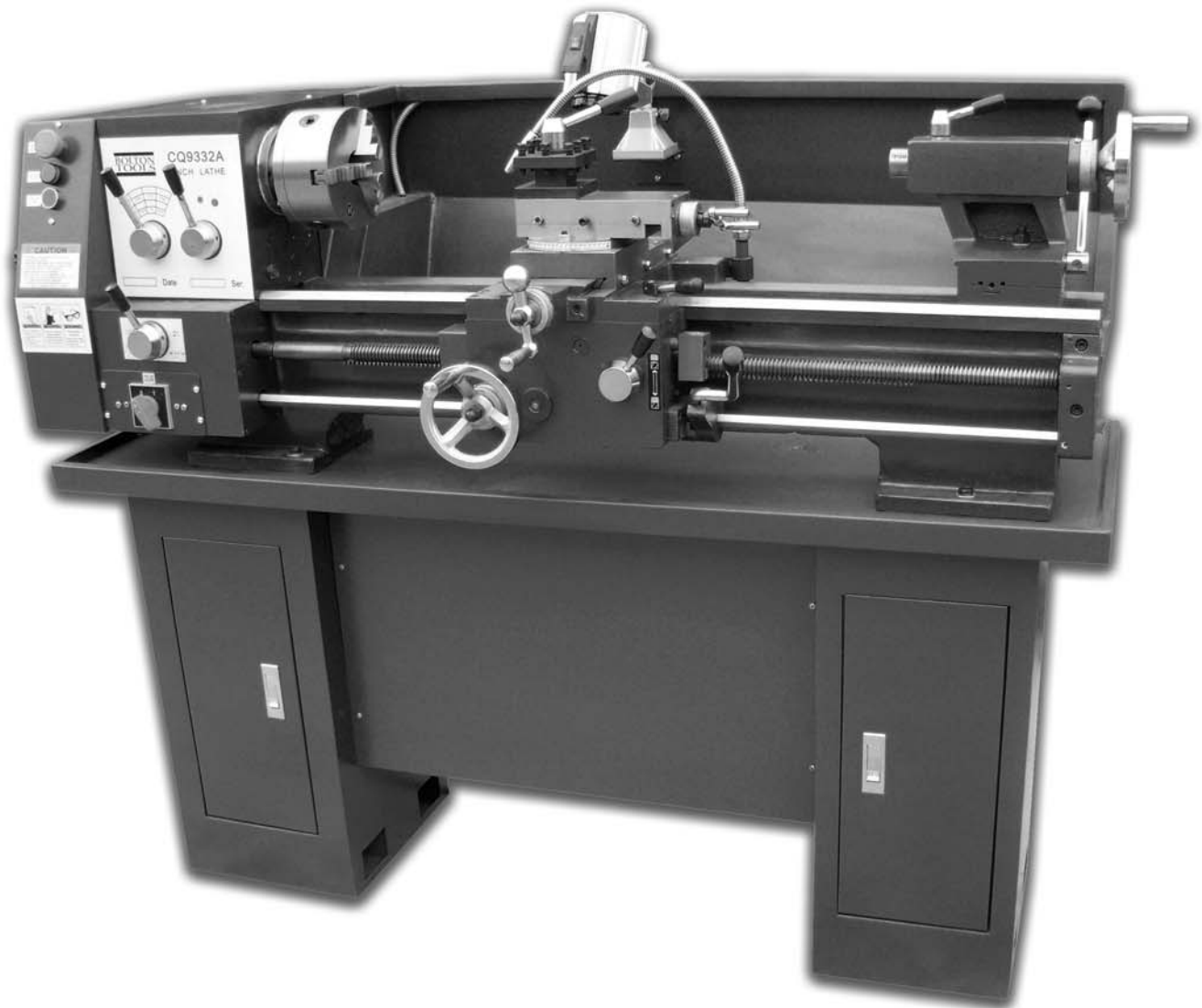


# BOLTON TOOLS

## MODEL AT320 OPERATION MANUAL



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# **WARNING!**

**This manual provides critical safety instructions on the proper setup, operation, maintenance and service of this machine/equipment. Failure to read, understand and follow the instructions given in this manual may result in serious personal injury, including amputation, electrocution or death.**

**The owner of this machine/equipment is solely responsible for its safe use. This responsibility includes but is not limited to proper installation in a safe environment, personnel training and usage authorization, proper inspection and maintenance, manual availability and comprehension, application of safety devices, blade/cutter integrity, and the usage of personal protective equipment.**

**The manufacturer will not be held liable for injury or property damage from negligence, improper training, machine modifications or misuse.**

**some dust created by power sanding, sawing, grinding, drilling, and other construction activities contains chemicals known to the State of California to cause cancer, birth defects or other reproductive harm. Some examples of these chemicals are:**

- **Lead from lead-based paints.**
- **Crystalline silica from bricks, cement and other masonry products.**
- **Arsenic and chromium from chemically-treated lumber.**

**Your risk from these exposures varies, depending on how often you Do this type of work. To reduce your exposure to these chemicals: Work in a well ventilated area, and work with approved safety equipment, such as those dust masks that are specially designed to filter out microscopic particles.**

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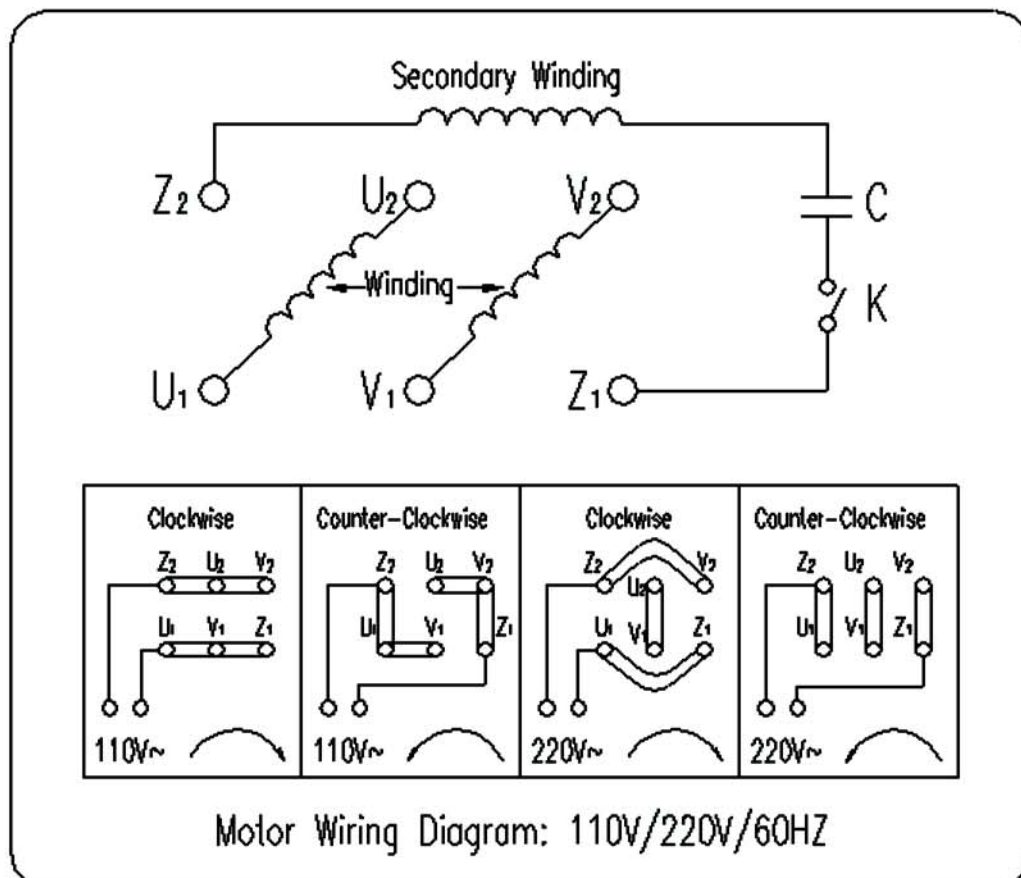
# WARNING!

Connection is 110v/60hz for this machine in factory

When customers need access to 220V power supply, **PLEASE TURN OFF THE POWER OF THE MACHINE,**  
**A):** open the plate on electrical box behind of the lathe head, find the control transformer (JBK5-63), the power transformer input are two ways: code 12 and code 11 for the 110V power input, the code 12 and code 10 for the 220V power supply Enter, please removed on the code 11th line, access code 10 side;

**B):** respective dismount the junction box of the lathe spindle motor, according to the electrical wiring diagram, and access to 220V power supply wire terminals.

110V/220V Motor



# Machine Data Sheet

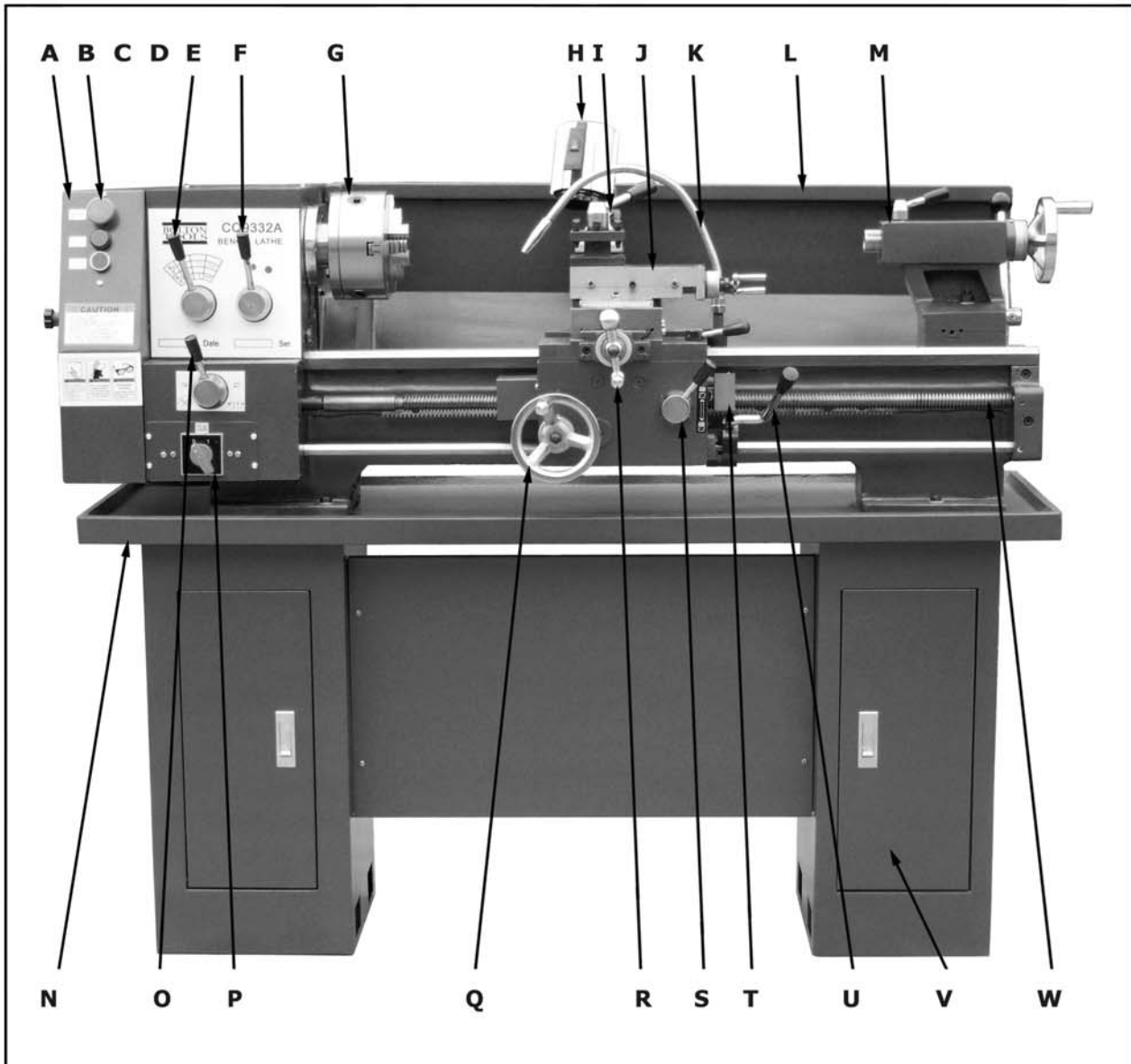
<b>Lathe Information</b>	Spindle Bore	1-1/2"
	Lathe Spindle Taper	MT#5
	Tailstock Taper	MT#3
	Tailstock Barrel Travel	3-5/16"
	Number of Lathe Speeds	12
	Lathe Speeds	75, 110, 140, 200, 240, 350, 420, 600, 720, 1050, 1250, 1900 RPM
	Cross Slide Travel	6-1/4"
	Thread Range (inches)	28 @ 5-48 TPI
	Thread Range (metric)	21 @ 0.45-6.0 mm
	Lathe Swing Over Bed	12-1/2"
	Distance Between Centers	29"

<b>Motors</b>		Lathe Motor
	Type	TEFC Capacitor Start Induction
	Horsepower	1-1/2 HP
	Voltage	220V or 110V
	Phase	Single
	Amps	220V/8A, 110V/15A
	Speed	1725 RPM
	Cycle	60 Hz
	Power Transfer	V-Belt Drive
	Bearings	Shielded and Lubricated

<b>Electrical</b>	Lathe Power Switch	Emergency Push-button Kill Switch w/Manual Reset
	Control Voltage	24VAC
	Cord Length	4 ft.
	Cord Gauge	14 gauge
	Recommended Breaker Size	30A

<b>Product Dimensions</b>	Approximate Net Weight	710 lbs
	Overall Dimensions	62" Wide x 32" Deep x 57" Tall
	Footprint	24-3/5" Deep x 45-1/4" Wide
	Approximate Shipping Weight	840 lbs

# IDENTIFICATION



- A.** Change Gear Box
- B.** Lathe Emergency Stop Button
- C.** Power Lamp
- D.** Start
- E.** Spindle Speed Lever
- F.** Spindle Range Lever
- G.** 3-Jaw Chuck
- H.** Work Lamp
- I.** Four-Way tool Post
- J.** Compound Rest
- K.** Coolant
- L.** Back Splach

- M.** Tailstock
- N.** Chiip Tray
- O.** Lead Screw Direction Lever
- P.** Coolant Switch
- Q.** Manual Feed Handwheel
- R.** Cross Slide Handle
- S.** Half Nut Lever
- T.** Thread Dail
- U.** Spindle ON/OFF Rotation Lever
- V.** Storage Cabinet
- W.** Lead Screw

# **WARNING !**

**For you own safety, read instruction manual be for operating this machine.**

**As with all machinery, there are certain hazards involved with their operation and use. Exercising respect and caution will considerably lessen the risk of personal injury. However, if normal safety precautions are overlooked or ignored, personal injury to the operator or damage to machinery may result.**

## **Safety Precautions**

- **Keep balance of the machine when lifting in case of the danger of overturn caused by the unbalanced lifting., Only when the machine is fixed firmly, can you use it, or danger will be resulted from vibration.**
- **Users must check and make sure that the power source is right for the machine before operation and with reliable neutral wire, or the operator will suffer the danger from touching the electricity.**
- **This machine isn't equipped with illuminant apparatus. Users must mount it themselves. The mounted illuminator must not generate too strong light, flash light or shadow.**
- **Do not use the machine in bad surroundings, do not put the machine at damp or wet place or expose it to rain. The working place should be dry. Or the machine will be eroded or suffer from leak of circuit.**
- **Non-operators should keep a safety distance from the working area in case of being hurt by the flying piece.**
- **Operators should wear safety glasses in case of being hurt by the iron piece.**
- **Don't put things is the upper pocket. Don't wear things like necklace .Don't put tools and gauges ready to use in wrong place.**
- **Operators should wear work clothes and not with gloves on. Long hair must be bound up to avoid possible dangers of being wound by the running parts.**
- **Stepping-things for the operator must be able to guard against slide. Operators should keep balance of their bodies and not incline bodies or stretch arms too much.**
- **Do not process work pieces exceeding the designed range with the machine.**
- **Work pieces or cutting tools must be fixed firmly and correctly. Spanners or keys must be removed from chucks or drill chucks after the fixation. Operators should be accustomed to check and ensure that the spanners or keys have been removed already before operation.**
- **When operation users should adopt suitable tools, and work pieces must be fixed firmly and never be touched.**
- **Only when the machine is stopped, can you change cutting tools or maintain it.**
- **Operators can never leave the running machine. Only when the machine is stopped and chucks or drill chucks are thoroughly stopped, can they leave.**
- **If any abnormal noise or any other abnormal situation appears during operation, stop the machine immediately and repair it.**
- **Please guard against any other possible dangers.**

 **WARNING!**

## **Additional Safety Rules For This Machine**

**This machine must not be modified for any purpose other than that for which it designed.**

- **You should not operate this machine unless you are thoroughly familiar with metal turning lathes and turning techniques. If there is any doubt whatsoever, you should consult a qualified person.**
- **Do not operate the machine until it is completely assembled, and this entire manual, has been read and understood.**
- **Ensure the proper electrical regulations are followed, and that the machine is properly earthed.**
- **Ensure all chuck keys, spanners and removed from the machine.**
- **Examine the setup carefully, ensuring that nothing could possibly interfere with the rotating workpiece.**
- **Ensure the tool post is secure and cutting tool is adjusted to the correct height.**
- **Ensure your clothing is properly adjusted.**
- **Ensure the workpiece is properly secured.**
- **Make all adjustments with the power off**
- **Always cut at speed for the size and type of material being worked.(refer to a suitable turning manual for cutting speeds.)**
- **When you have finished with machine, always remove and store the cutting tools.**
- **When using a coolant, on no account must suds be allowed to enter the electrical system.**



## Glossary of Terms

The following is a list of common definitions, terms and phrases used throughout this manual as they relate to this lathe/mill and metalworking in general. Become familiar with these terms for assembling, adjusting or operating this machine. Your safety is VERY important to us at Bolton Tools!

**Arbor:** A machine shaft that supports a cutting tool.

**Backlash:** Wear in a screw or gear mechanism that may result in slippage, vibration, and loss of tolerance.

**Collet:** A conical shaped split-sleeve bushing which holds round or rectangular tool and/or work pieces by their outside diameter.

**Cross Slide:** A fixture attached to the lathe carriage that holds the compound rest and can be moved in and out.

**Cutting Speed:** The distance a point on a cutter moves in one minute, expressed in meters or feet per minute.

**Dial Indicator:** An instrument used in setup and inspection work that shows on a dial the amount of error in size or alignment of a part.

**Dividing Head:** A milling machine accessory used to divide a circular object into a number of equal parts.

**Down Milling or Climb Milling:** Feeding the workpiece in the same direction as the cutter rotation.

**End Mill:** A cutter with cutting surfaces on both its circumference and end.

**Facing:** In lathe work, cutting across the end of a workpiece, usually to machine a flat surface.

**Feed:** The movement of a cutting tool into a workpiece.

**Fixture:** A device that securely holds the workpiece in place during cutting operation as opposed to a Jig which is used to hold and guide a workpiece through an operation.

**Gib:** A tapered wedge located along a sliding Member to take up wear or to ensure a proper fit.

**Headstock:** The major lathe component that houses the spindle and motor drive system to turn the workpiece.

**Lathe Center:** A lathe accessory with a 60° Point which is inserted into the headstock or tailstock of the lathe and is used to support the workpiece.

**Leadscrew:** Lathe—The long screw that is driven by the end gears and supplies power to the carriage. Mill—The screws that move the table in longitudinal, transverse, or vertical directions.

**Spindle:** The revolving shaft that holds and drives the workpiece or cutting tool.

**Tailstock:** A moveable fixture opposite of the headstock on a lathe that has a spindle used to support one end of a workpiece and for holding tools.

**Tool Post:** The part of the compound rest that holds the tool holder.

**Turret:** Lathe—A machine fixture that holds multiple tools and can be revolved and indexed to position. Mill—The part of a mill which rotates on the column and can be set to a specific degree.

**Ways:** The precision machined and flat tracks on a lathe or mill on which the carriage, tailstock, and the mill table and knee slide.

**220v -110v Single -Phase**

**Amperage**

This machine under maximum load.

Both motor operating 7.1/14.3Amps

We recommend connecting your machine to a dedicated and grounded circuit that is rated for the amperage given below. Never replace a circuit breaker on an existing circuit with one of higher amperage without consulting a qualified electrician to ensure compliance with wiring codes.

220V circuit 10 Amps  
 110V circuit 20 Amps

**Plug (fig1)**

**Grounding**

This machine dedicated and grounded circuit that is rated for the amperage given below. Ensure compliance with wiring codes, without consulting a qualified electrician DO NOT replace a circuit breaker on an existing circuit . All electrical connections must be made in accordance with local codes and ordinances. All electrical connections must be properly installed and grounded.

In the event of an electrical short, grounding reduces the risk of electric shock.

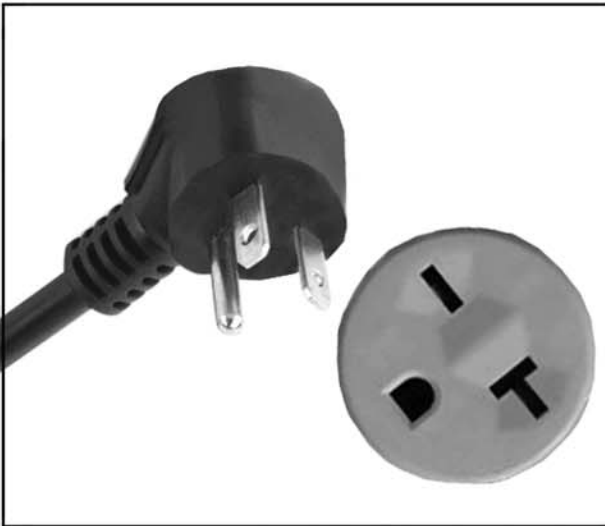
**Extension**

Do not use of extension cords. and arrange properly the placement and install wiring to avoid extension.

If this is very absolutely necessary which use an extension cord at 220v with machine;

The cord is at least a 12 gauge that is no exceed 50 feet, which must contain a ground wire and plug pin.

A qualified electrician must size cords over 50 feet long to prevent motor damage.

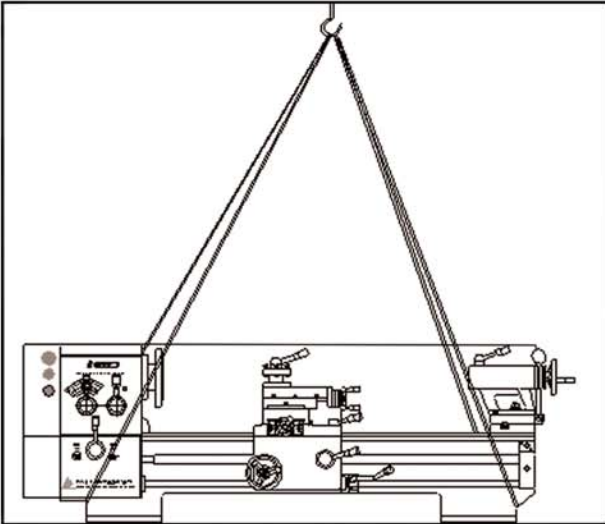


**Figure 1.** Plug and Receptacle.



**Figure 2:** Power lamp and emergency stop location.

## SECTION 2 : LIFTING & INSTALLATION -



**Figure 3.** Lifting strap locations.

It is recommended to use the lifting method in **figure 3**. If a forklift is available, it can also be used to lift the machine. When the machine is lifted and installed, you should make it level in case of turnover causing possible danger. The drilling and milling head can't be turned at 180° in case of losing balance.

Please assembly referring to figure Use to level the guide way and the small slide. Fix the machine in the base with bolts.

Prepare the machine location, and install or prepare holes for any floor mounting fasteners.

Use fork lift or 2-ton hoist to operator or 1ton lifting straps and hooks.

Unbolt the crate sides and remove the top and side.

Insert two lifting straps under the bedways and behind the feed rod and the lead screw as shown in fig to balance the load.

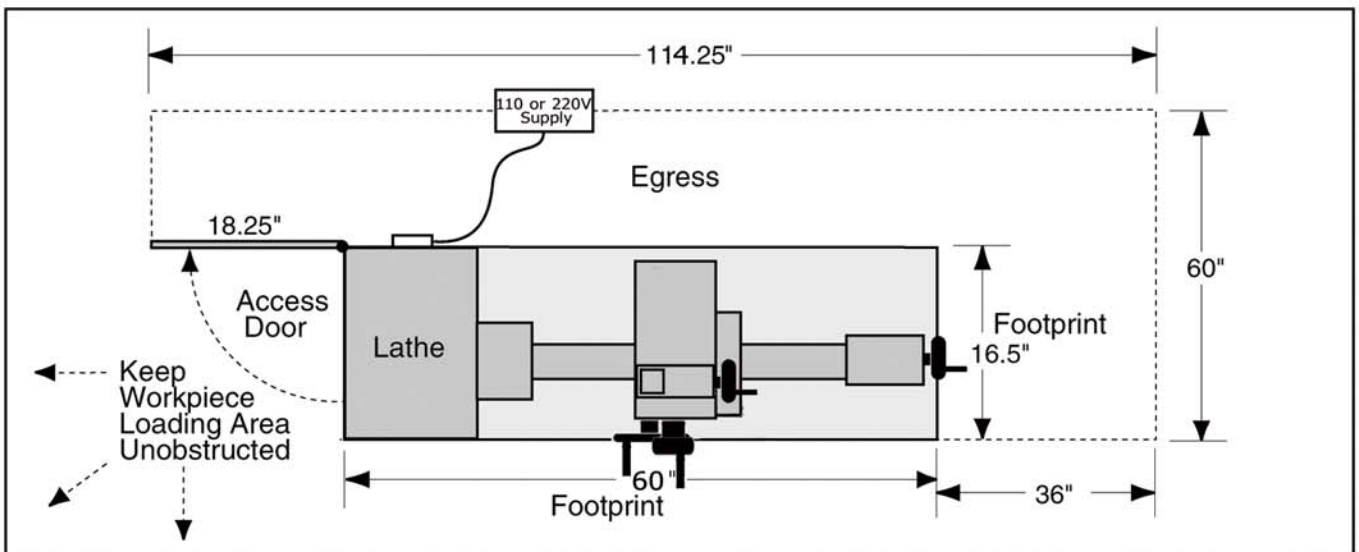
Unbolt the machine from the pallet.

Slowly raise the machine off the pallet and carefully move the machine to prepare location.

With the machine securely resting on the floor, shim between the floor and cabinet base as required to make the ways level at four corner locations as indicated with a machinist's level.

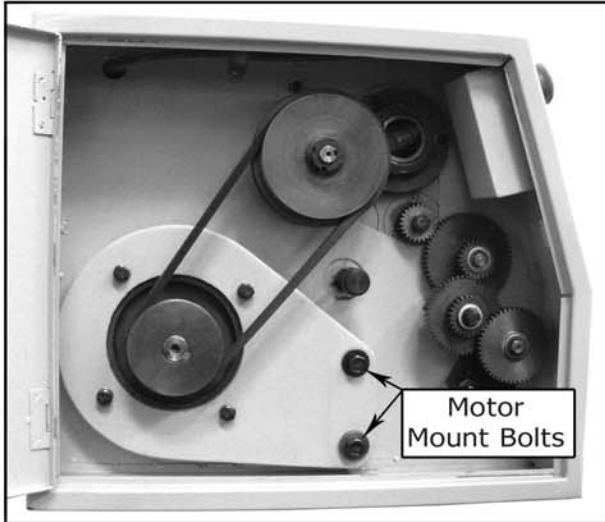
Secure the machine to the floor, but do not over tighten the fasteners.

Recheck the ways to make sure the ways are still level, and re-shim as required.

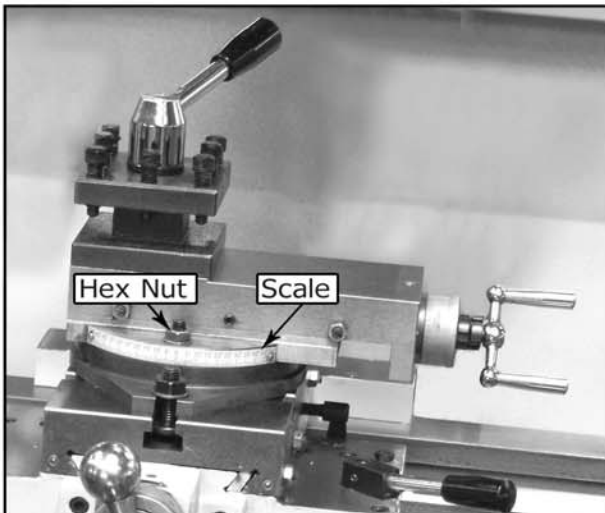


**Figure 4:** Minimum wall clearances.

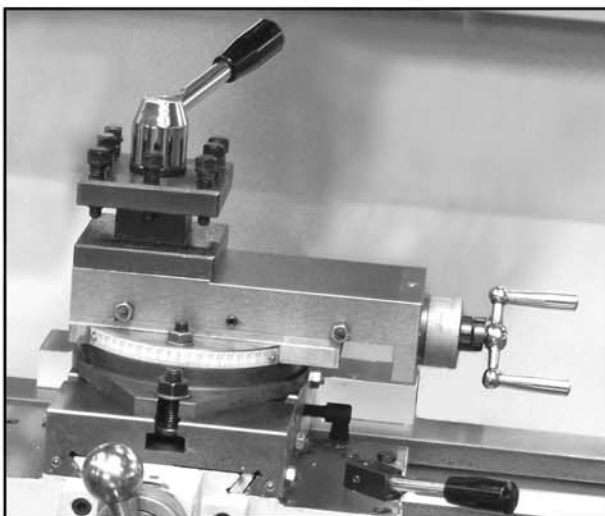
## Belt Adjustment or Replacement



**Figure 5.** Motor mount bolts.



**Figure 6:** Compound rest, scale, and handwheel.



**Figure 7:** Four-Way Tool Post

DISCONNECT POWER TO THE LATHE/MILL!

1. Open the change gear door(FIGURE5 )
2. Using a 17mm wrench, loosen the two motor out bolts shown in Figure 5.
3. Grasp the motor and lift upward to de-tension the belt and remove the belt.
4. Use solvent to clean the pulleys of oil and install the new belt.
5. the table shows the various combinations of belt setting(letters and numbers)to achieve the desired speed.
6. let the motor hang to tension the belt, and tighten the two motor mount bolts.
7. close the door and latch it shut.

## Using the Compound Rest and the Tool post

The compound rest is used to cut tapers on parts or to set the proper infeed angle when threading. It may also be used to cut specific lengths longitudinally, when set parallel to the spindle axis.

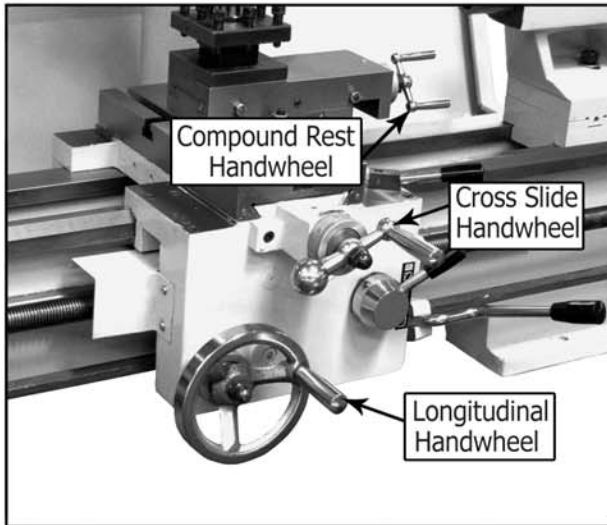
To set the angular position:

1. Loosen the hex nuts, one on each side of the compound rest (see Figure 6).
2. Rotate the compound rest to the desired angular position using the scale.
3. Tighten the two hex nuts. Be sure to not overtighten, as you may strip threads or crack or distort the base casting.

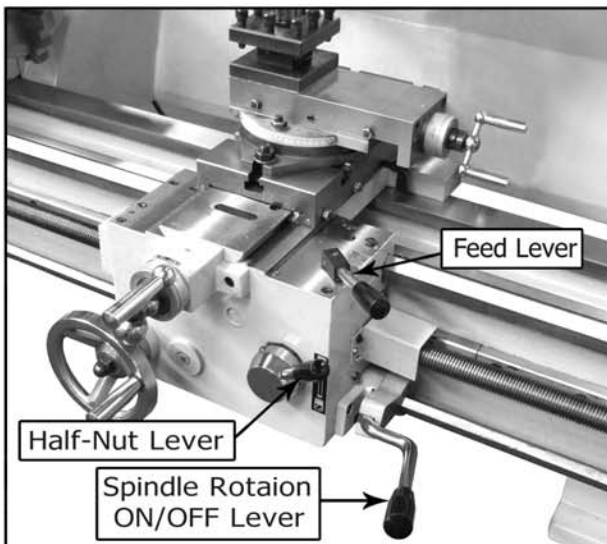
### use the tool post

This tool post (figure7) is mount on top of the compound rest , and maximum four tool to be loaded.

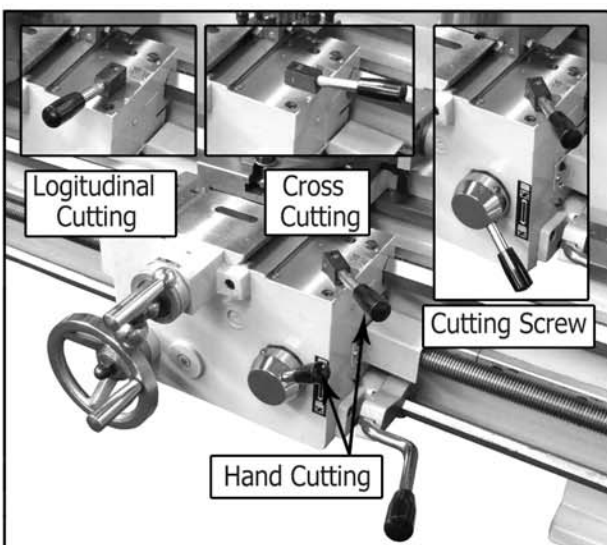
- a. when change the positions of the tool post ,first rotate the top of handle counterclockwise ,this tool post began lossed, rotate it 90° counterclockwise, and then clockwise rotate the tool post to the desired position, rotate clockwise the handle to lock the tool into position.
- b. When rotated the tool post handle by hand and slide the compound rest , must be lossed and adjust lock screw. when machine operating ,must lock the screw of compound rest.



**Figure 8 .** Carriage controls.



**Figure 9:** Compound rest, scale, and handwheel.



**Figure 10 .** Position of the Lever.

## Using the Manual Feed Handwheel

**Notice:** when using manual feed handwheel, the longitudinal and cross slide lever must be at the neutral of the position and the half is loos.

There are three handwheels by use for you can manually move the cutting tool around the lathe /mill.(Figure8)

### Longitudinal Handwheel

When move the carriage left or right along the bed, You can use the longitudinal handwheel, This control is helpful when setting up the machine for turning or when manual movement is desired during turning operations.

### Cross slide Handwheel

Turning the cross slide handwheel clockwise move the top of slide toward the workpiece, turning the dial counterclockwise move the slide away from the work.

### Compound Rest Handwheel

The compound rest handwheel mainly controls the position of the cutting tool relative to the workpiece, turning the dial move the tool post toward or away from the spindle, Adjust angle is depend on the two hex nuts on the base of the compound rest.

### use power feed handles

this machine power feed control by two handle longitudinal and cross slide lever and half nut (figure9, 10)

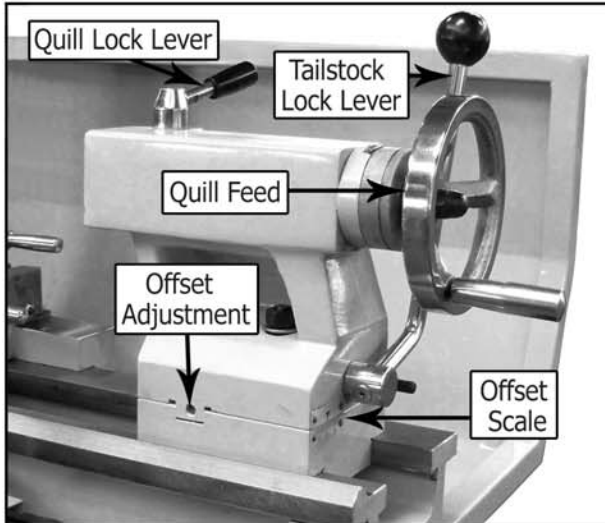
1. longitudinal and cross slide lever: this position is right top of the compound rest, the half nut is in loos before use. And by which could power feed cutting surface, hole ,face .

when longitudinal and cross slide lever in the 45° position, counter clockwise rotated 45°, for cross power feed, clockwise rotated 45° for longitudinal. before use the longitudinal and cross slide lever must be in the 45° position, and by which could cut screw.

When longitudinal and cross slide lever in the 45° position, drop down the half nut to cutting screw.

2. half nut handle :this position in the right of the apron.

## use the tailstock



**Figure 11 .** Tailstock and quill lock handles in locked position.

the tailstock can be used to support workpieces with the use of a live or dead center. the lathe can drill I or bore holes in the center of parts if use an MT3# or a drill bit on which the tailstock, can also be offset for cutting shallow tapers. it could be manual locked on the any position of the guild way .

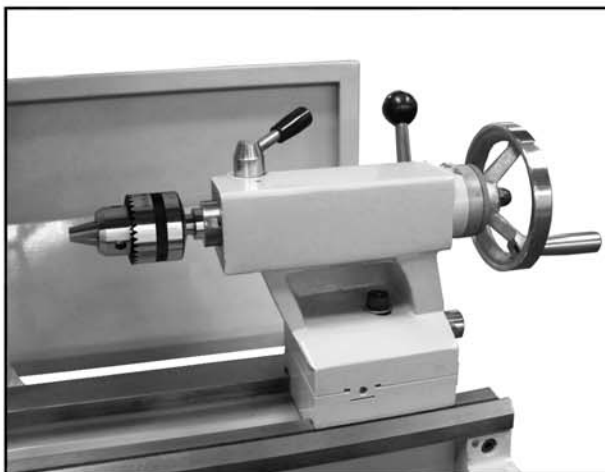
**Lock position:** first adjust the two nuts (figure11), make the two press plant of tailstock and bed can be meet to saitifed push tailstock by hand(gib is 0.5mm),rotate the lock sleeve(the two press plant is tigid each other), tailstock have been locked on the guildway of the bed. if tailstock must support more effort, turn tigid the nut on the top of bolt. by use wrench.

**Tailstock slide:** rotate lock sleeve to loose the press plant and top nut, the tailstock can be slide by hand.

Use tailstock center sleeve.

when need to move the center sleeve, Slide the tailstock to the desired positions and locked, push down counterclockwise the quill lock lever to unlock, turn the quill feed handle(wheel) to move the quill towards the spindle ,or counterclockwise to move away from the spindle. turn clockwise the quill lever to lock the center sleeve in place.

## Drilling with the Tailstock



**Figure 12:** Setting up tailstock for drilling.

To install the MT#3 drill chuck:

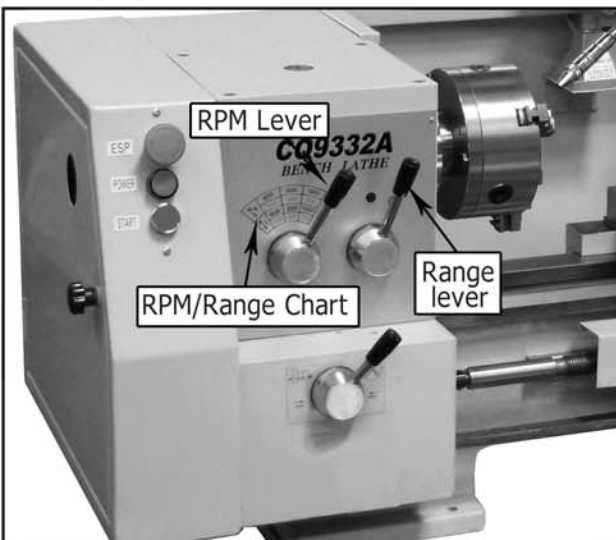
1. With the tailstock locked, unlock the quill lock lever.
2. Turn the quill feed handle clockwise to extend the quill about one inch.
3. Insert the MT#3 chuck (Figure 12) or an MT#3 tapered drill shank into the quill until the taper is firmly seated.
4. Turn the quill feed handle clockwise to feed the drill bit into a rotating workpiece.
5. To remove the chuck taper, turn the quill feed handle counterclockwise until the chuck is pushed out of the tailstock taper.

## Cutting Speeds for High Speed Steel (HSS) Cutting Tools

Workpiece Material	Cutting Speed (sfm)
Aluminum & alloys	300
Brass & Bronze	150
Copper	100
Cast Iron, soft	80
Cast Iron, hard	50
Mild Steel	90
Cast Steel	80
Alloy Steel, hard	40
Tool Steel	50
Stainless Steel	60
Titanium	50
Plastics	300-800
Wood	300-500

**Note:** For carbide cutting tools, double the cutting speed. These values are a guideline only. Refer to the *MACHINERY'S HANDBOOK* for more detailed information.

**Figure 13.** Cutting speed table for HSS cutting tools.



**Figure 14:** Spindle speed selector levers.

**Failure to follow RPM and feed rate guidelines may threaten operator safety from ejected parts or broken tools.**

## Setting the Spindle RPM

To determine and set the needed spindle **RPM** for cutting:

1. Use the table in Figure 13 to determine the cutting speed required for the workpiece material.
2. Determine the average final diameter of the workpiece in inches, for the cut to be made.
3. Now use the following formula to determine the closest RPM for the cutting operation:

$$\frac{(\text{Cutting Speed} \times 4)}{\text{Diameter of Cut}} = \text{RPM}$$

4. With the calculated RPM, decide on the closest cutting RPM to what you need.
5. Make sure the spindle is completely stopped before proceeding.
6. Move the levers (Figure 14) to get the RPM range that is closest to your calculated RPM:

— The range lever selects BLACK DOT = High or RED DOT = Low.

— The RPM Lever selects the RPM within that range.

### DISCONNECT POWER TO THE LATHE/MILL !

Your machine installed belt by two groove of pulley, there is high speed and low range, the yellow for high speed range, the red for low speed range.(figure14)

Setting high speed rang: mount the end of belt on the major diameter of motor pulley and the other end on the minor diameter of spindle pulley, and then move the levers to get the yellow rpm rang that is you need speed.

Setting low speed rang: mount the end of belt on the minor diameter of motor pulley and the other end on the major diameter of spindle pulley, and then move the levers to get the red rpm rang that is you need speed .

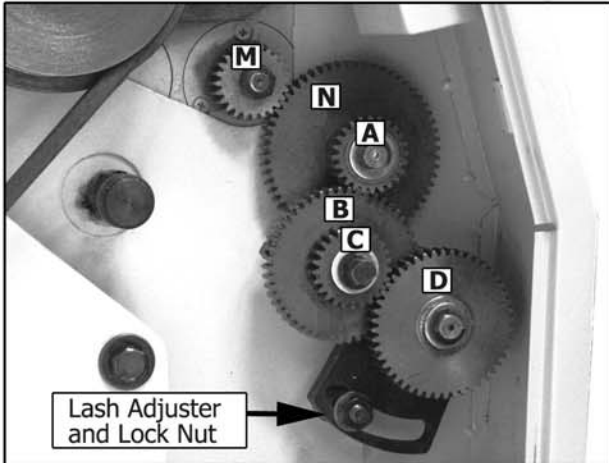
*Note: You may need to rotate the chuck by hand to get the gears to engage.*

## Setting the Power Feed Rate

**DISCONNECT POWER TO THE LATHE/MILL !**

**To set and engage the power feed**

Refer to the CHANGE GEAR LIST on page 15. to Setting parameters of feed rate and thread by combine gear. There are six gears in every group, the code is M,N,A,B,C,D., Figure for the gear installations locations that are referenced by the list. The up column of the list show FAQ feed rate, to be Suitable for cutting surface ,hole, end face.



**Figure 15.** Change gear locations

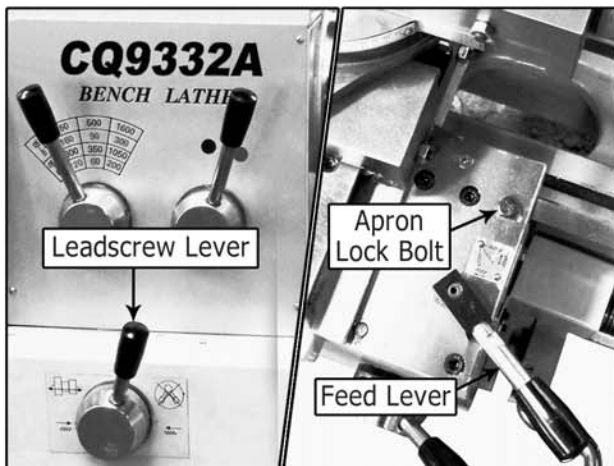
Inch Threading	Longitudinal Feed		Cross Feed	
	M=24 N=60	M=28 N=35	A B	C D
10	5	48 X 30	25 X 48	0.0040 0.0080
12	6	40 X 30	32 X 48	0.0072 0.0344
16	8	36 X 28	30 X 48	0.0130 0.0260
18	9	40 X 30	25 X 48	0.0115 0.0230
20	10	32 X 32	30 X 48	0.0103 0.0206
22	11	32 X 32	25 X 44	0.0094 0.0188
23	11.5	25 X 32	32 X 46	0.0089 0.0178
24	12	25 X 32	25 X 46	0.0086 0.0172
25	12.5	25 X 32	30 X 50	0.0082 0.0164
26	13	25 X 32	32 X 52	0.0079 0.0158
28	14	25 X 35	30 X 48	0.0074 0.0148
30	15	24 X 36	30 X 48	0.0069 0.0138
32	16	25 X 40	30 X 48	0.0065 0.0130
34	17	25 X 34	24 X 48	0.0061 0.0122
36	18	25 X 36	24 X 48	0.0057 0.0114

**Figure 16.** Using the change gear chart.

- If give the longitudinal and cross rate how to combine gear, please see Figure 16. For example: the list shows that 0.0103" of longitudinal travel per revolution of lead screw is need, or 0.0022" of cross travel per revolution of lead screw is need.

Fist loosen the gear plate and swing the assembly out of the way ,remove the required E-rings and swap out the appropriate change gears, install M,N,A gear side by side ,and then install B,C on the gear plant and mount the gear plant on the shaft of the left trestle, install gear D and adjust the gib with C and D, Move the gear plant and adjust gib of B with A gear. when finished and then tighten the lock nut. use the leadscrew lever to select leadscrew rotation direction, loosen the apron lock bolt, and use feed lever to engage the cross slide or longitudinal feed(see Fig.15,17).

**Note:** All change gears are stamped with the number of teeth they have.

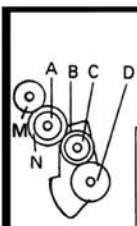


**Figure 17.** Leadscrew and feed levers.

## NOTICE

**Feed rate is based on spindle RPM. Pay close attention to the feed rate you have chosen and be ready to disengage the apron. Failure to do this may cause the carriage to crash into the chuck.**



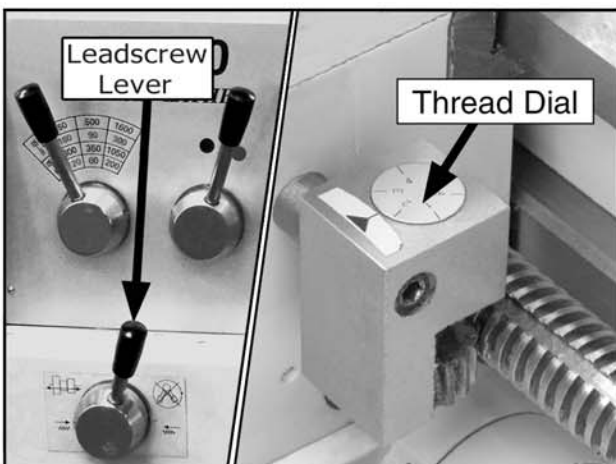


Inch Threading		Longitudinal Feed		Cross Feed	
M	N	A/B	C/D	M	N
M=24 N=60	M=28 N=35	24/50 X 25/48	30/32	0.0040	0.0080
10	5	48/36 X 30/32	30/32	0.0206	0.0412
12	6	40/36 X 30/32	30/32	0.0172	0.0344
16	8	35/28 X 30/48	30/48	0.0130	0.0260
18	9	40/30 X 25/48	25/48	0.0115	0.0230
20	10	32/32 X 30/48	30/48	0.0103	0.0206
22	11	32/32 X 25/44	25/44	0.0094	0.0188
23	11.5	25/32 X 32/46	32/46	0.0089	0.0178
24	12	25/32 X 32/48	32/48	0.0086	0.0172
25	12.5	25/32 X 32/50	32/50	0.0082	0.0164
26	13	25/32 X 32/52	32/52	0.0079	0.0158
30	14	25/32 X 30/48	30/48	0.0074	0.0148
30	15	24/36 X 30/48	30/48	0.0069	0.0138
32	16	25/40 X 30/48	30/48	0.0065	0.0130
34	17	25/34 X 24/48	24/48	0.0061	0.0122
36	18	25/36 X 24/48	24/48	0.0057	0.0114

**Figure 18:** Using the change gear chart.

THREAD DIAL TABLE LEAD SCREW PITCH 5 T.P.I.			
T.P.I.	DIAL	T.P.I.	DIAL
5	1-6	18	1 or 2
6	1 or 2	20	
7	1	22	1 or 2
8	1	23	1
9	1	24	1 or 2
10	1-6	25	1-6
11	1	26	1 or 2
11.5		28	1 or 2
12	1 or 2	30	1-6
12.5		32	1 or 2
13	1	34	1 or 2
14	1 or 2	36	1 or 2
15	1-6	40	1-6
16	1 or 2	48	1 or 2
17	1		

**Figure 19:** Thread dial table.



**Figure 20:** Threading controls.

## Setup for Threading

Your lathe is capable of cutting inch and metric threads.

To setup for threading:

**DISCONNECT THE LATHE/MILL FROM POWER!**

Refer to the CHANGE GEAR LIST on page 15. to Setting parameters of thread by combine gear.

- If achieve your need threading how to combine gear, please see Figure 18 .

For example: the list shows 30TPI is need.

Fist loosen the gear plate and swing the assembly out of the way, remove the required E-rings and swap out the appropriate change gears, install M,N,A gear side by side ,and then install B,C on the gear plant and mount the gear plant on the shaft of the left trestle, install gear D and adjust the gib with C and D, Move the gear plant and adjust gib of B with A gear. when finished and then tighten the lock nut. use the leadscrew lever to select leadscrew direction, setup the cutting, compound rest and cross slide to cut your threads and loosen the apron lock bolt.

While threading, keep your hand on the half-nut lever, ready to disengage the apron to avoid any potential for an apron/chuck crash.

- If cutting inch threads, refer to the Thread Dial Table in Figure 38 to use the thread dial.
- If cutting metric threads, do not use the thread dial. Instead, you must leave the half nut engaged until the threading operation is totally complete.

**Note:** All change gears are stamped with the number of teeth they have.

# SECTION 3 : LATHE OPERATIONS

## Change Gear Chart

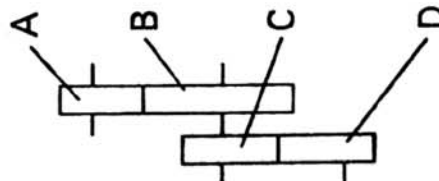
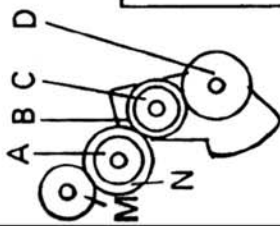
M = 24		M = 28		A X C / B X D	M = 24 N = 35	M = 28 N = 35	mm	mm
M = 24	N = 60	M = 28	N = 35					
10	5	24	25	24 X 25 / 50 X 48	0.0040	0.0080	0.100	0.200
12	6	40	30	40 X 30 / 36 X 32	0.0172	0.0344	0.618	1.236
16	8	35	30	35 X 30 / 28 X 48	0.0130	0.0260	0.565	1.130
18	9	40	25	40 X 25 / 30 X 48	0.0115	0.0230	0.520	1.040
20	10	32	30	32 X 30 / 32 X 48	0.0103	0.0206	0.465	0.930
22	11	32	25	32 X 25 / 32 X 44	0.0094	0.0188	0.360	0.720
23	11.5	25	32	25 X 32 / 32 X 46	0.0089	0.0178	0.310	0.620
24	12	25	32	25 X 32 / 32 X 48	0.0086	0.0172	0.260	0.520
25	12.5	25	32	25 X 32 / 32 X 50	0.0082	0.0164	0.200	0.400
26	13	25	32	25 X 32 / 32 X 52	0.0079	0.0158	0.182	0.364
28	14	25	30	25 X 30 / 35 X 48	0.0074	0.0148	0.164	0.328
30	15	24	30	24 X 30 / 36 X 48	0.0069	0.0138	0.154	0.308
32	16	25	30	25 X 30 / 40 X 48	0.0065	0.0130	0.145	0.290
34	17	25	24	25 X 24 / 34 X 48	0.0061	0.0122	0.122	0.245
36	18	25	24	25 X 24 / 36 X 48	0.0057	0.0114	0.105	0.210
40	20	25	24	25 X 24 / 40 X 48	0.0052	0.0104	0.093	0.186
48	24	25	25	25 X 25 / 48 X 50	0.0043	0.0086	0.088	0.175

M = 24		M = 28		A X C / B X D	M = 24 N = 35	M = 28 N = 35	mm	mm
M = 24	N = 60	M = 28	N = 35					
10	5	24	25	24 X 25 / 50 X 48	0.0040	0.0080	0.100	0.200
12	6	40	30	40 X 30 / 36 X 32	0.0172	0.0344	0.618	1.236
16	8	35	30	35 X 30 / 28 X 48	0.0130	0.0260	0.565	1.130
18	9	40	25	40 X 25 / 30 X 48	0.0115	0.0230	0.520	1.040
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22	11	32	25	32 X 25 / 32 X 44	0.0094	0.0188	0.360	0.720
23	11.5	25	32	25 X 32 / 32 X 46	0.0089	0.0178	0.310	0.620
24	12	25	32	25 X 32 / 32 X 48	0.0086	0.0172	0.260	0.520
25	12.5	25	32	25 X 32 / 32 X 50	0.0082	0.0164	0.200	0.400
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28	14	25	30	25 X 30 / 35 X 48	0.0074	0.0148	0.164	0.328
30	15	24	30	24 X 30 / 36 X 48	0.0069	0.0138	0.154	0.308
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36	18	25	24	25 X 24 / 36 X 48	0.0057	0.0114	0.105	0.210
40	20	25	24	25 X 24 / 40 X 48	0.0052	0.0104	0.093	0.186
48	24	25	25	25 X 25 / 48 X 50	0.0043	0.0086	0.088	0.175

M = 24		M = 28		A X C / B X D	M = 24 N = 35	M = 28 N = 35	mm	mm
M = 24	N = 60	M = 28	N = 35					
10	5	24	25	24 X 25 / 50 X 48	0.0040	0.0080	0.100	0.200
12	6	40	30	40 X 30 / 36 X 32	0.0172	0.0344	0.618	1.236
16	8	35	30	35 X 30 / 28 X 48	0.0130	0.0260	0.565	1.130
18	9	40	25	40 X 25 / 30 X 48	0.0115	0.0230	0.520	1.040
20	10	32	30	32 X 30 / 32 X 48	0.0103	0.0206	0.465	0.930
22	11	32	25	32 X 25 / 32 X 44	0.0094	0.0188	0.360	0.720
23	11.5	25	32	25 X 32 / 32 X 46	0.0089	0.0178	0.310	0.620
24	12	25	32	25 X 32 / 32 X 48	0.0086	0.0172	0.260	0.520
25	12.5	25	32	25 X 32 / 32 X 50	0.0082	0.0164	0.200	0.400
26	13	25	32	25 X 32 / 32 X 52	0.0079	0.0158	0.182	0.364
28	14	25	30	25 X 30 / 35 X 48	0.0074	0.0148	0.164	0.328
30	15	24	30	24 X 30 / 36 X 48	0.0069	0.0138	0.154	0.308
32	16	25	30	25 X 30 / 40 X 48	0.0065	0.0130	0.145	0.290
34	17	25	24	25 X 24 / 34 X 48	0.0061	0.0122	0.122	0.245
36	18	25	24	25 X 24 / 36 X 48	0.0057	0.0114	0.105	0.210
40	20	25	24	25 X 24 / 40 X 48	0.0052	0.0104	0.093	0.186
48	24	25	25	25 X 25 / 48 X 50	0.0043	0.0086	0.088	0.175

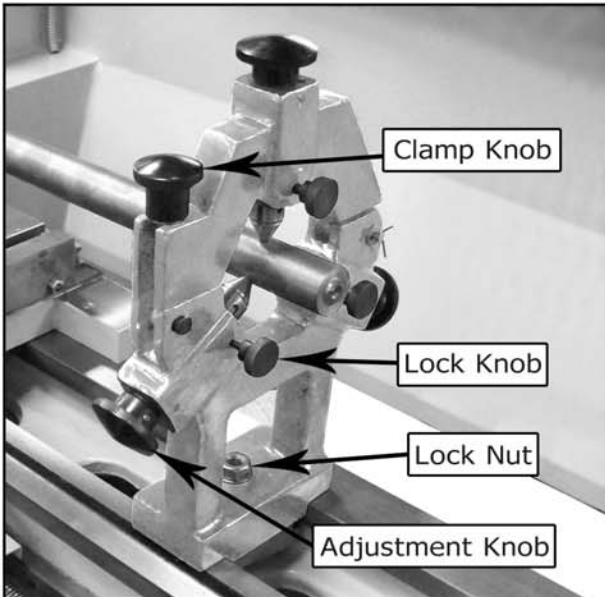


## Using the Steady Rest

The steady rest serves as a support for long shafts. The steady rest can be placed anywhere along the length of the ways.

### To use the steady rest:

1. Carefully place the steady rest on the lathe bedways.
2. Loosen the lock knobs so the finger position can be adjusted (see Figure 21).
3. Loosen the clamp knob (see Figure 21) and open the steady rest so a workpiece can fit inside of the fingers.
4. Position the steady rest where desired. Tighten the lock nut (see Figure 21) at the base of the steady rest to secure in place.
5. Close the steady rest so that the workpiece is inside the fingers and tighten the clamp knob.
6. Turn the adjustment knobs so the fingers are snug against the workpiece and then tighten the lock knobs. Lubricate the finger tips with an anti-seize lubricant during operation.
7. After prolonged use, the fingers will show wear. Either mill or file the tips for a new contact surface.

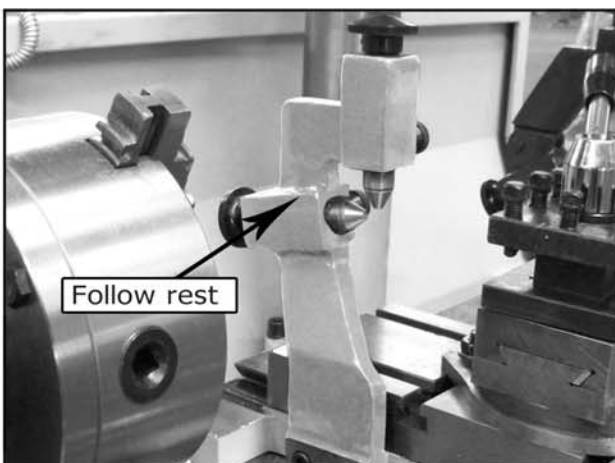


**Figure 21:** Steady rest adjustments.

## Using the Follow Rest

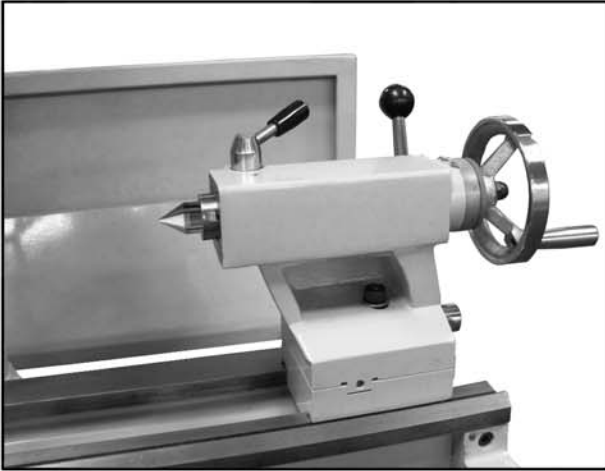
The follow rest in Figure 22 is mounted on the saddle and follows the movement of the tool. The follow rest requires only two fingers, as the cutting tool acts as the third. The follow rest is used on long, slender parts to prevent flexing of the workpiece from the pressure of the cutting tool.

The sliding fingers are set similar to those of the steady rest—free of play but not binding. Always lubricate during operation. After prolonged use, the fingers will need to be milled or filed to clean up the contact surface.



**Figure 22:** Follow rest attachment.

## Using the Centers



**Figure 23:** Inserting dead center.

The dead center is used in the tailstock and lathe spindle to support workpieces. When used in the tailstock, make sure to keep the MT#3 dead center tip and workpiece lubricated to prevent tip galling.

This lathe/mill is also supplied with an MT#5 dead center that fits into the lathe spindle taper.

To install a dead or live center:

1. Feed the quill out about 1" and insert the MT#3 dead center (Figure 23). The mating tapers provide the locking action.
2. Move the tailstock into position and lock in place.
3. Feed the quill into the workpiece.

*Note: Make sure there is a center drilled hole in the end of the workpiece for the dead center.*

4. Lock the quill into place once the live center and the part rotate together. The quill may need to be adjusted during operation.
5. To remove the dead center, retract the quill until the dead center pops free.

### To install the MT#5 dead center in the spindle:

1. DISCONNECT POWER TO THE LATHE/ MILL!
2. Remove the chuck from the spindle.
3. Install the MT#5 dead center in the spindle.
4. Attach the faceplate to the spindle, see Figure 24.

*Note: When using the dead center in the spindle, use a lathe dog so that your part will rotate with the spindle and not spin on the dead center tip.*



**Figure 24:** Faceplate and dead center setup.

### NOTICE

Failure to keep dead center point well lubricated will gall the dead center and workpiece.

## Mounting the Chuck and the Faceplate



**Figure 25:** Chuck mounting components.

The three-jaw scroll chuck has hardened steel jaws that self-center the workpiece within 0.002"-0.003". An extra set of jaws is included for machining larger workpieces.

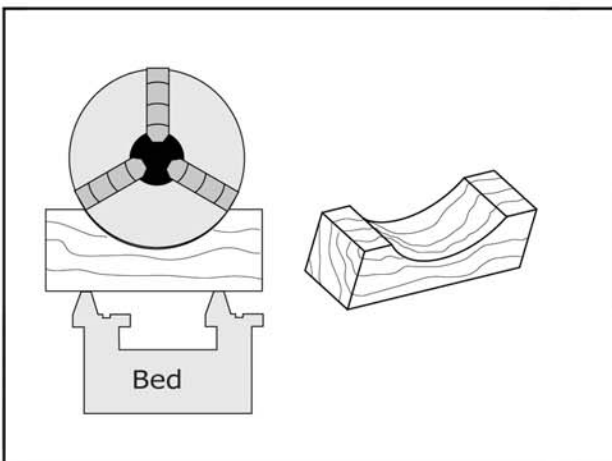
The four-jaw chuck also has hardened steel jaws but are adjusted independently to hold an offcenter workpiece. Each jaw can be removed from the chuck body and reversed for special clamping applications.

The cast-iron faceplate has slots for T-bolts that hold clamping fixtures. This face plate and aftermarket clamping hardware will hold non-cylindrical parts such as castings for many types of turning operations.

Both chucks and the faceplate are removed and installed the same way.

### To remove and install the chuck or face late:

1. DISCONNECT POWER TO THE LATHE/MILL!
2. Lay a chuck cradle or protective layer of plywood ver the bedways to prevent your fingers from being pinched and to protect the precision-ground surfaces (see Figure 26).
3. Use a 14mm wrench and loosen the three hex bolts that secure the chuck to the spindle Figure 25.
4. Support the chuck, and while anticipating the heavy weight of the chuck, remove the three hex bolts and then the chuck.
5. Clean the mating surfaces of the spindle and the new chuck or faceplate with a clean oiled rag.
6. Position the other chuck or faceplate on the spindle flange, making sure it is fully seated, and tighten the hex bolts in several alternating sequences.



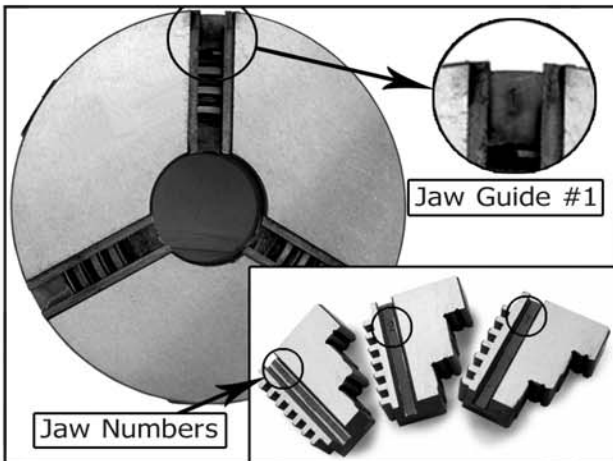
**Figure 26:** Faceplate and dead center setup.

## WARNING!

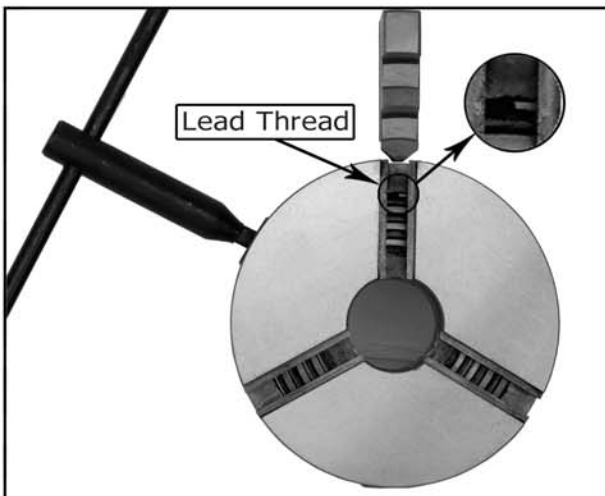
**Securely clamp your workpiece and remove the chuck key! Thrown objects from a lathe/mill can cause serious injury or death to the operator and to bystanders many feet away.**



**Figure 27:** Chuck and jaw selection.



**Figure 28:** Faceplate and dead center setup.



**Figure 29:** Jaw guide number.

## Replacing the Jaws

The three-jaw scroll chuck has removable hardened steel jaws (Figure 27). The outside of the jaws are used to hold the workpiece from the outer diameter.

Numbered from 1–3, the jaws must be used in the matching numbered jaw guides, see Figure 28.

### To remove a set of jaws:

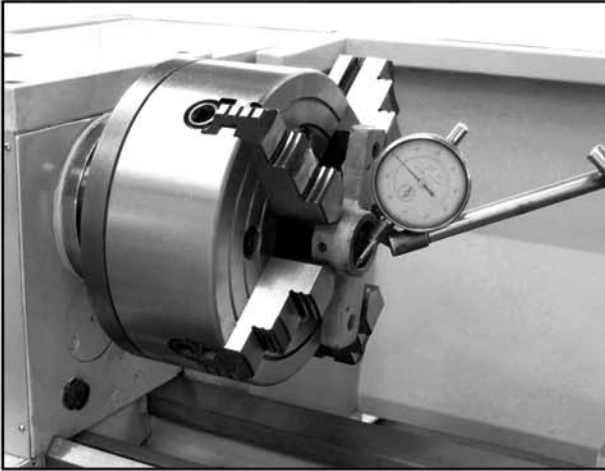
1. DISCONNECT POWER TO THE LATHE/MILL!
2. Place a piece of wood over the ways to protect them from potential damage.
3. Turn the chuck key counterclockwise and back the jaws out.
4. Clean the jaw mating surfaces and apply a film of white lithium grease to the mating surfaces.
5. Set the old jaws aside in a safe place free of moisture and abrasives.
6. Rotate the chuck key clockwise until you see the tip of the scroll-gear lead thread just begin to enter jaw guide #1 (see Figure 29).
7. Insert jaw #1 into jaw guide #1 and hold the jaw against the scroll gear.
8. Rotate the chuck key clockwise one turn to engage the tip of the scroll-gear lead thread into the jaw. Pull on the jaw now and it should be locked into the jaw guide.
9. Repeat the steps on the remaining jaws.

— If installed correctly, the three jaws will converge together at the center of the chuck.

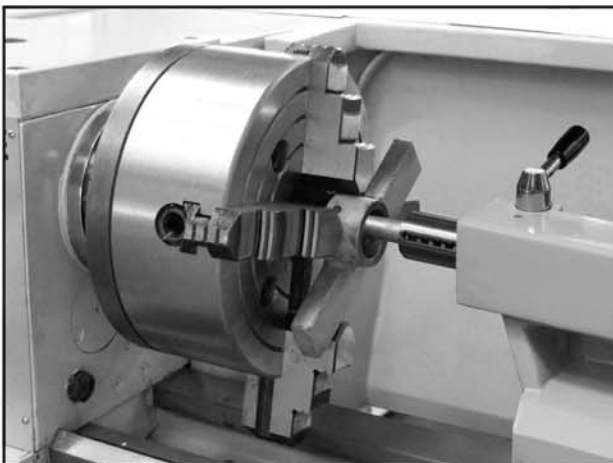
— If the jaws do not come together, repeat this procedure until they do.

**Note:** The chuck need not be removed from the spindle to swap the jaws.

## Using the Four-Jaw Chuck



**Figure 30:** Centering workpiece.



**Figure 31:** Clamping workpiece.

To install the four-jaw chuck:

Refer to the Mounting the Chuck and Faceplate procedures on Page 18 to mount the four-jaw chuck.

**To load a workpiece in the four-jaw chuck:**

1. DISCONNECT POWER TO THE LATHE/MILL!
2. Using the chuck key, open each jaw so the workpiece will lay flat against the chuck face.
3. Support the workpiece.
4. Lock the tailstock and then turn the tailstock quill so the dead center makes contact or is close to the center point of your workpiece (see Figure 31).
5. Turn each jaw until it just makes contact with the workpiece.
6. In an opposing pattern, tighten each jaw in small increments. After you have adjusted the first jaw, continue tightening the opposing jaw. Check the dead center alignment frequently to make sure you have not wandered off your index point due to applying too much pressure to a single jaw.
7. After the workpiece is held in place, back the tailstock away and rotate the chuck by hand. The center point will move if the workpiece is out of center.
8. Make fine adjustments by slightly loosening one jaw and tightening the opposing jaw until the workpiece is precisely aligned. Use a dial indicator for fine tuning adjustments in alignment (see Figure 30).
9. Use a lower RPM when machining heavy eccentric workpieces.

### **WARNING!**

**Securely clamp your workpiece and remove the chuck key! Thrown objects from a lathe/mill can cause serious injury or death to the operator and to bystanders many feet away.**

## Using the Faceplate

The faceplate can be used to turn non-cylindrical parts or for off-center turning by clamping the workpiece to the faceplate.

### To install the faceplate:

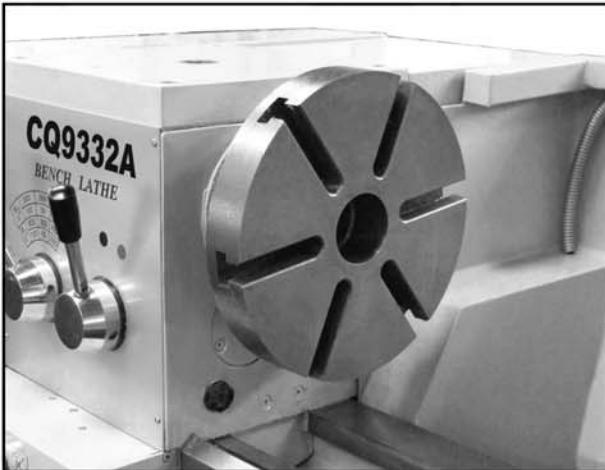
Refer to the Mounting the Chuck and Faceplate procedures on Page 18 to mount the faceplate.

### To load a workpiece:

1. Support the workpiece.
2. Slide the tailstock to the workpiece.
3. Lock the tailstock and then turn the tailstock quill so the dead center makes contact with the center point of your workpiece.
4. Lock the tailstock quill when sufficient pressure is applied to hold the workpiece in place.

**Note:** Depending on the workpiece, some additional support may be needed.

5. Secure the workpiece with a minimum of three independent clamping devices. Failure to follow this step may lead to deadly injury to yourself or bystanders. Take into account rotation and the cutting forces applied to the workpiece when clamping to the faceplate. Make sure your clamping application will not fail!
6. Use a lower RPM when machining heavy eccentric workpieces.



**Figure 32:** Faceplate installed.

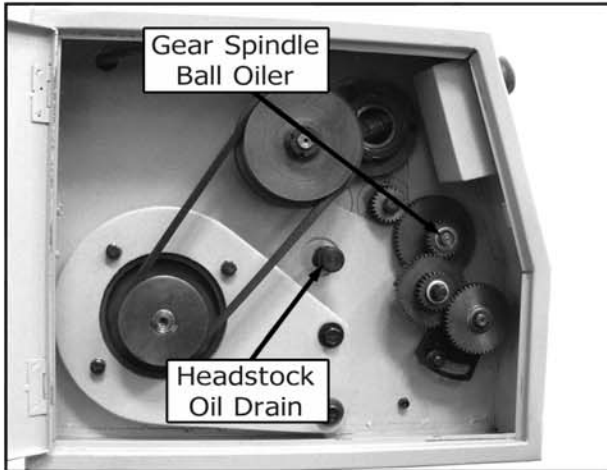
### **WARNING!**

Use a minimum of three independent clamping devices when turning eccentric workpieces. Failure to provide adequate clamping will cause workpiece to eject.

### **WARNING!**

Securely clamp your workpiece and remove the chuck key! Thrown objects from a lathe/mill can cause serious injury or death to the operator and to bystanders many feet away.

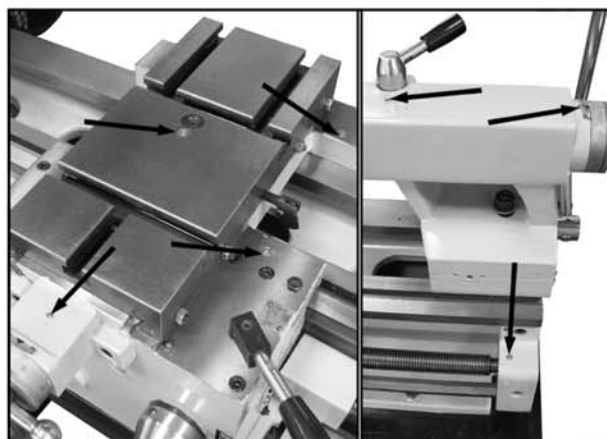




**Figure 33:** Start switch & spindle lock location.



**Figure 34:** Headstock and Gear box.



**Figure 35:** Typical ball fitting locations.

## BASIC MAINTENANCE

### **WARNING!**

**Ensure that the machine is unplugged from the power supply before attempting any maintenance.**

**. Inspecting this machine before each time using, and regular periodic maintenance.**

Lubricate the leadscrew (oil point on the leadscrew).

Lubricate the cross slide (oil point behind scale and two on front face of slide).

Lubricate the compound slide (two oil points on top face).

Lubricate the tailstock (two oil points on top face).

**. Clean the machine after each use and oil all machined surfaces.**

. If any play becomes apparent in the slides adjust as follows:

Loosen the lock nuts (compound slide only) of the gib strip adjusting screws (fig shows the screws for the compound slide).

Those for the cross slide are on the right-hand side of the slide, and those for the tail stock are either side of the locking lever).

Lightly tighten the screws equally and check that the slide will not move with normal effort on the handle.

Back-off each screw by 1/4 turn (tighten the lock nuts, compound slide only).

Check that there is no play and that the slide moves smoothly.

. If further adjustment is required, tighten or loosen the screws as necessary by 1/8th of a turn only and recheck.

. Keep the headstock oil level at 3/4 full (see Figure 35), after break in you can change with good quality (such as Mobil®DTE®) after that, each three month change once or more frequently if require.

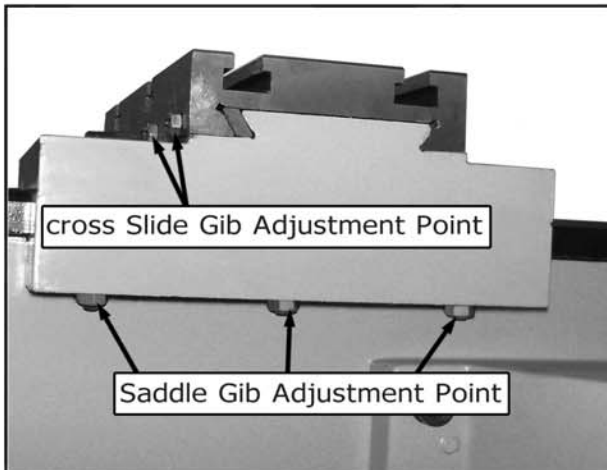
## Lubrication Positions List

Item in figure.	Lubrication Positions	Located Parts	Lubrication Methods	Types Of Lubrication Oil	Lubrication Period
1	Gears, bush bearing	Left trestle	Gun oiling	Machine oil	One year
2	Spindle bearing	Lathe head	Greasing	Grease	1 / year
3	Thrust ball bearing	Left trestle	Greasing	Grease	1 / year
4	Slide way, lead screw, guide surface	Apron parts	gun oiling	Machine oil	2 / day
5	Gears, racks	Apron parts	Greasing	Grease	one month
6	Tool post lead screw, guide surface	Tool carriage	gun oiling	Machine oil	2 /day
7	Longitudinal lead screw	lead screw	gun oiling	Machine oil	2 / day
8	Lathe bed guide	Lathe bed	gun oiling	Machine oil	2 / day
9	Tail stock sleeve	Tailstock	gun oiling	Machine oil	2 / day
10	Tailstock leads crew bush bearing	Tailstock	gun oiling	Machine oil	2 / day
11	Bearing pedestal	Lathe bed	gun oiling	Machine oil	2 / day
12	Cross nut \ lead screw	Small carriage	gun oiling	Machine oil	2 / day
13	Bearing bush	Small carriage	gun oiling	Machine oil	2 / day
14	Thrust bearing	Lead screw pedestal	Greasing	Grease	6 /year
15	Change gear shaft	Compound box	gun oiling	Machine oil	2 / year
16	Bearing	Input pulley	Greasing	Grease	6 /year

**Note.**

- 1) It is recommended to use 3#CA Grease for the "grease" in the table.
- 2) Use 20# machine oil for the "machine oil" in the table.
- 3) The parts lubricated should be cleaned in due .The oil in the carriage should be changed in due. Oil again to the oil sign.

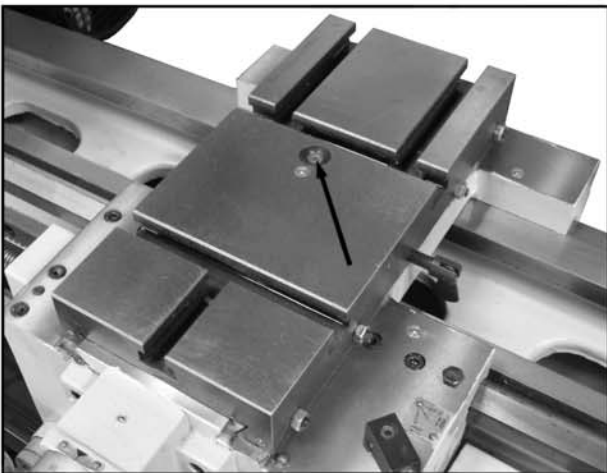
## Gib adjustment



**Figure 36:** Gib adjustment points.

There's a piece of chock between the table and the carriage and also one between the carriage and the bed to adjust the installing clearance which have great effect on the moving stability of the table and the final machining accuracy. The way to judge the width of the clearance is: to pull the table clockwise and counter clockwise alternatively with the hands holding the two ends of the table.

As showed in Fig43,44,45, both side A and side B of the carriage have set screws and screw nuts to adjust the clearances of the chocks. The adjusting method tighten the set screw then loosen it for about 1/5 round, tighten the set screw again with screw nut, finally check the clearance of the table. Repeat this again and again till the clearance is small and the carriage table can be moved smoothly by hand.



**Figure 37:** Cross slide backlash adjustment cap screw.

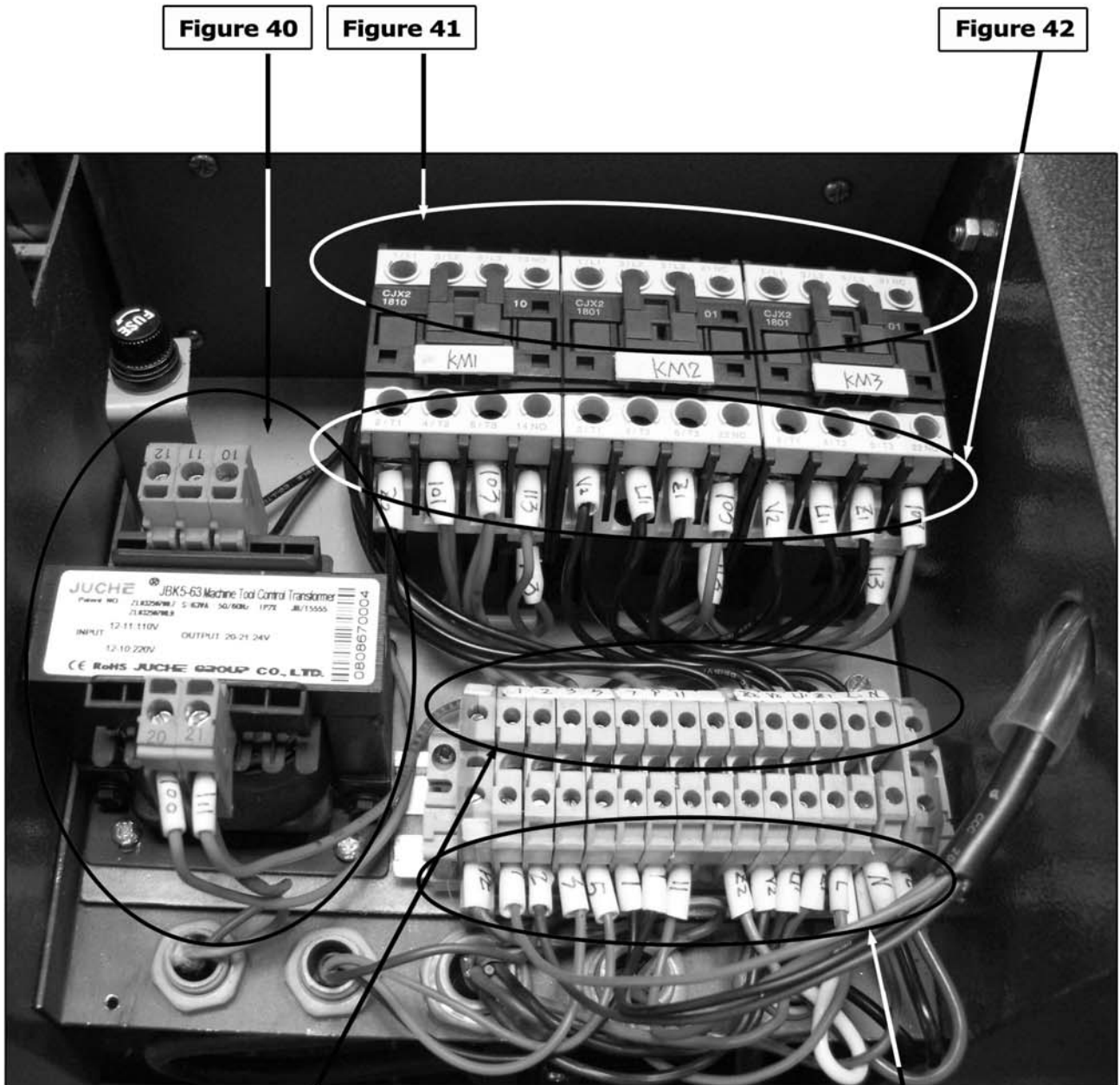
### Gib adjustment

The gibs between top slide and bed slideway, worktable and cross slide adjusted by wedges and nuts had been suitably adjusted before ex works. If any new adjustment is required, please make the judgment and adjustment as per the instructions shown in the picture.

This kind of gib is very important for the accuracy of the lathe movement. ,over –tightening the abrasion of the slideway shall get bigger and it shall be difficult for the carriage to move; damage the slide lead screw ,and half nut. Loose gibs, the movement of the carriage and top slide shall be unsteady and the accurate tooling cannot be achieved. When making adjustment, move the carriage and top slide vertically against the slideway, and decide if the tolerance is too big or not against the feeling of shaking. Moving the carriage and toolpost by handwheels to judge if the gib is small or not against the resistance. No matter the gib is too big or too small, the machine shall be re-adjust. The positions to be adjusted as show for the four gibs, loose the jam nuts and turn the three set screws untill slight tension felt and the gib plates are slightly pre-loaded against the underside of the flat-way, tighten the jam nuts when finished.



**Figure 38:** Half-nut gib adjustment location.



**Figure 40**

**Figure 41**

**Figure 42**

**Figure 39: Electrical panel.**

**Figure 43**

**Figure 44**



Figure 40: Transformer(JBK5-63).

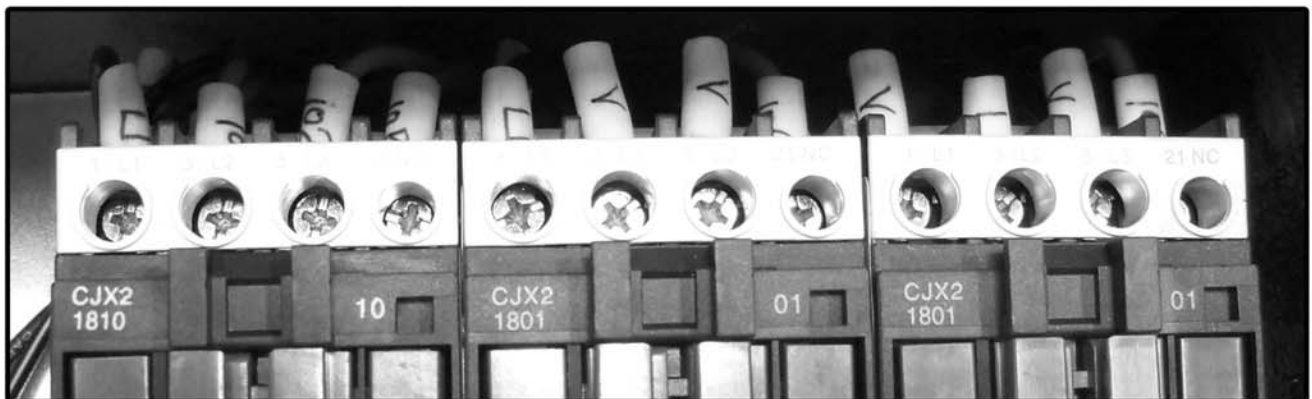


Figure 41: Contactor wiring.

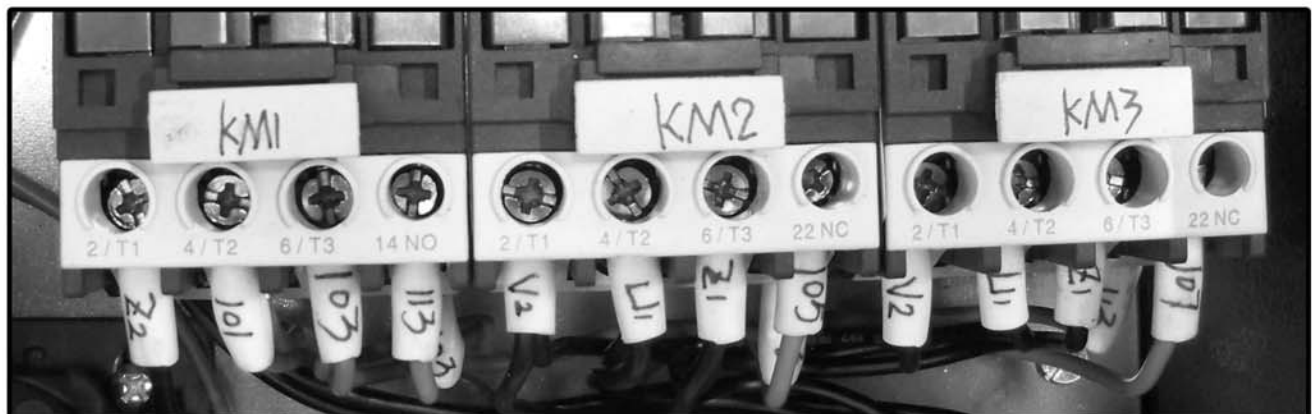
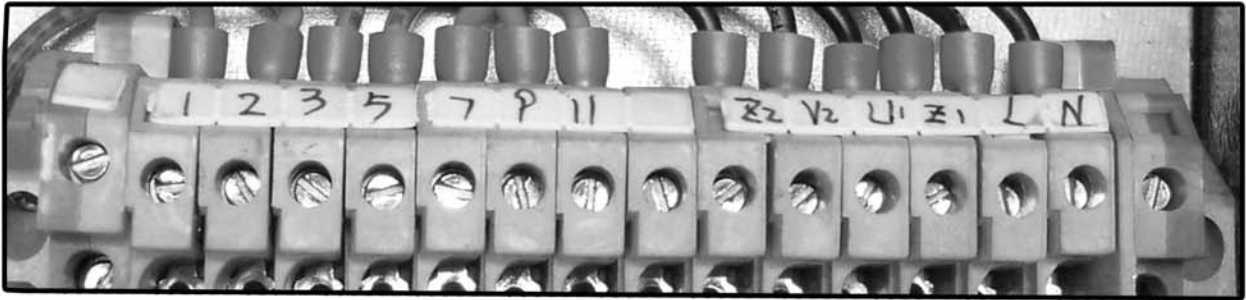
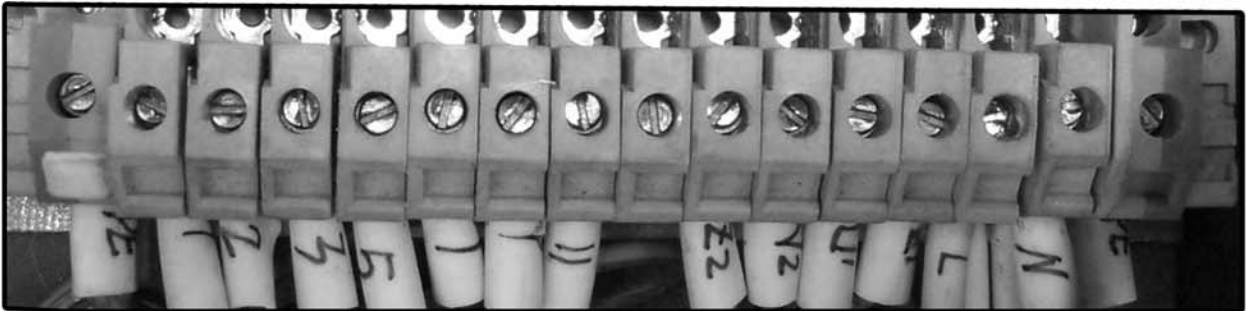


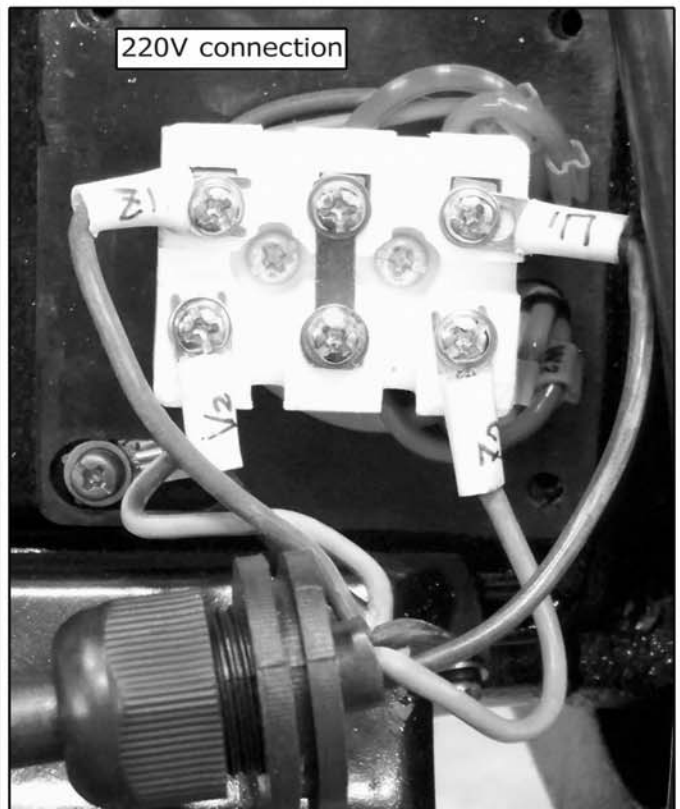
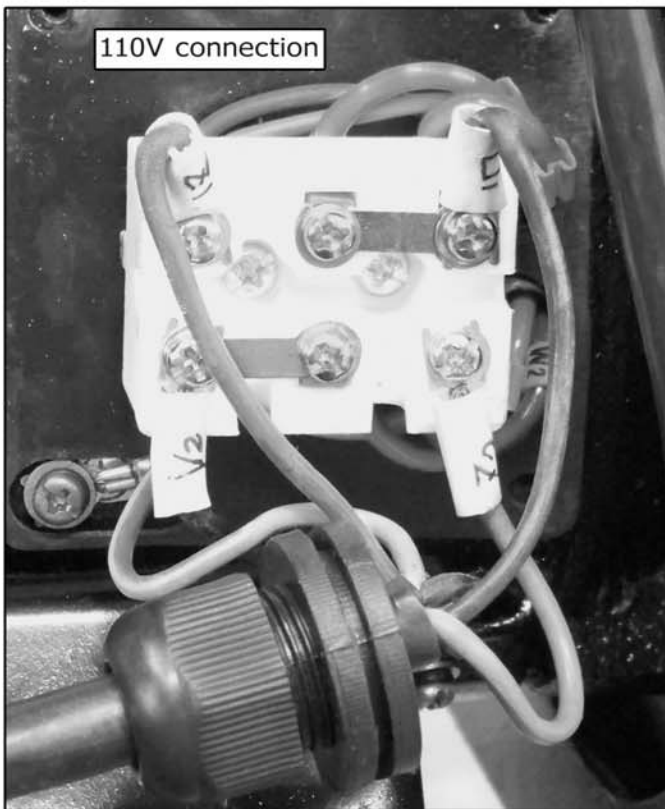
Figure 42: Contactor wiring.



**Figure 43:** Junction block wiring.



**Figure 44:** Junction block wiring.



**Figure 45:** Motor connection.

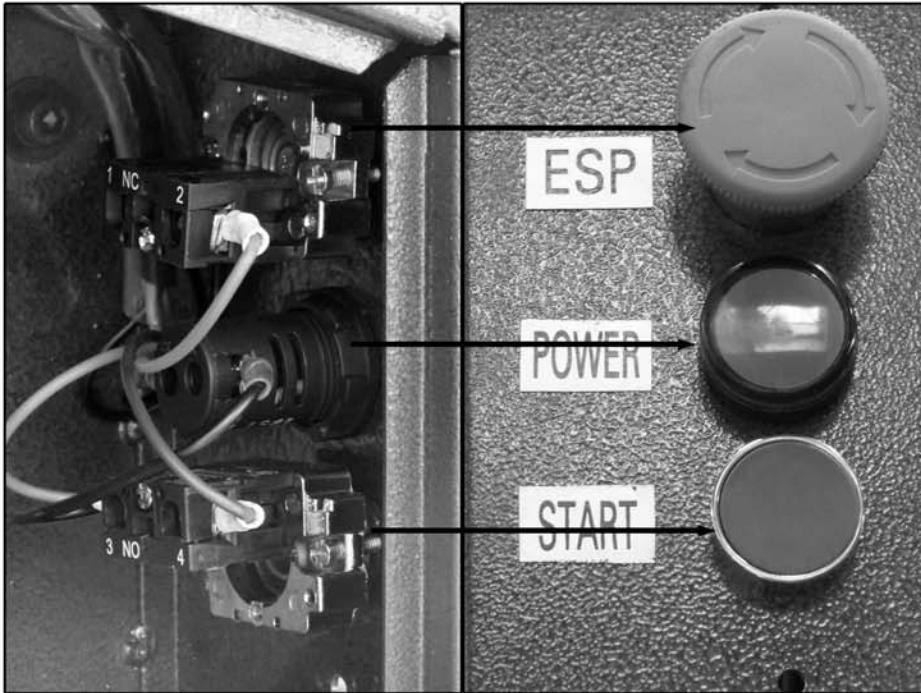


Figure 46: Lathe control panel wiring and controls.

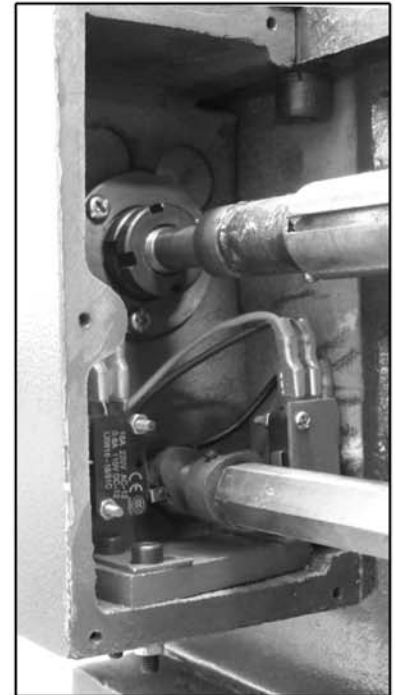


Figure 47: Lathe motor direction limit switches.

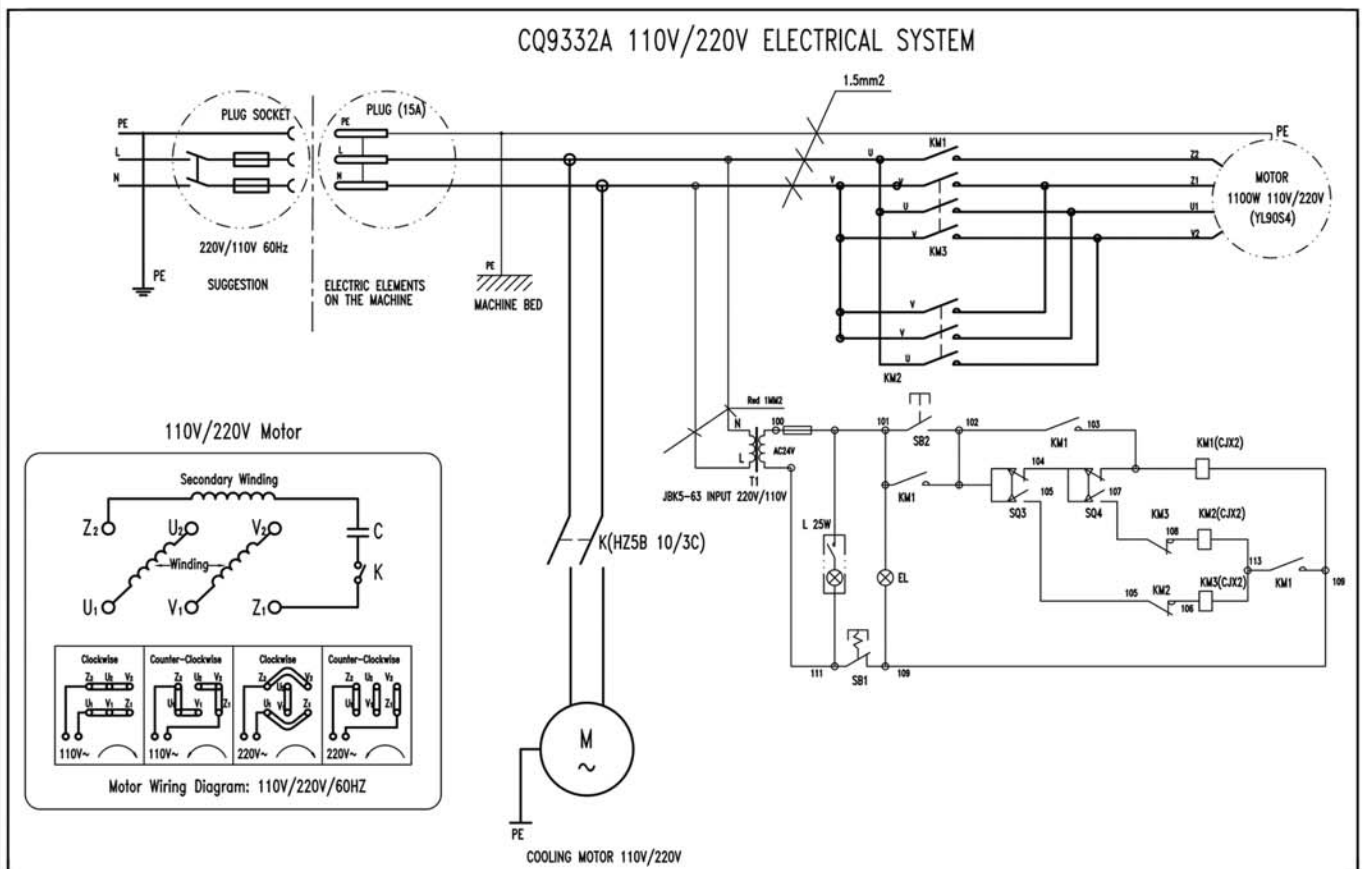
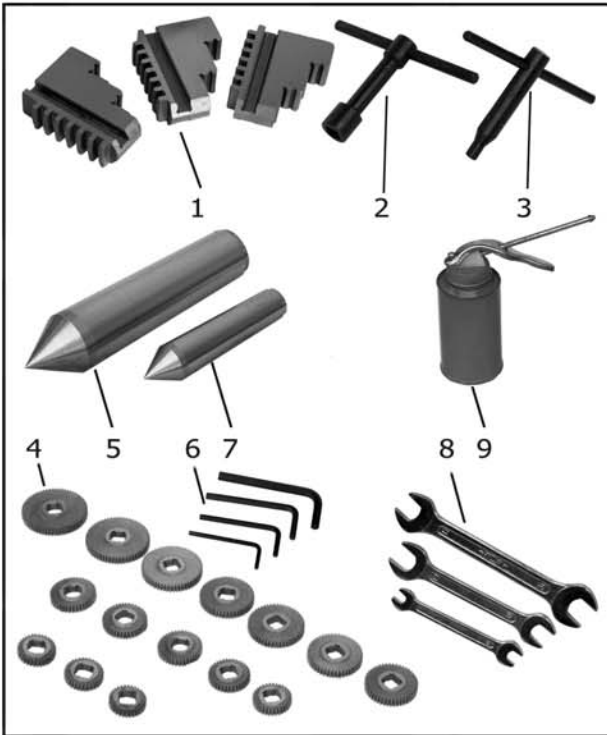


Figure 48: Wiring diagram.

**Standard Accessories**

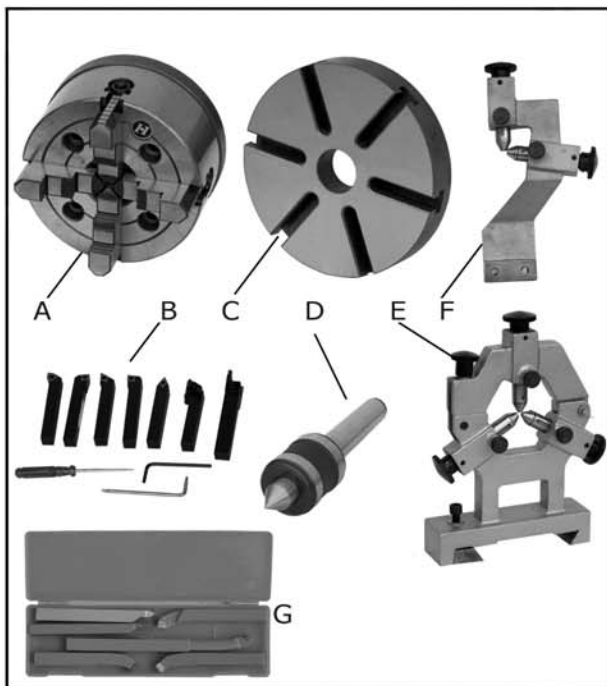
The parts have been removed from the box, you should have the following items:



**Figure 49:** Standard Accessories.

- |                                       | Qty  |
|---------------------------------------|------|
| 1. Three-jaw Chuck Internal Jaws..... | 1    |
| 2. Tool Post T-handle Wrench.....     | 1    |
| 3. Three-jaw Chuck Key.....           | 1    |
| 4. Change Gear Set                    |      |
| Gear(28&35 Coarse Tooth).....         | 1    |
| Change Gear(24-tooth).....            | 1    |
| Change Gear(25-tooth).....            | 1    |
| Change Gear(27-tooth).....            | 1    |
| Change Gear(28-tooth).....            | 1    |
| Change Gear(30-tooth).....            | 1    |
| Change Gear(32-tooth).....            | 1    |
| Change Gear(34-tooth).....            | 1    |
| Change Gear(35-tooth).....            | 1    |
| Change Gear(36-tooth).....            | 1    |
| Change Gear(40-tooth).....            | 1    |
| Change Gear(42-tooth).....            | 1    |
| Change Gear(44-tooth).....            | 1    |
| Change Gear(46-tooth).....            | 1    |
| Change Gear(52-tooth).....            | 1    |
| 5. Dead Center MT5#.....              | 1    |
| 6. Hex Wrench Set(4,5,6,8).....       | 1 EA |
| 7. Dead Center MT3#.....              | 1    |
| 8. Wrench Set(8-10,14-17,17-19).....  | 1 EA |
| 9. Oil Gun.....                       | 1    |

**Optional Accessories**



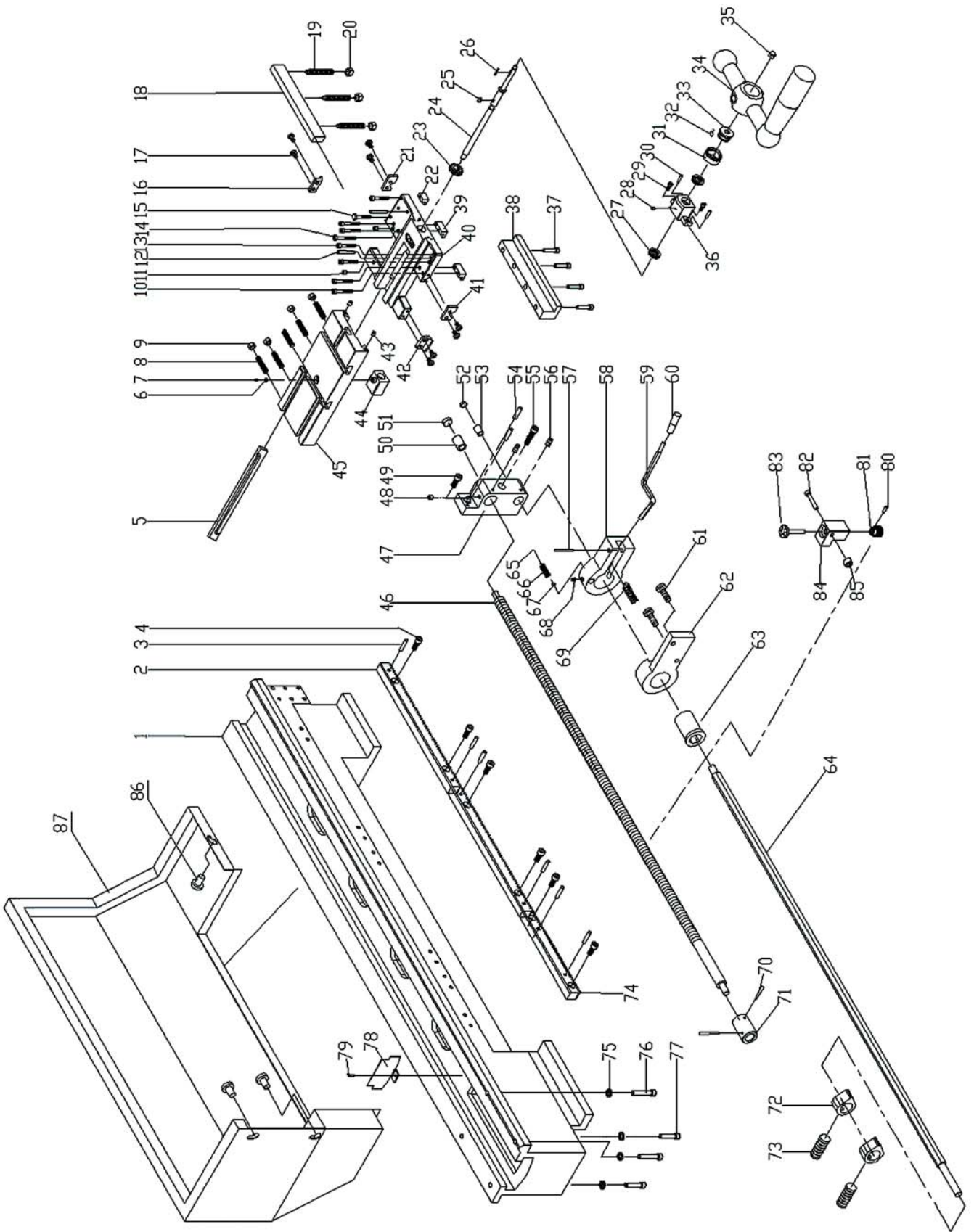
**Figure 50:** Optional Accessories.

- A. 8" Four-jaw Universal Chuck & blackplate
- B. Turning Tool Set(1)
- C. 8" Faceplate
- D. Rolling Center
- E. Steady Rest
- F. Follow Rest
- G. Turning Tool Set



# SECTION 6 : PARTS

## Bed Diagram



## SECTION 6 : PARTS

### Bed Parts List

NO.	PARTS	DESCRIPTION	
1	CQ9332AB001	Bed	CQ9332A-01-001
2	CQ9332AB002	Racks	CQ9332-01-003
3	CQ9332AB003	Taper pin	6×18 GB117-86
4	CQ9332AB004	Hexagon socket cap head screws	M8×16 GB70-85
5	CQ9332AB005	Chock	CQ9332-01-005
6	CQ9332AB006	Washer	CQ9332-05-015
7	CQ9332AB007	Screw	M5×12 GB68-85
8	CQ9332AB008	Screw	M6×25 GB75-85
9	CQ9332AB009	Hexagon nuts	M6 GB6170-86
10	CQ9332AB010	Hexagon socket cap head screws	M6×35 GB70-85
11	CQ9332AB011	Oil cup	8 GB1155-79
12	CQ9332AB012	Taper pin	6×40 GB117-86
13	CQ9332AB013	Hexagon socket cap head screws	M6×30 GB70-85
14	CQ9332AB014	Hexagon socket cap head screws	M6×45 GB70-85
15	CQ9332AB015	Hexagon head bolts	M6×40 GB5782-86
16	CQ9332AB016	The scratch board in right front	HA300-05-044
17	CQ9332AB017	Cross recessed pan head screws	M5×10 GB818-85
18	CQ9332AB018	Chock	CQ9332-01-008
19	CQ9332AB019	Hexagon socket set screws with dog point	M8×20 GB79-85
20	CQ9332AB020	Hexagon nuts	M8 GB6170-86
21	CQ9332AB021	The scratch board in right back	HA300-05-041
22	CQ9332AB022	Chain up block	CQ9332-05-027
23	CQ9332AB023	Gear	CQ9332-05-006
24	CQ9332AB024	Cross feed screw rod	CQ9332-05-004A
25	CQ9332AB025	Plain parralleled key	5×16 GB1096-79
26	CQ9332AB026	Plain parralleled key	4×18 GB1096-79
27	CQ9332AB027	Rolling bearing	8201 GB301-84
28	CQ9332AB028	Oil cup	6 GB1155-79
29	CQ9332AB029	Hexagon socket cap head screws	M6×16 GB70-85
30	CQ9332AB030	Taper pin	5×20 GB117-86
31	CQ9332AB031	Dial	AT320-05-024A
32	CQ9332AB032	Spring lamination	AT300-03-139
33	CQ9332AB033	Dial sleeve	AT300-03-138
34	CQ9332AB034	Handles with sleeve	12×40 GB4141.9-84
35	CQ9332AB035	Nut	M10 GB923-88
36	CQ9332AB036	Cross feed screw seat	CQ9332-05-008
37	CQ9332AB037	Hexagon socket cap head screws	M8×40 GB70-85
38	CQ9332AB038	Behind board	CQ9332-01-007
39	CQ9332AB039	Forward board	CQ9332-5-005
40	CQ9332AB040	Carriage	CQ9332A-05-002
41	CQ9332AB041	The scratch board in left back	HA300-05-042
42	CQ9332AB042	The scratch board in left front	HA300-05-044
43	CQ9332AB043	Oil cup	6 GB1155-79
44	CQ9332AB044	Cross nut	CQ9332-01-009A
45	CQ9332AB045	Worktable	CQ9332-00-004
46	CQ9332AB046	Longitudinal feed screw	AT320-01-002
47	CQ9332AB047	Right pedestal	CQ9332A-01-010
48	CQ9332AB048	Oil cup	6 GB1155-79
49	CQ9332AB049	Hexagon socket cap head screws	M8×20 GB70-85
50	CQ9332AB050	Sleeve	CQ9332-01-010

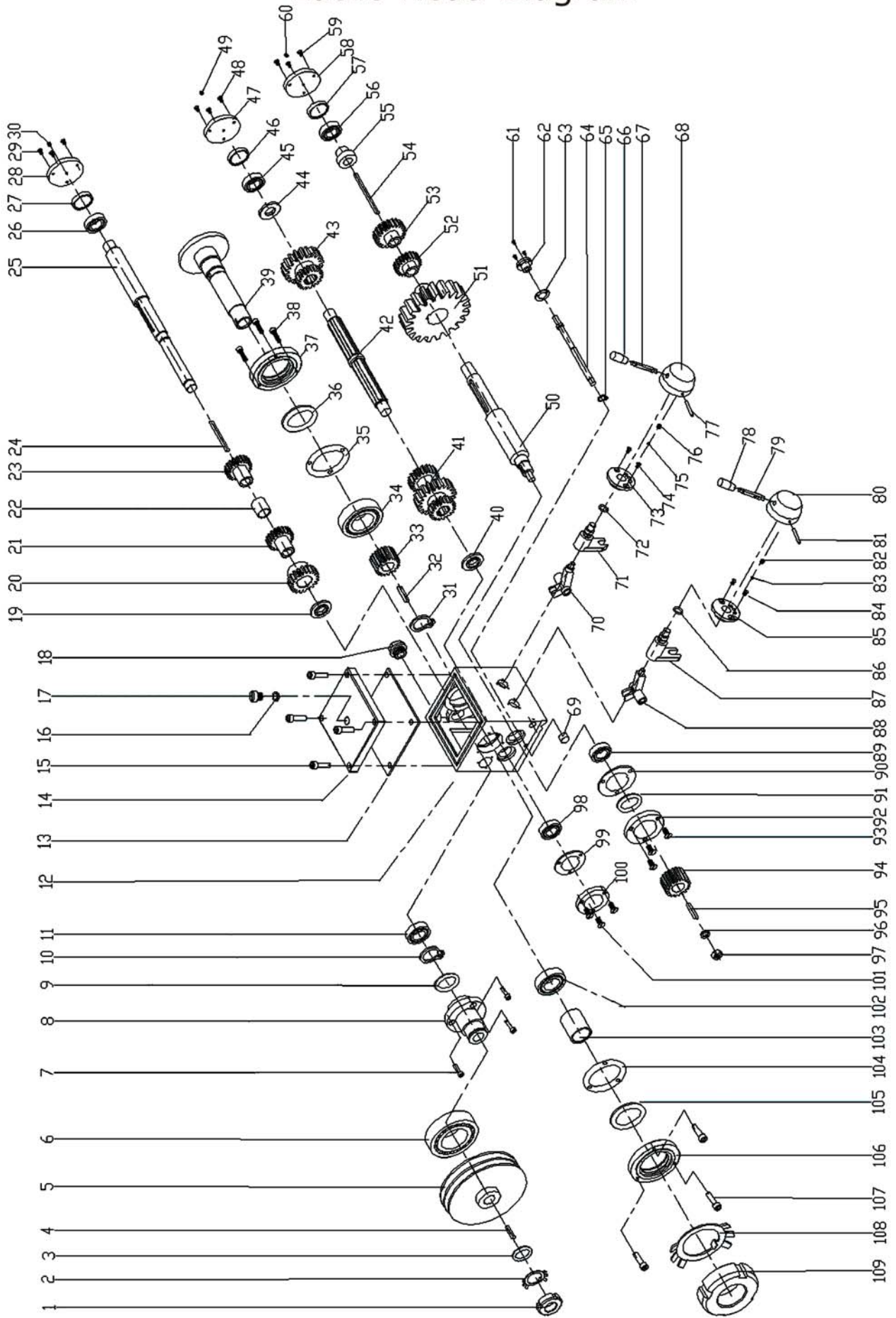
## SECTION 6 : PARTS

### Bed Parts List

NO.	PARTS	DESCRIPTION	
51	CQ9332AB051	Spigots	CQ9332-02-011
52	CQ9332AB052	Spigots	AT520-03-106
53	CQ9332AB053	Sleeve	CQ9332A-01-012
54	CQ9332AB054	Taper	pin 5×30 GB117-86
55	CQ9332AB055	Hexagon socke cap head screws	M8×60 GB70-85
56	CQ9332AB056	Slotted set screws with cone point	M5×10 GB71-85
57	CQ9332AB057	Straight pin	5×35 GB119-86
58	CQ9332AB058	Locking handle seat	CQ9332A-01-007
59	CQ9332AB059	Steer sleeve	CQ9332A-01-004
60	CQ9332AB060	Sleeve knobs	M10×32 B4141.12-84
61	CQ9332AB061	Hexagon socket cap head screws	M6×12 GB70-85
62	CQ9332AB062	Pedestal	CQ9332A-01-009
63	CQ9332AB063	Shaft sleeve	CQ9332A-01-006A
64	CQ9332AB064	Steer perch	CQ9332A-01-003A
65	CQ9332AB065	Set screw with flat point	M8×8 GB73-85
66	CQ9332AB066	Spring	0.5×6×15 GB2089-80
67	CQ9332AB067	Steel ball	6 GB307-88
68	CQ9332AB068	Slotted set screws with cone point	M8×15 GB71-85
69	CQ9332AB069	Spring	0.5×6×25 GB2089-80
70	CQ9332AB070	Taper pin	4×25 GB117-86
71	CQ9332AB071	Coupling sleeve	AT520-03-014
72	CQ9332AB072	Cam	CQ9332A-01-008
73	CQ9332AB073	Slotted set screws with cone point	M4×6 GB71-85
74	CQ9332AB074	Racks	CQ9332A-01-013
75	CQ9332AB075	Washer	10 GB93-87
76	CQ9332AB076	Hexagon socket cap head screws	M10×40 GB70-85
77	CQ9332AB077	Hexagon socket cap head screws	M10×35 GB70-85
78	CQ9332AB078	Shield	CQ9332-00-016
79	CQ9332AB079	Hexagon socket cap head screws	M5×10 GB70-85
80	CQ9332AB080	Taper pin	3×16 GB117-86
81	CQ9332AB081	Worm wheel	AT400A-00-302
82	CQ9332AB082	Hexagon socket cap head screws	M6×40 GB70-85
83	CQ9332AB083	Thread indicator	AT520-00-302
84	CQ9332AB084	Dial thread indicator	AT400A-00-301
85	CQ9332AB085	Mat	AT400A-00-303
86	CQ9332AB086	Screw	M4×16 GB65-85
87	CQ9332AB087	After baffle	CQ9332A-00-019

# SECTION 6 : PARTS

## Lathe Head Diagram



## SECTION 6 : PARTS

### Lathe head Parts List

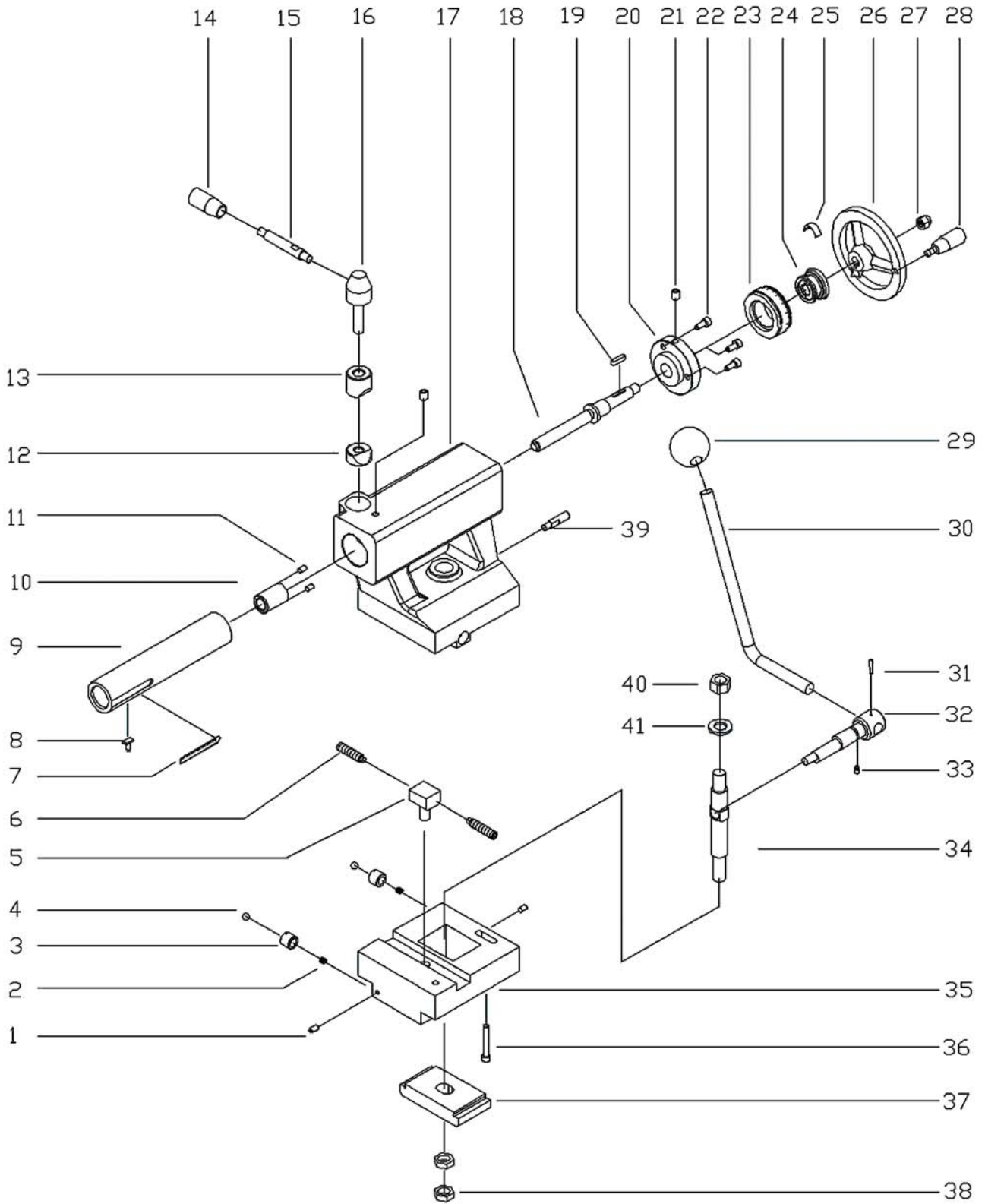
NO.	PARTS	DESCRIPTION	
1	CQ9332ALH001	Spanner nut	M16×1.5 GB812-88
2	CQ9332ALH002	Lock washer for circular nut	16 GB858-88
3	CQ9332ALH003	Plain washrs	16 GB97.2-85
4	CQ9332ALH004	Plain paralle key	5×16 GB1096-79
5	CQ9332ALH005	Spindle pulley	CQ9332A-02-016
6	CQ9332ALH006	Taper roller oearing	60206 GB298-89
7	CQ9332ALH007	Hexagon socket head screw	M5×12 GB70-85
8	CQ9332ALH008	Pulley seat	CQ9332-02-017
9	CQ9332ALH009	Felt collar	16 JB/GQ0324-89
10	CQ9332ALH010	Circlips for shaft-type A	16 GB894.1-86
11	CQ9332ALH011	Single-row ball bearing	203 GB276-89
12	CQ9332ALH012	Lathe head	CQ9332A-02-001
13	CQ9332ALH013	Pressurize washer	CQ9332-02-002
14	CQ9332ALH014	Transmission cover	CQ9332-02-003
15	CQ9332ALH015	Hexagon socket head screw	M8×30 GB70-85
16	CQ9332ALH016	Rubber ring	30×20×2 T300-04-141
17	CQ9332ALH017	Oil port plug	M20×1.5 Q/ZB220-77
18	CQ9332ALH018	Oil level indicator	M16×1.5 GB1160.2-89
19	CQ9332ALH019	Sleeve spacer	CQ9332-02-049
20	CQ9332ALH020	Gear	CQ9332-02-019
21	CQ9332ALH021	Gear	CQ9332-02-021
22	CQ9332ALH022	Sleeve spacer	CQ9332-02-047
23	CQ9332ALH023	Gear	CQ9332-02-022
24	CQ9332ALH024	Plain paralle Key	5×70 GB1096-79
25	CQ9332ALH025	Spindle shaft	CQ9332-02-024
26	CQ9332ALH026	Single-row ball bearing	203 GB276-89
27	CQ9332ALH027	Bearing sleeve	CQ9332-02-046
28	CQ9332ALH028	Right sleeve	CQ9332-02-026
29	CQ9332ALH029	Screw	M5×12 GB819-85
30	CQ9332ALH030	Screw	M6×8 GB78-85
31	CQ9332ALH031	External snap ring	55 GB894.1-86
32	CQ9332ALH032	Thin flat key	12×18 GB1567-79
33	CQ9332ALH033	Gear	CQ9332-02-007B
34	CQ9332ALH034	Taper roller oearing	D2007112 GB297-84
35	CQ9332ALH035	Pressurize washer	CQ9332-02-006
36	CQ9332ALH036	Felt collar	68 JB/GQ0324-89
37	CQ9332ALH037	Mainshaft bearing oil seal	AT400-04-123
38	CQ9332ALH038	Hexagon socket head screw	M5×20 GB70-85
39	CQ9332ALH039	Lathe spindle	Q9332-02-004
40	CQ9332ALH040	Sleeve spacer	CQ9332-02-049
41	CQ9332ALH041	Gear	Q9332-02-023
42	CQ9332ALH042	Middle shaft	CQ9332-02-028
43	CQ9332ALH043	Gear	CQ9332-02-025
44	CQ9332ALH044	Sleeve spacer	CQ9332-02-050
45	CQ9332ALH045	Single-row ball bearing	203 GB276-89
46	CQ9332ALH046	Bearing sleeve	CQ9332-02-046
47	CQ9332ALH047	Right sleeve	CQ9332-02-026
48	CQ9332ALH048	Screw	M5×12 GB819-85
49	CQ9332ALH049	Screw	M6×8 GB78-85
50	CQ9332ALH050	Output shaft	CQ9332-02-011
51	CQ9332ALH051	Gear	CQ9332-02-010
52	CQ9332ALH052	Gear	CQ9332-02-009
53	CQ9332ALH053	Gear	CQ9332-02-008
54	CQ9332ALH054	Plain paralle Key	5×60 GB1096-79
55	CQ9332ALH055	Sleeve spacer	CQ9332-02-030

## Lathe head Parts List

NO.	PARTS	DESCRIPTION	
56	CQ9332ALH056	Single-row ball bearing	203 GB276-89
57	CQ9332ALH057	Bearing sleeve	CQ9332-02-046
58	CQ9332ALH058	Right sleeve	CQ9332-02-026
59	CQ9332ALH059	Screw	M5×12 GB819-85
60	CQ9332ALH060	Screw	M6×8 GB78-85
61	CQ9332ALH061	Screw	M5×12 GB819-85
62	CQ9332ALH062	End cap	CQ9332-02-039
63	CQ9332ALH063	Pressurize washer	CQ9332-02-040
64	CQ9332ALH064	Shifting fork shaft	CQ9332-02-037
65	CQ9332ALH065	External snap ring	12 GB894.1-86
66	CQ9332ALH066	Knob B	M8×40 B4141.14-84
67	CQ9332ALH067	Handle lever	BM8×63 B4141.15-84
68	CQ9332ALH068	Handle seat	12×50 GB4141.19-84
69	CQ9332ALH069	Spigots	CQ9332-02-038
70	CQ9332ALH070	Right shifting fork	CQ9332-02-033
71	CQ9332ALH071	Right shifting fork shaft	CQ9332-02-034
72	CQ9332ALH072	O-seal ring	16×2.4 GB1235-76
73	CQ9332ALH073	Locating sleeve	AT400-04-127
74	CQ9332ALH074	Screw	M5×12 GB819-85
75	CQ9332ALH075	Steel ball	6.5 GB308-84
76	CQ9332ALH076	Spring	0.8×5×25 B2089-80
77	CQ9332ALH077	Pin	5×50 GB117-86
78	CQ9332ALH078	Knob	BM8×40 B4141.14-84
79	CQ9332ALH079	Handle lever	BM8×63 B4141.15-84
80	CQ9332ALH080	Handle seat	12×50 GB4141.19-84
81	CQ9332ALH081	Pin	5×50 GB117-86
82	CQ9332ALH082	Spring	0.8×5×25 B2089-80
83	CQ9332ALH083	Steel ball	6.5 GB308-84
84	CQ9332ALH084	Screw	M5×12 GB819-85
85	CQ9332ALH085	Locating sleeve	AT400-04-127
86	CQ9332ALH086	O-seal ring	16×2.4 GB1235-76
87	CQ9332ALH087	Left shifting fork shaft	CQ9332-02-035
88	CQ9332ALH088	Left shifting fork	CQ9332-02-036
89	CQ9332ALH089	Single-row ball bearing	203 GB276-89
90	CQ9332ALH090	Pressurize washer	CQ9332-02-015
91	CQ9332ALH091	Felt collar	16 JB/GQ0324-89
92	CQ9332ALH092	Left sleeve	CQ9332-02-014
93	CQ9332ALH093	Screw	M5×12 GB819-85
94	CQ9332ALH094	Gear	CQ9332-02-013
95	CQ9332ALH095	Key	4×10 GB1096-79
96	CQ9332ALH096	Spring washer	10 GB93-87
97	CQ9332ALH097	Hexagon nut	M10 GB6170-86
98	CQ9332ALH098	Single-row ball bearing	203 GB276-89
99	CQ9332ALH099	Pressurize washer	CQ9332-02-015
100	CQ9332ALH100	Sleeve	CQ9332-02-048
101	CQ9332ALH101	Screw	M5×12 GB819-85
102	CQ9332ALH102	Taper roller bearing	2007110 GB297-84
103	CQ9332ALH103	Spring washer	CQ9332-02-044
104	CQ9332ALH104	Pressurize washer	CQ9332-02-043
105	CQ9332ALH105	Felt collar	50 JB/GQ0324-89
106	CQ9332ALH106	End cap	AT400-04-118
107	CQ9332ALH107	Hexagon socket head screw	M5×20 GB70-85
108	CQ9332ALH108	Lock washer for circular nut	50 GB858-88
109	CQ9332ALH109	Spanner nut	M50×1.5 GB812-88

# SECTION 6 : PARTS

## Tailstock Diagram



## SECTION 6 : PARTS

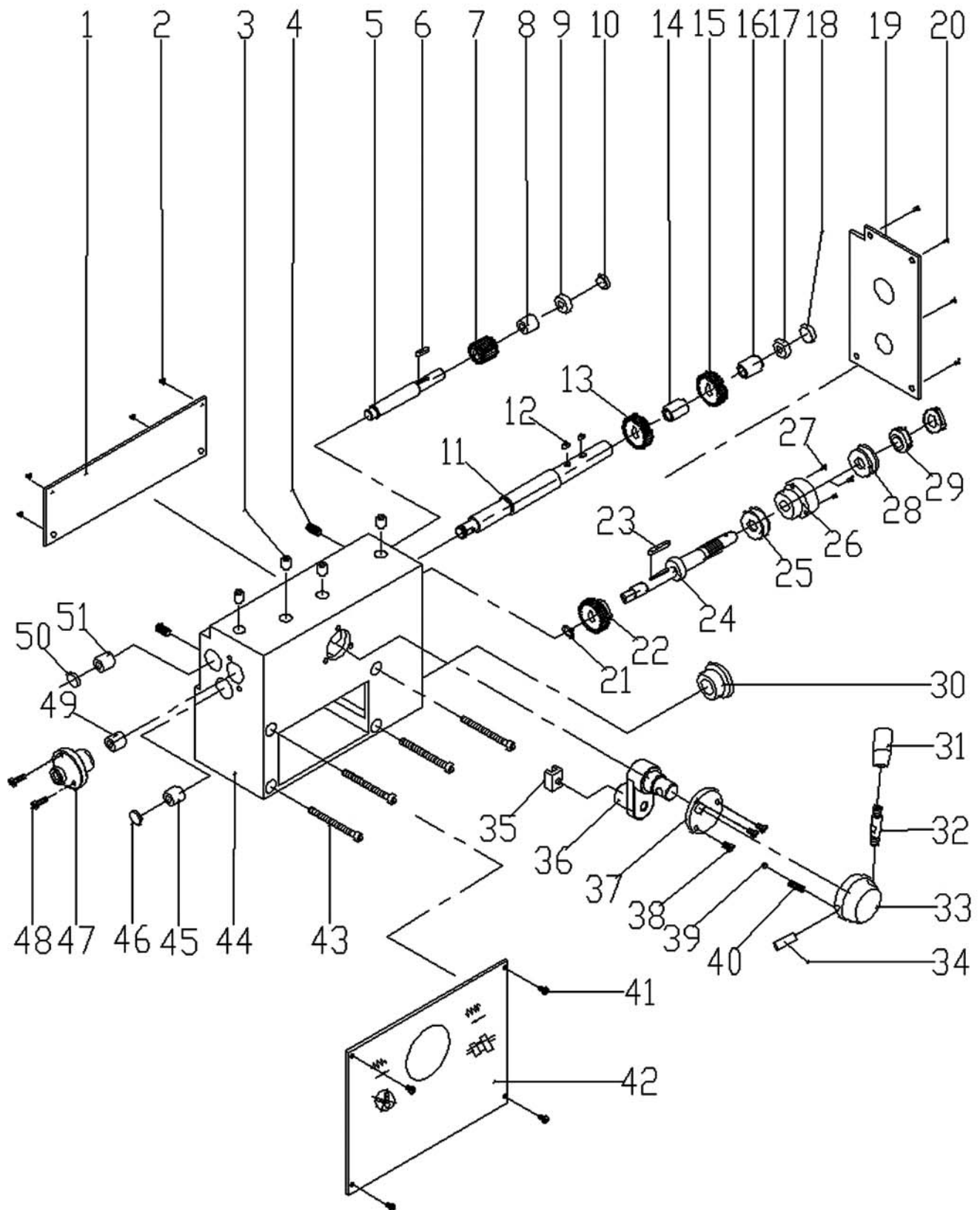
### Tailstock Parts List

NO.	PARTS	DESCRIPTION	
1	CQ9332ATS001	Set screws with cone point	M5×8 GB71-85
2	CQ9332ATS002	Spring	1.4×7×30 GB2089-80
3	CQ9332ATS003	Oil port plug	CQ9332-03-008
4	CQ9332ATS004	Steel ball	GB308-77
5	CQ9332ATS005	Tailstock nuts	CQ9332-03-009
6	CQ9332ATS006	Hexagon socket set screws with dog point	M8×40 GB79-85
7	CQ9332ATS007	Graduated label	AT400-02-108
8	CQ9332ATS008	T-key	AT300-02-114
9	CQ9332ATS009	Tailstock center sleeve	CQ9332-03-003
10	CQ9332ATS010	Tailstock nuts	AT400-02-120
11	CQ9332ATS011	Set screws with cone point	M5×10 GB71-85
12	CQ9332ATS012	Locking nuts	AT400-02-107
13	CQ9332ATS013	Locking sleeve	AT400-02-110
14	CQ9332ATS014	Long sleeve knob	BM8×40 GB4141.14-84
15	CQ9332ATS015	Handle lever	BM8×40 GB4141.15-84
16	CQ9332ATS016	Handle seat	AT280-2-001
17	CQ9332ATS017	Tailstock	CQ9332-03-001
18	CQ9332ATS018	Tailstock screw stem	AT400-02-113A
19	CQ9332ATS019	Plain parallel key	4×28 GB1096-79
20	CQ9332ATS020	Sleeve	CQ9332-03-011
21	CQ9332ATS021	Oil cup	6 GB1155-79
22	CQ9332ATS022	Hexagon socket head screw	M5×12 GB70-85
23	CQ9332ATS023	Dial	AT400-02-114
24	CQ9332ATS024	Sleeve	AT300-03-138
25	CQ9332ATS025	Spring lamination	AT300-03-139
26	CQ9332ATS026	Hand wheel	BM12×125 GB4141.22-84
27	CQ9332ATS027	Domed cap nuts	M10 GB923-88
28	CQ9332ATS028	Handles with sleeve	M6×50 GB4141.5-84
29	CQ9332ATS029	Handle ball	M10×32 GB4141.11-84
30	CQ9332ATS030	Handle lever	CQ9332-03-007
31	CQ9332ATS031	Taper pins	5×26 GB117-86
32	CQ9332ATS032	Shaft	CQ9332-03-010
33	CQ9332ATS033	Slotted set screws with long dog point	M5×12 GB75-85
34	CQ9332ATS034	Pull pole set	CQ9332-03-006
35	CQ9332ATS035	Tailstock carriage	CQ9332-03-002
36	CQ9332ATS036	Hexagon socket head screw	M6×50 GB70-85
37	CQ9332ATS037	Chock	CQ9332-03-004
38	CQ9332ATS038	Hexagon thin nuts	M12×1.5 GB6172-86
39	CQ9332ATS039	Pin	CQ9332-03-012
40	CQ9332ATS040	Hexagon thin nuts	M12 GB6170-86
41	CQ9332ATS041	Plain washers	12 GB97.2-85



# SECTION 6 : PARTS

## Left trestle Diagram



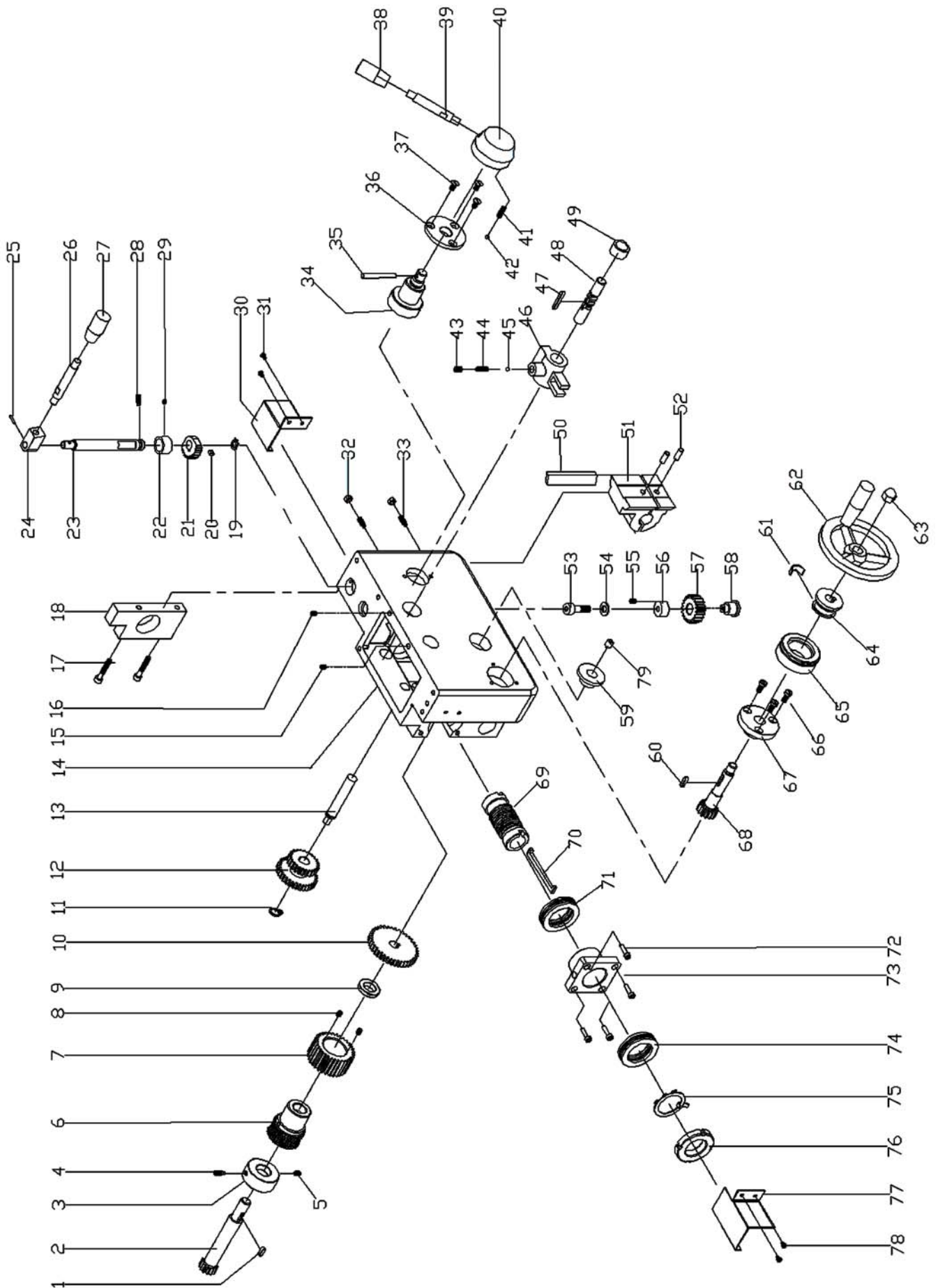
## SECTION 6 : PARTS

### Left Trestle Parts List

NO.	PARTS	DESCRIPTION	
1	CQ9332ALT001	Transmission cover	CQ9332-04-002
2	CQ9332ALT002	Screws	M5×8 GB68-85
3	CQ9332ALT003	Oil cup	8 GB1155-79
4	CQ9332ALT004	Set screws with cone point	M5×6 GB71-85
5	CQ9332ALT005	Shaft	CQ9332-04-004
6	CQ9332ALT006	Key	5×16 GB1096-79
7	CQ9332ALT007	Gear	CQ9332-04-005
8	CQ9332ALT008	Sleeve spacer	CQ9332-04-007
9	CQ9332ALT009	Sleeves	CQ9332-04-006
10	CQ9332ALT010	Spigots	CQ9332-04-012
11	CQ9332ALT011	Shaft	CQ9332-04-010
12	CQ9332ALT012	Key	5×8 GB1096-79
13	CQ9332ALT013	Gear	CQ9332-04-008
14	CQ9332ALT014	Sleeve spacer	CQ9332-04-009
15	CQ9332ALT015	Gear	CQ9332-04-008
16	CQ9332ALT016	Sleeve spacer	CQ9332-04-007
17	CQ9332ALT017	Sleeves	CQ9332-04-019
18	CQ9332ALT018	Spigots	CQ9332-04-012
19	CQ9332ALT019	Transmission cover	CQ9332A-04-015
20	CQ9332ALT020	Screws	M4×8 GB65-85
21	CQ9332ALT021	E-clip	16 GB894.1-86
22	CQ9332ALT022	Gear	CQ9332-04-014
23	CQ9332ALT023	key	5×32 GB1096-79
24	CQ9332ALT024	Shaft	CQ9332-04-013
25	CQ9332ALT025	Bearing	8102 GB301-64
26	CQ9332ALT026	Bearing sleeve	AT520-03-109
27	CQ9332ALT027	Screws	M5×16 GB818-85
28	CQ9332ALT028	Bearing	8102 GB301-64
29	CQ9332ALT029	Round nut	M14×1.5 GB812-88
30	CQ9332ALT030	Sleeves	CQ9332A-04-003
31	CQ9332ALT031	Knob	BM8×40 GB4141.14-84
32	CQ9332ALT032	Handle lever	BM8×40 GB4141.15-84
33	CQ9332ALT033	Handle seat	12×50 GB4141.19-84
34	CQ9332ALT034	Taper pin	5×50 GB117-86
35	CQ9332ALT035	Shifting yoke	AT520-03-117
36	CQ9332ALT036	Shifting fork plate	CQ9332-04-003
37	CQ9332ALT037	Locating plate	AT300-03-134
38	CQ9332ALT038	Slotted countersunk-Head screws	M5×10 GB68-85
39	CQ9332ALT039	Steel ball	6.5 GB308-84
40	CQ9332ALT040	Spring	0.8×5×25 GB2089-84
41	CQ9332ALT041	Cross recessed pan head screws	M3×6 GB818-85
42	CQ9332ALT042	Product scutcheon	CQ9332A-00-002
43	CQ9332ALT043	Hexagon socket head screw	M8×100 GB70-85
44	CQ9332ALT044	Left trestle	CQ9332A-04-001
45	CQ9332ALT045	Sleeves	CQ9332-04-018
46	CQ9332ALT046	Spigots	CQ9332-04-012
47	CQ9332ALT047	Pedestal	CQ9332-04-011
48	CQ9332ALT048	Hexagon socket head screw	M5×12 GB70-85
49	CQ9332ALT049	Sleeves	CQ9332-04-019
50	CQ9332ALT050	Spigots	CQ9332-04-012
51	CQ9332ALT051	Sleeves	CQ9332-04-006

# SECTION 6 : PARTS

## Apron Diagram



## SECTION 6 : PARTS

### Apron Parts List

NO.	PARTS	DESCRIPTION	
1	CQ9332AAP001	Key	6×12 GB1096-79
2	CQ9332AAP002	Gear shaft	AT400A-03-203
3	CQ9332AAP003	Sleeve	AT400A-03-206
4	CQ9332AAP004	Screws	M6×12 GB75-85
5	CQ9332AAP005	Set screws with cone point	M6×12 GB71-85
6	CQ9332AAP006	Worm gear	AT400A-03-205
7	CQ9332AAP007	Gear	CQ9332-05-010
8	CQ9332AAP008	Set screws with cone point	M5×8 GB71-85
9	CQ9332AAP009	Spring washer	AT400A-03-207
10	CQ9332AAP010	Big gear	AT400A-03-241
11	CQ9332AAP011	E-clip	20 GB894.1-86
12	CQ9332AAP012	Slippage gear	CQ9332-05-007
13	CQ9332AAP013	Slippage shaft	CQ9332-05-009
14	CQ9332AAP014	Apron body	CQ9332A-05-001
15	CQ9332AAP015	Set screws with cone point	M5×16 GB71-85
16	CQ9332AAP016	Set screws with cone point	M6×20 GB71-85
17	CQ9332AAP017	Hexagon socket head screw	M5×35 GB70-85
18	CQ9332AAP018	Apron body right cover	CQ9332A-05-025
19	CQ9332AAP019	E-clip	12 GB894.1-86
20	CQ9332AAP020	Key	4×8 GB1096-79
21	CQ9332AAP021	Gear	CQ9332-05-029
22	CQ9332AAP022	Sleeve	CQ9332-05-014
23	CQ9332AAP023	Axis	CQ9332-05-013
24	CQ9332AAP024	Square handle seat	AT520A-03-213
25	CQ9332AAP025	Taper pins	3×20 GB117-86
26	CQ9332AAP026	Handle lever	BM8×50 GB4141.15-84
27	CQ9332AAP027	Handle sleeve B-plastic	BM8×40 GB4141.14-84
28	CQ9332AAP028	Screws	M5×16 GB75-85
29	CQ9332AAP029	Set screws with cone point	M5×8 GB71-85
30	CQ9332AAP030	Right rod baseboard	CQ9332-00-106
31	CQ9332AAP031	Screws	M5×8 GB71-85
32	CQ9332AAP032	Hexagon nut	M5 GB6170-86
33	CQ9332AAP033	Screws	M5×25 GB75-85
34	CQ9332AAP034	Shaft	AT400A-03-212
35	CQ9332AAP035	Taper pins	5×50 GB117-86
36	CQ9332AAP036	Sleeve	AT400A-03-221
37	CQ9332AAP037	Screw	M4×12 GB68-85
38	CQ9332AAP038	Handle sleeve B-plastic	BM8×40 GB4141.14-84
39	CQ9332AAP039	Handle lever	BM8×40 GB4141.15-84
40	CQ9332AAP040	Handle seat	12×50 GB4141.19-84

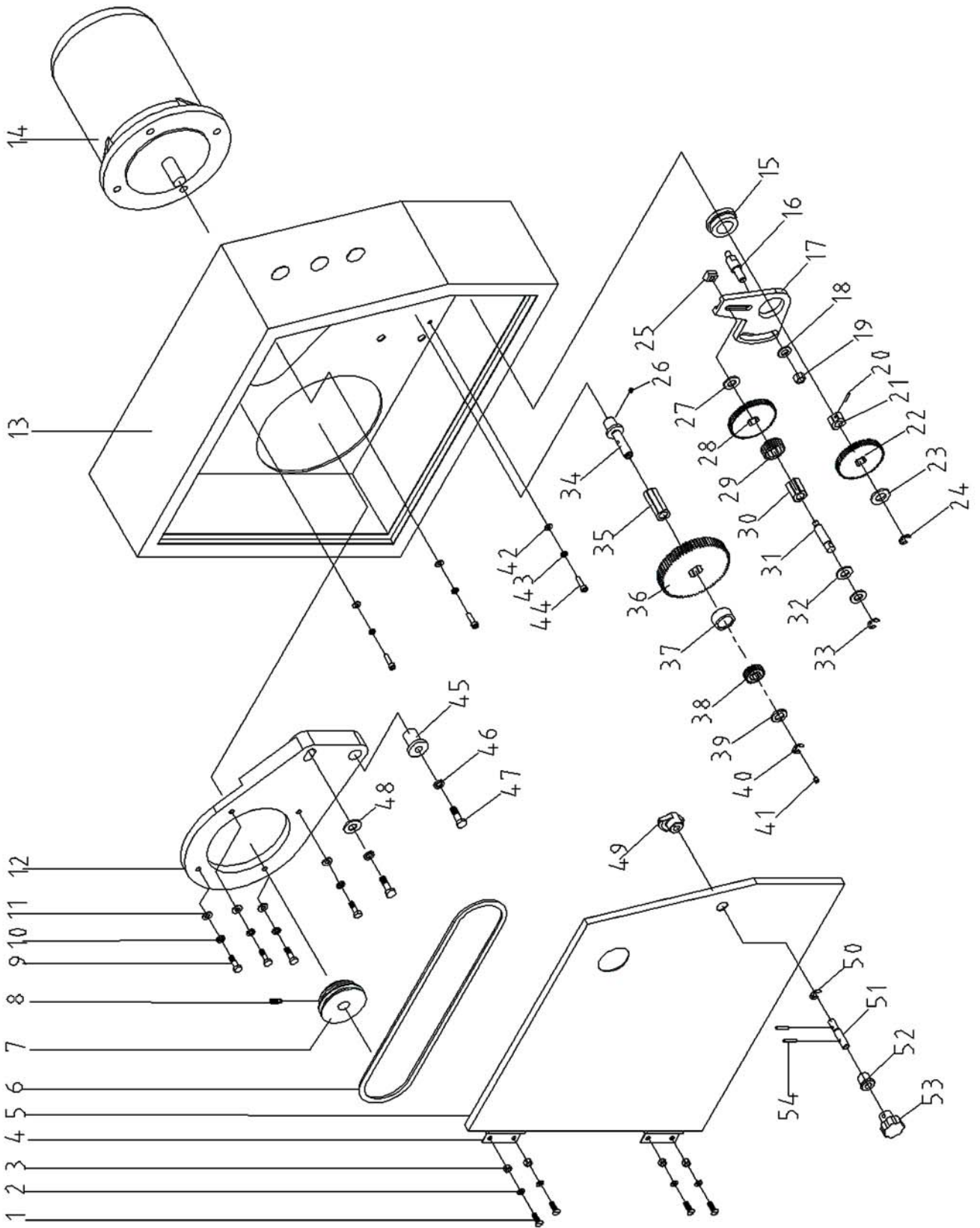
## SECTION 6 : PARTS

### Apron Parts List

NO.	PARTS	DESCRIPTION	
41	CQ9332AAP041	Spring	0.8×5 ×25 GB2089-80
42	CQ9332AAP042	Steel ball	6.5 GB308-84
43	CQ9332AAP043	Flat-point set screw	M6×8 GB73-85
44	CQ9332AAP044	Spring	0.6×5 ×15 GB2089-80
45	CQ9332AAP045	Steel ball	5 GB308-84
46	CQ9332AAP046	Shifting fork	AT400A-03-216
47	CQ9332AAP047	Key	5×40 GB1096-79
48	CQ9332AAP048	Shifting fork shaft	CQ9332-05-020
49	CQ9332AAP049	Sleeve	CQ9332-05-021
50	CQ9332AAP050	Chock	AT400-03-127
51	CQ9332AAP051	Screw nut	AT400-03-125
52	CQ9332AAP052	Column pins	6×18 GB119-86
53	CQ9332AAP053	Hexagon socket head screw	M6×25 GB70-85
54	CQ9332AAP054	Spring washer	6 GB93-87
55	CQ9332AAP055	Set screws with cone point	M4×8 GB71-85
56	CQ9332AAP056	Sleeve	CQ9332-05-015
57	CQ9332AAP057	Middle gear	CQ9332-05-017
58	CQ9332AAP058	Shaft	CQ9332-05-016
59	CQ9332AAP059	Bearing sleeve	AT400-03-132
60	CQ9332AAP060	Key	4×28 GB1096-79
61	CQ9332AAP061	Spring lamination (Leaf spring)	AT300-03-139
62	CQ9332AAP062	Hand wheel	B12×125GB4141.22-84
63	CQ9332AAP063	Domed cap nuts	M10 GB923-88
64	CQ9332AAP064	Sleeve	AT300-03-138
65	CQ9332AAP065	Dial	CQ9332-05-012A
66	CQ9332AAP066	Screw	M4×12 GB65-85
67	CQ9332AAP067	Flange sleeve	AT400A-03-227
68	CQ9332AAP068	Gear shaft	CQ9332-05-011
69	CQ9332AAP069	Worm shaft	CQ9332-05-022A
70	CQ9332AAP070	Saddle Key	4×28 JB/GQ0217-89
71	CQ9332AAP071	Thrust ball bearing	8106 GB301-84
72	CQ9332AAP072	Hexagon socket head screw	M5×16 GB70-85
73	CQ9332AAP073	Worm shaft	CQ9332-05-023
74	CQ9332AAP074	Thrust ball bearing	8106 GB301-84
75	CQ9332AAP075	Tang washer	30 GB858-88
76	CQ9332AAP076	Round nut	M30×1.5 GB812-88
77	CQ9332AAP077	Left rod baseboard	CQ9332-00-105
78	CQ9332AAP078	Screws	M5×8 GB71-85
79	CQ9332AAP079	Oil cup	8 GB1155-79

# SECTION 6 : PARTS

## Compound Box Diagram

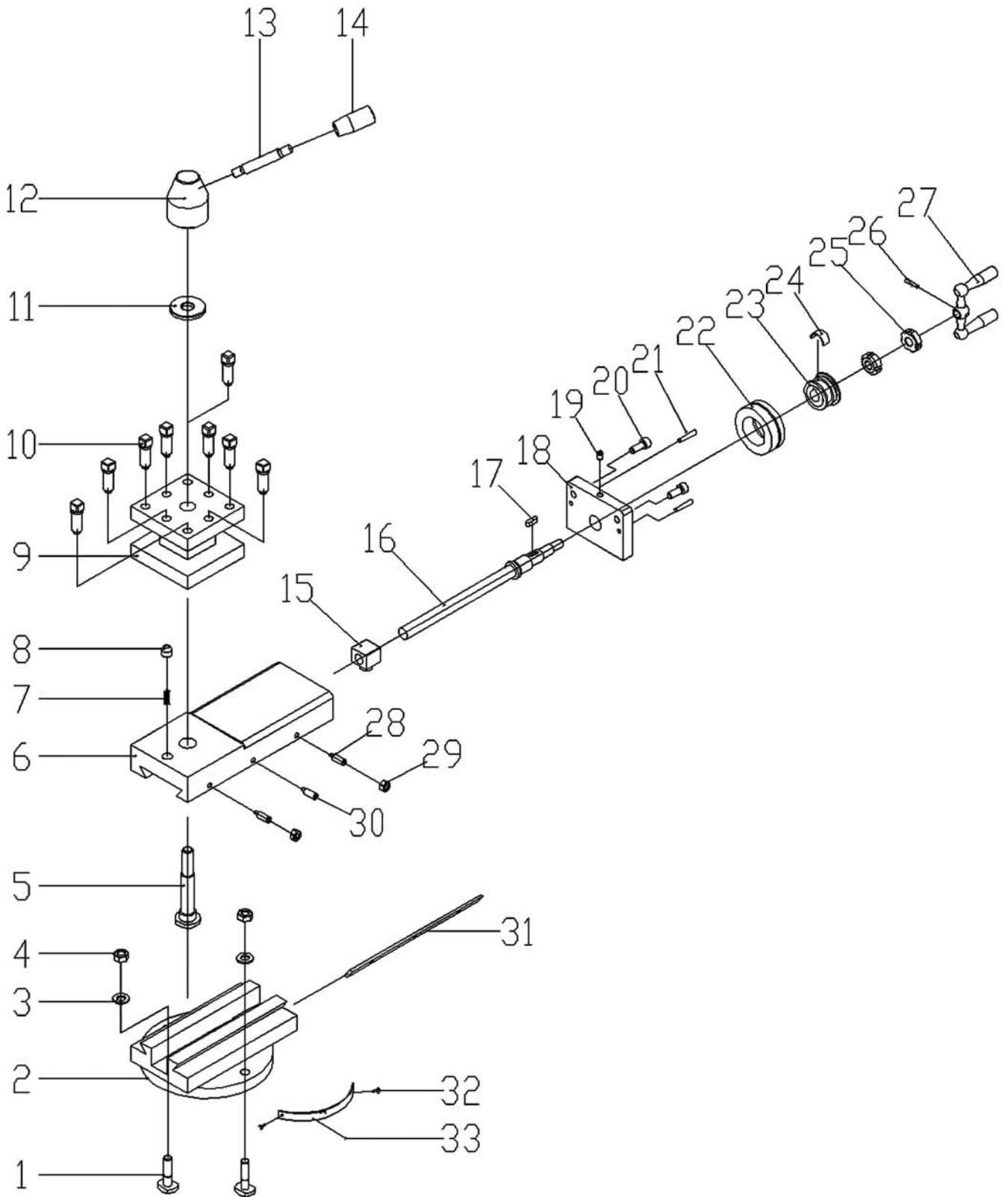


## SECTION 6 : PARTS

### Compound Box Parts List

NO.	PARTS	DESCRIPTION	
1	CQ9332ACB001	Screws	M4×10 GB65-85
2	CQ9332ACB002	Spring washers	4 GB93-87
3	CQ9332ACB003	Hexagon nuts	M4 GB6170-86
4	CQ9332ACB004	Butt hinge	
5	CQ9332ACB005	Door	CQ9332A-06-002
6	CQ9332ACB006	V-belt o-type	710 GB1171-74
7	CQ9332ACB007	Motor pulley	CQ9332-00-002A
8	CQ9332ACB008	Screws	M6×8 GB75-85
9	CQ9332ACB009	Hexagon heed bolts	M8×25 GB5782-86
10	CQ9332ACB010	Spring washers	8 GB93-87
11	CQ9332ACB011	Washer	8 GB97.2-85
12	CQ9332ACB012	Motor mount plate	CQ9332-00-001
13	CQ9332ACB013	Compound box	CQ9332A-06-001
14	CQ9332ACB014	220/110V Mount,60HZ	JY8034(7500W)
15	CQ9332ACB015	Sleeve	CQ9332-04-017
16	CQ9332ACB016	Shaft	AT400-03-146
17	CQ9332ACB017	Change gear plate	AT400-03-144
18	CQ9332ACB018	Washer	10 GB97.2-85
19	CQ9332ACB019	Hexagon nut	M10 GB6170-86
20	CQ9332ACB020	Parallel key	3×18 GB119-86
21	CQ9332ACB021	Spline housing	AT400-03-141
22	CQ9332ACB022	Change gear	CQ9332-00-015
23	CQ9332ACB023	Washer	12 GB97.2-85
24	CQ9332ACB024	"E" rings	9 GB896-86
25	CQ9332ACB025	T-nut	AT400-03-143
26	CQ9332ACB026	Flat-point screw	M5×6 GB73-85
27	CQ9332ACB027	Washer	12 GB97.2-85
28	CQ9332ACB028	Change gear	CQ9332-00-015
29	CQ9332ACB029	Change gear	CQ9332-00-015
30	CQ9332ACB030	Spline housing	AT400-03-145
31	CQ9332ACB031	Small shaft	AT400-03-142
32	CQ9332ACB032	Washer	12 GB97.2-85
33	CQ9332ACB033	"E" rings	9 GB896-86
34	CQ9332ACB034	Small shaft	AT400-04-108
35	CQ9332ACB035	Spline housing	AT400-04-112
36	CQ9332ACB036	Big gear wheel	AT400A-04-109
37	CQ9332ACB037	Sleeves	AT400-04-110
38	CQ9332ACB038	Change gear	CQ9332-00-015
39	CQ9332ACB039	Washer	12 GB97.2-85
40	CQ9332ACB040	"E" rings	9 GB896-86
41	CQ9332ACB041	Oil cup	6 GB1155-79
42	CQ9332ACB042	Washer	6 GB97.2-85
43	CQ9332ACB043	Spring washers	6 GB93-87
44	CQ9332ACB044	Hexagon socket head screw	M6×16 GB70-85
45	CQ9332ACB045	Sleeves	CQ9332-00-007
46	CQ9332ACB046	Spring washers	10 GB93-87
47	CQ9332ACB047	Hexagon heed bolts	M10×45 GB5782-86
48	CQ9332ACB048	Washer	10 GB96-85
49	CQ9332ACB049	Door-knob	AT300-05-108
50	CQ9332ACB050	"E" rings	6 GB896-86
51	CQ9332ACB051	Shaft	AT300-05-110
52	CQ9332ACB052	Stationary sleeve	AT300-05-111
53	CQ9332ACB053	Star-grip knob	8×32 GB4141.29-84
54	CQ9332ACB054	Taper pins	3×18 GB117-86

Compound Angle Toolpost Diagram





## SECTION 6 : PARTS

### Compound Angle Toolpost Parts List

NO.	PARTS	DESCRIPTION	
1	CQ9332ACAT001	Bolts for T-Slot	CQ9332-08-102
2	CQ9332ACAT002	Small carriage	CQ9332-08-104
3	CQ9332ACAT003	Plain washers	8 GB97.2-85
4	CQ9332ACAT004	Hexagon nuts	M8 GB6170-86
5	CQ9332ACAT005	Bolts for T-Slot	CQ9332-08-111
6	CQ9332ACAT006	Toolpost seats	CQ9332-08-108
7	CQ9332ACAT007	Spring	0.5×5×15 GB2089-80
8	CQ9332ACAT008	Locating sleeve	CQ9332-08-109
9	CQ9332ACAT009	Toolpost	CQ9332-08-112
10	CQ9332ACAT010	Screws	M10×30 GB83-88
11	CQ9332ACAT011	Plain washers	CQ9332-08-114
12	CQ9332ACAT012	Handle seats	CQ9332-08-110
13	CQ9332ACAT013	Handle lever	BM8×65 GB4141.15-84
14	CQ9332ACAT014	Long sleeve knobs	BM8×40 GB4141.14-84
15	CQ9332ACAT015	Nut	CQ9332-08-106
16	CQ9332ACAT016	Lead screw	CQ9332-08-105
17	CQ9332ACAT017	Plain parallel key	4×12 GB1096-79
18	CQ9332ACAT018	Hanger	CQ9332-08-113
19	CQ9332ACAT019	Oil cup	6 GB1155-79
20	CQ9332ACAT020	Hexagon socket cap head screws	M6×15 GB70-85
21	CQ9332ACAT021	Straight pin	4×20 GB117-86
22	CQ9332ACAT022	Dial	AT300-03-101
23	CQ9332ACAT023	Sleeve	AT300-03-138
24	CQ9332ACAT024	Spring lamination	AT300-03-139
25	CQ9332ACAT025	Spanner nut	M10×1 GB812-88
26	CQ9332ACAT026	Taper pins	3×16 GB117-86
27	CQ9332ACAT027	Bi-Lever balanced handles	8×25 GB4141.10-84
28	CQ9332ACAT028	Screws	M6×25 GB75-85
29	CQ9332ACAT029	Hexagon nuts	M6 GB6170-86
30	CQ9332ACAT030	Screws	M6×20 GB75-85
31	CQ9332ACAT031	Chock	CQ9332-08-107
32	CQ9332ACAT032	Rivets for name plate	2×5 GB827-86
33	CQ9332ACAT033	Name plate	CQ9332-08-116

## Warranty

Bolton Tools Inc. warrants all Bolton Tools machinery to be free of defect from workmanship and materials for a period of one year from the date of original purchase by the original purchaser. This warranty does not apply to damage due directly or indirectly to misuse, lack of maintenance, abuse, negligence, accidents, repairs or alterations outside of our facilities.

To take advantage of this warranty, items that fail under guarantee can be returned to us. Responsibility for safe return of freight is with the customer. Please ensure a clear explanation of the fault is included with any return. If our inspection verifies the defect, we will either repair or replace the product at our discretion or we may elect to refund the purchase price if we cannot readily and quickly provide you with a replacement. We will return repaired products at our expense, but if it is determined there is no defect, or that the defect resulted from cause not within the scope of our warranty, then the original owner must bear the cost of storing and returning the product. In order to place a warranty claim you must contact our Customer Service Department at (877)888-5913. Proof of purchase must accompany the merchandise.

The sole written warranty and all warranties that may be implied by law include any merchantability or fitness, for any particular purpose, are hereby limited to the duration of this written warranty.

We shall in no event be liable for death, injuries to persons or property for incidental, contingent, special or consequential damages arising from the use of our products. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation of exclusion may not apply to you.

Title: Mr/Mrs/Miss/Ms Surname

Forename:

Address:

Postal Town:

County:

Post Code:

E-mail address:

Product Purchased  Date of Purchase i. e. 01/01/2000

Model No:

Description:

Serial No (IF ANY):

The following information is given on a voluntary.  
 It will be used for marketing purposes to help us develop better products and services  
 Of course, all information is strictly confidential.

Application Type (tick one or more)

Bodyshop

Fleet Maintenance Dept

Industrial Maintenance

Other (Specify)

**Which Publications do you regularly read (tick one or more)**

Popular Mechanics

Hand Loader

Family Handyman

RC Modler

Today's Homeowner

Rifle

Live Steam

Woodshop news

Other (Specify)

Garage

Agricultural Engineer

Local Utility

Home Shop Machinist

Modeltec

Popular Science

Wood

Cabinet Maker

Shop notes

Shotgun News

Journal of light Cont.

**WHERE DO YOU NORMALLY BUY YOUR MACHINE?**

COMPANY:

TOWN:

**HOW MUCH DO YOU SPEND ON TOOLS AND EQUIPMENT PER YEAR?**

UNDER \$200  \$200-500  \$500-800

\$800-1000  \$1000-2000  \$2000+

**WHAT IS YOUR PERCEPTION/EXPERIENCE OF BOLTON TOOLS?**

PUT A CROSS ON YOUR CHOICE

EXCELLENT      GOOD      AVERAGE      BELOW      POOR

(ONE ONLY PER LINE)	EXCELLENT	GOOD	AVERAGE	BELOW	POOR
PRODUCT QUALITY	1	2	3	4	5
PRODUCT RANGE	1	2	3	4	5
SPARE PART SERVICE	1	2	3	4	5
TELESALES SERVICE	1	2	3	4	5
INTERNET SITE	1	2	3	4	5
PROMOTIONS	1	2	3	4	5
WARRANTIES	1	2	3	4	5
PRODUCT VALUE	1	2	3	4	5
DELIVERY	1	2	3	4	5

WHAT ITEMS NOT CURRENTLY INCLUDED WOULD YOU LIKE TO SEE IN OUR CATALOGUE?

**ANY OTHER COMMENTS?**

**THANK YOU FOR COMPLETING THIS QUESTIONNAIRE.**

This information is primarily held for warranty and marketing analysis. From time to time we may update you with information of our newest products. We may also provide your details to other parties where we feel their services or products may be of interest to you. If you do not wish us to mail or forward information using you details please tick here: