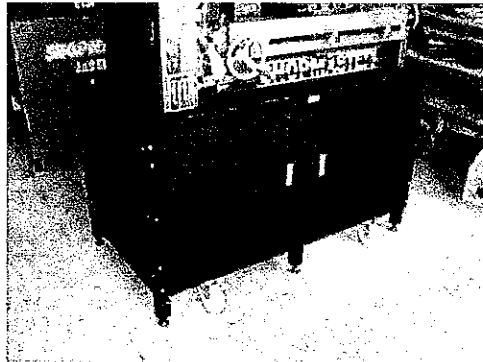


3. Turn the leg assembly over so it is resting on the casters.
4. Using your forklift or hoist, raise the machine up and move the leg assembly under it and lower the machine down onto the legs.  
*Note, that on one of the center legs there are 2 metal tabs welded vertically. These are the latch plates for your doors, so be sure they are on the front side of the machine.*



5. Align the holes and get all 12 bolts started by hand, then tighten. If you plan to use a coolant system, it would be a good time to seal around each bolt with some silicone sealant.
6. Inside your wood box of tools you will find the coolant drain return tube. This is a tube with a flange and 3 tapped holes with allen type bolts. On bench tray at the rear of the machine you will find a hole surrounded by 3 bolt holes. Put some sealant around the drain tube and place it under the tray with the bolts going down from the top. The other hole in the bench top is for the coolant pressure line.
7. You may use plywood or other material for your shelves, but if prefer, you can utilize the material from your shipping crate.

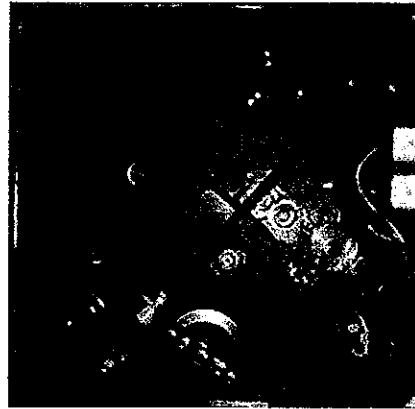
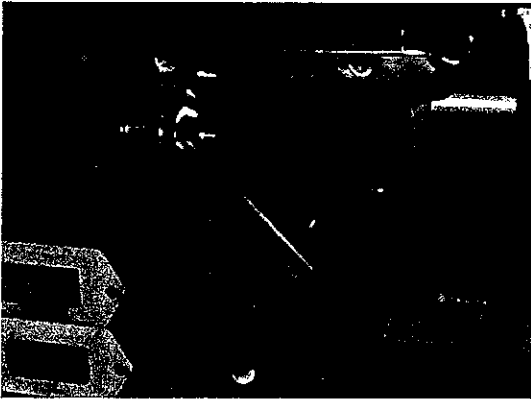
8. **Disassemble the crate and discard all but the side, end and top panels. Using a good carpenters glue, put the 2 side panels together and secure them with the screws from the crate. Glue and screw the 2 end panels to the top panel as well. Once the glue is dry, layout the shelves and cut to size. Both of your glued up panels will be oversized, so you can get nice fresh cuts on all sides.**
9. **Cut the notches for the legs in each shelf panel, noting that the upper shelf will require a wider notch to clear the door latches. Slide the shelves in from the end starting with the lower one.**
10. **Once the shelves are in place you can attach your sheet metal panels to the bench. Note that each panel has a numbered sticker on it which corresponds to a sticker on the bench frame. In the wood box of tools you will find a sack with allen bolts for the panels and countersunk screws for the door hinges. In some cases the door latches will also be in the wood box. Attach all the panels and doors.**



11. **You can now roll your machine into place on its casters. Once in place, screw the leg adjusters out until the machine is resting solidly on them and continue adjusting until your unit is level.**

# SHOPMASTER PATRIOT CONTROLS

Take a few minutes to familiarize yourself with the location of the various controls on your machine. This will make using your PATRIOT much easier when you are ready to operate the machine.



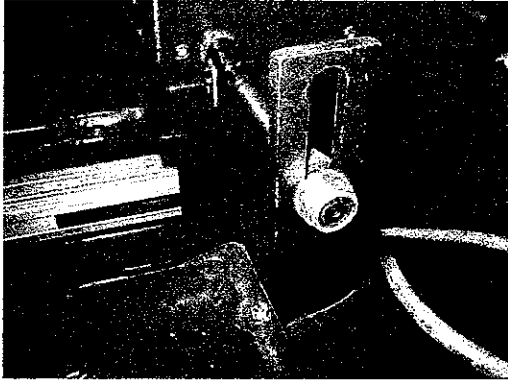
1. The high-low spindle speed and spindle brake is operated by a shifter mechanism mounted on the sheet metal housing near the top corner. The shifter arm is spring loaded and has a pin lock for all 3 positions. In the center position, the shift arm releases tension on both drive belts from the motor to the first pulley. At the same time, the spring loaded lever arm is forced against the pulley and the friction material stops its rotation. The tension of the brake is determined by adjusting the 2 adjuster screws against the lever arm.

Tension should be set so that the lathe chuck stops when neutral is engaged, but the chuck can be rotated with the use of the chuck in the scroll drives. This will allow you to turn the chuck even while the brake is engaged.

**CAUTION- DO NOT CHANGE PARTS OR ROTATE THE CHUCK WHILE THE LATHE MOTOR IS RUNNING. ALWAYS INSURE THAT THE SHIFTER IS FULLY SEATED INTO IT DETENT POSITION BEFORE MEASURING ANY PARTS HELD IN THE CHUCK.**

When you shift the lever up, the low speed belt will be engaged and your spindle will rotate at the low ratio. When the lever is moved down, the high speed belt is engaged and the spindle will rotate at the higher speed. For the majority of lathe operations you will find that selecting a medium speed, such as 1000 rpm in the high range will give you a good set of speeds for many operations. You can see that when the lever is engaged in neutral, the motor will run free because both

drive belts are free of tension. There are 2 adjustments to keep your High-Low speed belts operating properly.



**A. Motor tension is adjusted by the threaded rod coming from the rear of the lathe column and attached to the motor mount. By moving the mount away from the column, the belt tension will be increased. However, the belt should not be too tight so that when in neutral, the pulley will drag against the belts. This would create a squealing and burning of the belts. Only allow enough tension on the motor mount so that the belts are properly tensioned when engaged in high or low speed.**

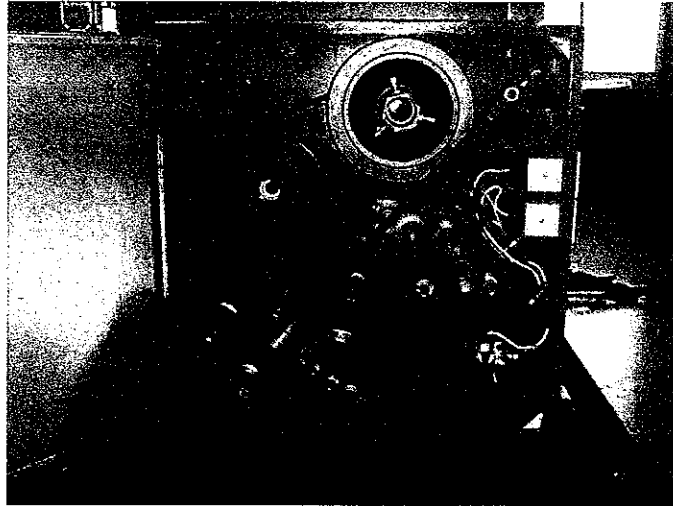
**B. The belts are also retained by a roller bearing idler mounted in a slotted bracket. This idler keeps the belts at the proper angle to prevent them from falling off the pulley when one speed is engaged or when the system is in neutral for a period of time. This idler should also have just enough tension to support the belts, but not so much as to cause dragging in neutral.**



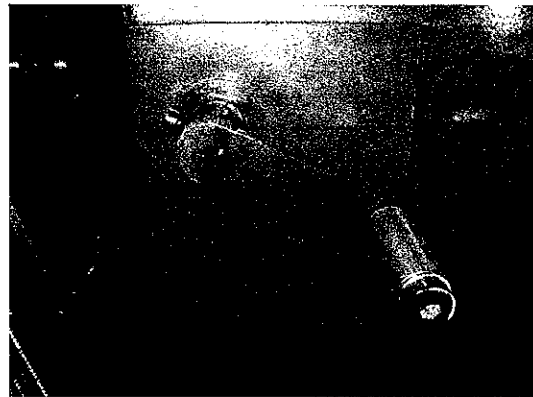
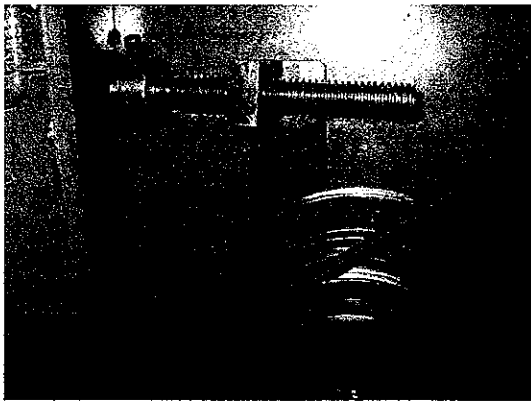
**You will see that the motor drives a pulley which acts as the spindle brake. The mounting bracket of this pulley contains the brake adjuster screws and also has slotted holes. The slotted holes are for alignment of the pulley shaft, since the shaft is in a threaded hole in the casting and the plate is mounted to the sheet metal housing, the slotted holes allow proper alignment of the 2 parts. The pulley runs on 2 sealed roller bearings.**



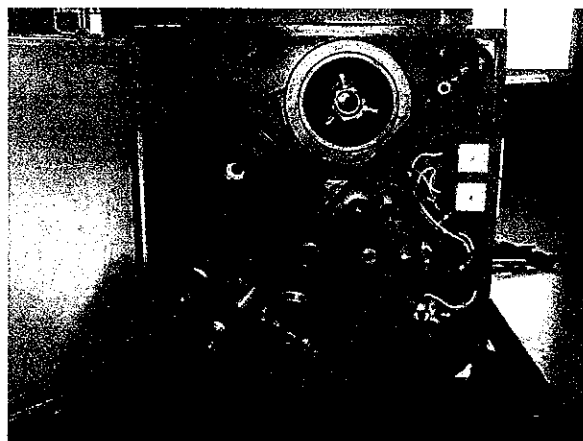
**This pulley also has a removable tooth belt pulley which drives the tooth belt to the next pulley in line, the belt center distance is pre-set and no tensioning or adjustment is necessary.**



- 2. This is the lathe drive housing. Made of heavy gauge steel it has a door to open for access to the spindle drive mechanism and the threading gear set. The belt tension and speed selection for the lathe spindle is controlled by a sliding idler pulley moved by a handle and acme screw thread.**



**The handle is found in your accessories box and should be installed onto the square drive found on the rear of the sheet metal housing.**

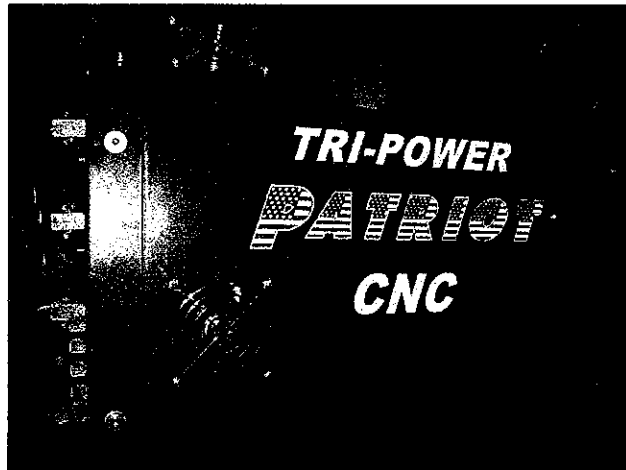


**The main drive belt system consists of 3 pulleys and 2 belts.**

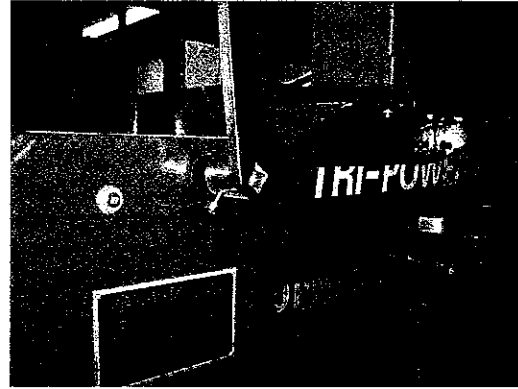
The first pulley in line is mounted on a shaft threaded into the casting and riding on 2 sealed roller bearings. This pulley is driven by the tooth belt from the pulley described in the previous section. This primary pulley drives the center idler with a belt, and the center idler drives the main spindle pulley with the second belt. Tension and speed selection is accomplished by turning the adjuster crank. As the center idler moves on its sliding mount, it also has a second swing arm which allows both belts to be tensioned at the same time and to the same tightness. Simply turn the crank to release the belt tension, select the ratio of drive for the speed desired and re-tighten the crank.

### **CAUTION:**

**THE CRANK CAN PUT AN EXTREME AMOUNT OF PRESSURE ON THE SYSTEM IF OVER-TENSIONED- USE COMMON SENSE AND TIGHTEN THE BELTS ONLY ENOUGH FOR NON SLIPPAGE.**



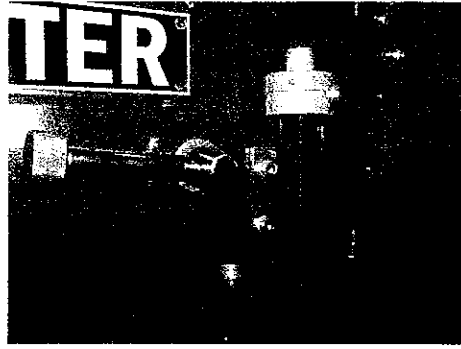
3. This is the housing for the CNC electronic drivers. When you order CNC with your machine, we will install the CNC system. If you build your own system, you have the enclosure ready for the components and the industry standard cable connectors. If you upgrade to our system in the future, simply remove the housing and ship it to us for installation of the electronics.



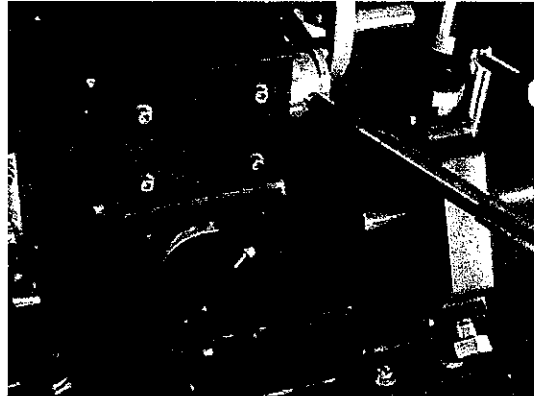
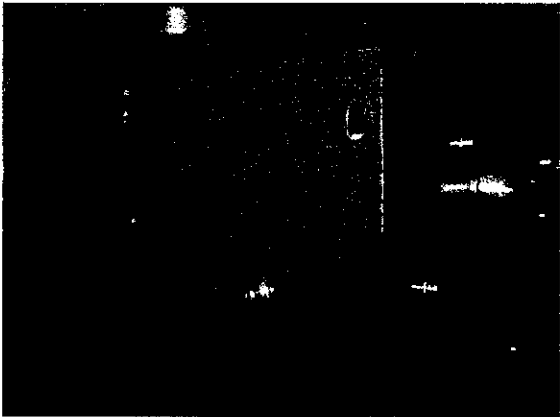
4. This front cover contains your name tag and warning label for the mill lift mechanism. The square head shaft drives a set of helix gears to raise and lower your mill head assembly. The handle which attaches to the square head with a set screw is shipped in your box of parts.



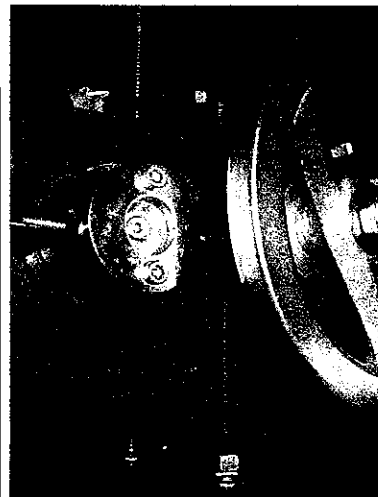
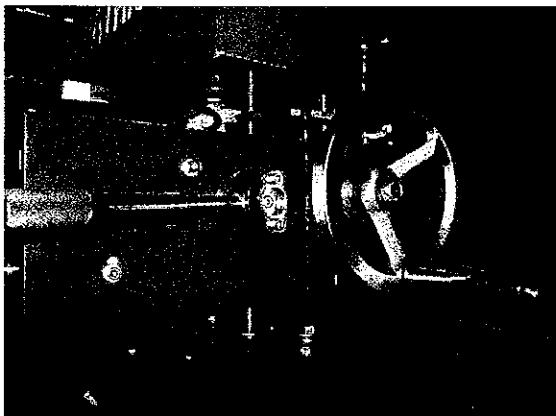
5. This is the main mill head casting. The mill head assembly can be raised and lowered a total of 8". The mechanism consists of a 4 column support plate which holds the head moved by an acme screw activated by the handle on the front of the assembly. Beneath the mill belt cover you will find the 2 drive belts for your milling speed selections. The primary belt drives from the motor to an idler and the secondary belt drives from the idler to the spindle pulley. The center idler pulley runs on 2 sealed roller bearings. The center idler swings on a swing bracket in the mill head casting. The belt tension is set by the adjuster rod. The mill head is supported by a heavy steel plate which attaches to the back of the 4 column lift mechanism and extends to the tailstock end of the machine. There it is supported by a vertical column with a slot and locking handle. This plate also acts as the mill motor mounting. The chrome knob in the center loosens and tightens tension to the mill belts for speed selection. The chrome handle to the right is the mill spindle lock. It moves a pin into a hole in the mill spindle pulley to lock the spindle while changing tools. The handle has a detent to keep it disengaged while milling.



6. The mill drill depth stop consists of a threaded rod attached to the quill drive bracket. It travels up and down with the quill, and the micrometer dial can be adjusted for pre-setting the depths of your holes. The dial also has a quick release button for rapid positioning. **CAUTION-** when using the power feed, be sure you do not go beyond the limit of the stop or severe damage could result to the drive mechanism.



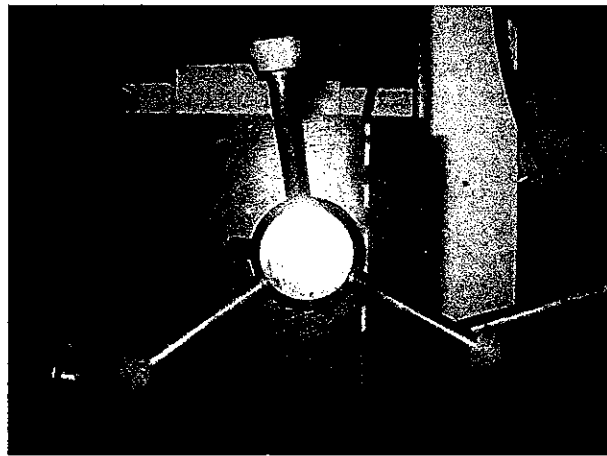
7. This sheet metal shield covers the Z axis CNC motor mount and drive belts. It also serves as the mounting point for the DRO display.



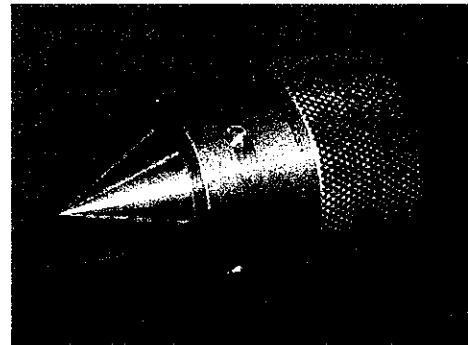
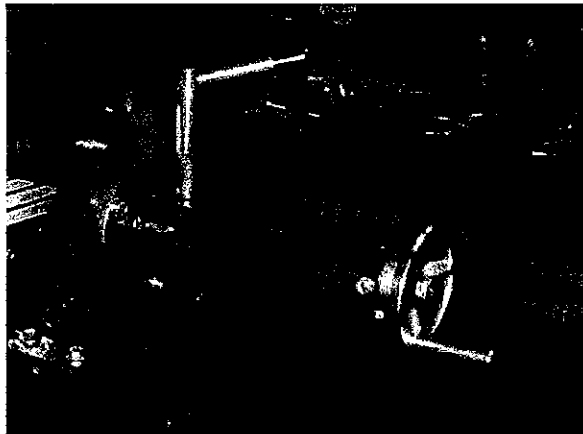
8. The lever operates the Z axis power feed gearbox. Pulling down on the lever drives the quill down and pushing up drives the quill

upwards. There is a detent for the neutral position. **CAUTION-** use care when operating the power feed. If you go beyond the limits of your mill/drill depth stop or the travel of the quill, the force of the gearbox could cause severe damage to the drive components. For your security we have installed an auto stop on the Z axis gearbox which will shift the gearbox into neutral before the quill reaches the limit of its travel.

The handle wheel operates your quill manually for fine positioning or manual drilling. It will spin when the power gearbox is engaged, but when the gearbox is in neutral you can move the quill up and down by turning the handle manually. Just to the right and behind the mill drill auto stop is your dial to read your motions.

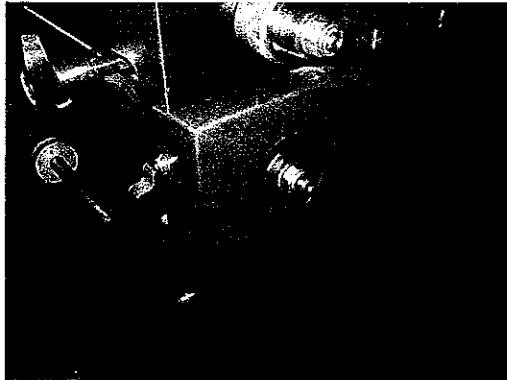


9. Locking this handle solidifies the mill head once you have set the desired height of the mill. **CAUTION-** read the warning label and **ALWAYS** loosen this lock before adjusting the height of the mill. The three handles are packed in the wood box of tools.

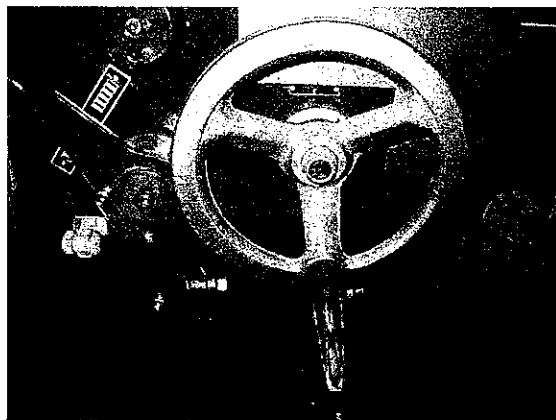


10. The PATRIOT tailstock assembly is unique in several ways. It combines the traditional tailstock functions with those of a steady rest. The entire long barrel assembly of the tailstock can be removed with 3 bolts to reveal the steady rest function. The tailstock itself has a full 7" of barrel travel for those deep hole

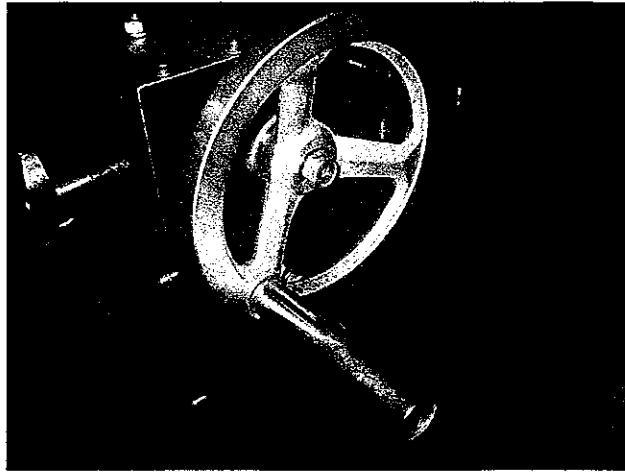
drilling operations. Plus, it can be attached to the main carriage and power driven for automated drilling. By removing the tailstock barrel assembly and installing the extenda-center, objects up to 40" long and 1" diameter can be held between centers. The handle has a dial for your depth measurements. The tailstock can be offset for cutting long tapers in the lathe. After loosening the 4 top hold down bolts, move the top slide to the desired offset by turning the 2 adjuster screws. ( one is on opposite side)



11. At the end of the machine casting is the X axis CNC drive assembly. Covered by a metal shield, inside is the drive pulley and motor mounting bracket. Center distances are factory set for the proper tooth belts, so no adjustment is necessary after installation. ( Y axis handle removed in picture for clarity)



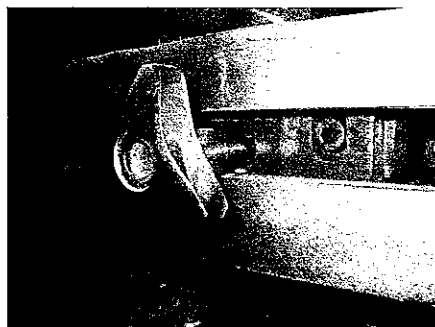
12. This handle drives your X axis carriage toward and away from the lathe chuck. Use this handle for manual positioning or fine motions. The handle grip is removed for shipping and is found in your box of tools.



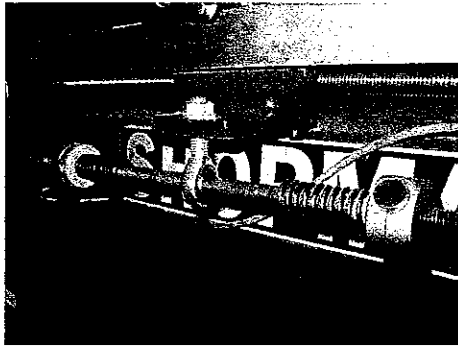
- 13. At the far right end of the machine is the handle for your Y axis manual feed. This handle will drive your table toward and away from you in lathe and mill modes. Use this for fine positioning .**



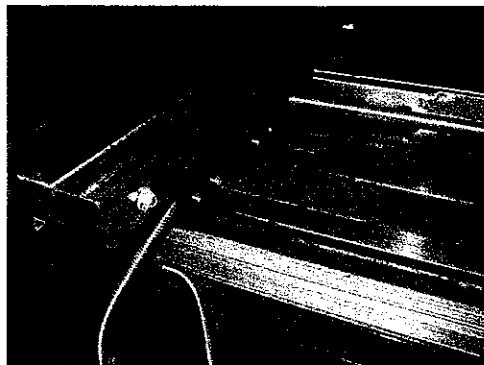
- 14. This knob will lock the position of your tailstock/ steady rest assembly along the length of the carriage.**
- 15. All the motions of the machine are adjustable by means of gib screws. There are 2 on the tailstock. Your main carriage has 2 and the cross slide has 4.**



- 16. This knob locks the main carriage in position along the bedway.**

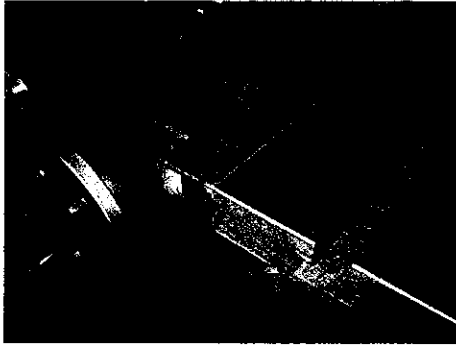


17. The auto stop mechanism has several functions. Primarily it is designed as a safety feature to prevent accidents when the operator allows the carriage or part to run into the chuck. By setting the auto stop adjusters at a pre-set point, even if the operator is distracted, the auto stop will disengage the lead screw gearbox before the carriage goes beyond the safety point. The stops can be set for both left and right hand travel. As a tool for production, it can also be set to a predetermined depth when using the power tailstock for deep hole drilling and reaming. When turning up to a shoulder or in a blind hole, the stops will stop your carriage at the pre-set point every time. When threading, the auto stop will start your carriage at the same point each time and stop it at the same point for easy repeats on your thread passes. The auto stops are mounted on a threaded rod and attached to the lead screw gearbox. When the carriage hits the auto stop it shifts the gearbox into neutral and stops the carriage. Each stop mechanism has a spring to clear the gears once the stop trips the lever. Each stop has a micrometer dial graduated in 0.001" increments for fine tuning of your position. To avoid tedious long travel of the dials, each one is equipped with a quick release spring nut which allows the stop to slide along its rod until the position is found and then the spring nut is released for fine tuning with the dial.

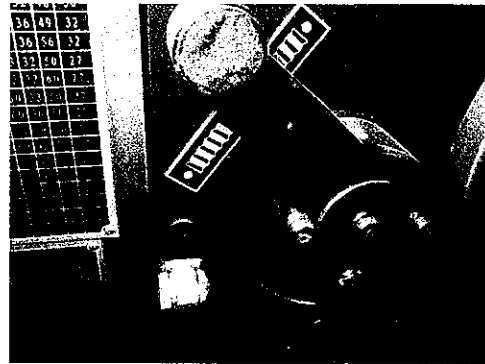


18. This heavy shield is designed for the installation of the DRO on the Y axis. All the holes are drilled and tapped at the factory for easy, professional installation. The shield is made of heavy gauge steel and painted to match the machine.

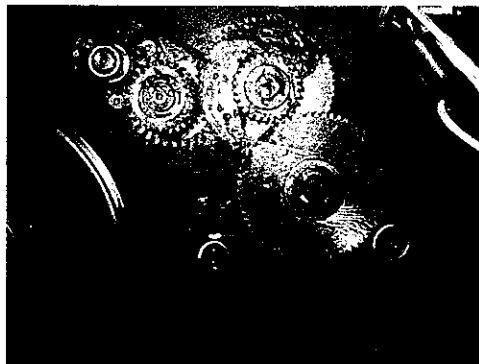




**19. All the lead screws on the PATRIOT machine are fully shielded to protect the moving parts. The X axis shield is made of heavy gauge stainless steel. The Y axis lead screw is shielded by the mill table.**



**20. The lead screw engagement gearbox activates the sliding gear which meshes with the final output gears in your gear box assembly. Moving the lever to the left will engage forward and travel your main carriage toward the lathe spindle. In the center (45 degree) position, your lead screw is disengaged from the gears and can be turned using the X axis handle or your CNC drive if you have one installed. Moving the handle to the right will travel your carriage toward the tailstock. Each position has a spring loaded detent to hold it in place, but we recommend that you always keep your hand on or near the lever in case of a problem requiring quick disengagement of the drive. The lead screw gearbox is also controlled by the auto stop rod assembly.**



**21. When you open the large door at the left side of the machine, you will find your power feed and threading gear set. The factory has already installed one set of gears on the machine, this one is the**

lowest feed rate and is used for turning operations. By reading the chart in this manual and on your machine you can select the gears you need for cutting various types of threads. The gear assembly consists of 3 main parts.

A. The primary drive gearbox which is contained in the lathe column casting.

B. The change gear sets as characterized by their 4 splined center holes and fine module teeth.

C. The final drive gear box and lead screw engagement.

Inside the lathe column you have a cluster gear which is driven by the lathe spindle and a sliding cluster gear which switches from high to low ratio and powers the final output gear. This output gear drives a combination gear, which has a coarse tooth gear on one end and a spline on the other to accept the fine tooth change gears. This combination gear rides on Shaft "A". Next in line are 2 gears of the fine tooth style riding on shaft "B" and finally, another combination gear, separated by a spacer. The final fine tooth gear and a coarse tooth gear ride on shaft "C". This final coarse tooth gear drives another coarse tooth gear which is the input to the carriage gearbox.

**REMEMBER, WHEN CHANGING RATIOS, YOU ONLY CHANGE THE FINE TOOTH GEARS.**

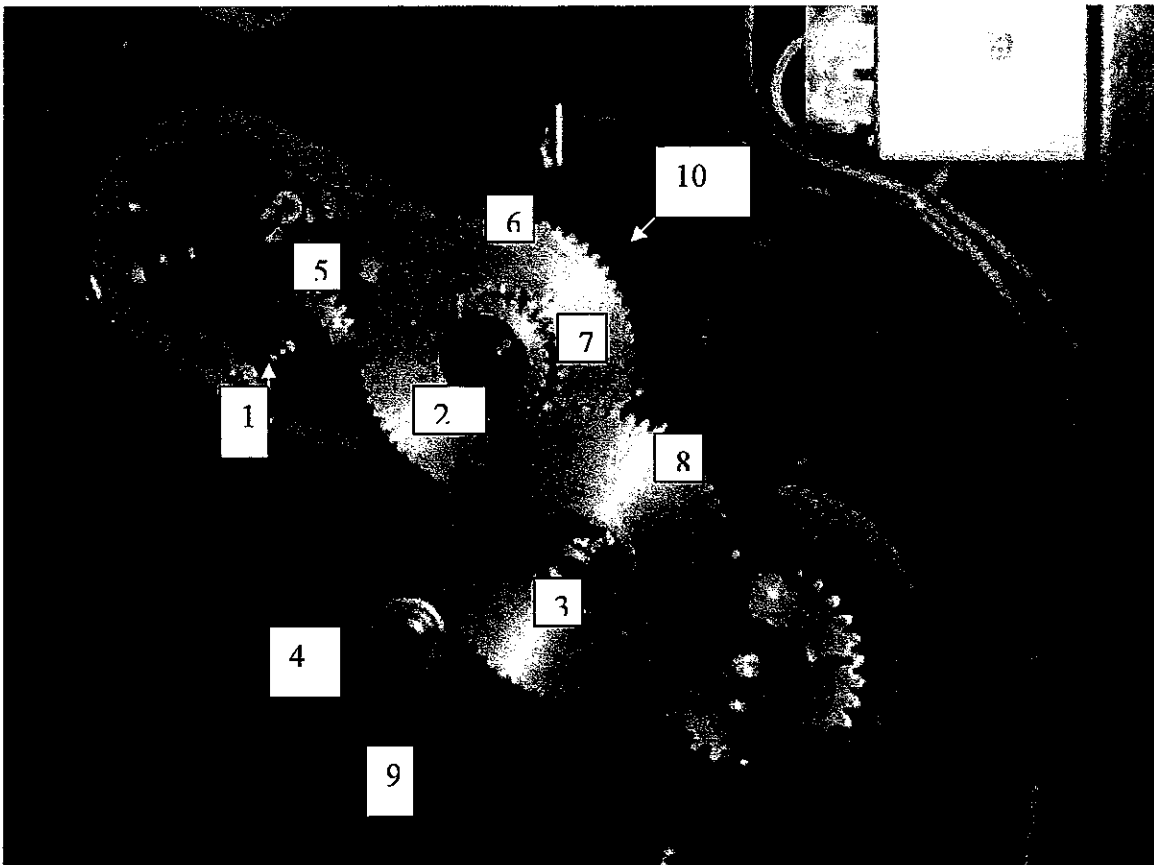
**THESE GEARS ALWAYS MESH AS FOLLOWS-**

**A to B and C to D with B and C on shaft "B"**

When changing gears, you have 2 adjustments to mesh your gears properly, shaft "B" which holds gears B and C moves in 2 directions. It is attached to a bracket which swings when the allen bolt is loosened, and it also slides up and down in a slot when the square end of the shaft is loosened using the "T" handle from your toolpost.

## **KEY TO PICTURE**

- 1. SHAFT "A" WITH BUTTON OILER IN CENTER**
- 2. SHAFT "B" WITH SQUARE DRIVE END**
- 3. SHAFT "C"**
- 4. ADJUSTER SLOT WITH ALLEN BOLT**
- 5. GEAR "A"**
- 6. GEAR "B"**
- 7. GEAR "C"**
- 8. GEAR "D"**
- 9. SWIVELING PLATE**
- 10. SLOT IN PLATE FOR SHAFT "B"**

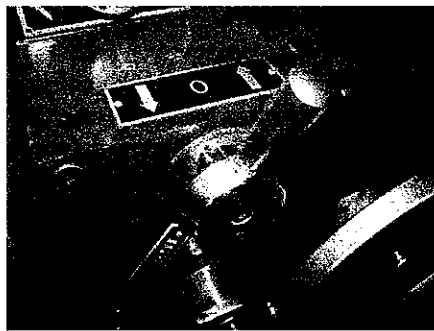


### **CHANGING GEAR RATIOS**

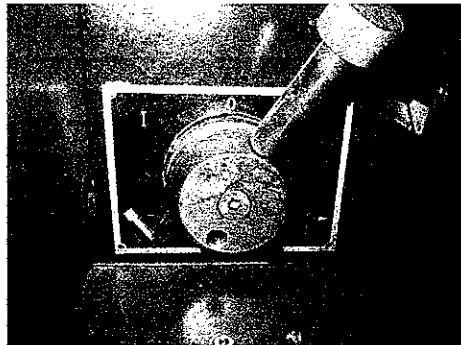
- 1. Remove the “ C “ clips from shafts A,B.C**
- 2. Loosen the allen screw adjuster nut and swing gear “B” away from gear “A”, loosen the shaft “B” with your toolpost tool.**
- 3. Remove the gears from the shafts. On shaft “A” you will remove the fine tooth gear from the shaft end leaving the coarse tooth gear in place, on shaft “B” you will remove both gears and on shaft “C” you will remove the fine tooth gear, leaving the spacer and coarse tooth gear in place.**
- 4. Place your new gear “A” on shaft “A”**
- 5. Place your new gear “B” on shaft “B” followed by your new gear “C”.**
- 6. Place your new gear “D” on shaft “C”**
- 7. Slide shaft “B” down until gears “C” and “D” are meshed and then tighten shaft “B”**
- 8. Swing shaft “B” until gears “A” and “B” are meshed and tighten the allen adjuster.**
- 9. Replace all “C” clips**
- 10. Engage your lead screw gearbox and turn the spindle by hand to test the mesh of the gears before turning motor on.**



- 33. The PATRIOT is equipped with push button safety style switches for the lathe and mill motors. The color markings are easy to remember, with green being forward, the black reverse and bright red for off. Should it become necessary to shut the machine down quickly, just push the red center button.**

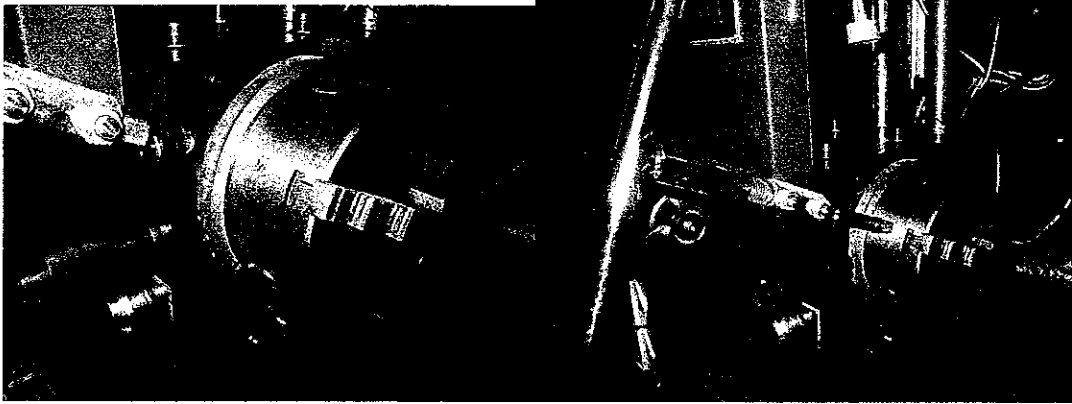


- 34. The y axis power feed control is conveniently located on your left to allow you to use one hand for power feed operations and the other for manual control. The lever has 3 detent positions for forward, neutral and reverse.**

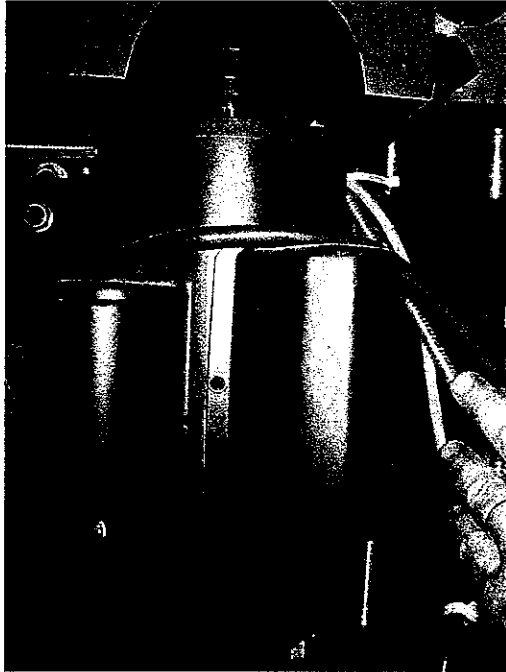


- 35. This lever operates the high and low gearbox for your primary gearbox speeds. The lever to the left is the low range, straight is neutral and to the right is high range. There is a 2/1 ratio between high and low.**

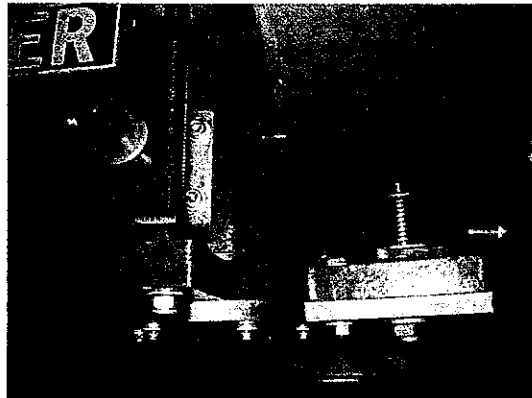
**NOTE: The main spindle bearings are splash lubricated by the gearbox, therefore you must ALWAYS have your gearbox in either high or low when running the lathe.**



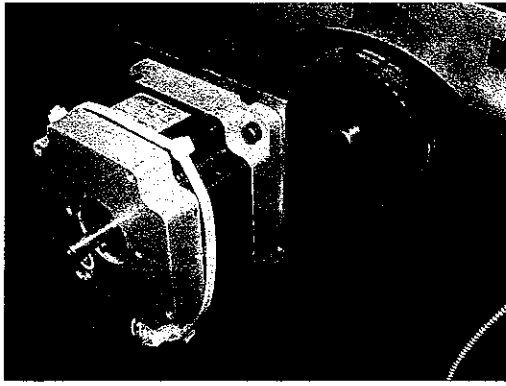
**36. Your PATRIOT is equipped with a unique lathe spindle indexer. A degree wheel is fixed to the spindle and divided into 360 degree markings, with a detent hole each 10 degrees. Attached to the lathe body is a spring loaded pin which can be engaged into any of the detent holes to mark off the spindle rotation in 10 degree increments. The spring loaded pin is mounted on a swing away bracket for convenience. The indexer is mounted to the spindle flange along with the 5" 3 jaw chuck. The chuck is equipped with a set of inner and outer jaws as well as a conventional chuck key. The chuck is mounted to the spindle flange by 3 bolts from the rear. Also included in your box of tools is the " auto key" for the 3 jaw chuck. The auto key is a T handle found in you wood box and fits through the chrome hex piece attached to the front cover. You will see that the key will align with the square holes on your 3 jaw chuck . The spring and detents will prevent the key from engaging the chuck while it is spinning.**



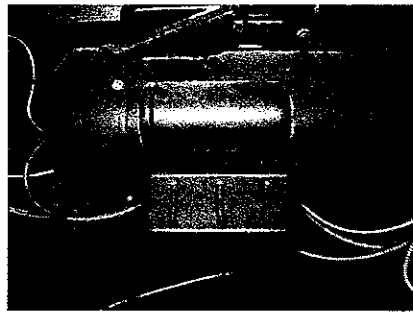
**37. This is your mill motor.**



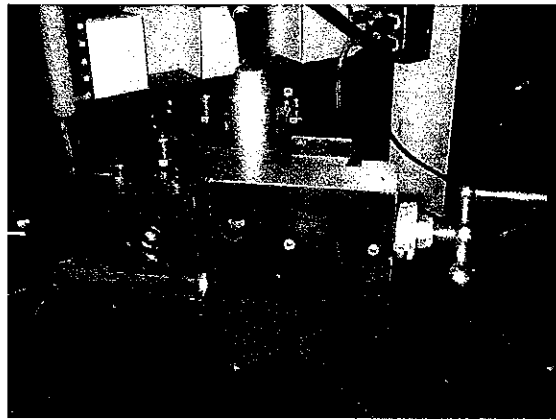
**38. This is the Z axis drive plate. It consists of a 3 piece “sandwich” with a top plate around the quill, a center section and a lower plate. The 3 pieces are held together by bolts and when tight they clamp solidly around the quill. The plate has 3 “arms” – the one toward the front is for the mill / drill depth stop rod. The one pointing toward the tailstock attaches to the drive screw from your mill power feed gearbox and the one pointing to the rear of the machine is for the DRO scale. There is also a small angle bracket in your box of tools which is used for the DRO mounting. CAUTION- your power feed, CNC and manual drives can generate a lot of force, and driving beyond the limits of the travel could bend or break this plate.  
( Later model machines have a 2 piece bracket)**



- 39. Hidden behind and below the cross slide table is the CNC drive for your Y axis.**

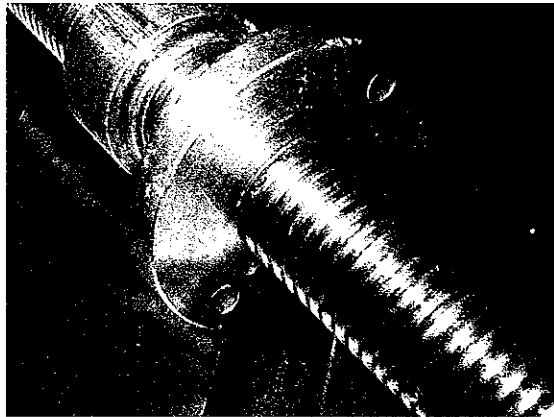


- 40. Behind the carriage you will find the lathe drive motor.**



- 41. Your PATRIOT toolpost is a turret style with the unique feature of removable and adjustable height tool holders as well a removable compound assembly. The main base is held to the table with a long "T" bolt which fits into either of your table slots and can be positioned at any point along the length of the table. Simply loosening the handle allows the entire toolpost to be removed when operating the mill or drill press. The center toolpost section has 4 detent positions for rapid positioning at 90 degree points. The toolpost can be clamped at any angle between as well. 4 holders come with your machine. 2 are lathe tool holders designed for cutting tools up to 1/2" shank size. One is a combination holder which will accept lathe tools as well as round**

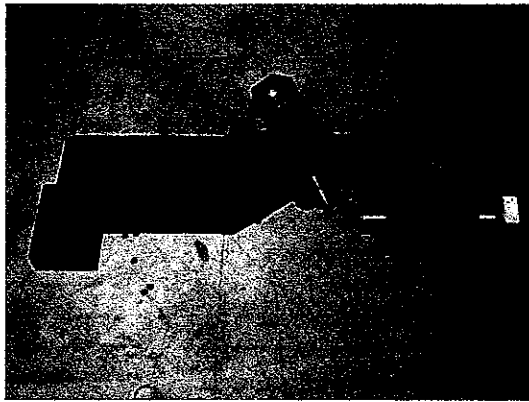
boring bars due to its “V” slot in the bottom. One is a parting tool holder designed to accept standard ½” parting tool blades. Each of the holders is adjustable for center height by loosening the main lock bolt and adjusting the allen bolt. Once the height is set, tightening the jam nut on the adjuster bolt will allow you to remove and replace the holder without the need of further adjustments. Your compound slide is removable to allow you to use the turret for heavy cuts, while leaving you the compound function for the lighter work such as threading and bevel cutting. Extra tool holders may be purchased as spare parts from the parts section of this manual.



42. The PATRIOT uses special 2 piece adjustable nuts to reduce the inherent backlash in the acme system. On both the X and Y tables, each acme screw has 2 piece nuts with one half threaded for adjusting screws.. The nuts are held in a bracket with 2 clamp locks. When the clamp lock holding the flanged nut is loosened , you can adjust the tensioning set screws such that the nuts are forced apart putting contact on both leading and trailing threads of the lead screw. Because they are now contacting both the leading and trailing edges of the screw, the backlash is eliminated. As the machine is used and more wear begins to show, it is a simple operation to loosen the bracket and re-adjust them.

*NOTE: Use care in this adjustment, as too much tension will make turning of the handles very difficult.*





- 43. The PATRIOT comes equipped with a follow rest which attaches to the main carriage and travels along, following the cutting tool. It gives support to stock to prevent the force of the cutting tool from flexing the piece.**

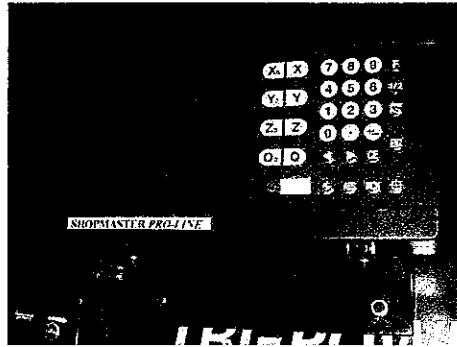


- 44. The PATRIOT is also equipped with a lathe spider fitted to the end of the spindle opposite the lathe chuck. The spider has 3 adjustable bolts to secure long rods and prevent the whipping associated with long part turning. It also prevents harmonic vibrations which can cause uneven finishes on your parts.**



- 45. As an added bonus to make your PATRIOT more convenient, we have included a mounting system for powering the mill head casting up and down. Included is the motor mount, 2 toothed belt pulleys and a motor cover to trim out the installation. The bracket is designed with the center distances pre-set so that the drive belt requires no adjustment. Higher powered NEMA 34 steppers or servos can be used in conjunction with the CNC system, or a simple AC or DC gear motor can be mounted and**

controlled via a toggle switch mounted on the front panel. We have pre-drilled the hole for the toggle switch so your installation will retain that clean professional look.



46. Included in your wood parts box you will also find the sheet metal bracket for the DRO display. This bracket is designed to mount to the Z axis CNC motor shield and is pre-drilled to fit. However, because the DRO cables are 10' long, the display can be mounted in any number of other locations depending on your personal preference.

## THREADING INSTRUCTIONS

Your PATRIOT machine uses a different style of threading system than most conventional lathes. This is due in part to the CNC drives being built into the machine. If you follow the instructions and experiment on some scrap stock, you will find that it is actually easier than the thread dial type machines. For you experienced machinists, however, you may have to make a mental note to “forget” the system you are used to before learning this one.

The principle of multiple pass threading consists of 2 important features;

1. You must always start and stop your carriage at the same point along the X axis of the machine and,
2. You must always start each threading pass in the same position of the chuck rotation.

If you miss either of these rules, you will not follow in the same path each time and end up “wiping” away your previous cuts.

In order to maintain your position along your carriage travel, you select your starting and stopping points and can simply set your X axis dial to 0 and count the turns, or if you have a Digital Readout system, set the 0 point and the stopping point. With your PATRIOT you have a more

convenient way with the use of the auto stops on the X axis carriage. By adjusting the auto stops you can set the carriage to start and stop at the same point automatically. That establishes the first one of your 2 features.

Setting the rotational position of the chuck is as using the lathe spindle indexer to find a point in the chuck rotation. By always returning to this point, your multiple passes will always start on the same rotational position of your work piece.

Once the 2 main features are established, and assuming you have the proper threading tool and your center height is set etc., you are ready to make some test cuts.

## **CUTTING THREADS**

- 1. Turn on your machine and allow the carriage to run in reverse until the auto stop engages at the beginning point. ( Even though your dial may read 0 at this point, it's a good idea to manually back the handle a few turns more and then come back to 0 each time to remove any back lash in the lead screw assembly. It's a good idea to have your starting point just beyond the end of your part.**
- 2. Place the hi-low spindle brake lever into neutral being sure it is fully in the detent position and with the motor still running. Your chuck will now be stopped.**
- 3. Bring the chuck around until your reference points on the spindle indexer are lined up.**
- 4. Engage your lead screw shifter into the forward travel position .**
- 5. Set the depth of your first cut on the Y axis table. ( Have your dial locked to 0 so that you can easily read the depth and always return to 0. If you have a Digital Readout system, 0 your display and read your depths from the display screen.**
- 6. Now you are ready for your first pass, you will note that you are starting at the reference mark on your chuck and the 0 point on your X axis carriage.**
- 7. Engage the low speed on your hi-low spindle and allow the carriage to travel until the auto stop disengages it.**
- 8. Now back your Y axis away from the part beyond your 0 point.**
- 9. Engage your lead screw lever in the reverse position and allow the carriage to return to the starting point and allow the auto stop to disengage the carriage. Back the handle up and return to 0 as explained before.**
- 10. Set the Y axis to the depth of your second cut.**

- 11. Put your hi-low spindle lever into the neutral position and when the chuck is stopped, bring it around until your reference marks are lined up.**
- 12. Put your lead screw shifter into the forward travel position again. You will now see that you are ready to start your second pass at the same point of the x axis carriage and rotation of the chuck. This insures that you will be cutting in the same “groove” as your first pass.**
- 13. Engage your hi-low spindle and allow the carriage to make the second pass.**
- 14. Continue repeating this routine until you have achieved the proper thread depth.**

## **HELPFUL HINTS**

**Threading is a skill that must be learned and practiced, so do not be discouraged if you make some errors early on. It is important to have your tool at the proper height, and for smaller diameter parts use your tailstock with center or the follow rest to prevent deflection of the part. Always set your spindle to the lowest speed for threading. The “by the book” method is to use your compound set your tool at 29.5 degrees to the part, but for most everyday jobs this is not necessary.**

### **MACHINE TROUBLESHOOTING**

- 1. Too much backlash on table-**
  - A. Check brass nuts on the lead screw for adjustment and tightness.**
  - B. Check the set screws holding the lead screw nuts on the carriage and cross slide.**
  - C. Check tightness of Cross Slide Handle.**
  
- 2. Table loose on ways-**
  - A. Adjust gibs.**
  
- 3. Spindle works on low speed but stalls on high-**
  - A. Check pre-load on spindle bearings.**
  - B. Check bearings for proper lubrication.**
  - C. Check belt tension.**

## A NOTE ON FEED RATES

For any machining exercise, certain parameters must first be calculated and set up on the machine, including RPM, FEED RATE, etc.. FEED is described as the machine movement that causes a tool to cut into or along the surface of a work piece. The amount of FEED is usually measured in thousandths of an inch when cutting metal.

The most frequent recommendations regarding FEED RATES are .010 to .020 inches per revolution for rough machining and .003 to .005 inches per revolution for finish machining. Consultation of professional machinist manuals such as the Machinist's Ready Reference (ST 39#24) is highly recommended for detailed descriptions and tables that prove invaluable for nearly any machining operation. Contact the SHOPMASTER technical line for any other additional support you may need. See appendix for feed rate charts.

## APPENDIX 1

### SELECTOR

POS'N 1

POS'N 2

<u>TPI</u>	<u>TPI</u>	<u>GEAR A</u>	<u>GEAR B</u>	<u>GEAR C</u>	<u>GEAR D</u>
20	10	60	30	50	27
22	11	60	33	50	27
24	12	60	36	50	27
26	13	60	39	50	27
28	14	60	42	50	27
30	15	56	42	50	27
32	16	60	48	50	27
34	17	60	51	50	27
36	18	50	54	60	27
38	19	50	57	60	27
40	20	50	60	60	27
42	21	50	63	60	27
44	22	60	33	50	54
46	23				
48	24	60	36	50	54
50	25	56	42	60	54
52	26	60	39	50	54
54	27	40	27	50	54
56	28	60	42	50	54
58	29				

60	30	56	42	50	54
62	31				
64	32	60	48	50	54
66	33	40	33	50	54
68	34	60	51	50	54

**SELECTOR**

<u>POS'N 1</u>	<u>POS'N 2</u>	<u>GEAR A</u>	<u>GEAR B</u>	<u>GEAR C</u>	<u>GEAR D</u>
70	35	40	42	60	54
72	36	50	54	60	54
74	37				
76	38	50	57	60	54
78	39				
80	40	50	60	60	54
82	41				
84	42	50	63	60	54
86	43				
88	44	50	33	30	54
90	45	40	27	30	54
92	46				
94	47				
96	48	50	36	30	54
98	49				
100	50	56	42	30	54
102	51	50	51	40	54
104	52	50	39	30	54
106	53				
108	54				
110	55	40	33	30	54
112	56	50	42	30	54

**NOTE!! WITH THE USE OF OUR COARSE THREAD KIT, THREADS AS COARSE AS 4 TPI CAN BE CUT. WITH THIS KIT, YOU MAY FIND MANY SIZES AVAILABLE BY SIMPLY DIVIDING THE ABOVE NUMBERS BY 3.**

**EX: 24 TPI / 3 = 8 TPI USING THE SAME GEAR SET.**

**BLANK AREAS INDICATE THREAD STYLES NOT POSSIBLE.**

## APPENDIX 2

### FEED RATES PER REVOLUTION

<u>GEARS</u>				<u>LOWSPEED</u>		<u>HIGH SPEED</u>	
<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>FEED IN</u>	<u>FEED MM</u>	<u>FEED IN</u>	<u>FEED MM</u>
30	60	27	63	.0029	.073	.0058	.147
30	57	27	63	.0030	.077	.0061	.155
33	60	27	63	.0032	.081	.0064	.162
33	57	27	63	.0033	.085	.0067	.170
36	60	27	63	.0035	.088	.0069	.176
36	57	27	63	.0037	.093	.0073	.186
39	60	27	63	.0038	.096	.0075	.191
36	56	27	60	.0039	.099	.0078	.198
42	60	27	63	.0041	.103	.0081	.206
39	60	30	63	.0042	.106	.0084	.212
42	56	27	63	.0043	.110	.0087	.220
42	60	30	63	.0045	.114	.0090	.229
39	57	30	60	.0046	.117	.0092	.235
49	60	27	63	.0047	.120	.0095	.240
51	60	27	63	.0049	.125	.0098	.250
49	56	27	63	.0051	.129	.0101	.257
54	60	27	63	.0052	.132	.0104	.265
49	56	27	60	.0053	.135	.0106	.270
57	60	27	63	.0055	.140	.0110	.279
56	57	27	63	.0057	.144	.0114	.289
54	60	30	63	.0058	.147	.0116	.294
57	56	27	63	.0059	.150	.0118	.299
60	57	27	63	.0061	.155	.0122	.309

A	<u>GEARS</u>			<u>LOW SPEED</u>		<u>HIGH SPEED</u>	
	B	C	D	FEED IN	FEED MM	FEED IN	FEED MM
60	56	27	63	.0062	.157	.0124	.315
56	57	30	63	.0063	.160	.0126	.321
60	54	27	63	.0064	.163	.0129	.327
57	56	30	63	.0065	.166	.0131	.332
63	57	27	60	.0067	.171	.0134	.341
63	56	27	60	.0068	.174	.0137	.347
57	56	32	63	.0070	.177	.0140	.355
63	54	27	60	.0071	.180	.0142	.360
63	56	27	57	.0072	.183	.0144	.365
60	56	32	63	.0073	.187	.0147	.373
63	57	30	60	.0075	.189	.0149	.379
63	56	30	60	.0076	.193	.0152	.386
56	54	33	60	.0077	.196	.0154	.391
63	49	27	60	.0078	.198	.0156	.397
63	57	32	60	.0080	.202	.0159	.404
63	56	32	60	.0081	.206	.0162	.411
63	57	33	60	.0082	.208	.0164	.417
63	56	33	60	.0084	.212	.0167	.424
63	56	32	57	.0085	.217	.0171	.433
63	54	33	60	.0087	.220	.0173	.440
63	56	33	57	.0088	.223	.0176	.447
63	57	36	60	.0090	.227	.0179	.455
63	56	36	60	.0091	.231	.0182	.463
63	54	33	56	.0093	.236	.0186	.471
63	54	36	60	.0095	.240	.0189	.480
63	56	36	57	.0096	.244	.0192	.487
63	57	39	60	.0097	.246	.0194	.493



GEARS				<u>LOW SPEED</u>		<u>HIGH SPEED</u>	
<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>FEED IN</u>	<u>FEED MM</u>	<u>FEED IN</u>	<u>FEED MM</u>
63	56	39	60	.0099	.251	.0197	.501
63	51	36	60	.0100	.254	.0200	.508
63	54	36	56	.0101	.257	.0203	.514
63	54	39	60	.0102	.260	.0205	.520
56	39	32	60	.0103	.263	.0207	.525
63	57	42	60	.0104	.265	.0209	.531
63	56	42	60	.0106	.270	.0213	.540
56	57	51	63	.0107	.273	.0215	.545
63	51	39	60	.0108	.275	.0217	.551
63	54	42	60	.0110	.280	.0221	.560
63	56	42	57	.0112	.284	.0224	.568
56	51	48	63	.0113	.287	.0226	.574
63	51	39	57	.0114	.290	.0228	.580
63	48	39	60	.0115	.293	.0230	.585
63	51	42	60	.0117	.297	.0233	.593
63	54	42	56	.0118	.300	.0236	.600
63	57	48	60	.0119	.303	.0239	.606
63	51	39	54	.0120	.306	.0241	.612
63	57	49	60	.0122	.310	.0244	.619
63	51	42	57	.0123	.312	.0246	.624
63	56	49	60	.0124	.315	.0248	.630
63	51	42	56	.0125	.318	.0250	.635
63	57	51	60	.0127	.322	.0254	.644
63	56	48	57	.0128	.325	.0256	.650
63	56	51	60	.0129	.328	.0258	.656

<u>GEARS</u>				<u>LOW SPEED</u>		<u>HIGH SPEED</u>	
<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>FEED IN</u>	<u>FEED MM</u>	<u>FEED IN</u>	<u>FEED MM</u>
63	56	49	57	.0131	.332	.0261	.663
63	42	39	60	.0132	.334	.0263	.669
63	54	48	57	.0133	.337	.0265	.674
63	57	54	60	.0134	.341	.0269	.682
63	54	49	57	.0135	.344	.0271	.688
63	56	54	60	.0137	.347	.0273	.694
63	54	49	56	.0138	.350	.0276	.700
63	57	56	60	.0139	.354	.0279	.707
63	54	51	57	.0141	.358	.0282	.716
63	51	48	56	.0143	.363	.0286	.726
63	56	57	60	.0144	.366	.0289	.733
63	51	49	56	.0146	.371	.0292	.741
63	54	56	60	.0147	.373	.0294	.747
63	51	48	54	.0148	.377	.0296	.753
63	54	57	60	.0150	.380	.0299	.760
63	30	32	60	.0151	.384	.0302	.768
63	48	49	57	.0152	.387	.0305	.774
63	49	48	54	.0154	.392	.0309	.784
63	51	56	60	.0156	.395	.0311	.791
60	32	39	63	.0157	.398	.0313	.796
63	51	57	60	.0158	.402	.0317	.805
63	56	60	57	.0160	.406	.0320	.812
57	30	32	51	.0161	.409	.0322	.818
63	49	56	60	.0162	.411	.0324	.823
63	51	56	57	.0164	.416	.0328	.832
63	54	60	57	.0166	.421	.0332	.842

<u>GEARS</u>				<u>LOW SPEED</u>		<u>HIGH SPEED</u>	
<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>FEED IN</u>	<u>FEED MM</u>	<u>FEED IN</u>	<u>FEED MM</u>
63	49	54	56	.0167	.425	.0335	.850
63	54	60	56	.0169	.429	.0338	.857
63	49	56	57	.0171	.433	.0341	.866
63	33	36	54	.0172	.436	.0344	.873
63	51	56	54	.0173	.439	.0346	.879
63	48	56	57	.0174	.442	.0348	.884
63	51	60	57	.0176	.446	.0351	.892
63	49	57	56	.0177	.449	.0353	.897
63	51	60	56	.0179	.454	.0357	.908
63	48	57	56	.0180	.458	.0361	.916
60	49	56	51	.0182	.461	.0363	.922
63	49	60	57	.0183	.464	.0365	.928
63	48	56	54	.0184	.467	.0368	.933
63	51	60	54	.0185	.471	.0371	.941
63	48	60	57	.0187	.474	.0373	.947
63	48	60	57	.0188	.477	.0375	.953
60	33	30	39	.0189	.480	.0378	.959
63	48	60	56	.0190	.482	.0380	.964
63	42	54	57	.0192	.487	.0384	.975
63	49	60	54	.0193	.490	.0386	.980
63	49	57	51	.0194	.493	.0388	.985
63	42	54	56	.0195	.496	.0391	.992
63	48	60	54	.0197	.500	.0394	1.000
63	48	57	51	.0198	.503	.0396	1.006
63	32	42	56	.0199	.506	.0399	1.013
63	36	51	60	.0201	.510	.0402	1.020
63	48	56	49	.0203	.514	.0405	1.029
63	49	60	51	.0204	.519	.0408	1.037

A	GEARS			LOW SPEED		HIGH SPEED	
	B	C	D	FEED IN	FEED MM	FEED IN	FEED MM
63	42	57	56	.0206	.524	.0412	1.047
63	39	57	60	.0207	.526	.0414	1.052
63	48	60	51	.0208	.529	.0417	1.059
63	42	56	54	.0210	.533	.0420	1.067
63	36	51	57	.0211	.537	.0423	1.074
63	42	60	57	.0213	.541	.0426	1.083
63	39	56	57	.0214	.544	.0429	1.088
63	27	39	57	.0216	.547	.0431	1.095
63	42	60	56	.0217	.551	.0434	1.102
57	30	51	60	.0218	.554	.0436	1.108
63	33	51	60	.0219	.556	.0438	1.113
63	36	56	60	.0221	.560	.0441	1.120
63	39	57	56	.0222	.564	.0444	1.128
63	36	54	57	.0224	.568	.0448	1.137
63	42	60	54	.0225	.572	.0450	1.143
63	42	57	51	.0226	.575	.0453	1.150
63	36	54	56	.0228	.579	.0456	1.157
63	39	60	57	.0230	.583	.0459	1.166
63	39	54	51	.0231	.586	.0462	1.173
63	36	56	57	.0232	.590	.0464	1.179
63	39	60	56	.0234	.593	.0467	1.187
63	42	57	49	.0236	.598	.0471	1.197
60	33	54	56	.0237	.601	.0473	1.202
63	42	60	51	.0238	.605	.0476	1.210
63	39	56	51	.0239	.608	.0479	1.216
63	36	57	56	.0240	.611	.0481	1.222
63	39	60	54	.0242	.615	.0485	1.231

<u>GEARS</u>				<u>LOW SPEED</u>		<u>HIGH SPEED</u>	
<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>FEED IN</u>	<u>FEED MM</u>	<u>FEED IN</u>	<u>FEED MM</u>
63	39	57	51	.0244	.619	.0487	1.238
63	33	57	60	.0245	.622	.0490	1.244
63	36	51	49	.0246	.625	.0492	1.249
63	33	49	51	.0248	.629	.0495	1.258
63	36	60	57	.0249	.632	.0497	1.263
63	36	54	51	.0250	.635	.0500	1.271
63	32	54	57	.0252	.640	.0504	1.279
63	36	60	56	.0253	.643	.0506	1.286
63	39	56	48	.0254	.646	.0509	1.292
60	33	51	49	.0255	.649	.0511	1.298
63	39	60	51	.0257	.652	.0513	1.303
60	32	57	56	.0258	.654	.0515	1.309
63	39	57	48	.0259	.658	.0518	1.316
56	27	39	42	.0260	.660	.0520	1.321
63	32	56	57	.0261	.663	.0522	1.326
63	36	60	54	.0263	.667	.0525	1.333
63	36	57	51	.0264	.671	.0528	1.341
63	36	54	48	.0266	.675	.0532	1.350
63	39	60	49	.0267	.678	.0534	1.357
63	33	51	49	.0268	.681	.0536	1.363
63	30	57	60	.0269	.684	.0539	1.368
63	33	60	57	.0271	.689	.0543	1.378
63	39	60	48	.0273	.692	.0545	1.385
63	36	57	49	.0275	.698	.0550	1.396
63	33	60	56	.0276	.701	.0552	1.403
63	36	60	51	.0278	.706	.0556	1.412
63	32	60	57	.0280	.711	.0560	1.421

<u>GEARS</u>				<u>LOW SPEED</u>		<u>HIGH SPEED</u>	
<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>FEED IN</u>	<u>FEED MM</u>	<u>FEED IN</u>	<u>FEED MM</u>
63	32	54	51	.0281	.715	.0563	1.430
63	33	56	51	.0283	.719	.0566	1.438
63	32	60	56	.0285	.723	.0570	1.447
63	33	60	54	.0286	.727	.0573	1.455
63	33	57	51	.0288	.732	.0576	1.463
63	36	60	49	.0289	.735	.0579	1.470
63	39	56	42	.0291	.739	.0582	1.477
63	32	56	51	.0292	.741	.0584	1.483
63	32	54	49	.0293	.744	.0586	1.488
63	27	56	60	.0294	.747	.0588	1.494
63	32	60	54	.0295	.750	.0591	1.500
63	32	57	51	.0297	.755	.0594	1.509
63	30	60	57	.0298	.758	.0597	1.516
63	33	57	49	.0300	.762	.0600	1.523
63	30	51	48	.0301	.765	.0602	1.530
63	27	49	51	.0303	.769	.0605	1.537
63	30	60	56	.0304	.772	.0607	1.543
57	33	51	39	.0305	.775	.0610	1.549
63	33	57	48	.0306	.777	.0612	1.555
63	30	39	36	.0307	.780	.0614	1.560
63	32	57	49	.0309	.785	.0618	1.571
63	39	60	42	.0312	.791	.0623	1.583
63	32	60	51	.0313	.794	.0625	1.588
51	27	48	39	.0314	.797	.0628	1.594
63	30	60	54	.0315	.800	.0630	1.600
63	30	57	51	.0317	.805	.0634	1.610
63	30	54	48	.0319	.810	.0638	1.620

A	GEARS			LOW SPEED		HIGH SPEED	
	B	C	D	FEED IN	FEED MM	FEED IN	FEED MM
63	27	57	56	.0321	.814	.0641	1.629
63	33	60	48	.0322	.818	.0644	1.637
63	30	56	49	.0324	.823	.0648	1.646
63	32	60	49	.0325	.827	.0651	1.653
63	27	56	54	.0327	.830	.0653	1.659
63	27	51	49	.0328	.833	.0656	1.666
63	30	57	49	.0330	.838	.0660	1.675
63	27	60	57	.0332	.842	.0663	1.684
63	30	60	51	.0334	.847	.0667	1.694
63	27	51	48	.0335	.850	.0669	1.700
63	27	32	30	.0336	.853	.0672	1.707
63	27	60	56	.0338	.857	.0675	1.715
63	36	56	39	.0339	.862	.0678	1.723
57	32	51	36	.0341	.865	.0681	1.731
63	32	54	42	.0342	.868	.0683	1.736
63	33	56	42	.0344	.873	.0687	1.746
63	36	57	39	.0345	.877	.0691	1.754
63	30	60	49	.0347	.882	.0694	1.763
63	30	48	39	.0349	.886	.0698	1.773
63	27	50	54	.0350	.889	.0700	1.778
54	27	39	30	.0351	.892	.0702	1.783
63	27	57	51	.0352	.894	.0704	1.788
60	30	51	39	.0353	.897	.0706	1.794
63	30	60	48	.0354	.900	.0709	1.800
63	33	54	39	.0357	.906	.0714	1.813
60	33	57	39	.0359	.911	.0717	1.822
63	32	57	42	.0361	.916	.0721	1.832

<u>A</u>	<u>GEARS</u>			<u>LOW SPEED</u>		<u>HIGH SPEED</u>	
	<u>B</u>	<u>C</u>	<u>D</u>	<u>FEED IN</u>	<u>FEED MM</u>	<u>FEED IN</u>	<u>FEED MM</u>
63	32	49	36	.0362	.919	.0724	1.838
63	36	60	39	.0363	.923	.0727	1.846
63	30	54	42	.0365	.926	.0729	1.852
63	27	57	49	.0366	.931	.0733	1.861
63	33	60	42	.0368	.935	.0736	1.870
60	27	48	39	.0369	.938	.0738	1.876
63	27	60	51	.0371	.941	.0741	1.883
63	30	42	32	.0372	.945	.0744	1.890
63	27	57	48	.0374	.950	.0748	1.900
54	30	51	33	.0376	.954	.0751	1.908
63	33	57	39	.0377	.957	.0753	1.914
63	30	56	42	.0378	.960	.0756	1.920
63	32	60	42	.0380	.964	.0759	1.929
63	32	56	39	.0832	.969	.0763	1.939
63	27	39	32	.0384	.975	.0768	1.950
63	27	60	49	.0386	.980	.0771	1.959
54	30	51	32	.0387	.984	.0775	1.967
63	32	57	39	.0388	.987	.0777	1.973
60	27	39	30	.0390	.991	.0780	1.981
60	32	51	33	.0391	.994	.0782	1.987
63	30	54	39	.0393	.997	.0785	1.994
63	27	60	48	.0394	1.000	.0788	2.000
63	33	60	39	.0397	1.007	.0793	2.014
63	32	54	36	.0399	1.013	.0797	2.025
63	33	56	36	.0401	1.018	.0802	2.037
57	27	51	36	.0404	1.026	.0808	2.051
63	30	60	42	.0405	1.029	.0810	2.057



A	GEARS			LOW SPEED		HIGH SPEED	
	B	C	D	FEED IN	FEED MM	FEED IN	FEED MM
63	30	56	39	.0407	1.034	.0814	2.068
63	32	60	39	.0409	1.039	.0818	2.077
63	32	51	33	.0411	1.043	.0822	2.087
63	27	51	39	.0412	1.046	.0824	2.093
63	30	57	39	.0414	1.052	.0829	2.105
60	27	54	39	.0415	1.055	.0831	2.110
60	30	51	33	.0417	1.060	.0835	2.120
57	30	54	33	.0420	1.066	.0839	2.132
63	32	57	36	.0421	1.069	.0842	2.138
57	27	49	33	.0423	1.075	.0846	2.150
63	30	54	36	.0425	1.080	.0851	2.160
63	27	57	42	.0428	1.086	.0855	2.172
63	33	60	36	.0430	1.091	.0859	2.182
60	27	56	39	.0431	1.094	.0862	2.188
57	30	54	32	.0433	1.099	.0866	2.199
63	32	54	33	.0435	1.105	.0870	2.209
63	30	60	39	.0436	1.108	.0872	2.216
63	30	51	33	.0438	1.113	.0876	2.226
63	30	56	36	.0441	1.120	.0882	2.240
63	32	60	36	.0443	1.125	.0886	2.250
63	27	51	36	.0446	1.133	.0893	2.267
63	30	57	36	.0449	1.140	.0898	2.280
63	27	60	42	.0450	1.143	.0900	2.286
63	32	56	33	.0451	1.146	.0902	2.291
63	27	56	39	.0452	1.149	.0905	2.298
57	27	51	32	.0454	1.154	.0908	2.307
60	30	54	32	.0456	1.157	.0911	2.315

A	GEARS			LOW SPEED		HIGH SPEED	
	B	C	D	FEED IN	FEED MM	FEED IN	FEED MM
56	27	49	30	.0457	1.162	.0915	2.323
63	32	57	33	.0459	1.166	.0918	2.332
63	27	57	39	.0460	1.169	.0921	2.339
63	30	54	33	.0464	1.178	.0928	2.357
60	30	57	33	.0466	1.185	.0933	2.369
63	27	49	33	.0468	1.188	.0935	2.376
63	30	60	36	.0473	1.200	.0945	2.400
60	27	57	36	.0475	1.206	.0950	2.413
56	27	51	30	.0476	1.209	.0952	2.418
63	30	54	32	.0478	1.215	.0957	2.430
60	27	48	30	.0480	1.219	.0960	2.438
63	30	56	33	.0481	1.222	.0962	2.444
63	32	60	33	.0483	1.227	.0966	2.455
63	27	60	39	.0485	1.231	.0969	2.462
63	27	51	33	.0487	1.237	.0974	2.473
63	30	57	33	.0490	1.244	.0979	2.488
60	27	54	33	.0491	1.247	.0982	2.494
63	30	56	32	.0496	1.260	.0992	2.520
63	27	57	36	.0499	1.267	.0998	2.534
63	27	51	32	.0502	1.275	.1004	2.550
63	30	57	32	.0505	1.283	.1010	2.565
60	27	54	32	.0506	1.286	.1013	2.572
60	27	56	33	.0509	1.293	.1018	2.586
57	27	54	30	.0513	1.303	.1026	2.606
63	30	60	33	.0515	1.309	.1031	2.619
60	27	57	33	.0518	1.316	.1036	2.632
63	27	60	36	.0525	1.333	.1050	2.667

A	GEARS			LOW SPEED		HIGH SPEED	
	B	C	D	FEED IN	FEED MM	FEED IN	FEED MM
63	30	60	32	.0532	1.350	.1063	2.700
63	27	56	33	.0535	1.358	.1069	2.715
60	27	54	30	.0540	1.372	.1080	2.743
63	27	57	33	.0544	1.382	.1088	2.764
63	27	56	32	.0551	1.400	.1103	2.800
60	27	56	30	.0560	1.422	.1120	2.845
63	27	57	32	.0561	1.425	.1122	2.850
63	27	54	30	.0567	1.440	.1134	2.880
60	27	57	30	.0570	1.448	.1140	2.896
63	27	60	33	.0573	1.455	.1145	2.909
63	27	56	30	.0588	1.494	.1176	2.987
63	27	60	32	.0591	1.500	.1181	3.000
63	27	57	30	.9599	1.520	.1197	3.040
63	27	60	30	.0630	1.600	.1260	3.200

**NOTE!! TO CALCULATE FEED RATE WHEN USING THE ST85 (COARSE THREAD KIT), MULTIPLY THE ABOVE RATES BY 3.**

**EX: .0630 X 3 = 0.190**

**FOR FEED RATE PER MINUTE, MULTIPLY BY RPM.**

**EX: .0630 X 120 = 7.560 INCHES PER MINUTE.**

## LUBRICATION OF THE UNIT

For accurate work, machinery must be properly lubricated. Take time to examine the CLEAR PLASTIC PORT located below the lathe spindle. It is called the GEAR BOX SIGHT GLASS. It is important to add only enough oil to become visible in the sight glass when the lathe is running. If needed, add oil by unscrewing the slotted plug that is located on the gearbox inspection plate which is just above the LATHE motor on the back of the machine. DO NOT OVERFILL. Another important item is to make sure the lathe bed ways are lubricated each time you use the unit. Oil all "button" oilers daily. Use a lightweight lithium grease on gears. The lead screws for the lathe and the cross slide must not be ignored. Using an oil can, lubricate both lead screws while they are in motion. To easily oil the cross slide, move the table toward you as far as it reaches and squirt a generous amount onto the screw as you turn the hand wheel to move the table back away from you. Annually the machine should be disassembled to the point where the lathe and mill taper bearings can be re-packed in grease. We recommend a durable wheel bearing grease that is obtained at any auto parts store. Remember to adjust the pre-load carefully upon re-assembly.

Please also note that grease may collect metal shavings and could cause excessive wear to the gearbox assembly. This may be true if the chips can enter the gear area. We suggest using tape to block all holes which would allow chips to enter the gear area.

An excellent all –round lubrication available in many places is MARVEL MYSTERY OIL.

### GEARBOX INSPECTION PLATE

During periodic maintenance you may want to inspect your internal drive gears and clean The gearbox reservoir. On the back side of the main lathe column you will find the gearbox Inspection plate. It is secured with 6 allen bolts and has a heavy gasket which can be re-used. Drain the oil by removing the drain plug below the 3 jaw chuck. Remove the lathe tension rod. Remove the 6 allen bolts and remove the cover. After your maintenance is completed, replace the gasket and cover.

Refill the gearbox with 10 weight oil ( auto trans fluid will work fine).

Your oil level should be about ½ way on the sight glass.

## **NOTES ON THE THREE JAW CHUCK**

**Your PATRIOT comes with a conventional 3-jaw chuck. Some also come with a 4-jaw chuck as an option. See the notes on the 4-jaw chuck in the next section. The normal 3-jaw chuck has three inside jaws and three outside jaws. Be sure to take careful note that all bolts that hold the chuck to its face plate are tight and that the chuck fits properly in the face-plate recess made for it. The various parts of the chuck are an integral part of that particular chuck and should always be maintained as a unit. Each chuck is manufactured as a unit and is dialed in with the jaws that are provided with the chuck. The serial number of each individual chuck is stamped on the body and on each of the jaws (see following illustration). The order in which the jaws go into the chuck is also critical to maintain accuracy. Note that the jaws are numbered 1, 2 and 3 as well as stamped with the serial number.**

**THE NUMBER ON THE CHUCK JAW, BOTH INSIDE AND OUTSIDE, INDICATE THE POSITION THAT THEY SHOULD BE PLACED IN THE CHUCK BODY. Jaw NO. 1 must go in the slot stamped NO. 1 on the chuck body. The same NO. 1 slot will also typically have the chuck serial number stamped immediately after the slot number. Make certain you follow the instructions for installation exactly.**

### **INSTALLATION OF THE CHUCK JAWS**

- 1. Using the chuck key provided, scroll to where the beginning of the scroll thread is visible in the NUMBER ONE slot, then back the thread off until the beginning of the thread is no longer visible in the slot (one-half turn counter clockwise will usually do it).**
- 2. Next, insert the jaw numbered NO. 1 in the slot and firmly push it toward the center of the chuck.**
- 3. Scroll the chuck until the thread becomes visible in the second slot; at this point pull out on the previously installed jaw to ensure that the scroll has engaged the teeth on the back of the jaw. If the jaw comes out, repeat steps 1 & 2. If the jaw holds proceed to step 4.**
- 4. With the beginning of the thread visible in the second slot, again back it off one-half turn and insert the jaw. Push it firmly toward the center of the chuck.**
- 5. Scroll the chuck until the thread becomes visible in the third slot; pull out on 2nd jaw to ensure the scroll has engaged the teeth.**
- 6. Repeat the steps for the third jaw.**

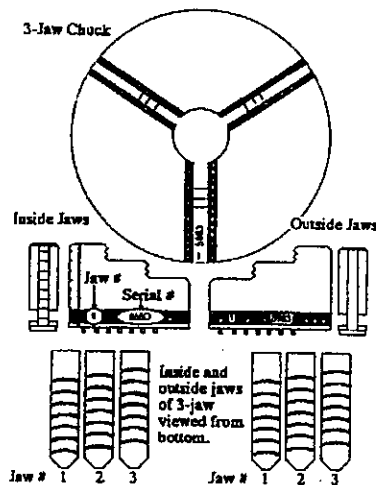
**WHEN ALL THE JAWS ARE INSTALLED AS INSTRUCTED ABOVE, THEY WILL MEET AT THE CENTER OF THE CHUCK SIMULTANEOUSLY.**

### **TO RECAP THE PROCEDURE...**

- 1. Jaws are inserted in numerical order 1-3.**
- 2. Always begin with slot No. 1.**
- 3. Scroll until the beginning of the thread is visible.**

4. Install jaw, pushing it firmly toward center of chuck.
5. Scroll until the beginning of the thread is visible in the next slot.
6. Test the jaw just installed by pulling out.
7. Repeat from STEP 4 until all the jaws are firmly installed.
8. Scroll the chuck until all jaws meet in the center of the chuck.

**IMPORTANT! IF ALL THE JAWS DO NOT MEET AT THE CENTER, REPEAT THE STEPS ABOVE AFTER REMOVING THE INCORRECTLY INSTALLED JAWS.**



**NOTE!**

**IF YOU LOSE THE JAWS YOU WILL HAVE TO BUY A COMPLETE NEW CHUCK-PARTS ARE NOT INTERCHANGABLE.**

**NOTES ON THE FOUR-JAW CHUCK**

The 4-jaw chuck can be purchased as an option. Whether or not you need the extreme accuracy offered by a 4-jaw chuck is a decision that you need to make. Also, some units come with a machined installation plate while others come with plate which must be machined by you (this depends upon our suppliers). The diagram and instructions included at the back of this owner's manual will tell you how the plate must be machined to fit properly. It is not a very difficult procedure and might well qualify for your first serious project after you get set up and take a few practice cuts to familiarize you with your machine.

**FACEPLATE MODIFICATION FOR THE FOUR JAW CHUCK.**

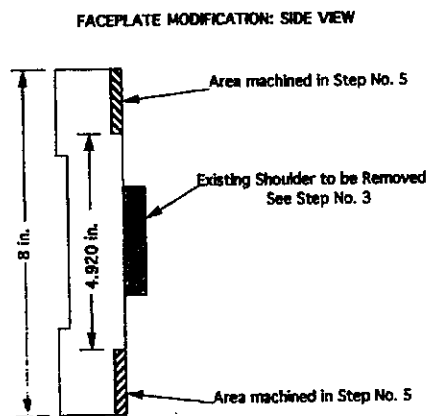
Due to factory specification changes, please modify your faceplate according to the following instructions. Please refer to the following diagram for assistance.

1. Remove the three jaw chuck from the spindle.
2. Bolt the 8" face plate that came with your standard accessories to the spindle.

3. Cut away the existing shoulder that exists on your faceplate. This was used as a centering boss for an old-style chuck that is no longer available.
4. Make a cut across the surface of the face plate to true it to the spindle. Be sure to work slow to attain a ultra-smooth surface.
5. Cut away the face plate on the outside edge to create a new shoulder 0.200" high and 4.920" (125 mm) in diameter.
6. Test the fit of the 4-Jaw chuck to the face plate.
7. When the fit is snug, remove the face plate from the spindle.
8. Clamp the chuck to the face plate and mark the position of the four mounting holes.
9. Drill and tap holes to accept the bolts supplied or any of your choice.

As always, do not be afraid to call the technical line for assistance.

### FACEPLATE MODIFICATION: SIDE VIEW



When performing any lathe work, please be sure to remove the chuck key from chuck **BEFORE TURNING ON THE MACHINE!** Serious injury can result if you carelessly leave the chuck key in the machine. It becomes a flying object of great speed due to the centrifugal force generated by the fast turning chuck.

# **ELECTRICAL TROUBLESHOOTING**

**!!!When Checking Electrical System,  
Always Disconnect Unit From The Power Source!!!**

**1. Neither motor will run-**

- A. Be sure unit is plugged in.**
- B. Check your outlet with an electrical tester to be sure it is "hot".**
- C. Ensure electrical breaker hasn't been tripped.**
- D. Check the cord connections to the machine.**
- E. Check the connections from the junction block to the switches.**

**2. Only one motor runs-**

- A. Check all connections on inoperable motor junction block both top and bottom sides.**
- B. Check connections of wires on switch.**
- C. Check connections of wires from switch to cord junction block.**

**3. Motor runs only one direction-**

- A. Check all connections on junction box.**
- B. Check connections from switch to motor.**
- C. Check switch contacts.**

**4. Motor runs slowly-**

- A. Check capacitor connections. If all are secure, switch capacitors from other motor. If this solves the problem, then the capacitors are faulty and should be replaced. Call the technical line for assistance.**

**5. Motor hums but does not turn-**

- A. Check capacitor connections.**

**6. Motor starts and stops constantly-**

- A. Check capacitor connections.**
- B. Check capacitor for damage, if all appears fine, switch capacitors from other motor. If this solves the problem, then the capacitors are faulty and should be replaced. Call technical line for assistance.**
- C. Check spindle pre-load. Loosen if it appears too tight. Remember it works on the same principle a car wheel bearing does.**

**!!!CAUTION!!!**

**Do not allow motor to run slowly or intermittently. This can cause windings to burn out and then the motor must be returned to Shopmaster for repair.**

**7. Motor runs but makes noise-**

- A. Check housing around the cooling fan for looseness or dents.**
- B. Check drive pulley and belts for tightness.**
- C. Check motor mount and bolts for tightness.**

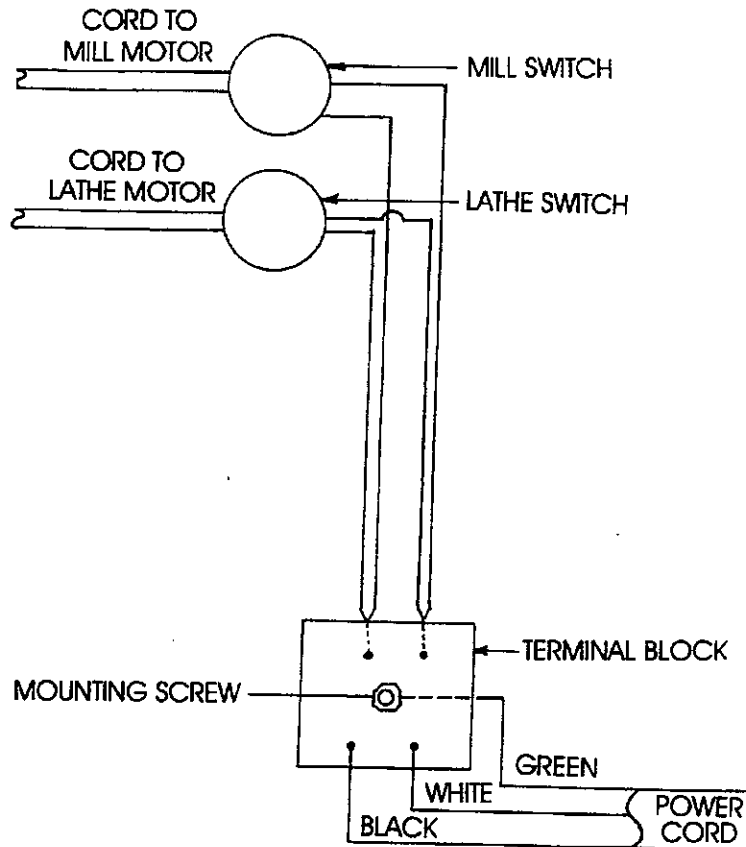
**8. Motor runs fine, but seems too hot-**

**Note! Motors are designed for 110V current. In normal systems, the current can vary from 105 to 125 volts. If your line is on the "high" side (over110V) then the motor will run hotter.**



## ILLUSTRATION A-4

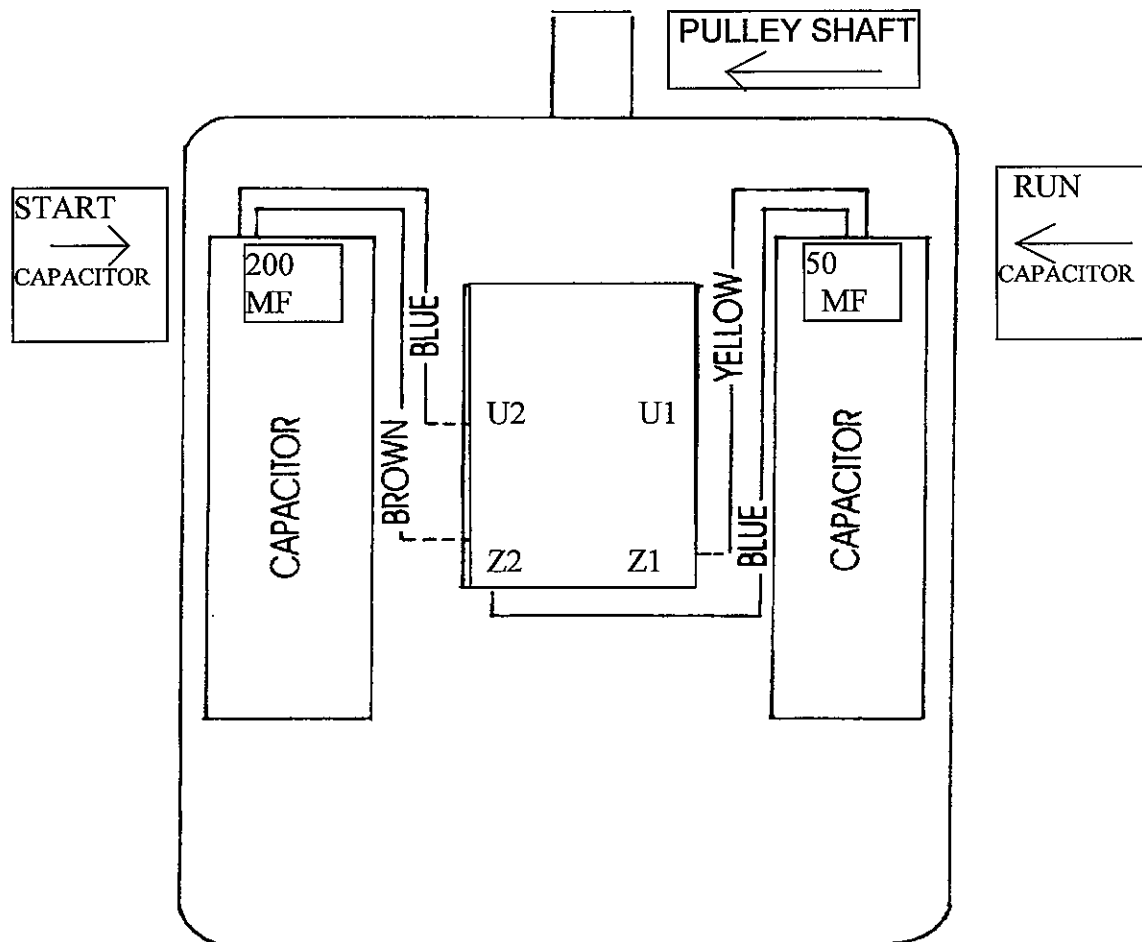
### WIRING DIAGRAM FOR POWER CORD



## CAUTION ON MOTORS !!!!

**THE MOST COMMON FAILURE OF AN INDUCTION MOTOR IS THE START CAPACITOR. THIS IS EASILY FIXED, BY REPLACING THE CAPACITOR. HOWEVER, ALLOWING THE MOTOR TO RUN SLOWLY DUE TO CAPACITOR FAILURE WILL OVERHEAT THE WINDINGS AND BURN THEM OUT. THIS WILL VOID YOUR WARRANTY. THEREFORE, IF YOU HAVE A MOTOR PROBLEM, STOP AND CALL FOR ASSISTANCE IMMEDIATELY.**

# WIRING DIAGRAM FOR MOTOR CAPACITORS



**CAPACITORS ARE NOT POLAR, SO IT IS ONLY IMPORTANT TO BE SURE THE WIRES GO TO THE PROPER TERMINALS.**

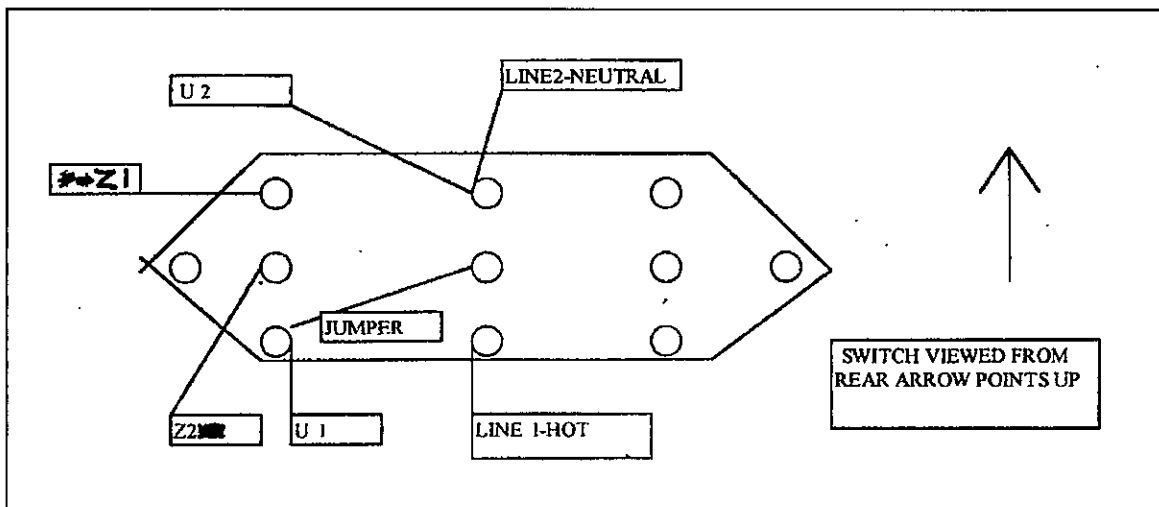
## **CAUTION:**

**CAPACITORS CAN HOLD A CHARGE AND GIVE YOU A PAINFUL SHOCK- ALWAYS DISCHARGE THEM BEFORE SERVICING.**

**TO REVERSE MOTOR DIRECTION-  
Switch Wires V1 and Z2**

# MOTOR WIRING SECTION

## SWITCH WIRING DIAGRAM



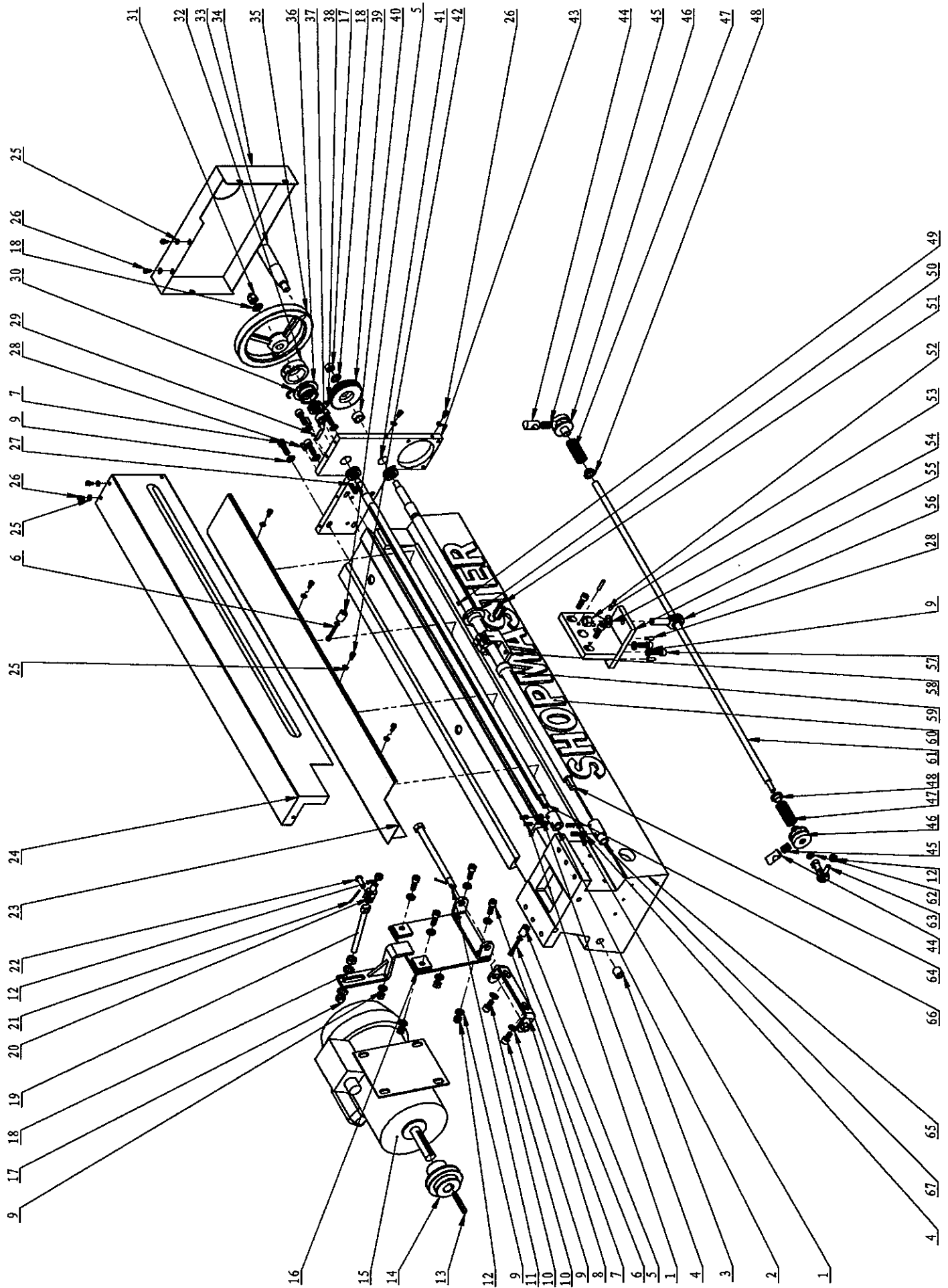
**NOTE: THIS VIEW IS FROM THE REAR OF SWITCH.**

**LINE 1 IS YOUR BLACK WIRE**

**LINE 2 IS YOUR WHITE WIRE**

**THE 2 SWITCHES ARE CONNECTED BY JUMPER WIRES AND CONNECTED TO THE POWER CORD TERMINAL BLOCK.**

# **PARTS MANUAL**



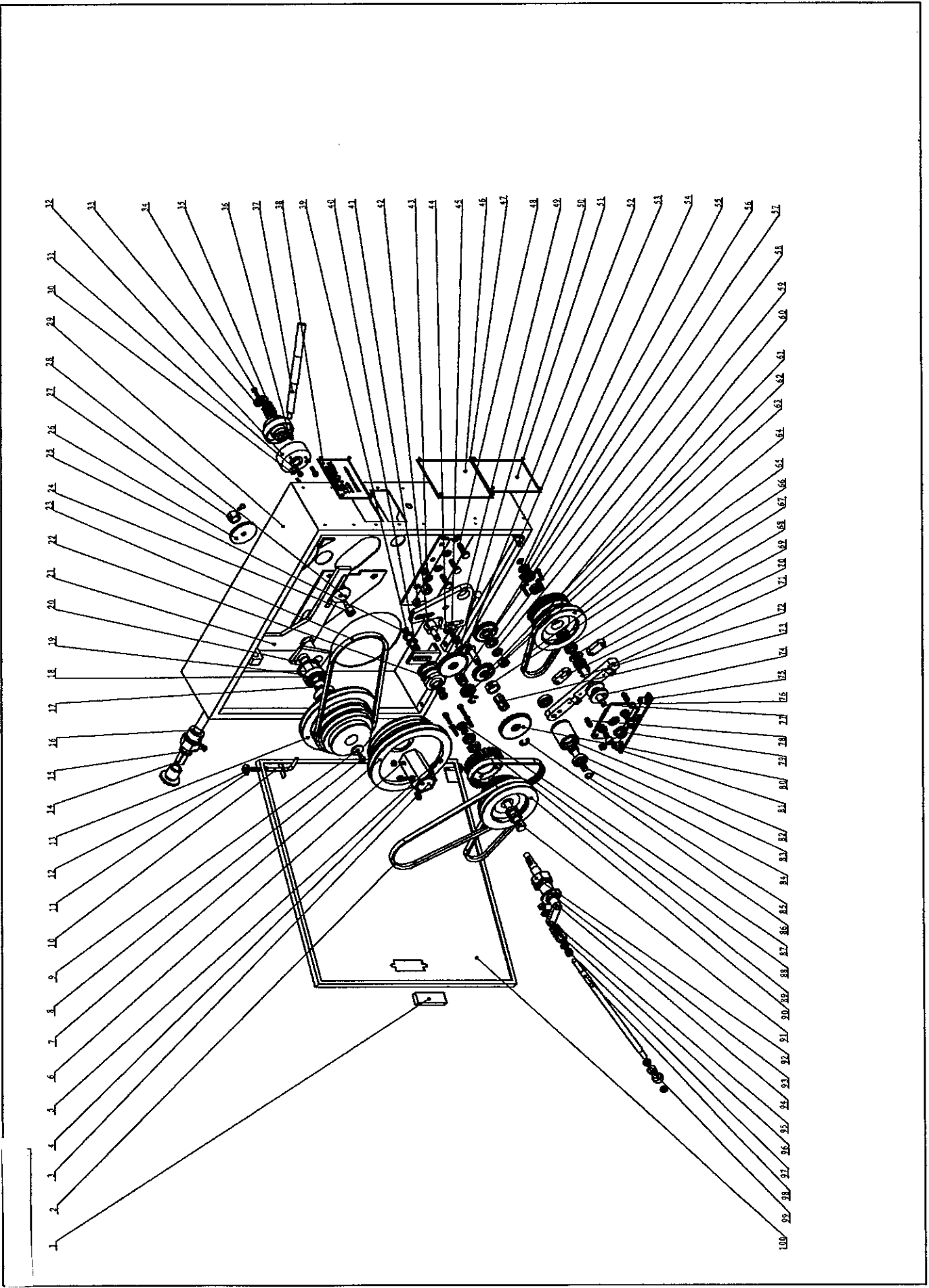
# MAIN BED - EXPLODED VIEW

# MAIN BED – PARTS LIST 1

32	CQ9112. 1-25	dial ring	1	A3			
31	GB923-88	nut M12	1				
30	CQ9109. 6-18	spring	1	65Mn			
29	GB/T 867-1986	rivet GB/T 867 2X3	2	steel			
28	GB 117-86	taper pin 5×18	4	steel			
27	GB 1096-79	key 5×25	1				
26	GB70-85	hex screw M5×8	6	stainless steel			
25	GB 95-85	washer 5	12				
24	CQ9112. 1-09	front cover	1	stainless steel plate δ 1			
23	CQ9112. 1-22	leadscrew protection	1	stainless steel plate δ 1			
22	CQ9112. 1-18	pin	1	45			
21	GB/T 91-86	cotter pin 2×28	2				
20	CQ9112. 1-17	adjusting bracket	1	45			
19	CQ9112. 1-16	adjusting rod	1	45			
18	GB 95-85	washer 10	4				
17	GB 6170-86	nut M10	3				
16	CQ9112. 1-15	motor assemble bracket	1	A3 plate δ 6			
15		motor	1				
14	CQ9112. 1-01	lower motor pulley	1	HT150			
13	GB 1096-79	key 6×56	1				
12	GB 6170-86	nut M8	7				
11	CQ9112. 1-19	shaft of motor bracket	1	bolt M12×120			
10	GB70-85	hex screw M8×16	2				
9	GB 95-85	washer 8	16				
8	CQ9112. 1-20	bracket	1	A3 plate δ 6			
7	GB70-85	hex screw M8×25	10				
6	GB70-85	hex screw M5×30	2				
5	CQ9112. 6-11	bush	2	A3			
4	GB 6170-86	nut M6	4				
3	CQ9112. 1-21	thread sleeve	1	45			
2	CQ9112. 1-04	upper connection sleeve	1	45			
1	GB77-85	hex screw M6×16	4				
item	part number	description	quan	material	unit weight	amount	remark

# MAIN BED – PARTS LIST 2

67	CQ9112. 1-06	lower connection sleeve	1	45			
66	CQ9112. 1-05	feed rod	1	45			
65	CQ9112. 1-02	bed assembly drawing	1	HT250			
64	CQ9112. 1-07	longitudinal leadscrew	1	45			
63	GB/T304. 1-1988	bearing SQ8-RS	1				
62	GB 6172-86	nut M8	1				black oxidized
61	CQ9112. 1-03	leadscrew	1	45			
60	CQ9112. 1-08	trade mark	1	A3			
59	CQ9112. 6-17	cross leadscrew B	1	ZQSN6-6-3			
58	CQ9112. 1-23	longitudinal leadscrew bracket	1	45			
57	GB70-85	hex screw M8×20	2				
56	GB4222-91	bearing SA12BK	1				
55	CQ9112. 1-10	longitudinal bracket	1	45			
54	GB 95-85	washer 12	1				
53	GB/T 117-86	taper pin 5×26	2	steel			
52	GB 6170-86	nut M12	1				
51	GB70-85	hex screw M5×20	2				
50	CQ9112. 6-16	cross leadscrew	1	ZQSn6-6-3			
49	GB77-85	hex screw M5×6	2				
48	CQ9112. 1-11	limit supporting bracket	2	45			
47	GB 362-65	spring 50×18×3	2	65Mn			9 loops
46	CQ9112. 1-13	limit dial	2	HT150			
45	GB 362-65	spring 16×12×1	2	65Mn			4 loops
44	CQ9112. 1-12	inner bush of limit dial	2	45			
43	CQ9112. 1-28	longitudinal supporting bracket	1	45			
42	GB70-85	hex screw M5×10	4	stainless steel			
41	GB/T 301-1995	roller bearing 51102	4	steel			
40	CQ9112. 1-24	lower sleeve	2	45			
39	CQ9112. 1-27	longitudinal follower pulley	1	45			
38	GB70-85	hex screw M6×20	1				
37	CQ9112. 1-29	zero plate	1	Al plate δ 0.5			
36	CQ9112. 1-26	dial body	1	HT150			
35	GB4141. 22-84	handwheel B-14×160(d <sub>y</sub> 14 M12)	1				special made
34	CQ9112. 1-14	right side cover	1	A3 plate δ 1			
33	HY8310. 4-1	handle M12×100	1	steel			



**LATHE DRIVE CABINET - EXPLODED VIEW**



# LATHE DRIVE CABINET – PARTS LIST 1

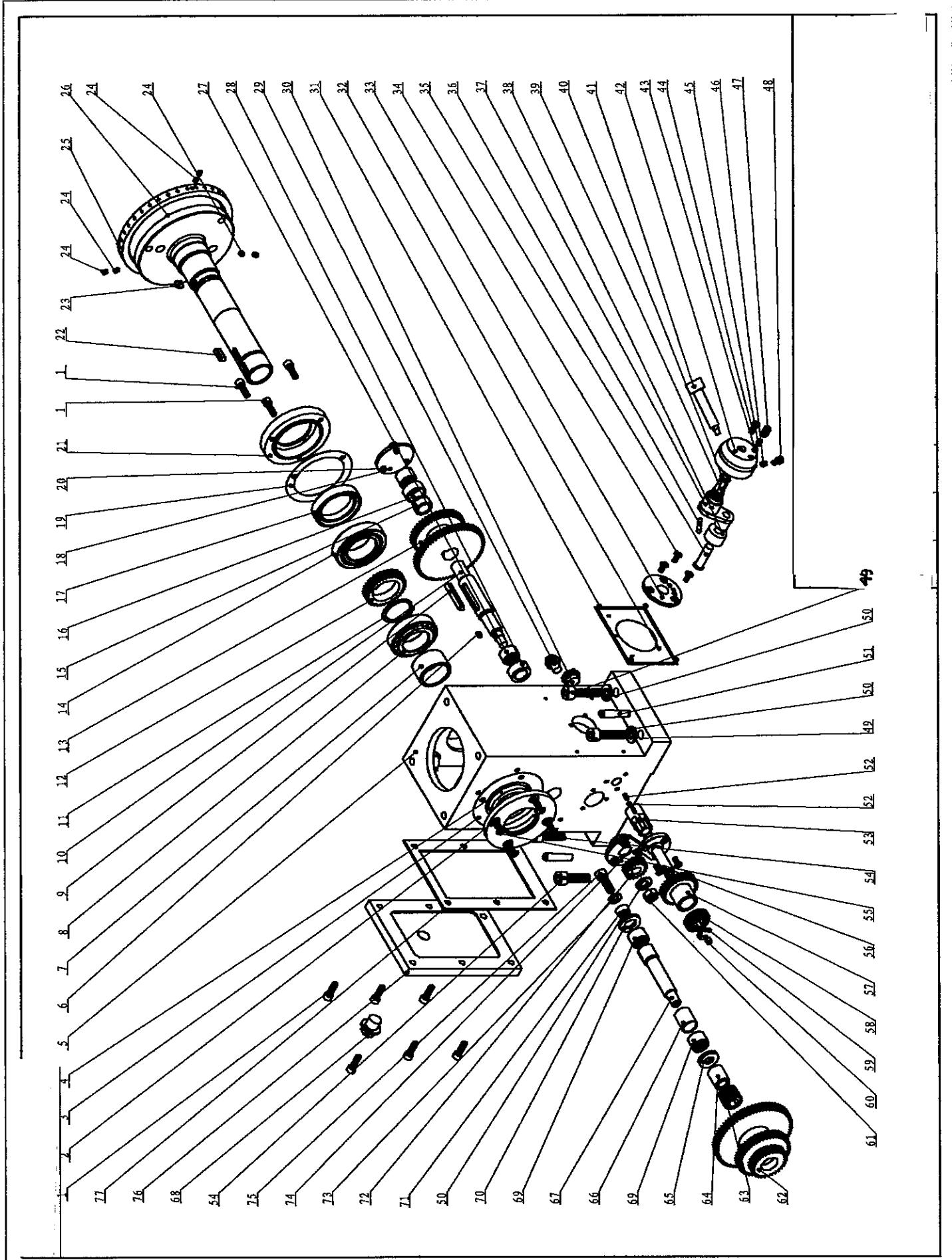
Item	Part number	Description	Material	Quan	Remark
1		Lock		1	
2	GB1171-96	Belt 3L-250		1	
3	CQ9112.2-71	Supporting sleeve		1	
4	GB6170-86	Nut M6		4	
5	GB70-85	Hex screw M6×20		3	
6	GB77-85	Hex screw M6×16		1	
7	CQ9112.2-81	Spindle pulley		1	
8	GB70-85	Hex screw M6×12		1	
9	CQ9112.2-64	Washer		1	
10	CQ9112.2-07	Door shaft		1	
11	CQ9112.2-05	Rubber washer		2	
12	GB2089-80	Spring 0.8×6×50		1	
13	CQ9112.2-66	Large pulley		1	
14	CQ9112.2-19	Adjusting screw		1	
15	GB70-85	Hex screw M5×8		2	
16	CQ9112.2-17	Position sleeve		1	
17	CQ9112.2-65	Separator		1	
18	GB/T 276-94	Bearing 6302		2	
19	GB893.1-86	Washer 42		1	
20	CQ9112.2-63	Large pulley bracket		1	
21	CQ9112.2-21	Pulley adjusting plate		1	
22	CQ9112.2-70	Tensioning wheel		1	
23	GB1171-96	Belt Z-750		1	
24	CQ9112.2-20	Lock screw		1	
25	CQ9112.2-69	Tensioning wheel shaft		1	
26	CQ9112.2-61	Large washer		1	
27	CQ9112.2-62	Nut		1	
28	CQ9112.2-18	Washer		1	
29	CQ9112.2-03	Headstock cover		1	
30	GB95-85	Washer 5		3	
31	GB70-85	Hex screw M5×16		4	
32	CQ9112.2-16	Handle base		1	
33	CQ9112.2-09	Washer		1	
34	GB2089-80	Spring 2×18×30		1	
35	CQ9112.2-12	Handle body		1	
36	CQ9112.2-11	Position shaft		1	

# LATHE DRIVE CABINET – PARTS LIST 2

37	CQ9112.2-14	Handle bar		1	
38	CQ9112.2-92	Nameplate		1	
39	GB894.1-86	Washer 10		3	
40	GB/T 276-94	Bearing 61800		2	
41	GB6170-86	Nut M8		8	
42	CQ9112.2-34	Shaft III		1	
43	CQ9112.2-91	Shaft sleeve		1	
44	GB96-85	Large washer 8		1	
45	GB70-85	Hex screw M8×40		1	
46	CQ9112.2-28	Feed plate		1	
47	GB876-86	Rivet 3×6		12	
48	GB/T 5781-2000	Bolt M8×25		3	
49	CQ9112.2-36	Change gear bracket		1	
50	CQ9112.2-38	Change gear (m=1 Z=60)		1	
51	CQ9112.2-88	Speed plate		1	
52	CQ9112.2-35	Shaft IV		1	
53	CQ9112.2-06	Washer		2	
54	CQ9112.2-25	Separator washer		1	
55	GB70-85	Hex screw M5×20		8	
56	CQ9112.2-42	Change gear (m=1.5 Z=30)		1	
57	CQ9112.2-41	Spline sleeve I		1	
58	GB95-85	Washer 12		1	
59	GB93-87	Washer 12		1	
60	CQ9112.2-93	Timing pulley		1	
61	CQ9112.2-45	Change gear (m=1.5 Z=27)		1	
62	GB6170-86	Nut M12		1	
63	CQ9112.2-37	Change gear (m=1 Z=27)		1	
64	CQ9112.2-29	Small pulley		1	
65	GB1171-96	Belt 3L-240		2	
66	CQ9112.2-39	Gear separator		1	
67	GB/T 276-94	Bearing 61901		8	
68	CQ9112.2-26	Washer		1	
69	GB818-85	Screw M4×8		4	
70	CQ9112.2-33	Washer		2	
71	CQ9112.2-32	Tensioning bracket		1	
72	GB2089-80	Spring 2×20×30		1	
73	CQ9112.2-43	Spline sleeve II		1	
74		Nut M16		2	

# LATHE DRIVE CABINET – PARTS LIST 3

75	CQ9112.2-67	Bracket plate		1	
76	CQ9112.2-68	Adjusting plate		1	
77	CQ9112.2-27	Small pulley shaft		1	
78	GB79-85	Hex screw M8×16		2	
79	GB6177-85	Nut M12		1	
80	CQ9112.2-40	Change gear (m=1 Z=63)		1	
81	GB70-85	Hex screw M8×16		4	
82	CQ9112.2-30	Tensioning sleeve		1	
83	GB/T 276-94	Bearing 6001		2	
84	CQ9112.2-31	Tensioning sleeve shaft		1	
85	GB894.1-86	Washer 12		1	
86	GB896-86	Washer 9		2	
87	GB97.1-85	Washer 10		1	
88	195 L 050	L-type timing belt		1	
89	CQ9112.2-22	Timing pulley I		1	
90	CQ9112.2-23	Middle pulley		1	
91	CQ9112.2-24	Middle pulley shaft		1	
92	GB6170-85	Nut M24		2	
93	CQ9112.2-15	Guiding sleeve		2	
94	CQ9112.2-08	Shaft		1	
95	GB97.1-85	Washer 8		12	
96	CQ9112.2-10	Shifting yoke		1	
97	GB70-85	Hex screw M8×30		1	
98	CQ9112.2-13	Pull-out bar		1	
99	GBT304.1-88	Bearing SQ8-RS		1	
100	CQ9112.2-04	Cover door		1	



# LATHE GEARBOX - EXPLODED VIEW

Item	Part number	Description	Material	Quan	Remark
1	GB70-85	Hex screw M6×20		9	
2	CQ9112.2-83	Rear bearing gland		1	
3	CQ9112.2-84	Rear seal		1	
4	GB13871-92	Seal FB40×55×8		1	
5	CQ9112.2-01	Headstock body		1	
6	GB/T1096-79	Key A type 4×8		1	
7	CQ9112.2-82	Sleeve		1	
8	GBT297-94	Bearing 32007		1	
9	GB/T 1096-1979	key 6×45		1	
10	CQ9112.2-53	Shaft		1	
11	GB/T894.1-86	Washer 36		1	
12	CQ9112.2-59	Spindle gear		1	
13	CQ9112.2-54	Duplicate wheel		1	
14	GB/T297-94	Bearing 32008		1	
15	CQ9112.2-51	Separator II		1	
16	CQ9112.2-52	Bearing sleeve		1	
17	GB13871-92	Seal 45×62×12		1	
18	CQ9112.2-72	End cap		1	
19	CQ9112.2-86	Front seal		1	
20	GB70-85	Hex screw M5×8		3	
21	CQ9112.2-85	Front bearing gland		1	
22	GB/T 1096-1979	Key 6×20		1	
23	GB/T 1096-1979	Key 6×10		1	
24	GB78-85	Lock screw M5×5		6	
25	CQ9112.2-60	Dial ring		1	
26	CQ9112.2-02	Spindle		1	
27	GB/T290-88	Bearing HK1614RS		1	
28	CQ9112.2-50	Separator		1	
29	JB/ZQ4450-97	Screw M10×1		1	
30	JB/ZQ4450-97	Screw M16×1.5		1	
31	GB876-86	Rivet 3×6		4	
32	CQ9112.2-94	Speed shifting plate		1	
33	CQ9112.2-76	Supporting plate		1	
34	GB/T 70.3-2000	Hex screw M5×12		9	
35	CQ9112.2-74	Pull-out shaft		1	
36	GB117-86	pin 4×26		1	
37	CQ9112.2-80	Bracket		1	

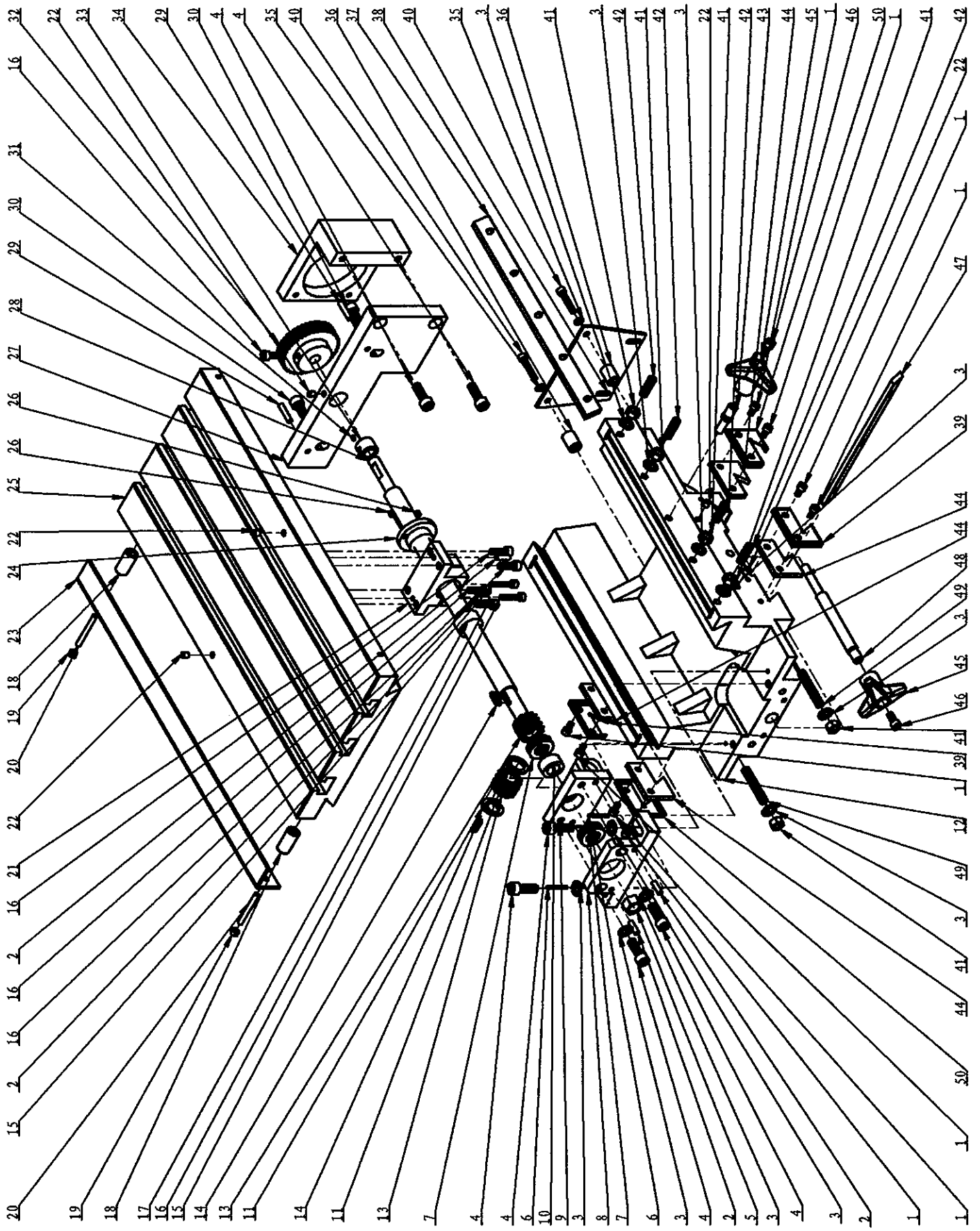
# LATHE GEARBOX – PARTS LIST 1

38	CQ9112.2-75	Sleeve		1	
39	CQ9112.2-79	Shaft		1	
40	GB/T3452.1-92	O type seal 11.2×1.8		1	
41	CQ9112.2-77	Speed adjusting handle		1	
42	CQ9112.2-78	Speed adjusting handle base		1	
43		Steel ball 6		1	
44	GB/T 70.3-2000	Hex screw M5×12		1	
45	GB2089-80	Spring 0.8×6×10		1	
46	GB77-85	Lock screw M6×6		1	
47	GB79-85	Lock screw M8×10		1	
48	GB70-85	Hex screw M5×10		1	
49	GB70-85	Hex screw M10×40		2	
50	GB97.1-85	Washer 10		3	
51	GB118-86	Pin 8×40		2	
52	GB71-85	Lock screw M4×8		2	
53	CQ9112.2-46	Spline sleeve III		1	
54	GB70-85	Hex screw M10×35		2	
55	GB/T70.3-2000	Hex screw M6×20		4	
56	CQ9112.2-47	Gear shaft		1	
57	CQ9112.2-90	Gear (m=1.5 Z=30)		1	
58	CQ9112.2-44	Gear		1	
59	GB896-86	Washer 9		1	
60	GB1155-74	Oil cup 6		1	
61	GB6170-86	Nut M10		1	
62	CQ9112.2-58	Triple wheel		1	
63	GB77-85	Lock screw M24×20		1	
64	CQ9112.2-56	Sleeve		1	
65	GB4605-84	Washer AS1226		1	
66	CQ9112.2-87	Bearing separator		1	
67	CQ9112.2-57	Supporting shaft		1	
68	JB/ZQ4450-97	Screw M16×1.5		1	
69	GB/T290-88	Bearing HK1616		3	
70	GB4605-84	Washer AS1628		1	
71	CQ9112.2-55	Sleeve		1	
72	CQ9112.2-48	Gear (m=1.5 Z=18)		1	
73	GB97.1-85	Washer 8		1	
74	CQ9112.2-49	Supporting plate		1	
75	GB70-85	Hex screw M8×25		1	

## LATHE GEARBOX – PARTS LIST 2

76	CQ9112.2-73	Side cover		1	
77	CQ9112.2-89	Seal		1	

# **LATHE GEARBOX – PARTS LIST 3**

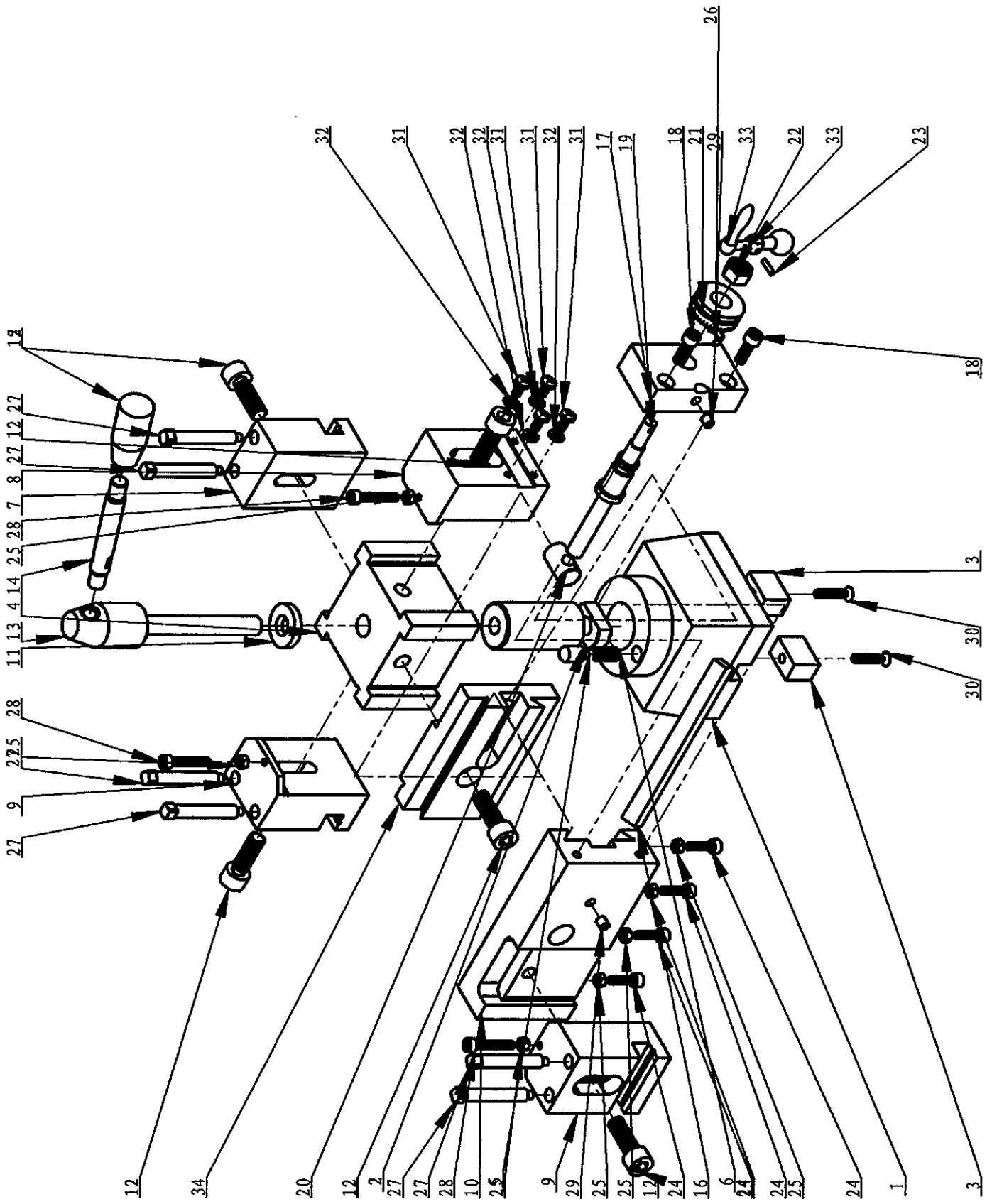


# X,Y CARRIAGE ASSEMBLY - EXPLODED VIEW



50	CQ9112. 6-10	scraper A	2	stainless steel δ 1			
49	GB78-85	lock screw M8 × 50	2				
48	CQ9112. 6-06	longitudinal lock bar	1	45			
47	CQ9112. 6-18	lower wedge	1	HT150			
46	GB70-85	hex screw M6 × 14	2				
45	HY8314. 21-1	triangle knob M10 × 63	2				
44	CQ9112. 6-09	seal	4	felt δ 5			
43	CQ9112. 6-13	cross lock bar	1	45			
42	GB78-85	lock screw M8 × 25	4				
41	GB 6170-86	nut M8	6				
40	GB70-85	hex screw M5 × 30	2				
39	CQ9112. 6-08	scaper B	2	stainless steel δ 1			
38	CQ9112. 6-26	bracket plate	1	A3 plate δ 3			
37	CQ9112. 6-04	upper wedge	1	HT150			
36	CQ9112. 6-11	sleeve	2	A3			
35	GB 95-85	washer 5	2	steel			
34	CQ9112. 6-25	cross motor base	1	HT150			
33	CQ9112. 6-15	stationary sleeve	1	HT150			
32	CQ9112. 6-14	cross driven wheel	1	45			
31	GB73-85	lock screw M3 × 5	1				
30	GB70-85	hex screw M8 × 16	2				
29	GB/T 117-86	pin 5 × 26	2	steel			
28	CQ9112. 6-20	cross lead screw	1	45			
27	CQ9112. 6-02	stationary base	1	HT150			
26	GB77-85	lock screw M5 × 6	2				
25	CQ9112. 6-01	table	1	HT250			
24	CQ9112. 6-16	cross nut	1	ZQSn6-6-3			
23	CQ9112. 6-05	hood	1	A3 plate δ 3			
22	GB1155-70	oil cup 6	5				
21	CQ9112. 6-12	upper nut base	1	45			
20	GB/T 15389-1994	screw M5 × 45	2	steel			
19	GB/T 6170-86	nut M5	2				
18	CQ9112. 6-03	cover supporting sleeve	2	A3			
17	CQ9112. 6-17	cross nut B	1	ZQSN6-6-3			
16	GB70-85	hex screw M6 × 20	5				
15	GB70-85	hex screw M5 × 25	2				
14	GB1096-79	key 5 × 18	2	steel			
13	CQ9112. 6-19	helical gear	2	45			
12	CQ9112. 6-07	slide bar	1	HT250			
11	CQ9112. 6-24	washer	2	45			
10	CQ9112. 6-21	upper sleeve	1	HT150			
9	CQ9112. 6-22	upper lead screw bracket	1	HT150			
8	CQ9112. 6-23	upper lead screw bracket base	1	HT150			
7	GB/T 301-1995	bearing 51102	2	steel			
6	GB117-86	pin 3 × 26	2	steel			
5	GB 6170-86	nut M12	1				
4	GB70-85	hex screw M8 × 25	6				
3	GB 95-85	washer 8	10	steel			
2	GB 117-86	pin 5 × 18	4	steel			
1	GB70-85	hex screw M5 × 10	8	stainless steel			
item	part number	description	quan	material	unit weight	amount	remark

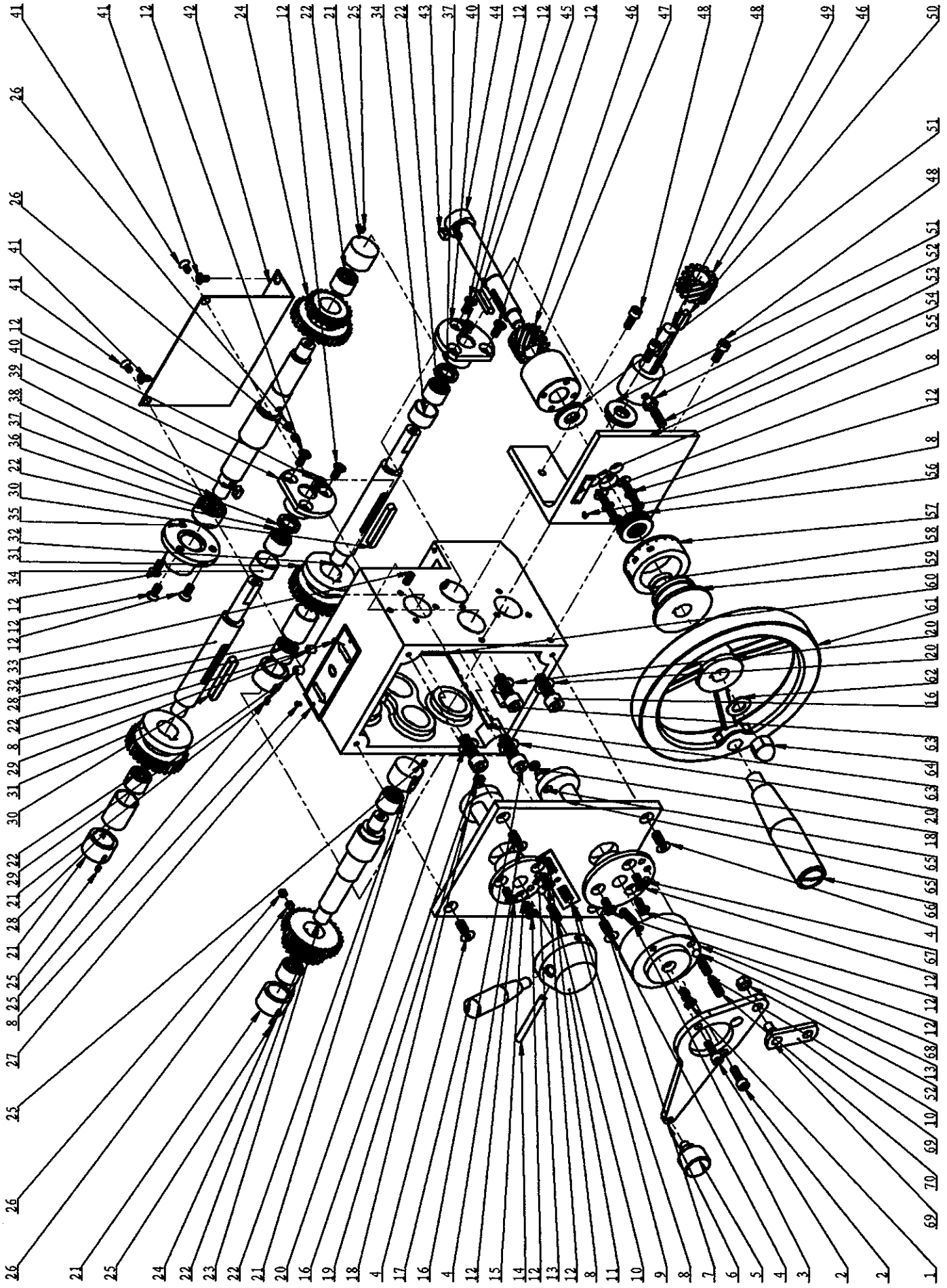
# X, Y CARRIAGE ASSEMBLY -- PARTS LIST



# TOOL POST - EXPLODED VIEW

# TOOL POST – PARTS LIST

34	CQ9112.10-01	dovetail base	1	HT200	0.84		
33	JB/T7270.9	handle B8 × 25	1				
32	GB/T95-1985	washer 5	4				
31	GB/T818-2000	screw M5 × 10	4				
30	GB819	hex screw	2	45			
29	GB1155-74	oil cup 6	2				
28	GB70-85	hex screw M5 × 30	3				
27	GB/T85-1988	screw M8 × 55	6				
26	CQ9112.10-15	spring	1	65Mn			
25	GB170-86	nut M5	7	30			
24	GB70-85	hex screw M5 × 18	4				
23	GB117-86	pin m3 × 12	1				
22	GB6170-88	nut M10	1				
21	CQ9112.10-14	dial ring	1	45	0.01		dark chorm coated
20	CQ9112.10-12	copper nut	1	ZQSn6-6-3	0.03		
19	CQ9112.10-13	small lead screw	1	45	0.08		
18	GB70-85	hex screw M6 × 18	2				
17	CQ9112.10-16	small slide bar	1	HT200	0.05		
16	CQ9112.10-03	wedge	1	HT200	0.05		
15	JB/T 7271.5	long handle sleeve M10 × 50	1	plastic	0.01		
14	JBT/ 7271.6-94	handle bar BM10 × 63	1	35	0.0714		
13	CQ9112.10-05	handle base	1	45	0.01		
12	GB70-85	hex screw M10 × 30	6				
11	CQ9112.10-06	washer	1	A3	18.84		
10	CQ9112.10-02	small slide bar	1	HT200	1.38		
9	CQ9112.10-17	carriage III	2	45	0.68		
8	CQ9112.10-18	carriage II	1	45	0.76		
7	CQ9112.10-08	carriage I	1	45	0.63		
6	GB2089-80	spring 0.8 × 5 × 25	1	65Mn	0.12		
5	CQ9112.10-04	locating pin	1	45	0.01		
4	CQ9112.10-07	carriage body	1	45	1.73		
3	CQ9112.10-10	locating block	2	45	0.05		
2	CQ9112.10-11	T-type nut	1	45	0.34		
1	CQ9112.10-09	carriage base	1	HT200	2860.67		
item	part number	description	quan	material	unit weight	amount	remark



# CARRIAGE GEARBOX - EXPLODED VIEW

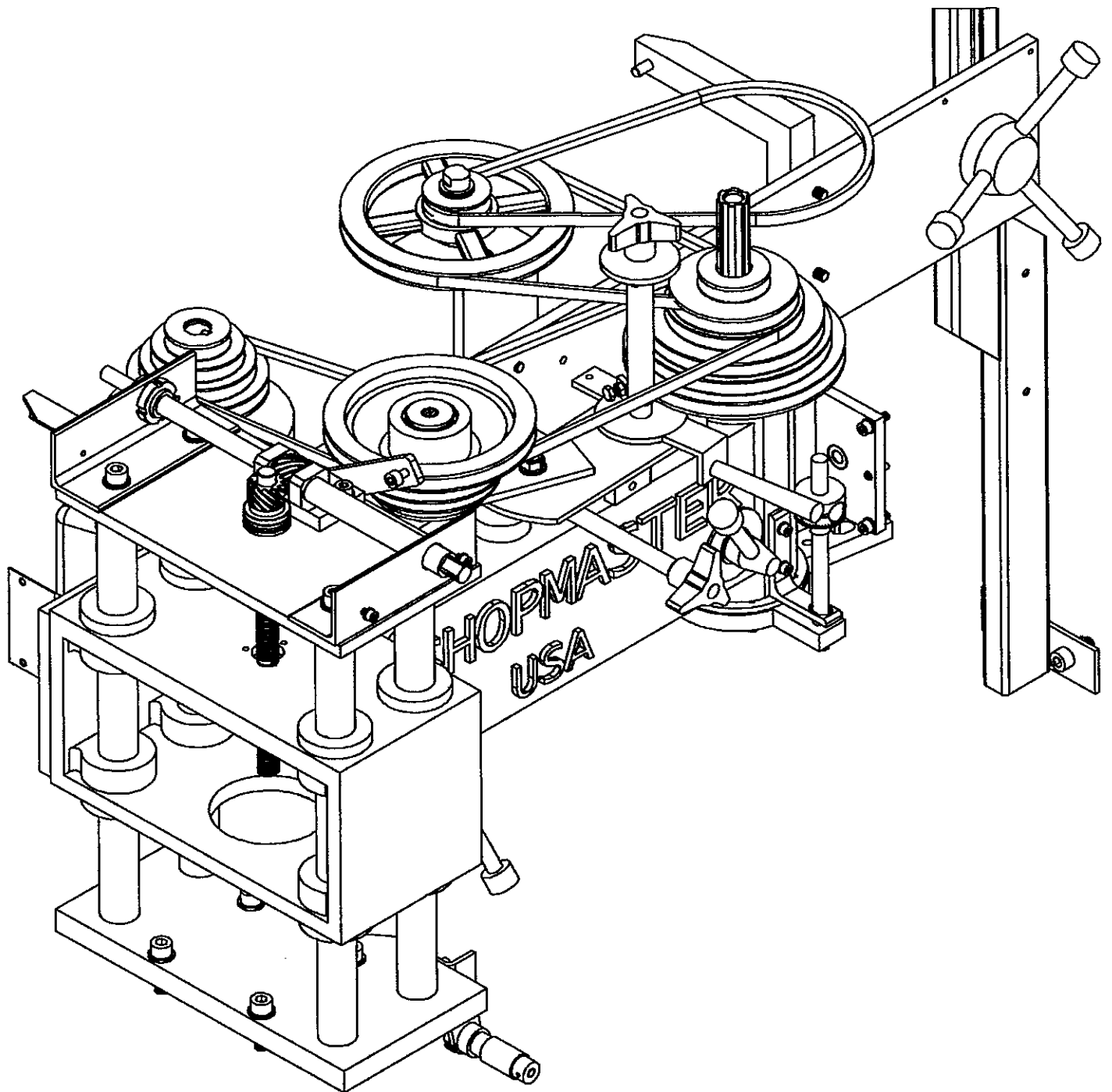
# CARRIAGE GEARBOX – PARTS LIST 1

35	CQ9112. 7-09	change gear train stationary sleeve	1	HT150		
34	CQ9112. 7-24	right side seperator of shaft I	2	45		
33	GB77-85	lock screw M5 × 10	1			
32	CQ9112. 7-23	shaft I	2	45		
31	CQ9112. 7-21	gear of shaft I	2	45		
30	GB 1096-79	key 6 × 45	2			
29	GB1155-74	oil cup 6	2			
28	CQ9112. 7-22	left side seperator of shaft I	2	45		
27	CQ9112. 7-12	cross switching plate	1	Al plate δ 1		
26	GB78-85	lock screw M5 × 4	4			
25	GB77-85	lock screw M3 × 4	5			
24	CQ9112. 7-17	gear of shaft II	2	45		
23	CQ9112. 7-19	shaft III	1	45		
22	GB/T 290-98	bearing HKH1214	7			
21	CQ9112. 7-18	large sleeve	5	HT150		
20	GB 95-85	washer 8	4			
19	CQ9112. 7-27	upper driver plate	1	45		
18		mini bearing R156ZZS	2			
17	GB4141. 1-84	handle B-8 × 63	1	45		chrom coated
16	GB70-85	hex screw M8 × 25	4			
15	CQ9112. 7-14	base A	1	45		
14	GB 117-86	pin 5 × 50	1			
13	GB308-77	steel ball 6	2			
12	GB/T70. 3-2000	hex screw M5 × 12	19			
11	GB4141. 19-84	handle base	1	HT150		chrom coated
10	GB2089-80	spring 0. 8 × 5 × 25	2	65Mn		
9	CQ9112. 7-08	longintudinal switching plate	1	Al plate δ 1		
8	GB/T 867-1986	rivet 2X3	6	Aluminum		
7	CQ9112. 7-13	feed box cover	1	HT150		
6	CQ9112. 7-07	operation plate	1	A3 plate δ 6		
5	CQ9112. 7-06	finger bar	1	A3		
4	GB/T70. 3-2000	hex screw M6 × 16	4			
3	GB78-85	lock screw M5 × 20	1			
2	GB70-85	hex screw M5 × 16	2	stainless steel		
1	GB/T70. 3-2000	hex screw M5 × 16	1			
item	part number	description	quan	material	unit weight amount	remark

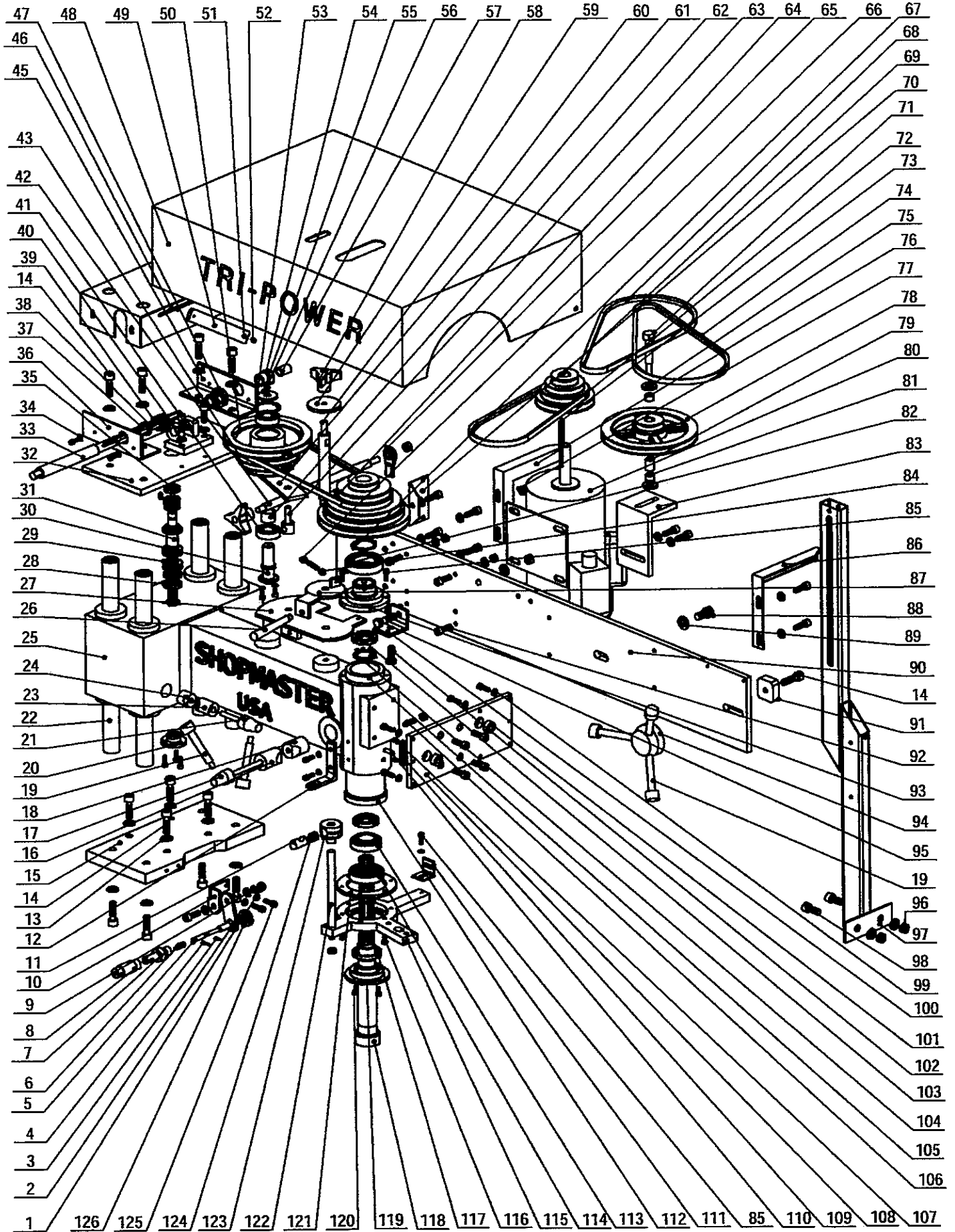
# CARRIAGE GEARBOX – PARTS LIST 2

70	GB79-85	lock screw M6 × 16	1			
69	CQ9112. 7-01	plate shaft	1	A3		
68	CQ9112. 7-26	lower handle body	1	HT150		
67	CQ9112. 7-15	base B	1	45		
66	HY8310. 4-1	rotation handle M12 × 100	1	steel		
65	CQ9112. 7-25	lower driver plate	1	45		
64	GB923-88	nut M12	1			
63	GB 117-86	pin 5 × 18	2			
62	GB/T 95-85	washer 10	1			
61	GB4141. 22-84	hand wheel B-14 × 160 ( d = 14 M12 )	1			special made
60	CQ9112. 7-02	feed box	1	HT150		
59	CQ9112. 1-26	dial ring body	1	HT150		
58	CQ9109. 6-18	spring	1	65Mn		
57	CQ9112. 1-25	dial ring	1	A3		
56	GB/T 301-1995	bearing 51102	1			
55	CQ9112. 1-29	zero plate	1	A1 plate δ 0.5		
54	CQ9112. 7-28	longitudinal bracket	1	A3 angle iron 100x100x6		
53	GB77-85	lock screw M6 × 16	1			
52	GB 6170-86	nut M6	2			
51	GB/T4605-84	washer assembly AXK+AS1226	2			2 washers+ seperator
50	GB1096-79	key 5 × 18	1			
49	CQ9112. 7-10	joint shaft	1	45		
48	GB70-85	hex screw M5 × 14	3			
47	CQ9112. 7-04	longitudinal stationary sleeve	1	45		
46	CQ9112. 6-19	helical gear	2	45		
45	GB 1096-79	key 5 × 25	1			
44	CQ9112. 7-03	longitudinal hand wheel shaft	1	45		
43	GB 1096-79	key 5 × 10	1			
42	CQ9112. 7-11	feed box rear press-fit	1	A3 plate δ 0.8		
41	GB/T70. 3-2000	hex screw M4 × 8	4			
40	CQ9112. 7-05	flange	2	HT150		
39	GB 1096-79	key 5 × 10	1			
38	CQ9112. 7-16	shaft II	1	45		
37	CQ9112. 7-20	washer	2	45		
36	GB/T 290-98	bearing HK1814	1			

# MILLING HEAD



# MILLING HEAD - EXPLODED VIEW





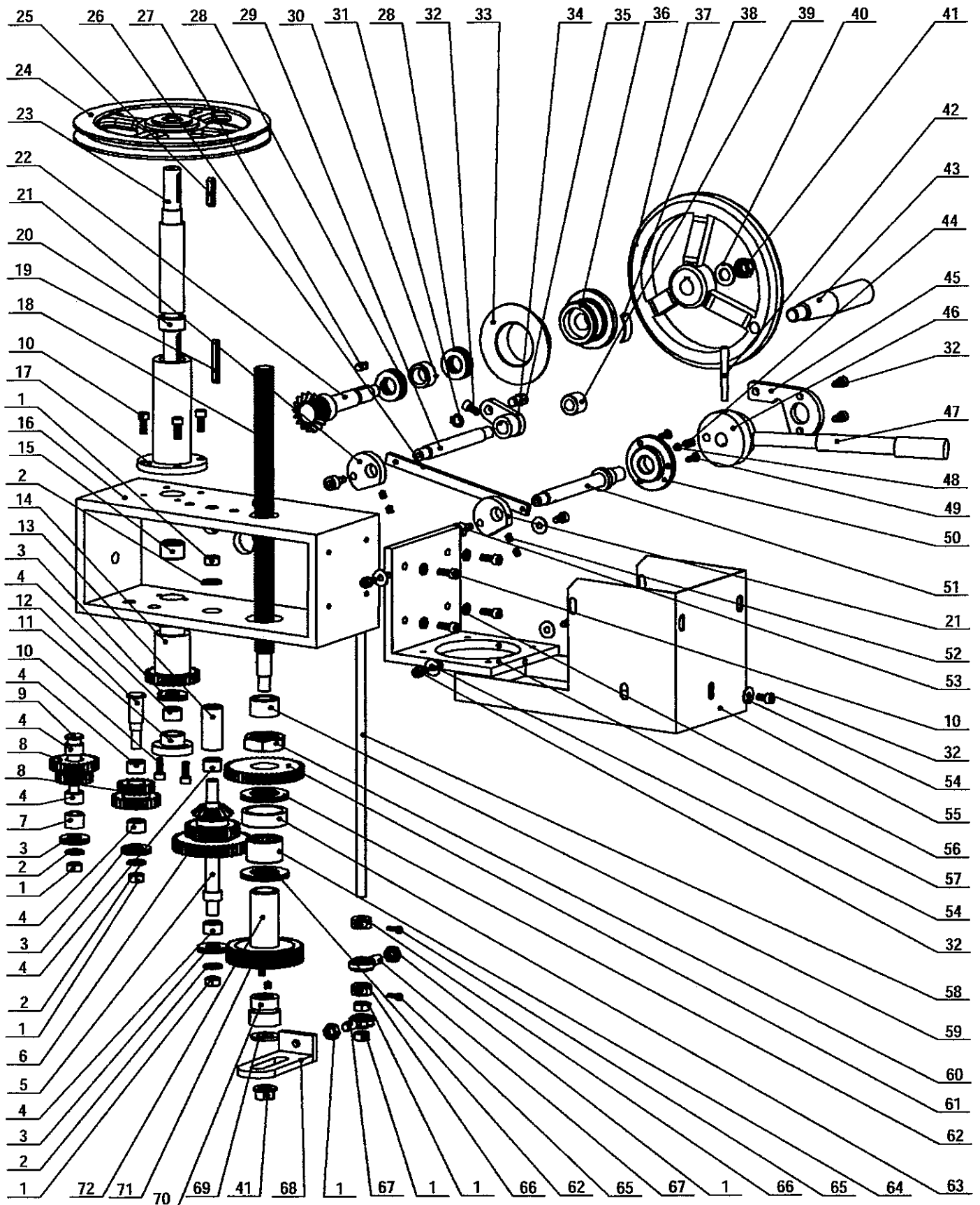
# MILLING HEAD -- PARTS LIST 1

64	CQ9112. 4-12	drill & mill spindle pulley	1	HT150			
63	CQ9112. 4-26	belt tensioning nut	1	45			
62	CQ9112. 2-65	seperator	1	A3			
61	CQ9112. 4-04	middle pulley upper bracket	1	A3 Ø 6			
60	CQ9112. 4-28	cover stationary bar	1	A3			
59	CQ9112. 4-27	circular plate	1	A3			
58	HY8314. 21-1	triangle star-type knob M10 × 63	2				
57	CQ9112. 4-46	nut inner bushing	1	45			
56	GB819-85	hex screw M5 × 10	1				
55	CQ9112. 4-43	middle pulley bearing upper press-fit	1	A3	0.00		
54	CQ9112. 4-45	nut	1	45	0.01		
53	GB893. 1-88	washer 42	1				
52	GB6170-88	nut M4	1				
51	GB/T70. 3-2000	hex screw M4 × 12	1				
50	CQ9112. 2-66	large pulley	1	HT150			
49	CQ9112. 4-08	joint drawbar	1	A1 plate Ø 6			
48	CQ9112. 4-25	upper cover	1	A3 Ø 2			
47	GB810-88	nut M22 × 1.5	1				
46	CQ9112. 3-05	screw	1				
45	CQ9112. 4-51	drill & mill box lifter bar left side bracket	1	angle iron 50x50x4			
44	CQ9112. 4-11	left side cover	1	A3 Ø 2			
43	GB1171-84	V-belt 330 (33" )	1				
42	CQ9112. 4-63	belt tensioning screw	1	45			
41	GB/T 276-94	bearing 6004	2	steel			
40	CQ9112. 4-57	upper screw bracket	1	HT150			
39	CQ9112. 6-19	helical gear	2	H62			
38	GB1096-79	key 5 × 12	2	steel			
37	CQ9112. 6-24	washer	2	45			
36	CQ9112. 4-62	drill & mill box lifter bar right side bracket	1	angle iron 50x50x4			
35	GB810-88	nut M14 × 1.5	1	steel			
34	GB95-88	washer 5	9				
33	CQ9112. 4-06	drill & mill box lifter bar	1	45			
32	CQ9112. 4-55	upper bracket plate	1	A3 Ø 12			
31	CQ9112. 4-03	stands approaches screw	1	45			
30	CQ9112. 4-05	middle pulley shaft	1	45			
29	GB/T 301-1995	bearing 51104	2	steel			
28	GB810-88	nut M18 × 1.5	2	steel			
27	CQ9112. 4-64	middle pulley bottom bracket plate	1	A3 plate			
26	HY8310. 3	straight handle B-M10 × 100	1	45			chrom coated polishing
25	CQ9112. 4-21	drill & mill box body	1	HT200			
24	CQ9112. 4-18	column lock sleeve II	1	HT150			
23	CQ9112. 4-20	column lock sleeve I	1	HT150			
22	CQ9112. 4-23	guide pin	4	45			
21	CQ9112. 4-19	column lock handle bar	1	A3			
20	CQ9112. 4-22	stands approaches screw nut	1	H62			
19	CQ9112. 4-02	handle	5	A3			
18	CQ9112. 4-54	lock sleeve II	1	HT150			
17	CQ9112. 4-65	sleeve lock handle bar	1	A3			
16	CQ9112. 4-31	lock sleeve I	1	HT150			
15	CQ9112. 4-17	drill & mill box joint plate	1	A3 plate Ø 20			
14	GB70-85	hex screw M10 × 35	13				chrom coated
13	GB95-88	washer 10	17				
12	CQ9112. 4-36	limit bar supporting bracket	1	angle iron 75x75x6			
11	CQ9112. 1-12	limit dial ring inner bushing	1	A3			
10	CQ9112. 4-01	adjusting bent plate	1	A3 plate Ø 4			
9	GB93-86	spring washer 8	1				
8	CQ9112. 4-61	crush handle	1	45			
7	CQ9112. 4-59	core tube	1	45			
6	GB2089-86	spring φ 1 × φ 8 × 38	1				
5	CQ9112. 4-58	clevis pin	1	45			
4	GB119-86	pin 3 × 17	1				
3	GB119-86	pin 3 × 10	1				
2	CQ9112. 4-60	adjusting straight plate	1	A3 plate			
1	GB6170-88	nut M8	7				
item	part number	description	quan	material	unit weight	amount	remark

126	GB810-88	nut M16 × 1.5	1				
125	GB70-85	nut M6 × 20	8				
124	GB2089-86	spring φ 1 × φ 14 × 16	1				
123	CQ9112. 1-13	limit dial ring	1	A3			
122	CQ9112. 4-34	limit screw	1	A3			
121	CQ9112. 4-53	joint plate	1	A3			
120	GB70-85	nut M5 × 10	8				
119	CQ9112. 4-52	sleeve lower press-fit	1	HT150			
118	CQ9112. 4-48	drill & mill shaft	1	45			
117	CQ9112. 4-50	anti-oil seal	1	felt			
116	GB70-85	nut M5 × 20	6				
115	CQ9112. 4-37	sleeve stationary bracket	1	HT150			
114	GB/T 297-94	bearing 32007	1	steel			
113	GB/T 297-94	bearing 32006	1	steel			
112	CQ9112. 4-47	sleeve	1	HT250			
111	CQ9112. 4-41	joint bent plate	1	angle iron 30x30x3			
110	GB118-86	pin 6 × 20	2				
109	CQ9112. 4-49	R8 dowel	1	45			
108	CQ9112. 4-32	stands approaches feed box bottom plate	1	A3 δ 10			
107	GB70-85	nut M4 × 6	2				
106	GB79-86	lock screw M8 × 30	1				
105	CQ9112. 4-16	sleeve	1	HT200			
104	GB858-86	washer 30	1				
103	GB810-88	nut M30 × 1.5	2				
102	GB5783-86	hexagonal head screw M10 × 25	1				
101	CQ9112. 4-33	stands approaches feed box bottom plate separator	2	HT150			
100	CQ9112. 4-42	belt tensioning rear bracket	1	angle iron 50x50x5			
99	GB95-88	washer 6	8				
98	GB70-85	nut M10 × 35	2				
97	CQ9112. 4-30	right column	1				
96	GB6170-88	nut M10	6	cold bending rectangular pipe 50x25			
95	GB5780-86	hexagonal head screw M10 × 40	1				
94	CQ9112. 4-39	right column lock handle bracket	1	HT150			
93	CQ9112. 4-10	housing	1	HT200			
92	GB70-85	hex screw M8 × 25	21				
91	CQ9112. 4-40	left column lock block	1	HT150			
90	CQ9112. 4-38	crossrail	1	A3 plate δ 12			
89	GB95-88	washer 12	1				
88	GB5783-86	hexagonal head screw M12 × 55	1	steel			
87	CQ9112. 4-29	handle plate	1	A3 δ 5			
86	CQ9112. 4-35	drill & mill cover right side bracket	1	angle iron 25x25			
85	GB70-85	hex screw M5 × 16	10				
84	GB6170-86	nut M6	1				
83	CQ9112. 4-13	motor feed middle pulley bracket	1	A3 plate welding			
82	GB/T 276-94	bearing 6008	1	steel			
81	GB/T 290-88	bearing H K 1210	2	steel			
80		motor	1				
79	CQ9112. 4-14	motor feed middle pulley separator	1	A3			
78	CQ9112. 4-15	motor feed middle pulley	1	HT150			
77	GB95-88	washer 8	19				
76	CQ9112. 4-44	drill & mill cover left side bracket	1	angle iron 25x25x3 welding			
75	GB4605-84	washer 1226	2				
74	GB1174-86	V-belt Z800	1				
73	GB/T 1096-1979	key 6 × 56	1	steel			
72	GB1171-84	V-belt 3L-290 (29" )	1				
71	CQ9112. 4-09	motor feed middle pulley shaft	1	45			
70	CQ9112. 4-56	bent plate	1	A3 plate δ 1			
69	CQ9112. 4-24	stands approaches motor pulley	1	HT150			
68	GB1174-86	V-belt Z800	1				
67	GB894. 1-88	washer 40	1				
66	GB/T 5783-2000	hexagonal head screw M6 × 45	1	steel			
65	SI10B M10	bearing	1				
item	part number	description	quan	material	unit weight	amount	remark

# MILLING HEAD - PARTS LIST 2

# MILL HEAD GEARBOX - EXPLODED VIEW



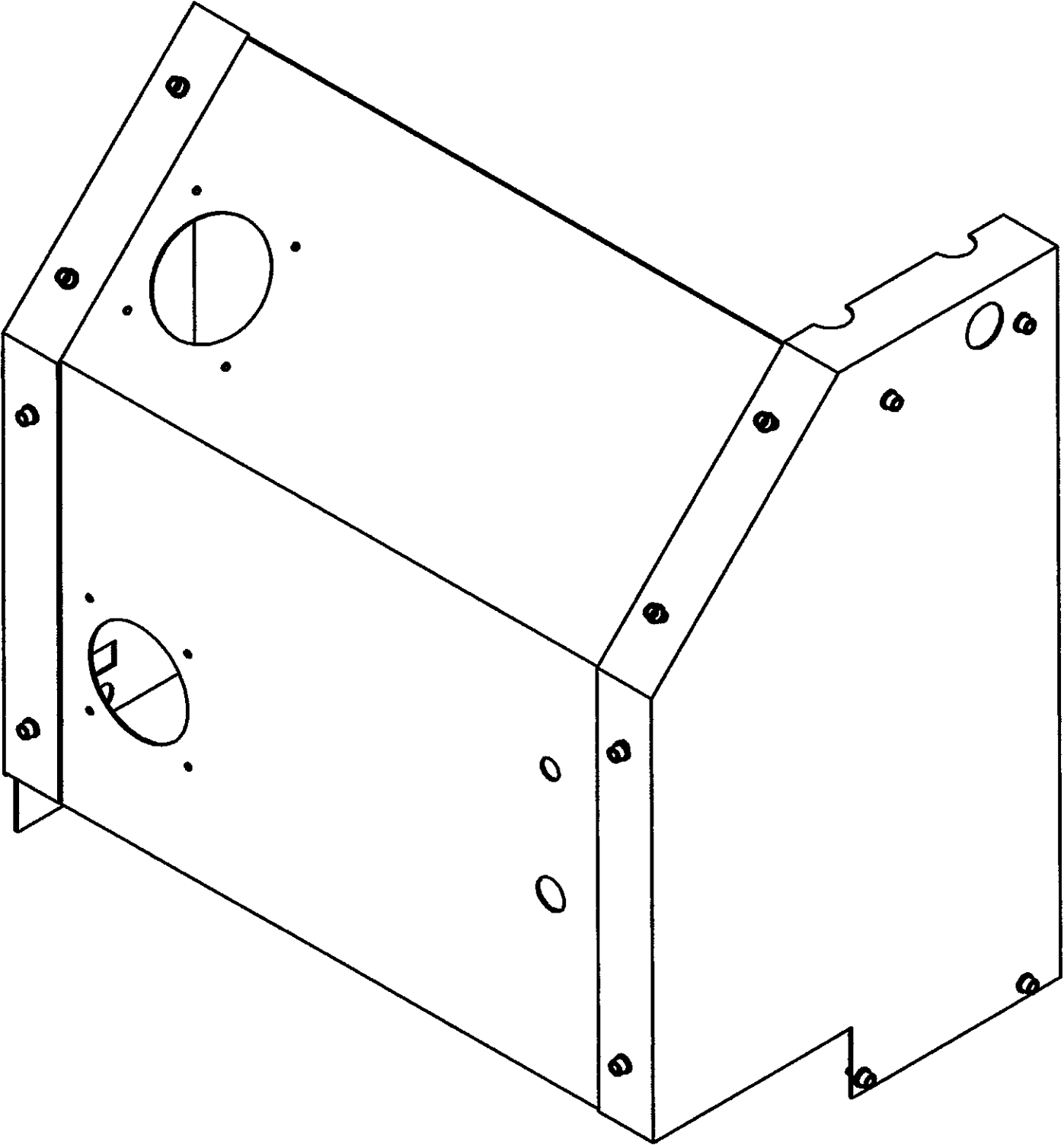
# MILL HEAD GEARBOX – PARTS LIST 1

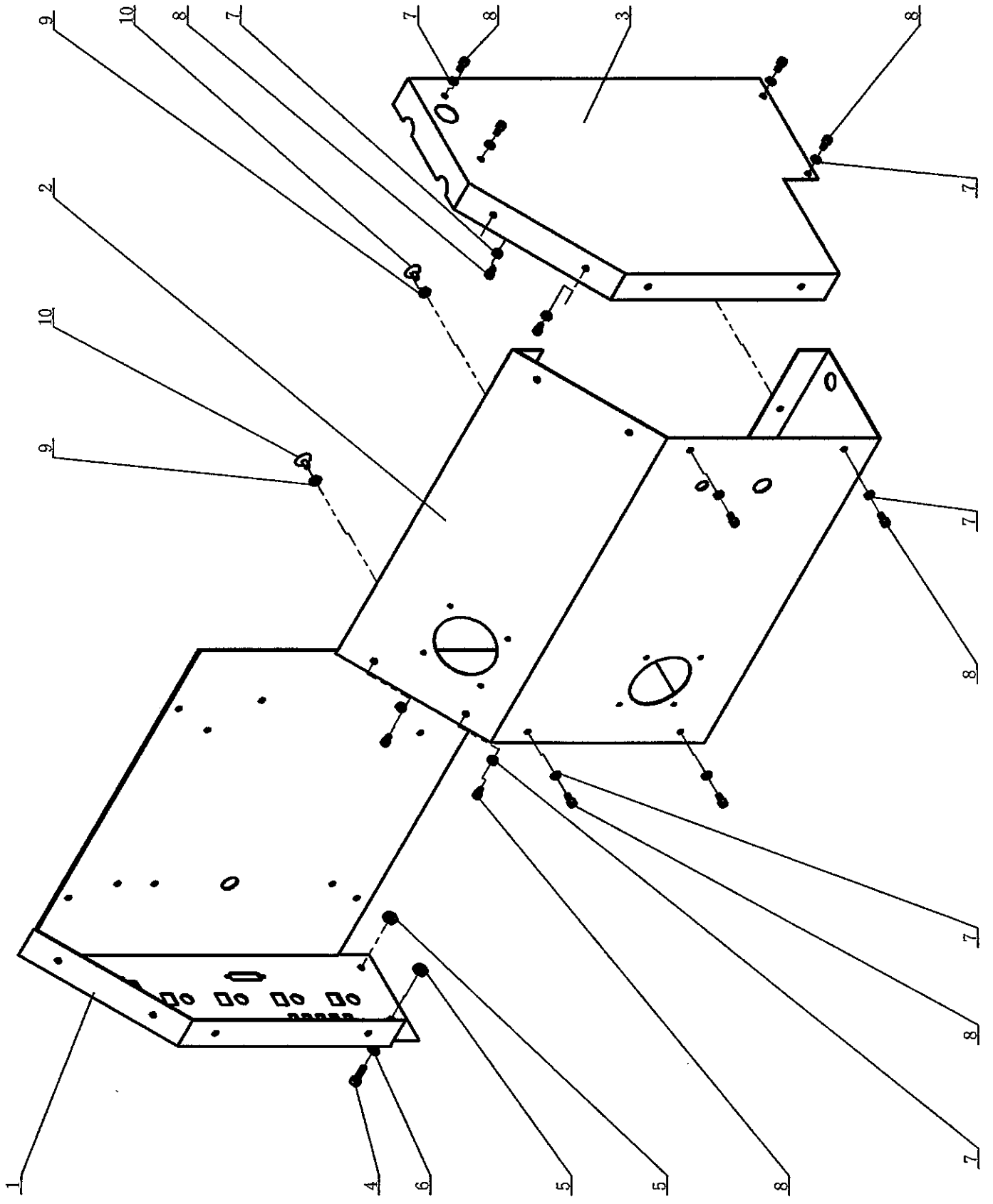
38	CQ9112. 6-18	spring	1				
37	JB/T7273. 3-94	hand wheelB14×160(HY8313.3)	1			M12	
36	CQ9112. 3-13	Dial plate	1	A3			
35	CQ9112. 3-28	Driver plate shaft	1	45			
34	CQ9112. 3-04	Driver plate	1	HT150			
33	CQ9112. 3-15	Dial	1	45			
32	GB70-85	hex screw M5 × 10	8				
31	GB894. 1-86	washer 8	1				
30	CQ9112. 3-14	Supporting sleeve of dial shaft	1	A3			
29	CQ9112. 3-27	driving shaft II	1	45			
28	GB/T301-95	bearing 51102	2	steel			
27	GB1096-79	key 5 × 14	1	steel			
26	CQ9112. 3-08	Drawbar	1	A3			
25	GB/T1096-79	key 5 × 26	1	steel			
24	CQ9112. 3-02	Motor feed pulley	1	HT150			
23	CQ9112. 3-21	Motor feed pulley shaft	1	45			
22	CQ9112. 3-12	Pinion shaft	1	45			
21	CQ9112. 3-06	Rotary plate	2	A3			
20	GB/T290-98	bearing HK1712	1	steel			
19	GB/T1096-79	key 5 × 40	1	steel			
18	CQ9112. 3-23	Stands approaches feed screw	1	45			
17	CQ9112. 3-24	Motor feed pulley shaft bracket	1	A3			
16	CQ9112. 3-26	drilling and milling box	1	HT250	5.59		
15	GB/T290-98	bearing HK1514	1	steel			
14	CQ9112. 3-34	gear of shaft V	1	45			
13	CQ9112. 3-16	sleeve of shaft III	1	A3			
12	CQ9112. 3-37	shaft II	1	45			
11	CQ9112. 3-29	Lower supporting sleeve of motor feed pulley shaft	1	A3			
10	GB70-85	hex screw M5 × 14	11				
9	CQ9112. 3-36	shaft I	1	45			
8	CQ9112. 3-35	gear of shaft I	2	45			
7	CQ9112. 3-03	sleeve of shaft I	1	A3			
6	CQ9112. 3-10	gear of shaft III	1	45			
5	CQ9112. 3-11	shaft III	1	45			
4	GB/T290-98	bearing HK1210	7	steel			
3	GB4605-84	washer AXK1226+AS1226	4				1 set
2	GB95-88	washer 8	4				
1	GB6170-88	nut M8	8				
item	part number	description	quan	material	unit weight	amount	remark

# MILL HEAD GEARBOX – PARTS LIST 2

72	CQ9112. 3-39	shaft IV	1	45			
71	CQ9112. 3-40	Timing pulley of shaft IV	1	45			
70	CQ9112. 3-38	Nut of stands approaches feed screw	1	H62			
69	GB95-88	washer 12	1				
68	CQ9112. 3-30	Joint bracket plate	1	A3 δ 6			
67	GB/T304-88	bearing SA8E	2				
66	CQ9112. 3-22	Limit adjusting nut	2	A3			
65	GB70-85	hex screw M3 × 10	2				
64	GB/T290-98	bearing HK253220	1	steel			
63	CQ9112. 3-07	sleeve of shaft IV	1	HT150			
62	GB4605-84	washer AXK2542+AS2542	2				1 set
61	CQ9112. 3-33	gear of shaft IV	1	45			
60	GB6172-86	nut M25 × 1.5	1				
59	CQ9112. 3-01	upper supporting sleeve of shaft IV	1	HT150			
58	CQ9112. 3-25	Limit screw	1	A3			
57	CQ9112. 3-32	Stands approaches feed motor base plate	1	A3 δ 8 welding			
56	GB95-88	washer 5	4				
55	CQ9112. 3-31	Stands approaches feed motor cover	1	A3 δ 1.5			
54	GB96-88	large washer 5	5				
53	CQ9112. 3-05	nut	2				
52	GB/T77-2000	Lock screw M5 × 5	7				
51	CQ9112. 3-09	driving shaft I	1	45			
50	CQ9112. 2-76	Shifting yoke chassis	1	45			
49	GB/T70. 3-2000	Hex screw M4 × 12	3				
48	GB308-84	steel ball φ 6	1				
47	CQ9112. 3-17	Driving pin	1	45			
46	GB4141. 19-84	handle bracket 12 × 50	1	45			
45	CQ9112. 3-19	Limit drawbar base	1	A3 plate δ 6			
44	GB2089-80	spring 0.8 × 5 × 25	1	5			10
43	HY8310. 4-1	long handle M12 × 100	1	45			
42	GB117-86	pin 5 × 50	1				
41	GB6170-88	nut M10	2				
40	GB95-88	washer 10	2				
39	CQ9112. 3-20	lower supporting sleeve of driving shaft II	1	45			
item	part number	description	quan	material	unit weight	amount	remark

# CNC BOX



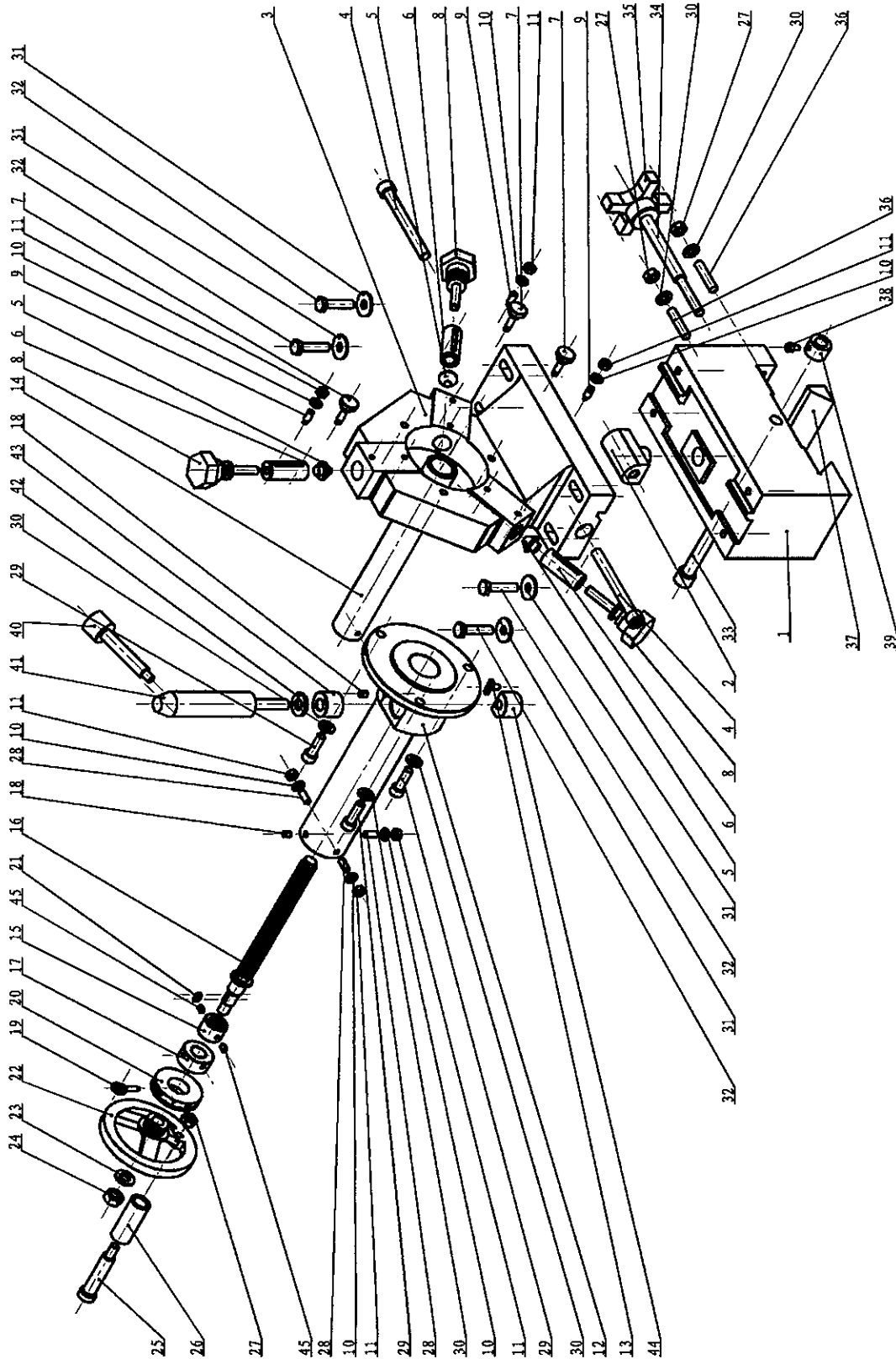


**CNC BOX -- EXPLODED VIEW**

10	GB2673-86 (A)	hex screw M5 x 10	4					
9	GB6170-86	nut M5	4					
8	GB70-85 (B)	hex screw M5 x 10	12					
7	GB96-85	washer 5	12					
6	GB96-85	washer 6	2					
5	GB6170-86	nut M6	2					
4	GB70-85 (B)	hex screw M6 x 20	2					
3	CQ9112. 8-03	numerical control box joint plate	1	A3 δ 1.5				
2	CQ9112. 8-02	numerical control box front plate	1	A3plate δ 1.5				
1	CQ9112. 8-01	numerical control box rear plate	1	A3plate δ 1.5				
item	part number	description	quan	material	unit weight	amount	remark	

## CNC BOX – PARTS LIST



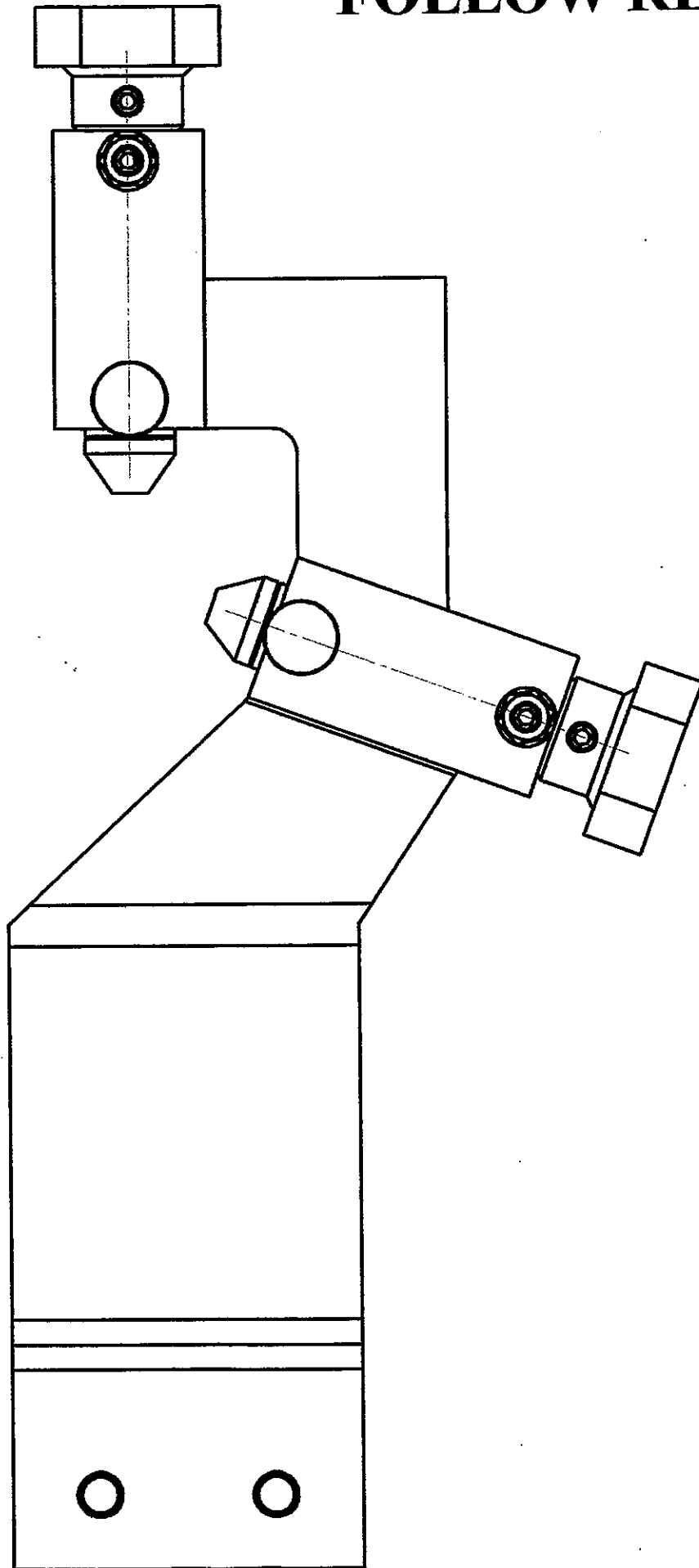


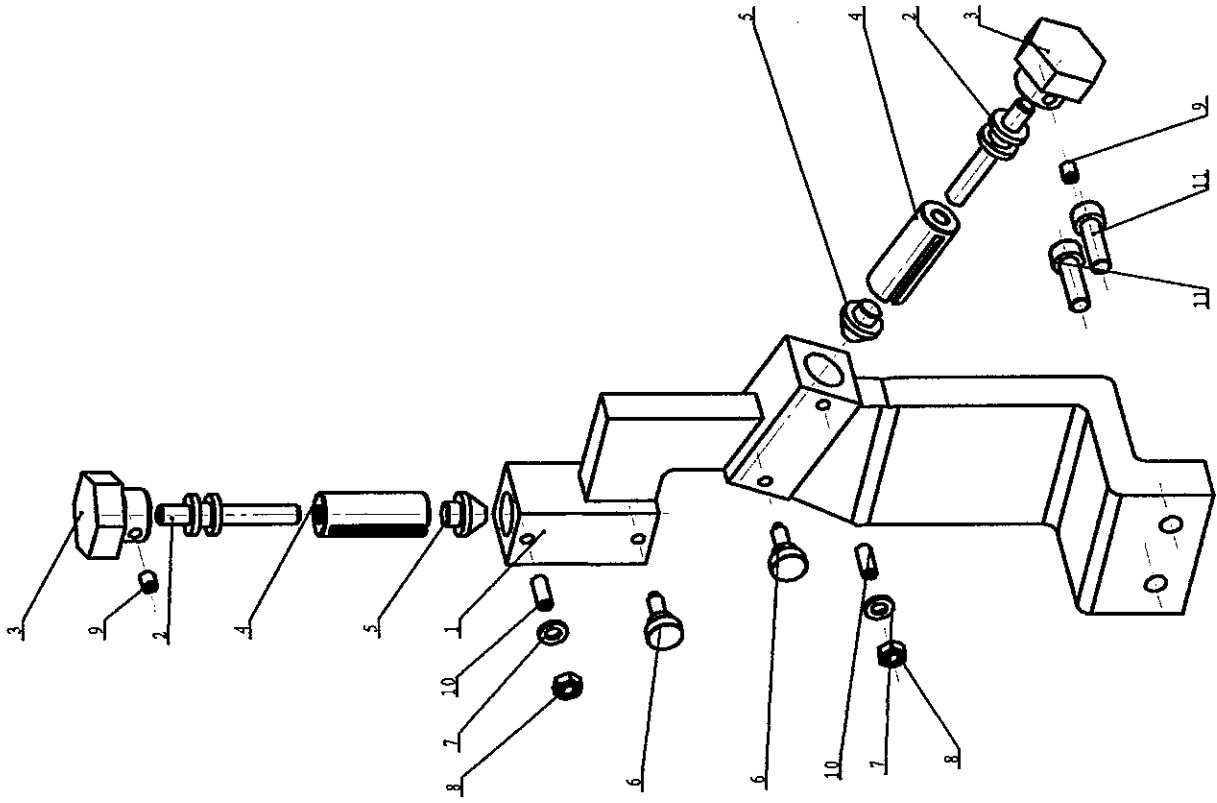
**TAILSTOCK/STEADY REST - EXPLODED VIEW**

# TAILSTOCK/STEADY REST – PARTS LIST

30	GB97.1-85	washer 8	5				
29	GB70-85	hex screw M8 × 25	3				
28	GB78-85	lock screw M6 × 16	3				
27	GB6170-86	nut M8	3				
26	CQ9112.5-18	handle body	1	45	0.06		
25	CQ9112.5-17	handle bar	1	45	0.06		
24	GB6170-86	nut M10	1				
23	GB97.1-85	washer 10	1				
22	CQ9112.5-16	hand wheel	1	45	0.37		
21	GB1096-79	key 4 × 12	1				
20	CQ9112.5-15	dial ring	1	45	0.11		
19	CQ9112.5-14	lock knob	1	45	0.00		
18	GB1155-74	oil cup 6	2				
17	CQ9112.5-13	bearing bushing	1	45	0.07		
16	CQ9112.5-12	tail stock screw	1	45	0.24		
15	CQ9112.5-11	nut	1	ZQSn6-6-3	0.04		
14	CQ9112.5-10	tail stock core	1	45	0.76		
13	CQ9112.5-09	gib head key	1	45	0.00		
12	CQ9112.5-08	tail stock body	1	HT200	3.09		
11	GB6170-86	nut M6	6				
10	GB97.1-85	washer 6	6				
9	GB79-85	hex screw M6 × 16	3				
8	CQ9112.5-07	lead screw	3	45	0.14		
7	CQ9112.5-06	lock screw	3	45	0.02		
6	CQ9112.5-05	sliding body	3	45	0.06		
5	CQ9112.5-04	sliding quill	3	ZQSn6-6-3	0.02		
4	GB70-85	hex screw M10 × 90	2				
3	CQ9112.5-03	rest body	1	HT200	8.52		
2	CQ9112.5-02	adjusting nut	1	HT150	0.21		
1	CQ9112.5-01	tail stock bottom plate	1	HT200	6.82		
item	part number	description	quan	material	unit weight	amount	remark

**FOLLOW REST**



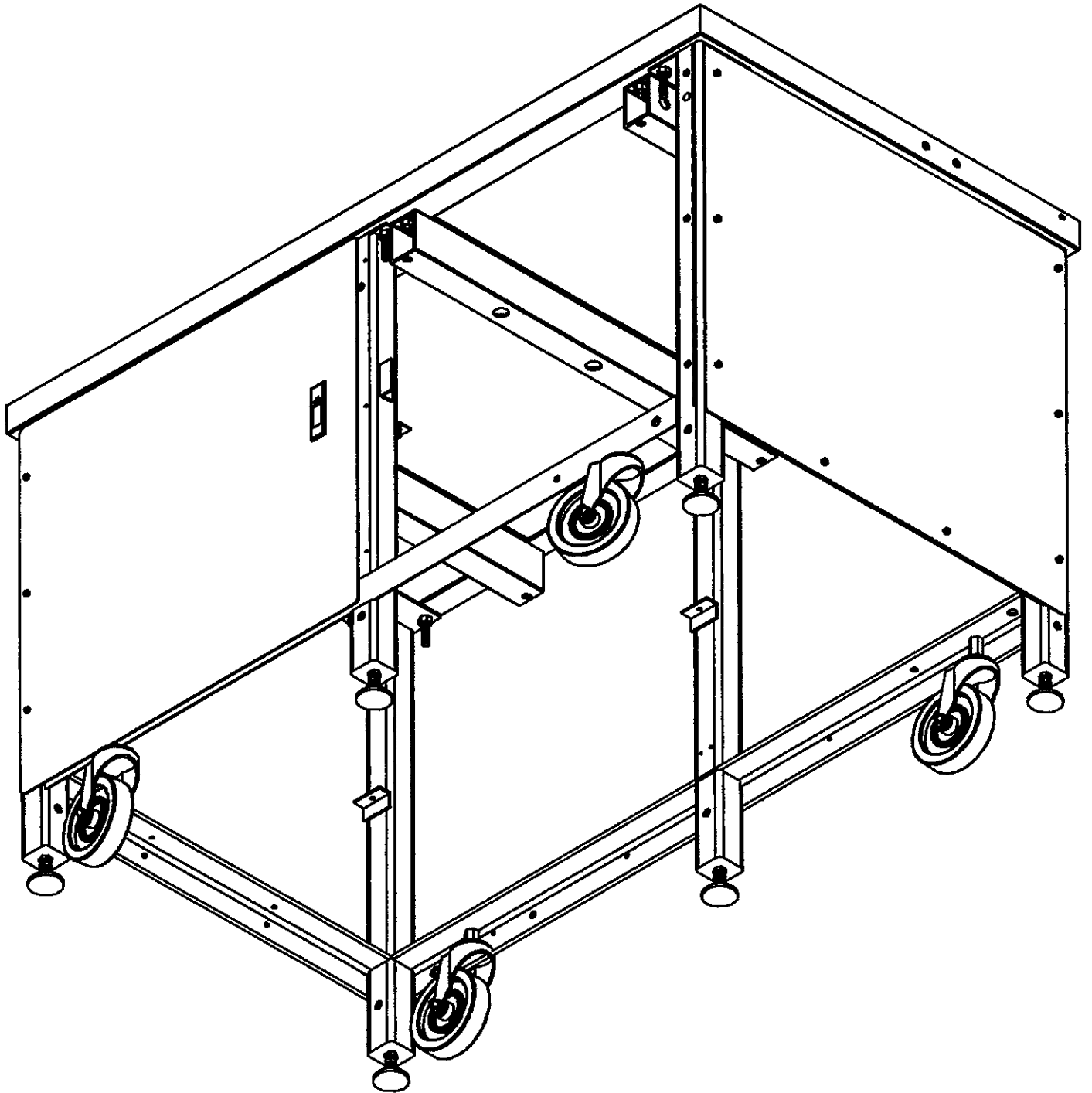


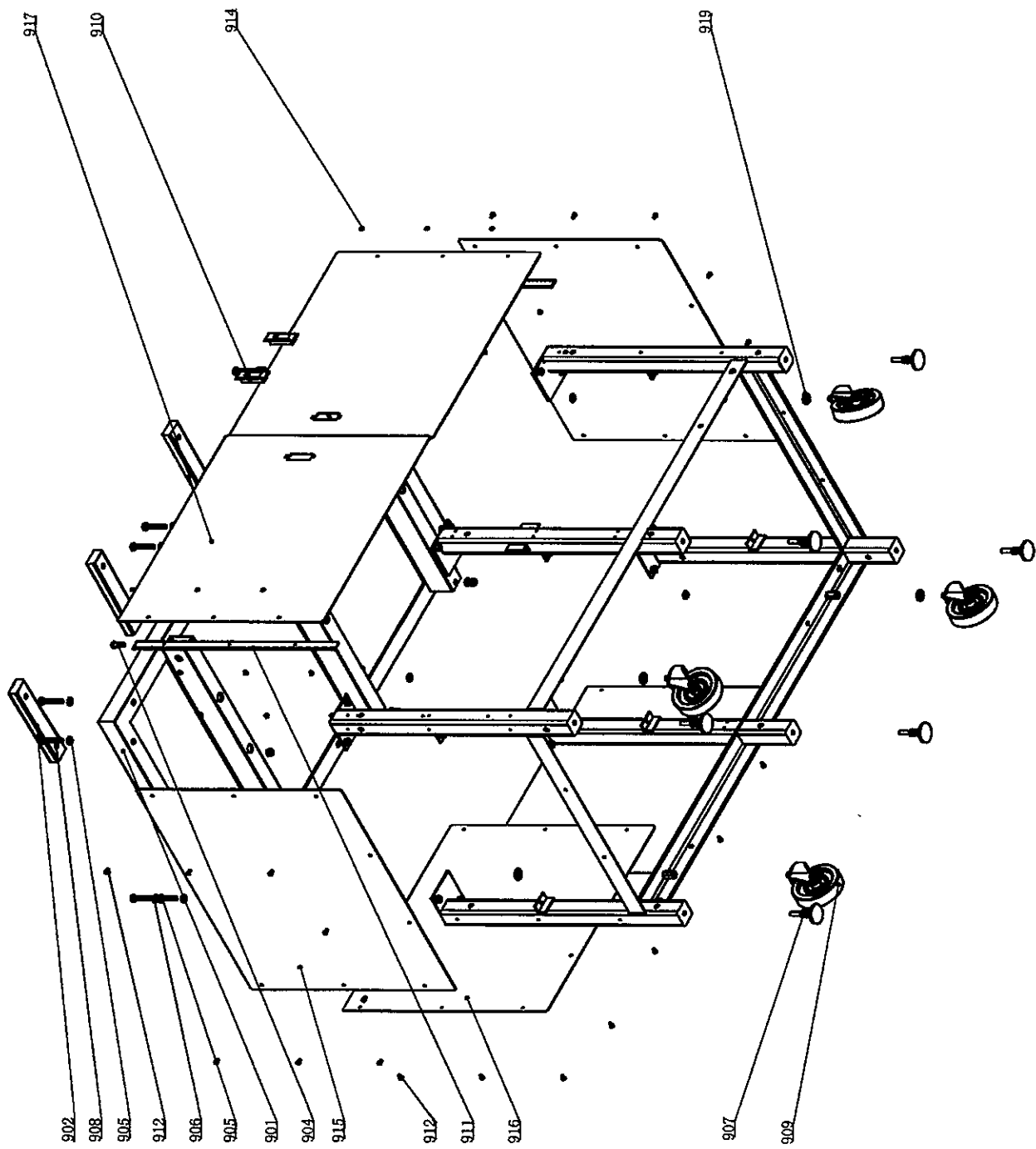
**FOLLOW REST – EXPLODED VIEW**

11	GB70-85	hex screw	M8 x 25	2					
10	GB77-85	lock screw	M6 x 16	4					
9	GB77-85	lock screw	M6 x 8	2					
8	GB6170-86	nut	M6	4					
7	GB97.1-85	washer	6	4					
6	CQ9112. F. 3-06	crush screw		2	45	0.01			
5	CQ9112. F. 3-05	slide sleeve		2	ZQSn6-6-3	0.02			
4	CQ9112. F. 3-04	slide block		2	45	0.01			
3	CQ9112. F. 3-03	knob		2	45	0.11			
2	CQ9112. F. 3-02	lead screw		2	45	0.03			
1	CQ9112. F. 3-01	follower rest body		1	HT150	2.63			
item	part number	description		quan	material	unit weight	amount	remark	

**FOLLOW REST - PARTS LIST**

# MOBILE BENCH





# MOBILE BENCH – EXPLODED VIEW

20	GB70-85	hex screw M10 × 50	6				
19	GB/T95-1985	washer 14	4				
18	GB/T6172.1-2000	nut M10	6				
17	CQ9112.9-06	front door	2	A3 δ 2	0.83		
16	CQ9112.9-04	rear cover	2	A3 δ 2	0.83		
15	CQ9112.9-05	side cover	2	A3 δ 2	0.90		
14	GB/T6172.1-2000	nut M5	6	steel			
13	GB/T70.3-2000	hex screw M5 × 8	12	steel			
12	GB/T70.1-2000	hex screw M5 × 8	32				
11	QB/T3874-1999	flange 50 × 615	2			purchase	
10		lock	2			each side 1	
9	GB/T14688	trundle WP13C-125 × 30	4			purchase	
8	GB/T5783-2000	hexagonal head screw M10 × 35	12	steel			
7	HY8334.1	pad foot	6	steel	0.03		
6	GB/T6170-86	nut M10	6	steel			
5	GB/T95-1985	washer 10	18	steel			
4	GB/T70.2-2000	hex screw M10 × 30	6	steel			
3	CQ9112.9-03	bracket	1	steel	37.18		
2	CQ9112.9-02	base plate	1	steel	7.3		
2	CQ9112.9-01	supporting block	3	steel δ 4	0.559		
item	part number	description	quant	material	unit weight	amount	remark

## MOBILE BENCH - PARTS LIST



# **PATRIOT PARTS PRICES**

**Once you have selected the part you require, you will find it listed in these pages in alpha-numeric order.**

## **PLEASE NOTE:**

**The parts prices supplied by the factory were calculated as if each part were to be shipped individually.**

**Therefore small parts such as fasteners are shown at a minimum price of 2.00. Most of these parts can be sourced locally at much lower prices.**

**The prices shown are current as of printing. However, due to rising materials and freight, plus changing exchange rates, the prices may fluctuate. Please call to verify before ordering.**

<b>part number</b>	<b>description</b>	<b>unit price</b>
CQ9112.1-01	lower motor pulley	\$8.5000
CQ9112.1-02	bed	\$280.0000
CQ9112.1-03	leadscrew	\$2.5000
CQ9112.1-04	upper connection sleeve	\$2.0000
CQ9112.1-05	feed rod	\$15.0000
CQ9112.1-06	lower connection sleeve	\$2.0000
CQ9112.1-07	longitudinal leadscrew	\$20.0000
CQ9112.1-09	front cover	\$6.0000
CQ9112.1-10	longitudinal bracket	\$10.0000
CQ9112.1-11	limit supporting bracket	\$2.0000
CQ9112.1-12	inner bush of limit dial	\$2.0000
CQ9112.1-13	limit dial	\$2.0000
CQ9112.1-14	right side cover	\$3.0000
CQ9112.1-15	motor assemble bracket	\$6.0000
CQ9112.1-16	adjusting rod	\$2.0000
CQ9112.1-17	adjusting bracket	\$2.0000
CQ9112.1-18	pin	\$2.0000
CQ9112.1-19	shaft of motor bracket	\$2.0000
CQ9112.1-20	bracket	\$2.0000
CQ9112.1-21	thread sleeve	\$2.0000
CQ9112.1-22A	leadscrew protection	\$2.0000
CQ9112.1-22B	leadscrew protection	\$2.0000
CQ9112.1-23	longitudinal leadscrew bracket	\$6.0000
CQ9112.1-24	lower sleeve	\$2.0000
CQ9112.1-25	dial ring	\$2.0000
CQ9112.1-26	dial body	\$2.0000
CQ9112.1-27	longitudinal follower pulley	\$8.0000
CQ9112.1-28	longitudinal supporting bracket	\$30.0000
CQ9112.1-30	washer	\$2.0000
CQ9112.1-31	longitudinal leadscrew A	\$12.0000
CQ9112.1-32	longitudinal leadscrew B	\$5.0000
CQ9112.1-33	small cover	\$2.0000
<b>total</b>		

<b>part number</b>	<b>description</b>	<b>unit price</b>
CQ9112.2-01	headstock compartment	\$60.0000
CQ9112.2-02	spindle	\$30.0000
CQ9112.2--03-04	headstock cover & door	\$50.0000
CQ9112.2-07	door shaft	\$2.0000
CQ9112.2-08	pull-out shaft	\$3.0000
CQ9112.2-09	washer	\$2.0000
CQ9112.2-10	shifting yoke	\$2.0000
CQ9112.2-11	shaft	\$2.0000
CQ9112.2-12	handle	\$2.0000
CQ9112.2-13	shaft	\$2.0000
CQ9112.2-14	shaft of handle	\$2.0000
CQ9112.2-15	guiding sleeve	\$3.0000
CQ9112.2-16	handle base	\$4.0000
CQ9112.2-17	positoning base	\$2.0000
CQ9112.2-18	washer	\$2.0000
CQ9112.2-19	adjusting screw	\$5.0000
CQ9112.2-20	locking screw	\$2.0000
CQ9112.2-22	timing belt □	\$8.0000
CQ9112.2-23	middle pulley	\$20.0000
CQ9112.2-24	shaft of middle pulley	\$2.0000
CQ9112.2-25	seperator	\$2.0000
CQ9112.2-26	washer	\$2.0000
CQ9112.2-27	shaft of small pulley	\$3.0000
CQ9112.2-29	small pulley	\$15.0000
CQ9112.2-30	belt tensioner	\$3.0000
CQ9112.2-31	tensioner shaft	\$2.0000
CQ9112.2-32	tensioner bracket	\$4.0000
CQ9112.2-34	shaft □	\$2.0000
CQ9112.2-35	shaft □	\$2.0000
CQ9112.2-36	change gear bracket	\$7.0000
CQ9112.2-37	change gear(m=1 Z=27)	\$27.0000
CQ9112.2-38	change gear(m=1 Z=60)	\$27.0000
CQ9112.2-39	gear seperator	\$2.0000
CQ9112.2-40	change gear(m=1 Z=63)	\$27.0000
CQ9112.2-41	splines sleeve □	\$8.0000
CQ9112.2-42	change gear(m=1.5 Z=30)	\$27.0000
CQ9112.2-43	splines sleeve □	\$8.0000
CQ9112.2-44	gear	\$27.0000
CQ9112.2-45	change gear(m=1.5 Z=27)	\$27.0000
CQ9112.2-46	splines sleeve □	\$8.0000
CQ9112.2-47	gear shaft	\$8.0000
CQ9112.2-48	gear(m=1.5 Z=18)	\$27.0000

CQ9112.2-49	supporting plate	\$5.0000
CQ9112.2-50	seperator	\$2.0000
CQ9112.2-51	seperator□	\$2.0000
CQ9112.2-52	bearing bush	\$2.0000
CQ9112.2-53	transmission shaft	\$8.0000
CQ9112.2-54	duplicate wheel	\$27.0000
CQ9112.2-55	taper sleeve	\$2.0000
CQ9112.2-56	sleeve	\$2.0000
CQ9112.2-57	supporting shaft	\$8.0000
CQ9112.2-58	triple wheel	\$27.0000
CQ9112.2-59	spindle gear	\$27.0000
CQ9112.2-60	dial ring	\$15.0000
CQ9112.2-61	large washer	\$2.0000
CQ9112.2-62	nut	\$2.0000
CQ9112.2-63	large pulley bracket	\$2.0000
CQ9112.2-63-01	bracket plate	\$3.0000
CQ9112.2-63-02	shaft I	\$8.0000
CQ9112.2-63-03	shaft II	\$8.0000
CQ9112.2-64	washer	\$2.0000
CQ9112.2-65	seperator	\$2.0000
CQ9112.2-66	large pulley	\$25.0000
CQ9112.2-67	bracking plate	\$6.0000
CQ9112.2-68	adjusting plate	\$3.0000
CQ9112.2-69	tensioner shaft	\$3.0000
CQ9112.2-70	tensioner	\$5.0000
CQ9112.2-71	supporting sleeve	\$6.0000
CQ9112.2-72	end cap	\$2.0000
CQ9112.2-73	side over plate	\$10.0000
CQ9112.2-74	shaft	\$2.0000
CQ9112.2-75	sleeve	\$2.0000
CQ9112.2-76	supporting plate	\$5.0000
CQ9112.2-77	speed adjusting handle	\$2.0000
CQ9112.2-78	speed adjusting handle base	\$5.0000
CQ9112.2-79	shaft	\$4.0000
CQ9112.2-80	bracket	\$2.0000
CQ9112.2-81	spindle pulley	\$35.0000
CQ9112.2-82	sleeve	\$2.0000
CQ9112.2-83	rear bearing gland	\$5.0000
CQ9112.2-85	front bearing gland	\$6.0000
CQ9112.2-87	bearing spacing collar	\$3.0000
CQ9112.2-90	gear(m=1.5 Z=30)	\$27.0000
CQ9112.2-91	sleeve	\$2.0000
CQ9112.2-93	timing pulley	\$12.0000

<b>part number</b>	<b>description</b>	<b>unit price</b>
CQ9112.3-01	upper supporting sleeve of shaft <input type="checkbox"/>	\$2.0000
CQ9112.3-02	Motor feed pulley	\$12.0000
CQ9112.3-03	sleeve of Shaft <input type="checkbox"/>	\$2.0000
CQ9112.3-04	Driver plate	\$3.0000
CQ9112.3-05	Screw	\$2.0000
CQ9112.3-06	Rotary plate	\$2.0000
CQ9112.3-07	sleeve of Shaft <input type="checkbox"/>	\$2.0000
CQ9112.3-08	Drawbar	\$4.0000
CQ9112.3-09	driving shaft <input type="checkbox"/>	\$4.0000
CQ9112.3-10	Gear of shaft <input type="checkbox"/>	\$27.0000
CQ9112.3-11	Shaft <input type="checkbox"/>	\$4.0000
CQ9112.3-12	Pinion shaft	\$8.0000
CQ9112.3-13	Dial plate	\$4.0000
CQ9112.3-14	Supporting sleeve of dial shaft	\$2.0000
CQ9112.3-15	Dial ring	\$4.0000
CQ9112.3-16	sleeve of Shaft <input type="checkbox"/>	\$3.0000
CQ9112.3-17	Driving pin	\$5.0000
CQ9112.3-19	Limit drawbar base	\$5.0000
CQ9112.3-20	lower supporting sleeve	\$2.0000
CQ9112.3-21	Motor feed pulley shaft	\$12.0000
CQ9112.3-22	Limit adjusting nut	\$2.0000
CQ9112.3-23	Stands approaches feed screw	\$12.0000
CQ9112.3-24	Motor feed pulley shaft bracket	\$12.0000
CQ9112.3-25	Limit screw	\$2.0000
CQ9112.3-26	Drilling & milling box	\$50.0000
CQ9112.3-27	driving shaft <input type="checkbox"/>	\$2.0000
CQ9112.3-28	Driver plate shaft	\$2.0000
CQ9112.3-29	supporting sleeve of pulley shaft	\$2.0000
CQ9112.3-30	Joint bracket plate	\$3.0000
CQ9112.3-31	Stands approaches feed motor cover	\$5.0000
CQ9112.3-32	Stands approaches feed motor base plate	\$6.0000
CQ9112.3-33	Gear of shaft <input type="checkbox"/>	\$27.0000
CQ9112.3-34	Gear of shaft <input type="checkbox"/>	\$27.0000
CQ9112.3-35	Gear of shaft <input type="checkbox"/>	\$27.0000
CQ9112.3-36	Shaft <input type="checkbox"/>	\$5.0000
CQ9112.3-37	Shaft <input type="checkbox"/>	\$5.0000
CQ9112.3-38	Nut of stands approaches feed screw	\$12.0000
CQ9112.3-39	Shaft <input type="checkbox"/>	\$6.0000
CQ9112.3-40	Timing pulley of shaft <input type="checkbox"/>	\$12.0000
CQ9112.3-41	nut	\$5.0000
CQ9112.3-42	bronze block	\$2.0000
CQ9112.3-43	washer	\$2.0000

part number	description	unit price
CQ9112.4-01	adjusting bent plate	\$2.0000
CQ9112.4-02	handle	\$3.0000
CQ9112.4-03	stands approaches screw	\$15.0000
CQ9112.4-04	middle pulley upper bracket	\$5.0000
CQ9112.4-05	middle pulley shaft	\$5.0000
CQ9112.4-06	drill & mill box lifter	\$7.0000
CQ9112.4-08	joint drawbar	\$3.0000
CQ9112.4-09	middle pulley shaft	\$5.0000
CQ9112.4-10	housing	\$7.0000
CQ9112.4-11	left side cover	\$8.0000
CQ9112.4-12	drill & mill spindle pulley	\$45.0000
CQ9112.4-13	middle pulley bracket	\$8.0000
CQ9112.4-14	middle pulley sleeve	\$2.0000
CQ9112.4-15	motor feed middle pulley	\$12.0000
CQ9112.4-17	drill & mill box joint plate	\$30.0000
CQ9112.4-18	column lock sleeve II	\$2.0000
CQ9112.4-19	column lock handle bar	\$3.0000
CQ9112.4-20	column lock sleeve	\$2.0000
CQ9112.4-21	drill & mill box body	\$180.0000
CQ9112.4-22	stands approaches screw nut	\$12.0000
CQ9112.4-23	guide pin	\$7.0000
CQ9112.4-24	stands approaches motor pulley	\$17.0000
CQ9112.4-25	upper cover	\$35.0000
CQ9112.4-26	nut	\$3.0000
CQ9112.4-27	circular plate	\$2.0000
CQ9112.4-28	cover stationary bar	\$3.0000
CQ9112.4-29	handle plate	\$8.0000
CQ9112.4-29-1	block of handle plate	\$2.0000
CQ9112.4-30	right column	\$8.0000
CQ9112.4-30-1	plate	\$6.0000
CQ9112.4-31	lock sleeve I	\$3.0000
CQ9112.4-32	stands approaches feed box bottom p	\$12.0000
CQ9112.4-33	stands approaches feed box bottom p	\$3.0000
CQ9112.4-34	limit screw	\$2.0000
CQ9112.4-35	right side bracket	\$4.0000
CQ9112.4-35-1	right side bracket shaft	\$3.0000
CQ9112.4-36	limit bar supporting bracket	\$3.0000
CQ9112.4-37	sleeve stationary bracket	\$30.0000
CQ9112.4-38	crossrail	\$60.0000

CQ9112.4-39	right column lock handle bracket	\$5.0000
CQ9112.4-40	right column lock block	\$3.0000
CQ9112.4-41	joint bent plate	\$2.0000
CQ9112.4-42	belt bracket	\$2.0000
CQ9112.4-43	middle pulley upper press-fit	\$2.0000
CQ9112.4-44	left supporting bracket	\$4.0000
CQ9112.4-45	nut	\$2.0000
CQ9112.4-46	nut inner bushing	\$2.0000
CQ9112.4-47	sleeve	\$30.0000
CQ9112.4-48a	drill & mill shaft	\$40.0000
CQ9112.4-49	R8 dowel	\$2.0000
CQ9112.4-51	drill & mill left bracket	\$2.0000
CQ9112.4-52	sleeve lower gland	\$4.0000
CQ9112.4-53	joint plate	\$4.0000
CQ9112.4-54	lock sleeve II	\$3.0000
CQ9112.4-55	upper bracket plate	\$15.0000
CQ9112.4-56	bent plate	\$2.0000
CQ9112.4-57	upper screw bracket	\$4.0000
CQ9112.4-58	clevis pin	\$3.0000
CQ9112.4-59	core tube	\$3.0000
CQ9112.4-60	adjusting straight plate	\$5.0000
CQ9112.4-61	crush handle	\$3.0000
CQ9112.4-62	lifter right side bracket	\$5.0000
CQ9112.4-63	belt tesioning screw	\$12.0000
CQ9112.4-64	middle pulley bracket plate	\$10.0000
CQ9112.4-65	sleeve handle bar	\$5.0000
CQ9112.4-69	upper bracket shaft sleeve	\$2.0000
CQ9112.4-70	seperator sleeve	\$2.0000
CQ9112.4-71	lock sleeve adjusting gasket	\$3.0000
<b>total</b>		

<b>part number</b>	<b>description</b>	<b>unit price</b>
CQ9112.5-01	tailstock bottom plate	\$40.0000
CQ9112.5-02	adjusting nut	\$4.0000
CQ9112.5-03	rest body	\$45.0000
CQ9112.5-04	sliding quill	\$3.0000
CQ9112.5-05	sliding body	\$3.0000
CQ9112.5-06	lock screw	\$2.0000
CQ9112.5-07	lead screw	\$2.0000
CQ9112.5-08	handle	\$4.0000
CQ9112.5-09	tailstock body	\$25.0000
CQ9112.5-10	tailstock core	\$10.0000
CQ9112.5-11	tailstock screw	\$5.0000
CQ9112.5-12	nut	\$5.0000
CQ9112.5-13	bearing bushing	\$2.0000
CQ9112.5-14	dial ring	\$3.0000
CQ9112.5-15	taper block	\$5.0000
CQ9112.5-16	lead screw	\$3.0000
CQ9112.5-17	lock sleeve	\$2.0000
CQ9112.5-18	lock shaft	\$4.0000
CQ9112.5-19	washer	\$2.0000
CQ9112.5-20	lock handle bar	\$3.0000
CQ9112.5-21	T-type key	\$2.0000
<b>total</b>		



<b>part number</b>	<b>description</b>	<b>unit price</b>
CQ9112.6-01	table	\$125.0000
CQ9112.6-02	stationary base	\$15.0000
CQ9112.6-03	cover supporting sleeve	\$2.0000
CQ9112.6-04	upper wedge	\$5.0000
CQ9112.6-05	hood	\$5.0000
CQ9112.6-06	longintudinal lock bar	\$2.0000
CQ9112.6-07	slide bar	\$95.0000
CQ9112.6-08	scraper A	\$2.0000
CQ9112.6-10	scraper B	\$2.0000
CQ9112.6-11	sleeve	\$2.0000
CQ9112.6-12	upper nut base	\$2.0000
CQ9112.6-13	cross lock bar	\$2.0000
CQ9112.6-14	cross driven wheel	\$9.0000
CQ9112.6-15	stationary sleeve	\$2.0000
CQ9112.6-16	cross nut A	\$12.0000
CQ9112.6-17	cross nut B	\$12.0000
CQ9112.6-18	lower wedge	\$5.0000
CQ9112.6-19	helical gear	\$27.0000
CQ9112.6-20	cross lead screw	\$25.0000
CQ9112.6-21	upper sleeve	\$2.0000
CQ9112.6-22	upper lead screw bracket	\$8.0000
CQ9112.6-23	upper lead screw bracket base	\$7.0000
CQ9112.6-24	wash	\$2.0000
CQ9112.6-25	cross motor base	\$5.0000
CQ9112.6-26	bracket plate	\$3.0000
<b>total</b>		

<b>part number</b>	<b>description</b>	<b>unit price</b>
CQ9112.7-01-01	shaft	\$3.0000
CQ9112.7-01-02	plate	\$2.0000
CQ9112.7-01-03	longitudinal hand wheel shaft	\$5.0000
CQ9112.7-02	feed box body	\$35.0000
CQ9112.7-04	longitudinal stationary sleeve	\$3.0000
CQ9112.7-05	flange	\$3.0000
CQ9112.7-06	finger bar	\$2.0000
CQ9112.7-07	operation plate	\$5.0000
CQ9112.7-09	stationary sleeve	\$5.0000
CQ9112.7-10	joint shaft	\$3.0000
CQ9112.7-11	feed box rear press-fit	\$2.0000
CQ9112.7-13	feed box cover	\$12.0000
CQ9112.7-14	base A	\$3.0000
CQ9112.7-15	base B	\$5.0000
CQ9112.7-16	shaft II	\$5.0000
CQ9112.7-17	gear of shaft II	\$27.0000
CQ9112.7-18	large sleeve	\$3.0000
CQ9112.7-19	shaft III	\$5.0000
CQ9112.7-20	washer	\$2.0000
CQ9112.7-21	gear of shaft I	\$27.0000
CQ9112.7-22	left side separator of shaft I	\$3.0000
CQ9112.7-23	shaft I	\$5.0000
CQ9112.7-24	right side separator of shaft I	\$2.0000
CQ9112.7-25-01	lower driver plate	\$6.0000
CQ9112.7-26	lower handle body	\$6.0000
CQ9112.7-27-01	upper driver plate	\$5.0000
CQ9112.7-27-02	upper driver plate shaft	\$2.0000
CQ9112.7-28	longitudinal bracket	\$12.0000
CQ9112.7-29	speed-adjusting handle base	\$6.0000
CQ9112.7-30	dial ring	\$5.0000
<b>total</b>		

<b>part number</b>	<b>description</b>	<b>unit price</b>
CQ9112.8-01-02	numerical control box front plate	\$45.0000
CQ9112.8-03	numerical control box joint plate	\$15.0000
<b>total</b>		

<b>part number</b>	<b>description</b>	<b>unit price</b>
CQ9112.9-01	supporting block	\$3.0000
CQ9112.9-02-03	base plate	\$300.0000
CQ9112.9-03-01	nut	\$2.0000
CQ9112.9-04	rear cover	\$35.0000
CQ9112.9-05	side cover	\$35.0000
CQ9112.9-06	front door	\$40.0000
CQ9112.9-07-01	bracket	\$3.0000
CQ9112.9-07-02	lead screw	\$3.0000
<b>total</b>		

<b>part number</b>	<b>description</b>	<b>unit price</b>
CQ9112.F. 1	face plate	\$60.0000
CQ9112.F. 2-01	gear Z32	\$27.0000
CQ9112.F. 2-02	gear Z33	\$27.0000
CQ9112.F. 2-03	gear Z36	\$27.0000
CQ9112.F. 2-04	gear Z39	\$27.0000
CQ9112.F. 2-05	gear Z40	\$27.0000
CQ9112.F. 2-06	gear Z42	\$27.0000
CQ9112.F. 2-07	gear Z48	\$27.0000
CQ9112.F. 2-08	gear Z49	\$27.0000
CQ9112.F. 2-09	gear Z50	\$27.0000
CQ9112.F. 2-10	gear Z51	\$27.0000
CQ9112.F. 2-11	gear Z54	\$27.0000
CQ9112.F. 2-12	gear Z56	\$27.0000
CQ9112.F. 2-13	gear Z57	\$27.0000
CQ9112.F. 3-01	follow rest body	\$20.0000
CQ9112.F. 4-01	nib	\$5.0000
CQ9112.F. 4-02	base	\$3.0000
CQ9112.F. 5-01	Inside square bar	\$3.0000
CQ9112.F. 5-02	Telescope	\$3.0000
CQ9112.F. 5-03	Cross pipe	\$4.0000
CQ9112.F. 6-01	Base bar	\$2.0000
CQ9112.F. 6-02	Sleeve	\$2.0000
CQ9112.F. 7-01	Flange	\$3.0000
CQ9112.F. 7-02	Telescope	\$3.0000
CQ9112.F. 8-01	Long crank handle body	\$7.0000
CQ9112.F. 8-02	Handle	\$2.0000
CQ9112.F. 9-01	Short crank handle body	\$2.0000
CQ9112.F. 9-02	Telescope	\$3.0000
CQ9112.F. 9-03	Handle shaft	\$3.0000
CQ9112.F. 10	Cover	\$5.0000
CQ9112.F. 11	Joint plate	\$6.0000
CQ9112.F. 11-01	packing stationary plate	\$6.0000
CQ9112.F. 12-01	timing pulley Z60	\$18.0000
CQ9112.F. 12-02	timing pulley Z21	\$12.0000
CQ9112.F. 12-03	timing pulley Z18	\$12.0000
CQ9112.F. 13-01A	guide sleeve	\$6.0000
CQ9112.F. 13-01B	supporting	\$6.0000
CQ9112.F. 13-02	screw	\$2.0000
CQ9112.F. 14-01	lead screw	\$2.0000
CQ9112.F. 14-02	blueing nut	\$3.0000
CQ9112.F. 15-01	crank handle	\$6.0000
CQ9112.F. 16	supporting plate	\$2.0000

part number	description & specification	unit price
GB 1096-79	key 6×56	\$2.0000
GB 1096-79	key 5×25	\$2.0000
GB 117-86	taper pin 5×18	\$2.0000
GB 362-65	spring 16×12×1	\$2.0000
GB 6170-86	hex nut M6	\$2.0000
GB/T889.1-2000	hex nut M12	\$2.0000
GB 6170-86	hex nut M10	\$2.0000
GB 6170-86	hex nut M8	\$2.0000
GB 95-85	washer 12	\$2.0000
GB 95-85	washer 5	\$2.0000
GB 95-85	washer 10	\$2.0000
GB 95-85	washer 8	\$2.0000
GB/T 117-86	taper pin 5×26	\$2.0000
GB/T 301-1995	rolling bearing 51102	\$6.0000
GB/T 867-1986	rivet 2X3	\$2.0000
GB/T 91-86	cotter pin 2×28	\$2.0000
GB/T304.1-1988	bent rod bulb bearing SQ8-RS	\$6.0000
GB4141.22-84	handwheel B-14×160□ d□ 14 M12□	\$7.0000
GB4222-91	outside thread bearing SA12BK	\$6.0000
GB70-85	socket head screw M8×25	\$2.0000
GB70-85	socket head screw M5×8 □ stainless steel□	\$2.0000
GB70-85	socket head screw M5×30	\$2.0000
GB70-85	socket head screw M5×10 □ stainless steel□	\$2.0000
GB70-85	socket head screw M8×20	\$2.0000
GB70-85	socket head screw M5×20	\$2.0000
GB70-85	socket head screw M6×20	\$2.0000
GB70-85	socket head screw M8×16	\$2.0000
GB77-85	socket head holding screw M6×16	\$2.0000
GB77-85	socket head holding screw M5×6	\$2.0000
GB923-88	blind nut M12	\$2.0000
GB 362-65	spring 50×18×3	\$3.0000
HY8310.4-1	turning handle M12×100	\$2.0000
GB819-85A	cruciform slot sunk screw M3×8	\$2.0000

GB78-85	socket head taper holding screw M8×10	\$2.0000
	sizing block	\$3.0000
	industrial caster	\$12.0000
	lock	\$5.0000
	hinge	\$5.0000
	scutcheon	\$18.0000
<b>total</b>		

part number	description & specification	unit price
195 L 050	L-type timing belt	\$15.0000
GB/T 1096-1979	key 6×45	\$2.0000
GB/T 1096-1979	key 6×20	\$2.0000
GB/T 1096-1979	key 6×10	\$2.0000
GB/T 276-94	rolling bearing 61800	\$6.0000
GB/T 276-94	bearing 6001	\$6.0000
GB/T 276-94	rolling bearing 61901	\$6.0000
GB/T 276-94	bearing 6302	\$6.0000
GB/T 5781-2000	bolt M8×25	\$2.0000
GB/T 70.3-2000	socket head sunk screw M5×16	\$2.0000
GB/T 70.3-2000	socket head sunk screw M5×12	\$2.0000
GB/T1096-79	key A-type 4×8	\$2.0000
GB/T290-88	drawn cup needle roller bearing HK1614PS	\$6.0000
GB/T290-88	drawn cup needle roller bearing HK1616	\$6.0000
GB/T297-94	conical roller bearing 32008	\$25.0000
GB/T70.3-2000	socket head screw M6×20	\$2.0000
GB/T894.1-86	circlip for shaft 36	\$2.0000
GB1155-74	oil cup 6	\$2.0000
GB1171-96	texrope Z-750	\$12.0000
GB1171-96	texrope 3L-240	\$12.0000
GB1171-96	texrope 3L-250	\$12.0000
GB117-86	taper pin 4×26	\$2.0000
GB118-86	internal thread taper pin 8×40	\$2.0000
GB13871-92	reinforced seal 45×62×12	\$5.0000
GB2089-80	compression spring 2×20×30	\$5.0000
GB2089-80	compression spring 0.8×6×10	\$5.0000
GB2089-80	compression spring 2×18×30	\$5.0000
GB2089-80	compression spring 0.8×6×50	\$5.0000
GB4605-84	thrust washer AS1226	\$4.0000
GB4605-84	thrust washer AS1628	\$4.0000
GB6170-85	hex nut M24	\$3.0000
GB6170-86	hex nut M12	\$2.0000
GB6170-86	hex nut M6	\$2.0000



GB6170-86	hex nut M10	\$2.0000
GB6170-86	hex nut M8	\$2.0000
GB6177-85	blueing hex nut M12	\$2.0000
GB810□ 88	round nut 16×1.5	\$2.0000
GB70-85	socket head screw M5×20	\$2.0000
GB70-85	socket head screw M8×40	\$2.0000
GB70-85	socket head screw M5×10	\$2.0000
GB70-85	socket head screw M6×12	\$2.0000
GB70-85	socket head screw M8×30	\$2.0000
GB70-85	socket head screw M5×16	\$2.0000
GB70-85	socket head screw M8×25	\$2.0000
GB70-85	socket head screw M6×20	\$2.0000
GB70-85	socket head screw M5×8	\$2.0000
GB70-85	socket head screw M8×16	\$2.0000
GB70-85	socket head screw M10×35	\$2.0000
GB70-85	socket head screw M10×40	\$2.0000
GB71-85	holding screw M4×8	\$2.0000
GB77-85	socket head holding screw M6×16	\$2.0000
GB77-85	socket head flat holding screw M24×20	\$2.0000
GB78-85	socket head holding screw M5×5	\$2.0000
GB79-85	socket head screw M8×10	\$2.0000
GB79-85	socket head holding screw M8×16	\$2.0000
GB818-85	cruciform slot screw M4×8	\$2.0000
GB876-86	hollow rivet 3×6	\$2.0000
GB893.1-86	circlip for hole 43	\$2.0000
GB894.1-86	circlip for shaft 12	\$2.0000
GB894.1-86	circlip for shaft 10	\$2.0000
GB896-86	split washer 9	\$2.0000
GB93-87	grower washer 12	\$2.0000
GB95-85	washer 12	\$2.0000
GB95-85	washer 5	\$2.0000
GB96-85	big washer 8	\$2.0000
GB97.1-85	washer 10	\$2.0000
GB97.1-85	washer 8	\$2.0000

GBT297-94	conical roller bearing 32007	\$25.0000
GBT304.1-88	rod end ball bearing SQ8- PS	\$6.0000
JB/ZQ4450-97	hex plug screw M10×1	\$2.0000
JB/ZQ4450-97	hex plug screw M16×1.5	\$2.0000
	lock	\$2.0000
	steel ball 6	\$2.0000
<b>total</b>		

part number	description & specification	unit price
GB/T1096-79	key 5×26	\$2.0000
GB/T1096-79	key 5×40	\$2.0000
GB/T290-98	drawn cup needle roller bearing HK1210	\$6.0000
GB/T290-98	drawn cup needle roller bearing HK1712	\$6.0000
GB/T290-98	drawn cup needle roller bearing HK1514	\$6.0000
GB/T290-98	drawn cup needle roller bearing HK253220	\$6.0000
GB/T301-95	thrust collar bearing 51102	\$6.0000
GB/T304-88	oscillating bearing SASE	\$6.0000
GB/T70.3-2000	socket head sunk screw M4×12	\$2.0000
GB/T77-2000	socket head flat holding screw M5×5	\$2.0000
GB1096-79	key 5×14	\$2.0000
GB117-86	taper pin 5×50	\$2.0000
GB2089-80	compression spring 0.8×5×25	\$3.0000
GB308-84	steel ball φ6	\$2.0000
GB4141.19-84	position handle base 12×50	\$6.0000
GB4605-84	thrust washer AXK2542+AS2542	\$6.0000
GB4605-84	thrust washer AXK1226+AS1226	\$6.0000
GB/T889.1-2000	non metal insert nut M8	\$2.0000
GB/T889.1-2000	non metal insert nut M10	\$2.0000
GB6172-86	hex thin nut M25×1.5	\$2.0000
GB70-85	socket head screw M5×14	\$2.0000
GB70-85	socket head screw M5×10	\$2.0000
GB70-85	socket head screw M3×10	\$2.0000
GB95-88	washer 5	\$2.0000
GB95-88	washer 8	\$2.0000
GB95-88	washer 10	\$2.0000
GB95-88	washer 12	\$2.0000
GB96-88	big washer 5	\$2.0000
HY8310.4-1	long handle M12×100	\$6.0000
JB/T7273.3-94	handwheel B14×160(HY8313.3)	\$8.0000
<b>total</b>		

part number	description & specification	unit price
GB/T 276-94	deep groove ball bearing 6008	\$25.0000
GB/T 276-94	deep groove ball bearing 6004	\$25.0000
GB/T 290-88	drawn cup needle roller bearing HK1210	\$6.0000
GB/T 297-94	conical roller bearing 32007	\$25.0000
GB/T 297-94	conical roller bearing 32006	\$25.0000
GB/T 301-1995	ball thrust bearing 51104	\$6.0000
GB4605-84	thrust washer 1226	\$6.0000
GB/T1096-79	key 5×12	\$2.0000
GB/T1096-1979	key 6×56	\$2.0000
GB1171-84	texrope 3L-290	\$12.0000
GB1174-86	texrope Z800	\$12.0000
GB118-86	inner thread taper pin 6×20	\$2.0000
GB119-86	straight pin 3×10	\$2.0000
GB119-86	straight pin 3×17	\$2.0000
GB2089-86	compression spring $\phi 1 \times \phi 14 \times 16$	\$3.0000
GB2089-86	compression spring $\phi 1 \times \phi 8 \times 38$	\$3.0000
GB/T70.3-2000	socket head sunk screw M4×12	\$2.0000
GB5783-86	hex bolt M6×45	\$2.0000
GB5783-86	hex bolt M10×25	\$2.0000
GB5780-86	hex bolt M10×40	\$2.0000
GB5783-86	hex bolt M12×55	\$2.0000
GB6170-88	hex nut M4	\$2.0000
GB6170-86	hex nut M6	\$2.0000
GB6170-88	hex nut M8	\$2.0000
GB6170-88	hex nut M10	\$2.0000
GB70-85	socket head screw M4×6	\$2.0000
GB70-85	socket head screw M5×10	\$2.0000
GB70-85	socket head screw M5×16	\$2.0000
GB70-85	socket head screw M5×20	\$2.0000
GB70-85	socket head screw M6×20	\$2.0000
GB70-85	socket head screw M8×25	\$2.0000
GB70-85	socket head screw M10×35	\$2.0000
GB810-88	round nut M14×1.5	\$2.0000

GB810-88	round nut M16×1.5	\$2.0000
GB810-88	round nut M18×1.5	\$2.0000
GB810-88	round nut M22×1.5	\$2.0000
GB810-88	round nut M30×1.5	\$2.0000
GB819-85	cruciform slot screw M5×10	\$2.0000
GB858-86	washer for round nut	\$2.0000
GB893.1-88	circlip for hole 42	\$2.0000
GB894.1-88	circlip for shaft 40	\$2.0000
GB93-86	elastic washer 8	\$2.0000
GB95-88	washer 5	\$2.0000
GB95-88	washer 6	\$2.0000
GB95-88	washer 8	\$2.0000
GB95-88	washer 10	\$2.0000
GB95-88	washer 12	\$2.0000
HY8310.3	straight handle B-M10×100	\$6.0000
HY8314.21-1	pylome triangle handle M10×63	\$6.0000
SI10E M10	inner thread bearing	\$12.0000
	handle 160	\$6.0000
<b>total</b>		

part number	description & specification	unit price
GB70-85	socket head screw M5×8	\$2.0000
GB70-85	socket head screw M8×25	\$2.0000
GB70-85	socket head screw M10×90	\$2.0000
GB78-85	socket head taper holding screw M5×8	\$2.0000
GB78-85	socket head taper holding screw M6×16	\$2.0000
GB78-85	socket head taper holding screw M8×50	\$2.0000
GB70-85	socket head screw M6×16	\$2.0000
GB97.1-85	washer 6	\$2.0000
GB97.1-85	washer 8	\$2.0000
GB97.1-85	washer 10	\$2.0000
GB96-85	big washer 8	\$2.0000
GB6170-86	hex nut M6	\$2.0000
GB6170-86	hex nut M8	\$2.0000
GB6170-86	hex nut M10	\$2.0000
GB5781-86	hex bolt M8×35	\$2.0000
GB1096-79	key 4×20	\$2.0000
GB1155-74	oil cup 6	\$2.0000
GB 117-86	taper pin 5×18	\$2.0000
GB 6170-86	hex nut M12	\$2.0000
GB 6170-86	hex nut M8	\$2.0000
GB95-85	washer 8	\$2.0000
GB95-85	washer 5	\$2.0000
GB/T 117-86	taper pin 5×26	\$2.0000
GB/T 15389-1994	lead screw M5×45	\$5.0000
GB/T 301-1995	rolling bearing 51102	\$12.0000
GB/T889.1-2000	hex nut M5	\$2.0000
GB1096-79	key 5×18	\$2.0000
GB1155-70	oil cup 6	\$2.0000
GB117-86	pin 3×26	\$2.0000
GB70-85	socket head screw M5×25	\$2.0000
GB70-85	socket head screw M6×20	\$2.0000
GB70-85	socket head screw M8×25	\$2.0000
GB70-85	socket head screw M6×14	\$2.0000

GB70-85	socket head screw M5×10	\$2.0000
GB70-85	socket head screw M8×16	\$2.0000
GB70-85	socket head screw M5×30	\$2.0000
GB73-85	slotted screw M3×5	\$2.0000
GB77-85	socket head screw M5×6	\$2.0000
GB78-85	socket head screw M8×25	\$2.0000
GB78-85	socket head screw M8×50	\$2.0000
HY8314.21-1	triangle handle M10×63	\$12.0000
HY8313.3	handwheel 12X100	\$12.0000
HY8310.4-1	transmitt handle 6X50	\$6.0000
	column bearing	\$8.0000
<b>total</b>		

part number	description & specification	unit price
GB4141.1-84	handle B-8×63	\$6.0000
GB4141.19-84	position handle base	\$12.0000
GB4141.22-84	handwheel B-12×100	\$8.0000
GB70-85	socket head screw M8×25	\$2.0000
GB70-85	socket head screw M5×16	\$2.0000
GB70-85	socket head screw M5×14	\$2.0000
GB77-85	socket head screw M3×4	\$2.0000
GB77-85	socket head screw M6×16	\$2.0000
GB77-85	socket head screw M5×10	\$2.0000
GB78-85	socket head screw M5×4	\$2.0000
GB78-85	socket head screw M5×20	\$2.0000
GB79-85	socket head screw M6×16	\$2.0000
GB/T889.1-2000	cap nut M12	\$2.0000
GB 1096-79	key 6×45	\$2.0000
GB 1096-79	key 5×10	\$2.0000
GB 1096-79	key 5×10	\$2.0000
GB 1096-79	key 5×25	\$2.0000
GB 117-86	taper pin 5×18	\$2.0000
GB 117-86	straight pin 5×50	\$2.0000
GB 6170-86	nut M6	\$2.0000
GB 95-85	washer 8	\$2.0000
GB/T 290-98	drawn cup needle roller bearing HK1214	\$6.0000
GB/T 290-98	rolling bearing HKH1214	\$25.0000
GB/T 301-1995	rolling bearing 51102	\$12.0000
GB/T 867-1986	rivet 2X3	\$2.0000
GB/T 95-85	washer 10	\$2.0000
GB/T4605-84	needle roller thrust bearing AYK+AS1226	\$6.0000
GB/T70.3-2000	socket head screw M4×8	\$2.0000
GB/T70.3-2000	socket head screw M5×16	\$2.0000
GB/T70.3-2000	socket head screw M6×16	\$2.0000
GB/T70.3-2000	socket head screw M5×12	\$2.0000
GB1096-79	key 5×18	\$2.0000
GB1155-74	oil cup 6	\$2.0000



GB2089-80	compression spring 0.8×5×25	\$3.0000
GB308-77	steel ball 6	\$2.0000
GB/T70.3-2000	socket head screw M10X35	\$2.0000
GB 95-85	washer M10	\$2.0000
GB 95-85	washer M14	\$2.0000
GB6170-86	hex nut M10	\$2.0000
GB/T70.3-2000	socket head screw M5X8	\$2.0000
GB/T70.3-2000	socket head screw M10X30	\$2.0000
GB/T70.3-2000	socket head screw M5X8	\$2.0000
GB6170-86	hex thin nut M10	\$2.0000
GB6170-86	hex thin nut M5	\$2.0000
GB/T70.3-2000	socket head screw M10X50	\$2.0000
GB/T70.3-2000	socket head screw M8X25	\$2.0000
GB/T70.3-2000	socket head screw M6X8	\$2.0000
GB/T70.3-2000	socket head screw M6X16	\$2.0000
GB 95-85	washer M6	\$2.0000
GB6170-86	hex nut M6	\$2.0000
<b>total</b>		

<b>part number</b>	<b>description</b>	<b>unit price</b>
electric appliance	single phase motor	\$150.0000
	combined switch	\$60.0000
	lighter	\$2.0000
	sleeve line (US type)	\$12.0000
	upper motor sleeve line	\$12.0000
	lower motor sleeve line	\$12.0000
	tie line	\$2.0000
	tie line	\$2.0000
	tie line	\$2.0000
	U-type wire connecting terminal	\$2.0000
	U-type wire connecting terminal	\$2.0000
	O-type wire connecting terminal	\$2.0000
	jugged line tube	\$2.0000
	ribbon	\$2.0000
	binding wire	\$2.0000
	tube union	\$2.0000
	single-side nylon stationary pipe cl	\$2.0000
	pyrocondensation tube	\$2.0000
	connection bobbin	\$2.0000
GB2673-86A	socket head sunk screw	\$2.0000
GB70-85B	socket head screw	\$2.0000
GB2673-86A	socket head screw	\$2.0000
GB70-85B	socket head screw	\$2.0000
GB6170-86	hex nut	\$2.0000
GB6170-86	hex nut	\$2.0000
GB96-85	washer	\$2.0000
GB96-85	washer	\$2.0000
GB70-85B	socket head screw	\$2.0000
GB70-85B	socket head screw	\$2.0000
GB70-85B	socket head screw	\$2.0000
GB/T95-1985	washer	\$2.0000
GB835-88	mill headed flat screw	\$2.0000
GB6170-86	hex nut	\$2.0000
GB6170-86	hex nut	\$2.0000
<b>total</b>		

<b>part number</b>	<b>description</b>	<b>amount</b>
accessories	outsourcing rest	\$140.0000
	follow rest body	\$45.0000
	spiral chuck	\$150.0000
	drill chuck	\$15.0000
	joint rod	\$15.0000
	lengthen drill holder	\$20.0000
	kicking sleeve 3/4	\$18.0000
	drill extension rod	\$12.0000
	regular centre	\$12.0000
	regular centre	\$12.0000
	push type broach wrench	\$2.0000
	right avertence turning tool	\$6.9500
	left avertence turning tool	\$6.9500
	screw cutting tool	\$6.9500
	parting tool	\$4.9500
	slot miller	\$6.9500
	slot miller	\$6.9500
	slot miller	\$6.9500
	combination wrenches	\$20.0000
	inner hexagon spanner	\$10.0000
	R8 expansion chuck □ 3/8 □	\$16.0000
	bench clamp	\$150.0000
GB70-85	socket cap screw	\$4.0000
GB77-85	socket head flat holding screw	\$4.0000
GB79-85	socket head holding screw	\$4.0000
GB97.1-85	washer	\$4.0000
GB6170-86	hex nut	\$4.0000
<b>total</b>		